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Hertfordshire County Council, St Albans District Council and Dacorum Borough Council

Hemel Garden Community 2050 COMET Test

Traffic Modelling Report

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June 2025

Confidential

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Executive summary

WSP were commissioned by Hertfordshire County Council (HCC) on behalf of Dacorum Borough Council (DBC) and St Albans District Council (SADC) to undertake transport modelling work to assess the combined impact of DBC's and SADC's Local Plan proposals and the proposed upgrade to M1 Junction 8. The work undertaken for this combined 2041 Local Plan assessment has been reported in a St Albans and Dacorum Combined Local Plan COMET Forecasting Report_FINAL_Accessible_09.05.2025.

The work so far has been undertaken to reflect the end of the plan period 2041. Infrastructure has been coded in to reflect the measures outlined in the Local Plan Infrastructure Delivery Plans. The Hemel Garden Community (HGC) growth areas include development growth beyond the Local Plan period up to 2050. For the purposes of the Local Plans and the HGC programme there is a need to understand the impact of the totality of the growth up to this end point along with the longer term more strategic transport schemes such as changes to M1 junction 8, the sustainable transport corridor running through the North and East Hemel growth area and the implementation of the HERT rapid transit scheme.

Therefore, an additional assessment has been undertaken post 2041 Local Plan period to understand the impacts of the additional growth from 2041 to 2050 using the COMET model, which have been documented in this report.

The following sections summarise each chapter of this report including key findings of the modelling work for each scenario and the overall conclusion.

Introduction

The introduction sets the context, explaining the need to model cumulative growth impacts for both Local Plans and Hemel Garden Communities expansion beyond 2041. It describes the COMET model's scope, its role in previous assessments, and the objectives for this forecasting exercise: to understand growth impacts and mitigation impacts of the IDP schemes.

The options developed are as follows:

- **2050 Option 0A** - with committed developments to 2041 (as per 2041 Option 0A of the joint run) plus additional National Trip End Model (NTEM) growth to 2050 across the county
- **2050 Vision & Validate** - which includes the Local Plan growth to 2041 in St Albans and Dacorum with associated infrastructure (as per 2041 Option 4b of the joint run), the additional HGC growth planned to come forward between 2041 and 2050 and the assumption of a 60% sustainable (non-car) mode share in the Hemel Garden Communities development areas plus a 40% sustainable mode share in the rest of Hemel Hempstead. These align to the mode share targets at the end point of the HGC Transport Vision and Strategy.

- **2050 Infrastructure Test** – this is a direct test of the infrastructure identified in the HGC post 2041 Infrastructure Delivery Plan (IDP) without the sustainable mode share assumption applied in HGC and the rest of Hemel Hempstead.

Future Year Scenarios

The future year scenarios chapter provides an overview of the scenarios developed for the forecasting work for the future year of 2050, the time periods of AM and PM peak, and the scenario definitions of Option 0A, Vision and Validate, and the infrastructure test.

COMET Model Forecast Methodology

The COMET model forecast methodology chapter describes the forecasting approach for the highway and public transport models, including the variable demand model, the model structure, the COMET trip end model, and the generalised cost parameters. The forecast trip matrix is an estimation of future trips based on available population and employment data for Hertfordshire and growth assumptions for the rest of Great Britain from the most recent version of the DfT NTEM. The COMET trip end model is used to forecast future trip ends for each model zone, which are used to build a reference matrix for the forecast year. The reference matrix is then adjusted based on the forecast highway and public transport assignments through the variable demand model, which takes into account the changes in transport infrastructure, travel times and costs in future years.

2050 Option 0A Assumptions

Option 0A represents all completed and committed developments and transport infrastructure across Hertfordshire between 2014 and 2050. The scenario aligns with the Department for Transport's National Trip End Model (NTEM) growth projections for all districts in Hertfordshire except St Albans and Dacorum.

The forecast network incorporates infrastructure schemes categorised as “near certain” and “more than likely,” in line with DfT guidance TAG Unit M4. Additional schemes in St Albans and Dacorum have been included due to improved certainty.

2050 Vision & Validate Assumptions

Option Vision & Validate incorporates all Local Plan allocations for SADC and DBC from 2014 to 2041, and the additional HGC growth for post Local Plan period from 2041-2050. In total, 13,219 dwellings and 8,776 jobs have been allocated as part of the Dacorum Local Plan, and 14,417 dwellings and 9,589 jobs have been allocated as part of the St Albans Local Plan. In addition to that, for HGC, additional growth has been added, which mainly is 3,500 dwellings for North Hemel growth area in Dacorum and 1,200 dwellings in the St Albans HGC developments split between North Hemel (375), East Hemel (365) and South Hemel (460).

It also includes the IDP schemes for both district and applies the Opportunity to Shift Mode (OSM) tool to model reductions in car trips. Mode shift targets are 60% sustainable modes for HGC and 40% for Hemel Hempstead, reflecting the mode shift targets set by HGC to walking, cycling and public transport. The OSM reduction applied in the rest of Dacorum and St Albans is the same as assumed for 2041 Option 4a.

Access arrangements and signalisation assumptions for key development sites are also described, as well as trip generation rates for residential and employment areas.

2050 Infrastructure Test Assumptions

The 2050 Infrastructure Test includes all the proposed infrastructure that is contained within the 2050 V&V scenario and in addition it also includes the AECOM post 2041 Hemel Garden Community proposed highway and public transport infrastructure, without assuming additional mode shift in the HGC and Hemel Hempstead areas. The intent is to directly assess the effectiveness of infrastructure in mitigating growth-related impacts.

Modelling Results

The results chapter provides a comprehensive summary of the main findings derived from the modelling work, as follows.

Option 0A: Represents a future with only committed developments and infrastructure. By 2050, the highway network sees increases in traffic and areas of high volume/capacity ratios (V/C), especially at major junctions and links (e.g., A414, Maylands Avenue, and Redbourn Road). Congestion hotspots persist, and delay is concentrated at key urban corridors.

Vision & Validate: With Local Plan and HGC growth, plus mode shift targets and new infrastructure, overall vehicle trips increase by 4% (AM) and 1% (PM) compared to Option 0A. Total travel time rises by 9% (AM) and 12% (PM). Time at junctions increases by 16% (AM) and 35% (PM), while average speed declines slightly. Increased delays are forecast at key sites, notably M1 Junction 8 and Redbourn Road junction. Some journey times rise substantially on routes connecting major developments, though targeted infrastructure mitigates delay at specific junctions (e.g., A414/Green Lane). Modal shift reduces car trips in targeted zones, but public transport share remains around 18% of trips overall.

Infrastructure Test: Directly applying all infrastructure, public transport patronage increases modestly; new MRT and bus/rail integration see a 27% rise in intermodal (bus-rail) trips, but overall mode share for public transport remains at 18.2%. Car trips still outnumber public transport by over four to one. Highway journey times are variably affected, with some routes showing improvements and others experiencing increased delay depending on scheme implementation and capacity changes.

Vision & Validate vs. Option 0A: Key Comparisons

- **Vehicle Trips:** Up by 4% (AM) and 1% (PM) in Vision & Validate due to added development.
- **Total Time Travelled:** Up 9% (AM) and 12% (PM), indicating network strain.
- **Junction Delays:** Increases at M1 Junction 8 and Redbourn Road, but improved at A414/Green Lane due to IDP upgrades.
- **Journey Times:** Key corridors (A414, Leighton Buzzard Road–A4251, A41) experience significant delays, notably an increase of up to 77% on some routes. Some journey times improve where infrastructure upgrades are applied.
- **Mode Shift:** Ambitious targets are assumed in HGC and Hemel Hempstead (up to 60% and 40% respectively), but overall the main trips remain by car.

- **Public Transport:** Infrastructure improvements result in a modest increase in multimodal trips, but broader mode shift is still limited.

Conclusions

As a result of the increase in vehicles in the V&V scenario there is increased delay on the highway network including Redbourn Road, Leighton Buzzard Road, and M1 Junction 8. There is also increased traffic in the V&V scenario, on key roads such as A414, Boundary Way, and Maylands Avenue. However, decreases in traffic are observed on Redbourn Road and Leighton Buzzard Road due to congestion as a result of the increase in dwellings at the North Hemel Garden Communities site.

Detailed analysis of nine key junctions around M1 Junction 8 indicate that within the Vision & Validate scenario there are generally increased traffic flows and delays at these junctions. Overall there are increases in journey times on the routes identified between Option 0a and the Vision and Validate scenario. Where the journey times reduce this is a result of an infrastructure scheme such as the A414/ Green Lane junction improvement.

As with the 2041 Combined St Albans and Dacorum Option 4b Sensitivity test, the results show that with two lanes on the circulatory carriageway of the proposed M1 Junction 8 layout, it can accommodate the 2050 growth in the Vision & Validate scenario.

The infrastructure test results focus on the additional schemes coded into the highway and public transport models. The introduction of these schemes results in changes to the highway journey times, with some increases and decreases depending on the scheme and impacts on highway capacity. With the introduction of the proposed public transport schemes there is increase public transport usage, however the patronage on services is relatively low as a result of the trip generation predicted by the COMET demand model.

The 2050 COMET modelling demonstrates that planned growth and associated infrastructure will increase demand and pressure on the local transport network. While proposed improvements and mode shift targets help mitigate some impacts, significant congestion and delays remain likely at key junctions and corridors. Even with ambitious mode shift assumptions and expanded public transport, the majority of journeys are expected to remain by car.

1 Introduction

1.1 Overview

1.1.1. WSP were commissioned by Hertfordshire County Council (HCC) on behalf of Dacorum Borough Council (DBC), St Albans District Council (SADC) and the Hemel Gardens Communities team (HGC) to undertake transport modelling work to assess the combined impact of DBC's and SADC's Local Plan proposals to 2041 and the proposed additional growth and infrastructure planned in the Hemel Garden Community area (HGC) between 2041 and 2050.

1.1.2. WSP have previously been commissioned to undertake separate option tests of St Albans District and Dacorum Borough Councils Local Plan allocations, as well as the combination of both the Local Plans for a forecast year of 2041.

1.1.3. The HGC growth areas include development growth beyond the Local Plan period up to 2050. For the purposes of the Local Plans and the HGC programme there is a need to understand the impact of the totality of the growth up to this end point along with the longer term more strategic transport schemes.

1.1.4. This report provides details of the COMET model, the forecast scenarios developed, the methodology adopted and assumptions alongside the results of the scenarios.

1.2 Scenarios

1.2.1. The following scenarios have been run within the COMET model:

- **2050 Option 0A** - with committed developments to 2041 (as per 2041 Option 0A of the joint run) plus additional National Trip End Model (NTEM) growth to 2050 across the county
- **2050 Vision & Validate** - which includes the Local Plan growth to 2041 in St Albans and Dacorum with associated infrastructure (as per 2041 Option 4b of the joint run), the additional HGC growth planned to come forward between 2041 and 2050 and the assumption of a 60% sustainable (non car) mode share in the Hemel Garden Communities development areas plus a 40% sustainable mode share in the rest of Hemel Hempstead. These align to the mode share targets at the end point of the HGC Transport Vision and Strategy.
- **2050 Infrastructure Test** – this is a direct test of the infrastructure identified in the HGC post 2041 Infrastructure Delivery Plan (IDP) without the sustainable mode share assumption applied in HGC and the rest of Hemel Hempstead.
    - Additional infrastructure identified from AECOM Hemel Hempstead Phase 2 Study identifying the additional measures needed to accommodate post 2041 growth. This model run tested the following measures:

- Coding of the Sustainable Transport Corridor in North Hemel (along with associated bus services)
- Basic assumptions around HERT – i.e. high frequency PT route running along A414 corridor between Hemel Hempstead station and a mobility hub in East Hemel with intermediate stop near the Plough Roundabout and assumption of priority measures at key junctions along the route.

1.2.2. Further details relating to these scenarios can be found in Chapter 2 for an overview of the scenarios and Chapters 4 to 6 of all the assumptions used to develop each option.

1.3 Background to COMET Model

1.3.1. HCC own and maintain the COMET transport model, comprising a highway assignment model built in SATURN and public transport and Variable Demand Model (VDM) in EMME. The latest version of COMET which was used for the basis of this work has a base year of 2014. An updated COMET model with a base year of 2023 is currently being developed but still under construction at the time this work was undertaken.

1.3.2. COMET provides a multi-purpose transport modelling tool to test a range of potential transport schemes and policies including:

- Highway scheme appraisals
- Inputs for transport business cases and funding applications
- Inputs for environmental appraisal
- Local Plan/ core strategy assessments
- Development impact assessments

1.3.3. COMET covers the entire county of Hertfordshire and surrounding area to varying degrees of detail, as shown in Figure 1-1. The area of detailed modelling, where all junctions are simulated, (within the green boundary line) includes all roads with significant traffic volumes and all realistic route choices. Outside of Hertfordshire, the rest of the fully modelled area encompasses a reduced level of detail, with principal strategic routes modelled and capacity restraint achieved using speed flow curves.

1.3.4. The external area includes a simplified network allowing traffic to enter the fully modelled area at the correct location without capacity restraint. It includes a skeleton network with approximate distances to allow the demand model to capture the full trip length.

1.3.5. This work has used COMET version 7.1 which aligns with Department for Transport (DfT) NTEM 8 and the most recent Transport Analysis Guidance (TAG) data book.

1.3.6. The NTEM model forecasts the growth in trip origin-destinations (or productions-attractions) up to 2051 for use in transport modelling. The forecasts take into account national projections of population, employment, housing, car ownership and trip rates.

1.3.7. The TAG data book provides all of the appraisal and modelling values referred to in TAG guidance. The data book features historical information and factual reference information about the appraisal and modelling values.

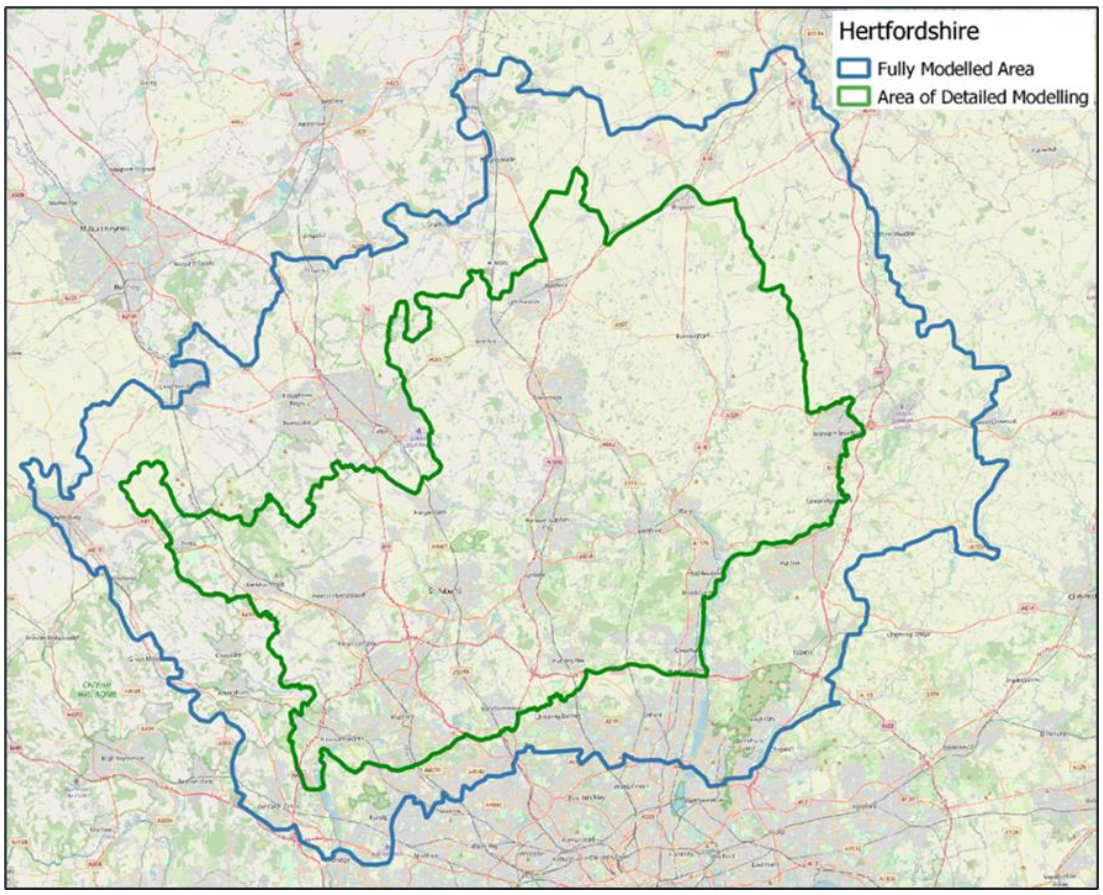


Figure 1-1: COMET Model Extent

1.4 Purpose of the Report

1.4.1. The purpose of this report is to document the forecast modelling process used to assess the combined impacts of the DBC and SADC Local Plan development sites and HGC growth to year 2050 and the proposed infrastructure for 2041-2050. It outlines the methodology for the development of the forecast matrices and networks and details of the proposed developments modelled and presents the results. The analysis within this Forecasting Report has been undertaken to support the Local Plan development process and assess the impact of the proposed infrastructure 2041-2050.

1.5 Structure of the Report

1.5.1. The purpose of this report is to summarise the work carried out by WSP in the development of the 2050 Scenarios which assesses the combined DBC and SADC Regulation 19 Local Plan sites, HGC growth 2041-2050 and the proposed infrastructure for 2041-2050. This report is structured as follows:

- Chapter 2: Future Year Scenarios

2 Future Year Scenarios

2.1 Future Year

2.1.1. The future year modelled is 2050, reflecting the proposed end point of the development growth associated with Hemel Garden Communities, which forms part of the Dacorum Local Plan and St Albans Local Plan.

2.2 Time Periods

2.2.1. The following time periods have been assessed using the model:

- AM peak (08:00 to 09:00)
- PM peak (17:00 to 18:00)

2.3 Scenarios

2.3.1. The following scenarios have been run within the COMET model:

- **2050 Option 0A** - with committed developments to 2041 (as per option 0A of the joint run) plus additional Tempro Growth to 2050 across the county
- **2050 Vision & Validate** - which includes local plan growth to 2041 in St Albans and Dacorum with associated infrastructure (as per Option 4b of the joint run), plus the additional HGC and an assumption of increased sustainable model share - 60% in the HGC developments and 40% elsewhere in Hemel in line with the targets in the HGC Transport Vision and Strategy.
- **2050 Infrastructure Test** - this is a direct test of the infrastructure identified in the HGC post 2041 Infrastructure Delivery Plan (IDP) without the sustainable mode share assumption applied in HGC and the rest of Hemel Hempstead:
  - Additional infrastructure identified from AECOM phase 2 study
  - Coding of the Sustainable Transport Corridor in North Hemel (along with associated bus services)
  - Basic assumptions around HERT – i.e. high frequency PT route running along A414 corridor between Hemel Hempstead station and a mobility hub in East Hemel with intermediate stop near the Plough Roundabout and assumption of priority measures at key junctions along the route.

2.3.2. An overview of what is included in each scenario is also shown in Table 2-1.

Table 2-1: Scenario Overview

Scenario Element	2050 Option 0A	2050 Vision & Validate	2050 Infrastructure Test
Completed / Consented developments to 2041 (as per Option 0A of the combined Local Plan runs) plus additional growth to 2050 (constrained to TEMPro)	Yes	Yes	Yes
Dacorum and St Albans Local Plan development growth to 2041 with associated infrastructure, plus additional HGC growth 2041 to 2050	No	Yes	Yes
Additional Infrastructure identified by AECOM phase 2 study, Sustainable Transport Corridor and basic assumptions around HERT	No	No	Yes
Opportunity to Shift Mode Applied	No	Yes	Yes (not applied in Hemel Hempstead area)
HGC Mode Shift Targets for 2050	No	Yes	No

2.3.3. Details of how each scenario was developed, including information on inputs and assumptions is provided in Chapters 4 to 6.

3 COMET Model Forecast Methodology

3.1 Forecast Objectives

3.1.1. This chapter will set out the forecasting approach for the highway and public transport to understand the cumulative effect of the Local Plan growth for St Albans and Dacorum plus the additional growth of the Hemel Garden Community 2041-50, in their respective scenarios.

3.1.2. This forecast takes into consideration the changes between 2014 and 2050 including increases in population, number of jobs and dwellings, rising cost of travel, and proposed transport infrastructure schemes. However, there is currently no allowance for factors that may fundamentally alter the nature of travel within Hertfordshire. These factors may include new technologies such as autonomous vehicles.

3.2 Model Time Periods

3.2.1. The time periods for the highway model are:

- AM Peak: 08:00 to 09:00
- Inter Peak: 10:00 to 16:00 (hourly average)
- PM Peak: 17:00 to 18:00

3.2.2. The time periods of the public transport model are:

- An average AM period hour (between 7:00am to 10:00am)
- An average Inter-peak hour (between 10:00am to 4:00pm)
- An average PM period hour (between 4:00pm to 7:00pm)

3.2.3. Although the Variable Demand Model covers periods spanning a full day, the assignment to the supply models has been undertaken in smaller but consistent time periods. The time periods are consistent with a three-hour time period in the Demand Model translated into a peak hour in the Highway assignment model and an average peak period in the Public Transport assignment model. As such, the analysis presented in this report reflects these time periods.

3.2.4. For the purpose of this assessment, the focus of results is on the AM and PM peaks within the highway model.

3.3 Treatment of Variable Demand

3.3.1. COMET includes a variable demand model, which has been used in the preparation of the forecast scenarios. The variable demand model is designed to estimate the effect of changes in transport infrastructure and travel cost upon patterns of demand. This considers changes in overall travel movements and is separate to modelling the way in which travellers respond to changes by choosing different routes. The latter is forecast by the highway and public transport assignment models.

3.4 Model Structure

3.4.1. The structure of the forecasting process, including the interaction between the demand models and assignment models is shown in Figure 3-1.

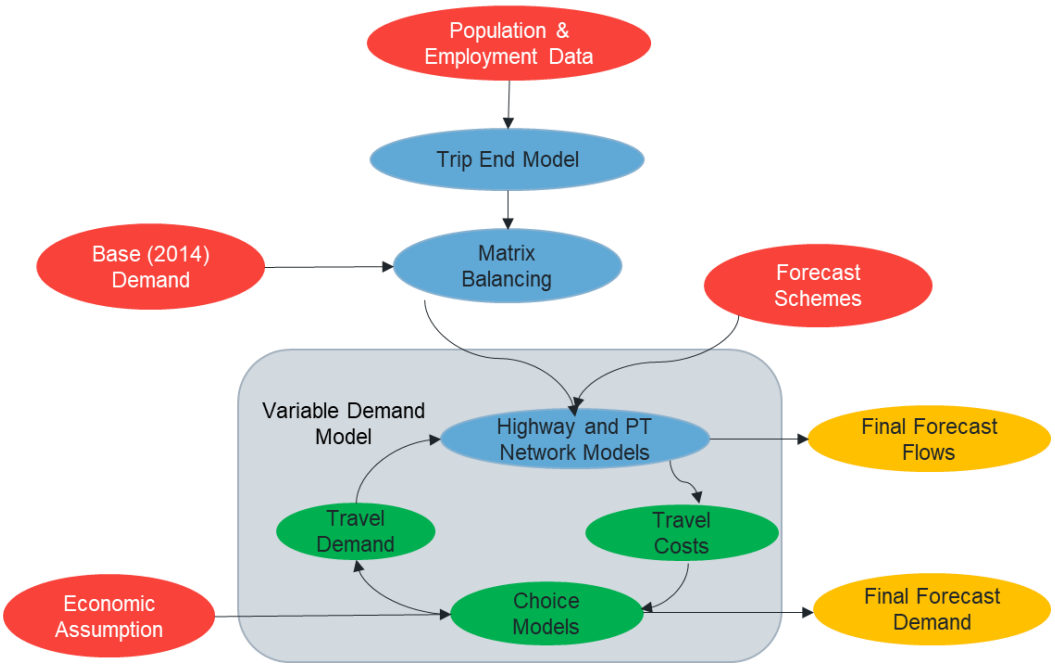


Figure 3-1: Model Structure

3.4.2. The forecast trip matrix is an estimation of future trips based on available population and employment data for Hertfordshire and growth assumptions for the rest of Great Britain from the most recent version of the Department for Transport (DfT) NTEM v8. Further details on the planning data for each assessment scenarios will be discussed in Chapters 4 to 6.

3.4.3. The COMET Trip End model is used to forecast future trip ends, i.e. total productions and attractions for each model zone. These trip ends are used to build a reference matrix for the forecast year (2041). The reference matrix is then adjusted based on the forecast Highway and Public Transport assignments through the VDM, which takes into account the changes in transport infrastructure, travel times and costs in future years. The resulting matrices constitute the forecast trip matrices.

3.5 COMET Trip End Model

3.5.1. A Trip End model has been built specifically for COMET as part of the COMET Base Year (2014) development. The COMET Trip End model is based on DfT's CTripEnd software package. The software creates trip end estimates based on NTEM planning data (v8) combined with a number of metrics based on population, car ownership and employment. It consists of a database of population/employment data and an executable file that runs a series of processes to create final trip end estimates for the desired model year, broken down by mode, time of day and demand segment.

If required more detailed information on the COMET Demand Model and CTripEnd model set up can be found in 2022-12-02 COMET 7 Forecasting Report_Final_Issued.pdf, which can be made available on request.

4 2050 Option 0A

4.1 Overview

4.1.1. This scenario represents the completed or committed developments and transport infrastructure across Hertfordshire over the period 2014-2050. This scenario is constrained to the growth in households and jobs within the DfT's NTEM for all districts in Hertfordshire except Dacorum and St Albans.

4.1.2. This option is similar to the Option 0A that was modelled for the combined St Albans and Dacorum Local Plan assessment, but with forecast growth to 2050 instead of 2041 from 2014.

4.2 Planning Data - Hertfordshire

Data Received

4.2.1. Planning data for all districts in Hertfordshire was received from Hertfordshire County Council. This included all completions and sites given planning permission between 2014 and 2022 which was the latest year available when work commenced.

Processing of Planning Data

4.2.2. The processing of the planning data has been undertaken using the same methodology as that for 2041 combined Local Plan assessment. For this assessment, the planning data has been processed based on the following three steps: Calculate the number of jobs from the floorspace for employment data

- Inclusion of sites that have been completed between 2014-2022
- Additional growth between 2022-2041 constrained to NTEM
- A further growth from 2041-2050 constrained to NTEM

4.2.3. For the data between 2014-2041, there are a total of 8,392 dwellings and 5,798 jobs estimated by Dacorum and 6,298 dwelling and 8,157 jobs provided by St Albans, with a total of 64,552 dwellings and 63,547 jobs for the whole of Hertfordshire. The planning data was constrained to NTEM for all district except St. Albans and Dacorum to accurately model the known planning data in these districts. More detail for the planning data processing for 2014-2041 is provided in the St Albans and Dacorum Combined Local Plan COMET Forecasting Report_FINAL_Accessible_09.05.2025.

Planning Data 2014 - 2050 Constrained to NTEM

4.2.4. Table 4-1 and Table 4-2 shows the total number of dwellings and jobs respectively in each district after the NTEM constraint had been applied. The planning data for Dacorum and St Albans was excluded from the constraining process to accurately model the known planning data in these districts. This is standard practise in line with DfT guidance, which retains the

integrity of the Dacorum and St Albans planning data which is more accurate than NTEM predictions.

4.2.5. Thus, the total number of dwellings and jobs for Hertfordshire without Dacorum and St Albans (so over 8 districts) was constrained to the NTEM totals for those districts. The number of dwellings needed to be increased by 6,801 dwellings and the number of jobs increased by 6,004 jobs to match the NTEM total as shown in Table 4-1and Table 4-2. The constraint was applied in a way that preserves the planning data totals as far as possible.

4.2.6. For dwellings an increase was not applied to Broxbourne or Hertsmere as the planning data total was already above NTEM in those districts. Reductions were applied in the other six districts proportional to the size of the district, so larger districts have a larger increase.

4.2.7. For jobs the increase was not applied to Broxbourne, Stevenage, Three Rivers or Watford as the planning data total was already above NTEM in those districts. Increases were applied in the other four districts proportional to the size of the district, so larger districts have a larger increase.

Table 4-1: Dwellings Summary after Constraining (2014-2050)

District	Dwellings in NTEM 8	Dwellings in planning data	Difference (planning data - NTEM 8)	Dwellings after constraint	Difference (after constraint - planning data)
Broxbourne	4,164	6,407	2,243	6,407	0
Dacorum	9,315	8,392	-923	8,392	0
East Hertfordshire	13,146	11,515	-1,631	13,363	1,848
Hertsmere	4,127	4,354	227	4,354	0
North Hertfordshire	8,568	5,263	-3,305	6,468	1,205
St Albans	8,294	6,298	-1996	6,298	0
Stevenage	4,945	4,942	-3	5,637	695
Three Rivers	3,329	3,079	-250.4	3,547	468
Watford	7,196	7,185	-11	8,197	1,012
Welwyn Hatfield	11,186	7,117	-4,069	8,690	1,573
Hertfordshire	74,272	64,552	-9,720	71,353	6,801

Table 4-2: Jobs Summary after Constraining (2014-2050)

District	Jobs in NTEM 8	Jobs in planning data	Difference (planning data - NTEM 8)	Jobs after constraint	Difference (after constraint - planning data)
Broxbourne	5,096	11,975	6,879	11,975	0
Dacorum	9,018	5,798	-3,220	5,798	0
East Hertfordshire	8,005	4,825	-3,180	6,380	1,555
Hertsmere	6,264	4,097	-2,167	5,314	1,217
North Hertfordshire	7,193	2,094	-5,099	3,491	1,397
St Albans	8,840	8,157	-683	8,157	0
Stevenage	6,590	7,202	612	7,202	0
Three Rivers	4,831	4,998	167.4	4,998	0
Watford	8,171	8,931	760	8,931	0
Welwyn Hatfield	9,448	5,470	-3,978	7,305	1,835
Hertfordshire	73,454	63,547	-9,907	69,551	6,004

Additional Growth 2041-2050

4.2.8. Table 4-3 and Table 4-4 provides the additional growth between 2041-2050 for dwellings and jobs respectively in each district after the NTEM constraint had been applied. Overall in Hertfordshire, there is an increase in 12,724 dwellings and a reduction of 2,781 jobs from 2041-2050, which is based on the NTEM forecasts. As no constrain has been applied to St Albans and Dacorum, there is no change in dwellings and jobs for them.

Table 4-3: Dwelling Growth 2041-2050

District	Dwellings after constraining 2014-2041	Dwellings after constraining 2014-2050	Additional dwellings growth modelled (2041-2050)	Dwellings NTEM 8 growth (2041-2050)
Broxbourne	5,751	6,407	656	1,015
Dacorum	8,392	8,392	0	2,181
East Hertfordshire	9,384	13,363	3,979	2,910
Hertsmere	3,723	4,354	631	1,097
North Hertfordshire	5,263	6,468	1,205	2,047
St Albans	6,298	6,298	0	1,874
Stevenage	4,157	5,637	1,480	1,175
Three Rivers	2,562	3,547	985	847
Watford	5,981	8,197	2,216	1,416
Welwyn Hatfield	7,117	8,690	1,573	2,217
Hertfordshire	**58,629**	**71,353**	**12,724**	**16,780**

Table 4-4: Jobs Growth 2041-2050

District	Jobs after constraint 2014-2041	Jobs after constraint 2014-2050	Additional Jobs growth modelled (2041-2050)	Jobs NTEM 8 growth (2041-2050)
Broxbourne	11,975	11,975	0	-272
Dacorum	5,798	5,798	0	-459
East Hertfordshire	6,794	6,380	-414	-410
Hertsmere	5,637	5,314	-323	-320
North Hertfordshire	3,862	3,491	-371	-365
St Albans	8,157	8,157	0	-431
Stevenage	7,202	7,202	0	-318
Three Rivers	6,186	4,998	-1,188	-246
Watford	8,931	8,931	0	-374
Welwyn Hatfield	7,791	7,305	-486	-475
Hertfordshire	**72,332**	**69,551**	**-2,781**	**-3,670**

4.3 Planning Data – Outside Hertfordshire

4.3.1. Outside Hertfordshire no specific data on sites within the planning system was available so housing and employment growth was taken directly from the national government forecasts in NTEM 8.

4.4 Goods Vehicle Demand

4.4.1. An uplift was applied to reflect the additional 14 years of growth between the existing COMET model forecasts for 2036 and the Local Plan forecast year of 2050. This uplift was based on DfT National Road Traffic Projections 2022 (NRTP22) which include the predicted increase in vehicle kilometres in future years based on the DfT National Transport Model (NTM). The factors set out in Table 4-5 were applied to cells within the LGV and HGV matrices. These factors are based on vehicle kilometre projections for the Southeast region, across all road types. As NRTP includes values in five-year increments, values for intermediate years (such as 2036 and 2050) were calculated through linear interpolation.

Table 4-5: Goods Vehicle uplift factors for 2036-50 based on NRTP22

Vehicle type	NRTP22 Vehicle Kilometres (billions) in 2036	NRTP22 Vehicle Kilometres (billions) in 2050	Uplift Factor 2036 to 2050
LGV	11.185	13.041	1.166
HGV	2.761	2.960	1.072

4.5 Transport Infrastructure

4.5.1. The forecast network for Option 0A scenario is based on the existing COMET 7 NTEM network as a starting point. The incorporated infrastructure schemes in this COMET 7 NTEM network are selected based on their certainty levels, which include schemes categorised as “near certain” and “more than likely” in line with DfT guidance. The proposed transport schemes are outlined in the St Albans and Dacorum Combined Local Plan Option 4 Traffic Modelling Report Section 4.5.

4.6 Generalised Cost Parameters

4.6.1. The generalised cost parameters used in the forecast models are from the TAG databook – November 2023 v1.22. Value of time is calculated in pence per minute (PPM) and vehicle operating cost is calculated in pence per kilometre (PPK). As in the base model, the value of time (PPM) for the HGVs was doubled from the value provided in the TAG databook. This is in line with TAG Unit A1.3 which advises for HGV that the driver’s time does not take account of the influence of owners on the routing of these vehicles.

4.6.2. The generalised cost parameters adopted for the 2050 forecast year is shown in Table 4-6. A split of 36.4% OGV1 and 63.6% OGV2 has been used to calculate the average generalised cost parameters for HGVs and an average simulation network speed of 54 kph has been used.

Table 4-6: Generalised Cost Values 2050

User Class	VOC (PPK) AM	VOC (PPK) IP	VOC (PPK) PM	VOT (PPM) AM	VOT (PPM) IP	VOT (PPM) PM
UC1: Car Commute	4.27	4.27	4.27	30.0	30.5	30.1
UC2: Car Employers Business	8.67	8.67	8.67	44.7	45.8	45.4
UC3: Car Other	4.27	4.27	4.27	20.7	22.0	21.7
UC4: LGV	12.17	12.17	12.17	33.3	33.3	33.3
UC5: HGV	39.22	39.22	39.22	69.5	69.5	69.5

5 2050 Vision & Validate Assumptions

5.1 Overview

5.1.1. This scenario adds the DBC and SADC Local Plan allocations onto Option 0A, together with the proposed Infrastructure Delivery Plans (IDP) in both areas, and the Opportunity to Shift Mode (OSM) Tool reduction in trips.

5.1.2. In addition to the Local Plan allocation previously tested to 2041, the additional growth to 2050 in the HGC is also included, as detailed below in section 5.4

5.2 Local Plan Allocations – Dacorum

5.2.1. A list of the Local Plan allocations in Dacorum was provided by DBC. The locations of the sites are shown in Figure 5-1 and Figure 5-2 for dwellings and employment respectively. In total, 13,219 dwellings and 8,776 jobs have been allocated as part of the Dacorum Local Plan. Sites where the number of dwellings is greater than 300 or jobs greater than 500 have been allocated a specific development zone (with a zone number over 9000).

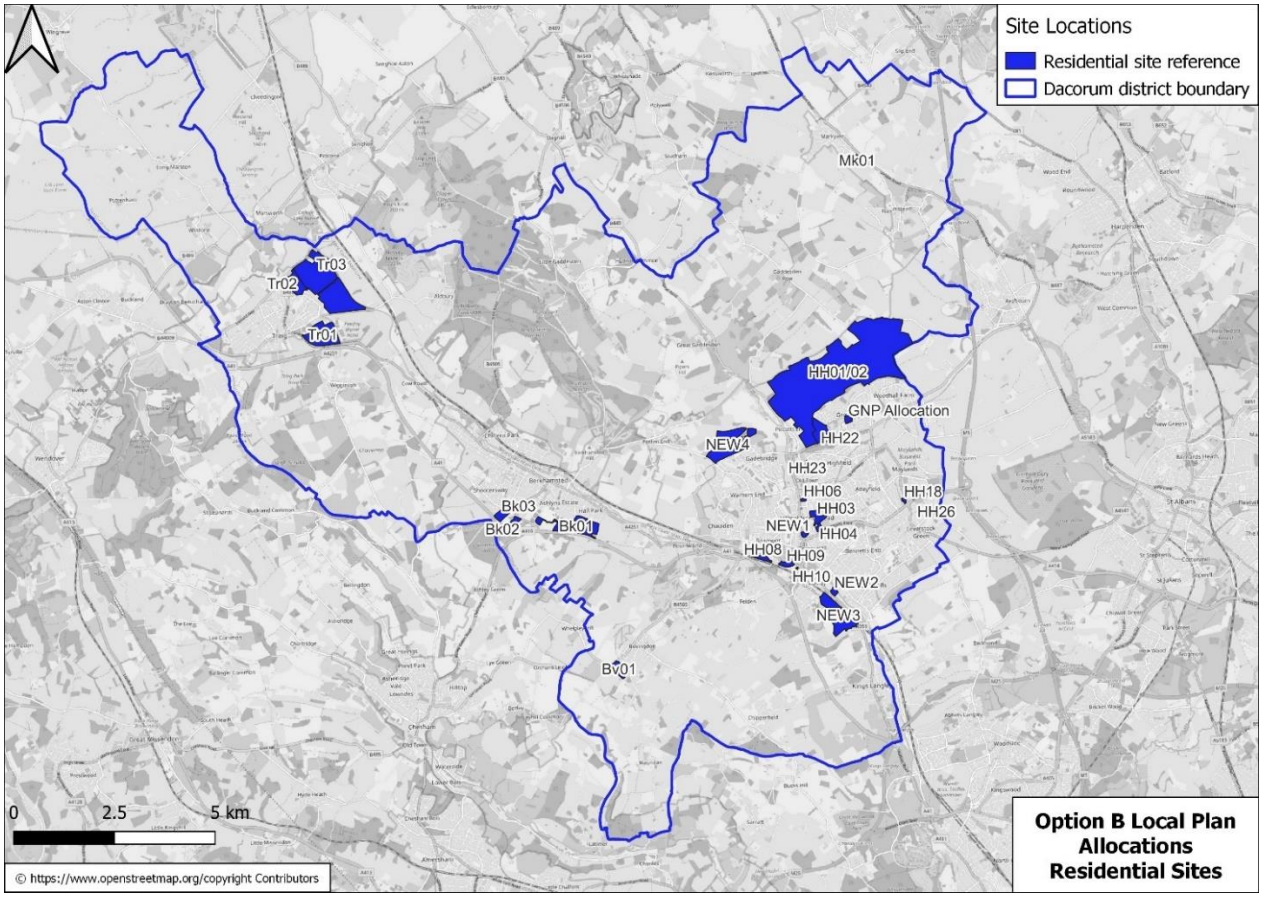


Figure 5-1: Location of Dacorum Local Plan Residential Sites

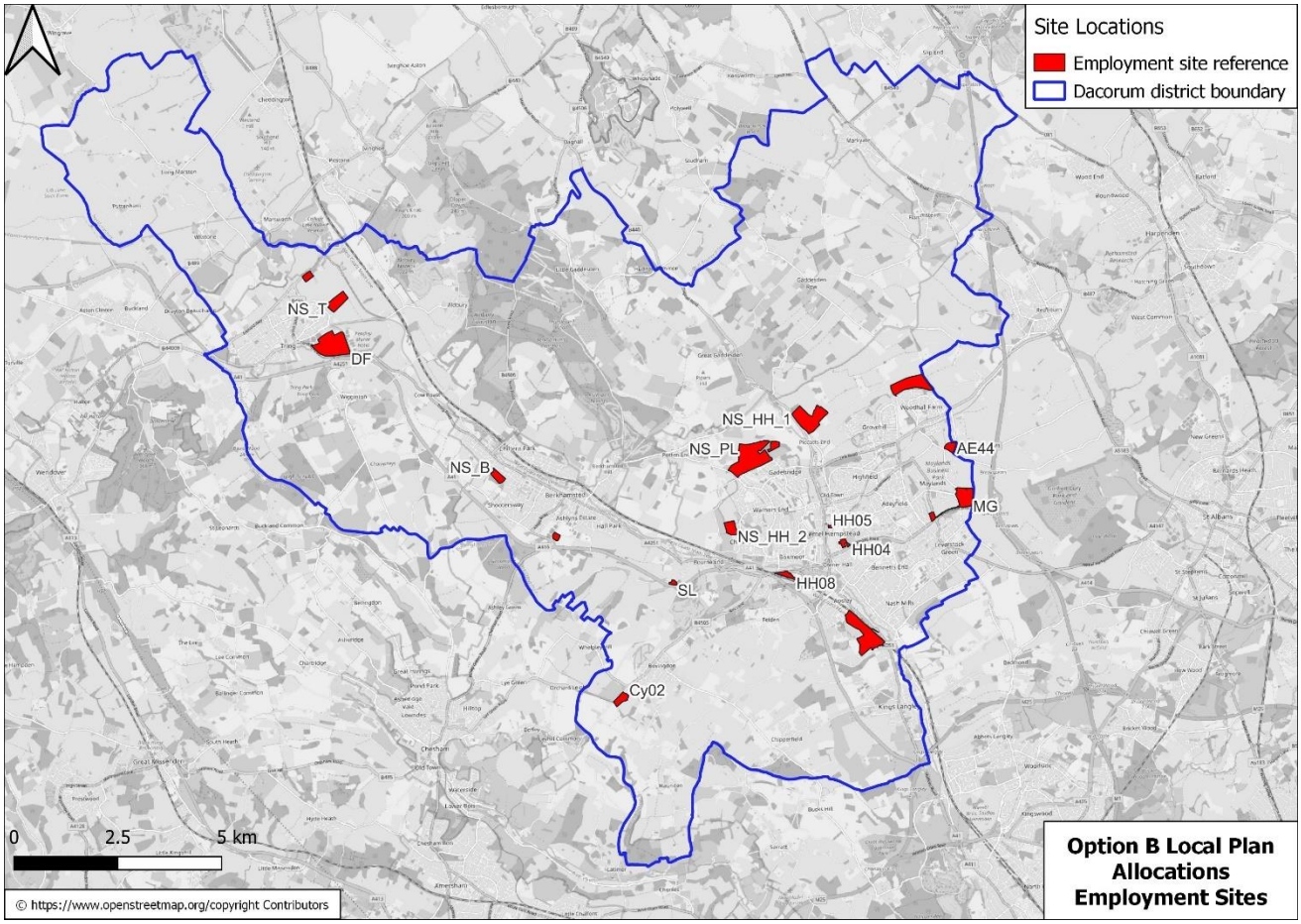


Figure 5-2: Location of Dacorum Local Plan Employment Sites

5.3 Local Plan Allocations – St Albans

5.3.1. A list of the Local Plan allocations was provided by SADC. In total, 14,417 dwellings and 9,589 jobs have been allocated as part of the St Albans Local Plan. Sites where the number of dwellings is greater than 300 or jobs greater than 500 have been allocated a specific development zone (with a zone number over 9000). The locations of the sites are shown in Figure 5-3.

Figure 5-3: Location of St Albans Local Plan Sites

5.4 Hemel Garden Community 2041 – 2050

5.4.1. In addition to the Local Plan allocation previously tested to 2041, the additional growth to 2050 in the HGC is also included, as detailed in Table 5-1 in the areas shown in Figure 5-4.

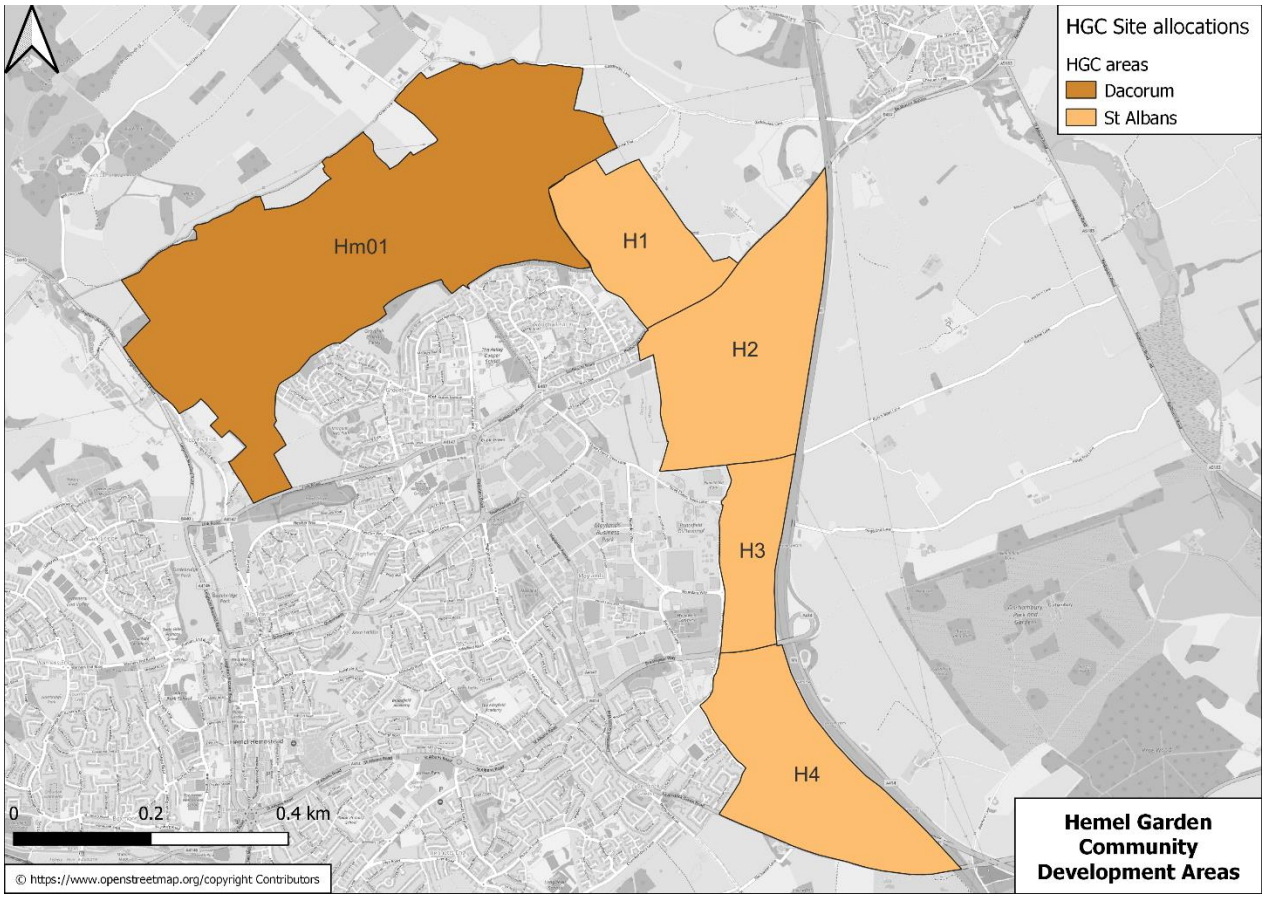


Figure 5-4: Hemel Garden Community Development Areas

Table 5-1: HGC 2041-2050 Development

Site allocation	Local Plan	Local Plan period development (up to 2041)	Post-Local Plan development (2041-2050)
Hm01 – North Hemel Growth Area	Dacorum	1,500 units	3,500 units
H1 – North Hemel Hempstead	St Albans	1,125 units	375 units
H2 – East Hemel Hempstead (North)	St Albans	1,235 units	365 units
H3 – East Hemel Hempstead (Central)	St Albans	53 ha employment land	0
H4 – East Hemel Hempstead (South)	St Albans	1,940 units	460 units

5.5 Watling Street Truck Stop

5.5.1. As per the 2041 Combined Local Plan assessment, an assumption has been made for the Watling Street Truck Stop near to M1 Junction 9 will be expanded in 2041. As there is no further expansion beyond 2041, the same trip generation assumption was also adopted for the 2050 assessment. Further detail on the trip generation assumption and methodology can be found in the 2041 St Albans and Dacorum Combined Local Plan Option 4 Traffic Modelling Report Section 5.4.

5.6 Transport Infrastructure

Infrastructure for developments

5.6.1. The largest Local Plan sites were modelled as separate zones and connected to the network at the location which are currently considered by DBC/SADC and HCC to the most likely access points at the time of undertaking the modelling.

5.6.2. In some cases, this has been possible to represent specific access arrangements where these are already known. In all cases care has been taken to ensure that there is sufficient capacity at the zone connection points and that all development traffic is able to load into the network within the modelled time periods

North Hemel Hempstead Development

5.6.3. The access proposals for the North Hemel Hempstead development have evolved between the 2041 combined Local Plan assessment and the latest 2050 assessment. These changes and assumptions for 2050 are outlined in the next section.

2041

5.6.4. For the North Hemel site in Dacorum, three accesses points onto the existing highway network in 2041 were assumed to be located at Leighton Buzzard Road (1), Link Road (2) and Redbourn Road (3), as illustrated in Figure 5-5. These accesses have been modelled as signalised junctions to ensure that there is sufficient capacity at the zone connection points and that all development traffic is able to load into the network within the modelled time periods. As signalisation of key development access junctions is also in line with HCC's new Place and Movement Design Guide. The assumed layouts of these signalised junctions are shown in Figure 5-6 to Figure 5-8. The highway trips associated with North Hemel Hempstead in this scenario are split, with two thirds allocated to the west of the site, location A in Figure 5-5, with the choice of using the Link Road or Leighton Buzzard Road access and one third allocated to the east of the site, location B in Figure 5-5, which use the Redbourn Road access.

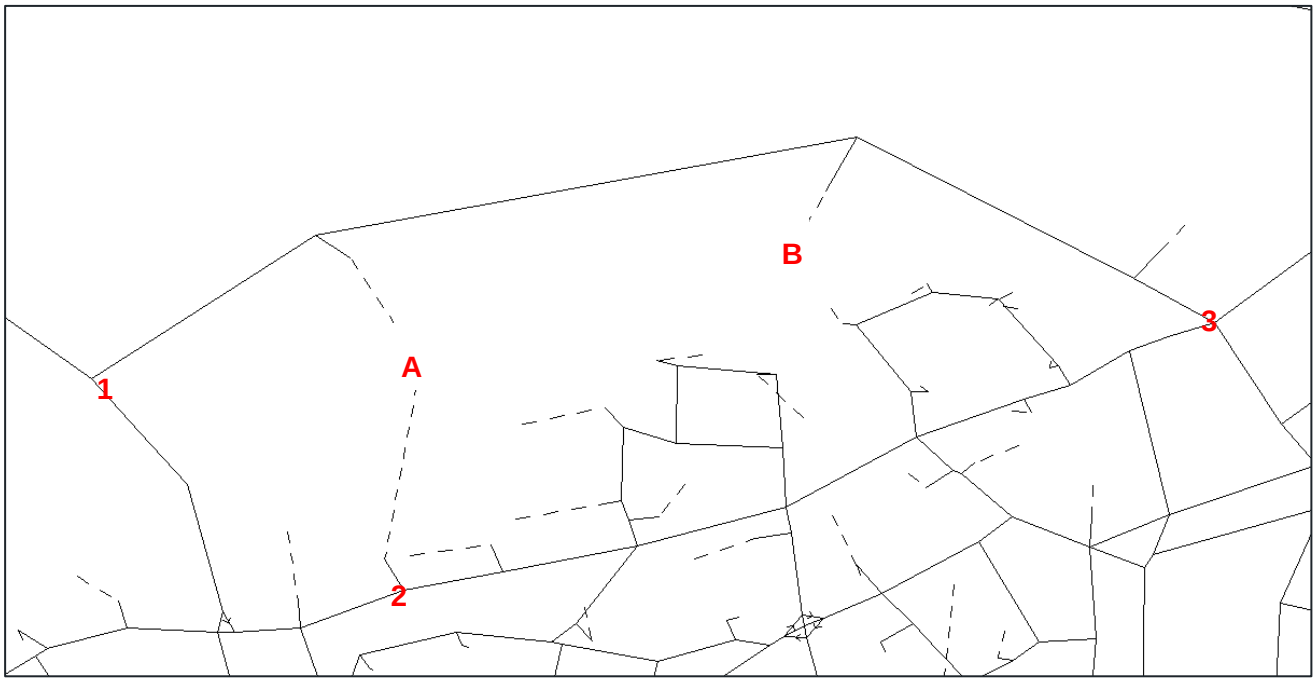


Figure 5-5: 2041 North Hemel Hempstead Access Assumptions

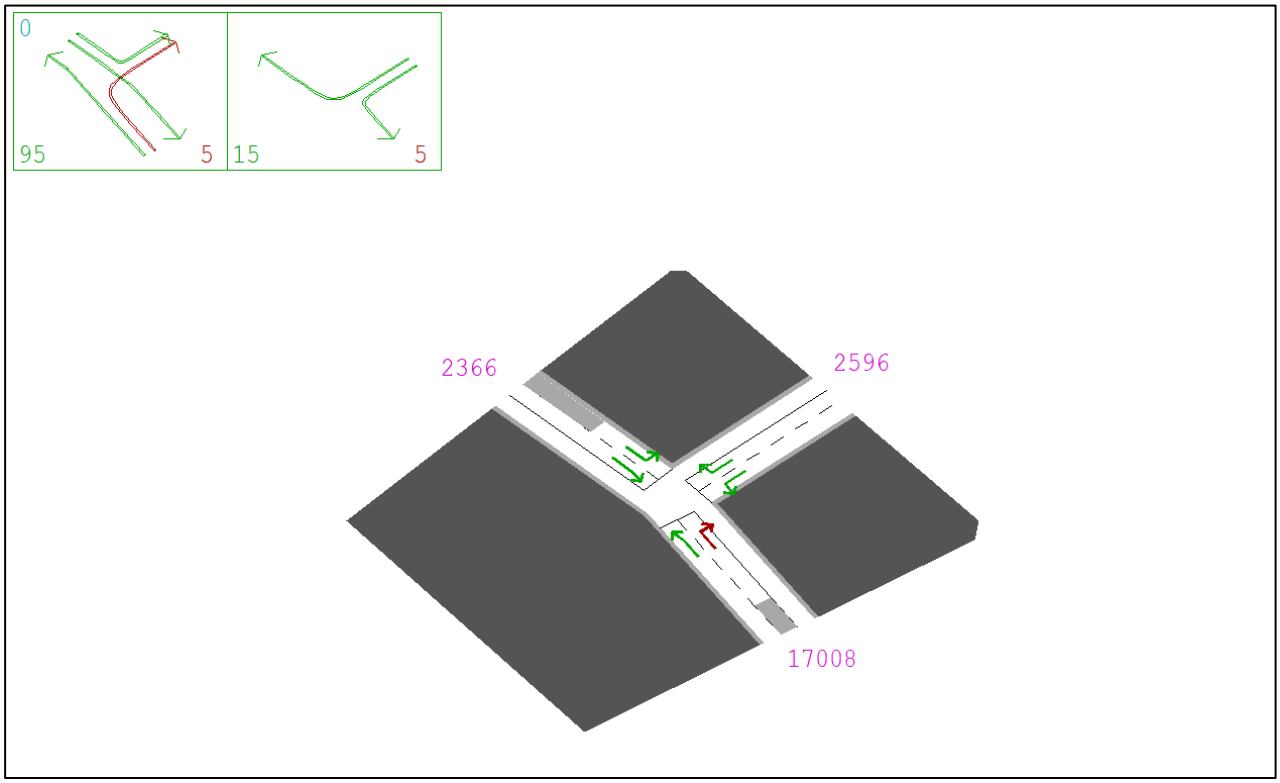


Figure 5-6: 2041 North Hemel Access Junction 1 with Leighton Buzzard Road

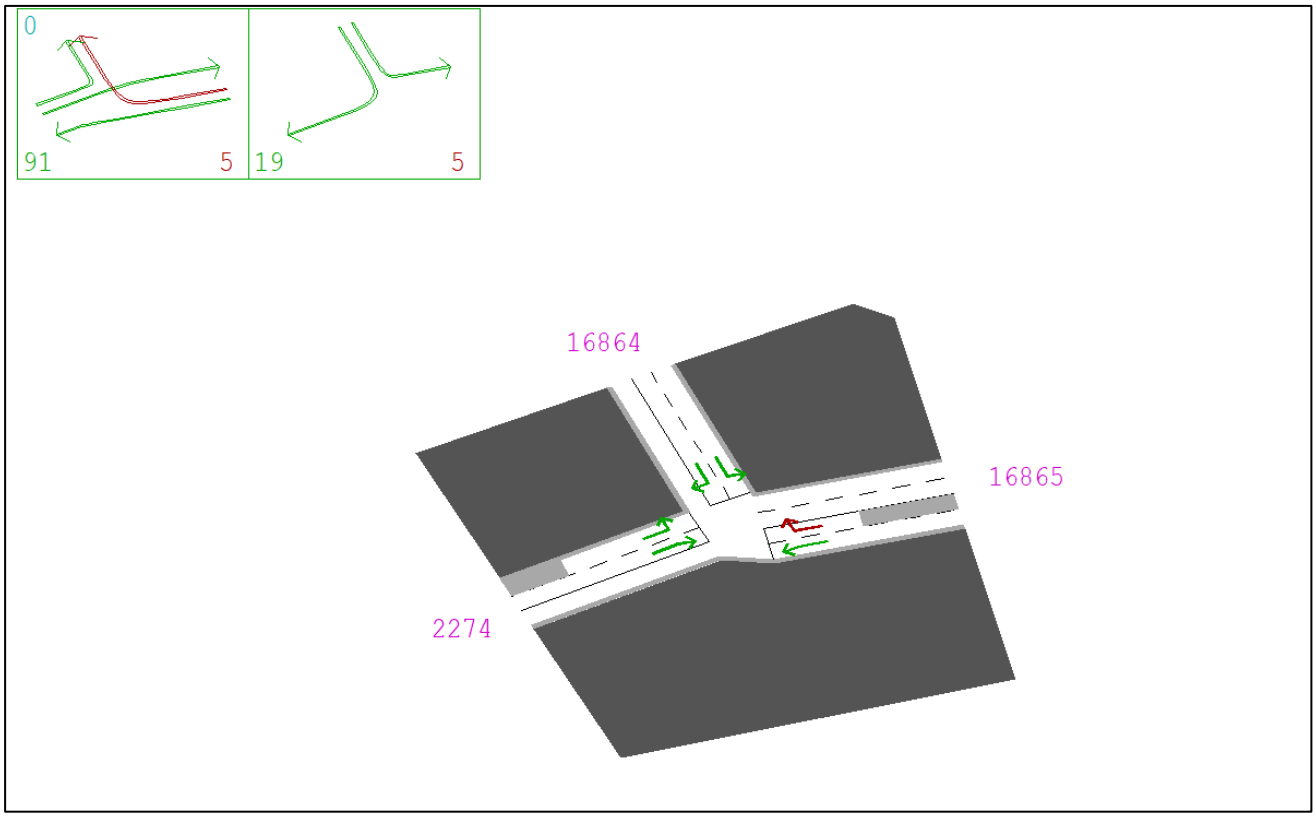


Figure 5-7: 2041 North Hemel Access Junction 2 with Link Road

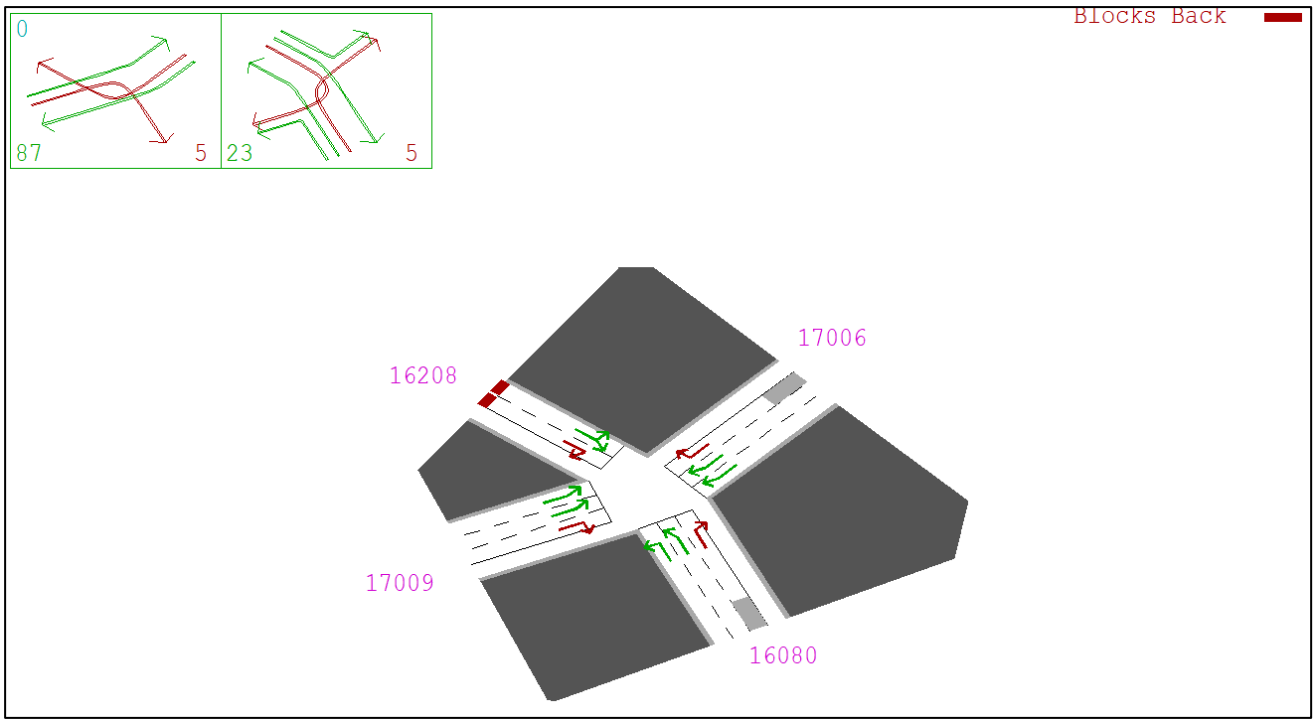


Figure 5-8: 2041 North Hemel Access Junction 3 with Redbourn Road

5.6.5. A “North Hemel Link Road” is also assumed to link the Leighton Buzzard Road and Redbourn Road accesses as shown in to allow development traffic to connect to local network. No through traffic is permitted on this link road.

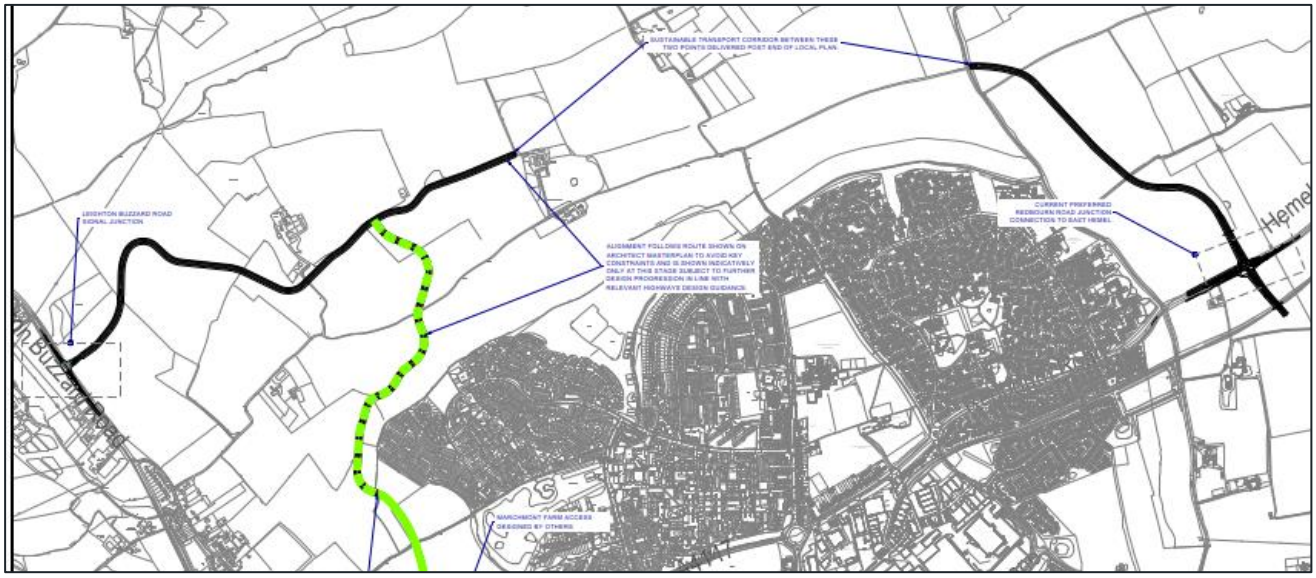


Figure 5-9: Proposed North Hemel Link Road

2050

5.6.6. At the time the 2050 assessments were undertaken, May 2025, there was an update in the access strategy for the North Hemel development. HCC informed us that two accesses were assumed to be located at Leighton Buzzard Road (1) and Redbourn Road (3), see Figure 5-10. In addition to it is assumed that a small proportion of the homes in North West Hemel (up to 300 homes), at location C, which would access using the Marchmont Farm development access. The Marchmont Farm access is proposed to be a roundabout with Link Road.

5.6.7. Junctions 1 and 3 have been modelled as signalised junctions. The junction layouts and signal phasing of these signalised junctions had to be revised compared to those assumed in 2041 as a result of high delays being experienced.

- Junction 1 – a new dedicated signal stage is assumed for Leighton Buzzard Road northbound traffic to go North and turn right to North Hemel Link Road.
- Junction 3 – in AM peak, a new dedicated signal stage is assumed for traffic exiting the North Hemel Link Road southeast bound approach. For PM peak, a dedicated signal stage is proposed for traffic from Redbourn Road westbound turning right to North Hemel Link Road.

5.6.8. The assumed junctions layouts are shown in Figure 5-11 to Figure 5-13. Noting that the signal phasing is different at the Redbourn Road junction in the AM and PM to optimise the junction performance.

5.6.9. A number of assignments were undertaken within the 2050 V&V assignment to optimise and improve the performance of the Leighton Buzzard Road and Redbourn Road access junctions. When the 2041 assumptions of assuming two thirds of traffic have to use Leighton Buzzard Road and one third have to use Redbourn Road there were large delays experienced at turns at the access junctions. As a result of this it was agreed that the transport model could be refined to test the impact of highway trips associated with North Hemel development at location A and B see Figure 5-10, so they are able to use either junction 1 or 3 depending on which is best for their journey.

5.6.10. Allowing some element of route choice within the development does reduce the level of delay experienced but these access junctions require further review and design work as part of the ongoing planning process.

5.6.11. As a result of the junction delays at junction 1 and 3, a sensitivity test has been generated, for 2050 V&V, which assumes a 'dummy' node - a junction without any delay, instead of a signalised junctions. This (whilst not being a realistic scenario) does provide information on what would happen to the wider network if all the development traffic was released.

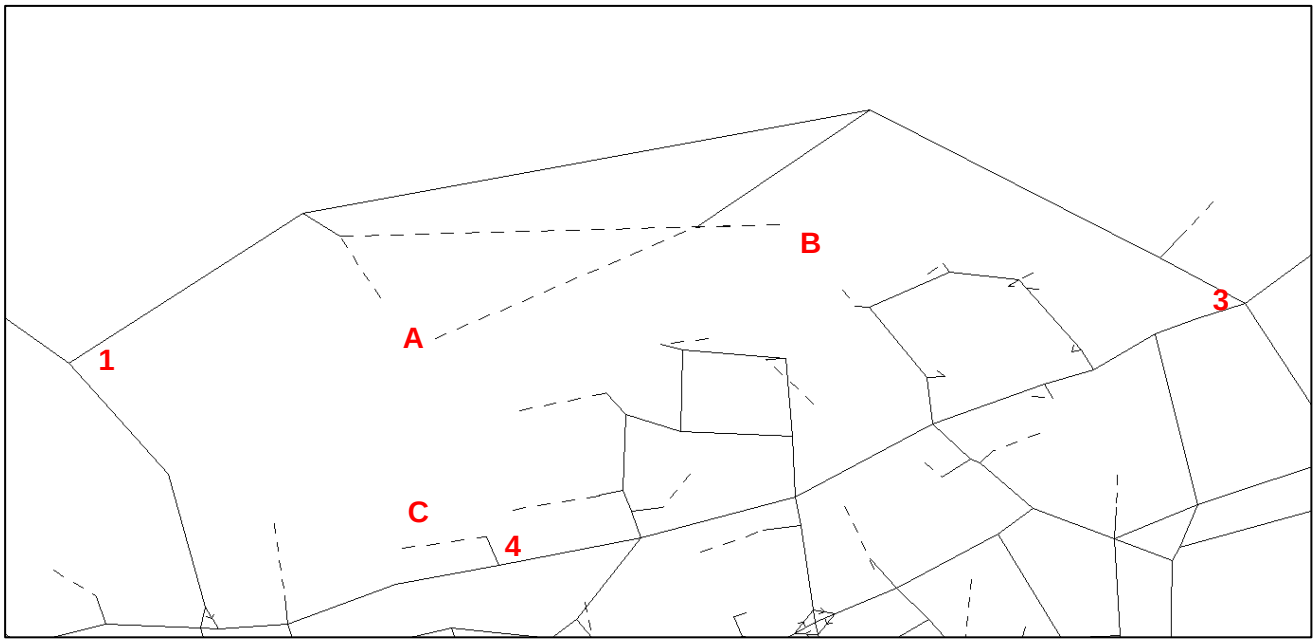


Figure 5-10: 2050 North Hemel Hempstead Route Choice Access Assumptions

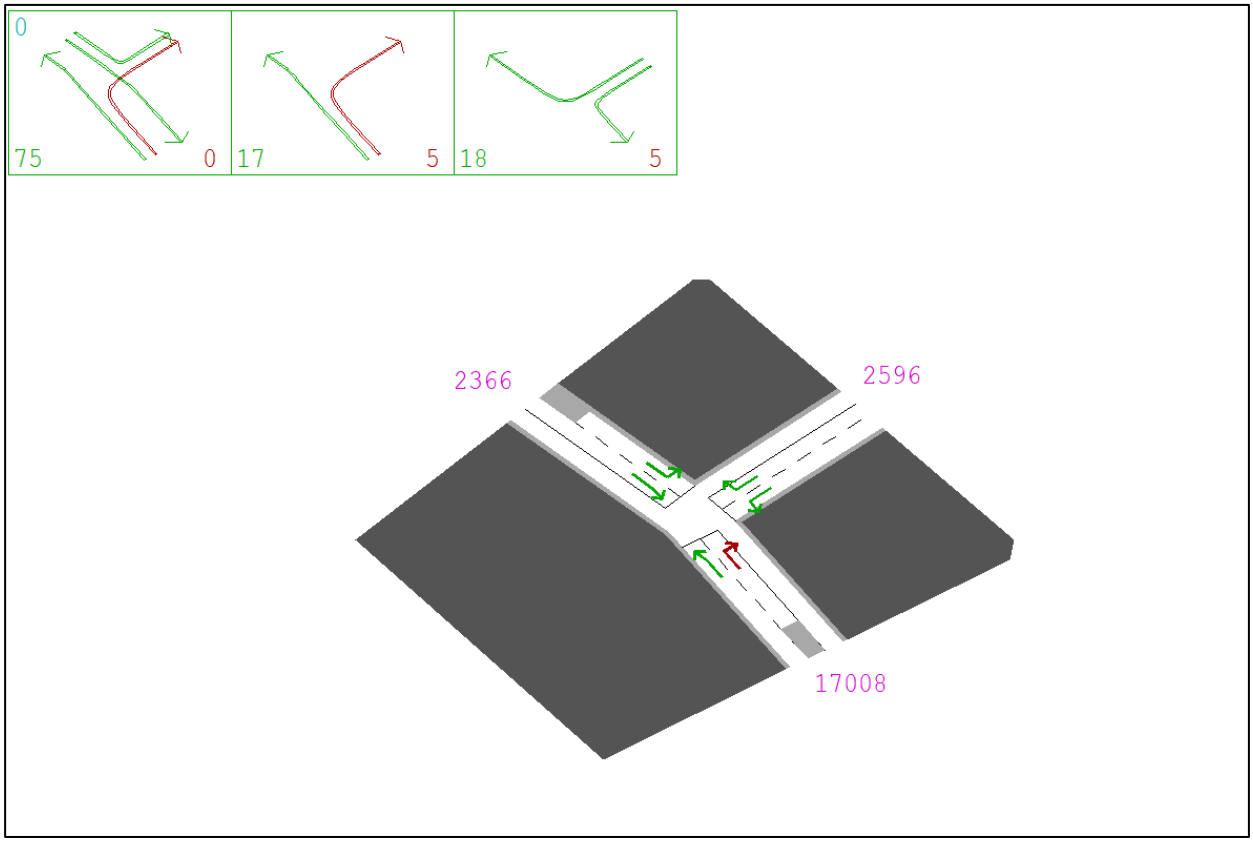


Figure 5-11: 2050 North Hemel Access Junction 1 with Leighton Buzzard Road

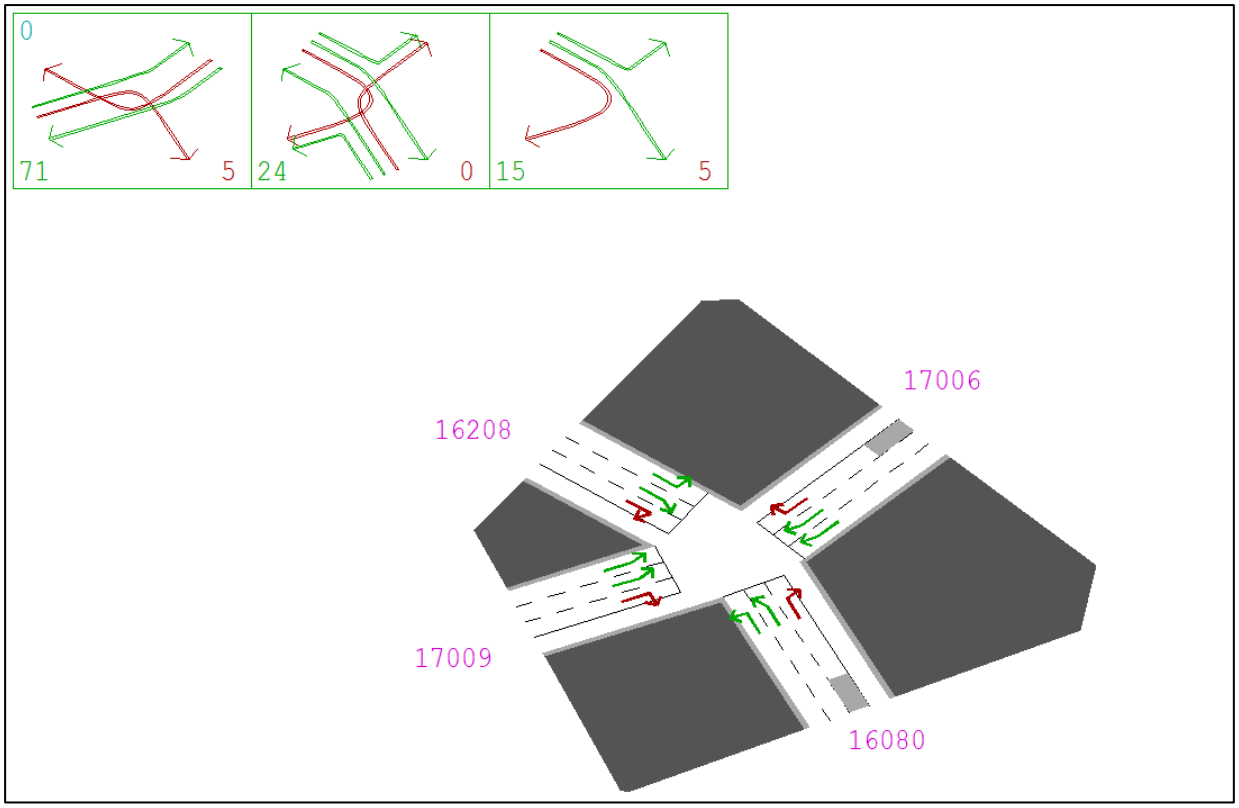


Figure 5-12: 2050 North Hemel Access Junction 3 with Redbourn Road AM Peak

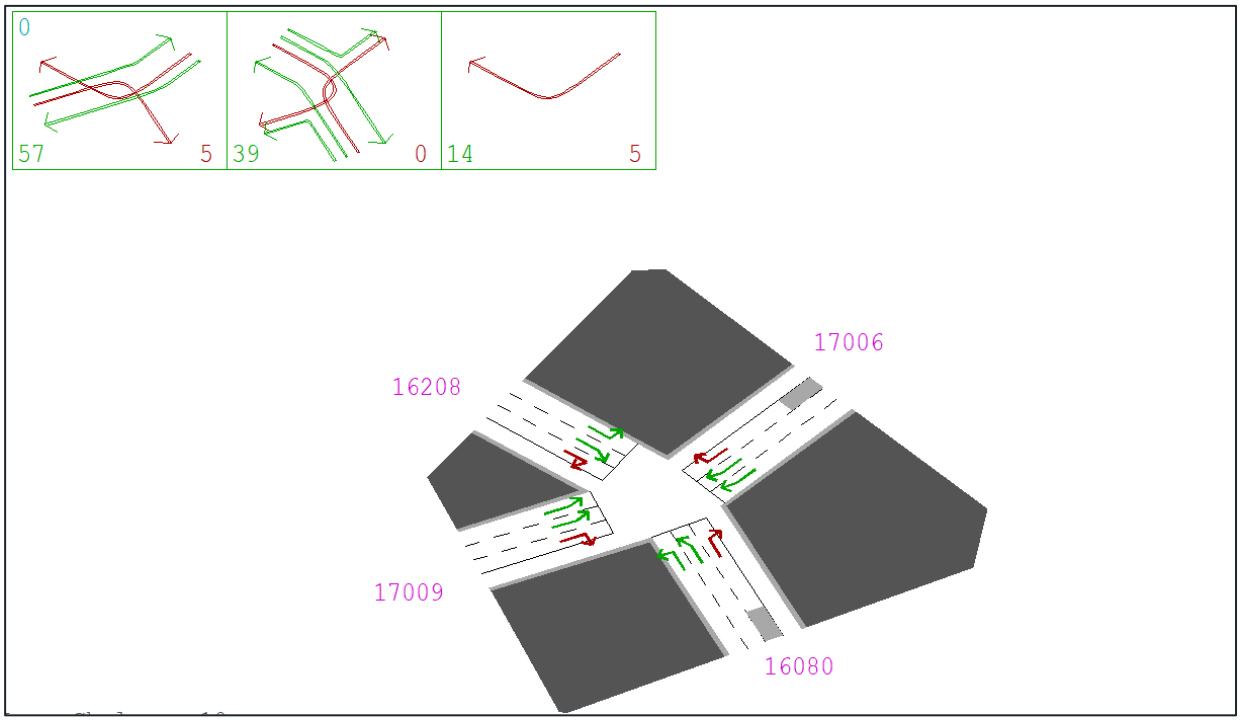


Figure 5-13: 2050 North Hemel Access Junction 3 with Redbourn Road PM Peak

East Hemel Hempstead Development

5.6.12. In St Albans, the East Hemel Spine Road was included in both 2041 and 2050 assessments as it provides access to the East Hemel development. Figure 5-14 shows the proposed layout of the East Hemel Spine Road and indicates where the main development areas (sites H1-H4) have been connected within the model. It should be noted that the junction between East Hemel Spine Road and Redbourn Road is assumed to be signal access on Redbourn Road instead of a roundabout as shown in Figure 5-14. The signal staging is further revised in 2050 assessment to accommodate the additional traffic generation as discussed in Section 5.6.11. The signal timing assumptions were optimised to best suit the forecast level of traffic.

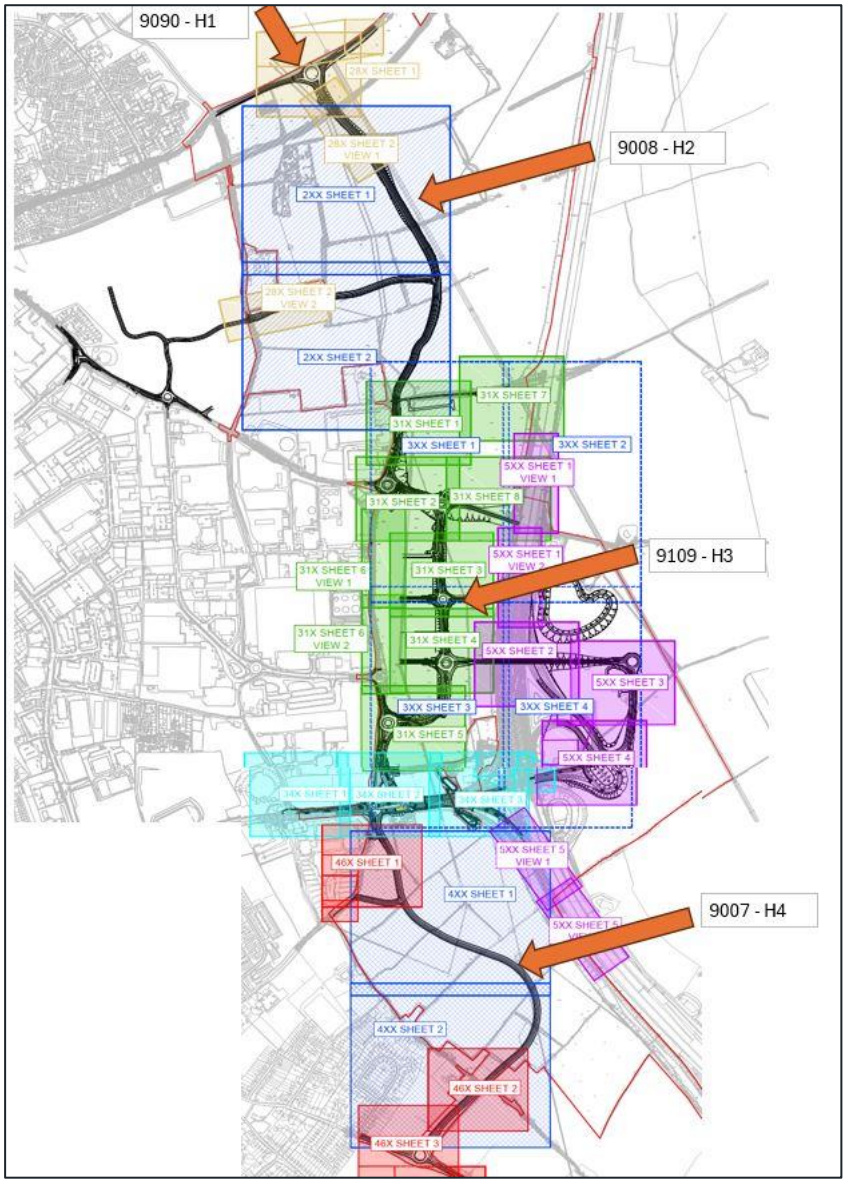


Figure 5-14: Proposed East Hemel Spine Road within the St Albans District Boundary

5.6.13. For the section of East Hemel Spine Road near East Hemel South development (H4) the spine road alignment is based on the development's framework masterplan as shown in Figure 5-15. A signal junction is also assumed at the intersection between the East Hemel Spine Road and A4147 Hemel Hempstead Road.

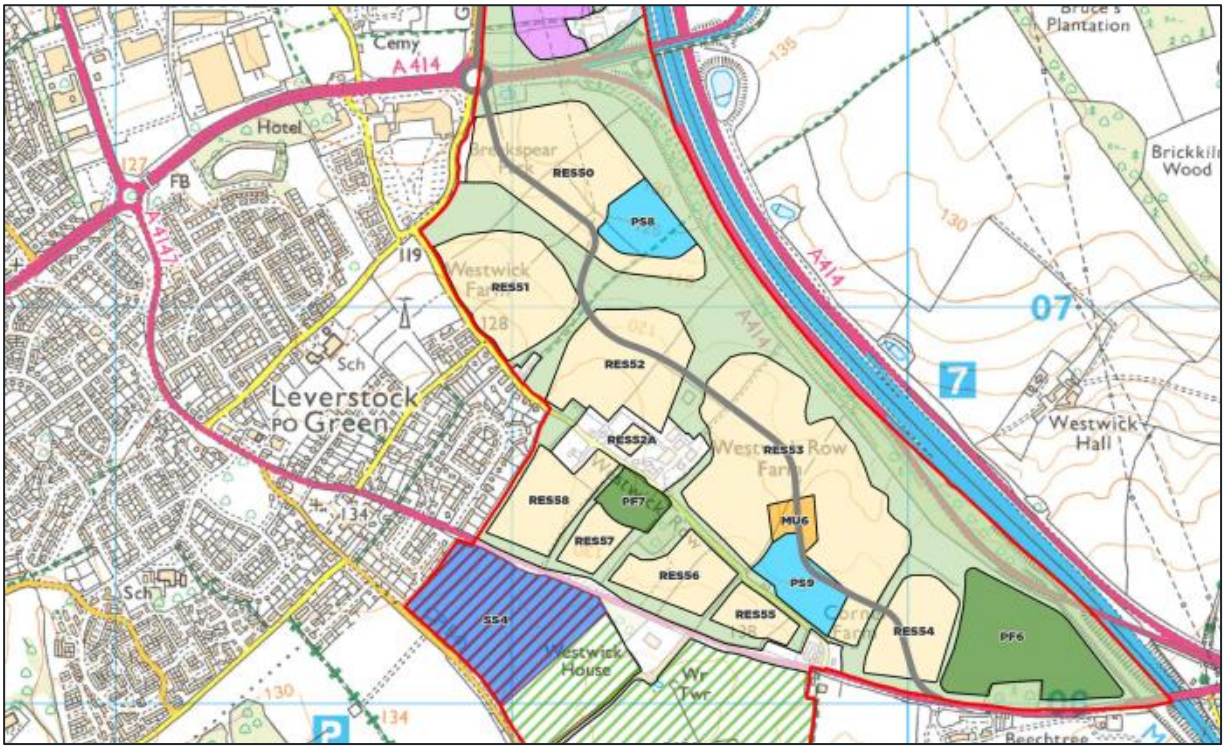


Figure 5-15: Proposed East Hemel South Spine Road near East Hemel South (H4)

IDP Schemes

5.6.14. It should be noted that identical IDP schemes are modelled in 2041 and 2050 assessment, further details for the IDP schemes can be found in the St Albans and Dacorum Combined Local Plan Option 4 Traffic Modelling Report Section 5.5.6. Appendix A and Appendix B provides the IDB schemes in Hemel Hempstead only for St Albans and Dacorum respectively, for reference.

M1 Junction 8 proposal

5.6.15. The proposed upgrade to M1 Junction 8 is assumed to be in place in 2050, and its layout is shown in Figure 5-16. The scheme involves a new roundabout junction to the east of the M1, directly linking the M1 southbound off-slip and on-slip with a new road over the M1 to link to the new East Hemel Spine Road. It should be noted that the circulatory links on the Junction 8 roundabout are assumed to be 2 lanes, instead of 1 lane as shown in the figure. This assumption is adopted following the high level of delay was forecasted in the 2041 models. The intersection between Breakspear Way and J8 roundabout and the intersection between M1 southbound off-slip and J8 roundabout are revised to incorporate the two-lane circulatory lanes as shown in Figure 5-17 and Figure 5-18.

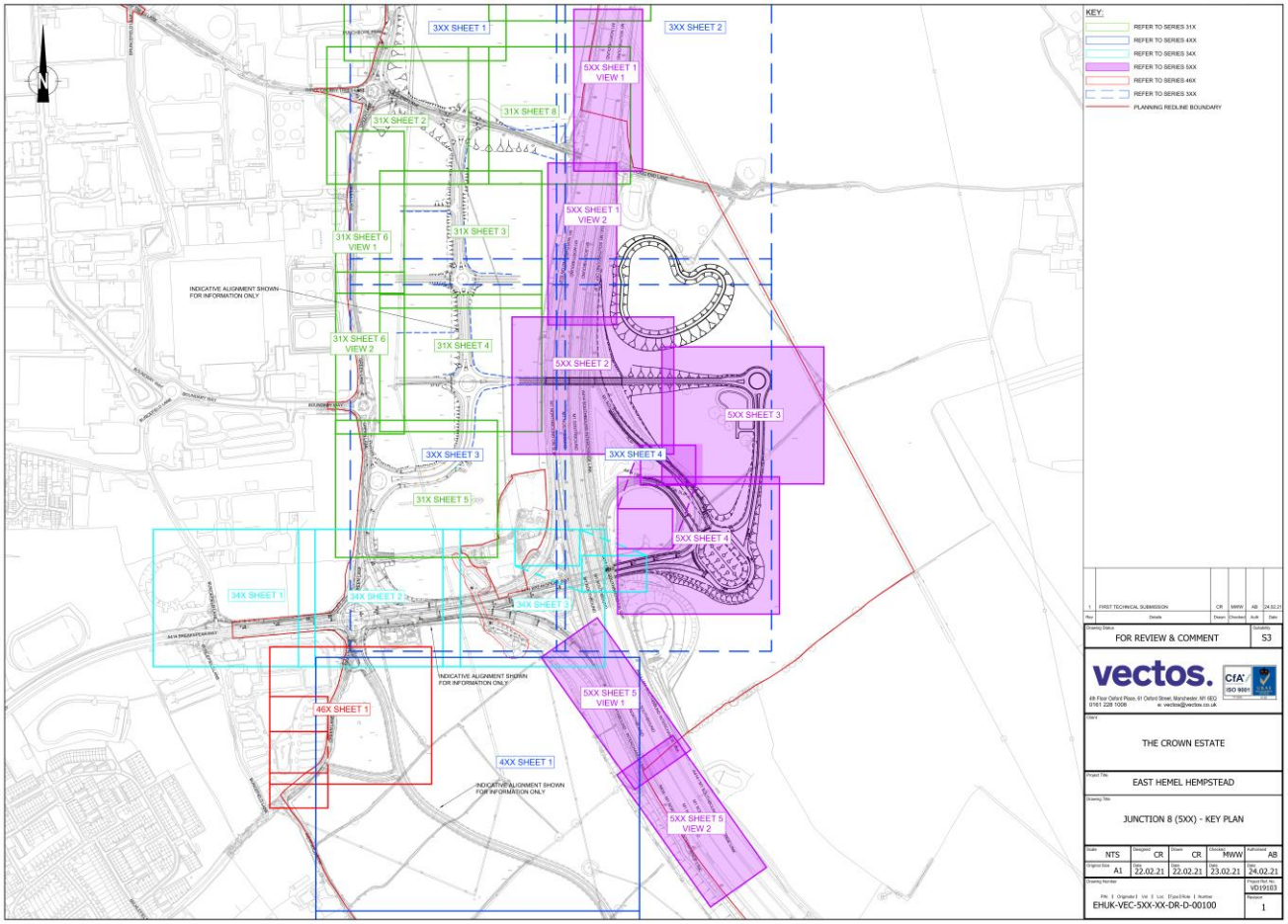


Figure 5-16: M1 Junction 8 Scheme Drawing

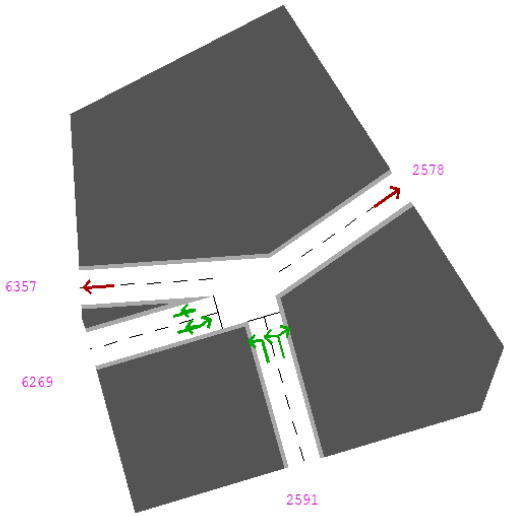


Figure 5-17: M1 Junction 8 Junction between Breakspear EB and roundabout

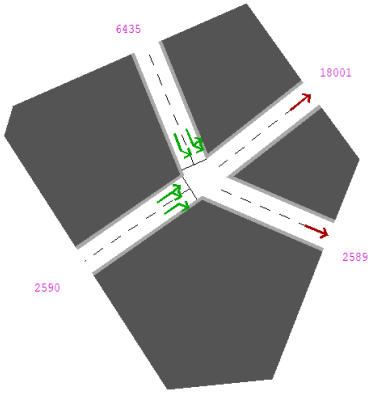


Figure 5-18: M1 Junction 8 Junction between M1 SB off-slip and roundabout

Signal Optimisation

5.6.16. Traffic signal timings have been optimised within 2050 V&V model where signal junctions were forecast with high increase of delay in the AM or PM peak hours. This reflects available signal technology which adapts to the relative balance of flows and delays around a junction. The following list sets out the junctions within Hemel Hempstead where signal timings have been adjusted, their locations are presented in Figure 5-19..

- **Maylands Avenue / Wood End Lane** (node 2450):The capacity for Mayland Avenue (southbound) arm was reduced from 2 lanes following the assumption of an improvement scheme (SG15-1). As a result, the junction was found to be over-capacity and was optimised.
- **A414 Breakspear Way / Green Lane** (nodes 2580, 2461 and 6356): This is a key junction and the location of an improvement scheme in 2050 V&V model (scheme ref SM7_SW – Scheme 1 in). The new layout was found to be over-capacity and was optimised, although it remains over-capacity in AM peak following optimisation.
- **Redbourn Road / Proposed East Hemel Spine Road / Proposed North Hemel Link Road** (node 2592): This junction is the proposed signal access for North Hemel and East Hemel developments to Redbourn Road, signal optimisation was attempted here but levels of delays remain.
- **Leighton Buzzard Road / Proposed East Hemel Spine Road** (node 2572): This junction is the proposed signal access for North Hemel development located at the western end of North Hemel Link Road. Signal optimisation was undertaken but high level of delays remain around this junction.

- **Redbourn Road / Three Cherry Trees Lane** (node 2162): This junction is the location of improvement scheme (SG14-2). The roundabout was signalised in 2050 V&V model network, signal optimisation was attempted here but it was not possible to improve the performance of the junction due to high level of traffic on Redbourn Road.
- **A4147 Hemel Hempstead Road / Proposed East Hemel Spine Road** (node 6417) This is the proposed signal junction connecting the Proposed East Hemel Spine Road to Hemel Hempstead Road, thus the signal timings at this junction have been optimised to best suit the traffic flows for 2050 V&V model .
- **A414 Breakspear Way / A4147 Maylands Avenue** (nodes 17010 / 17012): This is a key junction in the network which is the location of an improvement scheme in 2050 V&V whereby the existing roundabout becomes signalised (LS-71). Optimisation of the assumed signal timing was attempted to best suit the forecast traffic but blocking back is forecast on the circulatory arms.
- **M1 Junction 8 (nodes 2590 and 2578):** These are new signal controlled junctions proposed in the M1 Junction 8 scheme, signal optimisation was required to best suit the assigned traffic in the 2050 scenario.
- The following signal junctions outside Hemel Hempstead are also optimised :
  - A405 North Orbital Road / Watford Road (node 6295)
  - Watford Road / Tippendell Lane (node 6299/16850)
  - A414 / A1081 (node 6475/6482)
  - A1081 Luton Road/ Roundwood Lane (node 6538):

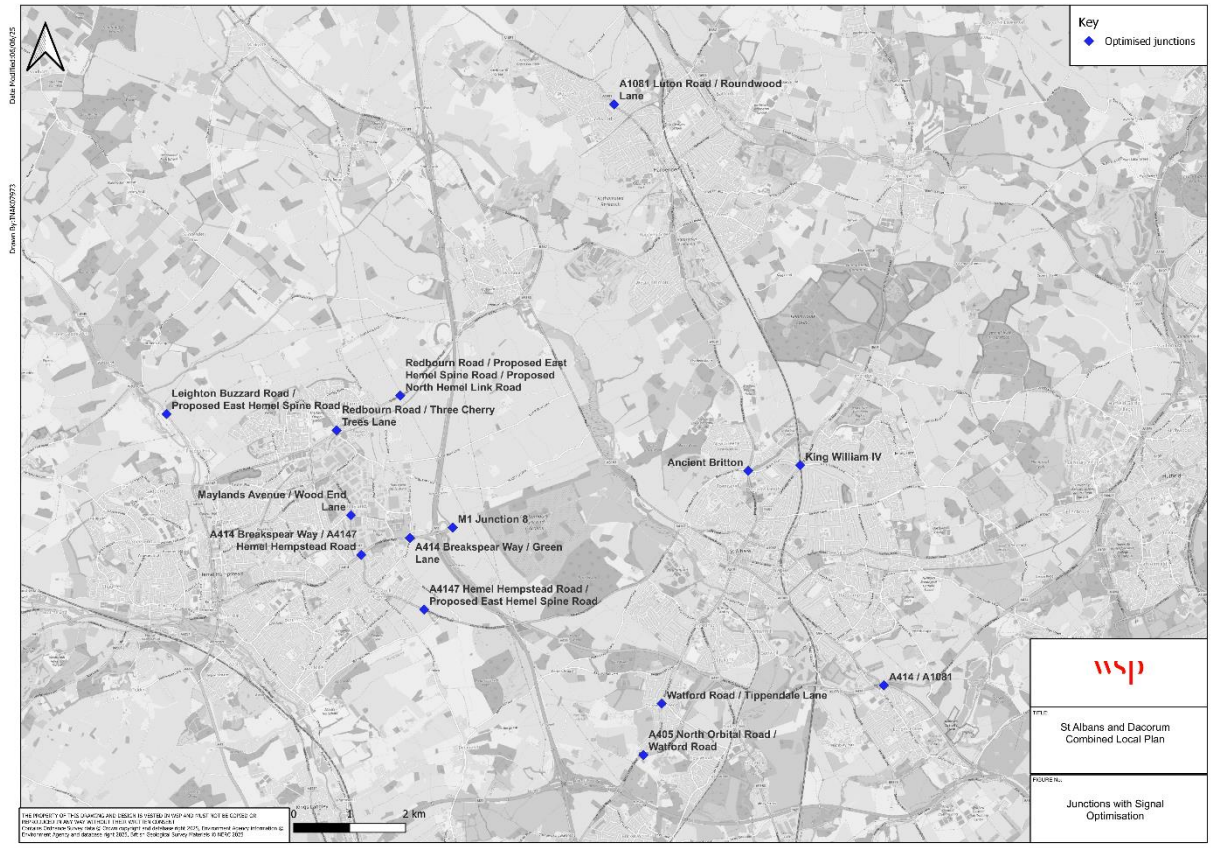


Figure 5-19: Signal Junctions with Traffic Signal Optimisation

5.7 Trip Generation Adjustment

5.7.1. The trip rates for the Local Plan allocations up to 2041 were extracted from Transport Assessment where available and TRICS trip rates were used where Transport Assessments were not available. More details on the 2041 trip generation is provided in the 2041 Forecasting report[3].

5.7.2. The highway trip generation adjustment is carried out with post COMET VDM highway matrix and the trip totals (tripends) for the required developments are uplifted accordingly. The assumed trip rates are summarised in Table 5-2 for the post 2041 growth for residential sites only as there is no employment growth post 2041. The final trip generation for these developments are summarised in Table 5-3 for AM peak and Table 5-4 for PM peak.

[3] St Albans and Dacorum Combined Local Plan COMET Forecasting Report_FINAL_Accessible_09.05.2025.pdf

Table 5-2: Residential Site Trip Rates for post 2041 Growth Sites

Development	Trip Rate Source	Residential Trip Type	AM Peak Departs	AM peak Arrivals	PM Peak Departs	PM Peak Arrivals
North Hemel	TRICS	Urban Edge	0.313	0.136	0.154	0.306
East Hemel Hempstead South	Trip Generation Report	N/A	0.613	0.235	0.376	0.645
East Hemel Hempstead North	Trip Generation Report	N/A	0.613	0.235	0.376	0.645
North Hemel Hempstead	Generic	N/A	0.347	0.119	0.221	0.363

Table 5-3: Assumed AM Peak Trip Generation for Post 2041 Key Local Plan Sites

Development Name	Uplifted Car Trip Generation Departs	Uplifted Car Trip Generation Arrivals	VDM Car Trips Departs	VDM Car Trips Arrivals	Difference (Uplifted – VDM) Departs	Difference (Uplifted – VDM) Arrivals
North Hemel	2016	1295	614	485	1402	810
East Hemel Hempstead South	1471	564	282	180	1189	384
East Hemel Hempstead North	981	376	188	114	793	262
North Hemel Hempstead	521	179	186	117	335	62

Table 5-4: Assumed PM Peak Trip Generation for Post 2041 Key Local Plan Sites

Development Name	Uplifted Car Trip Generation Departs	Uplifted Car Trip Generation Arrivals	VDM Car Trips Departs	VDM Car Trips Arrivals	Difference (Uplifted – VDM) Departs	Difference (Uplifted – VDM) Arrivals
North Hemel	869	1610	479	582	390	1028
East Hemel Hempstead South	902	1548	199	263	703	1285
East Hemel Hempstead North	602	1032	127	165	475	867
North Hemel Hempstead	332	545	122	159	210	386

5.8 Opportunity to Shift Mode Reductions

5.8.1. HCC commissioned WSP to undertake a modal shift study for Hemel Hempstead and Hemel Garden Communities growth areas. The study focused on understanding the sustainable travel opportunity, propensity and potential for Hemel Hempstead and HGC growth areas to test the realism of the ambitious mode shift targets set out in the Hemel Garden Communities Spatial Vision, which aims to achieve the following mode share targets by 2050:

- 40% of all trips starting and/or ending in the existing settlement area of Hemel Hempstead should be by active and sustainable travel modes, and
- 60% of all trips starting and/or ending in the new development of HGC growth area should be by active and sustainable travel modes.

5.8.2. WSP undertook a comprehensive HGC Mode Shift Study[4] and developed an Opportunity to Shift Modes (OSM) tool, to derive specific assumptions regarding potential modal shift for different movements within the study area, based on:

- Sustainable travel opportunities - car trips that can use sustainable models such as walking, cycling and public transport,
- Sustainable travel propensity - the likelihood that a resident will switch to walking, cycling, bus or rail

5.8.3. The OSM tool identified the sustainable travel potential, which was estimated by multiplying the sustainable travel opportunity by the propensity score, and calculated the potential mode shift for Dacorum, St Albans and HGC growth areas.

5.8.4. It should be noted that the reduction in car trips to sustainable modes is mainly the shift to walking and cycling with a small proportion of trips shifting to public transport, as provided in the Mode Shift Study.

5.8.5. For the 2041 Local Plan combined assessment, the mode shift estimates are based on the travel potential by 2041, which estimates approximately a 30% reduction in car trips between Dacorum and St Albans[5].

5.8.6. The HGC is planned to be built by 2050, it is expected that over time the improved active and public transport network will increase the opportunity of trips to be made by sustainable mode. Therefor by 2050 there is more potential to achieve the mode shift targets set out in the in the Hemel Garden Communities Spatial Vision. Hence, in the 2050 V&V scenario, the

[4] FINAL REPORT Hemel Hemsptead - Mode Shift Study.pdf
[5] St Albans and Dacorum Combined Local Plan COMET Forecasting Report_FINAL_Accessible_09.05.2025.pdf

reduction in car trips has been applied based on these targets for Hemel Hempstead and the HGC growth areas.

5.8.7. The OSM reductions in the rest of the areas in Dacorum and St Albans are the same as applied in Option C for Dacorum, Option 3 for St Albans, Option 4a and 4b in 2041 St Albans and Dacorum Combined assessment for all zones.

5.8.8. The reduction in car trips applied to the zones representing trips within Hemel Garden Community and Hemel Hempstead areas are shown in Table 5-5 and can be seen visually in Figure 5-20. The highway demand has been adjusted to ensure that trips to and from the HGC growth area zones have a sustainable mode share of 60%, and the trips to and from the current Hemel Hempstead urban area have a sustainable mode share of 40%. All other areas in St Albans and Dacorum have mode share reductions as applied in the 2041 Combined Local Plan assessment.

Table 5-5: Car Trip Reductions in Hemel Hempstead and Hemel Garden Community grown areas, Vision & Validate scenario

Origin	Destination	% Reduction
HGC	HGC	60%
HGC	Hemel Hempstead	60%
Hemel Hempstead	HGC	60%
Hemel Hempstead	Hemel Hempstead	40%

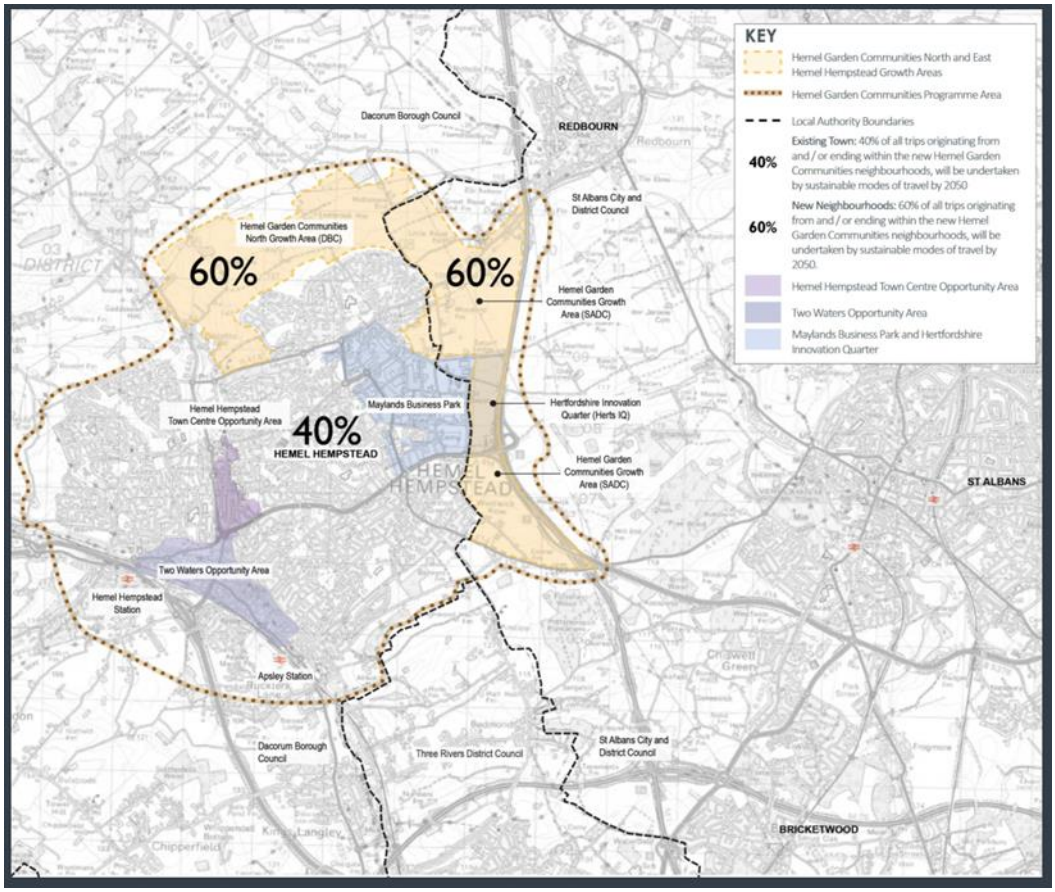


Figure 5-20: Trip reduction areas In Hemel Hempstead for Vision & Validate scenario

5.8.9. The mode shift assumptions were applied to the highway model demand matrices as a demand matrix adjustment after the normal variable demand modelling process within the COMET model.

5.8.10. Table 5-6 and Table 5-7 illustrate the degree of modal shift that was estimated in Dacorum and St Albans, based on the sustainable travel potential, when they were applied to the COMET model.

Table 5-6: Reduction in Car Trips with Mode Shift Assumptions in Dacorum and St Albans (AM Peak)

From	To	Car Trips Before Reduction	Car Trips After Reduction	Reduction	% Reduction
HGC	HGC	454	182	-273	-60%
HGC	Hemel	2063	825	-1238	-60%
Hemel	HGC	1241	496	-745	-60%
Hemel	Hemel	7262	4357	-2905	-40%
HGC	Rest of Dacorum / St Albans	888	877	-11	-1%
Rest of Dacorum / St Albans	HGC	534	503	-31	-6%
Hemel	Rest of Dacorum / St Albans	2531	2531	0	0%
Rest of Dacorum / St Albans	Hemel	3030	2964	-66	-2%
Rest of Dacorum / St Albans	Rest of Dacorum / St Albans	14885	11968	-2917	-20%

Table 5-7: Reduction in Car Trips with Mode Shift Assumptions in Dacorum and St Albans (PM Peak)

From	To	Car Trips Before Reduction	Car Trips After Reduction	Reduction	% Reduction
HGC	HGC	511	205	-307	-60%
HGC	Hemel	1249	499	-749	-60%
Hemel	HGC	1996	798	-1197	-60%
Hemel	Hemel	7321	4392	-2928	-40%
HGC	Dacorum / St Albans	611	532	-79	-13%
Dacorum / St Albans	HGC	799	730	-70	-9%
Hemel	Dacorum / St Albans	2688	2214	-474	-18%
Dacorum / St Albans	Hemel	2684	2317	-367	-14%
Dacorum / St Albans	Dacorum / St Albans	13664	10023	-3642	-27%

6 2050 Infrastructure Test Assumptions

6.1.1. The 2050 Infrastructure Test includes all the proposed infrastructure that is contained within the 2050 V&V scenario and in addition it also includes the AECOM post 2041 Hemel Garden Community proposed highway and public transport infrastructure.

Highway Infrastructure Assumptions

6.1.2. The proposed schemes which have been incorporated into the highway model are:

- Ext-1: Leighton Buzzard Road bus priority
- Ext-2: Link Road bus priority bypass lane – approach to Leighton Buzzard Road roundabout
- Ext-3: Redbourn Road (north-south oriented section) bus priority
- Ext-6: HERT route - Plough Roundabout-Jarman Park (this scheme has been included as IDP improvement LS16 in the 2041 assessment
- Ext-7: HERT route – Jarman Park -Maylands Avenue
- Ext-8: HERT- A414 St Albans route
- Ext-11: B487 Hemel Hempstead Road – Hemel Hempstead Road Redbourn junction improvement
- Ext-18: A5183 Chequers Hill junction (Flamstead) improvement

6.1.3. The details of these schemes can be found in Appendix C.

Public Transport Infrastructure Assumptions

6.1.4. There were a range public transport infrastructure improvements which were incorporated into the 2050 IT scenario. These included new public transport routes, some modified existing public transport routes and new mobility hubs. The details of each aspect are outlined below.

New Routes

HERT Route

6.1.5. A new route using the MRT sub-mode was introduced between Hemel Hempstead Station and A414 London Colney Roundabout. The stop-to-stop travel time was calculated based on the interventions planned along the corridor. A standard allowance of 60 seconds was applied to account for acceleration, deceleration, and dwell time. The service operates with a planned headway of 10 minutes and the fares were assumed to be equivalent to those of the bus sub-mode, but without any boarding penalty applied to the MRT. The route with stops is shown in Figure 6-1.

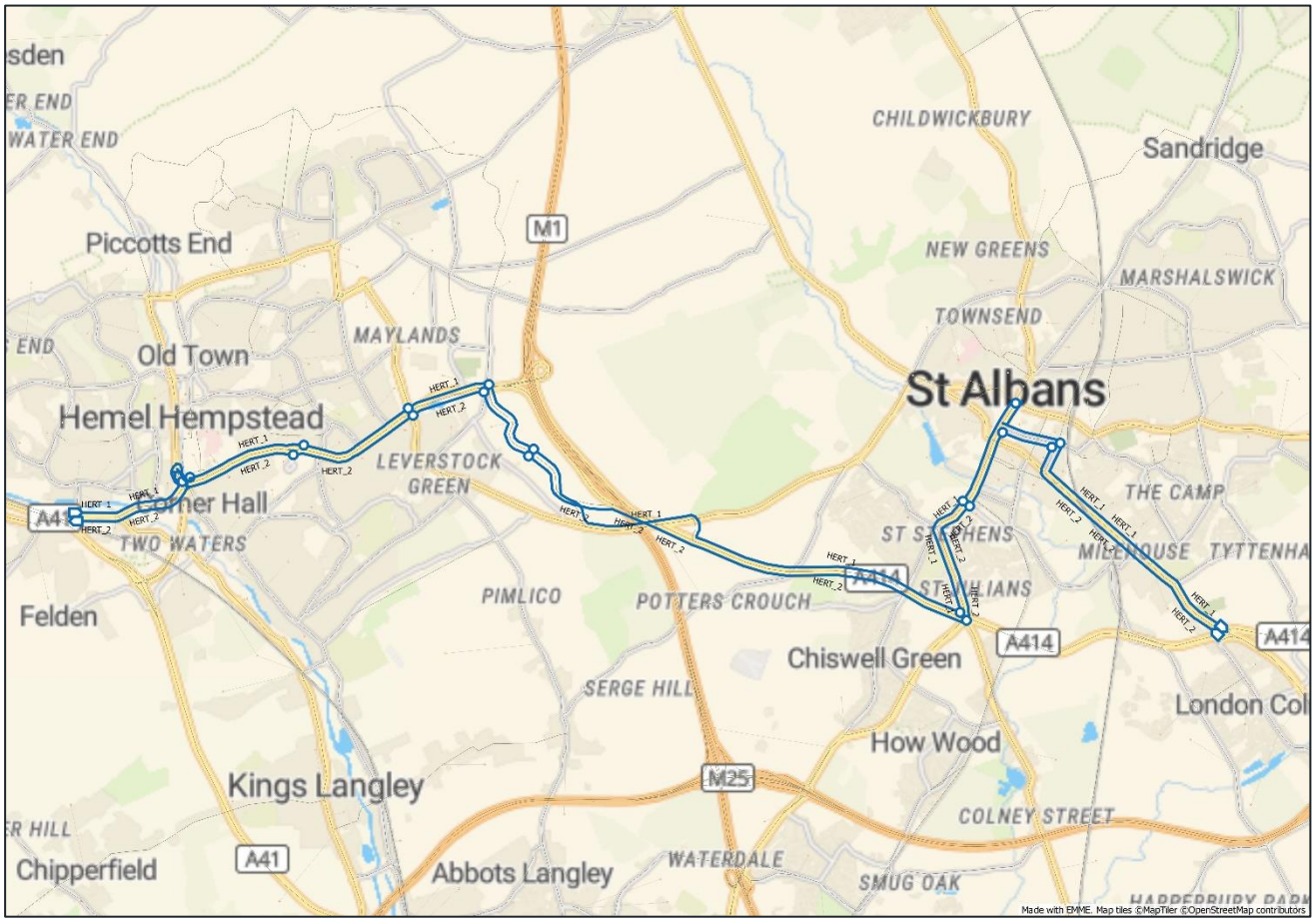


Figure 6-1: HERT Route with Stops

Orbital Route

6.1.6. Orbital Bus service to Hemel Garden Communities from Hemel Hempstead Station, rather than one long orbital bus service, the route has been split into 2 services, each with an assumed 20min headway. First Service runs from Hemel Hempstead Station to MU3 Site with a journey time of 29mins. The other service starts from MU3 Site and terminates at MU6 Site 19mins.. 60 seconds is assumed as time spent on accelerating, decelerating and dwell time. The route with stops is shown in Figure 6-2.

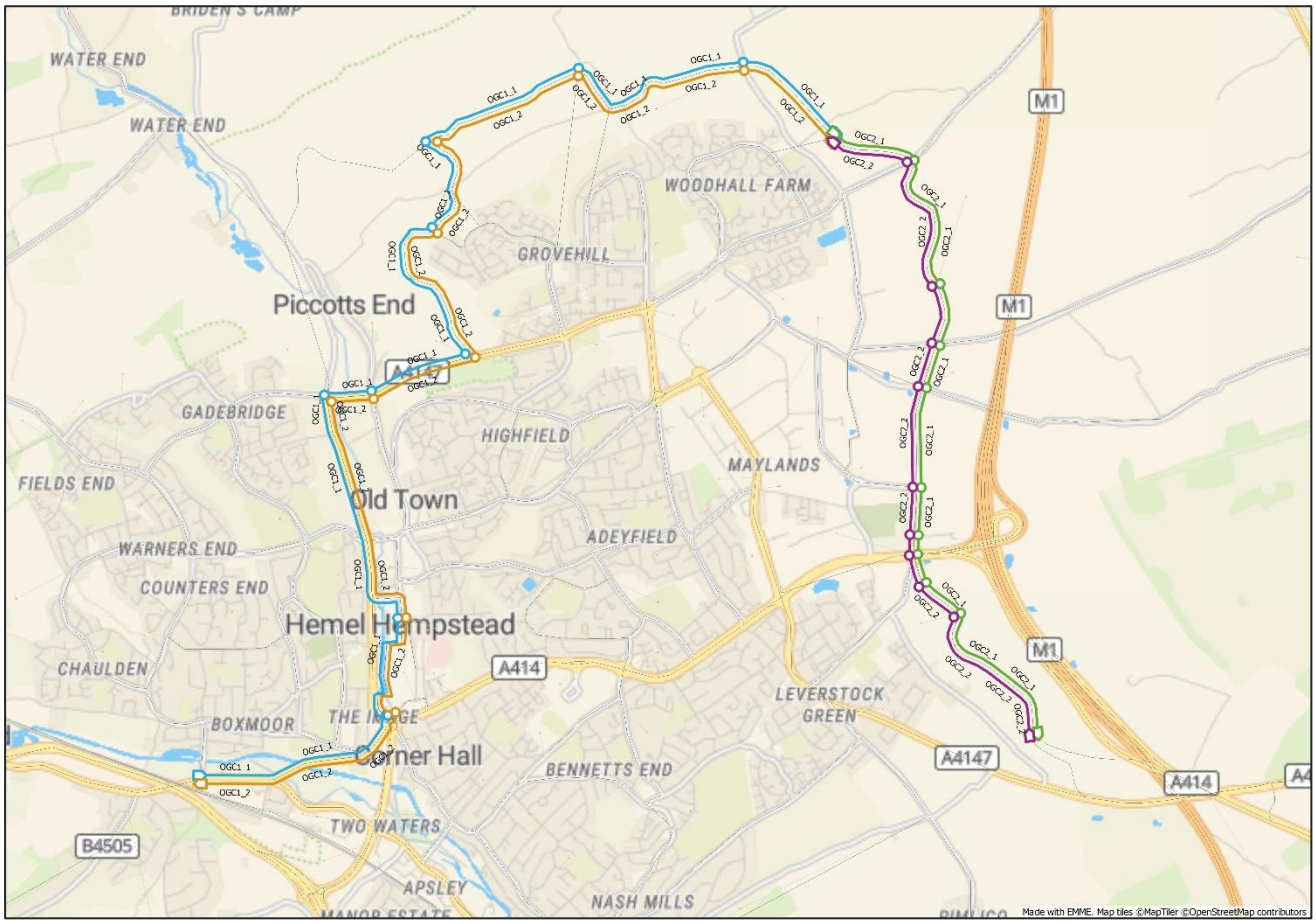


Figure 6-2: Orbital Route with Stops

Modified Public Transport Routes

6.1.7. The following existing public transport services were modified:

- **Route 46:** Service extended from Luton Parkway Station to Hemel Hempstead station with doubling of frequency to 2 buses per hr.
- **Route ML1:** Existing route is retained with 30 min frequency with the service terminating at MU6 Site. A short service with same frequency originating from Hemel Hempstead station is added.
- **Route 721**: Service frequency revised to run every 20 minutes.

- **Route 20:** Existing service between Hemel Hempstead and Holywell Estate was added to replace the older version of Route 20 in the model.

Mobility Hubs

6.1.8. Mobility hubs were established at key locations where multiple modes of transport converged. These hubs were designed to offer enhanced waiting facilities and improved passenger information for bus services, along with better integration with walking and cycling routes. Their impact was modelled by reducing the perceived wait time factor in the transport model from 2.0 to 1.5 at designated locations, reflecting the improved passenger environment. These locations are shown in Figure 6-3.

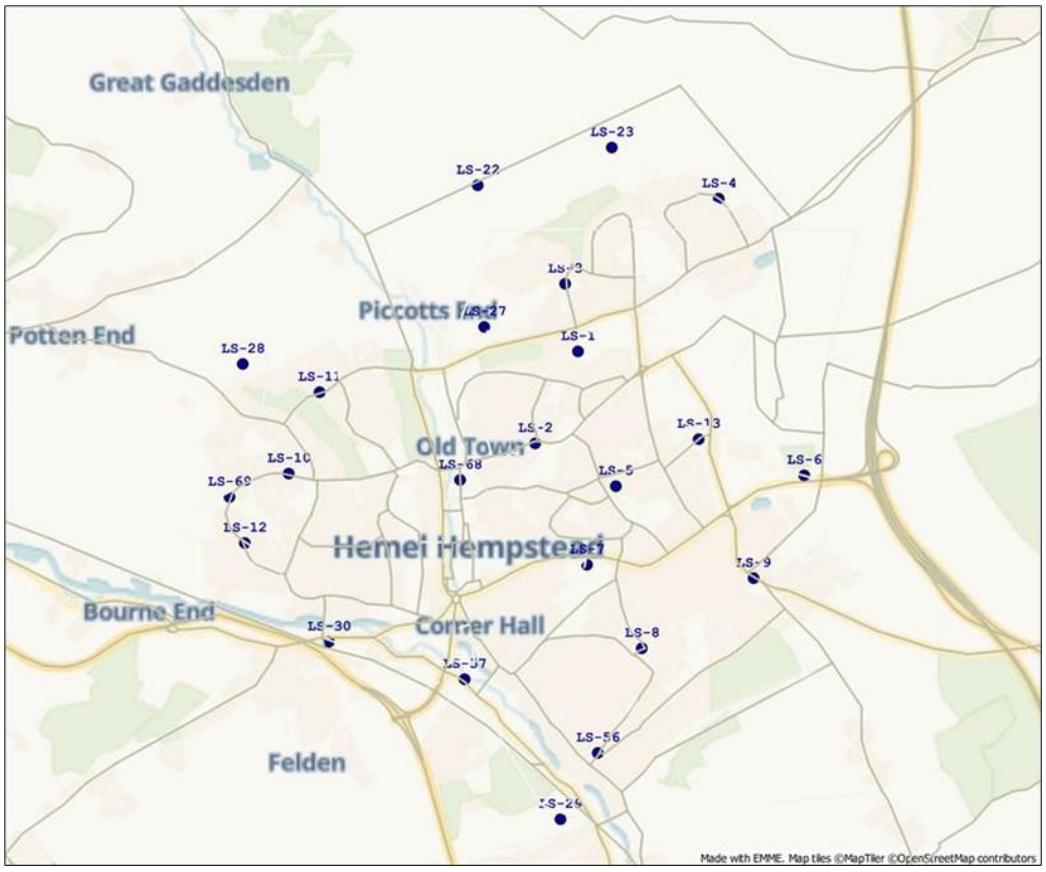


Figure 6-3: Mobility Hub Locations

6.1.9. In addition to the locations shown in Figure 6-3which were part of the 2041 networks, new mobility hubs were introduced at St Peter's Street in St Albans, St Albans Abbey Station, and London Colney Roundabout for the HERT route as shown in Figure 6-4.

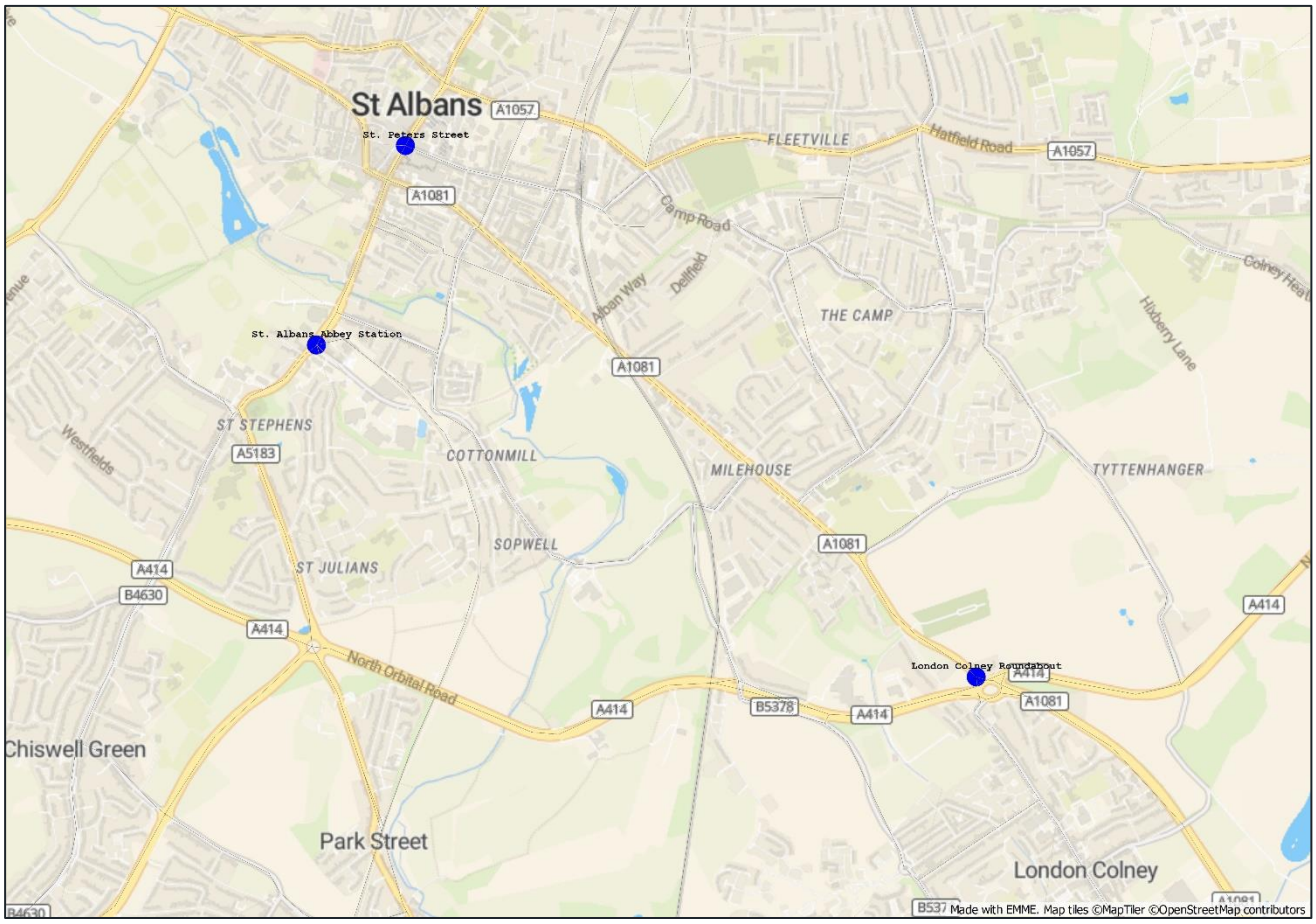


Figure 6-4: New Mobility Hub Locations

Link Network Update

6.1.10. Bus links and walk links were added for connection to the Hemel Garden Communities. Slip roads to and from A414 were also added for proposed HERT route as shown in Figure 6-5.

Figure 6-5: New and Modified Links in the Network

Mode Shift Assumptions

6.1.11. For the 2050 Infrastructure Test IT, no mode shift assumptions have been applied for Hemel Hempstead and HGC growth area to the highway matrix post VDM. This scenario focusses mainly on understanding the impacts of the IDP schemes identified to mitigate the Local Plan growth, including the schemes provided as part of the post 2041 Phase 2 study, without any mode shift based on OSM applied in Hemel Hempstead and HGC growth area. It will also be helpful to identify if there are any improvements that can be identified to the IDP schemes based on the modelling results of the 2050 IT scenario.

6.1.12. All other areas in St Albans and Dacorum except Hemel Hempstead and HGC will have mode reduction applied as calculated using the OSM tool.

7 Modelling Results

7.1 Overview

7.1.1. This chapter presents the results of the scenarios and within this section the transport modelling results are presented in a number of ways. In some cases results for each scenario are presented individually, whereas in other cases a series of comparisons have been drawn to show the incremental change between scenarios. These comparisons are as follows:

- **2050 Vision & Validate vs 2050 Option 0A**: This comparison shows the impact of the Local Plan development allocations, proposed Local Plan highway improvements, additional HGC growth after the Local Plan period (2041 to 2050) and anticipated mode shift assumptions against the future year baseline (2050 Option 0A).

7.1.2. The following metrics are presented:

- **Highway Network Performance** (section 7.2)
  - Highway network statistics for the Dacorum and St Albans area
  - Diagrams showing Volume / Capacity ratio (V/C%) for all links in the network – this indicates how close to capacity each link is.
  - Diagrams showing link delays.
- **Traffic Flows** (section 7.3)
  - Diagrams showing the net change in traffic flow between the scenarios.
- **Performance of Junctions** (section 7.4)
  - Diagrams showing the changes in node delay
  - Summary of flow changes at key junctions across each scenario
  - Summary of average delay per vehicle at key junctions across each scenario
- **Highway Journey Times** (section 7.5)
  - Summary of journey times along routes in each scenario
- **Infrastructure Test Results** (section 7.6)
  - Summary of highway and public transport results for the infrastructure test

7.1.3. All of the modelling results have been presented for the AM and PM peak hours.

7.1.4. Figure 7-1 shows the key roads in the Hemel Hempstead and the west of St Albans district for the ease of readers to identify the impacts shown in figures to follow.

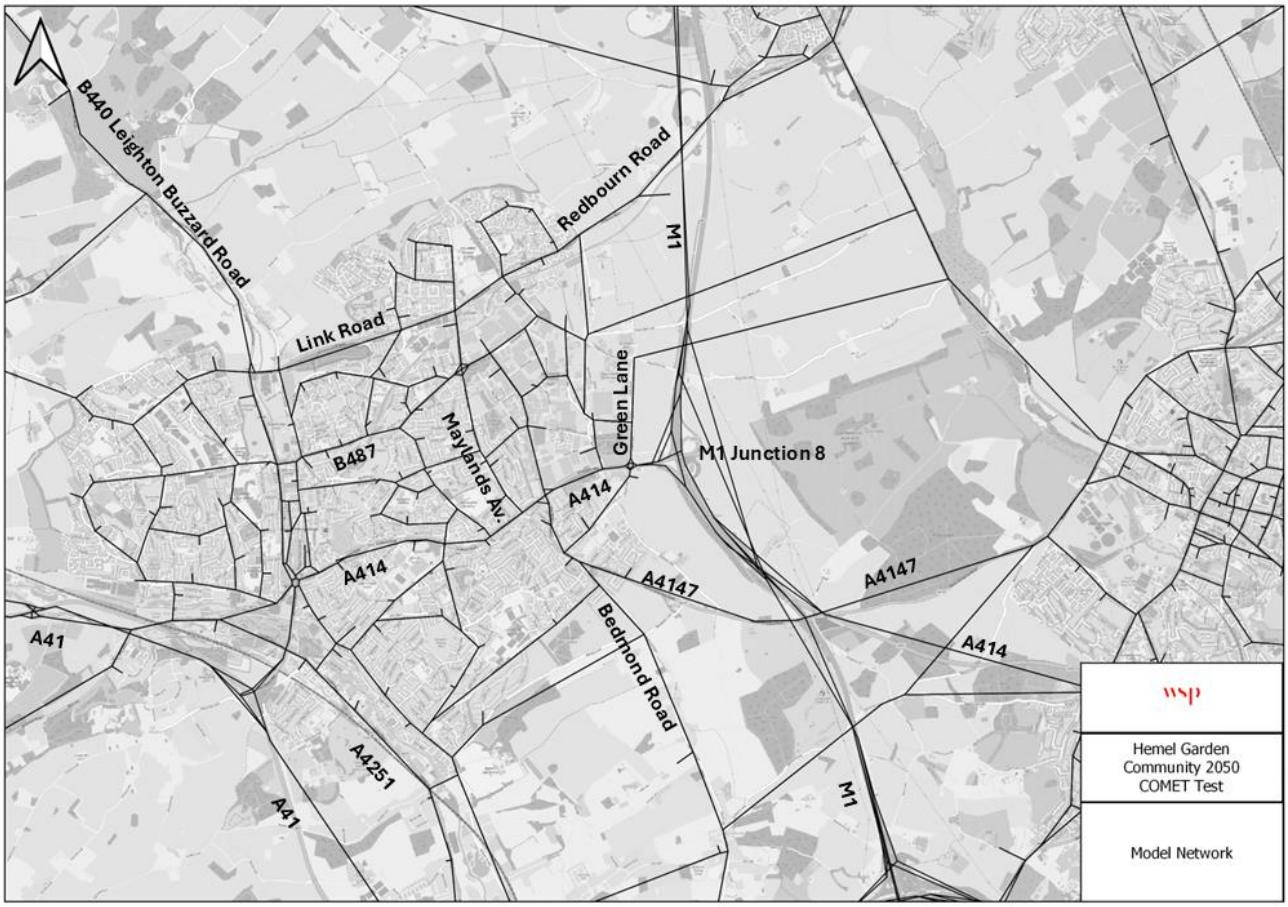


Figure 7-1: Key Roads

7.2 Highway Network Performance

7.2.1. Table 7-1 and Table 7-2 show summary indicators of network performance for the Dacorum and St Albans highway network for the Option 0A and Vision & Validate scenarios. These have been derived by cordoning the network in Dacorum and St Albans from the wider COMET model area and examining the network statistics within the SATURN highway assignment model. Overall, the statistics shows that as a result of the Local Plan allocations and additional HGC growth, there is an increase in vehicle trips and travel time in Vision & Validate compared to 2050 Option 0A.

7.2.2. These results show the following changes between scenarios:

Total Vehicle Trips

7.2.3. Total vehicle trips increase across St Albans and Dacorum between Option 0A and Vision & Validate as a result of the proposed developments in the Local Plan, HGC growth, IDP schemes, and mode shift, by 4% in the AM peak and 1% in the PM peak.

Total Time Travelled

7.2.4. The total time travelled increases across St Albans and Dacorum between Option 0A and Vision & Validate by 9% in AM Peak and 12% in PM Peak.

Time on Links

7.2.5. The time on links increases across St Albans and Dacorum between Option 0A and Vision & Validate by 6% in AM Peak and 5% in PM Peak.

Time at Junctions

7.2.6. The time at junctions increases across St Albans and Dacorum between Option 0A and Vision & Validate by 16% in AM Peak and 35% in PM Peak.

Average Speed

7.2.7. The average speed in the AM and PM peak decreases in Vision & Validate compared to 2050 Option 0A by 1% in AM and PM Peak.

Table 7-1: Summary of Dacorum and St Albans Highway Network Performance (AM Peak Hour)

Indicator	2050 Option 0A (Committed Developments and Infrastructure)	2050 Vision & Validate (With Local Plan allocations and additional HGC growth added)
Total vehicle trips	104,024	108,557
Total Time Travelled (PCU-Hours)	23,952	26,098
Time on links (PCU-Hours)	16,621	17,601
Time at junctions (PCU-Hours)	7,331	8,497
Average Speed (mph)	40.0	39.4

Table 7-2: Summary of Dacorum and St Albans Highway Network Performance (PM Peak Hour)

Indicator	2050 Option 0A (Committed Developments and Infrastructure)	2050 Vision & Validate (With Local Plan allocations and additional HGC growth added)
Total vehicle trips	101,387	102,091
Total Time Travelled (PCU-Hours)	20,997	23,587
Time on links (PCU-Hours)	15,979	16,788
Time at junctions (PCU-Hours)	5,019	6,798
Average Speed (mph)	40.4	40.0

Link Capacity

7.2.8. The following figures show the Volume/Capacity (V/C) ratio for all links in the network. In these plots, yellow indicates where links are approaching capacity, 85%-100%, orange indicates where the link is at- capacity or just over-capacity, 100-105% and red indicates that the link is over-capacity, greater than 105%.

Option 0A

7.2.9. Figure 7-2 and Figure 7-3 show the 2050 Option 0A V/C in the AM and PM peaks. As a result of the future increase in traffic by 2050, resulting from growth which is already committed, there are some high levels of V/C across both Dacorum and St Albans districts.

7.2.10. In the AM peak, key roads where the V/C ratio is over 100% are at the A414 Breakspear Way / Green Lane junction, Boundary Way westbound, Maylands Avenue northbound at the junction with Wood End Lane, Bedmond Road northbound at the junction with A4147 Leverstock Green Way, the A41 off slips at the Two Waters Way junction, Belswains Lane northbound at the junction with Barnacres Road, the junction of A4251 London Road / B4505 Box Lane and Boxted Road eastbound at the junction with Galley Hill. In the St Alban's area, over 100% V/C is predicted on Potterscrouch Lane northbound, Ragged Hall Lane eastbound, A4147 Bluehouse Hill southbound and St Stephen's Hill southbound.

7.2.11. In the PM peak, key roads where the V/C ration is over 100% are at the at the A414 Breakspear Way / Green Lane junction, Maylands Avenue northbound at the junction with Wood End Lane, Mark Road / Wood End Lane junction, Leverstock Green Road southbound at the junction with A414 Breakspear Way, Leverstock Green Road northbound at the junction with Adeyfield Road, the A4147 Leverstock Green Way / Bedmond Road junction, the junction of A4251 London Road / B4505 Box Lane, the A41 northbound off slip at the Two Waters Way junction, A4251 London Road westbound at the junction with Two Waters Way. In the St Alban's area, over 100% V/C is predicted on A4147 Bluehouse Hill southbound.

Figure 7-2: 2050 Option 0A Link Volume/Capacity Ratio, AM Peak

Figure 7-3: 2050 Option 0A Link Volume/Capacity Ratio, PM Peak

Vision & Validate

7.2.12. Figure 7-4 and Figure 7-5 show the Vision & Validate scenario V/C in the AM and PM peaks. The Vision & Validate scenario assumes DBC and SADC Local Plan development allocations to 2041 plus NTEM background growth to 2050, the highway infrastructure improvement under IDP schemes, M1 Junction 8 upgrade and mode shift assumptions.

7.2.13. Key roads which experience increases in V/C compared to Option 0A to become over capacity (100% or above) in the AM peak are A414 Breakspear Way eastbound at M1 Junction 8, Boundary Way westbound at the junction with Buncefield Lane, Boundary Way westbound at the junction with Maxted Road, Redbourn Road westbound at the junction with Shenley Road, the Leighton Buzzard Road / North Hemel Link Road junction, Two Waters Way northbound at the Plough Roundabout, the A41 / Two Waters Way junction, London Road / Featherbed Lane junction and St Albans Hill northbound at the junction with Bennetts End Road, the A4147 / King Harry Lane and A4147 / Bedmond Lane junctions.

7.2.14. Key roads which experience increases in V/C compared to Option 0A to become over capacity (100% or above) in the PM peak are the M1 Junction 8 northbound on-slip, Boundary Way westbound at the junction with Buncefield Lane, Boundary Way westbound at the junction with Maxted Road, on the East Hemel Spine Road north of Punchbowl Lane, on the East Hemel Spine Road south of Green Lane.

7.2.15. In both peak periods, there is a notable decrease in V/C at the A414 / Breakspear Way junction to become within 100% V/C, due to the proposed IDP upgrade of the junction and on Maylands Avenue and Leverstock Green Road due to re-routing caused by the M1 junction 8 upgrade.

Figure 7-4: Vision & Validate Link Volume/Capacity Ratio, AM Peak

Figure 7-5: Vision & Validate Link Volume/Capacity Ratio, PM Peak

Link Delay

7.2.16. The following figures show the link delay for all links in the network. In these plots the following colour coding has been used to show the range of link delays:

- Dark green indicates a link delay decrease of two minutes or less
- Light green indicates a link delay decrease between 1-2 minutes
- Orange indicates a link delay increase between 1-2 minutes
- Red indicates a link delay increase of over 2 minutes.

7.2.17. It is important to note that the length of the line represents the length of the link rather than the severity of delay and link lengths tend to be shorter in urban areas.

Vision & Validate vs Option 0A

7.2.18. The impacts of the DBC Local Plan, SADC Local Plan, HGC growth to 2050, proposed IDP highway improvements and mode shift reductions on the link delays are presented in Figure 7-6 and Figure 7-7 for AM and PM peak, which show the delay difference between Vision & Validate and Option 0A.

7.2.19. Key links that show increases in delay in the AM peak are the Redbourn Road / Shenley Road junction, the Redbourn Road / North Hemel Link Road / East Hemel Spine Road junction, The Leighton Buzzard Road/ North Hemel Link Road junction, the A414 eastbound at M1 Junction 8, the M1 junction southbound on-slip, Leverstock Green Road southbound and Longlands southbound at their junctions with A414 Breakspear Way, Two Waters Way northbound at the Plough Roundabout, the A4251 London Road / Featherbed Lane junction, at the Two Waters Way / A41 junction, the junction of A4251 London Road / B4505 Box Lane, Red Lion Lane at the junction with Lower Road, the A4147 / King Harry Lane and A4147 / Bedmond Lane junctions and Ragged Hall Lane at the junction with Watford Road.

7.2.20. Key links that show increases in delay in the PM peak are the Redbourn Road / Shenley Road junction, the Redbourn Road / North Hemel Link Road / East Hemel Spine Road junction, several links at M1 junction 8, the East Hemel Spine Road / A4147 Hemel Hempstead Road junction, Bedmond Road northbound at the junction with A4147 Leverstock Green Road and the North Hemel Link Road / Leighton Buzzard Road junction.

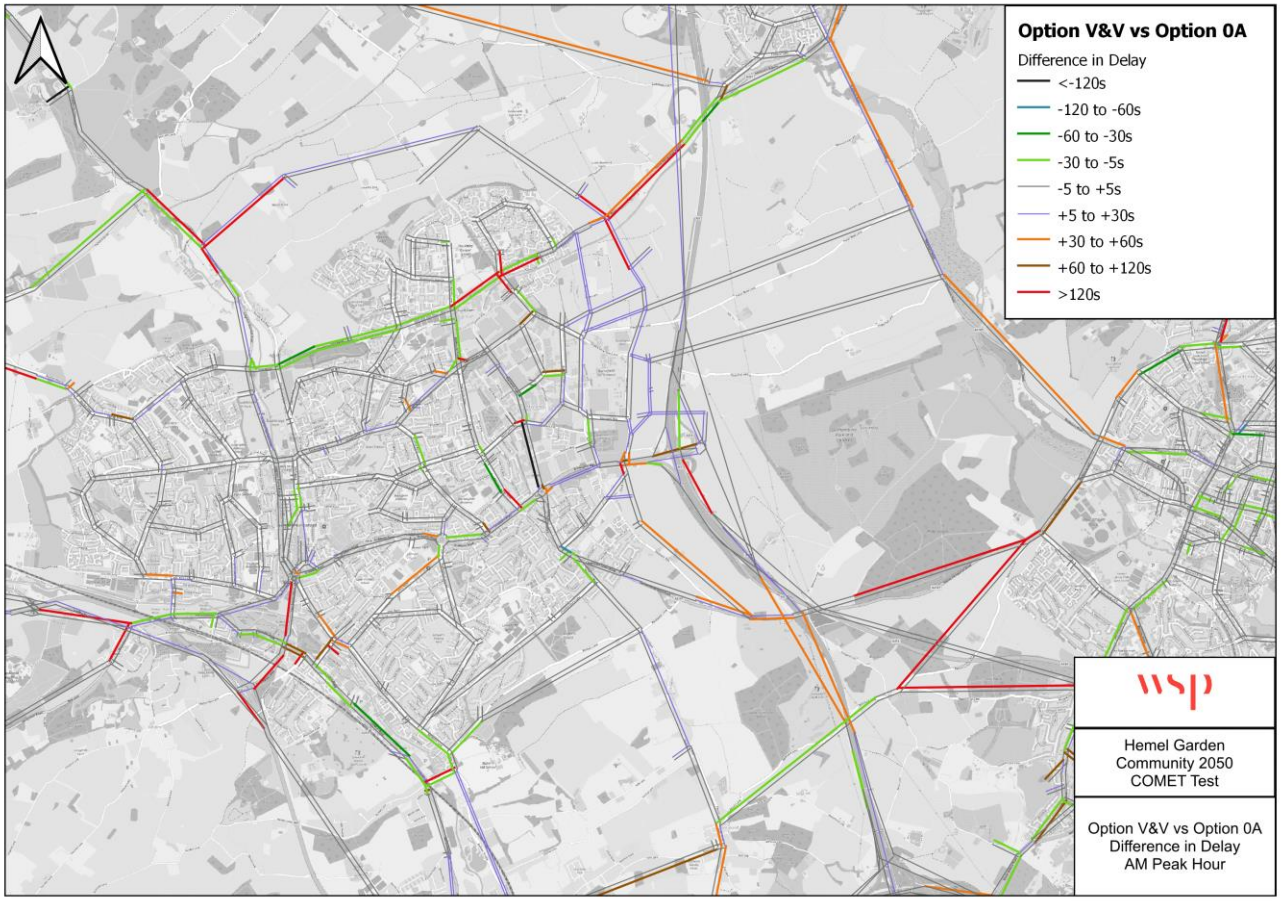


Figure 7-6: Link Delay Difference between Vision & Validate and 2050 Option 0A, AM Peak

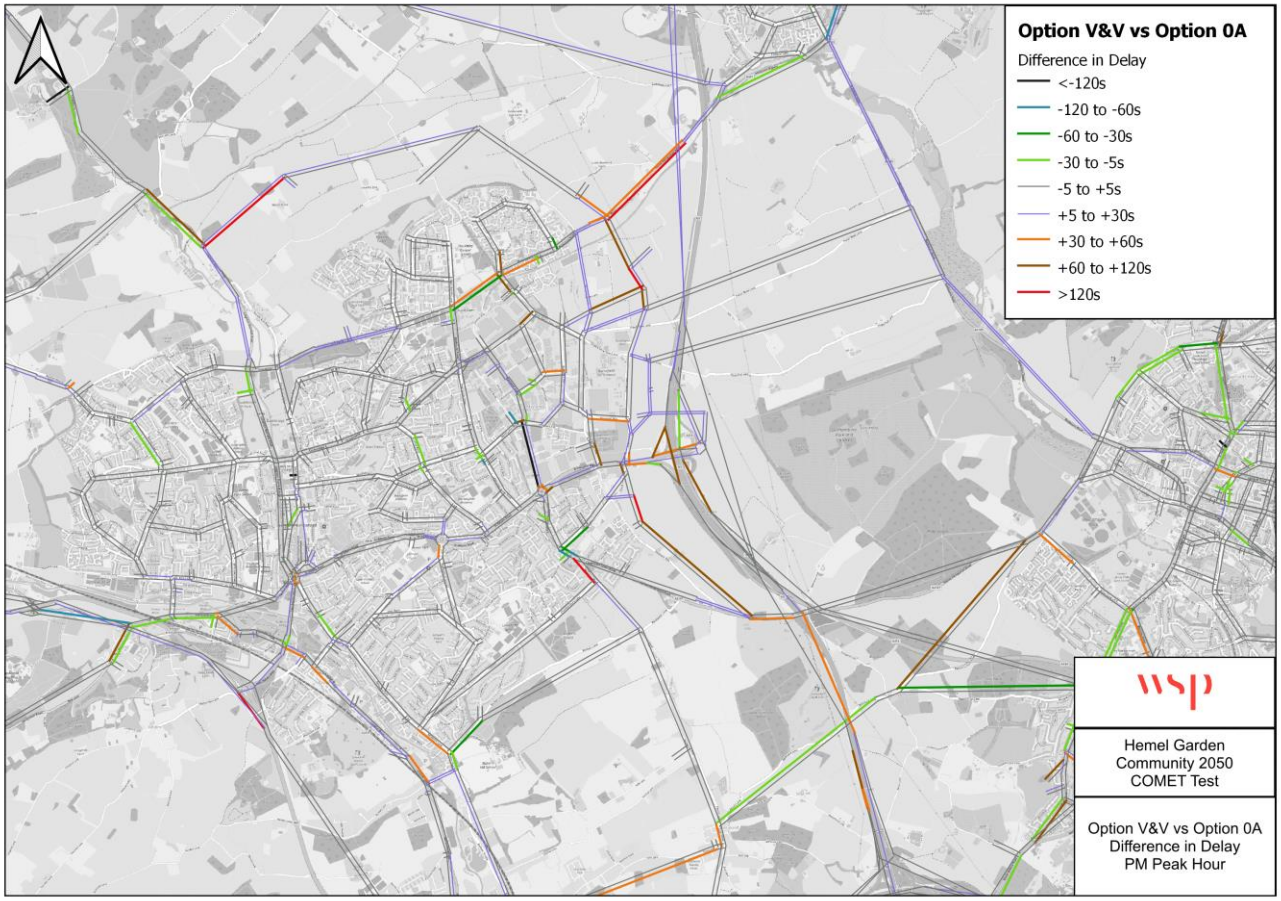


Figure 7-7: Link Delay Difference between Vision & Validate and 2050 Option 0A, PM Peak

Sensitivity Test Vision & Validate

7.2.21. The Vision & Validate models show that there is significant delay at the North Hemel junction accesses of North Hemel Link Road / Leighton Buzzard Road and North Hemel Link Road / Redbourn Road. This affects the modelled flow of traffic from the North Hemel development as well traffic on the local highway network. As a result of the junction delays at these signalised junctions not all highway traffic associated with North Hemel can access the wider network, as they are delayed leaving the development. Therefore the full impact of the additional traffic on the wider road network is not shown. A sensitivity test has therefore been undertaken to understand the impact if no delays were experienced at the North Hemel access junctions.

7.2.22. The impact of using the Sensitivity Test is presented in Figure 7-8 and Figure 7-9, which show the difference in link delay between the sensitivity test and the original Vision & Validate scenario.

7.2.23. In the AM peak, there is a significant reduction in delay at the junctions of North Hemel Link Road / Leighton Buzzard Road and North Hemel Link Road / Redbourn Road, however this has caused additional impacts elsewhere as more development traffic is released to the network. There is an increase in delay of over 2 minutes on Potten End Hill northbound at the junction Leighton Buzzard Road and an increase of 30-60 seconds on Two Waters Way northbound at the Plough Roundabout.

7.2.24. In the PM peak, there is an increase in delay of 30-60 seconds on Shenley Road southbound but delay differences of less than 30 seconds at all other junctions.

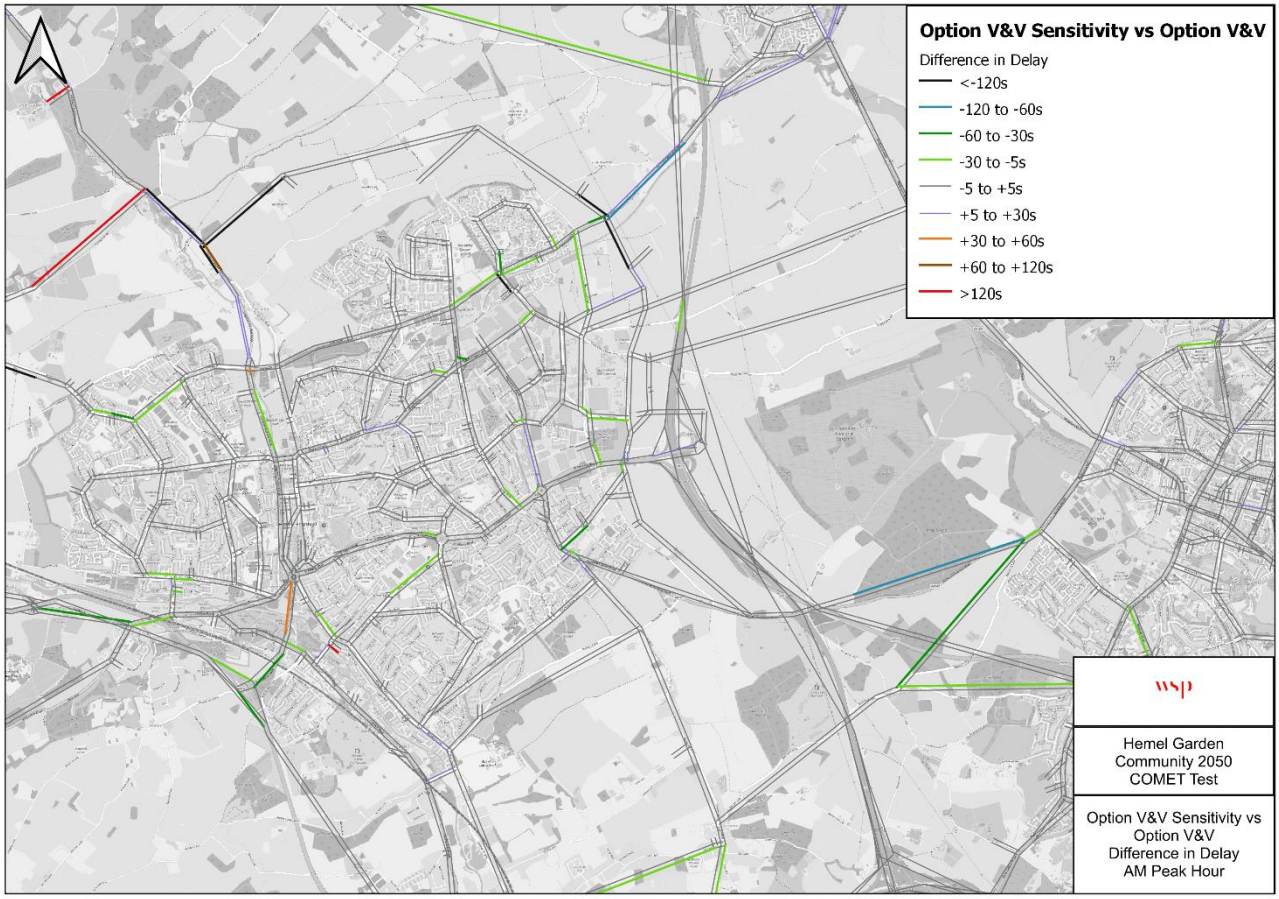


Figure 7-8: Link Delay Difference between Vision & Validate Sensitivity Test and Vision & Validate, AM Peak

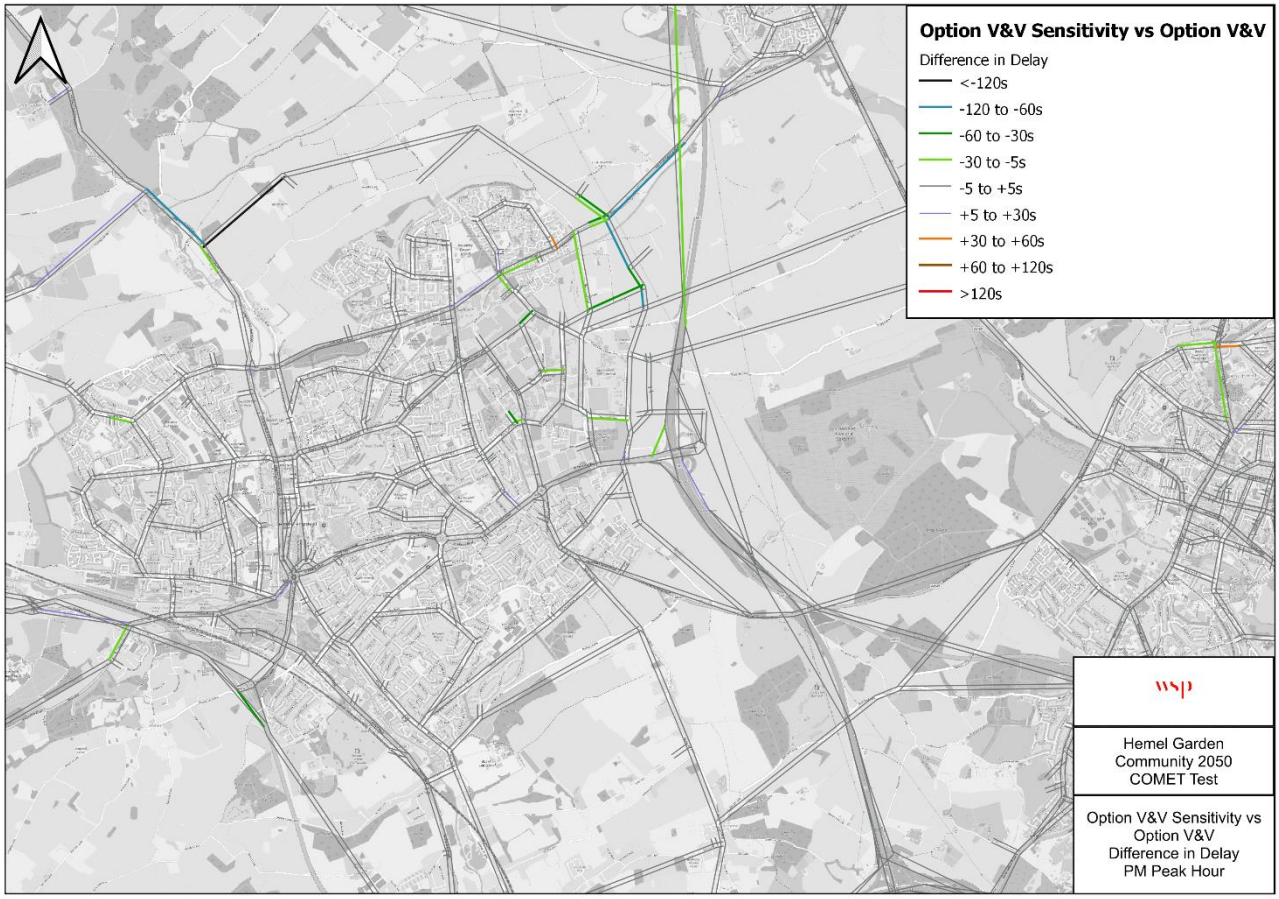


Figure 7-9: Link Delay Difference between Vision & Validate Sensitivity Test and Vision & Validate, PM Peak

7.3 Traffic flows

7.3.1. This section of the report provides details of the traffic flow changes across Dacorum and St Albans between scenarios as outlined in section 7.1.

7.3.2. These plots show flows in passenger car units (pcus), pcus are a relative weight factor used to represent the impact of different types of vehicles. In the COMET model cars and light goods vehicles (LGV's) have a pcu factor of 1 and heavy good vehicles (HGV's) have a pcu factor of 2.2.

Option 0A vs Vision & Validate

7.3.3. Figure 7-10 and Figure 7-11 present the changes in traffic flow which occur as a result of the Vision and Validate option which includes the additional mode shift changes and increased growth in HGC.

7.3.4. The models show that in the AM peak there are increases in traffic of over 300 pcus per hour on A414 between Bennetts End Road and North Orbital Road / Watling Street, at M1 Junction 8, on the East Hemel Spine Road, A4147 Hemel Hempstead Road, Boundary Way, Swallowdale Lane, Maylands Avenue, Redbourn Road to the east of the East Hemel Spine Road, Fishery Road, Kingsland Road and A41.

7.3.5. In the AM peak, the model forecasts a decrease in traffic of over 300 pcus per hour on Redbourn Road between Leighton Buzzard Road and East Hemel Spine Road, Leighton Buzzard Road between Link Road and the North Hemel Link Road, A4146 Station Road and Midland Road / Adeyfield Road. These decreases are a result of increased congestion occurring on the network, rerouting of traffic and proposed traffic calming schemes in the area.

7.3.6. In the PM peak, there are increases in traffic of over 300 pcus per hour on A414 between Bennetts End Road and North Orbital Road / Watling Street, at M1 Junction 8, on the M1 south of Junction 8, on the East Hemel Spine Road, A4147 Hemel Hempstead Road, Boundary Way, Swallowdale Lane, Maylands Avenue, Redbourn Road to the east of the East Hemel Spine Road, Link Road, Berkhamsted Road, Fishery Road, Kingsland Road, A41 Two Waters Way, and A4251 London Road.

7.3.7. In the PM peak, the model also forecasts a decrease in traffic of over 300 pcus per hour on Redbourn Road around the Shenley Road junction, A4146 Station Road, Green Lane south of the A414, Leighton Buzzard Road between Plough Roundabout and B487 Queensway and Midland Road / Adeyfield Road. These decreases are a result of increased congestion occurring on the network, rerouting of traffic and proposed traffic calming schemes in the area.

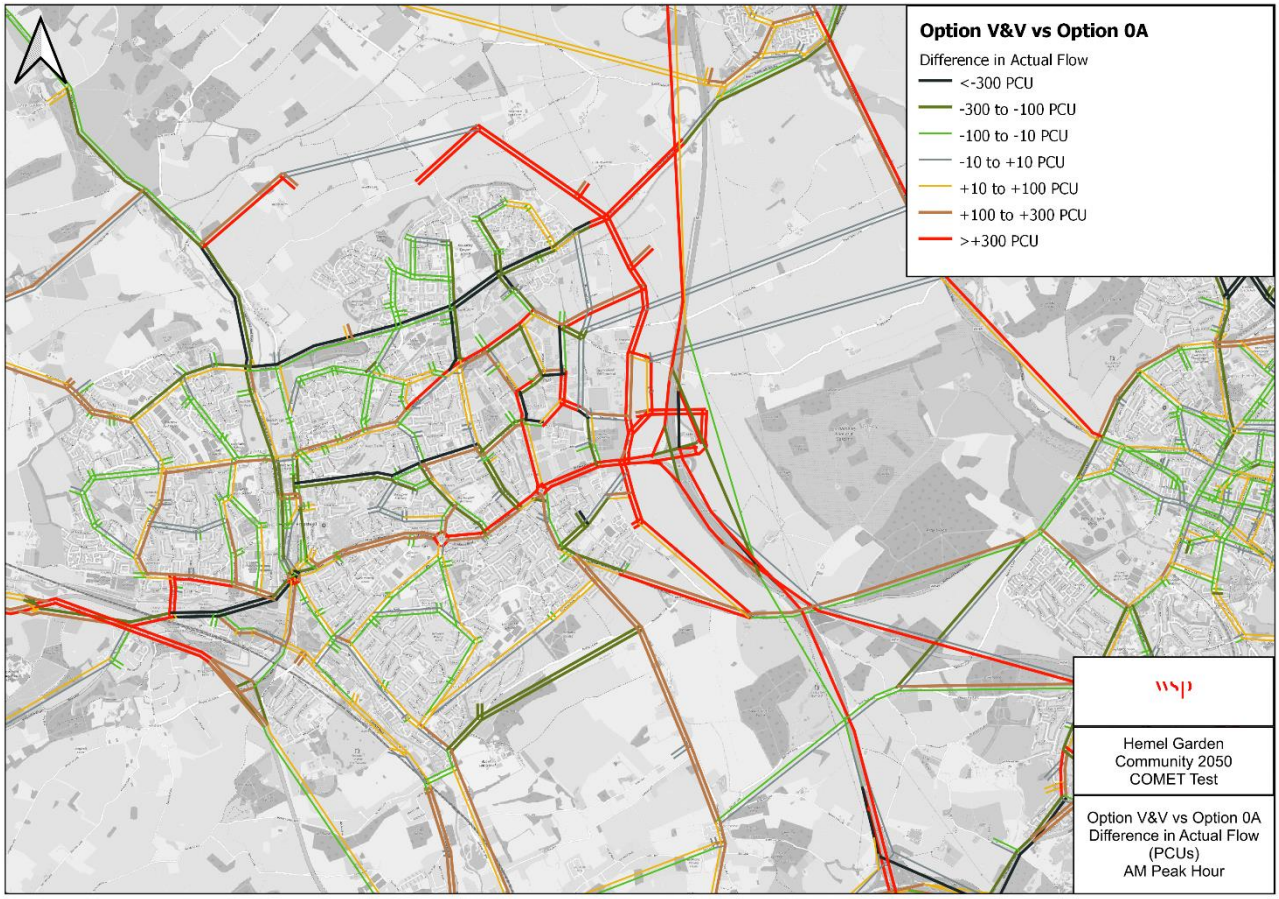


Figure 7-10: Changes in Traffic Flow between Vision & Validate and Option 0A, AM Peak

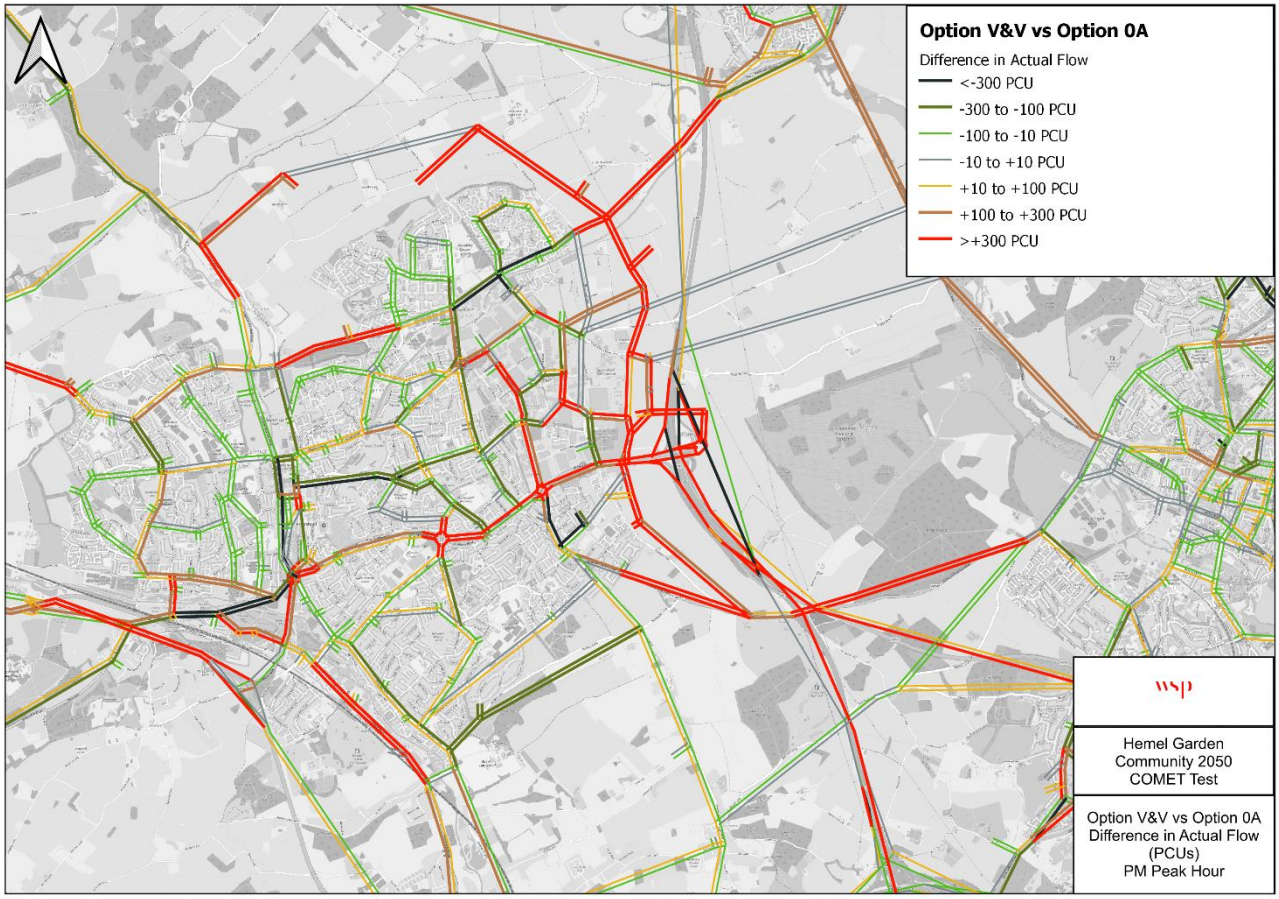


Figure 7-11: Changes in Traffic Flow between Vision & Validate and Option 0A, PM Peak

Sensitivity Test Vision & Validate

7.3.8. The impact of assuming no delay at the North Hemel access junctions, North Hemel Link Road / Leighton Buzzard Road and North Hemel Link Road / Redbourn Road (as described above in paragraph 7.2.21), is presented in Figure 7-12 and Figure 7-13, which show the difference in traffic flow between the Sensitivity Test and the original Vision & Validate scenario.

7.3.9. In both peak periods, there is an increase in flow through the junctions of North Hemel Link Road / Leighton Buzzard Road and North Hemel Link Road / Redbourn Road, due to the change to representing these without delays. There are also reductions on the M1 in both peaks as a result of removal of delays.

7.3.10. In the AM peak, there are increases in traffic flow of over 100 pcus on Leighton Buzzard Road northbound, Potten End southbound, Redbourn Road eastbound, and East Hemel Spine Road southbound. There is also a reduction of between 100 and 300 pcus on the M1 northbound.

7.3.11. In the PM peak, there are increases in traffic flow of over 100 pcus on Leighton Buzzard Road southbound, Redbourn Road westbound and East Hemel Spine Road northbound and a reduction of flow of up to 100 on the M1 southbound.

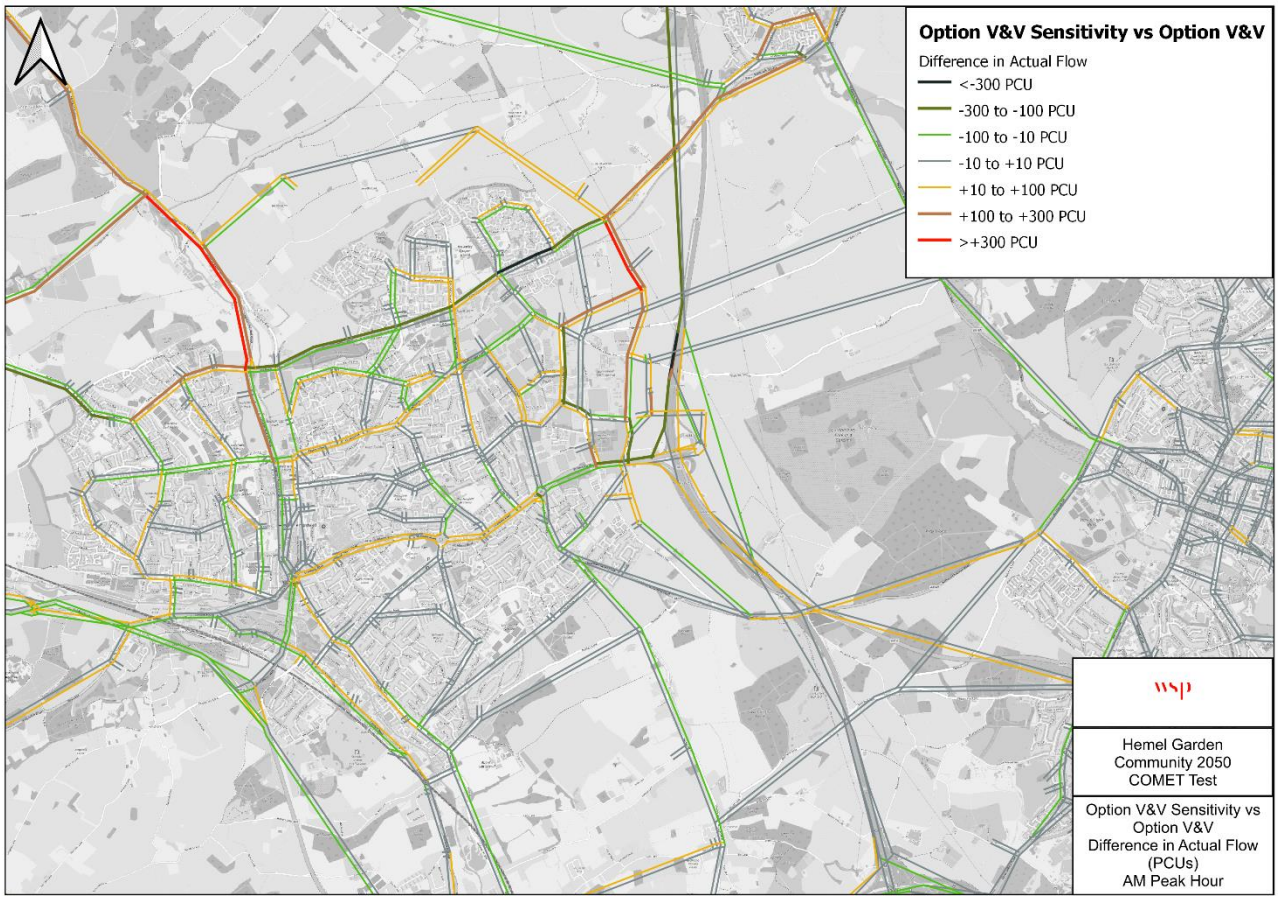


Figure 7-12: Changes in Traffic Flow between Vision & Validate Sensitivity Test and Vision & Validate, AM Peak

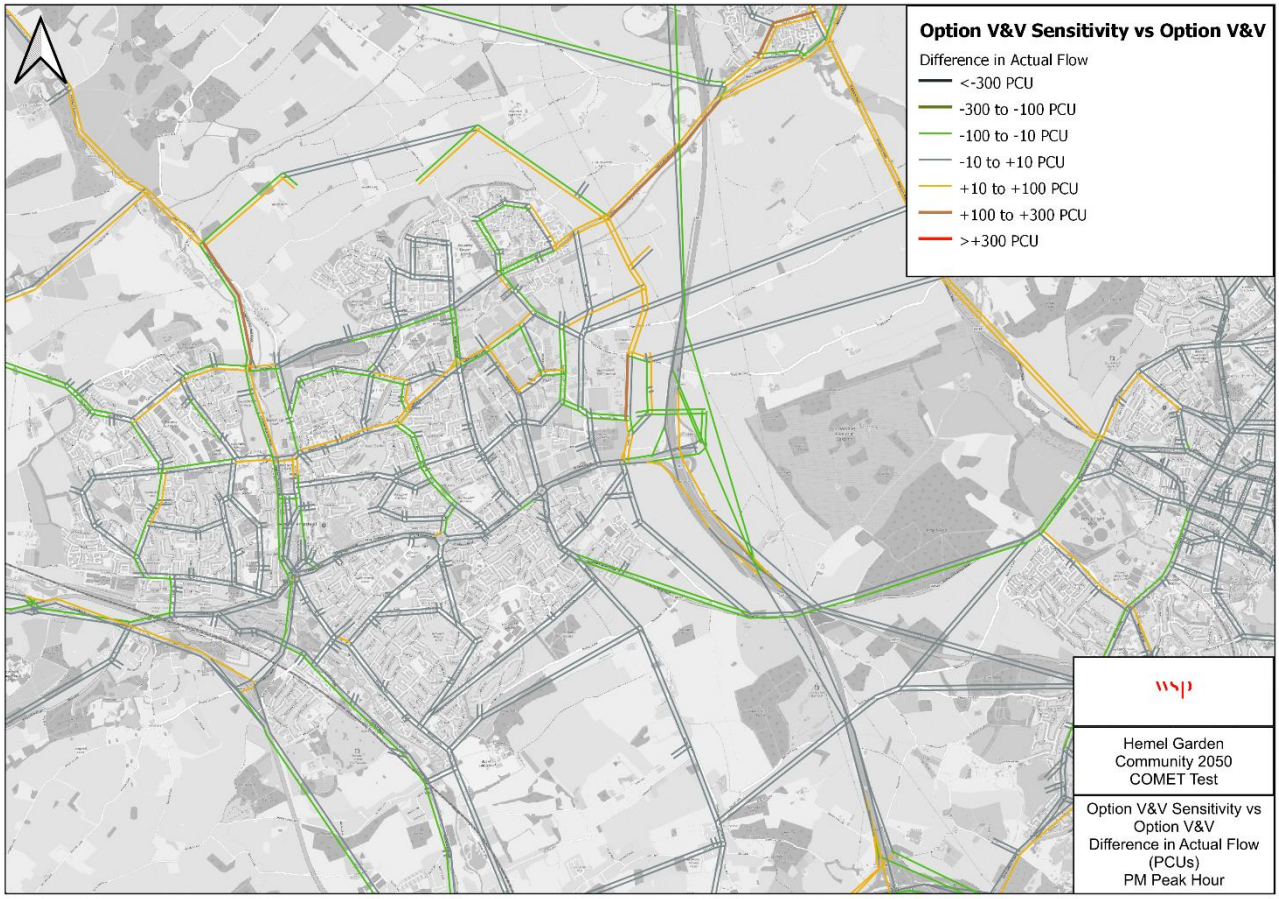


Figure 7-13: Changes in Traffic Flow between Vision & Validate Sensitivity Test and Vision & Validate, PM Peak

7.4 Junction Performance

7.4.1. Node delay difference plots have been generated to illustrate the changes in delays which occur between scenarios as outlined in section 7.1. The delay that is calculated is the flow-weighted average delay over all turning movements at a simulation node.

2050 Option 0A vs Vision & Validate

7.4.2. Junction delay differences between Vision & Validate and 2050 Option 0A in the AM and PM peaks are presented in Figure 7-14 and Figure 7-15. Junctions where the delay change is under a minute are not shown in the figures.

7.4.3. In the AM peak, a delay increases of over 5 minutes is predicted Durrants Hill Road / Ebberns Road. Delay increases of 2-5 minutes are predicted at Redbourn Road / Three Cherry Trees Lane, Leighton Buzzard Road / North Hemel Link Road and the M1 junction 8 southbound A414 / M1 merge.

7.4.4. In the PM peak, delays increase by 1-2 minutes at the M1 junction 8 northbound slip road onto the A414 / M1 and at the M1 junction 8 southbound A414 / M1 merge.

Figure 7-14: Node Delay Difference between Vision & Validate and 2050 Option 0A, AM Peak

Figure 7-15: Node Delay Difference between Vision & Validate and 2050 Option 0A, PM Peak

Performance of Key Junctions

7.4.5. Nine junctions have been identified as key junctions in the area around M1 Junction 8 as shown in Figure 7-16. For these junctions more detailed information has been extracted from the strategic transport model to understand the differences which occur within the scenarios. It is important to note COMET is a strategic model and detailed junction modelling is required to understand the performance of the junctions more precisely.

Figure 7-16: Key Junctions around the Hemel Hempstead Area

Summary of Flows at Key Junctions

7.4.6. Table 7-3 and Table 7-4 summarise the change in total entry flow at each of the key junctions across each of the scenarios.

7.4.7. The changes in total flow have been analysed by comparing the Vision & Validate scenario to 2050 Option 0A. If the traffic flow change between the options was an increase the cell in the table is orange, if there is a reduction the cell in the table is green.

7.4.8. In general traffic flows at junctions increase between Vision & Validate and Option 0A as a result of the Local Plan developments, with the largest flow increases at M1 Junction 8 (over 3,000 pcus in each peak period) and at the A414 / Green Lane junction (around 2,200 pcu in each peak period). At the junction of Redbourn Road / Link Road the flow decreases by 1,278 pcus in the AM peak and 389 pcus in the PM peak. This is due to the reduced traffic flow along Redbourn Road due to the IDP scheme at the Redbourn Road / Three Cherry Trees Lane junction. At the Leighton Buzzard Road / Queensway junction there is a reduction of around 200 pcus in the AM peak and 595 pcus in the PM peak, reflecting the reduced traffic flow on Leighton Buzzard Road. At the A414 / Leighton Buzzard Road / Two Waters Way / Station Road junction there is reduced traffic of around 300 pcus in each peak period, mainly due to the IDP scheme at the junction.

Table 7-3: Summary of Total Entry Flow (PCUs) at Key Junctions by Scenario (AM Peak)

Ref	Junction Name	2050 Option 0A	2050 Vision & Validate
1	M1 Junction 8	6134	9298
2	M1 Junction 9	4418	5051
3	A414 / Green Lane	4898	7103
4	A414 / Maylands Avenue / Leverstock Green Way	4903	6278
5	Redbourn Road / A1583 Redbourn Bypass	3468	3830
6	Redbourn Road / Link Road	3979	2701
7	Leverstock Green Road / Bedmond Road	1778	1784
8	Leighton Buzzard Road / Queensway	3524	3323
9	A414 / Leighton Buzzard Road / Two Waters Way / Station Road	6417	6127

Table 7-4: Summary of Total Entry Flow (PCUs) at Key Junctions by Scenario (PM Peak)

Ref	Junction Name	2050 Option 0A	Vision & Validate
1	M1 Junction 8	6892	9921
2	M1 Junction 9	4543	5128
3	A414 / Green Lane	4980	7251
4	A414 / Maylands Avenue / Leverstock Green Way	5047	5794
5	Redbourn Road / A1583 Redbourn Bypass	3339	3685
6	Redbourn Road / Link Road	4022	3633
7	Leverstock Green Road / Bedmond Road	1793	1834
8	Leighton Buzzard Road / Queensway	3820	3225
9	A414 / Leighton Buzzard Road / Two Waters Way / Station Road	6840	6499

Summary of Delays at Key Junctions

7.4.9. Table 7-5 and Table 7-6 summarise the performance of the key junctions in each of the scenarios assessed in the AM and PM peak hours respectively. The delays shown are the average delays per vehicle across all movements at each junction.

7.4.10. The tables show that in the AM peak there are greater junction delays overall, with an increase in the proportion of junctions with delays over 30 seconds in Vision & Validate compared to 2050 Option 0A. 22% of junctions have over 30 seconds delay in Option 0A whilst 44% have over 30 seconds delay in Vision & Validate. This is due to the increase in delays at the M1 junction 9 and at Redbourn Road / A5183 Redbourn Bypass (which have less than 30 delay in Option 0A and 30-60 seconds delay in Vision & Validate). At the A414 / Green Lane junction the delay decreases from over 60 seconds to 30-60 seconds, due to the IDP scheme.

7.4.11. However, in the PM peak, the proportion of junctions with over 30 seconds delay decreases in Vision & Validate compared to Option 0A. 22% of junctions have over 30 seconds delay in Option 0A whilst 11% have over 30 seconds delay in Vision & Validate. This is due to the reduction in delays at the A414 / Green Lane junction from over 60 seconds in Option 0A to less than 30 seconds Option Vision & Validate, due to the IDP scheme.

Table 7-5: Summary of Average Delay at Key Junctions (AM Peak)

Average Delay per Vehicle	Rating	Proportion of key junctions in 2050 Option 0A	Proportion of key junctions in Vision & Validate
0 – 30 sec	Green	78%	56%
30 – 60 sec	Amber	0%	33%
> 60 sec	Red	22%	11%

Table 7-6: Summary of Average Delay at Key Junctions (PM Peak)

Average Delay per Vehicle	Rating	Proportion of key junctions in Option 0A	Proportion of key junctions in Vision & Validate
0 – 30 sec	Green	78%	89%
30 – 60 sec	Amber	0%	0%
> 60 sec	Red	22%	11%

7.4.12. Table 7-7 and Table 7-8 present the change in delays which occurs as a result of the Vision & Validate scenario at each of the key junctions, noting that this does not take into consideration the delays which are experienced on links. The changes in delay have been analysed by comparing Vision & Validate against Option 0A. If the delay between the options was an increase the cell in the table is orange, if there is a reduction the cell in the table is green.

7.4.13. In general, the delay per vehicle increases in Vision & Validate compared to Option 0A, due to the increased traffic from the Local Plan developments. The greatest increases in the AM peak are at M1 Junction 9 (28s) and Redbourn Road / A1583 Redbourn Bypass (20s), whilst in the PM peak the largest increase is on and Leverstock Green Road / Bedmond Road (16s). At A414 / Green Lane there is a decrease of 58 seconds in the AM peak and 68 seconds in the PM peak, due to the IDP scheme at the junction.

Table 7-7: Change in Average Delay per vehicle (seconds) at Key Junctions by Scenario (AM Peak Hour)

Reference	Junction Name	Vision & Validate vs 2050 Option 0A
1	M1 Junction 8	13
2	M1 Junction 9	28
3	A414 / Green Lane	-58
4	A414 / Maylands Avenue / Leverstock Green Way	5
5	Redbourn Road / A5183 Redbourn Bypass	20
6	Redbourn Road / Link Road	-9
7	Leverstock Green Road / Bedmond Road	-5
8	Leighton Buzzard Road / Queensway	0
9	A414 / Leighton Buzzard Road / Two Waters Way / Station Road	14

Table 7-8: Change in Average Delay per vehicle (seconds) at Key Junctions by Scenario (PM Peak Hour)

Reference	Junction Name	Vision & Validate vs 2050 Option 0A
1	M1 Junction 8	9
2	M1 Junction 9	4
3	A414 / Green Lane	-68
4	A414 / Maylands Avenue / Leverstock Green Way	9
5	Redbourn Road / A5183 Redbourn Bypass	2
6	Redbourn Road / Link Road	-6
7	Leverstock Green Road / Bedmond Road	16
8	Leighton Buzzard Road / Queensway	0
9	A414 / Leighton Buzzard Road / Two Waters Way / Station Road	8

7.5 Highway Journey Times

7.5.1. Five journey time routes in the area around M1 Junction 8 have been examined. The routes are shown in Figure 7-17.

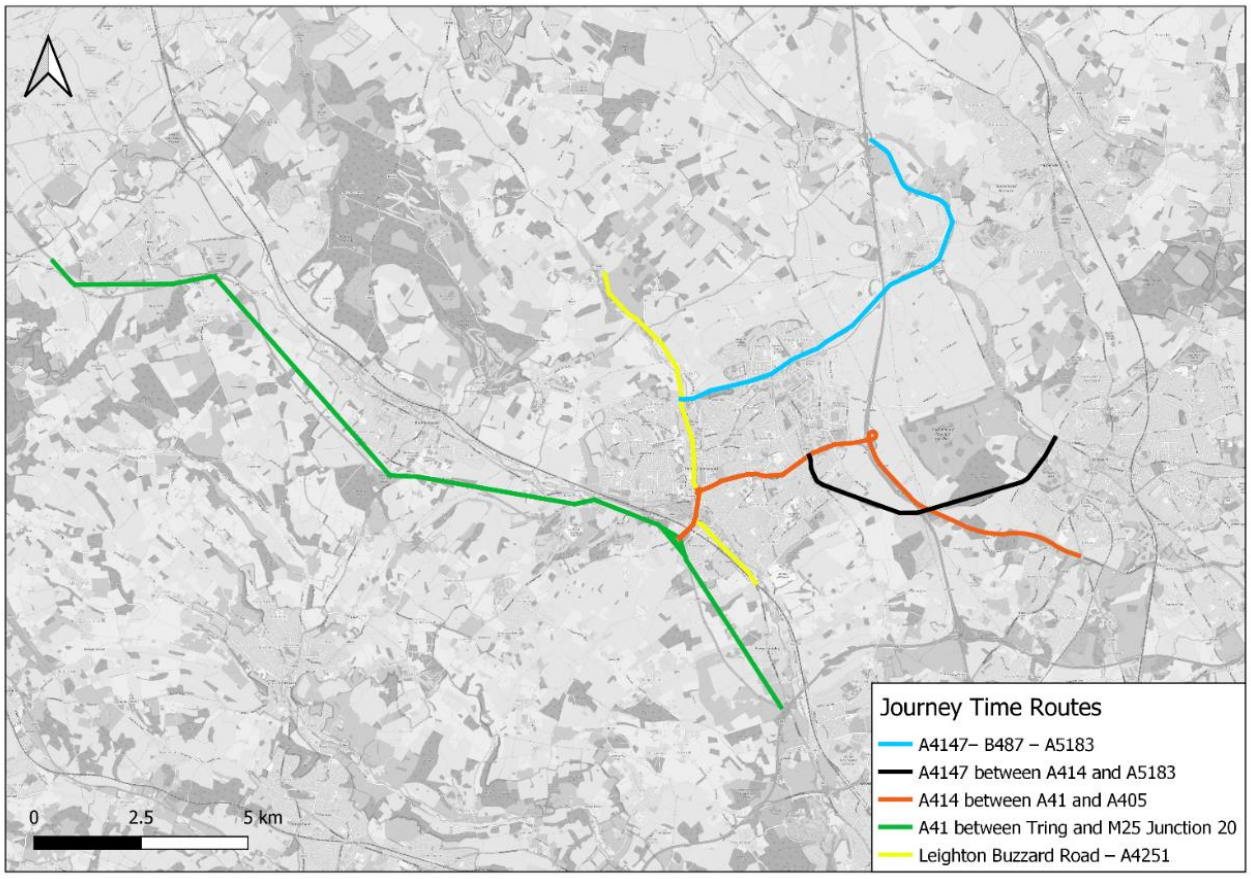


Figure 7-17: Location of Journey Time Routes

7.5.2. Table 7-9 and Table 7-10 provide details of each journey time route, the time taken to travel in each time scenario and time period. These tables have been coloured to show where journey times are higher (orange) or lower (green) between scenarios:

7.5.3. For Vision & Validate, cells are orange where times in Vision & Validate are greater than Option 0A.

7.5.4. Table 7-11 and Table 7-12 present the percentage changes in journey times between the scenarios. They have also been colour coded in a similar way to Table 7-9 and Table 7-10, with journey time increases shown in orange and decreases shown in green.

7.5.5. On the A414 route (orange), the journey time increases westbound in both directions in Vision & Validate compared to Option 0A, with an increase of 3 minutes in the AM peak and over 1 minute in the PM peak. In the eastbound direction the journey time is increased in the AM peak by around 6 minutes and decreased by less than a minute in the PM peak.

7.5.6. On the A41 route (green), the travel time is increased in Vision & Validate compared to 2050 Option 0A. In the AM peak it increases by around a minute eastbound and less than 30 seconds westbound, whilst in the PM peak it increases by less than 30 seconds eastbound and around a minute westbound.

7.5.7. On the Leighton Buzzard Road – A4251 route (yellow), in Vision & Validate compared to 2050 Option 0A, the journey time increases by around 10 minutes southbound and around 13 minutes northbound in the AM peak and by around 3 minutes southbound and 2 minutes northbound in each direction in the PM peak, due to the increased traffic flow from the Local Plan developments.

7.5.8. On the A4147 route (black), in Vision & Validate compared to 2050 Option 0A, the journey time increases by around 4 minutes eastbound and around 3 minutes westbound in the AM peak. In the PM peak, the journey time changes by less than 30 seconds in each direction.

7.5.9. On the A4147-B487-A5183 route (blue), in Vision & Validate compared to 2050 Option 0A, the journey time increases by 5.5 minutes eastbound and around 4 minutes westbound in the AM peak. In the PM peak, the journey time decreases by less than 30 seconds eastbound and increases by around 3 minutes eastbound. This is mainly due to the increased traffic from the Local Plan developments and IDP schemes.

Table 7-9: Summary of Journey Times (mins:secs) AM Peak

Route Name	Route Direction	2050 Option 0A	2050 Vision & Validate
A414 between A41 and A405 (Orange)	Eastbound	20:17	26:23
A414 between A41 and A405 (Orange)	Westbound	14:02	17:12
A41 between Tring and M25 Junction 20 (Green)	Eastbound	15:11	16:22
A41 between Tring and M25 Junction 20 (Green)	Westbound	14:16	14:40
Leighton Buzzard Road – A4251 (Yellow)	Southbound	14:16	24:39
Leighton Buzzard Road – A4251 (Yellow)	Northbound	17:19	30:38
A4147 between A414 and A5183 (Black)	Eastbound	11:32	15:13
A4147 between A414 and A5183 (Black)	Westbound	11:09	13:48
A4147– B487 – A5183 (Blue)	Eastbound	14:16	19:46
A4147– B487 – A5183 (Blue)	Westbound	14:04	18:26

Table 7-10: Summary of Journey Times (mins:secs) PM Peak

Route Name	Route Direction	2050 Option 0A	Vision & Validate
A414 between A41 and A405 (Orange)	Eastbound	20:25	19:52
A414 between A41 and A405 (Orange)	Westbound	14:56	16:18
A41 between Tring and M25 Junction 20 (Green)	Eastbound	14:07	14:20
A41 between Tring and M25 Junction 20 (Green)	Westbound	16:55	18:13
Leighton Buzzard Road – A4251 (Yellow)	Southbound	16:55	19:37
Leighton Buzzard Road – A4251 (Yellow)	Northbound	20:29	22:25
A4147 between A414 and A5183 (Black)	Eastbound	10:51	10:31
A4147 between A414 and A5183 (Black)	Westbound	11:47	11:54
A4147– B487 – A5183 (Blue)	Eastbound	19:10	18:53
A4147– B487 – A5183 (Blue)	Westbound	13:43	16:59

Table 7-11: Percentage Changes in Journey Times AM Peak

Route Name	Route Direction	Vision & Validate vs 2050 Option 0A
A414 between A41 and A405 (Orange)	Eastbound	30%
A414 between A41 and A405 (Orange)	Westbound	22%
A41 between Tring and M25 Junction 20 (Green)	Eastbound	8%
A41 between Tring and M25 Junction 20 (Green)	Westbound	3%
Leighton Buzzard Road – A4251 (Yellow)	Southbound	73%
Leighton Buzzard Road – A4251 (Yellow)	Northbound	77%
A4147 between A414 and A5183 (Black)	Eastbound	32%
A4147 between A414 and A5183 (Black)	Westbound	24%
A4147– B487 – A5183 (Blue)	Eastbound	39%
A4147– B487 – A5183 (Blue)	Westbound	31%

Table 7-12: Percentage Changes in Journey Times PM Peak

Route Name	Route Direction	Vision & Validate vs 2050 Option 0A
A414 between A41 and A405 (Orange)	Eastbound	-3%
A414 between A41 and A405 (Orange)	Westbound	9%
A41 between Tring and M25 Junction 20 (Green)	Eastbound	2%
A41 between Tring and M25 Junction 20 (Green)	Westbound	8%
Leighton Buzzard Road – A4251 (Yellow)	Southbound	16%
Leighton Buzzard Road – A4251 (Yellow)	Northbound	9%
A4147 between A414 and A5183 (Black)	Eastbound	-3%
A4147 between A414 and A5183 (Black)	Westbound	1%
A4147– B487 – A5183 (Blue)	Eastbound	-1%
A4147– B487 – A5183 (Blue)	Westbound	24%

7.6 Infrastructure Test Results

7.6.1. The results of the infrastructure test are presented within this section of the report. They focus on the additional schemes which have been coded into both the highway and public transport models and the impacts they have.

Highway Results

7.6.2. To provide a direct comparison of the impacts that the IT highway schemes have an additional scenario was generated which assigns the V&V highway demand to the IT network which includes the additional IT highway schemes. For this scenario, it is also assumed that no opportunity to shift mode reduction is applied for Hemel Hempstead area due to the improved public transport provisions. This ensures the changes in highway journey time directly relate to proposed schemes. Table 7-13 and Table 7-14 provide the journey times results for V&V and IT scenario in the area around where the scheme has been implemented. The journey time routes assumed can be found in Appendix D.

7.6.3. The infrastructure test highway schemes are introduced to improve the journey time for public transport service. In some cases, bus lanes, dedicated bus corridor and signal prioritisation are provided. Further discussion of these schemes is included in section 6.1.2 and Appendix C. In summary in the AM as a result of the introduction of the schemes, the highway journey time is affected:

- Ext1 and Ext 2, Ext 3 have a small increase in journey time ranging from an increase of -1%-3% this is because new bus priority has been included in the model however no highway capacity has been removed.
- Ext 6 the westbound journey time does not change as there are no changes to the highway capacity; in the eastbound direction the highway traffic now cannot use the direct link avoiding the roundabout and therefore there is a slight increase in the highway journey time
- Ext 7 shows that as a result of the signalisation and creation of the hamburger roundabouts all approaches experience an increase in delays with the exception of St Albans Road eastbound which experiences a reduction in delay.
- Ext 8 there are increases in delay on the A4147 in both directions with no change on the A414

7.6.4. In summary in the PM as a result of the introduction of the schemes:

- Ext1 and Ext 2, Ext 3 have a small increase in journey time ranging from an increase of ranging from -9 to 28 seconds this is because new bus priority has been included in the model however no highway capacity has been removed.
- Ext 6 the westbound journey time does not change as there are no changes to the highway capacity; in the eastbound direction the highway traffic now cannot use the direct link avoiding the roundabout and therefore there is a slight increase in the highway journey time

- Ext 7 shows that as a result of the signalisation and creation of the hamburger roundabouts all approaches of the Bennetts End Road Roundabout experience an increase in delays with the exception of St Albans Road eastbound. In terms of the Mayland Avenue Roundabout, the Breakspear Way and Maylands Avenue approaches experience a reduction in delay as a result of the changes
- Ext 8 there are increases in delay on the A4147 in both directions with very little change on the A414

Table 7-13: AM Peak Journey Times

Scheme	Description	Road	Direction	V&V	IT Sensitivity (with V&V Demand)	% Difference with V&V
Ext1, Ext2	Leighton Buzzard Road bus priority, Link Road bus priority bypass lane - approach to Leighton Buzzard Road roundabout	Link Road	SB	150	164	10%
Ext1, Ext2		Link Road	NB	97	97	0%
Ext3	Redbourn Road (north-south orientated section) bus priority	Redbourn Road	NB	53	55	4%
Ext3		Redbourn Road	SB	77	81	6%
Ext6	HERT route - Plough Roundabout-Jarman Park	St.Albans Road	EB	25	31	26%
Ext6		St.Albans Road	WB	29	29	0%
Ext 7	Hamburger layout with bus only section through centre of Bennets End Rbt	St.Albans Road	EB	100	95	-5%
Ext 7		St.Albans Road	WB	66	83	26%
Ext 7		Bennet's end road	NB	59	95	60%
Ext 7		White hart road	SB	88	113	28%
Ext 7	Hamburger layout with bus only section through centre of Maylands Ave roundabout	St.Albans Road	EB	82	65	-20%
Ext 7		Breakspear's Way	WB	71	88	25%
Ext 7		Leverstock Greenway	NB	53	99	88%
Ext 7		Mayland's avenue	SB	136	134	-1%
Ext 8	Provision of a dedicated route for HERT from the A4147 onto the A414 (former M10)	A4147 Hemel Hempstead Road	EB	469	538	15%
Ext 8		A4147 Hemel Hempstead Road	WB	336	343	2%
Ext 8		A414	NB	133	131	-2%
Ext 8		A414	SB	140	140	0%
Ext 11	B487 Hemel Hempstead Road - Hemel Hempstead Road Redbourn junction improvement	Redbourn Bypass	EB	140	290	107%
Ext 11		Redbourn Bypass	WB	137	174	27%
Ext 11		Hemel Hempstead road	NB	16	16	0%
Ext 11		Hemel Hempstead road	SB	193	114	-41%
Ext 18	A5183 Chequers Hill junction (Famsted) improvement	Chequer's hill	NB	37	82	120%
Ext 18		Chequer's hill	SB	25	25	1%
Ext 18		London Road	EB	136	149	10%
Ext 18		London Road	WB	121	162	34%

Table 7-14: PM Peak Journey Times

Scheme	Description	Road	Direction	V&V	IT Sensitivity (with V&V Demand)	% Difference with V&V
Ext1, Ext2	Leighton Buzzard Road bus priority, Link Road bus priority bypass lane - approach to Leighton Buzzard Road roundabout	Link Road	SB	121	135	12%
Ext1, Ext2		Link Road	NB	133	135	2%
Ext3	Redbourn Road (north-south orientated section) bus priority	Redbourn Road	NB	82	81	-1%
Ext3		Redbourn Road	SB	64	66	3%
Ext6	HERT route - Plough Roundabout-Jarman Park	St.Albans Road	EB	25	30	22%
Ext6		St.Albans Road	WB	30	30	0%
Ext 7	Hamburger layout with bus only section through centre of Bennets End Rbt	St.Albans Road	EB	56	97	74%
Ext 7		St.Albans Road	WB	69	96	39%
Ext 7		Bennet's end road	NB	84	97	15%
Ext 7		White hart road	SB	68	105	55%
Ext 7	Hamburger layout with bus only section through centre of Maylands Ave roundabout	St.Albans Road	EB	97	60	-38%
Ext 7		Breakspear's Way	WB	95	93	-3%
Ext 7		Leverstock Greenway	NB	50	108	118%
Ext 7		Mayland's avenue	SB	109	96	-12%
Ext 8	Provision of a dedicated route for HERT from the A4147 onto the A414 (former M10)	A4147 Hemel Hempstead Road	EB	357	379	6%
Ext 8		A4147 Hemel Hempstead Road	WB	328	335	2%
Ext 8		A414	NB	136	132	-3%
Ext 8		A414	SB	140	140	0%
Ext 11	B487 Hemel Hempstead Road - Hemel Hempstead Road Redbourn junction improvement	Redbourn Bypass	EB	133	270	104%
Ext 11		Redbourn Bypass	WB	141	171	22%
Ext 11		Hemel Hempstead road	NB	16	16	-1%
Ext 11		Hemel Hempstead road	SB	111	98	-11%
Ext 18	A5183 Chequers Hill junction (Famsted) improvement	Chequer's hill	NB	39	124	222%
Ext 18		Chequer's hill	SB	25	25	0%
Ext 18		London Road	EB	156	141	-10%
Ext 18		London Road	WB	184	193	5%

Public Transport Results

7.6.5. This section presents the public transport assignment model results comparing against Infrastructure Test against Option A.

7.6.6. For each user class for AM, IP and PM 3-hr period and at a 12hr level the Option A and Infrastructure Test public transport passenger trips have been compared, see Table 7-15 and Table 7-16.

7.6.7. The implementation of schemes, as outlined in Chapter 6, alongside mobility hub enhancements in Infrastructure Test, is resulting in a reduction in rail-only and bus-only trips compared to Option A as the new routes connect Hemel Hempstead station with the HGC development area and the model attracts BusRail submode trips coming to/from London, where the trip mainly occurs on rail and then bus is used access the HGC developments. Additionally, there is an increase in MRT mode trips, reflecting a shift in demand from both highway trips and rail and bus only trips, where passengers are utilising bus and newly introduced HERT MRT service as part of their journey.

Table 7-15: Option 0A and Infrastructure Test Passenger Numbers by Mode

Option 0A	**-**	**-**	**-**	**-**
User Class	AM	IP	PM	Total (12hr)
Rail	10,13,357	7,66,415	10,34,417	28,14,189
Bus	5,83,732	4,30,963	6,15,910	16,30,605
BusRail	18,462	16,361	17,405	52,228
MRT	-	-	-	-
Total	16,15,552	12,13,739	16,67,731	44,97,022
Infrastructure Test	**-**	**-**	**-**	**-**
User Class	AM	IP	PM	Total (12hr)
Rail	10,13,258	7,65,585	10,34,226	28,13,070
Bus	5,82,844	4,30,622	6,15,048	16,28,514
BusRail	22,900	21,246	22,261	66,407
MRT	2,002	2,746	2,147	6,895
Total	16,21,004	12,20,199	16,73,682	45,14,886

Table 7-16: 12 Hour Differences between Option 0A and Infrastructure Test

User Class	Option A	Infrastructure Test	Difference	% Diff
Rail	28,14,189	28,13,070	-1,119	0.0%
Bus	16,30,605	16,28,514	-2,091	-0.1%
BusRail	52,228	66,407	14,179	27.1%
MRT	-	6,895	6,895	-
Total PT	44,97,022	45,14,886	17,864	0.4%
Total Highway	20,231,167	20,238,935	7,768	0.04%
Total Trips	24,728,189	24,753,821	25,632	0.1%

7.6.8. Despite infrastructure improvements, highway trips remain significantly higher than public transport trips, with over 4.5 times as many trips made by car as by public transport in both scenarios, this is also down to the vehicle trips generated by the local development and additional highway infrastructure such as M1 Junction 8 changes. Table 7-17 represents a persistent mode share imbalance:

Table 7-17: Mode Share (12-Hr Period)

Scenario	PT Share (%)	Highway Share (%)
Option A	18.2%	81.8%
Infrastructure Test	18.2%	81.8%

7.6.9. Despite the introduction of the MRT and improvements to intermodal integration, the mode share for public transport remains static at 18.2% for the whole model, suggesting that current interventions—while improving connectivity and promoting multimodal use—are not yet sufficient to cause a meaningful shift in mode share from highway to public transport.

7.6.10. Flow difference plots between Option 0A and Infrastructure Test for the AM and PM peak periods are illustrated in Figure 7-18 and Figure 7-19 respectively. The red segments in the figures indicate an increase in trips under the Infrastructure Test scenario compared to Option A, while the green segments indicate a decrease.

7.6.11. Rail trips are increasing from Hemel Hempstead towards London in AM peak (426 trips). Transit volume on the reverse direction is also increasing by 422 trips.

7.6.12. A similar trend is observed at St. Albans City station, where transit volume is increasing in both directions to and from London.

7.6.13. There has been an increase in bus trips to and from Hemel Hempstead station, primarily due to increase in trips from proposed employment zones between A414 Breakspear Way and Punch Bowl Lane where the HGC development sites exist. Additionally, there has been an increase in bus trips to and from St. Albans City station. The introduction of the

HERT service has led to an increase in MRT trips between Hemel Hempstead and St. Albans City station.

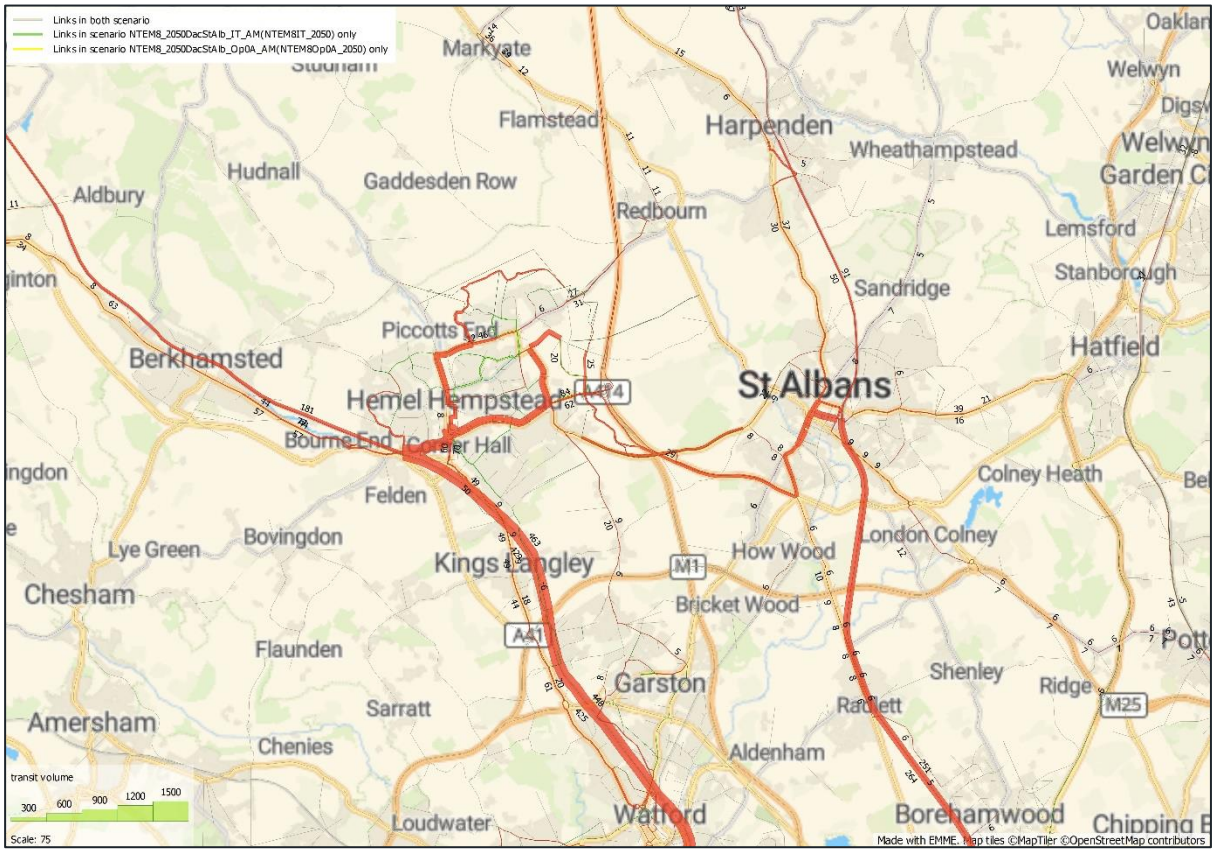


Figure 7-18: AM Peak Public Transport Flow Differences IT vs Option 0A

7.6.14. A similar trend is observed in PM peak too with rail trip from Hemel Hempstead to London increasing by 346 trips and 429 trips on the reverse direction. St Albans City station is also witnessing increase in rail trips like AM peak period.

7.6.15. Bus trips to and from Hemel Hempstead station are increasing in PM peak with the reverse trend of AM peak. As in AM peak, bus trips to and from St. Albans City station is also increasing in PM peak.

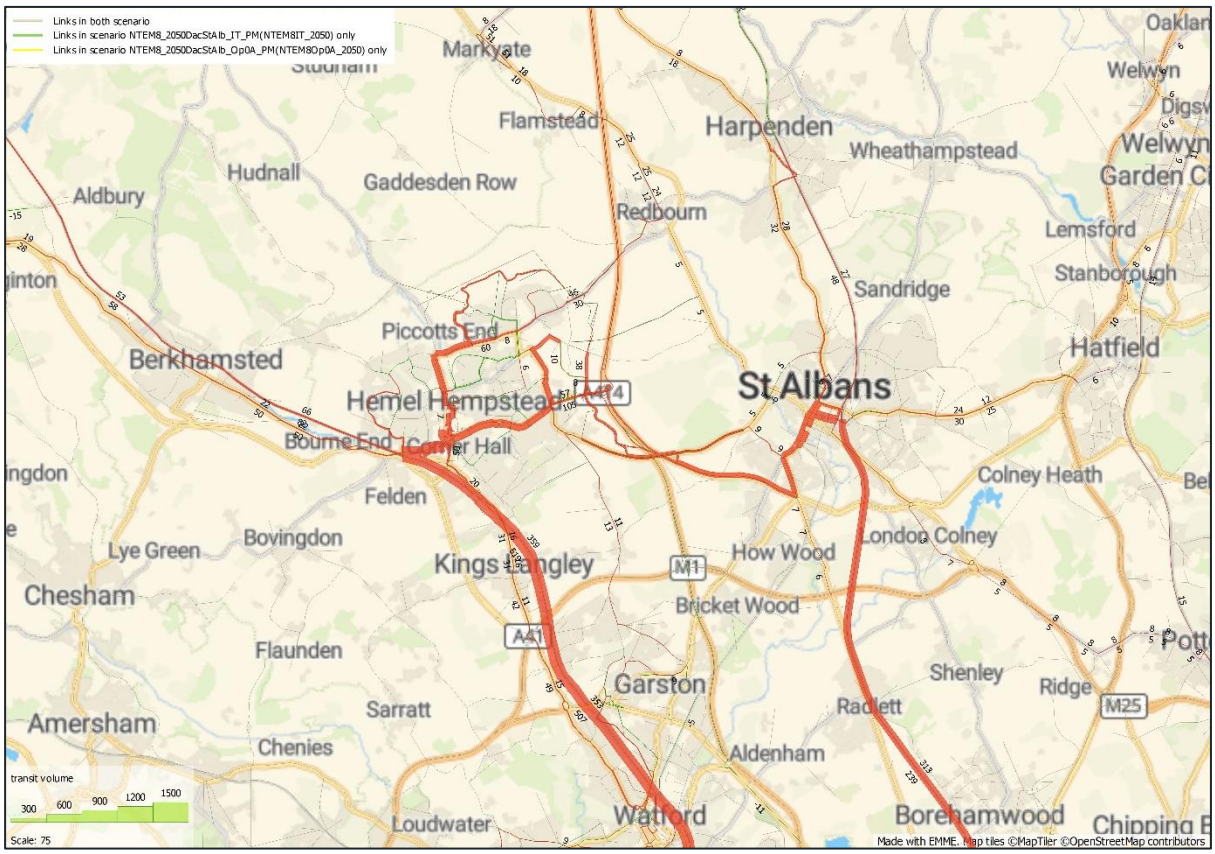


Figure 7-19: PM Peak Public Transport Flow Differences IT vs Option 0A

Orbital Route (Infrastructure Test Only)

7.6.16. An orbital bus route has been introduced to improve connectivity between Hemel Hempstead Station and the proposed MU6 development site (part of the Hemel Garden Communities scheme). This service is structured into two sections:

- Section 1 operates from Hemel Hempstead Station to the MU3 site (H1 – North Hemel Hempstead development site).
- Section 2 continues from MU3 to MU6, a proposed mixed-use hub further north.

7.6.17. Transit volume and Boarding/Alighting for the orbital routes for AM and PM peak are illustrated in Figure 7-18 and Figure 7-21 respectively.

7.6.18. During the AM peak:

- Hemel Hempstead Station records 109 boardings and 198 alightings.
- A significant boarding volume (136 passengers) is observed at the stop on the A414 Breakspear Way.

7.6.19. The first section of the route (Hemel Hempstead Station to MU3) carries a total of 111 passengers, with 204 boardings in the reverse direction.

7.6.20. The second section (MU3 to MU6) attracts 27 boardings in the outbound direction and 139 boardings in the inbound direction, with the majority of activity concentrated between Breakspear Way and Hogg End Lane. This suggests strong demand for services serving the proposed employment zones in this corridor.

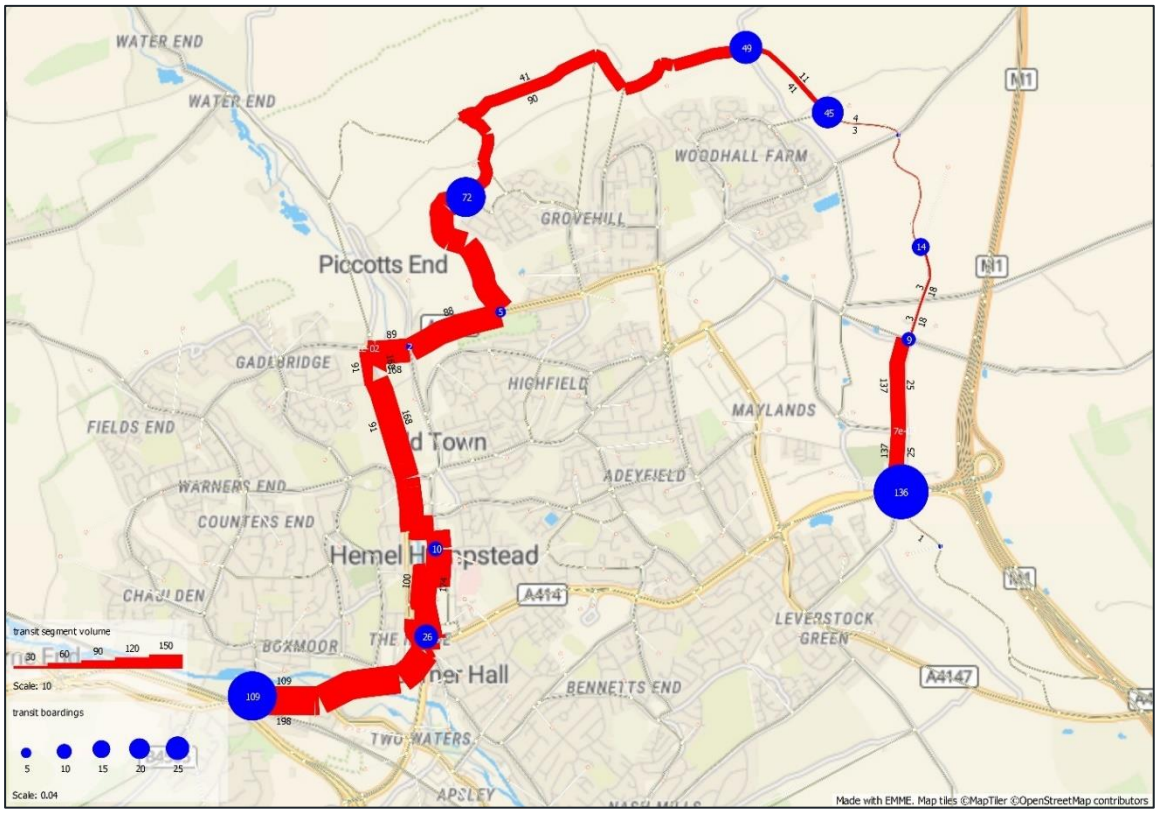


Figure 7-18: AM Peak Period Orbital Route Patronage

7.6.21. In the PM peak, demand trends reverse:

- Hemel Hempstead Station witnesses 187 boardings and 98 alightings.
- Hogg End Lane emerges as a key node with 189 boardings.

7.6.22. The first section (Hemel Hempstead Station to MU3) sees 191 boardings, compared to 111 in the opposite direction.

7.6.23. The second section (MU3 to MU6) carries 197 boardings, while the reverse direction records 40 boardings. Again, the majority of demand is concentrated between Breakspear Way and Hogg End Lane.

Figure 7-21: PM Peak Period Orbital Route Patronage

HERT Route (Infrastructure Test Only)

7.6.24. The HERT route runs between Hemel Hempstead station and London Colney Roundabout. Transit volume and Boarding/Alighting for the orbital routes for AM and PM peak are illustrated in Figure 7-19 and Figure 7-23 respectively.

7.6.25. During the AM peak:

- The highest boardings occur at St Albans City Station, with 85 passengers boarding.
- Other notable boarding points include St Albans Abbey Station, A414 Breakspear Way, and Hemel Hempstead Riverside.

7.6.26. The total observed eastbound ridership from Hemel Hempstead to London Colney Roundabout is 110 passengers, while the westbound direction (towards Hemel Hempstead) records a higher total of 142 boardings, indicating significant inbound demand into Hemel Hempstead during the AM peak period.

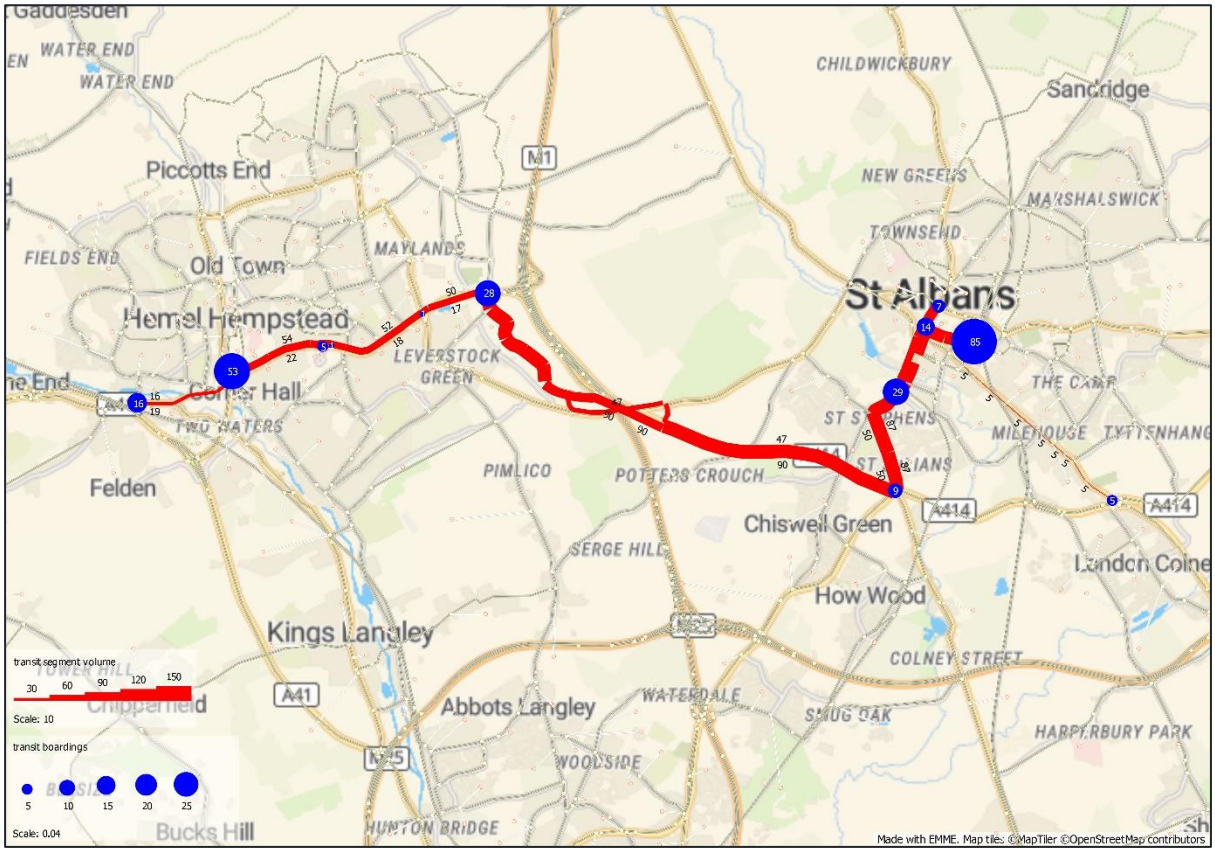


Figure 7-19: AM Peak Period HERT Route Patronage

7.6.27. In the PM peak, a similar pattern to the AM is observed; however, the peak boarding location shifts from St Albans City Station to A414 Breakspear Way, reflecting the influence of return commuter flows and evening demand from nearby employment centres.

- The eastbound (outbound) HERT route records 180 passengers, a notable increase compared to the morning.
- The westbound (inbound) direction records 155 trips, marginally lower than the outbound direction but still indicative of balanced bi-directional demand.

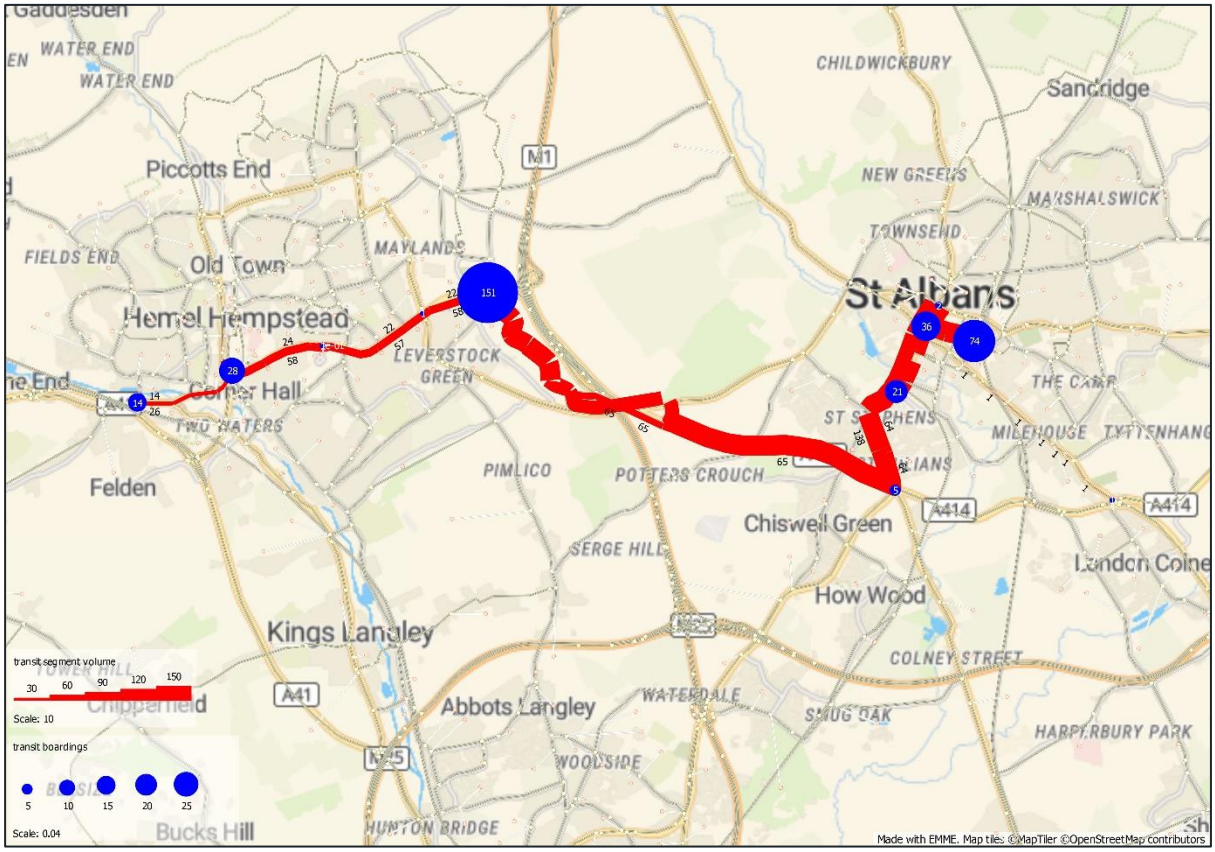


Figure 7-23: PM Peak Period HERT Route Patronage

7.6.28. Total boardings for HERT and Orbital routes are provided in Table 7-18.

Table 7-18:Total Boardings for HERT and Orbital Routes

Line Name	Description	Total Boardings	-
		AM Peak Period	PM Peak Period
HERT_1	Hemel Hempstead - Colney Roundabout	110	180
HERT_2	Colney Roundabout - Hemel Hempstead	142	155
OGC1_1	Hemel Hempstead Station - MU3 Site	111	191
OGC1_2	MU3 Site - Hemel Hempstead Station	204	104
OGC2_1	MU3 Site - MU6 Site	27	197
OGC2_2	MU6 Site - MU3 Site	139	40

7.6.29. It is important to note that the public transport usage presented reflects the public transport demand forecast by the Demand Model which is likely to be generating a lower public trip rate by dwelling compared to that predicted by the Hemel Garden Community developer. A further assessment which uplifts the public transport demand inline with the HGC trip generation report could be undertaken to fully understand the potential usage of the proposals if the mode share is achieved as predicted by the developer.

8 Conclusions

8.1 Overview

8.1.1. WSP were commissioned by Hertfordshire County Council (HCC) on behalf of Dacorum Borough Council (DBC) and St Albans District Council (SADC) to undertake transport modelling work to assess the combined impact of DBC's and SADC's Local Plan proposals and the HGC growth after the Local Plan period, between 2041 and 2050. The proposed infrastructure improvements to accommodate this growth have also been assessed. This report provides the impacts of the combined Local Plan and HGC growth on the highway network, and the impact of the proposed infrastructure improvements.

8.2 Findings

8.2.1. This report has presented the results of three 2050 future year scenarios:

- **2050 Option 0A** - with committed developments to 2041 (as per option 0A of the joint run) plus additional Tempro Growth to 2050 across the county
- **2050 Vision & Validate** - which includes local plan growth to 2041 in St Albans and Dacorum with associated infrastructure (as per Option 4b of the joint run), plus the additional HGC growth areas coming forward between 2041 and 2050.
- **2050 Infrastructure Test** - as the 2050 Vision & Validate plus
    - Additional infrastructure identified from AECOM phase 2 study
    - Coding of the Sustainable Transport Corridor in North Hemel (along with associated bus services)
    - Basic assumptions around HERT – i.e. high frequency PT route running along A414 corridor between Hemel Hempstead station and a mobility hub in East Hemel with intermediate stop near the Plough Roundabout and assumption of priority measures – assumptions to be provided by HCC HERT team.

8.2.2. The main findings from the modelling shows that for:

- **V&V vs Option 0A**: There is an increase of 1-4% in overall vehicle trips and increase in vehicle travel times (6% in AM and 5% in PM) due to impacts of Local Plan allocations and infrastructure schemes.

8.2.3. As a result of the increase in vehicles in the V&V scenario there is increased delay on the highway network including Redbourn Road, Leighton Buzzard Road, and M1 Junction 8. There is also increased traffic in the V&V scenario, on key roads such as A414, Boundary Way, and Maylands Avenue. However, decreases in traffic are observed on Redbourn Road and Leighton Buzzard Road due to congestion as a result of the increase in dwellings at the North Hemel Garden Communities site.

8.2.4. Detailed analysis of nine key junctions around M1 Junction 8 indicate that within the Vision & Validate scenario there are generally increased traffic flows and delays at these junctions.

Overall there are increases in journey times on the routes identified between Option 0a and the Vision and Validate scenario. Where the journey times reduce this is a result of an infrastructure scheme such as the A414/ Green Lane junction improvement.

8.2.5. As with the 2041 Combined St Albans and Dacorum Option 4b Sensitivity test[6], the results show that with two lanes on the circulatory carriageway of the proposed M1 Junction 8 layout, it can accommodate the 2050 growth in the Vision & Validate scenario.

8.2.6. The infrastructure test results focus on the additional schemes coded into the highway and public transport models. The introduction of these schemes results in changes to the highway journey times, with some increases and decreases depending on the scheme and impacts on highway capacity. With the introduction of the proposed public transport schemes there is increase public transport usage, however the patronage on services is relatively low as a result of the trip generation predicted by the COMET demand model.

[6] St Albans and Dacorum Combined Local Plan COMET Forecasting Report_FINAL_Accessible_09.05.2025

Appendix A

Dacorum IDP Schemes in Hemel Hempstead

ID	Name	Description
LS-16	Plough Roundabout Link Break	Converting a section of the Plough Roundabout to Bus Only, e.g. Seldon Hill-St Albans Road section only, in either or both clockwise and anticlockwise directions. This improvement would eventually facilitate the HERT system.
LS-17	A414 St Albans Road (town centre approach) bus priority	Bus priority lane on the A414 westbound approaching the Plough Roundabout including bus gate signals to enable buses to move from the nearside to the offside lane. Assume that general traffic speed is reduced to a single lane.
LS-18	Bus Only Traffic Filter - Adeyfield area	Introduction of a Bus Only traffic filter (in a single direction or both directions) in the Adeyfield area, for the purpose of preventing through traffic. Could be in operation throughout the day, or at peak times only. It could benefit Bus Routes 1, 20, 302 and/or 320 depending on its eventual location.
LS-19	Bus Only Traffic Filter - Station Road	A Bus Only traffic filter (in both directions) on A4146 Station Road, east of St John's Road, to prevent through traffic. Could be in operation throughout the day, or at peak times only. It would benefit Bus Routes 1, 2, 4, 20, 302, 352, 501, ML1 and X5.
LS-38	A414 Dual Carriageway gap closure - Rant Meadow	Closure of the central reservation gap to right turning traffic - traffic will be diverted to the next roundabout or an alternative route
LS-41	Buncefield Lane Quietway	Quietway, indicated by signs and some physical measures at entry points, on Buncefield Lane between Boundary Way to Three Cherry Trees Lane.
LS-42	Cherry Tree Lane Quietway	Quietway, indicated by signs and some physical measures at entry points, on Cherry Tree Lane between Three Cherry Trees Lane to Redbourn Road.
LS-43	Punchbowl Lane Quietway	Quietway, indicated by signs and some physical measures at entry points, on Punchbowl Lane. The section of the lane west of the M1 will be subsumed within East Hemel Hempstead

ID	Name	Description
		development and may therefore be subject to alteration.
LS-44	Hogg End Lane Quietway	Quietway, indicated by signs and some physical measures at entry points, on Hog End Lane. The section of the lane west of the M1 will be subsumed within East Hemel Hempstead development and may therefore be subject to alteration.
LS-45	Green Lane Quietway	Quietway, indicated by signs and some physical measures at entry points, on Green Lane between Breakspear Park office complex access and junction with Westwick Row. The section of Green Lane adjacent to Breakspear Park may be subject to alteration resulting from the East Hemel Hempstead development and changes to the A414 Phoenix Gateway Roundabout
LS-46	Bunkers Lane Quietway	Quietway, indicated by signs and some physical measures at entry points, on Bunkers Lane between Longdean Park and Bedmond Road.
LS-48	Berkhamsted Road Gateway Corridor	Alterations to Berkhamsted Road adjacent to the proposed Poleshanger Lane development which will include a vehicular access onto this road. Comprising a reduction in the speed limit from National Speed limit to 30 or 40mph between the access to Boxted Farm and the existing settlement boundary.
LS-54	A4147 Hemel Hempstead Road Gateway Corridor	Alterations to the A4147 Hemel Hempstead Road between the existing settlement boundary and the junction with Beechtree Lane and Appspond Lane (between M1 and A414), comprising: 1) speed limit changes 30mph along most of the length, with a buffer 40mph section at the eastern most end up to Beechtree Lane and Appsond Lane; 2) provision of upgraded shared use pedestrian and cycle route along the full length (northern side of the road); 3 crossings including 1 signal-controlled pedestrian/cycle crossing (for access to proposed secondary school on southern side)

ID	Name	Description
		and a crossing to link with the Blackwater Lane Green Loop; raised M1 bridge parapet (northern side) to facilitate cycling. Upgrades may be influenced by where proposed vehicle accesses will be created into the East Hemel Hempstead development site and school entrance.
LS-61	B487 Hemel Hempstead Road Gateway Corridor	Alterations to the B487 Hemel Hempstead Road between the existing settlement boundary and the M1 overbridge, comprising: 1) speed limit changes 30mph along the frontage of the proposed East Hemel Hempstead development, with a buffer 40mph section at the eastern; 2) provision of new cycle and pedestrian route on at least one side of the road to link with existing footway provision west of Cherry Tree Lane; 3) at least 1 controlled pedestrian/cycle crossing (to connect sections of the East Hemel Hempstead development on either side; 4) alteration to the B487-Cherry Tree Lane-Holtsmere Lane junction in line with the Quietway treatments proposed to the two lanes (including signage and kerbed build outs to discourage through traffic); 5) upgraded bus stops. It is anticipated there will be at least one junction serving access to the proposed East Hemel Hempstead development on either side.
LS-64	B440 Leighton Buzzard Road Gateway Corridor	Alterations to the B440 Leighton Buzzard Road in conjunction with the North Hemel Hempstead proposed development (which could potentially provide a vehicle access onto this road). Measures include reducing the current 50mph section to 40mph (matching the 40mph section to the north); reducing the current 60mph section leading out of Hemel Hempstead to 40mph; installing a signal-controlled Toucan crossing adjacent to Public Footpath 'Hemel Hempstead 013'); provision LTN standard cycle and footway (replacing the existing narrow footway) on the western side of the road (approx 680m): provision of signal-controlled crossing on Galley Hill at southern end of corridor, east of the B440-A4147 roundabout.

ID	Name	Description
LS-70	A414 Maylands Avenue - Green Lane bus priority lanes	Maylands Avenue to Green Lane - eastbound and westbound bus lanes (approx.335m in length) with signal-controlled bus gate at the terminating end. No reduction in general carriageway space
LS-71	A414 Maylands Avenue Roundabout Signalisation	Partial signalisation of Maylands Avenue roundabout - northern and eastern arms and opposing circulatories. Removal of left-turn bypass lane from north to east. Provide two lane exit onto A414 eastbound with widened central reserve to create more stacking space on southbound circulatory.
LS-72	A414 Rant Meadow to Bennetts End Road bus priority lane	Westbound only bus lane between Rant Meadow and Bennetts End Road roundabout with signal controlled bus gate. No reduction in general carriageway space
SG2-2	20mph speed limit zone including Fishery Road	(SG2-2) Investigate the introduction of a 20 mph speed limit zone in this area, including Fishery Road, Kingsland Road and Horsecroft Road
SG5-4	A4251-A4146 Junction Reconfiguration including provision for cyclists and buses	(SG5-4) Major junction improvement - convert to signal controlled crossroads with cycle priority at A4251/A4146 including advance stop lines or bicycle boxes. Include hurry call detection for buses travelling between London Road (west) and Station Road.
SG6-6	20mph speed limit on London Road	(SG6-6) Introduce 20mph speed limit between Featherbed Lane and Weymouth Street
SG11-3	20mph zone covering roads including Woolmer Drive, Green Lane, Mickleford Road and Datchworth Turn	(SG11-3) 20mph zone covering all roads leading off the A4147 and as far south as Green Lane up to and including junction with Kingcup Avenue (3 external entry points). Assume provision of additional traffic calming features to help ensure compliance with speed limit, c. x20 pairs of speed cushions
SG14-2	Redbourn Road-Three Cherry Trees Junction Enhancement	(SG14-2) Redbourne Road-Three Cherry Trees Lane-Shelby Road Junction Enhancement - signalisation scheme incorporating controlled crossings for pedestrians on all sides

ID	Name	Description
SG15-1	Maylands Avenue Segregated Cycle Corridor	(SG15-1) Provision of a high quality, segregated cycle route along the full length between the A414 Breakspear Way and A4147 Swallowdale Lane (eastern side of the road). Expected to comprise widening of the existing shared-use path to meet standards including replacing areas of grass verge and localised reduction in carriageway space (e.g. removal of additional lanes at some junctions (access to Aldi/Nuffield Health/McDonalds; junction with Wood Lane End). Assume cyclist priority on some side arms (Eaton Road; Maxted Road; x3 accesses to Hosking Court). Also provision of a Toucan crossing at location of existing uncontrolled crossing with refuge islands just north of the Travelodge vehicle access). Include upgrade to the existing shared use route between the A414 at-grade signal crossing to the proposed Toucan crossing on Maylands Avenue. Also provide additional signal-controlled crossing points on Maylands Avenue in the vicinity of Dixons Turn and Eaton Road
SG25-1	Marlowes 20mph zone	(SG25-1) Consider 20mph on entire length of the segment
SG25-2	Hillfield Road-Marlowes junctions reconfiguration	(SG25-2) Convert King Harry Street-Hillfield Road junction to a conventional T-junction. Reduce the Hillfield Road approach to Marlowes to a Single lane, widen the footway adjacent to the crossing.
SG25-3	Marlows carriageway reconfiguration - Hillfield Road-Combe Street	(SG25-3) a) Remove the landscaped central reservation on Marlowes between Hillfield Road and Combe Street. b) Reduce the northbound carriageway to a single lane and widen the footway on western side. c) Install an additional controlled crossing adjacent to the Wetherspoon public house, on a raised speed table.
SG25-4	Marlows carriageway reconfiguration - Combe Street-Midland Road	(SG25-4) a) Remove landscaped central reservation on Marlowes between Combe Street and Midland Road and widen the footway on eastern side. Reduce the southbound carriageway to a single lane. b) Install an

ID	Name	Description
		additional controlled crossing adjacent to the library, on a raised speed table.

Appendix B

St Albans IDP Schemes in Hemel Hempstead

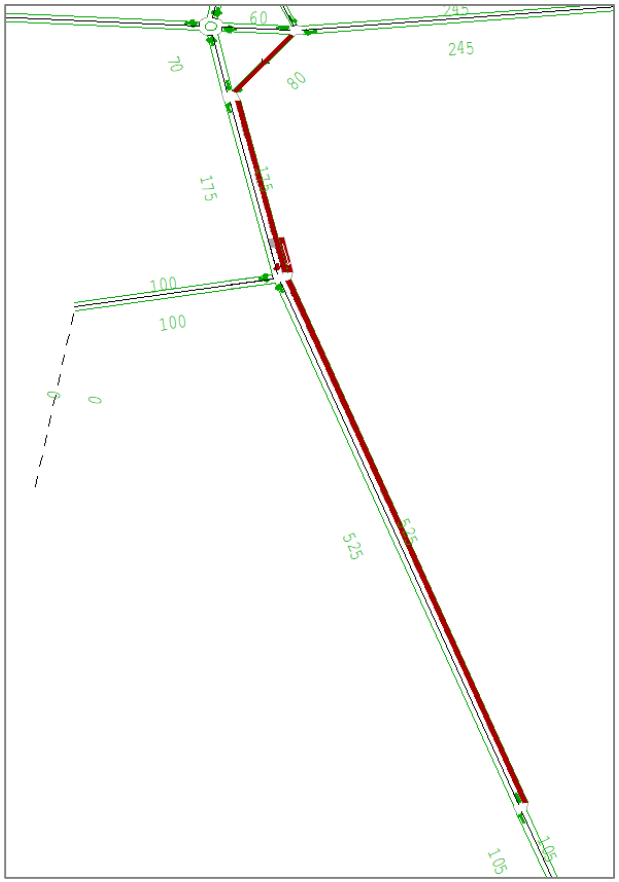
No.	HCC Ref	Name
	Highway Schemes	-
1	-	East Hemel - A414 Breakspear Way/Green Lane junction improvement – Introduction of signal junctions to replace existing roundabout
2	-	East Hemel - Closure/restriction of Punchbowl Lane
3	-	East Hemel - Closure/restriction of Hogg End Lane
-	**Public Transport Schemes**	-
1	-	High frequency bus corridor along A414

Appendix C

Infrastructure Test Highway Improvements

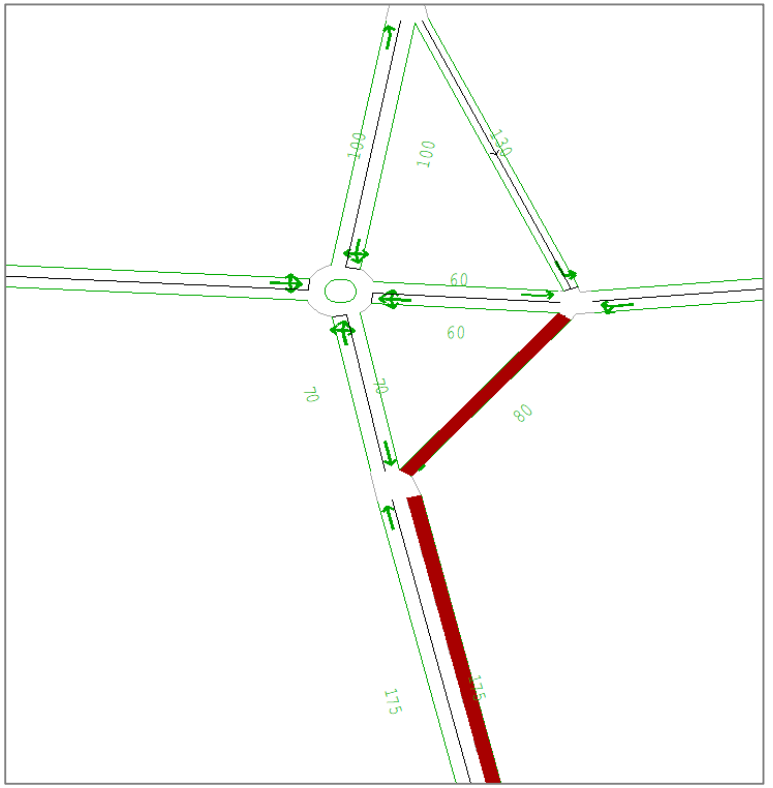
EXT-1 Leighton Buzzard Road bus priority

- Added a new bus priority lane in the southbound direction on Leighton Buzzard Road between south of Link Road and north of Queensway junctions.
- No reduction of existing road space



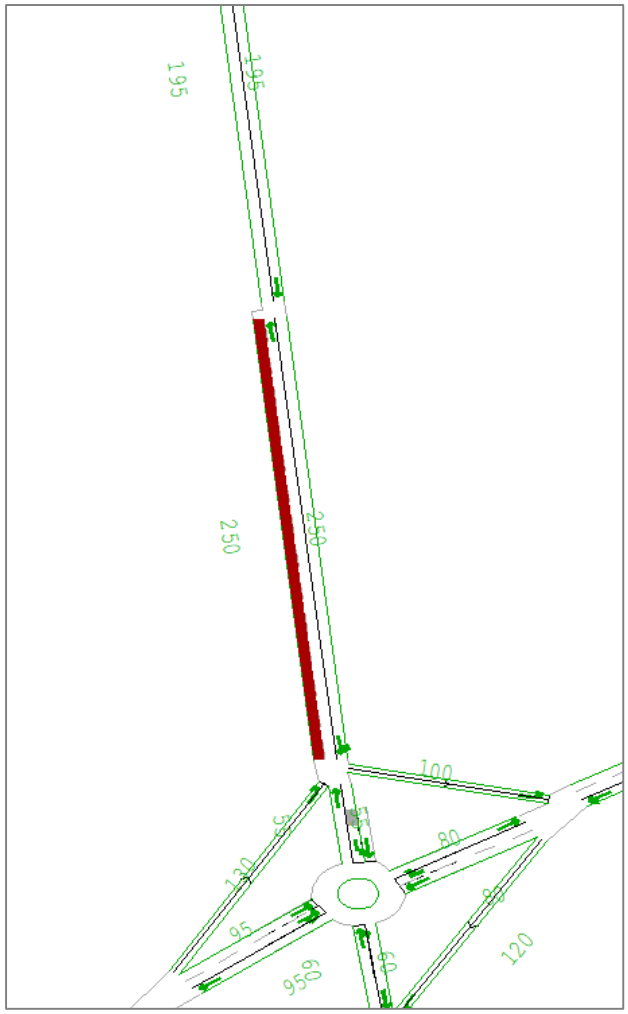
EXT-2 Link Road bus priority bypass lane - approach to Leighton Buzzard Road roundabout

- Added bus bypass link at Link Road / Galley Hill roundabout joining to bus lane in EXT-1.



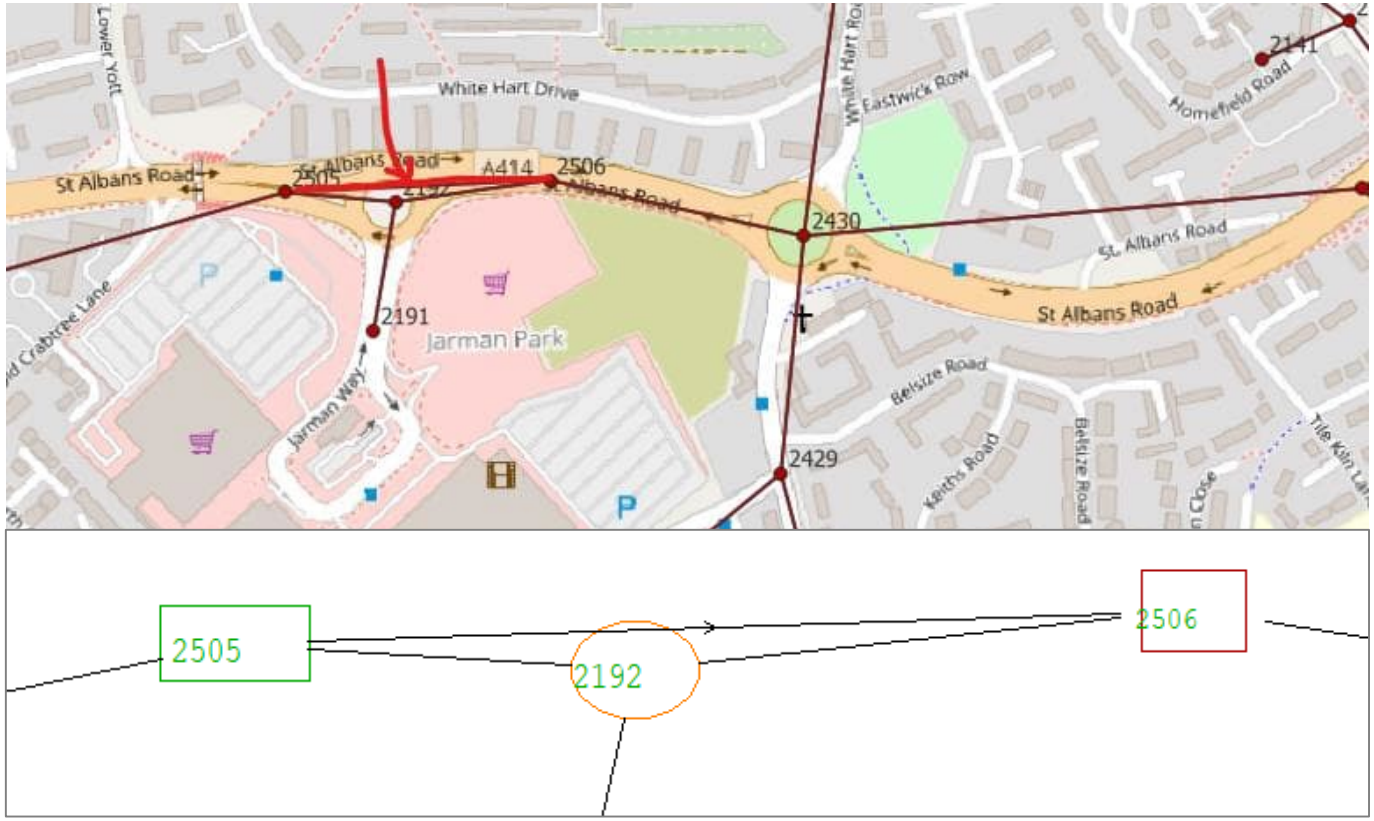
EXT-3 Redbourn Road (north-south orientated section) bus priority

- Added a new bus priority lane (northbound only) on Redbourn Road between the junctions with Link Road and Queensway/Swallowdale Lane
- No reduction of existing road space



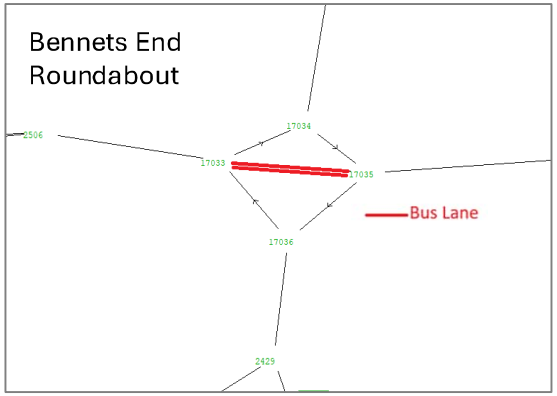
EXT-6 HERT route - Plough Roundabout-Jarman Park

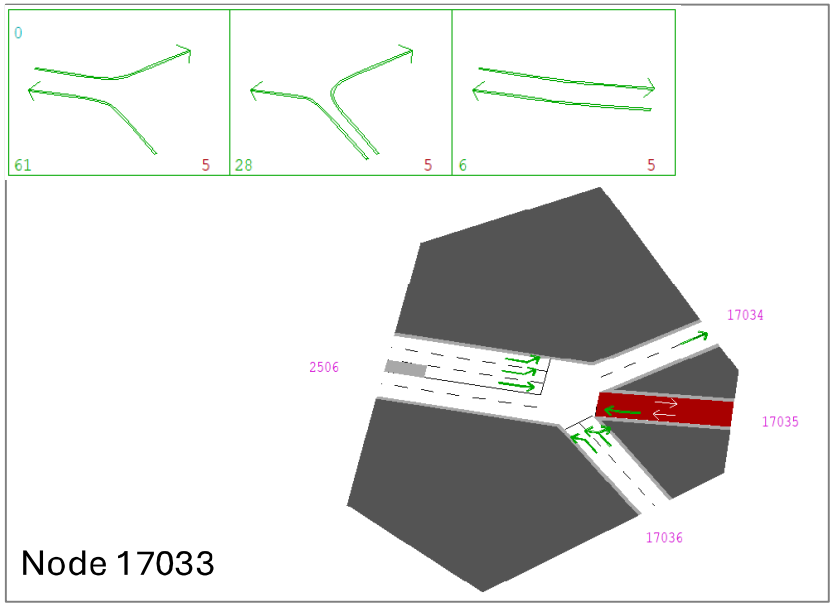
- Current EB segregated lane at Northern part of Jarman Park junction changed to bus only.
- Include bus only turn at 2506

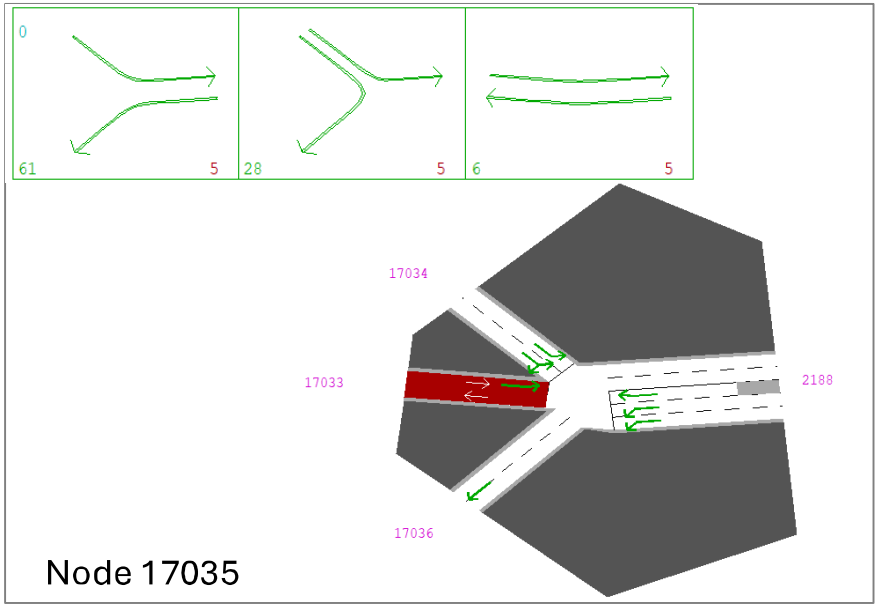


EXT-7 Hamburger layout with bus only section through centre of Bennets End Rbt and Maylands Ave roundabout

- Signalised Bennets End rbt to allow bus lane in the middle.
- Convert roundabout to exploded roundabout, node 17033 and 17035 convert to signal node, node 17034 and 17036 to priority nodes
- Signals use 120s cycle, third stage as bus only phase to avoid conflict with roundabout traffic, possible to include bus phase 3 in stage 1 to reduce impacts on general traffic.
- Bus stage assume 6s G + 5s IG, which may be overprovision due to HERT frequency unlikely to arrive stopline at every cycle

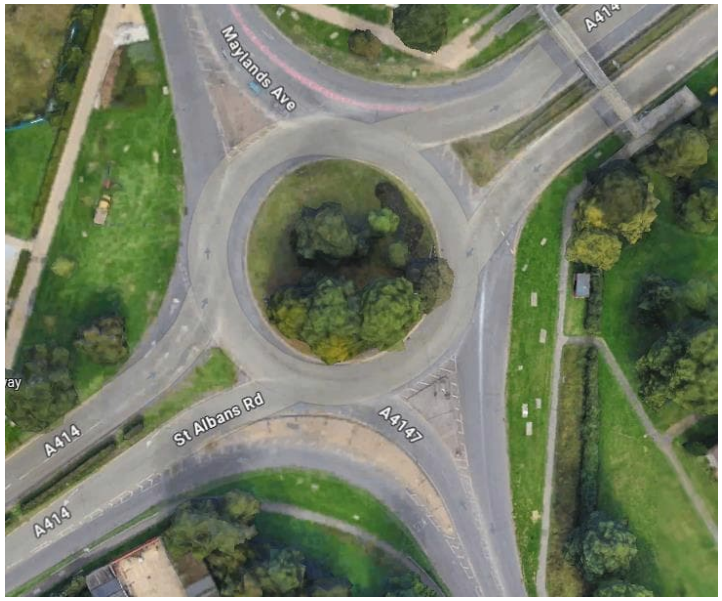


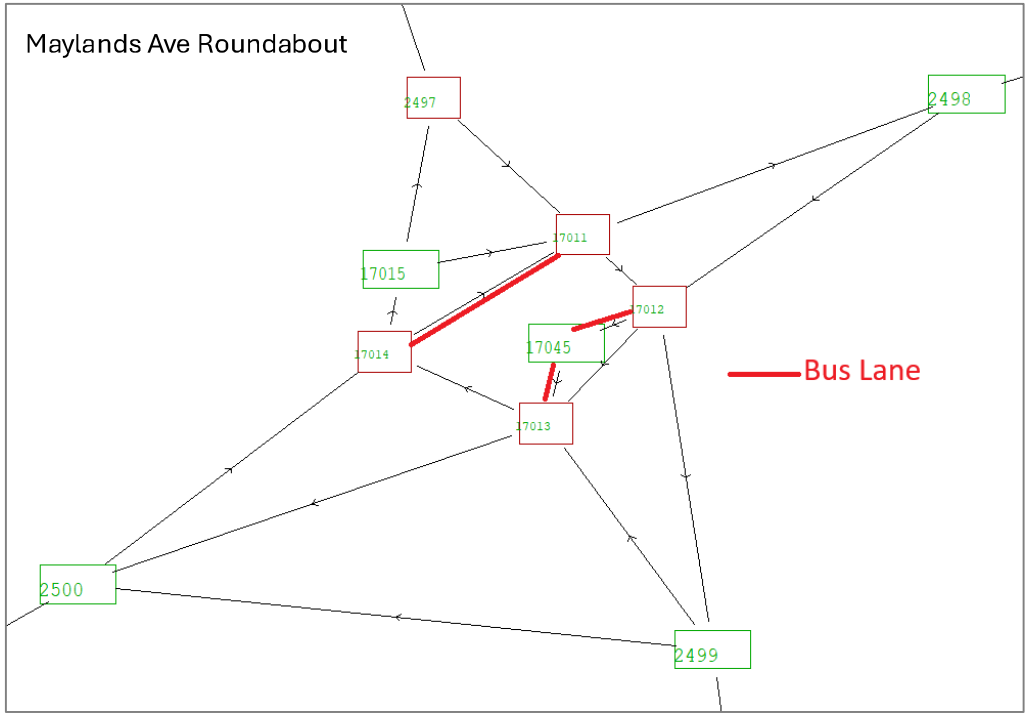




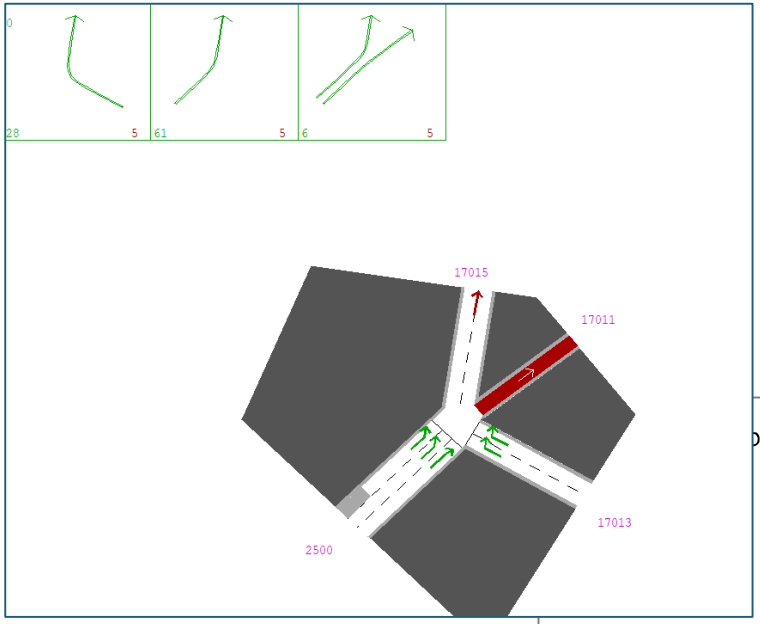
EXT-7 Hamburger layout with bus only section through centre of Bennets End Rbt and Maylands Ave roundabout

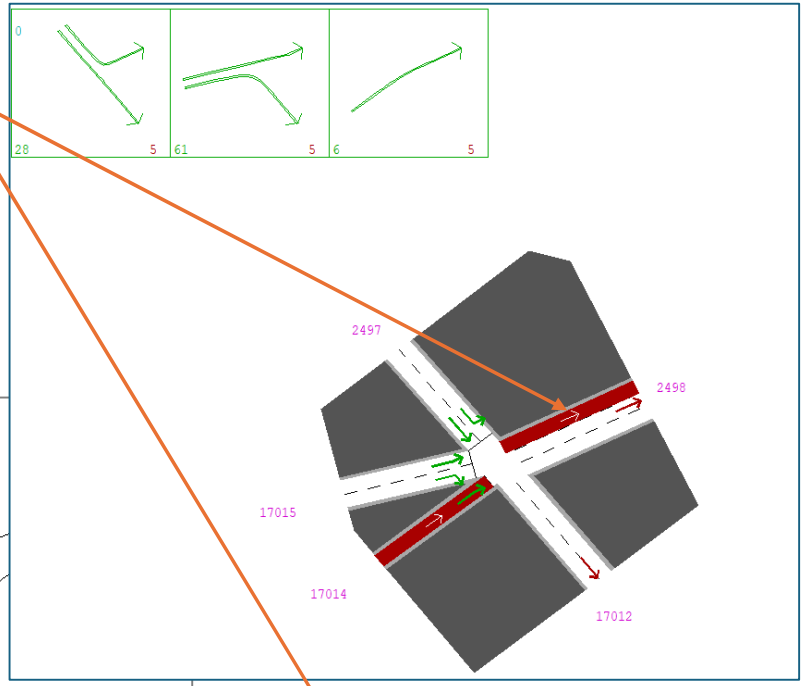
- Signalised Bennets End roundabout and Maylands avenue roundabout to allow bus lane in the middle.
- 17011 and 17012 were signalised and north to east bypass lane removed in Option 4b, 17013 and 17014 become signals to allow bus only stage
- Add two dedicate bus lane for bus in centre of roundabout
- Assume bus phase at stage 3 at all four signal nodes

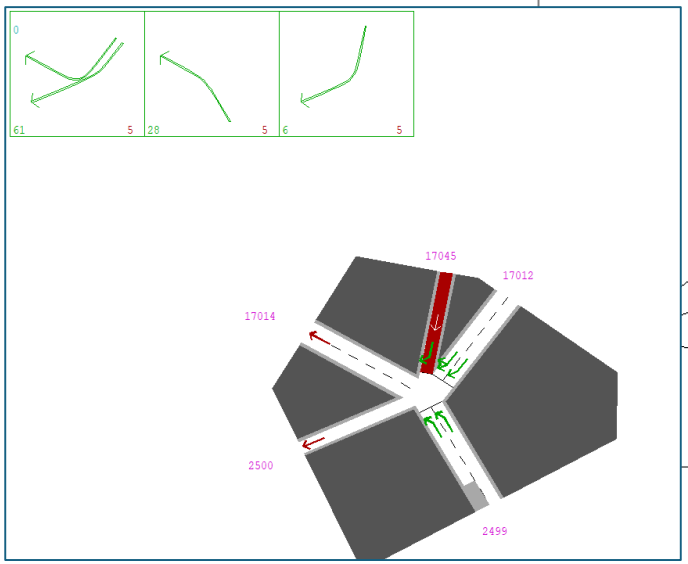


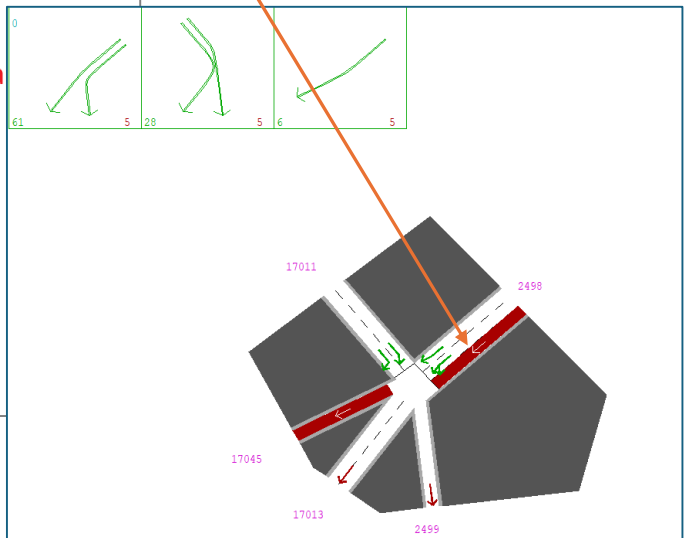


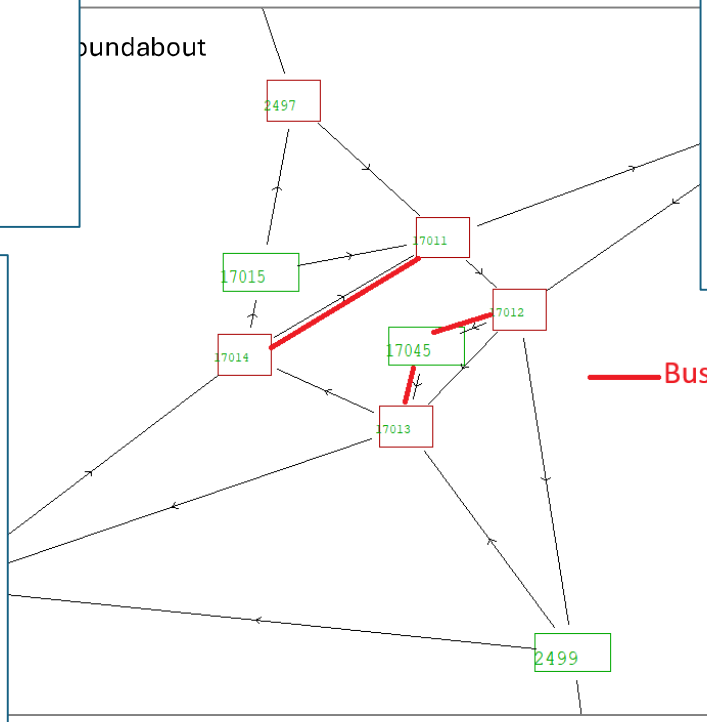
IDP bus lane scheme in 2041 4a and 4b, assume no change of bus lane position, ie. Separate bus stage is required to cross junction.





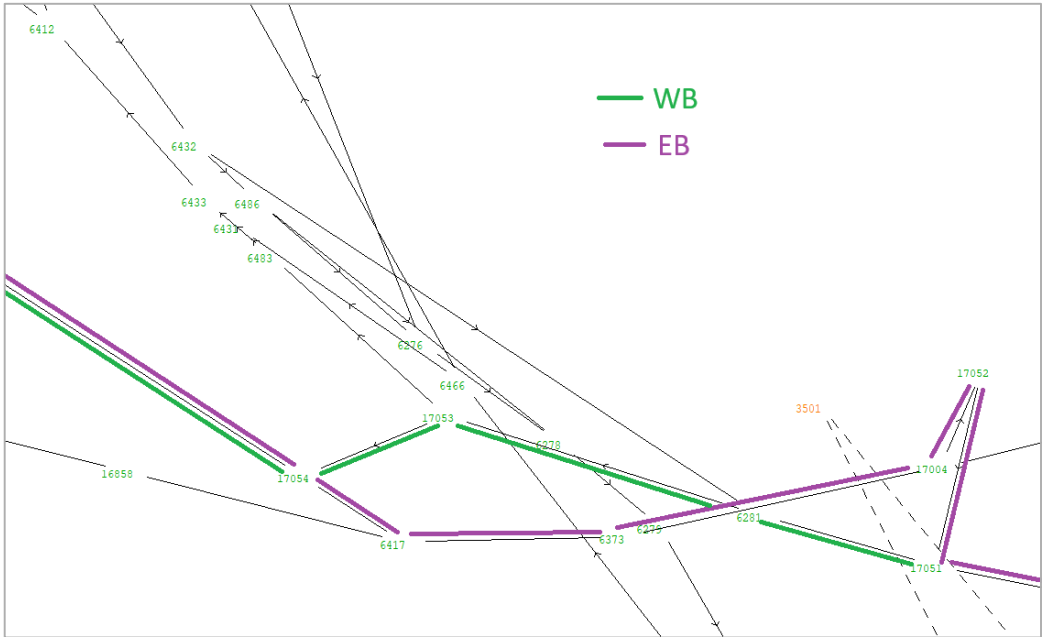






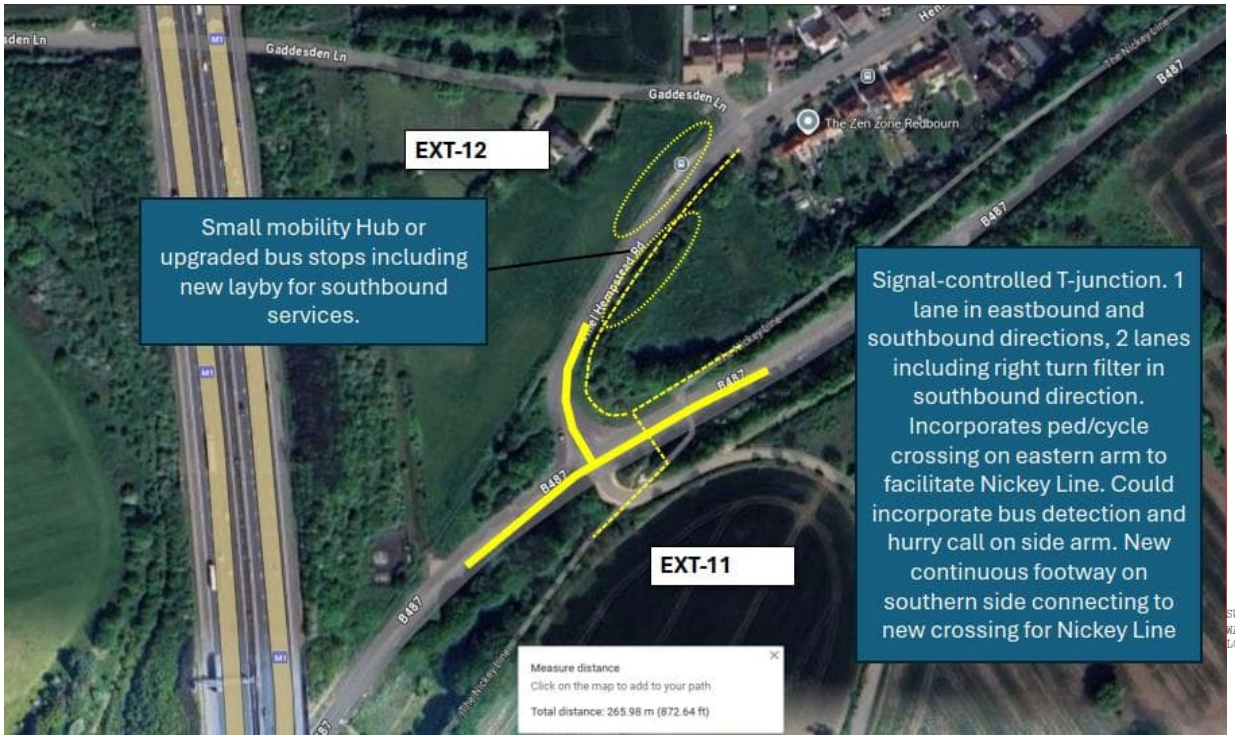
EXT-8 Provision of a dedicated route for HERT from the A4147 onto the A414 (former M10)

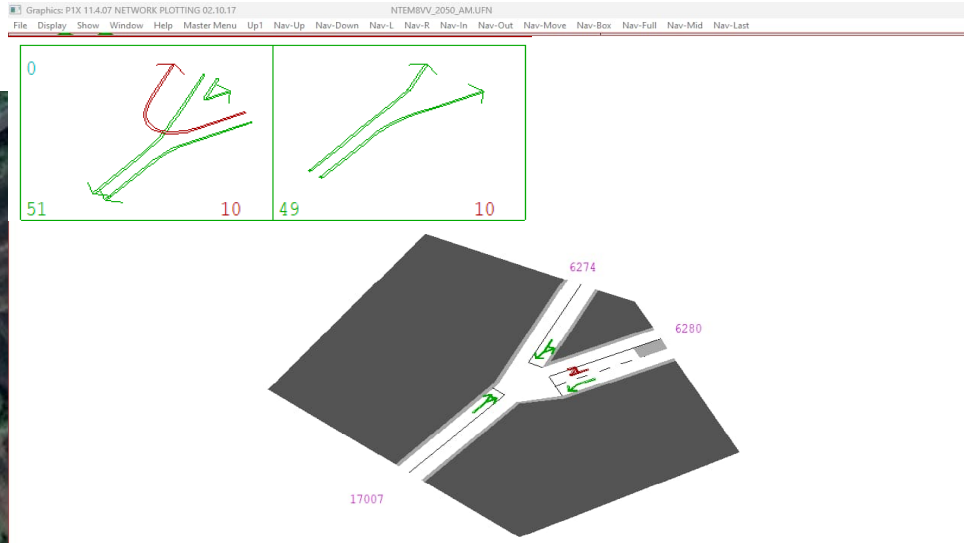
- EB buses enter onto A4147 Hemel Hempstead Road at Southern end of spine road then get onto A414 (former M10) via a short link with unsignalized on slip.
- WB buses continue along A414 (old M10) to where it becomes a parallel slip with the M1 - and are connected with the East Hemel South Spine Road via a short bus only WB off slip.



EXT-11 B487 Hemel Hempstead Road - Hemel Hempstead Road Redbourn junction improvement

- Changed B487/Hemel Hempstead Road junction to signal



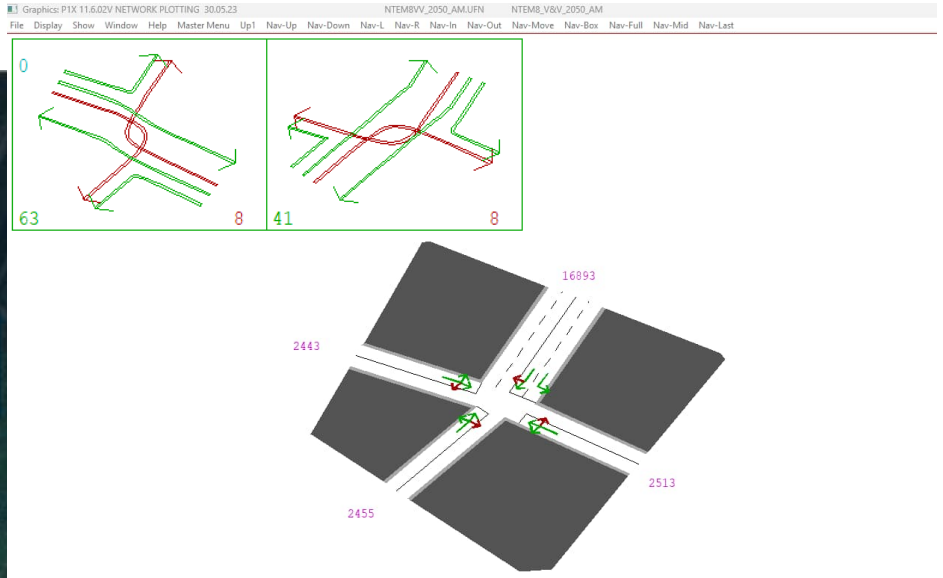


SWARN 137 x 1
WARN 33 x 2
LCY = 120

Node 6273

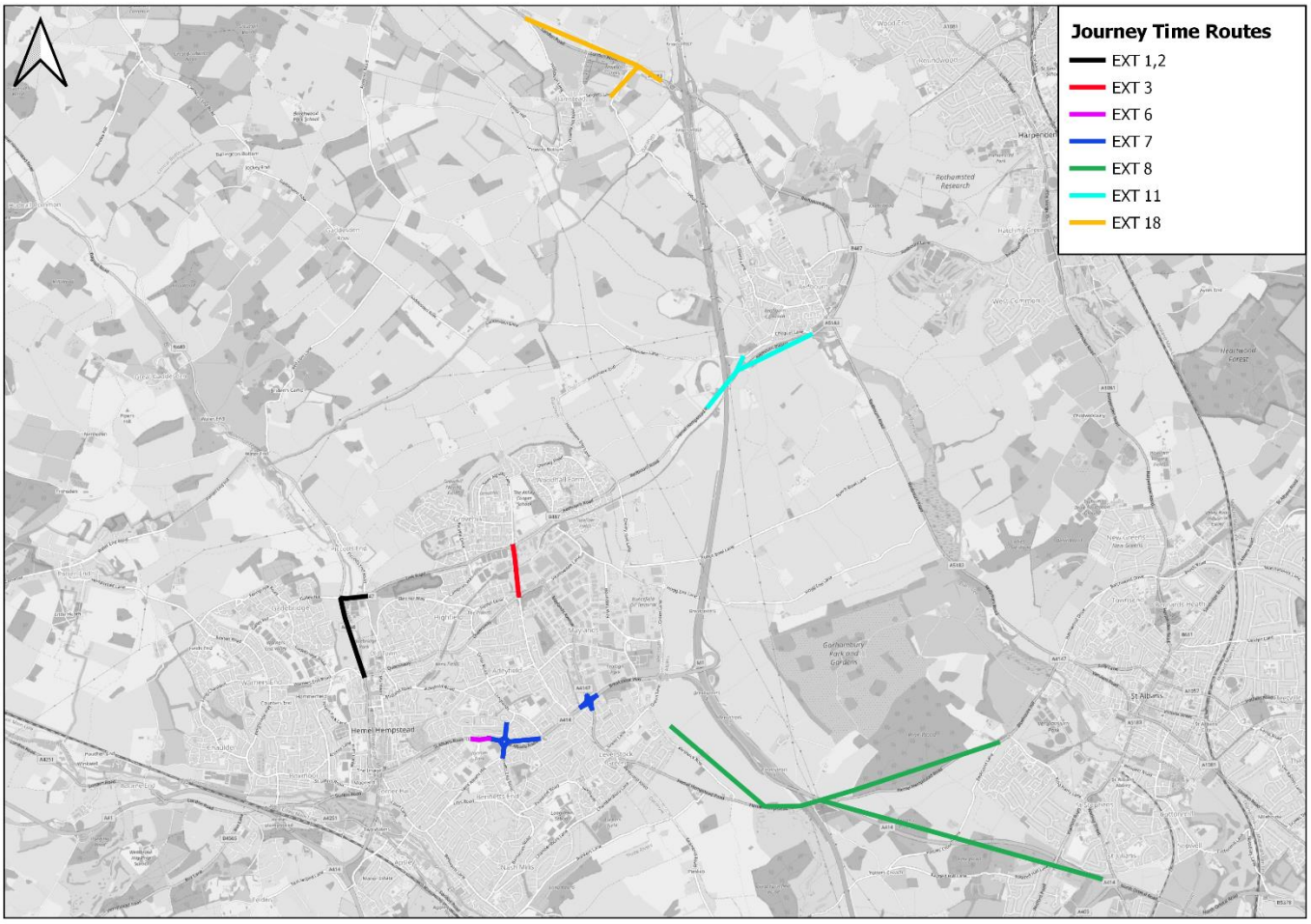
EXT-18 A5183 Chequers Hill junction (Famsted) improvement

- Changed A5183/Chequers Hill junction to signals



Appendix D

Highway Journey Time Routes


Journey Time Routes
EXT 1,2
EXT 3
EXT 6
EXT 7
EXT 8
EXT 11
EXT 18

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