

Dacorum Borough Council Strategic Infrastructure Study

>Transport

Final // February 2011

URS



**Dacorum Infrastructure
Study**



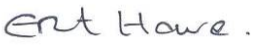
**Transport Infrastructure
Assessment**

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ABBREVIATIONS

DBC	Dacorum Borough Council
DSIS	Dacorum Strategic Infrastructure Study
HA	Highways Agency
HCC	Hertfordshire County Council
HIIS	Hertfordshire Investment & Infrastructure Strategy
IDP	Infrastructure Delivery Plan
JTW	Journey To Work
LTP	Local Transport Plan
NCN	National Cycle Network
PPG	Planning Policy Guidance
RTS	Regional Transport Strategy
SIP	Strategic Infrastructure Plan
SPD	Supplementary Planning Document
SUE	Sustainable Urban Extension
TRICS	Trip Rate Information Computer System
V/C	Volume to Capacity

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URS thanks all those who contributed to this report. Without the input and efforts of the many stakeholders involved, this project would not have been possible.

EXECUTIVE SUMMARY

This technical report forms part of the Dacorum Strategic Infrastructure Study (DSIS). The purpose of the report is to identify the transport needs of Dacorum over the period 2010 to 2031, which will subsequently feed into an Infrastructure Delivery Plan (IDP) and a Planning Obligations Supplementary Planning Document (SPD) for the borough.

Background evidence shows that the road network is currently under stress at key locations such as the A414 and A4146 within Hemel Hempstead, the A41 south of Berkhamsted, and the A5 west of Markyate. There is also stress on the Strategic Road Network, particularly the M25. The rail network is at capacity and growth in rail trips through Dacorum will be difficult. Consultation with the rail industry suggests that it is unlikely that there will be improvements to alleviate this and consideration of the proposed High Speed 2 rail system suggests that it will not reduce the number of passengers on regional trains through stations in Dacorum.

The bus network is well developed in Hemel Hempstead and adequate in other locations with the exception of Markyate. There are no indications that it has insufficient capacity at present but there are some service cancellations in Hemel Hempstead that are a cause of concern for some, including the commercial sector. The walking and cycling network broadly caters for current demand but there are localised issues, in part caused by an unattractive environment caused by congestion. Routes to stations are inadequate.

Low and high growth scenarios have been agreed with DBC, with the profile of growth also established. By 2031 the low growth scenario would see 8,942 additional dwellings completed, in the high growth scenario there would be 15,742 dwellings. In each scenario the commercial land-uses are distributed pro-rata according to the distribution of dwellings. The growth has been distributed across eight areas in discussion with and under direction from DBC. Additional dwellings and commercial floorspace in the high growth scenario are located in and around Hemel Hempstead.

Trip rates have been derived using TRICS and agreed with Hertfordshire County Council (HCC). Trips have been distributed using Census 2001 journey to work information. Mode shares have been developed using both TRICS and Census 2001 data. The mode shares are considered to generate worst case scenarios because development proposals would need to commit to increasing the proportion of trips by sustainable modes. This equates to a daily total of 421,824 trips in the low growth scenario and 525,662 trips in the high growth scenario. The residential mode share is approximately 75% by light vehicles (predominantly car) with 11% using public transport.

The impacts of growth on the transport network have been assessed at 2011, 2016, 2021, 2026 and 2031. An assessment of the cumulative impact of development indicates that impacts will be based on the existing travel patterns under the low growth scenario with a greater emphasis on orbital travel in the high growth scenario in Hemel Hempstead.

Impacts on the transport network are concentrated at Hemel Hempstead and Berkhamsted, and to a lesser extent at Tring. The Strategic Road Network is also affected. Walking and cycling networks will be impacted at strategic locations including in Hemel Hempstead town centre and routes to stations. There will be pressure on buses between Tring and Hemel Hempstead, and in Hemel Hempstead on radial routes. There will also be a demand for orbital bus trips in Hemel Hempstead; this will be greater

in the high growth scenario than the low growth scenario. The greatest impact on the rail network will be experienced at Hemel Hempstead Station, although passengers using other stations will contribute to cumulative stress on the line passing through Dacorum. On the road network there will be a particular impact around Hemel Hempstead town centre and through Apsley. In Berkhamsted the impact will be on the High Street in particular and at the junction of Kings Road/ Kingshill Way. It is also expected that pressure will increase on the A41 including its junction with the M25.

The impact of Gaps in the transport network and a comparison with the baseline conditions and existing interventions were identified through a document review and stakeholder consultation. Existing interventions have been identified on the road network around Hemel Hempstead town centre to accommodate some of the impact. There are also plans for improvements to cycle facilities at Hemel Hempstead Station to aid sustainable travel. The existing interventions identified to reduce the impacts on the transport network reduce the impact at some locations but only to a limited extent.

URS has identified new interventions following an assessment of transport impacts and gaps, which has taken a presumption in favour of infrastructure that promotes sustainable modes above the private car, whilst recognising the need to maintain a good road network for essential vehicle trips. Each intervention has been prioritised and given a timescale for delivery based on the profile of the growth impacts. The new interventions identified from this study are shown in Table ES 1.

The cost of existing planned interventions has been calculated as approximately £66m. This should not be assumed to be whole cost as the costs of a number of existing interventions were unavailable for this study. The approximate total cost of new interventions is estimated at £13m.

For existing interventions, it has been concluded that it may be appropriate to apportion costs to growth based on the new population and/ or jobs compared to the existing population and/ or jobs, with a few exceptions. If this approach is adopted on the basis of population the growth in Dacorum could be expected to contribute a maximum of £15.9m from contributions towards existing interventions.

For the majority of new interventions identified by URS the whole cost would be anticipated to fall on the growth in Dacorum. There are a small number of exceptions (e.g. cycle infrastructure and TravelSmart) where it may be more appropriate to apportion costs based on population growth relative to the existing population. The apportionment of cost will be addressed in more detail by the Planning Obligations SPD to emerge from this report and the wider infrastructure study as a whole.

Overall a number of issues affecting deliverability have been identified including:

- The cost of interventions that cannot be funded from growth, and the uncertainty over the total cost.
- Some schemes may not (yet) be recognised by the organisation that would be obliged to implement them.
- Some interventions may not be physically deliverable, or may not have a good fit with policy.
- Issues associated with capitalising revenue costs.
- A lack of capacity on the rail network.

Table ES 1: Additional Required Interventions Identified by URS

Area	Scheme	Est Cost (£)	Justification
Berkhamsted	Implementation of HCC Cycling Strategy including comprehensive cycle network	2,000,000	HIIS
Tring	Enhanced & extended cycle route between Tring & Tring station	97,500	Support for rail commuters and other rail travellers
Hemel Hempstead	Implementation of HCC Cycling Strategy including comprehensive cycle network	3,000,000	HIIS
Hemel Hempstead	Maylands Interchange	2,000,000	Orbital movements from high scenario growth
Hemel Hempstead	Orbital bus priority	1,000,000	Orbital bus passenger demand (especially in the high growth scenario)
Berkhamsted	High St traffic management	2,000,000	Impact of growth on existing bottleneck
Berkhamsted	Signalise Kings Rd/ Kingshill Way/ Durrants Rd	300,000	Access to residential areas
Hemel Hempstead	Partial signalisation of A41/ A4251	500,000	Substantial traffic to/ from the south
Dacorum	TravelSmart	low = 1,722,000 high = 1,893,000	To help achieve mode shift
Total		Low = 12,619,975 High = 12,789,975	

1. INTRODUCTION

Purpose and Scope

- 1.1. This technical report forms part of the Dacorum Strategic Infrastructure Study (DSIS). The purpose of the report is to identify the transport needs of Dacorum over the period 2010 to 2031, which will subsequently feed into an Infrastructure Delivery Plan (IDP) and a Planning Obligations (SPD) for the borough.
- 1.2. Section 2 identifies the baseline conditions for transport infrastructure in Dacorum and establishes the existing interventions that have been identified for delivery by Dacorum Borough Council (DBC) and other stakeholders (see Appendix D). This is followed by section 3 that outline the assessment framework used to determine future need to include considerations related to the anticipated planning scenario and assumptions on forecasting transport demand trip. The report then examines the impact of growth, the gaps in the transport network and the interventions that will be needed to manage those gaps (Sections 4 to 6). Finally Section 7 presents conclusions.
- 1.3. The report provides an assessment of growth across the whole of Dacorum Borough to include consideration of cross-boundary issues. It identifies the impact of growth, the gaps in the transport network relevant to those impacts and the need for interventions. Where URS has identified additional interventions these have been costed, although it is outside the scope of this study to allocate costs for interventions from other sources where this information could not be identified. The study addresses those costs that are capital or can reasonably be capitalised; revenue costs are not covered.
- 1.4. While the study acknowledges historic deficit in the transport network it does not however, seek to identify measures to address this deficit; rather it is concerned with addressing only the impact of growth. In most instances interventions identified by URS are deemed to be wholly attributable to this growth.
- 1.5. The assessment is broadly based on eight sub-areas that have been agreed with DBC:
 - **AREA 1:** Hemel Hempstead
 - **AREA 2:** Berkhamsted
 - **AREA 3:** Tring
 - **AREA 4:** Bovingdon
 - **AREA 5:** Markyate
 - **AREA 6:** Kings Langley
 - **AREAS 7 & 8:** Rural East & Rural West
- 1.6. The geographic extent of each sub-area is confirmed by Figure 1-1. The figure also sets out the growth forecasts for the borough on which the assessment is based with further details provided later in Section 3 below.

Figure 1-1: Dacorum Borough Sub-Areas and Development Trajectory



Dacorum Infrastructure Delivery Plan
Dacorum Sub Areas: Growth Scenarios

1 HEMEL HEMPSTEAD												
2009 - 2011		2011 - 2016		2016 - 2021		2021 - 2026		2026 - 2031		Total		
LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	
714	918	2,256	3,572	2,198	4,321	950	3,671	1,103	3,250	7,221	15,742	
-	-	35,857	35,857	35,857	35,857	43,061	43,061	49,800	49,800	164,574	164,574	
-	-	-15,426	-15,426	-15,426	-15,426	-15,426	-15,426	-3,299	-3,299	-49,579	-49,579	
-	-	21,145	21,145	21,145	21,145	21,145	21,145	6,122	6,122	69,558	69,558	
3,547	3,997	11,800	13,000	8,250	9,550	10,450	14,721	14,111	20,150	48,158	61,418	
-	-	3,222	5,754	3,222	5,754	3,222	5,754	3,222	5,754	12,889	23,017	

2 BERKHAMSTED						
2009 - 2011	2011 - 2016	2016 - 2021	2021 - 2026	2026 - 2031	Total	
115	157	359	70	96	797	
-	1,992	1,992	2,392	2,767	9,143	
-	-857	-857	-857	-183	-2,754	
-	1,175	1,175	1,175	340	3,864	
554	900	1,000	1,250	1,300	5,004	
-	320	320	320	320	1,279	

3 TRING						
2009 - 2011	2011 - 2016	2016 - 2021	2021 - 2026	2026 - 2031	Total	
35	90	43	40	97	305	
-	1,992	1,992	2,392	2,767	9,143	
-	-857	-857	-857	-183	-2,754	
-	1,175	1,175	1,175	340	3,864	
-11	450	550	650	700	2,339	
-	320	320	320	320	1,279	

4 BOVINGDON						
2009 - 2011	2011 - 2016	2016 - 2021	2021 - 2026	2026 - 2031	Total (2009-2031)	
19	32	5	10	17	83	

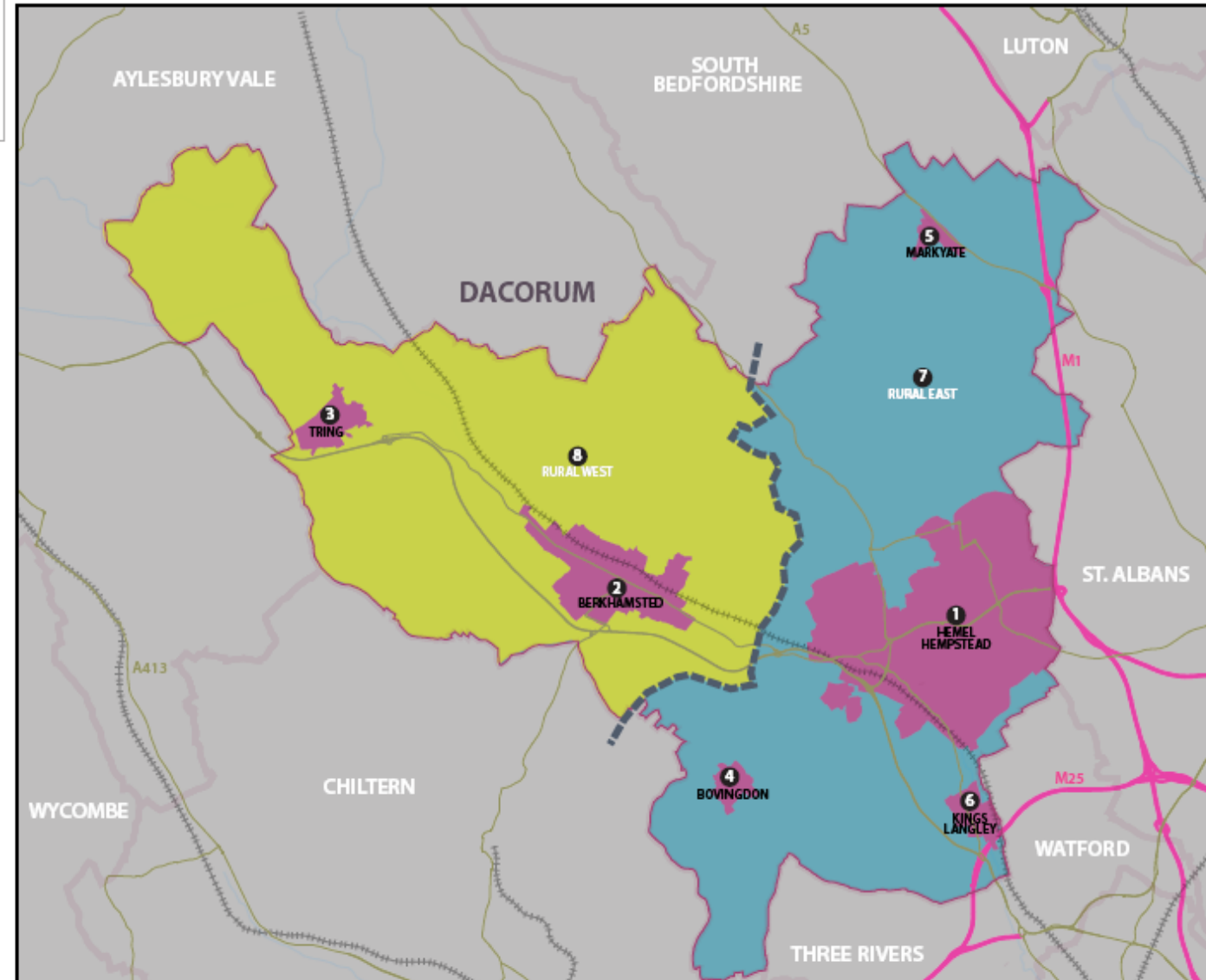
5 MARKYATE						
2009 - 2011	2011 - 2016	2016 - 2021	2021 - 2026	2026 - 2031	Total	
4	49	51	10	10	124	

6 KINGS LANGLEY						
2009 - 2011	2011 - 2016	2016 - 2021	2021 - 2026	2026 - 2031	Total	
10	10	5	16	42	83	

7 RURAL EAST						
2009 - 2011	2011 - 2016	2016 - 2021	2021 - 2026	2026 - 2031	Total	
3	10	15	30	30	88	

8 RURAL WEST						
2009 - 2011	2011 - 2016	2016 - 2021	2021 - 2026	2026 - 2031	Total	
18	68	45	45	65	241	

DACORUM BOROUGH - TOTAL												
2009 - 2011		2011 - 2016		2016 - 2021		2021 - 2026		2026 - 2031		Total		
LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	
918	918	2,672	3,572	2,721	4,321	1,171	3,671	1,460	3,260	8,942	15,742	
-	-	39,841	39,841	39,841	39,841	47,845	47,845	55,333	55,333	182,860	182,860	
-	-	-17,141	-17,141	-17,141	-17,141	-17,141	-17,141	-3,666	-3,666	-55,088	-55,088	
-	-	23,495	23,495	23,495	23,495	23,495	23,495	6,802	6,802	77,286	77,286	
4,090	4,540	13,150	14,350	9,800	11,100	12,350	16,621	16,111	22,150	55,501	68,761	
-	-	3,862	6,394	3,862	6,394	3,862	6,394	3,862	6,394	15,447	31,968	



LEGEND

Motorway	District Boundary	Dwellings	Office
A Roads	Wards	Industrial	Warehouse
Rail	Rural West	Retail	Leisure
River Gade	Rural East		

TABLES
RESIDENTIAL

COMMERCIAL FLOORSPACE (sqm)

- 1.7. The impact of growth on the road network in the borough up to 2031 has been assessed using the existing evidence base supplemented with further analysis by URS. However, the existing evidence base for the Strategic Road Network requires further detailed assessment, including at a sub-regional level. The Highways Agency is working with Hertfordshire County Council to address this using the Diamond Model. Once this work is complete (after the publication of this report) it will supplement the conclusions of this Transport Infrastructure Needs Assessment.

Policy Background

- 1.8. The publication of *Planning Policy Guidance 13 (PPG13)*¹ in 1994 (revised in 2001), followed by *A New Deal for Transport* in 1998 and the White Paper *Transport 10-Year Plan 2000* set the context and direction for transport policy in the UK. The policies enshrined within these documents demonstrated an acceptance that unrestrained growth in road traffic was neither desirable nor feasible based on concerns related to rising congestion levels, the effect of road traffic on the environment (both natural and built) and worries that an emphasis on road transport discriminated against vulnerable groups in society such as the poor, the elderly and the disabled.
- 1.9. In 2004 the White Paper entitled *The Future of Transport: a network for 2030*, was published and set out how the Government aimed to maximise the benefits of transport while minimising the negative impact on people and the environment. The Government was seeking a coherent transport network that can meet the challenges of a growing economy and the increasing demand for travel with:
- Walking and cycling offering a more serious alternative for local trips
 - Bus services that are reliable, flexible, convenient and tailored to local needs
 - The rail network providing a fast, reliable and efficient service, particularly for inter-urban journeys and commuting into large urban areas
 - The road network providing a more reliable and free-flowing service for both personal travel and freight, with people able to make informed choices about how and when they travel
 - Ports and airports providing improved international and domestic links.
- 1.10. The goals of *Towards a Sustainable Transport System* and the subsequent document *Delivering a Sustainable Transport System* are²:

¹ 'Planning Policy Guidance 13: Transport' Office of the Deputy Prime Minister, March 2001. Section 1.

² 'Delivering a Sustainable Transport System', Department for Transport, November 2008. Pg 7.

- To support national economic competitiveness and growth, by delivering reliable and efficient transport networks
 - To reduce transport's emissions of carbon dioxide and other greenhouse gases, with the desired outcome of tackling climate change
 - 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 promote greater equality of opportunity for all citizens, with the desired outcome of achieving a fairer society
 - To improve quality of life for transport users and non-transport users, and to promote a healthy natural environment.
- 1.11. It is also clear from the recent *Climate Change Act 2008*³ that there is an enhanced commitment and legal responsibility to improve carbon management to help the transition towards a low carbon economy in the UK.
- 1.12. *Circular 2/07: Planning and the Strategic Road Network* is a statement outlining the involvement of the Highways Agency in the planning process. With respect to Local Development Frameworks, for which the HA are a statutory consultee, it states that '*The Agency will offer advice and technical support that will guide the scale and location of proposals in relation to the strategic road network. The Agency will also provide guidance, for incorporation in the plan, on the scale and nature of improvements to the strategic road network and demand management measures*' (page 4). The circular also emphasises that the Strategic Road Network (SRN) cannot be expected to accommodate unconstrained traffic growth, and that development should be located at sustainable locations and incorporate demand management measures.
- 1.13. Transport policies and objectives in the Government framework have been cascaded and refined through the regional and sub-regional planning process to direct transport decisions across Hertfordshire. The *Regional Transport Strategy (RTS)*⁴ seeks to manage travel behaviour and transport demand effectively for all, and reduce the rate of road traffic growth to ensure the transport sector makes an appropriate contribution to reducing greenhouse gas emissions.
- 1.14. Complementary transport policies are confirmed at county level by the Local Transport Plan and its supporting documents, such as the bus and rail strategies. Objectives in the

³ The Climate Change Bill was introduced into Parliament on 14 November 2007 and became law on 26th November 2008. Copies of the Climate Change Act 2008 can be obtained via the OPSI website: http://www.opsi.gov.uk/acts/acts2008/ukpga_20080027_en_1.htm

⁴ 'East of England Plan', East of England Regional Assembly, May 2008. Page 39.

Hertfordshire County Council (HCC) *Local Transport Plan 2006/ 07 - 2010/ 11 (LTP2)*⁵ focus on:

- Improving safety
- Obtaining the best use of the existing network through effective design, maintenance and management
- Managing transport growth and travel volumes across the county to secure improvements in the predictability of travel time
- Developing an efficient, safe, affordable and enhanced transport system which is attractive, reliable, integrated and makes best use of resources
- Developing a transport system that provides access to employment, shopping, education, leisure and health facilities for all, including those without a car and those with impaired mobility
- A transport system that contributes towards improving the efficiency of commerce and industry and the provision of sustainable economic development in appropriate locations
- Mitigating the effect of the transport system on the built and natural environment and on personal health
- Raising awareness and encouraging use of more sustainable modes of transport through effective promotion, publicity, information and education
- Reducing the need for the movement of people and goods through integrated land-use planning, the promotion of sustainable distribution and the use of telecommunications.

1.15. Hertfordshire's *LTP Accessibility Strategy 2006/07-2010/11* is another important component that guides decisions on transport planning and land-use/ master planning with objectives aimed at:

- Supporting those who are disadvantaged to achieve their potential and to access sustainable employment
- Working in partnership with transport providers to achieve an efficient, affordable and enhanced transport system
- Developing a transport system that provides access to employment, shopping, education, leisure, and health facilities for all, including those without a car and those with disabilities.

1.16. The DBC *Local Development Framework (LDF)* is currently being developed. The Local Plan, adopted in April 2004 contains the following key policies related to transport and growth:

⁵ 'Hertfordshire Local Transport Plan 2006/07-2010/11', Hertfordshire County Council, March 2006. Page 42-43.

- Land-use planning will maintain a good relationship between different land-uses and with passenger transport. Traffic volumes should be reduced, and car parking will be controlled to discourage unnecessary car use.
 - The Council will give priority to modes in the following order:
 - Walking
 - Cycling
 - Passenger transport
 - Powered two wheeled vehicles
 - Other motor vehicles.
 - Development must be compatible in locational and general highway planning, design and capacity terms with the current and future operation of the defined road hierarchy;
 - Use of traffic management measures, including those designed to improve road safety, effect environmental improvements, divert intrusive traffic (particularly lorries), facilitate and control parking, and in appropriate cases improve traffic flows, will be considered jointly by the planning and highway authorities as problems and opportunities arise. Schemes will be promoted where an appropriate balance between road safety, environmental benefits, and traffic flow can be achieved;
 - Parking provision and management will be used as a tool to reduce car ownership and use
- 1.17. These policy considerations have consequently motivated and channelled the selection of new interventions set out in this report. Transport planning and infrastructure cannot deliver the outputs to achieve these objectives on their own. Policy and good practice dictate that land-use and transport planning must work together to deliver the most appropriate pattern of sustainable development to improve accessibility across Dacorum.
- 1.18. This assessment takes this into consideration and has a presumption in favour of infrastructure that promotes sustainable modes above the private car, whilst recognising that it is necessary to maintain a good road network for essential vehicle trips.
- 1.19. DBC has a coherent conceptual vision for Dacorum, in which the diverse parts of the borough develop in a unified and complimentary way. The vision includes a clear set of aspirations for Hemel Hempstead, as articulated in the work of the Hemel 2020 Vision, which is owned by the Dacorum Partnership, The Local Strategic Partnership (LSP). Hemel 2020 currently has key five projects:
- Town centre regeneration
 - Maylands
 - Neighbourhood improvements and regeneration

- Green spaces
- Housing in growth areas.

1.20. Considerable planning work has been undertaken on these workstreams by the Hemel 2020 Partnership and other stakeholders, and there are likely to be implications for infrastructure in key sites such as the 'gateways' at Maylands and the station, ranging from utilities and transport infrastructure to public realm works and social facilities. Elements relating to utilities works are covered throughout this report as relevant. The regeneration plans have been revised in recent months due to economic pressures, however DBC remains committed to their implementation in collaboration with its partners.

2. BASELINE

General Overview

- 2.1. Issues relating to Dacorum’s existing baseline transport infrastructure have been identified from a document review and stakeholder consultation. A summary of the outcomes is presented in Table 2-1, with a list of the documents reviewed and consultees identified in Appendix A.

Table 2-1: Dacorum Borough - Baseline Transport Issues

<p>Walking</p> <p>It is considered that there is poor pedestrian access to Hemel Hempstead station due to its remote location. There are stretches of road that may discourage walking during hours of darkness as a result of a lack of development alongside the roads that access the station from the main built up area.</p> <p>Cycling</p> <p>The need for an integrated cycle network.</p> <p>Bus</p> <p>A lack of bus services serving the rail station, residential, employment and leisure services across Hemel Hempstead.</p> <p>Bus frequencies in smaller urban areas are low.</p> <p>Rail</p> <p>Poor access to Hemel Hempstead rail station.</p> <p>Road</p> <p>Congestion, particularly on the A414 in peak periods.</p> <p>An imbalance/ lack of parking provision, as well as issues related to controlling parking including inappropriate parking in Berkhamsted and Northchurch.</p> <p>Rat-running and goods traffic on some rural roads.</p> <p>Commuters parking on residential streets in Hemel Hempstead.</p> <p>Rat-running and speeding traffic in urban areas.</p> <p>Other</p> <p>The impact of transport on air quality.</p> <p>A lack of travel information.</p> <p>Poor accessibility in some rural areas.</p>
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- 2.2. Based on the HIIS⁶ baseline of 2011 key stress points on the road network are shown on Figure 2-1 and occur at:

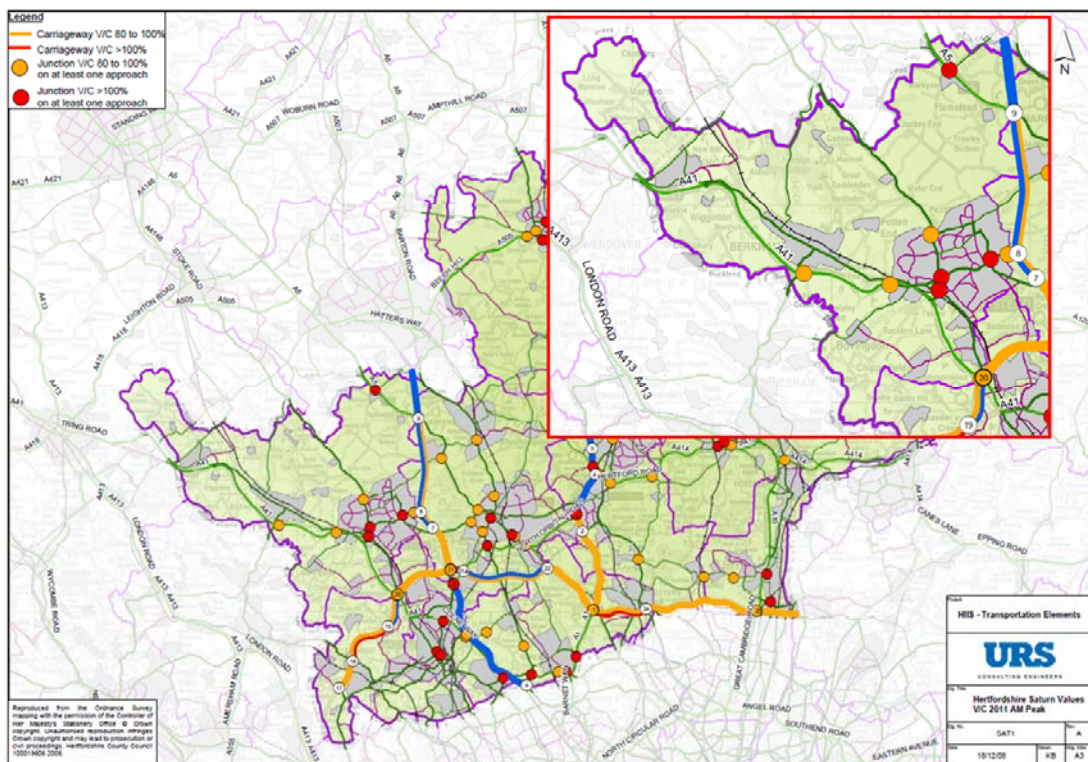
⁶ Hertfordshire Investment & Investment Strategy, Hertfordshire County Council and Partners (2009)

- Junctions within the main urban area of Hemel Hempstead;
- A4146 within northern Hemel Hempstead;
- A41 south and west of Hemel Hempstead plus A41 south of Berkhamsted; and
- A5 west of M1 at Markyate, surrounding the B4540 junction serving Slip End and Luton.

2.3. The HIIS work also indicates that in 2011 there will be stress on the M1 and M25 without proposed growth, although the M25 is likely to improve as current works to widen the carriageway and provide additional capacity are completed through south-western Hertfordshire.

2.4. Analysis for HIIS indicated that the AM peak showed the greatest level of stress on the road network and was therefore used as the critical time period to identify transport infrastructure need. A comparable PM peak version of Figure 2-1 is, therefore, not available. For the purpose of this assessment it is assumed that network stress would occur at the same locations, particularly with respect to junctions, although the balance of flow on certain links could vary.

Figure 2-1: Dacorum Strategic Road Stress 2011⁷



V/C = Ratio of Volume to Capacity - Measure of network stress in the East of England Regional Model, a SATURN model. In this instance a V/C of 80-100% indicates a link or junction under stress. A V/C over 100% indicates

⁷ Source: Taken from Hertfordshire Infrastructure & Investment Study Transport Technical Report, with specific focus on Dacorum Borough Council area.

network over capacity.

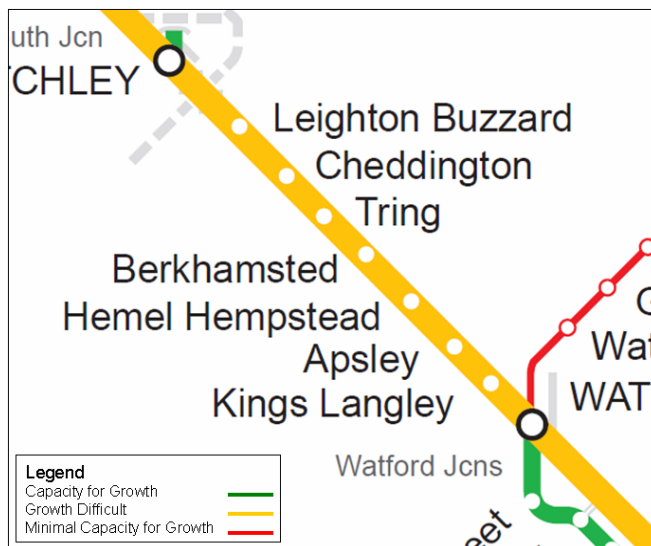
- 2.5. Mainline Rail is a good travel option for Dacorum, with four stations available to include Apsley, Berkhamsted, Hemel Hempstead and Tring. Apsley Station is a relatively short distance south of the Hemel Hempstead Station alongside the A4251, which effectively gives the town access to two stations.
- 2.6. There has been net annual growth of rail use across Dacorum in the last year for which data is available (see Table 2-2), although notably the figures indicate a reduction at Apsley Station, which is likely to respond to the geographic location of the station and the service levels, which are highlighted below.

Table 2-2: Station Use in Dacorum 2007/08 and Comparison With 2006/07

Station Name	Entries Season	Entries Total	Exits Total	06-07 Entries & Exits	07-08 Entries & Exits	Total Change
Apsley	88,813	202,925	202,855	414,680	405,780	-2%
Berkhamsted	318,320	707,003	715,659	1,340,014	1,422,662	+6%
Hemel Hempstead	289,747	834,781	855,815	1,577,266	1,690,596	+7%
Tring	127,774	290,720	296,753	553,253	587,473	+6%
TOTAL	824,654	2,035,429	2,071,082	3,885,213	4,106,511	+6%

- 2.7. The growth in rail patronage is in contrast to the limited capacity for growth on the rail network supporting the district in future years. Figure 2-2 shows a network growth will be difficult through the borough.

Figure 2-2: Baseline Rail Capacity



Source: West Coast Mainline RUS Baseline Information 2008

- 2.8. The recent West Coast Mainline Upgrade and planning for High Speed 2 seem likely to mean that there will be no significant improvements to capacity on the rail network in the foreseeable future. High Speed 2 (HS2) is a proposed high speed rail system running from London to the Midlands and potentially beyond, it could be operational in approximately 2027.
- 2.9. There are approximately five regional peak hour trains between London and Milton Keynes in each direction at the stations listed in Table 2-2. London and Milton Keynes provide opportunities for onward travel to a variety of locations across the country including places such as London and Birmingham.
- 2.10. In the periods from 08:00-09:00hrs and 17:00-18:00hrs (the peak periods for this assessment) Hemel Hempstead consistently experienced the highest service frequency when compared with other stations across the Borough. This is likely to respond to the relative size of Hemel Hempstead and the stations proximity to a sizable catchment. Table 2-3 presents the frequency at each station in Dacorum in the peak periods. Of particular note is the difference between Hemel Hempstead and Apsley with the latter generally offering fewer than half the number of trains as the former; this could also help explain the relative difference in passenger numbers between the two.

Table 2-3: Peak Hour Train Frequency at Dacorum Stations

Station Name	To London		From London	
	AM Peak Frequency	PM Peak Frequency	AM Peak Frequency	PM Peak Frequency
Apsley	2	2	2	3
Berkhamsted	3	4	4	4
Hemel Hempstead	6	5	5	5
Tring	4	3	3	5

- 2.11. URS has considered the impact that HS2 could have on the capacity of the rail network through Dacorum. HS2 would provide for strategic rail trips within the UK (no stations are anticipated between London and Birmingham), the rail network through Dacorum is regional in nature and as a result it is not expected that there will be long distance passengers on trains stopping at Dacorum stations (for example a trip from London to Birmingham can expect to be made using the West Coast Main Line intercity service at present). It is not, therefore, anticipated that HS2 would release significant capacity on the regional rail network and cannot be considered to improve conditions on the trains serving Dacorum once delivered.

Sub Area Issues

- 2.12. As noted in the introduction the strategic picture above has also been supplemented by a more detailed assessment and review of eight sub areas. The baseline transport conditions and known issues collated for each at this time are:

Area 1: Hemel Hempstead

- Accessibility will be improved by a new covered bus station in Hemel Hempstead Town Centre and improvements to the rail station as a gateway to the town.
- It is considered that there is a need to improve the condition of roads and reduce congestion.
- Bus services have recently been reduced to and from Maylands, with operation limited between 9am and 5pm, despite indications from commercial interests at Maylands suggesting that faster links to the town centre and station are required. The reduction in bus service frequency is also in tension with the desire to develop Maylands as one of a number of 'Gateways' for Hemel Hempstead. In support of development at Maylands a Maylands Sustainable Transport Study is being prepared.
- Provisional modelling undertaken for HCC indicates that key impacts from growth to 2031 will affect:
 - A414 Breakspear Way/ St Albans Road corridor.
 - A4147/ Redbourn Road corridor.
- Modelling has confirmed the need for the North East Relief Road.

Area 2: Berkhamsted

- Movement is easier east-west along the valley floor than north-south across and up the valley.
- There is limited car parking capacity or room for expansion. There are issues with parking in residential areas and no control over station parking prices, which affects where commuters park. A deck has however been proposed for the station car park (although no date confirmed). Residents are opposed to a parking scheme.
- Uncertain status of a link between New Road and Springfield Road, which may bring relief to the Northchurch area.
- It is considered that there is a requirement for improved cycle links, particularly to the station.

Area 3: Tring

- East-west movement on the valley floor is generally easier than north-south movement up valley sides.
- Improved walking and cycling links throughout the town could enhance the accessibility of attractions for residents and improve the attractiveness of the town for visitors.
- Perceived need for enhanced cycle routes and extended parking at the railway station.

Area 4: Bovington

- High Street suffers severe congestion, partly due to on-street parking. This discourages walking and cycling and contributes to an unattractive atmosphere. There may be potential for car parks at either end of the High Street or re-organised parking on the High Street, although no funding identified for either of these initiatives.

Area 5: Markyate

- There is congestion stemming from relatively high car ownership and limited parking spaces.
- Unreliable passenger transport services that are poorly integrated with larger local towns including Luton and Dunstable, which places reliance on car.
- Desire to improve range of facilities in the village, encourage better public transport connections between Markyate and Luton/ Dunstable and provide a better car park close to the village centre to reduce pressure on spaces along the High Street.

Area 6: Kings Langley

- There are good rail and road links to other towns although better walk and cycle links are needed to access the station.
- Concerns about high levels of traffic along the High Street and a desire for off-street parking expressed at community consultations.
- To increase accessibility to the canal better signage and pedestrian links are needed in and around the village.

Area 7 & 8: Rural East & Rural West

- There is a need to continue the policy of directing traffic to primary routes, potentially through enhanced signage.
- Tring station acts as a gateway for the Chilterns, with the station building due for replacement.
- Initiatives such as Ashridge Cycling Strategy and strengthened links to public transport need to be reinforced to reduce the impact of congestion from leisure visitors to the countryside.
- Bus services are not well patronised but are crucial for those without access to a car and to enable sustainable access to market towns and urban areas.

- Cycling in the countryside tends to be for leisure however routes between towns could be improved e.g. Grand Union Canal towpath and NCN 57⁸
- Need to improve safety on links between sections of public footpaths and bridleways. DBC consider this a priority.

⁸ National Route 57 (NCN57) of the National Cycle Network will run between Cricklade in Wiltshire and Welwyn Garden City in Hertfordshire via Oxford. Most of the route between Cricklade and Oxford is still awaiting development. The proposed route passes north of Bovingdon on a northeast/ southwest axis into Hemel Hempstead, once through Hemel Hempstead it runs along the existing Nickey Line into Harpenden.

3. ASSESSMENT FRAMEWORK

Assessment Approach

- 3.1. The assessment of the growth impact has been based on existing published evidence and further proof provided by stakeholders, to include the Highways Agency, HCC, Hertfordshire Highways and Network Rail.
- 3.2. The impact of growth has been completed as a spreadsheet exercise to quantify the potential trip generation, apportion these trips to transport modes and then distribute vehicle trips across the road network to determine impacts. This approach is judged to be appropriate for the study as it:
 - Is multi-modal.
 - Uses trip rates and mode shares appropriate to each land-use type.
 - Considers the impact of trips across the network, not just where they are generated.
 - Is applied to robust baseline information.
 - Uses a reasonable level of disaggregation to assess the impact of trips at a local but not at a micro level.
 - Assumes a realistic level of detail attached to predicted development that will ultimately be built at specific locations, adopting borough-wide assumptions for trip generation, mode share, and distribution.

Identification of Growth Zones

- 3.3. This assessment uses the development trajectory agreed with DBC. To ensure that development was disaggregated to an appropriate local level URS worked with DBC to identify zones for growth where residential development information was available.
- 3.4. Information for other land-uses was not available at this more refined level and as a result the projected quantum has been distributed on a pro-rata basis. For example retail development for Berkhamsted has been distributed across the Berkhamsted zones based on the proportion of residential development at each. The location of the zones is shown in Figure 3-1. For further reference the zones are named and listed in Table 3-1.
- 3.5. For consistency the development zones aggregate-up to the eight sub-areas of Hemel Hempstead, Berkhamsted, Tring, Bovingdon, Markyate, Kings Langley, Rural East, and Rural West that are referenced across all disciplines providing input to the Dacorum Infrastructure Study. For reference purposes they have been colour coded to aid identification.

Figure 3-1: Location of Development Zones

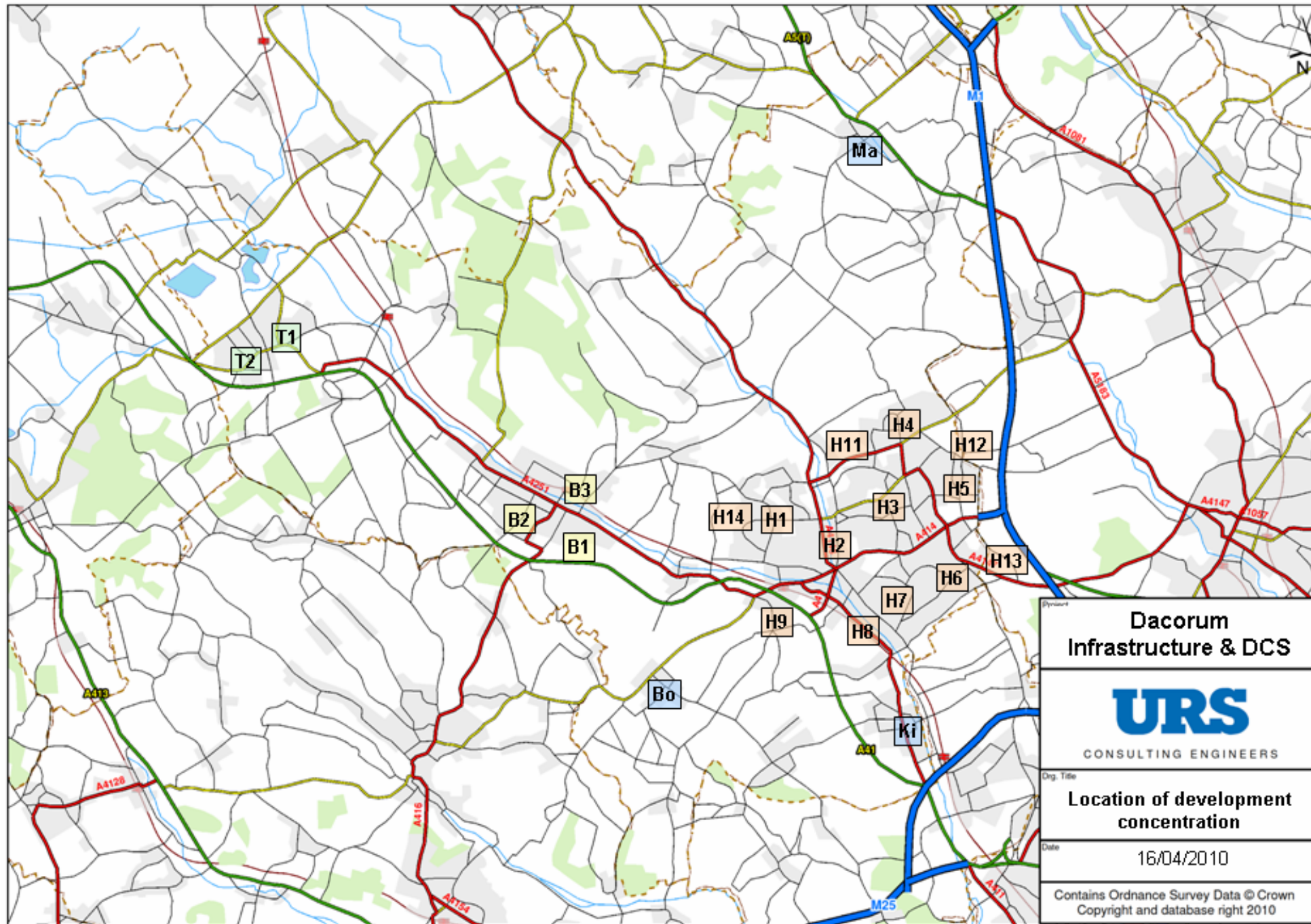


Table 3-1: Dacorum Development Zones

ID	Name	ID	Name
H1	Hemel Hempstead 1	H14	West Hemel
H2	Hemel Hempstead 2	B1	Berkhamsted 1
H3	Hemel Hempstead 3	B2	Berkhamsted 2
H4	Hemel Hempstead 4	B3	Berkhamsted 3
H5	Hemel Hempstead 5	B4	Berkhamsted Other
H6	Hemel Hempstead 6	T1	Tring 1
H7	Hemel Hempstead 7	T2	Tring 2
H8	Hemel Hempstead 8	T3	Tring Other
H9	Hemel Hempstead 9	Bo	Bovingdon
H10	Hemel Hempstead Other	Ma	Markyate
H11	Marchmont Farm	Ki	Kings Langley
H12	Wood End Farm	RE	Rural East
H13	Leverstock Green	RW	Rural West

Planning Scenarios and Population Growth

- 3.6. The total dwellings and jobs for each land-use type for the low and high growth scenarios respectively is shown in Table 3-2 and Table 3-3. These figures accord with the Development Trajectory set out in Figure 1-1 with full details of how the trajectory was derived set out in the URS *Executive Summary Report*.
- 3.7. As described in the *Executive Summary Report* there are two approaches that can be applied when considering potential population increases related to housing growth:
- Applying a projected average household size to the increase in dwellings to provide an indication of residents in the new dwellings. This approach is most relevant to considering the local impacts of new housing on infrastructure with a smaller catchment area.
 - Alternative population forecasts are derived from demographic projections that take background change (migration, natural decline as the population ages, etc.) in Dacorum's existing population into account. This approach is most relevant to considering the overall impact of population change on infrastructure that has a wider catchment and is less sensitive to the geographical location of growth.
- 3.8. In assessing transport impacts of population growth, the first approach has been adopted.
- 3.9. The assessment has been carried out 'bottom-up', by considering growth within identified development zones. This is because it is important to consider local impacts on transport infrastructure and to capture the impacts of growth versus those inherent with historical deficit. A resulting caveat should be noted when interpreting the headline results of the assessment that aggregate-up costs and consider borough and sub-regional requirements. The population figures represent a worst-case scenario as they do not reflect background declines in the existing population. As a consequence this element of the assessment may over-estimate impacts. This is consistent with the scope of the study.
- 3.10. Table 3-2 and Table 3-3 show that the dwellings (that can be directly interpreted into population using a factor of 2.73) increase significantly in the high growth scenario compared with the low growth scenario. The majority of this growth (18,564 people) is at sites H11 to H14, which are not present in the low growth scenario; the remainder is spread across Hemel Hempstead. Zones H11 to H14 would be Sustainable Urban Extensions (SUEs), extending the boundary of Hemel Hempstead.
- 3.11. The increase in dwellings in the high growth scenario represents a change of 76% over the low growth scenario. There is no change in the number of jobs in the office, industrial, and warehouse land-uses. Jobs in retail increase by 17% in the high growth scenario compared with the low growth scenario, while jobs in leisure increase by 66%.
- 3.12. Both Table 3-2 and Table 3-3 show a reduction in jobs in the industrial and warehouse land-uses in Hemel Hempstead, Berkhamsted, and Tring. This reflects the net change anticipated in the different urban areas; no growth-only information for these land-uses was available for

this study. Using the information available for other land uses only the change from growth was taken into account, consistent with the scope of this study.

Table 3-2: Low Growth Scenario Dwellings and Jobs (2009/11 to 2031)⁹

Area	Dwellings	Office	Industrial	Warehouse	Retail	Leisure
Hemel Hempstead	7,221	9,143	-1,460	-157	2,267	716
Berkhamsted	797	508	-81	-9	250	71
Tring	305	508	-81	-9	117	71
Bovingdon	83	0	0	0	0	0
Markyate	124	0	0	0	0	0
Kings Langley	83	0	0	0	0	0
Rural East	88	0	0	0	0	0
Rural West	241	0	0	0	0	0
TOTAL	8,942	10,159	-1,622	-174	2,634	858

Table 3-3: High Growth Scenario Dwellings and Jobs (2009/11 to 2031)

Area	Dwellings	Office	Industrial	Warehouse	Retail	Leisure
Hemel Hempstead	14,021	9,143	-1,460	-157	2,719	1,279
Berkhamsted	797	508	-81	-9	250	71
Tring	305	508	-81	-9	117	71
Bovingdon	83	0	0	0	0	0
Markyate	124	0	0	0	0	0
Kings Langley	83	0	0	0	0	0
Rural East	88	0	0	0	0	0
Rural West	241	0	0	0	0	0
TOTAL	15,742	10,159	-1,622	-174	3,086	1,421

- 3.13. The growth by period for each land-use for the low and high growth scenarios is shown in Table 3-4 and Table 3-5 respectively, with the profile of the change in dwellings. It is evident that the increase in growth in the high scenario shifts the balance of growth towards the second half of the study period; however, despite this there is still a greater dwelling growth in the early years compared to the low growth scenario. This means that while the high growth scenario is likely to place more stress on the transport network overall it is also likely that stress will be evident sooner and so potentially require earlier intervention, i.e. it will absorb capacity quicker.

⁹ Note: Population change is people, 2009 to 2011; commercial change is jobs, 2011 to 2031.

Table 3-4: Low Growth Scenario Development Trajectory (Dwellings & Jobs)

Land-Use	2009-2011	2011-2016	2016-2021	2021-2026	2026-2031	2011-2031	2009-2031
Dwellings	918	2,672	2,721	1,171	1,460	8,024	8,942
Pop. Change Profile	10%	30%	30%	13%	16%	90%	100%
Office	0	2,213	2,213	2,658	3,074	10,159	10,159
Industrial	0	-635	-635	-239	-114	-1,622	-1,622
Warehouse	0	-151	-151	30	97	-174	-174
Retail	205	658	490	618	664	2,429	2,634
Leisure	0	215	215	215	215	858	858

Table 3-5: High Growth Scenario Development Trajectory (Dwellings & Jobs)

Land-Use	2009-2011	2011-2016	2016-2021	2021-2026	2026-2031	2011-2031	2009-2031
Dwellings	918	3,572	4,321	3,671	3,260	14,824	15,742
Pop. Change Profile	6%	23%	27%	23%	21%	94%	100%
Office	0	2,213	2,213	2,658	3,074	10,159	10,159
Industrial	0	-635	-635	-239	-114	-1,622	-1,622
Warehouse	0	-151	-151	30	97	-174	-174
Retail	228	718	555	743	842	2,858	3,086
Leisure	0	355	355	355	355	1,421	1,421

Trip Generation

- 3.14. The quantum of development that Dacorum will experience is predicted to generate a considerable amount of traffic. To quantify this in transport terms the TRICS¹⁰ 2010a (Version 6.5.1) database was used to identify trip rates for each land-use type. TRICS is a standard planning tool for the calculation of trip rates to a range of possible developments.
- 3.15. In the case of dwellings the trip rate is based on person trips per dwelling, while for non-residential land uses they are based on jobs. In each case the trip rates were based on dwellings (residential) or jobs growth (office, industrial, warehouse, retail and leisure). Further details are provide in Figure 1-1. The foundation for the trip rates used is outlined below.
- 3.16. The population or number of jobs are directly related to dwellings/ gross floor area. The trip rates show the number of trips generated as a function of dwelling and employee numbers.
- 3.17. It is not the residents or employees who make all the trips. For example in a residential area some trips are made by service providers such as shopping deliveries and household

¹⁰ Trip Rate Information Computer System.

maintenance providers; at retail locations many trips are made by shoppers rather than employees.

- 3.18. The trip rates used in this study are shown in Table 3-6 and were confirmed and agreed with Hertfordshire Highways and HCC at a Preliminary Findings Workshop held on 30 March 2010. Different trip rates for each time period have been generated to identify the impact in the peak periods and quantify the trip generation potential across a full day.
- 3.19. From Table 3-6 it is evident that the highest trip rate for non-residential uses is by far that for retail, suggesting that the location of and access arrangements for this land use type will be critical when managing impact on the transport network.

Table 3-6: Study Trip Rates

Land Use	AM (08:00-09:00)		PM (17:00-18:00)		Daily (07:00-19:00)	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Residential	0.07	0.45	0.33	0.18	2.52	2.79
Office	0.33	0.01	0.01	0.29	1.19	1.12
Industrial	0.43	0.23	0.26	0.34	3.24	3.27
Warehouse	0.11	0.03	0.06	0.11	1.22	0.94
Retail	2.34	0.51	4.86	7.03	66.37	66.55
Leisure	0.17	0.43	0.97	0.30	6.82	6.72

- 3.20. It should be noted that the trip rates from Table 3-6 have been generated specifically for this assessment to inform a strategic view of impacts. This does not imply that they are appropriate for use at individual sites across Dacorum as transport impacts related to individual development sites will need to be based on site specific trip rates when more detail is known and finally agreed with the planning and highway authorities.
- 3.21. Using the trips rates shown in Table 3-6 and the planning scenarios presented in Section 1.1 the trip generation for both the low and high growth scenarios was calculated. The trip rates were then applied to the development in each zone, with the total trip generation shown in the remainder of this section aggregated from the individual zone totals.
- 3.22. The trip generation for the low and high growth scenarios is presented in

Table 3-7 and Table 3-8. As the trip rates were applied to the individual land-uses, the change in trips for each land use is proportionate to the change in dwellings/ jobs described above. Across all land-uses the increase for inbound daily trips from the low to high growth scenario was 50,998 (24%) and for outbound daily trips an increase of 52,840 (25%). The reduction in industrial and warehouse jobs issued some negative trip generation, but overall there was a significant net increase in both scenarios.

Table 3-7: Low Growth Scenario Trip Generation

Use	Dwells/ Jobs	AM Trips		PM Trips		Daily Trips	
		Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Residential	8,942	599	4,007	2,975	1,619	22,568	24,958
Office	10,159	3,352	141	121	2,985	12,119	11,369
Retail	2,634	6,171	1,355	12,792	18,515	174,829	175,300
Leisure	858	144	374	827	259	5,854	5,765
Industrial	-1,622	-689	-371	-417	-552	-5,259	-5,304
Warehouse	-174	-20	-4	-9	-19	-211	-164
TOTAL		9,557	5,502	16,289	22,807	209,900	211,924

Table 3-8: High Growth Scenario Trip Generation

Use	Dwells/ Jobs	AM Trips		PM Trips		Daily Trips	
		Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Residential	15,742	1,055	7,053	5,240	2,850	39,731	43,937
Office	10,159	3,353	141	121	2,986	12,118	11,368
Retail	3,086	7,231	1,586	14,988	21,694	204,828	205,379
Leisure	1,421	238	615	1,371	428	9,694	9,548
Industrial	-1,622	-689	-371	-417	-552	-5,261	-5,306
Warehouse	-174	-18	-3	-10	-18	-212	-164
TOTAL		11,168	9,028	21,296	27,388	260,898	264,764

Trip Distribution

3.23. Distribution has been based on an assessment of 2001 Census Journey To Work (JTW) data. This analysis has identified that there are five principal movements based on destination local authority areas (see Table 3-9). The resident population are those living in Dacorum who travel to the locations in Table 3-9 (north, south, east, west, internalised) for work, while the workplace population are those people (both resident and non-resident) who work in Dacorum and travel from the places listed in Table 3-9.

Table 3-9: Assumed Vehicle Distribution

To/ From	JTW Resident	JTW Workplace
North	0%	2%
East	17%	15%
South	20%	16%
West	0%	0%
Dacorum Internalisation	62%	67%
Total	100%	100%

- 3.24. To reflect travel patterns to and from each potential development site the JTW Resident distribution has been used for outbound trips in the AM peak and inbound trips in the PM peak. The JTW Workplace distribution has been applied to inbound trips in the AM peak and outbound PM peak trips.
- 3.25. It is acknowledged that neither the JTW Resident nor Workplace census distribution will totally reflect all inbound and outbound trips across the whole day (i.e. it excludes school and leisure/ shopping trips) but for the purpose of this study the resident distribution has been used. The AM and PM trip generation has informed the infrastructure needs for Dacorum because they best represent peak demand and as a result the use of these mode shares does not unduly affect the outcome of the study.
- 3.26. Analysis of the Census data identified that on average 65% of trips are within Dacorum. It has been assumed that within Hemel Hempstead these trips generally stay within the town but for other areas it is expected that they will move around the district to a greater extent. It is also acknowledged that there will be some internalisation within larger developments. These sites will need to have robust strategies to encourage sustainable travel and it is assumed that this will mean the overwhelming majority of internalised trips within developments will be by walking and cycling.
- 3.27. In terms of rail trips the assessment also assumes that the predominant impact on the rail network associated with Hemel Hempstead town will be through Hemel Hempstead Station, despite the fact that the town also benefits from an alternative at Apsley.
- 3.28. The reasoning is based on the fact that Hemel Hempstead Station is more attractive for the majority of local rail users. This is evidenced by the station use statistics presented earlier in

Table 2-2, which shows that some 80% of rail passengers from the Hemel Hempstead catchment use Hemel Hempstead Station.

- 3.29. Part of the attraction is tied to the fact that it is currently served by a much higher service frequency (see Table 2-3) than Apsley. In addition it also offers around 496 car parking spaces while Apsley only has capacity for some 20 or 30 vehicles.¹¹ Although it is perhaps not desirable for significant numbers of rail users to access stations by car it is reasonable to acknowledge that this will be an attractive travel mode for many as part of an overall journey involving rail.
- 3.30. Furthermore the distribution of development around the town will mean that Hemel Hempstead Station is likely to be the closest for the majority of residents housed in proposed new developments.
- 3.31. The distribution described above has been applied to the trips for each zone. A series of diagrams has been produced to illustrate the number of trips from each zone and their broad distribution on the road network. Bus and rail trip numbers are also shown on the diagrams. As well as trip generation and distribution from growth the diagrams illustrate the baseline situation described in Section 2. The diagrams for the AM and PM peaks are presented in Appendix C for 2031. Orange links and junctions show where there is network stress (a ratio of Volume to Capacity (V/C) of 85% or greater). Red links and junctions show where the network is over capacity (V/C of 100% or greater).

Mode Share

- 3.32. Mode share data has been based on information gathered from both TRICS and 2001 Census data for Dacorum. For all land-uses the TRICS mode share for car driver and passenger and for goods vehicles has been used. For walking, cycling, bus, and rail trips the proportion of these uses from journey to work 2001 census data has been used to apportion the remaining mode shares.
- 3.33. It is acknowledged that 2001 Census data is now somewhat historic and that journey to work mode share may not reflect all trip purposes. The approach to mode share does however ensure robust proportions are adopted for each land-use. There are different mode shares for each use and time period, which are presented in Appendix B.
- 3.34. The mode shares should be taken to represent a worst case. Current policy requires a change in mode share favouring sustainable travel and this would need to be considered as growth sites come forward for development and are planned and implemented. This assessment takes this into consideration and has a preference for infrastructure that favours sustainable modes above the private car, while recognising that it is necessary to maintain a good road network for essential vehicle trips, including sustainable transport modes such as buses.

¹¹ <http://www.nationalrail.co.uk/stations/hml/details.html>, accessed 23/07/2010.

3.35. The mode share described above has been applied to the trips shown in Table 3-7 and Table 3-8. This generates the modal trips for the low and high growth scenario in Table 3-10 and Table 3-11. The totals do not add up to the totals in Table 3-7 and Table 3-8 because Table 3-10 and Table 3-11 do not show trips made by car passengers as these have no additional impact on the road network above that of the car drivers. The percentage of people who are car passengers is shown in Appendix B.

Table 3-10: Low Growth Scenario Modal Trips

	Light Vehicles	Heavy Vehicles	Walk	Cycle	Bus	Train	Tot Veh	Total
AM Inbound	4,807	48	1,628	208	659	1,009	4,855	8,359
AM Outbound	3,648	4	544	69	222	334	3,652	4,821
PM Inbound	8,106	-92	1,003	126	408	621	8,014	10,172
PM Outbound	10,372	-16	1,938	244	785	1,205	10,356	14,528
Daily Inbound	104,369	-318	20,728	2,634	8,419	12,883	92,628	137,292
Daily Outbound	93,236	-316	21,652	2,753	8,790	13,458	92,920	139,573

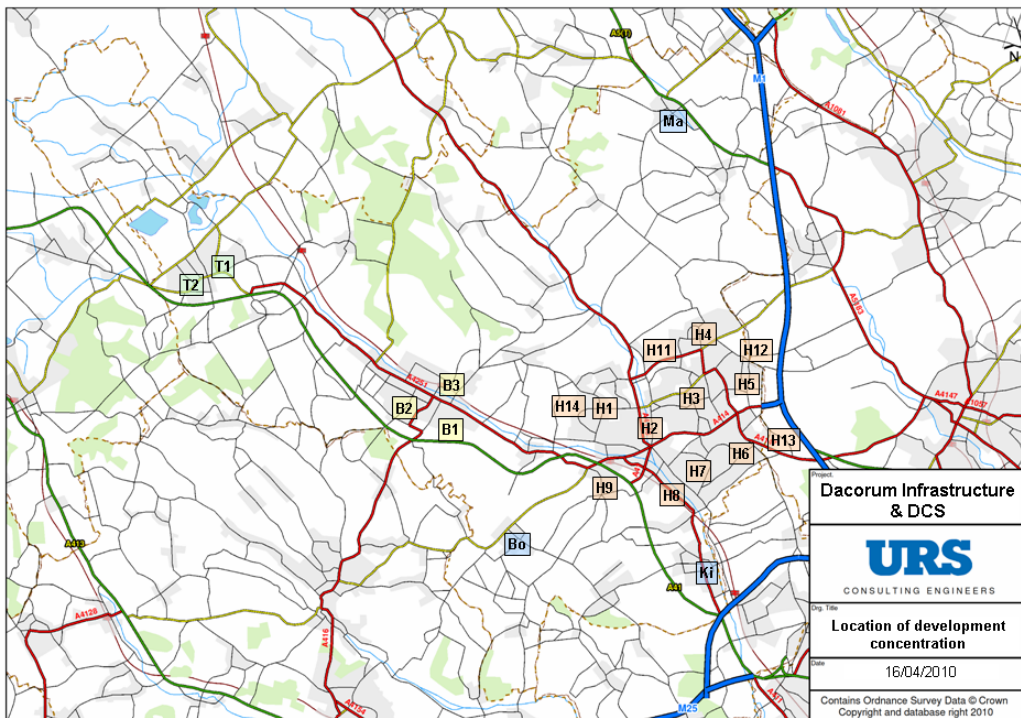
Table 3-11: High Growth Scenario Modal Trips

	Light Vehicles	Heavy Vehicles	Walk	Cycle	Bus	Train	Tot Veh	Total
AM Inbound	5,651	62	1,881	240	760	1,166	5,713	9,760
AM Outbound	6,084	20	898	111	362	552	6,104	8,027
PM Inbound	10,967	-88	1,369	172	555	850	10,879	13,825
PM Outbound	12,652	-14	2,313	292	937	1,441	12,638	17,621
Daily Inbound	160,499	-194	25,495	3,243	10,353	15,849	118,388	173,328
Daily Outbound	119,635	-183	26,583	3,381	10,790	16,519	119,452	176,725

4. DEVELOPMENT IMPACT ON THE TRANSPORT NETWORK

- 4.1. The development impact is based upon the modal trip generation shown in Section 3 for each scenario. Trip generation for areas outside Hemel Hempstead is identical in both the high and low growth scenarios because there are no additional development sites outside Hemel Hempstead in the high growth scenario. The impacts have been assessed for each of the periods ending 2011, 2016, 2021, 2026 and 2031 to inform the prioritisation of infrastructure.
- 4.2. The internalisation of trips within the borough means that some of the outbound generated trips from some areas become inbound trips at other locations within the borough. This has been taken into account during the assessment of impact discussed below. Where approximate numbers are given these represent an anticipated minimum based on the total outbound and inbound trip generation.
- 4.3. The trip distribution diagrams in Appendix C have been used to assess the impact of growth across the borough. In general any internalised traffic will be split between school trips, trips for work and trips for shopping and leisure. Trip generation for shopping and leisure is greater in the PM peak than the AM peak. For ease of reference the development zones diagram presented earlier in the report is repeated again here as Figure 4-1.

Figure 4-1: Development Zones



- 4.4. All quoted trip numbers, irrespective of mode, are for a peak hour unless otherwise stated.

Development Impact 2011

- 4.5. The small scale of growth to 2011 means that there is minimal impact above baseline conditions.

Walking & Cycling

- 4.6. The bespoke infrastructure used by pedestrians and cyclists is, to a large extent, shared by both. For example a cycle route may be used equally well by pedestrians for commuting and leisure walking, and signalised crossings can provide facilities for cyclists both as a crossing point and through the use of advanced stop lines.

Bus

- 4.7. Incremental additional passengers will mean that bus operators will need to adjust their timetabling and frequencies and possibly service routes, working in partnership with the planning and highway authorities to provide a sufficient level of service for the growing population.

Rail

- 4.8. Rail passengers use other modes to travel to/ from the station that they are using. This means further pressure on all modes and the need for cycling, parking, and bus facilities at stations. The impact of this additional travel cannot be quantified without further detailed study but the impact is likely to be fairly insignificant at this stage, although if the preference is for travel by car, this may place increased pressure on parking at rail heads.

Road

- 4.9. The principal baseline for road is presented for a 2011 position. This is not be expected to differ significantly from the present.

Development Impact 2016

- 4.10. Impacts have predominantly been identified for Hemel Hempstead, Berkhamsted, Tring, and to a lesser extent Markyate. Each of these is addressed in turn by mode.

Walking & Cycling

- 4.11. The demand for walking and cycling will be relatively localised, meaning that the zones that experience growth earliest will be those with the initial impacts.
- Hemel Hempstead – Walking and cycling demand will increase particularly in the town centre, as this is where the main focus of trips generation from growth will take place.
 - Berkhamsted – Walking will be reasonably well catered for in 2016 but with approximately one quarter of all development in place is likely to be more evident on core routes such as the High Street and Lower King's Road. There is some potential for increased cycling.

- Tring – Almost half of all development within Tring occurs by 2016; a significant element of the impact on walking and cycling facilities will therefore be generated by this time, although this impact will be minimal compared to other parts of the borough.
- Markyate – There will be limited additional walking and cycling trips in Markyate by 2016 as new growth by this period is expected to be minimal.

Bus

- Hemel Hempstead – There will be demand for bus travel particularly between the town centre, London Road Corridor south of the A414 (around Apsley) and the station and Maylands.
- Berkhamsted – The impact from additional bus passengers will be low in 2016.
- Tring – The impact on bus routes to Hemel Hempstead via Berkhamsted will be minimal in 2016.
- Markyate – Bus patronage from Markyate will be small at full build-out, as a result the impact will not be significant at any time.

Rail

- Hemel Hempstead – There will be significant demand for travel to and from the station from the town centre and the A4251 between the A414 and Nash Mills. In the high growth scenario there will also be demand for rail travel generated in east Hemel Hempstead (particularly Wood End Farm) that will need to be accommodated by other modes to access the rail network
- Apsley – Additional demand at this station will be relatively low and is unlikely to generate issues on the transport network
- Berkhamsted – There will be a relatively small number of additional rail trips in 2016. The potential for increased cycling in Berkhamsted will include multi-modal trips (i.e. cycle use to access the station).
- Tring – The increase in rail trips by 2016 is likely to increase demand for an improved cycle route to the station although the absolute demand is relatively low assuming current mode share
- Markyate – Markyate has no station but the development in the village will create a small demand for travel to other stations that is likely to be by car due to the relatively remote location of the town from a station and the low levels of bus service.

Road

- Hemel Hempstead – In 2016 the greatest impact on the road network will overwhelmingly be within the town centre and at zone H8 (the Apsley area). In the high growth scenario there will also be an impact from the Wood End Farm SUE.

- Berkhamsted – Traffic generation from zone B1 is slightly greater than zone B2. The impact from growth on the road network is likely to be minimal away from the High Street where traffic from all zones will have a joint impact.
- Tring – The traffic generation from growth at Tring is unlikely to have a significant impact on the road network in total and consequently will not have a noticeable effect in 2016.
- Markyate – Half of all development in Markyate is complete by 2016, although this is unlikely to have a noticeable impact.

Development Impact 2021

Walking & Cycling

- Hemel Hempstead – In 2021 there will be increasing demand for travel in the town centre. As development comes forward in the northeast of the town there will be demand for travel on radial routes to the edge of the town
- Berkhamsted – With almost half of all growth in Berkhamsted occurring in the period 2016 to 2021 cyclists will continue to become increasingly evident on core routes and increasingly within residential areas
- Tring – There is limited additional growth between 2016 and 2021; the impact on walking and cycling will be comparable with 2016
- Markyate – There will be limited additional walking and cycling trips in Markyate by 2021.

Bus

- Hemel Hempstead – There will be increasing demand for bus travel on routes within the existing urban area with at least 600 additional peak hour bus trips compared to a no growth scenario. This will predominantly be for radial trips and excludes rail access trips.
- Berkhamsted – Bus passenger numbers in Berkhamsted will increase dramatically, in relative terms, from growth to 2021, which may begin to affect capacity on bus services.
- Tring – There is limited additional growth between 2016 and 2021, the impact on bus routes will be comparable to 2016
- Markyate – Bus patronage from Markyate will be small at full build-out, as a result the impact will not be significant at any time.

Rail

- Hemel Hempstead – In the low growth scenario, based on existing mode shares, Hemel Hempstead will generate over 800 inbound and outbound trips on the rail network with more than 1,000 trips in the high growth scenario. In both instances there will be a considerable demand on the supporting road, bus, and walking and cycling networks for access to the rail stations. Assuming five trains per hour per direction, with the majority of

passengers travelling south, there may be between 50 and 100 additional passengers per train, which is unlikely to be sustainable; there may be potential for suppressed demand given existing capacity constraints.

- Apsley – Additional demand at this station will be relatively low and is unlikely to generate issues on the transport network.
- Berkhamsted – Across four trains per hour per direction the 161 passengers that will be using trains in 2021 will not have a significant impact on rail but will add to the cumulative impact on the line as a whole.
- Tring – There is limited additional growth between 2016 and 2021, the impact from rail will be comparable to 2016
- Markyate – Markyate has no station but the development in the village will create a small demand for travel to other stations that is likely to be by car.

Road

- Hemel Hempstead – Traffic generation will be focused on and around the town centre. There will be an increasing demand for cross town travel, particularly in the high growth scenario, that may change the balance of demand at principal junctions on the road network.
- Berkhamsted – By 2021 the focus of development is in zone B2. When combined with traffic growth at zone B1 this will lead to a visible impact at the junction of Kings Rd/ Kingshill Way/ Durrants Rd
- Tring – There is limited additional growth between 2016 and 2021, the impact on the road network will be comparable to 2016
- Markyate – By 2021 almost all growth will be in place in Markyate, however, the small level of traffic generation means that the impact of growth will be minimal.

Development Impact 2026

Walking & Cycling

- Hemel Hempstead – In the low growth scenario there will be at least 2,200 walking and cycling trips and in the high growth scenario at least 2,700 walking and cycling trips generated by growth in a single hour. This will place increasing demand on those areas impacted in 2021. In the high growth scenario there will be trips from the SUEs to the north, east, and west of the town, in particular from zones H12 and H13 (Wood End Farm and Leverstock Green respectively)
- Berkhamsted – There will be an increased demand for walking and cycling from both zones B1 and B2 that will need to be provided for to serve both onward travel by rail and trips within the town

- Tring – The demand for walking and cycling trips from growth will increase to more than 100 with development focused around the town centre
- Markyate – Walking and cycling numbers will not be sufficient to have an impact on local walking and cycling networks.

Bus

- Hemel Hempstead – In the low growth scenario there will be at least 250 additional bus passengers in 2026 compared to 2021, which will increase demand on radial trips to the town centre and station (particularly Hemel Hempstead Station). In the high growth scenario the expansion of Leverstock Green and the beginning of growth at SUEs to the north and west of Hemel Hempstead will generate pressure for orbital, as well as radial, trips.
- Berkhamsted – Principal demand will come from both zones B1 and B2
- Tring – Demand for bus travel will reach at least 40 two way trips (excluding school travel). This may impact bus routes through Berkhamsted and Hemel Hempstead because there will be less spare capacity on the buses at these locations.
- Markyate – Bus patronage from Markyate will be small at full build-out, as a result the impact will not be significant at any time.

Rail

- Hemel Hempstead – At existing mode shares rail demand will become increasingly difficult to accommodate on existing services.
- Apsley – Although it is not anticipated that passenger numbers at Apsley will of themselves overload the rail network the combined impact with other stations is likely to result in crowding. In 2026 in the High Growth Scenario the number of rail related car trips around Apsley may begin to increase stress on the road network in the immediate vicinity of the station.
- Berkhamsted – Rail demand will increase to a total of over 125 trips, increasing pressure on other modes for access to/ from the station and adding further patronage to a crowded rail network.
- Tring – Demand for rail travel will have a relatively small impact compared to other stations on the route. In part this is because it is furthest along the line, where capacity is likely to be greater, but principally it is because two-way passenger generation is approximately 60 trips spread across at least three trains in each direction.
- Markyate – Markyate has no station but the development in the village will create a small demand for travel to other stations that is likely to be by car.

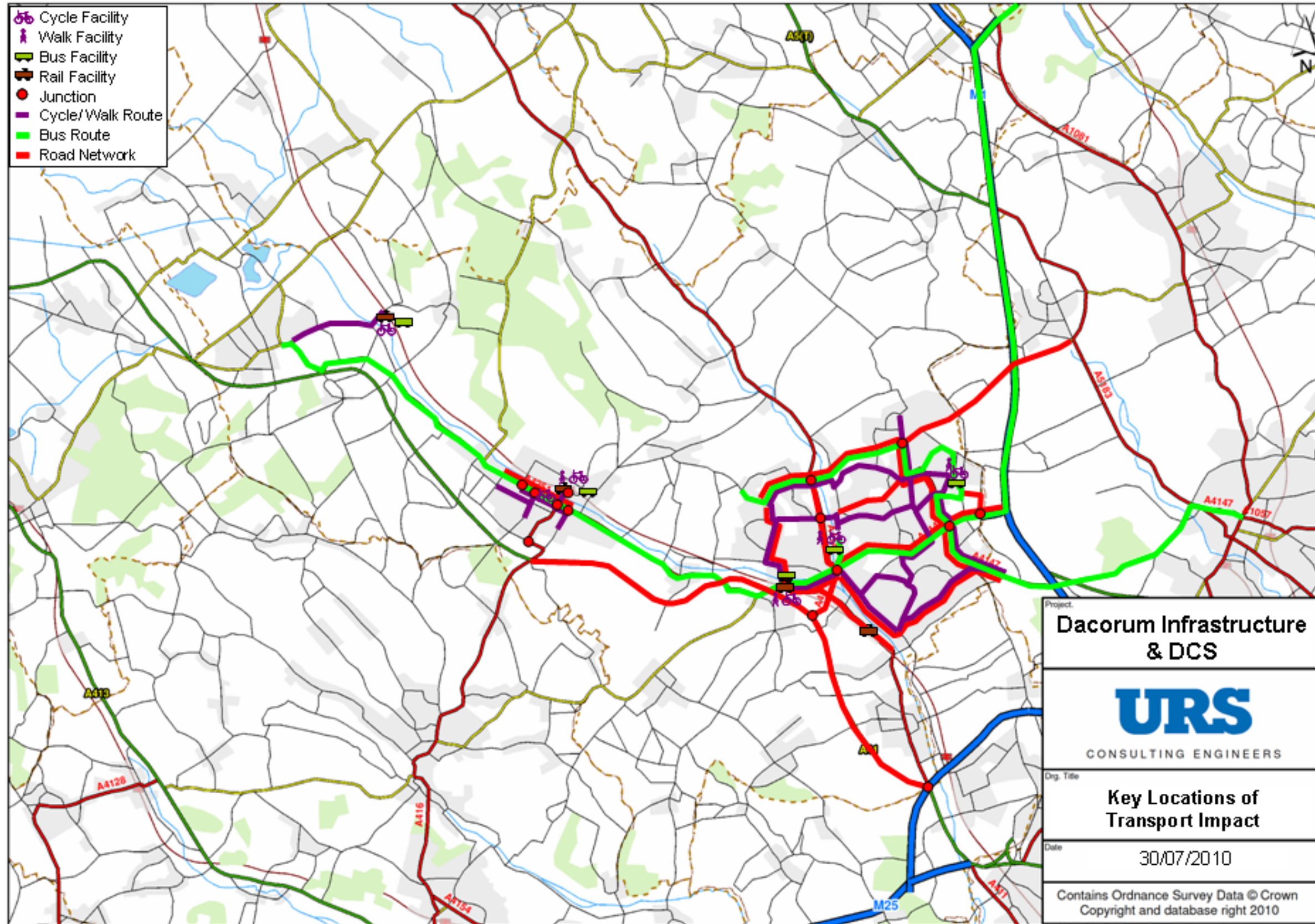
Road

- Hemel Hempstead – In the low growth scenario existing travel patterns will increasingly come under pressure as the town continues to grow. In the high growth scenario the additional development at the SUEs will alter the demand for travel to some extent and may require different solutions to junction capacity to accommodate the orbital movements that are likely to be generated. Orbital movements may be most noticeable around the Maylands area
- Berkhamsted – The impact on the road network will predominantly be generated by zone B2, placing increasing pressure on routes to the A41 via Kingshill Way There will also be almost 400 additional vehicle trips generated at zone B4 in 2026 compared to 2021, which is likely to increase pressure along London Rd to and from the A41.
- Tring – It is not anticipated that the road network will be unduly affected although local network improvements are likely to be required related to larger developments
- Markyate – There will be limited growth in Markyate between 2021 and 2026, as a result the impact on the road network in 2026 will be comparable with 2021.

Development Impact 2031

- 4.12. The cumulative impact of growth in Dacorum is assessed below and has been mapped in Figure 4-2.

Figure 4-2: Key Locations of Cumulative Transport Impact to 2031



- 4.13. The impact is addressed in more detail than above to provide the full picture of the impact attached with proposed growth and therefore provide a complete analysis of the overall strategic impacts that are anticipated.

Walking & Cycling

- 4.14. Trip generation suggests that there may be at least 3,000 additional walking and cycling trips in the low growth scenario based on the JTW mode shares from the 2001 census and 4,700 in the high growth scenario in 2031 in the busiest peak hour at Hemel Hempstead. These extra trips are likely to put additional pressure on strategic crossing facilities such as locations within the town centre and at employment areas such as Maylands. In addition to route infrastructure, cyclists will also require facilities to safely secure their cycles while shopping or working.

Bus

- 4.15. The maximum one-way peak generation for bus passengers from Tring and Berkhamsted is more than 100 outbound trips in both the high and low scenarios. With approximately 65% of this being internalised within Dacorum the impact on services between Tring and Berkhamsted, which have a combined frequency of approximately 2 buses per hour, will be significant assuming a bus passenger capacity of approximately 50 people per vehicle. There is provision for travel to places such as Watford and Luton for travel by bus.
- 4.16. Bus trips within Hemel Hempstead are likely to increase by at least 1,000 in the low growth scenario and some 1,300 in the high growth scenario. School trips will be less well reflected from this number because of the need to use census data. Approximately 160 and 208 (low/high growth scenario respectively) of these trips are likely to be travelling along the corridor to and from the east of England, predominantly via St Albans and Luton, with approximately two thirds travelling from Hemel Hempstead in the AM peak and to Hemel Hempstead in the PM peak; again based on distribution information obtained from the 2001 Census. This would strain local bus services noting that there are few access stops for the services travelling to/from the east. Coach services will carry some passengers where the journeys are beyond Hertfordshire.
- 4.17. Hemel Hempstead will be the main trip attractor for journeys generated within the town. The internal bus network is well developed on a radial pattern. With increased development across the town (and in the high growth scenario particularly on the edges of the town) there will be a desire for orbital and cross town movements that do not necessarily follow a desire line through the town centre. For example there is likely to be a demand for travel from the Leverstock Green and West Hemel urban extensions to Maylands Industrial Estate and Wood End Farm. At present the industrial estate does not have good penetration by bus and there are no direct services from northwest Hemel Hempstead.
- 4.18. There will be a demand for interchange in the town centre where cross town services cannot realistically be provided and for change between modes, perhaps from cycling to coach services. There will also be an increased demand for bus travel to rail stations (it is identified earlier in this report that the numbers of these passengers cannot be reasonably established in this report). Increased travel to/ from Maylands will increase the need for bus facilities there.

Rail

- 4.19. Across Dacorum it is anticipated that there would be a maximum of 1,009 inbound and 1,205 outbound rail trips in the low growth scenario and 1,166 inbound and 1,441 outbound in the high growth scenario. These would overwhelmingly be travelling to and from London (for commuting) based on census distribution data although in the PM peak and at weekends it is likely that there would be internalisation to and from Hemel Hempstead for leisure trips.
- 4.20. It will be important to encourage travel to and from the stations by bus, walking, and cycling, which will require provision of good facilities for these modes both in terms of routes and waiting/ storage facilities. Further work may be required at a town or zone level to establish appropriate strategies for maximising access to stations by sustainable modes.
- 4.21. In the low growth scenario approximately 84% of rail trips will use both the Hemel Hempstead and Apsley stations, with some 89% under high growth conditions. With approximately 80% of these likely to be attracted through Hemel Hempstead Station there will not only be pressure on this facility but also on the local supporting road and bus network and to cater for the potential further demand for walking and cycling.
- 4.22. In the high growth scenario there may be approximately 405 rail passengers generated at Apsley Station in the PM peak (inbound and outbound). A proportion of these will be 'Kiss & Ride' passengers where a family member or friend drops the passenger at the station but does not park there. If the number of people doing this becomes substantial when combined with existing passengers it may begin to cause congestion at the junction of the access road to the station.
- 4.23. The cumulative impact of additional demand for rail at all stations will increase pressure on the line, with potential for over crowding that provides a disincentive for some travellers creating an element of suppressed demand.

Road

- 4.24. The distribution of new growth traffic is based on 2001 Census data and is presented in Table 4-1 and Table 4-2 for total growth in Dacorum. Information from the census has been aggregated into five broad areas, these are listed below.
- North;
 - East;
 - South;
 - West; and
 - Internalised.
- 4.25. They have broadly been established based upon the regions of the UK (for example East Midlands, East of England, London and North West), which act as proxies for the approximate direction of travel to and from Dacorum. Internalised journeys are those that are to or from a destination within the district.

Table 4-1: Traffic Distribution for Total Growth in Dacorum (AM Peak)

	Low Growth Scenario		High Growth Scenario	
	Inbound	Outbound	Inbound	Outbound
North	23	61	27	102
East	813	563	956	941
South	983	568	1,157	950
West	11	15	13	26
Internalised	3,025	2,444	3,560	4,085
Total	4,855	3,652	5,713	6,104

Table 4-2: Traffic Distribution for Total Growth in Dacorum (PM Peak)

	Low Growth Scenario		High Growth Scenario	
	Inbound	Outbound	Inbound	Outbound
North	38	173	52	212
East	1,341	1,596	1,821	1,948
South	1,623	1,612	2,203	1,967
West	18	44	24	53
Internalised	4,994	6,931	6,779	8,458
Total	8,014	10,356	10,879	12,638

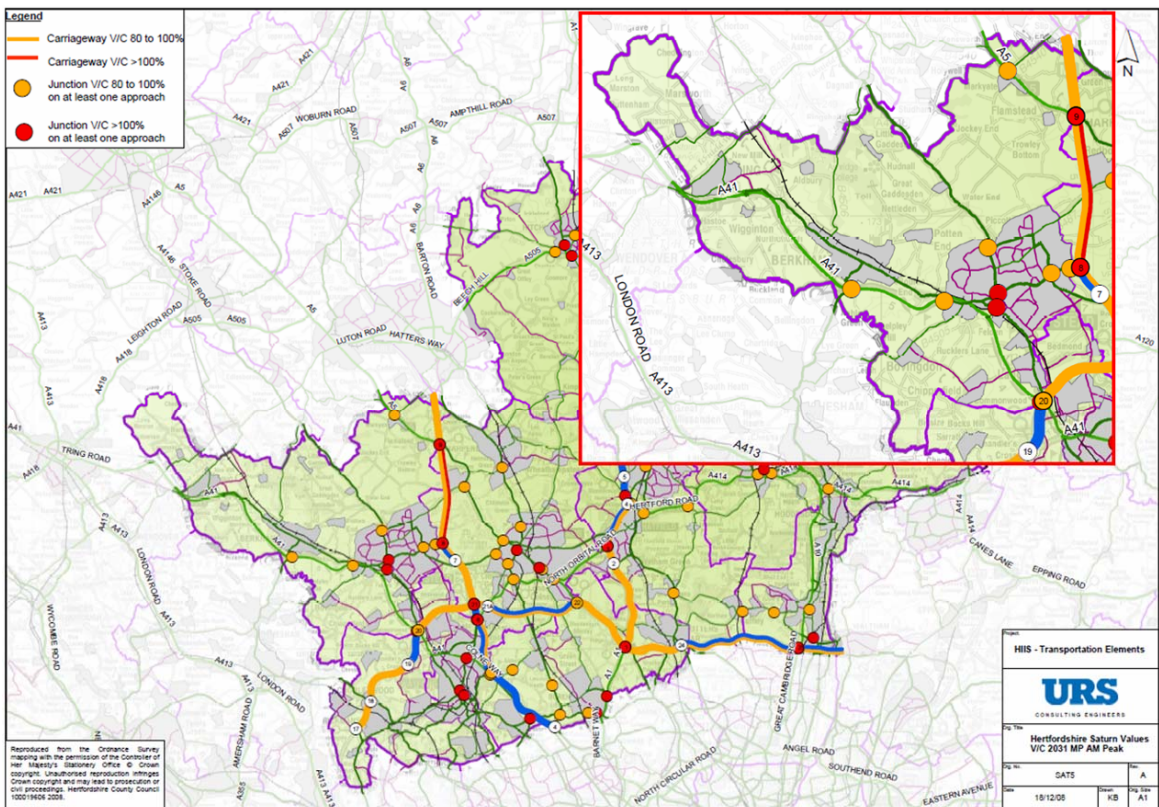
- 4.26. Traffic generation outside Hemel Hempstead is identical in both scenarios. In Tring the total traffic generation in the maximum peak hour amounts to an additional 16 vehicles per minute, assuming all the traffic uses the same junction. It is unlikely then that this will cause undue stress on the road network.
- 4.27. In Berkhamsted the equivalent assessment indicates that there may be an additional 36 vehicles per minute based on the absolute peak (PM) traffic generation. This is likely to have an impact at a number of junctions including those near the station and along the High Street. It seems likely that the maximum traffic generation in the PM peak of 1,661 vehicles would be sufficiently dispersed between the Kings Road and London Road corridors that any impact with junctions on the A41 would be minimal, although traffic generation from zones B1 and B2 may mean that there is some stress at the junctions from residential areas onto these main roads. The A41 is however, already under stress and, combined with traffic from other locations to include increased through traffic, this is likely to increase between Berkhamsted and the M25 including affecting operational capacity at M25 J20.
- 4.28. Traffic generation at Bovingdon and Kings Langley and from the Rural West and Rural East areas are relatively small and unlikely to have a significant local impact. Because traffic generation at Markyate is also small (45 vehicles in the AM peak and 44 vehicles in the PM peak, less than one vehicle per minute on average), it is unlikely in itself to cause additional congestion on the local or adjacent strategic road networks.

- 4.29. Traffic movements in Hemel Hempstead that are not internalised will predominantly travel to and from the M1 and A41, with some traffic likely to choose to travel to/ from the east via the B487. This will impact on strategic junctions such as M25 J20 and junctions along the A414 towards M1 J8.
- 4.30. Combined with these movements the internalised trips will place a great deal of pressure on the road network within the town itself. It can be expected that the majority of internalised vehicle trips would stay within Hemel Hempstead as this is the largest urban area and therefore the largest trip attractor in terms of employment, retail and leisure. This is despite the reduction of industrial and warehousing jobs.
- 4.31. In the low growth scenario the majority of traffic generation in Hemel Hempstead is focused between the A414 and A4147 (5,261 AM peak total inbound and outbound trips out of 7,197, 73%). This is a relatively beneficial focus for trip generation and although it means that there will be a significant impact on the 'central box' of Hemel Hempstead (A414/ A4147/ A4146) the concentrated nature of much of the development within this box means that there should be good opportunities to encourage mode shift. There will however, still be a significant number of trips generated outside this box, in particular the demand for travel to and from Maylands and the town centre from areas towards the edge of the town. This will impact on radial routes such as the A4146, B487 and A4251 south of Hemel Hempstead station to/ from Kings Langley (particularly within Hemel Hempstead). There is also likely to be an impact from traffic wishing to access the rail station from across the town that will be experienced at the Station Road/ London Road junction, the 'Magic Roundabout' and potentially from orbital trips through west Hemel Hempstead such as the Green End Road/ Fishery Road corridor.
- 4.32. In the high growth scenario the areas impacted by the low growth scenarios would be influenced to at least the same degree but the balance of trip making and demand at junctions would be affected by the concentration of residential development at the SUEs. In the AM peak the SUEs account for 3,711 vehicles (35%) out of a total of 10,507 while under the low growth scenario trips exclusively from the central box account for 50% of vehicles. This will generate an increased amount of traffic heading to the town centre but is also likely to lead to an increased demand for cross-town movements, such as from zone H14 (West Hemel) and zone H13 (Leverstock Green) to Maylands and the rail station. This will impose increased stress on the orbital routes to these locations including roads such as Green Lane and Chambersbury Lane.
- 4.33. In the high growth scenario traffic to and from the east of Hemel Hempstead, much of which will be attracted through J8 of the M1, may amount to some 3,929 PM peak vehicles (50% inbound and 50% outbound). It has already been recognised above that this will have an impact on junctions through the town and also increase demand at M1 J8. Both the M1 and J8 itself should have been upgraded within the time horizon for planned housing growth in Dacorum, consequently it is assumed that the SRN has broadly been improved to a standard that can accommodate increased traffic flows in the medium to long term where there has been major investment.
- 4.34. It is anticipated that the impact of growth in Dacorum on the SRN will be minimal. Figure 4-3 represents stress on the road network in and around Dacorum in 2031 using the East of England Regional Model and based on the HHS growth assumptions. It includes only

committed infrastructure, including the enhancement to the M25 currently being implemented. Figure 4-3 is comparable with Figure 2-1 that shows the baseline conditions. The orders of magnitude for development across Dacorum identified by HHS are comparable, although the distribution within the Borough may show subtle local variations. Given the strategic nature of this study it is therefore considered appropriate to use the HHS analysis to broadly assess the impact on the Dacorum road network.

- 4.35. The network stress between M1 J8 and 9 is likely to be generated by development north of Dacorum as traffic generated in Dacorum would not be expected to travel north on local roads to junction 9 to travel south on the M1. Conditions on the M25 are forecast to improve with the implementation of proposals for M25 widening. Conditions on other parts of the SRN may show some deterioration (north of Hemel Hempstead) although this is likely to be due to the cumulative impact of development across other areas of the region rather than Dacorum itself. Further study is being completed by the HA and HCC at a sub-regional level to assess the specific impacts on the SRN.

Figure 4-3: HHS 2031 Road Stress



5. GAPS IN THE TRANSPORT NETWORK

Introduction

- 5.1. The preceding assessment of the impact of growth has been based upon existing mode shares. While this is appropriate to establish a potential worst case future year it is unreasonable to assume that traffic growth can be allowed to continue for the next 20 years at historic levels. This is particularly true when set in the context of national, regional, and local policy such as *Delivering a Sustainable Transport System*, *The East of England Plan*, and the current and emerging Hertfordshire *Local Transport Plan 3*.
- 5.2. The remainder of this assessment therefore considers measures that may be required to add support for sustainable travel. It is most likely that this could be achieved within urban areas and, by bus, between urban areas. It is also necessary to recognise that supporting sustainable travel alone may not be enough, and that it may also be necessary to restrict travel by private car through, for example, a committed approach to parking control or other mechanisms that can deliver acceptable mode shift.
- 5.3. Both this section and the following Section 6 continue to assess the impact of growth only, as is appropriate within the scope of this study. For example, whilst it is acknowledged that there is evidence of congestion in Bovingdon, the traffic arising from new development will not be sufficient to warrant mitigation. Congestion both now and in the future will continue to be caused almost entirely by historic deficit and not by proposed new growth. The planning authority will however, be justified in seeking to negotiate appropriate contributions towards specific localised impacts of growth at this and similar locations as well as any broader impact in other places (for example contributing to impacts on the Strategic Road Network).
- 5.4. Gaps in the transport network have been identified for 2031 only. This is because 2031 signifies predicted full build-out and as such represents the worst case assuming no interventions other than committed and/ or programmed schemes.

Existing Planned Interventions

- 5.5. The DSIS has identified existing interventions that are planned for implementation by DBC and other stakeholders. While not all of these schemes are programmed they demonstrate the infrastructure DBC and stakeholders are seeking to deliver.
- 5.6. The existing interventions are listed in Appendix D and were assumed to be in place for the gap assessment (for example Hemel Hempstead Station Gateway). Appendix D also includes new interventions identified by URS that were not assumed to be in place for the purposes of the gap assessment.

- 5.7. The total cost of infrastructure in Appendix D excluding new interventions is **£704.2m**, which includes the cost of M25 widening funded by central government. Excluding the cost of the M25 the remaining cost is £102.4m¹², although it was not possible to complete all the cost information based on the existing level of information and as a result the total costs for existing interventions are under-estimated.

Transport Gaps to 2031

- 5.8. Figure 5-1 illustrates gaps in the transport network likely to arise by 2031.

Walking & Cycling

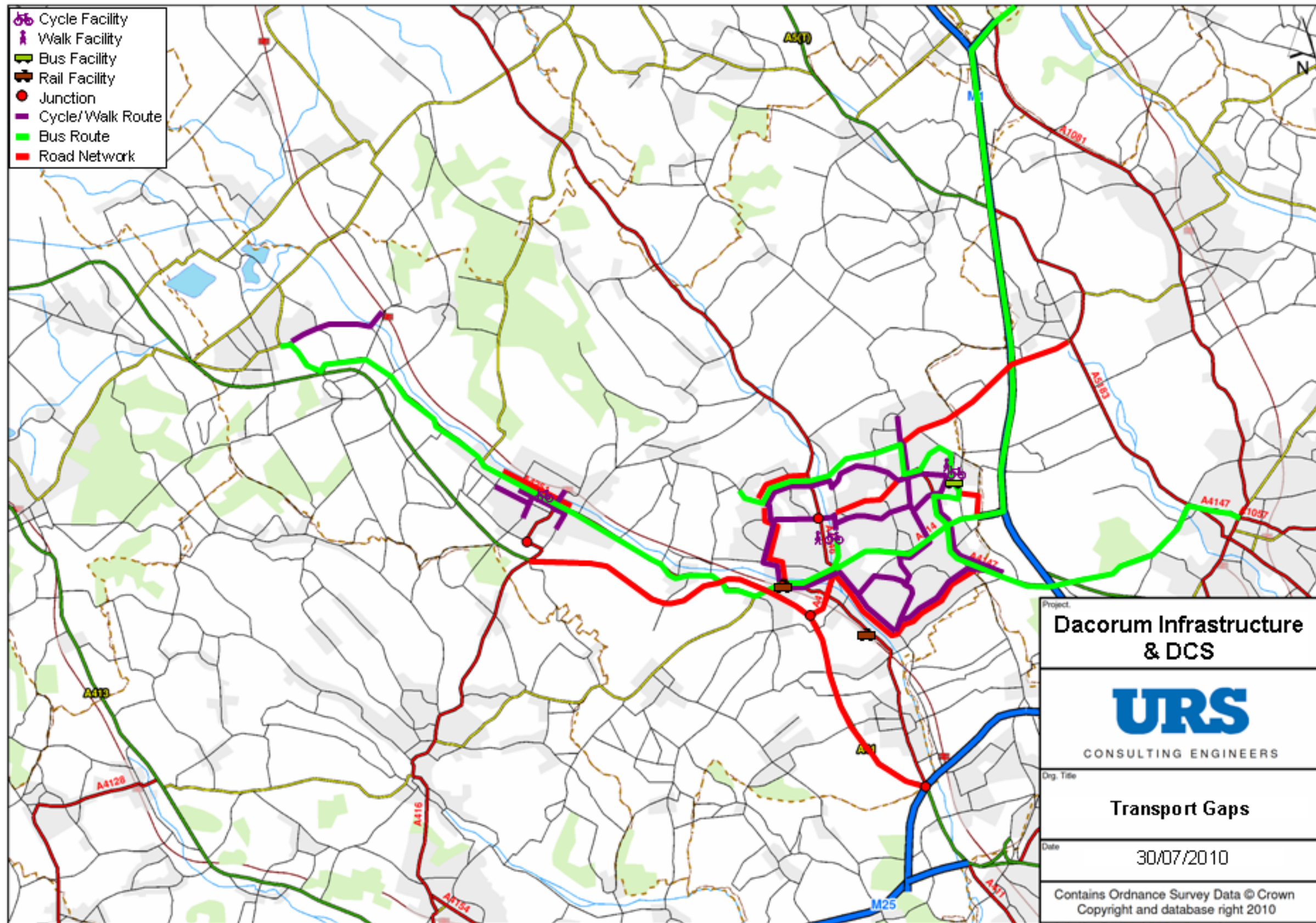
- 5.9. There are already some significant plans for enhancing cycling throughout the borough, particularly in support of inter-urban/ leisure cycling and walking. There are also plans for improved cycle parking facilities at all stations.
- 5.10. The HHS identified £36m for implementing the Hertfordshire Cycling Strategy, with appropriate amounts being allocated to each district as required. This would provide Dacorum with substantial funding for cycling in Hemel Hempstead and Berkhamsted. HHS did not consider cycle funding for Tring.
- 5.11. Gaps identified in the baseline include cycle routes in Berkhamsted, Hemel Hempstead and to a lesser extent Tring. The assessment of travel impacts suggests a need to improve routes within urban areas and also facilities at key locations. Not only would these include focus on areas such as stations but also at employment centres and within town centres to allow for commuting and utility trips by cycle. The need to encourage sustainable travel to stations for rail travel supports the baseline conclusions that a route to Tring Station is desirable.

Bus

- 5.12. With potential for an increase in east-west bus movements between Tring and Hemel Hempstead it seems likely that existing services may not be able to cope with demand. A higher service frequency may be required to accommodate additional patronage based on existing mode shares and also to encourage a greater number of people to use buses, particularly for trips within the borough and to stations. There may also be inadequate supporting bus priority in Berkhamsted although the historic nature of the highway network through the town will make remediation difficult.
- 5.13. With successful delivery of the new bus station and Station Gateway in Hemel Hempstead there will be a step change in bus interchange. They will help to promote bus use and also provide key focal points for inter-urban commuters.

¹² This includes the cost of implementing the HCC cycling strategy (£36m). This cost is excluded in Section 6 because the costs have been refined for this study.

Figure 5-1: Gaps in the Transport Network to 2031



- 5.14. Particularly in the high growth scenario there may be demand for orbital bus trips around, rather than through, Hemel Hempstead town centre. These could require a service arc from the north west of Hemel Hempstead to Leverstock Green via the Maylands Industrial Estate and the Wood End Farm urban extension. Such a service would serve all of the SUEs with a combined population of 18,564 people by 2031. There is currently no direct provision for such trips. To support orbital services it is likely that bus priority will be required at key junctions to help promote bus use and ensure journey time reliability.
- 5.15. There will need to be partnership working with bus and coach operators to ensure that journey requirements extending beyond Dacorum are catered for, particularly further assessment of the case for a greater frequency of some services to and from St Albans and Luton and beyond as time progresses.

Rail

- 5.16. The baseline identified limited capacity for additional passengers on rail services. This is likely to cause frustration for rail commuters, that will build with predicted events attracting growing passenger numbers. Network Rail is fully aware of the capacity constraints on the West Coast Mainline, however government policy promotes the use of rail over the private car. If there is insufficient network capacity then rail travel is likely to be suppressed, forcing people to use less sustainable modes or to change or refuse jobs because of the limitations of rail travel. The level of demand identified for rail in this study does not assume any measures to promote its use above that already in place at present.

Road

- 5.17. Because it is the most used and arguably the most prolific element of the transport network, roads have the greatest number of identifiable infrastructure gaps.
- 5.18. In Berkhamsted the impact along the High Street will lead to increased congestion, not only during peak periods but also at weekends. With junctions coming under increasing pressure attached to future growth it is likely that they will need to be upgraded to roundabouts or signals as appropriate including where practicable measures to accommodate bus priority.
- 5.19. There are significant plans (identified within the list of existing interventions) to improve junctions within the Hemel Hempstead central box, although they are likely to be subjected to further investigation by the highway authority. It is anticipated that these will provide the capacity required to accommodate growth. It is likely to be appropriate to secure contributions from developers for these improvements to support some of the cost. Junctions along the A41 with the A4251 and the M25 are also likely to require additional capacity based on analysis of the baseline.
- 5.20. The impact of the high growth scenario is likely to bring additional pressures and expose new stress points on the road network along the Green End Road/ Fishery Road corridor, east-west routes between Leverstock Green and the A41 avoiding the A414 and across the north of the town. The HISS transport study identified the need for a Hemel Hempstead northern eastern relief road to accommodate growth and analysis in this report supports this conclusion.

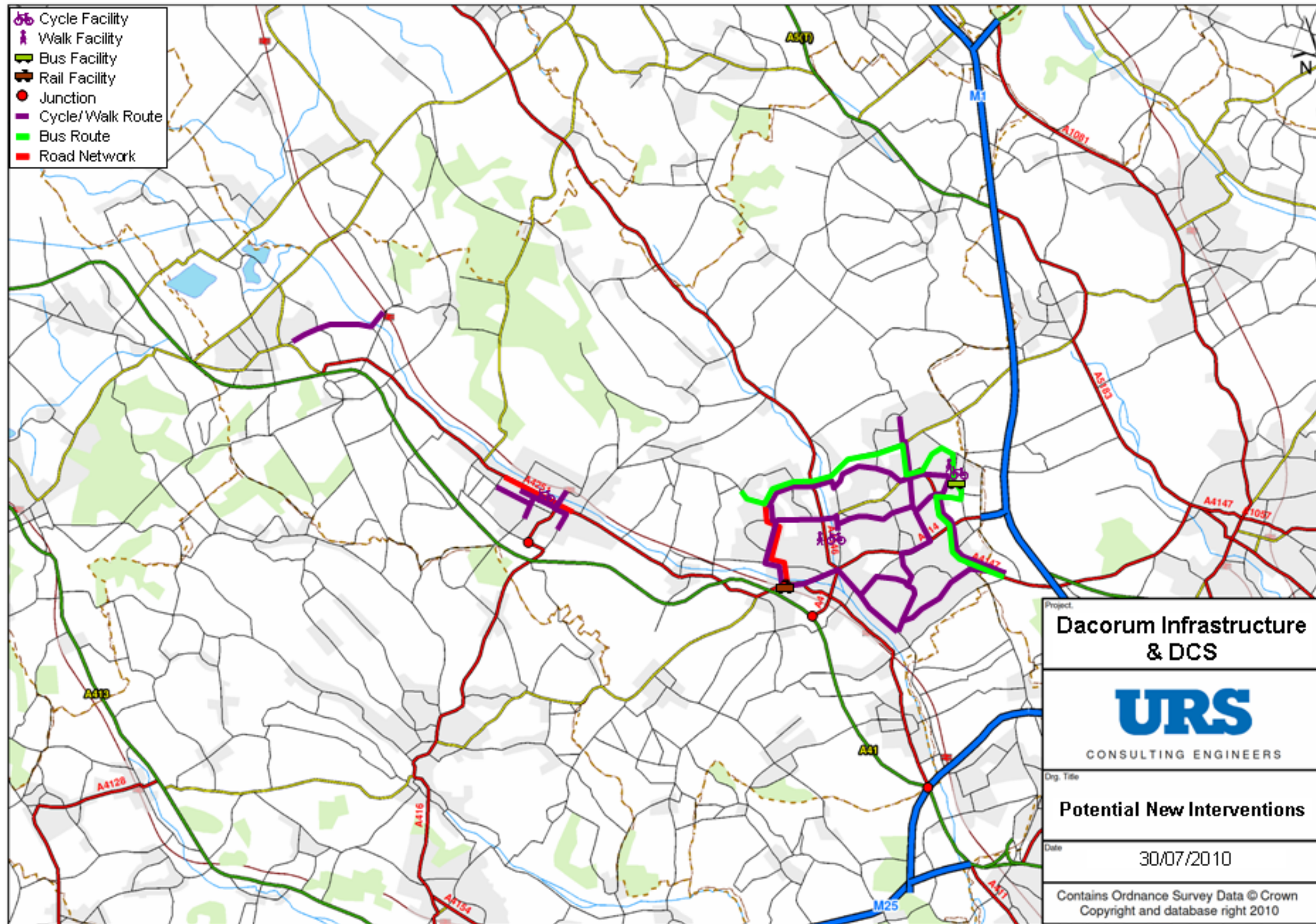
6. INFRASTRUCTURE NEED IN DACORUM

- 6.1. The infrastructure needs have been assessed based on the gap assessment in Section 5. Findings are presented below and summarised in the Infrastructure Delivery Plan in Appendix D.
- 6.2. The Infrastructure Delivery Plan includes items that are identified as not suitable for developer contribution funding. Within the HISS work these interventions were not considered appropriate for Community Infrastructure Levy because they primarily addressed existing historic deficit within the transport network. This assessment has been carried forward as an assumption for the Planning Obligations SPD. The interventions that are identified in this way however, may be appropriate for consideration in S106 agreements, once specific development proposals have been established in more detail.
- 6.3. A number of the interventions identified through the evidence base could not be explicitly confirmed as being supported by the provider through documents or consultation. URS has however consulted directly on the contents of the Infrastructure Delivery Plan with relevant stakeholders and where interventions have not been removed by consultees tacit support is assumed. This is noted with a '-' in the Infrastructure Delivery Plan.

Interventions

- 6.4. Where existing planned interventions have been identified from other sources it is assumed that the need for these interventions supporting growth has been robustly evidenced within other documents and studies. These interventions have however, been assessed for their relevance to the Dacorum growth scenarios to ensure that the costs could be reasonably attributed, at least in part, to that growth. The cost of existing interventions excluding the M25 widening and HCC cycle strategy is £66.4m.
- 6.5. Figure 6-1 illustrates the new interventions for the transport network that URS has identified, with the text below and Table 6-1 providing further details.
- 6.6. The new interventions identified by URS in support of growth in Dacorum have been attributed a cost. Each intervention has been prioritised and given a timescale for delivery based on the profile of the growth impacts in Section 4.
- 6.7. In general all interventions are required for each scenario. The cost of implementing TravelSmart initiatives will vary due to the difference in population under each scenario. An exception might be orbital bus routes and supporting bus priority measures as the case for these interventions is less robust in the low growth scenario, a more detailed study would inform this once more specific development scenarios are in place. Actual 'trigger points' may need to be identified through more detailed assessment. It will be important to consider that the strategy for growth will most likely need to be based on a sustainable approach that potentially promotes incentives for sustainable travel with disincentives to using the car.

Figure 6-1: Transport Network Interventions Identified by URS



Walking & Cycling

- 6.8. Existing walking and cycling facilities have been assessed for their relevance to growth. All are considered to be relevant and appropriate to support proposed growth across the borough.
- 6.9. Specific details for implementation of the cycling strategy in Berkhamsted and Hemel Hempstead, including to and from stations, will need to be developed by HCC and DBC. URS has illustrated indicative cycle networks for both towns in Figure 6-1 (some of which are already identified as improvements in Appendix D) but these will not necessarily represent the optimum routes. The routes will also provide improved walking facilities (road crossings and off-road facilities).
- 6.10. The routes will need to be supported by facilities such as secure cycle parking at key locations. Developments will also need to integrate their internal networks with the wider cycle networks and provide sufficient cycle facilities including parking but also, where appropriate, shower and changing facilities for cyclists.
- 6.11. Tring should be provided with a cycle route linking the town with the station to encourage more people to access the station by cycle.

Bus

- 6.12. Existing interventions are appropriate to the low growth scenario. The level of investment identified for bus priority appears inadequate for the high growth scenario as it seems likely that bus priority would be required on orbital routes within Hemel Hempstead.
- 6.13. The improvements to services would need to be addressed by the highway and planning authorities in partnership with bus operators.

Rail

- 6.14. There is little that either DBC or HCC can do to help increase rail capacity but they can work with Train Operating Companies to provide good quality facilities at stations. These are already planned at all relevant stations with plans for significant station upgrades in some towns such as Hemel Hempstead and Tring.
- 6.15. If 'Kiss & Ride' passengers at Apsley Station cause congestion on the road network serving the station it may be appropriate to construct a drop-off area in the vicinity of the station access road. This could potentially be accommodated on land opposite the Holiday Inn Express. Constraints to this could include land ownership issues and the cost relative to the benefits. This intervention has not been considered further in this study and is not included in Figure 6-1, as there is no firm case for it at this time.

Road

- 6.16. Interventions have not been identified for all gaps in the road network. This reflects the preference for interventions that favour sustainable modes. It also recognises that, in some places such as through existing residential areas, interventions might encourage traffic to use those routes inappropriately, for example those parallel to the A414.

- 6.17. Berkhamsted High Street should be considered as a corridor for improvement with close attention at key junctions that are predicted to face unacceptable stress. These improvements could be combined with the proposals for the Tunnel Fields Link. Further improvements may also be required along Kings Road/ Kingshill Way to cope with demand for access to residential areas.
- 6.18. It may be necessary to signalise the junction of the A41/ A4251 to help balance turning movements as it is likely that this junction will support many of the additional 2,100 to 4,200 vehicles anticipated to travel to and from locations south of the borough (see Table 4-1). Improvements at M25 J20 are also likely to be necessary but within the scope of this work it is not practicable to provide specific details on the scale and nature of such enhancements

Other Interventions

- 6.19. Section 5 has identified that to encourage travel by sustainable modes it may be necessary to discourage trips by unsustainable modes. This is a policy driver supported by the DBC Local Plan and that may emerge through LTP3 and continue as the LDF is formulated and updated over time. In many instances the most practical way to do this could be through increasing parking charges, particularly for stays of more than four hours, supported by a planning policy that resists any new private car parks. In some locations it could also be appropriate to limit short stay parking, such as at local centres. Such a policy is likely to need support from stringent parking maxima for new development, particularly in locations where viable sustainable transport exists or can be implemented.
- 6.20. Other initiatives to promote the use of sustainable travel could include implementing TravelSmart. This initiative has been successfully implemented in towns and cities across England including nearby Watford at a cost of approximately £25 per household. TravelSmart is an innovative project offering households information and support to encourage and enable people to walk, cycle and use public transport more often. The project started in Watford in 2008 and will run until 2010. It aims to reduce car use and encourage healthier lifestyles by increasing active travel to everyone's daily routine. Interim results for Watford show a positive 12% reduction in car trips across the target population.
- 6.21. The intervention cost could be capitalised as part of the Planning Obligations Strategy, or implementation of TravelSmart or a similar intervention could be secured through planning agreements. It is likely to be most successful if promoted in a unified way across Dacorum, which may require implementation by HCC/ Herts Highways and DBC rather than promoted by individual developers.
- 6.22. Research conducted separately from TravelSmart indicates that it is necessary to sustain funding for Smarter Choices measures (such as TravelSmart) to maintain the reductions in car trips¹³, although this may be possible at a lower level of funding. This on-going cost is not included in Table 6-1, as it is unlikely that it could be included in the Planning Obligations SPD

¹³ *The Effects of Smarter Choice Programmes in the Sustainable Travel Towns: Research Report*, DfT, March 2010.

as it is normally a revenue expense comparable to other on-going costs such as highway maintenance.

- 6.23. The new interventions that URS has identified for Dacorum as part of this study are listed in Table 6-1 and based on average cost. The figures cover all dwellings in Dacorum to include the existing population. The low growth scenario cost for TravelSmart is £1.7m with the high growth scenario estimated at £1.9m.

Table 6-1: Additional Interventions Identified by URS

Area	Scheme	Est Cost (£)	Justification
Tring	Enhanced & extended cycle route between Tring & Tring station	97,500	Support for rail commuters and other rail travellers
	Implementation of HCC Cycling Strategy including comprehensive cycle network	3,000,000	HIIS
Hemel Hempstead	Maylands Interchange	2,000,000	Orbital movements from high scenario growth
	Orbital bus priority	1,000,000	Orbital bus passenger demand (especially in the high growth scenario)
	Partial signalisation of A41/ A4251	500,000	Substantial traffic to/ from the south
Berkhamsted	Implementation of HCC Cycling Strategy including comprehensive cycle network	2,000,000	HIIS
	High St traffic management	2,000,000	Impact of growth on existing bottleneck
	Signalise Kings Rd/ Kingshill Way/ Durrants Rd	300,000	Access to residential areas
Dacorum	TravelSmart	1,807,475	To help achieve mode shift
Total		12,704,975	

Prioritisation and Phasing

- 6.24. Both prioritisation and phasing have been assessed with respect to the growth considered in this study only. The priority assigned to each intervention suggests the importance that should be attributed to that scheme, while the timescale suggests the opening year for delivery in the event that the intervention is pursued.
- 6.25. The prioritisation and phasing of schemes are shown in the table in Appendix D. Interventions have been phased and prioritised based on analysis described in Sections 4 and 5. All priorities have been assessed by URS. Where timescales have been assessed by URS for this study the fact is recorded in the notes column. The prioritisation rating and timescale has been completed in Appendix D for existing interventions where no implementation date could be found in published evidence sources.

- 6.26. Where an implementation date was stated in documentation for existing interventions, the priority and timing have not generally been queried as they will largely address deficit in the existing transport network and it would be inappropriate to alter them within this assessment. Timescales for a small number of interventions have been adjusted based on the findings of this study.
- 6.27. The timescales should be assumed to be an 'implementation by' date, as opposed to an 'implement during' date. To support mode shift away from the private car, interventions for and in support of sustainable modes will need to be in place at the opening of development sites and this will require further assessment of the development trajectory at specific locations to identify how this can best be achieved within the resources available (both financial and person hours).
- 6.28. Prioritisation and timescales for national schemes have not been assessed as they are outside the influence of DBC and HCC. It should however generally be considered that they are of a high priority and will be delivered in the short-term.
- 6.29. The new interventions suggested by URS are currently unique to this report and as a consequence it must be assumed that none of them have been formally acknowledged by those who would be responsible for delivering them. It would however be likely that at a number of them would be supported in principle, based on discussions with stakeholders.
- 6.30. The preference for ensuring that interventions are in place at the time a development opens results in a schedule that assumes the majority of schemes would be implemented by 2021. Furthermore the need to ensure sustainable interventions are prioritised to achieve mode shift, and to ensure that the existing road network continues to work efficiently, results in most interventions attracting a score as Priority 1 or 2.

Apportioning Costs

- 6.31. This section considers approaches that might be suitable for apportioning costs of interventions. It does not however discuss the matter in detail as this will be addressed by the Planning Obligations SPD.
- 6.32. For existing interventions (those identified from other sources) it may be appropriate to apportion cost to growth based on the population and/ or jobs that can be attributed to each area from growth in comparison with the existing population and/ or jobs. The exception to this is the Hemel Hempstead Northeastern relief road proposed during work undertaken for DBC during the HIIS project, which identified and promoted the need for the relief road solely as a product of growth within the urban area of Hemel Hempstead.
- 6.33. For the majority of new interventions identified by URS to emerge from this study (listed in Table 6-1) the whole cost would generally be anticipated to fall to predicted growth in Dacorum. There are a small number of exceptions where it may be more appropriate to apportion costs based on relative population or job numbers; these are :
- Berkhamsted cycle network and facilities;

- Tring station cycle route;
- Hemel Hempstead cycle network and facilities; and
- TravelSmart, the cost of which should be apportioned based on existing and growth households

6.34. Table 6-2 shows the percentage of costs that would be attributed to growth based on population attributable to new housing compared with the total population of Dacorum in 2031. This is not to suggest that a population only approach is the most appropriate way to apportion costs but is used for illustrative purposes. This issue will be addressed by the wider DSIS.

Table 6-2: Apportionment of Costs Based on Growth

	Population			Growth Percentage
	Existing	Growth	Total	
Low Scenario	133,105	24,433	157,538	16%
High Scenario	133,105	43,014	176,118	24%

6.35. Some interventions in the IDP, such as platform extensions at Euston, are not within the borough boundary. In the majority of cases it is not anticipated that development in Dacorum would contribute towards the cost. There may be exceptions to this where it can be demonstrated that there is a measurable impact on the transport network. This could for example include improvements to M25 J20 should it become clear that this is needed. A separate method to the one above would need to be established to identify an appropriate level of funding contribution as growth at Dacorum would be only one element of a much wider cumulative impact.

Deliverability

- 6.36. It is envisaged that the interventions identified in Table 6-1 would predominantly be funded by growth through a Planning Obligations SPD. However:
- New interventions would cost approximately £13.2m.
 - The cost for existing interventions is £66.4m (excluding the M25 enhancements and total cost of the HCC cycling strategy¹⁴).
 - Based on the proportion of costs shown in Table 6-2 the growth in population would account for £15.9m of the existing interventions costs in the high growth scenario.

¹⁴ Section 5 includes the cost of implementing the HCC cycling strategy (£36m). This cost is excluded in Section 6 because the costs have been refined for this study.

- The remainder, at least £50.5m¹⁵, will need to be found from other sources.
- 6.37. Section 2 and Appendix D indicate that for many schemes no costs or funding have yet been identified. This means that the true total cost of growth, i.e. including the contribution towards uncosted existing interventions, cannot be comprehensively assessed.
- 6.38. It is also evident from Appendix D that a number of existing interventions may not currently be recognised by those who would need to implement them. The status of these interventions will need to be clarified.
- 6.39. At a more local level specific bus priority in Berkhamsted has not been suggested as it is not considered to be deliverable, although to maintain or improve bus journey time reliability there is still a need to reduce the impact of the private car through the town. It is also likely that the market, held on the High Street, exacerbates congestion with heavy pedestrian movements and inconsiderate parking/ loading. While the market is an important feature of Berkhamsted it may be appropriate to consider how it can best be accommodated at a time when travel will be increasing. Alternatives may be to redirect through traffic but this will be difficult to enforce and would have an adverse impact on residential roads not intended for high traffic volumes.
- 6.40. Improved/ increased parking is a key aspiration identified from the review of baseline information. While additional parking may be appropriate at some locations none has been recommended. To do so would encourage the use of private cars above sustainable modes. This would threaten the efficient operation of the road network and reduce the attractiveness of public transport and other sustainable modes. This is particularly the case where parking is being sought at town and local centres, and to some extent at stations. Each case will need to be judged on its own merits but there should be a presumption against providing for parking demand based on existing trends.
- 6.41. It is proving increasingly difficult to capitalise revenue costs such as those related to Smarter Choices (e.g. TravelSmart) due to local government accounting procedures and responsibilities. This is restricting the opportunity for interventions that have been proven to have positive impacts on mode shift. There is a need to identify how these costs can be funded from what are traditionally considered to be capital budget. A more flexible approach to this may be introduced by future policy change¹⁶.
- 6.42. Delivering capacity for rail passengers, particularly at Hemel Hempstead, will remain a challenge for the train operating companies and Network Rail both now and for the foreseeable future. The local planning and highway authorities should seek to raise the profile of this issue at the earliest opportunity as Network Rail are currently developing the West Coast Mainline Route Utilisation Strategy.

¹⁵ This may be reduced by as much as £34m depending on how the costs for the North eastern relief road are apportioned.

¹⁶ http://www.conservatives.com/Policy/Where_we_stand/Transport.aspx accessed 20th May 2010.

7. CONCLUSION

Introduction

- 7.1. This technical report forms part of the Dacorum Strategic Infrastructure Study (DSIS). The purpose is to identify the transport needs of Dacorum over the period 2010 to 2031, which will subsequently feed into an Infrastructure Delivery Plan (IDP) and an Interim Development Contributions Strategy for the borough.
- 7.2. This section sets explains the IDP which is presented in Appendix D as a summary of this report's findings. It then draws together the key findings of the report.

Infrastructure Delivery Plan

- 7.3. The table in Appendix D gives the details of all transport infrastructure interventions, both existing (ie already identified as required and in some cases programmed) and new (ie identified as required in this report, in Dacorum). The same exercise has been undertaken for social infrastructure and utilities / physical infrastructure, and all these infrastructure requirements have been pulled together into an Infrastructure Delivery Plan (IDP) in the DSIS Executive Summary Report.
- 7.4. The IDP proposes the level of priority (1-3) relating to how critical the consultants consider the infrastructure item is to ensuring delivery of development in the borough in the context of the entire DSIS. Clearly, all the infrastructures covered by the DSIS are important to ensuring that growth is sustainable. However the process of prioritisation allows those items which are considered potential 'show-stoppers' to growth to be identified and also reflects factors such as DBC's legislative requirements.
- 7.5. The prioritisation ranking should be interpreted as follows:
- Priority level 1 – these are infrastructure items that enable basic functionality and, if not provided have the potential to threaten the delivery of growth
 - Priority level 2 – these items are considered critical to ensure that development is sustainable
 - Priority level 3 – these items are considered very important for sustainable development.
- 7.6. The table also sets out where possible:
- when and where the infrastructure is required
 - who is responsible for delivery and funding
 - where the infrastructure is accounted for in the range of existing plans and investments strategies of the respective responsible agencies

- potential costs as identified by the provider and/or by URS.
- 7.7. These dimensions of the analysis inform and add detail to the assessment of infrastructure priority.

Key Outcomes

- 7.8. The baseline conditions have established transport network stress within Dacorum. In particular the road network in Hemel Hempstead and the A41 currently experience stress in the form of congestion and journey time unreliability, with localised pressure along Berkhamsted High Street. There is also evidence that the strategic road network is experiencing stress, in particular along the M25 including at junctions.
- 7.9. The rail network is currently at capacity through the whole of Dacorum, with little scope for enhancements to accommodate significant numbers of new passengers. The greatest number of passengers use Hemel Hempstead Station. Hemel Hempstead also benefits from Apsley Station but its relatively remote location and lack of parking mean it is not attractive to the majority of residents and has seen some decline in passenger numbers during the last year. Only 20% of rail passengers using Hemel Hempstead stations use Apsley Station, with the remaining 80% using Hemel Hempstead Station.
- 7.10. At a local level analysis of the walking and cycling networks suggests that they are generally sufficient to cater for demand but that a more integrated cycle network is required and links with stations need improving. Bus services in the smaller urban areas are low, which influences a reliance on the use of cars (particularly at Markyate). There has been a reduction in some services in Hemel Hempstead that are considered important, in particular related to Maylands, given expected growth in that area.
- 7.11. The report has considered two scenarios. The low growth scenario accommodates a total of 8,942 new dwellings with increased floorspace across the Dacorum for office, retail, and leisure land-uses. It is anticipated that there will be a reduction in industrial and warehousing land-uses. The high growth scenario includes a total of 15,742 new dwellings with an increase in commercial floorspace for retail and leisure uses only. The growth has been distributed across eight areas in discussion with and under direction from DBC. Additional dwellings and commercial floorspace in the high growth scenario are located in and around Hemel Hempstead.
- 7.12. Trip rates from TRICS have been agreed with HCC for each land use and this traffic has been distributed across the transport network using 2001 Census information. The mode share for trips has been derived based on both TRICS and the 2001 Census. This equates to a daily total of 421,824 trips in the low growth scenario and 525,662 trips in the high growth scenario. The residential mode share is approximately 75% by light vehicles (predominantly car) with 11% using public transport.
- 7.13. The impacts of the growth in Dacorum have been considered in segments of five years. With the exception of junction 20 of the M25 this has found that there are no significant impacts outside Hemel Hempstead, Berkhamsted and Tring.

- 7.14. Under the low growth scenario the cumulative impact of development will see impacts that build on existing travel patterns. This will change under the high growth scenario where a greater demand for orbital travel in Hemel Hempstead is predicted to emerge.
- 7.15. The existing walking and cycling networks will generally accommodate the extra demand generated by growth but there will be additional pressure at strategic crossing facilities and on routes to stations. These include routes to Hemel Hempstead and Berkhamsted stations in particular and crossings in Hemel Hempstead town centre and around the Maylands employment area.
- 7.16. The bus network will experience additional pressure across the borough. Trips to and from Tring and Berkhamsted will use the bus corridor along the A4251, which currently has a relatively low frequency. Because of this there is likely to be a significant impact on the bus service. In Hemel Hempstead bus services will come under increased pressure on the radial network to the town centre and for trips involving Hemel Hempstead Station. In both development scenarios, but particularly the high growth scenario, there will be demand for orbital trips within Hemel Hempstead to link housing with employment.
- 7.17. The principal impact on the rail network will be through Hemel Hempstead Station, as it has the highest level of train frequency and the best supporting services (bus routes and car parking); it is also the optimum location for ease of access throughout most of Hemel Hempstead. This is unlikely to change in the foreseeable future. Despite the lower level of demand at Tring, Berkhamsted and Apsley stations will, however, also contribute to difficulties on the rail network because of the cumulative impact that they have along the East Midlands route.
- 7.18. There will be localised impacts on the road network that will need to be addressed once specific development proposals have been identified. Excepting these (which cannot be identified at this stage) this report has identified a number of locations on the road network that will be under stress due to growth. There will, however, be further stress at key locations such as around Hemel Hempstead town centre and through Apsley on the A4251 and Berkhamsted High Street. Other notable impacts have been identified in Berkhamsted at the junction of the Kings Road/ Kings Hill Way, along parts of the A41 and at the junction 20 of the M25.
- 7.19. URS has compared the baseline information with the impacts from growth on the transport network to identify any gaps. This takes into consideration the committed and programmed interventions that have been noted through consultation and a document review. The gaps broadly match to the impacts that have been identified, but this is not always the case, particularly where existing interventions will address the impacts.
- 7.20. Principal gaps across the walking and cycling networks are on strategic crossing facilities within town centres plus anticipated demand for new and improved safe routes to employment areas and other local facilities. It has been identified that the cycle networks in Tring, Berkhamsted and Hemel Hempstead require improving, particularly to enhance links to stations. In addition cyclists will need secure cycle storage facilities at key destinations to promote peace of mind while they undertake shopping, working or other day to day activities.

- 7.21. Local bus routes will come under increasing pressure as will those supporting inter-urban trips and journeys outside the borough. There is relatively poor existing penetration of bus services into areas that are likely to become higher trip generators (for example Maylands in Hemel Hempstead) and this will need to be addressed through agreement and partnership with transport providers. The emerging demand for orbital trips in Hemel Hempstead, linking areas together, is not currently provided for.
- 7.22. The rail network can also anticipate an increase in demand. Despite net annual growth of rail use within Dacorum over recent years this is in contrast to the limited capacity that is likely to be available to serve the borough in the future. Across Dacorum it is expected that there would be a peak hour maximum of 1,009 inbound and 1,205 outbound rail trips in the low growth scenario and 1,166 inbound and 1,441 outbound in the high growth scenario. It is predicted that the overwhelming focus would be commuting trips to London, although in the evening peak and at weekends there would be some more local rail trips as people along the line seek to take advantage of leisure facilities provided within Hemel Hempstead.
- 7.23. Despite the recent West Coast Mainline Upgrade and planning for new high speed rail (High Speed 2) it seems unlikely that there will any further significant improvements to improve rail capacity on the rail network in the foreseeable future. This would be to the detriment of sustainable travel in the borough and could lead to suppressed demand with a higher dependence on less sustainable travel choices to satisfy work and other journey purposes.
- 7.24. Traffic generated from growth at Bovington, Kings Langley, Markyate and the Rural West and Rural East zones is predicted to be small and unlikely to herald significant local impacts.
- 7.25. There is already stress on the road network especially at key junctions within Hemel Hempstead and along the A41 to the south and west of the town and the A4146 to the north. The A41 also experiences congestion to the south of Berkhamsted. It is predicted that congestion on the A41 will increase with resulting impacts on the operational capacity of M25 J20. There are current gaps in provision in Berkhamsted along the High St and at the junction of Kings Road/ Kings Hill Way
- 7.26. Travel demand associated with growth will have a significant impact on Hemel Hempstead. Any traffic generated within the town that is not internalised will largely head for the M1 and A41, with some likely to choose a route along the B487. This will impact on strategic junctions such as M25 J20 and others along the A414 towards M1 J8. Both these longer distance and internal local trips will add a great deal of pressure on the town's road network. It is expected that most of the internalised vehicle trips will remain within Hemel Hempstead as this is the largest urban area and trip attractor in terms of employment, retail and leisure. This is despite the anticipated reduction of local industrial and warehousing jobs.
- 7.27. The scale of anticipated growth across the borough will result in a significant number of new trips on the transport network. To deal with them in accordance with policy direction the presumption for new infrastructure will need to be steered in favour of promoting sustainable modes above the private car, while recognising that an effective road network is necessary for essential vehicle trips.

- 7.28. Transport planning and infrastructure cannot achieve policy objectives on their own. Policy and good practice dictate that land-use and transport planning must work together to deliver the most appropriate pattern of sustainable development to improve accessibility across the borough and for that matter the surrounding districts as a whole.
- 7.29. Following identification of the gaps in the transport network a number of new interventions have been identified that would help to alleviate the additional stress caused by growth. The additional new interventions identified by URS have been costed. Each intervention has been prioritised and given a timescale for delivery based on the profile of the growth impacts. The new interventions include:
- Limited highway improvements to maximise network efficiency
 - Cycle routes and facilities
 - Pedestrian crossings at strategic locations
 - Orbital bus priority in Hemel Hempstead
 - TravelSmart has been proposed as a form of individualised travel marketing.
- 7.30. The total cost of existing interventions is £66.4, the total cost of new interventions is £12.7m. This gives a total cost of all interventions of £79.1m. There is some slight variation in this that is dependent on the scenario being considered. TravelSmart costs are based on dwelling numbers and in the high growth scenario costs an additional £171k compared to the low growth scenario. The orbital bus priority, which costs £1m, is less likely to be required in the low growth scenario although there are still benefits to it being included in both. Orbital bus priority has been included in the low growth scenario but would benefit from more detailed study to assess its specific need in relation to growth.
- 7.31. For existing interventions, it may be appropriate to apportion cost to growth based on the population and/ or jobs of each area from growth compared to the existing population and/ or jobs, with a few exceptions. Based on the proportion of costs attributable to the high growth scenario the growth in population would account for £15.9m of the existing interventions costs. For the majority of new interventions identified by URS the whole cost would be anticipated to fall on the growth in Dacorum. There are a small number of exceptions where it may be more appropriate to apportion costs relative to the existing population/ jobs.
- 7.32. Finally a number of issues affecting deliverability have been identified to include:
- The costs of interventions that cannot be funded from growth, and the uncertainty over the total cost
 - Some schemes may not (yet) be recognised by the organisation that would need to implement them
 - Some interventions may not be physically deliverable, or may not have a good fit with policy

- Issues with capitalising revenue costs
- A lack of capacity on the rail network.

Further Work Arising from this Study

7.33. A small number of issues have been identified within this report that require further attention.

- Apportioning costs between growth and existing deficit (to be addressed by the DSIS);
- Identifying costs of uncosted existing interventions;
- Clarifying the status of some existing interventions;
- At a town or zone level establishing appropriate strategies for maximising access to stations by sustainable modes;
- Address the issue of capitalising revenue costs; and
- Assessment of the specific impacts of regional growth on junctions 8 and 9 of the M1.

Appendix A Documents & Stakeholders

Documents Reviewed:

- East of England Plan
- West Coast Main Line Route Utilisation Strategy
- Highways Agency targeted Programme of Improvements
- Regional Funding Allocation 2
- Local Transport Plan (LTP) 2
- LTP3 (consultation)
- Hemel Hempstead Urban Transport Plan
- Chilterns Traffic Management Strategy
- Hertfordshire Infrastructure & Investment Strategy
- Dacorum Transport Study
- HCC Bus Network Review
- Maylands Masterplan
- Maylands Implementation Plan Nov09
- Maylands (Hemel 2020) Project Initiation Document, Feb 2010.
- Maylands Gateway Development Brief, April 2009.
- Spatial Strategies for:
 - Berkhamsted
 - Bovingdon
 - Hemel Hempstead
 - Kings Langley
 - Markyate
 - Countryside
 - Tring
- Emerging Core Strategy, Vision & Themes
- West Coast Mainline Route Plan

- Dacorum Borough Council Local Plan Schemes List, and
- Dacorum Borough Council Cycle Strategy.

Stakeholders consulted:

- Hertfordshire Highways
- Hertfordshire County Council
- Highways Agency
- Network Rail
- Dacorum Borough Council

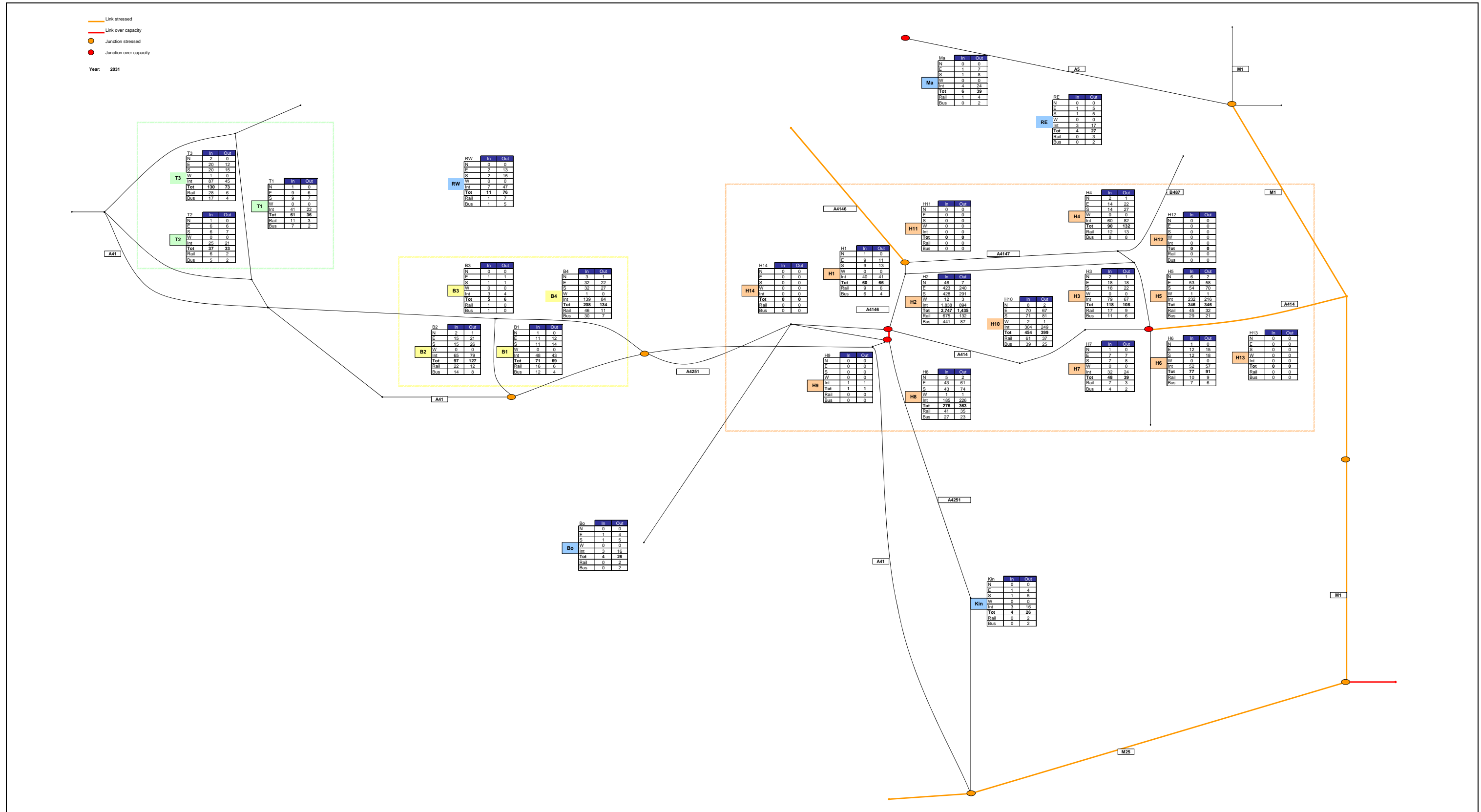
Appendix B Mode Shares

Light_D:	Light vehicle driver
Light_P:	Light vehicle passenger
OGV:	Other Goods Vehicle

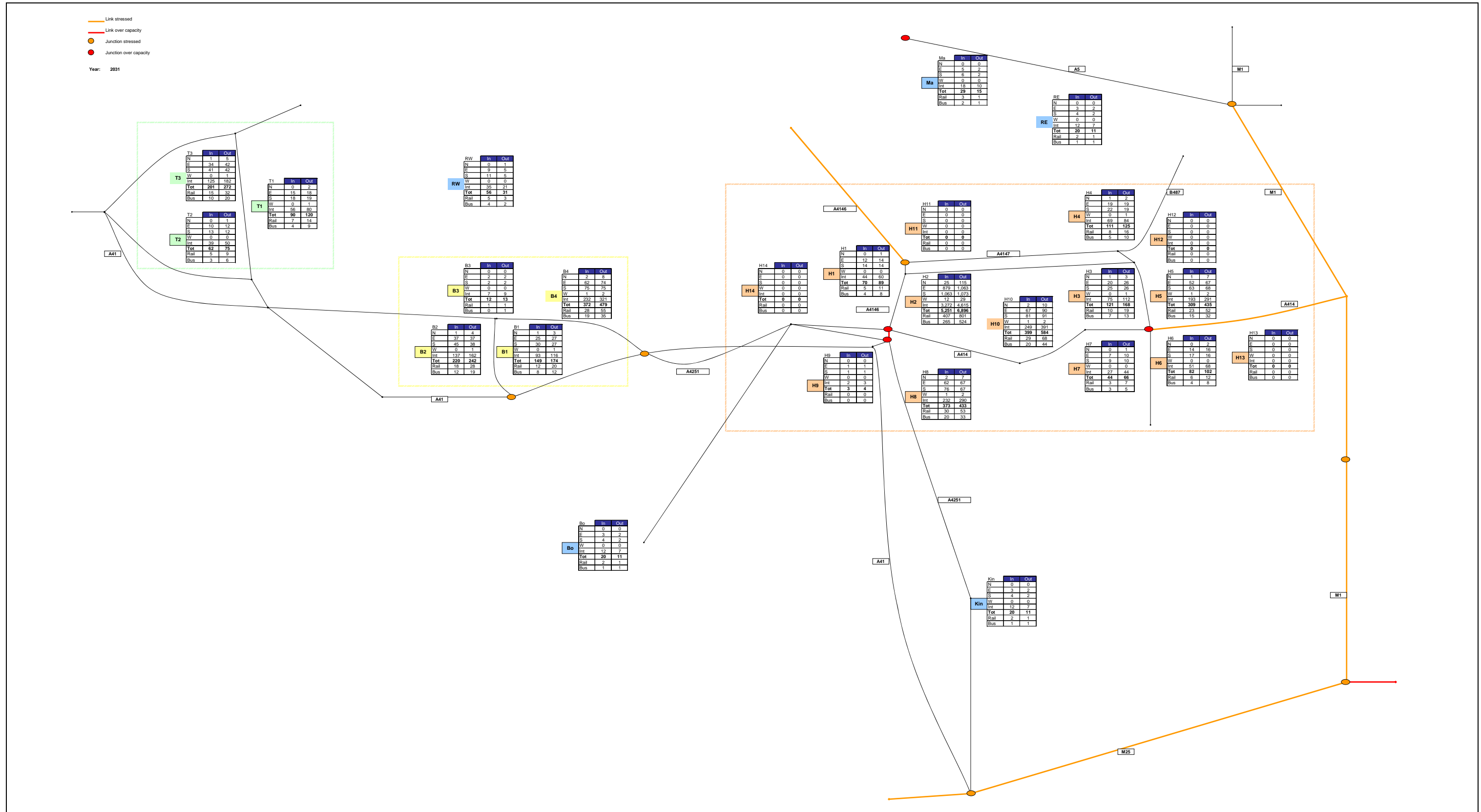
Appendix Table 1: Inbound & Outbound Mode Share Summary

		Inbound							
		Light_D	Light_P	OGV	Walk	Cycle	Bus	Train	Total
AM	Residential	70%	6%	0%	11%	1%	4%	7%	100%
	Office	63%	8%	0%	13%	2%	5%	8%	100%
	Industrial	61%	12%	4%	10%	1%	4%	6%	100%
	Warehouse	60%	11%	27%	1%	0%	1%	1%	100%
	Retail	41%	16%	1%	19%	2%	8%	12%	100%
	Leisure	92%	4%	0%	2%	0%	1%	1%	100%
PM	Residential	70%	6%	0%	11%	1%	4%	7%	100%
	Office	95%	0%	0%	2%	0%	1%	2%	100%
	Industrial	47%	20%	21%	6%	1%	2%	3%	100%
	Warehouse	47%	0%	47%	2%	0%	1%	2%	100%
	Retail	44%	44%	0%	5%	1%	2%	3%	100%
	Leisure	55%	44%	0%	0%	0%	0%	0%	100%
Daily	Residential	64%	11%	0%	11%	1%	5%	7%	100%
	Office	57%	5%	0%	18%	2%	7%	11%	100%
	Industrial	68%	16%	11%	2%	0%	1%	2%	100%
	Warehouse	47%	10%	33%	4%	1%	2%	3%	100%
	Retail	41%	39%	0%	9%	1%	4%	6%	100%
	Leisure	61%	36%	1%	1%	0%	0%	1%	100%
		Outbound							
		Light_D	Light_P	OGV	Walk	Cycle	Bus	Train	Total
AM	Residential	70%	6%	0%	11%	1%	4%	7%	100%
	Office	85%	0%	4%	5%	1%	2%	3%	100%
	Industrial	62%	17%	19%	1%	0%	0%	0%	100%
	Warehouse	20%	0%	50%	14%	2%	6%	9%	100%
	Retail	50%	28%	6%	8%	1%	3%	5%	100%
	Leisure	73%	26%	0%	1%	0%	0%	0%	100%
PM	Residential	70%	6%	0%	11%	1%	4%	7%	100%
	Office	66%	7%	0%	12%	2%	5%	8%	100%
	Industrial	82%	11%	3%	2%	0%	1%	1%	100%
	Warehouse	66%	2%	23%	4%	1%	2%	3%	100%
	Retail	41%	43%	0%	8%	1%	3%	5%	100%
	Leisure	74%	26%	0%	0%	0%	0%	0%	100%
Daily	Residential	62%	15%	0%	10%	1%	4%	6%	100%
	Office	57%	4%	0%	18%	2%	7%	11%	100%
	Industrial	69%	17%	11%	1%	0%	1%	1%	100%
	Warehouse	53%	4%	34%	4%	1%	2%	3%	100%
	Retail	41%	38%	0%	10%	1%	4%	6%	100%
	Leisure	63%	34%	1%	1%	0%	0%	1%	100%

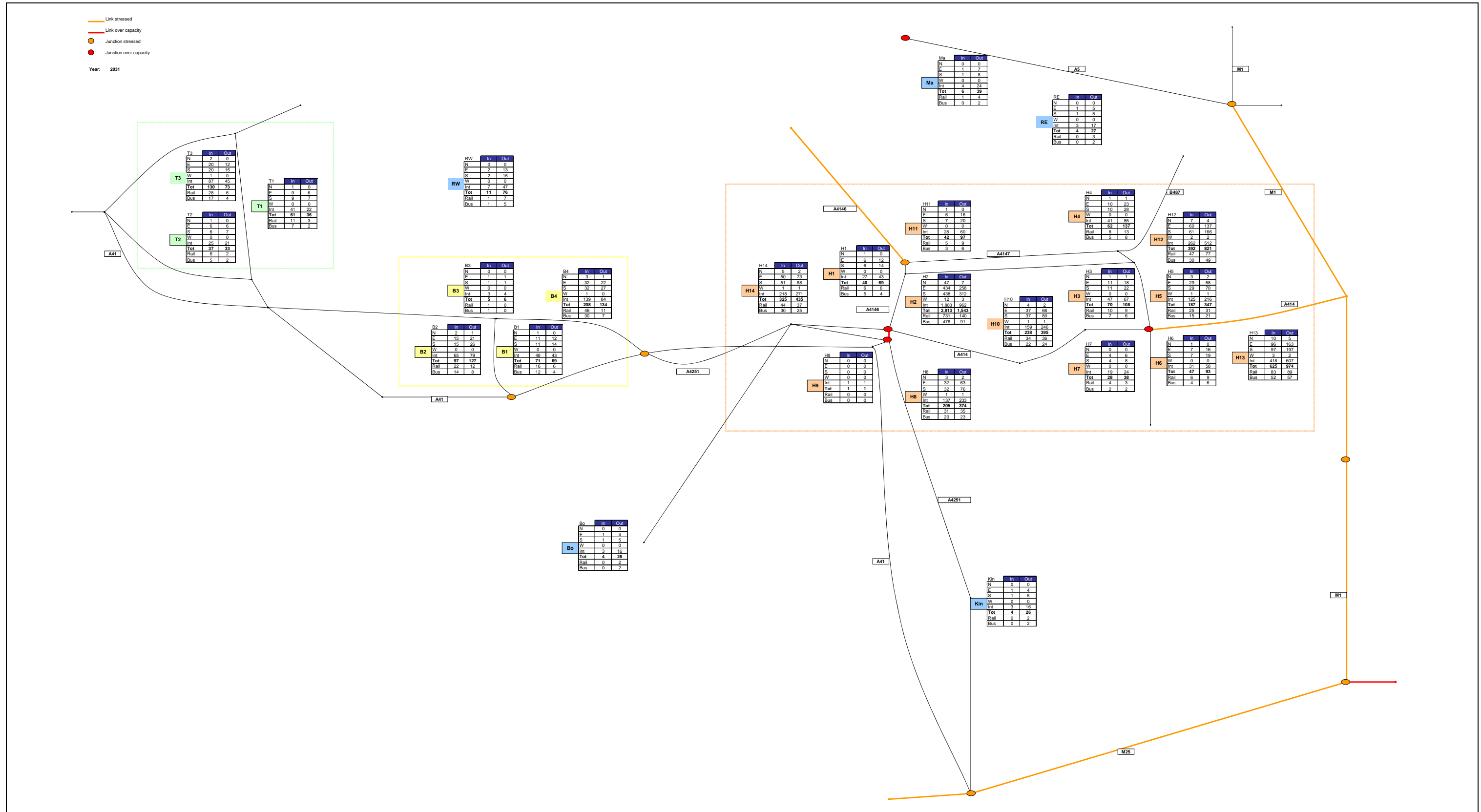
Appendix C Trip Distribution Diagrams



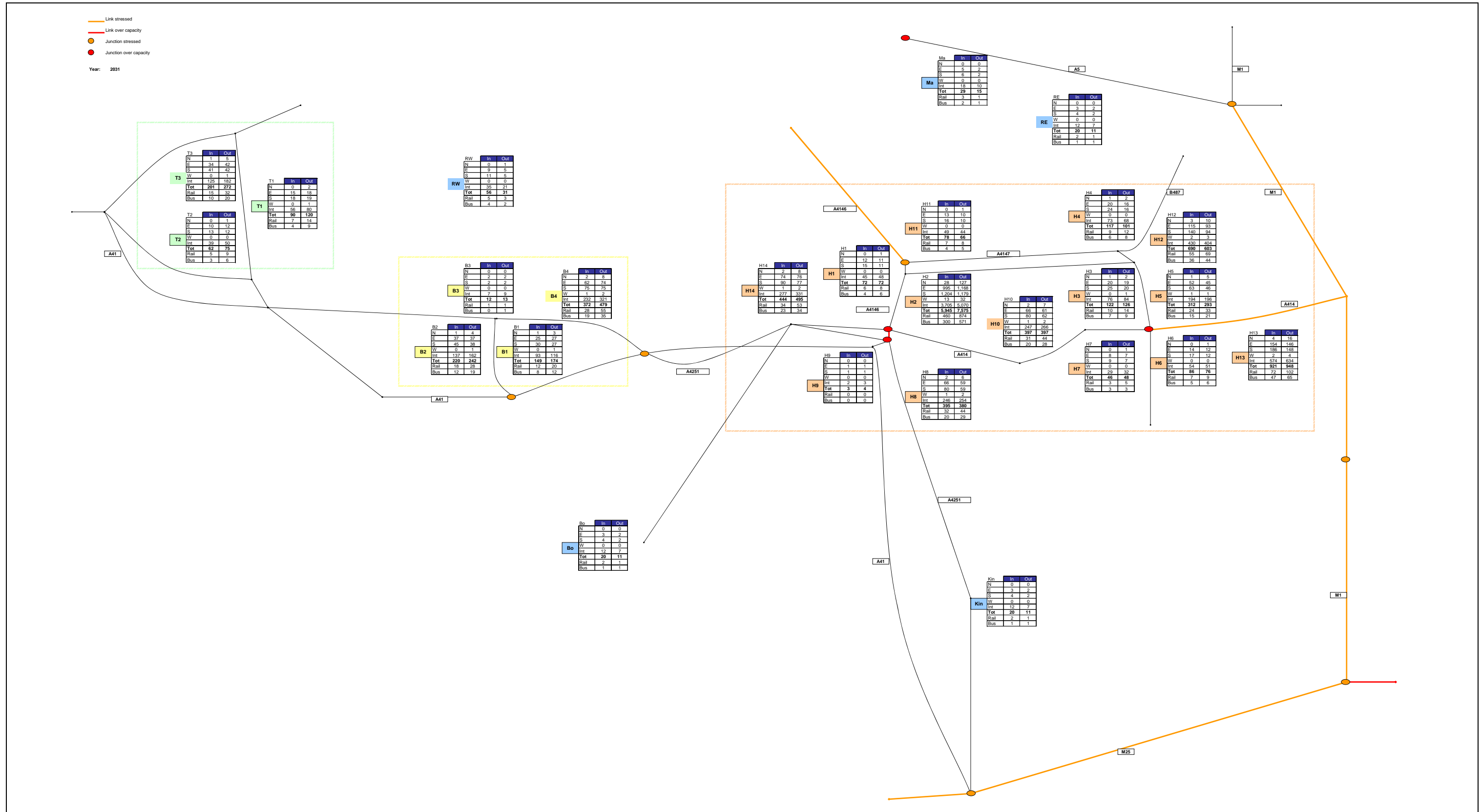
	Purpose:	For information		Client:	Dacorum Borough Council		Drawing Title: Low Growth Scenario 2031 AM Peak Traffic Distribution		
	Draft		Scale (at A3 size)	Project:	Dacorum Infrastructure & Developer Contribution Study	Issuing Office:	Bedford	Drawing Number	Version
	Issue:	●	NTS			Telephone:	01234 349641		B



	Purpose:	For information	Client:	Dacorum Borough Council		Drawing Title: Low Growth Scenario 2031 PM Peak Traffic Distribution	
	Draft		Project:	Dacorum Infrastructure & Developer Contribution Study		Issuing Office: Bedford	Version
	Issue:	●	Scale (at A3 size) NTS			Telephone: 01234 349641	B



	Purpose:	For information	Client:	Dacorum Borough Council		Drawing Title: High Growth Scenario 2031 AM Peak Traffic Distribution	
	Draft		Project:	Dacorum Infrastructure & Developer Contribution Study		Issuing Office: Bedford	Version
	Issue:	●	Scale (at A3 size) NTS			Telephone: 01234 349641	Drawing Number



	Purpose:	For information	Client:	Dacorum Borough Council		Drawing Title: High Growth Scenario 2031 PM Peak Traffic Distribution	
	Draft		Project:	Dacorum Infrastructure & Developer Contribution Study		Issuing Office: Bedford	Version
	Issue:	●	Scale (at A3 size) NTS			Telephone: 01234 349641	Drawing Number

Appendix D Infrastructure Delivery Plan

Type of Infrastructure	Description of Scheme / Requirement	Priority 1, 2 or 3 (1 Highest, 3 Lowest) Include rationale for rating and risks of non-delivery.	Timescale Required delivery date and phasing	Location Sub-area	Drivers		Costs (£) Cost	Planning and Funding Status			Funding and Delivery Responsibilities		Notes	Source
					To meet existing deficiency	To meet additional future demand		Is the need noted by the provider?	Planned and Committed Funds	Planned not committed funds	Funding Agency / Agencies	Delivery Agency / Agencies		
Transport														
Bus	Bus priority on key routes	1	by 2019	Hemel Hempstead	✓	✓	1,000,000	✓	£1M		HCC	HCC		Hemel Hempstead Urban Transport Plan, Jan 2009. Pg83
	Central corridor bus priority scheme	1	by 2021	Hemel Hempstead	✓	✓	1,000,000	-	600,000		HCC/ Operators	HCC/ Operators	Scheme was proposed by URS in HIIS. Note: DBC have removed funding for a similar scheme proposed by the HH UTP.	HIIS Transport Technical Report, Nov 2009. Appx F
	Hemel Hempstead Bus Station	1	by 2016	Hemel Hempstead	✓	✓	4,000,000	✓	£2.3M		HCC	HCC	Timescale changed from 2021 to 2016 following comment from HCC Passenger Transport Unit	HIIS Transport Technical Report, Nov 2009. Appx F
	Real Time Passenger Information (RTPI) on routes to/ from/ around Maylands	1	2016	Hemel Hempstead	✓	✓		-			Developer	HCC/ Developer/ DBC	URS phasing	Maylands Master Plan Planning Policy Statement, Sept2007. Pg14
	RTPI at bus stops	1	by 2019	Hemel Hempstead	✓	✓		✓			HCC	HCC		Hemel Hempstead Urban Transport Plan, Jan009. Pg82
	Orbital bus priority	1	2016	Hemel Hempstead		✓	1,000,000	-					URS new intervention. Particularly relevant for the high growth scenario	URS new intervention
	Maylands Interchange	2	2021	Hemel Hempstead		✓	2,000,000	-						
	Maylands Park & Ride	3		Hemel Hempstead	✓	✓		-			Development (TBC)	Development/ HCC/ DBC (TBC)	Aspirational - However could provide combined role with bus interchange suggested by URS below	Dacorum Borough Council IDP Comments
Cycling & Pedestrian	Cycle Route between Two Waters, Apsley & Nash Mills	1	2021	Hemel Hempstead	✓	✓		✓			HCC/ DBC	HCC/ DBC	URS phasing	Dacorum Borough Local Plan Schedule of Transport Proposals, April 2003. Pg153
	Improved cycle links from Maylands to Adayfield, Grovehill, & Cupid Green	1	2016	Hemel Hempstead	✓	✓		✓			HCC/ Developer	HCC/ Developer	Timescale to support growth in existing urban area. URS phasing	Maylands Master Plan Planning Policy Statement, Sept 2007. Pg15
	Queensway to Maylands advisory route	1	2021	Hemel Hempstead	✓	✓		✓			Developer/ HCC/ DBC	Developer/ HCC/ DBC	URS phasing	Dacorum Borough Local Plan Cycle Strategy, Oct 2009. Pg10
	Upgrades to station cycle parking	1	2016	Hemel/ Tring/ Berkhamsted/ Apsley/ Kings Langley	✓	✓		✓				HCC/ TOC/ DBC	URS phasing	HCC LTP2, March 2006. Rail Strategy Pg20
	Durrants Hill Rd footpath improvements	1	2016	Hemel Hempstead	✓	✓		✓			HCC	HCC	Funding not considered in HIIS as scheme not suitable for CIL. URS phasing	HIIS Transport Technical Report, Nov 2009. Appendix B

Type of Infrastructure	Description of Scheme / Requirement	Priority 1, 2 or 3 (1 Highest, 3 Lowest) Include rationale for rating and risks of non-delivery.	Timescale Required delivery date and phasing	Location Sub-area	Drivers		Costs (£) Cost	Planning and Funding Status			Funding and Delivery Responsibilities		Notes	Source
					To meet existing deficiency	To meet additional future demand		Is the need noted by the provider?	Planned and Committed Funds	Planned not committed funds	Funding Agency / Agencies	Delivery Agency / Agencies		
	Improved links between Hemel Hempstead station & Town Centre	1	by 2016 amended from 2019 due to town centre development	Hemel Hempstead	✓	✓	500,000	✓			HCC/ DBC	HCC/ TOC/ DBC	URS phasing	Hemel Hempstead Urban Transport Plan, Jan 2009. Pg82
	Maylands Avenue Shared Paths	1	2021	Hemel Hempstead	✓	✓		✓			Developer/ HCC/ DBC	Developer/ HCC/ DBC	URS phasing	Dacorum Borough Local Plan Cycle Strategy, Oct 2009. Pg10
	Implementation of HCC Cycling Strategy including comprehensive cycle network	1	2021	Berkhamsted	✓	✓	2,000,000	✓					URS new intervention	
	Implementation of HCC Cycling Strategy including comprehensive cycle network	1	2021	Hemel Hempstead	✓	✓	3,000,000	✓					URS new intervention	
	Riverside shared path, Waterhouse Square Proposal	2	2016	Hemel Hempstead	✓	✓		✓			Developer	Developer/ HCC/ DBC	URS phasing	Dacorum Borough Local Plan Cycle Strategy, Oct 2009. Pg10
	Kings Road footpath improvements	2	2026	Berkhamsted	✓	✓		✓			HCC	HCC	Funding not considered in HIIS as scheme not suitable for CIL. URS phasing	Dacorum Transport Study, Aug 2006. Pg31
	Enhanced & extended cycle route between Tring & Tring station	2	2021	Tring		✓	97,500	-					URS new intervention	
	Regional Route 66	3	2021	Hemel Hempstead/ Tring/ Rural West	✓	✓		-			Sustrans	Sustrans/ HCC/ DBC	Desirable. URS phasing	Dacorum Borough Local Plan Cycle Strategy, Oct 2009. Pg8
	Better pedestrian links, particularly to station	3	2016	Kings Langsley	✓	✓		✓			HCC	HCC	No committed funding. URS phasing	Spatial Strategy for the Town of Kings Langley, June 2009. Pg16
	Improvements to National Cycle Network Route 57 from Chesham to the start of the Nickey line and from the Nickey line to HH town centre.	3	2021	Hemel Hempstead	✓	✓		-					Desirable - Low priority as unlikely to be substantial interurban travel by cycle from growth, although recognised that may be desirable for leisure uses. URS phasing	Hemel Hempstead Urban Transport Plan, Jan09. Para 7.14
	Implementation of HCC cycling Strategy	See new interventions for Hemel, Berkhamsted, and Tring below	See new interventions for Hemel, Berkhamsted, and Tring below	Hertfordshire-wide	✓	✓	36,000,000 excluded from total due to new interventions	✓	£12.1		HCC	HCC	£3m anticipated from Sustrans. Cost & funding is for whole of Herts (av £2m/ town) including Hemel. This cost would be replaced by that identified for Hemel, Berkhamsted, and Tring below	HIIS Transport Technical Report, Nov 2009. Appendix F

Type of Infrastructure	Description of Scheme / Requirement	Priority 1, 2 or 3 (1 Highest, 3 Lowest) Include rationale for rating and risks of non-delivery.	Timescale Required delivery date and phasing	Location Sub-area	Drivers		Costs (£) Cost	Planning and Funding Status			Funding and Delivery Responsibilities		Notes	Source
					To meet existing deficiency	To meet additional future demand		Is the need noted by the provider?	Planned and Committed Funds	Planned not committed funds	Funding Agency / Agencies	Delivery Agency / Agencies		
Other	TravelSmart	1	Ongoing	Dacorum	✓	✓	low = 1,722,000 high = 1,893,000						URS new intervention	
	Car parking close to centre	3	2016	Markyate	✓	✓							Aspirational - Parking given low priority as internalisation of trips within Markyate by private car should be discouraged. URS phasing	Spatial Strategy for the Village of Markyate, June 2009. Pg15
	Station Gateway	3	2016	Hemel Hempstead	✓	✓		✓					Desirable. URS phasing	Dacorum Borough Council IDP Comments
Rail	London Euston station redevelopment			Sub-Regional (London Euston)	✓	✓		✓		Network Rail	Network Rail/ TOCs	At GRIP stage 0 (First stage in scheme approval for rail schemes) Not in DBC		West Coast Mainline RUS Scoping Document, Nov 2008. Pg
	National Stations Improvement Programme Works at Berkhamsted	1	2013	Berkhamsted	✓	✓		✓		Network Rail	Network Rail	Cost not provided for approved schemes		Route Plan Route 18 West Coast Mainline, 2009. Pg31
	Extension of platform 11 @ Euston for 12 car Class 350	1	2010	Sub-Regional (Euston)	✓	✓		✓		Third Party - Train Operating Company (TOC) / franchise	Network Rail	Cost not provided for approved schemes Not in DBC		Route Plan Route 18 West Coast Mainline, 2009, Pg29
	DDA access scheme at Hemel Hempstead station	1	2016	Hemel Hempstead	✓	✓		✓			HCC/ TOC			HCC LTP2, Mar 2006. Rail Strategy Pg19
	Hemel Hempstead station improvements	1	by 2021	Hemel Hempstead	✓	✓	2,000,000				TOCs/ HCC/ DBC	TOCs/ HCC/ DBC		HIIS Transport Technical Report, Nov 2009. Appx F
	Real Time Passenger Information at stations	1	by 2019	Hemel Hempstead	✓	✓		✓			TOCs	TOCs		Hemel Hempstead Urban Transport Plan, January 2009. Pg82
	Step free access to platforms	1	by 2015	Hemel Hempstead	✓	✓		✓			DfT	DfT	Timescale changed from 2019 to 2015 following comments from HCC. Fully funded – see link (commitment listed by DfT on website)	Hemel Hempstead Urban Transport Plan, January 2009. Pg82
Road	M25 Widening to D4 J16-23		2012	Sub-regional	✓	✓	601,800,000 excluded due to status as national scheme	✓	602	PFI	DBFO (Design Build Finance and Operate)	Not in DBC		East of England Plan, May 2006. Pg115. Also Highways Agency Senior Network Manager by phone.
	A4146/ A414 jct improvements	1	by 2016, amended from 2021 in HIIS due to town centre development	Hemel Hempstead	✓	✓	5,000,000				HCC	HCC	Scheme was proposed by URS in HIIS, URS phasing	HIIS Transport Technical Report, Nov 2009. Appx F

Type of Infrastructure	Description of Scheme / Requirement	Priority 1, 2 or 3 (1 Highest, 3 Lowest) Include rationale for rating and risks of non-delivery.	Timescale Required delivery date and phasing	Location Sub-area	Drivers		Costs (£) Cost	Planning and Funding Status			Funding and Delivery Responsibilities		Notes	Source
					To meet existing deficiency	To meet additional future demand		Is the need noted by the provider?	Planned and Committed Funds	Planned not committed funds	Funding Agency / Agencies	Delivery Agency / Agencies		
	A4147 widening & jct improvements	1	2021	Hemel Hempstead	✓	✓		✓			HCC	HCC	Funding not considered in HIIS as scheme not suitable for CIL - timescale to support orbital movements. URS phasing	HIIS Transport Technical Report, Nov 2009. Appx B
	Breakspear Way jct improvements	1	by 2021	Hemel Hempstead	✓	✓	100,000	✓	60,000		HCC	HCC		HIIS Transport Technical Report, Nov 2009. Appx F
	Durrants Hill Rd carriageway widening	1	2016	Hemel Hempstead	✓	✓		✓			HCC	HCC	Funding not considered in HIIS as scheme not suitable for CIL - timescale to support growth in south Hemel in addition to existing deficit. URS phasing	HIIS Transport Technical Report, Nov 2009. Appx B
	Durrants Hill/ London Road Signalisation	1	by 2021	Hemel Hempstead	✓	✓	100,000	✓	60,000		HCC	HCC		HIIS Transport Technical Report, Nov 2009. Appx F
	Featherbed Lane / London Rd jct improvements	1	by 2021	Hemel Hempstead	✓	✓	100,000	✓	60,000		HCC	HCC		HIIS Transport Technical Report, November 2009. Appendix F
	New Road Layout at Leverstock Green	1	by 2019	Hemel Hempstead	✓	✓		✓			HCC	HCC		Hemel Hempstead Urban Transport Plan, January 2009. Pg83
	Signalise Kings Rd/ Kingshill Way/ Durrants Rd	1	2016	Berkhamsted		✓	300,000	-					URS new intervention	
	Hemel Hempstead North eastern relief road	2	by 2031	Hemel Hempstead	✓	✓	34,000,000	-			Developers	HCC/ Developers	Cost is an assessment by URS for HIIS but is not committed nor formally adopted. Likely to be refined following ongoing work by HCC.	PN006 Dacorum Master Planning ODYSSEUS Testing, HIIS, Jan 2009. Unpublished.
	London Rd/ Station Rd jct improvements	2	by 2021	Hemel Hempstead	✓	✓	200,000	✓	12,000		HCC	HCC		HIIS Transport Technical Report, November 2009. Appendix F
	Swallowdale Ln widening & jct improvements	2	by 2021	Hemel Hempstead	✓	✓	1,000,000	✓	580,000		HCC	HCC		HIIS Transport Technical Report, Nov 2009. Appx F
	Maylands North East	2	2021	Hemel Hempstead	✓	✓		-			HCC/ DBC (TBC)	HCC/ DBC (TBC)	Considered essential, modelling work under way	Dacorum Borough Council IDP Comments
	High St traffic management	2	2021	Berkhamsted	✓	✓	2,000,000	-					URS new intervention	
	Partial signalisation of A41/ A4251	2	2021	Hemel Hempstead		✓	500,000	-					URS new intervention	

Type of Infrastructure	Description of Scheme / Requirement	Priority 1, 2 or 3 (1 Highest, 3 Lowest) Include rationale for rating and risks of non-delivery.	Timescale Required delivery date and phasing	Location Sub-area	Drivers		Costs (£) Cost	Planning and Funding Status			Funding and Delivery Responsibilities		Notes	Source	
					To meet existing deficiency	To meet additional future demand		Is the need noted by the provider?	Planned and Committed Funds	Planned not committed funds	Funding Agency / Agencies	Delivery Agency / Agencies			
	Tunnel Fields link to New Road, Northchurch, Berkhamsted and associated work to junction of New Road/ A4251	3		Berkhamsted	✓	✓		-			HCC	HCC		Dacorum Borough Local Plan Schedule of Transport Proposals, April 2003. Pg154	
	Water End Bypass	3	by 2021	Rural East	✓	✓	17,400,000	✓			HCC	HCC		HIIS Transport Technical Report, Nov 2009. Appx F	
Existing Interventions							66,400,000								
New Interventions							Low = 12,619,975 High = 12,789,975								
TOTAL COSTS / FUNDING							Low = 79,019,500 High = 79,190,500								

Appendix E Transport Interventions Map

Transport		
Cycle facility / route	Implementation of HCC Cycling Strategy including comprehensive cycle network	Berkhamsted
	Enhanced & extended cycle route between Tring & Tring station	Tring
	Implementation of HCC Cycling Strategy including comprehensive cycle network	Hemel Hempstead
Bus facility / route	Orbital bus priority	Hemel Hempstead
	Maylands Interchange	Hemel Hempstead
Road network / junction	Signalise Kings Rd/ Kingshill Way/ Durrants Rd	Berkhamsted
	Partial signalisation of A41/ A4251	Hemel Hempstead
Walk facility / route	High St traffic management	Berkhamsted
	Smarter Choices	Dacorum

