

**Warwick District Council
Local Development Framework Core Strategy**

**Warwickshire County Council
Highways Agency**

**Strategic Transport Assessment
Overview Report**

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1 Introduction

1.1 Background

- 1.1.1 This document forms the County Council's response on transport matters to Warwick District Council's most recent proposals for potential housing and employment growth sites for the Local Development Framework up to 2028. This response supersedes the submissions on transport which the County Council made as part of the previous Warwick District Local Development Framework Core Strategy.
- 1.1.2 The County Council has prepared this document with assistance from JMP consultants and the Highways Agency (HA) to form a key input to the decision making process regarding the levels of future housing and employment growth within the District over the next 15 years. It is recognised however that transport is only one of many important considerations in the planning process.
- 1.1.3 The approach taken by the County Council in presenting this submission builds on the experience gained from the similar assistance which was provided to Rugby Borough Council as part of the preparation of its Core Strategy. The use of an evidence based approach is also consistent with the expectations of the Planning Inspectorate, who will ultimately determine whether or not the Local Plan is deemed to be sound.

1.2 The Process

- 1.2.1 An iterative, staged approach is being adopted by the County Council in providing its advice to the District Council on the transport implications of the Local Plan. It is envisaged that further timely input to the process will be made at the option development, preferred option and submission stages.
- 1.2.2 In parallel with this process, the County Council, Highways Agency and District Council are working closely with promoters of a number of potential development sites within the area. It is likely that this work will help:
- (i) Identify the key transport infrastructure and services which will be needed to support the Local Plan proposals, in advance of the Independent Examination; and
 - (ii) Inform the position of the County Council and the Highways Agency when planning applications and supporting Transport Assessments

(TAs) come forward for these sites in due course.

2 Portrait of the District

2.1 The District in its Wider Spatial Context

- 2.1.1 Warwick District is located broadly in the centre of Warwickshire, south of Coventry. The District is bordered by five local authorities, these being Rugby Borough and Stratford-on-Avon District in Warwickshire, and Solihull Metropolitan Borough and Coventry City within the West Midlands. The principal towns of Warwick, Leamington Spa, Kenilworth and Whitnash are supplemented by a number of smaller settlements and villages which can be found in the rural parts of the District. The proximity of Coventry and Warwick University to the area leads to an intensive interaction which places demands on the local and strategic transport network.
- 2.1.2 The resident population of Warwick District in 2009 was 135,700, with 109,900 of these living in the four main towns (Source: ONS/Warwickshire Observatory). Despite the recent economic slowdown, the resident population has increased by around 7,000 since 2003, representing a growth of 5.4%. This is the highest level of growth within the County.
- 2.1.3 The District has a strong position within the geography of Britain, given its proximity to the A45, A46, M40 and M42, and the busy Birmingham Snow Hill to London Marylebone rail line. Despite their growth in recent decades, the area retains much of its character which is largely based on the history associated with Warwick and Kenilworth Castles and the spa town of Leamington, reinforced by the proximity of Stratford-upon-Avon. This attractiveness does however mean that the area is a popular place to live, work, and visit, all of which puts pressure on the local transport system. It is vital that future growth is seen to benefit the area rather than add to existing problems.
- 2.1.4 As the County town, Warwick is home to the County Council. A number of other major employers are also based in the area who, along with Warwick Castle, play a vital role in supporting the local economy. The regency town of Leamington Spa forms the main commercial centre of the District, and is also home to the District Council. Although a town in its own right, Whitnash forms a large suburb to the south of Leamington Spa. Kenilworth is essentially a dormitory town serving Warwick, Leamington Spa, Coventry and Solihull.
- 2.1.5 As noted above, Warwick University is located just outside the District within Coventry City. Coventry Airport can be found near Baginton to the south east of Coventry but within the District. The former Peugeot plant at Ryton-on-Dunsmore can be found in nearby Rugby Borough, whilst the Prodrive automotive research and development facility is located on the border with Solihull Metropolitan Borough near Chadwick End.

- 2.1.6 There are currently four declared AQMAs within Warwick District. Three were declared in December 2004 in Warwick, Leamington Spa and Barford, the last of which has subsequently been revoked. Two further AQMAs were declared in Kenilworth in 2008.
- 2.1.7 The AQMA in Warwick has been extended from the original declaration, and now includes High Street up to the junction with Bowling Green Street, Theatre Street/Saltisford up to the junction with Vittle Drive, Northgate/The Butts, Smith Street, St Nicholas Church Street and (most recently) Coventry Road near St Johns. This effectively means that the majority of the town centre core is covered by the AQMA.
- 2.1.8 The AQMA in Leamington Spa is located at the junction of High Street/Bath Street/Old Warwick Road/Clemens Street, and like Warwick it contains a substantial number of receptors including both residential and business properties. On-going monitoring of the Barford AQMA following its declaration showed a substantial reduction in NO₂ levels following the opening of the A429 Barford Bypass in 2007. The AQMA was formally revoked in 2009. The two AQMAs in Kenilworth are located on the Warwick Road between Waverley Road and Station Road in the town centre, and on New Street immediately east of the junction of Bridge Street, High Street, New Street and Fieldgate Lane.
- 2.1.9 An Air Quality Action Plan to cover the AQMAs in Warwick, Leamington Spa and Barford was jointly prepared by the District and County Councils in 2008. A revised AQAP for the District covering the two AQMAs that have been declared in Kenilworth along with the extended AQMA in Warwick is likely to be prepared in 2011/12.

2.2 Transport Context

Transport Policy

- 2.2.1 At a national level, transport policy is underpinned by five national transport goals which were set by the previous Government for the development of the UK's future transport policy and infrastructure. These national goals and associated challenges were identified in the Department for Transport's publication 'Delivering a Sustainable Transport System' (DaSTS) in 2008. The five goals are outlined below.
- To reduce transport's emissions of carbon dioxide and other greenhouse gases, with the desired outcome of **tackling climate change**.
 - To **support economic competitiveness and growth**, by delivering reliable and efficient transport networks.
 - To **promote greater equality of opportunity** for all citizens, with the desired outcome of achieving a fairer society.

- To **contribute to better safety, security and health** and longer life expectancy by reducing the risk of death, injury or illness arising from transport, and by promoting travel modes that are beneficial to health.
- To **improve quality of life** for transport users and non-transport users, and to **promote a healthy natural environment**.

2.2.2 The Local Transport White Paper, 'Creating Growth, Cutting Carbon: Making Sustainable Local Transport Happen' (January 2011) reiterates the Government's vision for a sustainable local transport system that supports the economy and reduces carbon emissions. It explains how the Government is placing localism at the heart of the transport agenda, taking measures to empower local authorities when it comes to tackling these issues in their areas. The White Paper also underlines the Government's direct support to local authorities, including through the Local Sustainable Transport Fund.

2.2.3 The National Planning Policy Framework (NPPF) (March 2012) was presented by Rt.Hon. Greg Clark MP. In his statement the Local Plan was described as the "keystone of the planning edifice". The NPPF retains the 'presumption in favour of sustainable development', which is defined by five principles as set out in the UK Sustainable Development Strategy:

- "living within the planet's environmental limits;
- ensuring a strong, healthy and just society;
- achieving a sustainable economy;
- promoting good governance; and
- using sound science responsibly."

The Government believes that sustainable development can play three critical roles in England:

- an economic role, contributing to a strong, responsive, competitive economy;
- a social role, supporting vibrant and healthy communities; and
- an environmental role, protecting and enhancing our natural, built and historic environment.

The NPPF sets out 12 core planning principles which "*should underpin both plan-making and decision-taking*." These stipulate that planning should:

- Be led by local plans which set out a vision for the future of the area and provide a practical framework within which decisions on planning applications can be made efficiently;
- Emphasise enhancing and improving the places in which people live their lives, not scrutiny alone;

- Drive sustainable development to deliver homes, business and industrial units, infrastructure and support local vitality, objectively identifying local need and setting out a clear strategy for allocating land;
- Seek to secure a high-quality of design and a good standard of amenity for occupants;
- Protect the diversity of different areas of England, protecting Green Belts and recognising the "intrinsic character and beauty of the countryside";
- Support the transition to a low-carbon future, take account of flood risk and coastal change and encourage the reuse of existing and renewable resources;
- Help conserve and enhance the natural environment and reduce pollution, allocating land of "lesser environmental value";
- Encourage the re-use of land that has been previously developed (brownfield land);
- Promote mixed use developments, encouraging multiple benefits from urban and rural land;
- Conserve heritage assets "in a manner appropriate to their significance";
- Manage development to make full use of public transport, walking and cycling; and
- Take account of local strategies to improve health, social, and cultural wellbeing.

2.2.4 The wide ranging nature of the goals contained in DaSTS, the Local Transport White Paper and the NPPF reflect the important contribution that transport can make in both supporting and acting as a stimulus to achieving a range of objectives, including supporting future growth proposals.

Warwickshire Local Transport Plan 2011-2026

2.2.5 The recently published Warwickshire Local Transport Plan (LTP3) sets out the County Council's proposals to improve transport and accessibility between 2011 and 2026. The Plan, which was submitted to the Department for Transport in March 2011, provides a 15-year strategy for transport up to the year 2026, with a rolling short term Implementation Plan.

2.2.6 The previous Warwickshire Local Transport Plan (2006-11) identified five overarching objectives for transport in the County. These have been reviewed to ensure that they remain relevant within the current policy context for transport. The revised objectives are as follows:

1. To promote greater equality of opportunity for all citizens in order to promote a fairer, more inclusive society;

2. To seek reliable and efficient transport networks which will help promote full employment and a strong, sustainable local and sub-regional economy;
3. To reduce the impact of transport on people and the [built and natural] environment and improve the journey experience of transport users;
4. To improve the safety, security and health of people by reducing the risk of death, injury or illness arising from transport, and by promoting travel modes that are beneficial to health;
5. To encourage integration of transport, both in terms of policy planning and the physical interchange of modes; and
6. To reduce transport's emissions of carbon dioxide and other greenhouse gases, and address the need to adapt to climate change.

2.2.7 Objective 6 has been added to support the Government's commitment to tackling climate change as set out in the Climate Change Act 2008, the National Transport Goals and the Local Transport White Paper.

DfT Circular 02/2007 "Planning and The Strategic Road Network"

2.2.8 The circular explains how the HA will participate in all stages of the planning process with Government Offices, regional and local highway/transport authorities, public transport providers and developers to ensure national and regional aims and objectives can be aligned and met. The circular;

- sets out how the HA will take part in the development of Local Development Frameworks(LDFs) from the earliest stages;
- encourages the HA and Local Planning Authorities to work together to ensure effective participation in the preparation of regional and local sustainable development policy;
- sets out how the Agency will deal with planning applications

Existing Travel Patterns

The Highway Network

2.2.9 The highway network within or near the District is dominated by a number of important motorway and trunk roads which carry large volumes of local and longer distance traffic, these being:

- M40, which links Birmingham with London;
- M42, which forms part of the motorway box around Birmingham;
- A45/M45, which links the M1, Coventry and Birmingham; and
- A46, which links the M1/M69 with the M5 near Tewkesbury.

2.2.10 There are numerous routes which link the four key towns as well as provide access to the motorway and trunk road network described above, these being:

- A452/A4177 Balsall Common to Warwick;
- A452 Balsall Common to Kenilworth, Leamington Spa and M40;
- A429 Coventry to Kenilworth, Warwick, Wellesbourne and Moreton-in-Marsh;
- A425 Warwick to Southam and Daventry;
- A445 Warwick to Leamington Spa and Rugby (via the A45/A4071); and
- A423 Coventry to Southam and Banbury

2.2.11 Certain routes within Warwick carry a significant amount of local and through traffic (particularly during peak periods of the day), including:

- A425 Birmingham Road/Saltisford/The Butts/Castle Hill/Banbury Road/Myton Road;
- A445 Northgate/Priory Road/Coten End/Emscote Road;
- A429 Coventry Road/St Johns/St Nicholas Church Street/Smith Street/Jury Street/High Street/West Street/Stratford Road;
- A4189 Friars Street/Hampton Street/Hampton Road;
- Theatre Street/Bowling Green Street;
- Cape Road/Wedgnock Lane/Primrose Hill; and
- Spinney Hill/Greville Road.

2.2.12 Within Leamington Spa and Whitnash, the following routes are heavily used by traffic:

- A445 Rugby Road/B4099 Warwick New Road/Warwick Place/Warwick Street;
- A452 Kenilworth Road/A445 Lillington Avenue
- Northumberland Road/A452 Binswood Street/Clarendon Place/Dale Street/Adelaide Road/Avenue Road/Park Drive/Europa Way/Greys Mallory;
- Princes Drive;
- Heathcote Lane/Gallows Hill/Harbury Lane;
- Clarendon Avenue/The Parade/Victoria Terrace/Bath Street/Spencer Street/Lower Avenue/B4087 Tachbrook Road/Clemens Street;
- Warwick Street/Willes Road/Radford Road;
- A425 Myton Road/Old Warwick Road/High Street; and
- Queensway/Tachbrook Park Drive/Heathcote Lane.

2.2.13 Within Kenilworth, the main routes affected by traffic are limited to the following:

- A452 Birmingham Road/Beehive Hill/Upper Spring Lane/Fieldgate Lane/Bridge Street/Rosemary Hill/Priory Road/Waverley Road/Warwick Road/Leamington Road/A46 Thickthorn;

- B4103 Warwick Road/The Square/Abbey End/Abbey Hill/Borrowell Lane/Castle Road/Clinton Lane;
- A429 Coventry Road/New Street/High Street/Castle Hill;
- Birches Lane/Glasshouse Lane/Knowle Hill;
- Common Lane;
- Windy Arbour/Leyes Lane/Park Hill/Park Road/Manor Road/Tainters Hill
- Farmer Ward Road/Whitemoor Road/Spring Lane;
- Rosemary Hill/Albion Street/Stoneleigh Road/Mill End/Dalehouse Lane

2.2.14 Other junctions or routes within or close to the District that experience high traffic flows include:

- A45/A46 Tollbar End (near Coventry);
- M40/A46/A429 Longbridge (recently improved);
- A46/A4177/A425 Stanks;
- A46/C32 Stoneleigh;
- B4113 and B4115 Leamington Spa to Coventry (via Stoneleigh)

2.2.15 Whilst there are commitments to improve certain junctions such as Tollbar End, there are currently no proposals to build any new roads within the District.

2.2.16 Variable Message Signing has recently been introduced on the main radial routes within Warwick and Leamington Spa to inform drivers of car park availability, thus reducing circulating traffic and congestion within the two town centres.

2.2.17 The three main towns in Warwick District (Leamington Spa, Warwick and Kenilworth) have all experienced overall negative traffic growth between 2000 and 2009 with traffic levels in Leamington Spa having reduced by 3.3%. It is believed that the decline in traffic levels in Warwick and Leamington Spa can be attributed to the closure of a number of major employment sites including Pottertons in Warwick, the Peugeot plant at Ryton, the Ford foundry in Leamington Spa and changes to the number of employers based on the Tachbrook business park in Leamington Spa. (Source: Warwickshire LTP3, Warwick/Leamington Spa/Kenilworth/Whitnash Urban Area Strategy).

2.2.18 Within the District, 68.8% of people use the car for their journey to work (Source: Census 2001). The respective figure for the journey to school is 33% (Source: WCC School Travel Survey 2010).

Public Transport

- 2.2.19 The urban areas of the District have a relatively comprehensive network of bus services, made up of a combination of intra and inter-urban routes. The majority of these services are provided on a commercial basis by Stagecoach and, to a lesser extent, Travel Coventry. A number of services are operated by these companies (along with Johnsons) on behalf of the County Council where there is a need to provide socially necessary journeys for the local community.
- 2.2.20 Access to the rail network can be found at Warwick, Warwick Parkway, Hatton, Lapworth, Leamington Spa and Claverdon. Coventry also acts as an important railhead for the District by providing access to train services on the West Coast Main Line (Virgin and London Midland).
- 2.2.21 On the Birmingham Snow Hill to London Marylebone line, Chiltern Railways provide a half-hourly service in each direction. From December 2011, fast and semi-fast trains have operated alternately giving a best journey time from Leamington Spa to London of 80 minutes . Leamington Spa, Warwick, Hatton and Claverdon are served by Chiltern Railways services between London Marylebone and Stratford-upon-Avon, which generally run every two hours. London Midland also operate some stopping trains between Birmingham and Leamington Spa which call at Hatton, Lapworth and Warwick. Leamington Spa and Coventry are also served by half-hourly Arriva Cross Country services between Manchester Piccadilly and Reading/Southampton/Bournemouth.
- 2.2.22 11% of journeys to school are made on public transport (Source: WCC School Travel Survey 2010). The journey to work by public transport (bus and rail) accounts for 5.3% of the modal share (Source: 2001 Census).

Walking and Cycling

2.2.23 The cycle network within Warwick District (particularly within Warwick and Leamington Spa) has been expanded and improved over the last 10-15 years through investment by the County Council (using LTP funding), Sustrans (as part of the development of the National Cycle Network) and Warwick District Council. There have also been improvements as a result of new development in the main towns. Key routes include the A429 Coventry Road, Woodloes – Aylesford School, Warwick Technology Park link, A445 Emscote Road, St Nicholas Park/A425 Myton Road/Old Warwick Road, B4087 Tachbrook Road and Radford Road/Sydenham Drive. Although less well developed, the cycle network within Kenilworth is currently being substantially expanded as a result of the construction of the Connect2 scheme between Abbey Fields, the Berkswell Greenway and Warwick University.

2.2.24 Apart from the usual range of controlled and uncontrolled pedestrian crossings, the main facilities for those on foot can be found within the existing pedestrianised areas of Warwick, Leamington Spa and Kenilworth.

2.2.25 The mode share for journeys to work made on foot and by bike in the District is 11.2% and 3.5% respectively (Source: 2001 Census). For the journey to school, 48% of pupils walk whilst 7% cycle (Source: WCC School Travel Survey 2010).

Performance of the Local Transport Network

The Highway Network

2.2.26 There are a number of issues and constraints which tend to be the cause of the majority of congestion problems across the transport network within Warwick District. These include:

- The historical nature and configuration of certain routes within the main town centres, particularly in Warwick;
- The geographical location of large employment sites to the south of Leamington Spa, which results in a heavy demand for movements at peak times of the day through both Warwick and Leamington Spa town centres;
- The proximity of Warwick, Leamington Spa and Kenilworth to parts of the motorway and trunk road network. This has implications both for traffic passing through the area in order to access this network, and when there is an incident on either the A46 or M40, however there is also the positive role they play in keeping traffic out of town centres;
- The limited number of routes between Warwick and Leamington Spa (A445 Emscote Road and A425 Myton Road), Warwick and Kenilworth (A46 and A429/Leek Wootton road) and Leamington Spa and Kenilworth (A452); and

- The additional pressure brought about by significant tourist activity within the area.

2.2.27 These issues result in delays and congestion throughout the network (as described earlier), principally (though not exclusively) at peak periods of the day and on Saturdays. The District has some of the slowest journey times within Warwickshire according to data collected by the County Council.

Public Transport

2.2.28 The principal constraint to bus operations within the District relate to issues of congestion and journey time reliability on certain routes. Generally speaking, bus service timings (for example on the G1 service between Warwick and Leamington Spa) during the peak periods are more generous to reflect this issue. New or enhanced bus services to serve future growth within the District will require careful planning in order to integrate them into the existing commercial and subsidised network.

2.2.29 The primary constraint for rail to maximise its role within the area is the availability of car parking at stations, particularly Hatton, Warwick Parkway and Leamington Spa. The County Council is working with Chiltern Railways and Network Rail to bring forward proposals to extend the station car park at Hatton. Chiltern themselves have a committed and funded scheme for decking at Warwick Parkway, and a franchise commitment to provide more parking at Leamington Spa.

2.2.30 Kenilworth currently lacks its own railway station. The County Council has developed proposals for a new station to be provided, the site of which is safeguarded in the existing Warwick District Local Plan. The principal barrier to the delivery of the station relates to funding.

2.2.31 Kenilworth Station is also included under NUCKLE (Nuneaton-Coventry-Kenilworth-Leamington) Phase 2. Phase 1 which delivers improvements between Coventry and Nuneaton has already been approved and funded. Phase 2 still awaits funding, the proposals deliver the following rail improvements within the District:

- Coventry to Leamington rail upgrade;
- Kenilworth Station;
- improved service between Coventry and Leamington;
- possible services from Kenilworth to Birmingham, London and the Thames Valley.

2.2.32 The DfT's Initial Industry Plan (IIP) also refers to the redoubling on the Coventry to Leamington rail track.

Walking and Cycling

2.2.33 There are limited issues in terms of the performance of the pedestrian and cycle network within Warwick District. The expansion of the cycle network within and around the town over the last 10-15 years has significantly improved conditions for cyclists. There are however a number of gaps in both the intra-urban and inter-urban cycle route network (e.g. Kenilworth to Leamington Spa).

Warwick District Transport Issues

2.2.34 Maps of the district have been produced summarising the key transport issues in the district, highlighting congested routes and areas and with safety concerns. Additionally, key recent, committed and proposed schemes have been plotted.

2.2.35 Key Committed and Completed Schemes

- A46/A425/A4177 Stanks grade separated roundabout signalisation.
- Princes Dr/Park Dr signalisation and Foundry roundabout upgrade.
- A425 Emscote Rd signals upgrade.
- M40 J15 improvements completed 2010.
- A429 Gallows Hill junction signalisation completed 2010.
- Kenilworth town centre one-way system completed 2008.
- A45/A46 Tollbar Upgrade due 2013/14

2.2.36 Key Scheme Proposals or Investigations (not committed)

- A452 Europa Way/Heathcote Lane roundabout upgrade, likely delivery in 2013.
- A452 Greys Mallory roundabout upgrade, likely delivery in 2013.
- Warwick town centre street by street proposals.
- A46 Thickthorn grade separated roundabout signalisation.
- A46 Stoneleigh grade separated priority junction upgrade.
- B4113/C32 junction improvement.
- Access improvements to Coventry Airport and employment and improvements to Stivchall roundabout, jaguar link road and A45 link to Tollbar.

2.3 Strengths, Weaknesses, Opportunities and Threats

2.3.1 A summary of the strengths, weaknesses, opportunities and threats of the transport network is set out in Table 2.1 overleaf.

<p>Strengths</p> <ul style="list-style-type: none"> • Unique location of Warwick District in relation to the national road and rail network • Committed improvements to rail services and facilities and improved connections on certain routes • Well developed cycle network • Reasonably comprehensive intra and inter-urban bus network • Partially pedestrianised areas within the main town centres 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Existing congestion on key routes within and around the main town centres • Poor location of Warwick and Leamington Spa railway stations in relation to their respective town centre • Pressure on parking at rail stations • Majority of bus and rail services are outside the control of the County Council • Existing bus network will probably need to be revised to maximise the public transport potential of development sites
<p>Opportunities</p> <ul style="list-style-type: none"> • All of the strengths above represent opportunities • Future development could be provided in a way that maximises the benefits of new or enhance transport infrastructure and services, e.g. public transport proposals will become commercially viable in the medium/long term after initial pump-priming • Revisions to the existing bus network may open up new journey opportunities 	<p>Threats</p> <ul style="list-style-type: none"> • Development sites may come forward which are not supported by sustainable transport improvements, leading to a growth in car-based travel. Subsequent impacts on rat-running and increased congestion (particularly in town centres and surrounding residential areas) and on local air quality • Lack of reaction to development by bus operators is a threat to the delivery of an effective PT network

Table 2.1: Strengths, Weaknesses, Opportunities and Threats

3 Option Assessment

3.1 The Vision for Transport within Warwick District

Introduction

3.1.1 The proposals for transport in relation to the Local Plan must support the vision for the District. In this respect, transport should:

1. Contribute to the area being a place where people want to live, work and visit;
2. Support the economy of the main towns and surrounding rural areas, thus stimulating growth and prosperity;
3. Mitigate, where possible, the negative impacts of growth;
4. Help achieve connectivity between new and existing neighbourhoods, community facilities and public spaces; and
5. Ensure that communities can access health and local services by sustainable means.

Local imperatives

3.1.2 As set out earlier, the County Council's objectives for taking forward National Transport Goals at a local level are as follows:

1. To promote greater equality of opportunity for all citizens in order to promote a fairer, more inclusive society;
2. To seek reliable and efficient transport networks which will help promote full employment and a strong, sustainable local and sub-regional economy;
3. To reduce the impact of transport on people and the [built and natural] environment and improve the journey experience of transport users;
4. To improve the safety, security and health of people by reducing the risk of death, injury or illness arising from transport, and by promoting travel modes that are beneficial to health;
5. To encourage integration of transport, both in terms of policy planning and the physical interchange of modes; and
6. To reduce transport's emissions of carbon dioxide and other greenhouse gases, and address the need to adapt to climate change.

3.1.3 When these are combined with the vision for transport in Warwick District as set out above, a number of local imperatives begin to emerge:

1. The need for a sustainable transport system to underpin growth, with a focus on public transport, walking, cycling and targeted highway improvements;
2. The need to ensure that any growth proposals support the economy of the District, and do not adversely impact upon it (particularly in terms of congestion);
3. The need for the impact of any transport improvements on the built and natural environment to be minimised (particularly air quality); and
4. The need to ensure that existing and future residents/visitors to the area can access and use the transport network safely and in an integrated way.

3.2 Future Growth in Warwick District

Introduction

3.2.1 The District Council has requested that 4 options for possible locations of housing and employment growth. WDC has already decided upon the preferred levels of growth to be approximately 8,500 dwellings and 26 Ha of employment land to be completed by 2028. WCC provided an assessment of differing levels of housing growth in a previous Strategic Transport Assessment, this report now supersedes any previous submissions.

Development Scenarios and Assumptions

Commitments and Windfalls

3.2.2 All committed employment was distributed according to the capacity and location of employment described within Employment and Land Supply in Warwick District April 2011. This includes the Foundry site development and the associated committed network infrastructure which is modelled in both “reference case” and “do something” models.

3.2.3 Housing and Employment trip rates are contained in the accompanying report.”WDC Strategic Transport Assessment Modelling”. Just over 60 Ha of employment can be identified across the district through this process. Any committed site covered by the 2 S-Paramics Microsimulation models used to undertake the assessment will be explicitly represented in the modelling, sites which fall outside this area will have been included in the DfT’s Tempro 6.2 growth assumptions and will therefore also be represented. Tempro will also account for any windfall sites to be included in the modelling for the 2028 test year.

3.2.4 The test year for all assessments was 2028. AM morning peak (0700-1000) and PM evening peak (1600-1900) have been adopted as the most suitable time periods to test as they represent the worst case in terms of traffic congestion issues on the road network with Warwick District..

3.2.5 All committed road network schemes or scheme which are very likely have also been included in the reference case and do something models. These include major network improvements at the following junctions;

- A46/A425 Stanks Island Signalisation (OPUS 40 development)
- A452 Princes Drive/Park Drive Signals (Foundry development)
- A452/A425 Princes Dr/Myton Rd/Old Warwick Rd Capacity Improvements (Foundry development)
- Additional lane on A452 Princes Dr northbound (Foundry development)
- A452 Europa Way/Heathcote Lane roundabout capacity improvements (WCC scheme)
- A452 Greys Mallory roundabout capacity improvements (WCC scheme)

3.2.6 The highway impact relating to each scenario was assessed using S-Paramics Microsimulation modelling software. An explanation of S-Paramics is provided below:

“S-Paramics is the latest version of the widely applicable Paramics microsimulation traffic flow modelling system, software for the analysis and design of urban and highway networks. Only S-Paramics offers wide area vehicle routing with dynamic feedback for accurate traffic flow modelling within a context of active ITS and UTC.

S-Paramics simulates the individual components of traffic flow and congestion, and presents its output as a real-time visual display for traffic management and road network design. S-Paramics represents the actions and inter-actions of individual vehicles as they travel through a road network. It models the detailed physical road layout, and includes features such as bus operations, traffic signal settings, driver behavioural characteristics and vehicle kinematics. As a consequence, S-Paramics can accurately portray the variable circumstances which lead to congestion in all types and sizes of road network.....

.....S-Paramics enables non traffic experts, such as the public and their elected representatives, to interactively test " What If " scenarios and immediately see the results in terms of real-time traffic flows and congestion. The most widely used microsimulation system in the UK for applications at all scales, S-Paramics brings new standards of integrity and veracity to traffic flow modelling.

S-Paramics is being applied to trunk, urban, suburban and rural schemes for a very wide range of purposes and situations. It is being used routinely to examine signalised roundabouts, bus priority, emissions control, ramp

metering, toll plaza design, urban traffic control, traffic calming, wide area traffic management, road works design, car park location and control, multi-level inter-changes, pedestrian and cyclist interaction, traffic impact, unusual/non-standard layouts and complex junctions, incident management, slow moving traffic on rural roads ... indeed every conceivable combination of circumstances which other modelling systems have difficulty simulating and analysing."

Source: SIAS S-Paramics Website
<http://www.sias.com/ng/spoverview/spintroduction.htm>

- 3.2.7 It should also be noted that the outputs from S-Paramics are considered to be a worst case scenario. Whilst some account has been taken of modal shift, the profile of development related trips is based on adjusted current mode share and current time period choice. There is evidence that this type behaviour is already happening however it is difficult to protract this evidence to provide reliable 15 year forecasts. Therefore the most suitable approach is to use current patterns of travel and except that the model is providing a robust worst case scenario.
- 3.2.8 This first stage of S-Paramics modelling provides evidence to be used in a strategic sift of scenarios and sites, and highlights where possible highway infrastructure improvements are required and their potential effectiveness. Once this has been achieved a more detailed modelling exercise should be undertaken to refine the microsimulation modelling and to ascertain with more confidence the actual impact on the highway network, thoroughly testing mitigation options through an iterative process. This issue is discussed further in Chapter 6.

3.3 Identification and costing of transport interventions

- 3.3.1 Identification of key transport interventions was based on expert analysis of the modelling outputs and officer local knowledge of existing network conditions. Schemes were identified through a project board including senior transport planning and development control officers from WCC and senior planners from the HA and JMP (HA consultants). Transport interventions were identified in terms of provision of sustainable transport to encourage modal shift and key road network schemes to improve capacity.
- 3.3.2 Broad approximations of costs have been provided based on suitable mitigation schemes discussed with the project board. These can only be considered as indicative costs. The most suitable mitigation measures will be derived though mitigation option testing using microsimulation modelling. This can only be undertaken once a suitable set of sites and growth level have been decided by WDC.

4 Results of Option Assessment

4.1 Introduction to Strategic Microsimulation Modelling

4.1.1 A fully detailed assessment is provided in the accompanying “WDC Strategic Transport Assessment Modelling Report”. Headline results have been extracted from this report and are presented below. For detailed modelling methodology and explanations please refer to the accompanying report

4.1.2 Analysis of results covers the following;

- Comparison of 2028 Reference Case (i.e. growth based on DfT supplied figures) compared with the 4 options for growth supplied by WDC;
- Comparison of Do Nothing with Do Something scenarios (i.e. each option is modelled with the absolute minimum of transport interventions (e.g. site access only) compared to provision of a comprehensive transport intervention mitigation package.)
- Use of queue lengths, journey times and network wide statistics to provide the comparison between scenarios.

4.1.3 For ease of comparison only AM peak outputs are presented in this section of the report. Both AM and PM periods were assessed and all results are contained in the accompanying report.

4.1.4 To avoid repeating all results contained in the modelling report a selection of example plots have been presented. Figures 4.1 – 4.5 show the impact of options with no mitigation (Do Nothing) compared with inclusion of mitigation (Do Something).

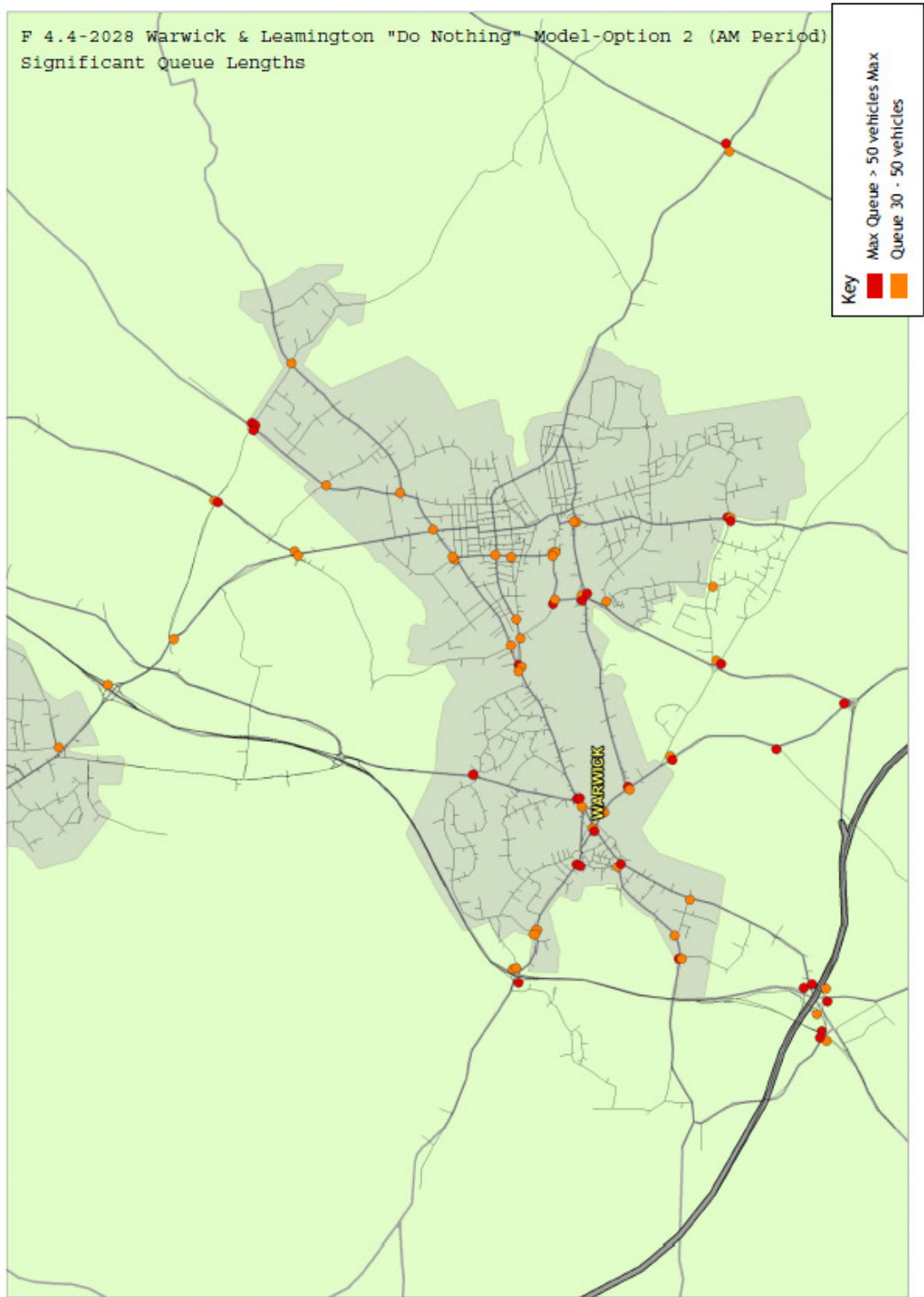


Figure 4.1 Example Plot Option 2 No Mitigation

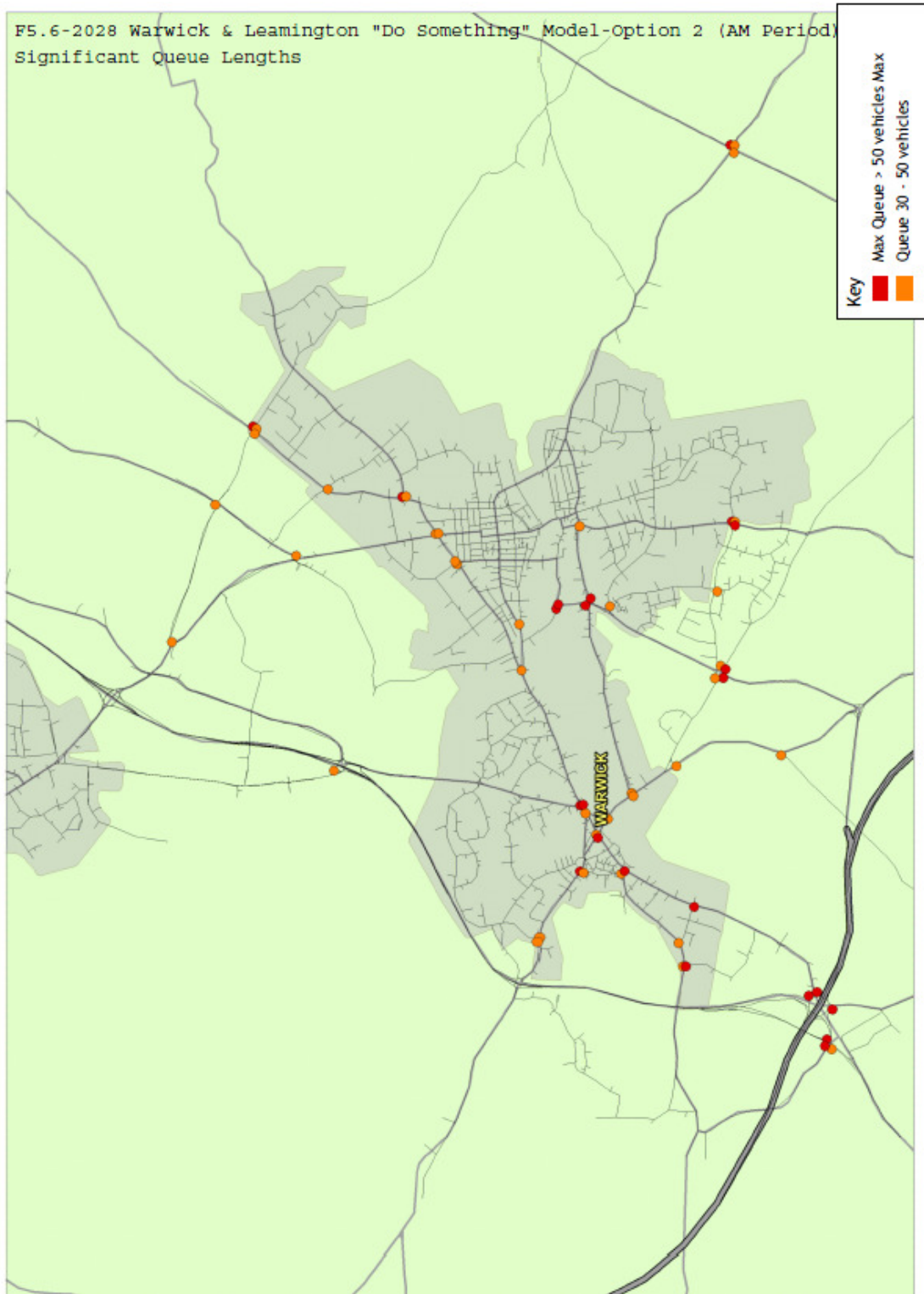


Figure 4.2 Example Plot Option 2 With Mitigation

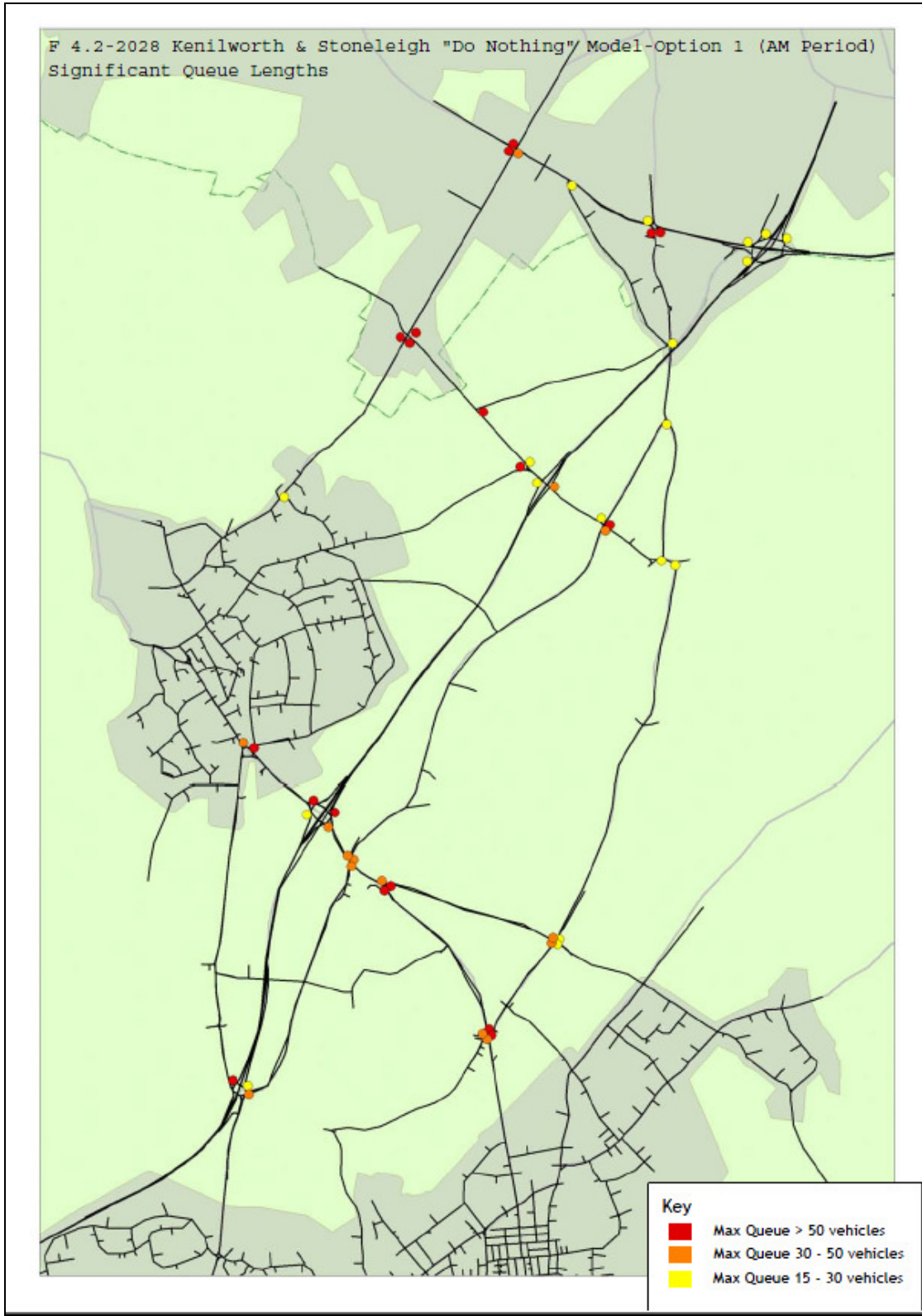


Figure 4.3 Example Plot Option 1 No Mitigation

F5.4-2028 Kenilworth & Stoneleigh "Do Something" Model-Option 1 (AM Period)
Significant Queue Lengths

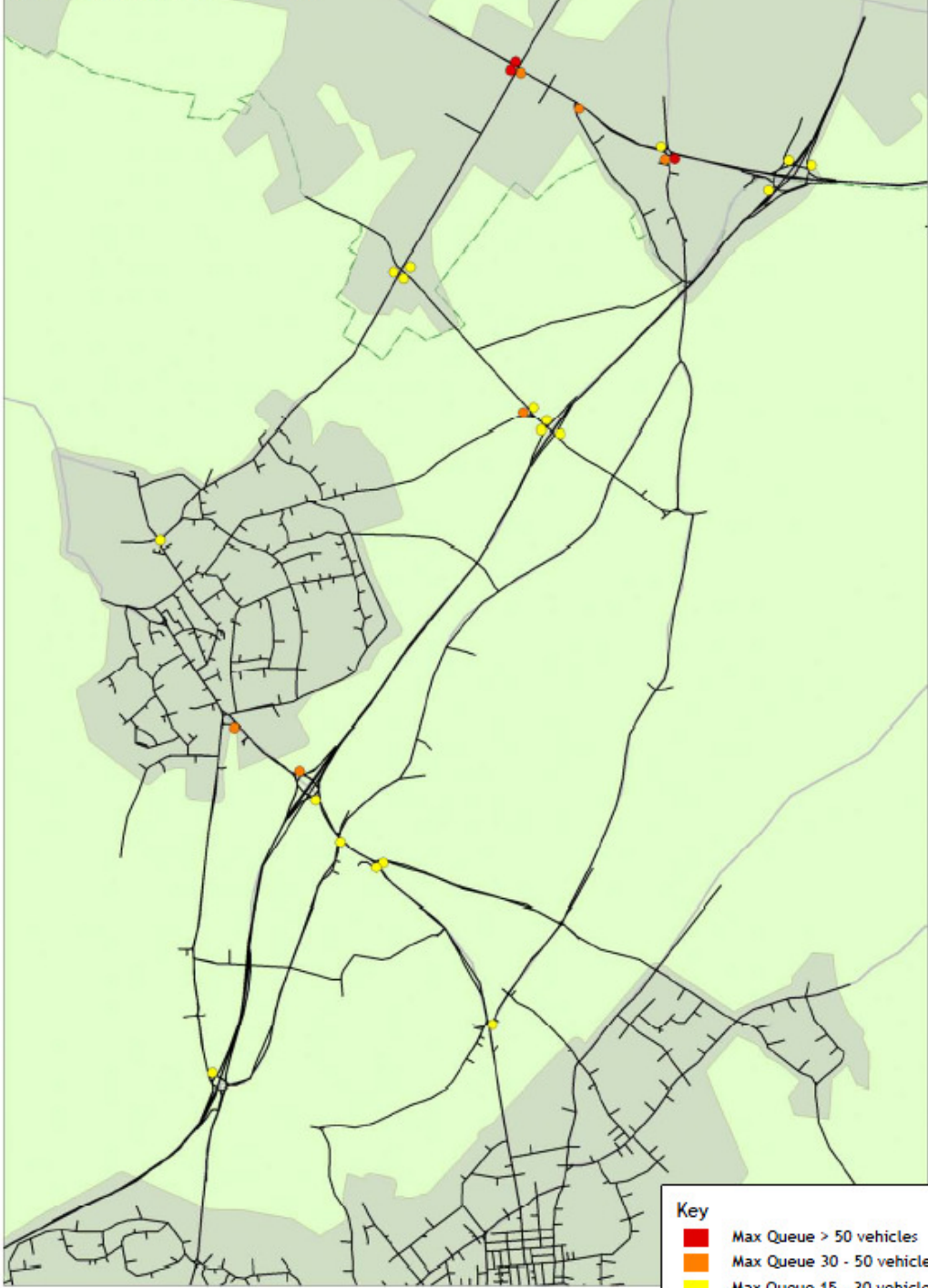


Figure 4.4 Example Plot Option 2 With Mitigation

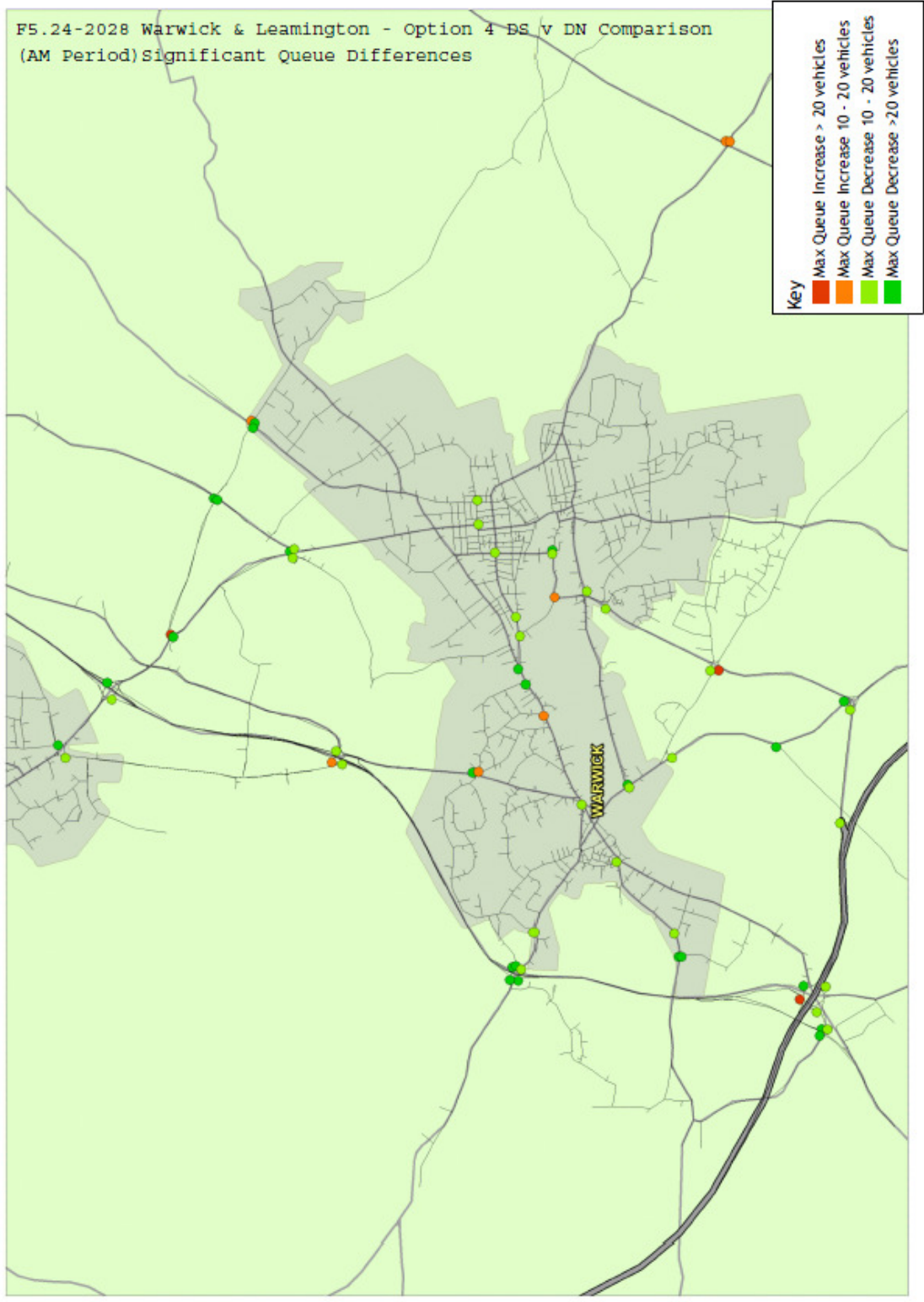


Figure 4.5 Example Plot Option 4 DS v DN

4.2 Impact Prior To Mitigation

4.2.1 Figure 4.6 and 4.7 show the journey time routes used in the comparison between options and DS and DN sceanrios.

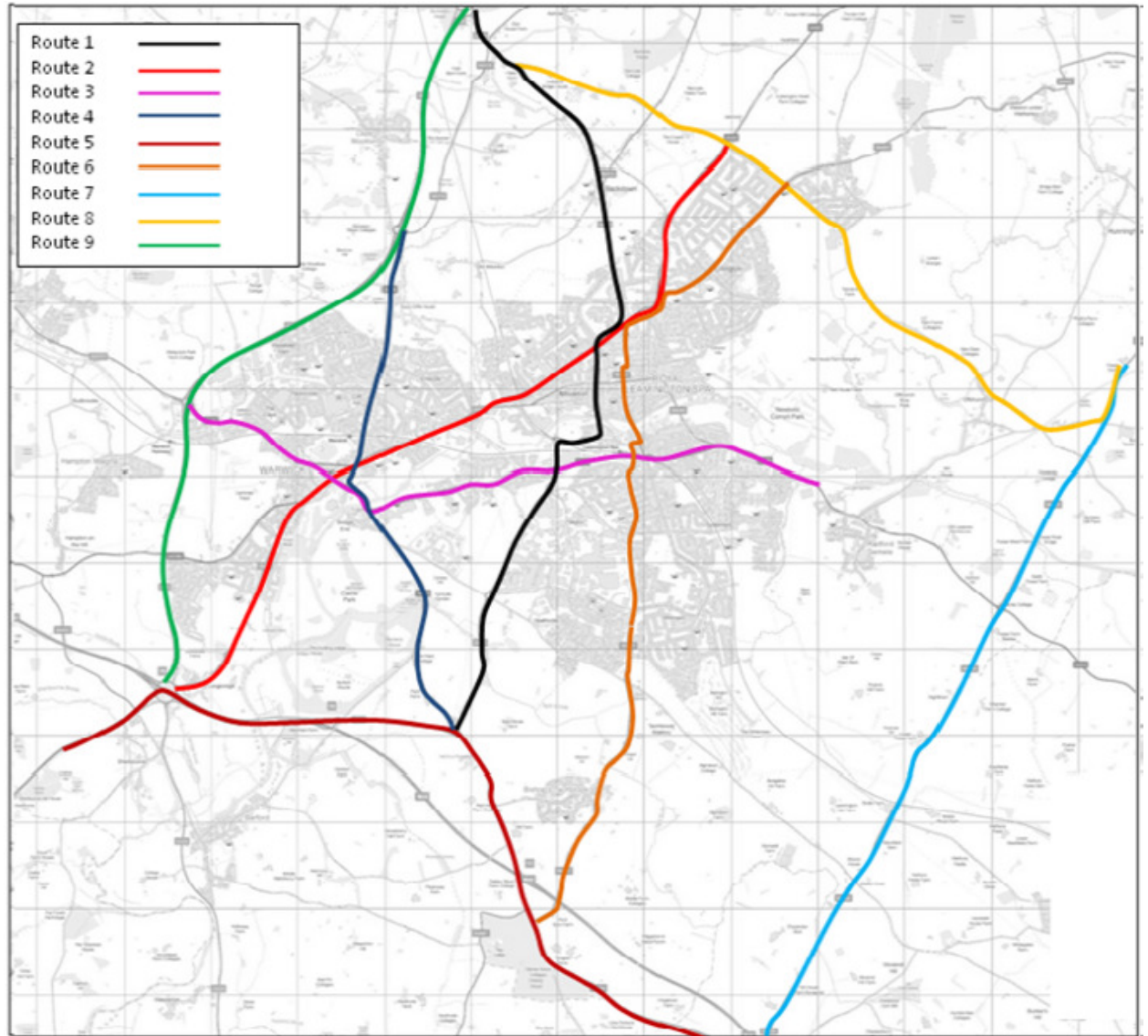


Figure 4.6 Journey Time Routes Warwick and Leamington

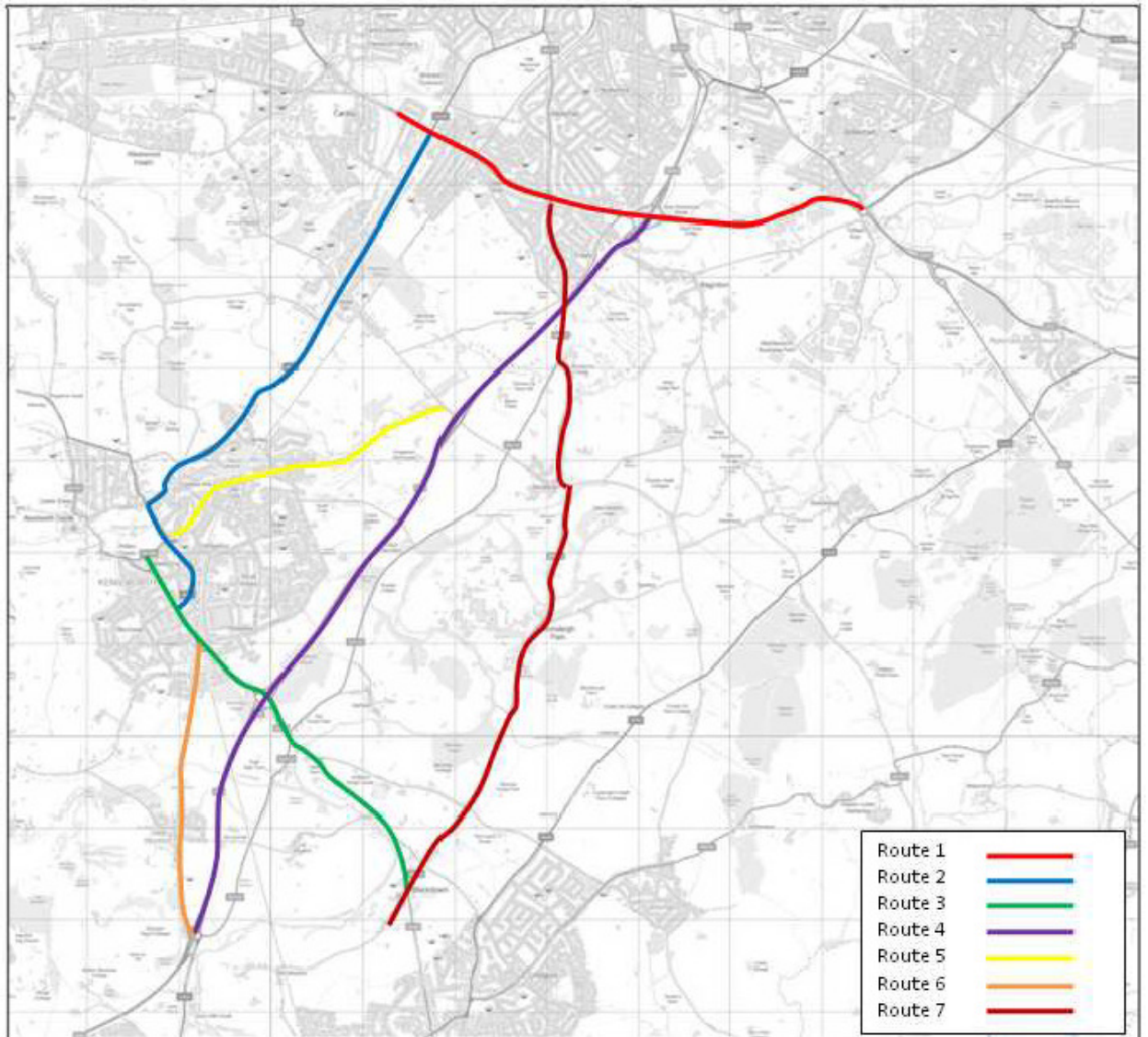


Figure 4.7 Journey Time Routes Kenilowrth and Stoneleigh

Route	Option 1	Option 2	Option 3	Option 4
Route 1 NB	1471	1162	1183	1184
Route 1 SB	1234	1360	1363	1390
Route 2 NB	1972	1834	2054	1863
Route 2 SB	3198	3123	3350	3013
Route 3 EB	1255	1234	1318	1217
Route 3 WB	1456	1564	1540	1497
Route 4 NB	931	969	1146	1063
Route 4 SB	997	1116	1279	1179
Route 5 WB	528	559	531	549
Route 5 EB	815	818	792	873
Route 6 NB	1283	1335	1336	1294
Route 6 SB	1405	1401	1379	1427
Route 7 NB	486	491	495	474
Route 7 SB	464	470	455	456
Route 8 EB	657	555	657	623
Route 8 WB	885	822	893	807
Route 9 NB	369	363	369	403
Route 9 SB	520	518	521	543
TOTAL	19926	19694	20681	19855

Table 5.1 Do Nothing Warwick/Leamington Journey Time Comparison

Route	Option 1	Option 2	Option 3	Option 4
Route 1 EB	439	425	401	410
Route 1 WB	590	532	546	532
Route 2 NB	881	791	821	779
Route 2 SB	684	710	723	673
Route 3 NB	640	566	646	597
Route 3 SB	673	622	710	659
Route 4 SB	726	781	785	715
Route 4 NB	454	430	474	460
Route 5 NB	629	511	511	506
Route 5 SB	246	242	247	247
Route 6 NB	175	177	177	175
Route 6 SB	296	282	252	254
Route 7 NB	989	975	1049	949
Route 7 SB	715	644	679	708
TOTAL	8137	7688	8021	7664

Table 5.2 Do Nothing Kenilworth/Stoneleigh Journey Time Comparison

	Option 1	Option 2	Option 3	Option 4
Ave Distance (metres)	6,778	6,808	6,798	6,754
Ave Travel Time (secs)	608	630	632	633
Ave Speed (mph)	24.9	24.2	24.1	23.9
Completed Trips	124,926	126,009	126,227	125,774

Table 5.3 Do Nothing Warwick/Leamington Network Wide Stats

	Option 1	Option 2	Option 3	Option 4
Ave Distance (metres)	6,692	6,691	6,714	6,718
Ave Travel Time (secs)	549	522	551	525
Ave Speed (mph)	27.3	28.5	27.2	28.6
Completed Trips	68,833	69,097	68,762	68,176

Table 5.4 Do Nothing Kenilworth/Stoneleigh Network Wide Stats

- 4.2.2 Table 5.1 demonstrates that prior to mitigation Option 2, closely followed by Option 4 has the least impact on the road network in terms of journey time in the Warwick and Leamington area.
- 4.2.3 Table 5.2 demonstrates that prior to mitigation Option 4 has the least impact on the road network in terms of journey time in Kenilworth and Stoneleigh area.
- 4.2.4 Table 5.3 demonstrates that prior to mitigation in Warwick and Leamington area, Option 1 has the least impact on the road network in terms of overall stats, however option 4 demonstrates less average distance travelled suggesting less propensity for vehicles to re-route due to congestion.
- 4.2.5 Table 5.4 demonstrates that prior to mitigation in Kenilworth and Stoneleigh area, Option 4 has the least impact on the road network in terms of overall stats.
- 4.2.6 The overall conclusion from assessment of the options without mitigation is that option 4 performs best prior to mitigation.

Route	Option 1		Option 2		Option 3		Option 4	
	Diff	%	Diff	%	Diff	%	Diff	%
Route 1 NB	-468	32%	274	24%	-180	15%	-204	17%
Route 1 SB	-111	9%	-121	9%	-240	18%	-283	20%
Route 2 NB	-225	11%	-131	7%	-307	15%	-261	14%
Route 2 SB	-217	7%	-101	3%	-369	11%	-380	13%
Route 3 EB	-121	10%	-3	0%	-184	14%	-72	6%
Route 3 WB	-127	9%	-145	9%	-211	14%	-192	13%
Route 4 NB	-73	8%	-133	14%	-288	25%	-294	28%
Route 4 SB	-124	12%	-250	22%	-406	32%	-367	31%
Route 5 WB	7	1%	-21	4%	4	1%	-18	3%
Route 5 EB	-91	11%	-88	11%	-68	9%	-168	19%
Route 6 NB	-76	6%	-52	4%	-129	10%	-67	5%
Route 6 SB	-113	8%	-37	3%	-87	6%	-177	12%
Route 7 NB	0	0%	25	5%	-9	2%	19	4%
Route 7 SB	4	1%	3	1%	13	3%	17	4%
Route 8 EB	-101	15%	11	2%	-101	15%	-68	11%
Route 8 WB	24	3%	134	16%	16	2%	119	15%
Route 9 NB	-3	1%	-9	2%	-23	6%	-52	13%
Route 9 SB	-48	9%	-36	7%	-49	9%	-84	15%

Table 5.5 Mitigation Improvements on Journey Time – Warwick and Leamington

Route	Option 1		Option 2		Option 3		Option 4	
	Diff	%	Diff	%	Diff	%	Diff	%
Route 1 EB	-24	5%	-33	8%	-2	0%	-2	0%
Route 1 WB	80	14%	-12	2%	-17	3%	26	5%
Route 2 NB	82	9%	-43	5%	-65	8%	5	1%
Route 2 SB	-193	28%	-159	22%	-160	22%	-111	16%
Route 3 NB	-192	30%	-118	21%	-161	25%	-146	24%
Route 3 SB	-298	44%	-245	39%	-321	45%	-281	43%
Route 4 SB	-383	53%	-448	57%	-442	56%	-370	52%
Route 4 NB	-46	10%	-22	5%	-64	14%	-44	10%
Route 5 NB	-314	50%	-219	43%	-223	44%	-223	44%
Route 5 SB	-4	2%	1	0%	-2	1%	-4	2%
Route 6 NB	0	0%	-1	1%	-2	1%	0	0%
Route 6 SB	-71	24%	-56	20%	-23	9%	-29	11%
Route 7 NB	-363	37%	-333	34%	-413	39%	-298	31%
Route 7 SB	-286	40%	-210	33%	-233	34%	-271	38%

Table 5.6 Mitigation Improvements on Journey Time – Kenilworth and Stoneleigh

4.2.7 Tables 5.5 and 5.6 demonstrate improvements from application of mitigation packages. Overall Option 4 appears to show the biggest improvements in journey times.

	Option 1	Option 2	Option 3	Option 4
Ave Distance (metres)	6,732	6,761	6,718	6,708
Ave Travel Time (secs)	578	585	565	557
Ave Speed (mph)	26.1	25.8	26.5	26.9
Completed Trips	127,561	128,138	128,375	128,549

Table 5.7 Warwick/Leamington Area Network Wide Stats – Do Something

	Option 1	Option 2	Option 3	Option 4
Ave Distance (metres)	6,547	6,541	6,550	6,572
Ave Travel Time (secs)	450	426	439	437
Ave Speed (mph)	32.5	34.3	33.3	33.6
Completed Trips	68,945	69,559	69,483	68,761

Table 5.8 Kenilworth Area Network Wide Stats – Do Something

4.2.8 Tables 5.7 and 5.8 demonstrate the lowest network wide stats for option 4 in the Warwick and Leamington area and option 2 for the Kenilworth and Stoneleigh area. It should be noted that Warwick and Leamington area experiences far more congestion than Kenilworth and Stoneleigh area in all options.

	Option 1	Option 2	Option 3	Option 4
Ave Distance (metres)	-46	-47	-80	-46
Ave Travel Time (secs)	-30	-45	-67	-76
Ave Speed (mph)	1.2	1.6	2.4	3.0
Completed Trips	2634	2129	2148	2774

Table 5.9 Warwick/Leamington Area Network Wide Stats overall improvement – Do Something

	Option 1	Option 2	Option 3	Option 4
Ave Distance (metres)	-145	-150	-164	-146
Ave Travel Time (secs)	-99	-96	-112	-88
Ave Speed (mph)	4.7	5.5	5.8	4.4
Completed Trips	311	460	721	585

Table 5.10 Kenilworth Area Network Wide Stats overall improvement – Do Something

4.2.9 Tables 5.8 and 5.9 highlight the improvements between DN and DS scenarios. Option 4 shows the greatest improvements in Warwick and Leamington area and Option 3 shows the greatest improvements in the Kenilworth and Stoneleigh area.

4.3 Summary of Options 1-4

- 4.3.1 It is clear from the results presented that option 4 has least impact prior to mitigation and demonstrates the greatest improvements when mitigation is applied.
- 4.3.2 Whilst there are greater improvement in Kenilworth and Stoneleigh area in option 3 and option 2 shows then lowest impact in this area, the overall congestion level are much lower in general within Kenilworth and Stoneleigh area.
- 4.3.3 Below is an extract from the modelling report for the area south of Coventry not covered by S-Paramics models. Option 4 locates the reduced scale development in this area, as such the impact would not be of concern with this option.

Westwood Heath

- 3.23 The proposed site at Westwood Heath is not situated in either the Warwick & Leamington or Kenilworth & Stoneleigh model networks. As such, it is not possible to assess this development's impact on its immediate surrounding network in the existing PARAMICS models. It should be noted that the impact from this development on the modelled networks is however captured through the methodology discussed in Chapter 2 (i.e. using CITEware distribution).
- 3.24 In order to assess the impact on the immediate roads surrounding this site a separate CITEware run has been carried out and the increase in trips on the local roads assessed using the GEH statistics.
- 3.25 As this site is included as both a full site and a partial site in different option scenarios both have been assessed in CITEware using the corresponding trip generations. The AM and PM impacts have been presented graphically in Appendix C.
- 3.26 The results indicate that under partial development the Westwood Heath development has minimal impact on the surrounding road network with the GEH less than 5 on all links. The assessment of the full site highlights notable increases in flows on the local roads of Westwood Heath Road, Crackley Land and Cryfield Grange Road between the site and the A429.

4.4 Option 4a and 4b – Further Mitigation Tests

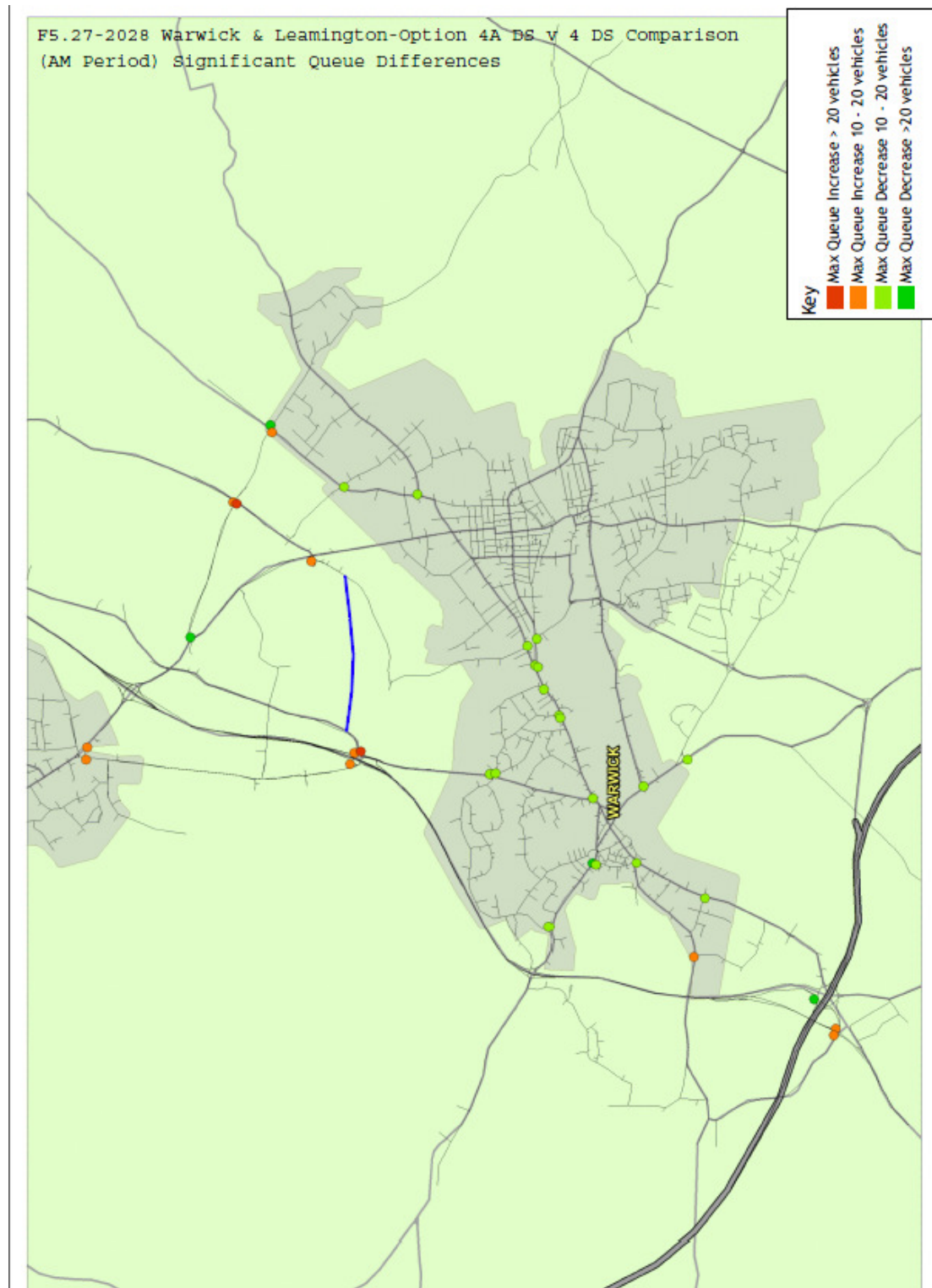


Figure 4.8 Option 4a LNRR test

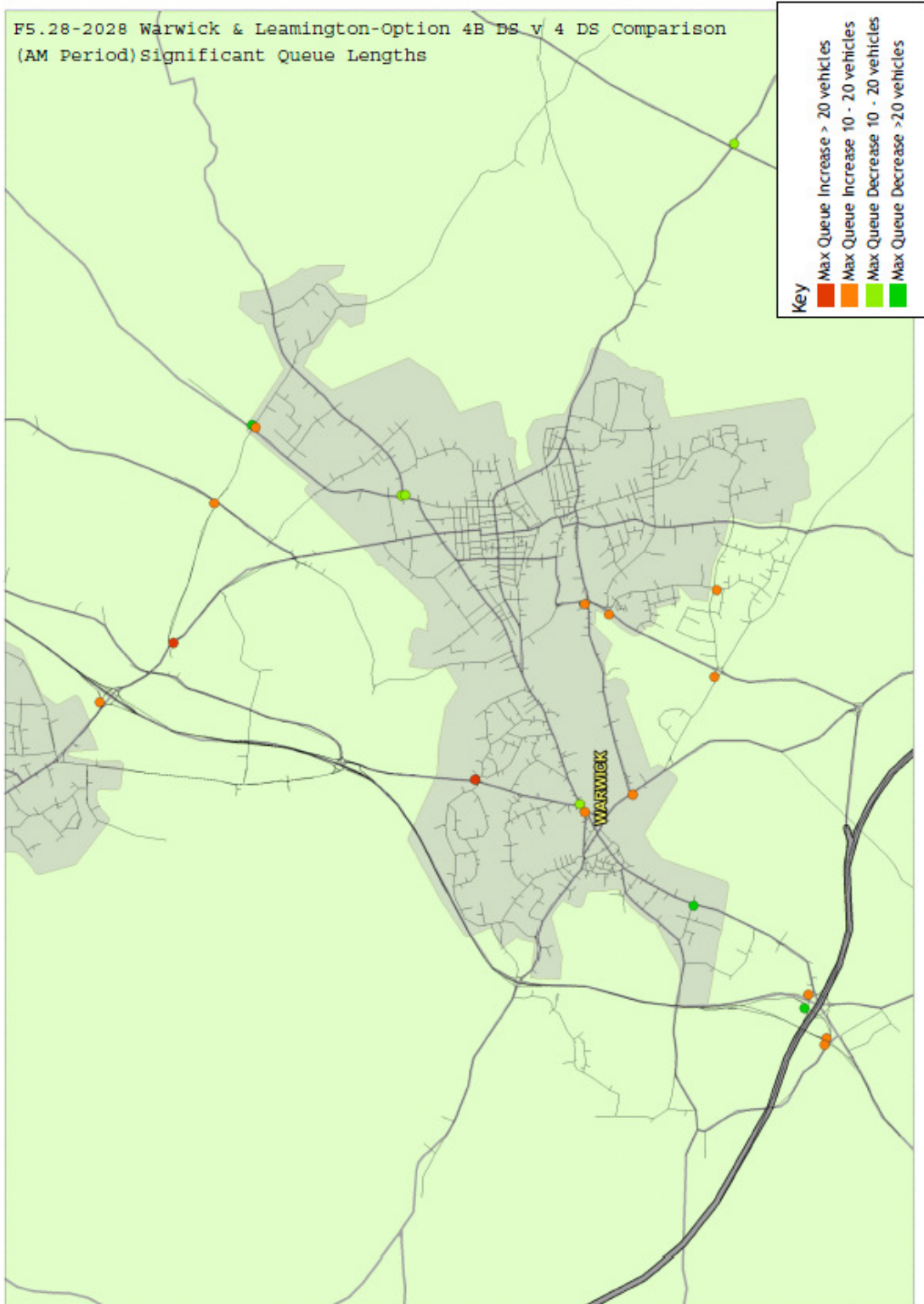


Figure 4.9 Option 4b A452 North Leamington Dualling test

Route	Option 4	Option 4A	Option 4B
Route 1 NB	980	919	1299
Route 1 SB	1107	966	1171
Route 2 NB	1602	1509	1650
Route 2 SB	2633	2188	2536
Route 3 EB	1145	1035	1197
Route 3 WB	1305	1171	1323
Route 4 NB	769	684	807
Route 4 SB	812	723	831
Route 5 WB	531	527	533
Route 5 EB	705	703	731
Route 6 NB	1227	1169	1226
Route 6 SB	1250	1218	1275
Route 7 NB	493	509	520
Route 7 SB	473	459	471
Route 8 EB	555	575	592
Route 8 WB	926	704	841
Route 9 NB	351	348	349
Route 9 SB	459	455	476

Table 4.11 Option 4a and 4b comparison

- 4.4.1 Option 4 was chosen to test further mitigation packages due to the high concentration of development north of Leamington.
- 4.4.2 Figures 4.8, 4.9 and table 4.11 clearly demonstrate that the LNRR provides the greatest congestion relief of the 2 options.
- 4.4.3 Further investigation should be undertaken to ascertain the costs and benefits derived of implementing this scheme.

5 Transport Interventions

5.1 Introduction

- 5.1.1 Identification of key transport interventions to mitigate the traffic impact relating to sites/scenarios was based on expert analysis of the modelling outputs. A project board which included senior transport planning and development control officers from WCC and senior planners from the HA and JMP (HA consultants) was set up to interpret the modelling outputs and identify mitigation solutions. Transport interventions were identified in terms of provision of sustainable transport to encourage modal shift and key road network schemes to improve capacity.
- 5.1.2 Key transport interventions were identified to mitigate development scenario traffic impact, however there may be residual benefits and disbenefits to other road users as a result of the growth sites and implementing the associated mitigation packages. Implementation of a Community Infrastructure Levy (CIL) Charging Schedule will be required to ensure that this cumulative impact can be mitigated (i.e. no single development may trigger the requirement for a mitigation scheme, however combined impact may trigger this need and therefore a charging structure may be required). This issue is covered in more detail in Chapter 6.
- 5.1.3 The mitigation described in this chapter does not include the requirements for site accesses. Suitable site accesses will be a prerequisite for the delivery of a site and have therefore not been included in cost estimates. Position of site accesses is important and can influence the mitigation required.
- 5.1.4 It should be noted that the current mitigation requirements are based on professional interpretation of the strategic microsimulation modelling work. To fully understand the impact of the developments and the mitigation requirements, a more in depth microsimulation modelling study would be required which would include an iterative assessment of mitigation options, would optimise network performance (e.g. signal timing and junction capacity optimisation) and would take account of time period choice and modal shift. This kind of study is not possible until there is certainty over the location of sites due to the large number of possible permutations and lengthy model run times. This stage of modelling is likely to be undertaken by working with the developers of sites to find an appropriate level of mitigation which can be agreed by the highway authorities and the developers.
- 5.1.5 A number of the mitigation schemes identified may be delivered/partly delivered by developments that are currently in the planning process. Therefore some schemes may not be required/costs reduced if they are delivered by developments.

- 5.1.6 The costs identified for each scheme are indicative and are based solely on professional opinion and experience of similar types of infrastructure delivery. Once a more detailed microsimulation modelling exercise has been undertaken, the nature and costs associated with mitigation strategies can be more accurately assessed. Although efforts have been made to provide some contingency within the cost estimates, it should be noted that the location of utilities and acquisition of non-highway or non-developer owned land could significantly alter some of the proposed costs.
- 5.1.7 The mitigation schemes listed include both site(s) specific interventions and area wide interventions. There will be derived benefits for public transport through the delivery of network interventions that aid the free flow of traffic on the network. In addition to this a number of sustainable transport schemes are listed which should complement the Green Travel Plans for each development. The mitigation schemes described are for major capital schemes and do not include minor schemes such as bus shelter provision, footpaths and pedestrian crossing facilities, nor do they include revenue based schemes secured through S106 such as provision of additional bus services.
- 5.1.8 Where a new bus service is required to serve a site or cluster of sites contribution over 5 years would be required to deliver a 15 minute frequency bus service. At certain sites there may be opportunity to make minor diversions to existing routes subject to the agreement of bus service providers and will also incur costs. Further work would be required to ascertain the actual bus service provision for each individual site. This work can be undertaken once there is more certainty over the exact location of sites and the level of growth adopted.
- 5.1.9 Where developments are clustered it would be possible to achieve a critical mass of development that enables greater mitigation possibilities. This is especially true in the provision of sustainable travel infrastructure. Although the usual approach is to ensure that the highway network experiences nil detriment, some of the more major mitigation solutions may actually accrue benefits for the wider network. However, it is inevitable that some areas of the network will experience additional congestion issues as a result of all growth levels.

5.2 The Transport Strategy

- 5.2.1 The following rationale underpins the transport strategy which the County Council believes is necessary to support the objectives of the LDF Core Strategy and the delivery of development through the various scenarios and growth options provided by WDC:
- Maximise the use of public transport to meet new travel demand for both short and medium/longer distance journeys;
 - Maximise the overall number of trips which can be made on foot and by bike;

Leamington	Leamington Northern Relief Road (LNRR)	Yes						X	
Leamington	Junction 13 and 14 improvements	Yes	X	X	X	X	X	X	X
Leamington	Further Capacity/PT Improvements on A452 between Kenilworth and Leamington	Yes							X
Leamington	Greville Rd/Emscote Rd junction improvements	Yes	X	X	X	X	X	X	X
Leamington	Princes Dr/Warwick New Rd junction improvements	Yes	X	X	X	X	X	X	X
Leamington	Adelaide Rd/Park Dr junction improvements	Yes	X	X	X	X	X	X	X
Warwick	Myton Rd/Banbury Rd improvements	Yes	X	X	X	X	X	X	X
Westwood Heath	Improvements on Coventry network	No	X						

Table 5.1 Mitigation Matrix for Option Testing

Area	Mitigation Strategy	Cost	Details
Kenilworth/Westwood Heath	Gibbet Hill Junction Improvements	500,000	Key junction on the approach to Coventry from Kenilworth and linking the A46 to Warwick University. The junction currently experiences significant congestion issues due to the tidal flow of traffic to the University and Coventry in the AM peak and vice versa in the PM peak. Westwood Heath sites and the cumulative impact of other developments in the district put further pressure on the junction. Improvements would involve increasing length of 2 lane approaches to the junction on the A429 and if possible on the C32 approaches. Some proposals were put forward as part of the Warwick University expansion plan, the status of these is unknown at present.
Kenilworth	Dalehouse Lane roundabout flare extensions, A46/C32 Signalisation and C32/B4115 Roundabout	3,000,000	Scheme proposals may include signalisation or provision of a dumbbell roundabout arrangement. It is not expected that additional bridges over the A46 will be required. Dalehouse lane roundabout will also require minor improvements and a new roundabout may be required at the C32./B4115 junction. This scheme may come forward as part of other planning applications in the area.
Kenilworth	Kenilworth Station	1,000,000	WCC has a shovel ready scheme for this location, we are currently seeking funding, this may be achieved prior to adoption of the local plan and thus may not be required as part of the mitigation package
Kenilworth	St Johns Gyrotory improvements	500,000	This may involve provision of additional capacity on the Birches Lane approach or lane widening up to Thickthorn. Due to the existing uses within the gyrotory and the rail bridge constraints, it is unlikely that signalisation could be provided. This scheme should be considered in conjunction to the proposals for the A46/A452 junction and it may be worth pooling the contribution to enable a more substantial and coherent scheme can be delivered.

Kenilworth	Thickthorn signalisation	1,500,000	Full signalisation and the possibility of bus priority. Lengthening the 2 lane approaches to the junction on the A452 may be required. Provision should also accommodate the requirements of the K2L cycle scheme which would pass through this junction.
Leamington	Blackdown improvements	750,000	Mitigation may include provision of additional lanes on the approaches and circulatory of the roundabout and should still allow for the provision of K2L
Leamington	Bericote improvements	500,000	Mitigation may include provision of additional lanes on the approaches and circulatory, dedicated slip to Bericote Lane and 2 lane exits on the A452 to aid the through put. Any mitigation should still allow for the provision of K2L.
Warwick	Coventry Road/Spinney Hill Percy Island	1,000,000	Mitigation may include extending the approach lanes on the A429, widening the circulatory and providing 2 lane exits on the A429 to aid the through put.
Leamington	Partial dualling/link capacity improvement A452 Europa Way and junction improvements	5,000,000	Sections of the route may require dualling or more innovative cheaper alternatives such as centre lane tidal running using ATM gantries could be investigated. It is imperative that queuing onto the M40 mainline is avoided
Leamington	Dualling A452 Europa Way and Banbury Spur, junction improvements and bus priority	10,000,000	The costs where development is concentrated on this corridor escalate as it is likely that the entire route including Banbury Spur may require dualling or more innovative cheaper alternatives such as centre lane tidal running using ATM gantries could be investigated. It is imperative that queuing onto the M40 mainline is avoided.

Leamington	Sustainable Travel Infrastructure	2,000,000	<p>Extensive sustainable travel infrastructure should be constructed to encourage modal shift and thus alleviate pressure on the road network. It is likely that this contribution would be best spent on provision of K2L cycle route between Kenilworth and Leamington, completion of the existing cycle networks - this has been termed "Missing Links" and provision of new cycle infrastructure linking proposed developments to the existing cycle network. Provision of "Missing Links" may involve working closely with WDC in order to provide the shortest routes to key destinations (e.g. Use of Victoria Park to link the town centre with the proposed cycle infrastructure for Ford Foundry, linking Connect2 to Kenilworth town centre and linking Warwick town centre to the rail station). Provision should include toucan/pedestrian crossings to avoid severance. Provision of minor schemes has not been included in these costs but provision of bus shelters should also be included.</p>
Leamington	Town Centre Improvements	2,000,000	<p>Leamington in particular has significant pressure on town routes. Careful consideration needs to be given as to whether additional capacity should be provided where possible in order to alleviate these town routes, whether further improvements to sustainable infrastructure such as further cycle route provision, bus priority and crossing facilities with the aim of reducing demand or divert the funds for use on the wider highway network in order to provide realistic alternatives to using town centre through routes. The funding pool could be used for any of these options or combinations and may require involvement of stakeholder groups to decide the most appropriate way to use the fund.</p>

Leamington	Virtual P&Rs	1,500,000	Virtual Park and Rides accrue the benefits of standard park and ride facilities without incurring the costs of providing expensive infrastructure. Developers would be encouraged to provide additional parking at edge of town sites which could then be utilised for P&R facilities. Instead of providing a bespoke bus services to the P&R facilities, a two stage bus journey would be made where the first stage would provide a direct service to the town centres or employment sites with perhaps one or two stop on route thus avoiding. The second stage would distribute local trips around housing areas or employment areas This would maximise potential of new bus routes provided by developers which are necessary ensure sustainable access to their developments and to meet modal share targets. Such facilities would be easier to deliver where there is a critical mass of development proposed in one area. Suitable sites may include developments along the A452 corridor to the south of Leamington or close to the sites next to the A46 proposed at Kenilworth
Leamington	Leamington Northern Relief Road (LNRR)	20,000,000	The route would link an upgraded Old Milverton Lane or would utilise L07 development site distributor roads to link to the A429/A46 grade separated junction.
Leamington	Junction 13 and 14 improvements	3,000,000	These schemes may involve dualling the off slip at J14 of the M40 and signalling J13
Leamington	Further Capacity/PT Improvements on A452 between Kenilworth and Leamington	5,000,000	These schemes may involve dualling sections or widening to provide additional link capacity, bus lanes and bus priority schemes to encourage modal shift and should complement the K2L proposals and junction capacity improvements. Chesford bridge may require widening works.

Leamington	Greville Rd/Emscote Rd junction improvements	400,000	Most likely scheme would involve signals. High turning volumes at this junction cause issues currently and will be further exacerbated in the future.
Leamington	Princes Dr/Warwick New Rd junction improvements	400,000	Most likely scheme would involve signals. High turning volumes at this junction cause issues currently and will be further exacerbated in the future.
Leamington	Adelaide Rd/Park Dr junction improvements	400,000	Most likely scheme would involve signals. High turning volumes at this junction cause issues currently and will be further exacerbated in the future. This may be delivered through other planning applications
Warwick	Myton Rd/Banbury Rd improvements	400,000	Signals, not tested but anticipated to be required
Westwood Heath	Improvements on Coventry network	unknown	Schemes required in Coventry area are not likely to be extensive, Coventry CC will comment in relation to the Westwood Heath sites on submission of planning application.

Table 5.2 Mitigation Costs and Descriptions

	Option 1	Option 2	Option 3	Option 4	Option 4a	Option 4b	
Indicative Total Costs	£ 23,850,000.00	£ 28,350,000.00	£ 28,350,000.00	£ 28,350,000.00	£ 48,350,000.00	£ 33,350,000.00	These are indicative costs based on experience from previous similar schemes
Costs per Household	£ 2,771.64	£ 3,359.00	£ 3,311.92	£ 3,327.46	£ 5,674.88	£ 3,914.32	Note that no contribution has been attributed to employment developments. It is likely a significant proportion could be attributed to these developments and as such cost per household would decrease

Table 5.3 Mitigation Total Costs per Option

5.4 Other Modal Shift Mitigation Strategies

5.4.1 Encouraging modal shift is a key strategy aimed at reducing the impact of the developments on the road network. A “sticks and carrots” approach to influencing modal shift should be adopted. Options to complement Travel Plans could include;

Sticks

- Preferential business rates for those employers that can evidence significant shifts in employee travel behaviour.
- Parking tariffs for employee parking.
- Road pricing within town centres.

Carrots

- Subsidised employee bus shuttles from all rail stations to build on the success of the National Grid shuttle bus.
- Subsidised commuter bus shuttles to all rail stations.
- Long distance virtual P&Rs and employee bus schemes.
- Area wide car share databases.
- Further investment in “Smarter Choices”.

5.4.2 Smarter Choices are ‘soft’ measures in influencing people’s travel behaviour away from car use towards more sustainable modes of transport. They are aimed at helping people to choose to reduce their car use while enhancing the attractiveness of more sustainable alternatives, such as walking, cycling and public transport. These include:

- Workplace and School Travel Plans
- Personalised travel planning
- Travel awareness campaigns
- Public transport information and marketing
- Car clubs
- Car sharing schemes
- Teleworking, teleconferencing and home shopping

5.4.3 ‘Smarter Choices’ measures have an integral role in complementing ‘hard’ policies and infrastructure improvements, which alone are unlikely to generate significant behaviour change. Information, promotion, marketing and other supporting measures are key to successful schemes aimed at increasing use of sustainable transport and reducing single-occupancy car journeys through improving knowledge, perceptions and choice of alternative modes of transport. Research by Sustrans shows that lack of information about alternative modes such as cycling and public transport, and motivation to try them, are key barriers to change.

- 5.4.4 The DfT commissioned a major study in 2004 to examine whether large-scale programmes could potentially deliver substantial cuts in car use. In summary the results suggested that, within approximately 10 years, smarter choices measures have the potential to reduce national traffic levels by about 11% with reductions of up to 21% of peak period urban traffic.
- 5.4.5 Each measure should work on the three principles of (i) 'inform'; (ii) 'enable'; and (iii) 'promote' with resources and interventions tailored to the individual needs of the target audience and proximity to the development (s).
- 5.4.6 Example activities for each of the three principles include, but are not limited to:
- (i) Inform - provide route maps, timetable information, travel advice;
 - (ii) Enable - 'taster' public transport tickets, travel training services, marketing offers
 - (iii) Promote - destination advertising, discount (e.g. 2 for 1 via rail) promotions, public transport launch events.

5.5 Initial Assessment of Deliverability

- 5.5.1 WCC believe that the impact of all options can be mitigated and that there are no fundamental barriers to delivering schemes that achieve mitigation. A number schemes presented have potential to accrue benefits for the wider network. However there will be implications resulting from any level of growth. Overall the network should be able to accommodate the different proposed position of sites, however there will be areas of the network that will suffer from increased congestion issues with no potential mitigation options

5.6 Managing Risk

- 5.6.1 Throughout the work undertaken to date on the LDF Core Strategy, the County Council has attempted to identify and manage risk and will continue to do so as the Core Strategy evolves. Examples of this include the following:
- Early discussions with the District Council regarding its LDF, and timely submissions on transport throughout the development of the strategy;
 - Joint working with the Highways Agency to ensure that a complete assessment of the impact of development on the local and strategic highway network is undertaken with agreements on the most suitable way forward in terms assessing these impacts once there is more certainty on the levels of growth and locations of sites ;
 - Establishment of joint working arrangements with the developers of the preferred sites;
 - To seek agreement with the respective developers and the Highways Agency regarding the combined use of the Warwick and Leamington

Area Wide S-Paramics model and the Kenilworth and Stoneleigh Area Wide S-Paramics Model to include agreement trip rates/distribution and public transport assumptions;

- Carrying out timely discussions with other organisations regarding potential transport interventions and measures;
- Working in partnership with WDC to deliver a comprehensive cycle network which may involve linking through district land;
- Commenting and advising on the technical work in support of the
- proposals for major infrastructure delivery;
- Possibility of undertaking work on key measures to help support the transport network of the towns and the LDF housing and employment growth. This may include the assessment of public transport improvements, town centre proposals and the design of key mitigation infrastructure.
- Advising developers on measures to encourage modal shift.

5.6.2 It is envisaged that further detailed work will be undertaken in conjunction with developers, public transport providers and authorities to develop a comprehensive Transport Infrastructure Delivery Plan prior to the LDF Core Strategy Independent Examination to further reduce any remaining elements of risk.

5.7 Funding

5.7.1 WCC preliminary assessment of mitigation requirements and indicative costings suggest that for this level of growth and for the proposed positioning of development sites, contributions towards mitigation schemes would be between approximately £2770 and £5,675 per household. It should be noted that all costs have been split by housing only and a suitable methodology will be required for attributing a proportion of these costs to the proposed employment sites.

5.7.2 These mitigation schemes do not include revenue based contributions towards bus services which could be significant. Further studies would be required to understand the requirements.

5.7.3 It should be noted that costs are based on current prices. They are derived from the professional opinion of the project board. No detailed cost estimates have been undertaken. Although contingency has been provided in the costs estimates the existence of utility services and purchasing of land can substantially increase costs.

5.7.4 Funding could be secured through the traditional Section 106 agreement approach or a Community Infrastructure Levy(CIL) approach.

5.7.5 The benefits of using the CIL type approach would be that an average cost per household/cost per trip could be collected and placed in a funding pool which could be used for mitigation purposes. Under the S106 approach it may be that an uneven distribution of costs and responsibility is placed on the different development sites. For instance, it may be considered a Leamington Northern Relief Road(LNRR) is required for sites in the Milverton area and the developers would be expected to pay for it. In reality development traffic from all sites may use the LNRR route and diverted background traffic may alleviate routes surrounding alternative developments, thus reducing the need for mitigation in these areas. Therefore all developments accrue benefits from the mitigation packages as a whole and should provide contributions in relation to the numbers of housing unit/size of employment development/numbers of vehicle trips.

6 Conclusions and Further Work

6.1 Conclusions

- 6.1.1 This document has outlined the existing transport issues within Warwick District, highlighted the impact of proposed growth scenarios and their existing accessibility, and taken consideration of the impact of a number of committed and currently unidentified development sites. A series of effective mitigation infrastructure schemes have been proposed to be complemented by sustainable transport provision, soft measures in the form of “Smarter Choices” and policy changes to influence travel behaviour. The promotion of sustainable measures to influence travel behaviour is in line with policy objectives contained within the WCC Local Transport Plan.
- 6.1.2 Strategic microsimulation traffic modelling assessments were undertaken using industry recognised tools and the interpretation and identification of mitigation schemes was carried out by senior transport professionals working for WCC and the HA. A detailed assessment of impact is provided in the accompanying report “WDC Strategic Transport Assessment Modelling”.
- 6.1.3 WCC believe that a combination of innovative engineering solutions combined with significant, effective, sustainable transport provision will mean that all options put forward by WDC for allocation of development sites put forward can be accommodated in terms of traffic impact. However, WCC have highlighted a number issues relating to the position of certain sites
- 6.1.4 It has been demonstrated that PM peak conditions will be particularly congested and there may be further work required to understand the causes and possible strategies for dealing with this situation. These may include but will not be exclusive to the following;
- Revising growth assumptions used in the modelling.
 - Including a peak spreading assumption in modelling.
 - Optimising network performance of proposed mitigation packages.
 - Identifying further mitigation to deal specifically with PM network conditions.
 - Further consideration of how “smarter choices” may influence the need to travel by car.

- 6.1.5 Although modelling has identified that severe congestion is experienced within the Warwick and Leamington area in all option proposals throughout the PM period, WCC do not consider that the situation is irreconcilable.
- 6.1.6 All options allocation of sites will have implications in terms of traffic impact. There may be some areas of the network that accrue benefits from well targeted mitigation measures especially where a critical mass of development exists (thus providing significant mitigation). However, with any proposed growth option there will be areas of the network that suffer. A robust assessment of the extent to which gains and losses are experienced can only be fully assessed once there is more certainty over the exact positioning of sites, and when appropriate mitigation is more accurately defined through a more refined microsimulation modelling mitigation option testing exercise. Such detailed modelling will be undertaken through working with site promoters to ascertain the most appropriate mitigation package which will have to be agreed by both developers and highway authorities.
- 6.1.7 The impact on the modelling outputs may appear severe in places however a number of points must be considered in their interpretation;
- The strategic microsimulation modelling does not account of the propensity for further modal shift through infrastructure, public transport provision, policy changes, congestion avoidance, escalating costs of motoring and targeted soft measures such as “Smarter Choices”. Approximately 15-20% modal shift was in fact the recommended targets for use in Rugby Borough Council’s LDF Core Strategy which has been approved at the Examination in Public. This may be an underestimate, in a fast changing world attitudes towards other forms of transport may change more rapidly and further advances in technology may negate the need for today’s levels of travel (e.g. more home working, teleconferencing etc.).
 - Time period choice becomes a reality. Evidence already exists of peak spreading across the Warwick and Leamington cordon monitors. This is likely to continue as more pressure is applied to the network.
 - This is a strategic modelling exercise some of the more minor routes will not have been utilised, and as such, impact is over estimated.
 - The assumption is that economic conditions are good. Recently we have experienced negative traffic growth thus creating capacity on the network.

6.1.8 Further recommended work through more detailed microsimulation modelling will take account of all the issues raised above. See 6.2.4 – 6.2.8.

6.1.9 A comprehensive and viable set of mitigation infrastructure proposals has been identified for each scenario. Dependent on mitigation package, costs would be anticipated to be between £24 and £48m. A contribution of between approximately £2,700 and £5675 per housing unit would be required. No contribution has been allocated to employment sites, therefore the identified cost per housing unit could reduce significantly. These figures are indicative costs based on the mitigation identified within this report. If more detailed modelling identifies that further mitigation packages are required, especially when dealing with PM peak congestion, costs may escalate.

6.1.10 Assuming the identified mitigation is implemented, the “WDC Strategic Transport Assessment Modelling” Report identifies that the following headline modelling outputs are of note;

- Option 4 has least impact prior to mitigation
- Option 4 accrues the greatest benefits in the Warwick and Leamington area from the mitigation packages.
- Whilst more benefit is accrued from other options in the Kenilworth and Stoneleigh area, less congestion is experienced in this area overall.
- Further benefits and reduced congestion may be accrued in Option 4 through more extensive mitigation such as Leamington Northern Relief Road.
- When sites south of Coventry are considered, it may be more suitable to go with the reduced site size due to the limited mitigation options.
- The large site to the South East of Warwick and Leamington is very difficult to mitigate. It may be worth considering other options that do not include this site.

6.1.11 Consideration has been given to managing risk throughout the LDF Core Strategy planning process.

6.1.12 WCC has expressed that Community Infrastructure Levy as our preferred route to manage developer contributions for mitigation proposals.

6.1.13 A series of further studies is recommended in the following section.

6.2 Further Work

Congestion Reference Flow (CRF) analysis to determine link capacity constraints

- 6.2.1 It is apparent that when the impact of the significant growth levels expected to be delivered by 2028 that link capacity may become an issue.
- 6.2.2 The analysis of CRF to determine which link capacity will become an issue is recommended along with S-Paramics microsimulation modelling to determine the requirement for elements of the proposed mitigation.
- 6.2.3 It should be recognised however that the result of the modelling exercise may demonstrate an overly robust scenario as no account has been taken of time period choice as commuters choose to re-time their journeys in order to avoid congestion. Other factors such as changes in technology which influence travel behaviour and negate the need to travel will also have potential to reduce the number of trips made on the network .

Detailed modelling of Preferred Option using S-Paramics

- 6.2.4 To fully understand the real impact of proposed developments an in depth study using microsimulation modelling tools will be required.
- 6.2.5 This type of modelling should be undertaken once there is certainty location of development sites.
- 6.2.6 Microsimulation modelling should be used to determine the effectiveness of the proposed mitigation options. An extensive iterative modelling process will be required to optimise the mitigation packages. This is beyond the scope of this study and will be undertaken first by WCC and then by working with developers to identify solutions. These solutions may go beyond those identified in this report.
- 6.2.7 WCC has two up to date models covering the Warwick District which were used in this assessment and should be used in further assessments;
- Warwick and Leamington 2011, 2016 and 2026 Area Wide Models
 - Kenilworth and Stoneleigh 2009, 2016 and 2026 Area Wide Models (this model is being updated (to base year 2011) and extended to investigate proposal for Coventry & Warwickshire Gateway developments around Coventry Airport.

- 6.2.8 WCC has also developed a corridor model of the A452 Europa Way and M40 between J15 and J12 and also plans to develop a corridor model of the A452 Kenilworth Rd north of Leamington. These will be ideal for testing various mitigation options in more detail for sites focussed to the north and south of Leamington and south east of Kenilworth.
- 6.2.9 Further testing should also sensitivity test major developments planned at Bagington Airport (Coventry & Warwickshire gateway circa 10,000 additional jobs and 4,000 at the Whitley site) and Stoneleigh Park (circa 1,500 additional jobs)
- 6.2.10 WCC has setup a licence agreement and modelling protocol for use of the models by developers. WCC will work with promoters of the preferred sites to test mitigation proposals. This will also cover phasing of development and mitigation.

Public Transport Studies

- 6.2.11 Further work on the requirements and viability of public transport provision will be required and will involve close working relationships with site promoters, bus and rail service providers and WCC.

Costing and Feasibility Assessment of Transport Interventions

- 6.2.12 Initial estimates covering the mitigation requirements at various growth levels and alternative site locations have been provided within this document.
- 6.2.13 Once there is more certainty over the locations of sites, more detailed testing of transport mitigation requirements can be undertaken. This will inform the actual mitigation requirements.
- 6.2.14 When the actual mitigation requirements are defined, further work on the costing and feasibility of the transport interventions can be undertaken.
- 6.2.15 Where substantial mitigation requirements are proposed with significant construction of infrastructure, it may be appropriate to undertake preliminary feasibility studies on individual schemes.

Preparation of Draft IDP/Input to Wider Viability Assessment

6.2.16 It is recognised that the LDF Core Strategy needs to be supported by a comprehensive Transport Infrastructure Delivery Plan, which covers the measures which are required to mitigate the impact of the proposed development sites.

6.2.17 An Infrastructure Delivery Plan will be prepared to support the development proposals set out in the LDF. WCC has identified a number of the transport mitigation measures as described in Chapter 5. These proposals will form the basis for mitigation testing through more detailed modelling exercises. Once the broad specification of the mitigation requirements is defined, the preparation of the Infrastructure Delivery Plan can be undertaken. It is suggested that officers from both the District and County Council meet at an appropriate point in the near future to discuss the current mitigation proposals. It is also suggested to convene again, once the mitigation proposals have further defined through the modelling process in order to discuss which measures need to be included in the Plan, who the lead delivery organisation will be, the likely timescale for the improvements to come forward, and their anticipated cost.

6.2.18 It is envisaged that further detailed work will be undertaken prior to the LDF Core Strategy Examination in Public to further reduce any remaining elements of risk within the Transport Infrastructure Delivery Plan

Preparation of Developer Contributions SPD/draft CIL Charging Schedule

6.2.19 It is anticipated that contributions from developers will be secured through either the conventional S106 route, or via an approach based on the principles of a Community Infrastructure Levy (CIL) Charging Schedule. The County Council's view is that the latter, a CIL type developer contribution model, would be its preferred approach. It is understood that this would need to be produced as a separate Supplementary Planning Document (SPD) to the LDF Core Strategy.