Luton Rising
Our airport.
Our community.
Our planet.

February 2023

London Luton Airport Expansion

Planning Inspectorate Scheme Ref: TR020001

Volume 7 Other Documents

7.02 Transport Assessment Appendices - Part 2 of 3 (Appendix F)

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7.02 TRANSPORT ASSESSMENT APPENDICES –

PART 2 OF 3 (APPENDIX F)

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Contents

Contents

Appendix F: Strategic Modelling Forecasting Report

Appendix F: Strategic Modelling Forecasting Report

London Luton Airport Expansion Development Consent Order

Strategic Modelling: Forecasting Report

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Contents

Appendix A - Airport Trip Generation

Appendix B - Forecast Vehicle Flows at Selected Locations

Appendix C - TAG-based “Without” Expansion Average Node Delays

Appendix D - Local Plan Alternative Scenario Average Node Delays

Appendix E – Link Based Volume to Capacity (V/C)

Appendix F - Local Plan Alternative Scenario Link-based V/C

Appendix G – Highway Assignment Matrix Totals

Appendix H – Highway Assignment Average Trip-Lenghts

Appendix I – Forecast Trip Routing Analysis

Tables

Figures

1 OVERVIEW

1.1 Introduction

1.1.1 London Luton Airport Limited is preparing to secure the necessary consents through a Development Consent Order (DCO) to allow London Luton Airport to grow from the current permitted capacity of 18 million passengers per annum (mppa) to 32 mppa by 2043.

1.1.2 The Surface Access Strategy Position paper (July 2017) discusses the existing strategic transport modelling tools developed in and around the Luton Airport area which can potentially be used to first understand the existing transport provision and constraints, secondly to understand the impact of growth on the highway and public transport network, and finally to develop and examine multi-modal interventions required to deliver the proposed development as part of the Airport Masterplan.

1.1.3 In order to assess the strategic impacts of the proposed expansion, the existing Central Bedfordshire and Luton Transport Model (CBLTM) was identified as the best available tool.

1.1.4 The original version of the CBLTM was developed in 2009 by Halcrow (now Jacobs) with a base year of 2009. In 2016 AECOM was commissioned to update this model to reflect a 2016 base year, which included the collection of new travel demand data (mobile network data and public transport ticket data).

1.1.5 As part of the assessment of the proposed Luton Airport expansion, a 'Model Specification Report' (September 2018) was produced detailing the recommended updates to the CBLTM for the purposes of assessing the proposed development, creating a new version of the model suite, hereafter referred to as CBLTM-LTN.

1.1.6 This updated CBLTM-LTN retains the base year of 2016, and the model suite contains the following elements:

a. a highway assignment model;
b. a public transport assignment model;
c. a variable demand model; and
d. a trip-end forecasting tool, based on the Department for Transport's (DfT) CTripEnd software.

1.1.7 When producing a model forecast, all these elements of the CBLTM-LTN suite are used, using user-defined inputs and passing information between the individual components of the suite.

1.1.8 The CBLTM-LTN model is used to firstly understand the existing transport provision and constraints, secondly to understand the impact of growth on the highway and public transport network, and finally to develop and examine multi-modal interventions required to deliver the proposed development as part of the Airport Masterplan.

1.1.9 The strategic modelling is used to provide:

a. strategic assessment of the potential offsite pressure points on the transport network resulting from the proposed development;

b. traffic flows for the Air Quality and Noise assessments of the traffic component of the scheme, to be reported in the Environmental Statement; and

c. traffic forecasts to inform the micro-simulation modelling (covering M1 Junction 10, the A1081 between the M1 and Luton Airport, and areas of southern Luton);

1.1.10 This report provides details of the future year scenarios produced using the CBLTM-LTN to assess the forecast impacts of proposed development at Luton Airport. In addition to this, the development of the 2016 base year models for the CBLTM-LTN suite has been reported in the following four reports:

a. a Data Collection Report (dated March 2019);

b. a Highway Local Model Validation Report (dated March 2019);

c. a Public Transport Local Model Validation Report (dated March 2019); and

d. a Demand Model Development Report (dated March 2019).

1.1.11 This report refers to the model runs of the proposed development as “Without” and “With” Expansion (i.e. the proposed development) throughout.

1.2 Structure of the Forecasting Report

1.2.1 Following this introduction, this Forecasting Report contains the following sections:

a. **Section 2** - Overview of Forecasting Process: this section provides an overview of the forecasting process adopted within the CBLTM-LTN.

b. **Section 3** - Forecasting Assumptions: this section details the assumptions adopted for the forecasting scenarios discussed within this report, including the Uncertainty Log.

c. **Section 4** – Transport Analysis Guidance (TAG) based “Without” Expansion Forecasts: this section discusses the TAG-based forecasts excluding the proposed expansion at Luton Airport.

d. **Section 5** - TAG-based “With” Expansion Forecasts : following on from Section, this section details the TAG-based forecasts including the proposed expansion at Luton Airport.

e. **Section 6** - Local Plan Growth: the developments included in the TAG-based forecasts are based on those which meet the required TAG level of certainty, with this section detailing forecasts undertaken incorporating growth from the current Local Plans.

f. **Section 7** - Summary of Forecasts: this section provides a high-level overview of the processes and forecasts detailed in the preceding sections.

1.2.2 In addition to the above sections, this Forecasting Report also contains a number of appendices (Appendix B to Appendix H) providing additional detail and supporting evidence on the forecasts detailed in this report.

2 OVERVIEW OF FORECASTING PROCESS

2.1 Introduction

2.1.1 This section outlines the forecasting process adopted within the CBLTM-LTN. Further information on the forecasting processes is detailed in the 'Demand Model Development Report'; however, Figure 2.1 provides an overview of the process where:

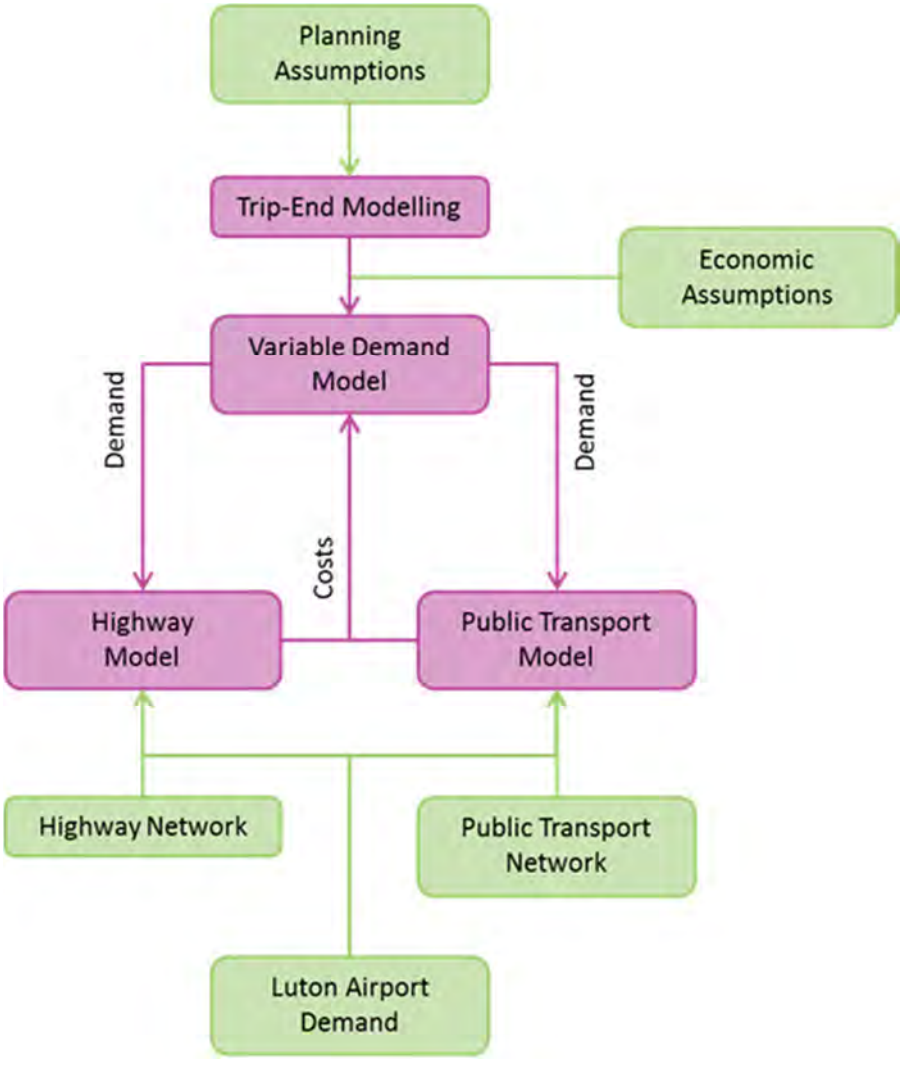
a. the forecast planning data for a given year and scenario are entered into the trip-end model to produce forecast trip-end estimates;

b. those forecast trip-ends and the forecast economic assumptions (such as values of time, fuel costs and public transport fares) are used within the demand model to produce an estimate of forecast travel demand;

c. this forecast demand is assigned onto the highway and public transport networks to generate forecast travel costs; and

d. there is then an iterative process between the demand and assignment models until a defined level of convergence is reached.

Figure 2.1: Overview of CBLTM-LTN Forecasting Process



2.1.2 The processes detailed above are used to forecast all travel except that to / from Luton Airport. Forecasts for travel demand for Luton Airport passengers, employees and freight are derived externally and are added to the demand matrices prior to assignment within the highway and public transport models. Further details on the Luton Airport travel demand forecasts can be found in Section 3.3.

2.1.3 The remainder of this section provides more detail on the main elements of the forecasting process implemented within the CBLTM-LTN.

2.2 Forecast Growth (Planning Data and Trip-Ends)

2.2.1 Base year (2016) planning data have been used in the development of the highway and public transport models. These base year planning data have primarily been derived from Census data and information contained within Trip End Model Presentation Program (TEMPro).

2.2.2 Using these base year planning data as a starting point, growth has been added based on the residential and employment developments identified within the Uncertainty Log, supplemented by information from TEMPro forecasts. Further details on the developments include in the forecast scenarios can be found in Section 3.

2.2.3 The forecast planning data for a given scenario are entered into the trip-end model. This is a variant of the DfT CTripEnd software associated with the TEMPro forecasts, which has been adapted to represent the zone system implemented within CBLTM-LTN.

2.2.4 The trip-end model provides 'reference' trip-ends for forecasting. These exclude the direct effects of changing costs of travel, which are applied by the demand model, but includes forecast changes in land-uses.

2.2.5 Trip-end changes are applied to the base year demand matrices through a matrix-balancing procedure (Furnessing). This involves factoring matrix rows to match given production targets, then factoring matrix columns to match attraction targets, and repeating this process until convergence is achieved. Convergence is measured where both production and attraction totals match the target trip-ends within a specified tolerance for error.

2.2.6 The derivation of the target trip productions and attractions is detailed in Section 7 of the ‘Demand Model Development Report’. For most zones, a growth factor is applied to the base year validated demand matrices based on the percentage change from the base year to a given future year forecast by the trip-end model. This approach retains the trip rates observed within the development of the base year highway and public transport assignment models for the majority of zones.

2.2.7 Where the growth factor is large (i.e. above a factor of 5) this suggests significant development within a given zone (such as a greenfield development), and in these cases the trip-end forecasts from the trip-end model are used directly.

2.2.8 Where the growth factor forecast by the trip-end model is above 5, a gravity model is applied to estimate the starting trip distribution for trips produced by and attracted to the zone. This is because the demand data present within the base year matrices are unlikely to be representative due to the scale of change forecast in the zone. The gravity models have been calibrated based on the base year travel demand, and further details can be found in Section 7.3 of the 'Demand Model Development Report'.

2.2.9 The outputs from this process are 'reference' demand matrices for a given scenario. These 'reference' demand matrices provide the starting point for the demand model, with these matrices being adjusted based on the costs of travel forecast by the assignment models.

2.3 Supply Models

2.3.1 The CBLTM-LTN contains both a highway and public transport assignment model. The development, calibration and validation of the 2016 base year assignment models are detailed in the associated highway and public transport Local Model Validation Reports (both dated March 2019).

2.3.2 In addition to these validated assignment models, the CBLTM-LTN also includes a representation of active mode demand (i.e. walking and cycling). The costs of travel for active modes are estimated using a version of the public transport network for a given scenario.

2.3.3 Infrastructure schemes for both highway and public transport are included in the model within the forecast scenarios. Further details on the future year schemes included in each assignment model can be found in the Uncertainty Log within Section 3.

2.3.4 With the exception of the changes to the network coding to represent the assumed future year infrastructure schemes and changes to the generalised cost parameters used within the assignment (due to assumed changes in GDP and fuel costs), no other changes to the assignment models have been made from the base year models (and detailed in the Local Model Validation Reports). This includes the assignment parameters adopted for the highway model, including those relating to the assignment convergence and the use of the PassQ functionality to represent the pre-peak hours in the AM Peak and PM Peak.

2.4 Demand Model

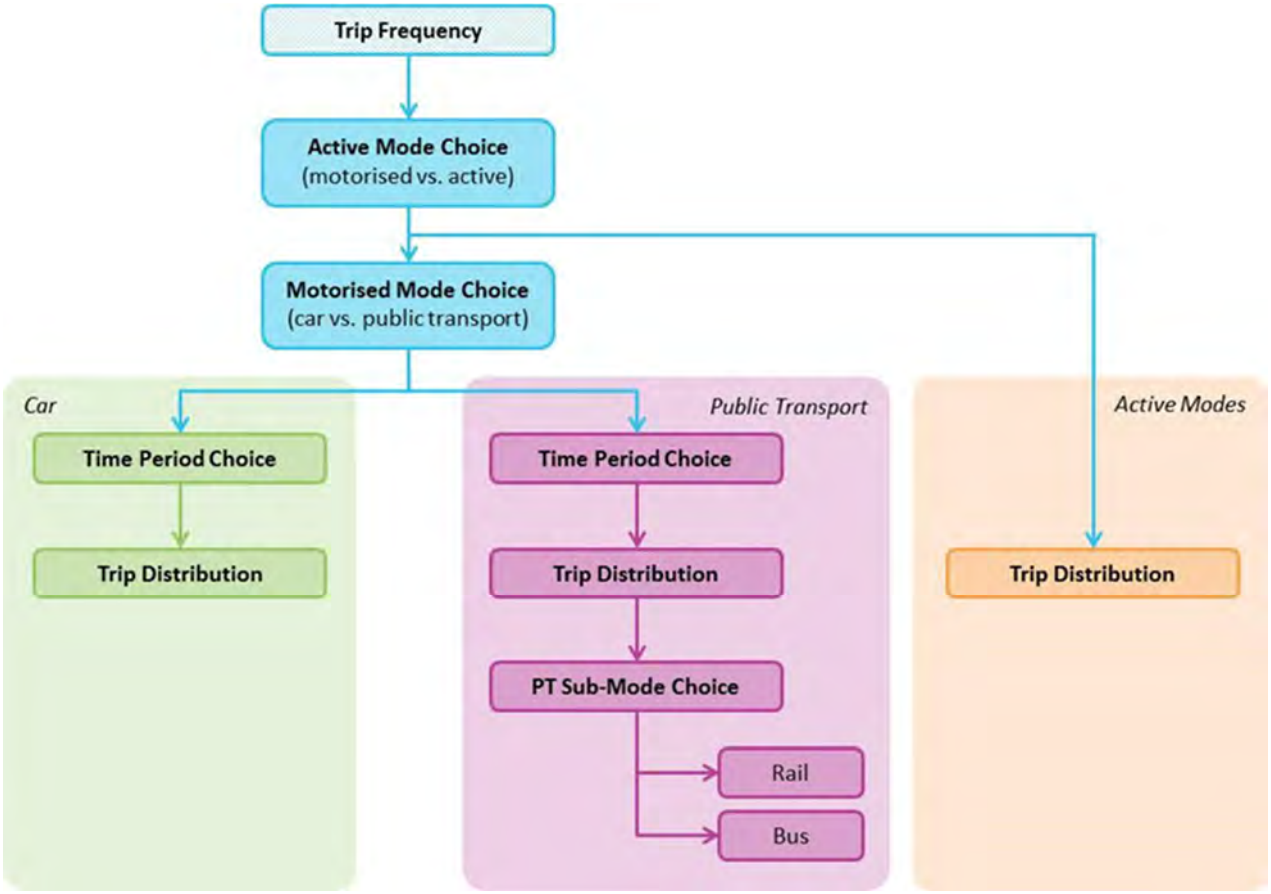
2.4.1 The CBLTM-LTN includes a TAG-compliant variable demand model, the development of which is detailed in the 'Demand Model Development Report' (dated March 2019).

2.4.2 The demand model takes the 'reference' demand estimated based on changes in land-use, forecast year economic assumptions (including values of time, fuel costs and public transport fares), and costs of travel from the assignment models to forecast demand for a given scenario.

2.4.3 Central to this process is the demand choice structure, which is shown in Figure 2.2 for a car-available, non-freight demand segment. The trip frequency effect at the top of the demand choice structure is only applied to 'other' trips which are largely discretionary.

2.4.4 The choice structure applied for other demand segments may differ from that shown in Figure 2.2. For example, demand segments which are no-car-available do not have the option of 'car' within the motorised mode choice, assigning all motorised travel to public transport.

Figure 2.2: Overview of CBLTM-LTN Demand Model Choice Structure



2.4.5 The choices at each level of the demand choice structure are based on composite costs across the available options. These costs are derived from the assignment models using the economic assumptions for a given forecast year. Details on the economic assumptions adopted within the CBLTM-LTN forecasts are included in Section 3.2.

2.4.6 In addition to the composite costs, sensitivity parameters for the choice models are required and have been derived from the illustrative parameters detailed in TAG Unit M2. Further details on these sensitivity parameters and the results of the base year realism testing can be found in the 'Demand Model Development Report'.

3 FORECASTING ASSUMPTIONS

3.1 Introduction

3.1.1 This section details the forecasting assumptions underpinning the model forecasts detailed in this report. This includes the forecasting assumptions used within the TAG-based "Without" and "With" Expansion scenarios, and those within the defined alternative scenarios.

3.1.2 These alternative scenarios assess the forecast impacts of incorporating housing and employment proposals based on current Local Plans for Luton Borough, Central Bedfordshire, North Hertfordshire, St Albans District and Dacorum.

3.1.3 In total, 12 forecast scenarios are reported within this Forecasting Report, and these are:

a. TAG-based "Without" Expansion forecasts for 2027, 2039 and 2043;

b. TAG-based "With" Expansion forecasts for 2027, 2039 and 2043; and

c. 2027, 2039 and 2043 "Without" and "With" Expansion forecasts using Local Plan growth.

3.1.4 In terms of the passenger throughput assumed at Luton Airport, the "Without" Expansion scenarios assume 18 mppa in all forecast years. For the "With" Expansion scenarios, the following passenger throughput has been assumed for each forecast year:

a. 2027: 21.5 mppa (at existing terminal only) – around 19% net increase from the "Without" Expansion Scenario;

b. 2039: 27 mppa (at both existing and a new Terminal 2) – around 50% net increase from the "Without" Expansion Scenario; and

c. 2043: 32 mppa (at both existing and a new Terminal 2) – around 78% net increase from the "Without" Expansion Scenario.

3.2 Core Forecasting Assumptions

3.2.1 There are a number of assumptions required when running the CBLTM-LTN in forecasting mode. These include network inputs for highway and public transport, economic assumptions such as values of time and fuel costs, and future land-use assumptions.

3.2.2 In accordance with TAG Unit M4, information regarding potential future land-use and transport developments has been considered together with their likelihoods. For Luton Borough and Central Bedfordshire, the existing Uncertainty Log (UL) for the CBLTM has been reviewed for the planning and infrastructure assumptions within these districts.

3.2.3 For North Hertfordshire, St Albans District and Dacorum (which together with Luton and Central Bedfordshire form the internal area of the model), planning and infrastructure assumptions have been developed from published online sources. This includes planning applications listed within each district's

Planning Portal website, growth assumptions detailed in their current Local Plans, and information on infrastructure from their Infrastructure Delivery Plans.

3.2.4 In terms of each district's current Local Plans, the following documents considered for residential and employment growth within each district as part of the development of the forecasting assumptions:

a. Luton Borough: Adopted Local Plan, November 2017 (2011 to 2031);

b. Central Bedfordshire: Central Bedfordshire: Local Plan (2015 to 2035). This Local Plan was submitted to the Planning Inspectorate in March 2018. The Local Plan is now within its Examination stage - consultation on the additional evidence presented closed on the 12th August 2020;

c. North Hertfordshire: Proposed Submission Local Plan, October 2017 (2011 to 2031);

d. St Albans District: Publication Draft Local Plan, 2019 (2020 to 2036); and

e. Dacorum: Adopted Core Strategy, September 2013 (2006 to 2031)

3.2.5 At the time of preparing the updated UL for use within the modelling work, the status of the various Local Plan documents was investigated. A few points to note in relation to document updates are as follows:

a. A new Local Plan (2020 – 2038) was being prepared in Dacorum and the council were consulting on the emerging growth strategy. Once this document is adopted it will replace the previous 2013 document, however this was still at consultation stage at the time of preparing the UL; and

b. The current St Albans adopted Local Plan is the 'District Local Plan Review 1994', which is in the process of being replaced by a new Local Plan. The Local Plan "expired" in 2007, although a direction was made saving specific policies. These saved policies are the remaining operational policies. At the time of the update to the UL a new Local Plan was being developed to cover the period 2020 – 2036. This draft was submitted to the Secretary of State in March 2019. However, the document was withdrawn by St. Albans Council in November 2020. No reason was given for the document withdraw. Given the lack of similar information to replace the withdrawn document with at the time of the UL update, the modelling has been based on the information with the 2019 draft document.

3.2.6 Following the advice in TAG, it is important that national and local sources of uncertainty are assessed as part of the model forecasting approach. At a national level, uncertainty in forecasting can typically relate to:

a. national uncertainty in travel demand;

b. national uncertainty in travel cost; and

c. other modelled / nationally-based forecast parameter errors.

3.2.7 At a local level, such sources of uncertainty typically include:

a. local uncertainty (within the vicinity of Luton Airport) in travel demand, including uncertainty surrounding whether proposed developments are built; and

b. local uncertainty (within the vicinity of Luton Airport) in travel supply / cost, which includes whether other transport infrastructure projects materialise.

3.2.8 Across both planning and infrastructure assumptions, the classifications on certainty defined within Table A2 of TAG Unit M4 have been applied. These classifications are reproduced in Table 3.1.

Table 3.1: Classification of Future Inputs (TAG Unit M4, Table A2)

Probability of the Input	Status	Core Scenario Assumption
Near certain: the outcome will happen or there is a high probability that it will happen	Intent announced by proponent to regulatory agencies. Approved development proposals. Projects under construction.	This should form part of the Core Scenario
More than likely: this outcome is likely to happen, but there is some uncertainty	Submission of planning or consent application imminent. Development application within the consent process.	This could form part of the Core Scenario
Reasonably foreseeable: the outcome may happen, but there is significant uncertainty	Identified within a development plan. Not directly associated with the transport scheme / strategy, but may occur if the strategy / scheme is implemented. Development conditional upon the transport strategy / scheme proceeding. Or, a committed policy goal, subject to tests (e.g. of deliverability) whose outcomes are subject to significant uncertainty.	These should be excluded from the Core Scenario but may form part of the alternative scenarios
Hypothetical: there is considerable uncertainty whether the outcome will ever happen	Conjecture based upon currently available information. Discussed on a conceptual basis. One of a number of possible inputs in an initial consultation process. Or, a policy aspiration.	These should be excluded from the Core Scenario but may form part of the alternative scenarios

3.2.9 For the TAG-based forecasts, all identified proposals classified as ‘near certain’ or ‘more than likely’ have been included, in line with TAG recommendations on the Core Scenario. An alternative scenario using ‘reasonably foreseeable’ planning data assumptions (i.e. those detailed within the Local Plans) has been undertaken and is discussed in Section 3.4.

3.2.10 Table 3.2 to Table 3.6 provide details on the forecasting assumptions adopted within CBLTM-LTN for the scenarios detailed in this report. Table 3.2 provides details of the adopted forecasting assumptions, excluding assumptions regarding development and infrastructure changes. This includes the assumptions regarding GDP growth, vehicle operating costs, public transport fares, freight growth, and external network speeds.

3.2.11 All TAG related parameters were updated to utilise the latest TAG publication, May 2021. A sensitivity test analysing the impact of updating these parameters on the base year models were undertaken, and the study concluded that the changes are not material and would not impact the models’ level of validation, hence the conclusion was to utilise the latest TAG for all forecasting scenarios.

3.2.12 Table 3.3 provides details of the highway and public transport infrastructure schemes, and their TAG certainty classification, collated as part of the development of the CBLTM-LTN forecasts. Included within this scheme list are several junction improvements within Luton, and further details on these schemes are given in Table 3.4. An indication of the location of these schemes are given in Figure 3.1 and Figure 3.2.

3.2.13 Included within the list of junction improvements within Luton are a number of schemes which are only included in the “With” Expansion scenarios. These schemes have been identified through an initial assessment of the proposed expansion and have been included within the strategic assessment of the scheme.

3.2.14 Also included within the assumed infrastructure scheme list is the SMART motorway operation between Junction 9 and 10 on the M1. Whilst this is not a committed scheme for National Highways, in discussions with National Highways it has been agreed to include a representative capacity improvement scheme at this location within the 2043 forecasts. The objective of this scheme is to prevent a limiting of forecast flows along the M1 due to capacity constraints, potentially understating congestion at M1 Junction 10, and acknowledges that what some form of capacity improvement is likely to be introduced by 2043.

3.2.15 In addition to the infrastructure assumptions, Table 3.5 and Table 3.6 provide details on the forecast planning assumptions for housing and employment developments respectively. Due to the number of developments collated for the CBLTM-LTN, these tables only include those housing developments with more than 250 dwellings and employment developments forecasts to generate at least 100 jobs. The assumptions are included in both the “Without” and “With” Expansion forecasts.

3.2.16 For the TAG-based forecasts, only those developments classified as ‘complete’, ‘near certain’ or ‘more than likely’ have been incorporated into the forecasts. For

the Local Plan Growth alternative scenario (discussed further in Section 3.4), developments classified as ‘reasonably foreseeable’ have also been included within the forecasts.

3.2.17 Figure 3.3 and Figure 3.5 show the approximate location of the developments included in the TAG-based forecasts for residential and employment developments respectively. Figure 3.4 and Figure 3.6 show the additional residential and employment developments included within the Local Plan growth alternative scenario. In all these figures, the locations of the residential / employment developments are indicative and should not be used to determine the precise location of a given development.

3.2.18 The forecasting assumptions detailed in Table 3.2 to Table 3.6 are based on the latest available information on economic assumptions, infrastructure schemes and development proposals as of Summer 2021. Any changes to the status of the assumed forecasting assumptions after this date have not been included within the model forecasts.

Table 3.2: Forecasting Assumptions (excluding development and infrastructure)

<table>
<tr><th>Input</th><th>Assumption / Source</th></tr>
<tr><td>Population and Employment Forecasts</td><td>Total growth in population and employment has been controlled to the forecast growth contained within TEMPro 7.2 for the five districts within the internal area, with the allocation of growth within each district is based on the adopted planning assumptions for a given scenario. The constraint to TEMPro is applied as follows:
where growth from the included developments is above TEMPro forecasts, the assumed growth is factored to match TEMPro forecasts; and
where growth from the included developments is below TEMPro forecasts, the remaining growth is added based on TEMPro growth assumptions.
Outside these five districts, growth has been taken directly from TEMPro 7.2 forecasts.</td></tr>
<tr><td>Car Ownership</td><td>Forecast population has been allocated to car ownership levels based on the forecasts contained within TEMPro 7.2.</td></tr>
<tr><td>Economic Growth
(GDP growth and values of time)</td><td>Information on changes in GDP and values of time are taken from DfT advice (TAG data book, May 2021), and are summarised below. Values of time are assumed to be constant across modes[1], time periods, production and attractions zones, and only vary by trip purpose and trip-length.
<table>
<tr><th>Year</th><th>GDP Change from 2016</th></tr>
<tr><td>2027</td><td>9.6%</td></tr>
<tr><td>2039</td><td>30.0%</td></tr>
<tr><td>2043</td><td>37.2%</td></tr>
</table></td></tr>
<tr><td>Trip Rates</td><td>The trip rates assumed within the DfT’s CTripEnd software have been adopted, and are assumed to be constant over time.
Demand growth is applied at the 24-hour level to produce ‘reference’ demand, and the base year splits by time period are applied to produce ‘reference’ demand by time period (which are subsequently adjusted within the variable demand model).</td></tr>
</table>

[1] Non-working values of time do not vary by mode within the WebTAG data book; however, values of time are assumed to vary by mode for employers’ business trips. The functions for distance-based values of time for employers’ business are different for rail trips over 100km. Given the focus of the modelling on Luton Airport, this variation is not considered to be material to the model forecasts.

<table>
<tr><td>Freight Demand Growth</td><td>Freight demand growth is controlled separately for LGV and HGV traffic to the forecast growth contained within the latest National Transport Model (NTM) Road Traffic Forecasts (RTF18) using Scenario 1:
<table>
<tr><th>Year</th><th>LGV Growth from 2016</th><th>HGV Growth from 2016</th></tr>
<tr><td>2027</td><td>15.1%</td><td>3.6%</td></tr>
<tr><td>2039</td><td>33.5%</td><td>10.7%</td></tr>
<tr><td>2043</td><td>39.3%</td><td>13.3%</td></tr>
</table>
The allocation of this growth to modelled zones is based on changes in employment within a given zone, with freight trip-ends estimated from TRICS trip rates applied to the employment forecasts.</td></tr>
<tr><td>Vehicle Operating Costs</td><td>Changes in fuel prices, vehicle fuel efficiency, and non-fuel vehicle operating costs (VOCs) have been taken from the TAG data book, May 2021. A broad indication of the scale of changes from 2016 is illustrated below; however, these values vary by trip purpose and average journey speed. All changes are to real prices, i.e. excluding inflation.
<table>
<tr><th>Year</th><th>Petrol Price</th><th>Avg. Fuel Price</th><th>Fuel Consumption</th><th>Fuel Costs</th><th>Non-Fuel Costs</th></tr>
<tr><td>2027</td><td>13.8%</td><td>6.2%</td><td>-15.7%</td><td>-7.7%</td><td>-4.7%</td></tr>
<tr><td>2039</td><td>20.7%</td><td>-11.3%</td><td>-31.4%</td><td>-37.2%</td><td>-16.1%</td></tr>
<tr><td>2043</td><td>22.3%</td><td>-16.0%</td><td>-34.2%</td><td>-42.8%</td><td>-18.8%</td></tr>
</table></td></tr>
<tr><td>Public Transport Fares</td><td>Bus and rail fares are assumed to grow by 1% per annum above inflation. For rail travel this is consistent with recent government policy on rail fares, with bus fares assumed to increase in-line with rail travel[2].</td></tr>
<tr><td>Active Mode Costs</td><td>Costs of travel for walking and cycling are assumed to be constant over time.</td></tr>
<tr><td>Car Occupancy</td><td>Global changes in car occupancy over time are assumed to be zero, in-line with current TAG advice.</td></tr>
</table>

[2] Data on recent trends for bus and rail fares included in the government briefing paper of railway fares (http://researchbriefings.files.parliament.uk/documents/SN06384/SN06384.pdf, November 2018) suggest that bus and rail fares have increased at a similar rate since 1987)

External Highway Congestion Changes

The external buffer network is coded with fixed speeds which do not change as forecast traffic levels increase / decrease. In order to represent the likely change in these speeds over time, the average change in speeds within the simulation network for each forecast year have been applied to the external buffer network, with the speed changes summarised as follows, along with a comparison against the RTF18 Scenario 1 average speed change forecasts for the East of England (using a weighted average of AM Peak, interpeak and PM Peak speed forecasts):

Year	Speed Change from 2016	RTF18 Forecasts
2027	-2.1%	-1.0%
2039	-5.8%	-3.3%
2043	-7.4%	-4.0%

Table 3.3: Forecast Infrastructure Assumptions

Location	Development	Certainty	Timescale	Comment
Luton	Access arrangements for Terminal 2			Includes access road to Terminal 2 and reallocation of car parking
Luton	DART	Near certain	2027	Intermediate station at mid-stay car park. Five minute journey time to terminal. Headway assumed to be four minutes. Removal of existing shuttle bus service, with associated changes to bus-only infrastructure along route. https://www.llal.org.uk/LLAL-MPT.html.
Luton	Century Park Link	Near certain	2027	See Arup ID in Mitigation Drawing Log.
Luton	LTN Access Road	Near certain	2027	Dualling of airport access road between Percival Way and the terminal, and associated junction improvements. Funding in place, and included in latest LBC infrastructure plan.
Luton	Hitchin Road / Stopsley Way / Ashcroft Road Roundabout	Near certain	2027	Junction improvements: Option 1 - Signalise Hitchin Road and Stockingstone Road junctions and convert Ramridge Road / Stockingstone Road junction to priority Option 2 - Signalise Hitchin Road & Stockingstone Road and Ramridge Road & Stockingham Road & link both sets of signals. Funding in place, and included in latest LBC infrastructure plan.
Luton	Hitchin Road / Vauxhall Way Roundabout	Near certain	2027	Additional flare on all approaches. Dedicated left-turn on Stopsley Way approach. See Arup ID in Mitigation Drawing Log. Status unknown - funding in place, and included in latest LBC infrastructure plan.
Luton	Vauxhall Way / Crawley Green Road Roundabout	Near certain	2027	Signalising this junction was initially considered as a result of improvements required to increase capacity to cater for increased traffic to airport, but rejected in favour of localised widening at the roundabout. Vacant highway land on Vauxhall Way approaches may provide opportunities for this localised widening. See Arup ID in Mitigation Drawing Log. Funding in place, and included in latest LBC infrastructure plan.
Luton	Vauxhall Way / Kimpton Road Roundabout	Near certain	2027	Lengthen flares on Vauxhall Way and Eaton Green Road. Funding in place, and included in latest LBC infrastructure plan.
Luton	Airport Way to Gypsy Lane Signals	Near certain	2027	Junction improvements. Funding in place, and included in latest LBC infrastructure plan.
Luton	Wigmore Lane / Eaton Green Road Roundabout	Near certain	2027	Junction improvements. Funding in place, and included in latest LBC infrastructure plan.
Luton	Luton Northern Bypass: M1 to A6	Near certain	2027	https://www.centralbedfordshire.gov.uk/info/55/transport_roads_and_parking/581/m1-a6_link_road/6. Planning application granted Dec 2020.
Luton	A5-M1 Link Road	Complete	2027	New link road to north of Dunstable, including new Junction 11a on M1, Poynters Road scheme and connection to Woodside Link from Parkside Drive. Scheme complete.
Luton	Dunstable Road	Complete	2027	Widening to 3 lanes south-eastbound and 2 lanes north-westbound between Telford Way and Cardiff Road. Scheme complete.
Luton	Hitchin Road / Ramridge Road	Near Certain	2027	See Arup ID in Mitigation Drawing Log

Luton	Wigmore Lane / Crawley Green Road	Near Certain	2027	See Arup ID in Mitigation Drawing Log
Luton	A1081 / London Road (North)	Near Certain	2027	See Arup ID in Mitigation Drawing Log
Luton	Windmill Road / Kimpton Road	Near Certain	2027	See Arup ID in Mitigation Drawing Log
Luton	Windmill Rd / Manor Rd / St. Mary's Rd	Near Certain	2027	See Arup ID in Mitigation Drawing Log
Luton	A505 Vauxhall Way / Eaton Green Road	Near Certain	2027	See Arup ID in Mitigation Drawing Log
Luton	Eaton Green Road / Lalleford Road	Near Certain	2027	See Arup ID in Mitigation Drawing Log
Luton	Eaton Green Road / Frank Lester Way	Near certain	2027	See Arup ID in Mitigation Drawing Log
C.Beds	A421 Dualling (including between Eagle Farm and M1)	Near Certain	2027	Signalised roundabout where A421 crosses M1, coded as dual carriageway with speed limit of 70mph. Approved planning status.
C.Beds	Houghton Regis North Site 1 development access	Near Certain	2027	20mph dual carriageway link connecting Sundon Road and Woodside Link. Intermediate roundabouts connect the new access to Woodside Link.
C.Beds	Houghton Regis North Development 2 distributor road	More than likely	2027	20 - 40mph dual carriageway link running across the north of the development between the B5120 and Woodside Link. Bus priority measures west of the Woodside Link Road. Junction with Woodside Link Road is a 3 arm roundabout.
C.Beds	Billington Rd traffic calming (Leighton Buzzard)	More than likely	2027	Assumed 15mph speed limit and restricted capacity
C.Beds	A505 / Billington Rd / Stanbridge Rd roundabout (Leighton Buzzard)	More than likely	2027	Assumed to be mini-roundabout
C.Beds	East Leighton Distributor Road (Leighton Buzzard)	More than likely	2027	40mph dual carriageway connecting Leighton Road and Heath Road in eastern Leighton buzzard. Junction with A4012 and Vandyke Road signalised. Alignment of Vandyke Road amended.
C.Beds	Marston Vale New Villages	More than likely	2027	Assess arrangements for development
C.Beds	North of Houghton Regis (Site 1)	Near certain	2027	Assess arrangements for development
C.Beds	East of Arlesey	More than likely	2027	Assess arrangements for development
C.Beds	North of Houghton Regis (Site 2 - Land West of Bidwell)	Near certain	2027	Assess arrangements for development
C.Beds	Wixams	Near certain	2027	Assess arrangements for development
C.Beds	East of Leighton Linslade (Clipstone Park)	Near certain	2027	Assess arrangements for development
C.Beds	Land South of The Wixams	More than likely	2027	Assess arrangements for development

C.Beds	Wixams Southern Extension (Wixams Park)	Near certain	2027	Associated with A5-M1 Link. Coded as two 3 lane roundabouts of the A5 joining to the M1. Scheme complete.
HE	M1 J11a Dumbbell Junction	Complete	2027	Linked with M1-A6 scheme
HE	M1 J11a Dumbbell Junction with capacity-increase measures and access to M1-A6 link	More than likely	2027	Assumed additional lane with speed limit reduction in peak hours.
HE	A1(M) J6-8 Smart Motorway	Near Certain	2027	
HE	A428 Black Cat to Caxton Gibbet	Near Certain	2027	
NR	East West Rail – Western Section	Near Certain	2027	Three additional hourly services i.e. Bedford to Oxford (in 61 minutes), Milton Keynes to Oxford (in 41 minutes) and Milton Keynes to Aylesbury (in 33 minutes). This translates to 2 services per hour on the Marston Valley line (between Bletchley and Bedford). https://www.eastwestrail.org.uk/train-services/
Dacorum	Signalisation of Kings Road/Kingshill Way/Shootersway, Berkhamstead	Complete	2027	Funding in place within Dacorum Infrastructure Delivery Plan
Dacorum	Improve High St/Kings Road junction, Berkhamstead	More than likely	2027	Funding in place within Dacorum Infrastructure Delivery Plan
Dacorum	Traffic calming & 20mph zone - Castle St, Berkhamstead	Near certain	2027	Funding not in place for scheme
Dacorum	Traffic calming & 20mph zone - Gravel Path - Berkhamstead	Near certain	2027	Funding not in place for scheme
StAlbans	Additional bus routes to new development locations (housing/employment) with particular emphasis on connecting bus routes to new schools	More than likely	2043	Linked to development proposals within St Albans, so expected to be delivered in line with additional housing / employment
C.Beds	Wixams Western Access – B530 Roundabout	Near certain	2027	Completed
C.Beds	Marston Valley – C94/Western Access	More than likely	2027	Condition of approved planning permission
C.Beds	Marston Valley – C94/Eastern Access	More than likely	2027	Condition of approved planning permission
C.Beds	Marston Valley – Northern Access/Station Lane	More than likely	2027	Condition of approved planning permission
C.Beds	Marston Valley – C94/Woburn Road Junction Upgrade	More than likely	2027	Condition of approved planning permission
C.Beds	Marston Valley – C94 Rbt and minor access	More than likely	2027	Condition of approved planning permission
C.Beds	Marston Valley – Section of Station Road closure – Downgrade to cycleway	More than likely	2027	Condition of approved planning permission
C.Beds	Marston Valley – Marston Road Access	More than likely	2027	Condition of approved planning permission

C.Beds	M1 J13 Junction Improvements	More than likely	2027	Part of pending planning application
C.Beds	M1 J13 Junction Improvements - Bypass lane at North-Western Rbt	More than likely	2027	
C.Beds	A1 Biggleswade North Roundabout Capacity improvements	More than likely	2043	
C.Beds	Land E of Biggleswade - Accesses	Near certain	2027	Approved planning status
C.Beds	Land E of Biggleswade - A1/London Rd Rbt	Near certain	2027	Approved planning status
C.Beds	Land E of Biggleswade - A1/Hill Lane Rbt	Near certain	2027	Approved planning status
C.Beds	M1 junction 11a	More than likely	2027	Construction of a new single and dual carriageway 2.75 miles (4.4km) road linking the M1 and the A6 between the M1 junction 11a and the A6 Barton Road. Comprising intermediate junctions, overbridges, underbridges, cycle paths, revisions to the Public Rights of Way network, drainage and landscaping. Approved planning.
HE	M1 J13-J16 SMP	Near certain	2027	Under construction
C.Beds	PT - East West Rail Western Section	Near certain	2027	Approved planning status. https://www.networkrail.co.uk/running-the-railway/railway-upgrade-plan/key-projects/east-west-rail/east-west-rail-western-section/. Rail scheme linking Bicester to Bedford - EWR TWAO website .
C.Beds	Biggleswade Eastern Relief Road	Near certain	2027	Completed
C.Beds	East of Leighton Link Road	More than likely	2027	Part of planning application ref 02827, 04444,01937
C.Beds	Woodside Link Road	Near certain	2027	Completed
NorthHerts	Southern link road connection B656/A607, Baldock	Near certain	2027	Funded
Milton Keynes	M1 J14, and associated development infrastructure	More than likely		Application submitted - allocated site

Table 3.4: Forecast Infrastructure Assumptions: Luton Junction Scheme

Location	Description	Included from…
M1 Junction 10	Widening of junction gyratory and Northbound off-slip	2027 'With Expansion'
	Widening of dedicated left-turn from the A1081 to M1 South to two-lanes (associated with M1 Jn9-10 SMART Motorway scheme)	2039 'With Expansion'
	Further widening of junction gyratory, eastbound exit to A1081, and signalisation of southbound off-slip at junction with circulatory carriageway	2043 'With and Without Expansion'
A505 Vauxhall Way Corridor	Widening of Vauxhall Way to dual-carriageway, plus the following junction improvements:	2027 onwards 'With and Without Expansion'
A505 Vauxhall Way / Kimpton Road	Junction converted to four-arm signalised junction and widening of northbound Vauxhall Way approach to junction	2039 'With Expansion' onwards
A505 Vauxhall Way / Eaton Green Road	Roundabout with partial signalisation in peak hours only	2027 'With Expansion' only
A505 Vauxhall Way / Crawley Green Road	Junction converted to four-arm signalised junction	2027 onwards 'With and Without Expansion'
A505 Vauxhall Way / Stopsley Way	Junction converted to three-arm signalised junction	2027 onwards 'With and Without Expansion'
Century Park Access Road	London Luton Airport Roundabout replaced with signalised junction	2027 'With Expansion' only
	Modification to London Luton Airport Roundabout to sever direct connection with Percival Way, connection through Spittlesea Rd is kept. Construction of western CPAR corridor with a new junctions connecting CPAR on both ends to A1081 and Percival Way to the west of Frank Lester Way. Construction of eastern CPAR corridor with new junctions connecting CPAR to Terminal 2, Long Stay car park and Eaton Green.	2039 'With Expansion' only
	Connecting both western and eastern corridor of CPAR	2043 'With Expansion' only
A1081 New Airport Way / B653 / Gipsy Lane	Two-lane approach on Gipsy Lane, east to north movement from A1081 closed for all traffic and widening of left-turn flare on approach to A1081.	2027 onwards 'With and Without Expansion'
	Widening on A1081 from two to three-lanes on both directions	2027 onwards 'With Expansion'
A1081 / London Road (north)	Part signalisation and widening of London Road entry and exit	2027 onwards 'With Expansion'
A1081 / London Road (south)	Part signalisation of the roundabout	2039 onwards 'With Expansion'
Hitchin Road / Ramridge Road	Reconfiguration of junction from roundabout to four-arm signalised junction	2027 onwards 'With and Without Expansion'

Figure 3.1: Location of Assumed Infrastructure Schemes: Overview

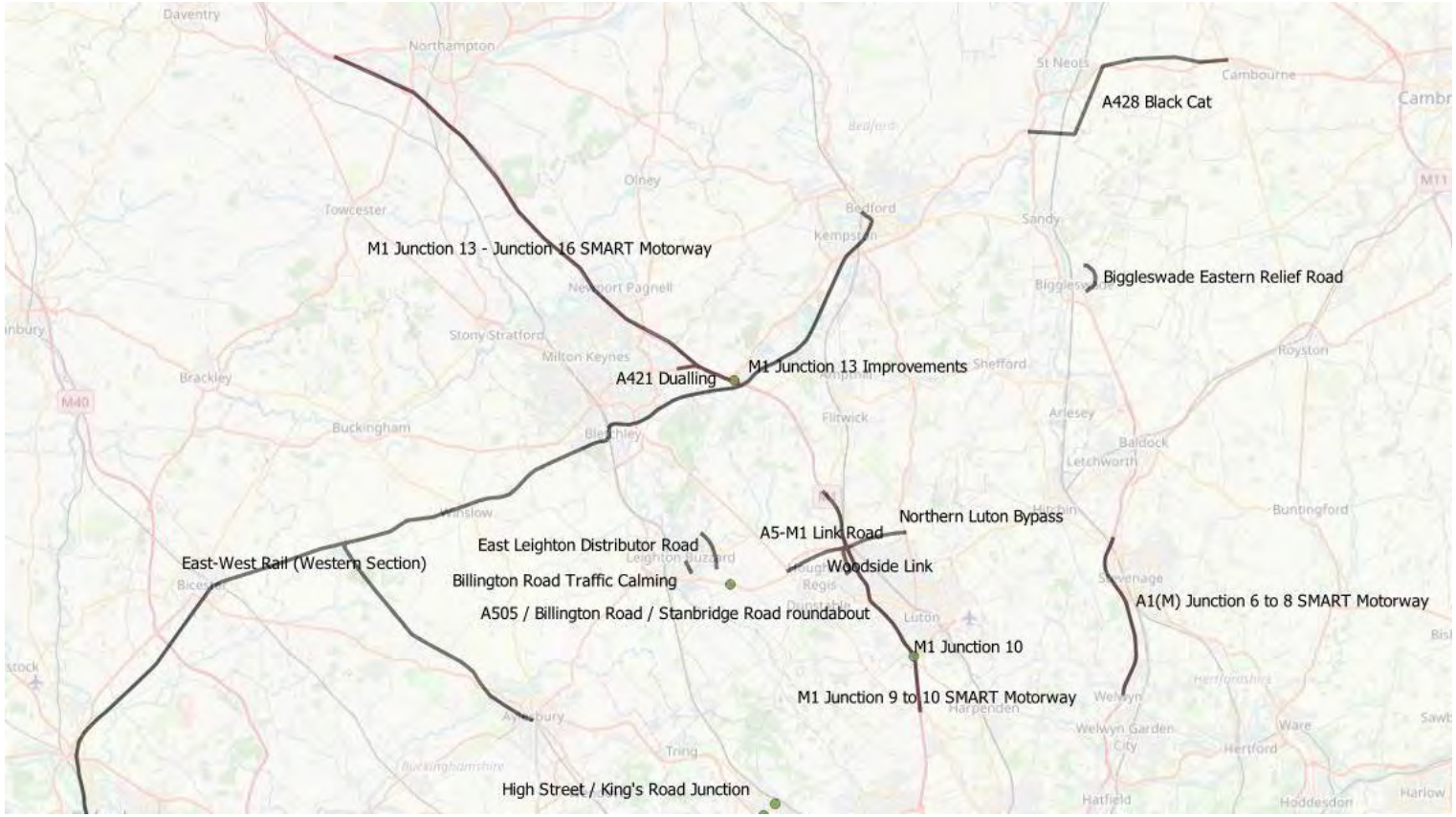


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Figure 3.2: Location of Assumed Infrastructure Schemes: South Luton

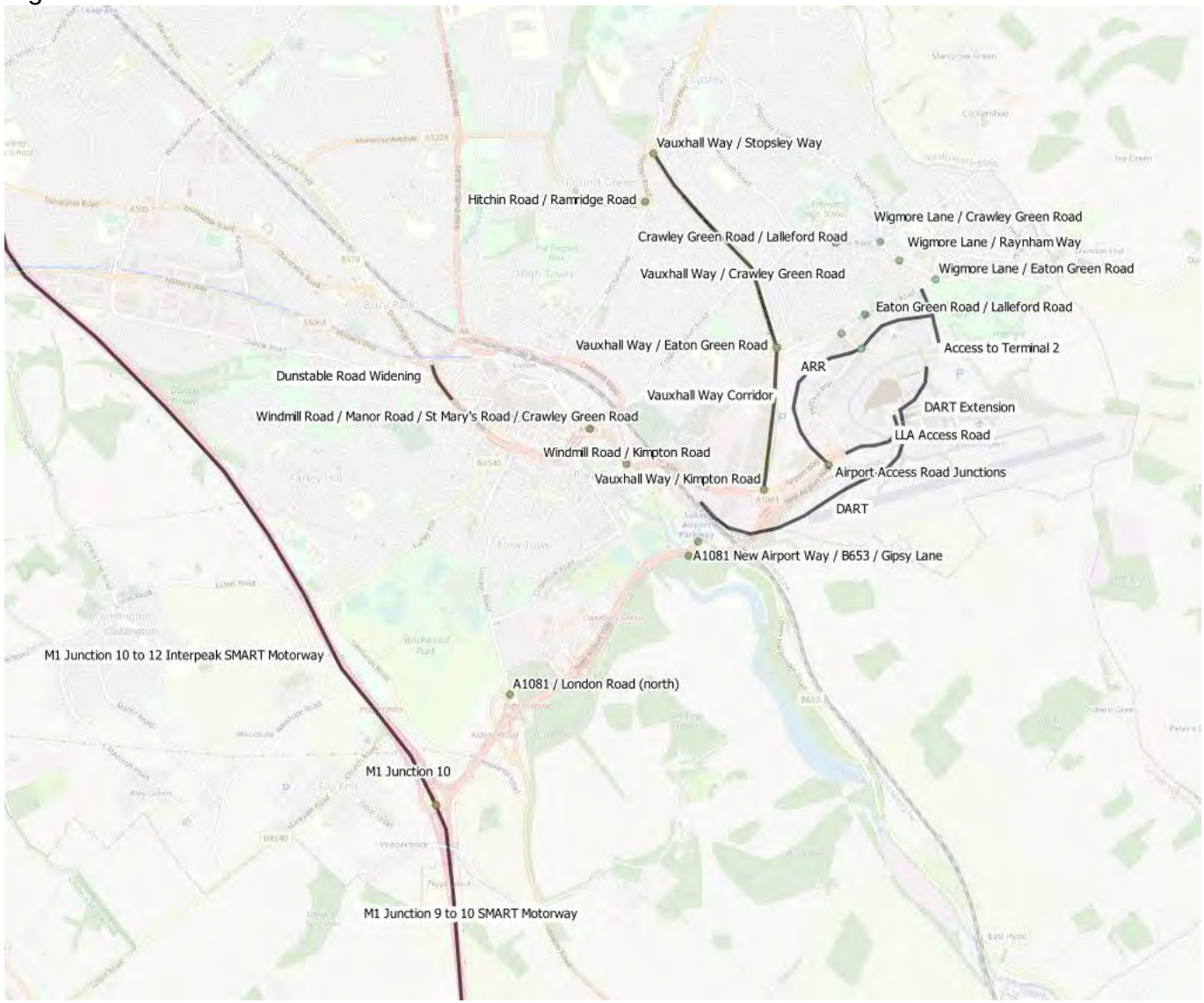

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Table 3.5: Forecast Residential Developments (greater than 250 dwellings)

Location	Scheme Name	Certainty	Dwellings	Included from	Comment
Luton	Kimpton Road (Napier Park), Former Vauxhall Motors Site	Near certain	1,205	2018-2028	Under construction
Luton	Hayward Tyler 1 Kimpton Road Luton LU1 3LD	More than likely	1,000	2022	Planning application submitted
Luton	Power Court	Near certain	750	2024-2027	Planning application approved September 2019
Luton	Old Vauxhall HQ, Griffin House	More than likely	685	2023-2026	Planning permission granted
Luton	Station Quarter	More than likely	375	2024-2025	Non- residential land
Luton	Land Adjacent To Caddington Road & Newlands Road	Near certain	340	2024	Previous outline planning permission 14/1609/OUT for 394 units. Subsequent full planning application in 2017 for 340 units. There has then been a series of minor amendments to this application.
Luton	Imperial Square, Land opposite Whitbread House, Flowers Way	Near certain	318	2021-2022	Planning application granted
Luton	Britannia Estate	More than likely	294	2020-2023	Land allocated for Non- residential uses
Luton	4-11 Burr Street	More than likely	272	2022	Awaiting decision - application received March 2021
Luton	1 - 11 Cumberland Street	More than likely	256	2022	Extant planning permission
Central Bedfordshire	Marston Vale New Villages	More than likely	5,000	2022-2039	Land allocated within Local Plan
Central Bedfordshire	North Luton	Reasonably foreseeable	3,100	2023-2034	Land allocated within Local Plan Linked with M1-A6 link road
Central Bedfordshire	North of Houghton Regis (Site 1)	Near certain	5,150	2024-2049	Planning application granted
Central Bedfordshire	East of Arslesey	Reasonably foreseeable	2,000	2024-2037	Land allocated within Local Plan

Central Bedfordshire	North of Houghton Regis (Site 2 - Land West of Bidwell)	Near certain	1,468	2020-2028	Outline planning permission
Central Bedfordshire	Wixams	Near certain	1,087	2022-2031	Outline planning permission
Central Bedfordshire	East of Biggleswade	Near certain	1,500	2024-2034	Land allocated within Local Plan
Central Bedfordshire	East of Leighton Linslade (Clipstone Park)	Near certain	1,280	2020-2028	Planning application registered
Central Bedfordshire	Land at Chase Farm & Land West / Northeast of High Street (East)	Near certain	1,030	2024-2033	Outline planning permission
Central Bedfordshire	Land South of The Wixams	More than likely	1,200	2024-2035	Land allocated within Local Plan Landowner intent to develop. Planning application submitted.
Central Bedfordshire	East of Leighton Linslade (Chamberlains Barn)	Near certain	950	2020-2026	Outline application submitted
Central Bedfordshire	Wixams Southern Extension (Wixams Park)	Near certain	650	2019-2030	Land allocated within Local Plan Landowner intent to develop
Central Bedfordshire	Land to the East of Barton le Clay	Reasonably foreseeable	498	2024-2030	Land allocated within Local Plan Landowner intent to develop
Central Bedfordshire	Land to the west of Midland Mainline Railway, Harlington	Reasonably foreseeable	435	2025-2031	Land allocated within Local Plan Landowner intent to develop
Central Bedfordshire	Land North of Biggleswade	More than likely	416	2023-2028	Land allocated within Local Plan Landowner intent to develop. Planning application submitted, awaiting decision
Central Bedfordshire	Site 4, Land East of Biggleswade	More than likely	373	2024-2028	Outline planning permission
Central Bedfordshire	Land at Moreteyne Farm	Near certain	365	2018-2021	Reserved matters granted
Central Bedfordshire	Land to the East of Houghton Regis	More than likely	350	2025-2030	Land allocated within Local Plan Landowner intent to develop
Central Bedfordshire	Land at Chase Farm & Land West / Northeast of High Street (West)	More than likely	355	2024-2028	Planning application submitted

Central Bedfordshire	Warren Farm Land off Flitwick Road	Near certain	259	2018-2020	Reserved matters granted
Central Bedfordshire	Land at Steppingley Road & Froghall Road	Near certain	400	2018-2019	Reserved matters granted
Central Bedfordshire	Dukeminster Estate	Near certain	314	2019-2020	Outline planning permission
Central Bedfordshire	Land East of Biggleswade (Blocks 1-7, 46-48a, 50, 51a)	Near certain	288	2018	Reserved matters granted
Central Bedfordshire	Land at Potton Road	Near certain	301	2018	Planning permission granted
Central Bedfordshire	Parcels 6A and 6B, Land West of Bidwell	Near certain	625	2021-2025	Under Construction
Central Bedfordshire	Parcel 5A and 5B, Land West of Bidwell	Near certain	336	2022-2028	Reserved Matters approved
Central Bedfordshire	Land to West of Houghton Regis, Watling Street (Parcel 7), Land West of Bidwell	Near certain	255	2021-2025	Reserved Matters approved
Central Bedfordshire	Parcel 3&4 (Phase 7, 7a, and 7b) Land at Thorn Road, North of Houghton Regis (HRN2)	Near certain	264	2020-2026	Approved planning permission
Dacorum	Marchmonth Farm	Near certain	350	2024-2027	Land identified in Local Plan Currently undertaking consultation
Dacorum	West Hemel (Phase One)	More than likely	350	2021	Planning application submitted
Dacorum	West Hemel (Phase Two)	Reasonably foreseeable	750	2024-2027	Land identified in Local Plan
Dacorum	Town Centre	Reasonably foreseeable	1,200	2018-2031	Development identified in Local Plan
Dacorum	East Hemel	Reasonably foreseeable	600	2019-2031	Development identified in Local Plan
Dacorum	Rest of Hemel	Reasonably foreseeable	2,770	2018-2031	Development identified in Local Plan
Dacorum	Rest of Berkhampstead	Reasonably foreseeable	564	2018-2031	Development identified in Local Plan

Dacorum	Dacorum Countryside	Reasonably foreseeable	252	2018-2031	Development identified in Local Plan
Dacorum	Kier Park, Maylands Avenue, Hemel Hempstead	Reasonably foreseeable	268	2021	Planning application registered but then refused in June 2019
Dacorum	Land between Three Cherry Tree Lane and Cherry Tree Lane, Hemel Hempstead	Near certain	600	2021-2023	Planning application granted April 2020
North Hertfordshire	Land north of Baldock	More than likely	2,800	2023-2031	Strategic site in Local Plan Planning application registered
North Hertfordshire	East of Luton	Reasonably foreseeable	2,100	2023-2031	Strategic site in Local Plan
North Hertfordshire	Land North of Stevenage	More than likely	900	2023-2031	Strategic site in Local Plan Planning application submitted
North Hertfordshire	Land North of Letchworth	Reasonably foreseeable	900	2022-2031	Strategic site in Local Plan. Application expected 2021
North Hertfordshire	Highover Farm, Hitchin	More than likely	700	2023-2031	Strategic site in Local Plan Planning application registered
North Hertfordshire	Land Northeast of Great Ashby	Reasonably foreseeable	600	2023-2031	Strategic site in Local Plan
North Hertfordshire	Royston	Near certain	332	2018-2021	Completions / Permissions
North Hertfordshire	Roundwood, Great Ashby	Reasonably foreseeable	330	2023-2031	Land allocated within Local Plan
North Hertfordshire	Land North of Newmarket Road, Royston	Near certain	330	2023-2031	Land allocated within Local Plan Conditional permission December 2016.
North Hertfordshire	Rest of Hitchin	Near certain	319	2018-2021	Completions / Permissions
North Hertfordshire	Land South of Newmarket Road, Royston	Reasonably foreseeable	300	2023-2031	Land allocated within Local Plan
North Hertfordshire	Land South of Little Wymondley, Wymondley	Reasonably foreseeable	300	2023-2031	Land allocated within Local Plan
North Hertfordshire	Rest of Letchworth	Near certain	297	2018-2021	Completions / Permissions

North Hertfordshire	Land West of Ivy Farm, Baldock Road, Royston	Near certain	279	2023-2031	Land allocated within Local Plan Planning application conditional permission February 2019.
North Hertfordshire	Land West of A1M Stevenage	More than likely	1,500	2022-2023	Previously 1,350 dwellings with a first phase of 350. Planning application submitted April 2021 - full planning 390, outline 1,110 dwellings.
North Hertfordshire	Land off Barkway Road and North of Flint Hall, Barkway Road, Royston, Hertfordshire.	More than likely	280	2022	Outline application registered
St. Albans	East Hemel Hempstead (north)	Reasonably foreseeable	600	2023-2031	Land allocated within Local Plan
St. Albans	East Hemel Hempstead (south)	More than likely	2,500	2023-2031	Land allocated within Local Plan
St. Albans	North Hemel Hempstead	Reasonably foreseeable	1,500	2035-2041	Land allocated within Local Plan
St. Albans	East St. Albans	Reasonably foreseeable	900	2023-2027	Land allocated within Local Plan
St. Albans	East St. Albans	More than likely	348	2021	Extant planning permission
St. Albans	North St. Albans	More than likely	1,100	2022-2035	Land allocated within Local Plan
St. Albans	Northeast Harpenden	Reasonably foreseeable	760	2022-2035	Land allocated within Local Plan
St. Albans	Northwest Harpenden	Reasonably foreseeable	580	2022-2035	Land allocated within Local Plan
St. Albans	West of London Colney	Reasonably foreseeable	440	2022-2035	Land allocated within Local Plan
St. Albans	West of Chiswell Green	Reasonably foreseeable	365	2022-2035	Land allocated within Local Plan
St. Albans	Park Street Garden Village	Reasonably foreseeable	2,300	2029-2039	Land allocated within Local Plan

Table 3.6: Forecast Employment Developments (greater than 100 jobs)

Location	Scheme Name	Certainty	Jobs	Included from	Comment
Luton	London Luton Airport, Airport Way, Luton, Bedfordshire, LU2 9LY	Scheme to be Tested	5,100	2022-2039	Scheme to be tested
Luton	Butterfield, Hitchin Road, Luton, Bedfordshire	Reasonably foreseeable	1,090	2020-2030	Submitted Planning Application - Approved 2005. Application for extension of time limits set in 2005 refused in July 2019.
Luton	Wigmore Employment Area (Century Park), Eaton Green Road	More than likely	3,200	2020-2024	Application submitted, awaiting decision
Luton	Power Court	Near certain	839	2022	Application approved (September 2019)
Luton	Napier Park	More than likely	2,700	2020-2030	Application permitted
Luton	Newlands Park	More than likely	4,901	2022	Application permitted (September 2019)
Luton	The Poynt, Dunstable Road, Luton, Bedfordshire	Complete	104	2018	
Luton	Unit 1 PC World, Madford Retail Park, 540 Dunstable Road, Luton, Bedfordshire	Complete	106	2018	
Luton	Cargo 10 Airport Way, Luton, Bedfordshire	Complete	114	2018	
Luton	University Of Bedfordshire - Block K (Fairview House), 65 Park Street, Luton, Bedfordshire	Complete	160	2018	
Luton	Stopsley High School And Community College, St Thomas's Road, Luton, Bedfordshire	Complete	283	2018	
Luton	Drop Off Zone, London Luton Airport, Airport Way, Luton, Bedfordshire	Complete	614	2018	
Central Bedfordshire	North Luton	Reasonably foreseeable	1,000	2018-2025	Linked with M1-A6 link road
Central Bedfordshire	Stratton Farm	Reasonably foreseeable	1,941	2018-2030	Development identified, but no planning application

Central Bedfordshire	Wixams Southern Extension	Reasonably foreseeable	441	2018-2030	Land allocated within Local Plan. Landowner intent to develop
Central Bedfordshire	Houghton Regis North 1	Complete	1,417	2018-2031	Planning application granted
Central Bedfordshire	Houghton Regis North 2	Near certain	393	2018-2021	Outline planning permission
Central Bedfordshire	East Leighton Buzzard	More than likely	2,171	2018-2031	Planning application registered
Central Bedfordshire	Thorn Turn	Complete	187	2018-2021	
Central Bedfordshire	Sundon RFI	Reasonably foreseeable	2,000	2018-2025	Linked with M1-A6 link road
Central Bedfordshire	RAF Henlow	Reasonably foreseeable	2,000	2018-2035	Identified in Local Plan. Land yet to be purchased from MoD
Central Bedfordshire	West of A1 Biggleswade	Reasonably foreseeable	2,000	2018-2025	Pre-application Advice Released (Dec 2020)
Central Bedfordshire	Marston Gate	Near certain	2,207	2019-2026	Identified in Local Plan
Central Bedfordshire	Non-B jobs (dispersed according to household growth throughout the unitary authority - split across housing sites with 100+ dwellings (55 sites))	More than likely	12,785	2018-2031	Linked with residential developments
Central Bedfordshire	Land at Phase 6 Stratton Business Park, East of Pegasus, Biggleswade	More than likely	756	2021	Planning application submitted.
Central Bedfordshire	Land To The North And East Of Houghton Regis, Sundon Road, Houghton Regis	More than likely	833	2022	Planning application submitted.
Central Bedfordshire	Land to the South East of Prologis Park Marston Gate	More than likely	2,207	2022	Planning application submitted.
Dacorum	Growth of app. 10,000 jobs over plan period, spread across district based on base year employment	Reasonably foreseeable	6,025	2018-2031	Included in current Local Plan. No specific proposals - use TEMPro growth
Dacorum	Maylands Gateway, Hemel Hempstead - comprehensive redevelopment of site	Reasonably foreseeable	975	2020	It is within the Herts Local Enterprise maps, but no planning permission has been submitted.

					Therefore, the uncertainty level is downgraded into Reasonably Foreseeable.
Dacorum	Prologis Park, Wood Lane End, Hemel Hempstead	Near certain	700	2019-2020	Planning permission granted
Dacorum	499 London Road, Hemel Hempstead - 3 floors of offices	More than likely	150	2020	Planning permission granted
North Hertfordshire	Royston Road, Baldock	More than likely	1,307	2018-2031	Strategic site in Local Plan. Planning application registered
North Hertfordshire	Wilbury Way, Hitchin	Reasonably foreseeable	2,593	2018-2031	Land allocated within Local Plan
North Hertfordshire	Burymead Road, Hitchin	Reasonably foreseeable	473	2018-2031	Land allocated within Local Plan
North Hertfordshire	Former power station, Works Road, Letchworth	Reasonably foreseeable	100	2018-2031	Land allocated within Local Plan
North Hertfordshire	Land North of York Way, Royston	Reasonably foreseeable	713	2018-2031	Land allocated within Local Plan
St. Albans	Industrial site & new business / tech park - East Hemel Hempstead	More than likely	10,000	2018-2035	Order of 10000 jobs over time' - attached to housing development - Crown Estate LEZ plan says 8,000 jobs here
St. Albans	2 new primary schools - East Hemel Hempstead (south)	Near certain	100	2018-2035	Linked with residential developments
St. Albans	2 new primary schools - Park Street Garden Village	Reasonably foreseeable	100	2018-2035	Linked with residential developments

Figure 3.3: Location of TAG-based Assumed Housing Developments

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Figure 3.4: Location of Additional Local Plan Growth Scenario Assumed Housing Developments

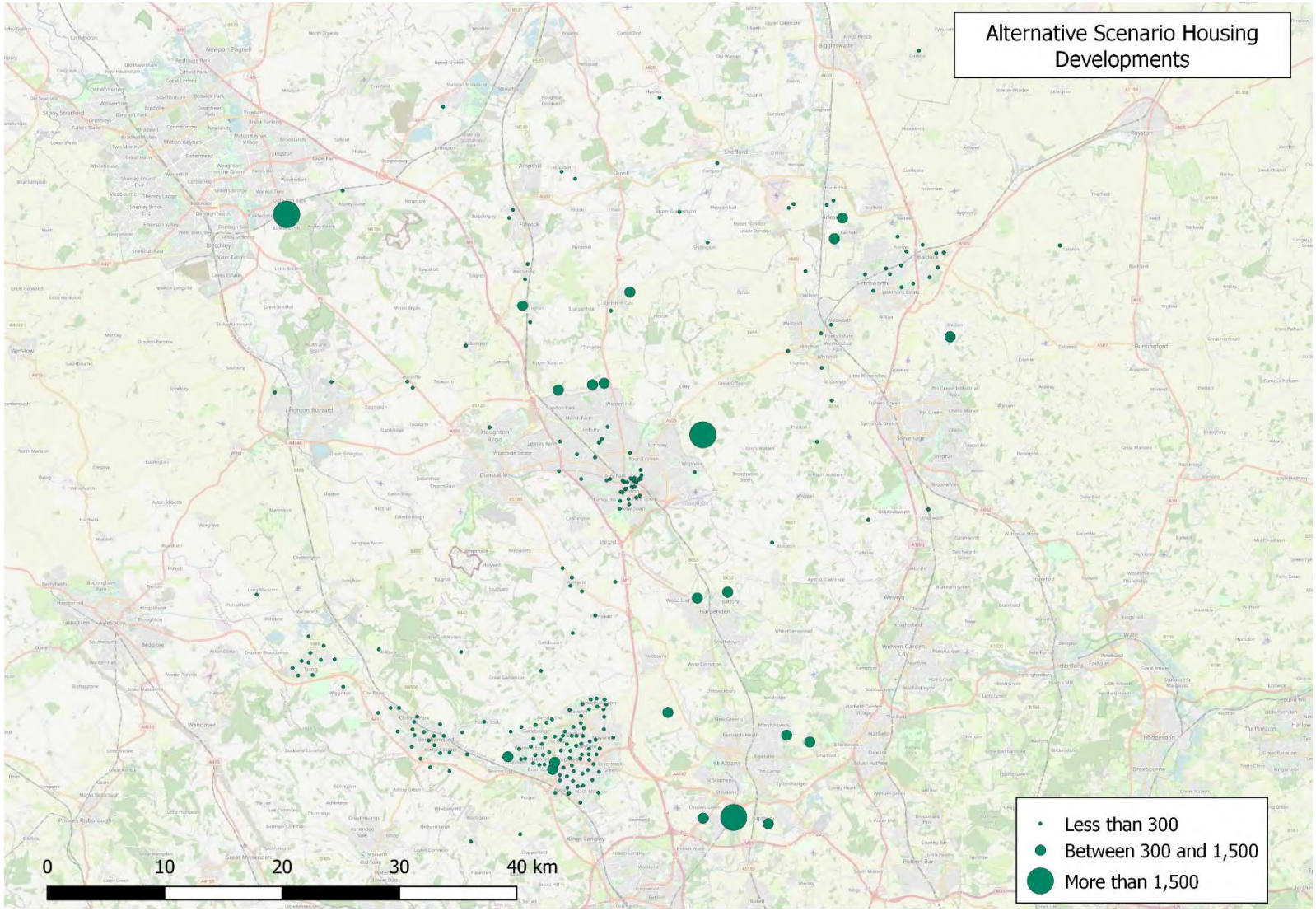

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Figure 3.5: Location of TAG-based Assumed Employment Developments

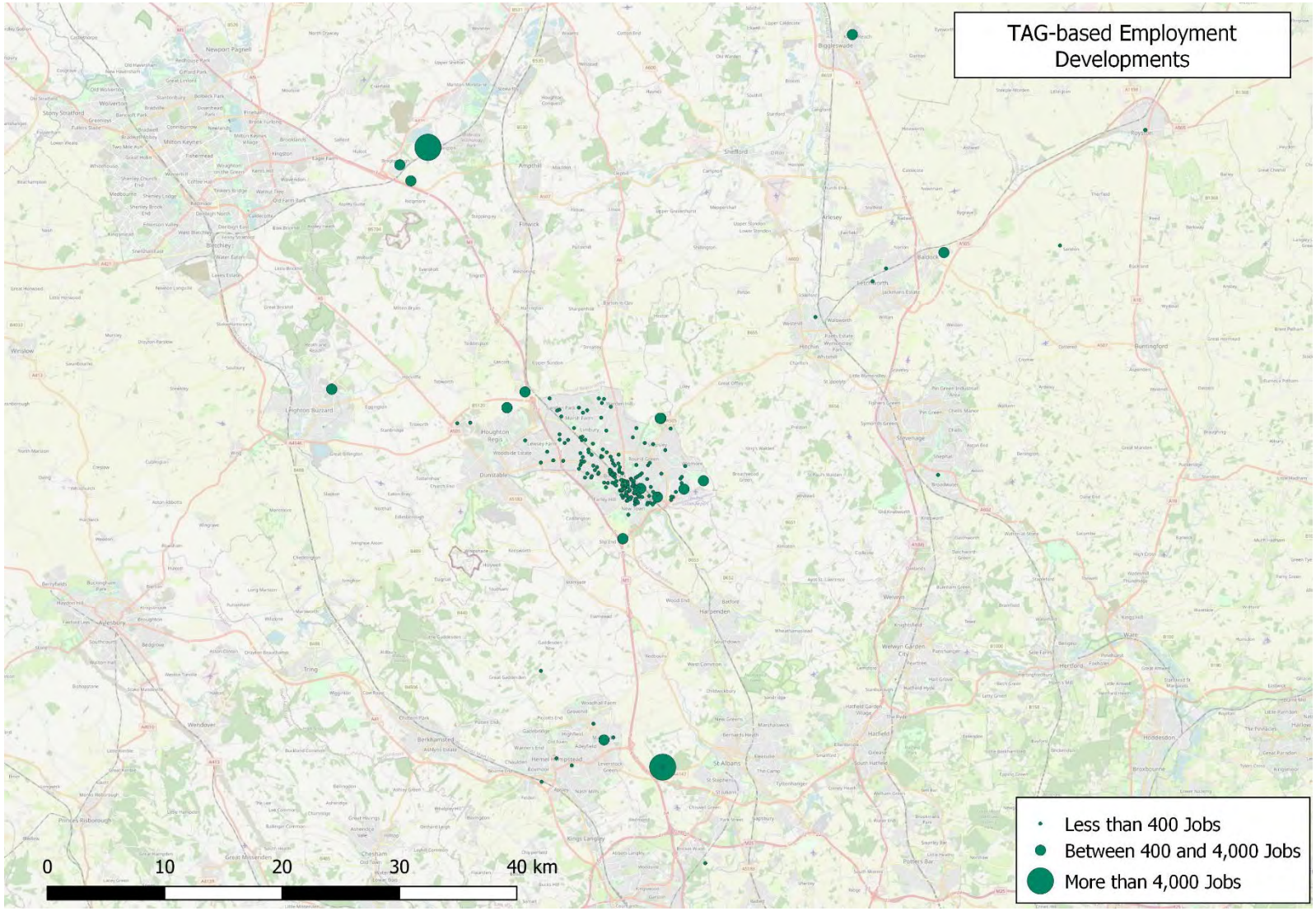

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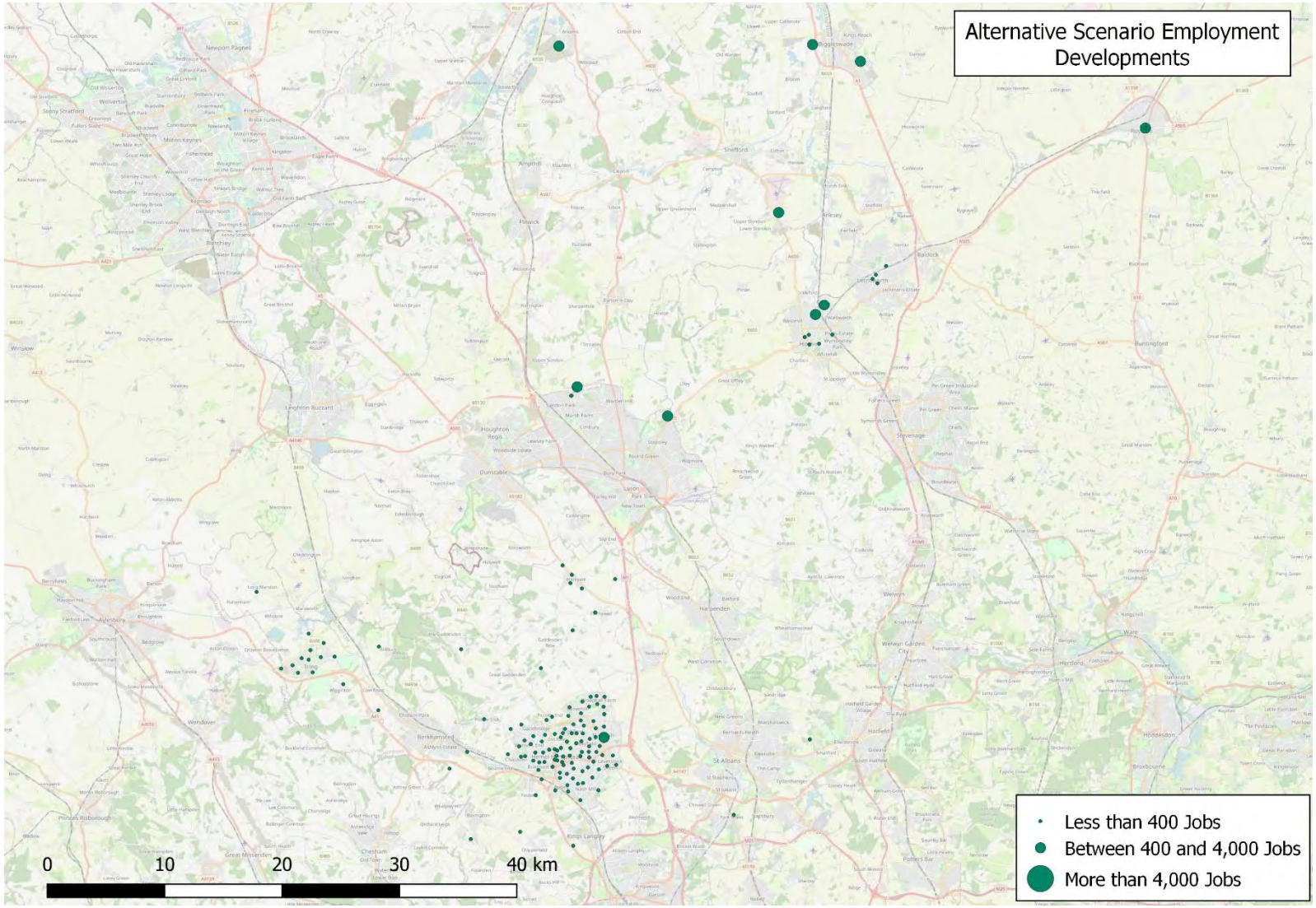
Figure 3.6: Location of Additional Local Plan Growth Scenario Assumed Employment Developments



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3.3 Luton Airport Demand Forecasts

3.3.1 Forecast travel demand to / from Luton Airport is an input to the CBLTM-LTN suite, and covers passenger, staff and freight demand by mode. The development of both the base year and forecast year airport travel demand is detailed in the 'Getting to and from the airport – Emerging Transport Strategy' (SAETS) report.

3.3.2 The development of the Luton Airport travel matrices has used a number of data sources. For the base year, information from the Civil Aviation Authority (CAA) passenger survey, the London Luton Airport Limited (LLAL) annual monitoring report, and the 2011 Census journey to work data has been used.

3.3.3 For future years, forecast airport passenger demand has been developed by York Aviation, and this has been used in conjunction with Capita's report on mode share of airport passengers to produce future year airport passenger travel demand.

3.3.4 For airport employment, an additional 350 employees at Luton Airport per 1 million passengers per annum increase has been assumed based on advice from York Aviation. Freight demand to / from Luton Airport has also been assumed to increase in line with the forecast growth in passenger throughput at the airport.

3.3.5 Table 3.7 and Table 3.8 provide a summary of the daily trip totals for highway travel and public transport respectively.

3.3.6 More detailed Airport Trip generation values are included in Appendix A.

Table 3.7: Forecast Daily Luton Airport Highway Trip Totals (vehicles)

Mode	"Without" Expansion		"With" Expansion		
	2016	2027/2039/2043	2027	2039	2043
	14.6mppa	18mppa	21.5mppa	27mppa	32mppa
Car	34,690	39,685	44,318	49,029	54,622
Taxi	7,331	8,409	9,739	11,047	12,933
LGV	3,118	3,935	4,639	5,746	6,752
HGV	1,062	1,344	1,583	1,957	2,297
Total	46,201	53,373	60,278	67,778	76,605
Change from 2016		16%	30%	47%	66%

Table 3.8: Forecast Daily Luton Airport Public Transport Trip Totals (passengers)

Mode	"Without" Expansion		"With" Expansion		
	2016	2027 / 2039 / 2043	2027	2039	2043
	14.6mppa	18mppa	21.5mppa	27mppa	32mppa
Bus (Passengers)	8,010	9,668	11,326	15,213	17,975
Bus (Staff)	1,194	1,630	2,026	2,849	3,821
Rail (Passengers)	7,958	13,080	15,323	22,402	26,468
Rail (Staff)	918	1,134	1,330	1,669	2,032
Total	18,080	25,512	30,005	42,133	50,296
Change from 2016		41%	66%	133%	178%

3.4 Local Plan Growth Alternative Scenario

3.4.1 As discussed, the TAG-based forecasts include only those residential and employment developments classified as 'complete', 'near certain' or 'more than likely', with growth controlled to that forecast within TEMPro 7.2.

3.4.2 An alternative scenario has been produced for 2027, 2039 and 2043 which takes the development assumptions from the TAG-based forecasts and adds those developments classified as 'reasonably foreseeable' in Table 3.5 and Table 3.6. This planning scenario therefore represents the growth assumed within the current Local Plans for Luton Borough, Central Bedfordshire, North Hertfordshire, St Albans District and Dacorum.

3.4.3 Within this alternative scenario, the constraint to TEMPro forecasts is retained, resulting in the overall growth within each district being the same as that assumed for the TAG-based forecasts. This alternative scenario therefore results in a redistribution of growth across the model zones within each district.

4 TAG-BASED "WITHOUT" EXPANSION FORECASTS

4.1 Introduction

4.1.1 This section details the results from the TAG-based forecasts, excluding the proposed expansion at Luton Airport. "Without" Expansion forecasts have been produced for 2027, 2039 and 2043 assuming 18mppa at Luton Airport.

4.1.2 The remainder of this section considers the planning data forecasts adopted within these forecast scenarios, how these translate to growth in travel demand from the validated base year models, the convergence of the forecast models (both in terms of the demand model and the highway assignment model), and the impacts of growth in demand within the highway assignment model.

4.2 Planning Data Forecasts

4.2.1 As discussed in Section 3, the forecast planning data for a given scenario are based on a set of assumed residential and employment developments, with growth controlled to TEMPro 7.2 forecasts by district. For the TAG-based forecasts, the residential and employment developments included are those which have been classified as 'complete', 'near certain' or 'more than likely' within the Uncertainty Log.

4.2.2 Based on this, Table 4.1, Table 4.2 and Table 4.3 provide the assumed forecast planning data for the five internal districts for households, population and employment respectively. The growth from 2016, in terms of additional households, people and jobs, is controlled to the growth contained within TEMPro 7.2.

Table 4.1: Forecast Households by District

District	2016	2027	2039	2043
Luton	81,610	85,458	86,815	87,270
Central Bedfordshire	117,264	136,470	150,671	155,332
North Hertfordshire	57,594	68,023	76,408	79,210
St Albans	60,225	62,891	64,546	65,034
Dacorum	65,016	70,981	75,674	77,217
Internal Area	**381,710**	**423,823**	**454,113**	**464,063**

Table 4.2: Forecast Population by District

District	2016	2027	2039	2043
Luton	216,308	224,794	230,317	231,429
Central Bedfordshire	278,937	314,742	336,677	342,099
North Hertfordshire	133,230	153,565	166,633	169,861
St Albans	146,282	150,681	154,613	155,383
Dacorum	152,692	163,630	171,721	173,635
Internal Area	**927,449**	**1,007,412**	**1,059,961**	**1,072,408**

Table 4.3: Forecast Employment by District

District	2016	2027	2039	2043
Luton[3]	109,365	113,927	117,564	118,994
Central Bedfordshire	132,118	137,221	141,217	142,788
North Hertfordshire	58,856	61,777	63,896	64,728
St Albans	69,079	72,170	74,653	75,629
Dacorum	73,623	76,687	79,326	80,362
Internal Area	**443,042**	**461,782**	**476,657**	**482,500**

4.2.3 Considering the growth within the internal area, Figure 4.1 and Figure 4.2 summarise the forecast growth from 2016 in households and employment respectively. In terms of households, North Hertfordshire and Central Bedfordshire districts are assumed to have the highest growth in households, with St Albans and Luton Borough District forecast to have the lowest growth in households.

4.2.4 For forecast employment growth, as shown in Figure 4.2, there is less variation in growth rates between the five districts than forecast for household growth. By 2043, the growth in employment is forecast to be between 8.1% (in Central Bedfordshire) and 10% (in North Hertfordshire).

4.2.5 Figure 4.3 and Figure 4.4 show the forecast growth between 2016 and 2043 in households and employment respectively at a model zone level for the internal/simulation area. These figures does not show the growth assumed outside the five internal districts, which is based on TEMPro 7.2 forecasts.

4.2.6 Within these figures the locations of key residential and employment developments can be seen. Figure 4.3 highlights the location of forecast housing developments within southern Luton (Napier Park and Power Court), to

[3] TEMPro does not contain details on individual developments included in the forecasts; however, given the employment growth included within the proposed Masterplan for expansion at Luton Airport, it is assumed that the proposed expansion is not included within the TEMPro employment growth forecasts for Luton Borough.

the north of Dunstable at Houghton Regis, to the east of Leighton Buzzard, and at Wixams on the A6 between Luton and Bedford.

4.2.7 In terms of the forecast employment developments shown in Figure 4.4 , there are forecast employment developments linked with forecast residential developments (such as Houghton Regis and east of Leighton Buzzard), but also employment developments within Luton Newlands Park, Napier Park, Power Court, and Butterfield on the A505 to the north-east of Luton.

Figure 4.1: Forecast Household Growth from 2016 by District

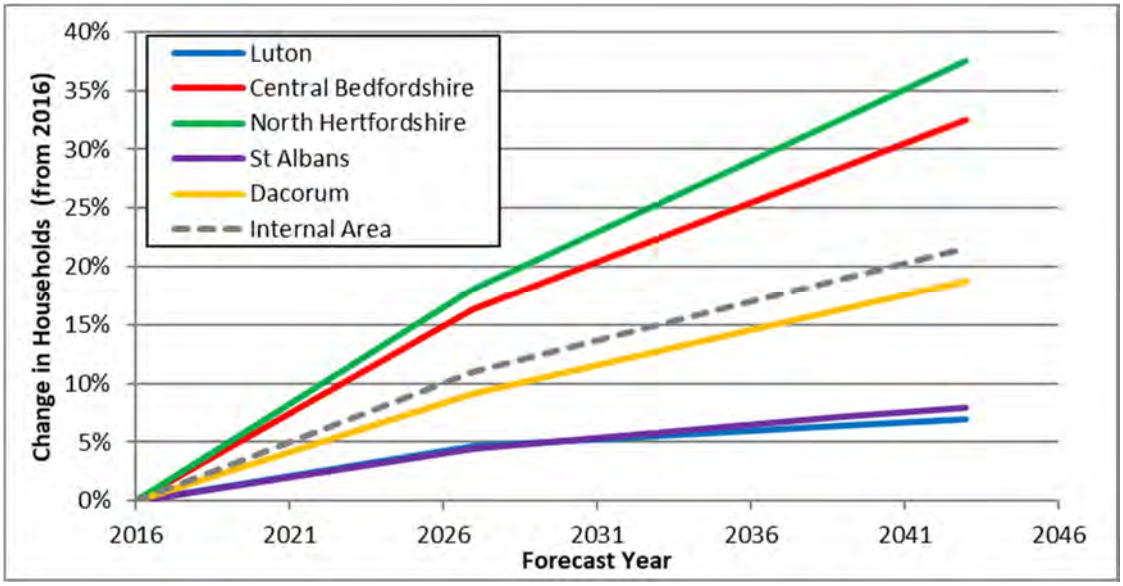


Figure 4.2: Forecast Employment Growth from 2016 by District

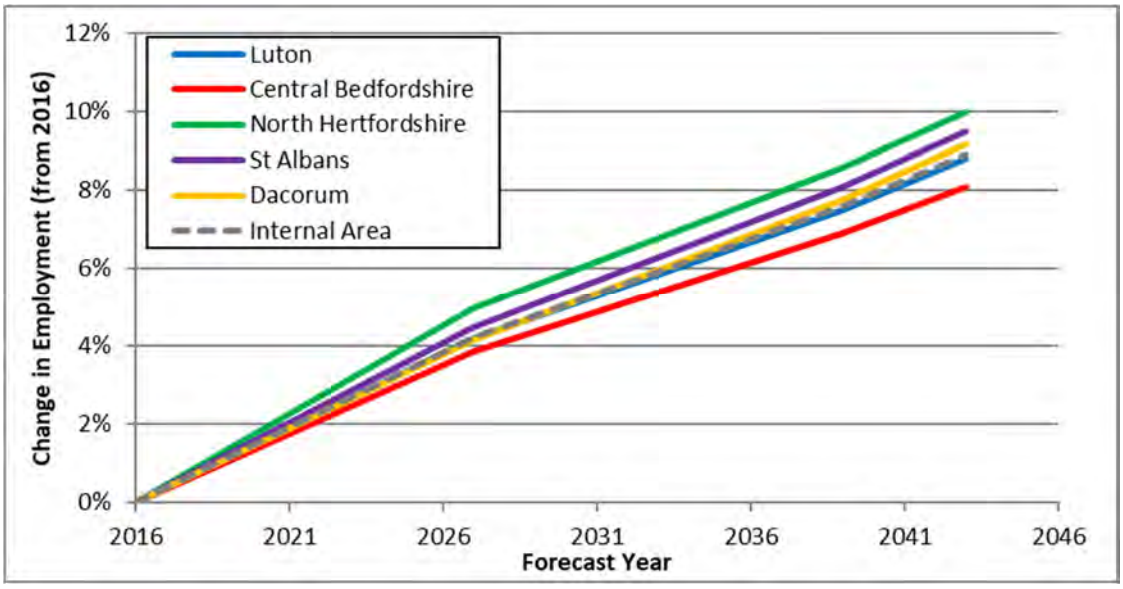


Figure 4.3: Forecast Household Growth (households per km2) from 2016 to 2043 – Internal/Simulation Area

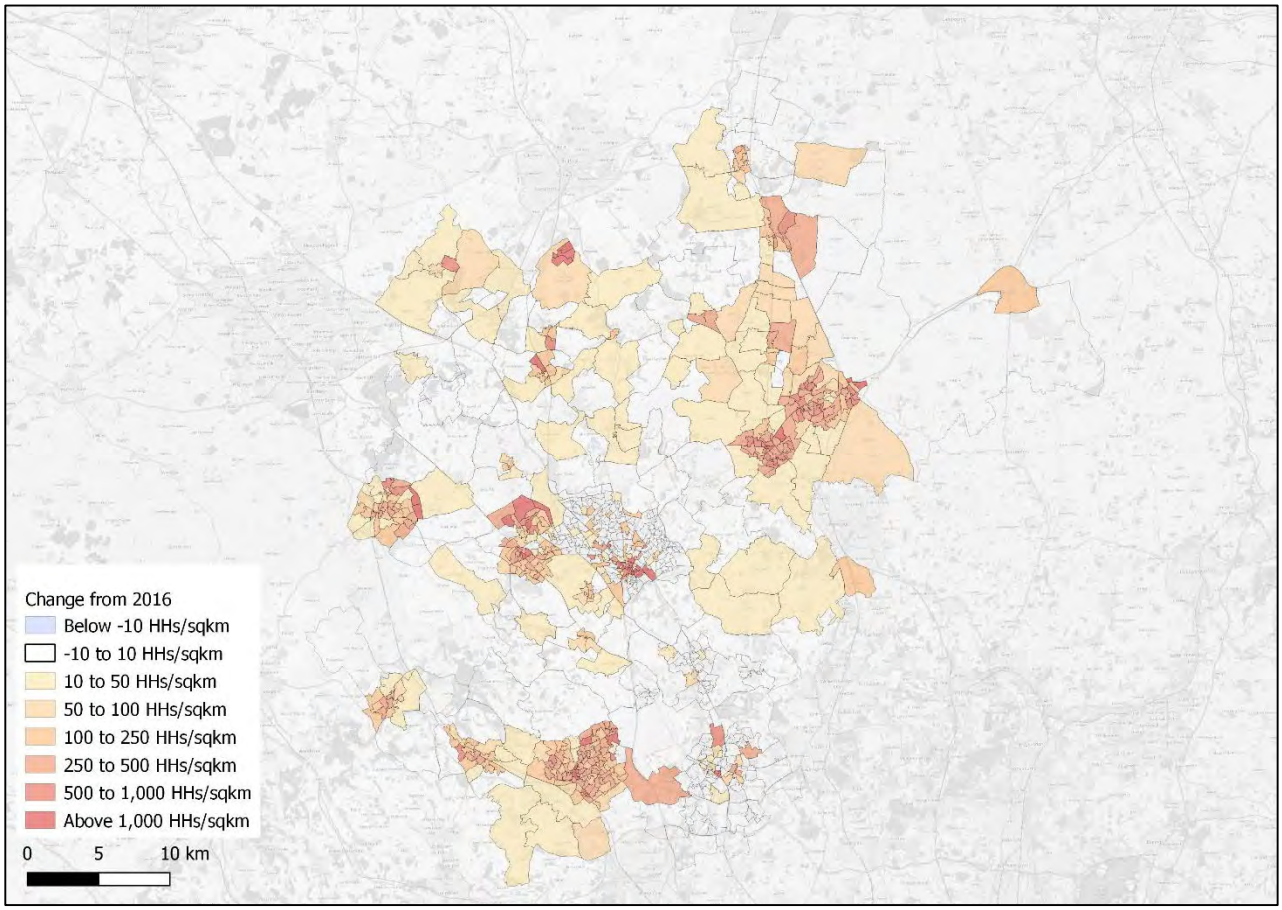
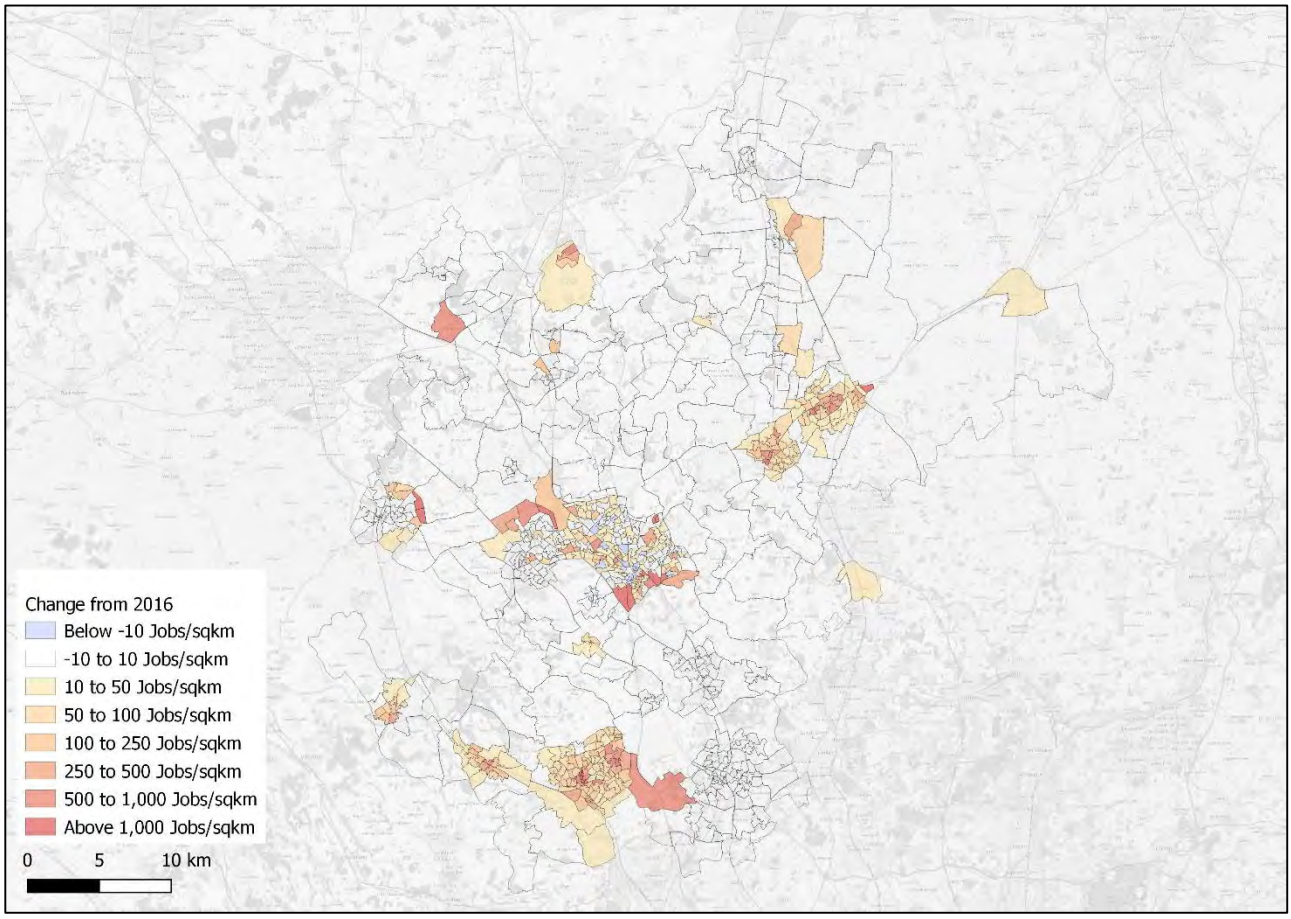


Figure 4.4: Forecast Employment Growth (jobs per km2) from 2016 to 2043 – Internal/Simulation Area



4.2.8 In terms of the constraint of forecast growth to TEMPro forecasts, Table 4.4 and Table 4.5 provide a comparison of the growth based on the developments included in the TAG-based scenario and that assumed within TEMPro for households and employment respectively.

4.2.9 In terms of forecast household growth, the constraint to TEMPro growth is adding growth across the internal area in all forecast years, with forecast growth in households being broadly doubled due to the constraint to TEMPro in 2043.

4.2.10 Within the districts, the constraining process in general increases the forecast growth in households for all districts except Luton Borough and Central Bedfordshire in 2027, where the constraining process reduces the assumed growth from that based on the Uncertainty Log.

4.2.11 For employment growth, in general the constraint to TEMPro growth reduces the assumed employment growth across the internal area; however, there is a relatively small increase in 2043 where the assumed growth based on the Uncertainty Log is increased by around 3%.

4.2.12 In terms of the impact of the constraint to TEMPro for employment growth by district, in general the process increases the assumed growth for districts within North Hertfordshire and Dacorum, and decreases the assumed growth for Luton, Central Bedfordshire and St Albans.

Table 4.4: Comparison of TAG-based and TEMPro Household Growth by District (Dwellings)

District	2027			2039			2043		
	Uncert.Log	TEMPro	Diff	Uncert.Log	TEMPro	Diff	Uncert.Log	TEMPro	Diff
Luton	8,632	3,848	-4,784	8,760	5,205	-3,555	8,760	5,660	-3,099
Central Bedfordshire	21,986	19,206	-2,780	27,279	33,407	6,127	28,079	38,068	9,988
North Hertfordshire	5,095	10,429	5,334	7,277	18,813	11,536	7,277	21,616	14,339
St Albans	3,024	2,666	-358	4,611	4,321	-290	4,611	4,809	198
Dacorum	3,256	5,965	2,709	3,594	10,657	7,063	3,594	12,201	8,607
Internal Area	**41,992**	**42,114**	**121**	**51,521**	**72,403**	**20,883**	**52,321**	**82,354**	**30,033**

Table 4.5: Comparison of TAG-based and TEMPro Employment Growth by District (Jobs)

District	2027			2039			2043		
	Uncert.Log	TEMPro	Diff	Uncert.Log	TEMPro	Diff	Uncert.Log	TEMPro	Diff
Luton	7,700	4,562	-3,138	8,697	8,200	-498	8,697	9,629	931
Central Bedfordshire	14,001	5,102	-8,898	16,980	9,099	-7,881	17,280	10,669	-6,611
North Hertfordshire	915	2,921	2,006	1,176	5,040	3,864	1,176	5,872	4,696
St Albans	5,867	3,091	-2,776	10,120	5,574	-4,546	10,120	6,550	-3,570
Dacorum	1,166	3,064	1,898	1,219	5,702	4,483	1,219	6,739	5,520
Internal Area	**29,649**	**18,740**	**-10,908**	**38,192**	**33,615**	**-4,577**	**38,492**	**39,458**	**966**

4.3 Demand Forecasts

4.3.1 Using the planning data forecasts detailed in Section 4.2, forecast trip-ends are estimated using a customised version of the DfT's CTripEnd software for each modelled year.

4.3.2 To run the trip-end model the population forecasts are required to be classified into 11 person types based on age, gender and employment status, and into a number of car ownership classifications based on household size and number of cars. In addition to this, the forecast employment data are allocated to 12 classifications representing different employment types, such as education, retail and services.

4.3.3 In order to provide these classifications, the proportions of population and employment by these categories from the TEMPro 7.2 forecasts have been applied. For internal zones, these have been applied based on the TEMPro zone (based on Census Middle Super Output Areas, or MSOAs) in which each CBLTM-LTN zone is contained.

4.3.4 The classifications for population, along with the proportions across the internal area forecast for 2016 and 2043, are shown in Table 4.6. This table shows the assumed aging of the population contained within TEMPro forecasts with a four percentage point increase in the proportion of retired people and corresponding reductions in children and adults of working age.

4.3.5 Figure 4.5 shows the forecast proportion of population for a simplified set of demographics (ignoring gender) by district for 2016 and 2043. This shows that there is limited variation in the assumed demographics across the five districts within the internal area, both in 2016 and in 2043.

Table 4.6: Detailed Population Proportions for Internal Area

Population Classification	2016	2043	Change
Children (aged 0 to 15)	21%	20%	-1%
Males in Full-time Employment (aged 16 to 74)	23%	21%	-2%
Males in Part-time Employment (aged 16 to 74)	4%	3%	-1%
Males Students (aged 16 to 74)	2%	2%	0%
Males Economically Inactive (aged 16 to 74)	7%	9%	2%
Males Retired (aged 75+)	3%	5%	2%
Females in Full-time Employment (aged 16 to 74)	14%	12%	-1%
Females in Part-time Employment (aged 16 to 74)	10%	9%	-1%
Females Students (aged 16 to 74)	2%	2%	0%
Females Economically Inactive (aged 16 to 74)	10%	11%	1%
Females Retired (aged 75+)	4%	6%	2%
Total	**100%**	**100%**	**0%**

4.3.6 The classifications for employment type, along with the assumed proportions within the internal area for 2016 and 2043, are shown in Table 4.7. This table shows that based on the TEMPro forecasts, there is not forecast to be a significant change in the types of employment within the internal area between 2016 and 2043.

4.3.7 Figure 4.5 shows the forecast proportion of employment by district for 2016 and 2043. This shows that there is some limited variation in the assumed proportion of employment by type within the internal area; however, the overall pattern in job type are similar between the five districts.

Table 4.7: Detailed Employment Proportions for Internal Area

Employment Classification	2016	2043	Change
Primary and Secondary Schools	9%	9%	0%
Higher Education	1%	1%	0%
Adult Education	1%	1%	0%
Hotels, Camp sites, etc.	1%	1%	0%
Retail Trade	11%	12%	1%
Health / Medical	6%	6%	0%
Services	10%	10%	0%
Industry, Construction and Transport	26%	25%	0%
Restaurants and Bars	4%	4%	0%
Recreation and Sport	4%	4%	0%
Agriculture and Fishing	0%	1%	0%
Business	29%	28%	-2%
Total	**100%**	**100%**	**0%**

Note: numbers do not add up to 100% due to rounding

4.3.8 The classifications for car ownership include both a measure of household size and the number of cars available. The assumed proportions within these categories for the internal area for 2016 and 2043, are shown in Table 4.8.

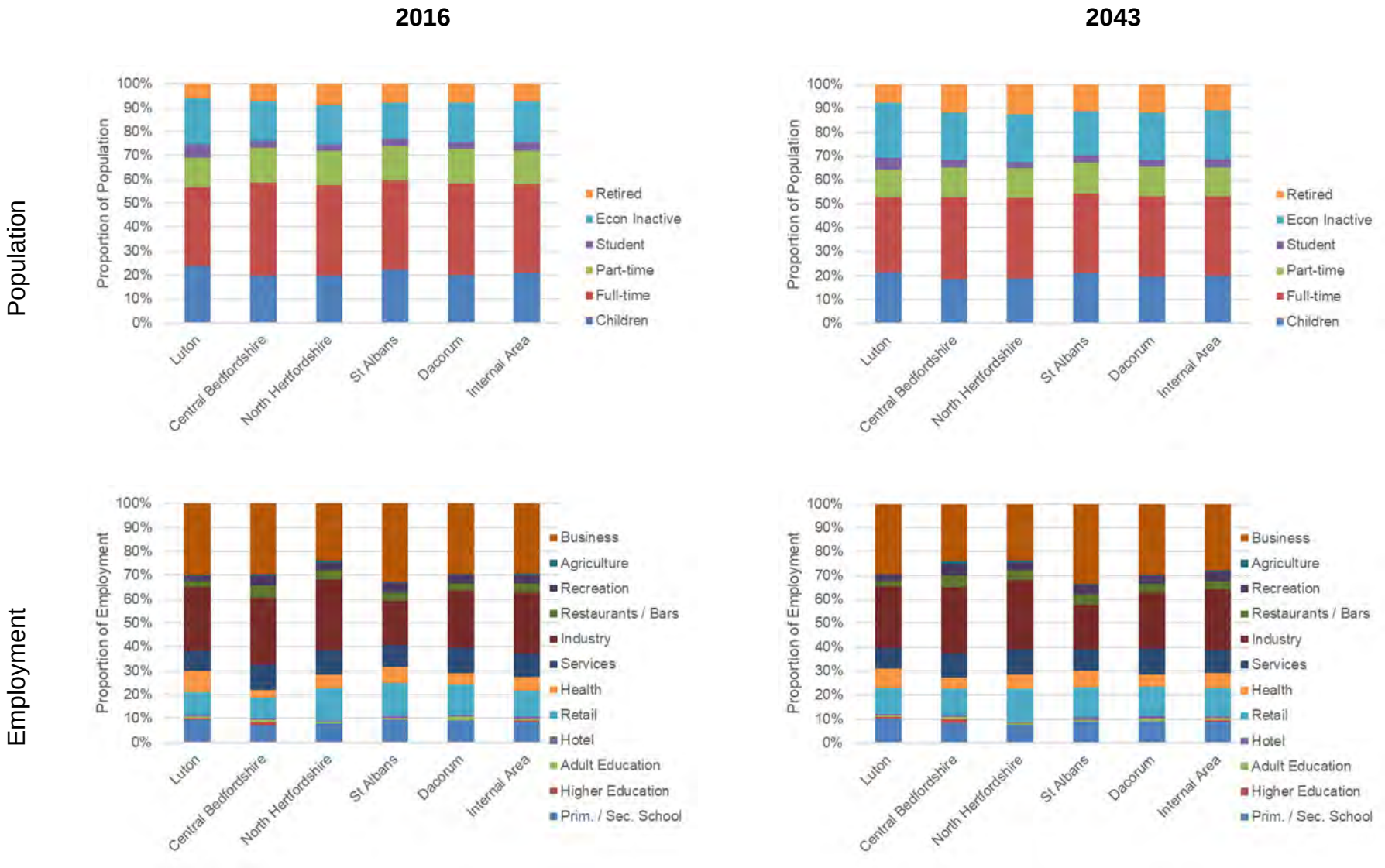
4.3.9 Figure 4.5 shows the forecast proportion of no-car and car available households by district for 2016 and 2039. This shows that Luton is assumed within TEMPro to have the highest rates of no-car available households in both 2016 and 2043, and shows the forecast reduction in the proportion of no-car available households between 2016 and 2043 in all districts.

Table 4.8: Detailed Car Ownership Proportions for Internal Area

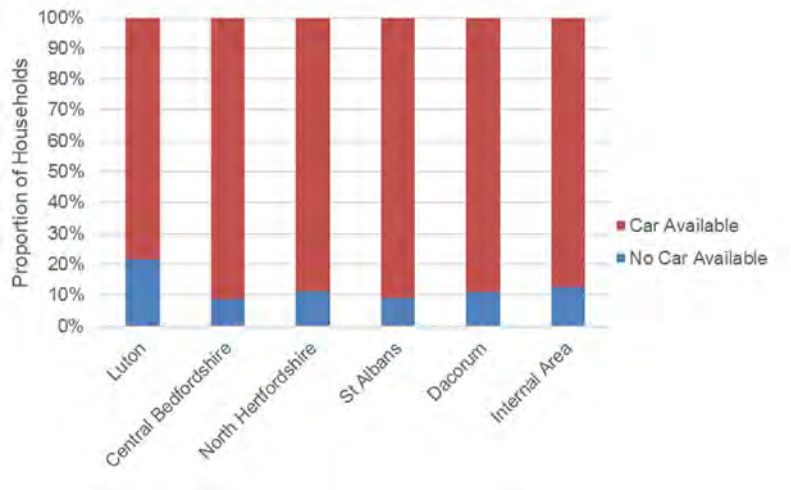
Population Classification	2016	2043	Change
1 Adult Households with No Car	5%	4%	-1%
1 Adult Households with One or More Cars	9%	9%	0%
2 Adult Households with No Car	5%	4%	-1%
2 Adult Households with One Car	22%	21%	-1%
2 Adult Households with Two or More Cars	30%	38%	8%
3+ Adult Households with No Car	3%	2%	-1%
3+ Adult Households with One Car	7%	4%	-2%
3+ Adult Households with Two or More Cars	20%	18%	-2%
Total	**100%**	**100%**	**0%**

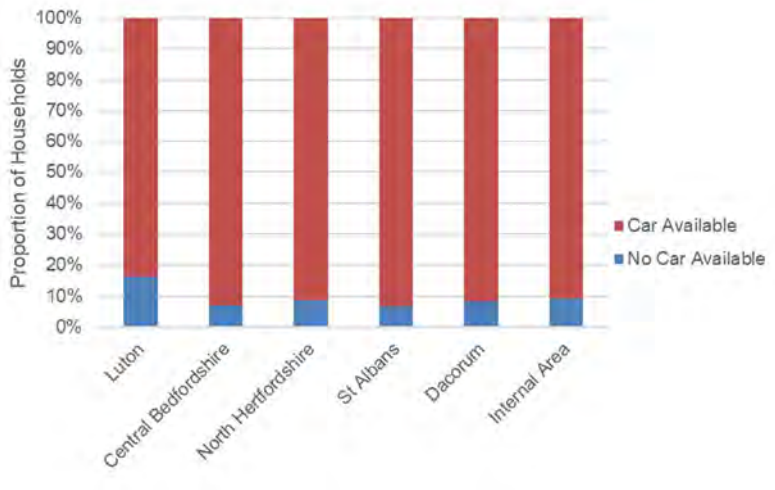
Note: numbers do not add up to 100% due to rounding

Figure 4.5: Detailed Planning Data Proportions by District



Car Ownership





4.3.10 The outturn trip-end estimates have been compared with the corresponding growth from the TEMPro 7.2 forecasts, and re-controlled to the trip-end growth contained within TEMPro 7.2.

4.3.11 Whilst there is a direct correspondence between trip-ends within CBLTM-LTN and TEMPro for highway (excluding freight) and active mode (walking and cycling) demand, such a correspondence does not exist for public transport. The public transport matrices used within the CBLTM-LTN represent all rail travel within Great Britain; however only bus travel which starts, ends or passes through Luton Borough and Central Bedfordshire is included in the model.

4.3.12 A similar measure of bus travel is not available within TEMPro, and so public transport trip-ends from the TEMPro 7.2 forecasts have included rail trip-ends for all model zones and bus trip-ends for only those zones within Luton Borough and Central Bedfordshire. Whilst this is not directly comparable with the matrices contained within the CBLTM-LTN, it is the closest available measure and is not thought to significantly impact on the model forecasts. This is due to the estimated trip-ends being used, in general, to calculate growth factors which are applied to the base year matrices rather than being used directly within the model forecasts.

4.3.13 The trip-ends detailed above are used to generate ‘reference’ demand which contains the impact of changes in land-uses but excludes the impacts of changes in travel costs, including congestion. This ‘reference’ demand forms the starting point for the demand model, which then adjusts this forecast demand in response to the travel costs from the highway and public transport assignment models.

4.3.14 Following the application of the demand model, Table 4.9 and Table 4.10 compare the growth in total travel (excluding freight) from the 2016 base year within the CBLTM-LTN forecasts and the TEMPro 7.2 forecasts for trip productions and attractions respectively. In both tables, the projected growth within the CBLTM-LTN forecasts are generally within one percentage point of the corresponding growth contained within TEMPro, both for the internal area as a whole and for each district individually.

4.3.15 There are expected to be some minor differences between the trip forecasts from CBLTM-LTN and TEMPro due to the impacts of changes in travel costs being excluded from the TEMPro forecasts but included within the CBLTM-LTN forecasts, resulting in a trip frequency response for some trip purposes. As discussed, there is also a different definition of public transport trips within CBLTM-LTN and TEMPro, which will also contribute to the minor differences.

4.3.16 Using the CBLTM-LTN forecasts contained within Table 4.9 and Table 4.10, Figure 4.6 and Figure 4.7 present the growth from 2016 by district for trip productions and trip attractions respectively for all modes excluding freight demand.

4.3.17 Home-based trips are the majority of non-freight trips, therefore, a strong correlation between the forecast growth in households and the forecast growth in trip productions is expected. Comparing Figure 4.1 and Figure 4.6 shows this correlation between forecast household and trip production growth. North

Hertfordshire and Central Bedfordshire have the highest forecast growth in both households and trip productions, with Luton Borough and St Albans District having the lowest forecast growth in both households and trip productions.

4.3.18 Considering trip attractions, these are most closely aligned with employment although the correspondence is not as strong as for trip productions and households. Trips are attracted to both employment locations (including commuting, business and shopping trips) and residential locations (such as visiting friends and relatives).

4.3.19 However, comparing the forecast trip attraction growth shown in Figure 4.7 with the forecast employment growth (shown in Figure 4.2) shows a similar, smaller variation in both forecast trip attraction and employment growth by district.

Figure 4.6: Forecast Daily Trip Production Growth from 2016 by District, All Modes Excluding Freight

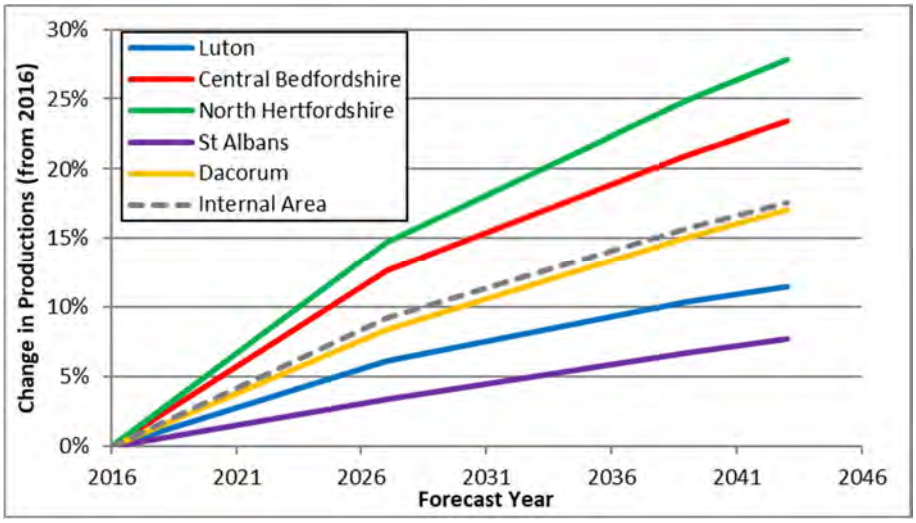
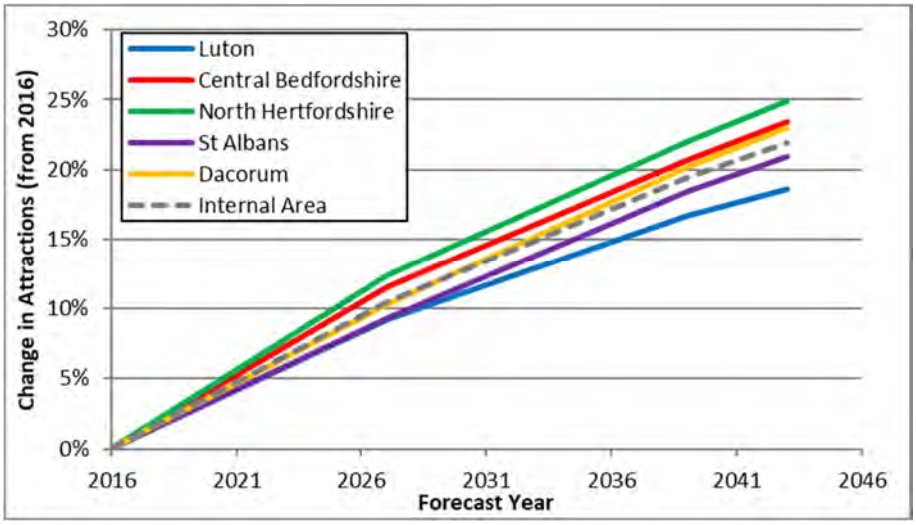


Figure 4.7: Forecast Daily Trip Attraction Growth from 2016 by District, All Modes Excluding Freight



4.3.20 In addition to the analysis of forecast trip growth for all modes, Table 4.11 and Table 4.12 provide the corresponding comparisons of forecast CBLTM-LTN and TEMPro growth for highway trips only (excluding freight) for trip productions and attractions respectively.

4.3.21 As with the analysis of all modes, the forecast growth in daily highway trips within CBLTM-LTN aligns well with the corresponding growth contained within TEMPro 7.2 forecasts. In general, the growth forecast within CBLTM-LTN is within one to three percentage points of that included within TEMPro, both for the internal area and each district individually.

4.3.22 In addition to the impact of trip frequency, these results for CBLTM-LTN also include the impact of the mode choice included within the demand model. TEMPro contains forecast travel demand by mode; however, these do not include a response to forecast travel costs. Given the results presented within Table 4.9 to Table 4.12, these demonstrate that the CBLTM-LTN forecasts represent the scale and pattern of growth in daily travel demand within the internal area forecast within TEMPro.

4.3.23 Based on the forecasts contained within Table 4.11 and Table 4.12, Figure 4.8 and Figure 4.9 show the forecast growth from 2016 in daily highway trips by district within the internal area for trip productions and attractions respectively. As discussed, forecast trip production growth is most closely aligned with the forecast growth in households, with forecast trip attraction growth most closely aligned with the forecast change in employment.

4.3.24 For trip productions, both Central Bedfordshire and North Hertfordshire are forecast to have the highest growth in households and highway trips across the five districts. St Albans District is forecast to have the lowest growth in daily highway trip productions, and this district also has one of the lowest forecast growths in households.

4.3.25 For forecast daily trip attraction growth, there is less variation between districts within the internal area in the CBLTM-LTN forecasts, which is also the case in the TEMPro 7.2 forecasts and the forecast growth in employment (an indicator of trip attraction growth) as shown in Figure 4.2.

Figure 4.8: Forecast Daily Trip Production Growth from 2016 by District, Highway Excluding Freight

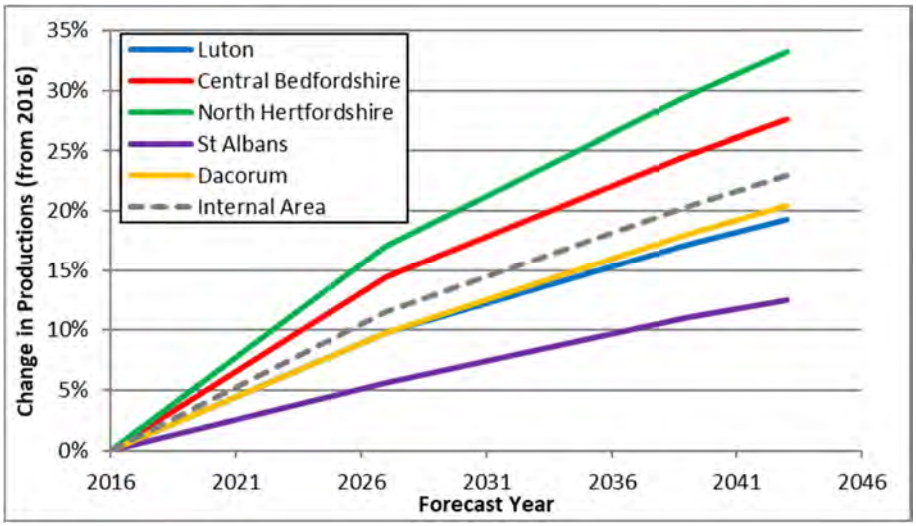
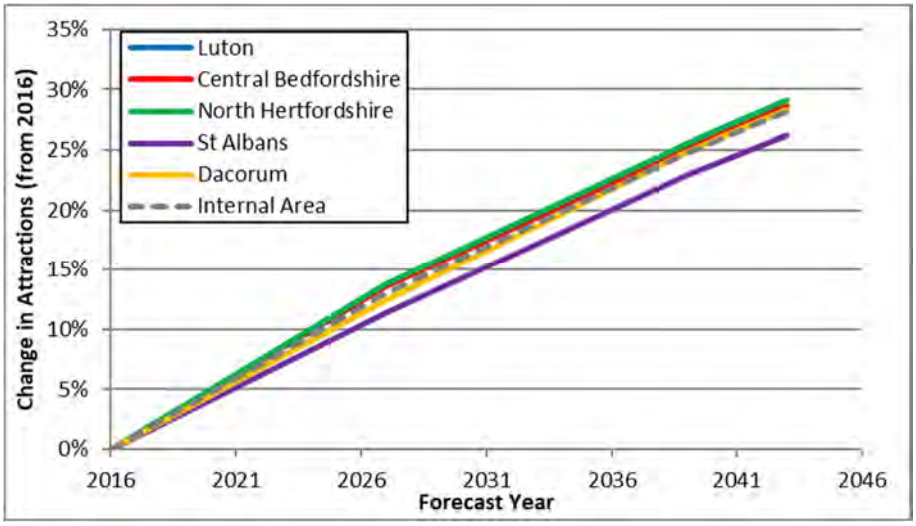


Figure 4.9: Forecast Daily Trip Attraction Growth from 2016 by District, Highway Excluding Freight



4.3.26 Growth in freight trips, for LGV and HGV, is forecast using a different approach as neither CTripEnd nor TEMPro provides forecasts for freight travel. Aggregate growth in freight demand has been derived from the latest DfT National Transport Model Road Traffic Forecasts (RTF18), with the allocation of this growth to model zones determined by the forecast change in employment.

4.3.27 Trip rates from TRICS have been estimated by CTripEnd employment type, and these have been applied to the forecast employment to provide weights for the allocation of RTF18 LGV and HGV growth to model zones.

4.3.28 Table 4.13 provides a summary of the forecast growth in daily freight trips from 2016 for the internal area. This shows that there is some variation in the forecast growth in freight trips across the five districts within the internal area. This is due to differences in the employment forecasts for these districts, not

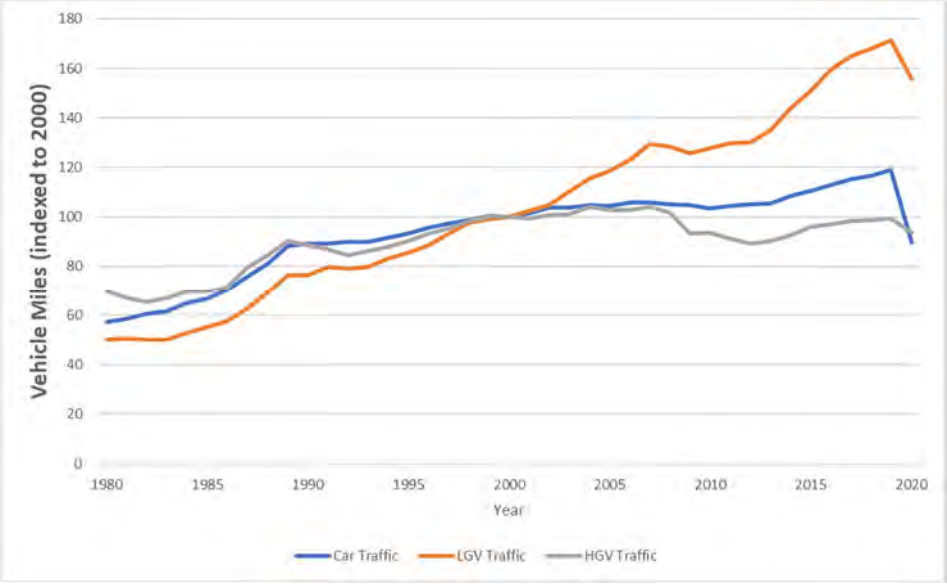
just in terms of the overall growth in employment but also the assumptions of the different employment types within each district.

4.3.29 The classification of forecast employment growth is determined by the proportions of employment types contained within the TEMPro 7.2 forecasts. Where growth in employment is forecast to be concentrated in employment types with higher freight trip rates (such as warehousing and industry), these areas will have proportionally higher forecast growth in freight trips. Conversely, where TEMPro assumes employment growth is focussed on employment types with lower trip rates (such as education and business / office work) these areas have relatively low forecast growth in freight demand.

4.3.30 The forecast growth in freight travel from RTF18 shows higher growth in LGV trips (growth of 43% to 2043) compared with the corresponding forecasts for HGV trips (growth of 15% to 2043) and the forecast growth in non-freight highway trips from TEMPro (growth of 20% to 2043).

4.3.31 This differential in forecast growth by vehicle type is in part due to observed trends in traffic growth by vehicle type. Figure 4.10 shows the trends in road traffic by vehicle type from the DfT's Road Traffic Statistics[4]. This shows significant growth in LGV traffic from the early 2000s, with limited change in car and HGV traffic over the same period. However, during 2020 all traffic shows declining trends.

Figure 4.10: Road Traffic (annual vehicle miles) by Vehicle Type in Great Britain



Source: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/981969/tra0101.ods

4.3.32 Looking at the DfT Road Traffic Statistics for 2020, the summary states:

4 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1028165/road-traffic-estimates-in-great-britain-2020.pdf

"Road traffic trends during 2020 have been affected by the coronavirus (COVID-19) pandemic in the UK. 280.5 billion miles were driven on Great Britain's roads in 2020, a 21.3% decrease on the previous year."

4.3.33 With respect to the pre-COVID trends, within the summary of the DfT Road Traffic Statistics of 2019[5], the document answered the question of why van traffic is rising so quickly as follows:

a. Alongside the 106% increase in van miles between 1994 and 2019, the number of licensed vans rose 93% over the same period, from 2.1 to 4.1 million.

b. In contrast to the trend seen in average car mileage, the average annual mileage per van in Great Britain (estimated from van vehicle miles divided by van stock) has remained broadly stable, at around 13,000 miles per year.

c. Over the last twenty years, trends in van traffic have followed changes in the economy closely. This is perhaps to be expected given the mainly commercial use of vans, and the variety of uses to which they are put.

d. Gross domestic product (GDP) resumed growth after the 2008 recession, but van traffic grew even faster than GDP between 2012 and 2019. This additional growth may be linked to a shift in the way consumers and businesses operate.

4.3.34 The Century Park development was not included in the "Without" Expansion scenario. This is due to the case that the development could not be implemented without the Century Park Access Road (CPAR), which is now included as a part of the Expansion proposals and known as the Airport Access Road (AAR). Therefore, the Century Park development demands were included in the "With" Expansion Scenario only.

4.3.35 Moreover, 'manual' adjustments for some of the Luton local large developments was undertaken to assure that the generated trips are adequately represented and tie in with the relevant Transport Assessment (TA) trip generation. After investigating the "Without" Expansion Scenario, the Napier Park and Newlands Park developments were adjusted to reflect more reasonable highway trip generation.

5 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/916749/road-traffic-estimates-in-great-britain-2019.pdf

Table 4.9: Forecast Daily Trip Production Growth from 2016 by District, All Modes Excluding Freight

District	2027		2039		2043	
	CBLTM-LTN	TEMPro	CBLTM-LTN	TEMPro	CBLTM-LTN	TEMPro
Luton	6%	5%	10%	8%	11%	9%
Central Bedfordshire	13%	12%	21%	19%	23%	21%
North Hertfordshire	15%	15%	25%	25%	28%	27%
St Albans	3%	4%	7%	7%	8%	8%
Dacorum	8%	8%	15%	14%	17%	15%
Internal Area	**9%**	**9%**	**16%**	**15%**	**18%**	**16%**

Table 4.10: Forecast Daily Trip Attraction Growth from 2016 by District, All Modes Excluding Freight

District	2027		2039		2043	
	CBLTM-LTN	TEMPro	CBLTM-LTN	TEMPro	CBLTM-LTN	TEMPro
Luton	9%	10%	17%	18%	19%	20%
Central Bedfordshire	12%	11%	21%	20%	23%	23%
North Hertfordshire	12%	12%	22%	21%	25%	24%
St Albans	9%	10%	18%	19%	21%	22%
Dacorum	10%	11%	20%	19%	23%	22%
Internal Area	**10%**	**11%**	**19%**	**19%**	**22%**	**22%**

Table 4.11: Forecast Daily Trip Production Growth from 2016 by District, Highway Excluding Freight

District	2027		2039		2043	
	CBLTM-LTN	TEMPro	CBLTM-LTN	TEMPro	CBLTM-LTN	TEMPro
Luton	10%	9%	17%	15%	19%	17%
Central Bedfordshire	14%	14%	25%	22%	28%	25%
North Hertfordshire	17%	17%	30%	27%	33%	31%
St Albans	6%	5%	11%	9%	13%	10%
Dacorum	10%	10%	18%	16%	20%	19%
Internal Area	**12%**	**11%**	**20%**	**18%**	**23%**	**20%**

Table 4.12: Forecast Daily Trip Attraction Growth from 2016 by District, Highway Excluding Freight

District	2027		2039		2043	
	CBLTM-LTN	TEMPro	CBLTM-LTN	TEMPro	CBLTM-LTN	TEMPro
Luton	14%	12%	25%	21%	28%	24%
Central Bedfordshire	14%	13%	25%	23%	29%	26%
North Hertfordshire	14%	13%	25%	23%	29%	27%
St Albans	11%	12%	23%	21%	26%	24%
Dacorum	12%	12%	25%	22%	28%	25%
Internal Area	**13%**	**12%**	**25%**	**22%**	**28%**	**25%**

Table 4.13: Forecast Daily Trip Production Growth from 2016 by District, Freight

District	2027		2039		2043	
	LGV	HGV	LGV	HGV	LGV	HGV
Luton	18%	6%	37%	13%	43%	16%
Central Bedfordshire	21%	4%	39%	10%	45%	13%
North Hertfordshire	17%	5%	35%	12%	41%	14%
St Albans	14%	3%	31%	9%	36%	11%
Dacorum	15%	3%	33%	10%	39%	13%
Internal Area	**18%**	**4%**	**36%**	**11%**	**41%**	**13%**

4.4 Model Convergence

4.4.1 Within the CBLTM-LTN suite there are two main measures of convergence measuring that of the demand model and the highway assignment models.

4.4.2 The demand model convergence measures the change in the demand estimates between two consecutive iterations using the $\%Gap$ statistic. More information on how the $\%Gap$ is calculated is given in the *'Demand Model Development Report'*.

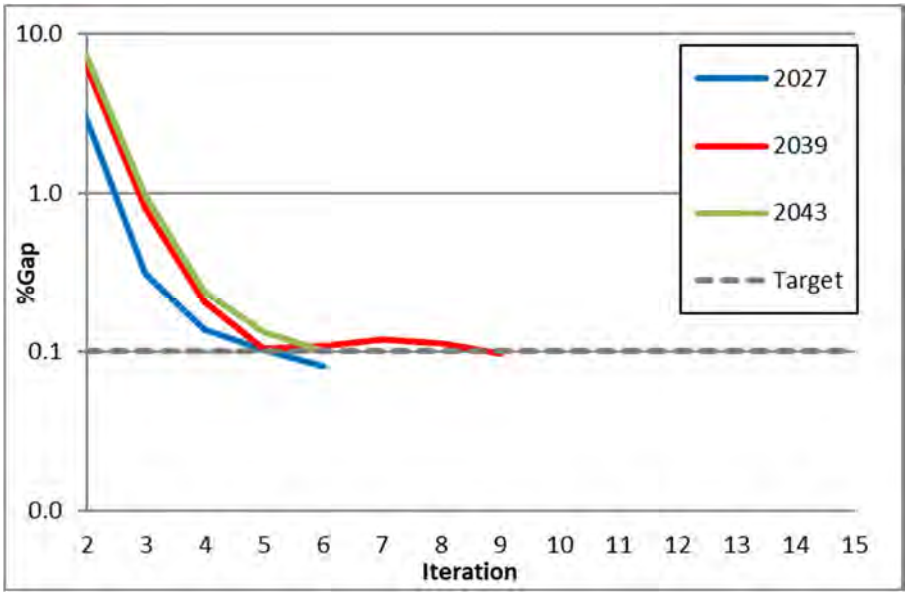
4.4.3 The target $\%Gap$ value for the demand model is a value below 0.1%, and Table 4.14 provides a summary of the demand model convergence for the TAG-based "Without" Expansion forecasts. These convergence statistics are also shown in Figure 4.11.

4.4.4 For all forecast years the demand model reaches the target %Gap value within a reasonable number of iterations. In general, the number of iterations required to reach convergence increases in later forecast years.

Table 4.14: TAG-based "Without" Expansion Demand Model Convergence ($\%Gap$)

Iteration	2027	2039	2043
2	2.975	6.405	7.443
3	0.311	0.814	0.969
4	0.137	0.209	0.243
5	0.102	0.105	0.134
6	0.080	0.108	0.100
7		0.119	
8		0.112	
9		0.097	

Figure 4.11: TAG-based "Without" Expansion Demand Model Convergence



4.4.5 The convergence of the highway assignment model is measured using a statistic calculated within the assignment, also referred to as *%Gap*, with the target for the highway assignment models being a *%Gap* value of less than 0.01% in four consecutive iterations. Table 4.15 provides an overview of the highway assignment convergence in the three modelled hours for the TAG-based "Without" Expansion forecasts.

4.4.6 For each forecast year and time period, the highway assignment model reaches the required level of convergence. As with the variable demand model, the number of iterations required to reach convergence generally increases in later forecast years and is also higher in the peak hours than in the interpeak. Both these effects are due to the level of congestion within the assignment, with additional iterations generally required as forecast congestion increases.

Table 4.15: TAG-based "Without" Expansion Highway Model Convergence

Forecast Year	AM Peak Hour 0800-0900		Interpeak Hour Average (1000-1600)		PM Peak Hour 1700-1800	
	Iterations	%Gap	Iterations	%Gap	Iterations	%Gap
2027	11	0.0089	8	0.0028	14	0.0073
2039	25	0.0069	8	0.0049	20	0.0044
2043	29	0.0066	11	0.0027	29	0.0073

4.5 Highway Assignment Forecasts

4.5.1 This section details forecasts from the TAG-based “Without” Expansion highway assignment models. This firstly considers district-level network statistics, which report the forecast change in traffic (measured through vehicle-kms) and average network speeds.

4.5.2 Table 4.16 details the forecast changes in vehicle-kms from the 2016 base year highway model by time period and by district. Each link within the model has been allocated to a district based on the mid-point of the link as part of this analysis. Table 4.16 also provides the forecast change in vehicle-kms for the simulation network (where detailed junction modelling is included), which broadly corresponds with the five internal districts.

4.5.3 Considering the forecast changes in traffic detailed in Table 4.16, traffic is forecast to increase over time in all districts and time periods, with larger forecast increases in traffic in the interpeak hour compared with the AM Peak and PM Peak hours as traffic moves away from the congested time periods.

4.5.4 Whilst the analysis of daily trip productions considers trips produced within each district and this analysis considers the traffic on links within each district, there is a correlation between the forecast trip production growth shown in Figure 4.8 and the forecast traffic growth shown in Table 4.16. The forecast traffic growth in all time periods within Central Bedfordshire and North Hertfordshire are above the simulation network average, and these two districts also have above average forecast growth in highway trip productions.

Table 4.16: Forecast Change in Vehicle-kms from 2016, TAG-based "Without" Expansion

Period	District	2027	2039	2043
AM Peak Hour (08:00 to 09:00)	Luton	10%	16%	18%
	Central Bedfordshire	15%	28%	31%
	North Hertfordshire	13%	25%	29%
	St Albans	9%	17%	19%
	Dacorum	9%	19%	22%
	Simulation Network	**11%**	**22%**	**25%**
Interpeak Hour (between 10:00 to 16:00)	Luton	11%	22%	24%
	Central Bedfordshire	17%	33%	37%
	North Hertfordshire	17%	35%	39%
	St Albans	13%	27%	30%
	Dacorum	14%	30%	34%
	Simulation Network	**15%**	**31%**	**35%**
PM Peak Hour (17:00 to 18:00)	Luton	8%	14%	17%
	Central Bedfordshire	14%	24%	27%
	North Hertfordshire	12%	24%	26%
	St Albans	10%	19%	21%
	Dacorum	8%	17%	21%
	Simulation Network	**11%**	**21%**	**24%**

4.5.5 In response to the forecast increase in traffic on the highway network, average network speeds are forecast to generally decrease over time. Table 4.17 provides a summary of the forecast average speed changes by district and for the simulation network within the three modelled hours.

4.5.6 Average network speeds across the simulation network are forecast to reduce by between 5% and 10% (depending on the modelled hour) by 2043 in response to the forecast increase in traffic of between 24% (in the PM Peak hour) and 35% (in the interpeak hour). Table 4.17 also shows that in general average network speeds are forecast to reduce by a larger percentage in the AM Peak and PM Peak hours compared with the interpeak hour, reflecting the increased congestion forecast within the peak hours.

4.5.7 The forecast average speed reductions are smaller in magnitude within Luton Borough and Central Bedfordshire compared with the other districts. This is in response to the additional highway infrastructure assumed within the highway model within the future scenarios; where the M1-A5 link road, Woodside Link and M1 Junction 11a are introduced, and the M1-A6 Luton Northern Bypass is

introduced. Both these schemes provide mitigation for the additional forecast traffic within the districts.

Table 4.17: Forecast Change in Average Speed from 2016,TAG-based "Without" Expansion

Period	District	2027	2039	2043
AM Peak Hour (08:00 to 09:00)	Luton	-2%	-4%	-5%
	Central Bedfordshire	-1%	-4%	-6%
	North Hertfordshire	-4%	-8%	-10%
	St Albans	-4%	-10%	-13%
	Dacorum	-6%	-11%	-11%
	Simulation Network	**-3%**	**-8%**	**-10%**
Interpeak Hour (between 10:00 to 16:00)	Luton	-1%	-3%	-3%
	Central Bedfordshire	0%	-3%	-3%
	North Hertfordshire	-2%	-5%	-6%
	St Albans	-2%	-6%	-7%
	Dacorum	-3%	-5%	-7%
	Simulation Network	**-1%**	**-4%**	**-5%**
PM Peak Hour (17:00 to 18:00)	Luton	-5%	-10%	-12%
	Central Bedfordshire	-2%	-5%	-7%
	North Hertfordshire	-4%	-8%	-10%
	St Albans	-4%	-9%	-11%
	Dacorum	-6%	-10%	-10%
	Simulation Network	**-3%**	**-8%**	**-10%**

4.5.8 In addition to the analysis above showing the forecast change in vehicle-kms and average network speeds across the five internal districts and the simulation network, Table 4.18 and Table 4.19 show the forecast change in assigned vehicle-time and vehicle-delay from the 2016 base year in the "Without" Expansion scenario.

4.5.9 Table 4.18 shows that between 2016 and 2043 assigned vehicle time on the simulation network is forecast to increase by between 37% in the PM Peak hour and 42% in the interpeak hour. Within the five districts, Luton Borough has the lowest forecast increase in assigned vehicle-time between 2016 and 2043 (of between 25% in the AM Peak hour and 32% in PM Peak hour), with the largest forecast increase in assigned vehicle-time being 48% in the interpeak hour in North Hertfordshire between 2016 and 2043.

Table 4.18: Forecast Change in Assigned Vehicle-Time from 2016, TAG-based "Without" Expansion

Period	District	2027	2039	2043
AM Peak Hour (08:00 to 09:00)	Luton	13%	21%	25%
	Central Bedfordshire	16%	34%	39%
	North Hertfordshire	17%	37%	43%
	St Albans	13%	30%	36%
	Dacorum	16%	34%	37%
	Simulation Network	**15%**	**33%**	**40%**
Interpeak Hour (between 10:00 to 16:00)	Luton	12%	25%	28%
	Central Bedfordshire	17%	36%	42%
	North Hertfordshire	19%	42%	48%
	St Albans	15%	34%	39%
	Dacorum	18%	37%	44%
	Simulation Network	**16%**	**36%**	**42%**
PM Peak Hour (17:00 to 18:00)	Luton	14%	26%	32%
	Central Bedfordshire	16%	31%	36%
	North Hertfordshire	17%	35%	40%
	St Albans	14%	31%	36%
	Dacorum	16%	30%	34%
	Simulation Network	**15%**	**31%**	**37%**

4.5.10 Table 4.19 shows that between 2016 and 2043, vehicle-delay across the simulation network is forecast to increase by between 81% in the PM Peak hour and 79% in the interpeak hour. Within the five districts, Luton Borough has the lowest forecast increase in vehicle-delay between 2016 and 2043 (of between 44% in the AM Peak hour and 70% in the PM Peak hour), with the largest forecast increase in vehicle-delay being 103% between 2016 and 2043 in North Hertfordshire in the interpeak hour.

Table 4.19: Forecast Change in Vehicle-Delay from 2016, TAG-based "Without" Expansion

Period	District	2027	2039	2043
AM Peak Hour (08:00 to 09:00)	Luton	23%	38%	44%
	Central Bedfordshire	29%	70%	85%
	North Hertfordshire	24%	66%	81%
	St Albans	23%	62%	80%
	Dacorum	38%	81%	86%
	Simulation Network	**28%**	**70%**	**87%**
Interpeak Hour (between 10:00 to 16:00)	Luton	17%	37%	43%
	Central Bedfordshire	22%	63%	76%
	North Hertfordshire	35%	88%	103%
	St Albans	26%	78%	90%
	Dacorum	36%	78%	82%
	Simulation Network	**25%**	**67%**	**79%**
PM Peak Hour (17:00 to 18:00)	Luton	30%	56%	70%
	Central Bedfordshire	33%	69%	83%
	North Hertfordshire	25%	66%	78%
	St Albans	29%	69%	88%
	Dacorum	43%	77%	80%
	Simulation Network	**28%**	**66%**	**81%**

4.5.11 Figure 4.12 shows the forecast changes in vehicle-kms and average network speeds from 2016 as reported in Table 4.16 and Table 4.17. Within Figure 4.12 the steady increase in forecast vehicle-kms between 2027 and 2043 within all districts can be seen. Similarly, the forecast average speed within all districts shows an overall reduction due to the additional traffic within the forecast demand. As mentioned previously, both Luton Borough and Central Bedfordshire have lower average speed reduction.

4.5.12 This outcome is due to the introduction of the Luton Northern Bypass (which is assigned to Central Bedfordshire within this analysis) which is forecast to attract traffic away from Luton Borough.

4.5.13 Figure 4.12 also shows the impact of the additional assumed infrastructure on average speeds within Luton Borough and Central Bedfordshire, which provide mitigation for the forecast increase in traffic within these districts and limits the average speeds reduction compared with the other districts. Beyond 2039, the forecast reduction in average network speeds is similar across the five districts,

with Dacorum forecast to have a slight/minimal increase in average speed (around 0.5%).

4.5.14 In addition to the forecast network statistics, Figure 4.13 and Figure 4.14 show the forecast change in assigned flows from 2016 for the simulation network and for Luton Borough respectively. Within this analysis, where the network definition changes within a forecast scenario (such as the introduction of M1 Junction 11a), network links have been matched to show the change at these locations from 2016; so a reasonable comparison could be undertaken as much as possible.

4.5.15 This is not possible where new infrastructure is included in the network, such as the M1-A6 and M1-A5 link roads. In this case, the forecast flow for the future year has been shown, i.e. showing the forecast flow change against zero flow in the base year. This therefore shows a large increase in traffic volumes on these new links within Figure 4.13 and Figure 4.14.

4.5.16 Considering the forecasts contained in Figure 4.13 these show that at a strategic level, growth in traffic is forecast to be most prominent on the Strategic Road Network within the modelled area, namely the M1, M25 and A1(M). Within the 2043 scenario, forecast growth in traffic on the A421, A6, A5 and other key routes within the simulation network can also be seen.

4.5.17 Within Figure 4.13 the forecast impact of firstly the introduction of the M1-A5 link road, the Woodside Link and M1 Junction 11a from 2027 onwards can be seen, and then also the introduction of the M1-A6 Luton Northern Bypass from 2027 onwards. The forecast impact of these two schemes can also be seen within Figure 4.14, with forecast reductions in traffic volumes within northern Dunstable and northern Luton with the introduction of the M1-A5 link road and the Luton Northern Bypass respectively,

4.5.18 There are also forecast flow changes from 2016 within eastern Luton in response to the assumed junction improvements (see Table 3.4), and also flow increases at the southern end of Vauxhall Way within Luton in response to the assumed widening of this route.

4.5.19 In addition to these figures showing the forecast change in assigned vehicle flows, Appendix B details the forecast flows at a number of selected locations in the vicinity of Luton Airport for the AM Peak hour, interpeak hour, PM Peak hour and for Annual Average Daily Traffic (AADT).

4.5.20 In addition to the analysis of forecast flows, Table 4.20 provides a summary of the forecast journey times along key routes in the TAG-based “Without” Expansion forecasts. These journey times have been calculated from M1 Junction 9, M1 Junction 11 and Hitchin to / from the existing terminal building, and along the M1 between Junctions 8 and 12.

4.5.21 In general, this analysis shows a forecast increase in journey times over time excluding the proposed expansion, with journey times along the M1 between Junctions 8 and 12 forecast to increase between 2016 and 2043 by between 1 min 58 sec in the AM Peak hour northbound and 5 min 51 sec in the AM Peak southbound.

4.5.22 The exception to this is for the Luton Airport to M1 Junction 9 route which is forecast to reduce by 18 sec between the 2016 base year and 2043 in the PM Peak hour. This is due to the assumed improvements in the “Without” Expansion scenarios for the A1081 to M1 southbound merge, which reduces forecast delays at this location.

4.5.23 The journey time for the route between Hitchin and Terminal 1 (via A505 & Vauxhall Way) is forecast to have a reduction In journey time (in 2027 in the AM Peak hour and interpeak) and in all forecast years in the PM Peak hour. This is due to the improvements scheme on Vauxhall Way which is assumed in all “without” Expansion scenarios.

4.5.24 In addition to this, Appendix C provides details on the forecast average junction delays across the simulation network and within Luton Borough for the TAG-based “Without” Expansion scenarios.

4.5.25 Delays are calculated individually for each turn at junctions within the simulation network, and these individual turn delays have been summarised by taking a flow-weighted average delay at each junction. It is this forecast flow-weighted average delay which is presented within Appendix C.

Figure 4.12: Forecast Change in Vehicle-kms and Average Speed from 2016, TAG-based “Without” Expansion

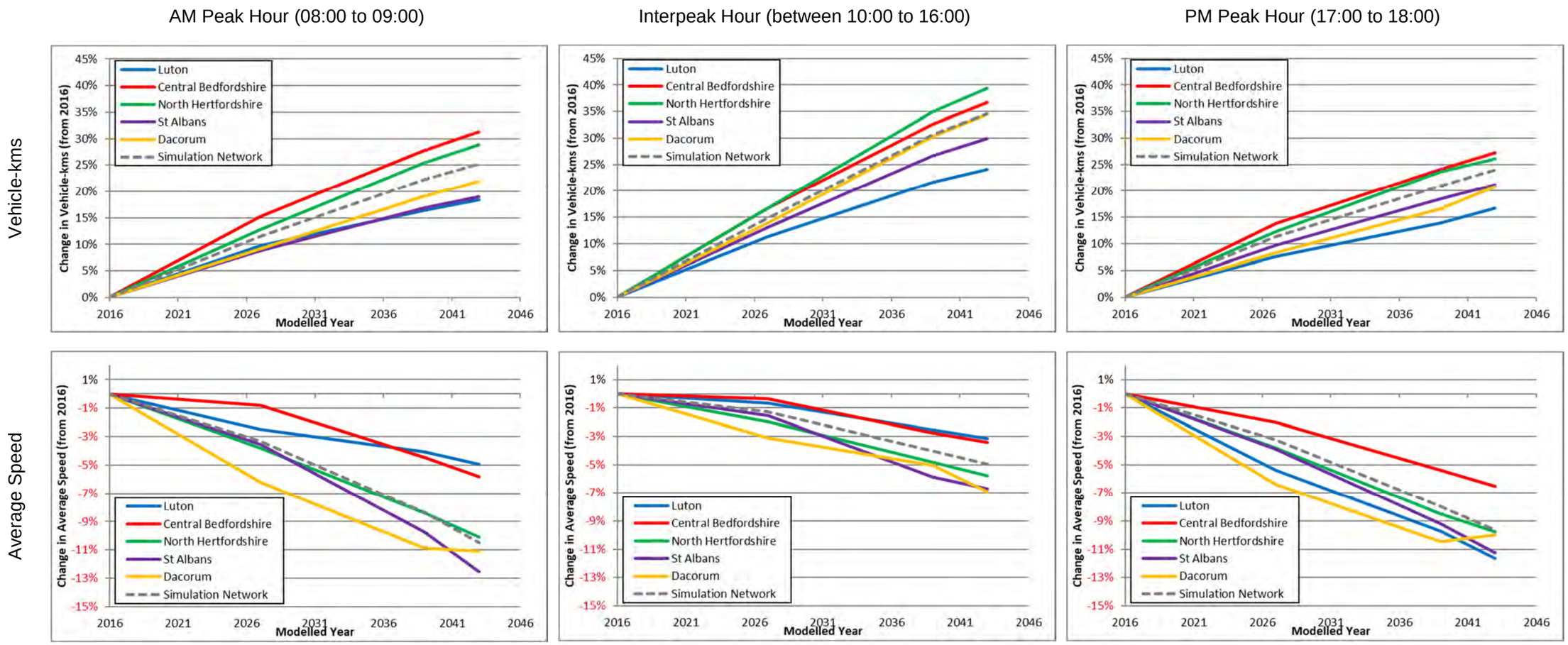
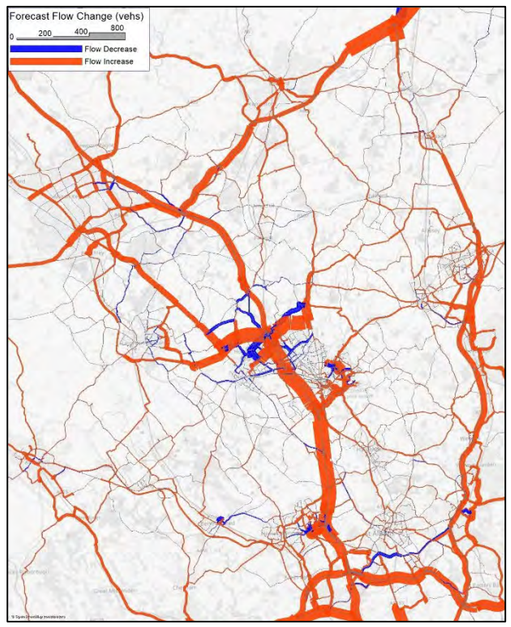
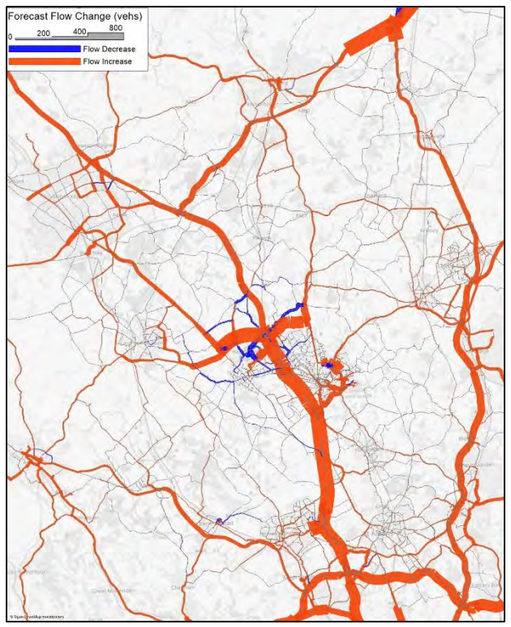
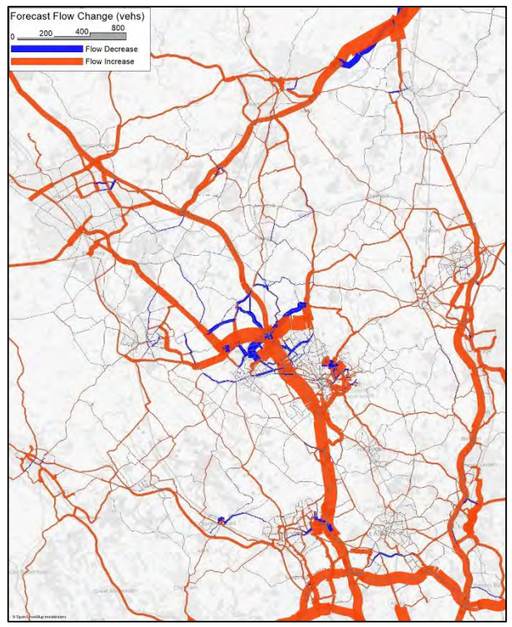
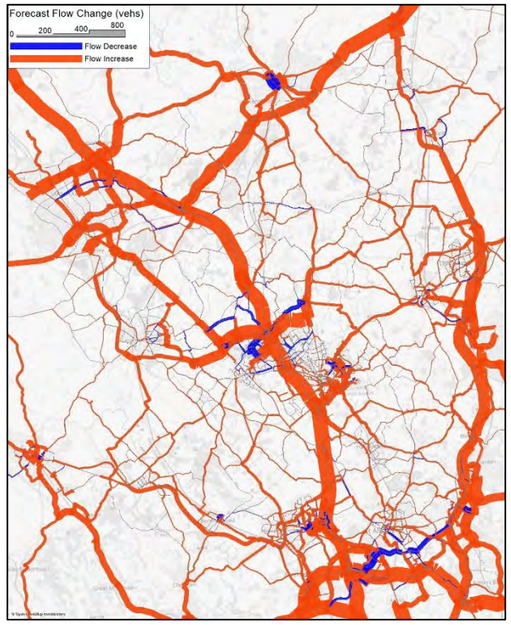
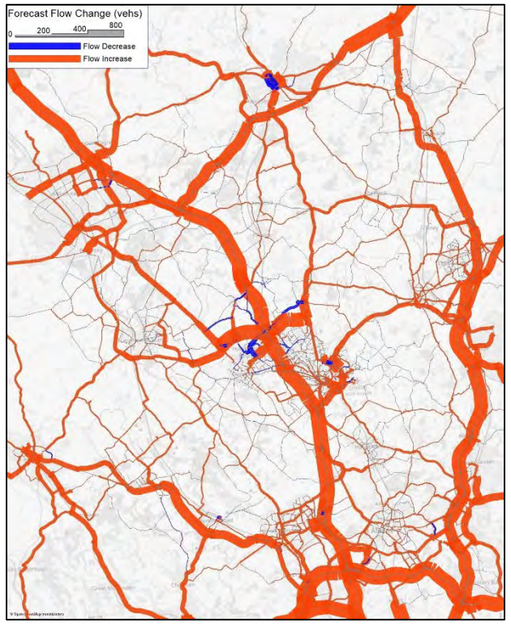
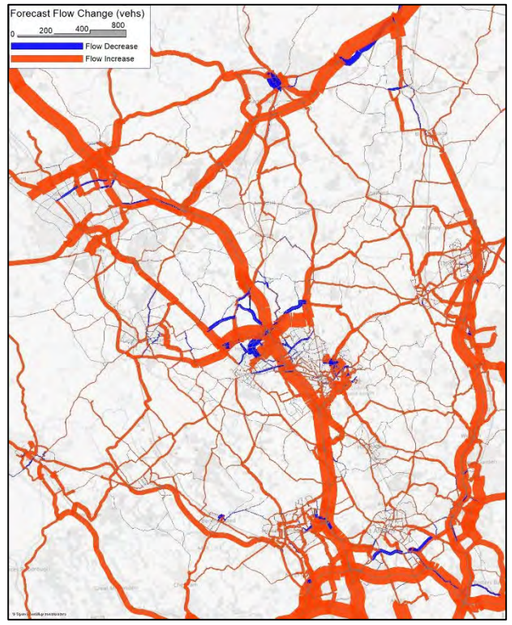
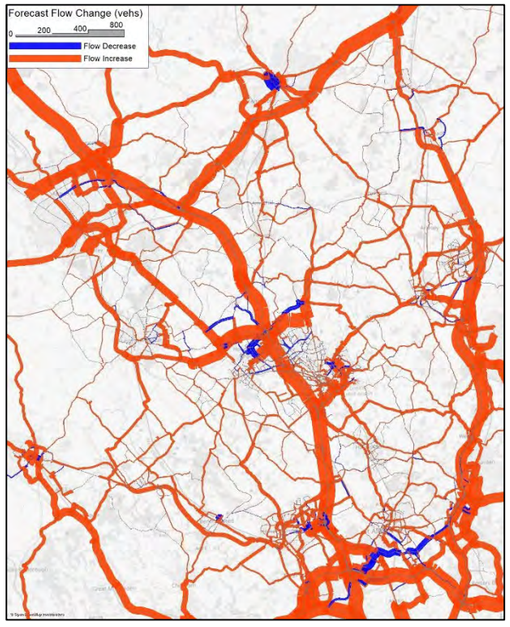
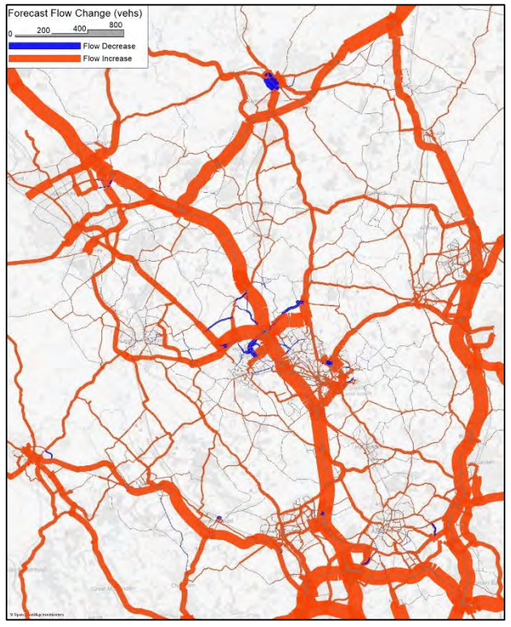


Figure 4.13: Forecast Change in Traffic Volumes (vehicles) from 2016, TAG-based “Without” Expansion, Simulation Network

	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)
2027 “Without” Expansion			
2039 “Without” Expansion			

2043 " Without" Expansion





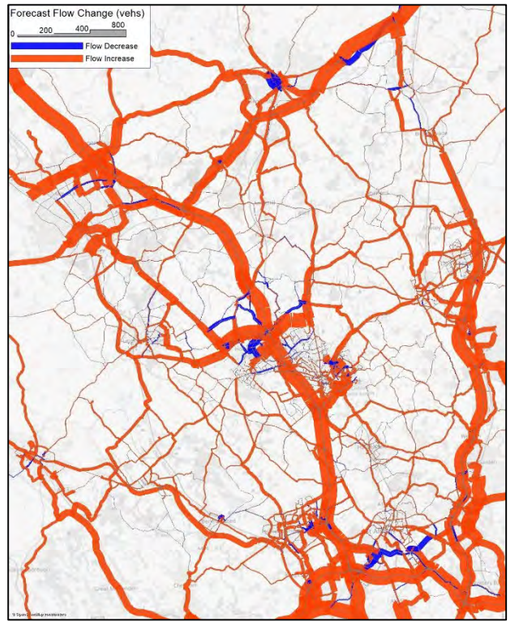


Figure 4.14: Forecast Change in Traffic Volumes (vehicles) from 2016, TAG-based “Without” Expansion, Luton Borough

2043 " Without" Expansion

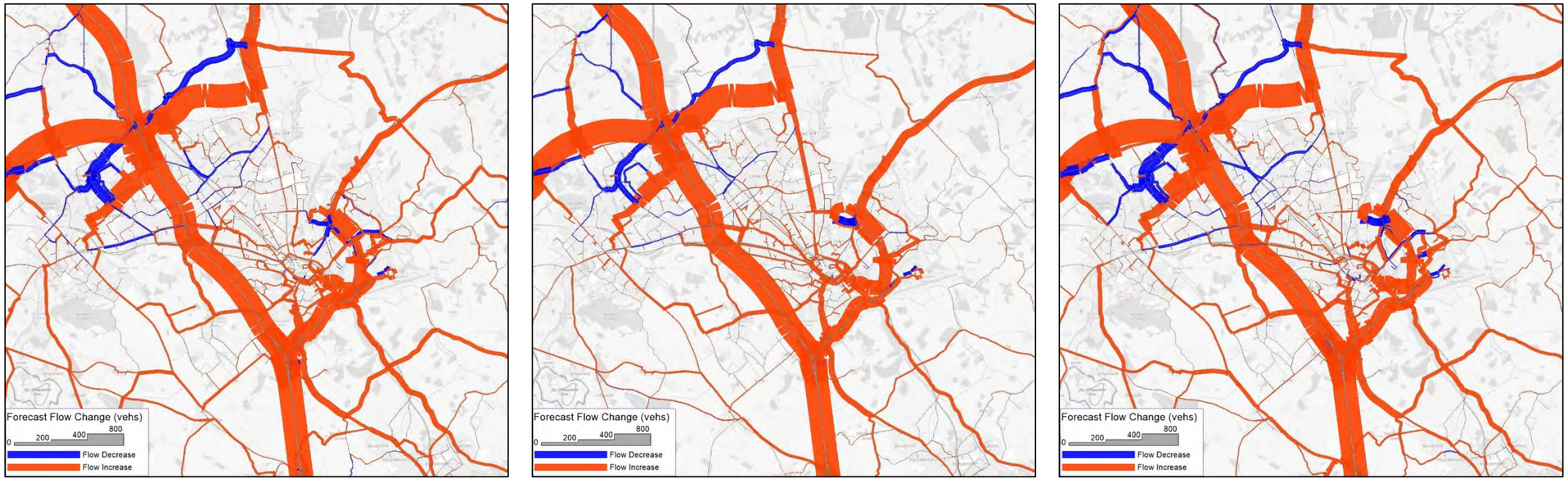


Table 4.20: Forecast Journey Times in TAG-based “Without” Expansion Scenario, including change from Base Year

		Forecast Journey Time (mm:ss)				Change from 2016 (mm:ss)		
	Route	2016	2027	2039	2043	2027	2039	2043
AM Peak Hour (08:00 to 09:00)	M1 Jn9 to LTN Terminal 1	00:08:29	00:09:13	00:09:33	00:09:38	00:44	01:05	01:10
	LTN Terminal 1 to M1 Jn9	00:08:44	00:09:43	00:09:49	00:09:07	00:59	01:05	00:23
	M1 Jn11 to Terminal 1	00:09:42	00:11:05	00:12:00	00:11:03	01:23	02:18	01:21
	LTN Terminal 1 to M1 Jn11	00:10:06	00:10:59	00:11:10	00:11:01	00:53	01:04	00:55
	Hitchin to Terminal 1 (via A505 & Vauxhall Way)	00:16:15	00:15:56	00:16:47	00:17:03	-00:19	00:32	00:48
	Terminal 1 to Hitchin (via A505 & Vauxhall Way)	00:16:06	00:16:31	00:17:10	00:17:23	00:25	01:04	01:17
	M1 Jn8 to M1 Jn12	00:15:09	00:15:46	00:16:47	00:17:07	00:37	01:38	01:58
	M1 Jn12 to M1 Jn8	00:18:58	00:21:09	00:23:59	00:24:49	02:12	05:01	05:51
Interpeak Hour (between 10:00 to 16:00)	M1 Jn9 to LTN Terminal 1	00:07:53	00:08:15	00:08:14	00:08:38	00:22	00:21	00:45
	LTN Terminal 1 to M1 Jn9	00:07:14	00:07:32	00:07:57	00:08:10	00:18	00:42	00:56
	M1 Jn11 to Terminal 1	00:08:20	00:08:45	00:09:09	00:08:33	00:25	00:49	00:13
	LTN Terminal 1 to M1 Jn11	00:09:08	00:09:43	00:10:21	00:10:16	00:35	01:12	01:07
	Hitchin to Terminal 1 (via A505 & Vauxhall Way)	00:14:51	00:14:43	00:14:59	00:15:00	-00:08	00:08	00:09
	Terminal 1 to Hitchin (via A505 & Vauxhall Way)	00:15:39	00:16:10	00:16:26	00:16:30	00:31	00:47	00:51
	M1 Jn8 to M1 Jn12	00:15:49	00:16:25	00:17:42	00:18:15	00:36	01:53	02:26
	M1 Jn12 to M1 Jn8	00:14:06	00:15:27	00:16:47	00:17:21	01:21	02:40	03:15
PM Peak Hour (17:00 to 18:00)	M1 Jn9 to LTN Terminal 1	00:09:24	00:09:21	00:09:51	00:09:29	-00:03	00:27	00:05
	LTN Terminal 1 to M1 Jn9	00:10:09	00:12:24	00:12:55	00:09:51	02:15	02:46	-00:18
	M1 Jn11 to Terminal 1	00:09:15	00:09:29	00:10:02	00:09:22	00:15	00:47	00:07
	LTN Terminal 1 to M1 Jn11	00:10:44	00:12:08	00:12:52	00:12:55	01:24	02:08	02:11
	Hitchin to Terminal 1 (via A505 & Vauxhall Way)	00:16:07	00:15:08	00:15:16	00:15:31	-00:59	-00:51	-00:36
	Terminal 1 to Hitchin (via A505 & Vauxhall Way)	00:16:52	00:17:07	00:17:31	00:17:40	00:14	00:39	00:48
	M1 Jn8 to M1 Jn12	00:19:28	00:20:44	00:21:58	00:22:14	01:16	02:29	02:46
	M1 Jn12 to M1 Jn8	00:15:57	00:17:07	00:18:32	00:19:02	01:10	02:35	03:05

Note: Negative numbers in red show a modelled journey time saving.

5 TAG-BASED "WITH" EXPANSION FORECASTS

5.1 Introduction

5.1.1 Based on the TAG-based "Without" Expansion forecasts detailed in Section 4, TAG-based "With" Expansion forecasts have been produced for 2027 (representing 21.5mppa), 2039 (representing 27mppa) and 2043 (representing 32mppa).

5.1.2 In terms of forecast modelling assumptions, there are no changes to the planning assumptions and reference demand growth from the TAG-based "Without" Expansion forecasts. The incremental changes from the "Without" Expansion forecasts are:

a. different forecast Luton Airport travel matrices representing the assumed airport throughput in each forecast year;

b. a number of highway network schemes depending on the forecast year, as detailed previously in Table 3.4; and

c. required network changes to represent the proposed Terminal 2, including the extension of the DART service between Luton Airport Parkway and the existing terminal to serve Terminal 2.

5.1.3 The AAR, formerly known as CPAR is now forming a part of the Airport application incorporating the entire alignment of this access road within the proposed Expansion. The AAR would be delivered in two phases, Phase 1 implemented in the "With" Expansion in 2039 (27 mppa), where the full AAR would be completed in 2043 (32 mppa).

5.1.4 As was mentioned in Section 4.3, the Century Park development was only included in the "With" Expansion scenario. The development highway trip generation was also 'manually' adjusted to reflect more reasonable trip generation (similar to Napier Park and Newlands Park as mentioned in Section 4.3).

5.1.5 The remainder of this section details the forecast TAG-based "With" Expansion scenarios, focusing on the incremental changes from the TAG-based "Without" Expansion forecasts detailed in Section 4.

5.2 Model Convergence

5.2.1 The convergence of the TAG-based "With" Expansion forecasts has been reported using the same measures as discussed for the "Without" Expansion forecasts within Section 4.4.

5.2.2 Firstly, Table 5.1 and Figure 5.1 detail the convergence statistics for the demand model contained within CBLTM-LTN. As with the "Without" Expansion scenarios, the demand model reaches the required %Gap value of 0.1% within a reasonable, and similar, number of iterations.

5.2.3 Similarly, Table 5.2 summarises the convergence of the highway assignment model for the three forecast years for each time period. As with the demand model convergence, the highway model reaches the required level of

convergence and does so in a similar number of iterations to the "Without" Expansion forecasts.

5.2.4 As with the TAG-based "Without" Expansion forecasts, the number of iterations required to reach convergence is greater in the AM Peak and PM Peak hours compared with the interpeak hour, reflecting the additional levels of congestion forecast within the peak hours.

Table 5.1: TAG-based "With" Expansion Demand Model Convergence *(%Gap)*

Iteration	2027	2039	2043
2	2.944	6.126	7.108
3	0.329	0.743	0.885
4	0.121	0.201	0.238
5	0.094	0.156	0.166
6		0.127	0.146
7		0.111	0.117
8		0.116	0.104
9		0.119	0.125
10		0.096	0.105
11			0.121
12			0.136
13			0.117
14			0.100

Figure 5.1: TAG-based "With" Expansion Demand Model Convergence

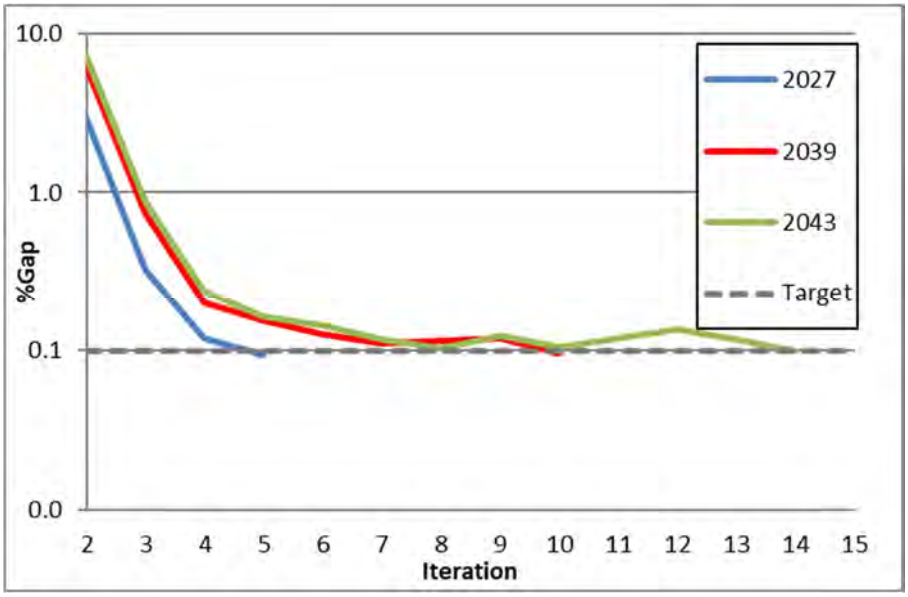


Table 5.2: TAG-based "With" Expansion Highway Model Convergence

Forecast Year	AM Peak Hour 0800-0900		Interpeak Hour Average (1000-1600)		PM Peak Hour 1700-1800	
	Iterations	%Gap	Iterations	%Gap	Iterations	%Gap
2027	12	0.0049	8	0.0028	12	0.0062
2039	23	0.0079	9	0.0048	17	0.0076
2043	28	0.0076	9	0.0058	24	0.0081

5.3 Highway Assignment Forecasts

5.3.1 Using the same measures of vehicle-kms and average network speeds for the forecast traffic levels and network congestion, Table 5.3 and Table 5.4 present the forecast change vehicle-kms and average network speeds with the inclusion of the proposed expansion at Luton Airport.

5.3.2 In terms of vehicle-kms, the forecast increase in traffic with the inclusion of the proposed expansion across the simulation network in 2043 is between 0.6% in the PM Peak hour and 0.8% in the AM Peak and interpeak average hour. This increase is forecast to be smaller in magnitude in earlier forecast years as the expected additional throughput at Luton Airport is lower.

5.3.3 Considering the 2043 scenarios, the forecast increase in vehicle-kms of between 0.6% and 0.8% with expansion is in the context of forecast growth in vehicle-kms of between 24% (in the PM Peak hour) and 35% (in the interpeak hour). from the 2016 base year to the 2043 TAG-based "Without" Expansion forecasts (as shown in Table 4.16).

5.3.4 By referring to Table 5.3, in terms of the forecast change in traffic by district, Luton Borough is forecast to have the highest increase in vehicle-kms when including the proposed expansion of between 2.4% and 3.4% in 2043, depending on the modelled hour. Vehicle-kms within Central Bedfordshire and North Hertfordshire are forecast to increase with expansion by between 0.9% and 2.2% in 2043 across time periods, with lower increases forecast within St Albans district and Dacorum of between 0.3% and 0.7% depending on the modelled hour.

5.3.5 In general, the forecast percentage increases in traffic between the "Without" and "With" Expansion scenarios are greater in the interpeak hour than in the AM Peak and PM Peak hours for the simulation network as a whole and for each district individually, apart from North Hertfordshire when the highest increase observed in the AM peak hour.

5.3.6 With the forecast increases in vehicle-kms with the inclusion of the proposed Luton Airport expansion, Table 5.4 details the forecast change in network average speeds with expansion. As with the forecast change in vehicle-kms, the forecast change in average network speeds increases in magnitude over time as the passenger throughput proposed at Luton Airport increases.

5.3.7 For the simulation network in 2039 forecast average speeds decrease by between 0.6 and 0.7% in the AM Peak and interpeak hours, whereas the simulation network sees an increase in the average speed during the PM peak hour, this is mainly affected by the increase in average speed within Luton Borough. This ties in with the observation from the VISSIM micro-simulation model. For context, the forecast decrease in average speeds from 2016 to 2043 within the “Without” Expansion forecasts is between 5% (in the interpeak hour) and 10% (in the AM and PM Peak hours).

5.3.8 As with the forecast change in vehicle-kms, there is some variation in the forecast impact of expansion on average speeds by district. In-line with the forecast changes for vehicle-kms, in the 2043 scenario Luton Borough is forecast to have the highest decrease in average speeds of between 2.1% (in the interpeak average hour) and 5.7% (in the AM Peak hour) with expansion. Although, as was mentioned previously, the PM peak hour is forecast to have an increase in the average speed within Luton Borough area of around 3.5%. For the remaining districts within the 2043 scenario, the forecast average speed reductions are generally smaller in magnitude.

5.3.9 Apart from the increase in average speed within Luton borough in the PM Peak hour, there are a limited number of forecast years and time periods where the forecast average network speed increases with the inclusion of the proposed expansion at Luton Airport. These increases are relatively small in magnitude (up to 0.7%), and are therefore not considered to significant in the assessment of the proposals.

5.3.10 In addition to the forecast changes in vehicle-kms and average speeds detailed in Table 5.3 and Table 5.4 , Figure 5.2 provides a summary of these forecast changes by district and time period.

Table 5.3: Forecast Change in Vehicle-kms between TAG-based “Without” and “With” Expansion

Period	District	2027	2039	2043
AM Peak Hour (08:00 to 09:00)	Luton	-0.4%	1.4%	3.2%
	Central Bedfordshire	0.3%	0.4%	0.9%
	North Hertfordshire	0.3%	1.1%	2.2%
	St Albans	0.1%	0.1%	0.4%
	Dacorum	0.3%	0.4%	0.6%
	Simulation Network	**0.1%**	**0.3%**	**0.8%**
Interpeak Hour (between 10:00 to 16:00)	Luton	0.4%	2.0%	3.4%
	Central Bedfordshire	0.2%	0.7%	1.0%
	North Hertfordshire	0.4%	1.0%	1.8%
	St Albans	0.0%	0.2%	0.5%
	Dacorum	0.2%	0.3%	0.4%
	Simulation Network	**0.2%**	**0.4%**	**0.8%**
PM Peak Hour (17:00 to 18:00)	Luton	0.3%	1.4%	2.4%
	Central Bedfordshire	0.6%	0.3%	0.7%
	North Hertfordshire	0.7%	0.8%	1.8%
	St Albans	0.4%	0.2%	0.7%
	Dacorum	0.4%	0.9%	0.3%
	Simulation Network	**0.4%**	**0.3%**	**0.6%**

Table 5.4: Forecast Change in Average Speed between TAG-based "Without" and "With" Expansion

Period	District	2027	2039	2043
AM Peak Hour (08:00 to 09:00)	Luton	-0.5%	-3.2%	-5.7%
	Central Bedfordshire	0.0%	0.0%	-0.4%
	North Hertfordshire	-0.2%	0.7%	0.4%
	St Albans	0.0%	-0.3%	-0.5%
	Dacorum	0.0%	0.3%	0.1%
	Simulation Network	**0.0%**	**-0.3%**	**-0.7%**
Interpeak Hour (between 10:00 to 16:00)	Luton	-0.9%	-1.7%	-2.1%
	Central Bedfordshire	-0.2%	-0.2%	-0.5%
	North Hertfordshire	-0.1%	-0.2%	-0.3%
	St Albans	-0.1%	0.1%	-0.2%
	Dacorum	0.0%	0.0%	0.0%
	Simulation Network	**-0.2%**	**-0.3%**	**-0.6%**
PM Peak Hour (17:00 to 18:00)	Luton	1.6%	3.3%	3.5%
	Central Bedfordshire	-0.1%	0.0%	-0.5%
	North Hertfordshire	-0.7%	-0.1%	-0.3%
	St Albans	-0.5%	0.0%	-0.5%
	Dacorum	-0.2%	0.5%	-0.2%
	Simulation Network	**0.0%**	**0.3%**	**0.1%**

5.3.11 In addition to the analysis of vehicle-kms and average network speeds, Table 5.5 and Table 5.6 show the forecast change in assigned vehicle time and vehicle-delay in the TAG-based scenario as a result of the proposed expansion at Luton Airport.

5.3.12 Assigned vehicle time is forecast to increase with the inclusion of the proposed Luton Airport expansion within the internal area, with increases of 1.5% in the AM Peak hour, 1.4% in the interpeak hour and 0.6% in the PM Peak hour within 2043. Across the five districts, assigned vehicle-time is forecast to increase by the largest percentage in Luton and North Hertfordshire, with the lowest forecast increases within Dacorum. However, the results show a decrease in the vehicle time forecasts within Luton Borough during the PM Peak hour, which aligns with the forecast increase in the average speed within the area.

Table 5.5: Forecast Change in Assigned Vehicle-Time between TAG-based "Without" and "With" Expansion

Period	District	2027	2039	2043
AM Peak Hour (08:00 to 09:00)	Luton	0.1%	4.7%	9.4%
	Central Bedfordshire	0.3%	0.4%	1.3%
	North Hertfordshire	0.5%	0.4%	1.9%
	St Albans	0.1%	0.3%	1.0%
	Dacorum	0.3%	0.1%	0.5%
	Simulation Network	**0.2%**	**0.6%**	**1.5%**
Interpeak Hour (between 10:00 to 16:00)	Luton	1.3%	3.8%	5.7%
	Central Bedfordshire	0.4%	0.9%	1.5%
	North Hertfordshire	0.5%	1.1%	2.1%
	St Albans	0.1%	0.1%	0.7%
	Dacorum	0.1%	0.3%	0.4%
	Simulation Network	**0.3%**	**0.7%**	**1.4%**
PM Peak Hour (17:00 to 18:00)	Luton	-1.3%	-1.8%	-1.0%
	Central Bedfordshire	0.7%	0.3%	1.2%
	North Hertfordshire	1.4%	0.9%	2.1%
	St Albans	1.0%	0.2%	1.2%
	Dacorum	0.6%	0.4%	0.4%
	Simulation Network	**0.4%**	**0.0%**	**0.6%**

5.3.13 Table 5.6 shows that vehicle-delay is forecast to increase by between 0.2% in the PM Peak hour and 3.0% in the interpeak hour across the simulation network in 2043 due to the proposed Luton Airport expansion. In terms of the individual districts within the simulation network, Luton Borough is forecast to experience the largest increase in vehicle-delay during both AM Peak and interpeak average hours with the inclusion of the proposed expansion of between 11.8% in the interpeak average hour and 20.6% in the AM Peak hour, whereas in the PM Peak hour, Luton Borough is forecast to have an increase in vehicle delay of around 7.1% in 2039 and 6.2% in 2043. This also ties in with the reduction in assigned vehicle-time and the increase in average speed within the district.

Table 5.6: Forecast Change in Vehicle-Delay between TAG-based "Without" and "With" Expansion

Period	District	2027	2039	2043
AM Peak Hour (08:00 to 09:00)	Luton	0.7%	10.7%	20.6%
	Central Bedfordshire	0.4%	0.3%	2.4%
	North Hertfordshire	0.6%	-2.6%	-0.3%
	St Albans	0.2%	0.8%	2.0%
	Dacorum	0.4%	-0.3%	0.6%
	Simulation Network	**0.2%**	**1.0%**	**2.7%**
Interpeak Hour (between 10:00 to 16:00)	Luton	3.3%	8.3%	11.8%
	Central Bedfordshire	1.2%	1.4%	3.2%
	North Hertfordshire	0.5%	-0.2%	0.7%
	St Albans	0.3%	0.0%	2.0%
	Dacorum	-0.1%	0.4%	0.5%
	Simulation Network	**1.0%**	**1.4%**	**3.0%**
PM Peak Hour (17:00 to 18:00)	Luton	-4.9%	-7.1%	-6.2%
	Central Bedfordshire	1.0%	-0.1%	2.4%
	North Hertfordshire	3.4%	0.7%	1.6%
	St Albans	2.6%	0.9%	2.8%
	Dacorum	1.2%	-0.2%	0.9%
	Simulation Network	**0.4%**	**-0.9%**	**0.2%**

5.3.14 In addition to these aggregate network statistics, Figure 5.3 and Figure 5.4 the forecast change in traffic volumes within each forecast year with the inclusion of the proposed expansion at Luton Airport for the simulation network and for Luton Borough respectively.

5.3.15 The forecast traffic flow changes in Figure 5.3 show that at a strategic level the additional traffic volumes forecast with the inclusion of the proposed expansion at Luton Airport are focussed on the A1081 between M1 Junction 10 and the airport, the M1 to the north and south of Luton, and on routes to the east of the airport towards the A1(M). The flow increases to the east of Luton Airport are forecast on the A505 between Luton and Hitchin, and other rural routes to the south of the A505.

5.3.16 In terms of the forecast local impacts of the proposed expansion within Luton, Figure 5.4 shows that the forecast flow changes are concentrated on the A1081 and the Airport Access Road (formerly known as CPAR), with some re-routing within eastern Luton in response to assumed junction improvements in the "With" Expansion scenarios.

5.3.17 The 2039 and 2043 AM Peak flow change plots show that within Luton there is forecast to be a reduction in traffic on the access road to / from the existing Luton Airport terminal. This is due to the increased public transport mode share forecast within the “With” Expansion scenarios, which is forecast to reduce highway trips compared with the “Without” Expansion scenario in some time periods.

5.3.18 Within 2027 PM Peak hour models there are forecast to be slight flow increases on Luton Road and M1 Junction 9. This is due to a forecast capacity constraint at the M1 Junction 10 southbound merge in the PM Peak hour. This constraint are forecast to occur in the 2027 “Without” and “With” Expansion, and in 2039 “Without” Expansion scenarios. With the forecast additional traffic in the background growth and the Airport Expansion, traffic wishing to travel southbound on the M1 finds other alternative routing such as the route via A1081 / London Road junction 10(a) towards the northern side of Harpenden to cross the M1 and joining via Junction 9.

5.3.19 This constraint is removed with the junction improvements assumed within the 2039 forecasts, which managed to attract traffic back onto Junction 10. This would be also the case in 2043 scenarios where further junction improvement and the Junction 10 – Junction 9 smart motorway is assumed in both “Without” and “With” Expansion scenarios.

5.3.20 Considering the forecast flow increases on rural routes to the east of Luton Airport, Figure 5.5 shows the forecast routeing of traffic to / from Luton Airport for the existing terminal and the proposed Terminal 2 (in 2039 and 2043). These show that traffic accessing the existing terminal from the east is forecast to use Vauxhall Way and the A505; however, traffic accessing the proposed Terminal 2 is forecast to use more minor routes to the south of the A505. Although this additional traffic is forecast to change some of the routing for the background traffic, via some of the Local roads to the east of Luton such as Lilley Bottom Road, Kings Walden Road and Darley Rd.

5.3.21 With the introduction of Phase 1 of the AAR, a link is provided between the proposed location of Terminal 2 and Eaton Green Road near the junction with Wigmore Lane. This additional access point to the east of Luton is forecast to make rural routes through Tea Green, King’s Walden and Preston more attractive than routeing through eastern Luton to access the A505.

5.3.22 Further details on the forecast traffic flows at selected locations in the vicinity of Luton Airport can be found in Appendix B.

5.3.23 Table 5.7 shows the forecast journey times for the key routes detailed in the analysis of the TAG-based “Without” Expansion scenario. In addition to the routes previously reported, forecast journey times from M1 Junction 9, M1 Junction 11 and Hitchin to / from the proposed second terminal at Luton Airport have been included.

5.3.24 In general, journey times along the selected routes are forecast to increase as a result of the proposed expansion at Luton Airport. In terms of travel times from the M1 to / from the existing terminal at Luton Airport, these are forecast to

increase by around two min and 45 seconds in the AM Peak and around 40 sec in PM Peak hours and the interpeak hour.

5.3.25 This is partially due to the increase in traffic, but more importantly introducing a new signalised junction on the A1081 due to the AAR introduction (replacing the existing priority roundabout junction with the Percival way). this increases the delay at this route. This increase in journey time also occur in the 2039 (27 mppa) but to a lesser extent (around 44 sec in the AM peak hour and around 19 sec in the PM peak hour, with additional one second forecast in the interpeak average hour).

5.3.26 On the opposite direction of this route, i.e. from Terminal 1 into M1 Junction9, the increases occur in the 2043 (32 mppa) “With” Expansion, with around one minute in the PM Peak hour and very small changes in both AM Peak and interpeak hours. Although, in 2039 (27 mppa) there is a forecast reduction in both AM peak hour (around 18 sec) and in the PM Peak hour (around two min) due the Junction 9 improvement scheme in the 2039 (27 mppa) in the “With” Expansion scenario.

5.3.27 As detailed for the TAG-based “Without” Expansion forecasts, Appendix D presents the forecast flow-weighted average junction delays for the TAG-based “With” Expansion scenarios for the simulation network and within Luton Borough.

Figure 5.2: Forecast Change in Vehicle-kms and Average Speed between TAG-based “Without” and “With” Expansion

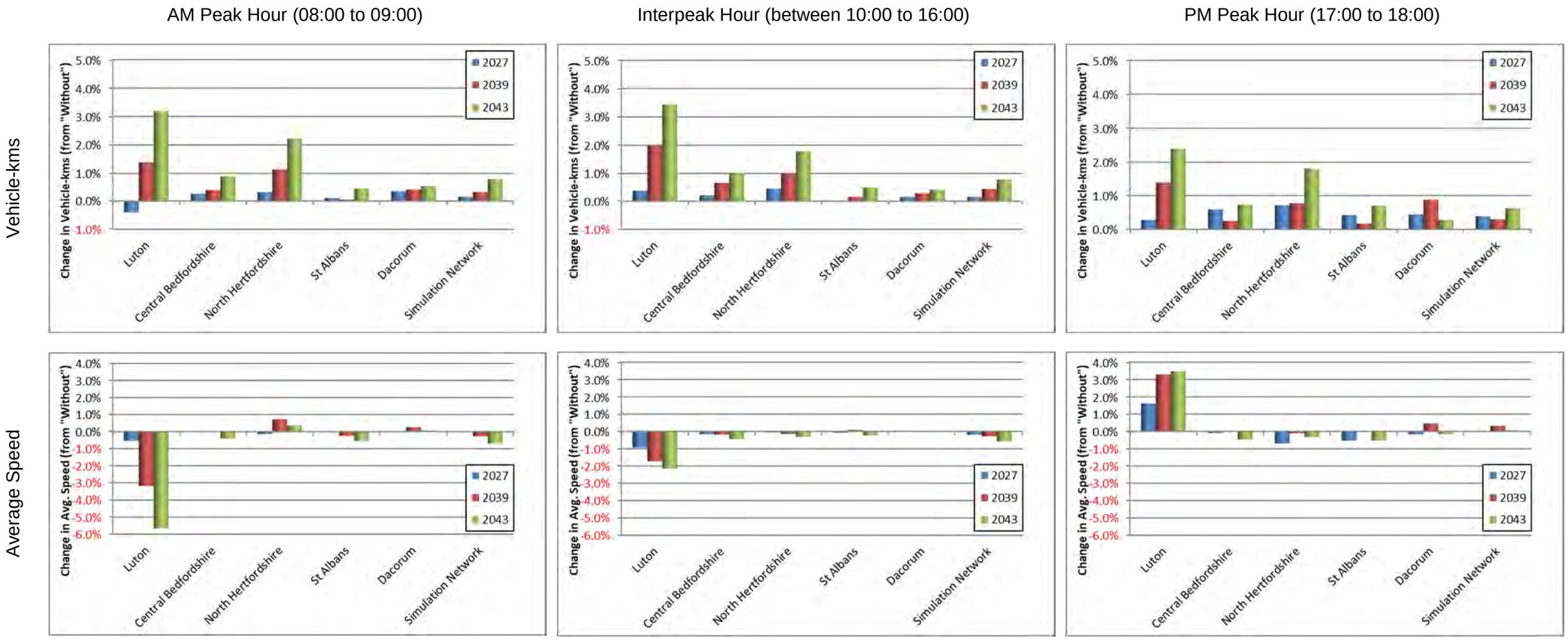
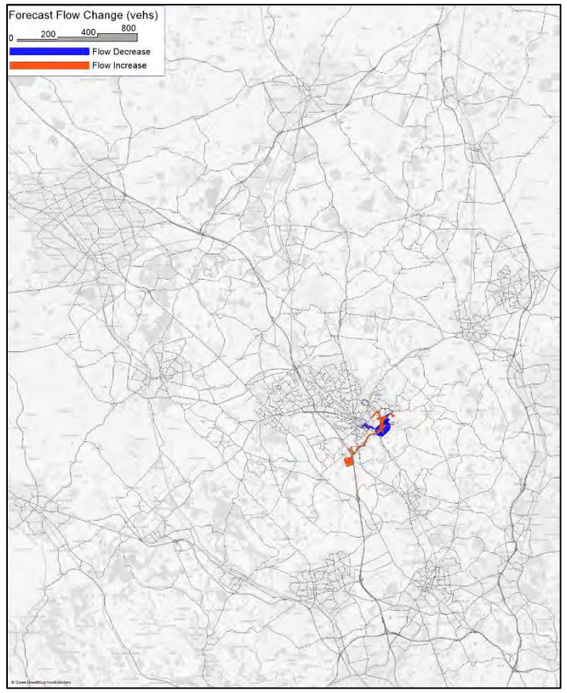
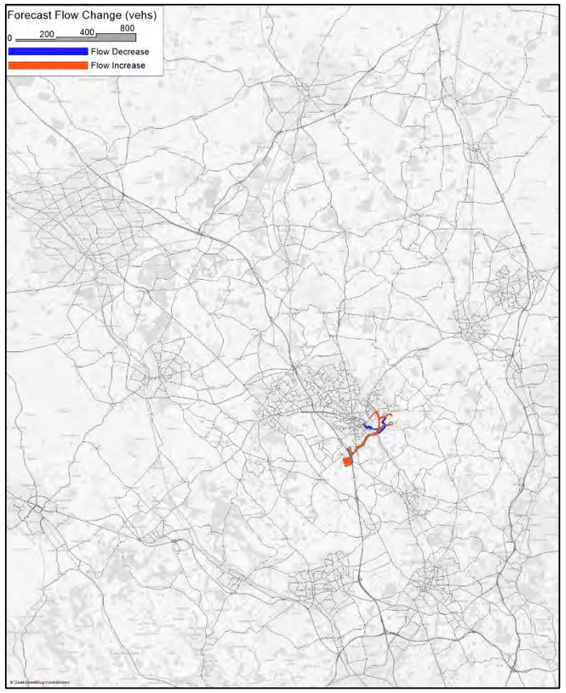
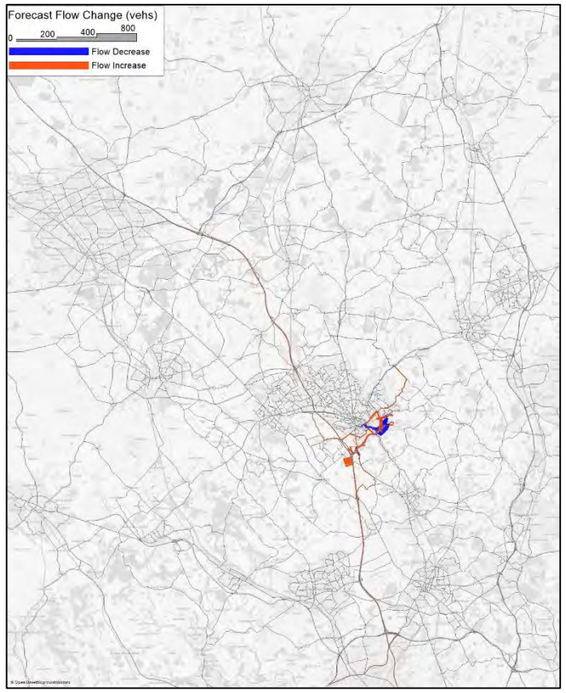
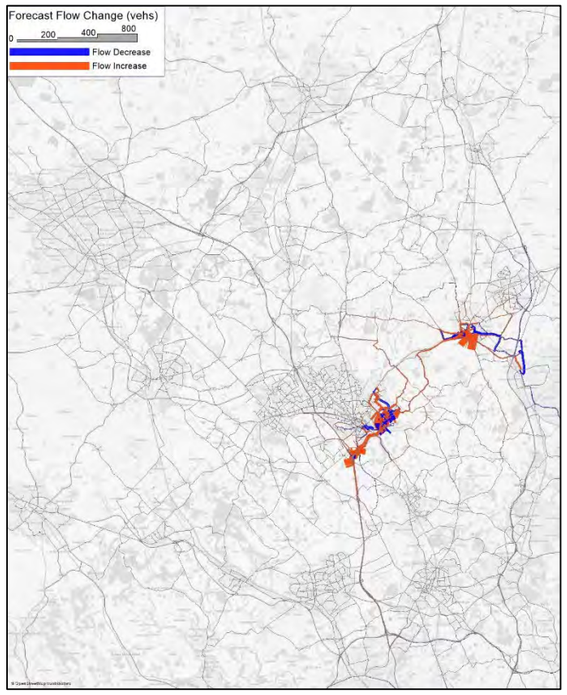
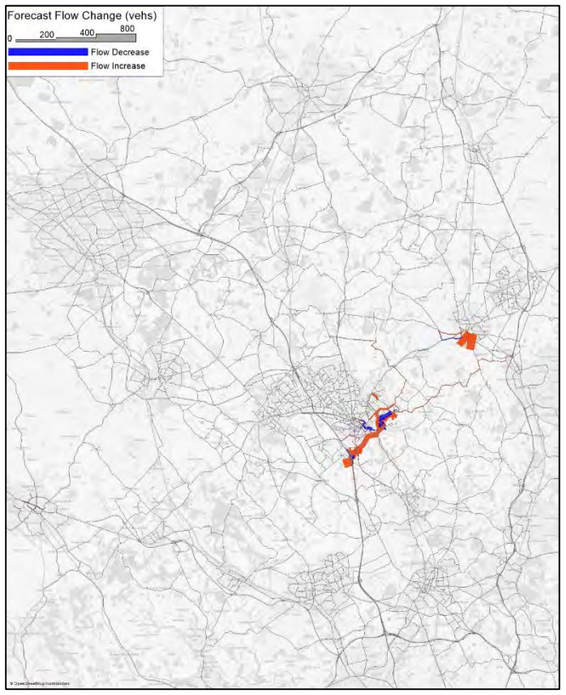
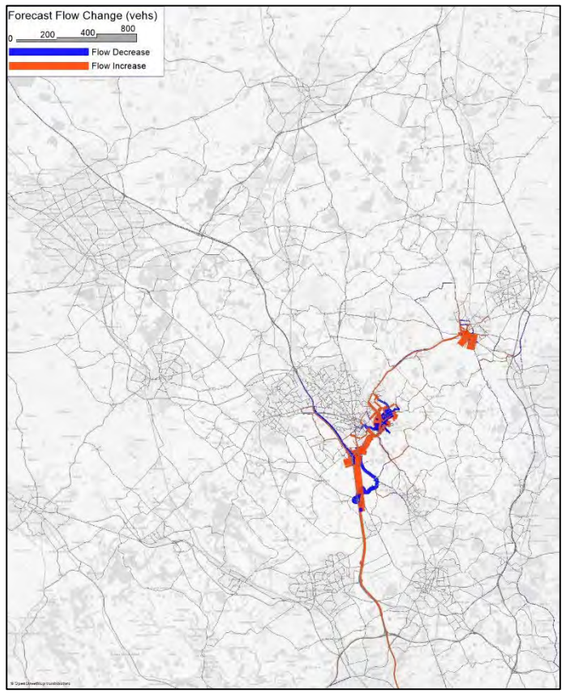
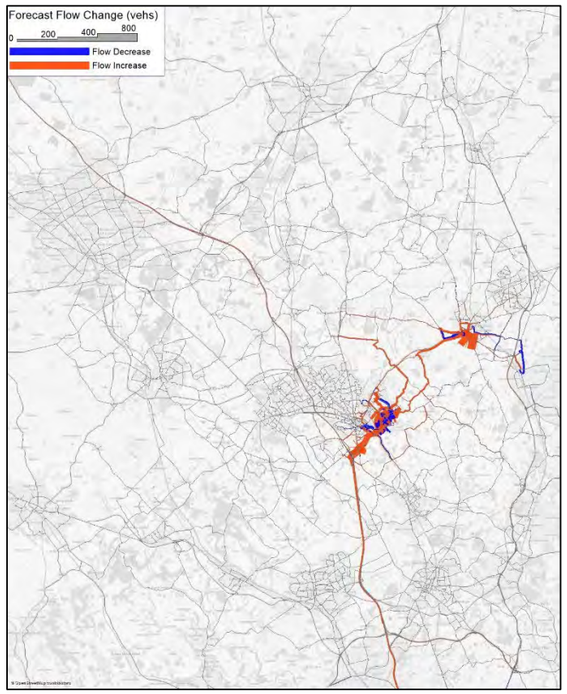
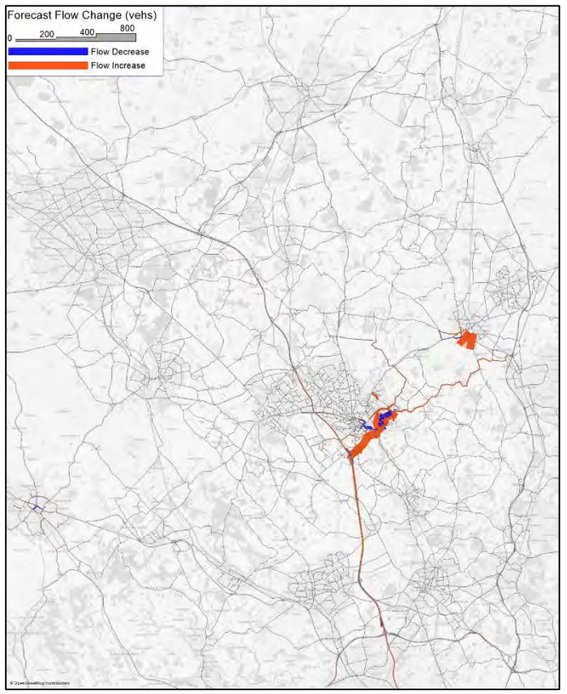


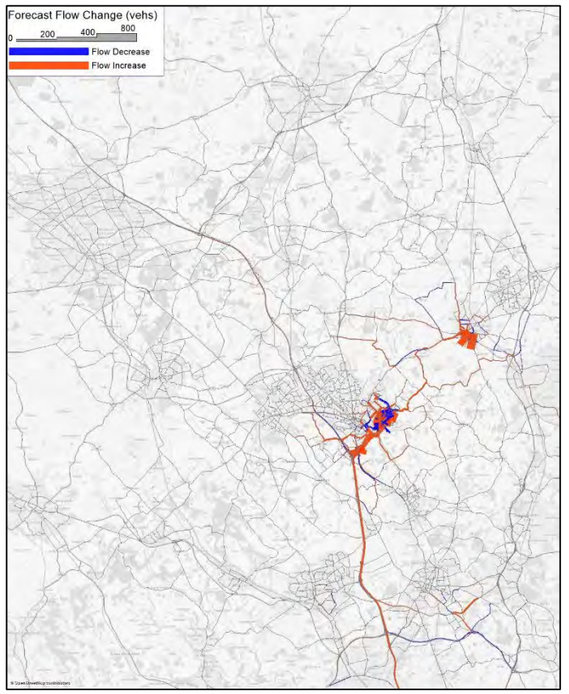
Figure 5.3: Forecast Change in Traffic Volumes (vehicles) between TAG-based “Without” and “With” Expansion, Simulation Network

	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)
2027			
2039			

2043

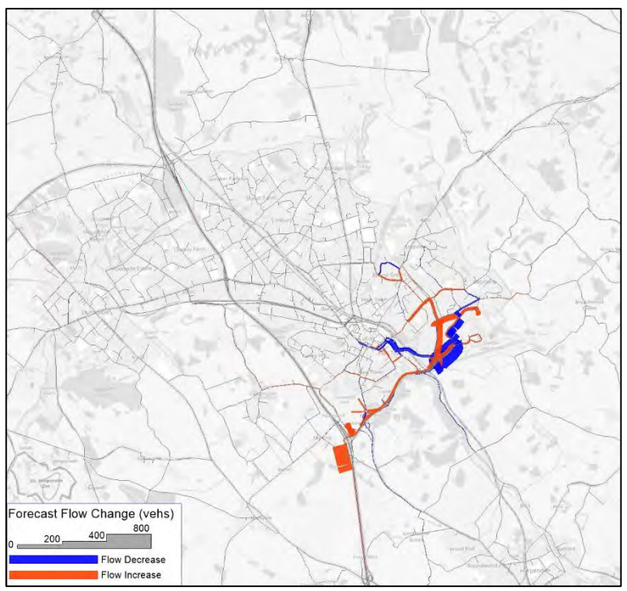
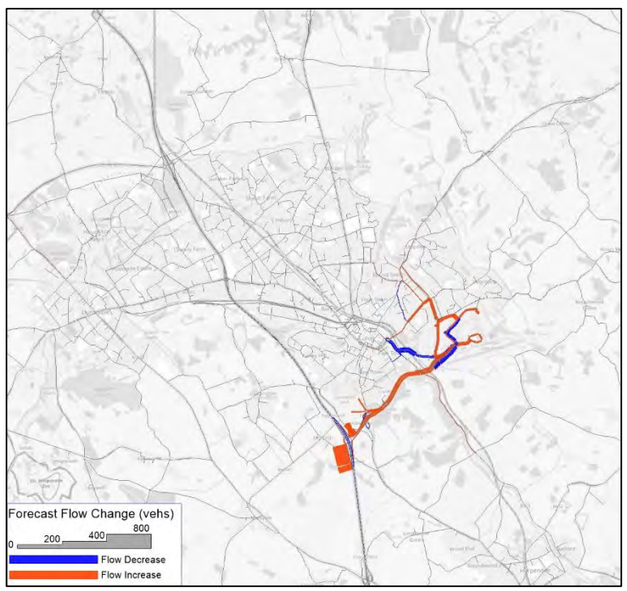
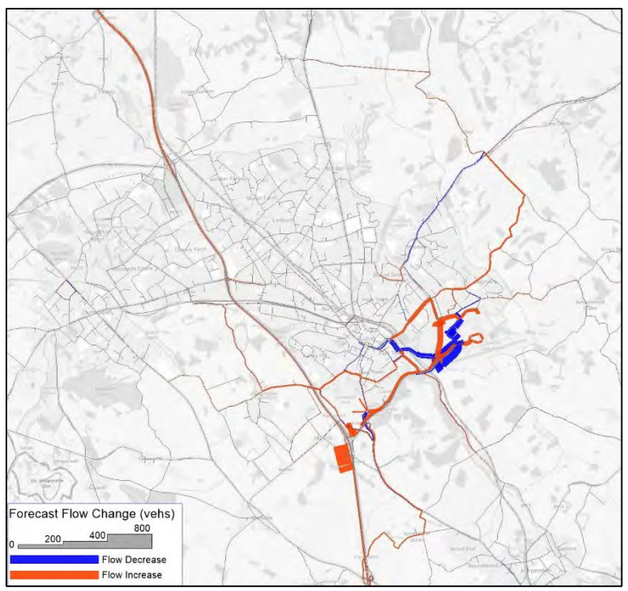
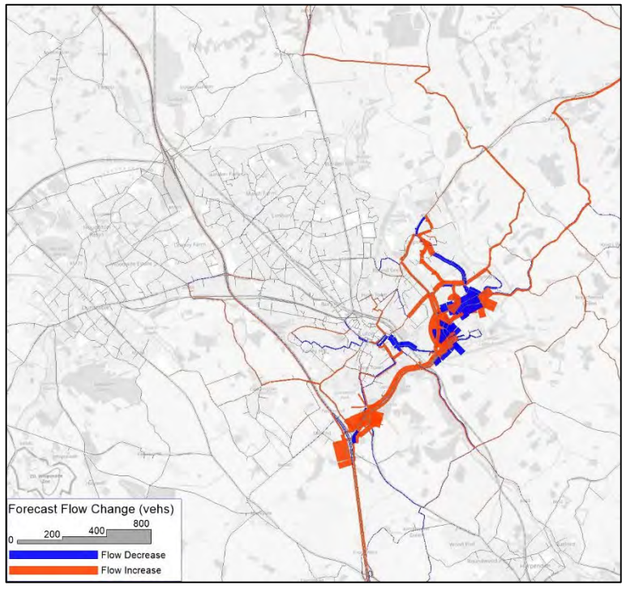
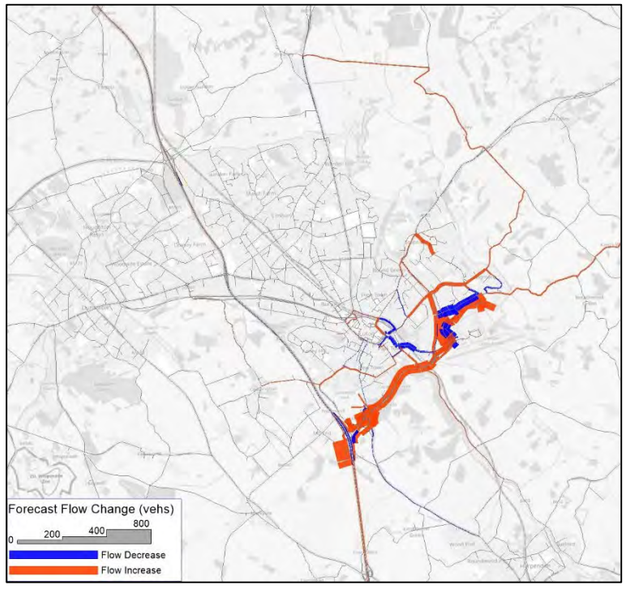
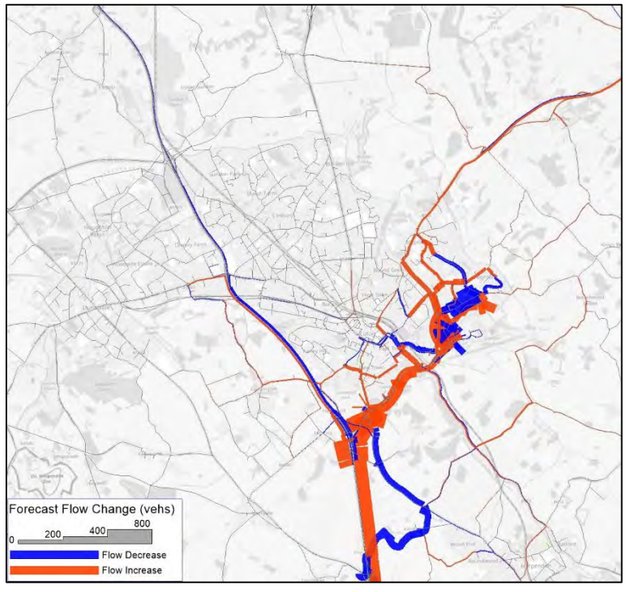




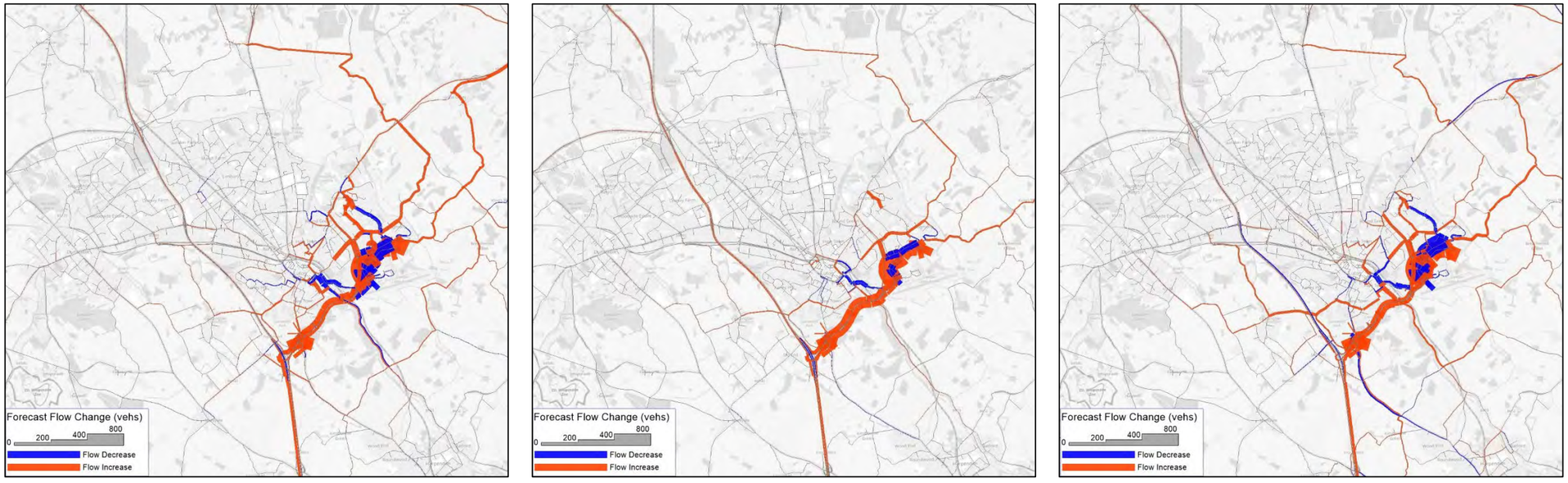


Note: Large bandwidths shown at the M1 Northbound off-slip at Junction 10, and near Hitchin (orange increase) are due to network changes rather than real increase in traffic flows

Figure 5.4: Forecast Change in Traffic Volumes (vehicles) between TAG-based “Without” and “With” Expansion, Luton Borough

	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)
2027			
2039			

2043



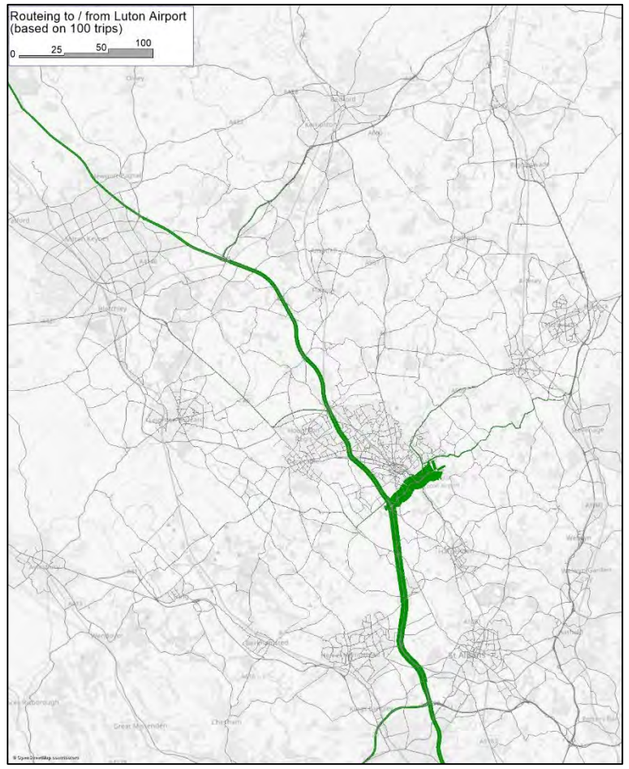
Note: Large bandwidths shown at the M1 Northbound off-slip at Junction 10 are due to network changes rather than real increase in traffic flows

Figure 5.5: Forecast Routeing to / From Luton Airport in 2039 TAG-based “With” Expansion Scenario, AM Peak Hour

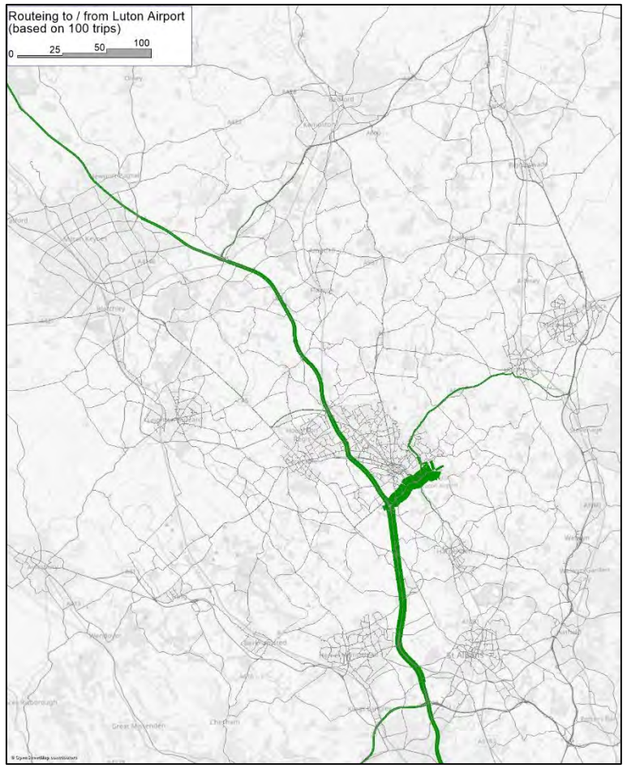
2027

Terminal 1

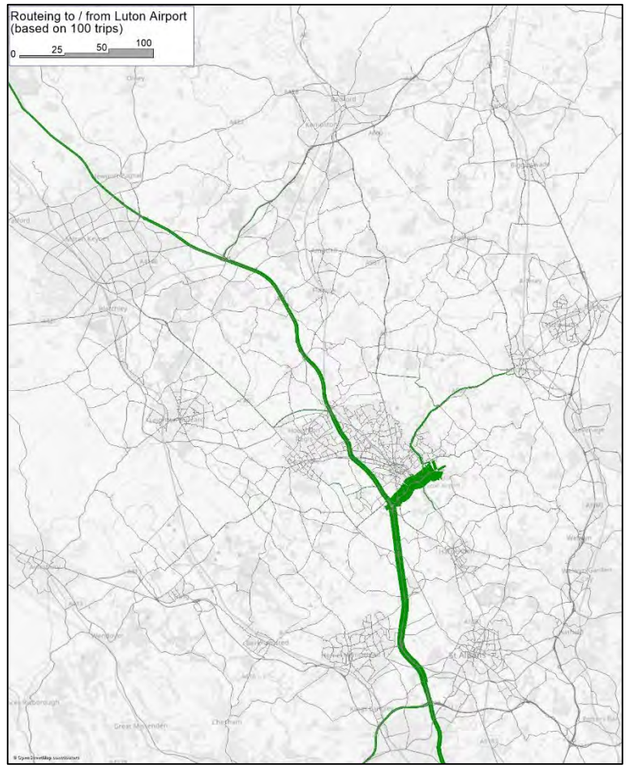
AM Peak Hour (08:00 to 09:00)

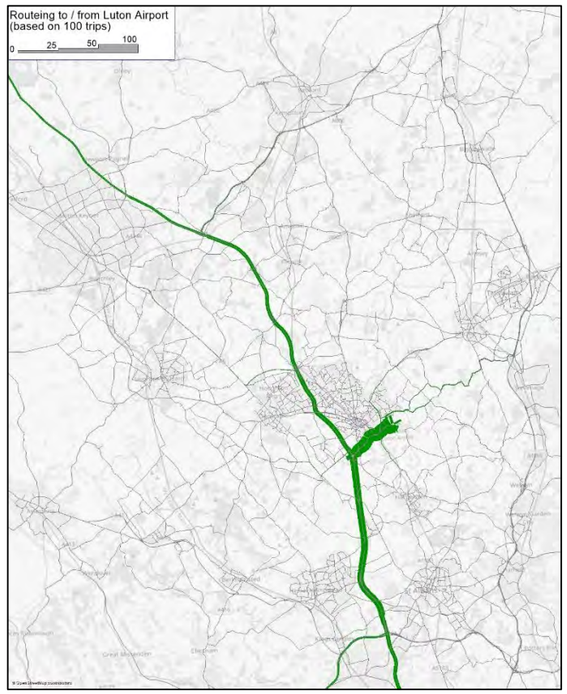
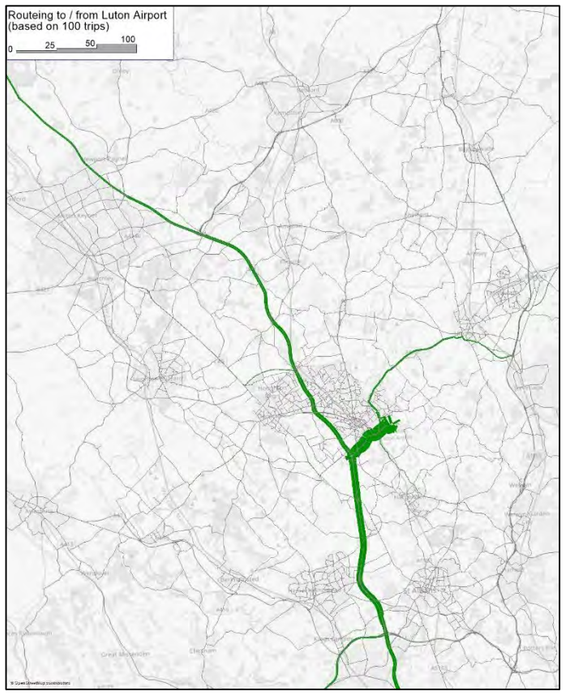
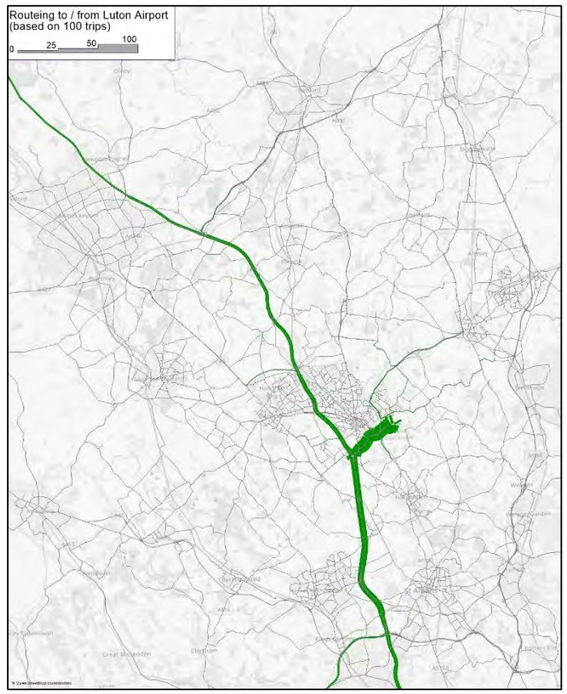
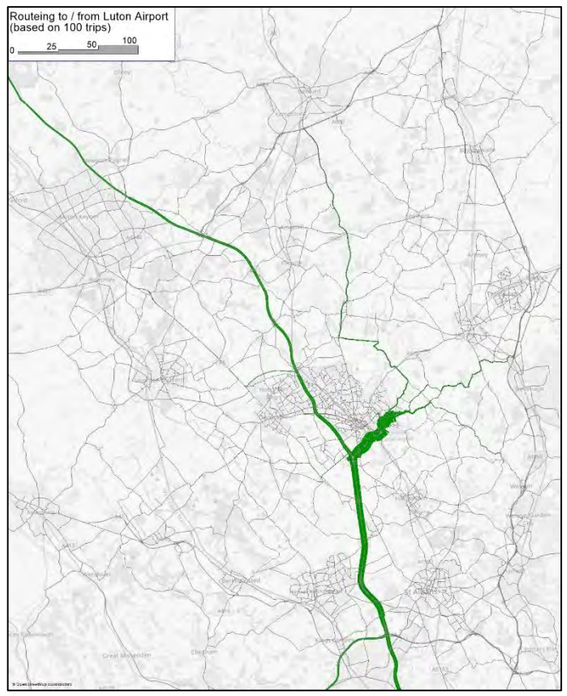
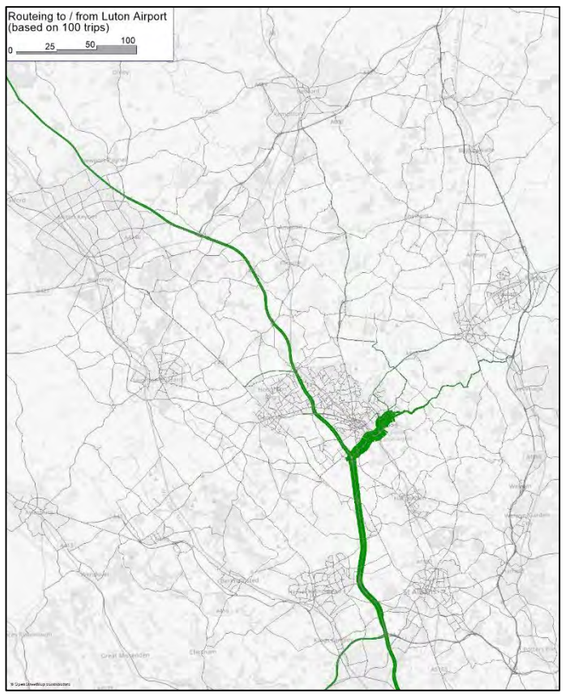
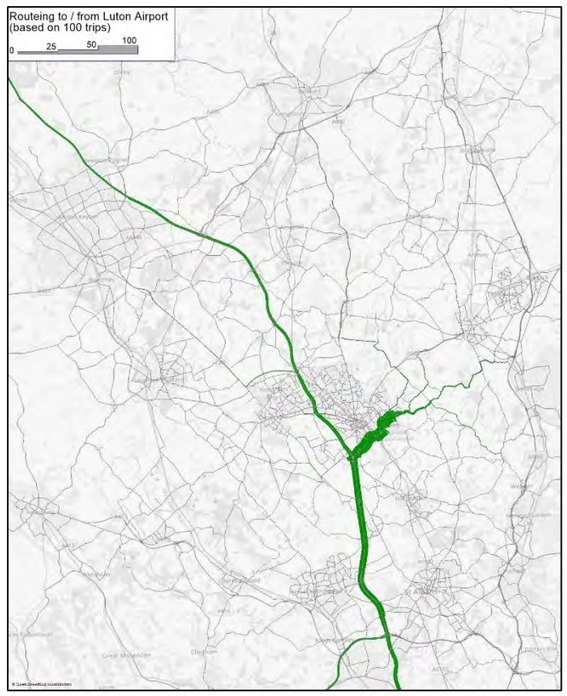


Interpeak Hour (between 10:00 to 16:00)



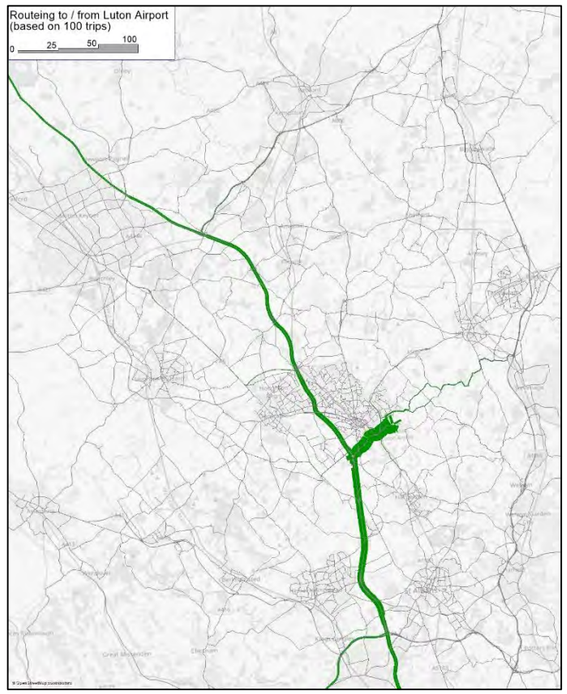
PM Peak Hour (17:00 to 18:00)

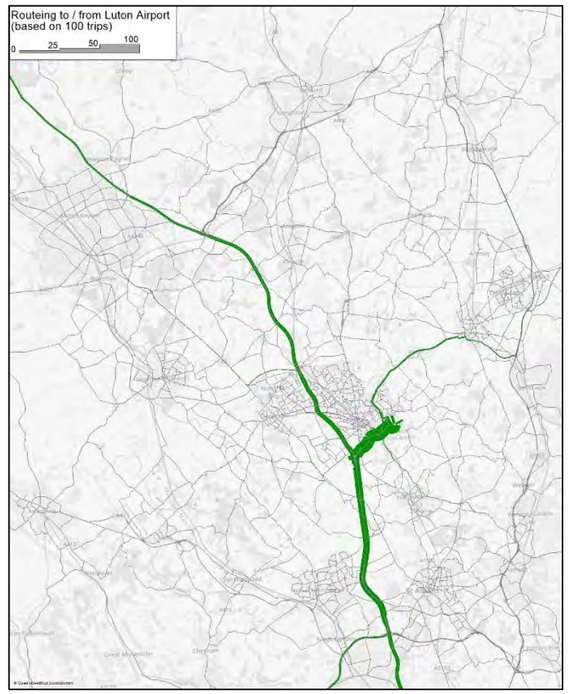


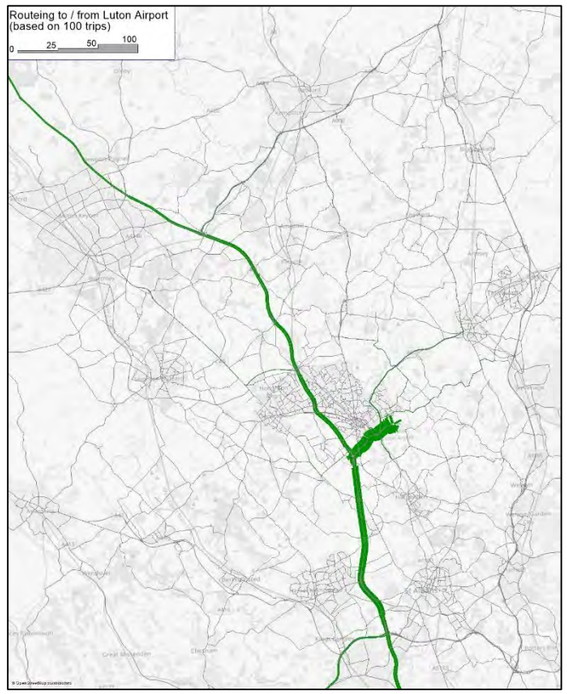
2039	Terminal 1			
	Terminal 2			

2043

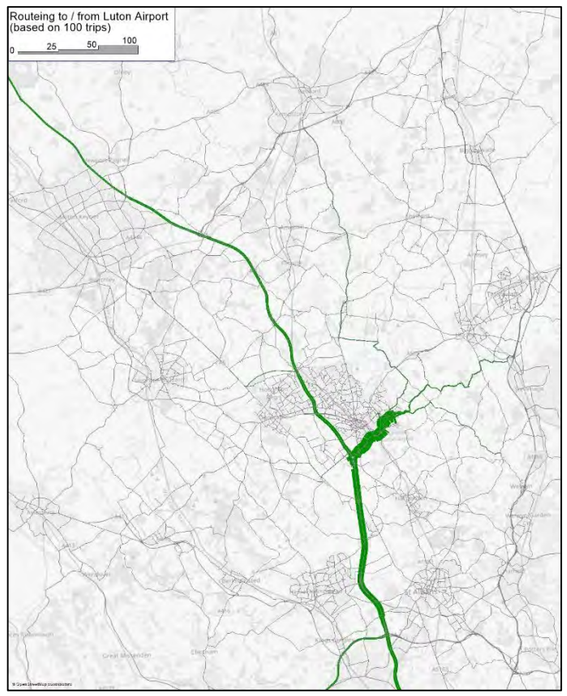
Terminal 1

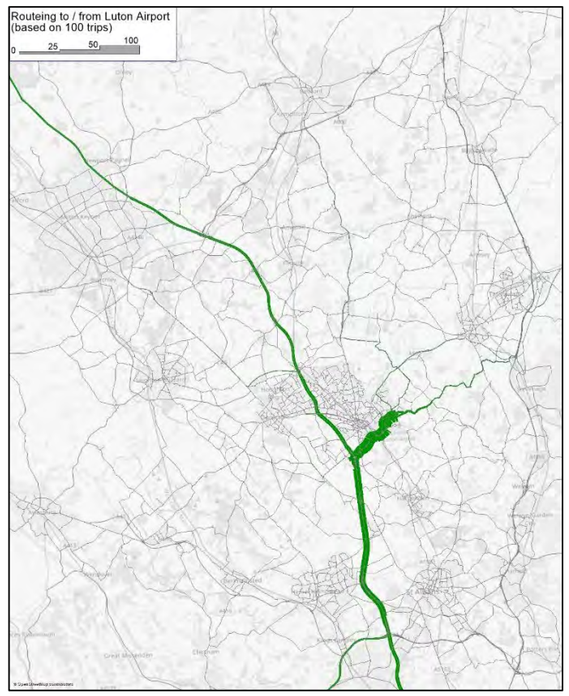






Terminal 2





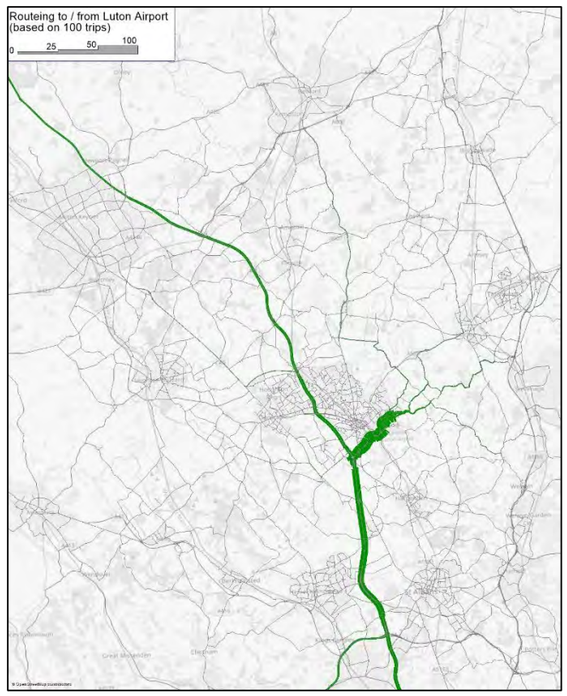


Table 5.7: Forecast Journey Times in TAG-based “With” Expansion Scenario, including change from “Without” Expansion Scenario

		Forecast Journey Time (mm:ss)				Change from “Without” Expansion (mm:ss)		
	Route	2016	2027	2039	2043	2027	2039	2043
AM Peak Hour (08:00 to 09:00)	M1 Jn9 to LTN Terminal 1	08:29	09:32	10:18	12:24	00:19	00:44	02:46
	LTN Terminal 1 to M1 Jn9	08:44	10:05	09:31	09:12	00:22	-00:18	00:06
	M1 Jn9 to LTN Terminal 2		11:03	11:40	13:15			
	LTN Terminal 2 to M1 Jn9		12:44	11:20	10:35			
	M1 Jn11 to Terminal 1	09:42	11:30	12:59	14:54	00:26	00:59	03:50
	LTN Terminal 1 to M1 Jn11	10:06	11:34	10:41	11:08	00:35	-00:28	00:08
	M1 Jn11 to Terminal 2			15:58	17:12			
	LTN Terminal 2 to M1 Jn11			13:43	13:34			
	Hitchin to Terminal 1 (via A505 & Vauxhall Way)	16:15	17:25	18:39	18:53	01:29	01:53	01:51
	Terminal 1 to Hitchin (via A505 & Vauxhall Way)	16:06	17:13	17:08	17:12	00:42	-00:03	-00:12
	Hitchin to Terminal 2 (via A505 & Vauxhall Way)			22:49	22:27			
	Terminal 2 to Hitchin (via A505 & Vauxhall Way)			19:37	19:17			
	M1 Jn8 to M1 Jn12	15:09	15:47	16:53	17:15	00:01	00:06	00:08
	M1 Jn12 to M1 Jn8	18:58	21:13	24:15	25:07	00:03	00:16	00:18
Interpeak Hour (between 10:00 to 16:00)	M1 Jn9 to LTN Terminal 1	07:53	09:32	10:18	12:24	-00:07	00:01	00:40
	LTN Terminal 1 to M1 Jn9	07:14	10:05	09:31	09:12	00:25	00:02	00:21
	M1 Jn9 to LTN Terminal 2		11:03	11:40	13:15			
	LTN Terminal 2 to M1 Jn9		12:44	11:20	10:35			
	M1 Jn11 to Terminal 1	08:20	11:30	12:59	14:54	-00:03	00:21	01:33
	LTN Terminal 1 to M1 Jn11	09:08	11:34	10:41	11:08	00:37	00:27	00:24
	M1 Jn11 to Terminal 2			15:58	17:12			
	LTN Terminal 2 to M1 Jn11			13:43	13:34			
	Hitchin to Terminal 1 (via A505 & Vauxhall Way)	14:51	17:25	18:39	18:53	00:40	00:42	00:44
	Terminal 1 to Hitchin (via A505 & Vauxhall Way)	15:39	17:13	17:08	17:12	00:24	00:26	00:18
	Hitchin to Terminal 2 (via A505 & Vauxhall Way)			22:49	22:27			
	Terminal 2 to Hitchin (via A505 & Vauxhall Way)			19:37	19:17			
	M1 Jn8 to M1 Jn12	15:49	15:47	16:53	17:15	00:00	00:07	00:10
	M1 Jn12 to M1 Jn8	14:06	21:13	24:15	25:07	00:00	00:06	00:10

		Forecast Journey Time (mm:ss)				Change from "Without" Expansion (mm:ss)		
	Route	2016	2027	2039	2043	2027	2039	2043
PM Peak Hour (17:00 to 18:00)	M1 Jn9 to LTN Terminal 1	09:24	09:32	10:18	12:24	00:07	00:19	00:54
	LTN Terminal 1 to M1 Jn9	10:09	10:05	09:31	09:12	00:55	-02:00	01:08
	M1 Jn9 to LTN Terminal 2		11:03	11:40	13:15			
	LTN Terminal 2 to M1 Jn9		12:44	11:20	10:35			
	M1 Jn11 to Terminal 1	09:15	11:30	12:59	14:54	00:15	00:22	01:52
	LTN Terminal 1 to M1 Jn11	10:44	11:34	10:41	11:08	01:19	00:04	01:04
	M1 Jn11 to Terminal 2			15:58	17:12			
	LTN Terminal 2 to M1 Jn11			13:43	13:34			
	Hitchin to Terminal 1 (via A505 & Vauxhall Way)	16:07	17:25	18:39	18:53	00:56	01:21	01:32
	Terminal 1 to Hitchin (via A505 & Vauxhall Way)	16:52	17:13	17:08	17:12	00:48	00:48	00:39
	Hitchin to Terminal 2 (via A505 & Vauxhall Way)			22:49	22:27			
	Terminal 2 to Hitchin (via A505 & Vauxhall Way)			19:37	19:17			
	M1 Jn8 to M1 Jn12	19:28	15:47	16:53	17:15	00:09	00:06	00:06
	M1 Jn12 to M1 Jn8	15:57	21:13	24:15	25:07	00:03	00:29	00:22

5.4 Public Transport Assignment Forecasts

5.4.1 In addition to the forecast flow changes within the highway assignment model, this section details the forecast changes in public transport passenger volumes with the inclusion of the proposed expansion at Luton Airport.

5.4.2 There are a number of differences between the highway and public transport models which should be considered as part of this analysis. These are:

a. Whilst the highway model represents the peak hour within the AM Peak and PM Peak periods, the public transport models represent an average hour within each of the three modelled periods.

b. Through link and junction constraints, the highway model represents forecast congestion and how trips may reroute in response to that congestion. In the public transport model crowding on bus and rail services is not represented so there is no feedback represented to additional passengers on services.

5.4.3 By design, the coding within the public transport model focuses on the location of bus stops / rail stations, how passengers access the network, and the services which call at given locations. The routeing of bus services between stops is not considered in detail within the public transport model as this does not affect the assignment results, and so the model estimates the routes services take between stops. Where bus stops are represented in detail, this estimation tends to accurately represent the actual route of a bus service; however, in the external areas of the model where a limited number of bus stops are represented, the estimated routeing can be less accurate.

5.4.4 One of the key changes in the public transport service coding from the base year is the introduction of the DART service between Luton Airport Parkway and the airport, with the assumed extension of this service to Terminal 2 in the “With” Expansion scenarios.

5.4.5 The DART service has been coded as a ‘shuttle’ service within the public transport model, with a four-minute journey time between Luton Airport Parkway station and the existing terminal. The coding of the DART as a ‘shuttle’ service is similar to the representation of the existing shuttle bus service within the base year (see the ‘Public Transport Local Model Validation Report’ for further details).

5.4.6 Figure 5.6, Figure 5.7 and Figure 5.8 detail the forecast passenger flow changes for rail and bus / coach within the three modelled time periods between the “Without” and “With” Expansion scenarios for 2027, 2039 and 2043 respectively.

5.4.7 As discussed within the analysis of the forecast change in highway traffic flows, the analysis of the forecast change in public transport passenger volumes matches links where there is a correspondence between the “Without” and “With” networks. This is possible for all links except the extension to the DART service to Terminal 2. For these links, the forecast “With” Expansion passenger

flows are compared with zero passenger flow from the “Without” Expansion scenario.

5.4.8 In terms of the forecast changes in rail passengers, the forecast increases are concentrated on the Midland Main Line between Bedford and London, with larger increase in passengers forecast on the section between London and Luton Airport.

5.4.9 For bus and coach travel, a large proportion of the forecast increases in passengers are on coach services between Luton Airport and London. In addition to this there are forecast to be increases on services within Luton (including the busway to Dunstable), services to the north-east towards Hitchin, services to the north towards Bedford, and to the north-west towards Milton Keynes.

5.4.10 The forecasts regarding both the quantity and distribution of rail and bus / coach passenger demand to / from Luton Airport are produced outside the CBLTM-LTN suite and are discussed in Section 3.3. The forecasts passenger flow changes detailed in this section are therefore largely determined by the forecasts for public transport airport travel.

Figure 5.6: Forecast Change in Public Transport Passenger Volumes between 2027 TAG-based “Without” and “With” Expansion

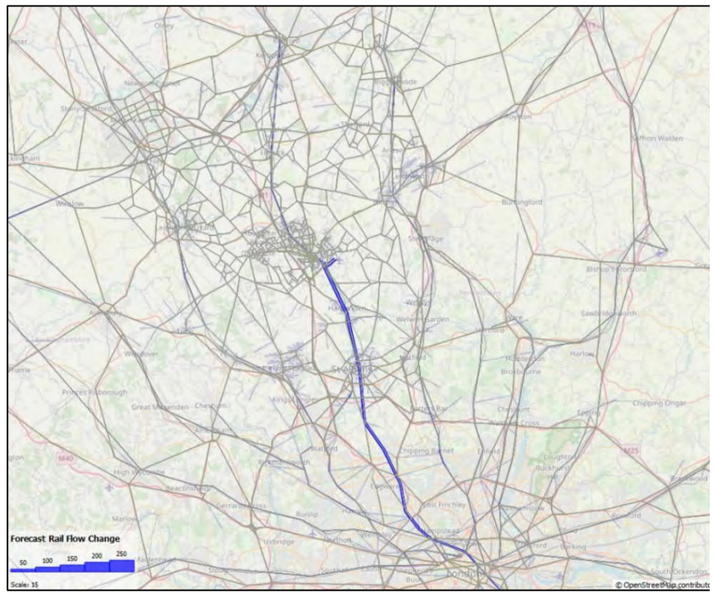
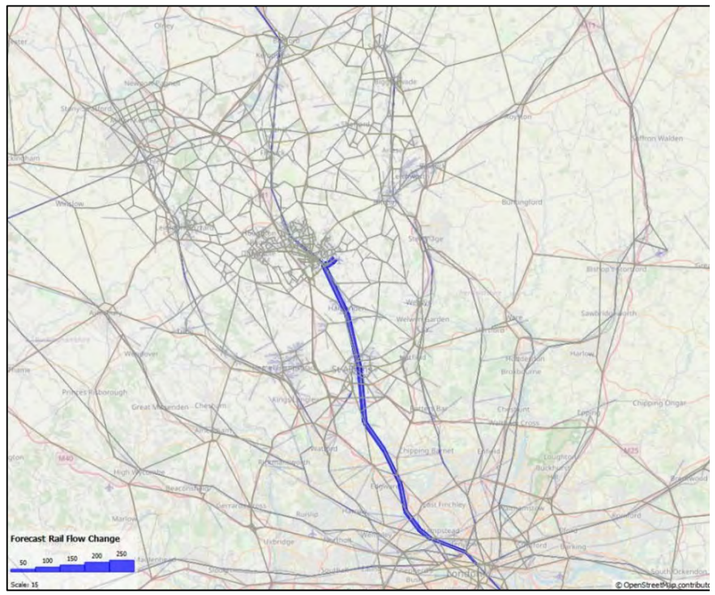
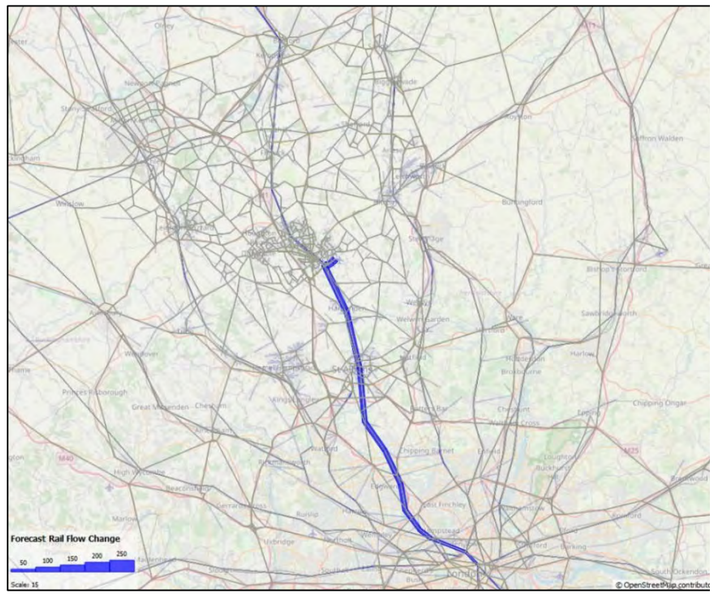
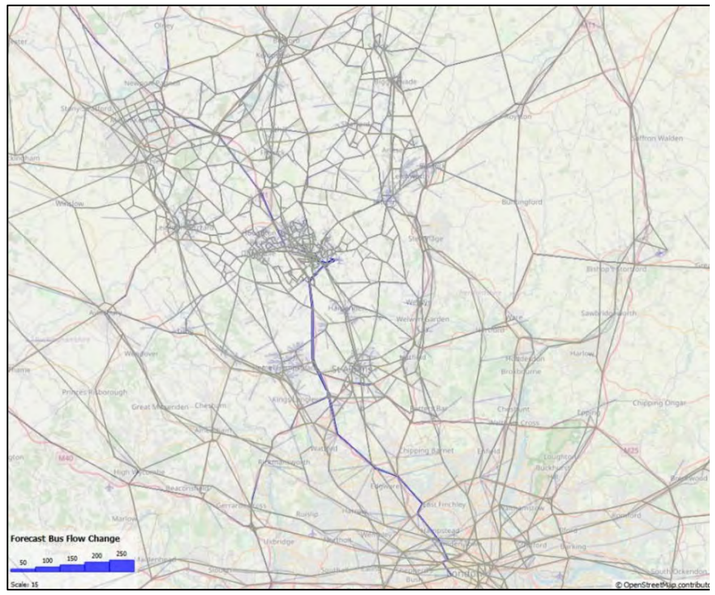
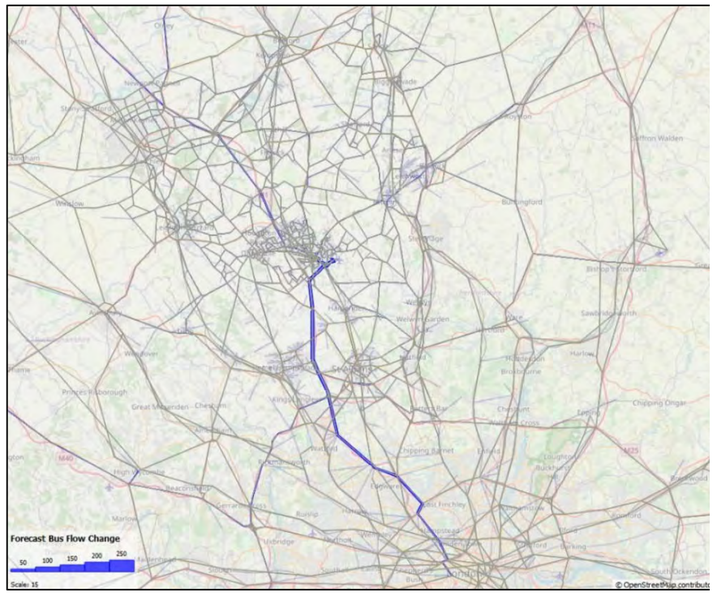
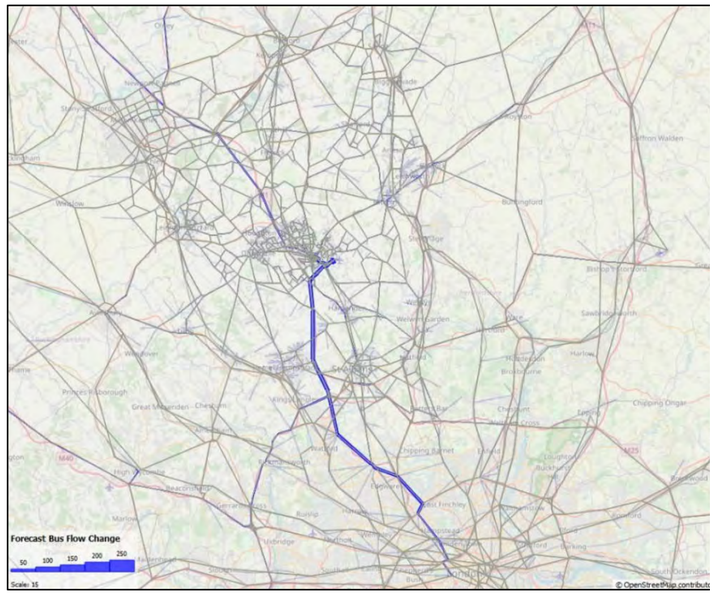
	AM Peak Hour (between 07:00 to 10:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (between 16:00 to 19:00)
Rail			
Bus / Coach			

Figure 5.7: Forecast Change in Public Transport Passenger Volumes between 2039 TAG-based “Without” and “With” Expansion

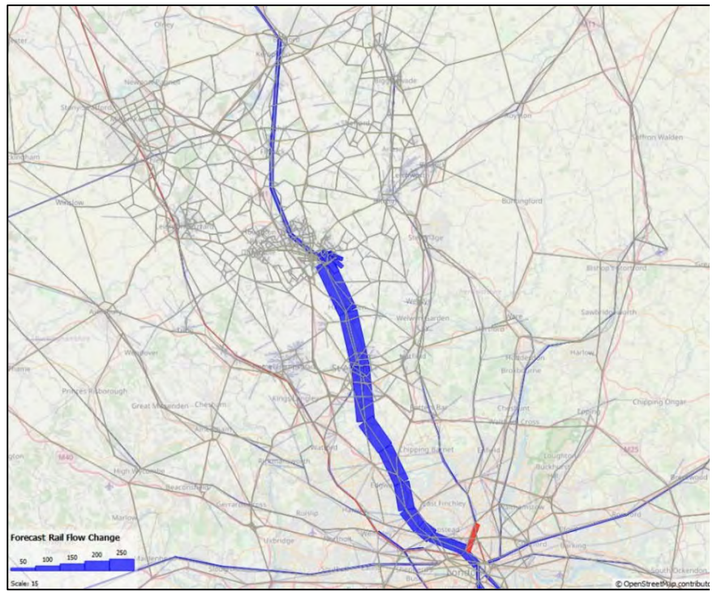
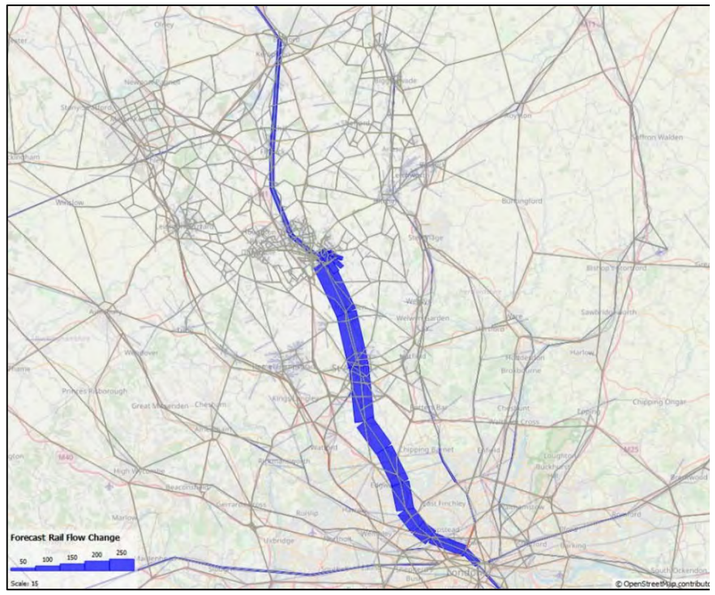
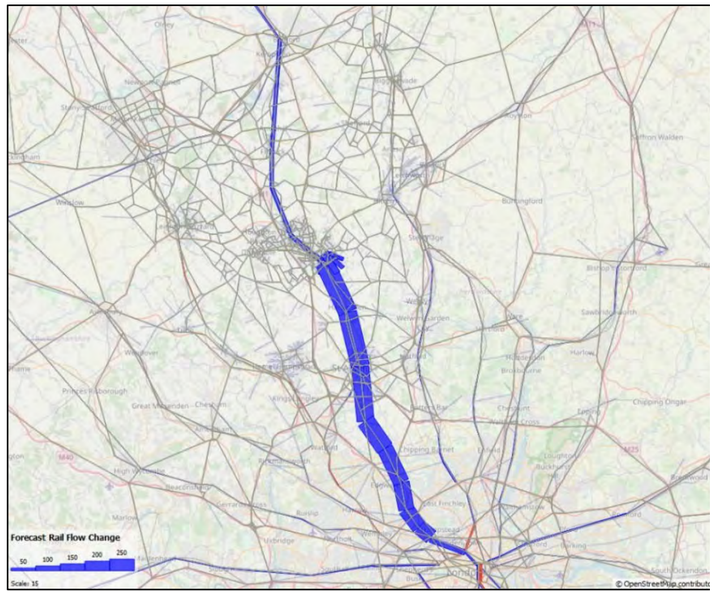
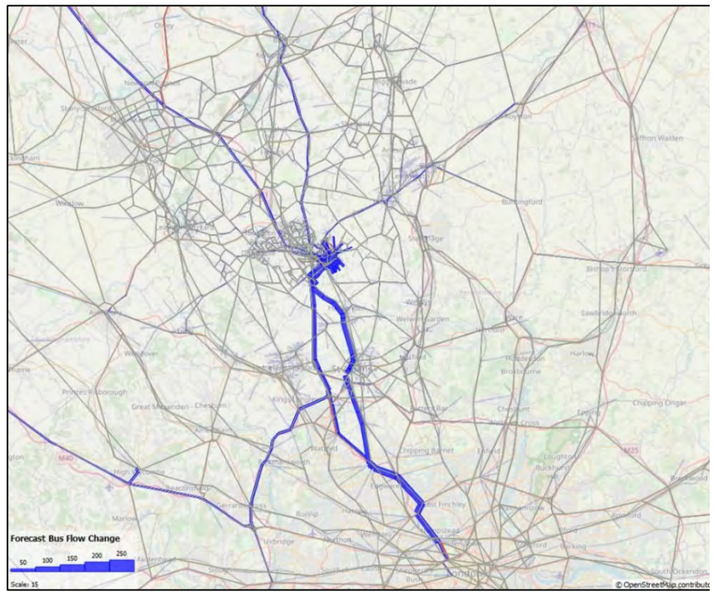
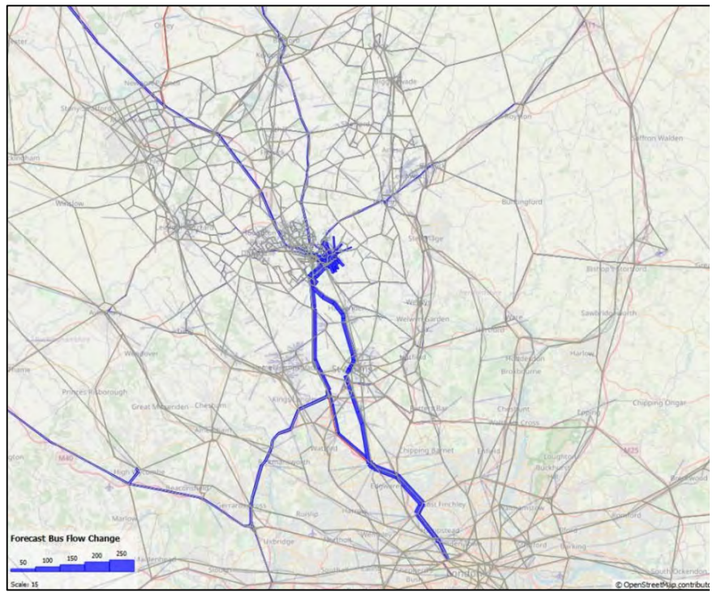
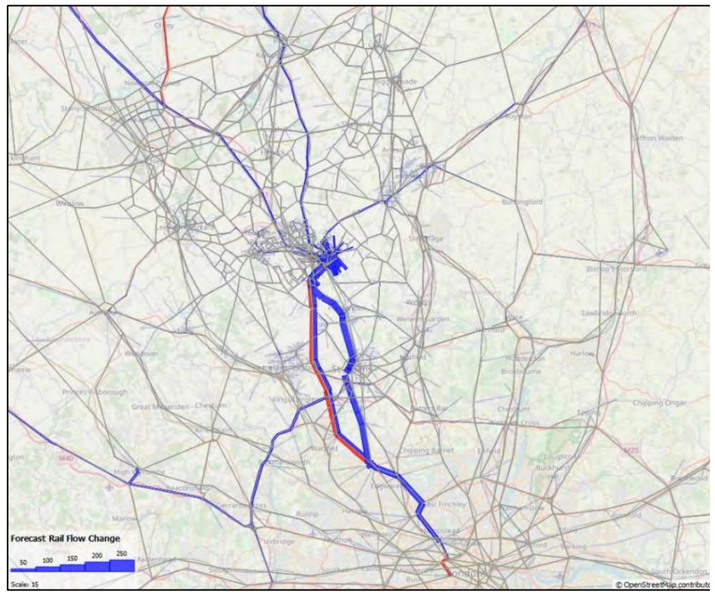
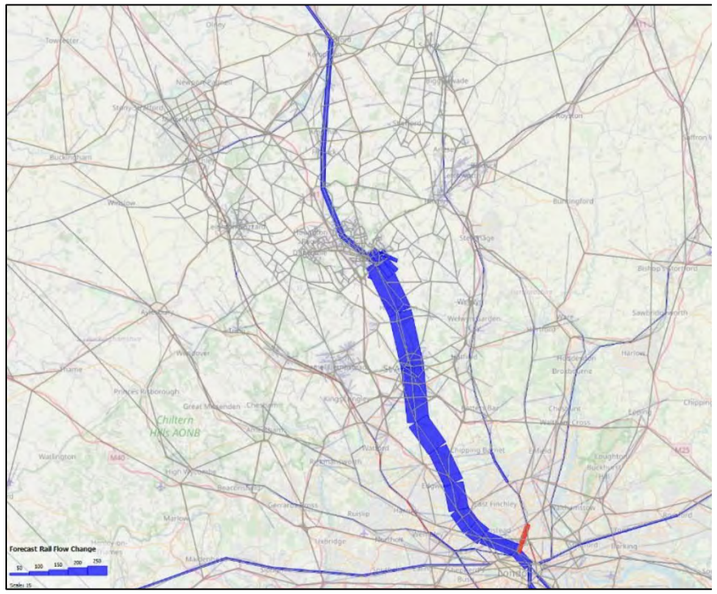
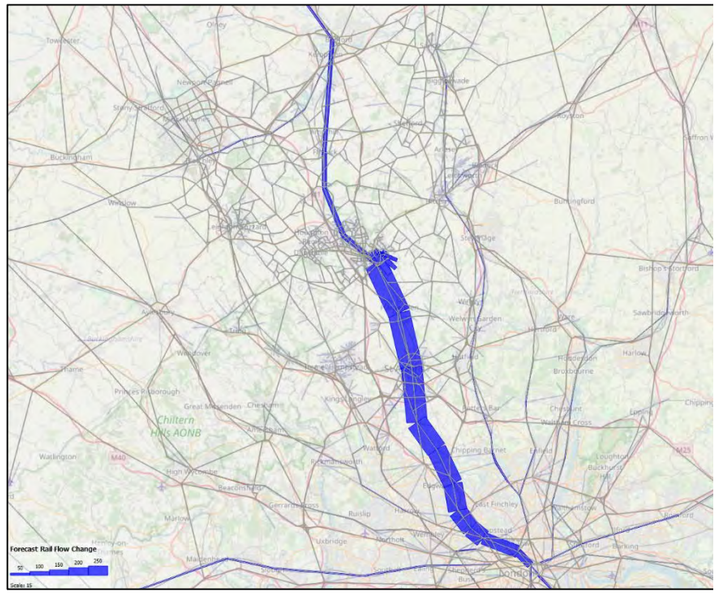
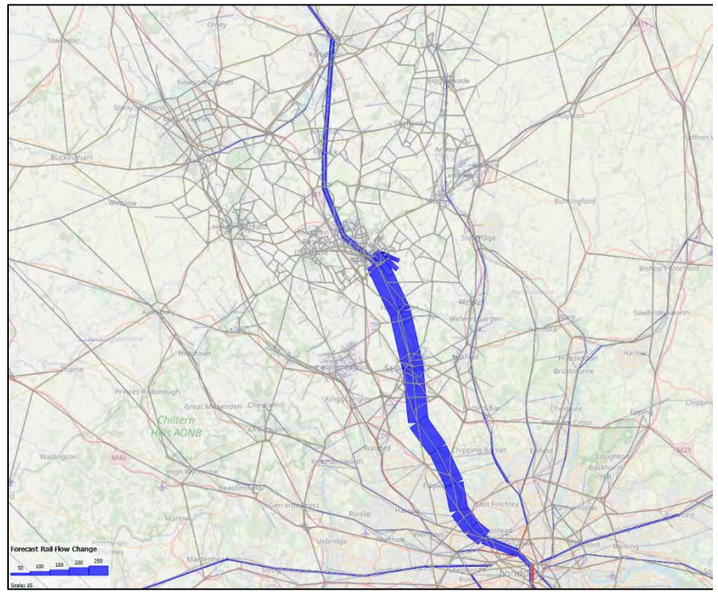
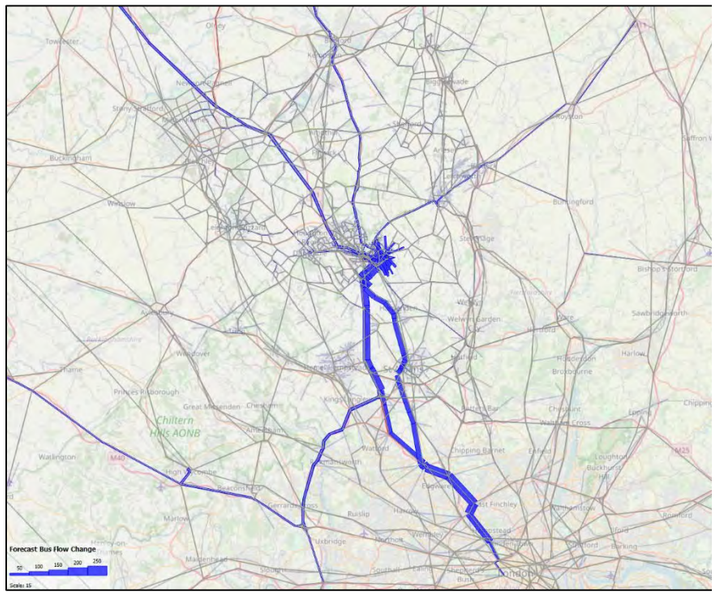
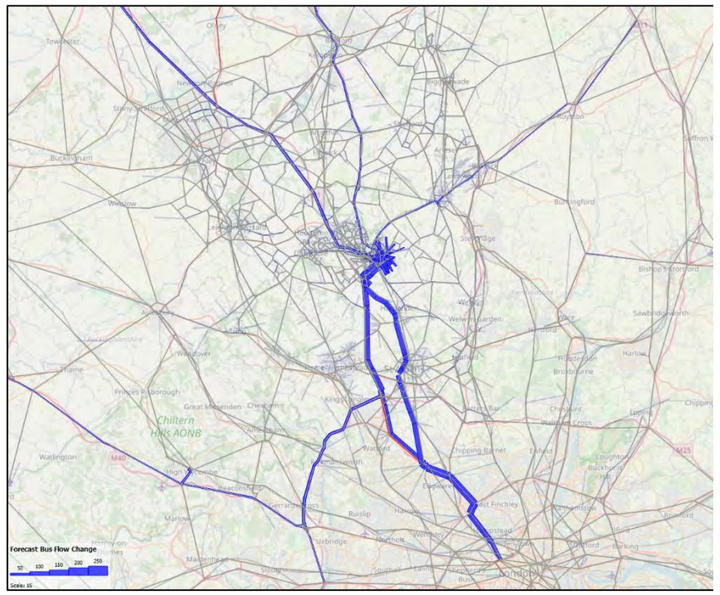
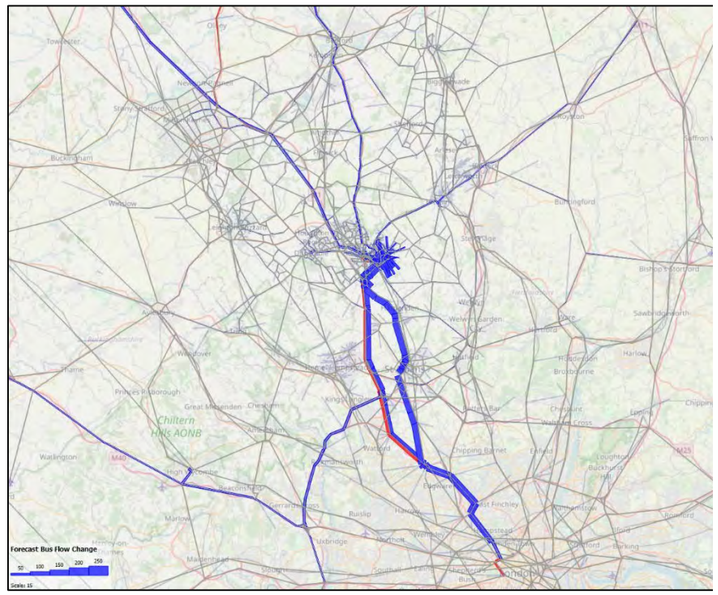
	AM Peak Hour (between 07:00 to 10:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (between 16:00 to 19:00)
Rail			
Bus / Coach			

Figure 5.8: Forecast Change in Public Transport Passenger Volumes between 2043 TAG-based “Without” and “With” Expansion

	AM Peak Hour (between 07:00 to 10:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (between 16:00 to 19:00)
Rail			
Bus / Coach			

6 LOCAL PLAN GROWTH ALTERNATIVE SCENARIO

6.1 Introduction

6.1.1 The TAG-based forecasts detailed in Section 4 and 5 are based on TAG guidance to include residential, employment and infrastructure developments which are considered to be 'near certain' or 'more than likely'. In terms of residential and employment developments, this largely captures those developments which have either submitted a planning application or are expected to submit a planning application in the near future.

6.1.2 On this basis, a number of large developments included within the current Local Plans for the five districts (Luton Borough, Central Bedfordshire, North Hertfordshire, St Albans District and Dacorum) are classed as 'reasonably foreseeable' and are therefore not included within the TAG-based forecasts. These developments are detailed within Table 3.5 and Table 3.6, and include:

a. Marston Vale New Villages, North Luton and east of Arlesey residential developments and Sundon Rail Freight Interchange within Central Bedfordshire;

b. the East Luton residential development within North Hertfordshire; and

c. the residential developments to the north and east of Hemel Hempstead within St Albans, along with associated employment development.

6.1.3 This alternative scenario assesses the forecast impacts of including the residential and employment developments classified as 'reasonably foreseeable', which equates to including the growth assumed within the Local Plans. Within these forecasts, the constraint to TEMPro 7.2 forecast growth at a district level has been maintained. This approach results in a redistribution of growth within the districts compared with the TAG-based forecasts and does not change the overall growth assumed within a district.

6.1.4 Table 6.1 and Table 6.2 provide a comparison between the growth assumed from the Uncertainty Log based on the developments included within this alternative scenario and the growth assumed within TEMPro for households and employment respectively.

6.1.5 For household growth, across the internal area the constraint to TEMPro growth is reducing the assumed growth in all forecast years. In 2043 the constraint process is reducing the assumed growth in households by around 6%. By district within the internal area in 2043, the assumed growth is increased within North Hertfordshire and Dacorum due to the TEMPro constraint, with the assumed growth reduced in all other districts.

6.1.6 For employment growth, across the internal area the constraint to TEMPro forecasts is reducing the assumed overall growth across the five districts apart from Luton and North Herfordshire. In 2043 the constraint process is reducing the assumed overall growth across the internal area. The largest absolute reduction in assumed growth in 2043 due to the constraint to TEMPro is within Central Bedfordshire where the assumed growth from the Uncertainty Log of

around 31,400 jobs is reduced to the TEMPro forecast growth of around 10,700 jobs.

Table 6.1: Comparison of Local Plan Alternative Scenario and TEMPro Household Growth by District (Dwellings)

District	2027			2039			2043		
	Uncert.Log	TEMPro	Diff	Uncert.Log	TEMPro	Diff	Uncert.Log	TEMPro	Diff
Luton	9,580	3,848	-5,732	10,023	5,205	-4,818	10,023	5,660	-4,362
Central Bedfordshire	28,386	19,206	-9,180	40,987	33,407	-7,581	41,787	38,068	-3,720
North Hertfordshire	9,471	10,429	958	14,517	18,813	4,296	14,517	21,616	7,099
St Albans	5,285	2,666	-2,619	11,656	4,321	-7,335	12,056	4,809	-7,247
Dacorum	7,849	5,965	-1,884	9,556	10,657	1,101	9,556	12,201	2,645
Internal Area	**60,570**	**42,114**	**-18,457**	**86,739**	**72,403**	**-14,335**	**87,939**	**82,354**	**-5,585**

Table 6.2: Comparison of Local Plan Alternative Scenario and TEMPro Employment Growth by District (Jobs)

District	2027			2039			2043		
	Uncert.Log	TEMPro	Diff	Uncert.Log	TEMPro	Diff	Uncert.Log	TEMPro	Diff
Luton	7,700	4,562	-3,138	8,697	8,200	-498	8,697	9,629	931
Central Bedfordshire	24,399	5,102	-19,297	31,091	9,099	-21,992	31,392	10,669	-20,722
North Hertfordshire	3,197	2,921	-276	4,289	5,040	751	4,289	5,872	1,583
St Albans	5,998	3,091	-2,906	10,345	5,574	-4,771	10,345	6,550	-3,795
Dacorum	6,450	3,064	-3,386	8,071	5,702	-2,368	8,071	6,739	-1,332
Internal Area	**47,745**	**18,740**	**-29,004**	**62,493**	**33,615**	**-28,878**	**62,793**	**39,458**	**-23,335**

6.1.7 For this alternative scenario, forecasts have been produced the “Without” and “With” the proposed expansion at Luton Airport using the same airport forecasts as included within the TAG-based forecasts.

6.2 Model Convergence

6.2.1 Table 6.3 and Figure 6.1 show the demand model convergence statistics for the Local Plan alternative scenario. These show that the demand model reaches the target convergence level within these forecasts, reaching this target in a similar number of iterations as the corresponding TAG-based forecasts.

6.2.2 Table 6.4 shows the convergence of the highway model within the Local Plan alternative scenario. As with the demand model, the highway assignment models reach the target level of convergence in a similar number of iterations as required within the TAG-based forecasts.

Table 6.3: Local Plan Alternative Scenario Demand Model Convergence (*%Gap*)

Iteration	2027	2039	2043
“Without” Expansion			
2	2.961	6.467	7.500
3	0.276	0.828	0.971
4	0.138	0.193	0.200
5	0.126	0.134	0.150
6	0.113	0.115	0.129
7	0.101	0.091	0.116
8	0.081		0.111
9			0.084
“With” Expansion			
2	2.970	6.192	7.185
3	0.308	0.735	0.904
4	0.125	0.199	0.207
5	0.092	0.127	0.142
6		0.110	0.139
7		0.090	0.111
8			0.099

Figure 6.1: Local Plan Alternative Scenario Demand Model Convergence

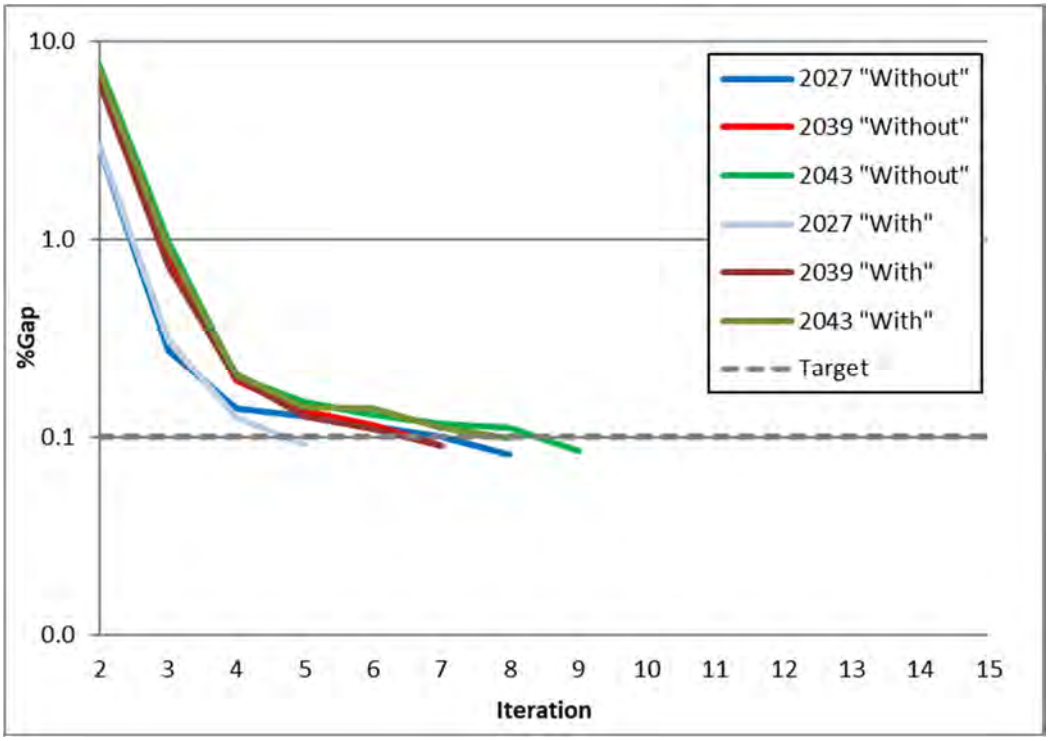


Table 6.4: Local Plan Alternative Scenario Highway Model Convergence

Forecast Year	AM Peak Hour 0800-0900		Interpeak Hour Average (1000-1600)		PM Peak Hour 1700-1800	
	Iterations	%Gap	Iterations	%Gap	Iterations	%Gap
2027	14	0.0065	8	0.0037	12	0.0083
2039	20	0.0081	9	0.0041	19	0.0097
2043	34	0.0061	9	0.0043	27	0.0053

6.3 Highway Assignment Forecasts

6.3.1 Table 6.5 shows the forecast change in vehicle-kms within each of the five districts and across the simulation network between the TAG-based forecasts and the Local Plan alternative scenario tests. In general, the forecast vehicle-kms by districts do not change by more than ±1% with the inclusion of the 'reasonably foreseeable' residential and employment developments.

6.3.2 Considering the variation in change by district, Luton Borough is forecast to have an increase in vehicle-kms of up to around 1% in this alternative scenario compared with the TAG-based forecasts. This is due to the inclusion of a number of additional developments near Luton (namely North Luton, Sundon Rail Freight Interchange, and East Luton) within this alternative scenario.

6.3.3 In general, the remaining forecast changes in vehicle-kms are within ±0.8%, with a reduction in vehicle-kms forecast within Central Bedfordshire in the Local Plan alternative scenario compared with the TAG-based forecasts.

6.3.4 Table 6.6 presents the corresponding analysis for average speeds, showing the forecast change in network speeds between the TAG-based forecasts and the Local Plan alternative scenario. As with the forecasts for vehicle-kms, the forecast changes in average speeds are within ±1% within this alternative scenario compared with the TAG-based forecasts.

6.3.5 In general, the additional traffic forecast within Luton Borough within the inclusion of the 'reasonably foreseeable' residential and employment developments results in a forecast reduction in average speeds within the borough. These forecast reductions in average speeds are up to -1% in the 2039 "With" and "Without" Expansion scenarios.

6.3.6 Overall, the forecast change in traffic and average speeds within the highway network between the TAG-based forecasts and the Local Plan alternative scenario are broadly consistent between the "Without" and "With" scenarios. Therefore, the incremental impact of the proposed expansion of Luton Airport is comparable to that detailed in Section 5.

6.3.7 In addition to the analysis of vehicle-kms and average speeds detailed above, Table 6.7 and Table 6.8 provide the corresponding analysis for assigned vehicle-time and vehicle-delay. As with the above analysis of traffic and average speeds, these tables show limited forecast change in assigned vehicle-time and vehicle-delay between the TAG-based and Local Plan alternative scenarios, particularly for assigned vehicle-time.

Table 6.5: Forecast Change in Vehicle-kms between Local Plan Alternative Scenario and TAG-based Forecasts

Period	District	2027 "Without"	2039 "Without"	2043 "Without"	2027 "With"	2039 "With"	2043 "With"
AM Peak Hour (08:00 to 09:00)	Luton	0.5%	0.7%	0.8%	0.5%	0.7%	0.7%
	Central Bedfordshire	-0.1%	0.0%	-0.1%	-0.1%	0.0%	-0.1%
	North Hertfordshire	0.1%	0.5%	0.6%	0.1%	0.6%	0.8%
	St Albans	0.2%	0.1%	0.1%	0.2%	0.2%	0.1%
	Dacorum	0.1%	0.0%	-0.1%	0.1%	-0.1%	-0.1%
	Simulation Network	**0.0%**	**0.1%**	**0.1%**	**0.0%**	**0.1%**	**0.1%**
Interpeak Hour (between 10:00 to 16:00)	Luton	0.6%	0.8%	0.6%	0.6%	0.8%	0.6%
	Central Bedfordshire	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	0.0%
	North Hertfordshire	-0.3%	-0.1%	-0.2%	-0.3%	-0.2%	-0.1%
	St Albans	0.2%	0.3%	0.3%	0.2%	0.3%	0.2%
	Dacorum	0.1%	-0.2%	-0.2%	0.1%	-0.2%	-0.2%
	Simulation Network	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
PM Peak Hour (17:00 to 18:00)	Luton	0.9%	1.1%	1.1%	0.7%	0.9%	0.9%
	Central Bedfordshire	0.0%	-0.2%	-0.2%	-0.1%	-0.1%	-0.2%
	North Hertfordshire	-0.1%	0.1%	0.3%	-0.2%	0.4%	0.6%
	St Albans	0.1%	0.1%	0.0%	0.1%	0.0%	-0.1%
	Dacorum	0.1%	-0.2%	-0.2%	0.1%	-0.1%	-0.2%
	Simulation Network	**0.0%**	**-0.1%**	**-0.1%**	**0.0%**	**0.0%**	**-0.1%**

Table 6.6: Forecast Change in Average Speed between Local Plan Alternative Scenario and TAG-based Forecasts

Period	District	2027 "Without"	2039 "Without"	2043 "Without"	2027 "With"	2039 "With"	2043 "With"
AM Peak Hour (08:00 to 09:00)	Luton	0.4%	-0.3%	-0.7%	-0.5%	0.0%	-0.4%
	Central Bedfordshire	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
	North Hertfordshire	0.2%	0.7%	0.5%	0.0%	0.3%	0.7%
	St Albans	-0.2%	-0.5%	-0.2%	-0.2%	-0.5%	-0.3%
	Dacorum	-0.3%	0.2%	0.1%	-0.2%	-0.2%	-0.1%
	Simulation Network	**0.0%**	**-0.1%**	**0.0%**	**-0.2%**	**-0.1%**	**0.0%**
Interpeak Hour (between 10:00 to 16:00)	Luton	0.0%	-0.3%	0.0%	-0.2%	0.0%	-0.6%
	Central Bedfordshire	-0.1%	0.0%	0.1%	0.1%	0.1%	0.2%
	North Hertfordshire	-0.1%	0.0%	-0.1%	-0.1%	0.0%	-0.1%
	St Albans	0.0%	0.1%	0.1%	0.0%	-0.1%	0.0%
	Dacorum	0.0%	-0.1%	0.0%	-0.1%	-0.1%	-0.1%
	Simulation Network	**-0.1%**	**0.0%**	**0.0%**	**-0.1%**	**-0.1%**	**0.0%**
PM Peak Hour (17:00 to 18:00)	Luton	-0.7%	-1.1%	-0.3%	-0.4%	-1.0%	-0.6%
	Central Bedfordshire	0.1%	0.2%	0.1%	0.2%	0.1%	0.1%
	North Hertfordshire	-0.3%	0.1%	0.2%	0.3%	0.3%	0.3%
	St Albans	-0.1%	-0.2%	0.0%	0.1%	-0.4%	-0.2%
	Dacorum	-0.1%	-0.1%	-0.4%	0.0%	-0.2%	-0.2%
	Simulation Network	**-0.1%**	**-0.1%**	**0.0%**	**0.0%**	**-0.1%**	**0.0%**

Table 6.7: Forecast Change in Assigned Vehicle-Time between Local Plan Alternative Scenario and TAG-based Forecasts

Period	District	2027 "Without"	2039 "Without"	2043 "Without"	2027 "With"	2039 "With"	2043 "With"
AM Peak Hour (08:00 to 09:00)	Luton	0.0%	1.0%	1.5%	1.0%	0.7%	1.1%
	Central Bedfordshire	-0.1%	-0.1%	0.0%	0.0%	0.0%	-0.2%
	North Hertfordshire	-0.1%	-0.1%	0.2%	0.0%	0.3%	0.1%
	St Albans	0.4%	0.7%	0.4%	0.4%	0.7%	0.4%
	Dacorum	0.4%	-0.2%	-0.2%	0.2%	0.1%	0.0%
	Simulation Network	**0.0%**	**0.2%**	**0.1%**	**0.2%**	**0.2%**	**0.1%**
Interpeak Hour (between 10:00 to 16:00)	Luton	0.6%	1.0%	0.6%	0.7%	0.8%	1.2%
	Central Bedfordshire	0.0%	-0.1%	-0.2%	-0.2%	-0.1%	-0.3%
	North Hertfordshire	-0.2%	-0.2%	-0.1%	-0.2%	-0.1%	0.0%
	St Albans	0.2%	0.1%	0.2%	0.2%	0.4%	0.2%
	Dacorum	0.1%	-0.1%	-0.2%	0.2%	-0.1%	-0.1%
	Simulation Network	**0.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
PM Peak Hour (17:00 to 18:00)	Luton	1.6%	2.3%	1.4%	1.1%	1.9%	1.4%
	Central Bedfordshire	-0.1%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%
	North Hertfordshire	0.1%	0.0%	0.1%	-0.5%	0.1%	0.2%
	St Albans	0.2%	0.3%	0.0%	0.0%	0.4%	0.1%
	Dacorum	0.2%	-0.1%	0.2%	0.1%	0.1%	-0.1%
	Simulation Network	**0.1%**	**0.0%**	**-0.1%**	**0.0%**	**0.1%**	**-0.1%**

Table 6.8: Forecast Change in Vehicle-Delay between Local Plan Alternative Scenario and TAG-based Forecasts

Period	District	2027 "Without"	2039 "Without"	2043 "Without"	2027 "With"	2039 "With"	2043 "With"
AM Peak Hour (08:00 to 09:00)	Luton	-0.8%	1.4%	2.5%	1.9%	0.6%	1.5%
	Central Bedfordshire	0.0%	0.3%	0.5%	0.2%	0.4%	-0.1%
	North Hertfordshire	-1.4%	-2.9%	-1.7%	-0.8%	-1.5%	-2.5%
	St Albans	1.0%	1.9%	1.3%	1.0%	2.0%	1.3%
	Dacorum	1.1%	-0.5%	-0.3%	0.5%	0.7%	0.3%
	Simulation Network	**0.1%**	**0.3%**	**0.3%**	**0.5%**	**0.3%**	**0.2%**
Interpeak Hour (between 10:00 to 16:00)	Luton	0.8%	1.7%	0.6%	1.3%	0.7%	2.6%
	Central Bedfordshire	0.6%	0.3%	0.0%	-0.8%	0.0%	-0.5%
	North Hertfordshire	-0.3%	-1.6%	-0.9%	-0.6%	-1.5%	-0.9%
	St Albans	0.6%	0.0%	0.5%	0.3%	1.2%	0.5%
	Dacorum	0.3%	0.4%	0.1%	0.6%	0.4%	0.2%
	Simulation Network	**0.5%**	**0.1%**	**0.1%**	**0.2%**	**0.2%**	**0.0%**
PM Peak Hour (17:00 to 18:00)	Luton	2.9%	4.1%	1.9%	1.8%	3.6%	2.3%
	Central Bedfordshire	-0.1%	-0.5%	0.1%	-0.9%	-0.3%	0.0%
	North Hertfordshire	0.5%	-1.0%	-1.1%	-2.2%	-1.7%	-1.5%
	St Albans	0.6%	1.1%	0.3%	-0.2%	1.4%	0.4%
	Dacorum	0.4%	0.1%	1.2%	0.1%	0.5%	0.3%
	Simulation Network	**0.3%**	**0.2%**	**-0.2%**	**-0.2%**	**0.3%**	**-0.1%**

6.3.8 Figure 6.2 shows the forecast flow changes across the simulation network between the TAG-based forecasts and the Local Plan alternative scenario, for each of the four scenarios assessed and for the three modelled hours.

6.3.9 Within Figure 6.2, the forecast flow increases occur where 'reasonably foreseeable' developments have been included within the Local Plan alternative scenario. This includes:

6.3.10 North Luton and Sundon Rail Freight Interchange located along the M1-A5 link road to the north of Luton;

a. East Luton residential development within North Hertfordshire;
b. Marston Vale New Villages to the north-east of M1 Junction 13; and
c. residential and employment developments to the east of Hemel Hempstead within St Albans District.

6.3.11 In addition to these forecast flow increases within the Local Plan alternative scenario, there are also forecast to be flow reductions. These forecast flow reductions are due to the constraint to TEMPro growth, whereby the addition of growth at the 'reasonably foreseeable' developments results in reductions in growth elsewhere to maintain the growth forecast within TEMPro.

6.3.12 This effect is largest in terms of absolute forecast flow changes for the larger developments included in the TAG-based forecasts, although all developments are affected. This can be seen through forecast flow reductions within Houghton Regis to the north of Dunstable, and to the east of Leighton Buzzard.

6.3.13 Further detail on the forecast flow changes within Luton Borough for the four scenarios assessed within this alternative scenario are shown in Figure 6.3. As discussed, this shows the forecast flow increases to the north of Luton (due to the North Luton and Sundon Rail Freight Interchange developments) and to the east of Luton around Tea Green and Cockernhoe.

6.3.14 Figure 6.3 also shows forecast flow reductions within Houghton Regis to the north of Dunstable when comparing the Local Plan alternative scenario with the TAG-based forecasts. These forecast reductions in traffic flows are due to the application of the constraint to TEMPro growth.

6.3.15 Further details on the forecast traffic volumes in the Local Plan alternative scenario can be found in Appendix B.

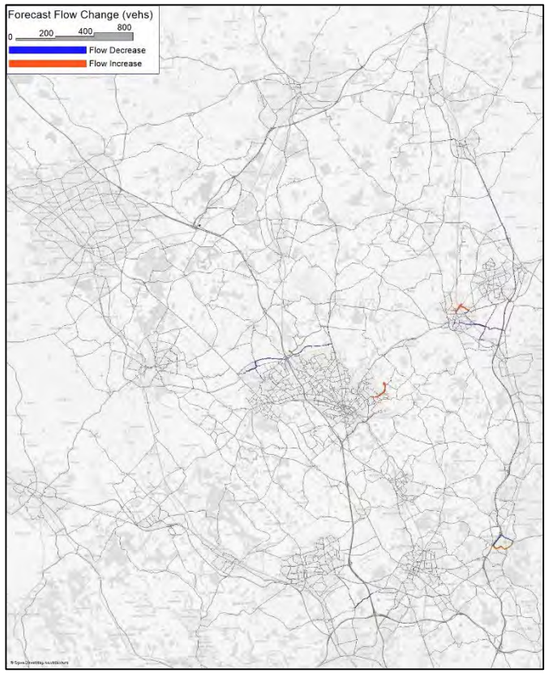
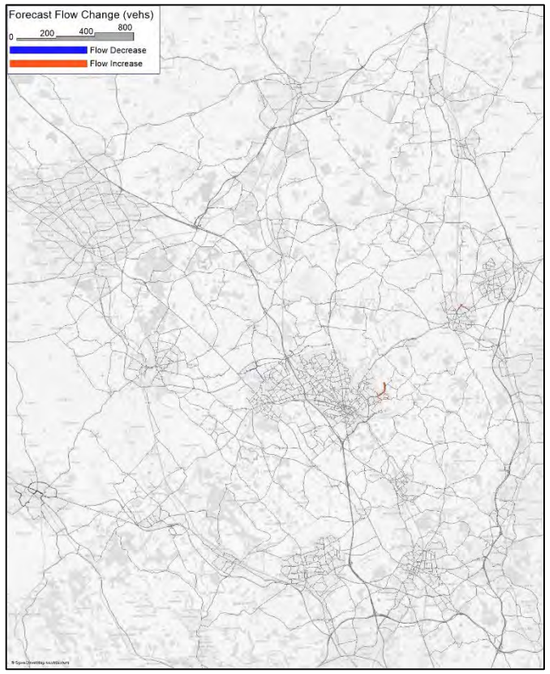
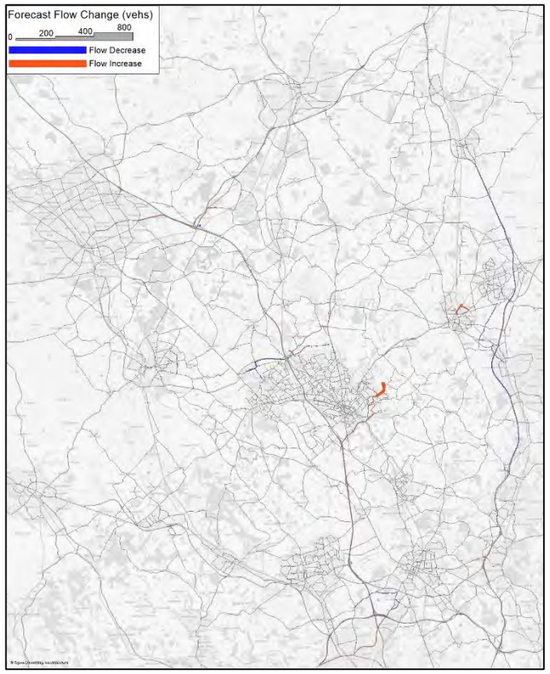
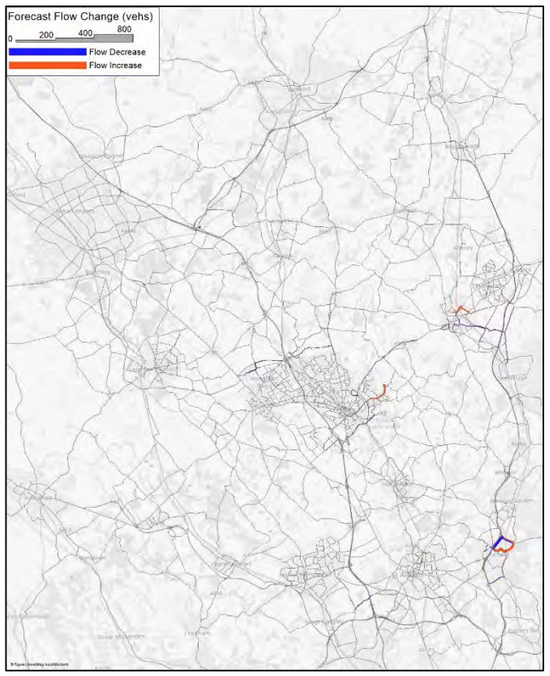
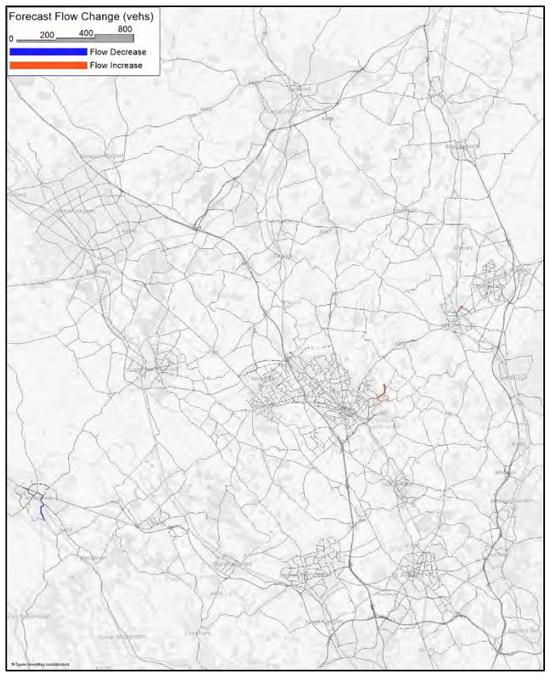
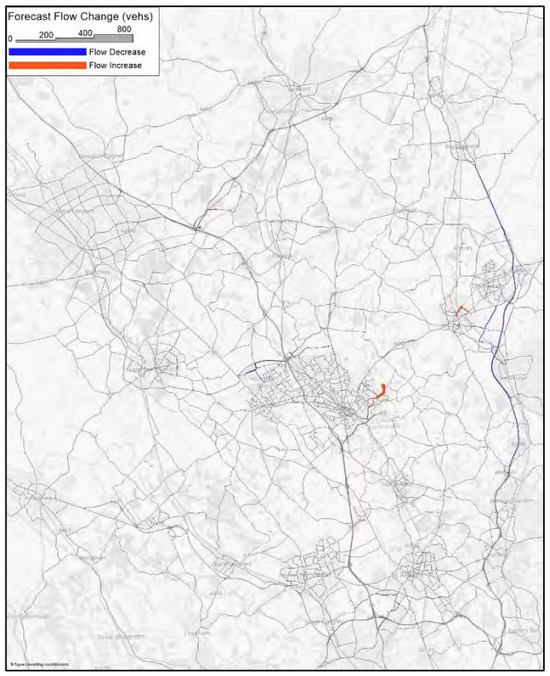
6.3.16 As with the TAG-based scenario, Table 6.9 and Table 6.10 provide the forecast journey times along the selected routes for the Local Plan alternative scenario "Without" and "With" Expansion scenarios, including the forecast change from the corresponding TAG-based forecasts.

6.3.17 These tables show that there are not forecast to be significant changes to the forecast journey times for the selected routes between the Local Plan Growth and TAG-based scenarios, generally with no journey time forecast to change by more than 20 seconds. The only exception is the route from Hitchin to both Terminal 1 and Terminal 2 where the model forecasts significant increases in AM peak hour for both 2027 and 2039 at around nine minutes. This was

investigated and the changes were found to be associated with additional delays at two signalised junctions along the southern section of Vauxhall Way. This is due to additional traffic in the Local Plan Growth Scenario triggering increased delay for some turning movements, such as the left turn from the Vauxhall Way into the Airport Way. It is considered that future signal optimisation at these junctions would reduce the overall delays, although the journey time would still be expected to be higher when compared to the TAG-based scenario.

6.3.18 In addition to the analysis of forecast journey times, Appendix D details the forecast flow-weighted average junction delays for the Local Plan alternative scenario tests.

Figure 6.2: Forecast Change in Traffic Volumes (vehicles) between TAG-based Forecasts and Local Plan Alternative Scenario, Simulation Network

	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)
2027 " Without"			
2027 " With"			

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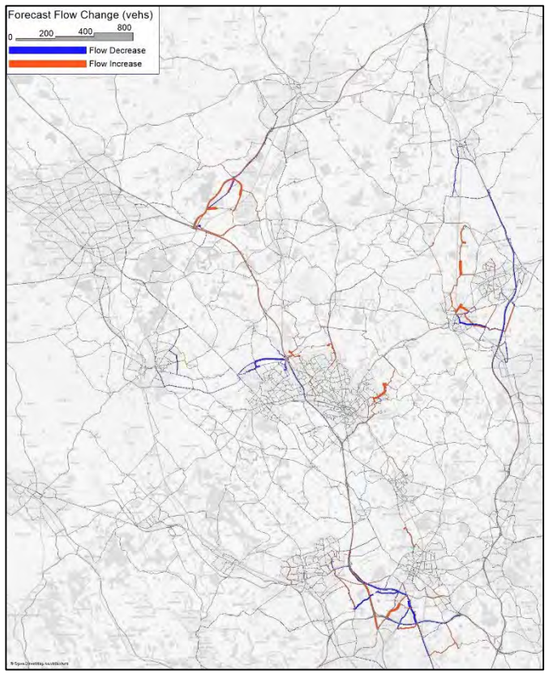

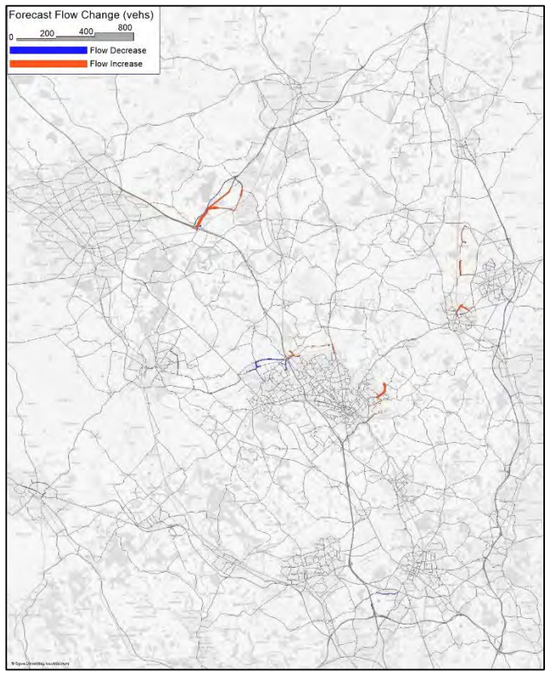

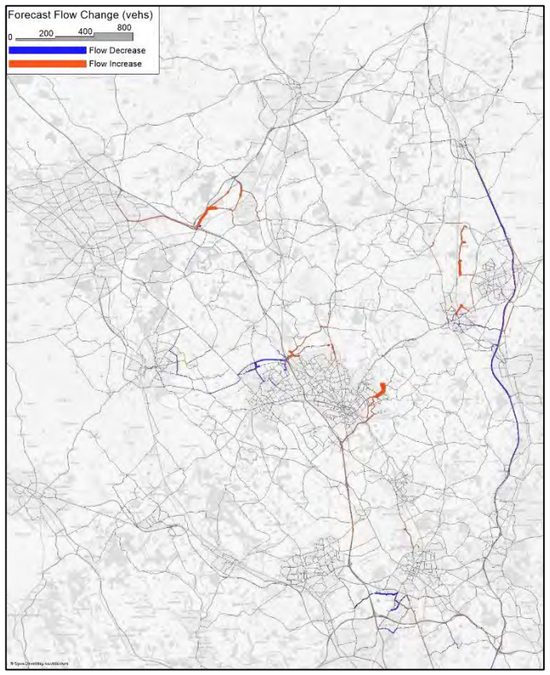

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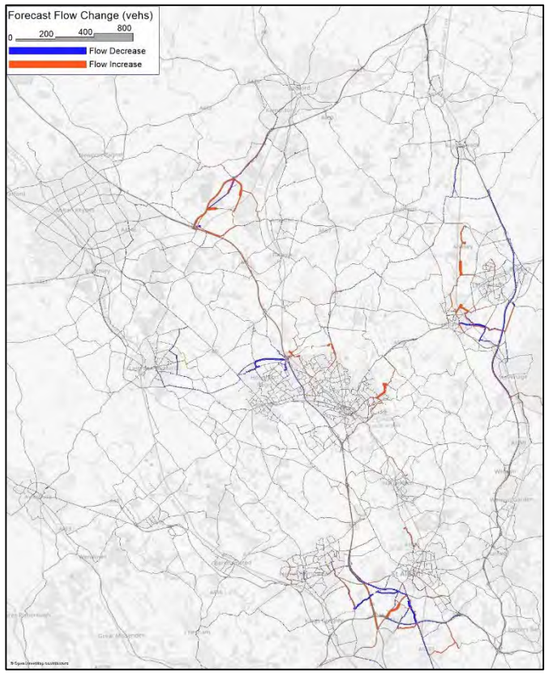

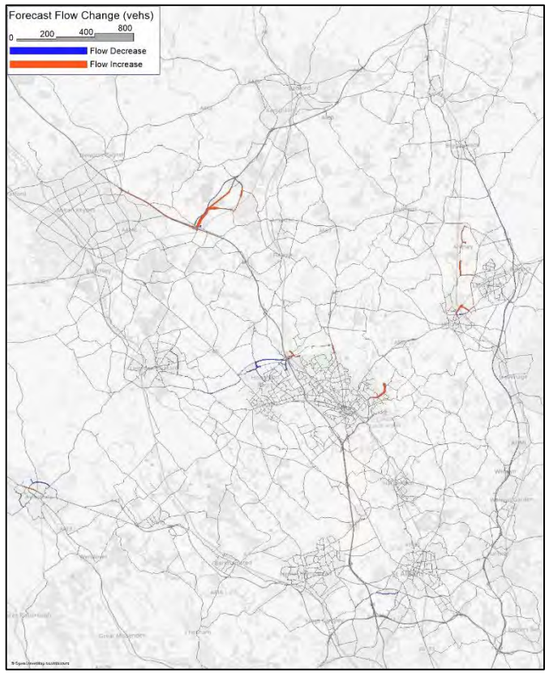

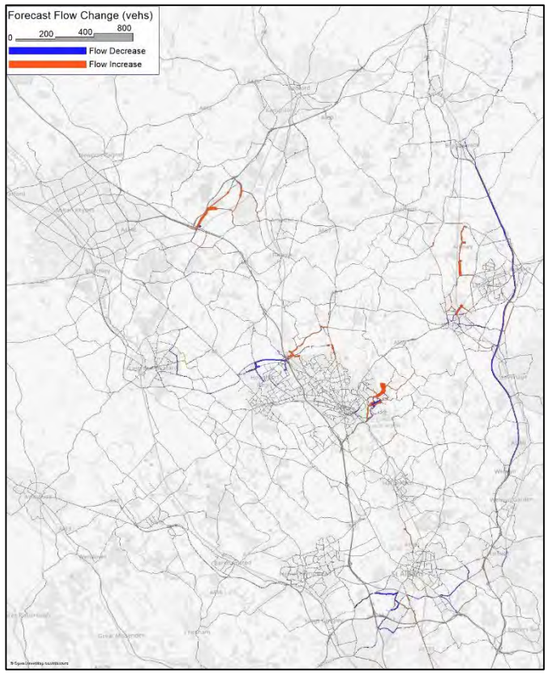

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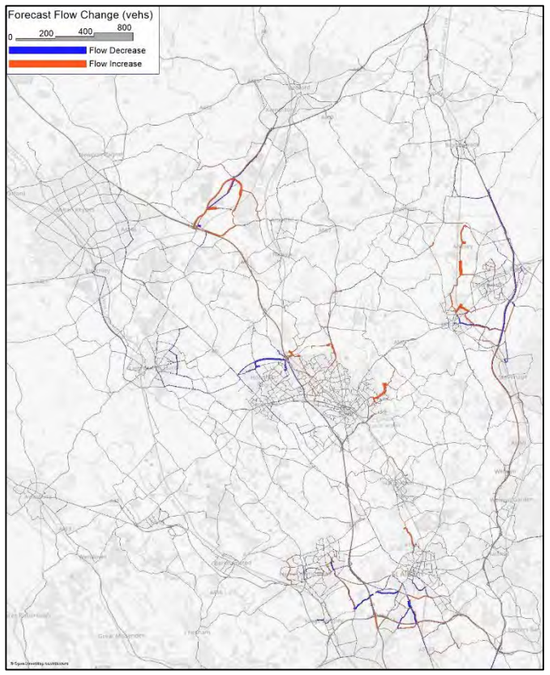

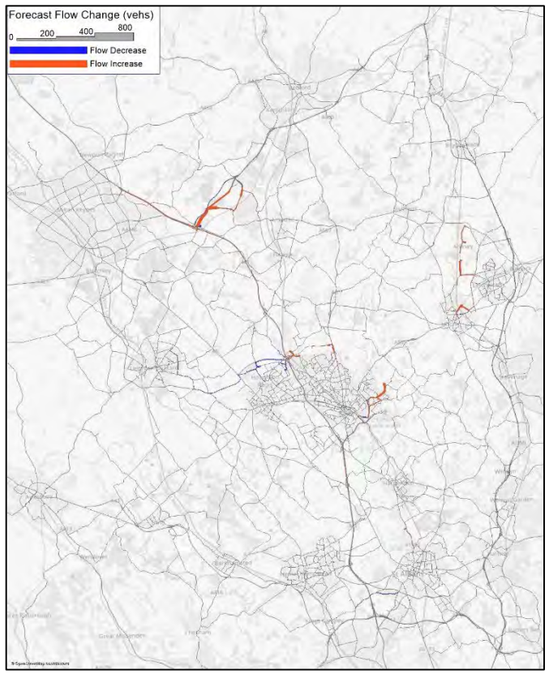

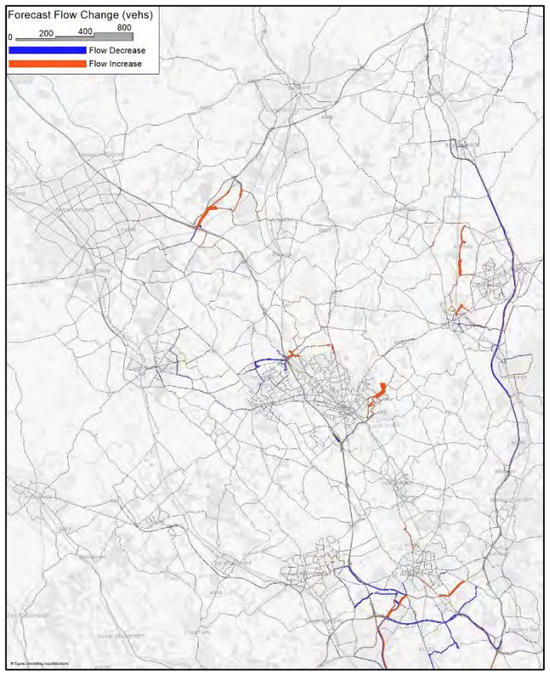

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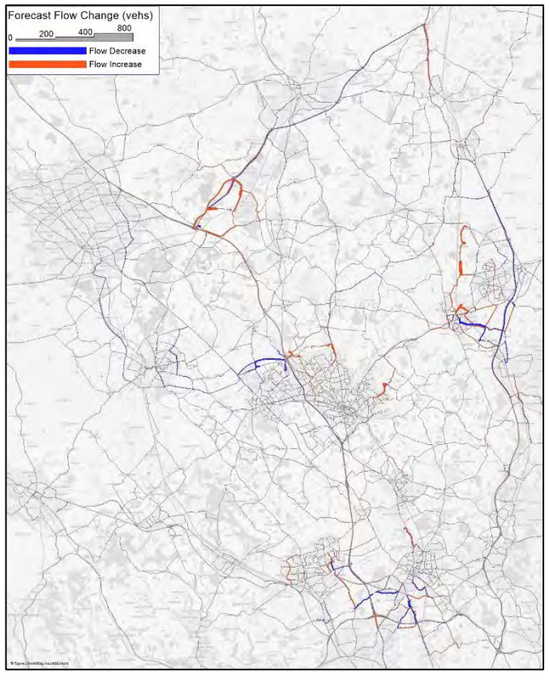
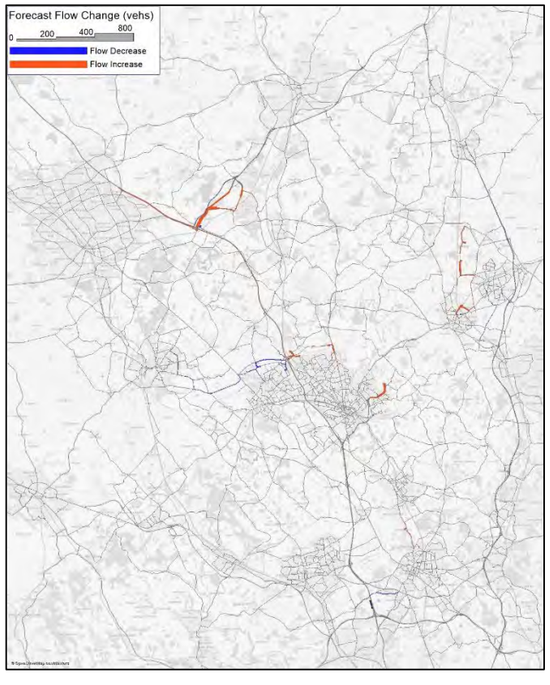




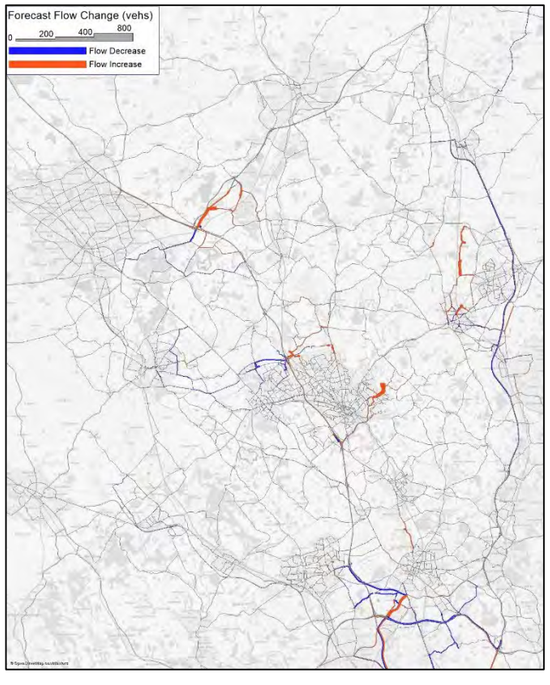
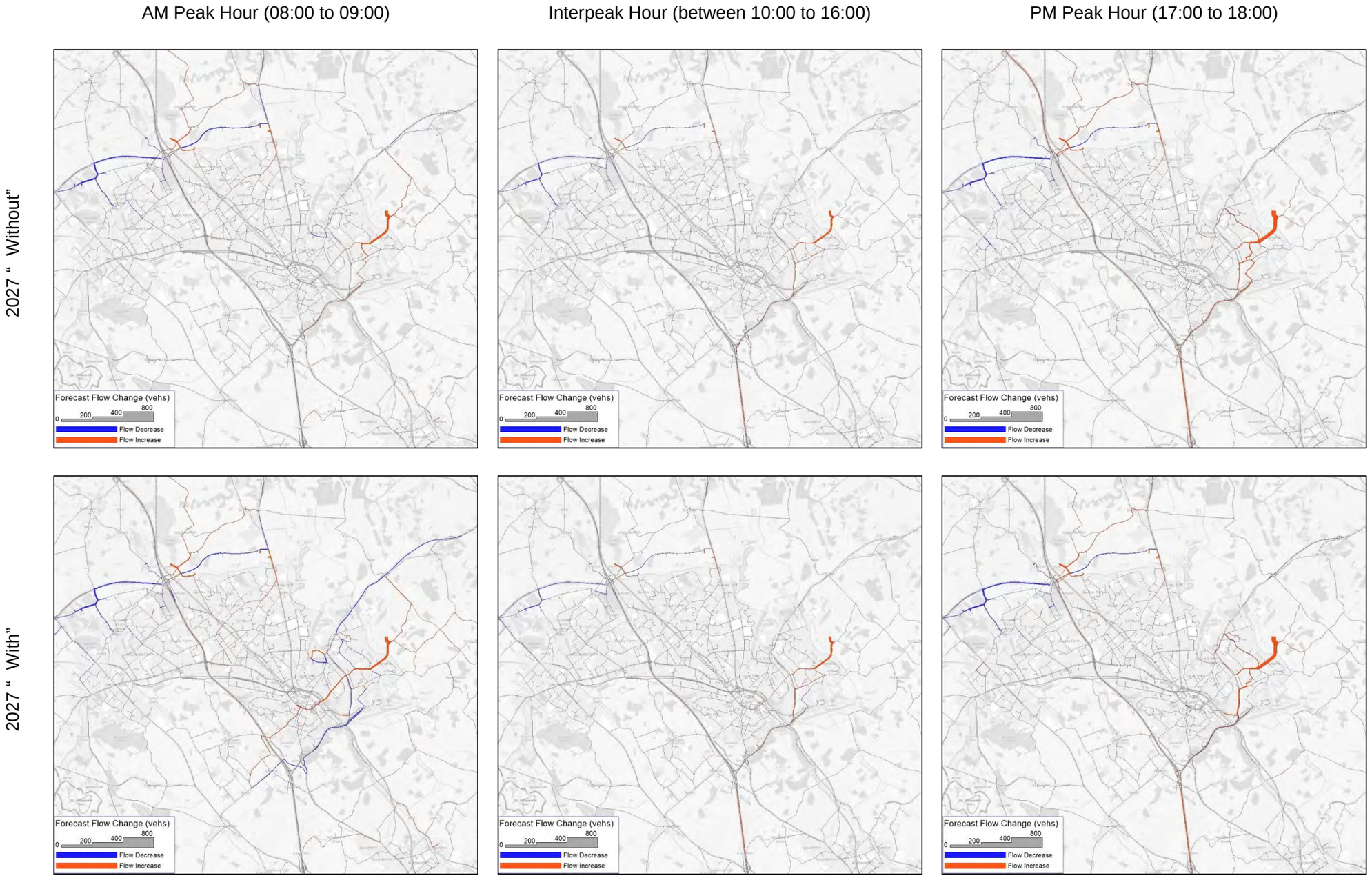


Figure 6.3: Forecast Change in Traffic Volumes (vehicles) between TAG-based Forecasts and Local Plan Alternative Scenario, Luton Borough



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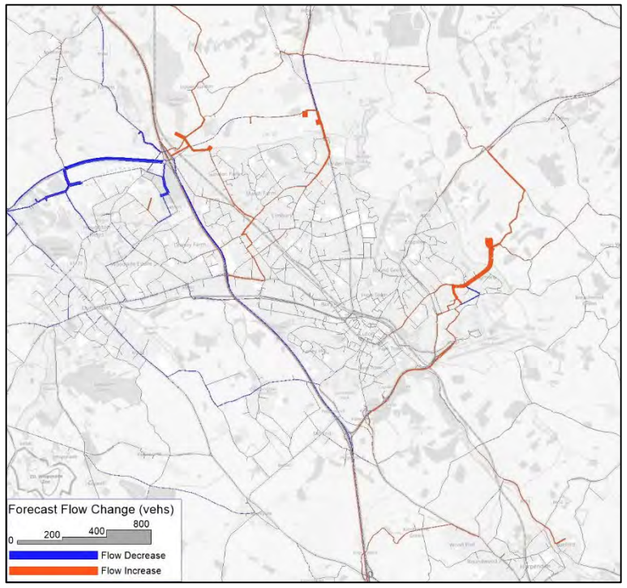

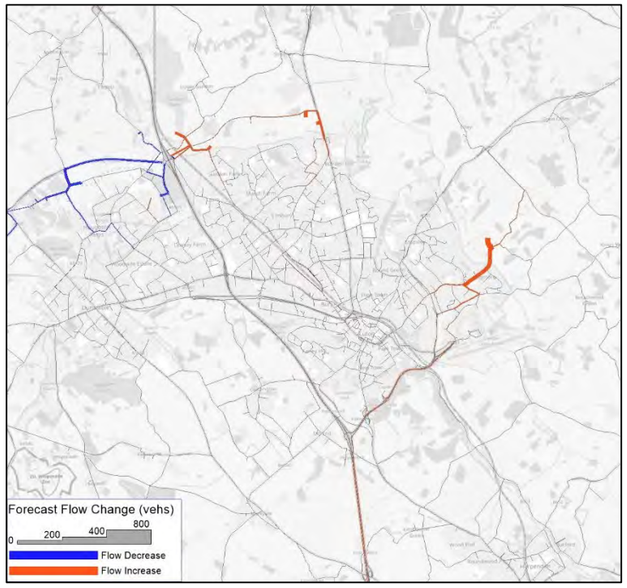

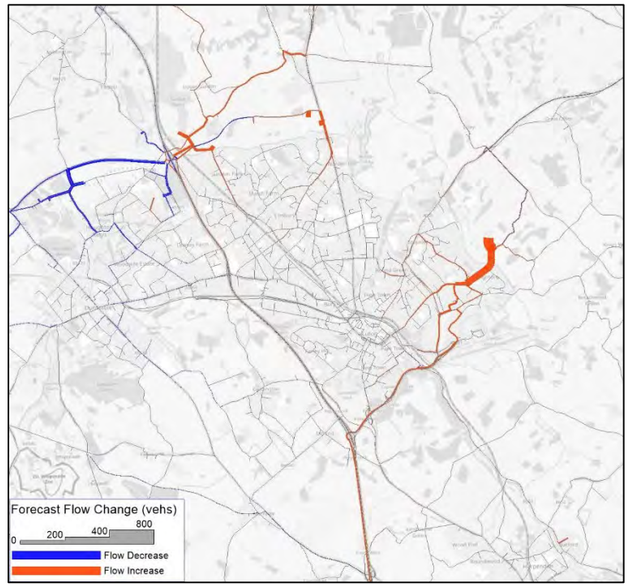

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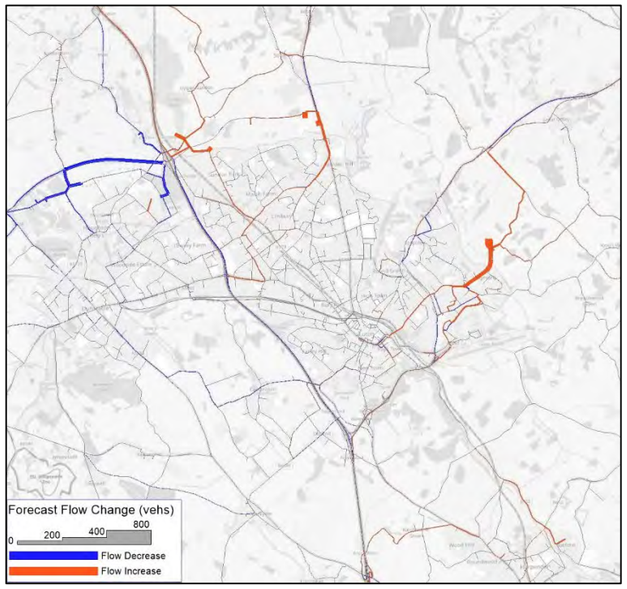

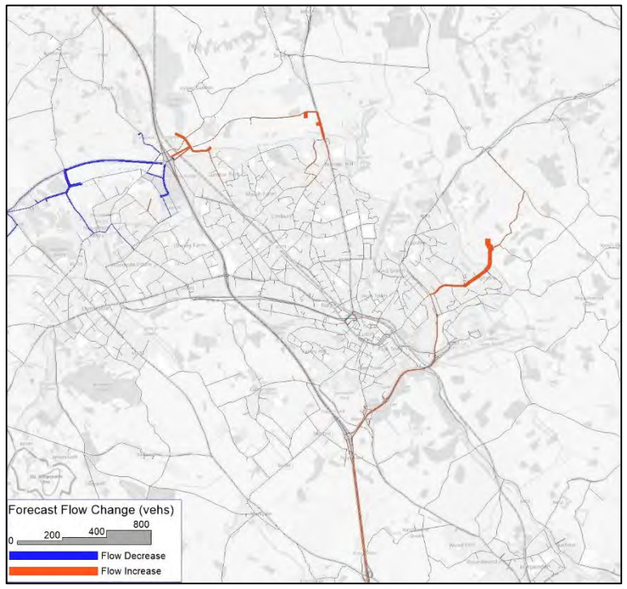

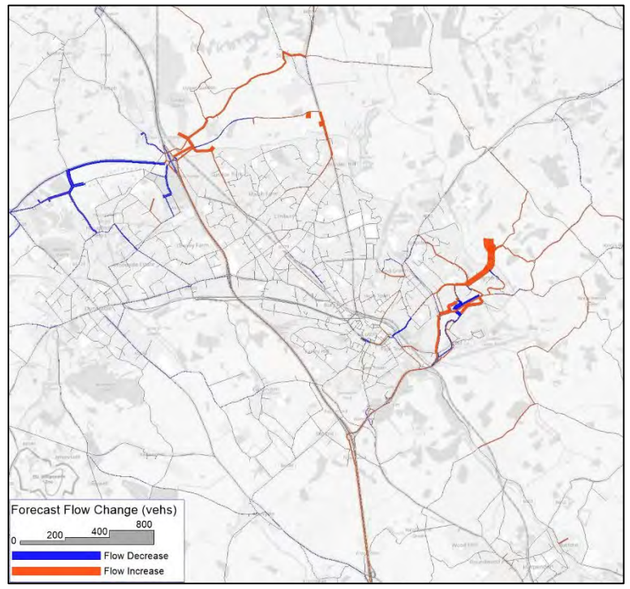

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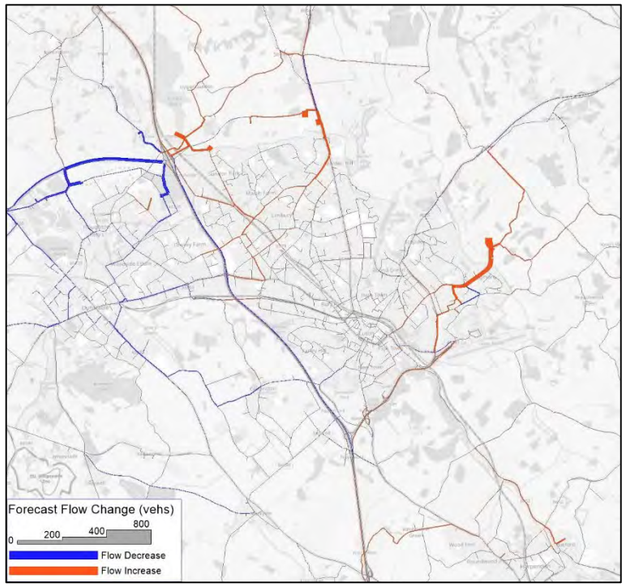

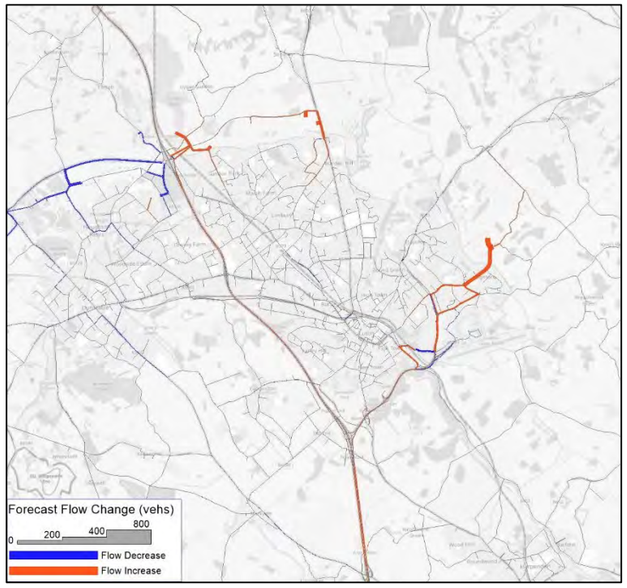

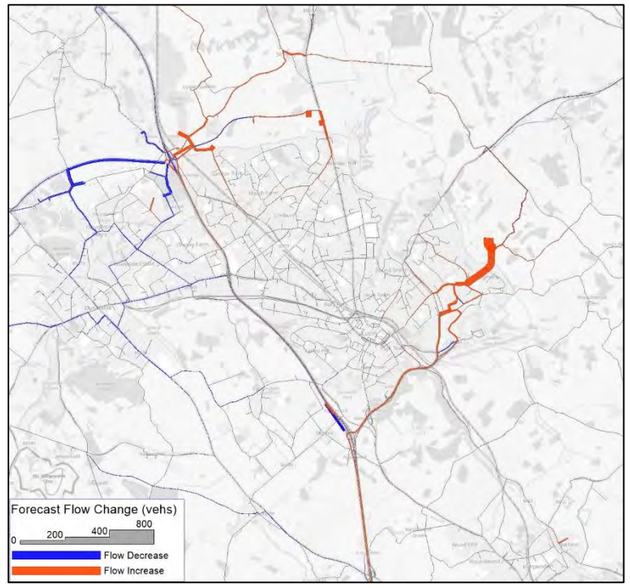

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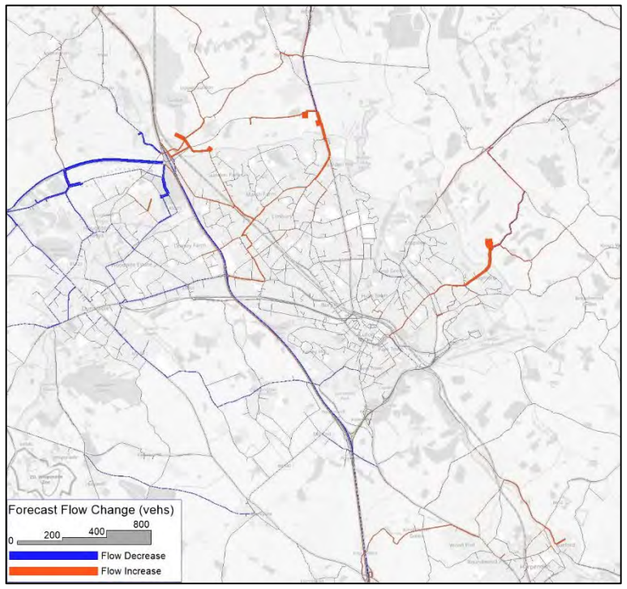
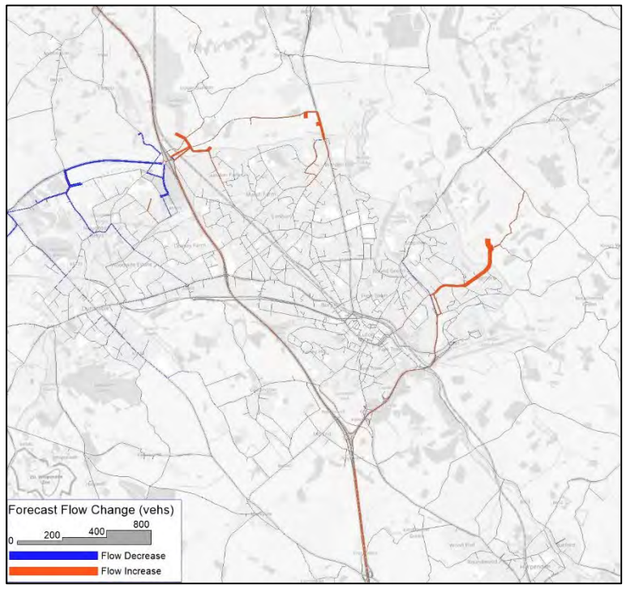




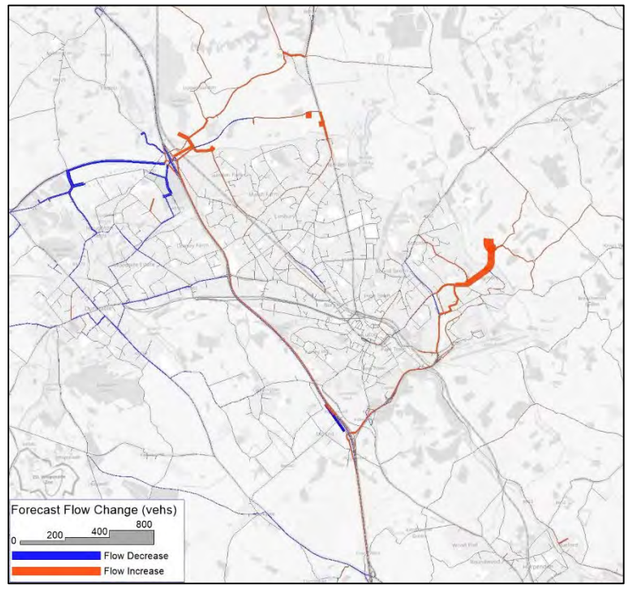


Table 6.9: Forecast Journey Times in Local Plan Growth Alternative Scenario “Without” Expansion, including change from TAG-based Forecasts

		Forecast Journey Time (mm:ss)				Change from TAG-based Forecasts (mm:ss)		
	Route	2016	2027	2039	2043	2027	2039	2043
AM Peak Hour (08:00 to 09:00)	M1 Jn9 to LTN Terminal 1	00:08:29	00:09:13	00:09:34	00:09:40	00:00	00:01	00:01
	LTN Terminal 1 to M1 Jn9	00:08:44	00:09:49	00:09:57	00:09:11	00:06	00:09	00:04
	M1 Jn11 to Terminal 1	00:09:42	00:11:05	00:11:59	00:11:02	00:01	-00:01	-00:01
	LTN Terminal 1 to M1 Jn11	00:10:06	00:11:03	00:11:17	00:11:06	00:04	00:08	00:05
	Hitchin to Terminal 1 (via A505 & Vauxhall Way)	00:16:15	00:15:56	00:16:43	00:17:03	00:00	-00:03	00:00
	Terminal 1 to Hitchin (via A505 & Vauxhall Way)	00:16:06	00:16:31	00:17:15	00:17:42	00:00	00:05	00:19
	M1 Jn8 to M1 Jn12	00:15:09	00:15:46	00:16:51	00:17:11	00:01	00:04	00:03
	M1 Jn12 to M1 Jn8	00:18:58	00:21:15	00:24:07	00:24:54	00:05	00:08	00:05
Interpeak Hour (between 10:00 to 16:00)	M1 Jn9 to LTN Terminal 1	00:07:53	00:08:16	00:08:15	00:08:39	00:01	00:01	00:01
	LTN Terminal 1 to M1 Jn9	00:07:14	00:07:34	00:08:00	00:08:10	00:02	00:03	00:00
	M1 Jn11 to Terminal 1	00:08:20	00:08:45	00:09:10	00:08:34	00:01	00:01	00:01
	LTN Terminal 1 to M1 Jn11	00:09:08	00:09:44	00:10:23	00:10:16	00:01	00:02	00:00
	Hitchin to Terminal 1 (via A505 & Vauxhall Way)	00:14:51	00:14:45	00:15:00	00:15:02	00:01	00:00	00:02
	Terminal 1 to Hitchin (via A505 & Vauxhall Way)	00:15:39	00:16:10	00:16:27	00:16:50	00:00	00:00	00:20
	M1 Jn8 to M1 Jn12	00:15:49	00:16:26	00:17:44	00:18:17	00:01	00:01	00:02
	M1 Jn12 to M1 Jn8	00:14:06	00:15:27	00:16:49	00:17:24	00:01	00:03	00:03
PM Peak Hour (17:00 to 18:00)	M1 Jn9 to LTN Terminal 1	00:09:24	00:09:30	00:10:04	00:09:40	00:09	00:13	00:11
	LTN Terminal 1 to M1 Jn9	00:10:09	00:12:29	00:13:03	00:09:55	00:05	00:08	00:04
	M1 Jn11 to Terminal 1	00:09:15	00:09:37	00:10:13	00:09:31	00:08	00:12	00:09
	LTN Terminal 1 to M1 Jn11	00:10:44	00:12:11	00:12:54	00:12:55	00:03	00:02	00:00
	Hitchin to Terminal 1 (via A505 & Vauxhall Way)	00:16:07	00:15:10	00:15:18	00:15:39	00:01	00:02	00:08
	Terminal 1 to Hitchin (via A505 & Vauxhall Way)	00:16:52	00:17:09	00:17:37	00:17:49	00:03	00:06	00:09
	M1 Jn8 to M1 Jn12	00:19:28	00:20:49	00:21:58	00:22:12	00:05	00:01	-00:02
	M1 Jn12 to M1 Jn8	00:15:57	00:17:09	00:18:36	00:19:05	00:02	00:04	00:04

Table 6.10: Forecast Journey Times in Local Plan Growth Alternative Scenario “With” Expansion, including change from TAG-based Forecasts

		Forecast Journey Time (mm:ss)				Change from “Without” Expansion (mm:ss)		
	Route	2016	2027	2039	2043	2027	2039	2043
AM Peak Hour (08:00 to 09:00)	M1 Jn9 to LTN Terminal 1	08:29	09:19	10:19	12:38	-00:12	00:02	00:14
	LTN Terminal 1 to M1 Jn9	08:44	09:56	09:33	09:14	-00:08	00:02	00:01
	M1 Jn9 to LTN Terminal 2		10:51	11:42	13:29	-00:12	00:01	00:14
	LTN Terminal 2 to M1 Jn9		13:22	11:23	10:36	00:38	00:02	00:01
	M1 Jn11 to Terminal 1	09:42	11:19	12:58	15:05	-00:12	-00:01	00:12
	LTN Terminal 1 to M1 Jn11	10:06	11:26	10:44	11:11	-00:08	00:03	00:03
	M1 Jn11 to Terminal 2			15:56	17:24	00:00	-00:01	00:12
	LTN Terminal 2 to M1 Jn11			13:46	13:36	00:00	00:03	00:02
	Hitchin to Terminal 1 (via A505 & Vauxhall Way)	16:15	26:47	27:41	19:38	09:22	09:02	00:44
	Terminal 1 to Hitchin (via A505 & Vauxhall Way)	16:06	17:17	17:15	17:17	00:04	00:07	00:05
	Hitchin to Terminal 2 (via A505 & Vauxhall Way)			31:51	23:12	00:00	09:03	00:45
	Terminal 2 to Hitchin (via A505 & Vauxhall Way)			19:45	19:23	00:00	00:08	00:05
	M1 Jn8 to M1 Jn12	15:09	15:48	16:56	17:19	00:01	00:03	00:04
	M1 Jn12 to M1 Jn8	18:58	21:18	24:21	25:10	00:05	00:06	00:03
Interpeak Hour (between 10:00 to 16:00)	M1 Jn9 to LTN Terminal 1	07:53	08:16	08:16	09:19	00:07	00:01	00:01
	LTN Terminal 1 to M1 Jn9	07:14	08:06	08:01	08:33	00:09	00:02	00:02
	M1 Jn9 to LTN Terminal 2		09:42	09:36	10:09	00:07	00:01	00:01
	LTN Terminal 2 to M1 Jn9		10:29	09:49	10:07	00:13	00:02	00:02
	M1 Jn11 to Terminal 1	08:20	08:49	09:31	10:07	00:08	00:01	00:01
	LTN Terminal 1 to M1 Jn11	09:08	10:29	10:50	10:42	00:09	00:02	00:02
	M1 Jn11 to Terminal 2			12:19	12:36	00:00	00:01	00:01
	LTN Terminal 2 to M1 Jn11			13:38	13:21	00:00	00:02	00:02
	Hitchin to Terminal 1 (via A505 & Vauxhall Way)	14:51	15:44	15:42	15:46	00:21	00:02	00:02
	Terminal 1 to Hitchin (via A505 & Vauxhall Way)	15:39	16:46	16:55	16:53	00:11	00:03	00:05
	Hitchin to Terminal 2 (via A505 & Vauxhall Way)			19:39	19:24	00:00	00:02	00:02
	Terminal 2 to Hitchin (via A505 & Vauxhall Way)			19:11	19:04	00:00	00:03	00:05
	M1 Jn8 to M1 Jn12	15:49	16:26	17:51	18:27	00:01	00:02	00:02
	M1 Jn12 to M1 Jn8	14:06	15:27	16:56	17:34	00:01	00:03	00:03

		Forecast Journey Time (mm:ss)				Change from "Without" Expansion (mm:ss)		
	Route	2016	2027	2039	2043	2027	2039	2043
PM Peak Hour (17:00 to 18:00)	M1 Jn9 to LTN Terminal 1	09:24	09:38	10:15	10:36	00:10	00:04	00:13
	LTN Terminal 1 to M1 Jn9	10:09	12:58	11:06	11:00	-00:20	00:11	00:01
	M1 Jn9 to LTN Terminal 2		11:10	11:33	11:22	00:10	00:06	00:13
	LTN Terminal 2 to M1 Jn9		16:35	12:51	12:27	00:27	00:15	00:01
	M1 Jn11 to Terminal 1	09:15	09:53	10:27	11:28	00:09	00:04	00:13
	LTN Terminal 1 to M1 Jn11	10:44	13:10	13:00	13:57	-00:18	00:04	-00:02
	M1 Jn11 to Terminal 2			13:13	14:02	00:00	00:02	00:14
	LTN Terminal 2 to M1 Jn11			15:49	16:41	00:00	00:03	-00:02
	Hitchin to Terminal 1 (via A505 & Vauxhall Way)	16:07	16:04	17:33	18:14	00:00	00:57	01:11
	Terminal 1 to Hitchin (via A505 & Vauxhall Way)	16:52	17:55	18:33	18:24	00:01	00:14	00:05
	Hitchin to Terminal 2 (via A505 & Vauxhall Way)			21:32	22:05	00:00	00:54	01:12
	Terminal 2 to Hitchin (via A505 & Vauxhall Way)			20:54	20:46	00:00	00:11	00:06
	M1 Jn8 to M1 Jn12	19:28	20:57	22:05	22:16	00:03	00:01	-00:03
	M1 Jn12 to M1 Jn8	15:57	17:11	19:04	19:27	00:01	00:04	00:04

7 SUMMARY OF FORECASTS

7.1 Introduction

7.1.1 The preceding sections in this Forecasting Report detail the processes, assumptions and results of the forecasts undertaken using the CBLTM-LTN suite to assess the proposed expansion at Luton Airport. Detailed within this report are the forecasts for 12 scenarios, which are:

a. TAG-based “Without” Expansion forecasts for 2027, 2039 and 2043;

b. TAG-based “With” Expansion forecasts for 2027, 2039 and 2043; and

c. 2027, 2039 and 2043 “Without” and “With” Expansion forecasts using Local Plan growth.

7.1.2 For the “Without” Expansion scenarios, the assumed passenger throughput at Luton Airport is the currently permitted maximum of 18 million passengers per annum. For the “With” Expansion scenarios this assumed passenger throughput increases to:

a. 2027: 21.5 mppa (at existing terminal only);

b. 2039: 27 mppa (at both existing and a new Terminal 2); and

c. 2043: 32 mppa (at both existing and a new Terminal 2).

7.2 Forecasting Assumptions

7.2.1 Underpinning these forecasts are a number of assumptions regarding the changes in economic parameters (such as values of time, fuel costs and public transport fares), land-use (such as residential and employment development), and infrastructure (including both highway and public transport schemes).

7.2.2 As part of the development of these forecasts, a comprehensive review has been undertaken of the forecasting assumptions to ensure that they are in line with latest TAG guidance. Following this review, those assumptions classified as ‘near certain’ or ‘more than likely’ have been used within the TAG-based forecasts, with residential and employment developments classified as ‘reasonably foreseeable’ also included within the Local Plan alternative scenario.

7.2.3 Within all forecast scenarios, the forecast growth in land-use changes (population, households and employment) and personal travel has been controlled to the growth forecast from TEMPro v7.2. TEMPro does not provide growth forecasts for road freight demand, with the growth in LGV and HGV traffic forecast using results from the DfT’s National Transport Model Road Traffic Forecasts (RTF18).

7.3 Forecast Travel Demand

7.3.1 For all modes (excluding freight), daily travel demand is forecast to increase by 18% from 2016 to 2043 across the five districts within the internal area (namely Luton, Central Bedfordshire, North Hertfordshire, St Albans and Dacorum).

7.3.2 There is variation in the forecast growth between these five districts, with Central Bedfordshire and North Hertfordshire forecast to have the highest growth in daily travel demand (of between 23% and 28% to 2043), and Luton and St Albans forecast to have the lowest growth (of between 8% and 11% to 2043).

7.3.3 In terms of highway travel (excluding freight), daily trips produced within the internal area are forecast to increase by 23% from 2016 to 2043. Growth in trip productions is forecast to the highest in Central Bedfordshire and North Hertfordshire (at between 28% and 33% between 2016 and 2043), and is forecast to be lowest within St Albans (with growth of 13% forecast to 2043).

7.3.4 Based on this forecast growth in trips produced within the internal area, traffic levels (measured through vehicle-kms) are forecast to increase within the five districts. Across the simulation network (broadly equivalent to the internal area) growth in vehicle-kms is forecast to be higher in the interpeak (at 35% from 2016 to 2043) compared with the two peak hours (at between 24% and 25% growth to 2043) due to the forecast movement of demand away from the peak hours.

7.3.5 As with the forecast growth in travel demand, the forecast growth in vehicle-kms by districts is highest within Central Bedfordshire and North Hertfordshire (at 26% to 39% between 2016 and 2043). Forecast growth in traffic within Luton Borough is the lowest of the five districts in each modelled hour, with growth between 17% and 24% from 2016 to 2043.

7.3.6 These forecast increases in traffic levels within the simulation network result in forecast decreases in average speeds. Average speed changes from 2016 to 2043 across the simulation network are forecast to be lowest in the interpeak hour at 5%, compared with forecast reductions of 10% in the AM Peak and PM Peak hours.

7.3.7 In general, the forecast speeds reductions are lowest within Central Bedfordshire and Luton Borough compared with the other districts within the simulation network. This is due to the additional infrastructure assumed within the forecasting providing some mitigation for the additional growth assumed. This is primarily due to the introduction of the M1-A5 link road and the Luton Northern Bypass between the M1 and A6.

7.4 TAG-based Forecasts for Luton Airport Expansion

7.4.1 As mentioned in Section 4.3, the Century Park development was only included in the “With” Expansion scenario. Moreover, It is worth noting that the AAR, formerly known as CPAR, included as a part of the Airport application incorporating the entire alignment of this access road within the proposed Expansion. The AAR would be delivered in two phases, Phase 1 implemented in the “With” Expansion in 2039 (27 mppa), where the full AAR would be completed in 2043 (32 mppa).

7.4.2 In the “With” Expansion scenario (including the Century Park development generated traffic) traffic levels are forecast to increase across the five districts. The largest increase (of between 2.4% and 3.4% in 2043) is forecast within

Luton Borough, with Central Bedfordshire and North Hertfordshire forecast to have lower increases in traffic as a result of the proposed expansion (at between 0.7% and 2.2% in 2043).

7.4.3 This additional traffic is forecast to reduce average network speeds. Within Luton Borough in 2039, average speeds are forecast to reduce by between 2.1% (in the interpeak average hour) and 5.7% (in the AM Peak hour) with expansion. Although, the PM peak hour is forecast to have an increase in the average speed within Luton Borough area of around 3.5%. the improvements brought by the Airport Mitigation measures tie in with the VISSIM micro-simulation model, which shows that within the PM peak period, a notable improvements to the network performance is forecast.

7.4.4 For the remaining districts within the 2043 scenario, the forecast average speed reductions are generally smaller in magnitude.

7.4.5 The forecast additional traffic due to the proposed expansion at Luton Airport is focussed on the A1081 to the south-west of the airport and on the M1 to the north and south of Junction 10. In addition to this, there are forecast to be traffic flow increases on rural routes to the east of Luton towards the A1(M) to the south of the A505.

7.4.6 These forecast flow increases on rural routes to the east of Luton are due to the additional connectivity provided by the AAR to the east of Luton, resulting in these routes being forecast to be more attractive that the alternative A505 route to / from Hitchin and the A1(M).

7.4.7 In the 2027 PM Peak hour models there are forecast to be slight flow increases on Luton Road and M1 Junction 9. This is due to a forecast capacity constraint at the M1 Junction 10 southbound merge in the PM Peak hour. This constraint is forecast to occur in the 2027 “Without” and “With” Expansion, and in 2039 “Without” Expansion scenarios. With the forecast additional traffic in the background growth and the Airport Expansion, traffic wishing to travel southbound on the M1 finds other alternative routing such as the route via A1081 / London Road junction 10(a) towards the northern side of Harpenden to cross the M1 and joining via Junction 9.

7.4.8 This constraint is removed with the junction improvements assumed within the 2039 “With” Expansion forecasts, which results in traffic moving back to Junction 10. This would be also the case in 2043 scenarios where further junction improvements and the Junction 10 – Junction 9 Smart Motorway is assumed in both “Without” and “With” Expansion scenarios.

7.4.9 In addition to the forecast flow increases on the highway network, the proposed expansion is also forecast to increase passenger flows on rail and bus / coach services. In terms of rail passenger flows, these are forecast to increase along the Midland Main Line, primarily between Luton Airport and London. In terms of bus / coach travel, a significant proportion of the forecast increases in passengers are on coach services between Luton Airport and London.

7.5 Local Plan Growth Alternative Scenario

7.5.1 The Local Plan alternative scenario considered the impact of including those residential and employment developments classified as ‘reasonably foreseeable’ as part of the review of the forecasting assumptions. Inclusion of these developments results in the assumed growth within these forecasts representing that included within the current Local Plans for the five districts.

7.5.2 Within these forecasts, the constraint to TEMPro growth both for planning data and demand is retained. This means that the inclusion of ‘reasonably foreseeable’ developments results in a redistribution of growth within each district rather than an overall increase in the assumed growth.

7.5.3 Using planning data assumptions consistent with the current Local Plans, the forecast change in vehicle-kms and average network speeds from the TAG-based forecasts are generally within ±1%.

7.5.4 Due to the inclusion of a number of significant developments in the vicinity of Luton Borough within this sensitivity test (namely North and East Luton residential developments and Sundon Rail Freight Interchange), vehicle-kms within Luton Borough are forecast to increase by up to 1% compared with the TAG-based forecasts.

7.5.5 The forecast impact of these alternative planning assumptions on traffic flows shows that there is forecast to be an increase in traffic levels in the vicinity of the major ‘reasonably foreseeable’ developments included within this sensitivity test compared with the TAG-based forecasts. This includes the developments around Luton detail above, and also the developments at Marston Vale New Villages to the north-east of M1 Junction 13 and developments to the east of Hemel Hempstead within St Albans District.

Appendix A - Airport Trip Generation

Table A.1: Airport Trip Generation – All Modes

Purpose	Mode	Time Period	DM 2029+ **18mppa**	DS 2027 **21.5mppa**	DS 2039 **27mppa**	DS 2043 **32mppa**	Net Change **18 to 21.5mppa**	Net Change **18 to 27mppa**	Net Change **18 to 32mppa**
AirPassenger	Bus	AMPeakPeriod	1,069	1,197	1,956	2,520	128	887	1,451
AirPassenger	Bus	InterPeakPeriod	3,016	3,541	4,887	5,668	525	1,871	2,652
AirPassenger	Bus	PMPeakPeriod	1,549	1,839	2,381	2,819	290	832	1,270
AirPassenger	Bus	Daily	9,668	11,326	15,213	17,975	1,658	5,545	8,307
AirPassenger	Car	AMPeakPeriod	2,469	2,733	3,698	4,686	264	1,229	2,217
AirPassenger	Car	InterPeakPeriod	6,969	8,050	9,326	10,697	1,081	2,357	3,728
AirPassenger	Car	PMPeakPeriod	3,657	4,254	4,642	5,410	597	985	1,753
AirPassenger	Car	Daily	22,314	25,730	29,081	33,925	3,416	6,767	11,611
AirPassenger	Car	AMPeakHr	1,253	1,357	1,515	1,791	104	262	538
AirPassenger	Car	PMPeakHr	1,132	1,357	1,390	1,601	225	258	469
AirPassenger	Rail	AMPeakPeriod	1,446	1,619	2,881	3,710	173	1,435	2,264
AirPassenger	Rail	InterPeakPeriod	4,081	4,791	7,196	8,347	710	3,115	4,266
AirPassenger	Rail	PMPeakPeriod	2,095	2,488	3,506	4,151	393	1,411	2,056
AirPassenger	Rail	Daily	13,080	15,323	22,402	26,468	2,243	9,322	13,388
AirPassenger	Taxi	AMPeakPeriod	857	960	1,336	1,721	103	479	864
AirPassenger	Taxi	InterPeakPeriod	2,419	2,841	3,338	3,872	422	919	1,453
AirPassenger	Taxi	PMPeakPeriod	1,242	1,475	1,627	1,926	233	385	684
AirPassenger	Taxi	Daily	7,755	9,085	10,393	12,279	1,330	2,638	4,524
AirPassenger	Taxi	AMPeakHr	442	483	544	652	41	102	210
AirPassenger	Taxi	PMPeakHr	384	471	484	566	87	100	182
Freight	HGV	AMPeakPeriod	320	377	467	548	57	147	228
Freight	HGV	InterPeakPeriod	536	631	780	916	95	244	380
Freight	HGV	PMPeakPeriod	119	140	173	204	21	54	85
Freight	HGV	Daily	1,344	1,583	1,957	2,297	239	613	953
Freight	HGV	AMPeakHr	128	150	186	218	22	58	90

Freight	HGV	PMPeakHr	40	47	58	68	7	18	28
Freight	LGV	AMPeakPeriod	798	940	1,164	1,368	142	366	570
Freight	LGV	InterPeakPeriod	1,514	1,785	2,211	2,598	271	697	1,084
Freight	LGV	PMPeakPeriod	546	644	798	937	98	252	391
Freight	LGV	Daily	3,935	4,639	5,746	6,752	704	1,811	2,817
Freight	LGV	AMPeakHr	261	307	381	448	46	120	187
Freight	LGV	PMPeakHr	177	209	258	303	32	81	126
Hotel	Car	AMPeakPeriod	400	400	400	400	-	-	-
Hotel	Car	InterPeakPeriod	962	962	962	962	-	-	-
Hotel	Car	PMPeakPeriod	453	453	453	453	-	-	-
Hotel	Car	Daily	2,614	2,614	2,614	2,614	-	-	-
Hotel	Car	AMPeakHr	232	232	232	232	-	-	-
Hotel	Car	PMPeakHr	169	169	169	169	-	-	-
Hotel	Taxi	AMPeakPeriod	100	100	100	100	-	-	-
Hotel	Taxi	InterPeakPeriod	226	226	226	226	-	-	-
Hotel	Taxi	PMPeakPeriod	113	113	113	113	-	-	-
Hotel	Taxi	Daily	654	654	654	654	-	-	-
Hotel	Taxi	AMPeakHr	48	48	48	48	-	-	-
Hotel	Taxi	PMPeakHr	43	43	43	43	-	-	-
Staff	Bus	AMPeakPeriod	333	414	582	781	81	249	448
Staff	Bus	InterPeakPeriod	555	690	971	1,302	135	416	747
Staff	Bus	PMPeakPeriod	333	413	581	780	80	248	447
Staff	Bus	Daily	1,630	2,026	2,849	3,821	396	1,219	2,191
Staff	Car	AMPeakPeriod	3,267	3,537	3,840	4,006	270	573	739
Staff	Car	InterPeakPeriod	4,043	4,376	4,747	4,952	333	704	909
Staff	Car	PMPeakPeriod	3,474	3,761	4,082	4,259	287	608	785
Staff	Car	Daily	14,758	15,974	17,334	18,084	1,216	2,576	3,326
Staff	Car	AMPeakHr	1,462	1,583	1,718	1,792	121	256	330
Staff	Car	PMPeakHr	1,385	1,500	1,628	1,699	115	243	314
Staff	Rail	AMPeakPeriod	231	271	340	414	40	109	183

Staff	Rail	InterPeakPeriod	389	455	572	696	66	183	307
Staff	Rail	PMPeakPeriod	230	271	340	414	41	110	184
Staff	Rail	Daily	1,134	1,330	1,669	2,032	196	535	898
All Vehs		Daily	53,373	60,278	67.778	76,605	6,905	14,406	23,232
		AM Peak Hr	3,825	4,159	4,623	5,180	335	799	1,356
		PM Peak Hr	3,329	3,795	4,029	4,449	465	699	1,120

Appendix B - Forecast Vehicle Flows at Selected Locations

Table B.1: TAG-based “Without” Expansion Forecast Vehicle Flows (rounded to nearest 100 vehicles) along M1, including change from Base Year

Location	Direction	Year	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)	Annual Average Daily Traffic
M1 Jn9 to 10	Northbound	2016	5,300	4,400	6,200	70,000
		2027	6,200 (16.0%)	5,400 (21%)	6,900 (12.6%)	82,500 (17.7%)
		2039	6,800 (28.4%)	6,000 (36.0%)	7,300 (18.3%)	90,900 (29.8%)
		2043	7,000 (31.5%)	6,100 (37.3%)	7,600 (23.9%)	92,800 (32.5%)
M1 Jn9 to 10	Southbound	2016	5,500	4,300	5,900	69,600
		2027	6,400 (15.1%)	5,200 (19.8%)	6,400 (9.0%)	80,700 (15.8%)
		2039	6,700 (21.3%)	5,900 (34.9%)	6,800 (15.8%)	88,600 (27.2%)
		2043	7,000 (27.1%)	5,900 (35.7%)	7,800 (31.7%)	91,900 (32.0%)
M1 within Jn10	Northbound	2016	4,100	3,600	4,800	56,000
		2027	4,600 (14.2%)	4,400 (22.9%)	5,500 (14.1%)	66,700 (19.1%)
		2039	5,100 (26.6%)	5,000 (38.4%)	5,800 (21.3%)	73,900 (31.9%)
		2043	5,300 (30.1%)	5,100 (40.5%)	6,100 (27.1%)	75,700 (35.1%)
M1 within Jn10	Southbound	2016	4,200	3,400	4,200	53,200
		2027	5,000 (18.1%)	4,000 (19.9%)	4,700 (12.4%)	62,400 (17.2%)
		2039	5,300 (26.2%)	4,600 (36.8%)	5,100 (22.3%)	69,500 (30.5%)
		2043	5,400 (28.6%)	4,700 (38.7%)	5,200 (22.6%)	70,400 (32.3%)
M1 Jn10 to 11	Northbound	2016	4,600	4,200	5,700	65,400
		2027	5,400 (17.4%)	5,300 (25.6%)	6,800 (19.7%)	79,800 (22.1%)
		2039	6,000 (30.0%)	5,900 (40.5%)	7,200 (26.1%)	87,900 (34.5%)
		2043	6,200 (34.6%)	6,000 (43.4%)	7,600 (33.2%)	90,500 (38.5%)
M1 Jn10 to 11	Southbound	2016	5,300	3,900	4,900	63,100
		2027	6,600 (25.9%)	4,900 (23.0%)	5,800 (17.1%)	76,300 (20.9%)
		2039	7,100 (35.7%)	5,500 (39.1%)	6,300 (27.5%)	84,600 (34.0%)
		2043	7,300 (39.0%)	5,600 (41.1%)	6,300 (27.9%)	85,800 (36.0%)
M1 Jn10 Off-Slip	Northbound	2016	1,300	800	1,400	14,000
		2027	1,500 (21.9%)	900 (12.6%)	1,500 (7.5%)	15,700 (12.2%)
		2039	1,700 (34.1%)	1,000 (25.3%)	1,500 8.0%)	17,000 (21.4%)
		2043	1,700 (36.2%)	1,000 (23.5%)	1,500 (12.7%)	17,100 (22.0%)
M1 Jn10 On-Slip	Northbound	2016	500	600	900	9,300
		2027	700 (41.5%)	800 (41.7%)	1,400 (48.9%)	13,100 (40.1%)

		2039	800 (56.1%)	900 (53.2%)	1,400 (51.4%)	14,000 (49.6%)
		2043	900 (68.7%)	1,000 (60.9%)	1,500 (65.0%)	14,800 (58.8%)
M1 Jn10 Off-Slip	Southbound	2016	1,000	600	700	9,900
		2027	1,600 (57.8%)	800 (40.9%)	1,100 (43.7%)	13,900 (40.7%)
		2039	1,800 (74.8%)	900 (52.9%)	1,200 (56.9%)	15,100 (53.1%)
		2043	1,900 (81.6%)	900 (55.0%)	1,200 (57.9%)	15,400 (56.2%)
M1 Jn10 On-Slip	Southbound	2016	1,300	1,000	1,700	16,400
		2027	1,400 (5.5%)	1,200 (19.5%)	1,700 (0.4%)	18,300 (11.3%)
		2039	1,400 (5.4%)	1,300 (28.5%)	1,700 (-0.2%)	19,100 (16.4%)
		2043	1,600 (22.3%)	1,200 (25.8%)	2,600 (54.2%)	21,500 (31.1%)

Table B.2: TAG-based “Without” Expansion Forecast Vehicle Flows (rounded to nearest 100 vehicles) at Selected non-M1 Locations, including change from Base Year

Location	Direction	Year	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)	Annual Average Daily Traffic
A1081, between Capability Green and B653	Eastbound	2016	2,000	1,400	2,300	22,900
		2027	2,400 (24.5%)	1,700 (22.1%)	2,600 (13.1%)	27,400 (20.0%)
		2039	2,600 (34.6%)	1,800 (32.0%)	2,600 (15.8%)	29,300 (28.0%)
		2043	2,700 (35.7%)	1,900 (33.7%)	2,600 (16.1%)	29,500 (29.3%)
A1081, between Capability Green and B653	Westbound	2016	2,400	1,500	2,300	24,500
		2027	2,800 (15.2%)	1,800 (20.3%)	2,500 (12.0%)	28,800 (17.1%)
		2039	2,900 (18.5%)	1,900 (30.5%)	2,700 (18.1%)	30,700 (25.0%)
		2043	2,900 (21.7%)	2,000 (33.2%)	3,000 (30.8%)	31,900 (30.1%)
Kimpton Road	Eastbound	2016	300	400	500	5,600
		2027	600 (84.3%)	700 (70.5%)	900 (69.1%)	9,700 (73.5%)
		2039	700 (128.4%)	900 (119.0%)	1,100 (102.0%)	12,300 (119.7%)
		2043	700 (133.0%)	900 (129.2%)	1,200 (116.7%)	13,000 (130.7%)
Kimpton Road	Westbound	2016	600	500	400	6,300
		2027	1,000 (60.0%)	700 (52.2%)	600 (63.7%)	9,800 (56.7%)
		2039	1,300 (111.6%)	900 (97.4%)	800 (106.1%)	12,800 (104.1%)
		2043	1,300 (116.7%)	900 (101.7%)	800 (110.9%)	13,100 (108.7%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	2016	1,000	800	1,200	12,800
		2027	800 (-15.2%)	900 (11.1%)	1,300 (11.2%)	13,700 (7.0%)
		2039	900 (-9.5%)	1,000 (22.2%)	1,400 (15.7%)	14,800 (15.7%)
		2043	900 (-10.1%)	1,100 (29.9%)	1,400 (16.2%)	15,500 (20.4%)

Vauxhall Way, between Eaton Green Road and Crawley Green Road	Southbound	2016	1,200	800	1,100	12,600
		2027	1,600 (27.7%)	1,000 (22.6%)	1,200 (7.0%)	15,200 (20.4%)
		2039	1,700 (36.6%)	1,200 (44.5%)	1,200 (10.6%)	17,200 (36.0%)
		2043	1,700 (40.2%)	1,100 (39.5%)	1,300 (18.4%)	17,100 (35.4%)
A505, west of Lilley	Eastbound	2016	900	700	1,200	11,000
		2027	900 (2.1%)	800 (12.0%)	1,400 (19.3%)	12,400 (12.2%)
		2039	1,000 (8.7%)	900 (33.3%)	1,500 (29.1%)	14,100 (28.1%)
		2043	1,000 (7.7%)	1,000 (40.8%)	1,500 (30.9%)	14,600 (32.6%)
A505, west of Lilley	Westbound	2016	1,300	700	1,000	11,200
		2027	1,500 (19.1%)	800 (17.8%)	1,000 (0.2%)	12,800 (14.1%)
		2039	1,700 (29.7%)	900 (44.6%)	1,100 (8.0%)	14,900 (33.0%)
		2043	1,700 (32.5%)	1,000 (49.4%)	1,200 (17.6%)	15,500 (38.5%)
Eaton Green Road, east of Wigmore	Eastbound	2016	200	100	200	1,500
		2027	200 (20.9%)	100 (25.7%)	200 (29.2%)	1,900 (25.7%)
		2039	300 (38.6%)	100 (34.4%)	200 (41.8%)	2,100 (37.7%)
		2043	300 (50.6%)	100 (44.9%)	200 (37.7%)	2,200 (44.5%)
Eaton Green Road, east of Wigmore	Westbound	2016	200	100	200	1,400
		2027	200 (35.3%)	100 (10.2%)	200 (-6.0%)	1,600 (11.3%)
		2039	300 (76.2%)	100 (8.4%)	200 (11.2%)	1,800 (25.7%)
		2043	300 (94.0%)	100 (15.8%)	200 (17.4%)	2,000 (35.2%)
Lower Harpenden Road, south of A1081	Northbound	2016	600	400	800	6,600
		2027	700 (17.2%)	400 (5.9%)	800 (8.9%)	7,200 (9.0%)
		2039	800 (26.6%)	400 (19.0%)	900 (14.5%)	7,900 (19.4%)
		2043	800 (30.2%)	500 (23.6%)	900 (14.7%)	8,100 (22.6%)
Lower Harpenden Road, south of A1081	Southbound	2016	600	300	500	5,600
		2027	800 (20.9%)	400 (20.3%)	700 (29.7%)	6,900 (22.8%)
		2039	800 (29.1%)	500 (39.9%)	800 (52.4%)	7,900 (40.6%)
		2043	800 (30.5%)	500 (45.5%)	700 (37.3%)	7,900 (40.4%)
London Road, south of Front Street	Northbound	2016	800	600	700	8,600
		2027	900 (18.7%)	700 (24.2%)	900 (25.6%)	10,600 (23.6%)
		2039	1,000 (30.1%)	800 (37.2%)	1,000 (36.8%)	11,700 (36.0%)
		2043	1,100 (33.6%)	800 (43.8%)	1,100 (45.7%)	12,300 (42.5%)
London Road, south of Front Street	Southbound	2016	800	500	800	8,200
		2027	900 (19.2%)	500 (10.5%)	1,300 (49.5%)	10,000 (22.1%)
		2039	1,100 (38.2%)	600 (21.8%)	1,400 (65.7%)	11,100 (36.3%)
		2043	1,000 (25.2%)	700 (32.4%)	1,000 (20.1%)	10,500 (28.2%)

Table B.3: TAG-based “With” Expansion Forecast Vehicle Flows (rounded to nearest 100 vehicles) along M1, including change from “Without” Expansion

Location	Direction	Year	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)	Annual Average Daily Traffic
M1 Jn9 to 10	Northbound	2016	5,300	4,400	6,200	70,000
		2027	6,200 (0.7%)	5,400 (0.0%)	7,000 (1.1%)	82,800 (0.4%)
		2039	6,900 (1.0%)	6,100 (0.5%)	7,300 (-0.2%)	91,500 (0.6%)
		2043	7,100 (2.4%)	6,200 (1.3%)	7,700 (0.5%)	94,200 (1.5%)
M1 Jn9 to 10	Southbound	2016	5,500	4,300	5,900	69,600
		2027	6,400 (0.0%)	5,200 (-0.3%)	6,400 (-0.2%)	80,600 (-0.1%)
		2039	6,800 (1.1%)	5,900 (0.8%)	7,500 (10.0%)	91,000 (2.7%)
		2043	7,100 (0.8%)	6,000 (1.5%)	7,900 (2.1%)	93,600 (1.8%)
M1 within Jn10	Northbound	2016	4,100	3,600	4,800	56,000
		2027	4,600 (-0.2%)	4,400 (-0.9%)	5,500 (0.8%)	66,500 (-0.4%)
		2039	5,100 (-0.9%)	4,900 (-1.2%)	5,700 (-1.3%)	73,100 (-1.2%)
		2043	5,200 (-2.0%)	5,000 (-1.4%)	6,100 (-0.2%)	74,800 (-1.2%)
M1 within Jn10	Southbound	2016	4,200	3,400	4,200	53,200
		2027	5,000 (0.0%)	4,000 (-1.4%)	4,700 (0.0%)	61,800 (-0.9%)
		2039	5,300 (-0.6%)	4,500 (-1.5%)	4,900 (-4.3%)	68,300 (-1.7%)
		2043	5,400 (-0.1%)	4,600 (-1.6%)	5,100 (-0.9%)	69,600 (-1.2%)
M1 Jn10 to 11	Northbound	2016	4,600	4,200	5,700	65,400
		2027	5,400 (-0.1%)	5,300 (-0.3%)	6,900 (0.6%)	79,800 (0.0%)
		2039	6,000 (0.7%)	5,900 (-0.3%)	7,300 (1.4%)	88,100 (0.3%)
		2043	6,200 (-0.2%)	6,100 (0.9%)	7,600 (0.4%)	91,200 (0.8%)
M1 Jn10 to 11	Southbound	2016	5,300	3,900	4,900	63,100
		2027	6,600 (0.2%)	4,800 (-0.3%)	5,800 (0.2%)	76,300 (0.0%)
		2039	7,100 (-0.2%)	5,500 (0.3%)	6,200 (-2.4%)	84,500 (-0.1%)
		2043	7,300 (0.5%)	5,600 (0.6%)	6,300 (-1.1%)	86,200 (0.4%)
M1 Jn10 Off-Slip	Northbound	2016	1,300	800	1,400	14,000
		2027	1,600 (3.2%)	1,000 (4.0%)	1,500 (2.1%)	16,400 (4.1%)
		2039	1,800 (6.7%)	1,100 (9.1%)	1,500 (3.8%)	18,500 (8.4%)
		2043	2,000 (15.8%)	1,200 (14.4%)	1,600 (3.5%)	19,400 (13.7%)

M1 Jn10 On-Slip	Northbound	2016	500	600	900	9,300
		2027	800 (0.5%)	900 (2.7%)	1,400 (-0.1%)	13,400 (2.2%)
		2039	900 (10.5%)	1,000 (4.4%)	1,600 (12.7%)	15,100 (8.0%)
		2043	1,000 (10.3%)	1,100 (13.0%)	1,600 (3.0%)	16,500 (11.1%)
M1 Jn10 Off-Slip	Southbound	2016	1,000	600	700	9,900
		2027	1,600 (1.0%)	900 (5.0%)	1,100 (1.1%)	14,500 (3.9%)
		2039	1,800 (1.0%)	1,000 (9.5%)	1,200 (5.9%)	16,200 (7.3%)
		2043	1,900 (2.2%)	1,000 (11.7%)	1,100 (-1.8%)	16,600 (7.5%)
M1 Jn10 On-Slip	Southbound	2016	1,300	1,000	1,700	16,400
		2027	1,400 (7.8%)	1,200 (8.9%)	1,700 (53.2%)	18,700 (18.8%)
		2039	1,500 (7.8%)	1,400 (8.9%)	2,600 (53.2%)	22,700 (18.8%)
		2043	1,700 (3.8%)	1,400 (13.2%)	2,800 (8.0%)	24,000 (11.6%)

Table B.4: TAG-based “With” Expansion Forecast Vehicle Flows (rounded to nearest 100 vehicles) at Selected non-M1 Locations, including change from “Without” Expansion

Location	Direction	Year	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)	Annual Average Daily Traffic
A1081, between Capability Green and B653	Eastbound	2016	2,000	1,400	2,300	22,900
		2027	2,600 (4.8%)	1,800 (7.4%)	2,700 (5.6%)	29,300 (6.7%)
		2039	2,900 (8.9%)	2,100 (13.9%)	2,800 (6.4%)	32,700 (11.8%)
		2043	3,000 (14.2%)	2,300 (20.5%)	2,900 (8.7%)	34,700 (17.4%)
A1081, between Capability Green and B653	Westbound	2016	2,400	1,500	2,300	24,500
		2027	2,800 (0.3%)	1,900 (6.2%)	2,600 (0.7%)	29,900 (4.1%)
		2039	3,000 (4.0%)	2,200 (12.4%)	3,200 (17.2%)	34,400 (12.3%)
		2043	3,100 (5.7%)	2,400 (19.7%)	3,300 (12.2%)	37,000 (16.0%)
Kimpton Road	Eastbound	2016	300	400	500	5,600
		2027	500 (-16.1%)	600 (-8.9%)	700 (-19.6%)	8,600 (-12.3%)
		2039	600 (-11.3%)	900 (-5.6%)	800 (-24.0%)	11,100 (-10.1%)
		2043	600 (-13.3%)	900 (-8.6%)	900 (-26.1%)	11,300 (-12.9%)
Kimpton Road	Westbound	2016	600	500	400	6,300
		2027	900 (-4.6%)	600 (-9.6%)	500 (-17.6%)	8,800 (-10.0%)
		2039	1,300 (-0.4%)	900 (-5.9%)	700 (-11.2%)	12,000 (-5.7%)
		2043	1,300 (-1.2%)	900 (-4.7%)	700 (-9.4%)	12,400 (-4.8%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	2016	1,000	800	1,200	12,800

		2027	900 (9.8%)	1,100 (13.1%)	1,400 (7.8%)	15,300 (11.4%)
		2039	1,100 (19.1%)	1,200 (19.9%)	1,600 (12.2%)	17,500 (18.2%)
		2043	1,100 (18.5%)	1,300 (15.2%)	1,600 (12.7%)	17,800 (15.2%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Southbound	2016	1,200	800	1,100	12,600
		2027	1,700 (5.0%)	1,000 (6.8%)	1,200 (4.5%)	16,100 (5.9%)
		2039	1,700 (3.0%)	1,200 (6.3%)	1,500 (23.1%)	18,700 (8.6%)
		2043	1,900 (6.6%)	1,300 (12.3%)	1,600 (21.1%)	19,300 (12.8%)
A505, west of Lilley	Eastbound	2016	900	700	1,200	11,000
		2027	900 (-0.4%)	800 (2.4%)	1,400 (-2.2%)	12,400 (0.7%)
		2039	1,000 (0.3%)	900 (1.6%)	1,500 (0.2%)	14,300 (1.1%)
		2043	1,000 (1.7%)	900 (-0.8%)	1,500 (0.8%)	14,600 (0.0%)
A505, west of Lilley	Westbound	2016	1,300	700	1,000	11,200
		2027	1,500 (-0.4%)	800 (0.5%)	1,000 (-2.0%)	12,700 (-0.2%)
		2039	1,700 (1.6%)	900 (-1.5%)	1,200 (9.5%)	15,100 (1.3%)
		2043	1,800 (3.4%)	1,000 (0.5%)	1,200 (2.0%)	15,700 (1.5%)
Eaton Green Road, east of Wigmore	Eastbound	2016	200	100	200	1,500
		2027	300 (12.6%)	100 (19.5%)	300 (14.1%)	2,200 (16.6%)
		2039	200 (-14.5%)	100 (43.6%)	300 (13.8%)	2,500 (20.7%)
		2043	300 (4.3%)	200 (87.9%)	400 (84.6%)	3,600 (66.0%)
Eaton Green Road, east of Wigmore	Westbound	2016	200	100	200	1,400
		2027	200 (-1.6%)	100 (-5.3%)	200 (1.7%)	1,600 (-2.4%)
		2039	400 (34.2%)	100 (45.4%)	200 (6.2%)	2,400 (31.3%)
		2043	500 (41.8%)	100 (73.1%)	200 (5.3%)	2,800 (44.9%)
Lower Harpenden Road, south of A1081	Northbound	2016	600	400	800	6,600
		2027	700 (0.4%)	400 (8.0%)	900 (5.5%)	7,600 (5.8%)
		2039	900 (8.1%)	500 (9.0%)	900 (8.8%)	8,600 (8.7%)
		2043	900 (9.7%)	500 (8.5%)	1,000 (11.3%)	8,900 (9.4%)
Lower Harpenden Road, south of A1081	Southbound	2016	600	300	500	5,600
		2027	700 (-3.7%)	400 (-2.3%)	700 (-2.3%)	6,700 (-2.7%)
		2039	800 (-4.4%)	500 (1.2%)	800 (-6.1%)	7,700 (-1.8%)
		2043	700 (-9.7%)	500 (0.9%)	800 (3.3%)	7,800 (-0.9%)
London Road, south of Front Street	Northbound	2016	800	600	700	8,600
		2027	900 (-2.4%)	700 (-1.4%)	900 (-2.5%)	10,400 (-1.9%)
		2039	1,000 (-3.5%)	700 (-3.8%)	1,000 (-3.9%)	11,300 (-3.8%)
		2043	1,000 (-1.5%)	800 (-3.1%)	900 (-10.3%)	11,700 (-4.3%)
London Road, south of Front Street	Southbound	2016	800	500	800	8,200

		2027	1,000 (1.0%)	500 (0.4%)	1,300 (5.1%)	10,200 (1.9%)
		2039	1,100 (-1.0%)	600 (-1.5%)	1,100 (-21.2%)	10,300 (-7.4%)
		2043	1,000 (3.7%)	600 (-0.6%)	1,100 (8.6%)	10,700 (2.5%)

Table B.5: Local Plan Growth Alternative Scenario Forecast Vehicle Flows (rounded to nearest 100 vehicles) along M1, including change from TAG-based Forecasts

Location	Direction	Scenario	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)	Annual Average Daily Traffic
M1 Jn9 to 10	Northbound	2016	5,300	4,400	6,200	70,000
		2027 Without	6,200 (0.2%)	5,400 (0.5%)	7,000 (0.9%)	82,800 (0.4%)
		2027 With	6,200 (0.2%)	5,400 (0.5%)	7,100 (0.8%)	83,200 (0.4%)
		2039 Without	6,900 (0.6%)	6,100 (0.5%)	7,400 (0.8%)	91,400 (0.5%)
		2039 With	6,900 (0.3%)	6,100 (0.7%)	7,300 (0.6%)	92,000 (0.5%)
		2043 Without	7,000 (0.5%)	6,100 (0.7%)	7,700 (0.5%)	93,300 (0.5%)
		2043 With	7,200 (0.5%)	6,200 (0.6%)	7,700 (0.4%)	94,700 (0.5%)
M1 Jn9 to 10	Southbound	2016	5,500	4,300	5,900	69,600
		2027 Without	6,400 (0.3%)	5,200 (0.5%)	6,500 (0.2%)	81,000 (0.4%)
		2027 With	6,400 (0.3%)	5,200 (0.6%)	6,400 (0.2%)	80,900 (0.4%)
		2039 Without	6,700 (-0.2%)	5,900 (0.6%)	6,900 (0.3%)	88,900 (0.3%)
		2039 With	6,800 (0.1%)	5,900 (0.7%)	7,600 (0.3%)	91,300 (0.4%)
		2043 Without	7,000 (0.1%)	6,000 (1.0%)	7,800 (0.5%)	92,500 (0.6%)
		2043 With	7,100 (-0.4%)	6,000 (0.8%)	8,000 (0.3%)	94,000 (0.4%)
M1 within Jn10	Northbound	2016	4,100	3,600	4,800	56,000
		2027 Without	4,600 (0.1%)	4,400 (0.3%)	5,500 (0.2%)	66,900 (0.2%)
		2027 With	4,600 (0.2%)	4,400 (0.3%)	5,500 (0.3%)	66,600 (0.2%)
		2039 Without	5,100 (0.3%)	5,000 (0.3%)	5,800 (-0.3%)	74,000 (0.1%)
		2039 With	5,100 (0.3%)	4,900 (0.3%)	5,700 (-0.2%)	73,100 (0.1%)
		2043 Without	5,300 (0.3%)	5,100 (0.4%)	6,100 (-0.3%)	75,800 (0.1%)
		2043 With	5,200 (0.5%)	5,000 (0.3%)	6,000 (-0.6%)	74,800 (0.1%)
M1 within Jn10	Southbound	2016	4,200	3,400	4,200	53,200
		2027 Without	5,000 (0.2%)	4,000 (0.2%)	4,700 (0.3%)	62,500 (0.2%)
		2027 With	5,000 (0.2%)	4,000 (0.4%)	4,700 (0.3%)	62,000 (0.3%)
		2039 Without	5,300 (-0.7%)	4,600 (0.1%)	5,200 (0.4%)	69,400 (0.0%)
		2039 With	5,300 (-0.6%)	4,500 (0.1%)	5,000 (0.5%)	68,200 (0.0%)
		2043 Without	5,400 (-0.6%)	4,700 (0.5%)	5,200 (0.4%)	70,500 (0.2%)
		2043 With	5,400 (-1.1%)	4,600 (0.4%)	5,100 (0.7%)	69,700 (0.1%)

M1 Jn10 to 11	Northbound	2016	4,600	4,200	5,700	65,400
		2027 Without	5,400 (0.2%)	5,300 (0.3%)	6,800 (0.2%)	80,000 (0.2%)
		2027 With	5,400 (0.3%)	5,300 (0.3%)	6,900 (0.2%)	80,000 (0.2%)
		2039 Without	6,000 (0.4%)	5,900 (0.3%)	7,200 (-0.2%)	88,000 (0.1%)
		2039 With	6,000 (0.3%)	5,900 (0.3%)	7,300 (-0.2%)	88,200 (0.1%)
		2043 Without	6,200 (0.4%)	6,100 (0.4%)	7,600 (-0.3%)	90,600 (0.1%)
		2043 With	6,200 (0.5%)	6,100 (0.2%)	7,600 (-0.3%)	91,300 (0.1%)
M1 Jn10 to 11	Southbound	2016	5,300	3,900	4,900	63,100
		2027 Without	6,600 (0.2%)	4,900 (0.4%)	5,800 (0.3%)	76,500 (0.3%)
		2027 With	6,600 (0.2%)	4,900 (0.5%)	5,800 (0.2%)	76,500 (0.3%)
		2039 Without	7,100 (-0.5%)	5,500 (0.2%)	6,300 (0.5%)	84,600 (0.0%)
		2039 With	7,100 (-0.4%)	5,500 (0.3%)	6,200 (0.4%)	84,600 (0.1%)
		2043 Without	7,300 (-0.5%)	5,600 (0.5%)	6,400 (0.4%)	86,000 (0.2%)
		2043 With	7,300 (-0.6%)	5,600 (0.5%)	6,300 (0.8%)	86,400 (0.2%)
M1 Jn10 Off-Slip	Northbound	2016	1,300	800	1,400	14,000
		2027 Without	1,500 (0.4%)	900 (1.3%)	1,500 (3.2%)	16,000 (1.5%)
		2027 With	1,600 (0.2%)	1,000 (1.5%)	1,500 (2.5%)	16,600 (1.3%)
		2039 Without	1,700 (1.4%)	1,100 (1.8%)	1,600 (4.9%)	17,400 (2.3%)
		2039 With	1,800 (0.5%)	1,200 (2.5%)	1,600 (3.6%)	18,900 (2.1%)
		2043 Without	1,700 (1.3%)	1,000 (2.1%)	1,600 (3.8%)	17,500 (2.2%)
		2043 With	2,000 (0.5%)	1,200 (2.2%)	1,700 (4.1%)	19,800 (2.0%)
M1 Jn10 On-Slip	Northbound	2016	500	600	900	9,300
		2027 Without	800 (0.6%)	800 (0.2%)	1,400 (0.0%)	13,100 (0.2%)
		2027 With	800 (0.8%)	900 (0.1%)	1,400 (-0.1%)	13,400 (0.1%)
		2039 Without	800 (1.0%)	900 (0.6%)	1,400 (0.1%)	14,000 (0.5%)
		2039 With	900 (0.4%)	1,000 (0.3%)	1,600 (0.0%)	15,100 (0.2%)
		2043 Without	900 (1.1%)	1,000 (0.2%)	1,500 (-0.4%)	14,800 (0.2%)
		2043 With	1,000 (0.4%)	1,100 (-0.1%)	1,600 (0.5%)	16,500 (0.1%)
M1 Jn10 Off-Slip	Southbound	2016	1,000	600	700	9,900
		2027 Without	1,600 (0.0%)	800 (1.1%)	1,100 (0.4%)	14,000 (0.6%)
		2027 With	1,600 (0.2%)	900 (0.9%)	1,100 (-0.2%)	14,500 (0.5%)
		2039 Without	1,800 (0.1%)	900 (0.5%)	1,200 (0.7%)	15,200 (0.4%)
		2039 With	1,800 (-0.1%)	1,000 (1.4%)	1,200 (0.1%)	16,400 (0.7%)
		2043 Without	1,900 (-0.2%)	900 (0.3%)	1,200 (0.7%)	15,500 (0.2%)
		2043 With	1,900 (0.9%)	1,000 (0.7%)	1,200 (1.1%)	16,700 (0.7%)
M1 Jn10 On-Slip	Southbound	2016	1,300	1,000	1,700	16,400

		2027 Without	1,400 (0.7%)	1,200 (1.5%)	1,700 (-0.1%)	18,400 (1.0%)
		2027 With	1,400 (0.4%)	1,200 (1.3%)	1,700 (0.1%)	18,900 (0.8%)
		2039 Without	1,400 (1.7%)	1,300 (2.5%)	1,700 (-0.1%)	19,400 (1.7%)
		2039 With	1,500 (2.5%)	1,400 (2.7%)	2,600 (0.0%)	23,100 (1.7%)
		2043 Without	1,600 (2.5%)	1,300 (2.9%)	2,600 (0.7%)	22,000 (2.1%)
		2043 With	1,700 (1.9%)	1,400 (2.2%)	2,800 (-0.5%)	24,300 (1.3%)

Table B.6: Local Plan Growth Alternative Scenario Forecast Vehicle Flows (rounded to nearest 100 vehicles) at Selected non-M1 Locations, including change from TAG-based Forecasts

Location	Direction	Scenario	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)	Annual Average Daily Traffic
A1081, between Capability Green and B653	Eastbound	2016	2,000	1,400	2,300	22,900
		2027 Without	2,400 (-0.2%)	1,700 (0.5%)	2,600 (1.6%)	27,600 (0.6%)
		2027 With	2,600 (0.0%)	1,800 (0.6%)	2,700 (1.5%)	29,400 (0.7%)
		2039 Without	2,600 (0.2%)	1,900 (1.4%)	2,700 (2.1%)	29,600 (1.3%)
		2039 With	2,900 (0.2%)	2,100 (1.3%)	2,800 (1.5%)	33,100 (1.1%)
		2043 Without	2,700 (0.3%)	1,900 (1.1%)	2,700 (2.7%)	29,900 (1.2%)
		2043 With	3,000 (0.3%)	2,300 (0.6%)	2,900 (2.0%)	35,000 (0.8%)
A1081, between Capability Green and B653	Westbound	2016	2,400	1,500	2,300	24,500
		2027 Without	2,800 (0.7%)	1,800 (1.6%)	2,600 (0.4%)	29,100 (1.1%)
		2027 With	2,700 (-1.7%)	1,900 (1.3%)	2,500 (-1.1%)	30,000 (0.2%)
		2039 Without	2,900 (2.1%)	2,000 (1.8%)	2,700 (0.6%)	31,100 (1.5%)
		2039 With	3,000 (0.7%)	2,200 (1.8%)	3,200 (0.8%)	34,900 (1.3%)
		2043 Without	3,000 (1.5%)	2,000 (1.4%)	3,000 (0.6%)	32,300 (1.2%)
		2043 With	3,100 (0.2%)	2,400 (1.5%)	3,300 (0.1%)	37,400 (0.9%)
Kimpton Road	Eastbound	2016	300	400	500	5,600
		2027 Without	600 (-0.1%)	700 (1.0%)	900 (3.0%)	9,900 (1.4%)
		2027 With	500 (3.1%)	600 (0.0%)	800 (7.1%)	8,700 (1.8%)
		2039 Without	700 (-1.3%)	900 (0.3%)	1,100 (3.5%)	12,400 (0.8%)
		2039 With	600 (-1.1%)	900 (-0.6%)	800 (0.6%)	11,000 (-0.4%)
		2043 Without	700 (-3.4%)	900 (-9.6%)	1,200 (-0.5%)	12,000 (-7.0%)
		2043 With	600 (1.8%)	900 (0.4%)	900 (4.6%)	11,400 (1.3%)
Kimpton Road	Westbound	2016	600	500	400	6,300
		2027 Without	1,000 (0.0%)	700 (0.4%)	600 (-1.8%)	9,800 (0.0%)

		2027 With	900 (-0.3%)	600 (0.8%)	500 (3.5%)	8,900 (1.0%)
		2039 Without	1,300 (0.4%)	900 (-0.1%)	700 (-2.2%)	12,700 (-0.3%)
		2039 With	1,300 (0.5%)	900 (0.6%)	700 (1.4%)	12,100 (0.7%)
		2043 Without	1,300 (-0.7%)	900 (-0.3%)	800 (-1.6%)	13,000 (-0.6%)
		2043 With	1,300 (1.1%)	900 (-0.3%)	700 (2.7%)	12,500 (0.4%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	2016	1,000	800	1,200	12,800
		2027 Without	1,600 (-0.2%)	1,000 (2.8%)	1,200 (0.2%)	15,500 (1.7%)
		2027 With	1,600 (-2.3%)	1,100 (2.0%)	1,200 (-0.3%)	16,200 (0.7%)
		2039 Without	1,700 (0.3%)	1,200 (0.4%)	1,200 (-0.4%)	17,200 (0.2%)
		2039 With	1,700 (-0.9%)	1,300 (2.0%)	1,500 (-1.7%)	18,800 (0.7%)
		2043 Without	1,700 (0.1%)	1,200 (5.4%)	1,300 (1.2%)	17,700 (3.5%)
		2043 With	1,800 (-0.6%)	1,300 (2.3%)	1,500 (-1.2%)	19,500 (1.0%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Southbound	2016	1,200	800	1,100	12,600
		2027 Without	800 (-0.4%)	900 (-0.3%)	1,400 (1.4%)	13,700 (0.1%)
		2027 With	1,000 (4.2%)	1,100 (-0.4%)	1,500 (1.5%)	15,400 (0.5%)
		2039 Without	900 (-0.2%)	1,000 (-0.4%)	1,400 (1.7%)	14,900 (0.1%)
		2039 With	1,100 (0.5%)	1,200 (-0.1%)	1,600 (0.3%)	17,500 (0.1%)
		2043 Without	900 (2.4%)	1,100 (-4.0%)	1,400 (0.1%)	15,100 (-2.4%)
		2043 With	1,100 (0.7%)	1,200 (-2.3%)	1,500 (-2.4%)	17,400 (-2.0%)
A505, west of Lilley	Eastbound	2016	900	700	1,200	11,000
		2027 Without	900 (0.6%)	800 (-0.6%)	1,400 (-0.1%)	12,300 (-0.3%)
		2027 With	900 (0.3%)	800 (-0.7%)	1,400 (0.3%)	12,400 (-0.3%)
		2039 Without	1,000 (2.5%)	900 (-0.1%)	1,500 (1.1%)	14,200 (0.5%)
		2039 With	1,000 (3.3%)	900 (-1.0%)	1,500 (-0.1%)	14,200 (-0.2%)
		2043 Without	1,000 (2.4%)	1,000 (-0.5%)	1,500 (0.7%)	14,600 (0.2%)
		2043 With	1,000 (3.4%)	900 (0%)	1,500 (-0.3%)	14,700 (0.4%)
A505, west of Lilley	Westbound	2016	1,300	700	1,000	11,200
		2027 Without	1,500 (-0.8%)	800 (-0.6%)	1,000 (1.4%)	12,700 (-0.3%)
		2027 With	1,500 (-2.8%)	800 (-0.8%)	1,000 (0.1%)	12,600 (-1.1%)
		2039 Without	1,700 (-0.1%)	900 (-1.1%)	1,100 (2.1%)	14,800 (-0.3%)
		2039 With	1,700 (-0.9%)	900 (-1.0%)	1,200 (-0.2%)	14,900 (-0.8%)
		2043 Without	1,700 (-1.0%)	1,000 (-1.1%)	1,200 (1.4%)	15,400 (-0.6%)
		2043 With	1,800 (0.6%)	1,000 (-1.0%)	1,200 (0.6%)	15,700 (-0.4%)
Eaton Green Road, east of Wigmore	Eastbound	2016	200	100	200	1,500
		2027 Without	200 (6.3%)	100 (-2.4%)	200 (-3.8%)	1,900 (-0.7%)
		2027 With	300 (6.9%)	100 (-0.7%)	300 (0.7%)	2,200 (1.5%)

		2039 Without	300 (3.5%)	100 (-1.7%)	200 (-0.6%)	2,100 (-0.1%)
		2039 With	200 (1.5%)	100 (-1.1%)	300 (-8.5%)	2,400 (-2.7%)
		2043 Without	300 (4.1%)	100 (1.9%)	200 (-2.3%)	2,200 (1.4%)
		2043 With	300 (1.3%)	200 (-3.2%)	400 (0.3%)	3,600 (-1.3%)
Eaton Green Road, east of Wigmore	Westbound	2016	200	100	200	1,400
		2027 Without	200 (-6.4%)	100 (-1.9%)	200 (-2.8%)	1,600 (-3.5%)
		2027 With	200 (-6.8%)	100 (-2.0%)	200 (-2.8%)	1,500 (-3.6%)
		2039 Without	300 (-2.7%)	100 (-2.1%)	200 (-0.6%)	1,800 (-2.0%)
		2039 With	400 (-2.0%)	100 (-0.8%)	200 (12.5%)	2,400 (1.7%)
		2043 Without	300 (-3.9%)	100 (-0.8%)	200 (-1.1%)	1,900 (-2.0%)
		2043 With	500 (3.2%)	100 (-0.8%)	200 (5.8%)	2,900 (1.9%)
Lower Harpenden Road, south of A1081	Northbound	2016	600	400	800	6,600
		2027 Without	700 (0.2%)	400 (1.8%)	800 (1.2%)	7,300 (1.3%)
		2027 With	700 (1.6%)	400 (0.8%)	900 (1.1%)	7,700 (1.0%)
		2039 Without	800 (1.0%)	500 (1.1%)	900 (1.7%)	8,000 (1.2%)
		2039 With	900 (0.9%)	500 (0.0%)	900 (0.4%)	8,600 (0.3%)
		2043 Without	800 (1.2%)	500 (-1.8%)	900 (2.5%)	8,100 (-0.1%)
		2043 With	900 (-0.1%)	500 (0.0%)	1,000 (0.8%)	8,900 (0.2%)
Lower Harpenden Road, south of A1081	Southbound	2016	600	300	500	5,600
		2027 Without	800 (0.6%)	400 (0.9%)	700 (0.0%)	6,900 (0.6%)
		2027 With	700 (-0.3%)	400 (0.4%)	700 (-2.1%)	6,700 (-0.4%)
		2039 Without	800 (1.9%)	500 (2.3%)	800 (1.7%)	8,100 (2.1%)
		2039 With	800 (0.6%)	500 (1.9%)	800 (-0.3%)	7,800 (1.1%)
		2043 Without	800 (1.5%)	500 (-1.2%)	700 (0.0%)	7,800 (-0.4%)
		2043 With	700 (0.5%)	500 (0.3%)	800 (-0.1%)	7,800 (0.2%)
London Road, south of Front Street	Northbound	2016	800	600	700	8,600
		2027 Without	900 (0.4%)	700 (0.6%)	900 (0.6%)	10,700 (0.6%)
		2027 With	900 (1.0%)	700 (1.0%)	900 (0.0%)	10,500 (0.8%)
		2039 Without	1,000 (0.4%)	800 (0.4%)	1,000 (-0.3%)	11,700 (0.2%)
		2039 With	1,000 (1.9%)	800 (1.0%)	900 (-0.7%)	11,300 (0.8%)
		2043 Without	1100 (0.0%)	800 (0.8%)	1,100 (-0.2%)	12,300 (0.5%)
		2043 With	1,100 (1.7%)	800 (0.6%)	900 (-0.8%)	11,800 (0.5%)
London Road, south of Front Street	Southbound	2016	800	500	800	8,200
		2027 Without	1,000 (1.5%)	500 (0.3%)	1,300 (0.7%)	10,000 (0.7%)
		2027 With	1,000 (0.7%)	500 (0.3%)	1,300 (-0.6%)	10,200 (0.1%)
		2039 Without	1,100 (0.4%)	600 (0.5%)	1,400 (1.1%)	11,200 (0.7%)

		2039 With	1,100 (-0.6%)	600 (0.5%)	1,100 (1.2%)	10,400 (0.5%)
		2043 Without	1,000 (-0.9%)	700 (0.5%)	1,000 (2.0%)	10,500 (0.6%)
		2043 With	1,000 (-0.9%)	600 (0.4%)	1,100 (0.7%)	10,800 (0.2%)

Appendix C - TAG-based "Without" Expansion Average Node Delays

Figure Apx C.1: Forecast Average Node Delays, 2016 Base Model, Simulation Network

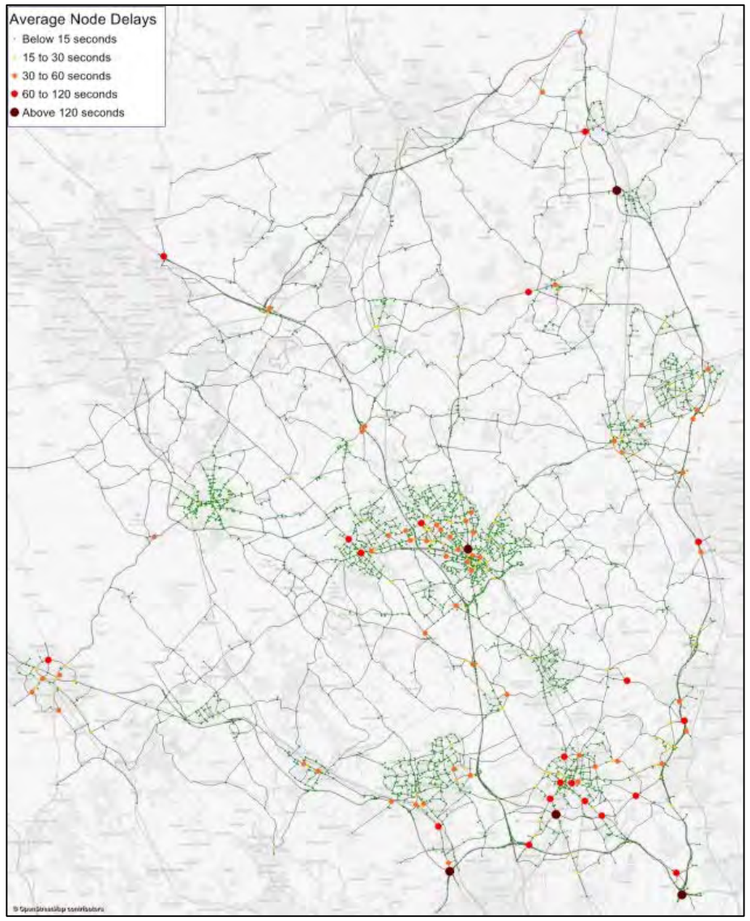
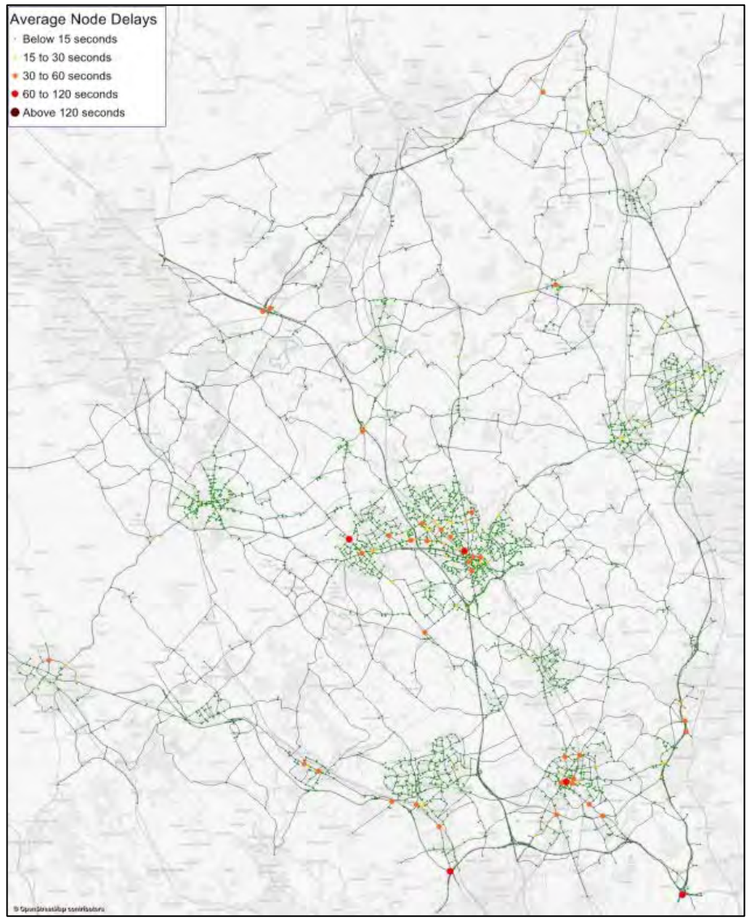
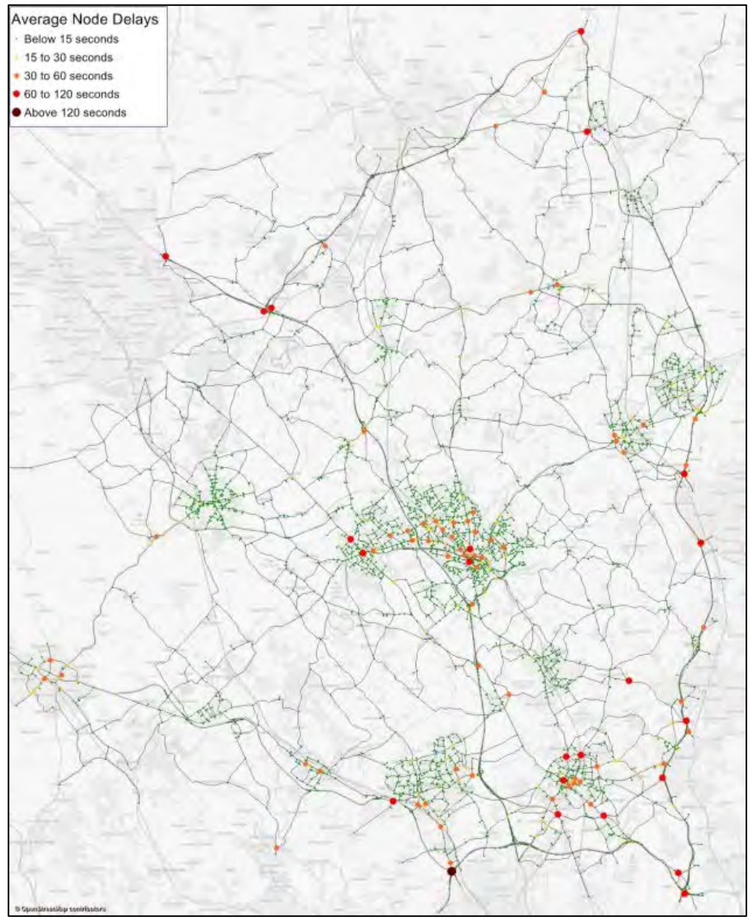
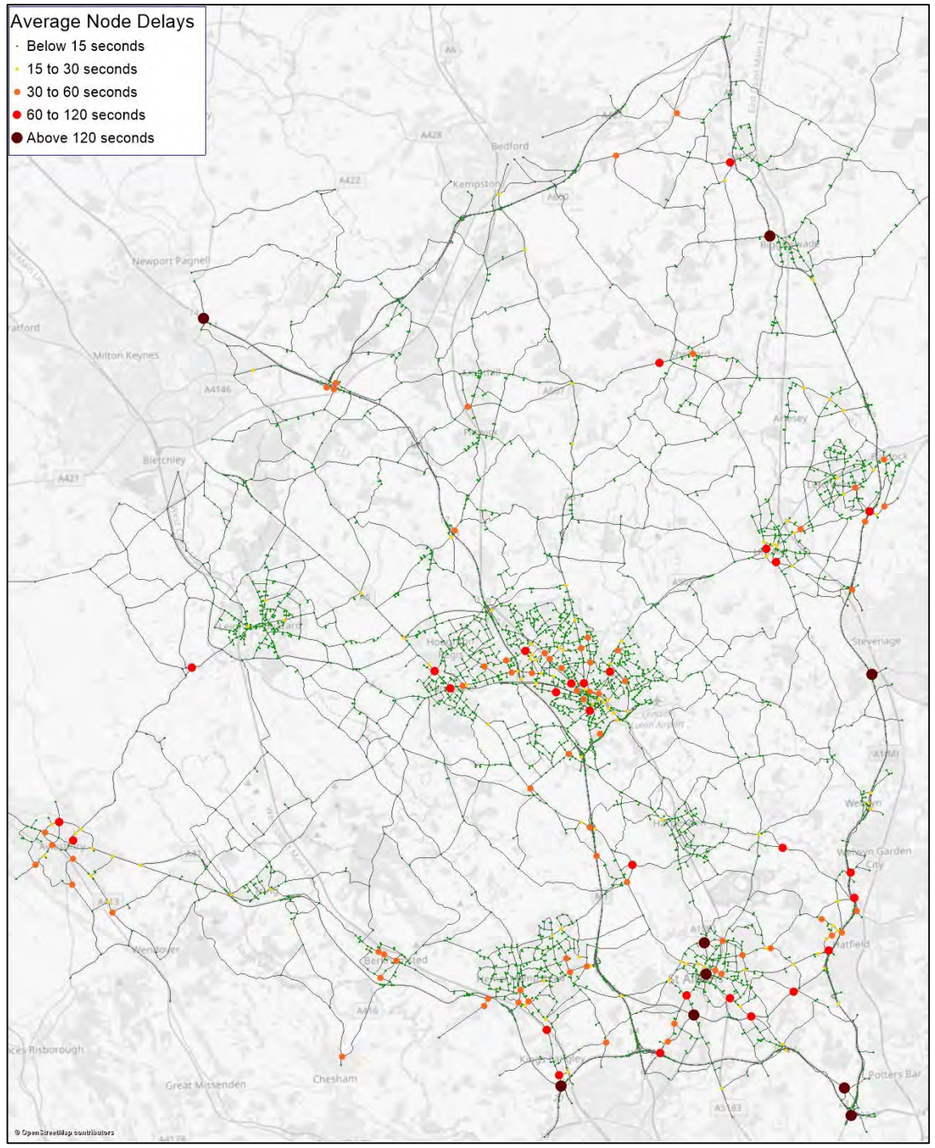
	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)
2016 Base			

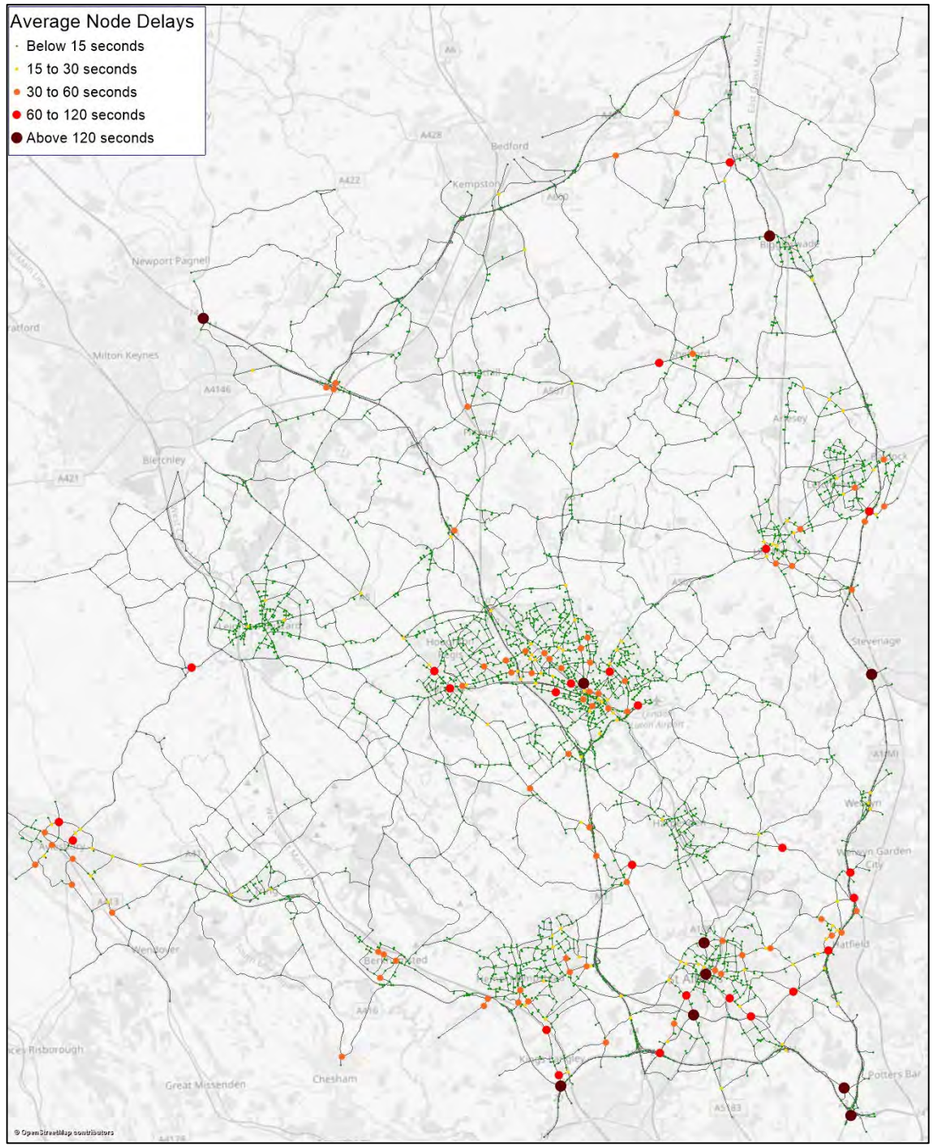
Figure C.2: Forecast Average Node Delays, TAG-based “Without” and “With” Expansion Forecasts, Simulation Network – 2027

“Without Expansion

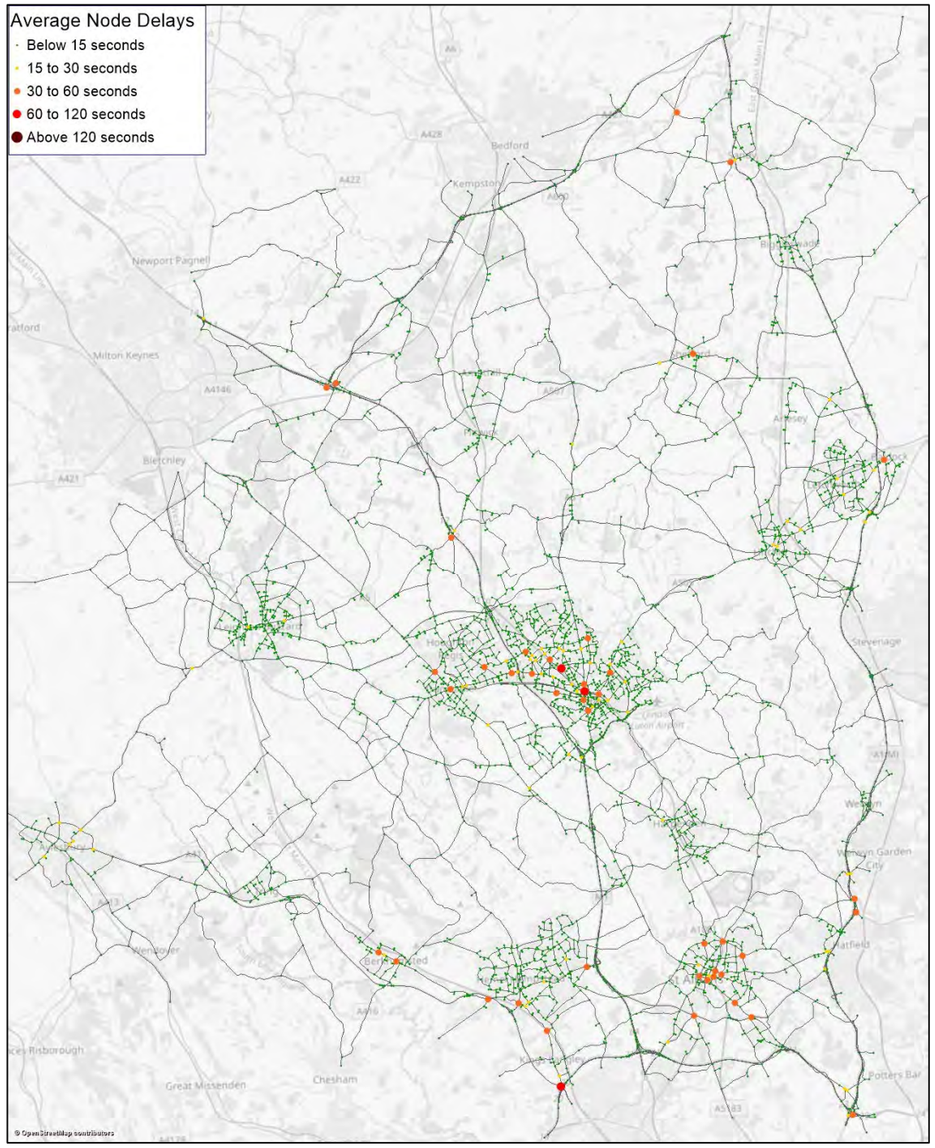
“With” Expansion

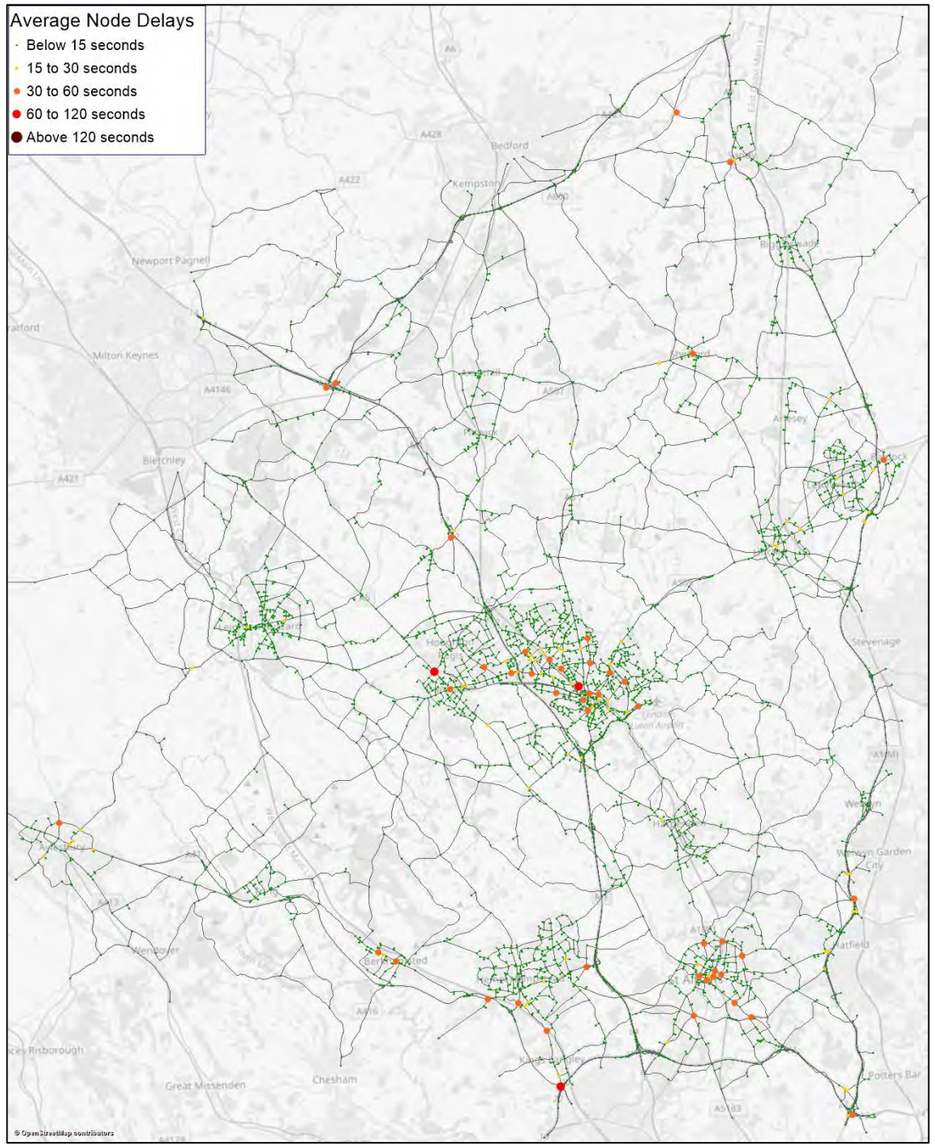
AM Peak Hour
(08:00 – 09:00)



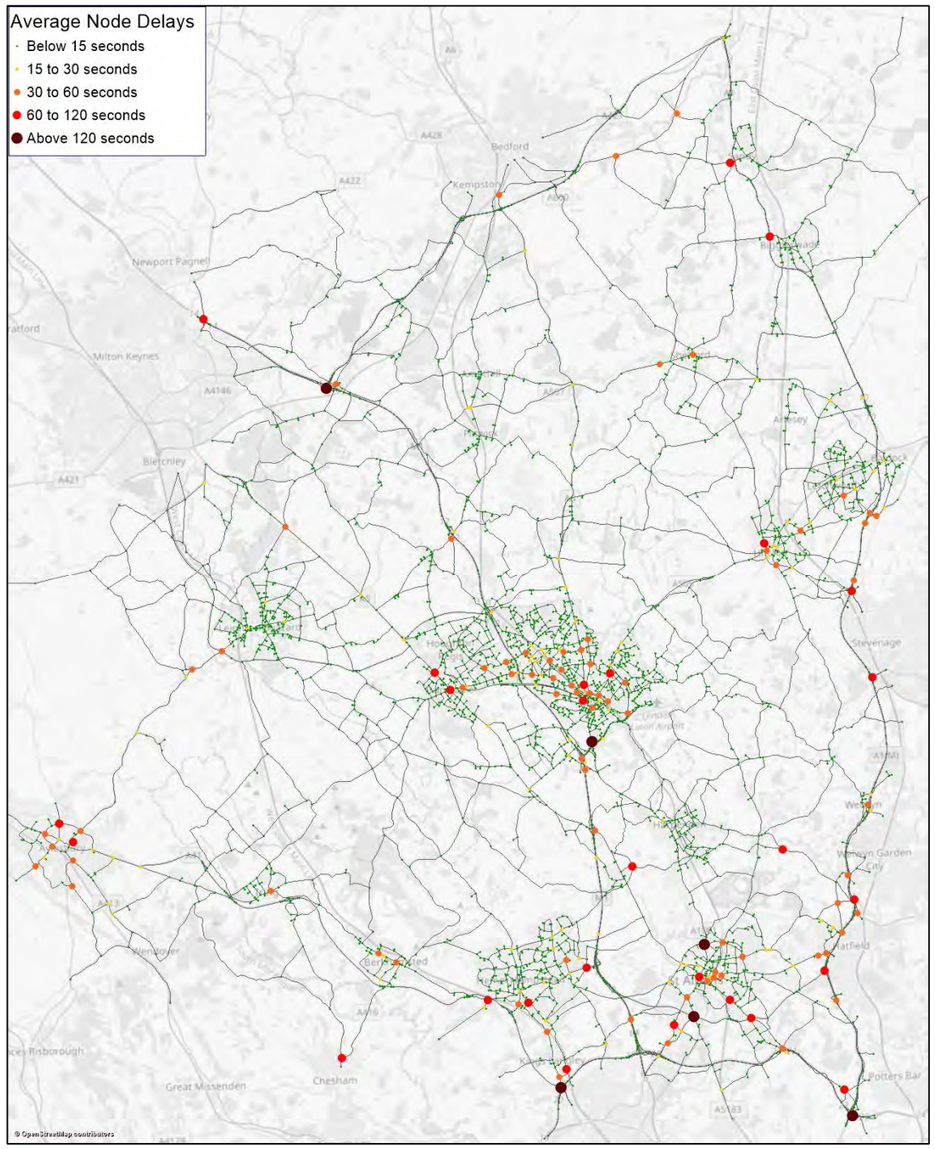


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



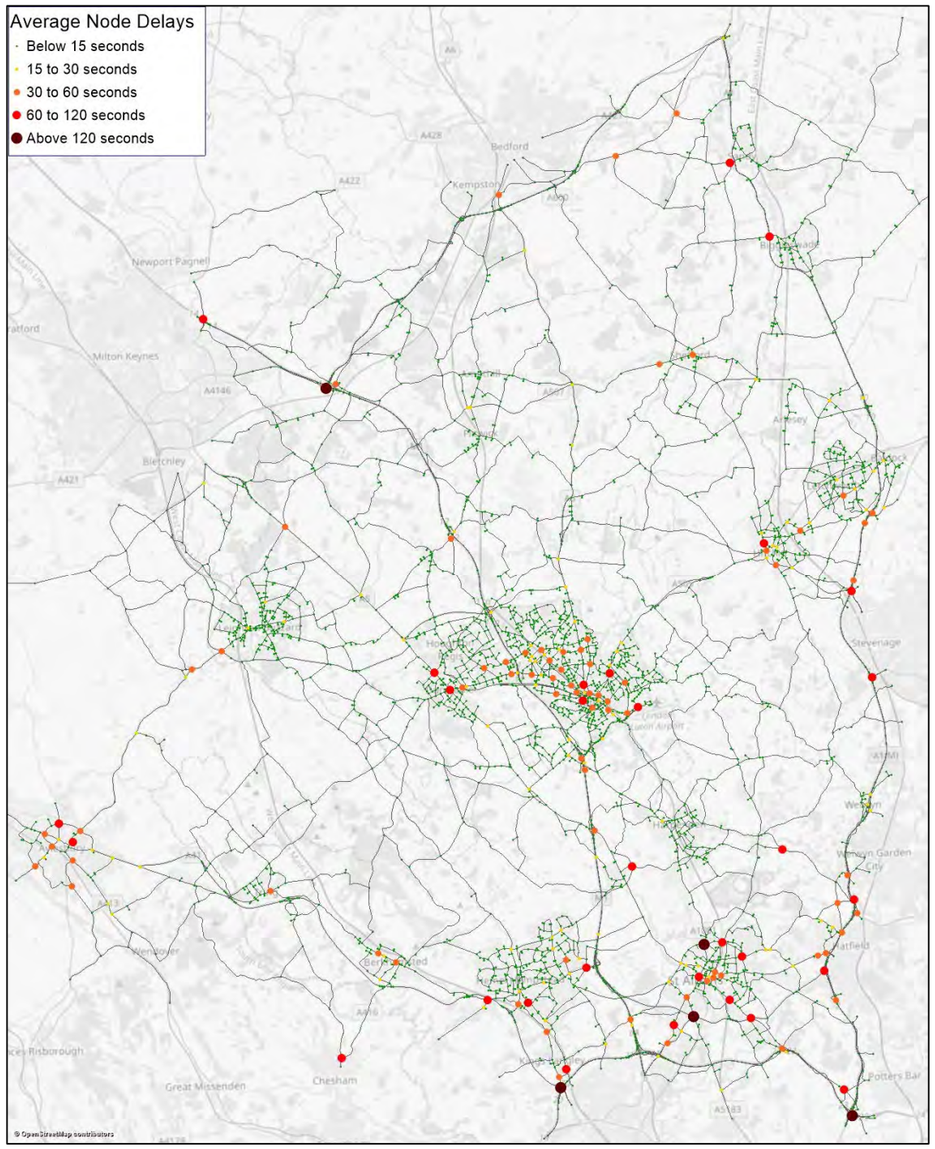
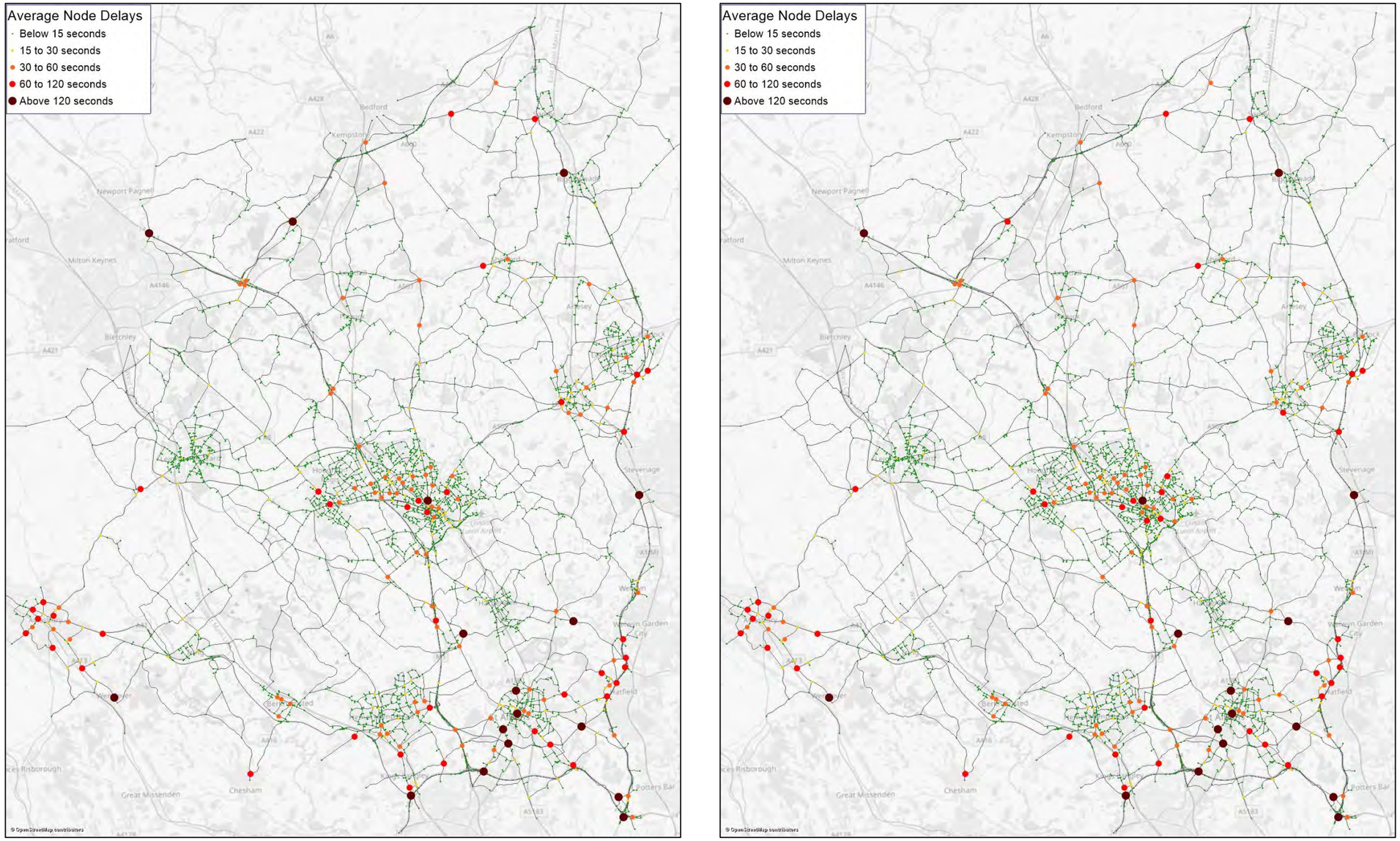


Figure C.3: Forecast Average Node Delays, TAG-based “Without” Expansion Forecasts, Simulation Network – 2039

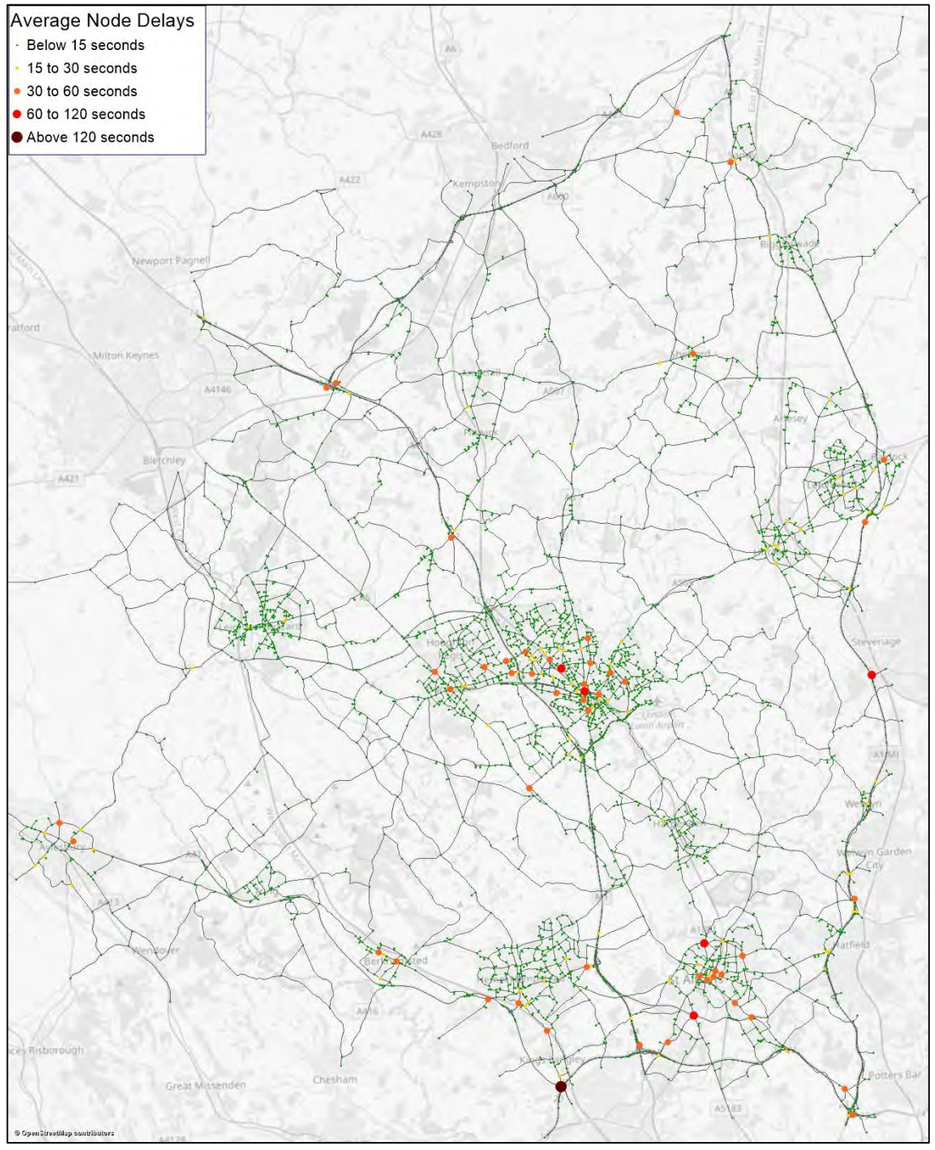
“Without Expansion

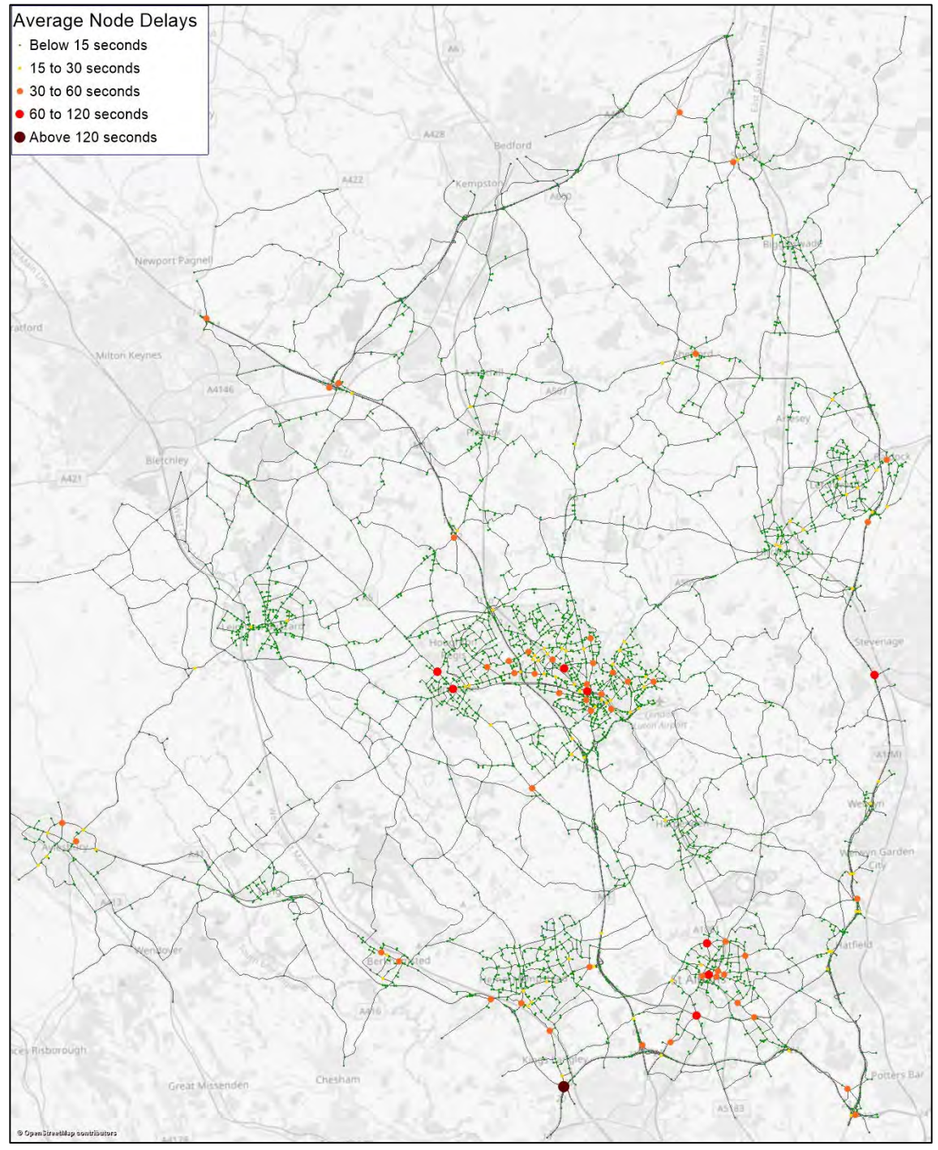
“With” Expansion

AM Peak Hour
(08:00 – 09:00)

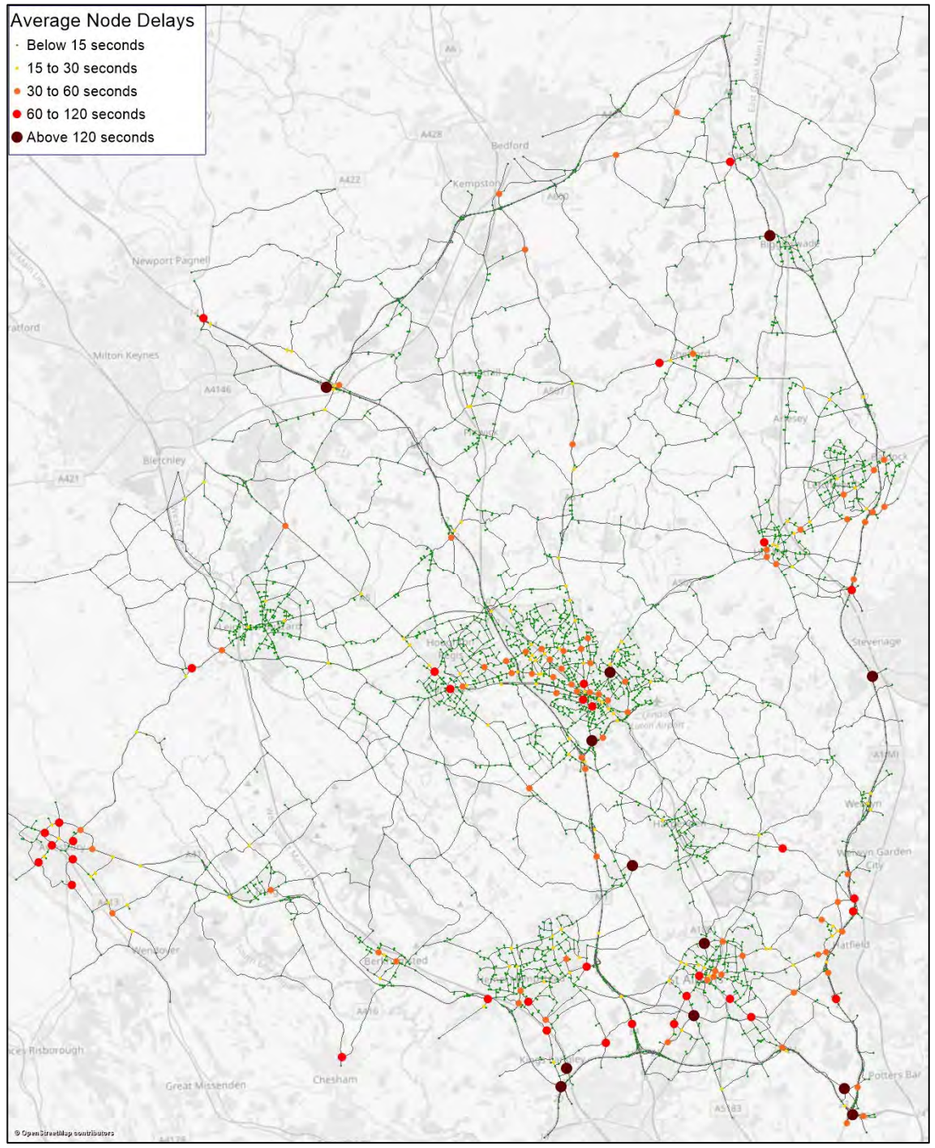


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



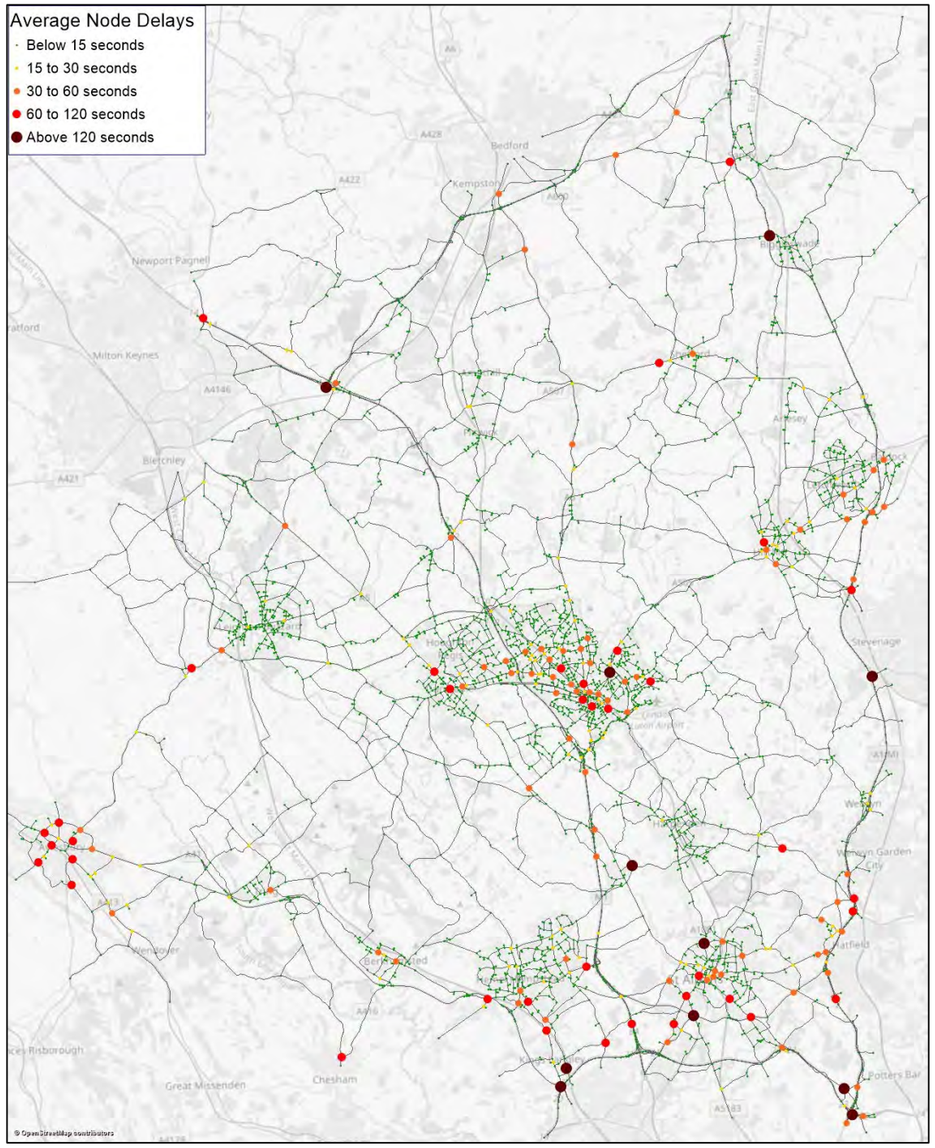
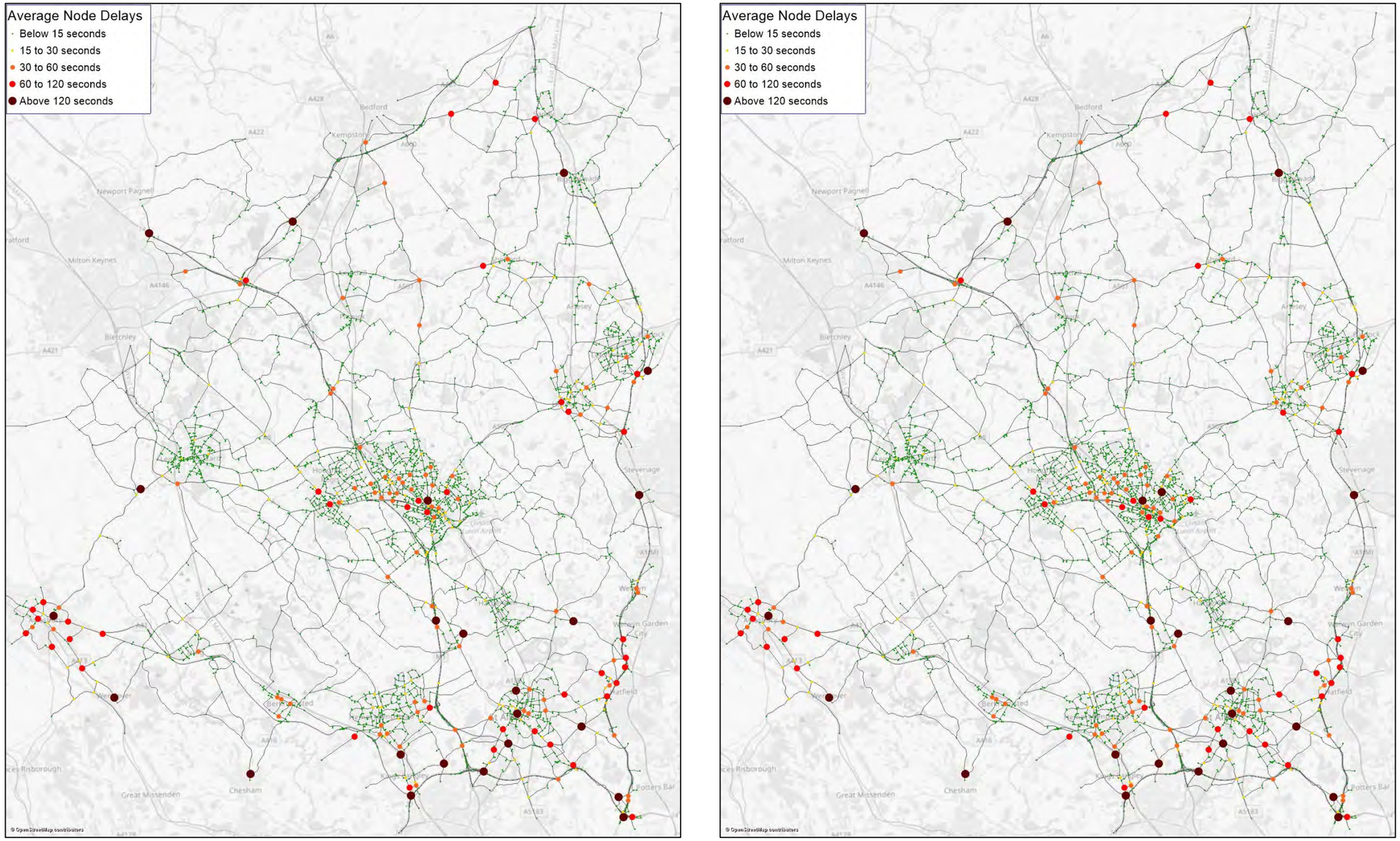


Figure C.4: Forecast Average Node Delays, TAG-based “Without” Expansion Forecasts, Simulation Network – 2043

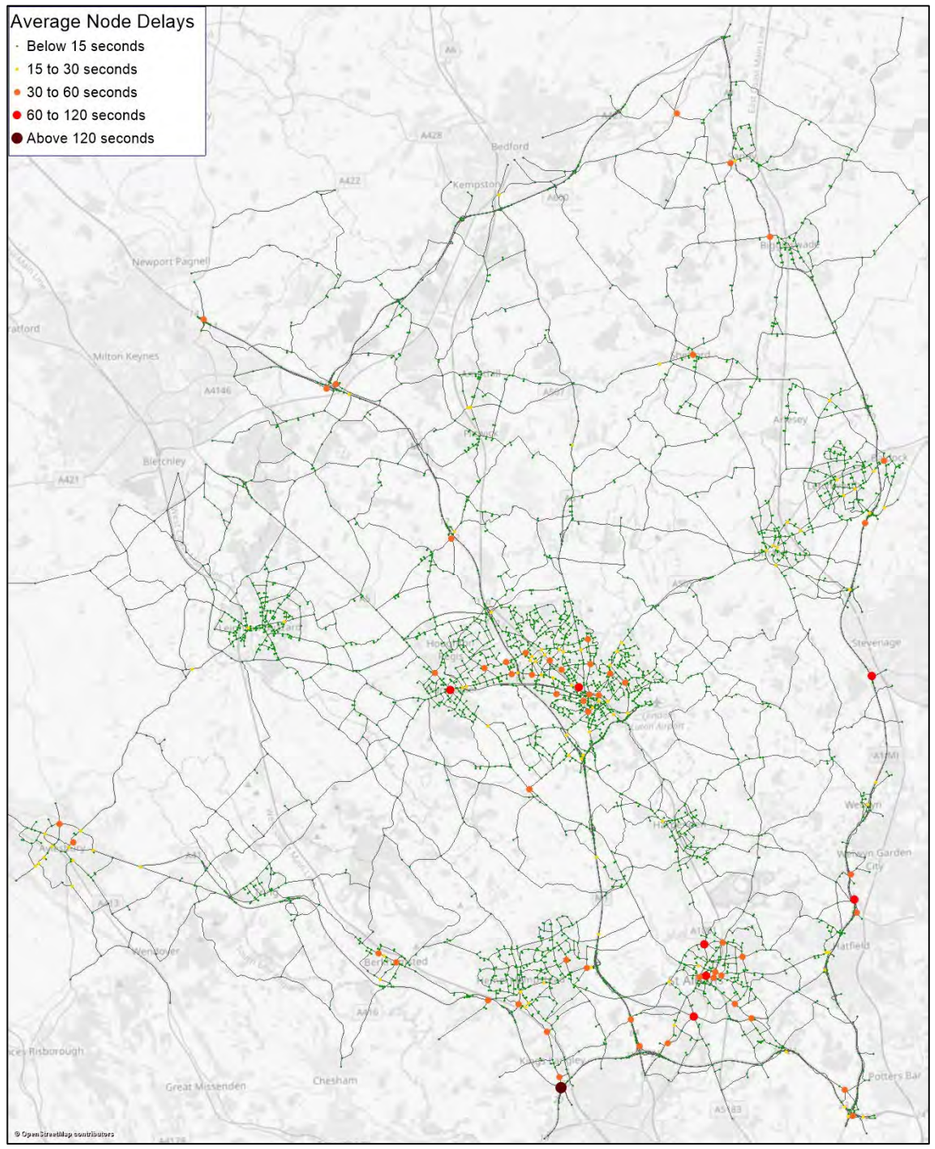
“Without Expansion

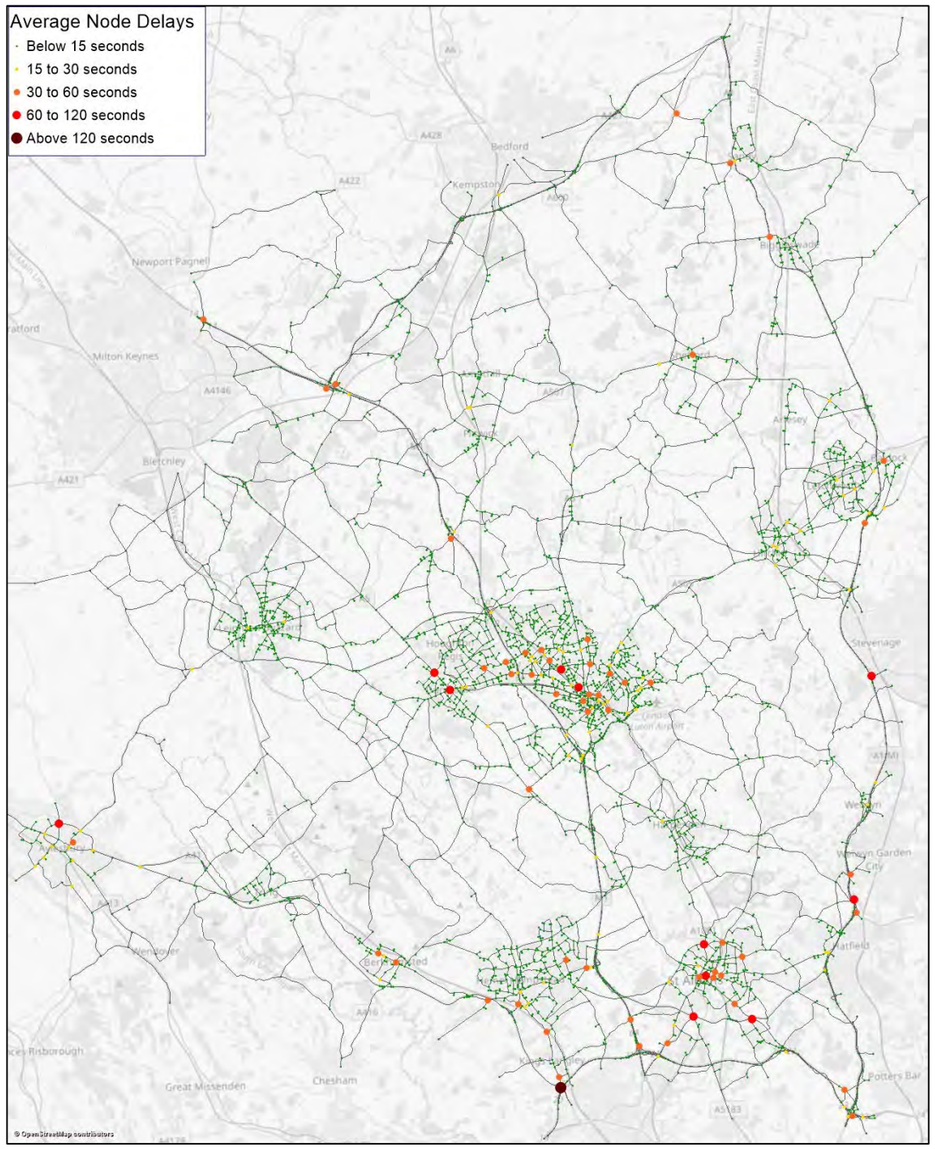
“With” Expansion

AM Peak Hour
(08:00 – 09:00)

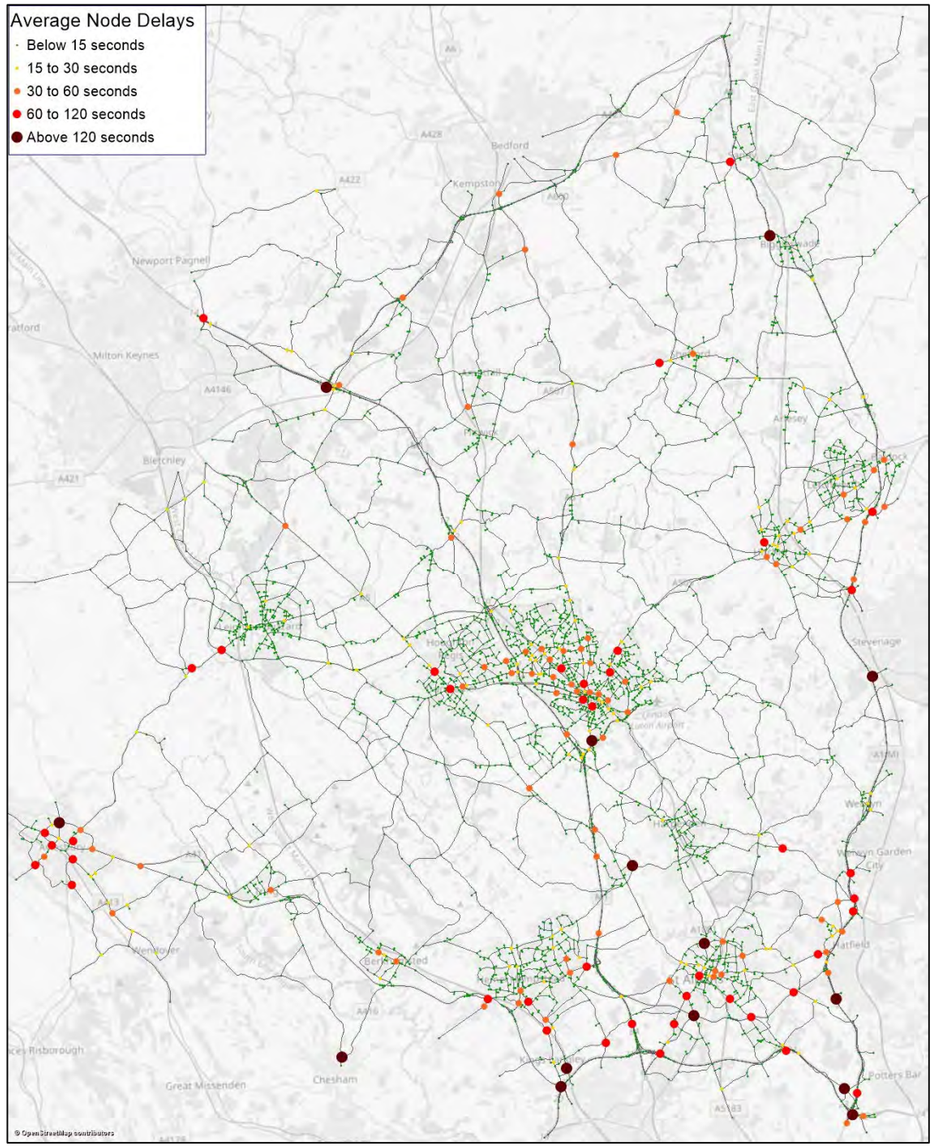


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



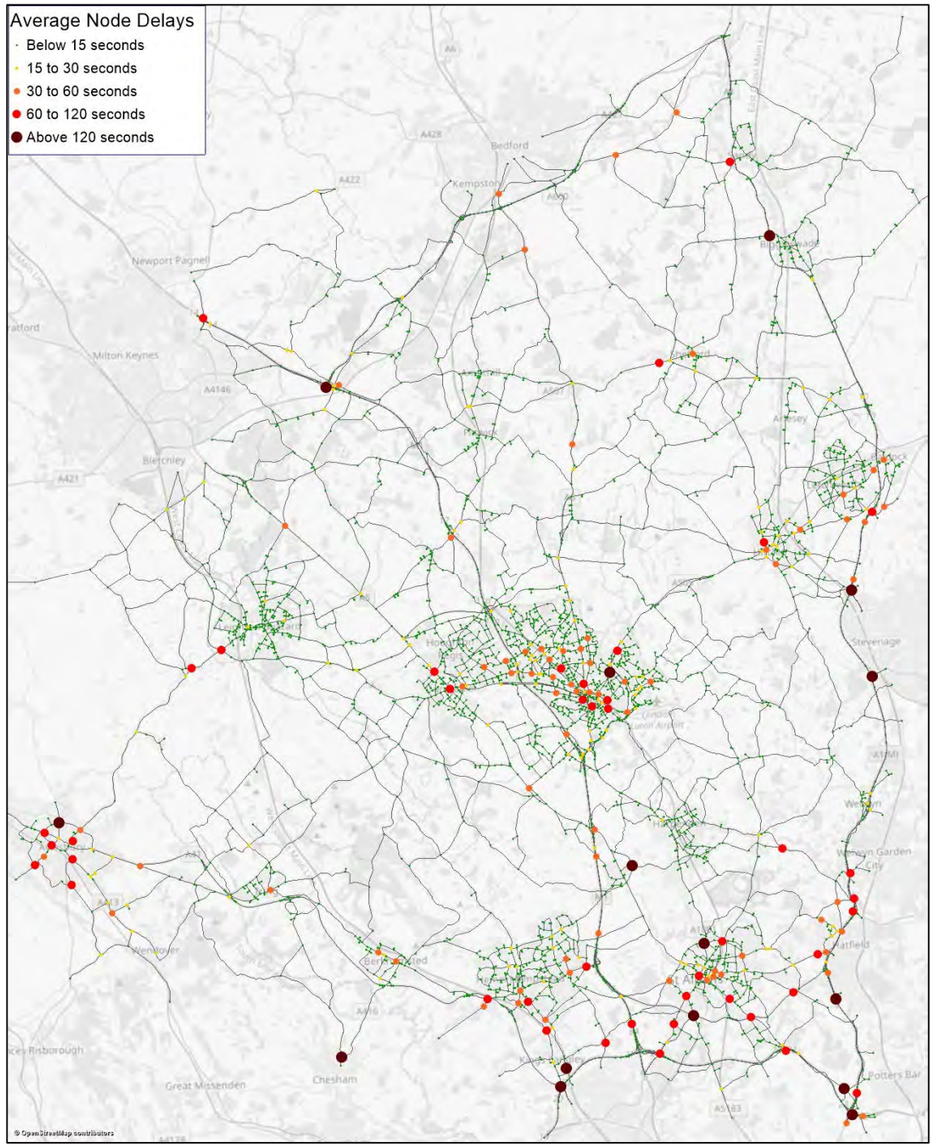
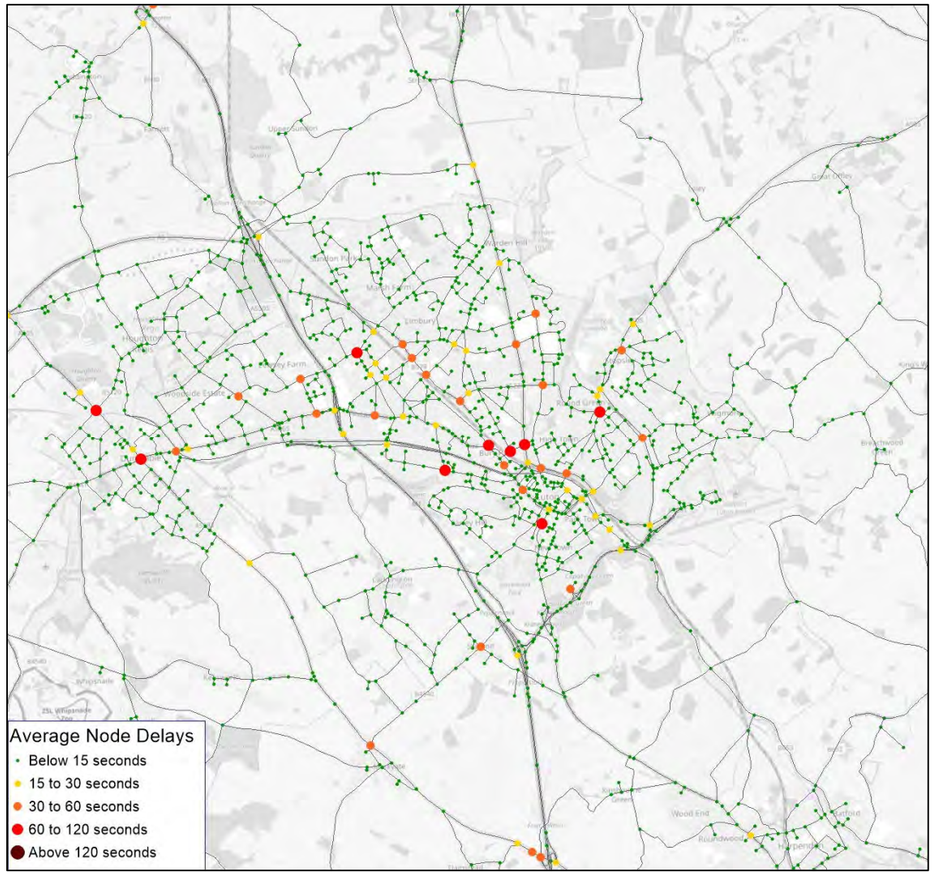


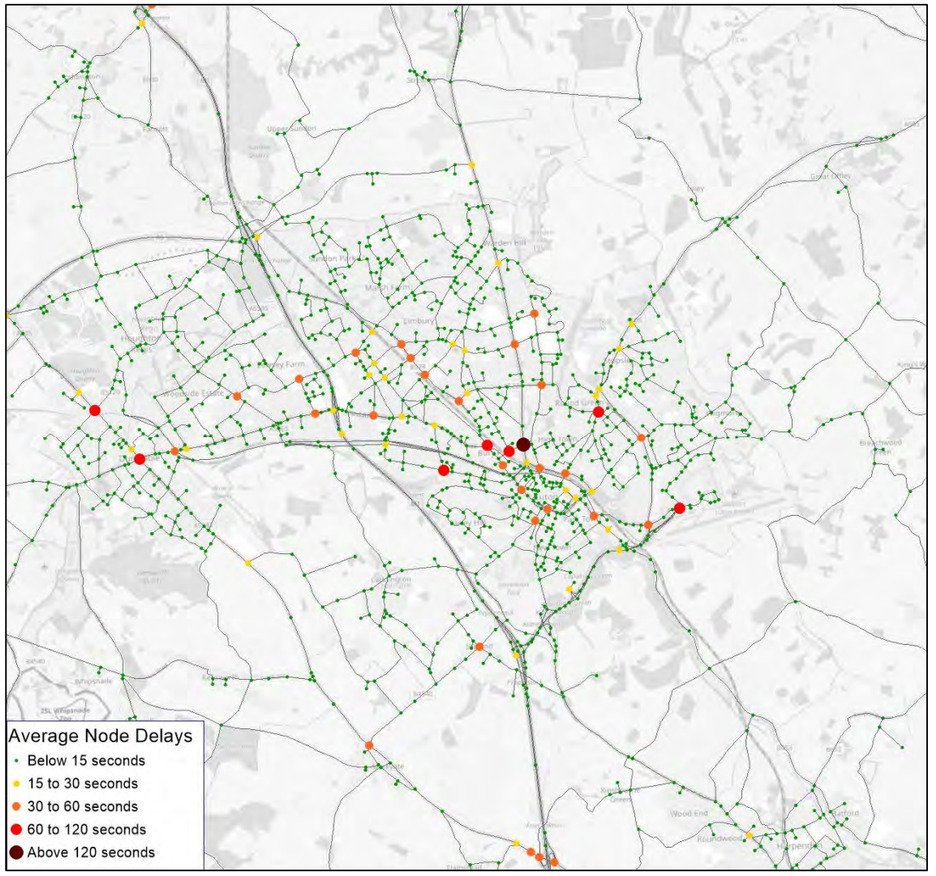
Figure C.5: Forecast Average Node Delays, TAG-based “Without” Expansion Forecasts, Luton Borough – 2027

“Without Expansion

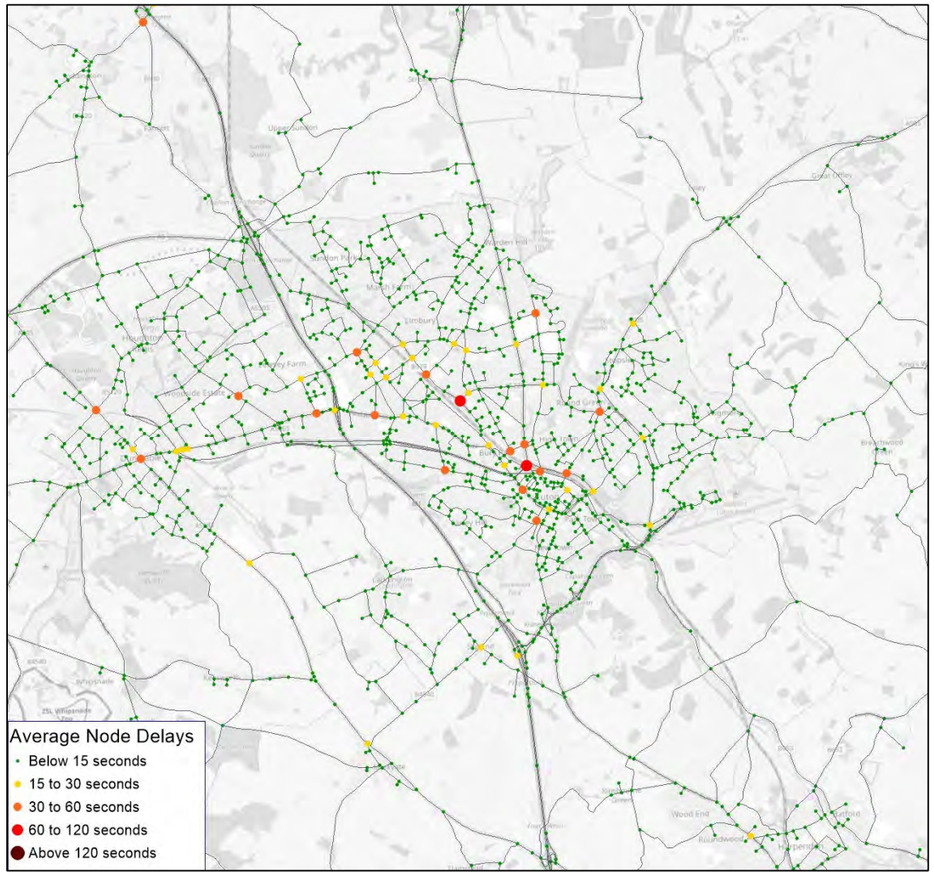
“With” Expansion

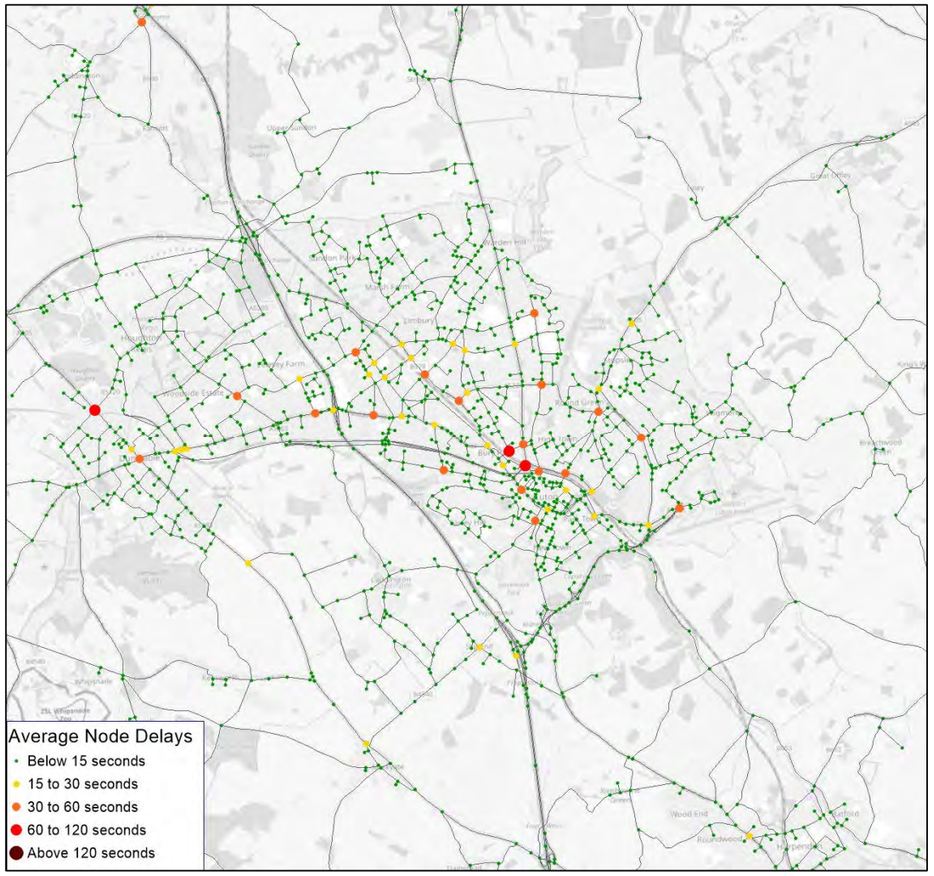
AM Peak Hour
(08:00 – 09:00)



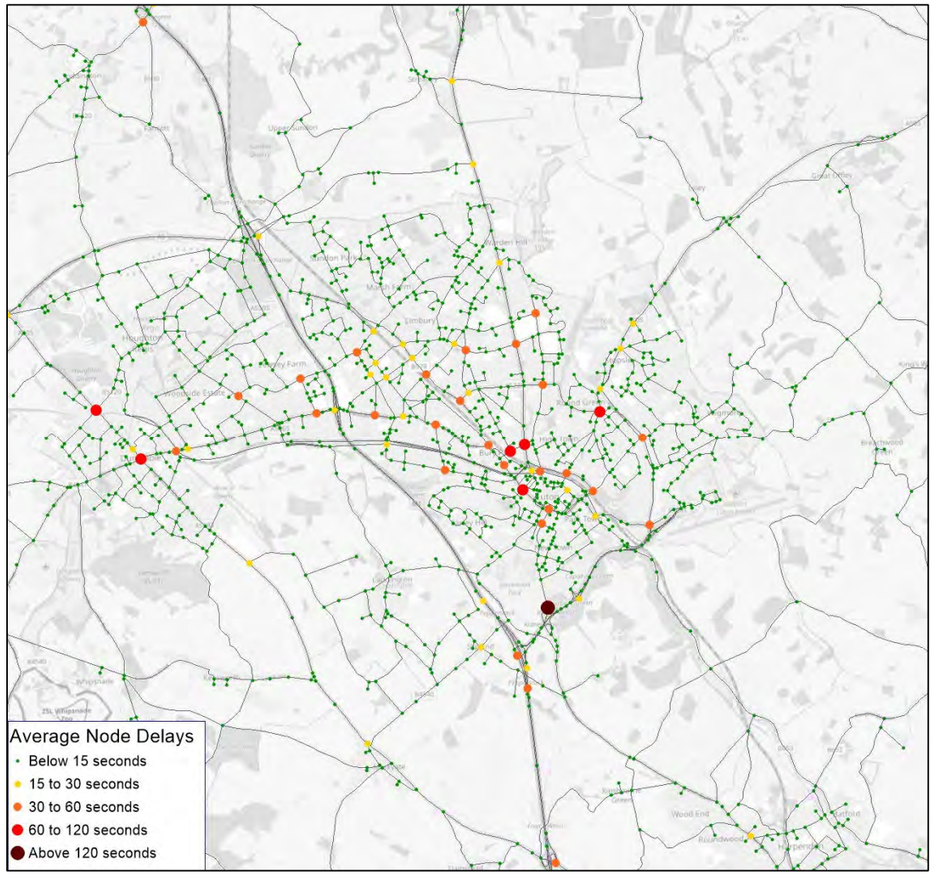


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



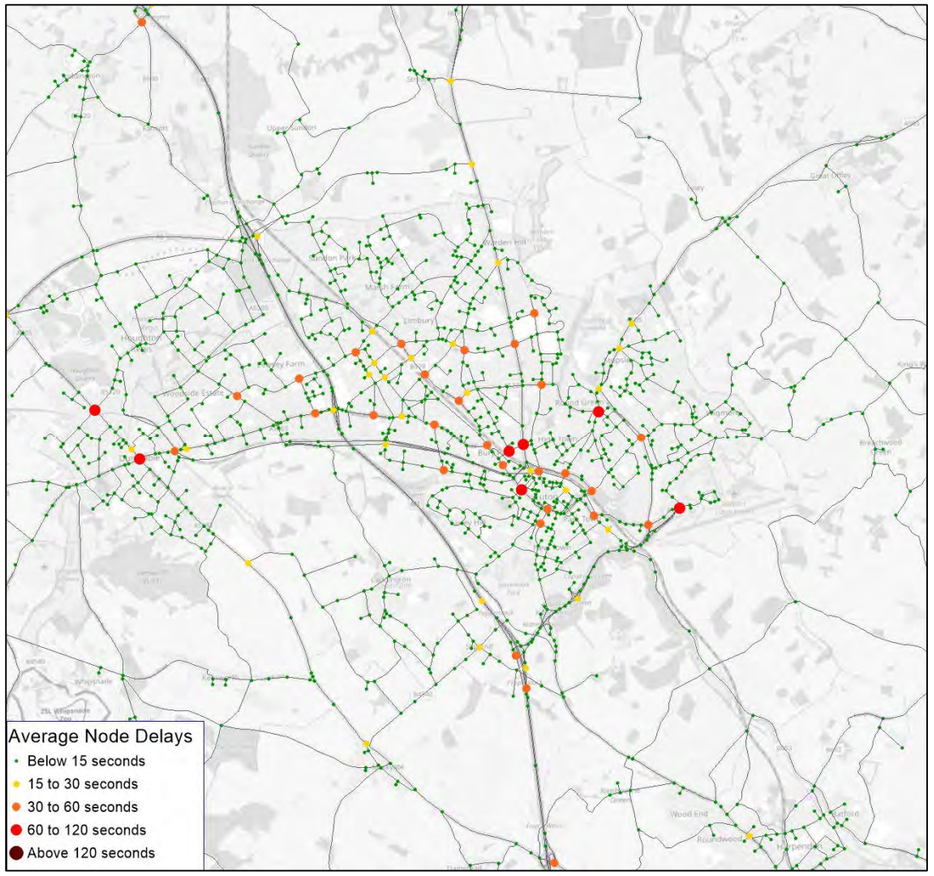
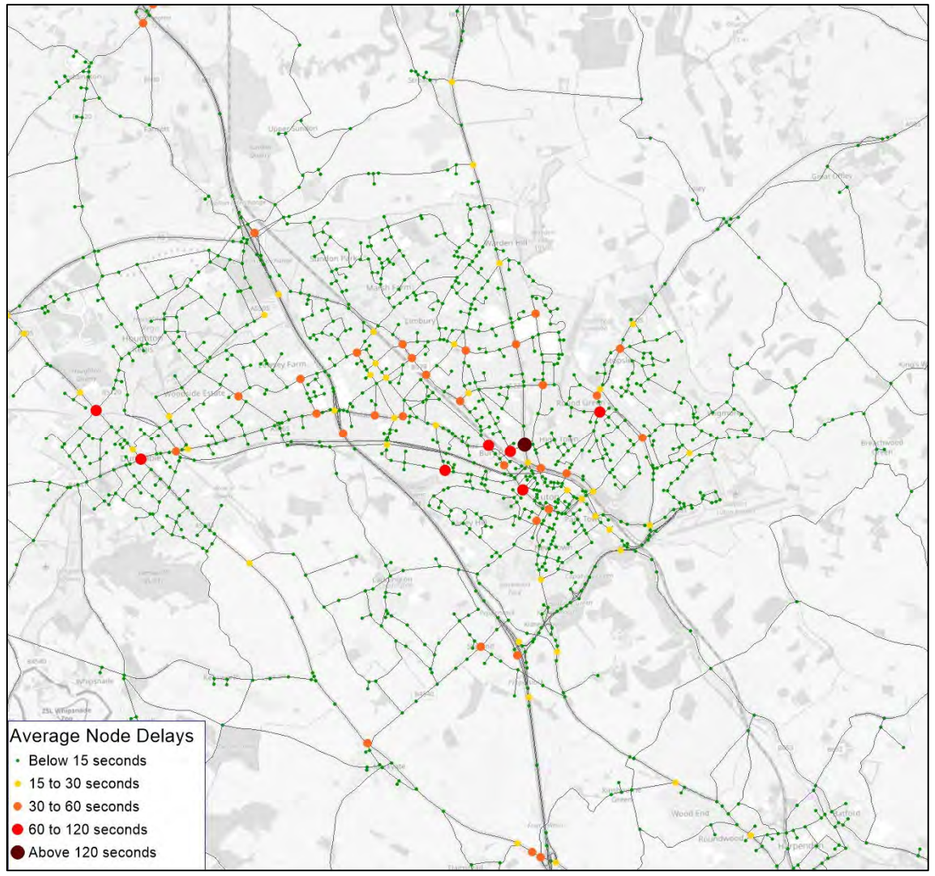


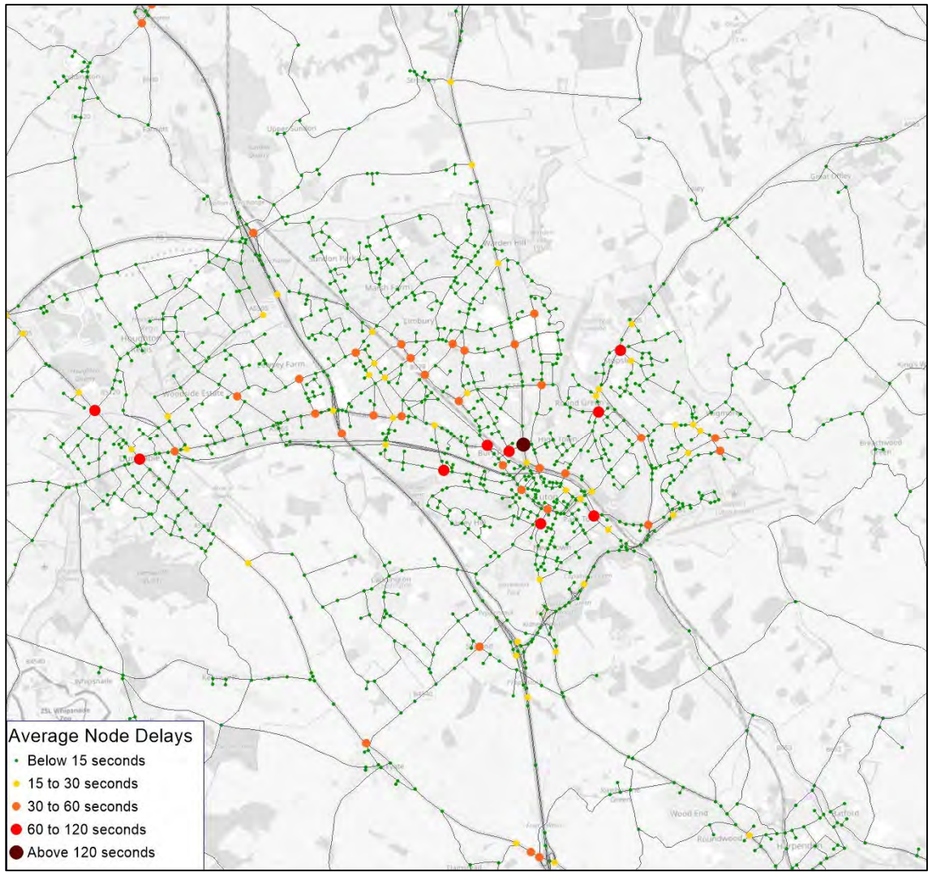
Figure C.6: Forecast Average Node Delays, TAG-based “Without” Expansion Forecasts, Luton Borough – 2039

“Without Expansion

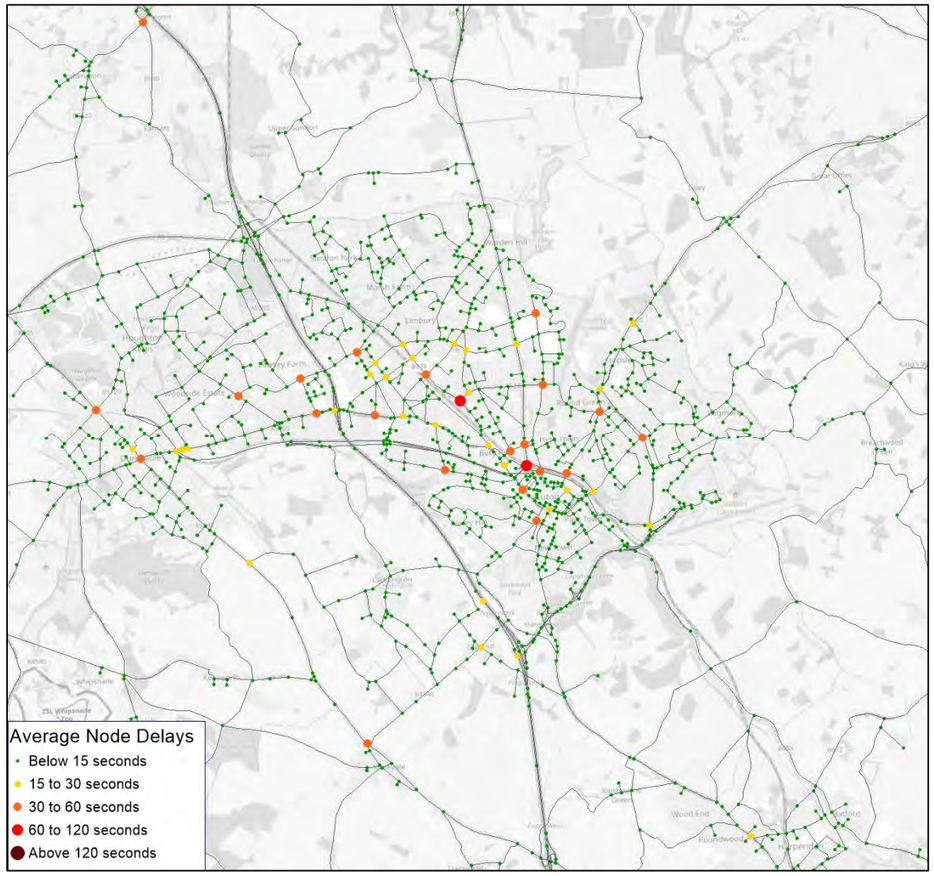
“With” Expansion

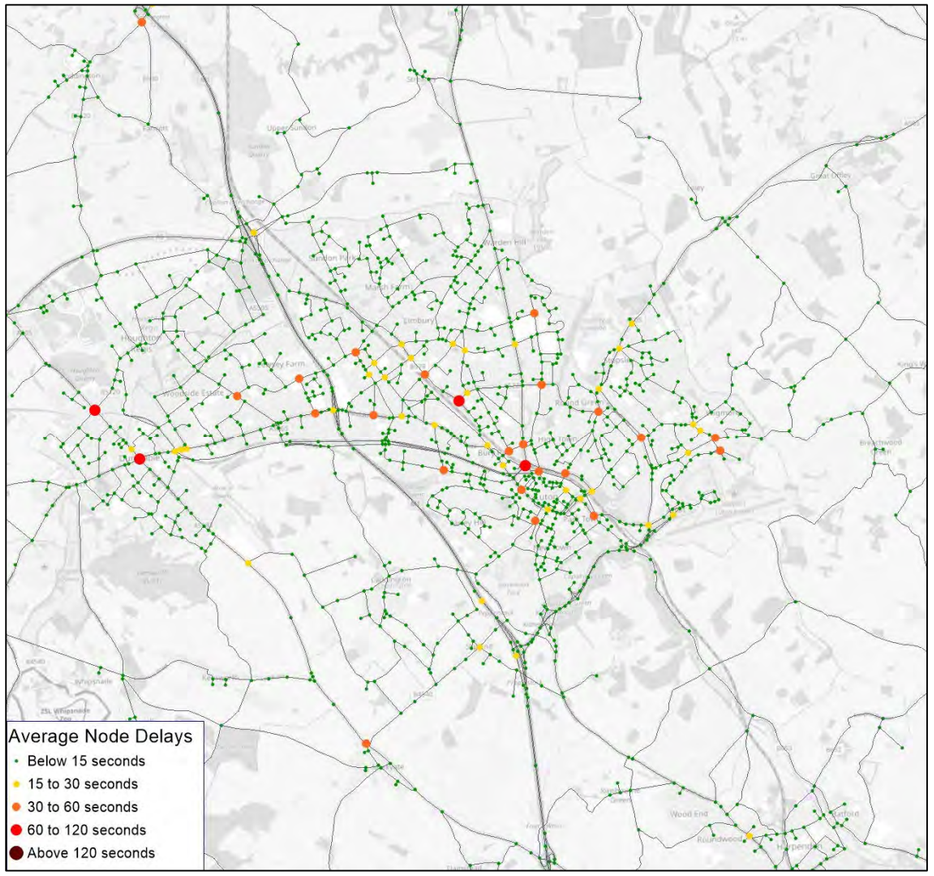
AM Peak Hour
(08:00 – 09:00)



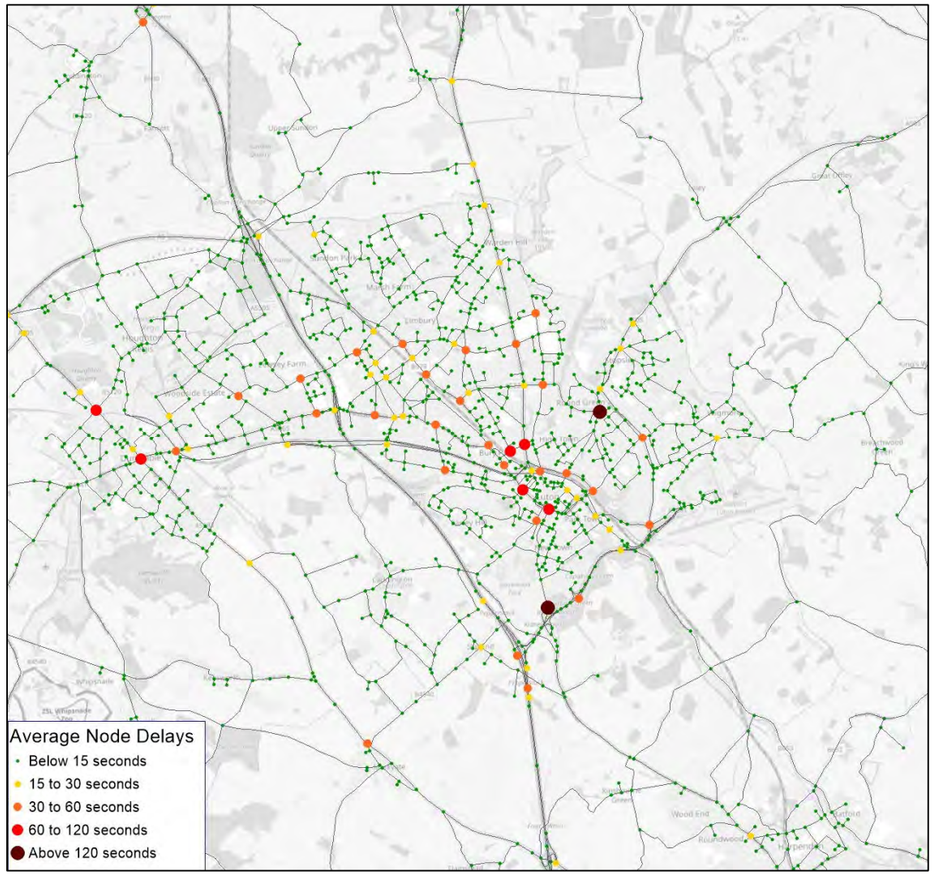


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



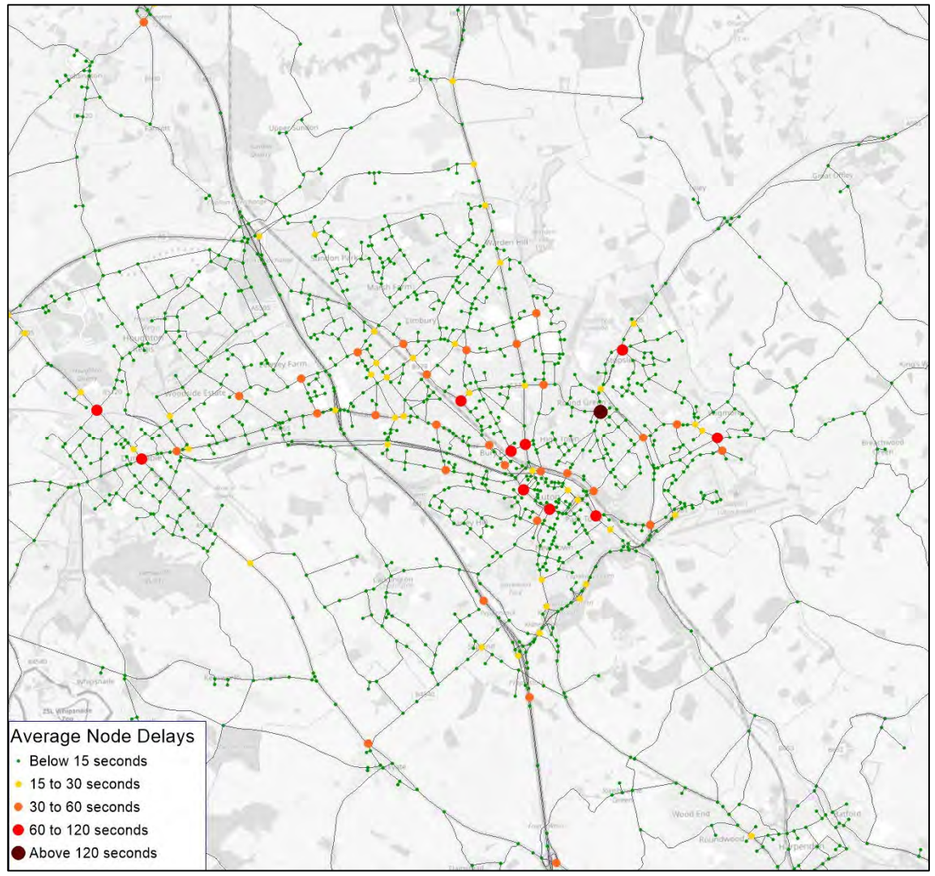
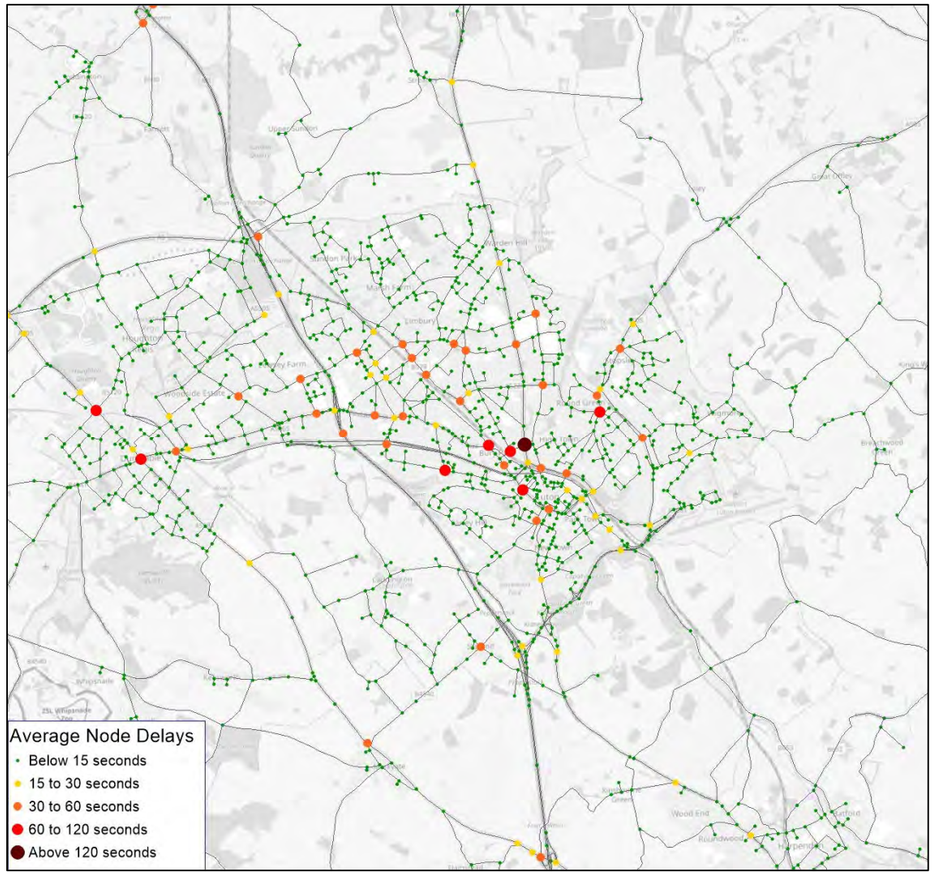


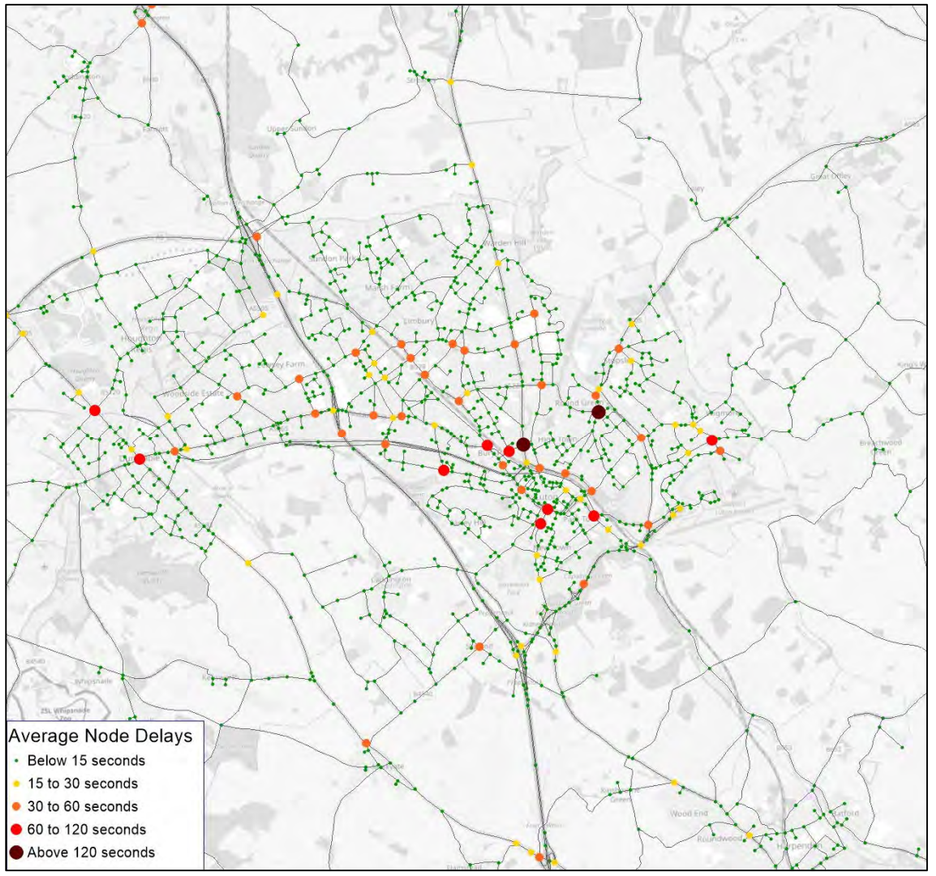
Figure C.7: Forecast Average Node Delays, TAG-based “Without” Expansion Forecasts, Luton Borough – 2043

AM Peak Hour
(08:00 – 09:00)

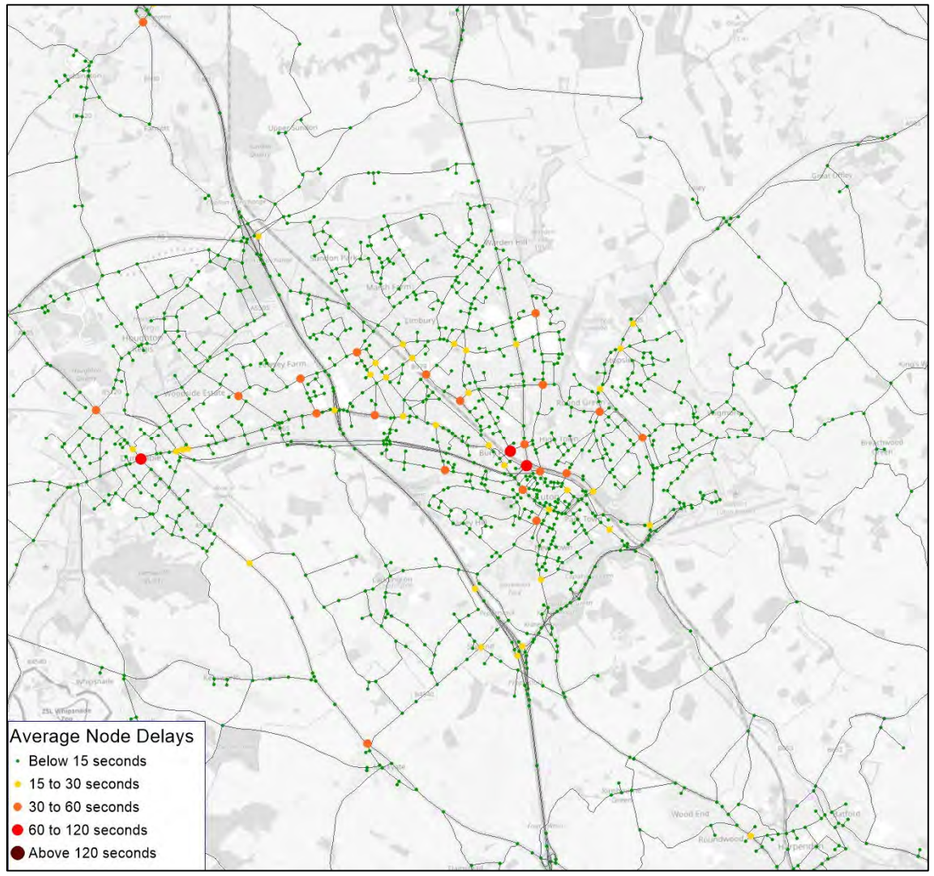
“Without Expansion

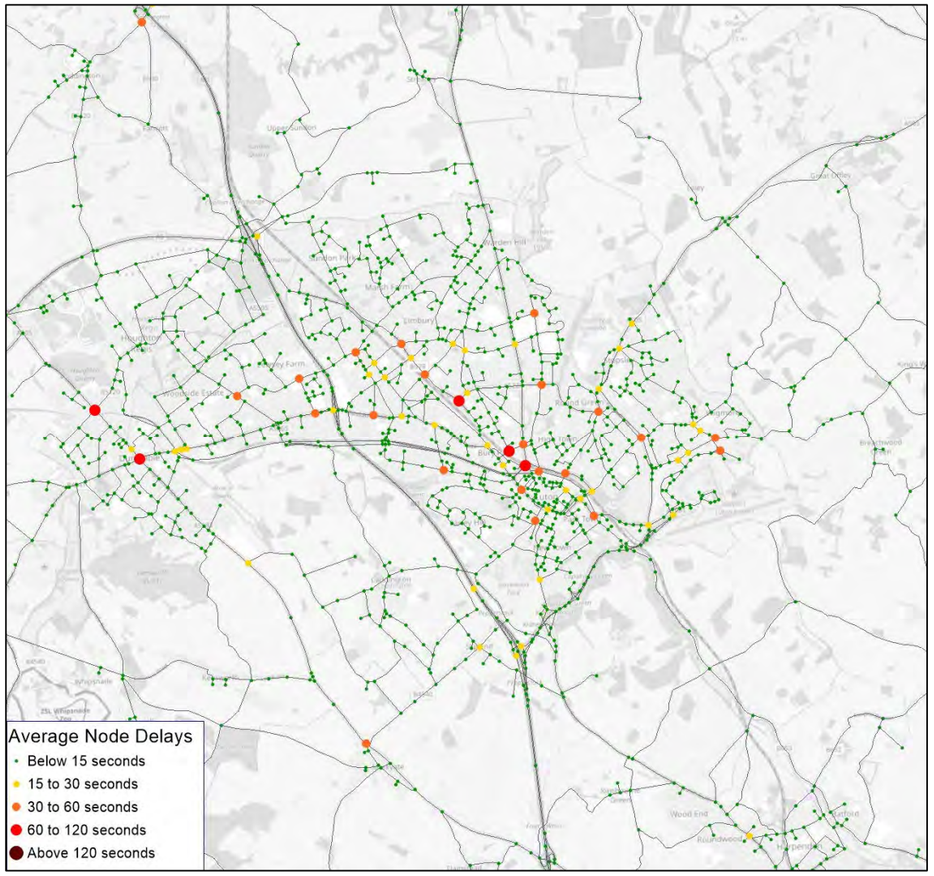


“With” Expansion

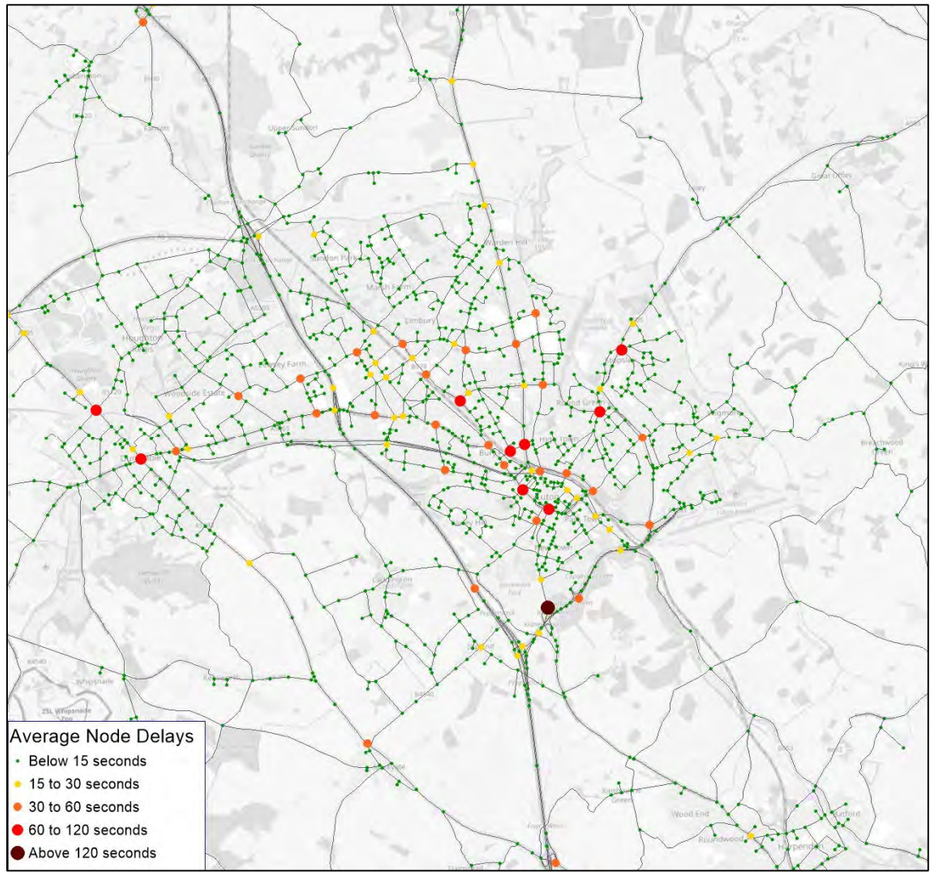


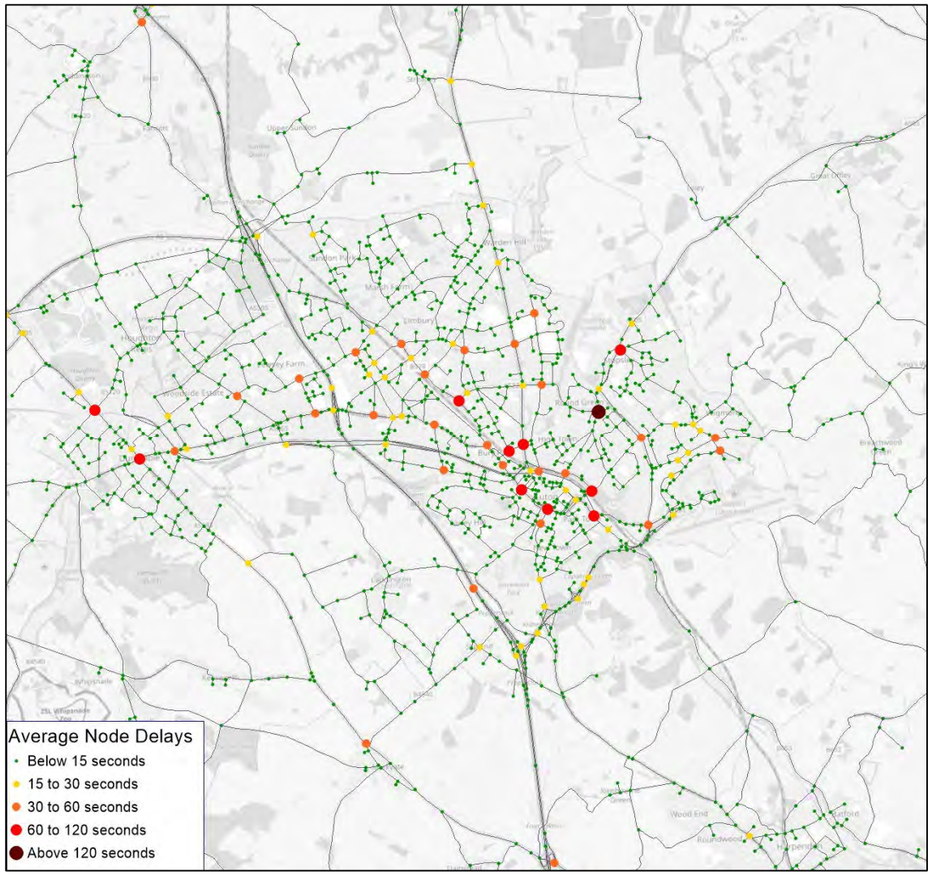
Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



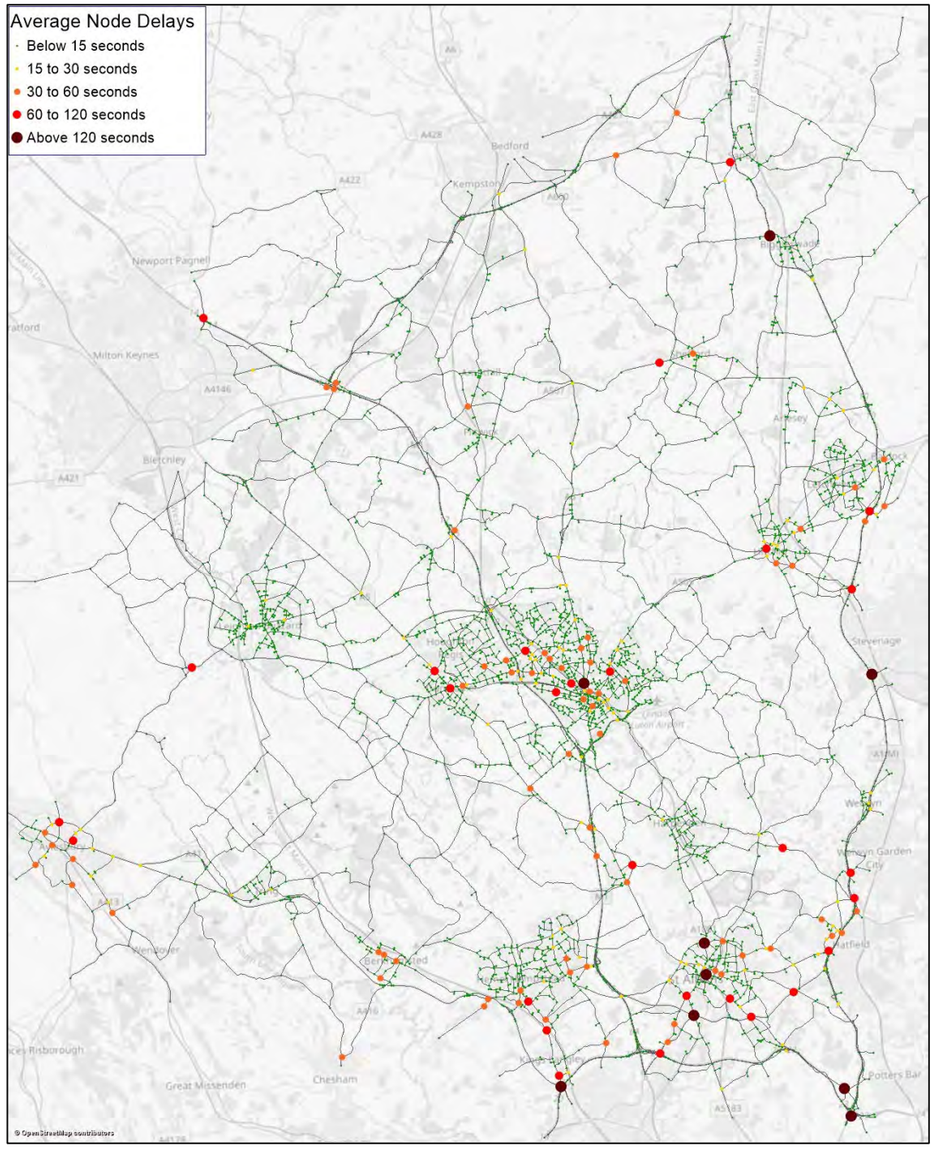


Appendix D - Local Plan Alternative Scenario Average Node Delays

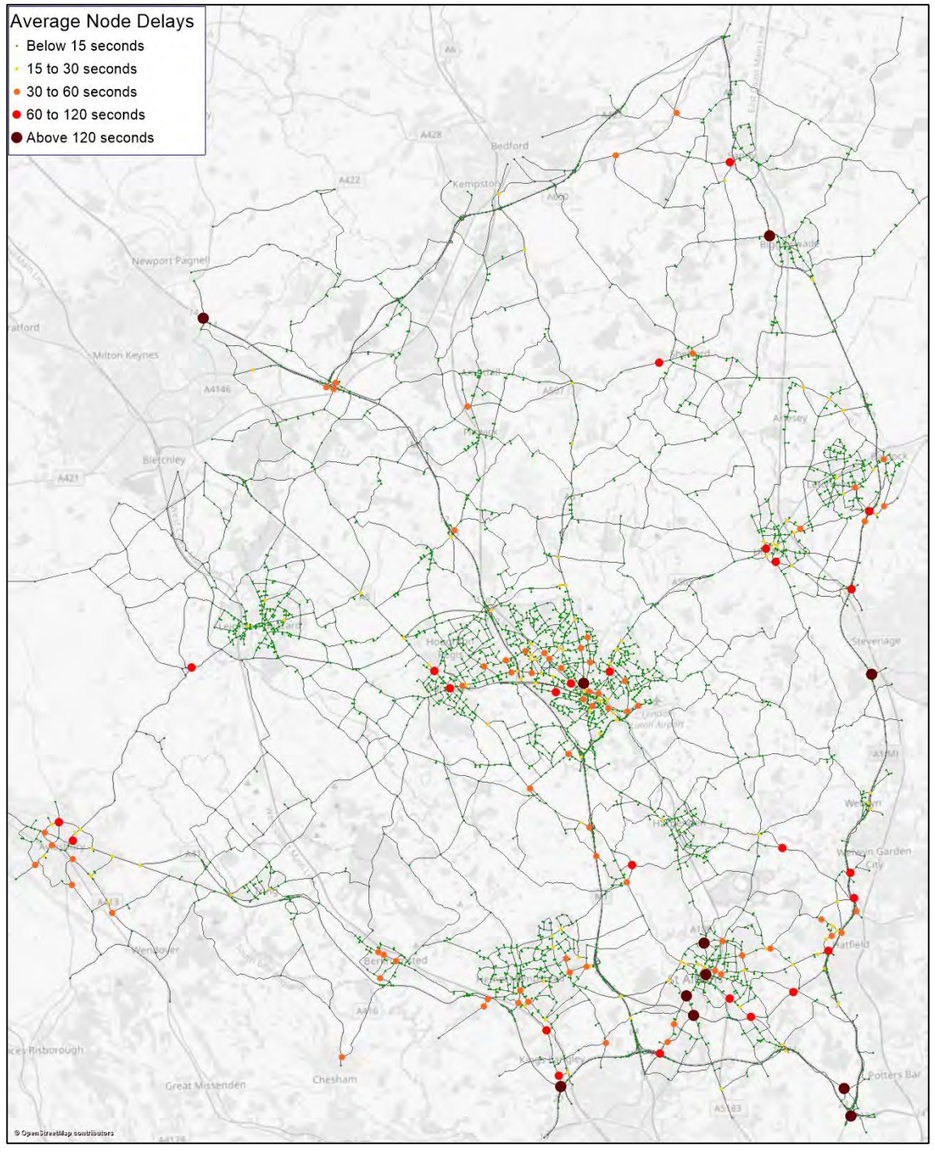
Figure D.1: Forecast Average Node Delays, Local Plan Alternative Scenario Forecasts, Simulation Network – 2027

AM Peak Hour
(08:00 – 09:00)

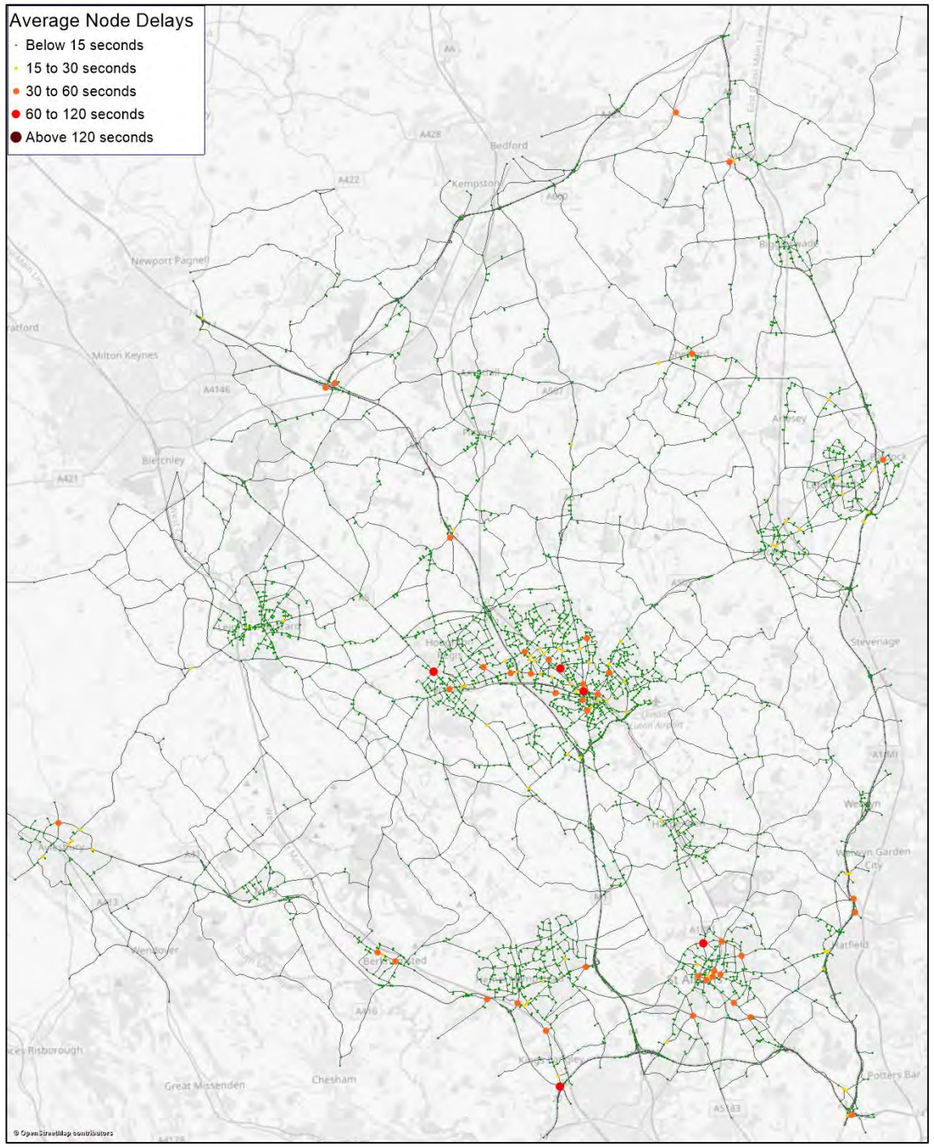
"Without Expansion

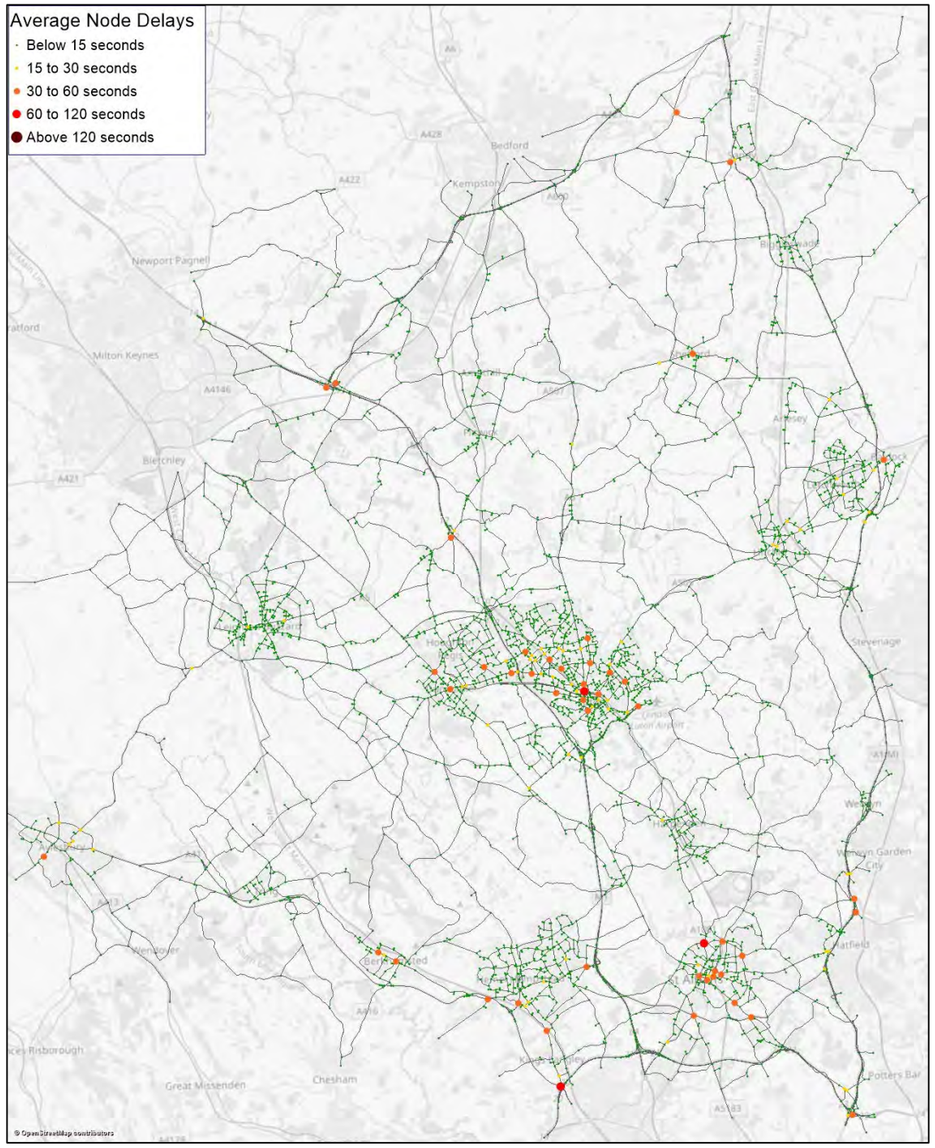


"With" Expansion

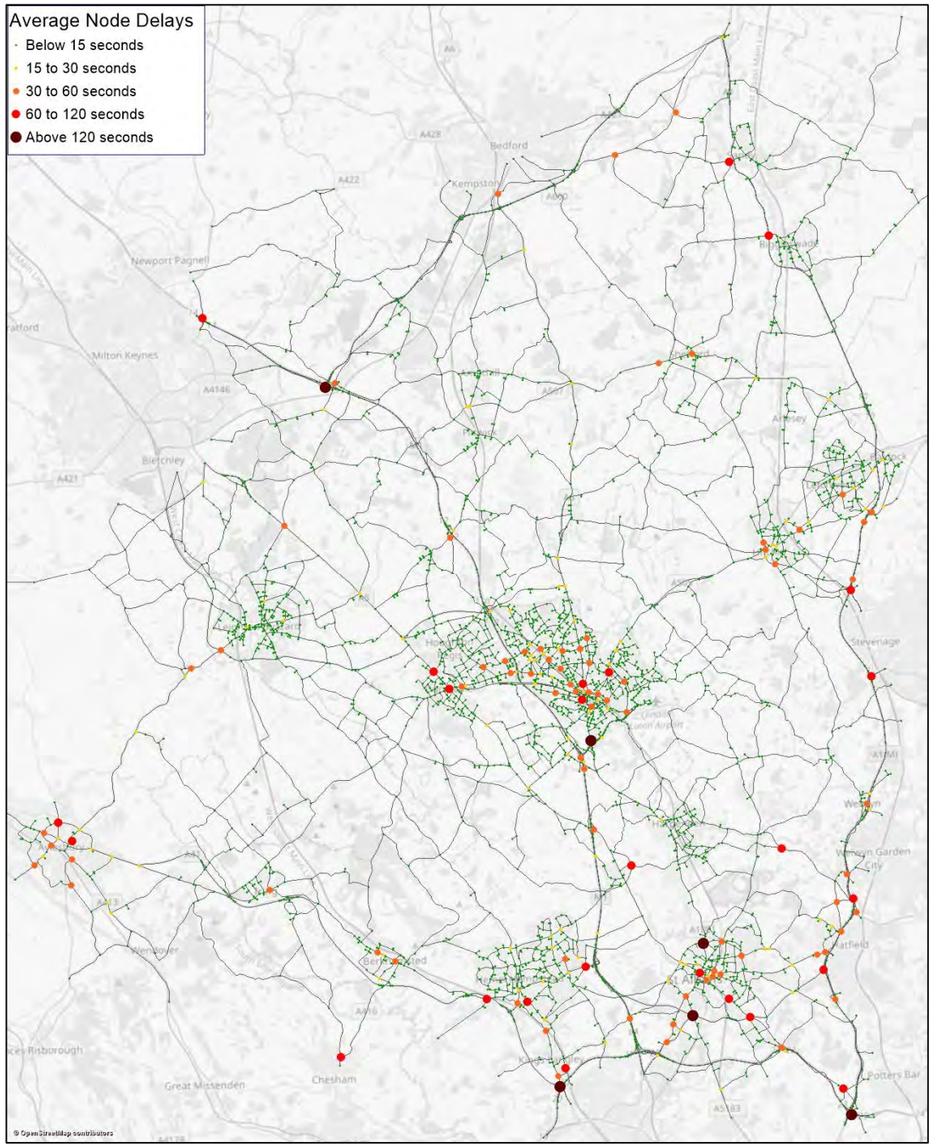


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



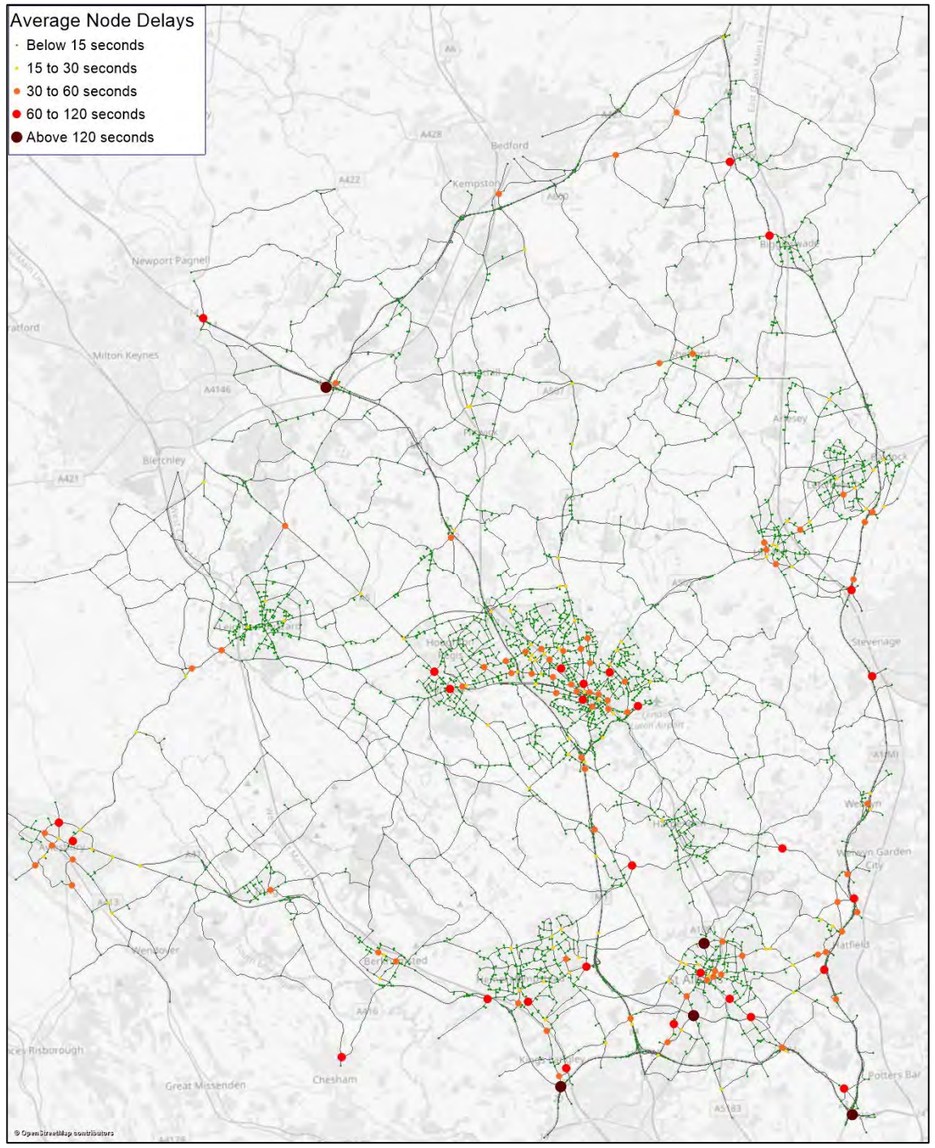
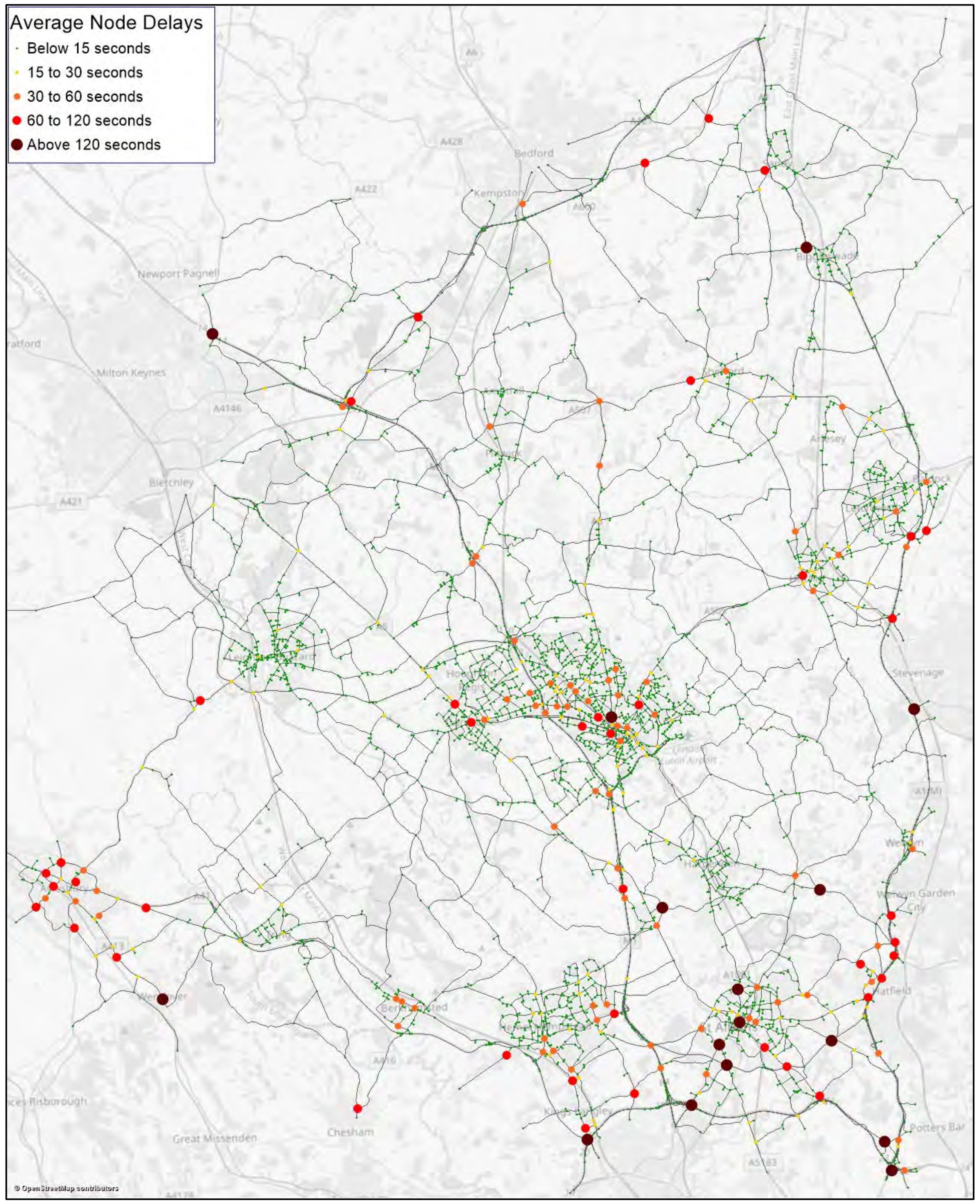


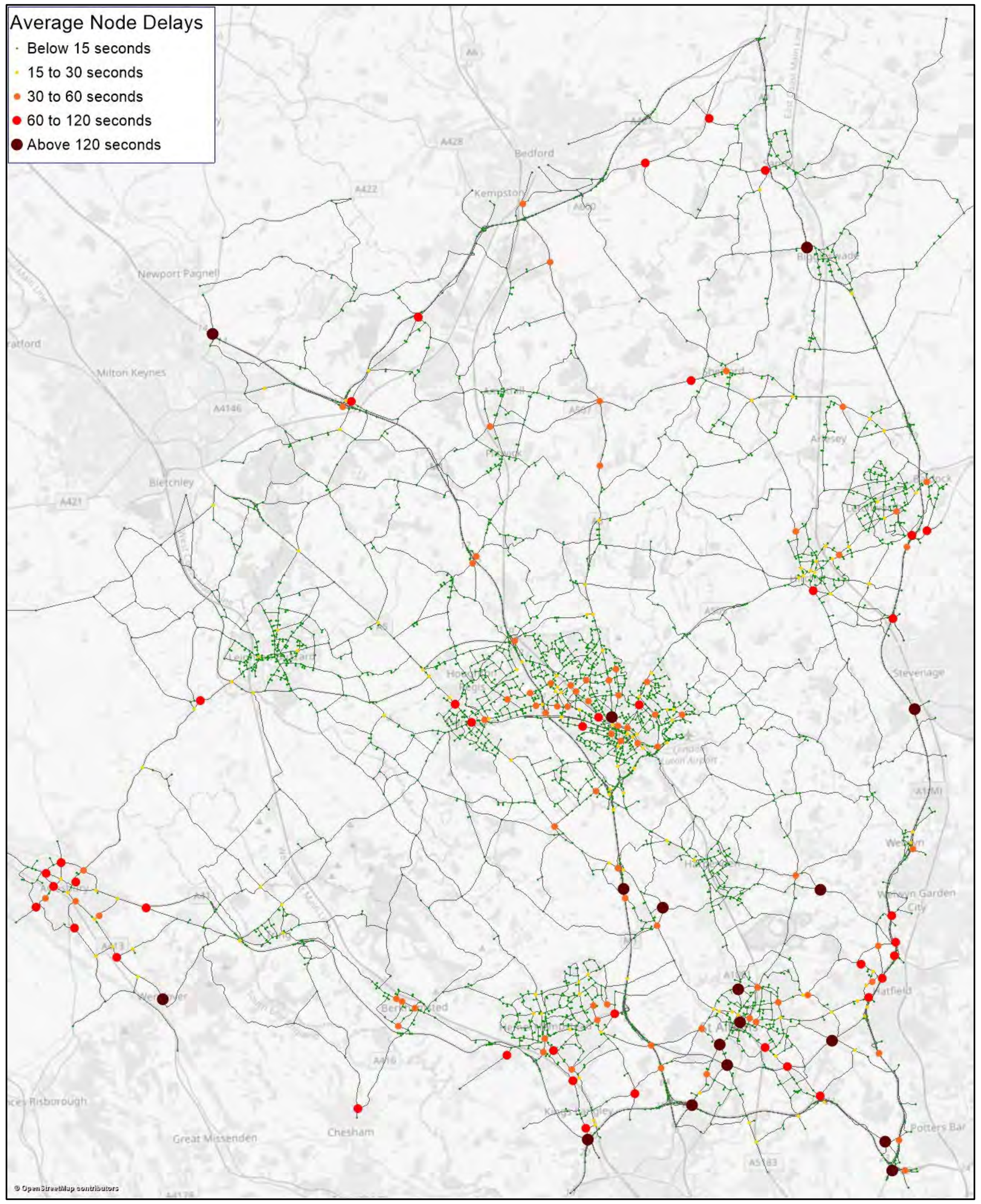
Figure D.2: Forecast Average Node Delays, Local Plan Alternative Scenario Forecasts, Simulation Network – 2039

AM Peak Hour
(08:00 – 09:00)

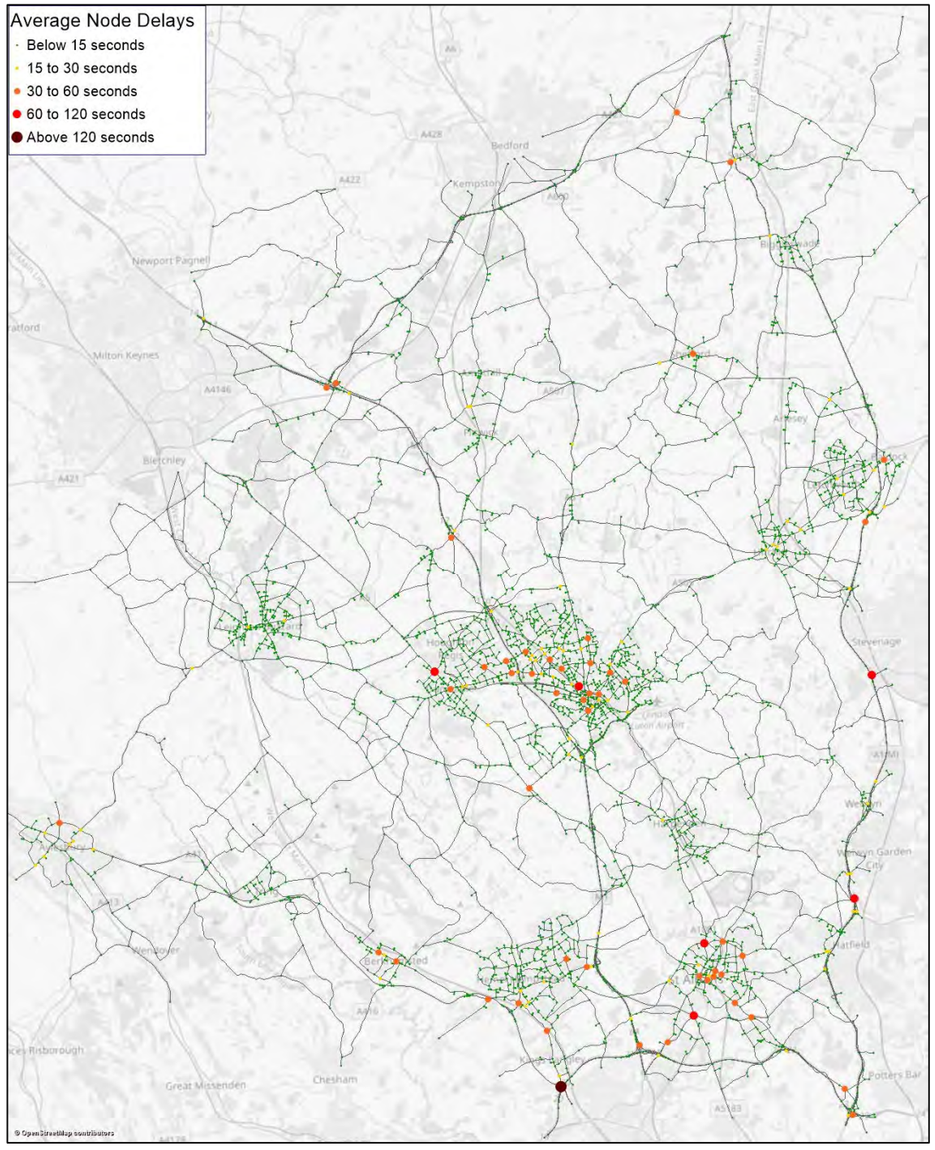
“Without Expansion”

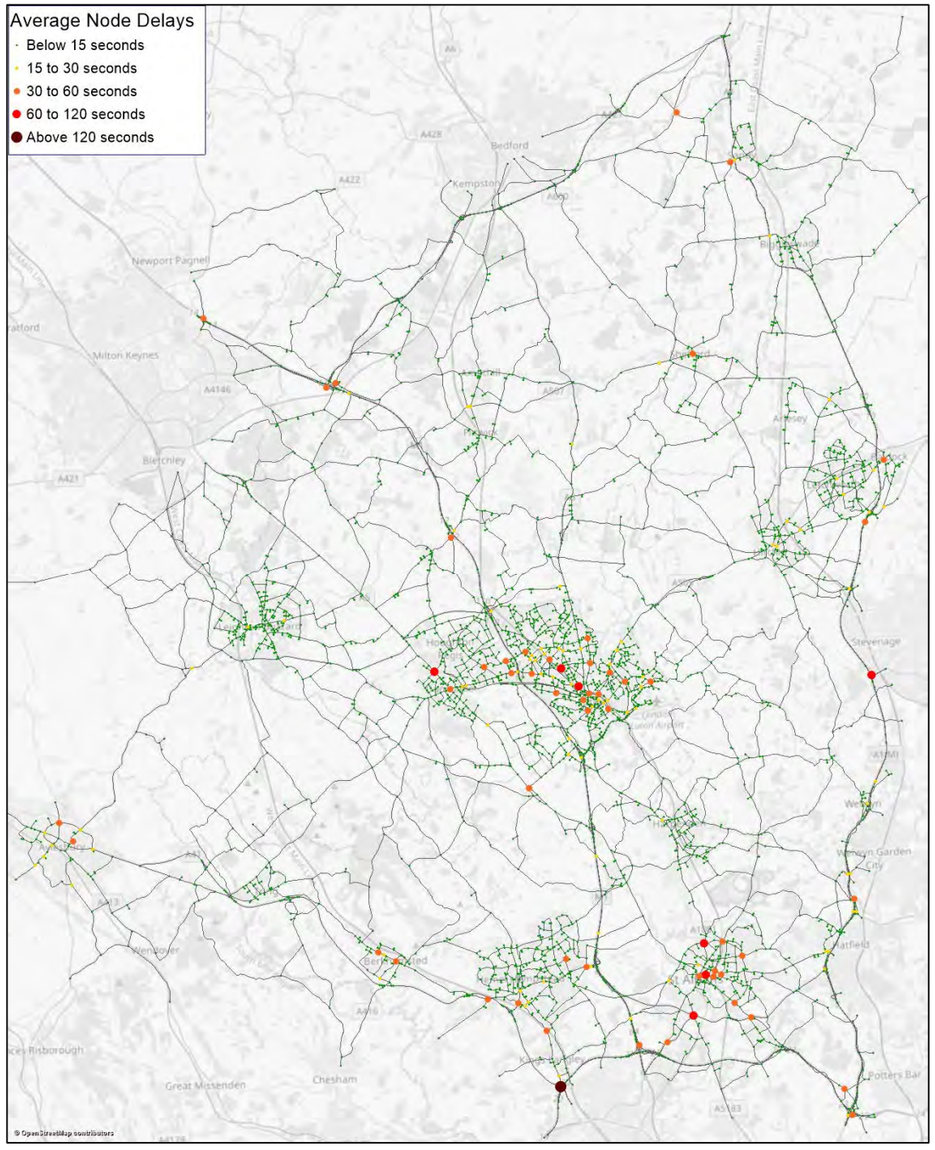


“With” Expansion

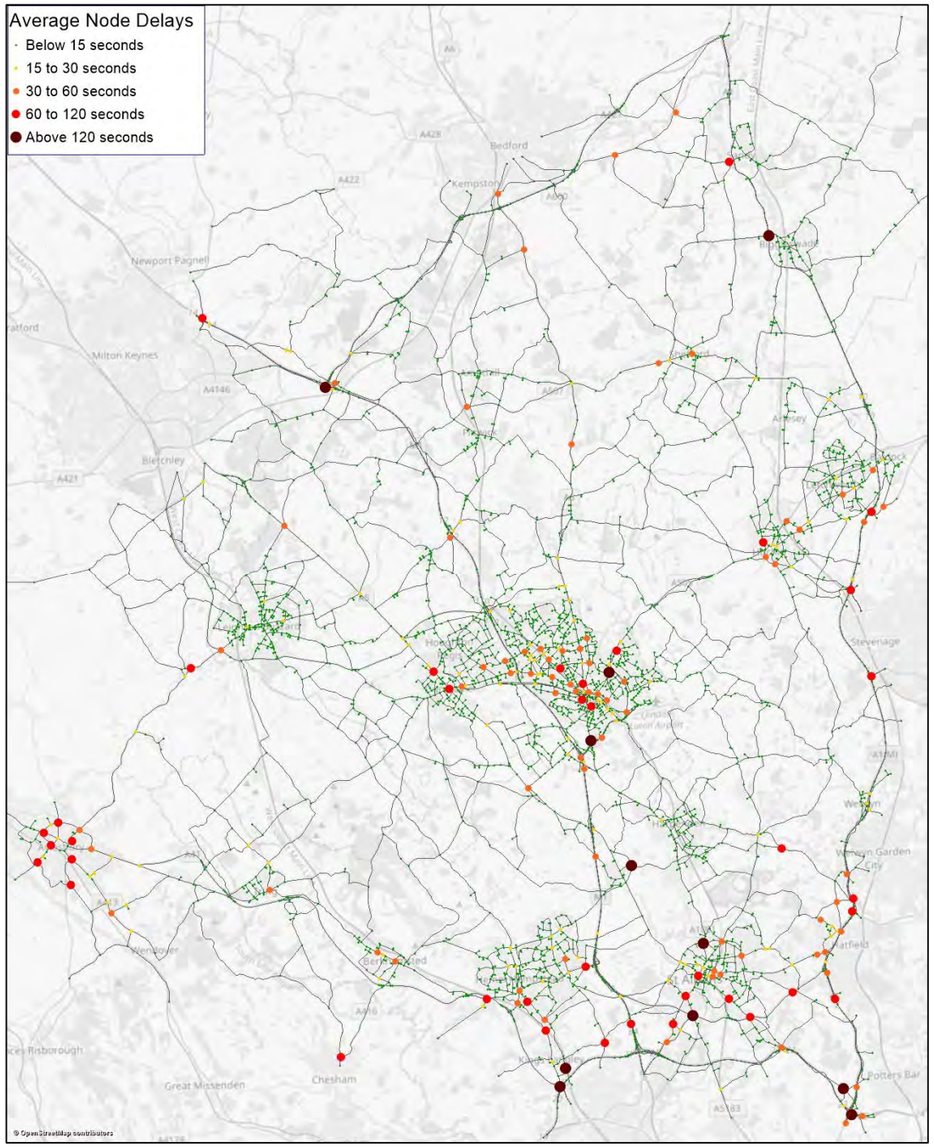


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



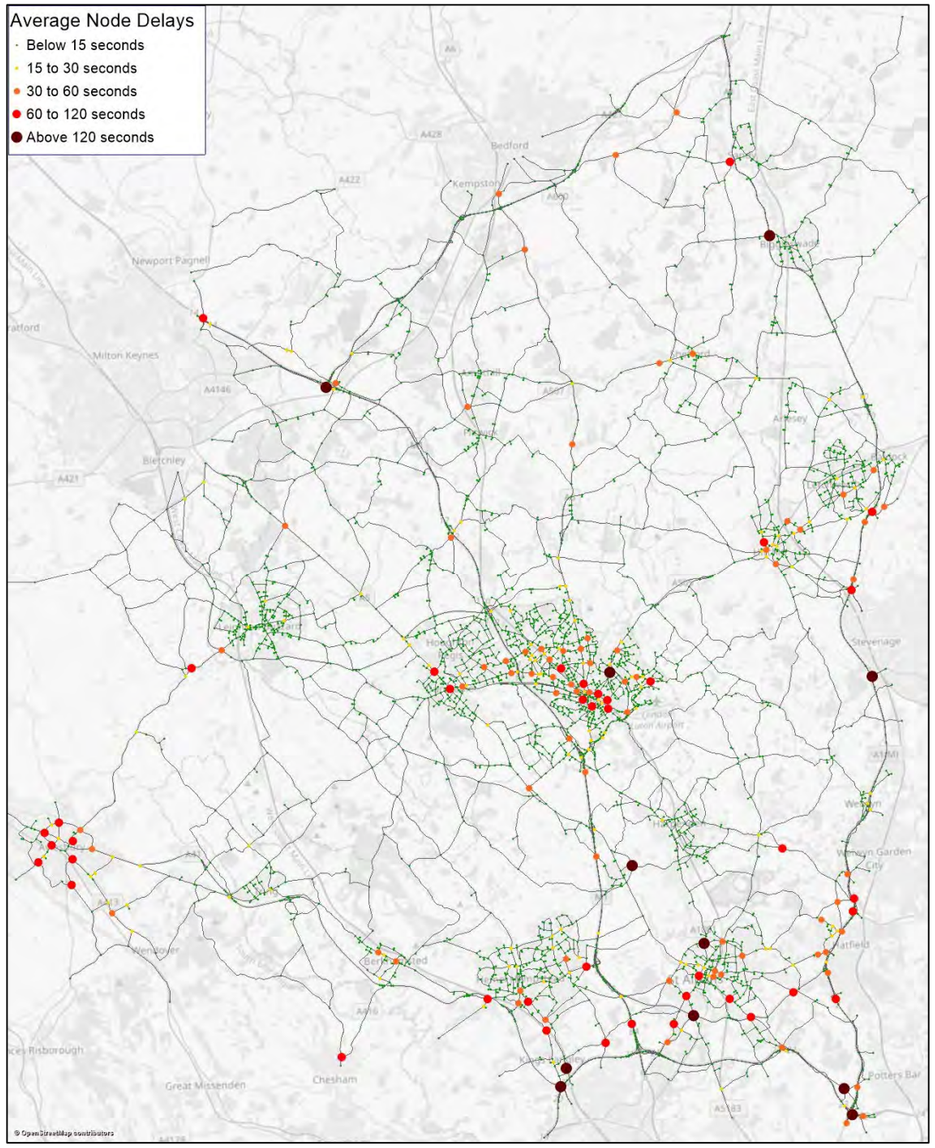
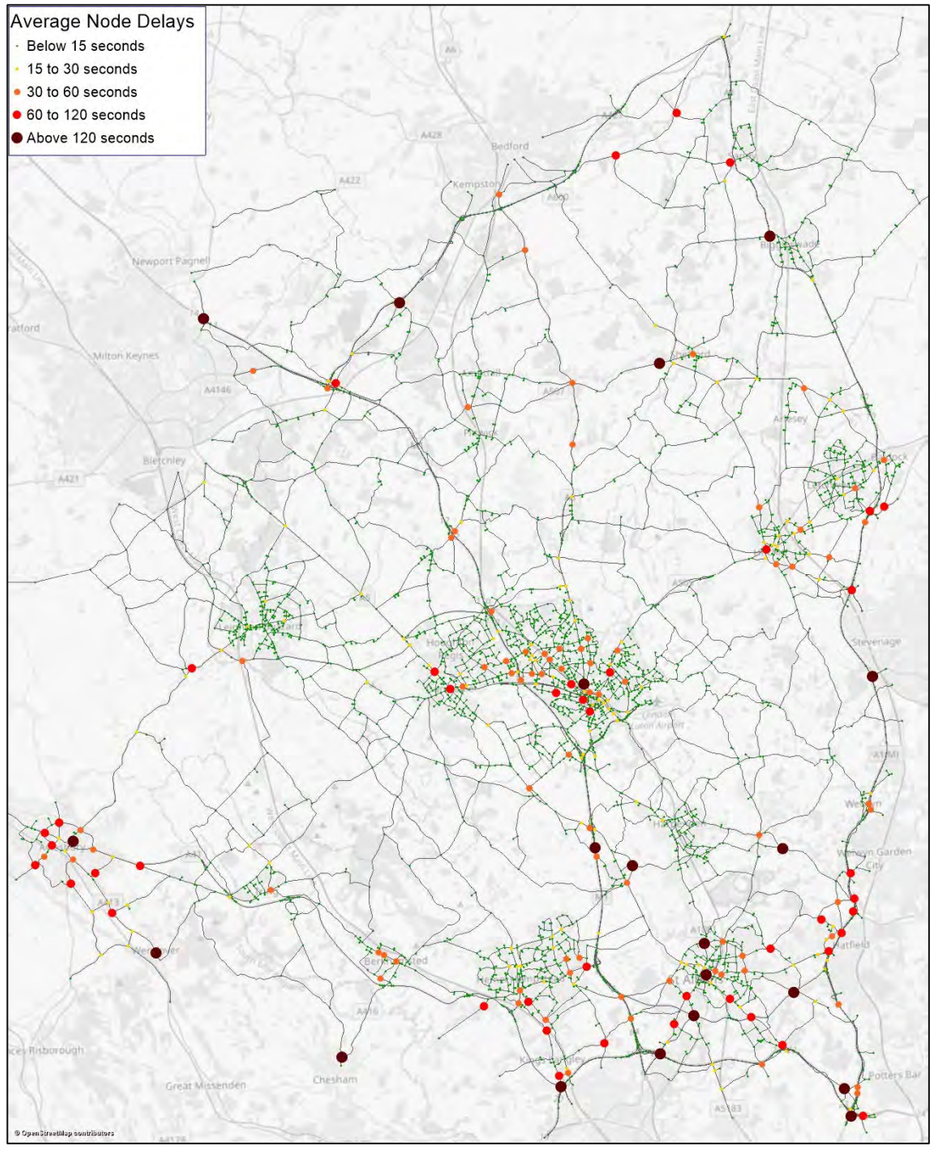


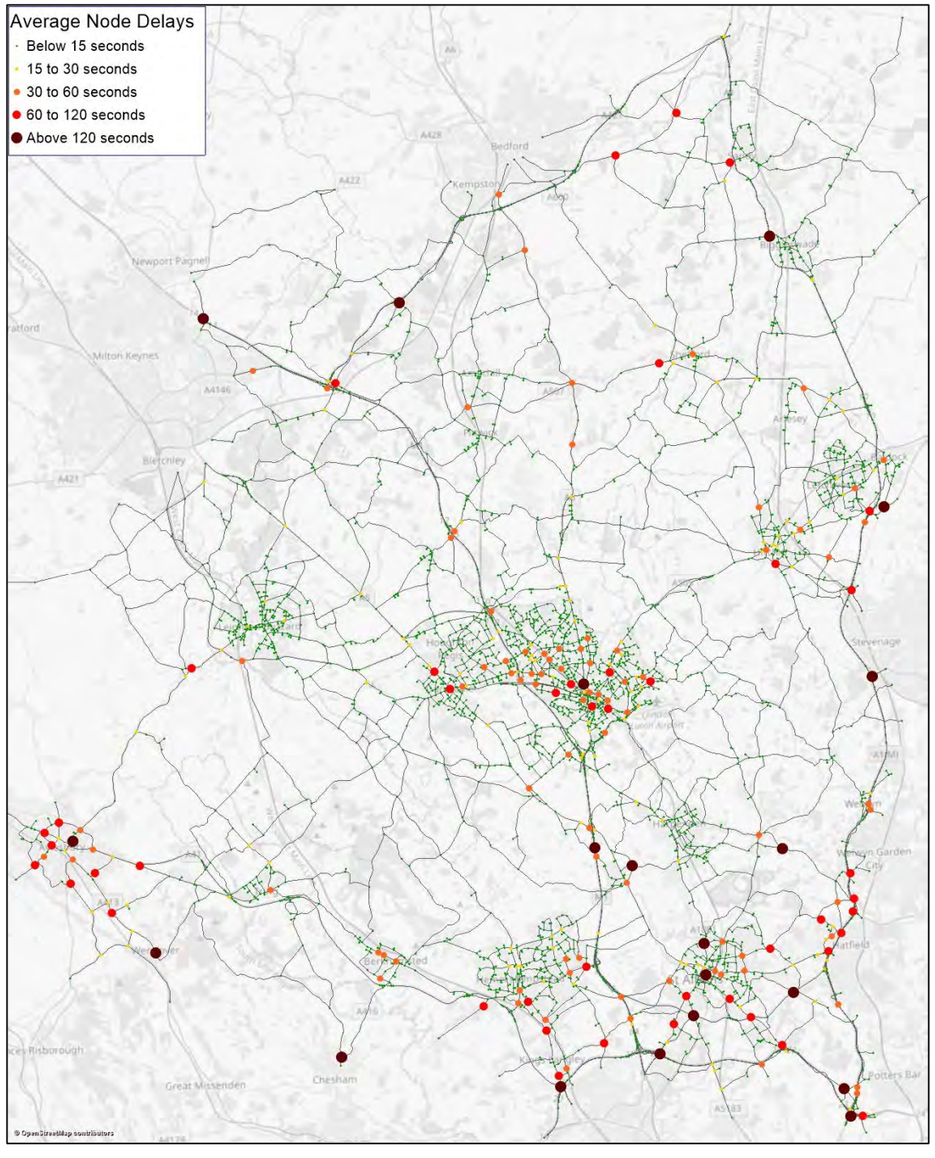
Figure D.3: Forecast Average Node Delays, Local Plan Alternative Scenario Forecasts, Simulation Network – 2043

AM Peak Hour
(08:00 – 09:00)

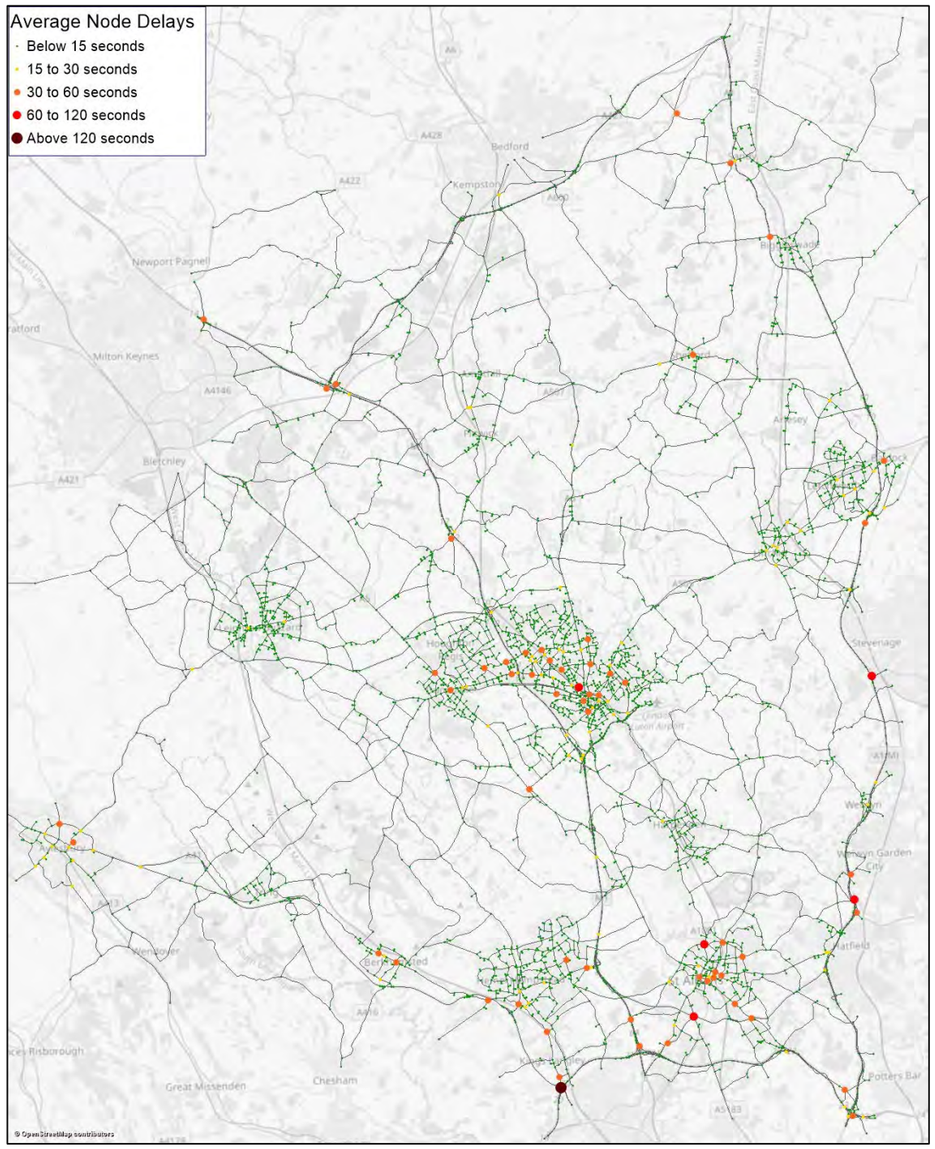
"Without Expansion

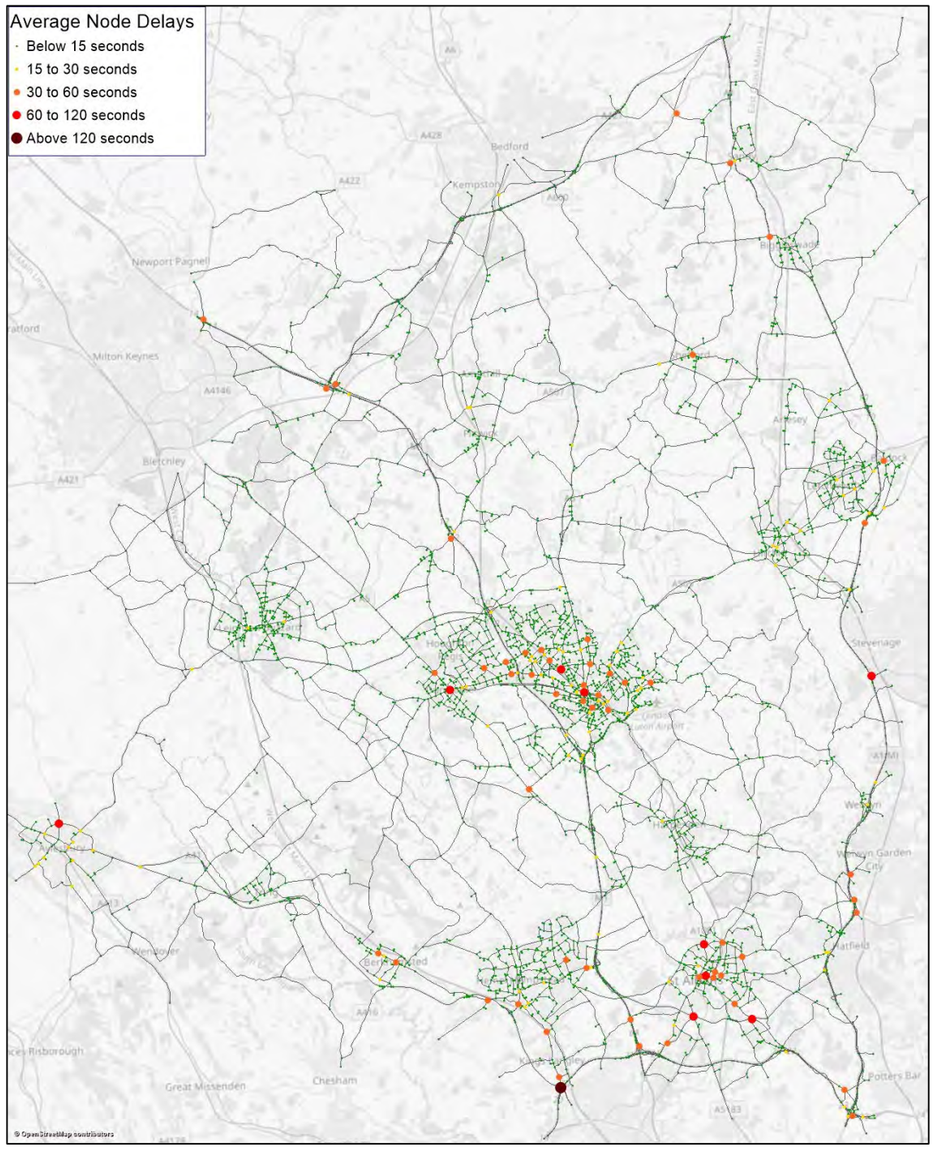


"With" Expansion

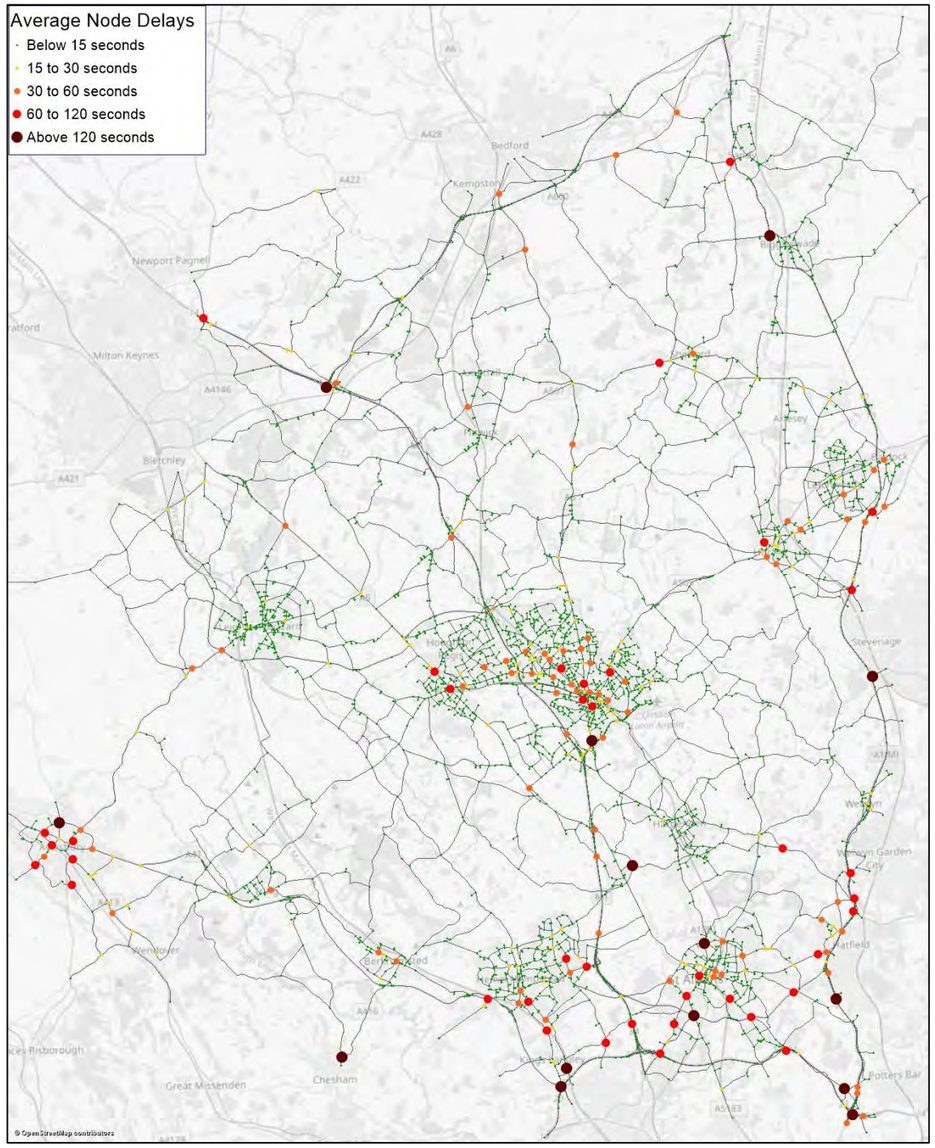


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



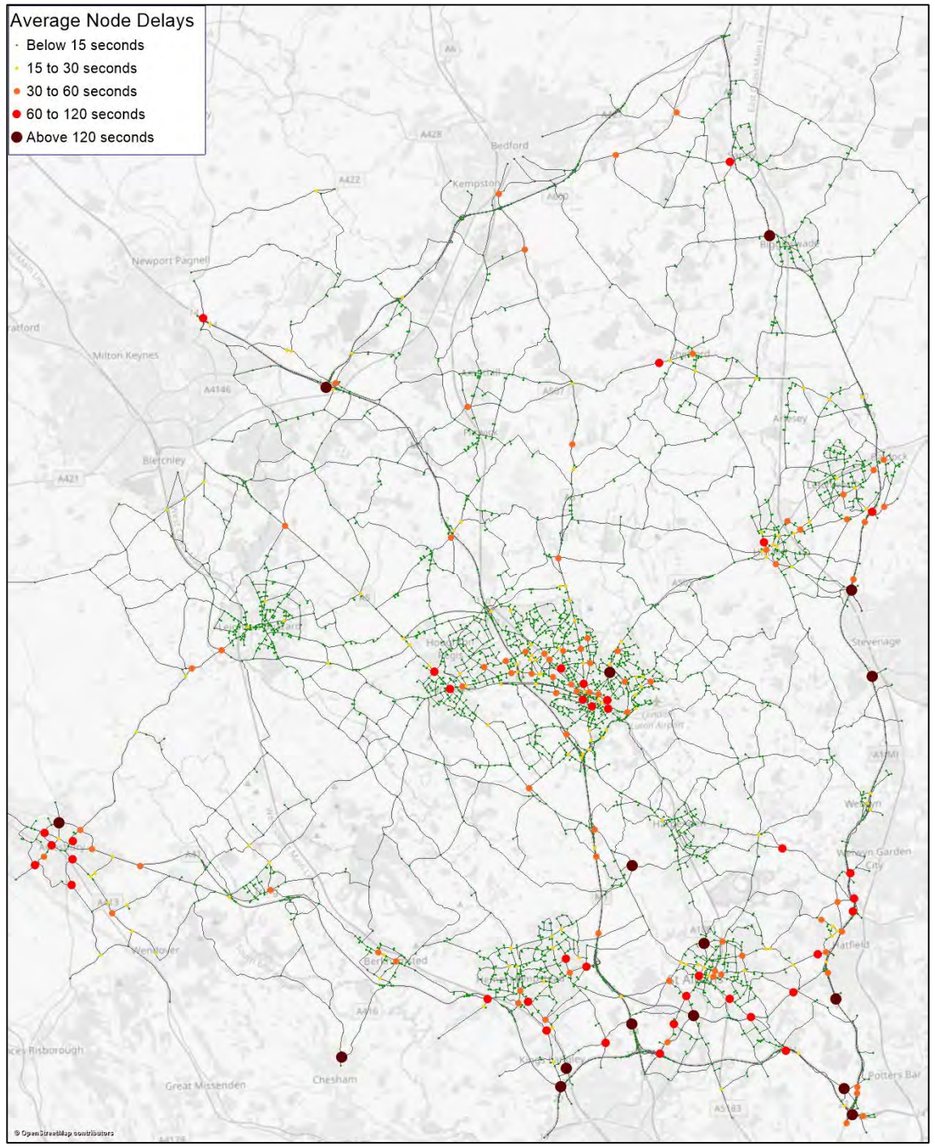
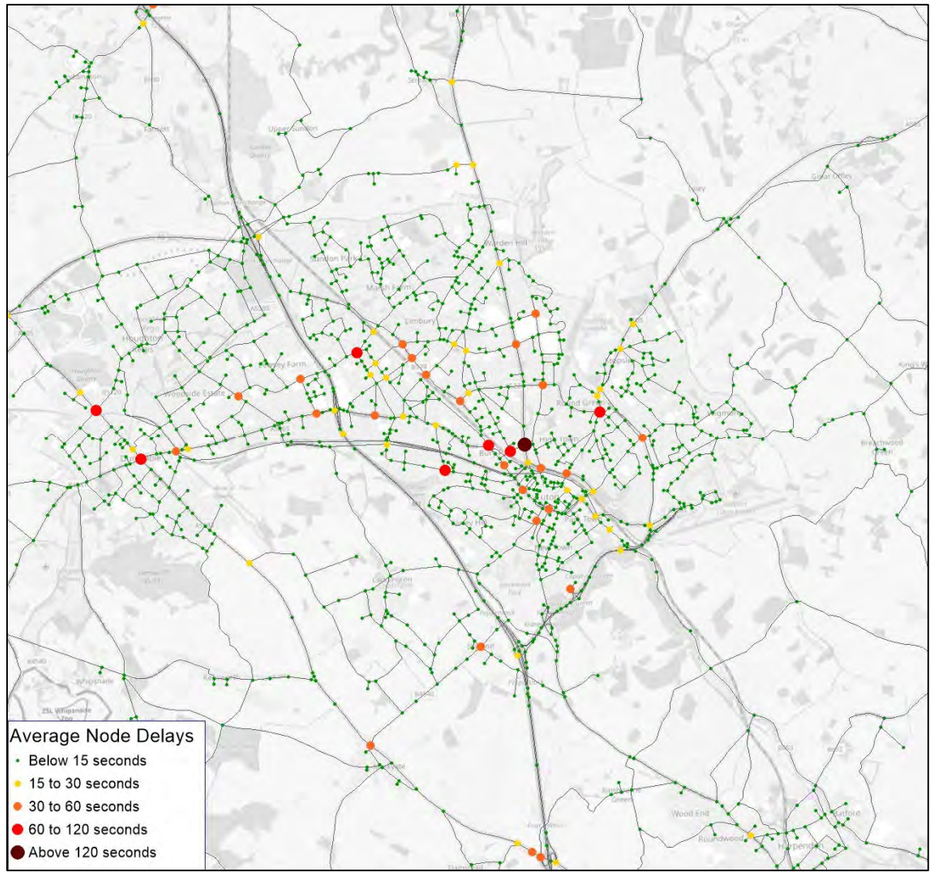


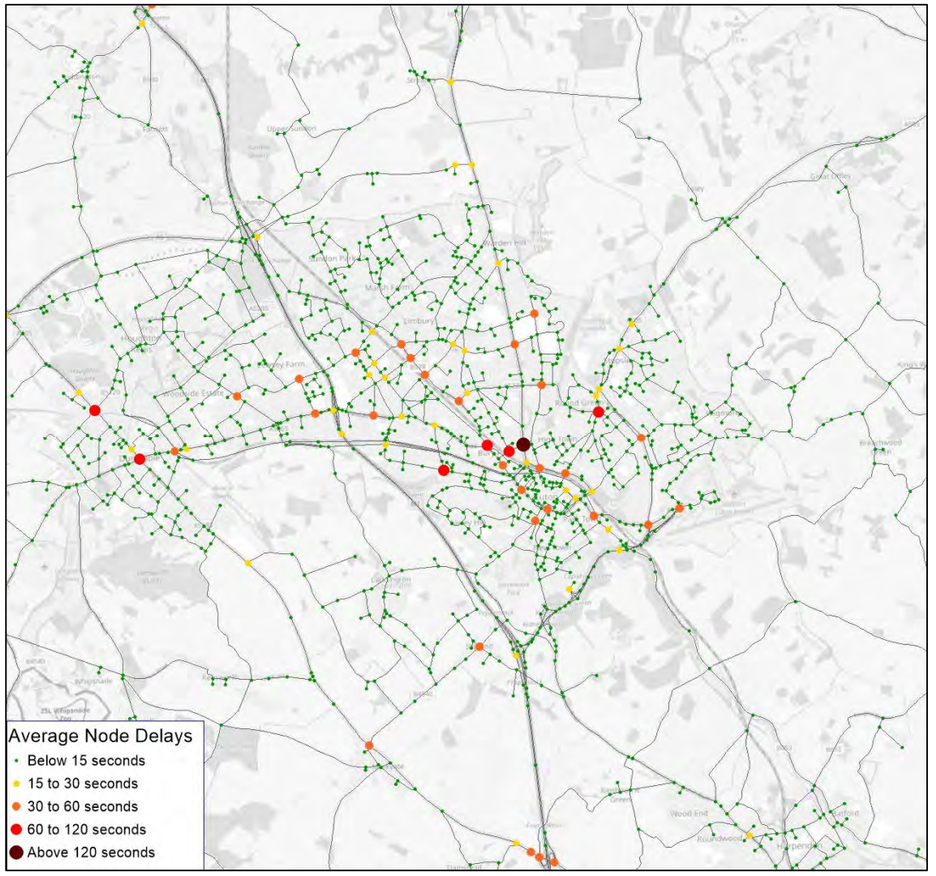
Figure D.4: Forecast Average Node Delays, Local Plan Alternative Scenario Forecasts, Luton Borough – 2027

AM Peak Hour (08:00 – 09:00)

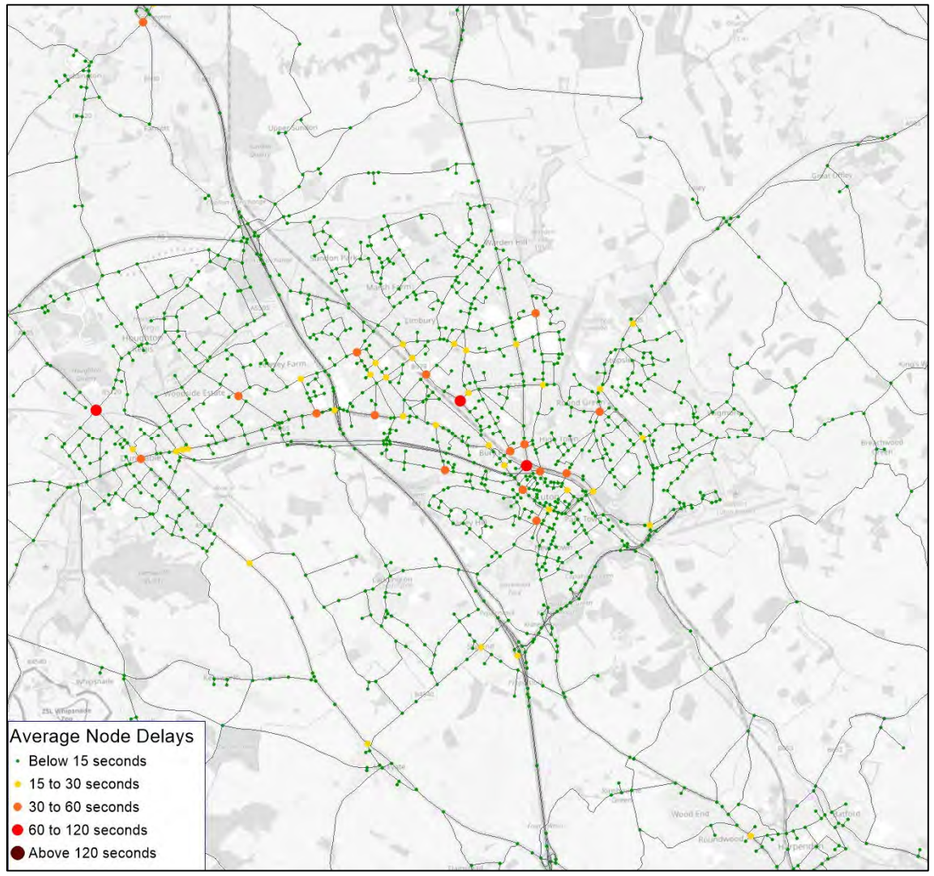
"Without Expansion

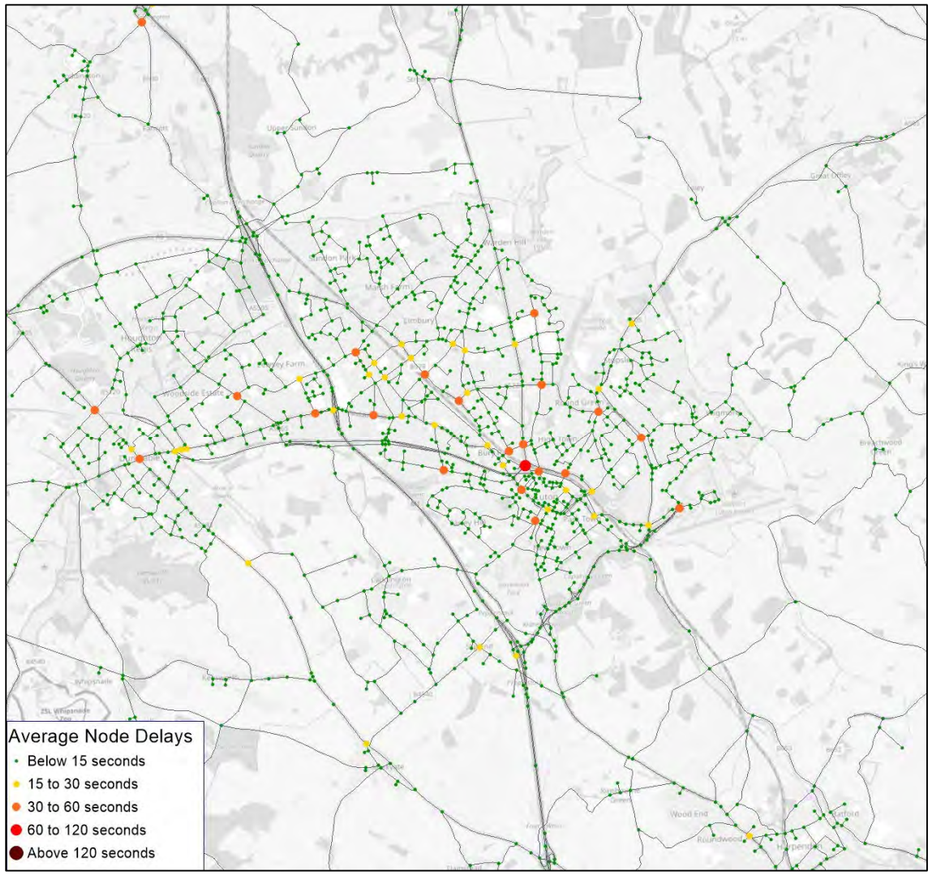


"With" Expansion

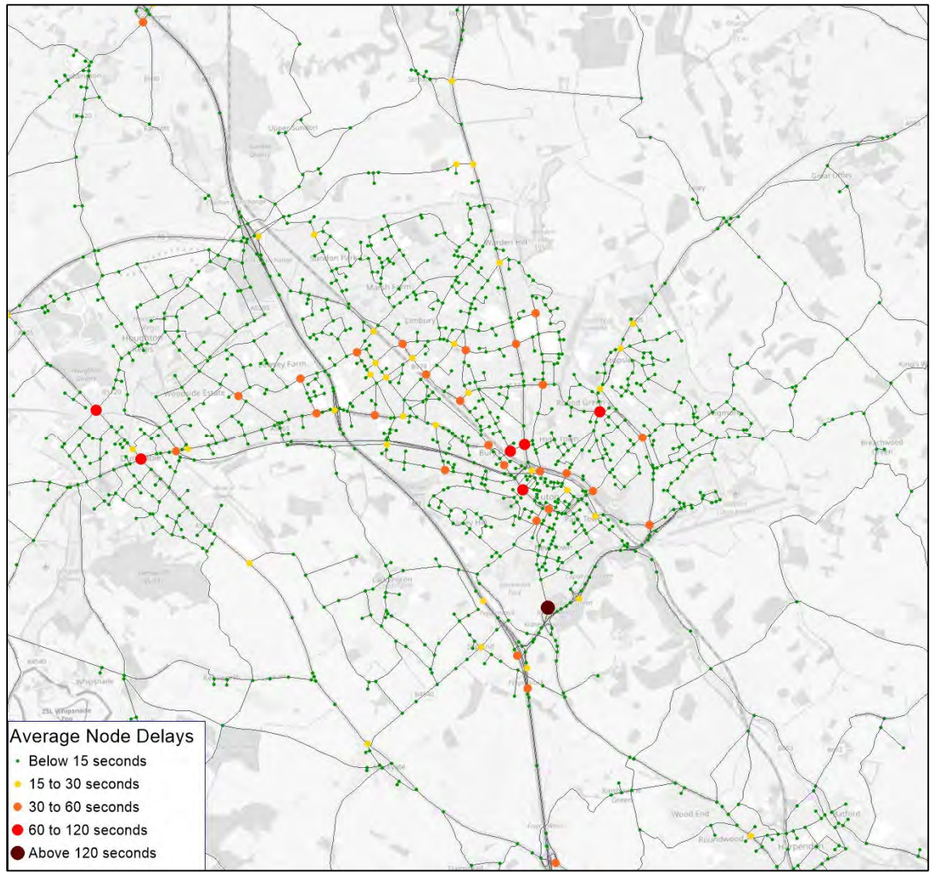


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



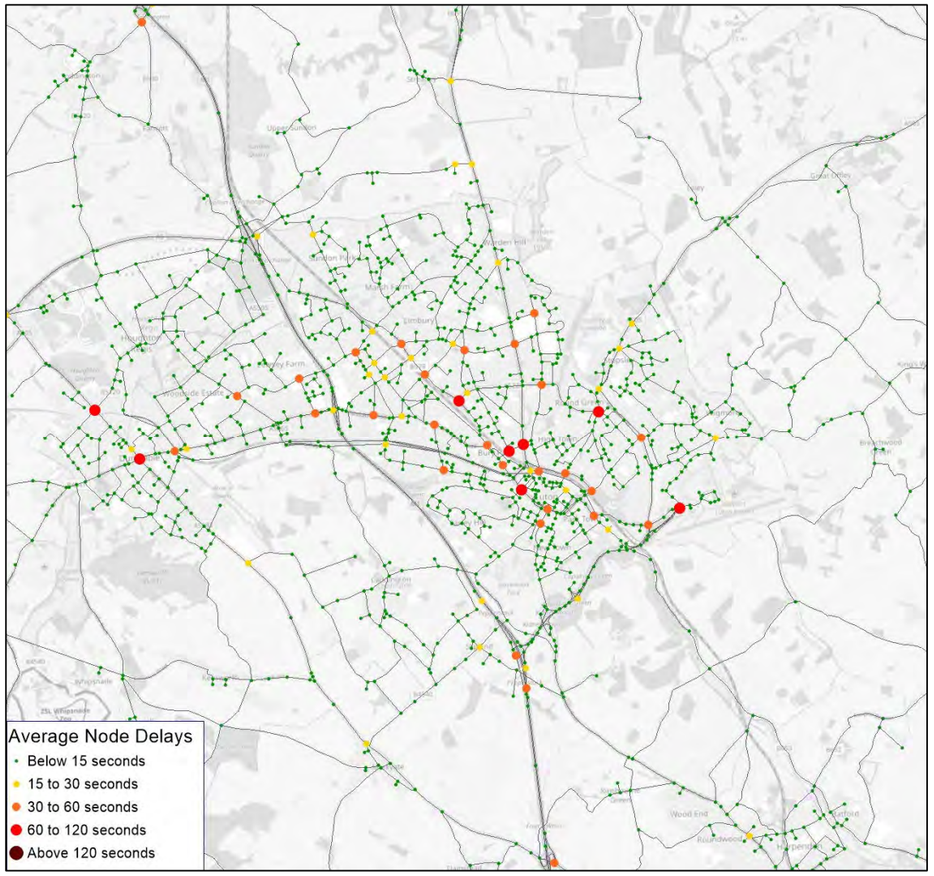
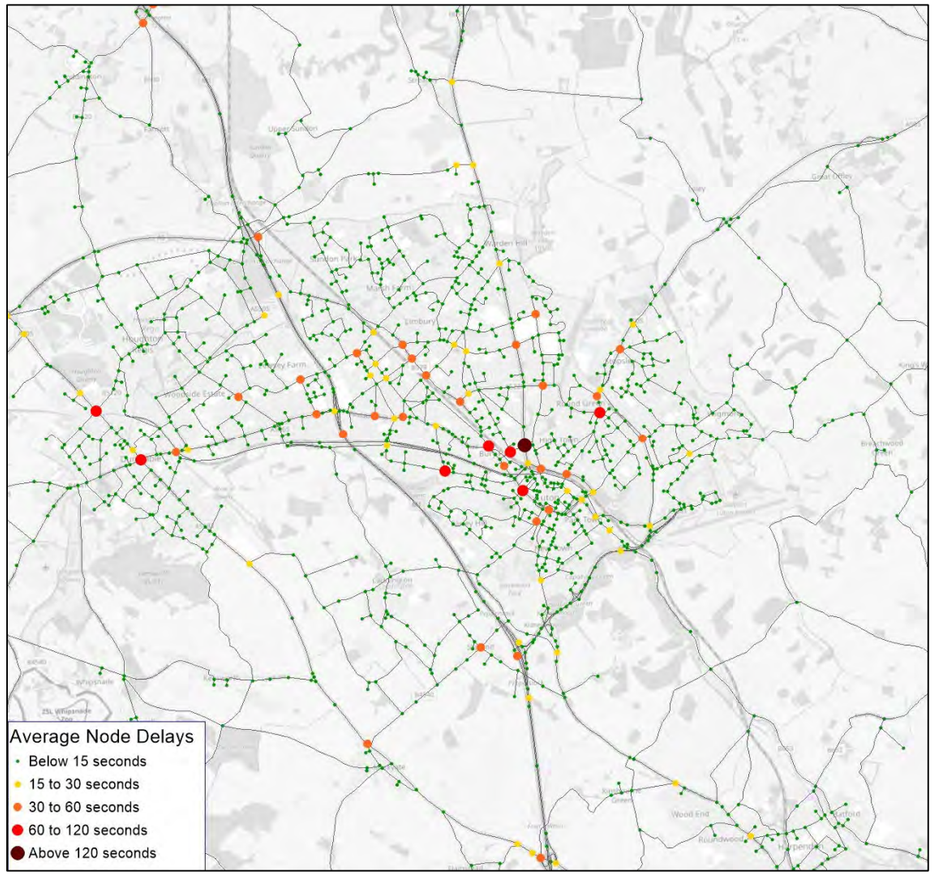


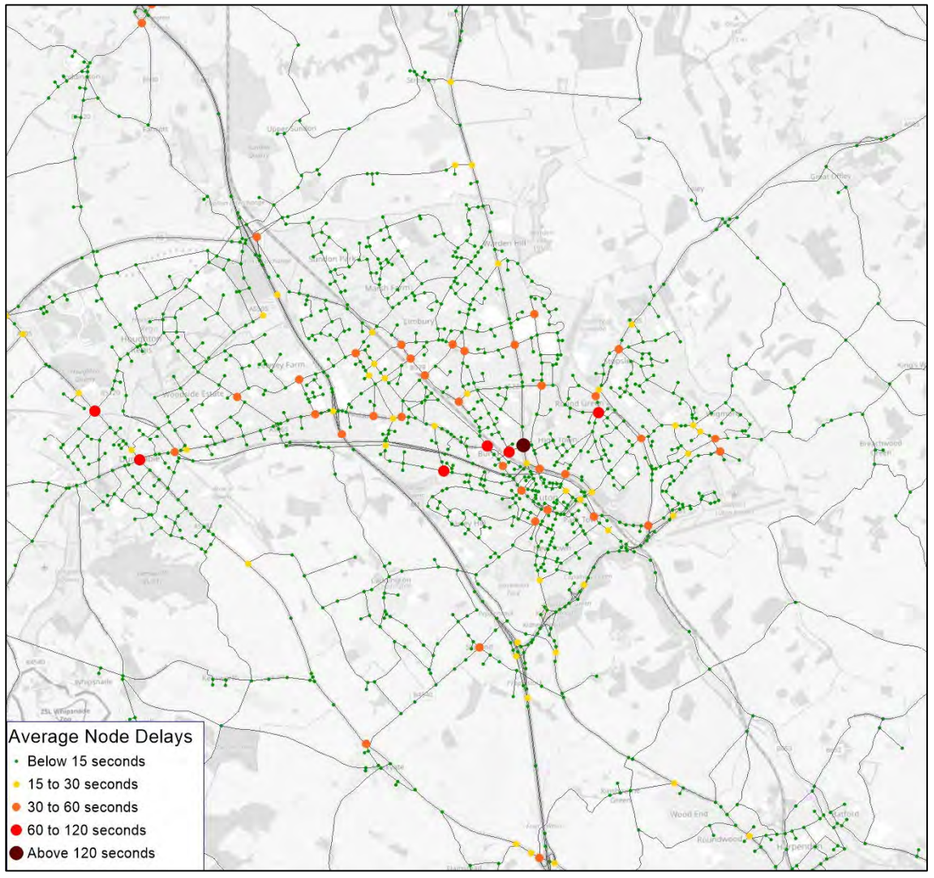
Figure D.5: Forecast Average Node Delays, Local Plan Alternative Scenario Forecasts, Luton Borough – 2039

AM Peak Hour (08:00 – 09:00)

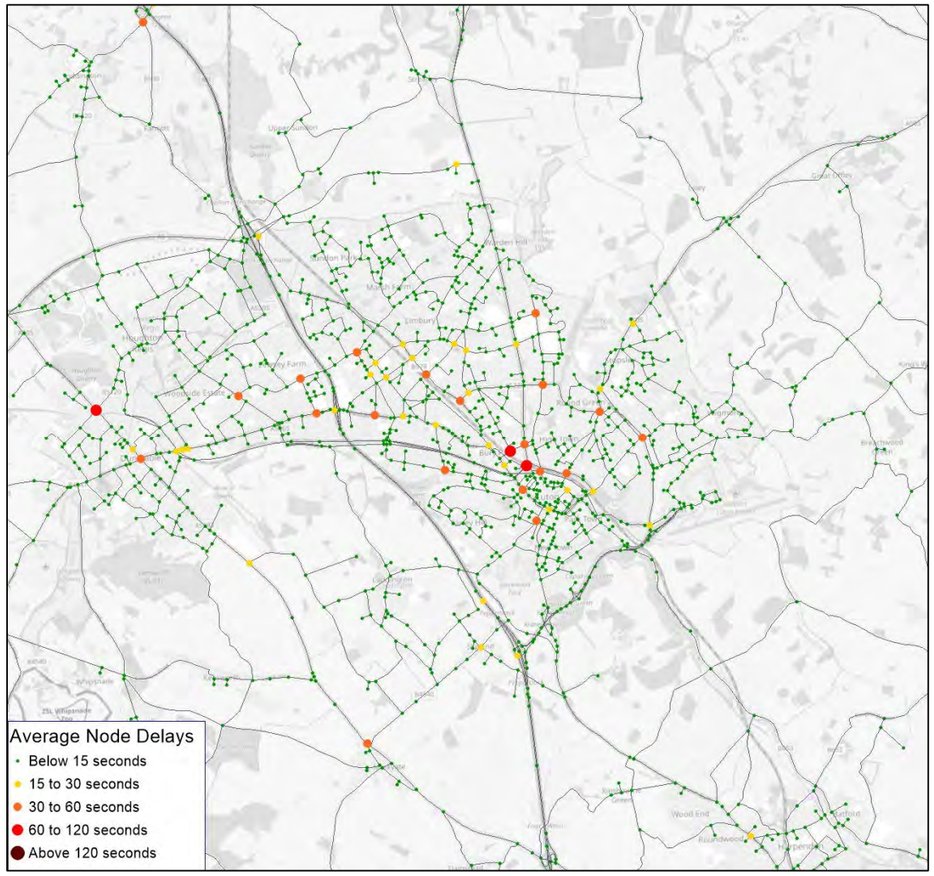
"Without Expansion

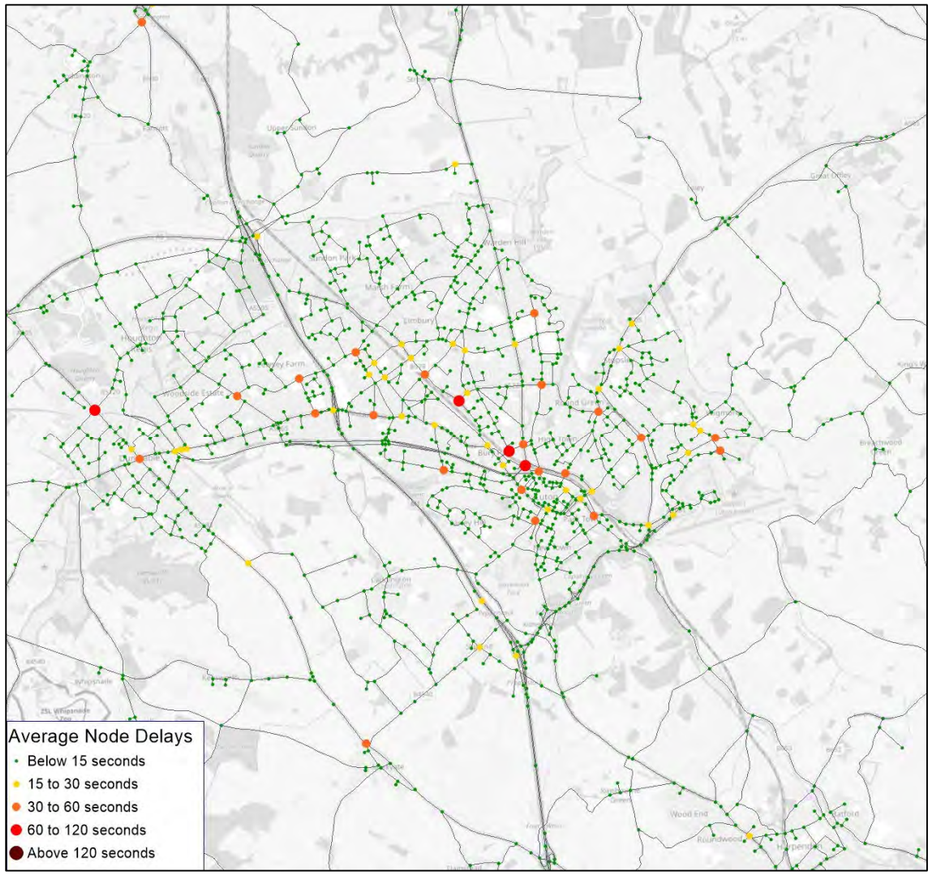


"With" Expansion

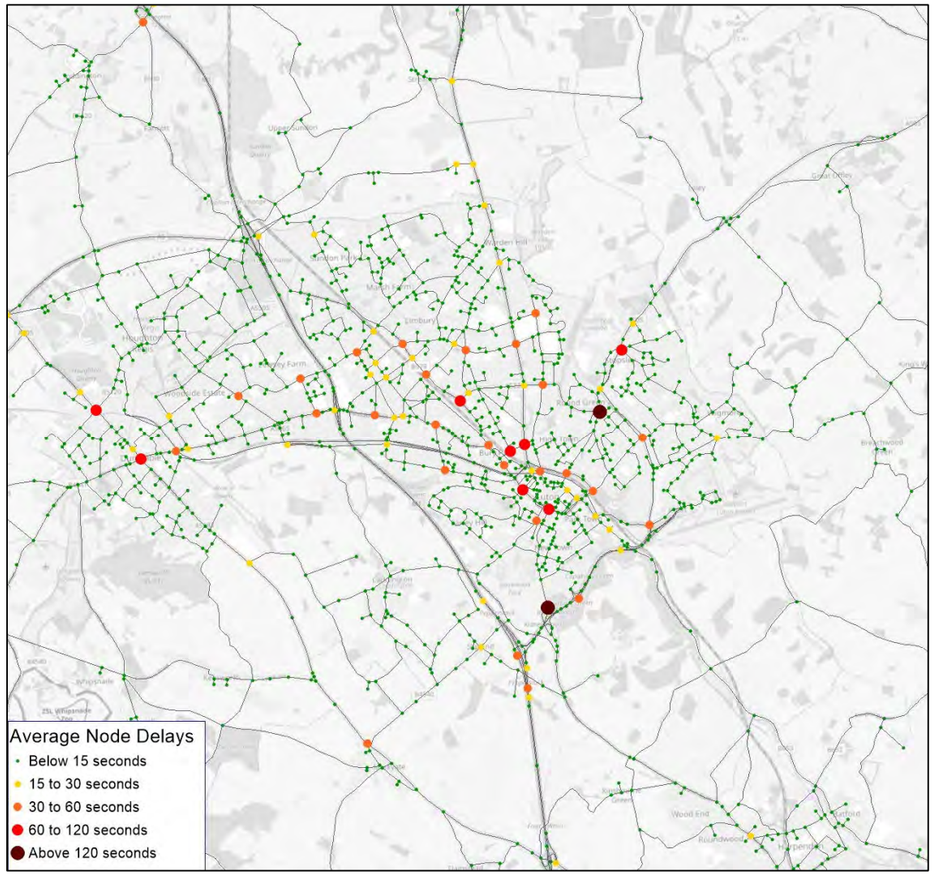


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



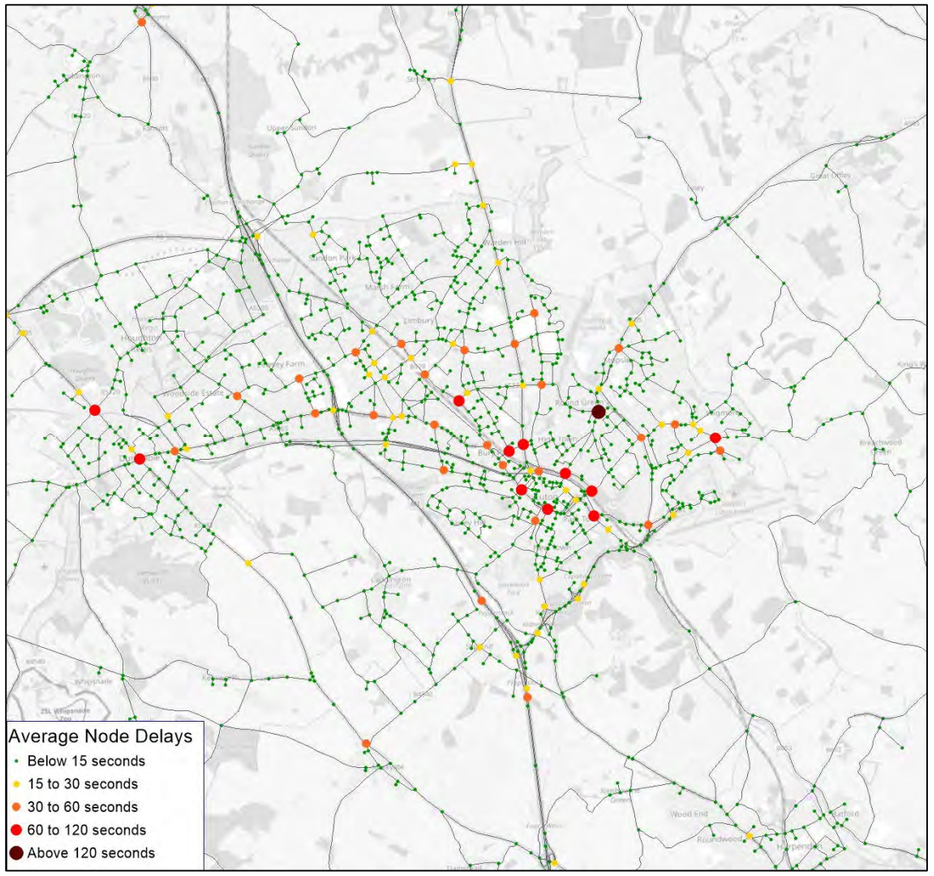
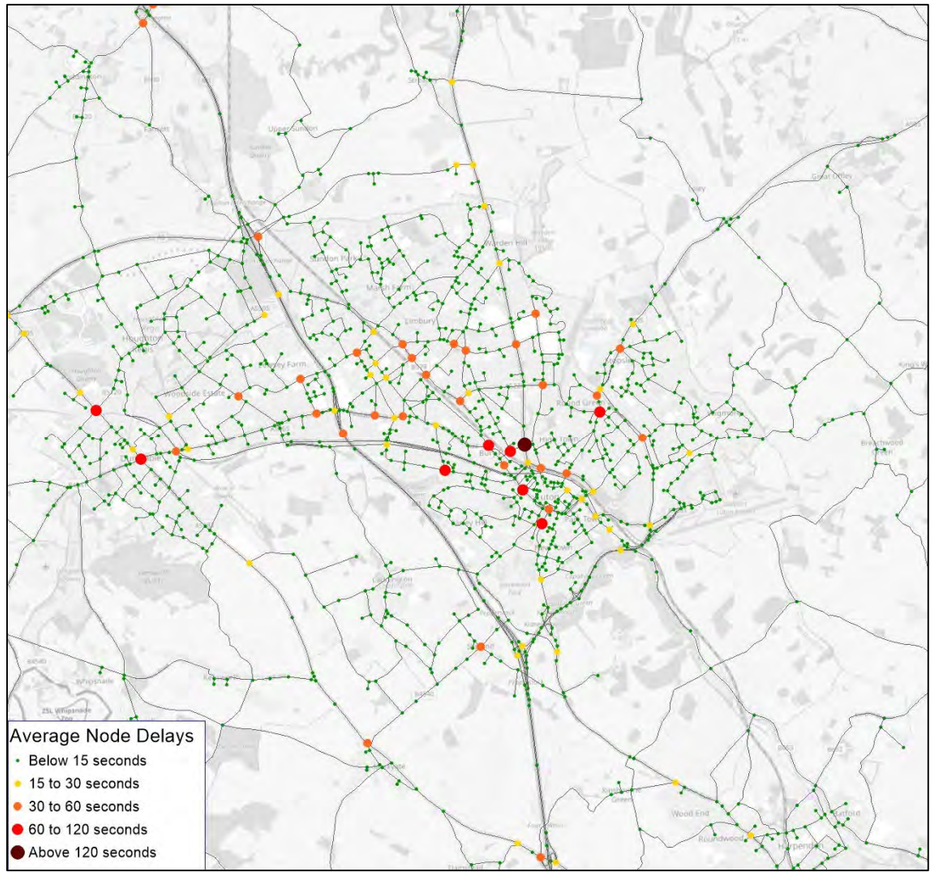


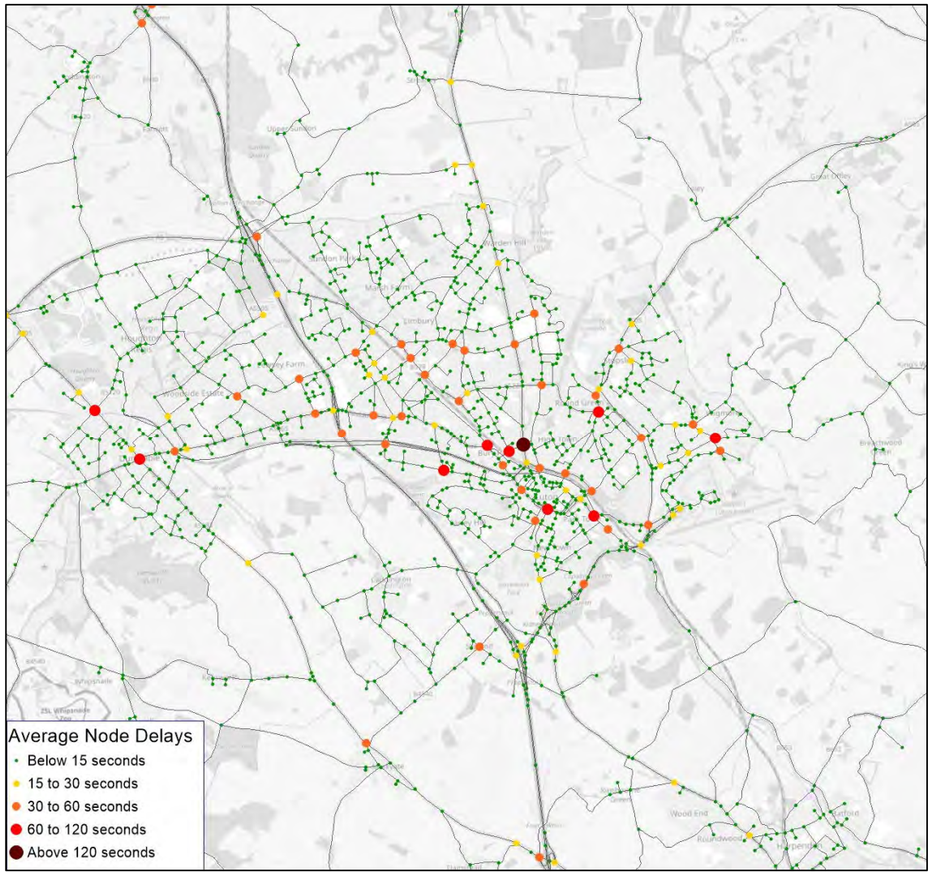
Figure D.6: Forecast Average Node Delays, Local Plan Alternative Scenario Forecasts, Luton Borough – 2043

AM Peak Hour (08:00 – 09:00)

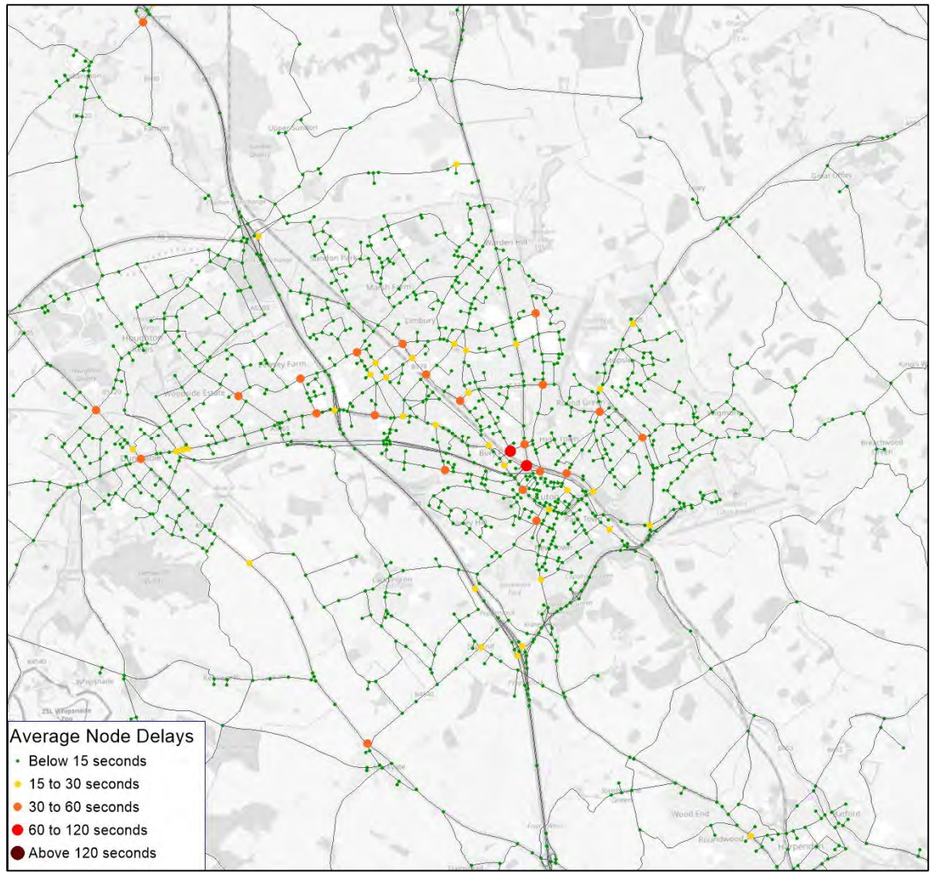
"Without Expansion

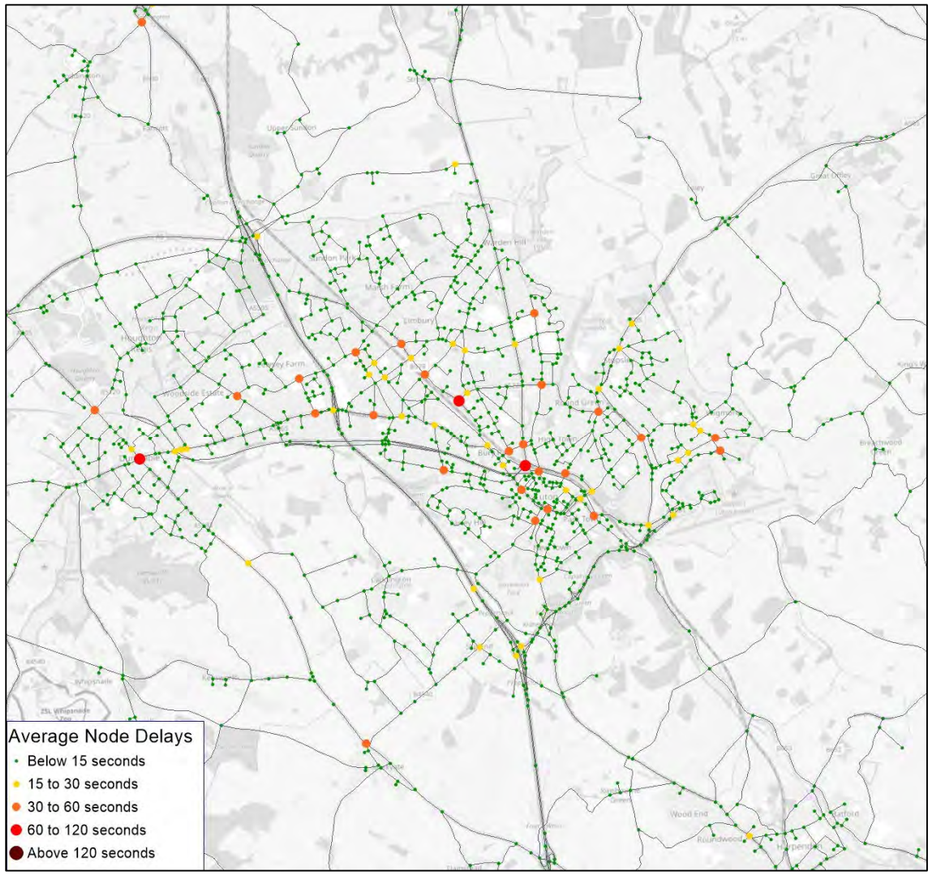


"With" Expansion

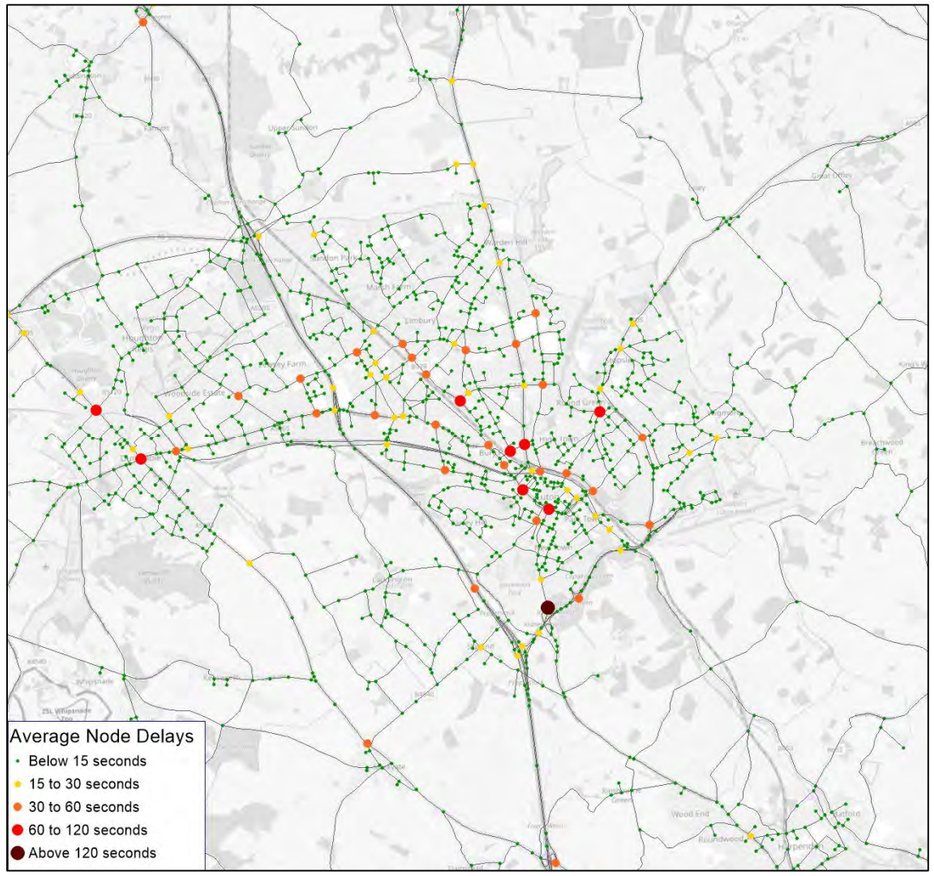


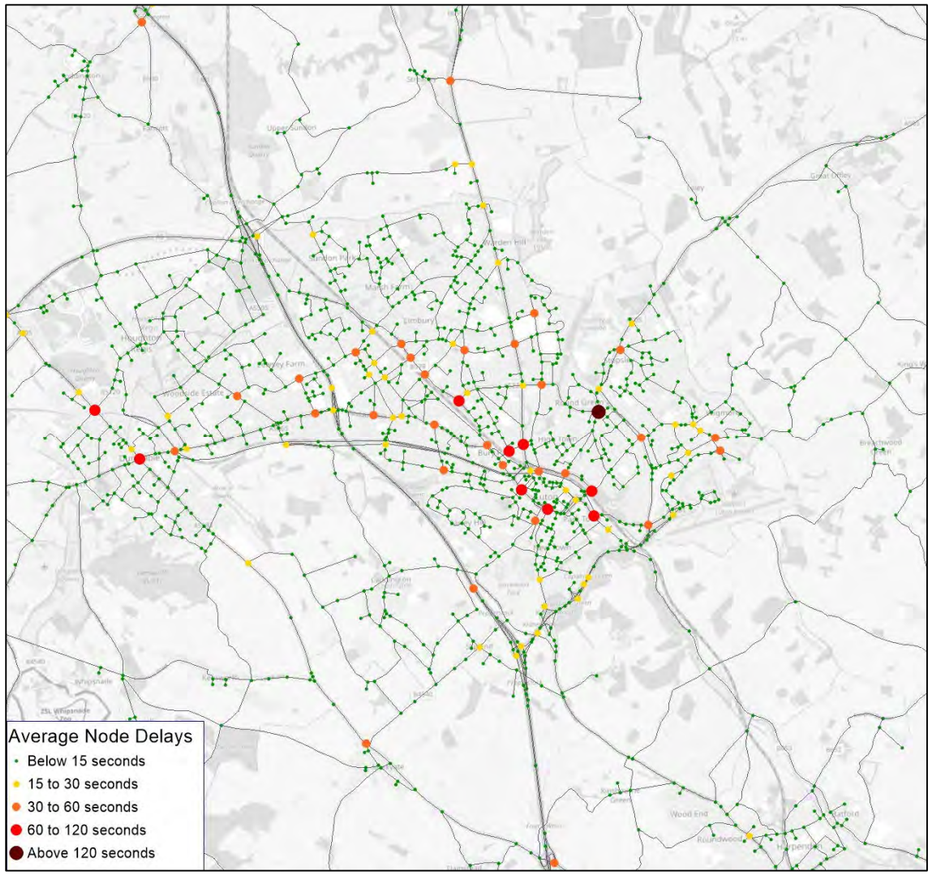
Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)





Appendix E – Link Based Volume to Capacity (V/C)

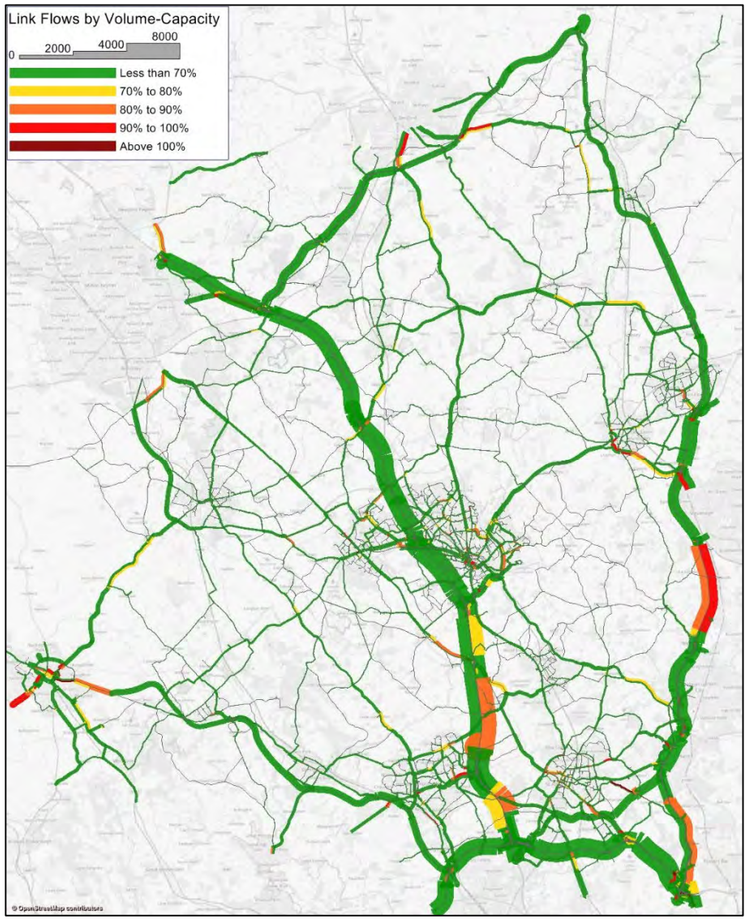
Figure E.1: Forecast Link-based V/C, 2016 Base Model, Simulation Network

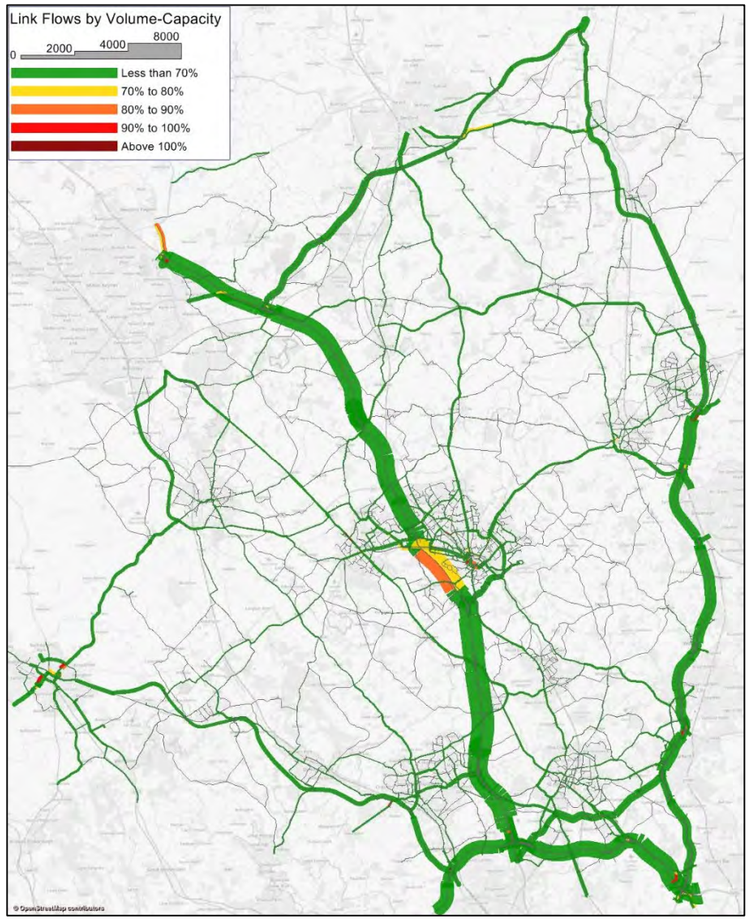
AM Peak Hour (08:00 to 09:00)

Interpeak Hour (between 10:00 to 16:00)

PM Peak Hour (17:00 to 18:00)

2016 Base





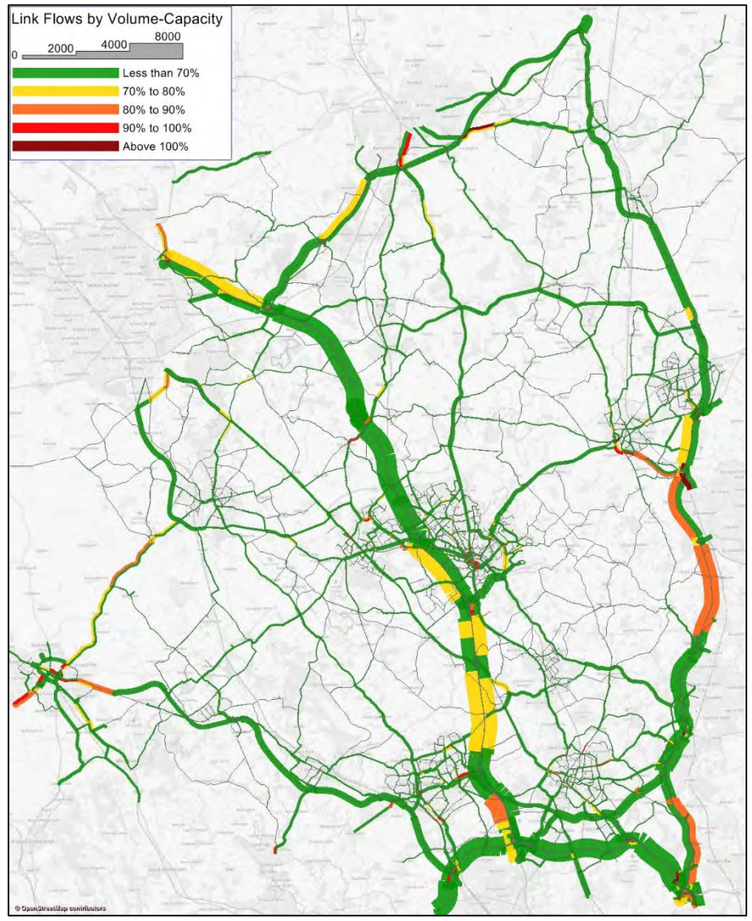
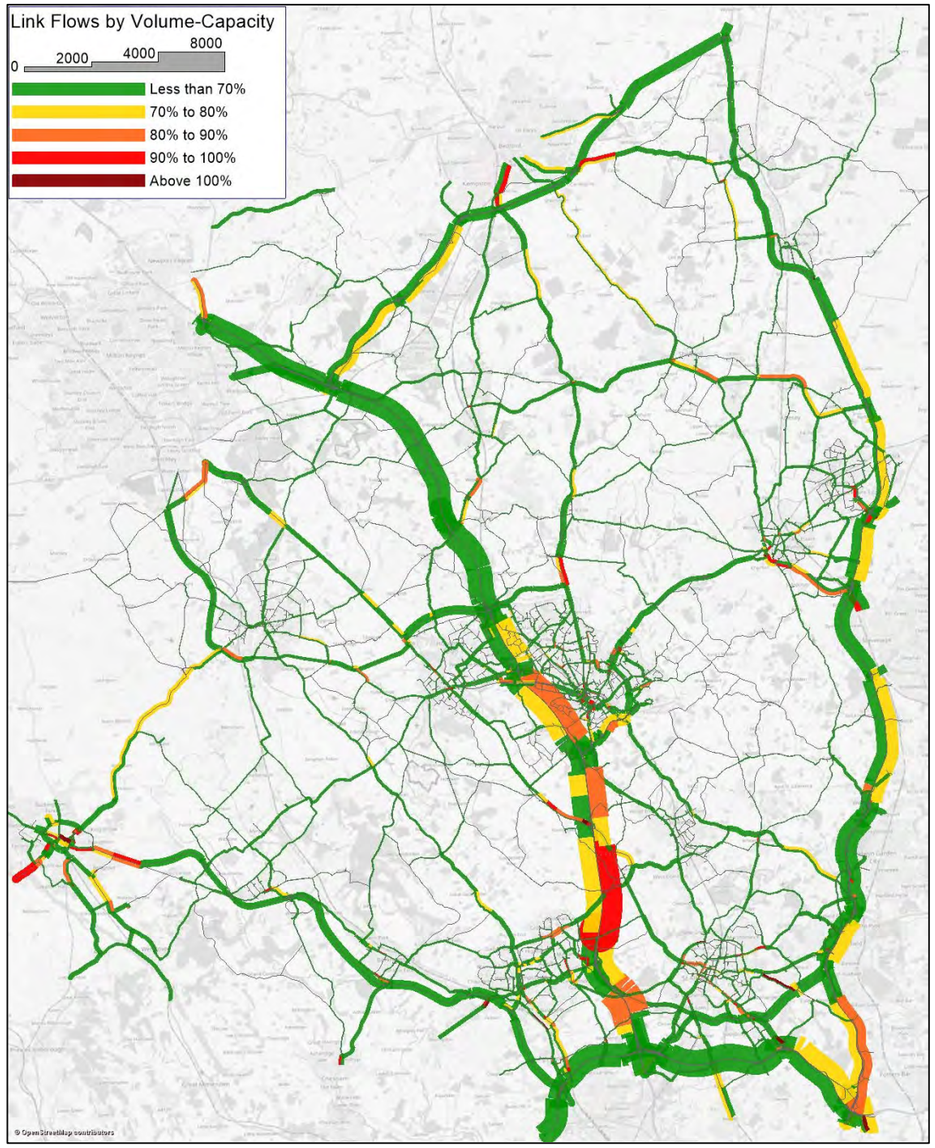


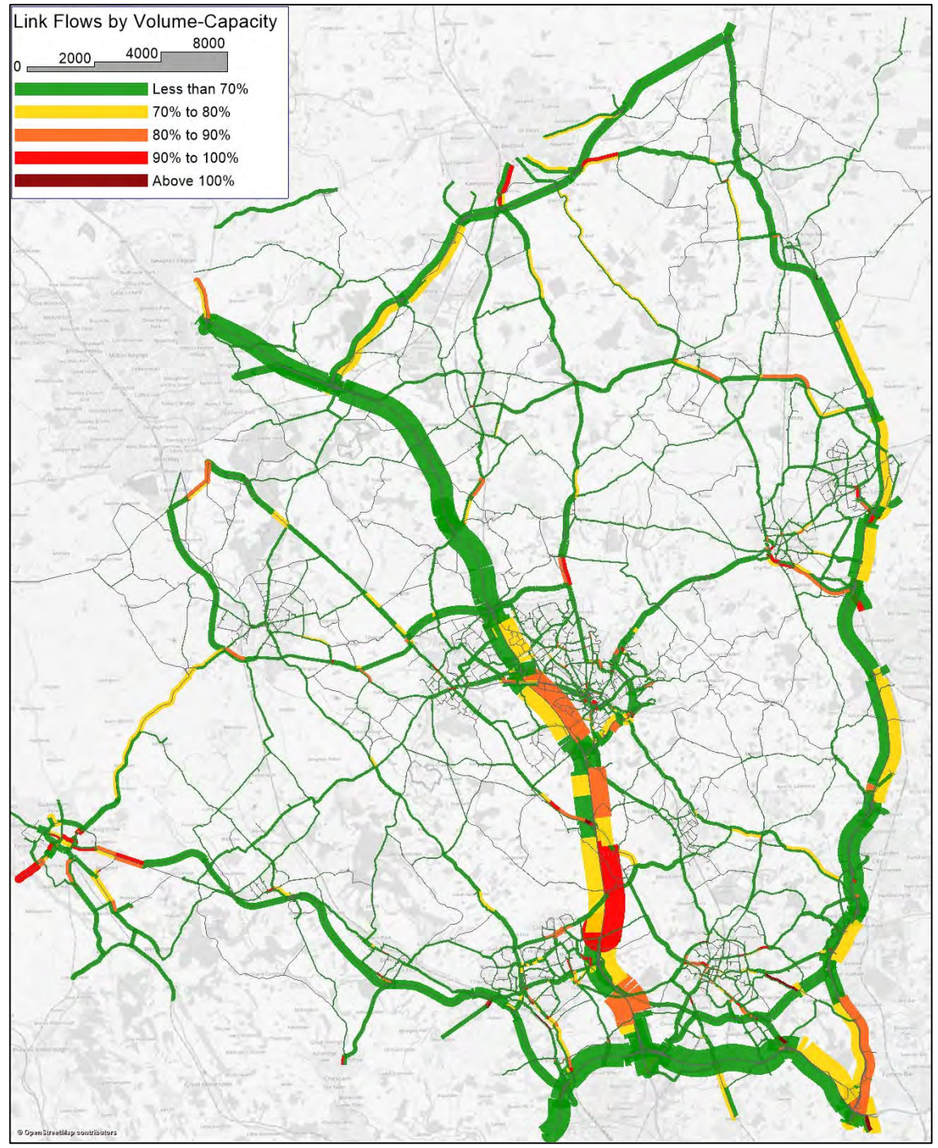
Figure E.2: Forecast Link-based V/C, TAG-based “Without” and “With” Expansion Forecasts, Simulation Network – 2027

“Without Expansion

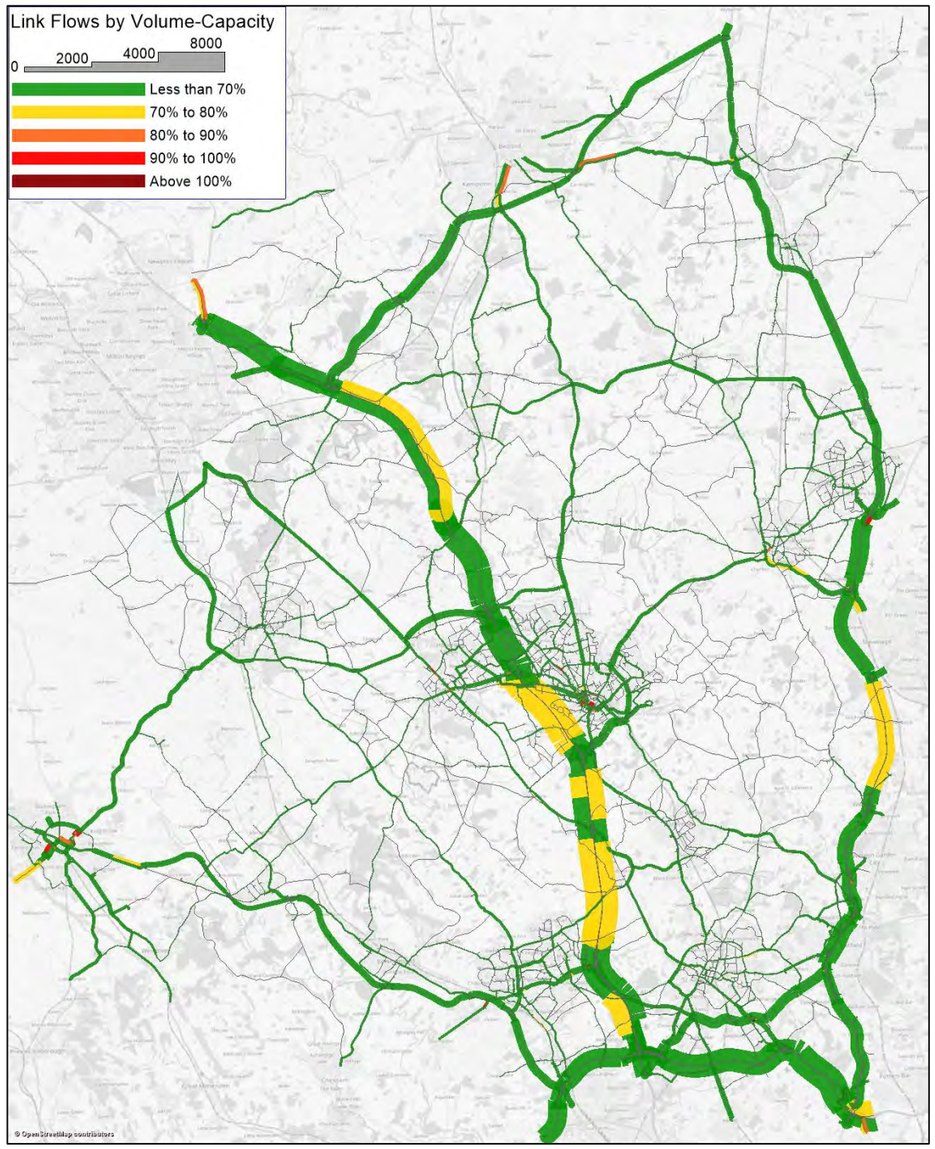
“With” Expansion

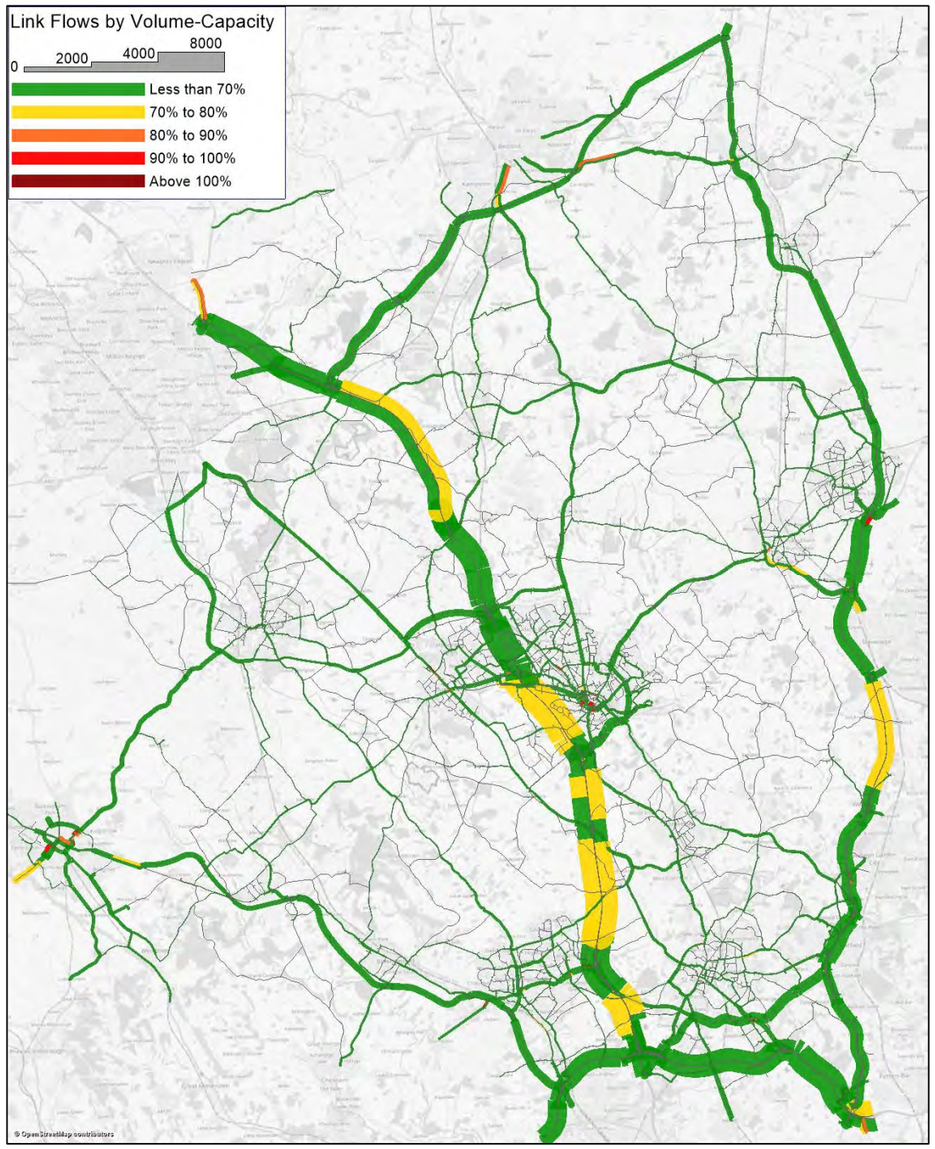
AM Peak Hour
(08:00 – 09:00)



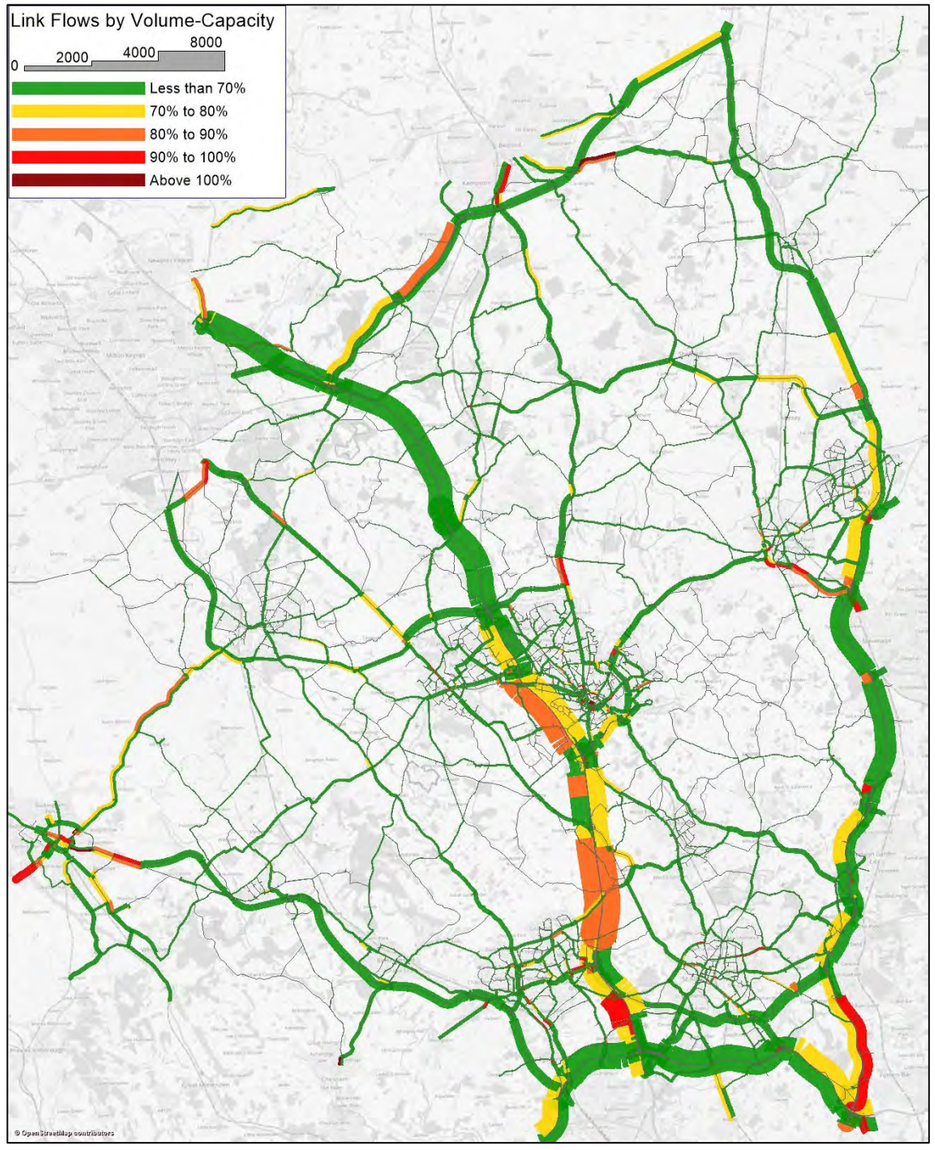


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



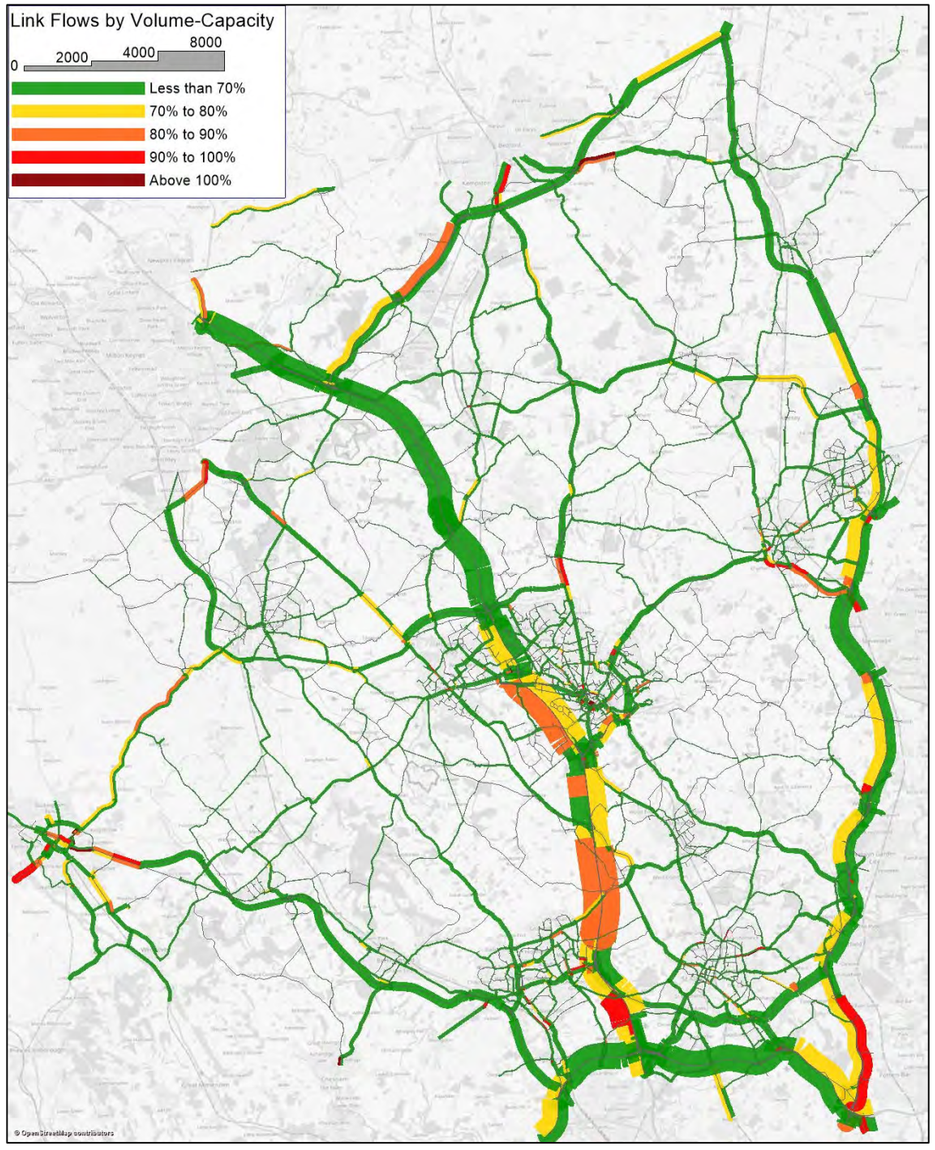
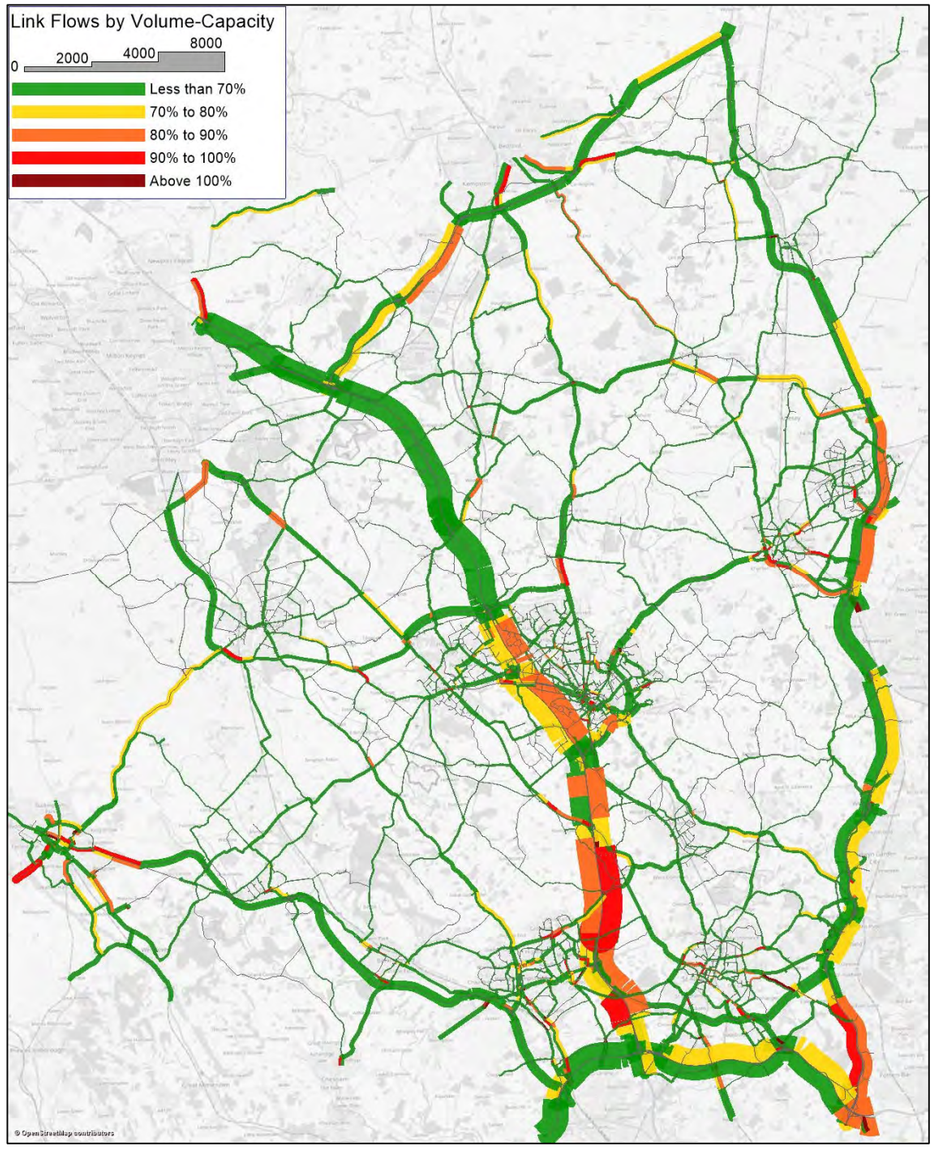


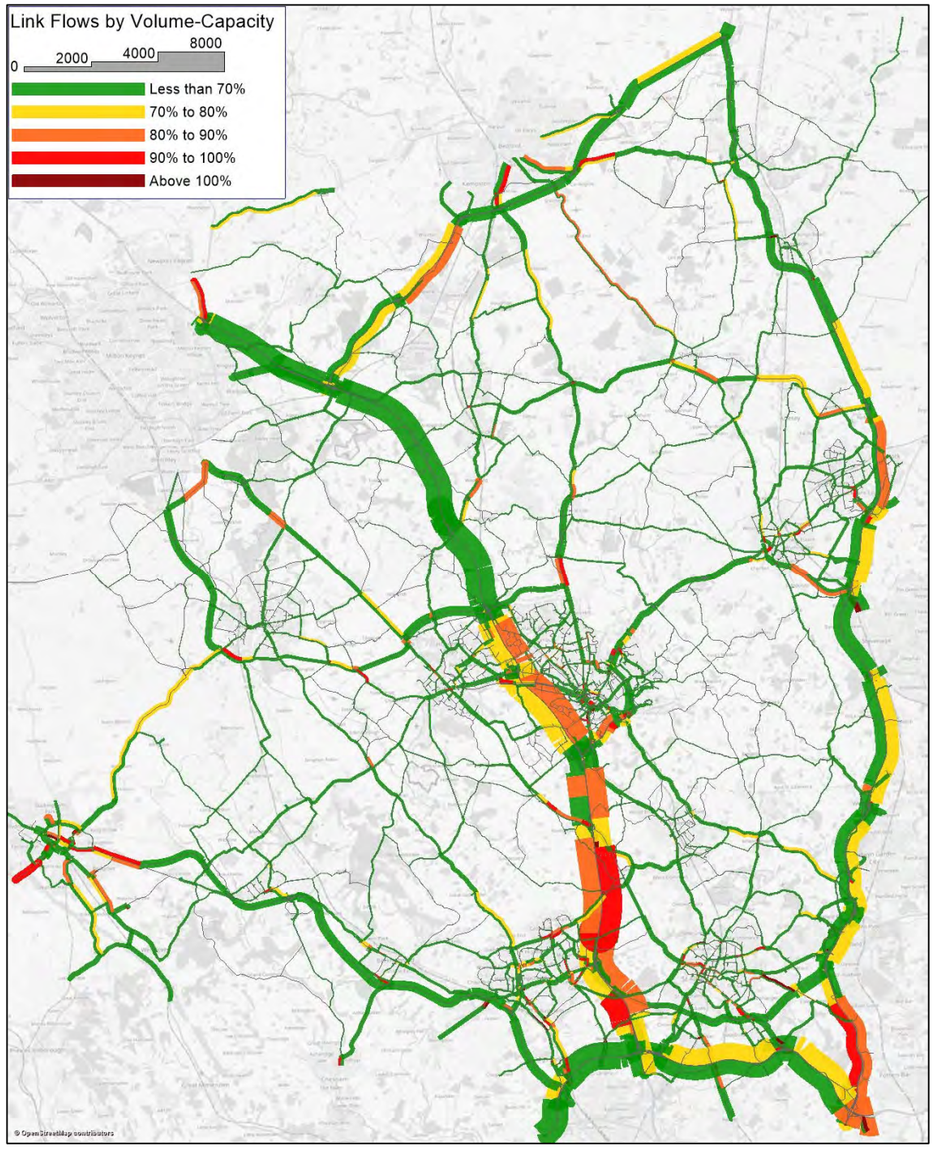
Figure E.3: Forecast Link-based V/C, TAG-based “Without” and “With” Expansion Forecasts, Simulation Network – 2039

“Without Expansion

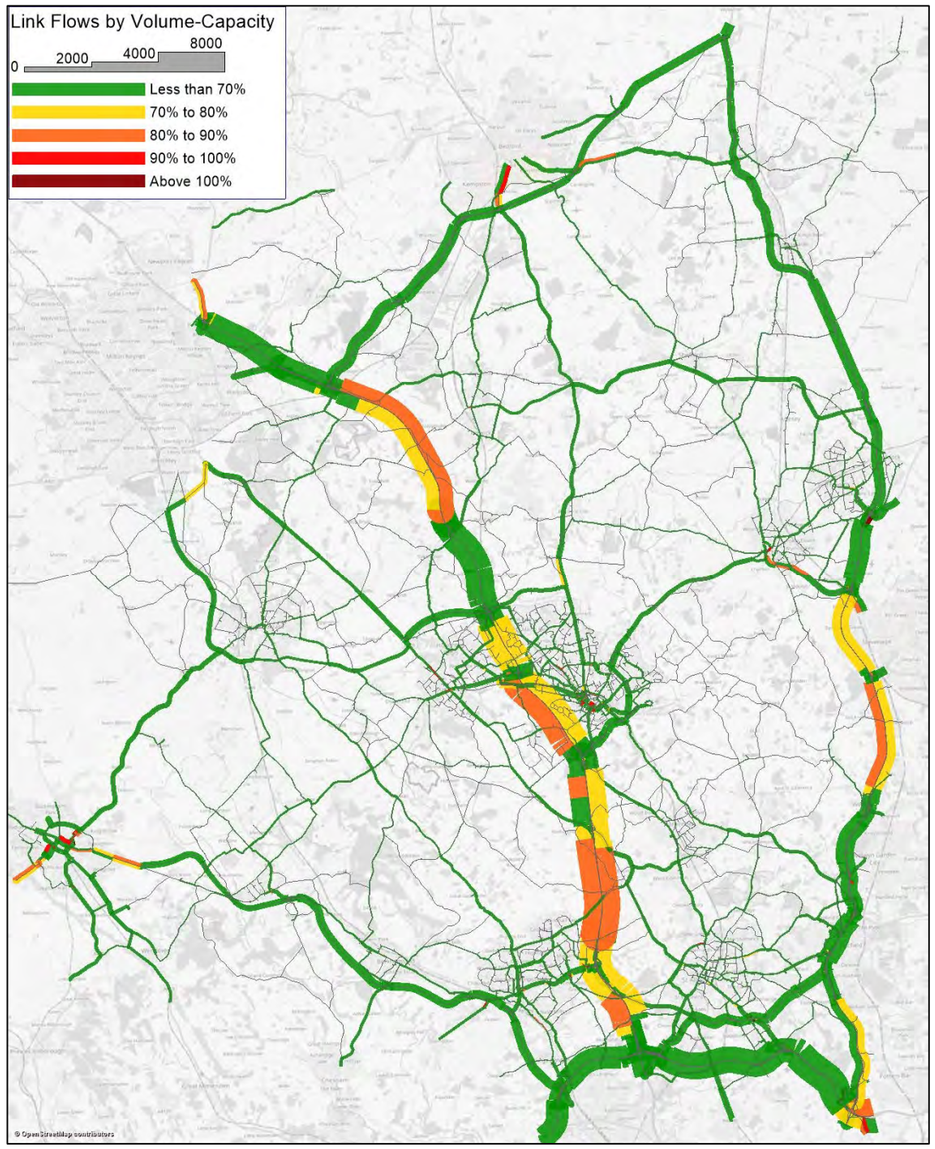
“With” Expansion

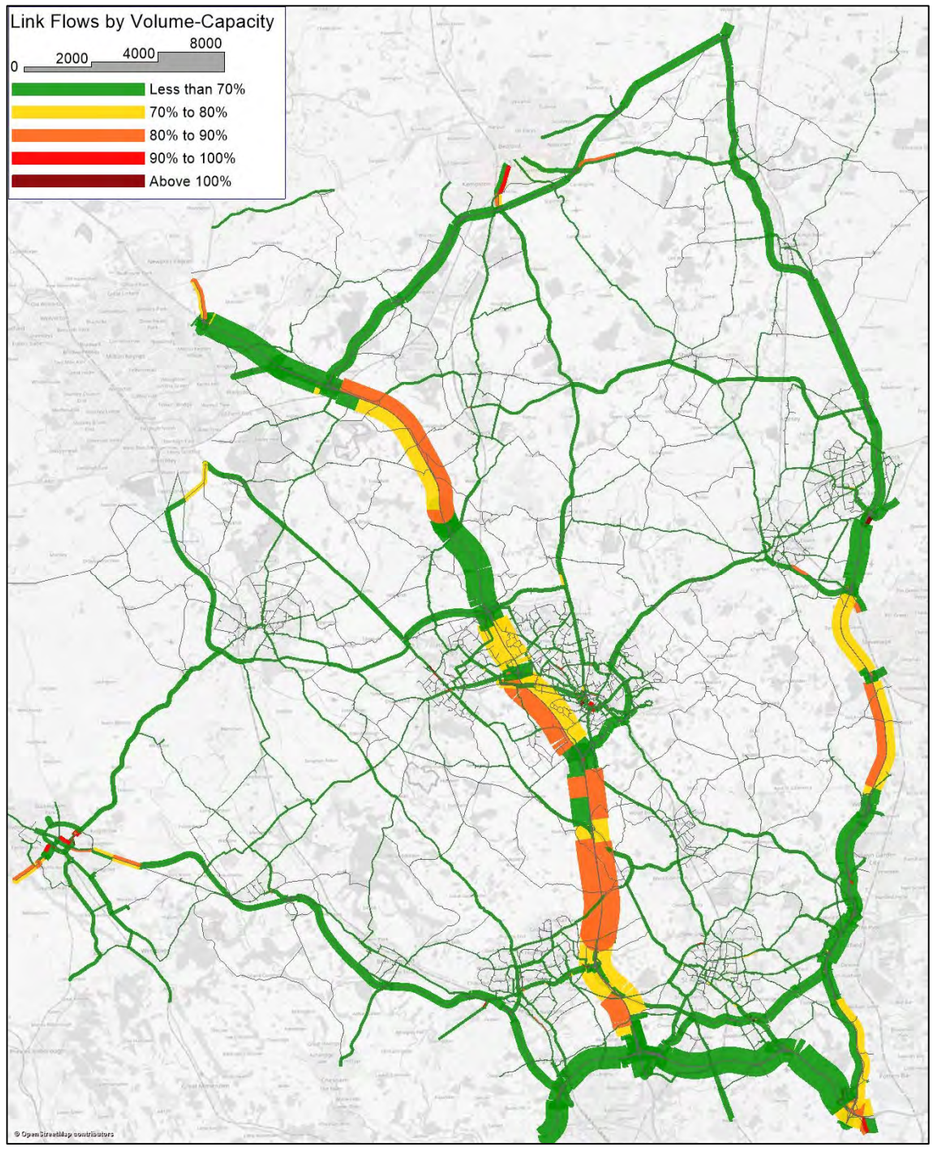
AM Peak Hour
(08:00 – 09:00)



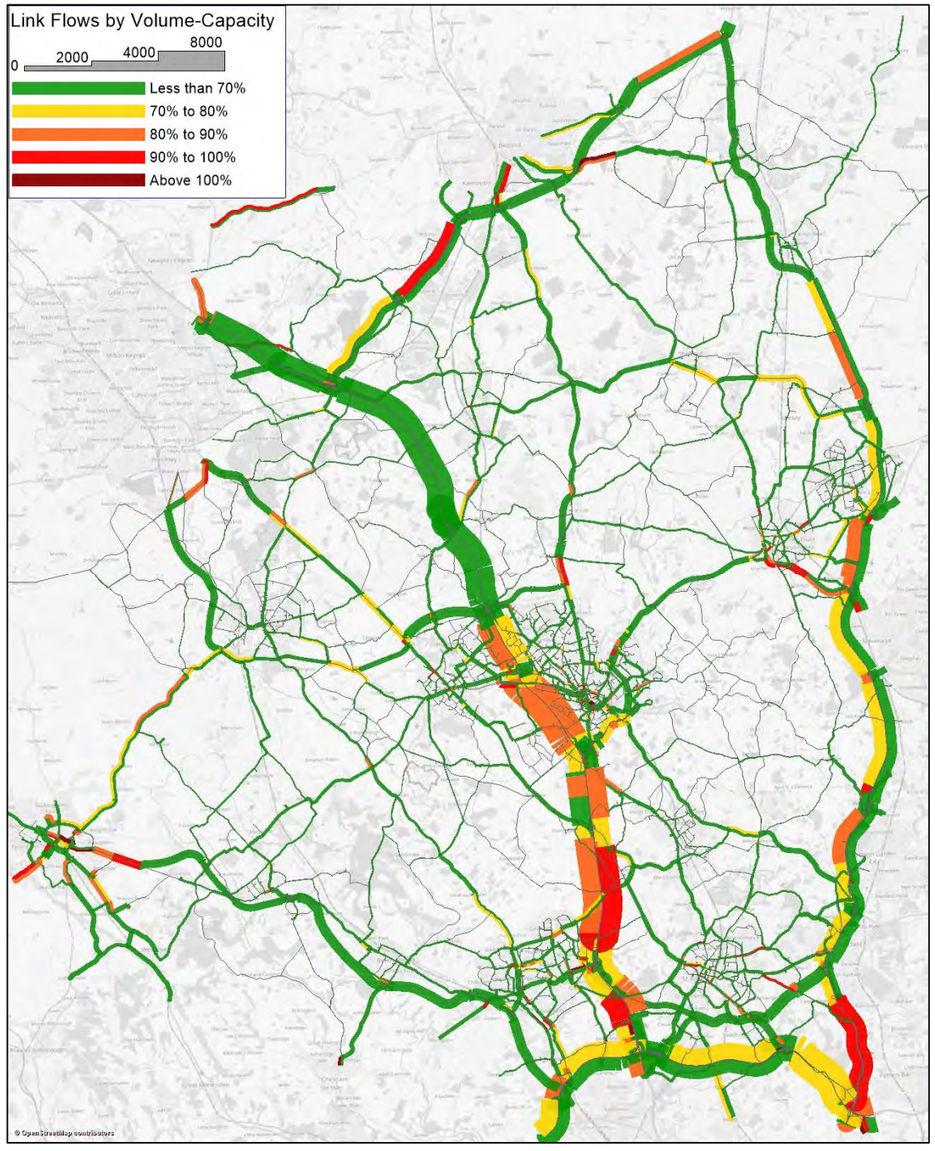


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



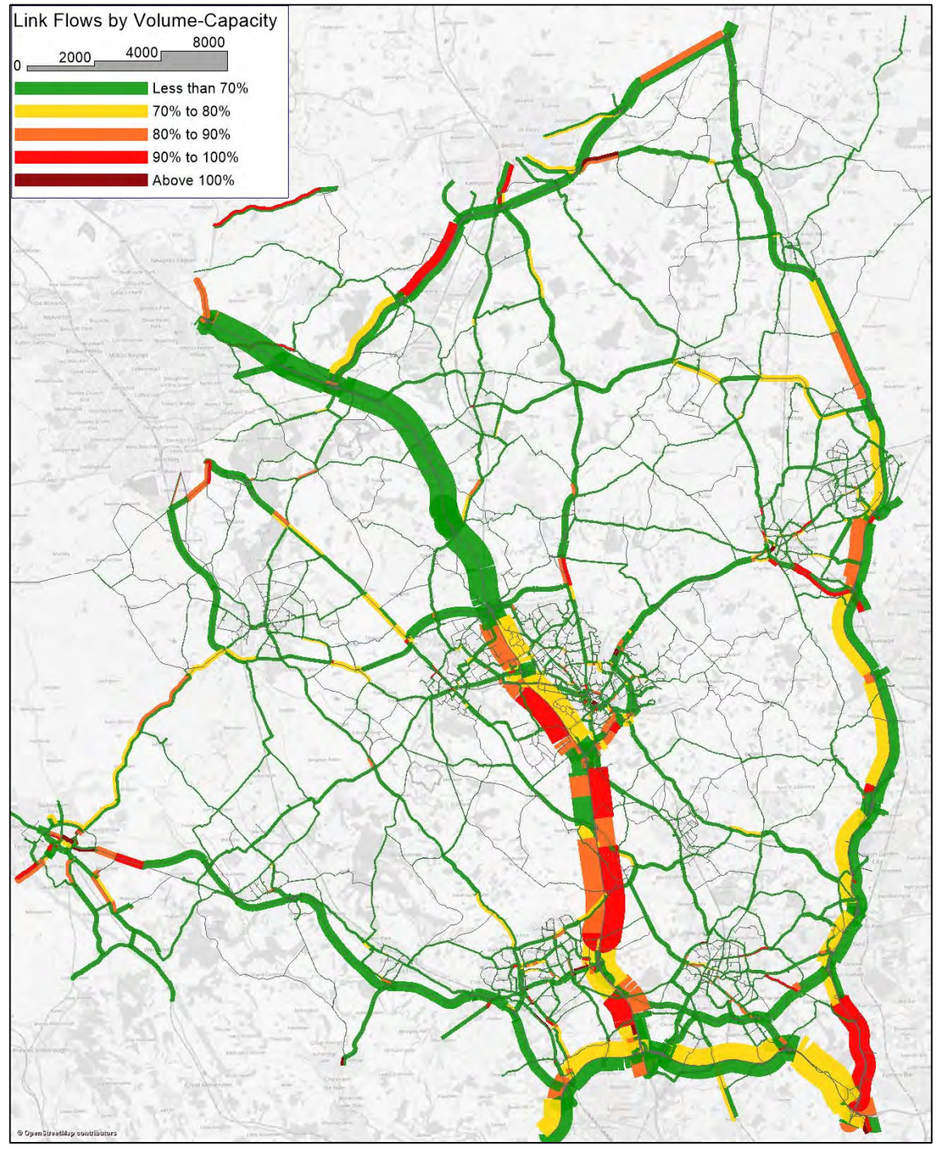
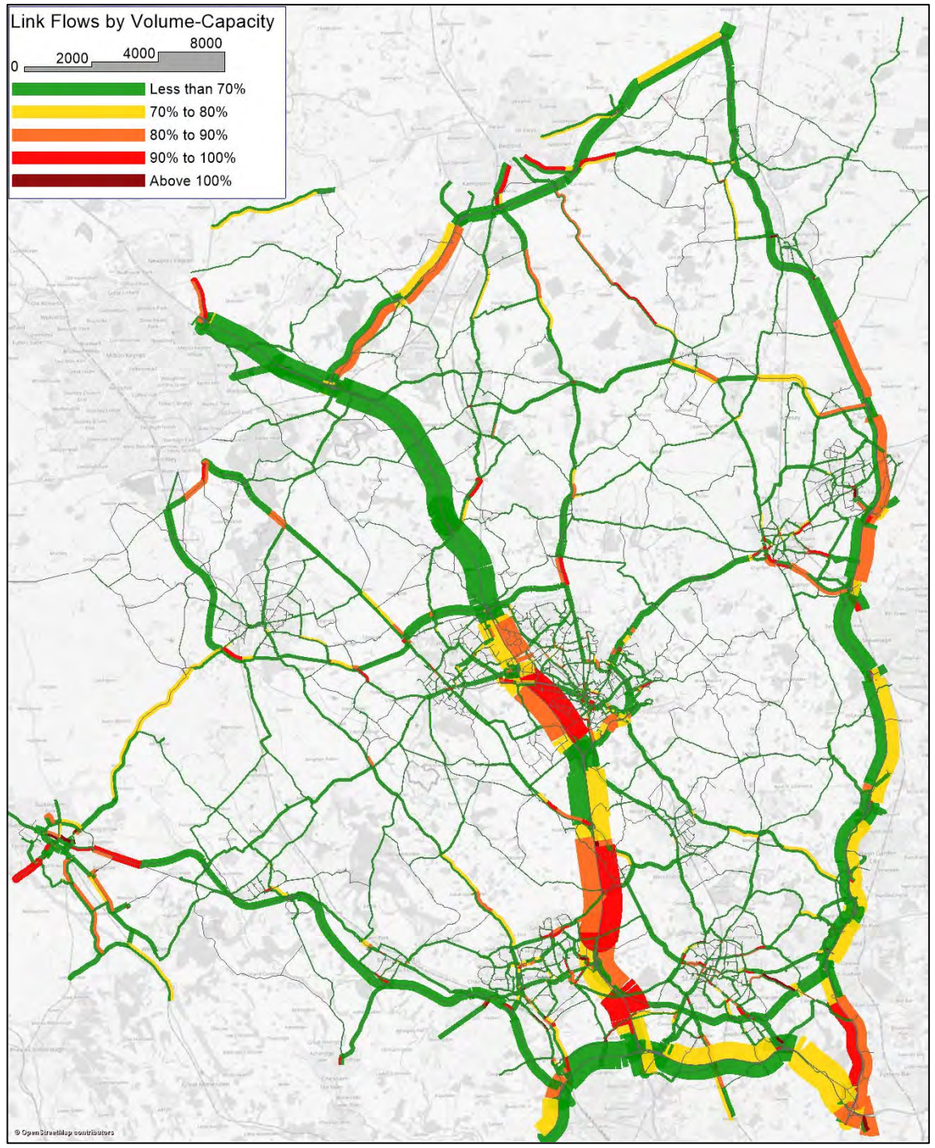


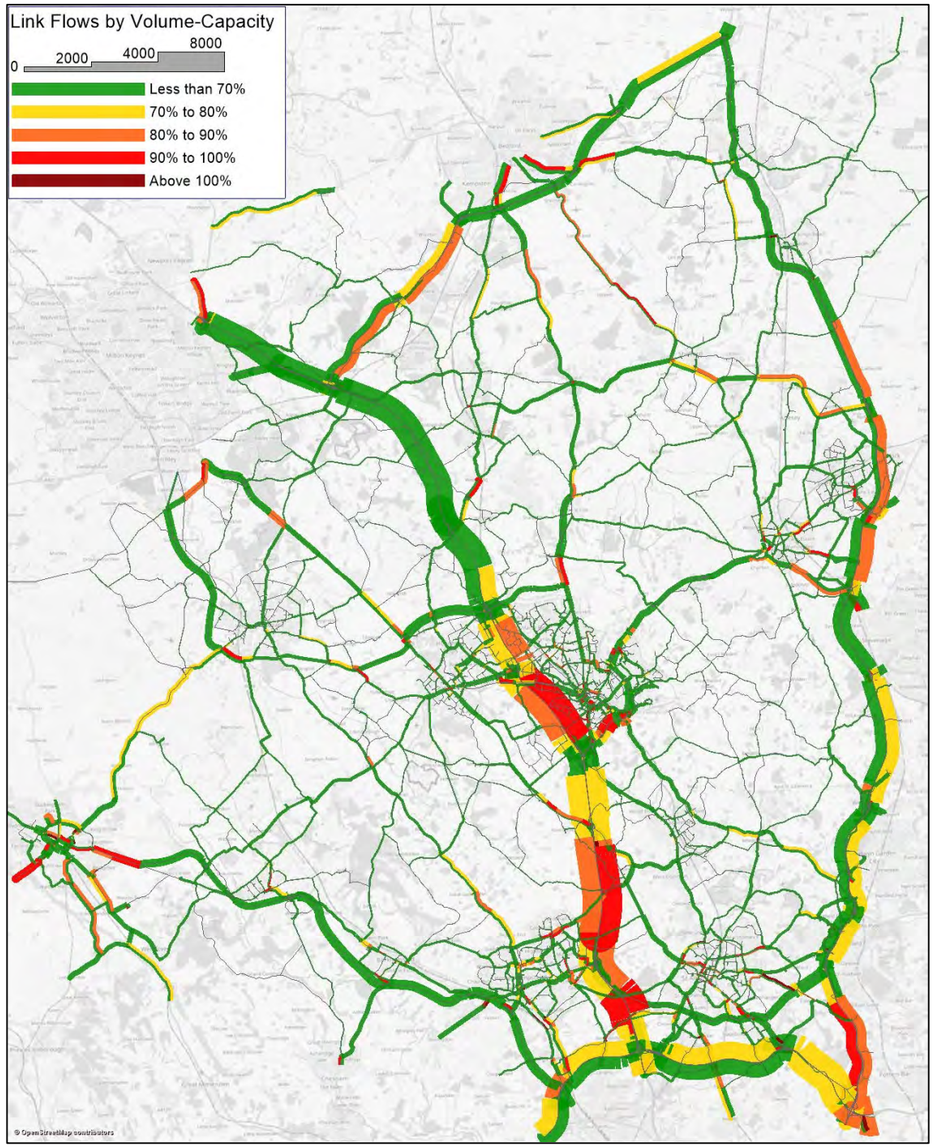
Figure E.4: Forecast Link-based V/C, TAG-based “Without” and “With” Expansion Forecasts, Simulation Network – 2043

AM Peak Hour
(08:00 – 09:00)

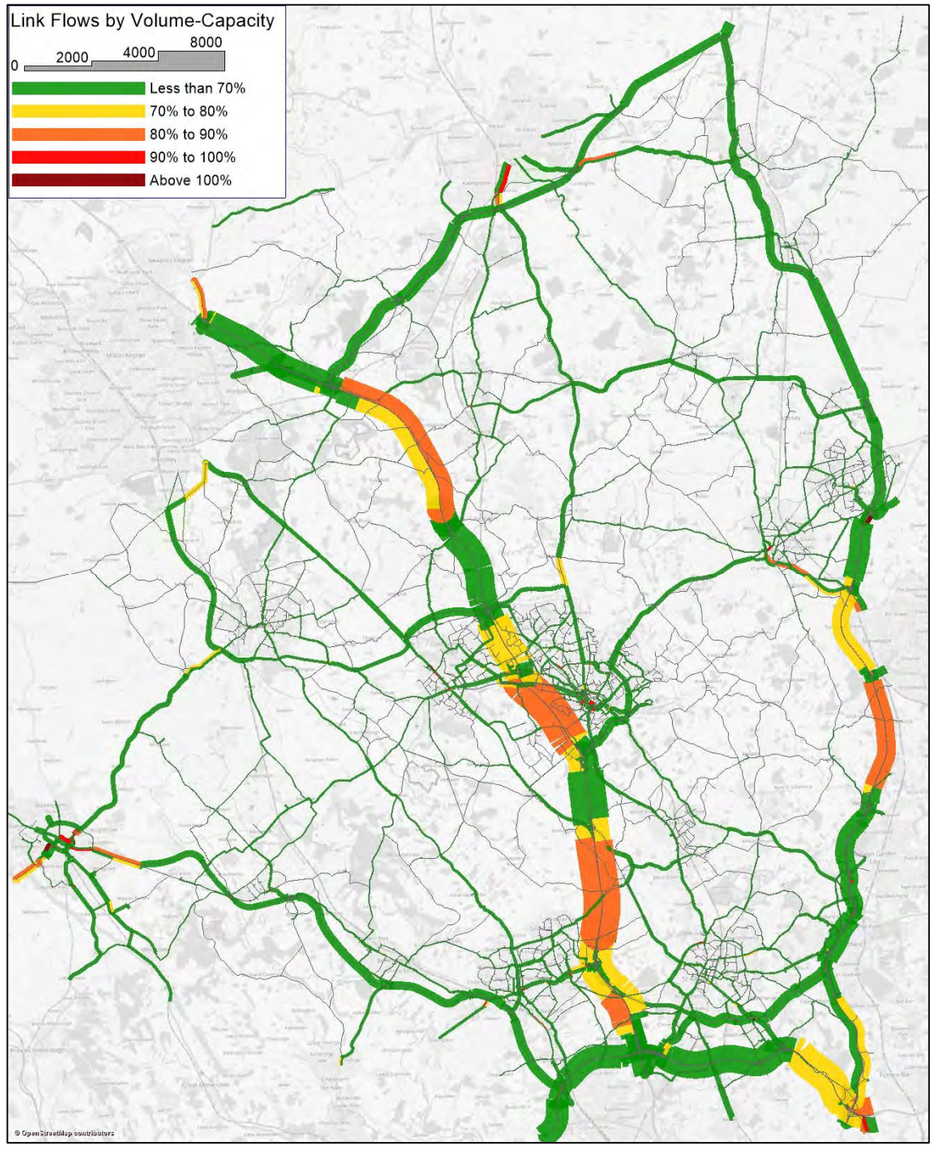
“Without Expansion

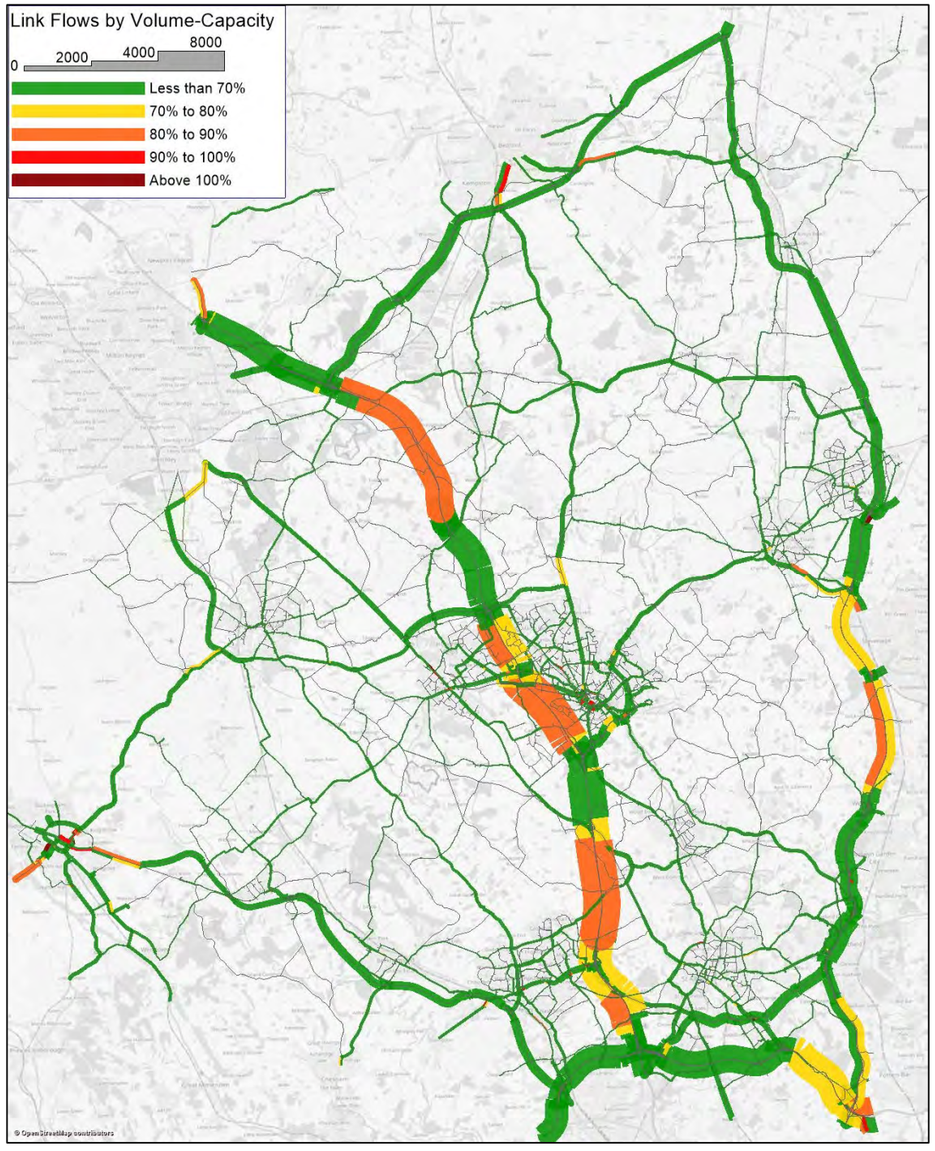


“With” Expansion

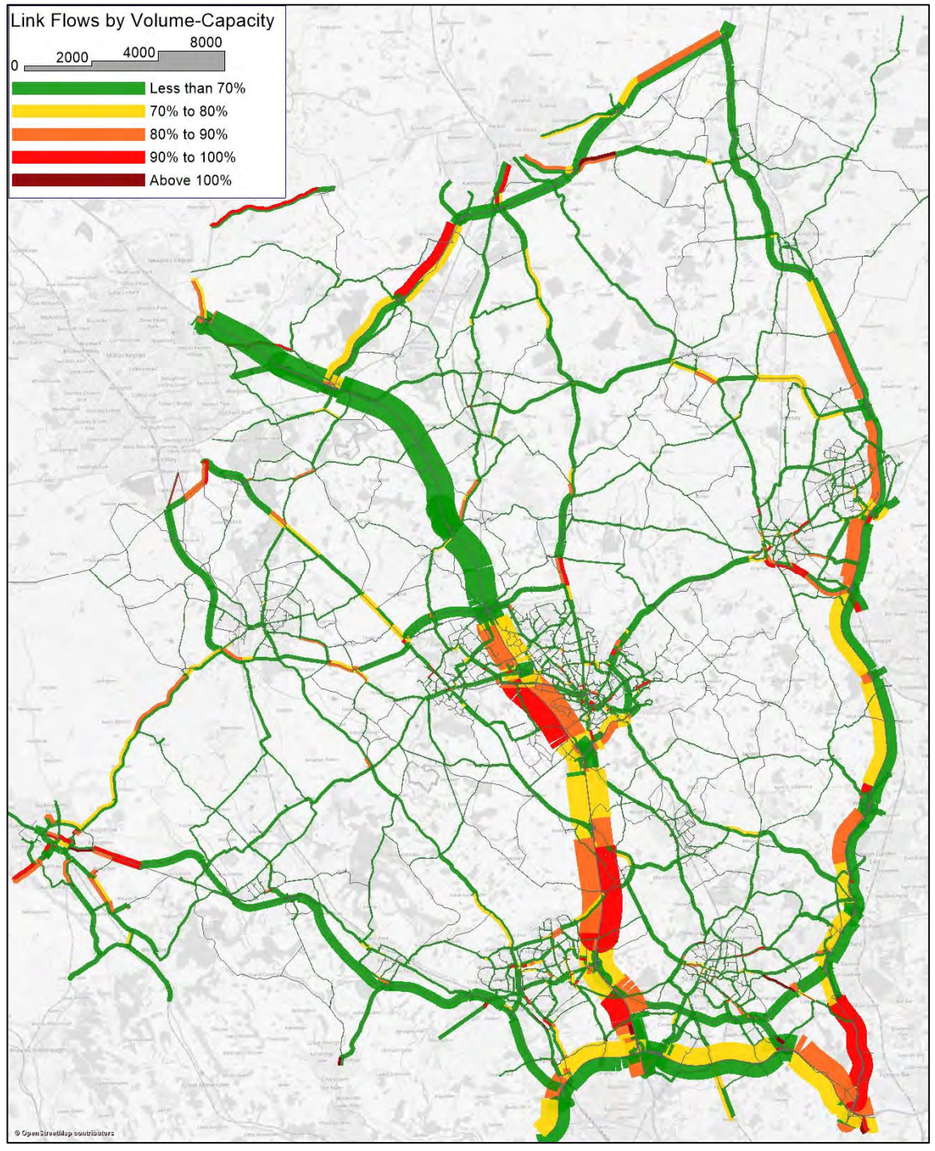


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



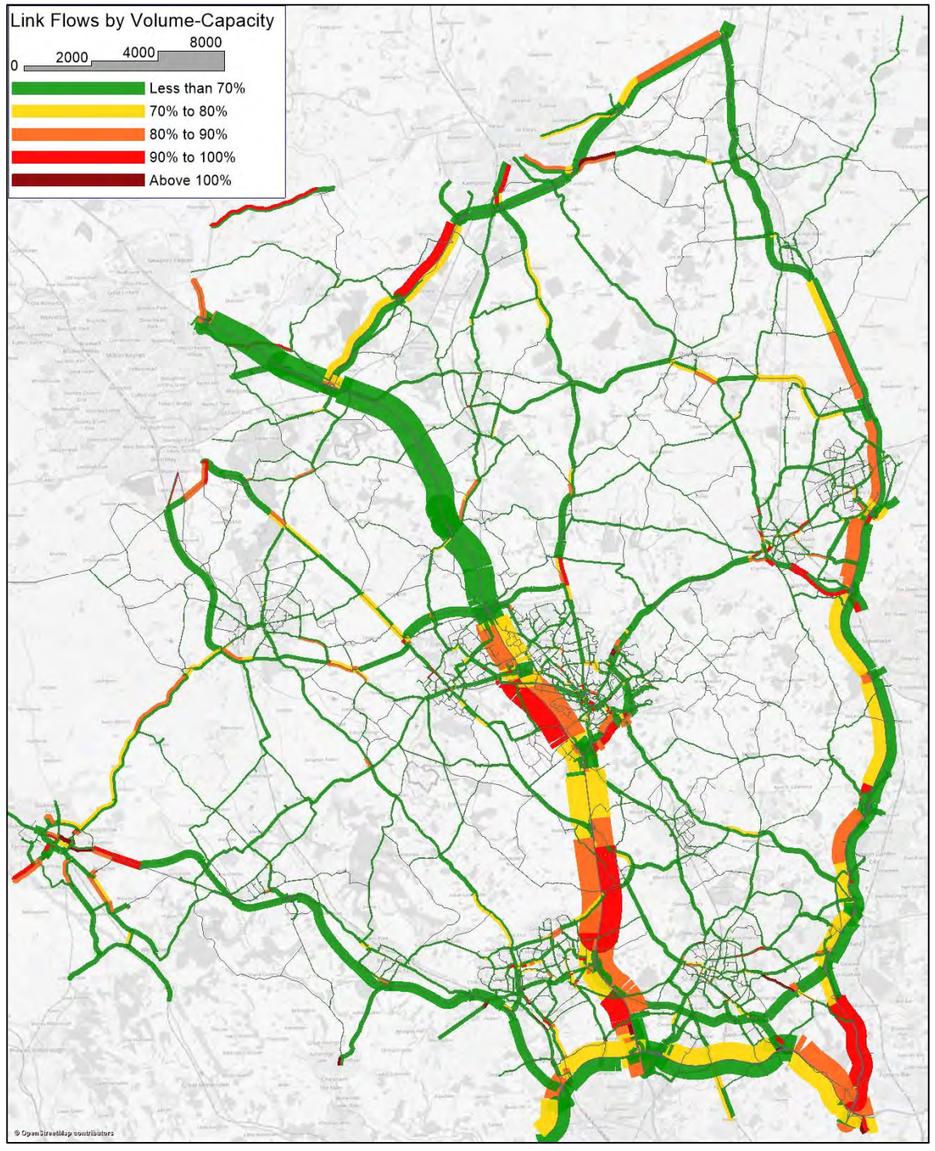
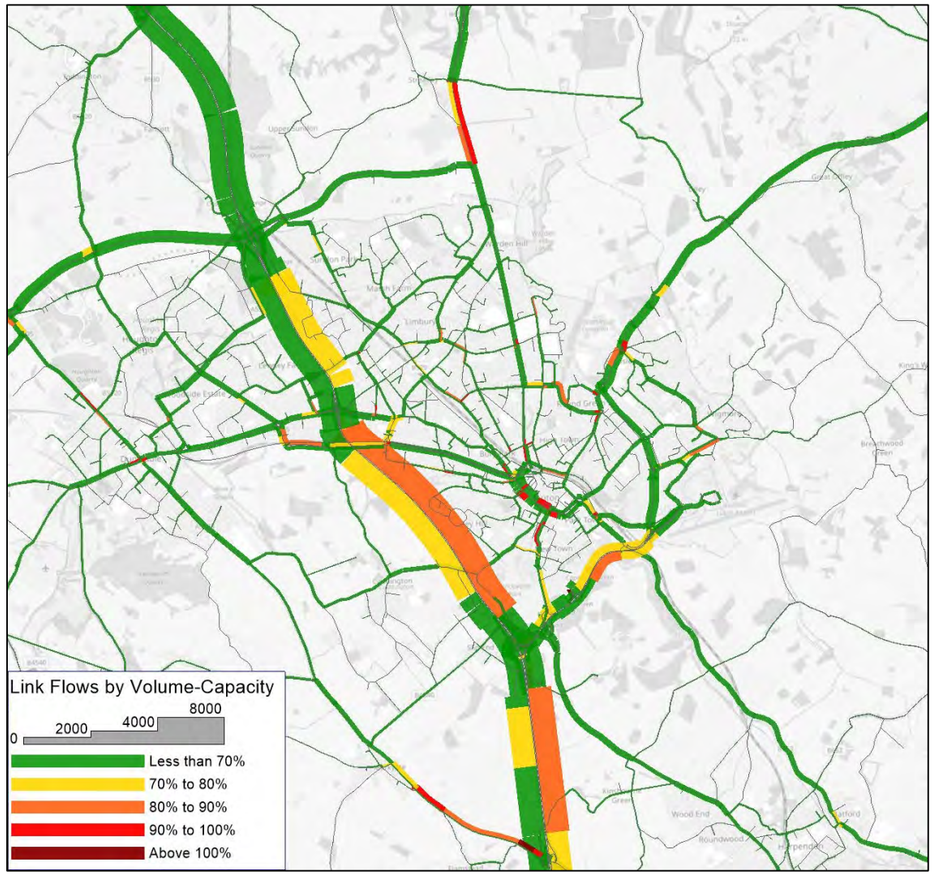


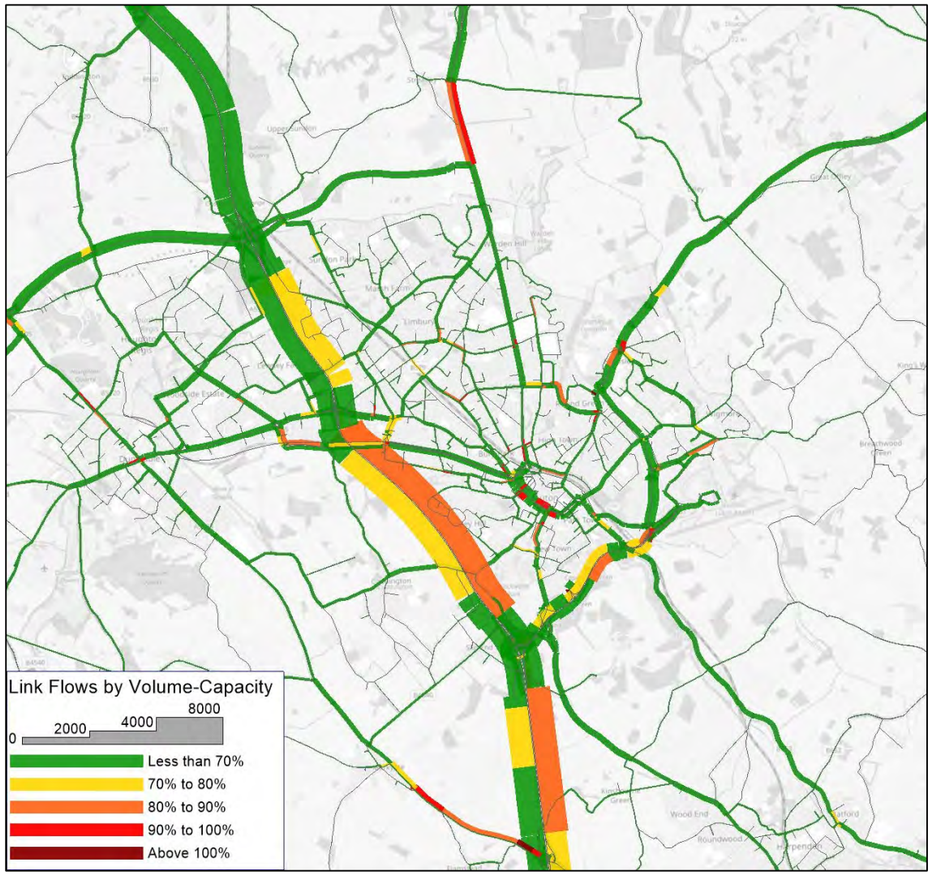
Figure E.5: Forecast Link-based V/C, TAG-based “Without” and “With” Expansion Forecasts, Luton Borough – 2027

AM Peak Hour
(08:00 – 09:00)

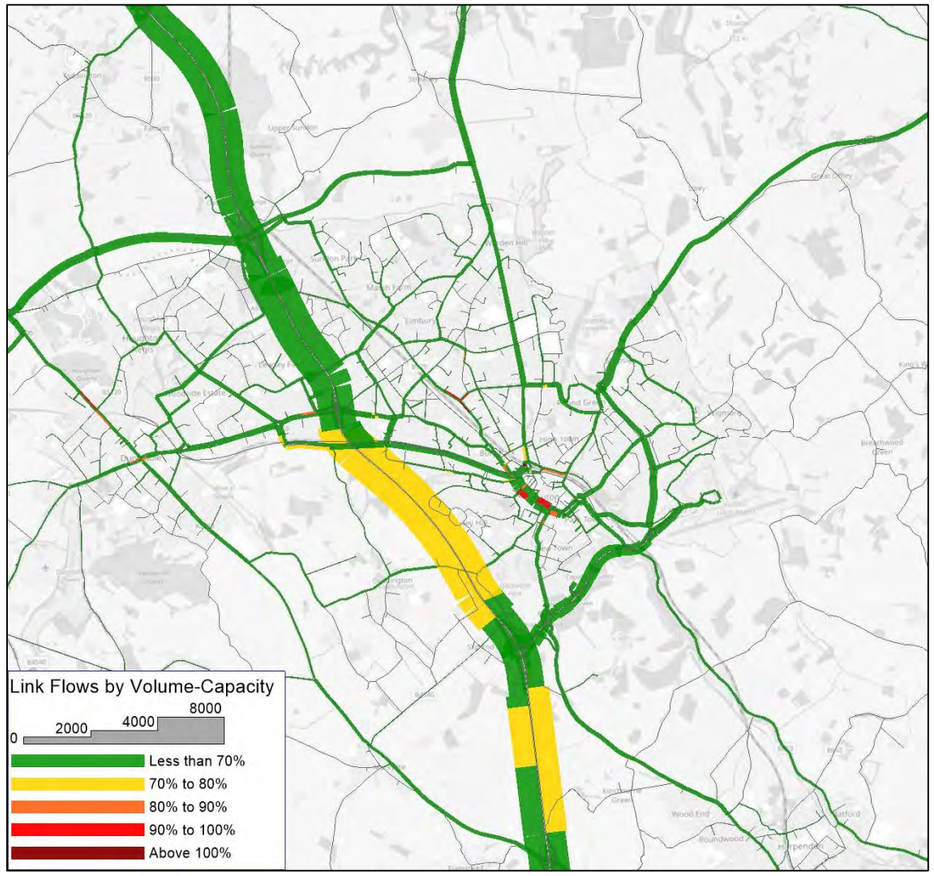
“Without Expansion

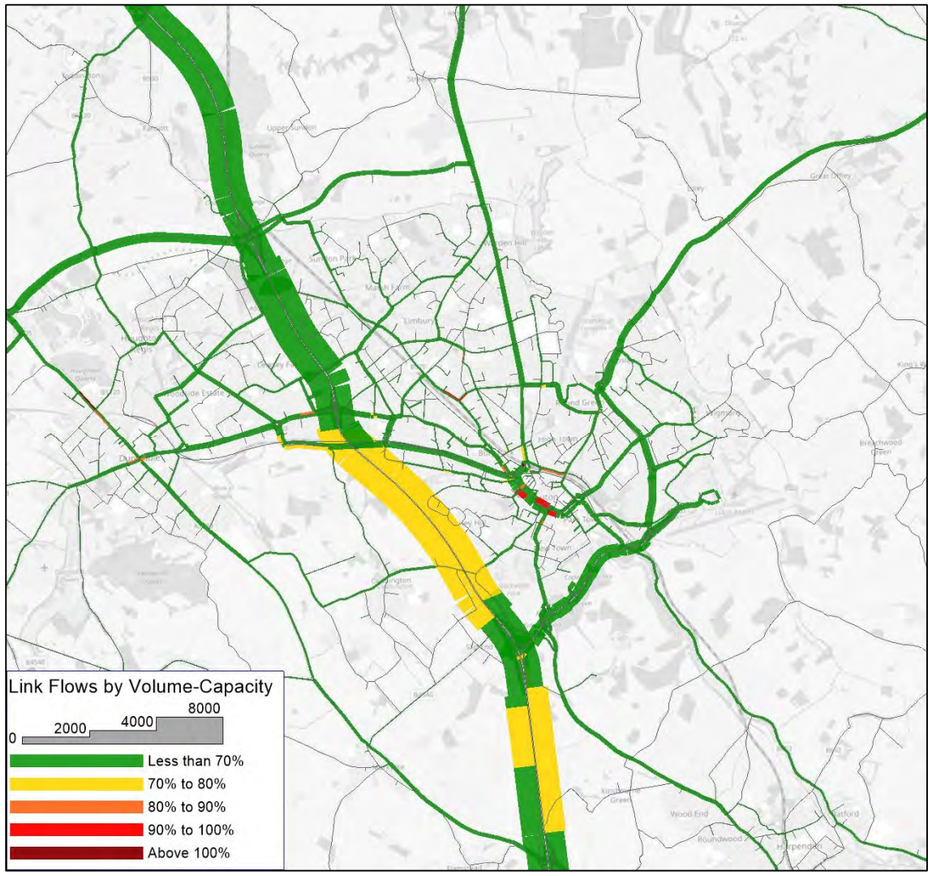


“With” Expansion

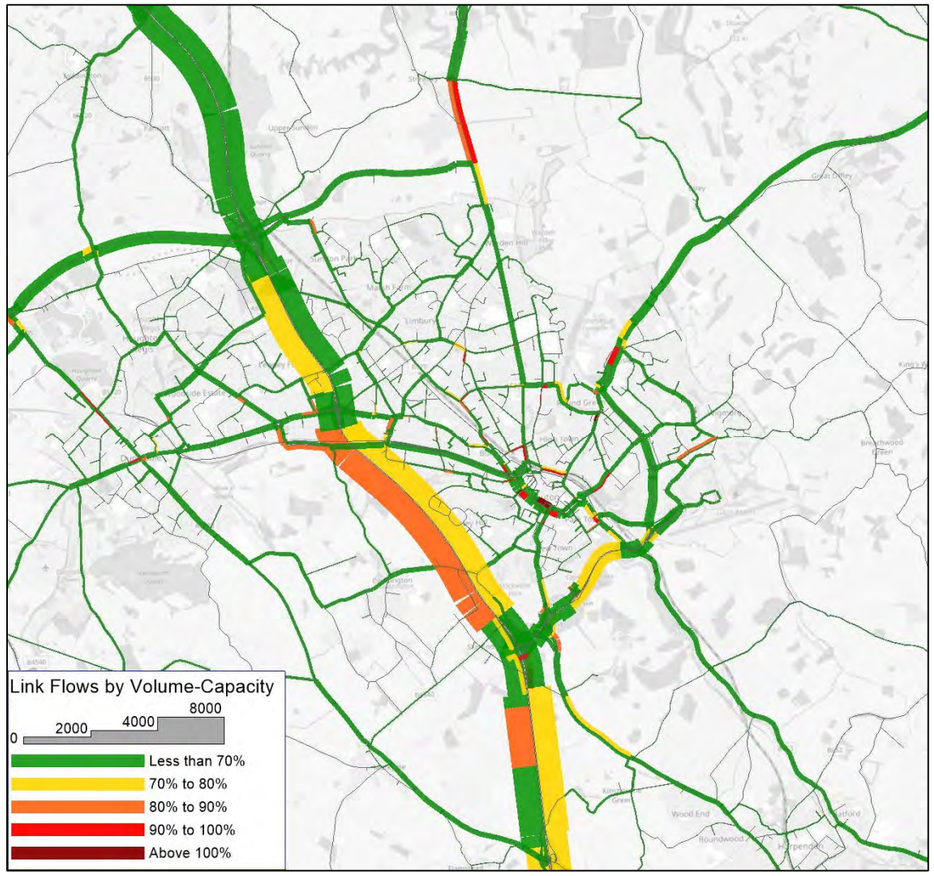


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



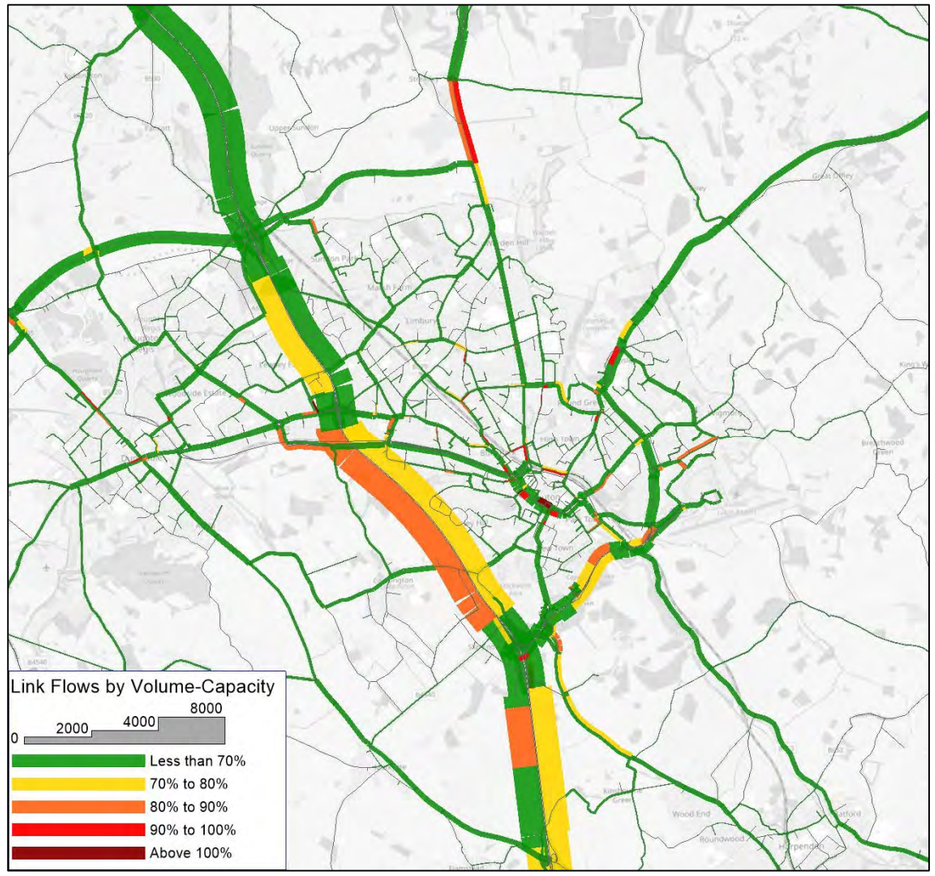
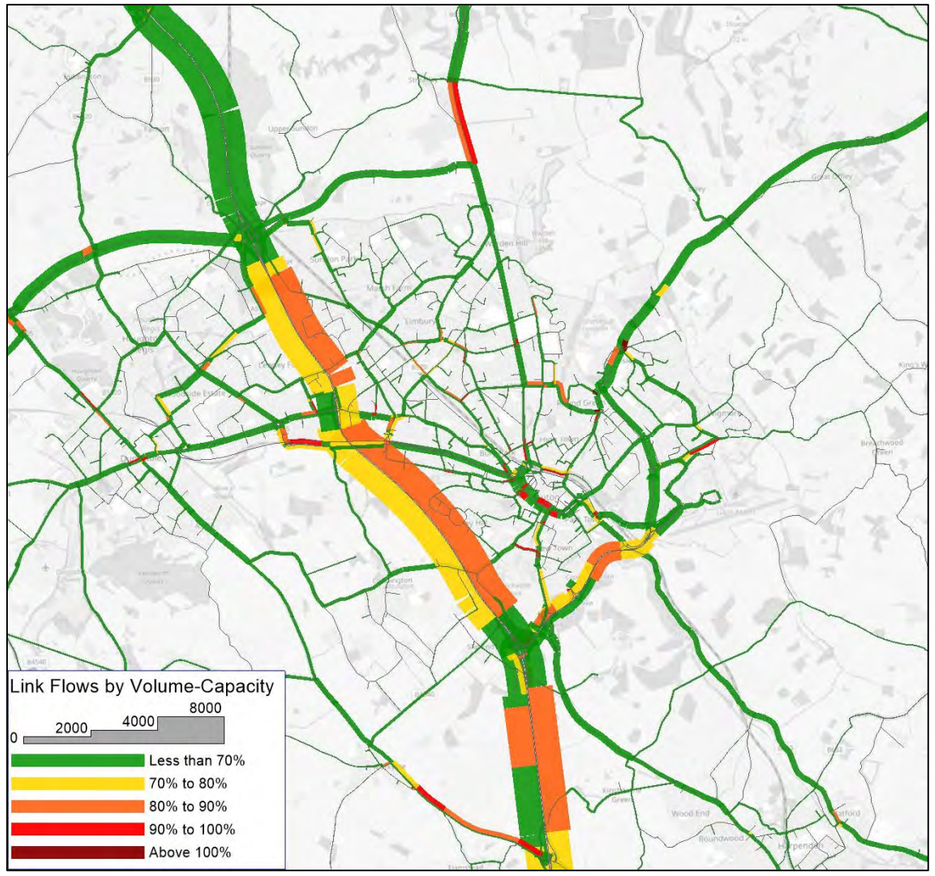


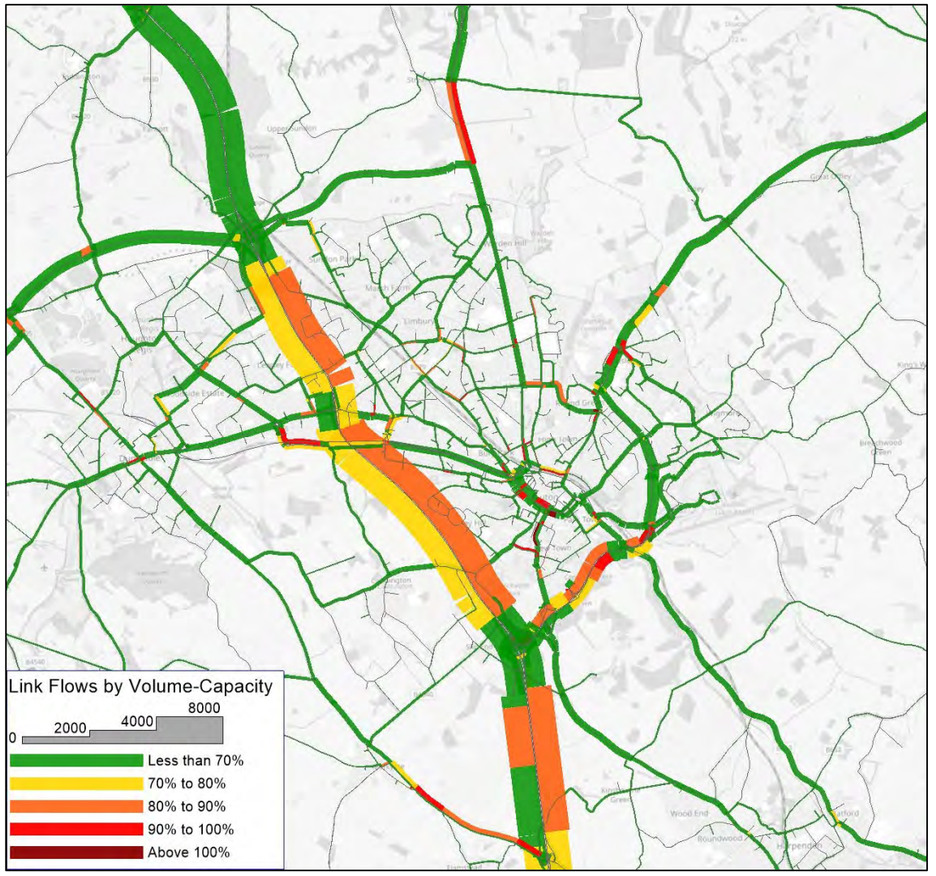
Figure E.6: Forecast Link-based V/C, TAG-based “Without” and “With” Expansion Forecasts, Luton Borough – 2039

AM Peak Hour
(08:00 – 09:00)

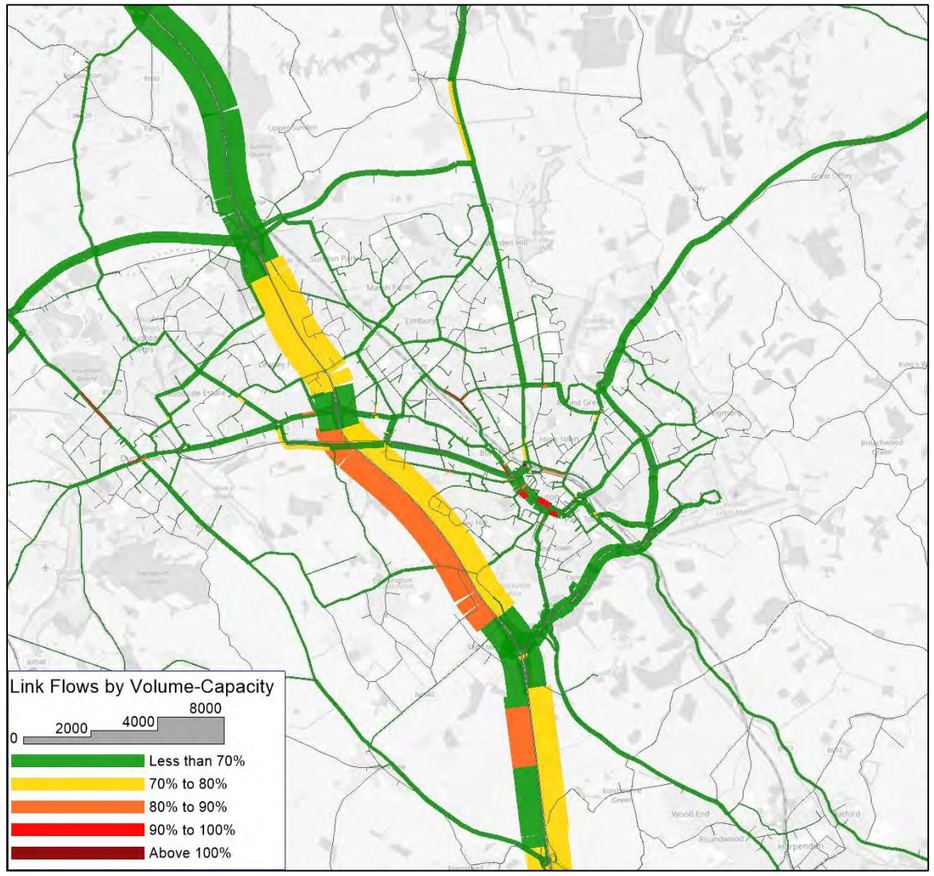
“Without Expansion

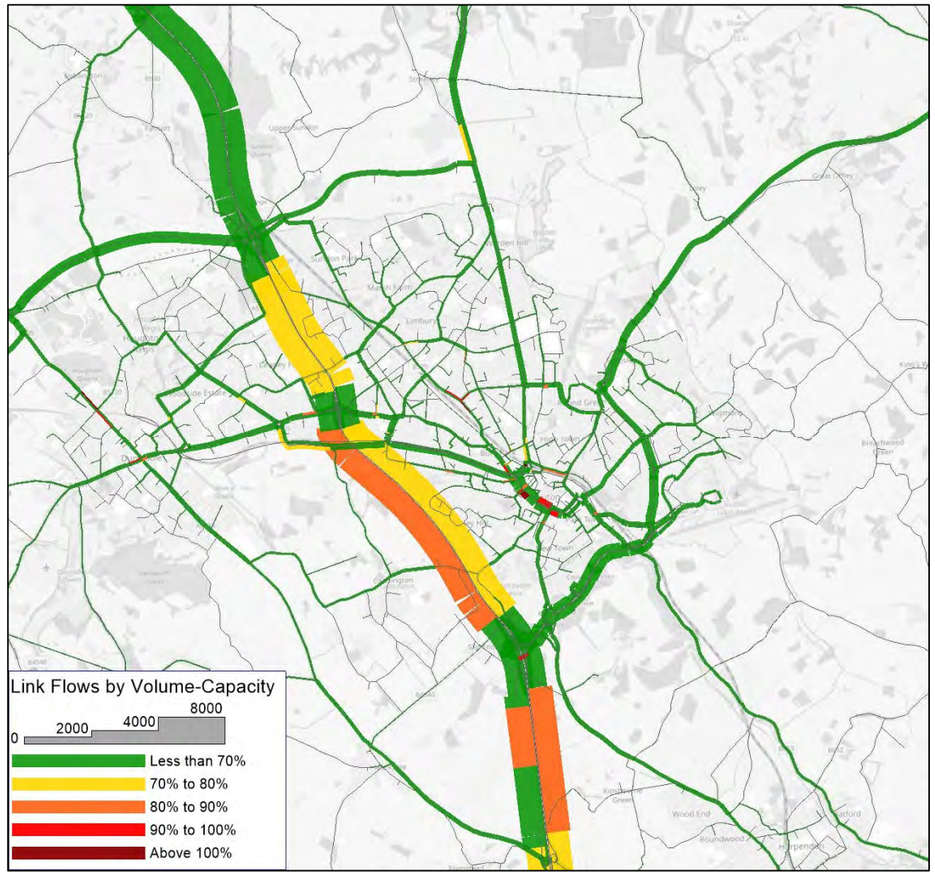


“With” Expansion

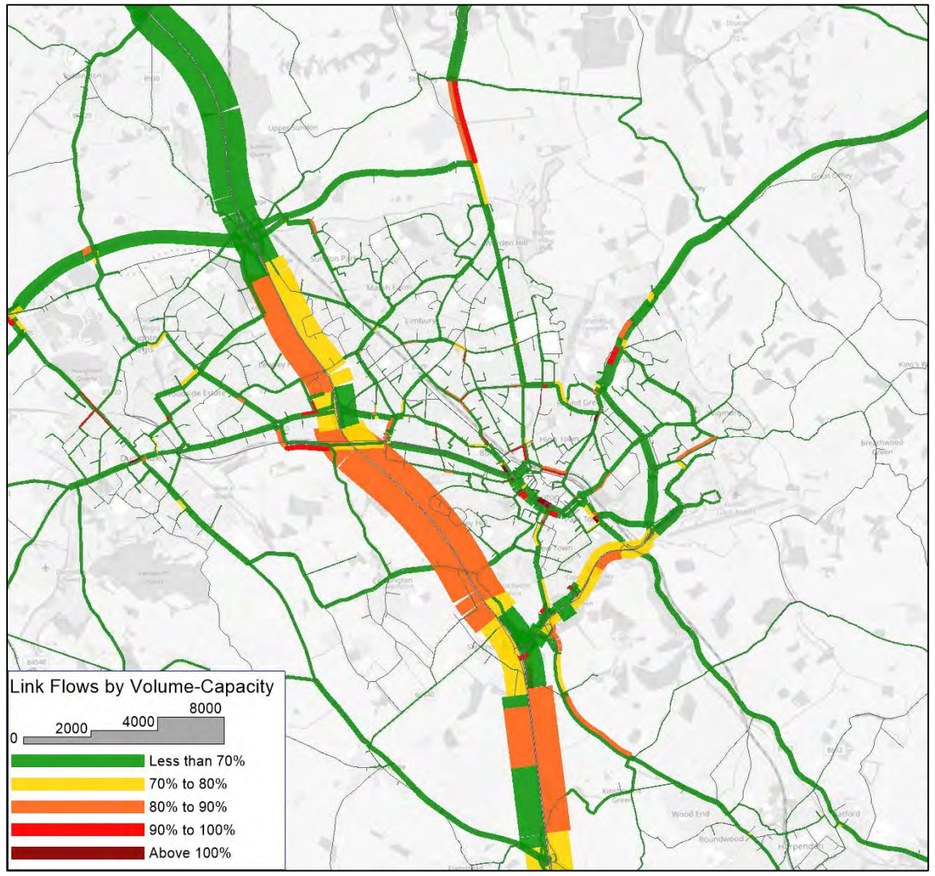


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



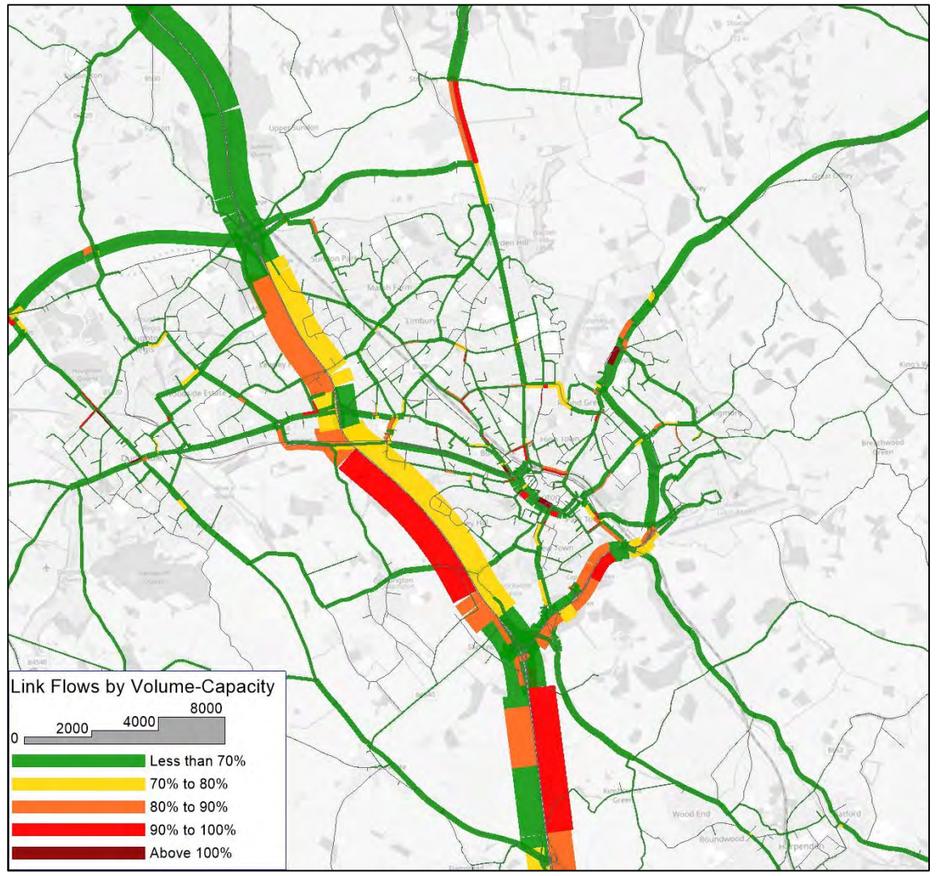
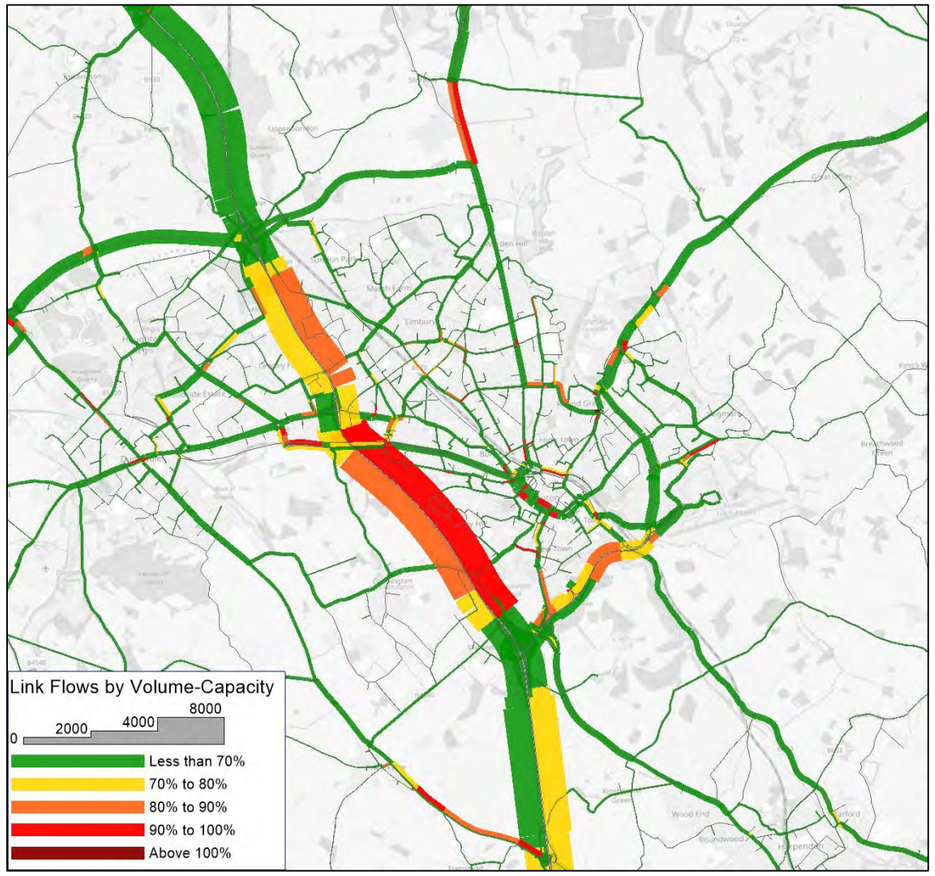


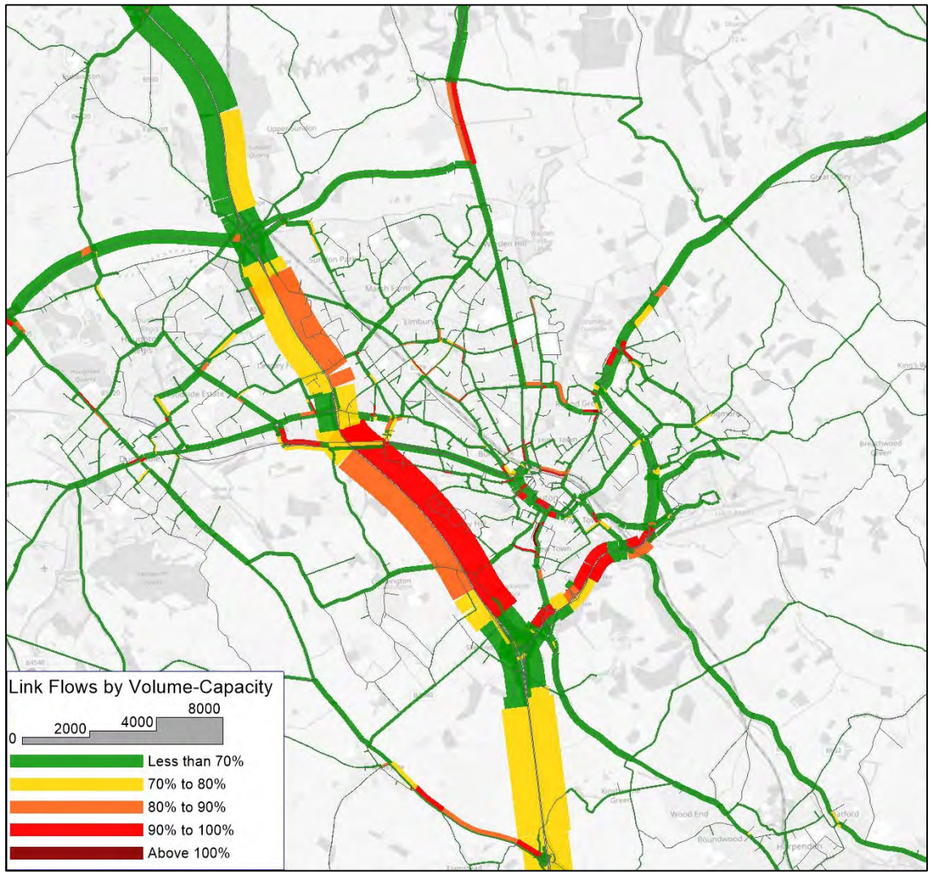
Figure E.7: Forecast Link-based V/C, TAG-based “Without” and “With” Expansion Forecasts, Luton Borough – 2043

AM Peak Hour
(08:00 – 09:00)

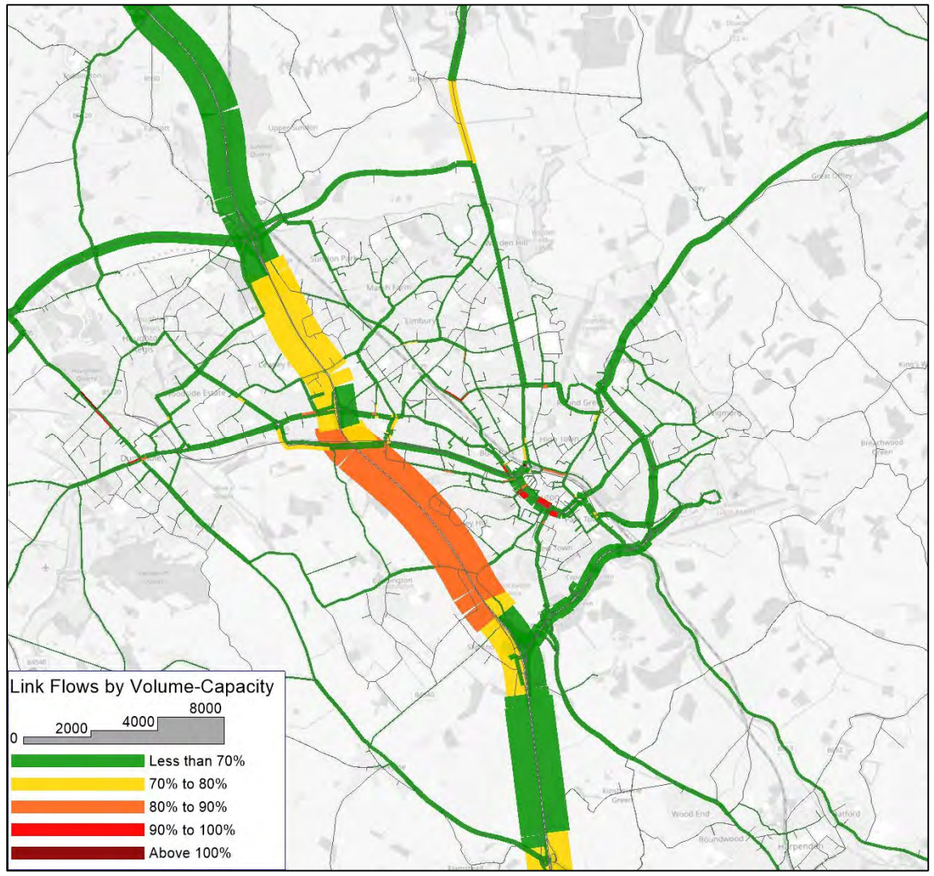
“Without Expansion

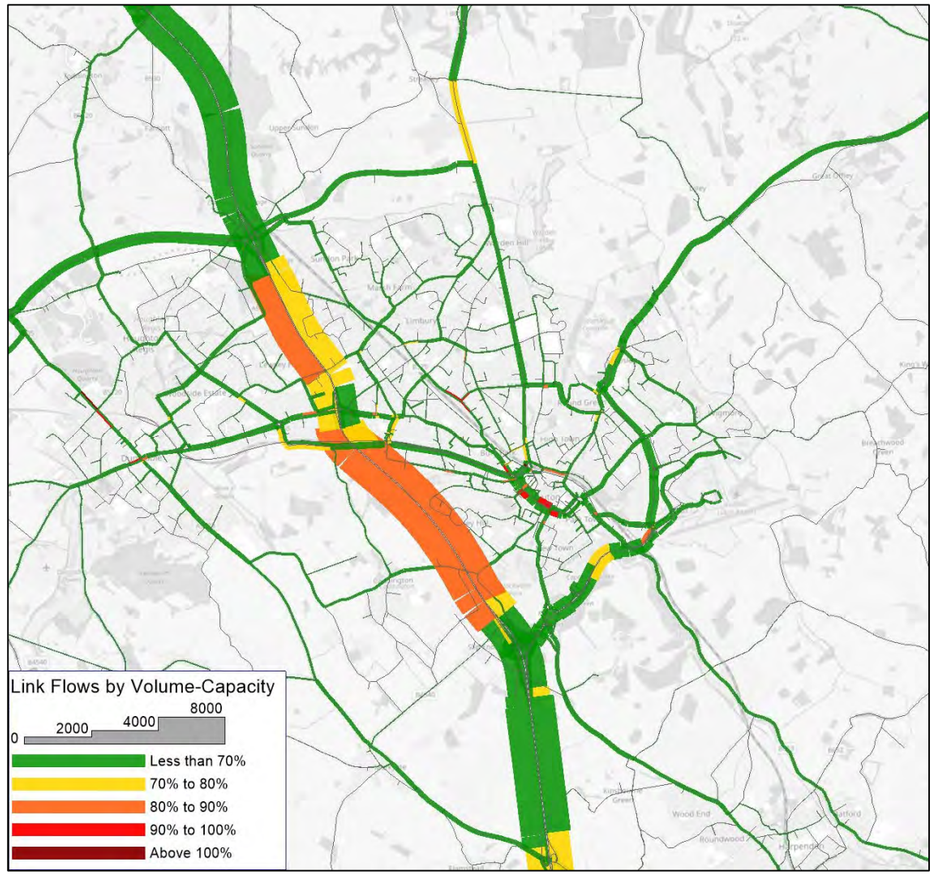


“With” Expansion

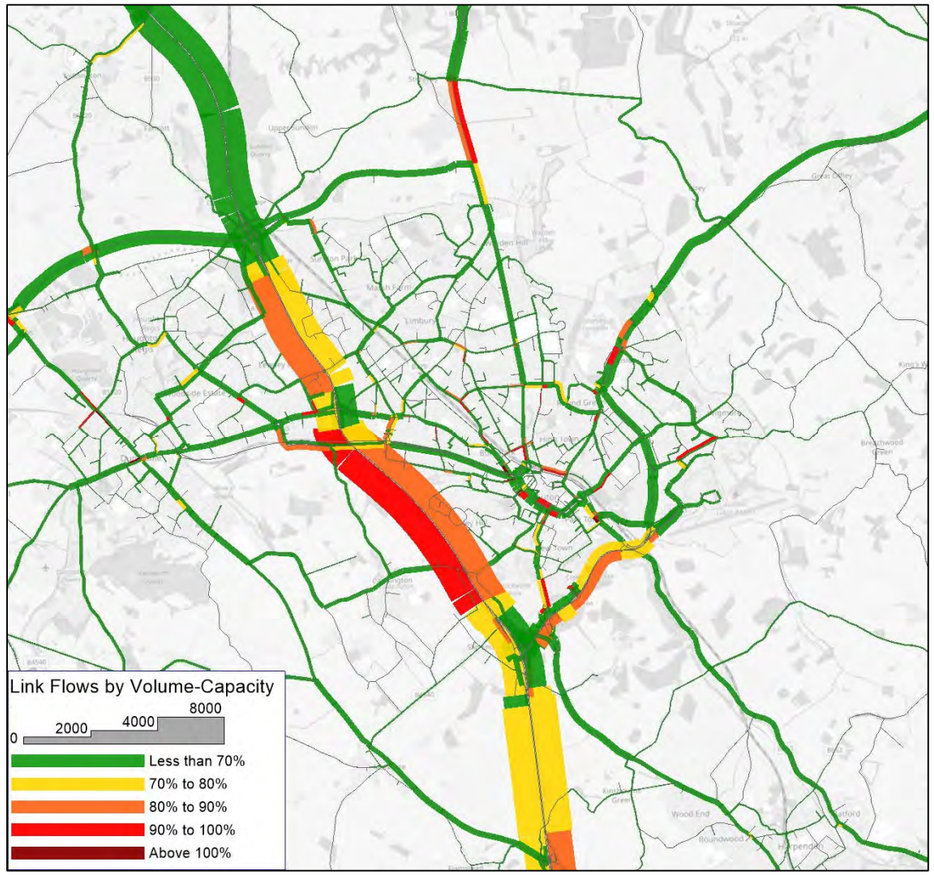


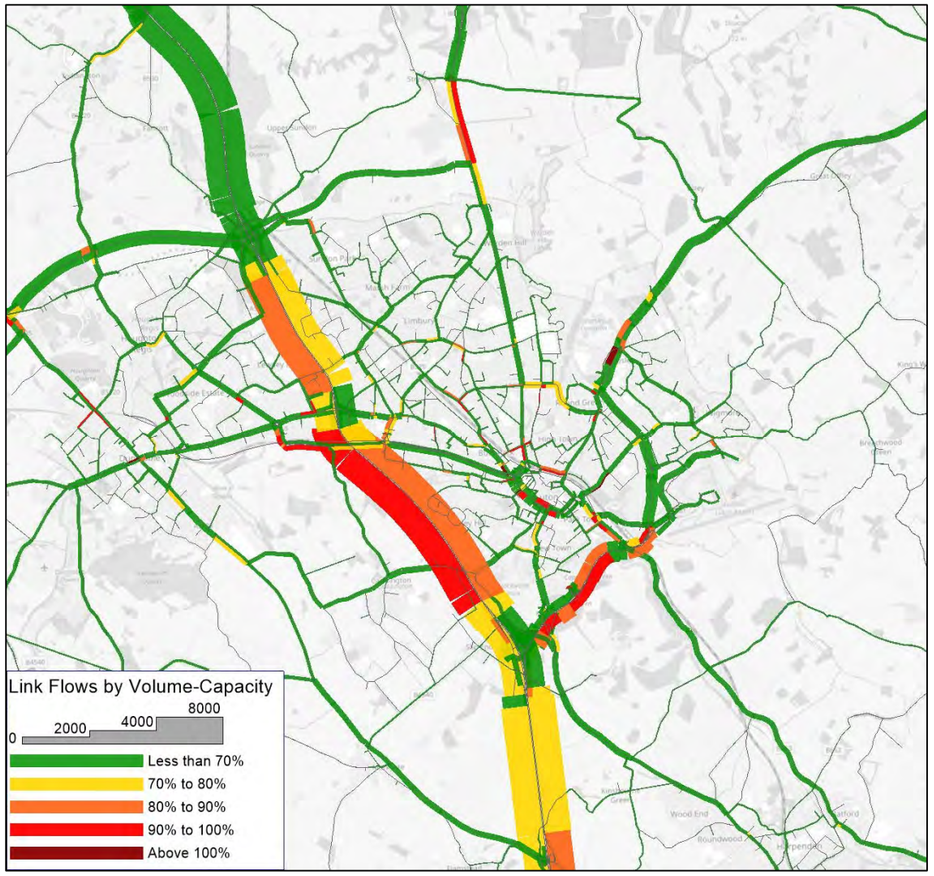
Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



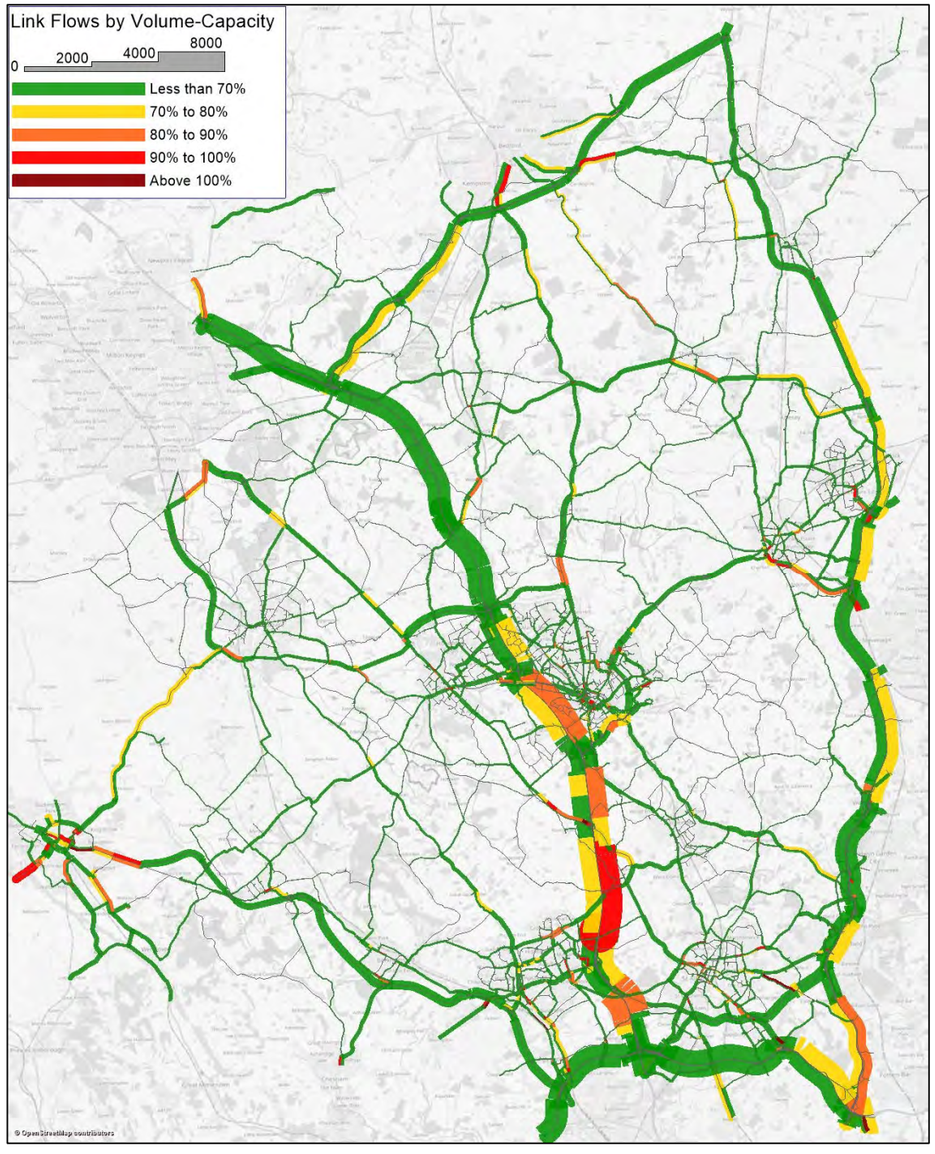


Appendix F - Local Plan Alternative Scenario Link-based V/C

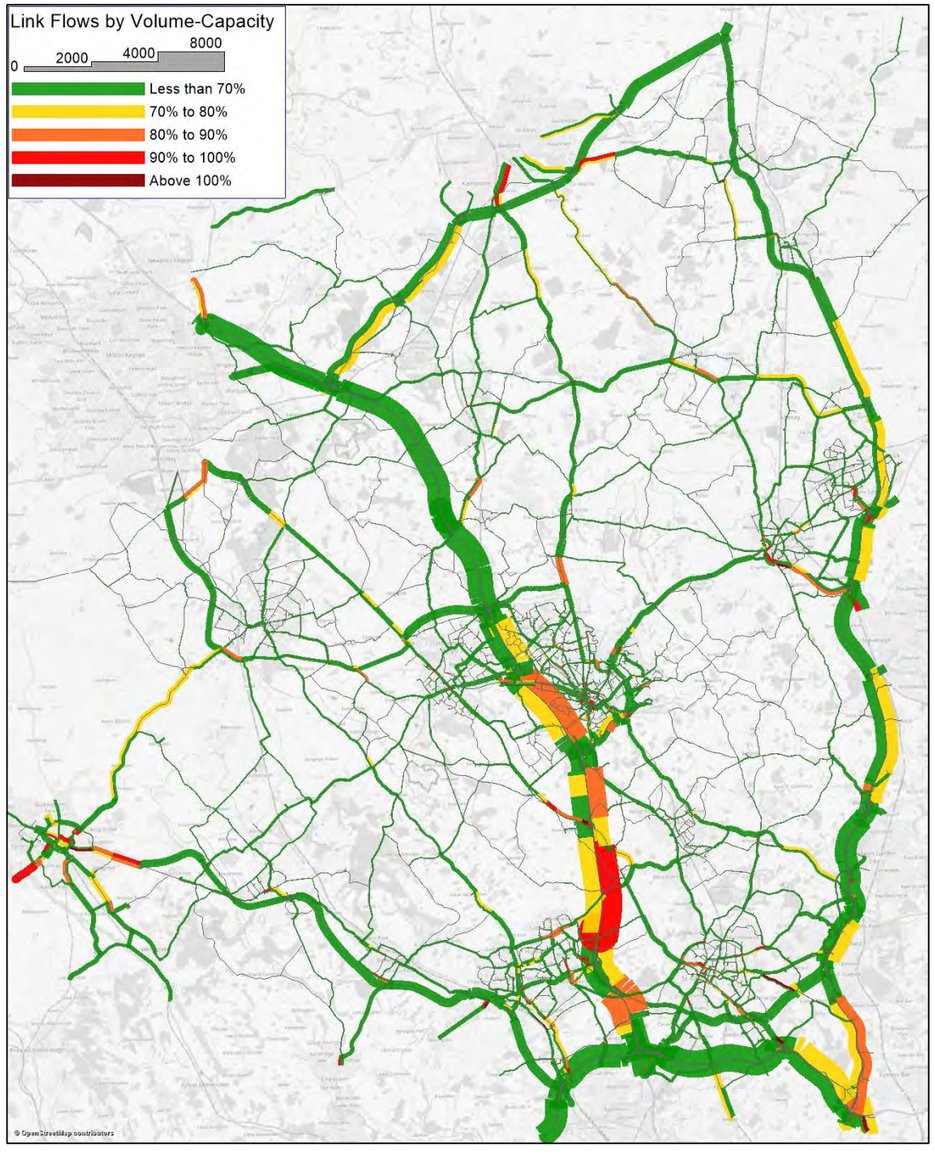
Figure F.1: Forecast Link-based V/C, Local Plan Alternative Scenario Forecasts, Simulation Network – 2027

AM Peak Hour
(08:00 – 09:00)

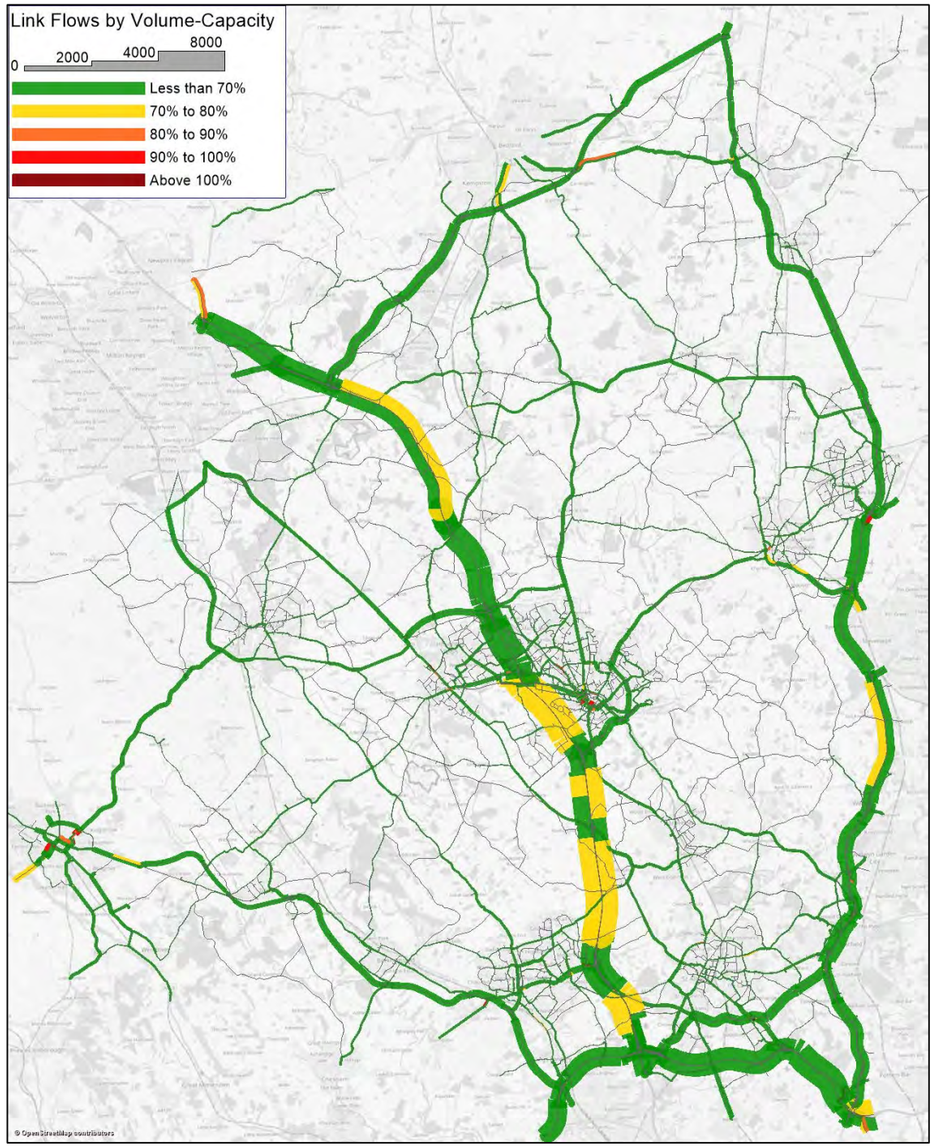
"Without Expansion

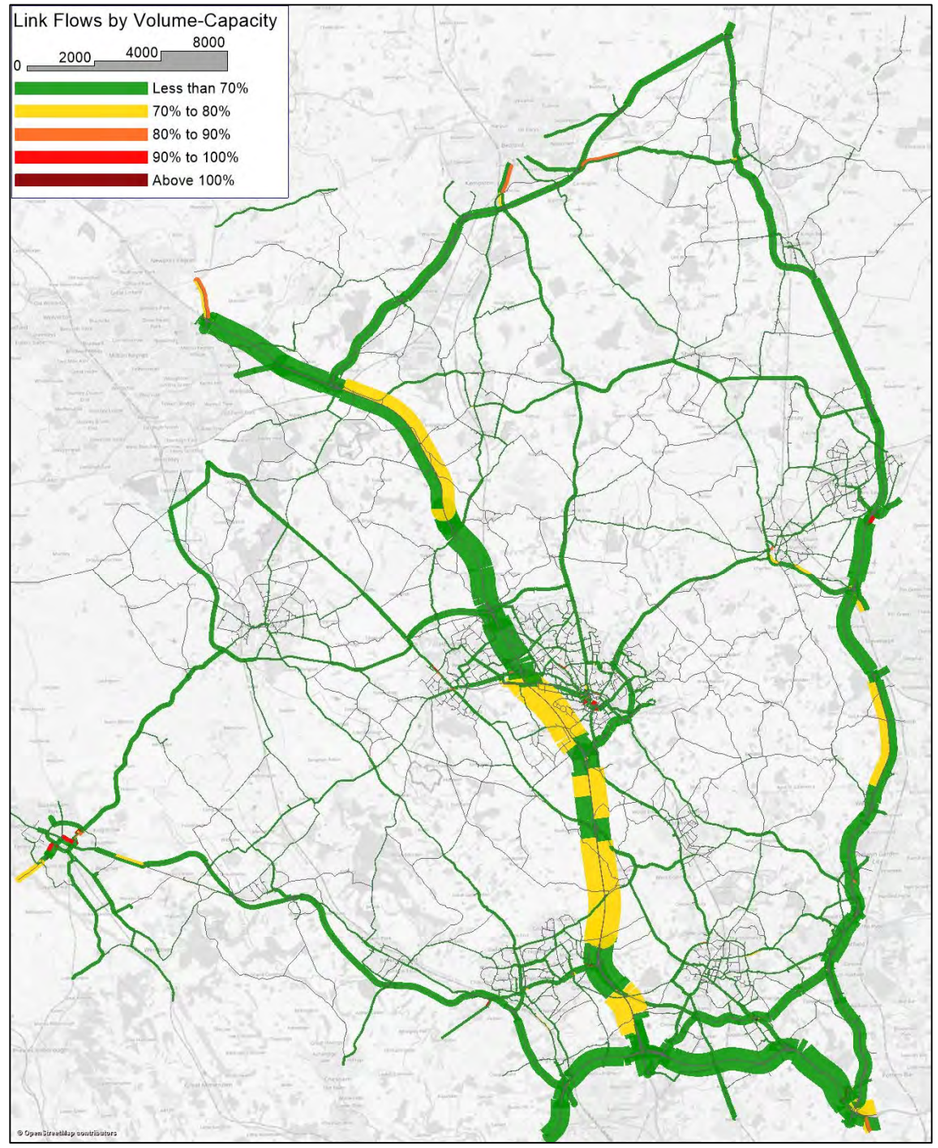


"With" Expansion

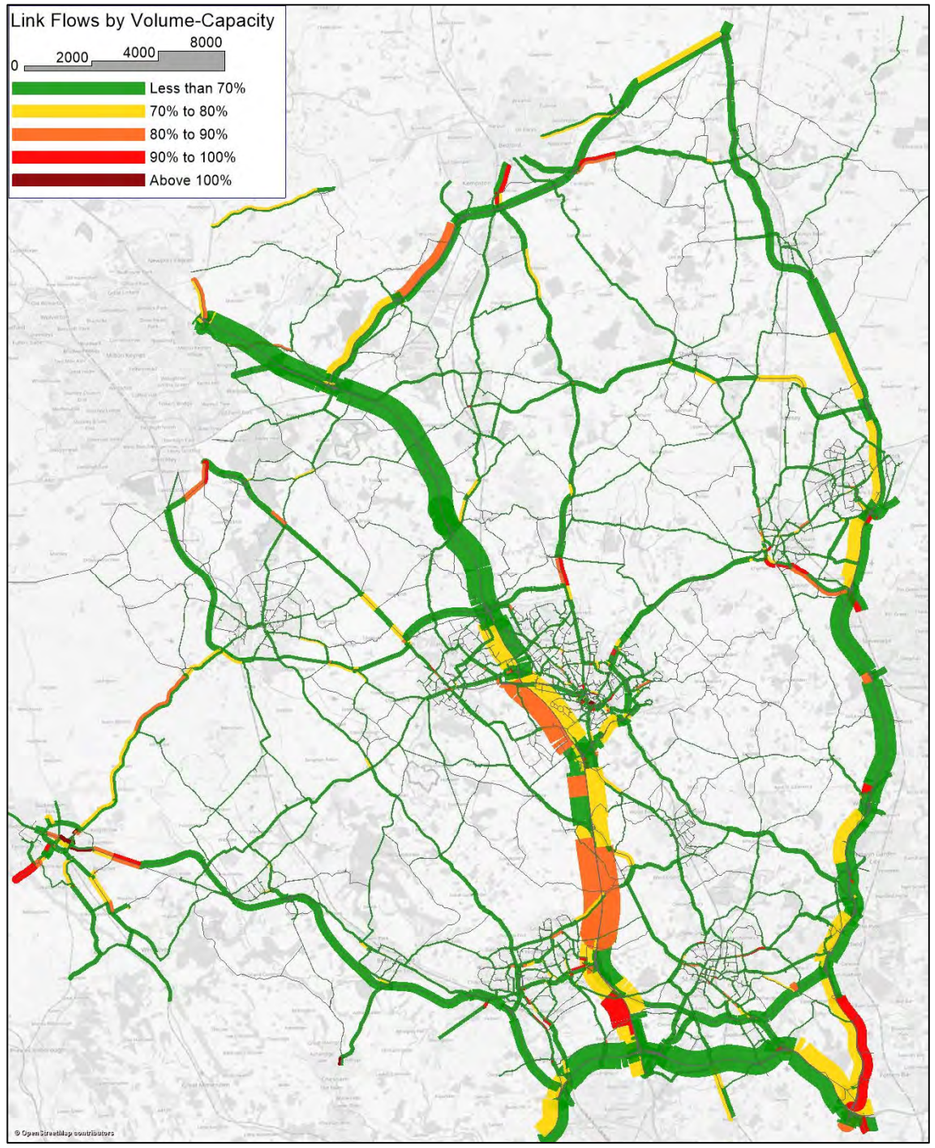


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



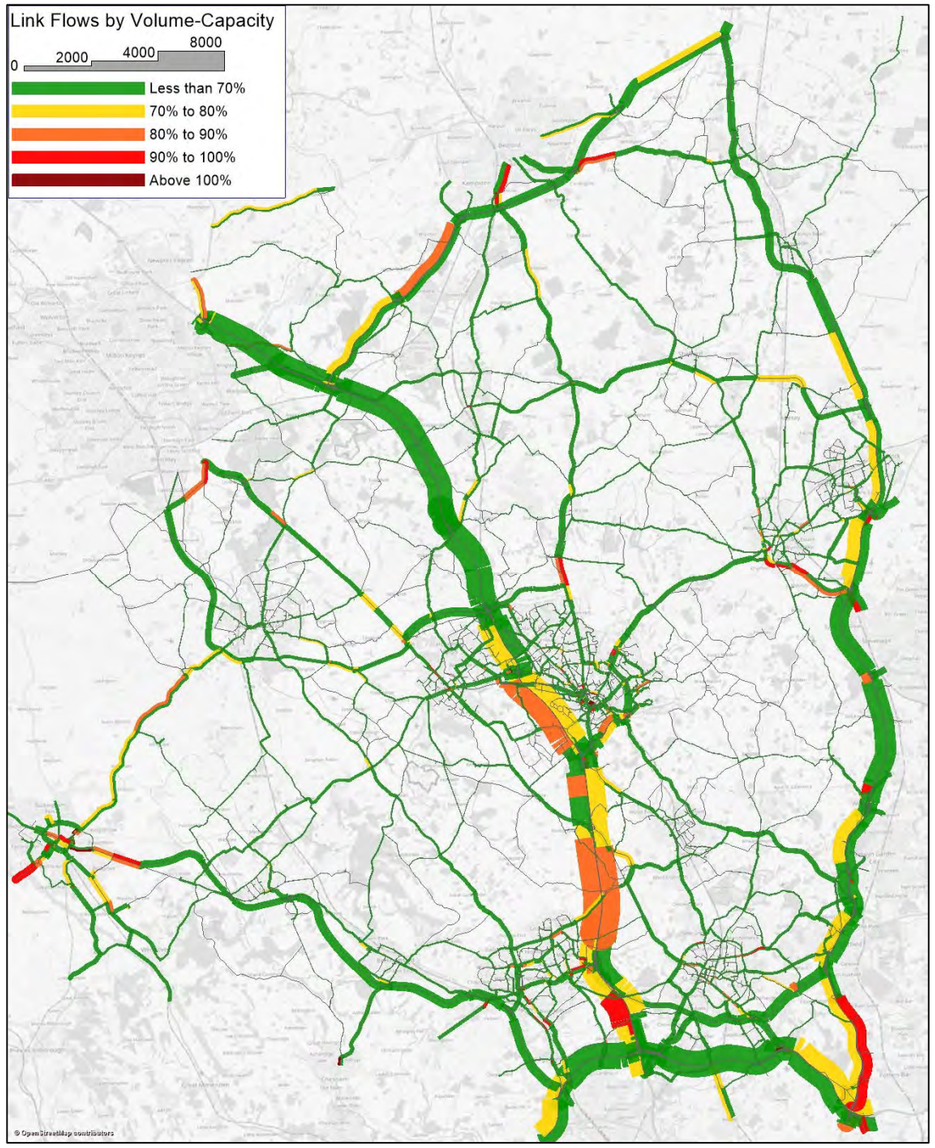
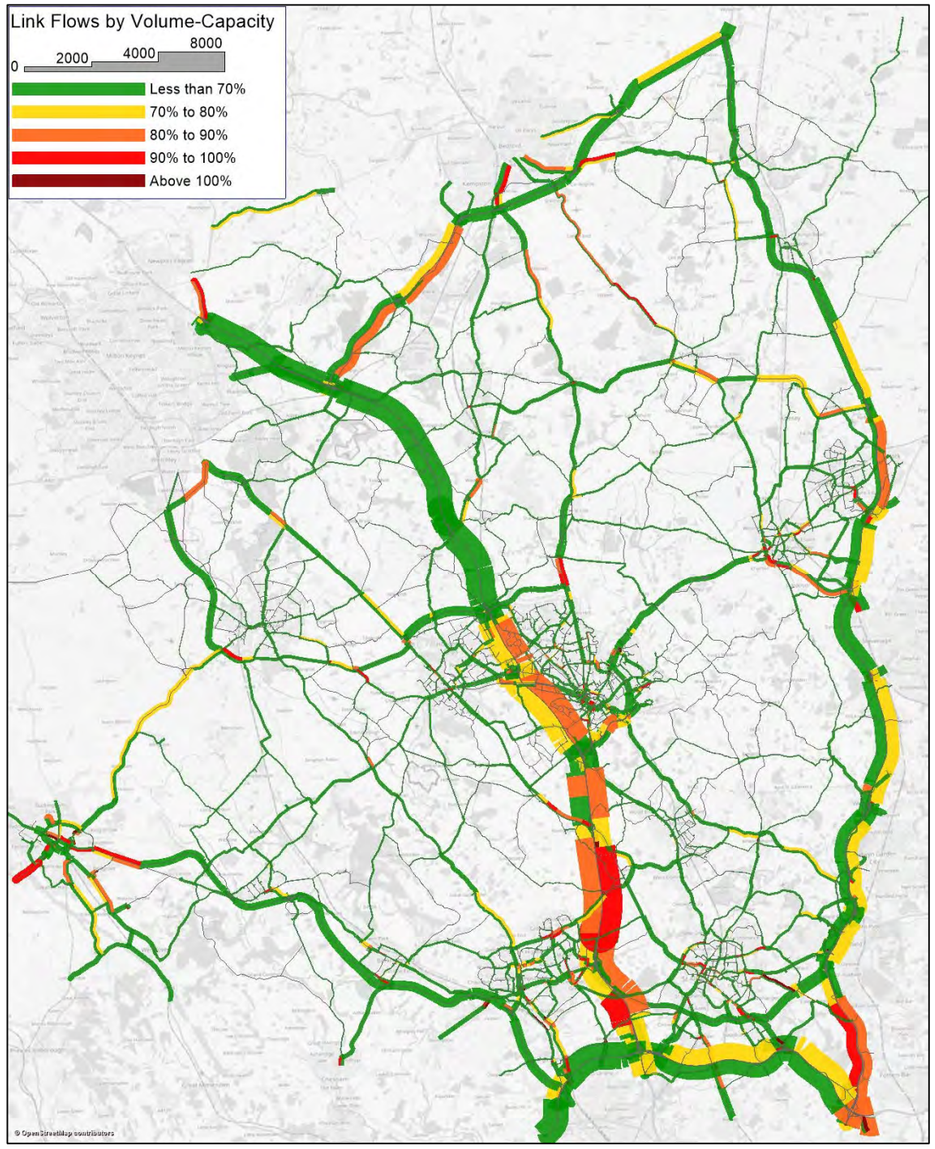


Figure F.2: Forecast Link-based V/C, Local Plan Alternative Scenario Forecasts, Simulation Network – 2039

AM Peak Hour
(08:00 – 09:00)

"Without Expansion



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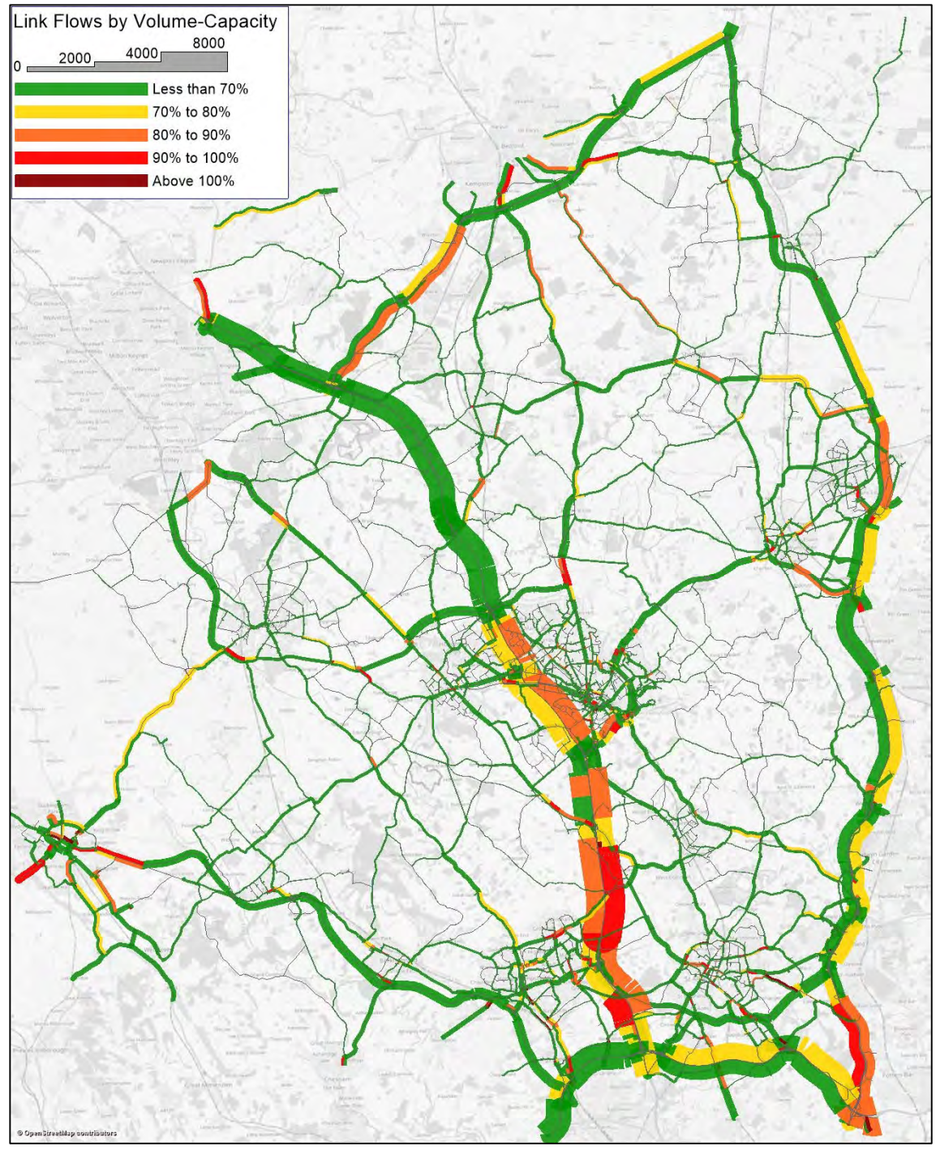
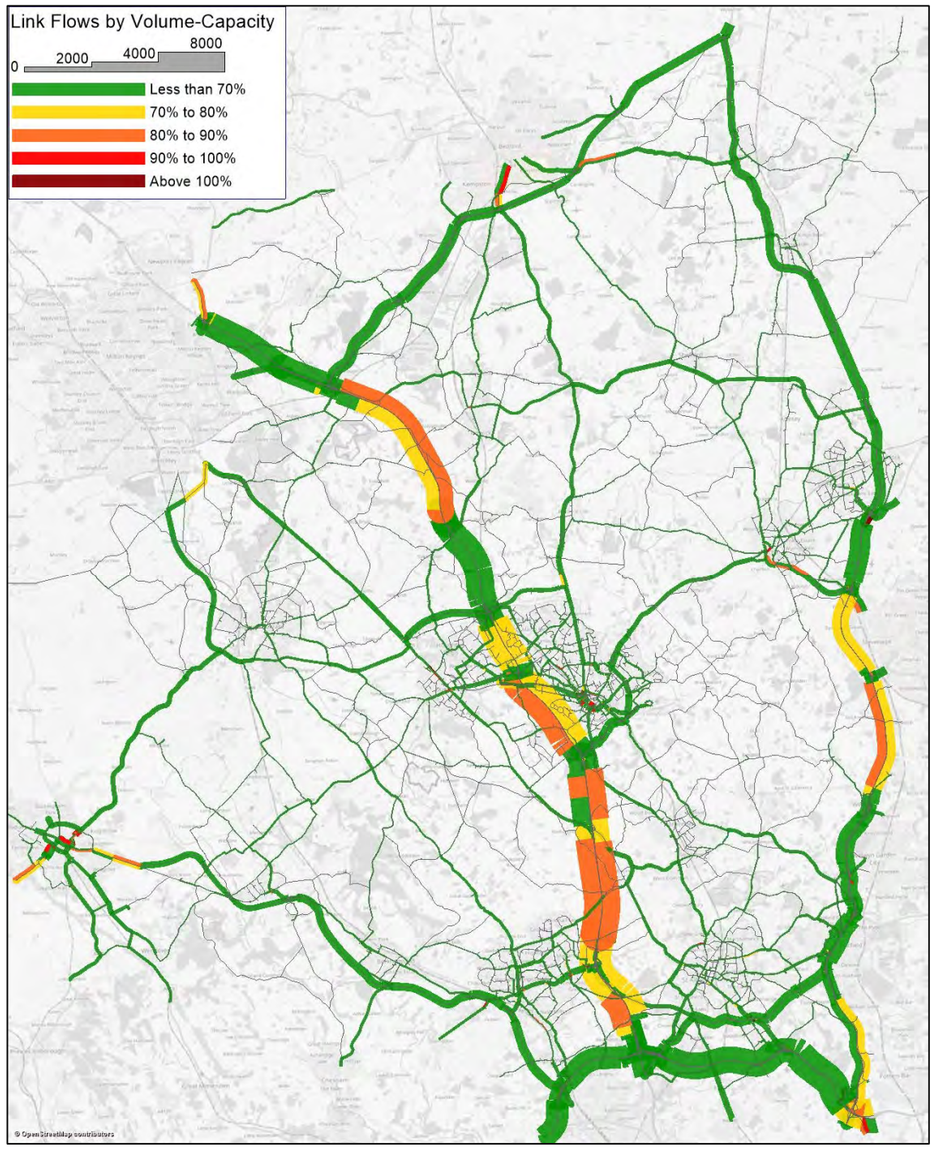
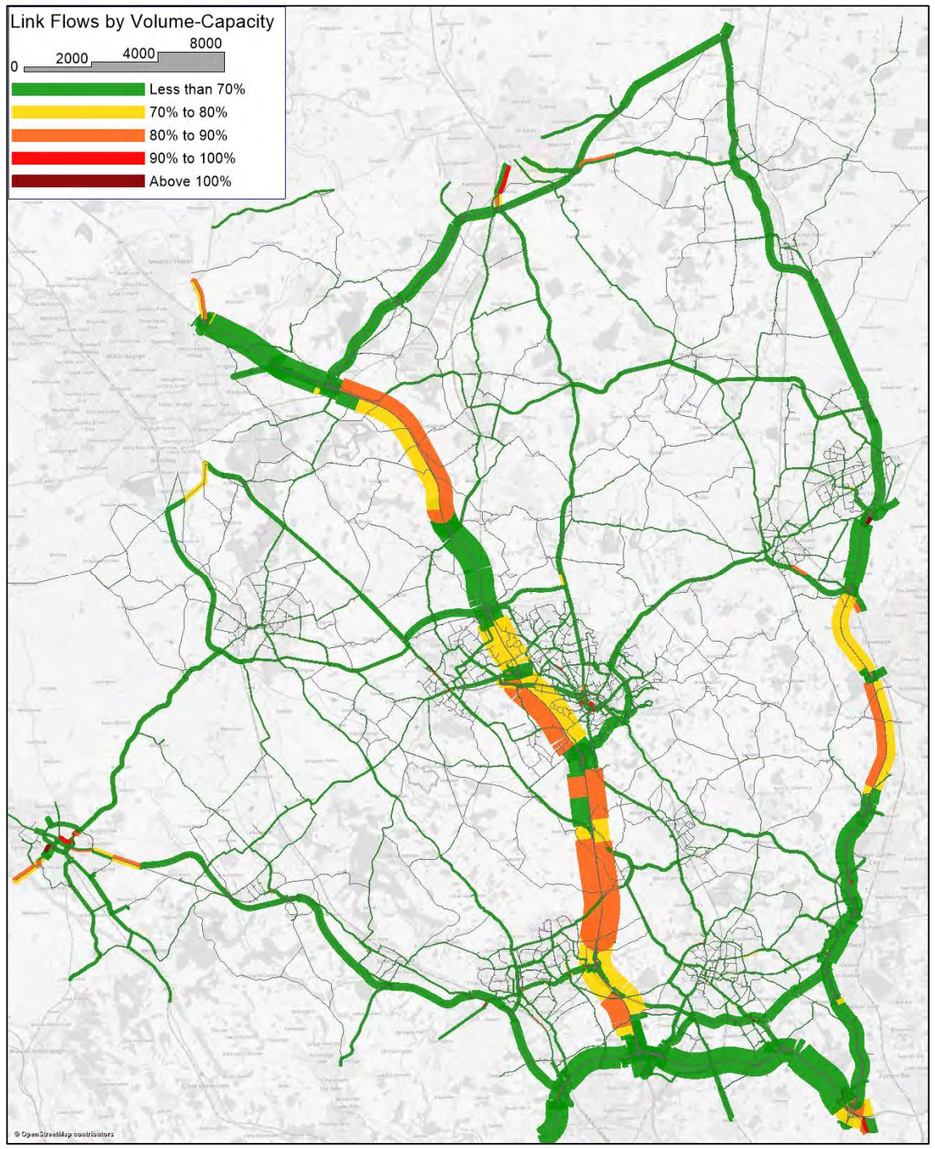
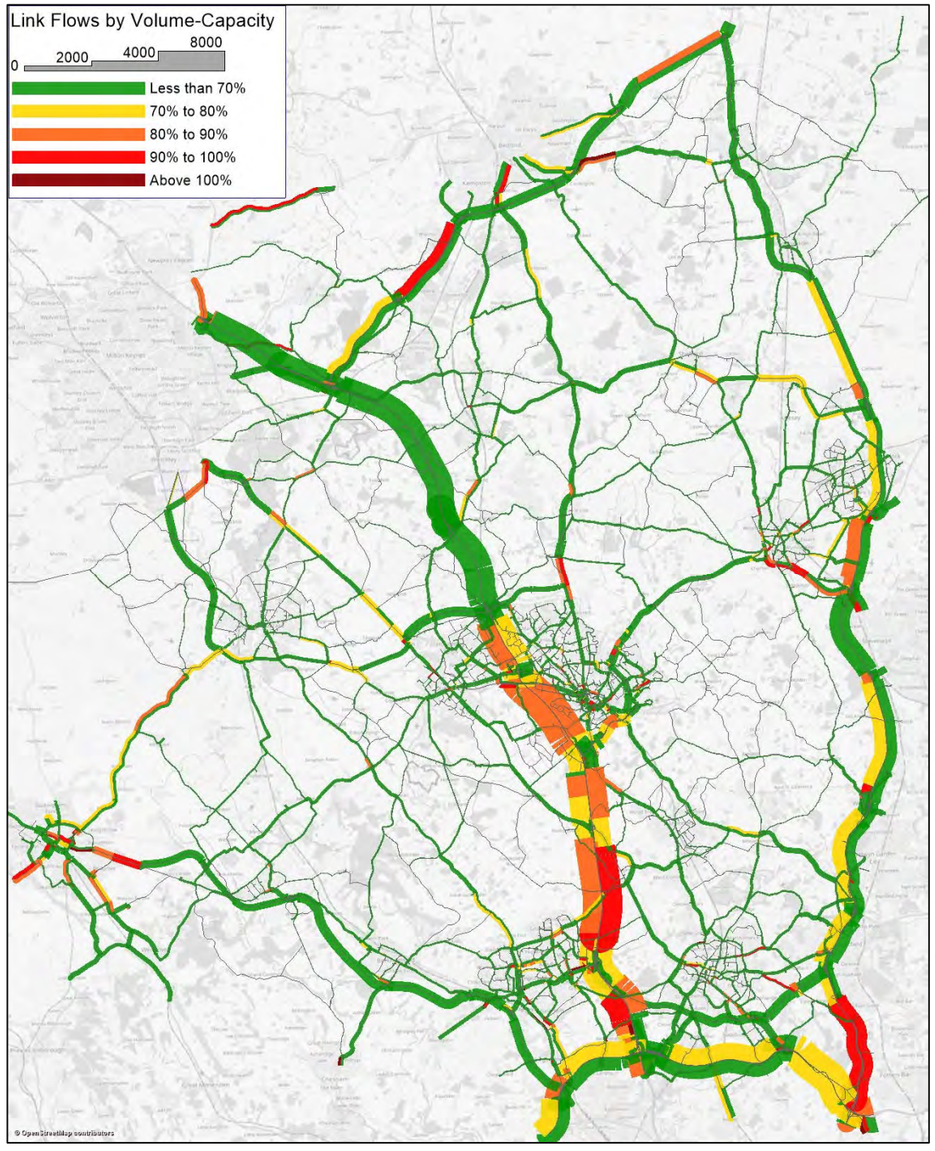


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



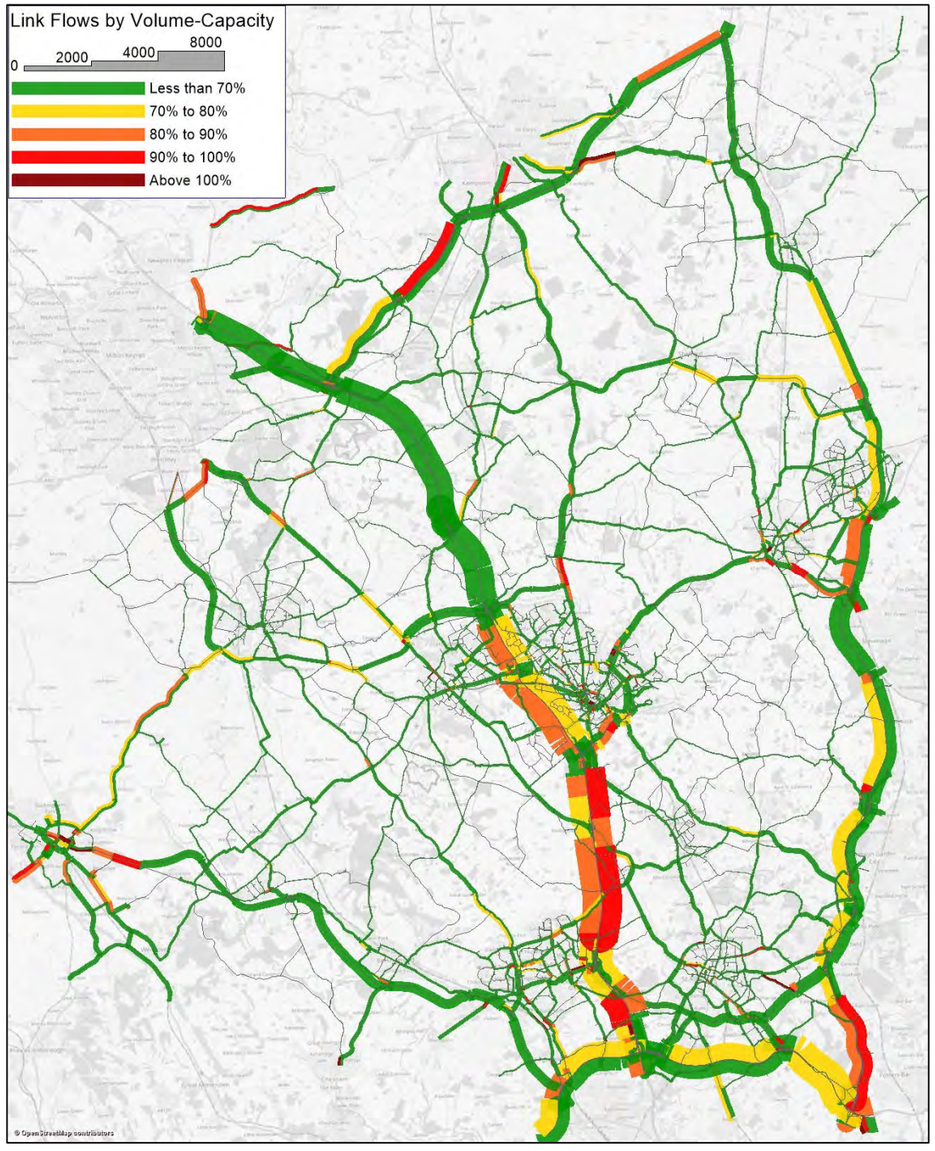
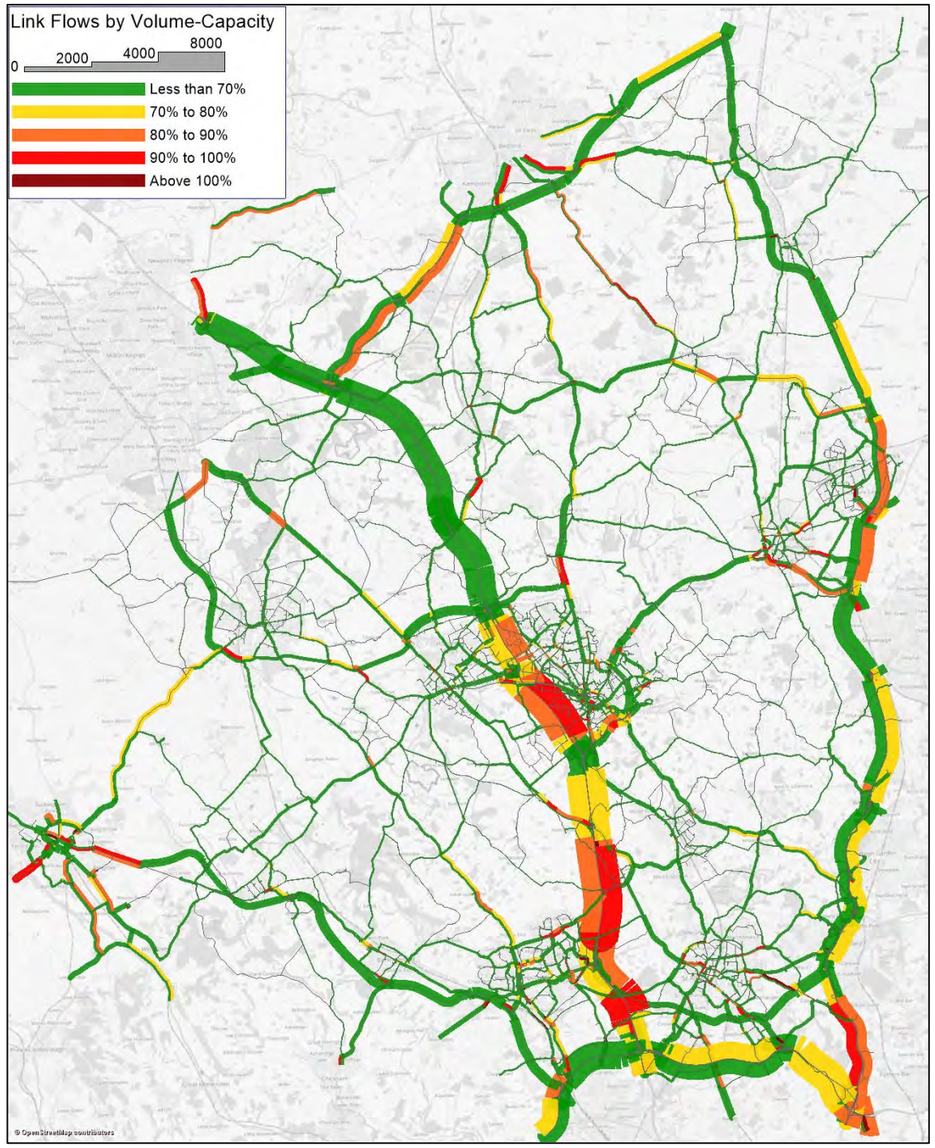
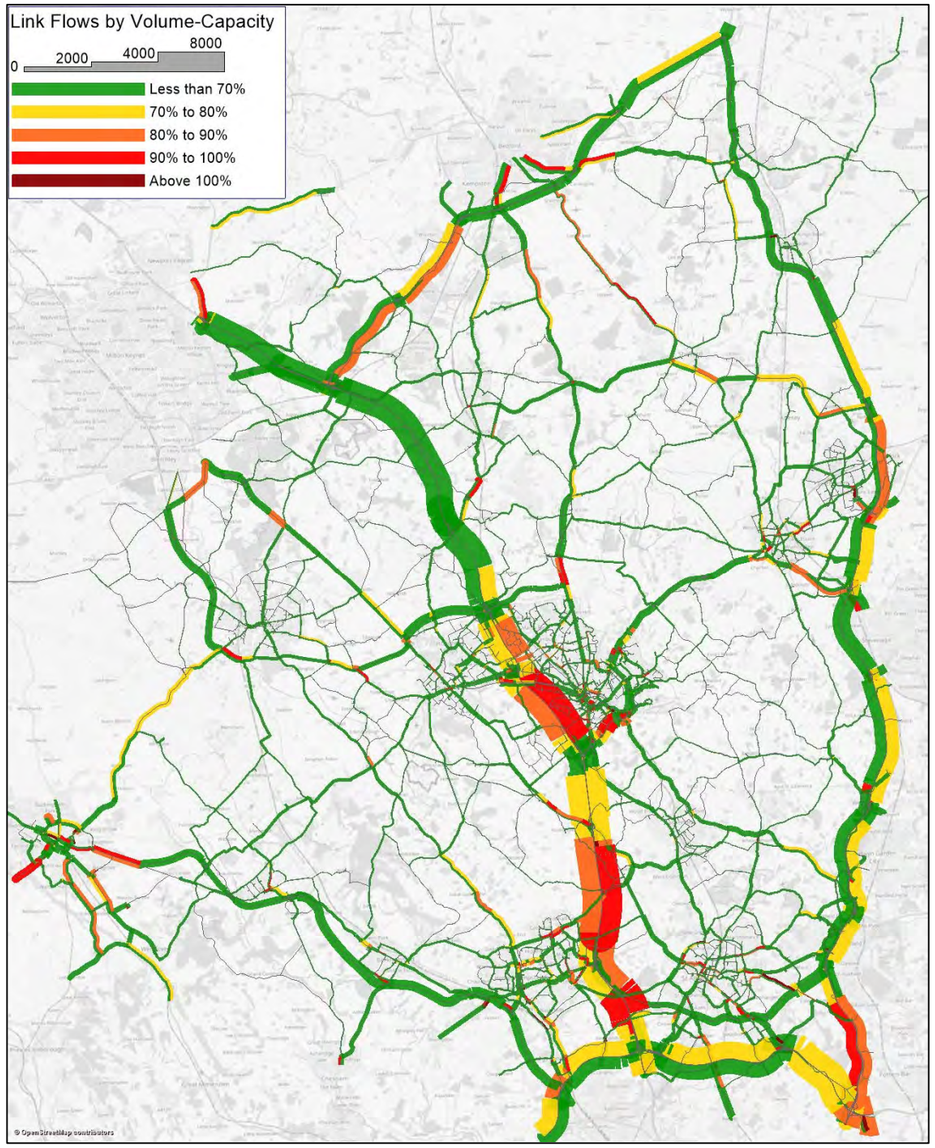
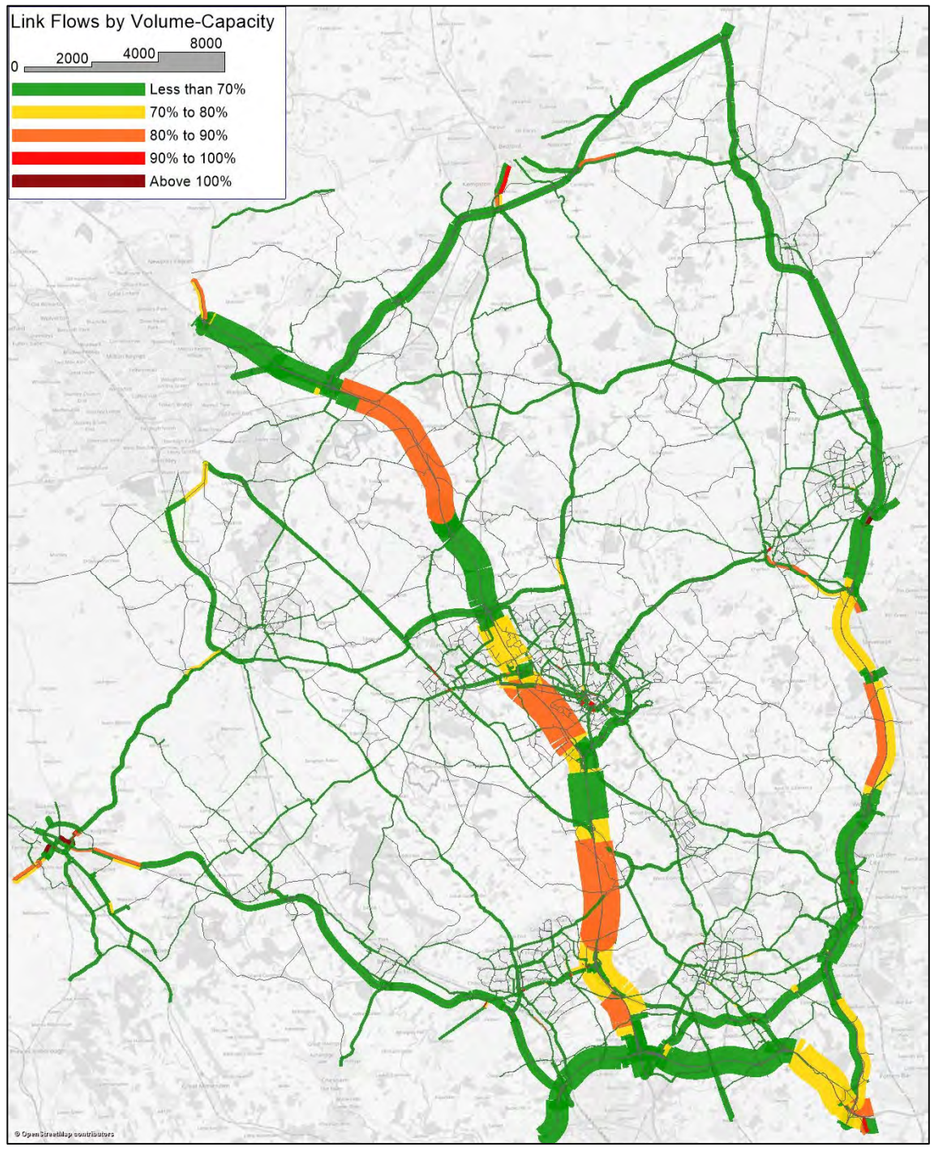
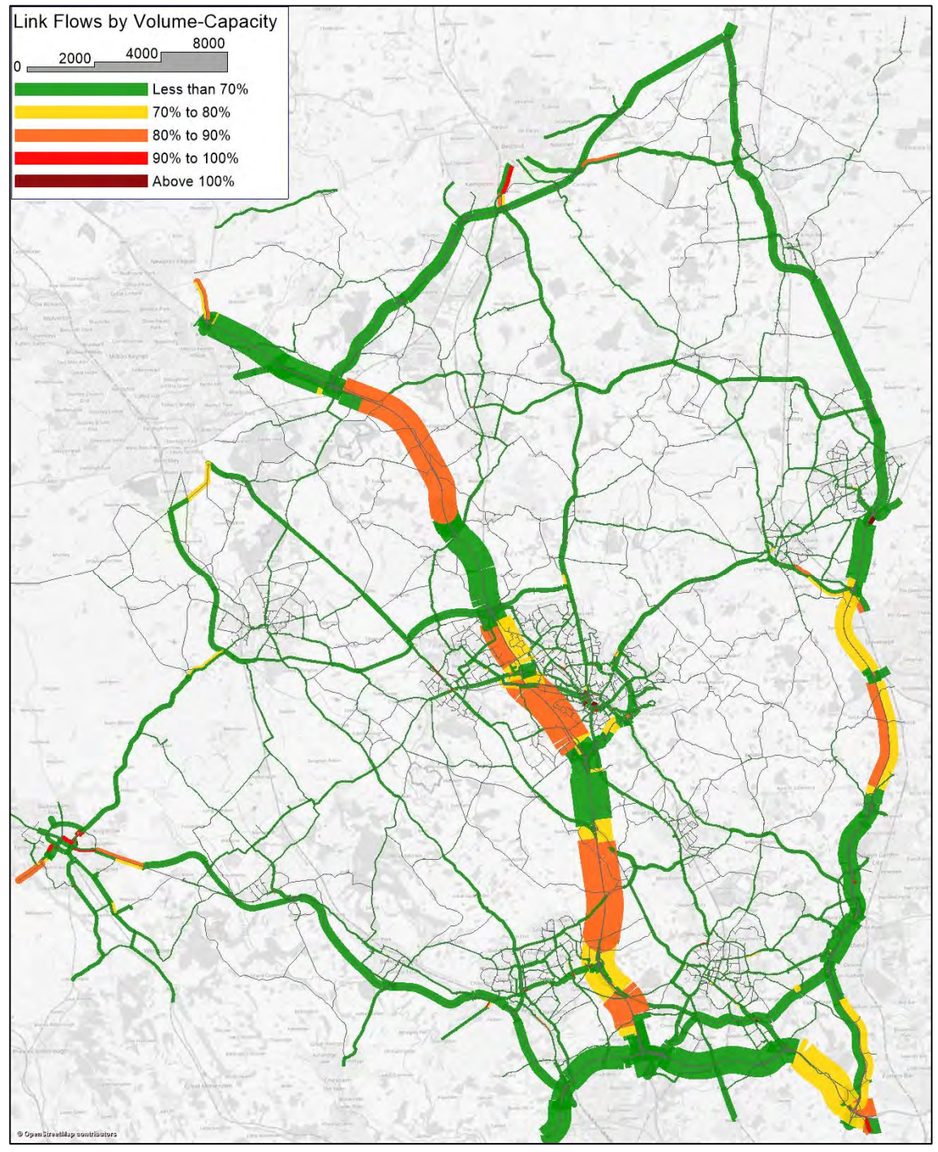


Figure F.3: Forecast Link-based V/C, Local Plan Alternative Scenario Forecasts, Simulation Network – 2043

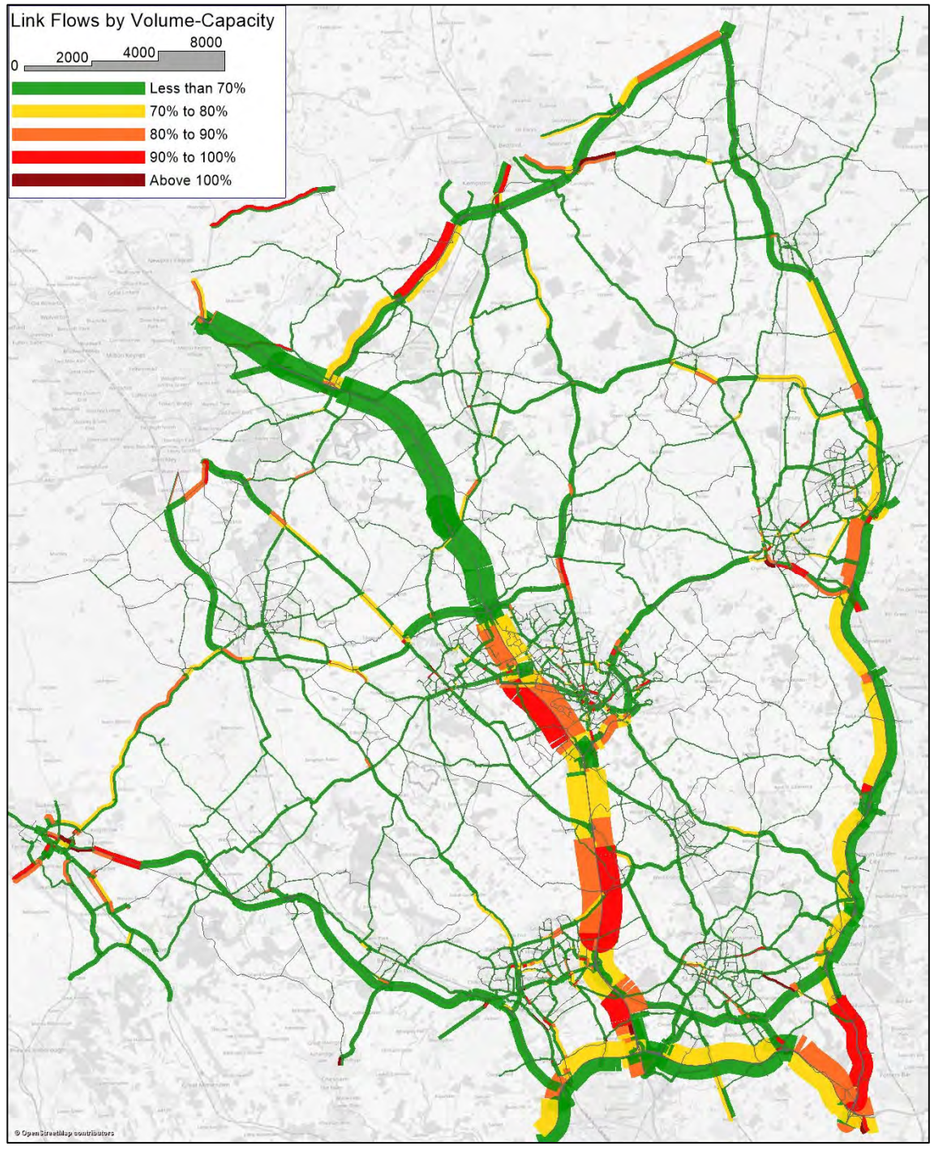
	"Without Expansion	"With" Expansion
AM Peak Hour (08:00 – 09:00)		

Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



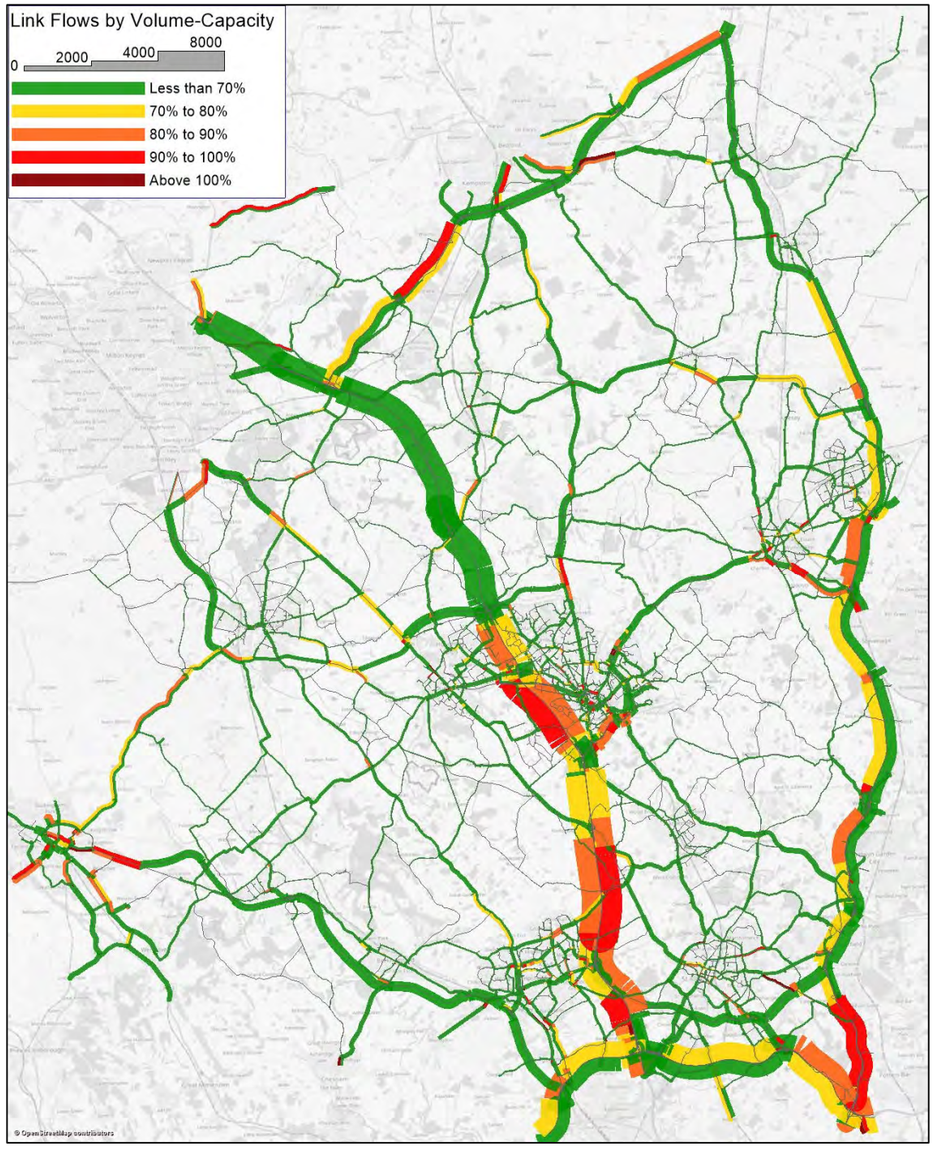
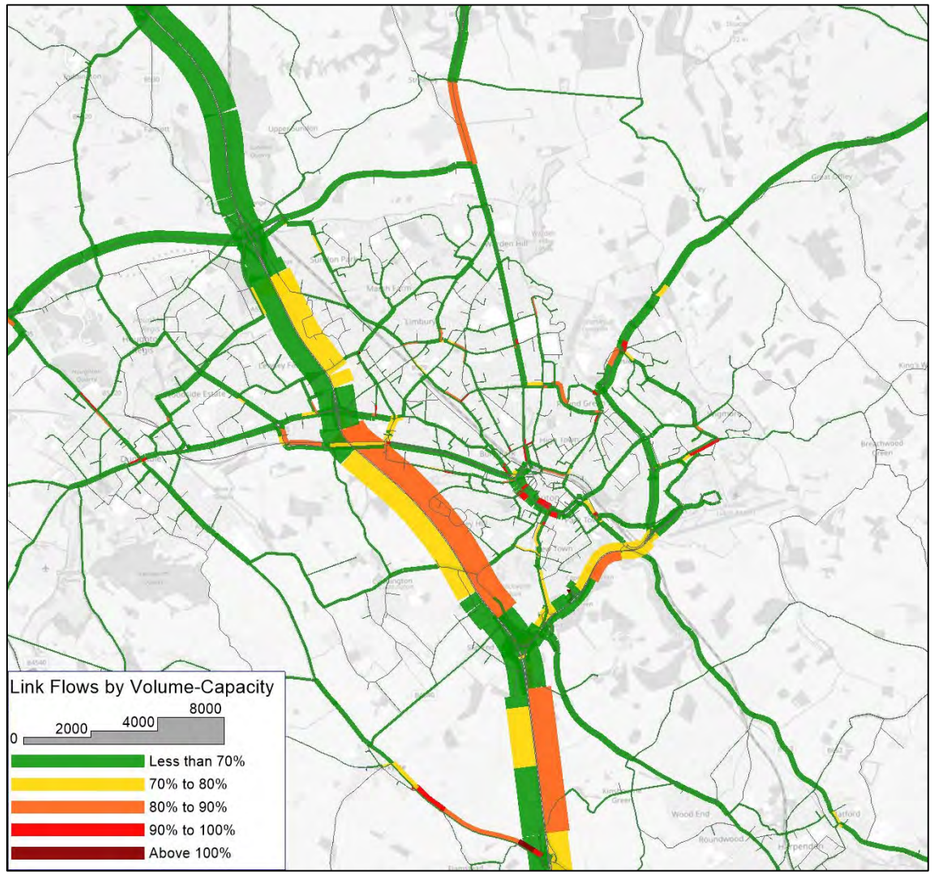


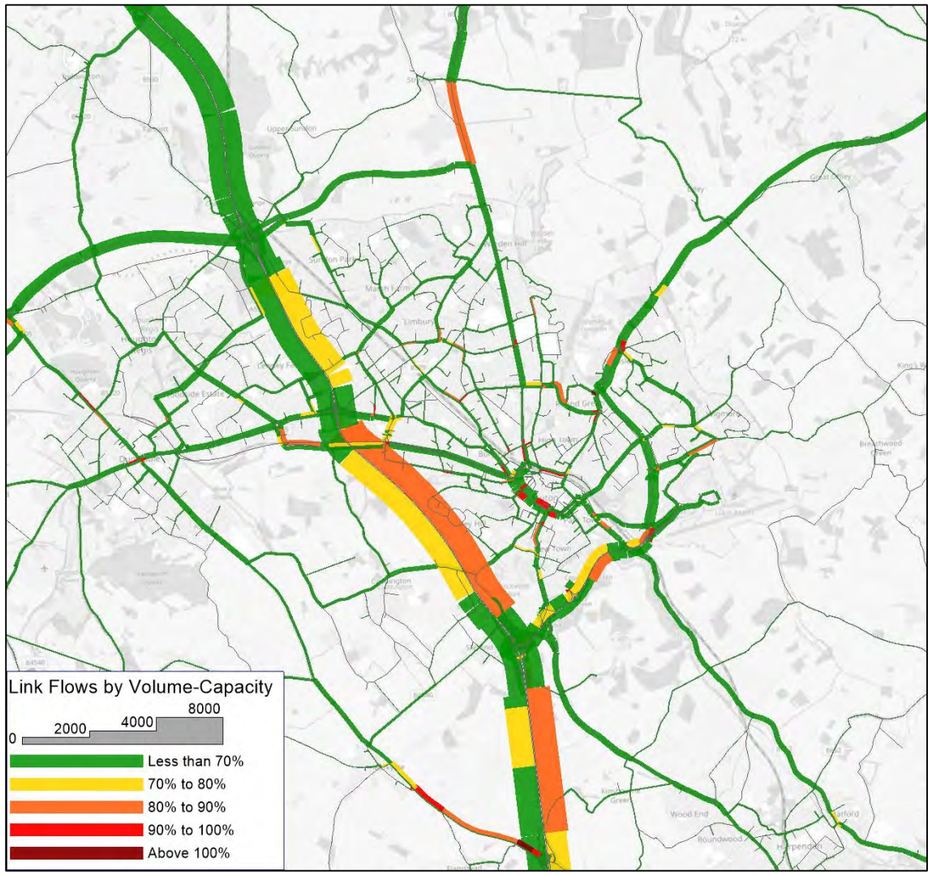
Figure F.4: Forecast Link-based V/C, Local Plan Alternative Scenario Forecasts, Luton Borough – 2027

AM Peak Hour
(08:00 – 09:00)

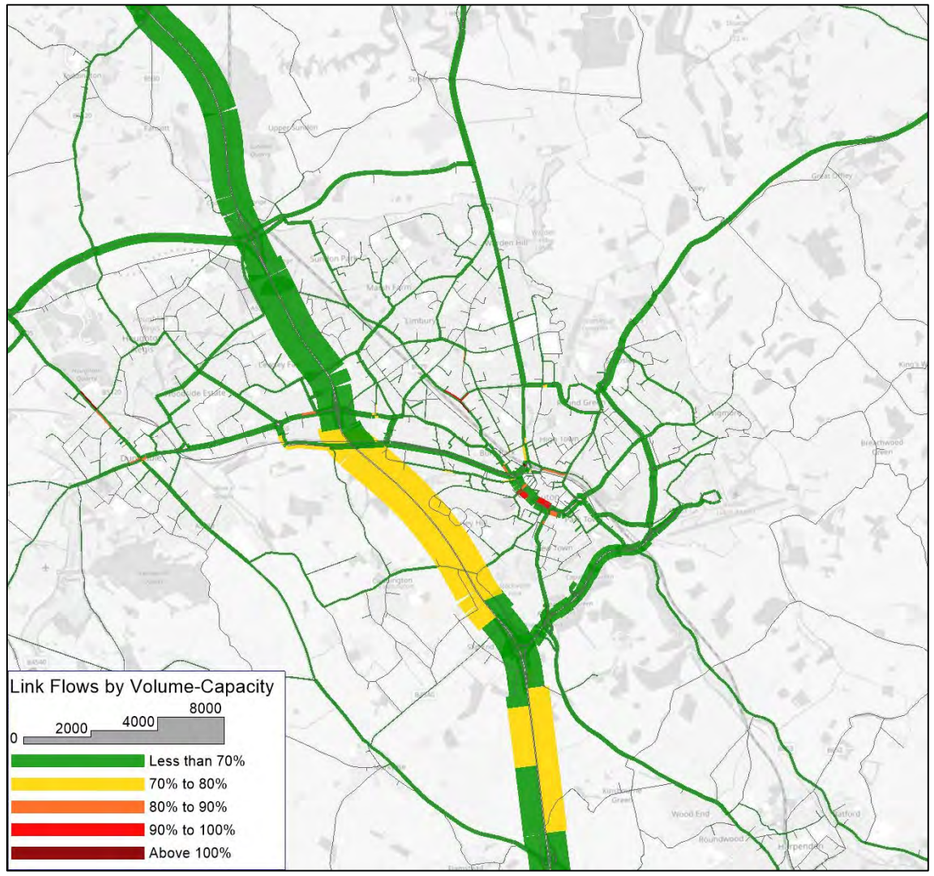
"Without Expansion

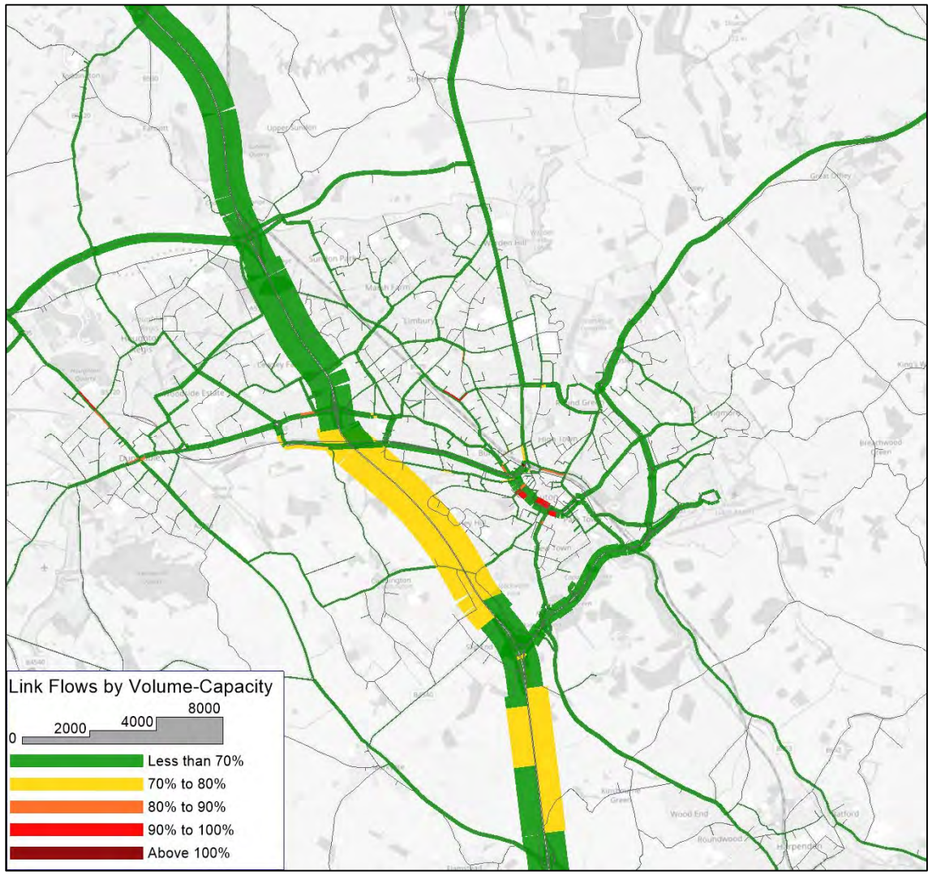


"With" Expansion

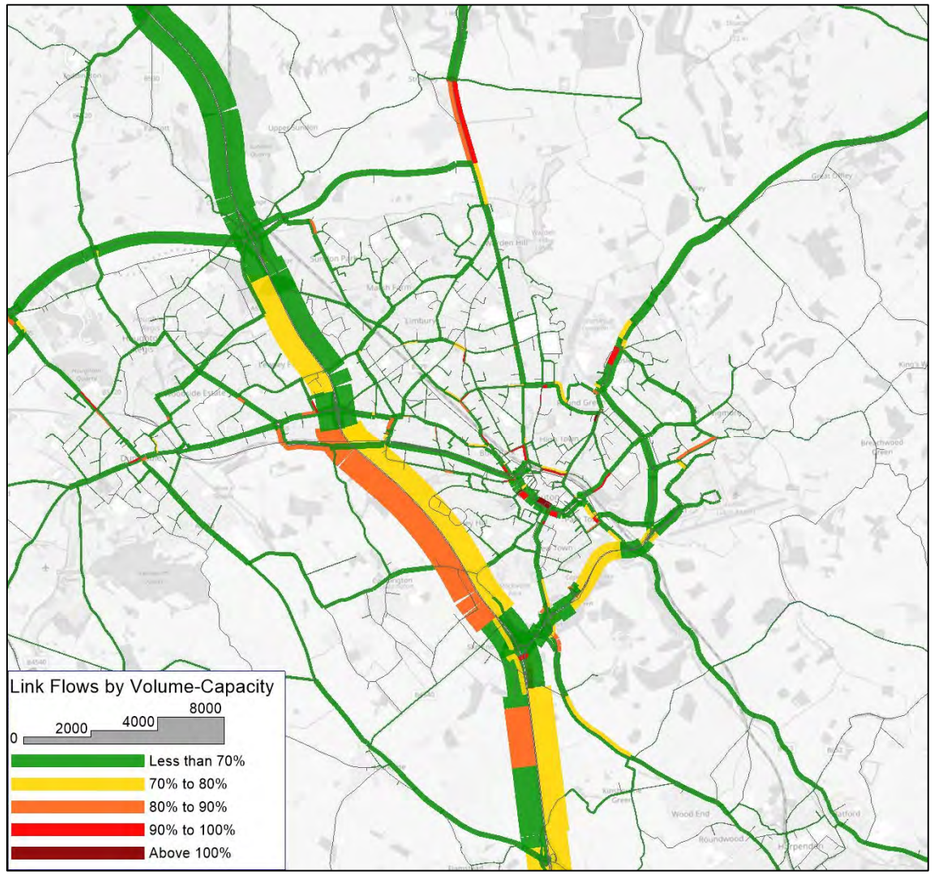


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



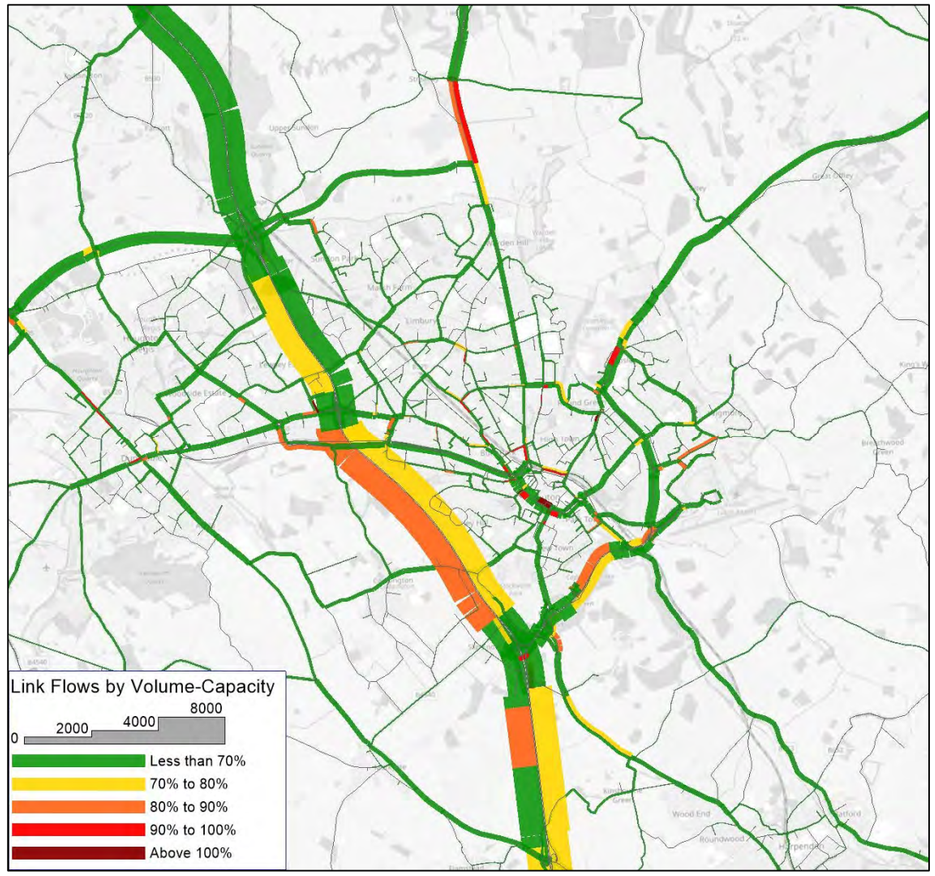
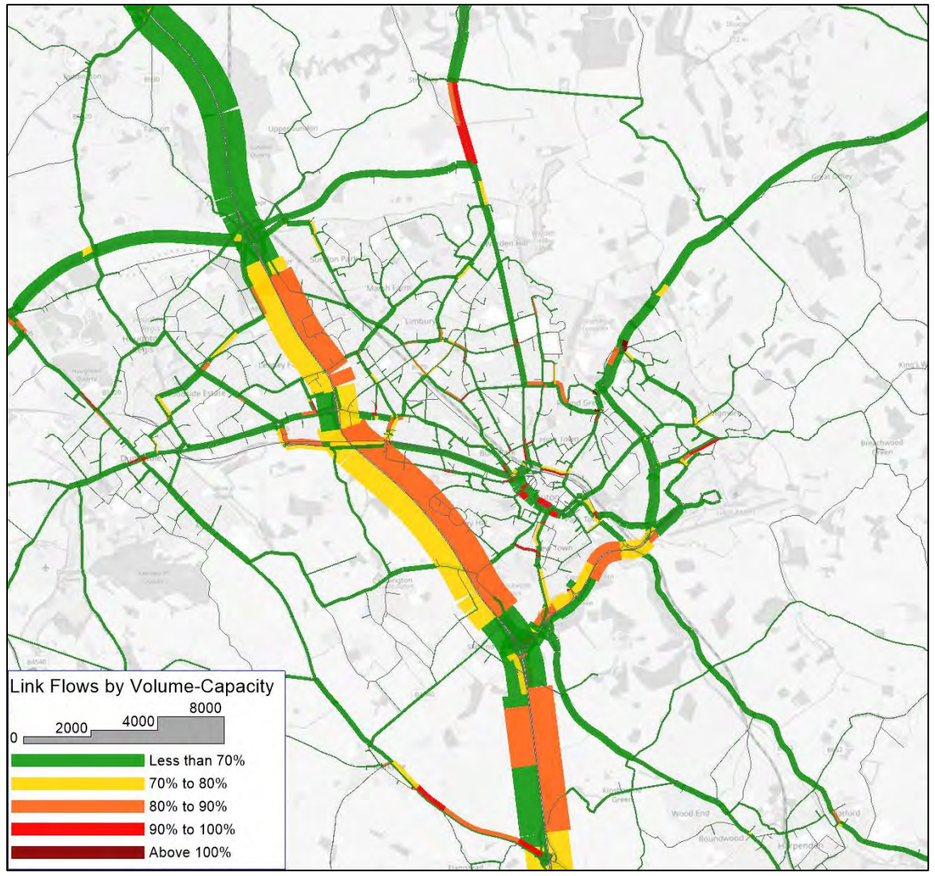


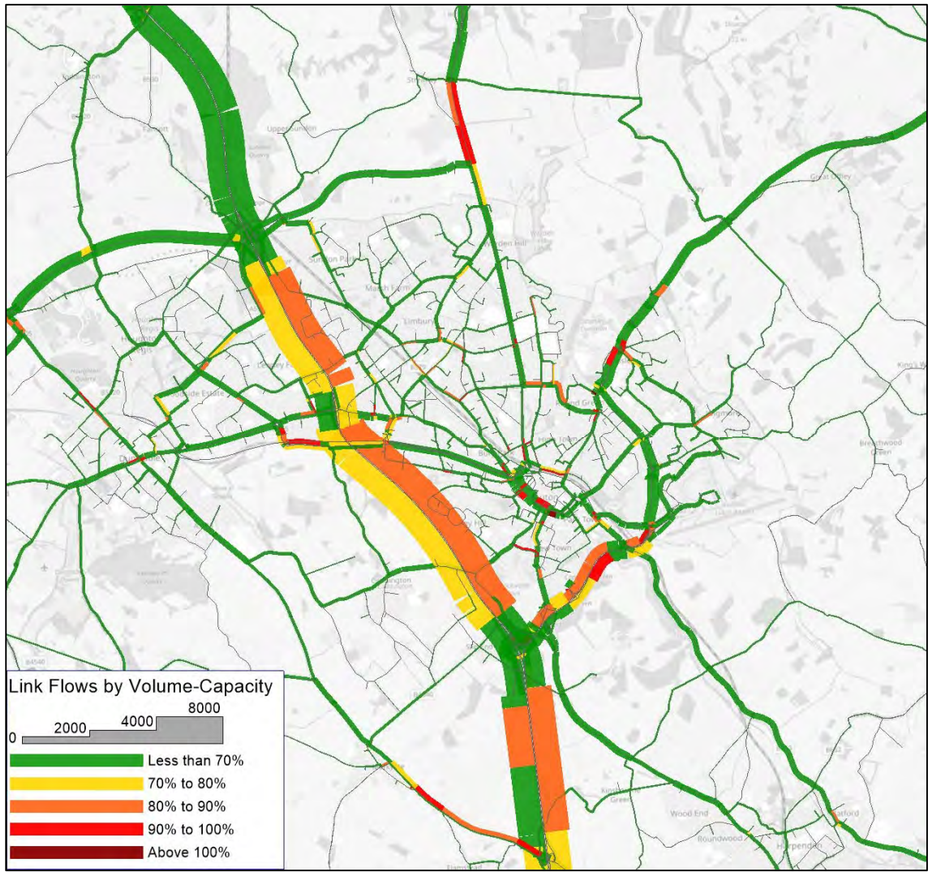
Figure F.5: Forecast Link-based V/C, Local Plan Alternative Scenario Forecasts, Luton Borough – 2039

AM Peak Hour
(08:00 – 09:00)

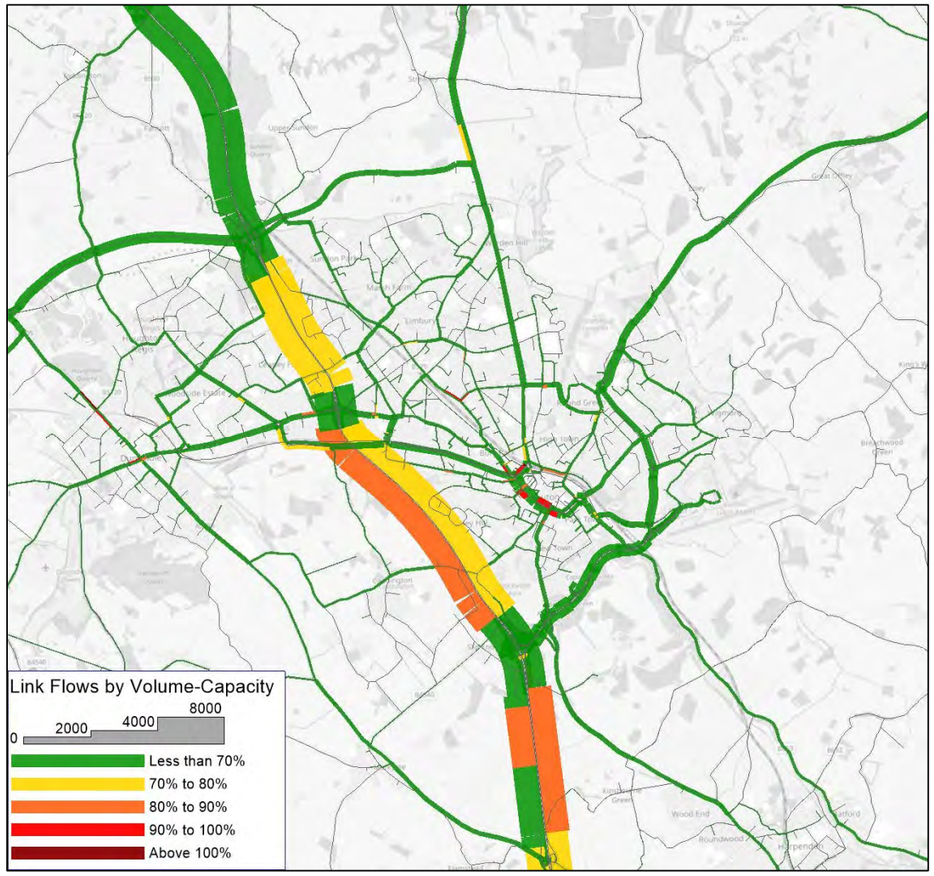
"Without Expansion

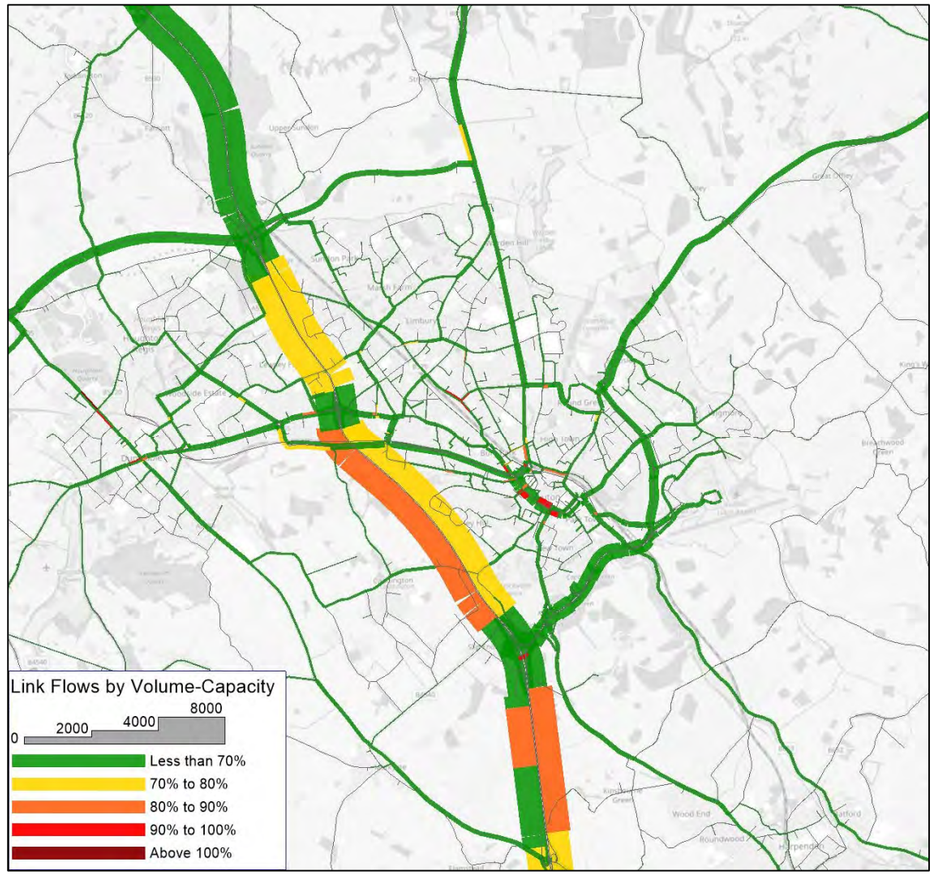


"With" Expansion

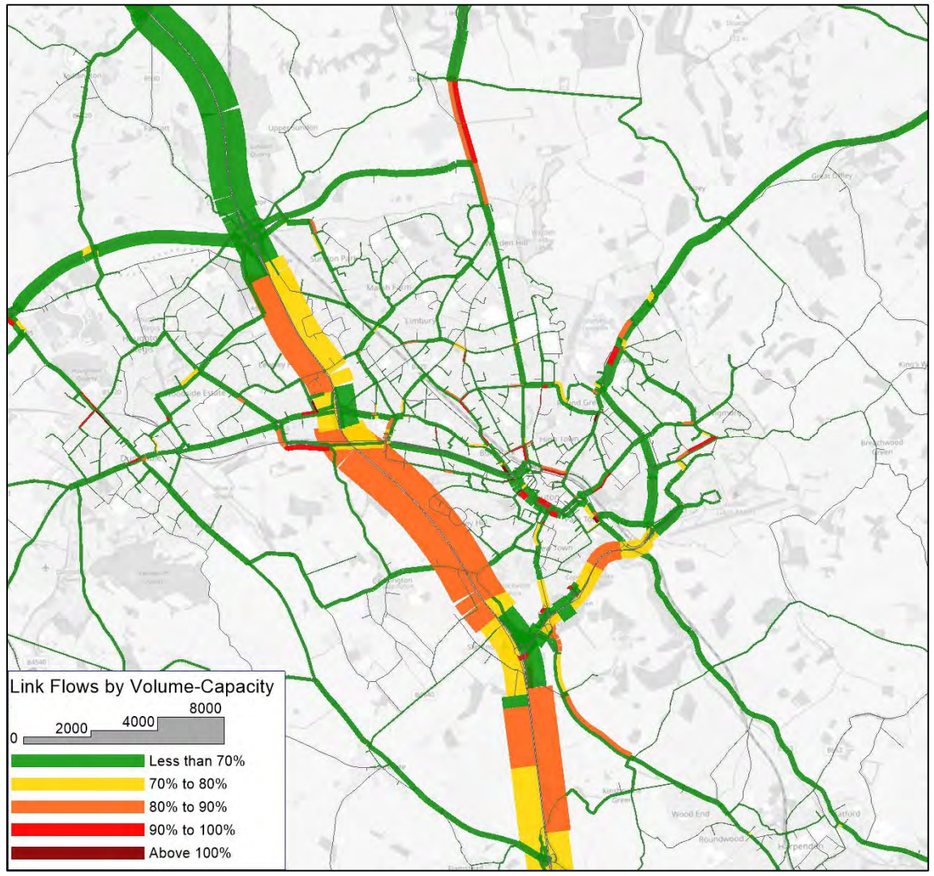


Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)



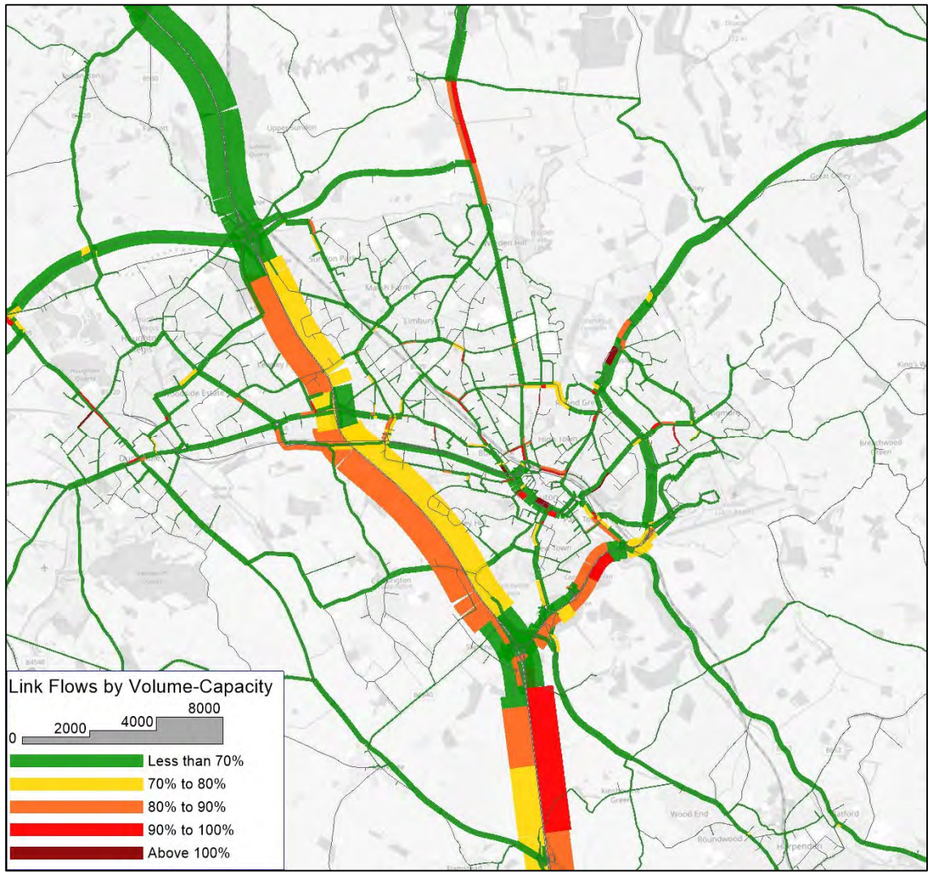
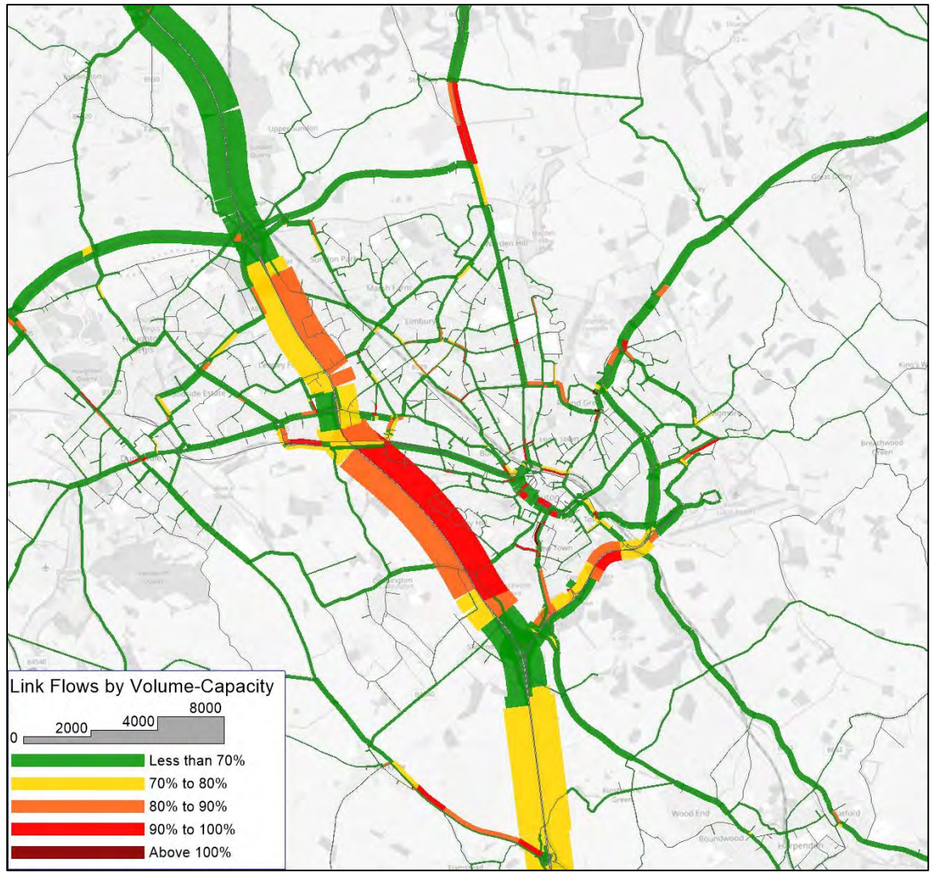


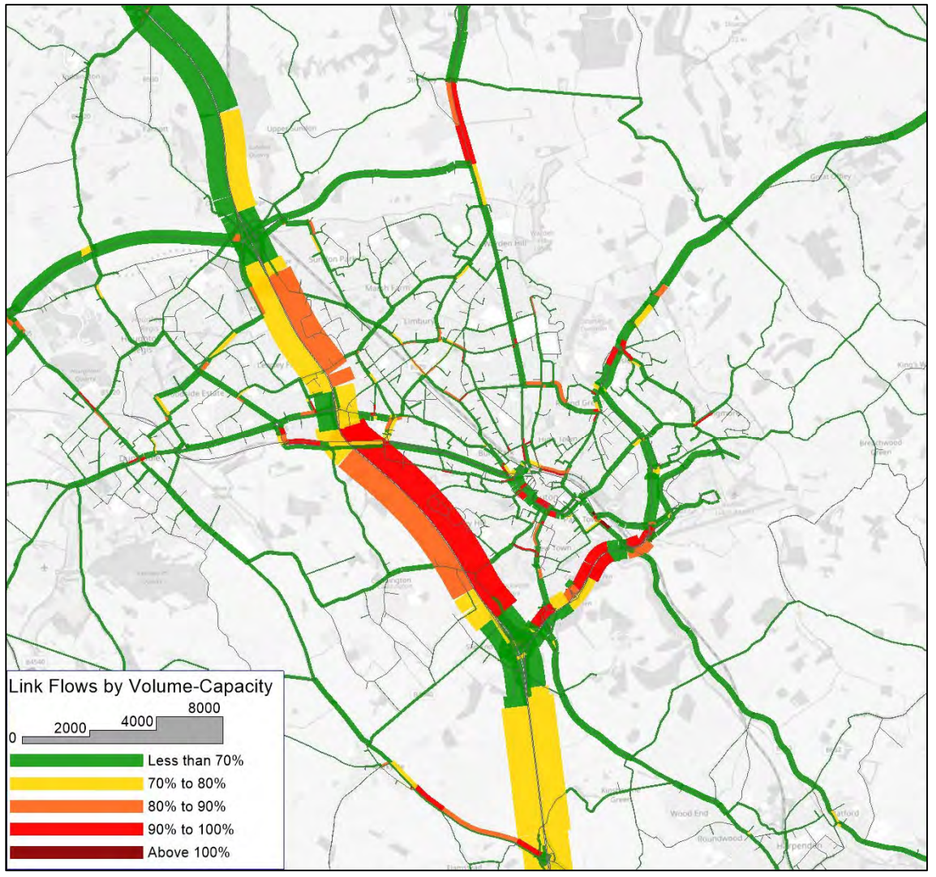
Figure F.6: Forecast Link-based V/C, Local Plan Alternative Scenario Forecasts, Luton Borough – 2043

AM Peak Hour
(08:00 – 09:00)

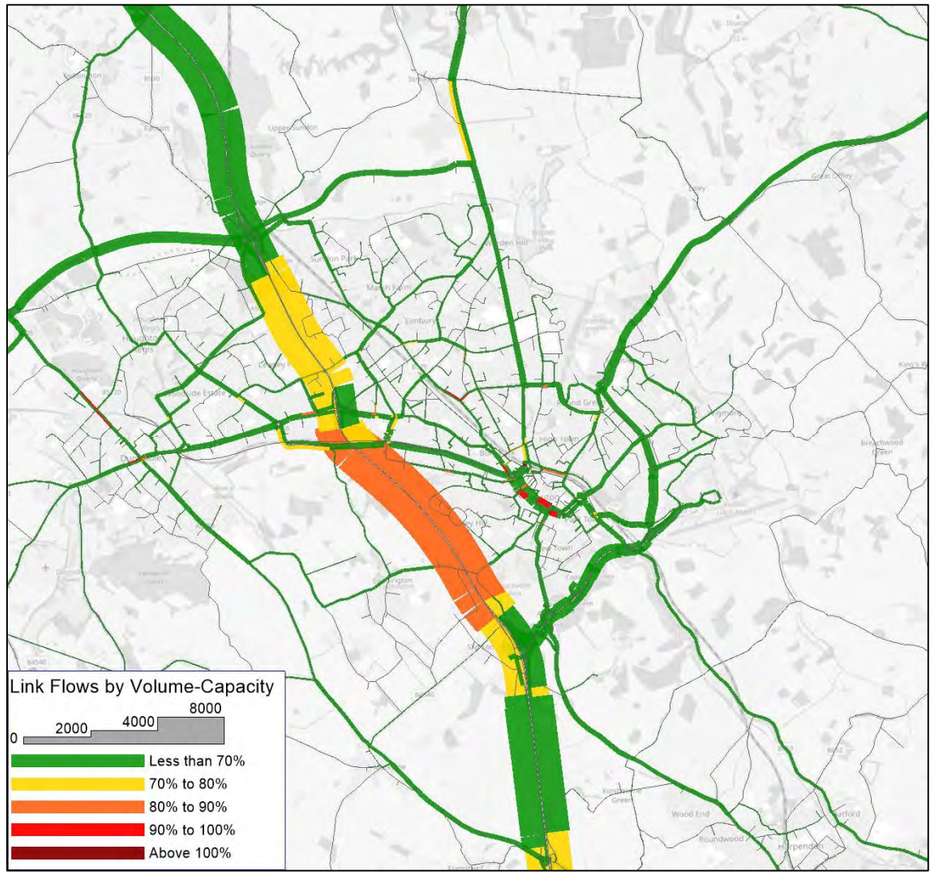
"Without Expansion

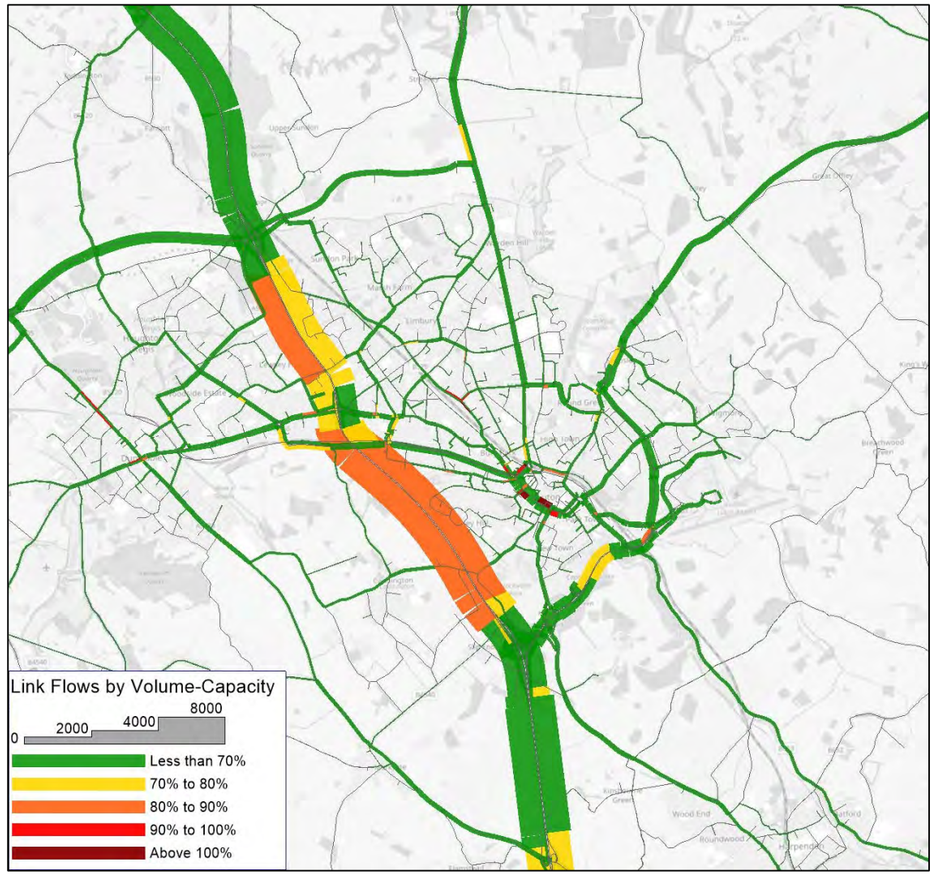


"With" Expansion

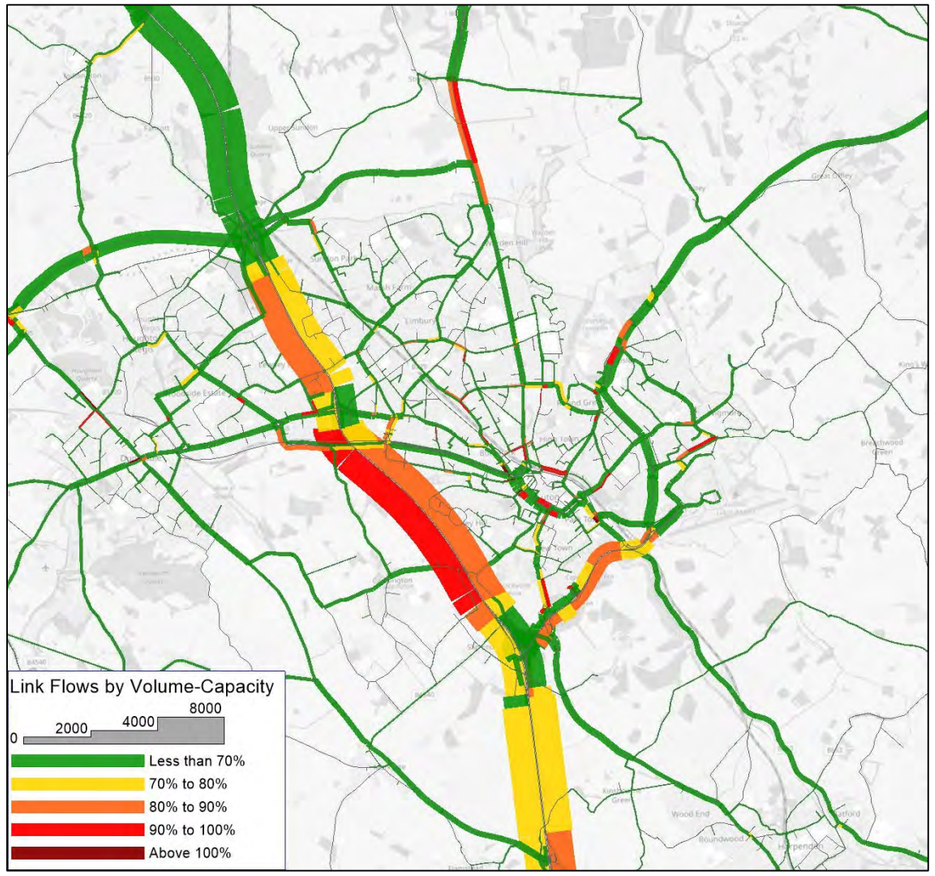


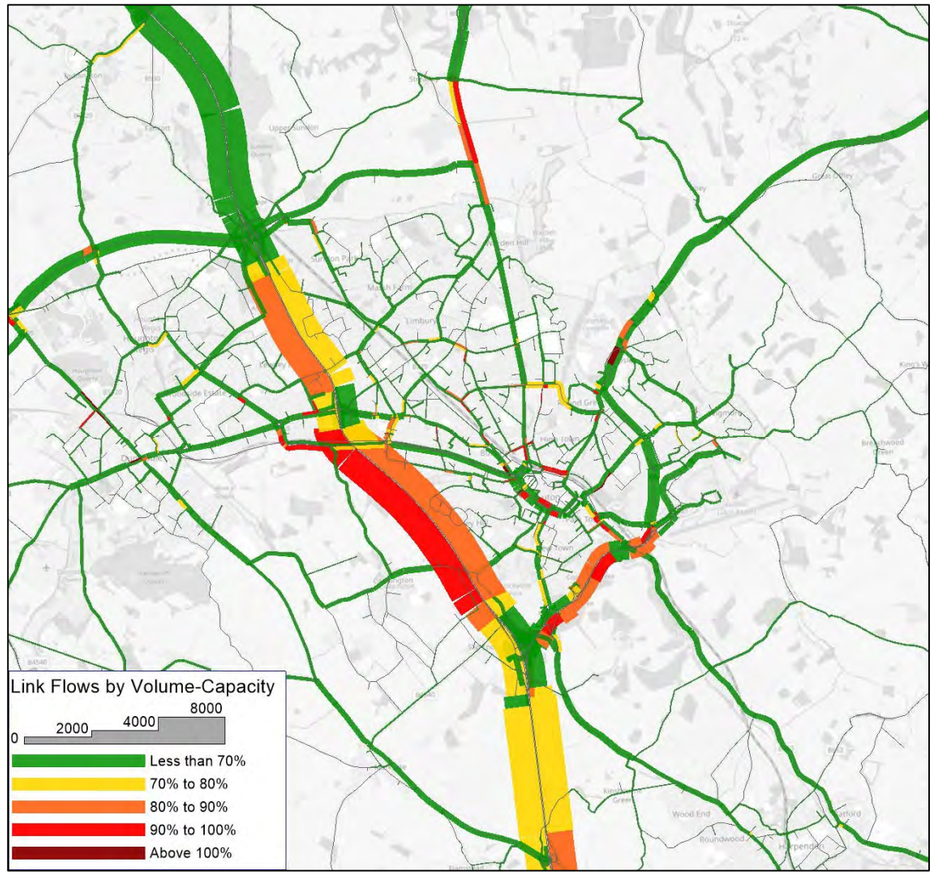
Interpeak
(between 10:00 to 16:00)





PM Peak Hour
(17:00 to 18:00)





Appendix G – Highway Assignment Matrix Totals

Table G.1: TAG-based “Without” Expansion Highway Assignment Matrix Totals (vehicles)

		All Movements			Internal Origins		
Scenario	**User Class**	**AM Peak**	**Interpeak**	**PM Peak**	**AM Peak**	**Interpeak**	**PM Peak**
2016 Base	Car Commuting	2,710,704	574,600	2,681,387	50,098	10,784	40,055
	Car Business	510,156	355,406	505,455	12,397	8,302	14,045
	Car “Other”	2,959,458	3,464,489	2,875,459	45,762	49,690	46,288
	LGV	584,551	519,542	457,793	9,144	9,993	8,629
	HGV	91,159	113,064	59,900	2,090	2,238	1,087
	Total	6,856,027	5,027,101	6,579,994	119,491	81,006	110,104
2027 “ With” Expansion	Car Commuting	2,892,558	612,879	2,860,778	52,820	11,589	43,615
	Car Business	553,407	385,778	547,329	13,294	8,992	14,879
	Car “Other”	3,341,448	3,912,787	3,243,626	52,884	57,583	53,652
	LGV	672,864	597,877	527,179	10,800	11,765	10,244
	HGV	94,488	117,163	62,090	2,206	2,350	1,156
	Total	**7,554,766**	**5,626,483**	**7,241,002**	**132,004**	**92,279**	**123,547**
2039 “ With” Expansion	Car Commuting	3,045,262	644,615	3,008,975	53,547	11,983	45,317
	Car Business	589,432	411,880	581,734	13,694	9,490	15,493
	Car “Other”	3,711,723	4,348,830	3,593,280	58,334	63,774	59,204
	LGV	780,416	693,374	611,400	12,434	13,503	11,778
	HGV	100,965	125,176	66,327	2,347	2,487	1,208
	Total	**8,227,797**	**6,223,875**	**7,861,716**	**140,356**	**101,237**	**132,999**
2043 “ With” Expansion	Car Commuting	3,103,394	656,696	3,065,474	54,048	12,152	46,015
	Car Business	603,426	421,696	595,285	13,909	9,672	15,795
	Car “Other”	3,827,815	4,484,426	3,703,821	59,777	65,456	60,710
	LGV	814,320	723,478	637,954	12,946	14,048	12,262
	HGV	103,333	128,113	67,883	2,394	2,538	1,233
	Total	**8,452,289**	**6,414,410**	**8,070,417**	**143,075**	**103,866**	**136,014**

Table G.2: TAG-based “With” Expansion Highway Assignment Matrix Totals (vehicles)

		All Movements			Internal Origins		
Scenario	**User Class**	**AM Peak**	**Interpeak**	**PM Peak**	**AM Peak**	**Interpeak**	**PM Peak**
2027 “ With” Expansion	Car Commuting	2,892,567	612,927	2,861,094	52,898	11,641	43,716
	Car Business	553,539	386,012	547,714	13,381	9,136	15,058
	Car “Other”	3,340,998	3,912,348	3,243,881	52,838	57,567	53,630
	LGV	672,912	597,925	527,213	10,843	11,809	10,274
	HGV	94,512	117,179	62,099	2,228	2,366	1,163
	Total	**7,554,529**	**5,626,391**	**7,242,000**	**132,188**	**92,519**	**123,840**
2039 “ With” Expansion	Car Commuting	3,044,414	644,532	3,008,448	53,769	12,040	45,438
	Car Business	589,749	412,331	582,065	13,701	9,602	15,543
	Car “Other”	3,704,183	4,339,935	3,586,679	58,287	63,771	59,128
	LGV	780,568	693,522	611,498	12,533	13,603	11,837
	HGV	101,027	125,222	66,347	2,395	2,521	1,222
	Total	**8,219,941**	**6,215,542**	**7,855,037**	**140,684**	**101,537**	**133,169**
2043 “ With” Expansion	Car Commuting	3,102,704	656,694	3,065,257	54,476	12,270	46,343
	Car Business	604,121	422,489	595,931	13,962	9,821	15,859
	Car “Other”	3,819,543	4,475,264	3,696,830	59,746	65,531	60,705
	LGV	814,569	723,720	638,108	13,083	14,190	12,338
	HGV	103,432	128,185	67,915	2,466	2,587	1,254
	Total	**8,444,369**	**6,406,352**	**8,064,041**	**143,732**	**104,400**	**136,498**

Table G.3: Local Plan Growth Alternative Scenario Highway Assignment Matrix Totals (vehicles)

		All Movements			Internal Origins		
Scenario	**User Class**	**AM Peak**	**Interpeak**	**PM Peak**	**AM Peak**	**Interpeak**	**PM Peak**
2027 " With" Expansion	Car Commuting	2,892,464	612,915	2,860,918	52,816	11,607	43,669
	Car Business	553,367	385,787	547,333	13,277	8,994	14,883
	Car "Other"	3,341,253	3,912,923	3,243,791	52,866	57,612	53,703
	LGV	672,862	597,889	527,168	10,783	11,766	10,229
	HGV	94,491	117,162	62,091	2,205	2,346	1,155
	Total	**7,554,437**	**5,626,675**	**7,241,301**	**131,948**	**92,325**	**123,639**
2039 " With" Expansion	Car Commuting	3,045,391	644,669	3,008,762	53,471	12,012	45,447
	Car Business	589,355	411,873	581,618	13,620	9,489	15,459
	Car "Other"	3,711,813	4,348,856	3,593,178	58,283	63,781	59,278
	LGV	780,402	693,396	611,415	12,388	13,495	11,769
	HGV	100,969	125,174	66,327	2,343	2,477	1,205
	Total	**8,227,930**	**6,223,968**	**7,861,299**	**140,105**	**101,256**	**133,157**
2043 " With" Expansion	Car Commuting	3,103,240	656,711	3,065,416	53,930	12,177	46,205
	Car Business	603,295	421,670	595,147	13,812	9,667	15,758
	Car "Other"	3,827,474	4,484,217	3,703,650	59,721	65,421	60,824
	LGV	814,317	723,490	637,932	12,902	14,029	12,221
	HGV	103,338	128,111	67,884	2,391	2,527	1,229
	Total	**8,451,664**	**6,414,198**	**8,070,029**	**142,756**	**103,821**	**136,238**
2027 " With" Expansion	Car Commuting	2,892,557	612,932	2,861,141	52,894	11,657	43,765
	Car Business	553,532	385,999	547,714	13,364	9,137	15,059
	Car "Other"	3,340,956	3,912,228	3,243,918	52,826	57,589	53,678
	LGV	672,910	597,937	527,202	10,826	11,809	10,260
	HGV	94,515	117,178	62,099	2,228	2,362	1,163
	Total	**7,554,470**	**5,626,274**	**7,242,074**	**132,139**	**92,554**	**123,924**
2039 " With" Expansion	Car Commuting	3,044,272	644,611	3,008,403	53,687	12,077	45,577
	Car Business	589,626	412,339	581,956	13,627	9,603	15,512
	Car "Other"	3,703,776	4,340,132	3,586,527	58,230	63,806	59,213
	LGV	780,555	693,548	611,510	12,487	13,598	11,827
	HGV	101,031	125,220	66,348	2,391	2,512	1,219
	Total	**8,219,261**	**6,215,850**	**7,854,744**	**140,423**	**101,596**	**133,348**

		All Movements			Internal Origins		
Scenario	**User Class**	**AM Peak**	**Interpeak**	**PM Peak**	**AM Peak**	**Interpeak**	**PM Peak**
2043 " With" Expansion	Car Commuting	3,102,413	656,696	3,065,487	54,364	12,303	46,523
	Car Business	603,958	422,462	595,840	13,866	9,819	15,819
	Car "Other"	3,818,932	4,475,000	3,697,103	59,703	65,533	60,808
	LGV	814,566	723,737	638,087	13,039	14,174	12,298
	HGV	103,436	128,183	67,916	2,463	2,577	1,250
	Total	**8,443,305**	**6,406,078**	**8,064,432**	**143,434**	**104,406**	**136,698**

Appendix H – Highway Assignment Average Trip-Lenghts

Table H.1: TAG-based “Without” Expansion Highway Assignment Average Trip-Lengths (internal area origins, kilometres)

Scenario	User Class	AM Peak	Interpeak	PM Peak
2016 Base	Car Commuting	16.1	14.5	15.2
	Car Business	36.5	46.8	43.2
	Car “Other”	8.3	8.4	8.3
	All Car	15.2	14.0	15.9
	LGV	22.3	20.3	20.5
	HGV	49.9	48.0	48.4
2027 “ Without” Expansion	Car Commuting	16.3	15.0	15.8
	Car Business	37.6	47.9	43.9
	Car “Other”	8.7	8.9	8.6
	All Car	15.3	14.3	16.1
	LGV	22.5	20.5	20.7
	HGV	49.4	47.8	48.5
2039“ Without” Expansion	Car Commuting	16.6	16.3	17.1
	Car Business	39.2	50.0	45.9
	Car “Other”	9.2	9.5	9.1
	All Car	15.6	15.0	16.9
	LGV	22.8	20.7	21.0
	HGV	49.5	47.9	47.6
2043 “ Without” Expansion	Car Commuting	16.7	16.7	17.5
	Car Business	39.9	51.0	46.9
	Car “Other”	9.3	9.6	9.2
	All Car	15.8	15.2	17.2
	LGV	22.9	20.8	21.1
	HGV	49.6	47.9	47.6

Table H.2: TAG-based “With” Expansion Highway Assignment Average Trip-Lengths (internal area origins, kilometres)

Scenario	User Class	AM Peak	Interpeak	PM Peak
2027 “ With” Expansion	Car Commuting	16.2	15.0	15.8
	Car Business	37.8	48.1	44.1
	Car “Other”	8.7	8.8	8.6
	All Car	15.3	14.3	16.1
	LGV	22.5	20.4	20.7
	HGV	49.0	47.6	48.3
2039“ With” Expansion	Car Commuting	16.4	16.2	17.0
	Car Business	38.8	49.7	45.6
	Car “Other”	9.1	9.4	9.0
	All Car	15.5	14.9	16.8
	LGV	22.6	20.6	20.9
	HGV	48.6	47.3	47.0
2043 “ With” Expansion	Car Commuting	16.7	16.7	17.5
	Car Business	39.6	50.6	46.6
	Car “Other”	9.2	9.5	9.2
	All Car	15.7	15.1	17.2
	LGV	22.8	20.7	21.0
	HGV	48.5	47.3	47.1

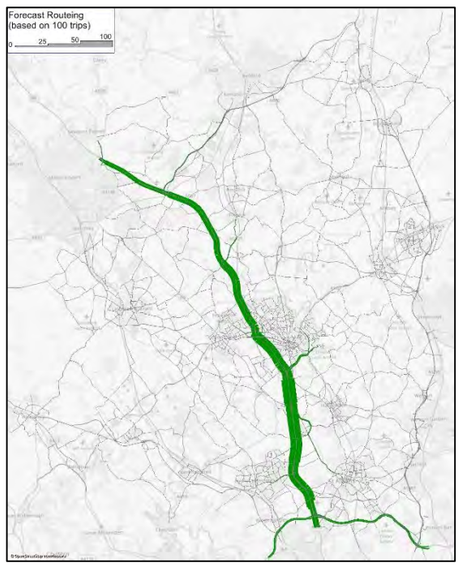
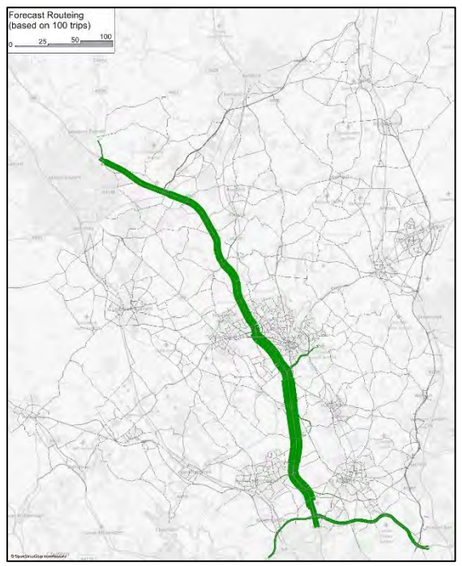
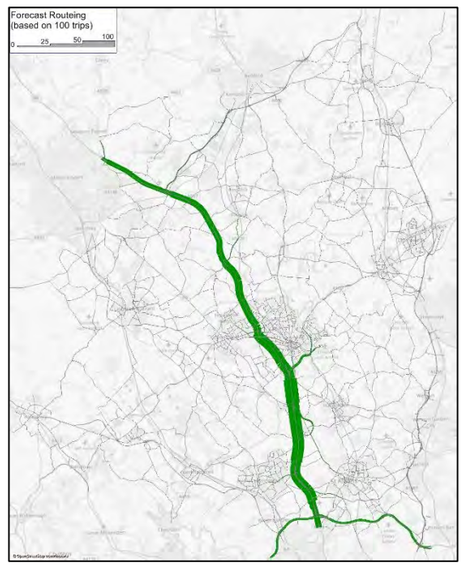
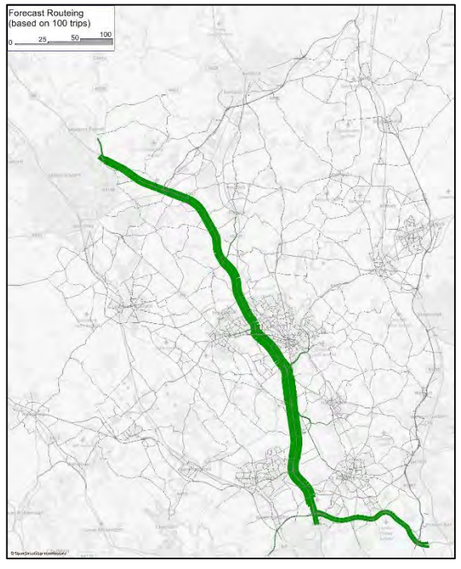
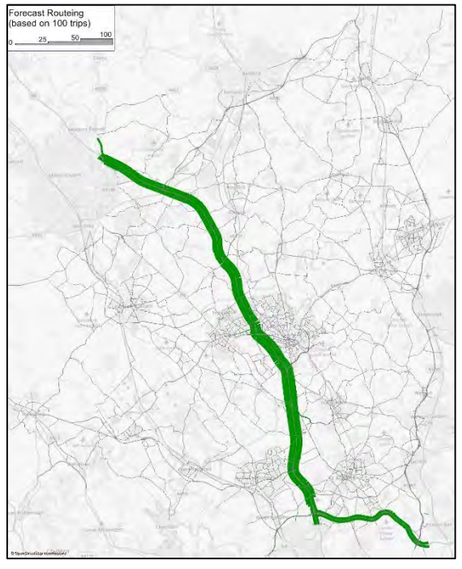
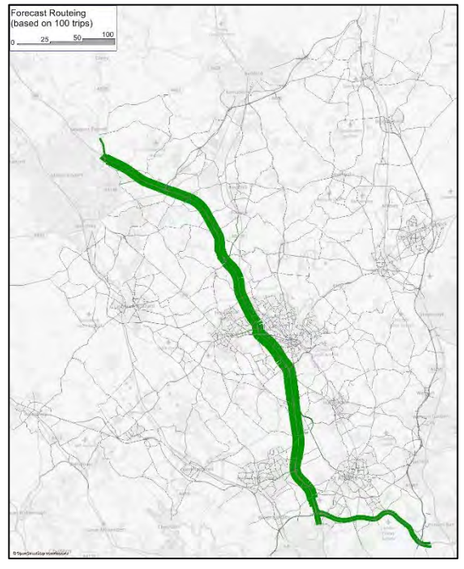
Table H.3: TAG-based “With” Expansion Highway Assignment Average Trip-Lengths (internal area origins, kilometres)

Scenario	User Class	AM Peak	Interpeak	PM Peak
2027 “ With” Expansion	Car Commuting	16.3	15.0	15.8
	Car Business	37.6	47.9	43.9
	Car “Other”	8.7	8.9	8.6
	All Car	15.3	14.2	16.1
	LGV	22.5	20.4	20.7
	HGV	49.3	47.8	48.5
2039“ With” Expansion	Car Commuting	16.6	16.3	17.1
	Car Business	39.1	49.9	45.8
	Car “Other”	9.2	9.5	9.2
	All Car	15.6	14.9	16.9
	LGV	22.8	20.7	21.0
	HGV	49.5	47.9	47.6
2043 “ With” Expansion	Car Commuting	16.7	16.8	17.6
	Car Business	39.7	50.8	46.8
	Car “Other”	9.3	9.6	9.3
	All Car	15.7	15.2	17.2
	LGV	22.8	20.7	21.0
	HGV	49.6	47.9	47.7
2027 “ With” Expansion	Car Commuting	16.2	15.0	15.8
	Car Business	37.7	48.0	44.1
	Car “Other”	8.7	8.8	8.6
	All Car	15.3	14.3	16.1
	LGV	22.4	20.4	20.7
	HGV	49.0	47.6	48.3
2039“ With” Expansion	Car Commuting	16.5	16.3	17.2
	Car Business	38.9	49.7	45.7
	Car “Other”	9.1	9.4	9.1
	All Car	15.5	14.9	16.9
	LGV	22.7	20.6	21.0
	HGV	48.8	47.4	47.2
2043 “ With” Expansion	Car Commuting	16.7	16.8	17.7
	Car Business	39.4	50.4	46.5
	Car “Other”	9.2	9.5	9.2

Scenario	User Class	AM Peak	Interpeak	PM Peak
	All Car	15.7	15.1	17.2
	LGV	22.7	20.6	21.0
	HGV	48.5	47.2	47.1

Appendix I – Forecast Trip Routing Analysis

Figure Apxi I.1: Forecast Vehicle Routeing, 2016 Base Year

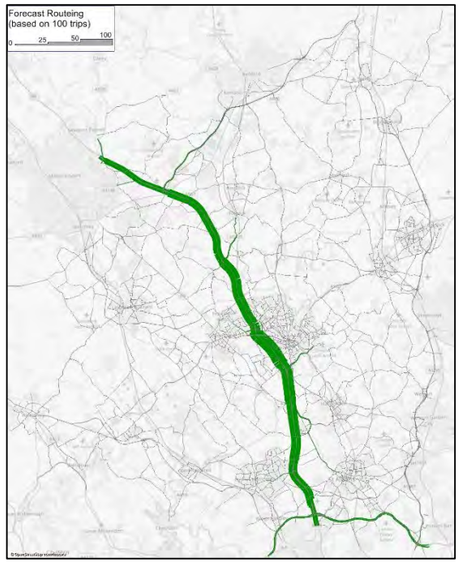
	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)
M1 Junction 9 to 10 (all vehicles)			
M1 Junction 9 to 10 (HGV vehicles)			

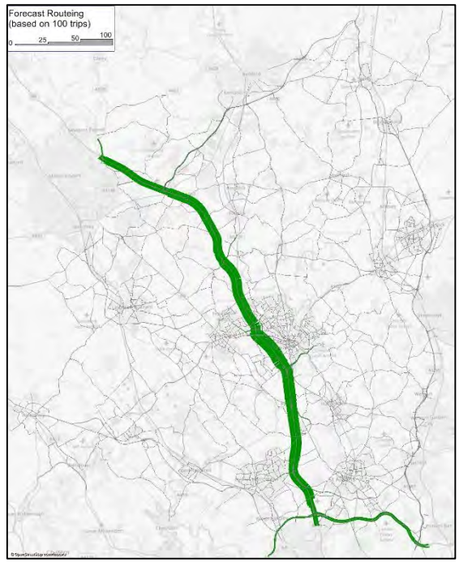
AM Peak Hour (08:00 to 09:00)

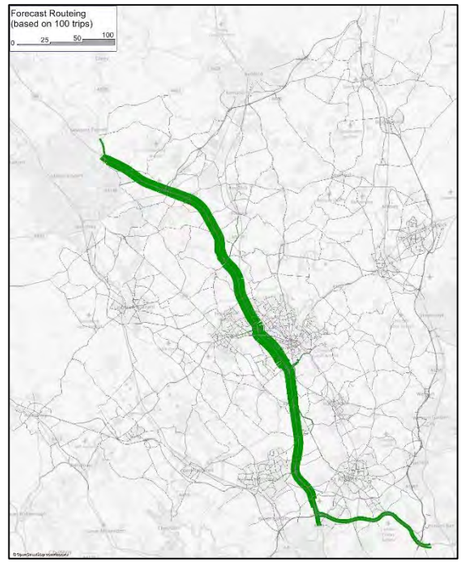
Interpeak Hour (between 10:00 to 16:00)

PM Peak Hour (17:00 to 18:00)

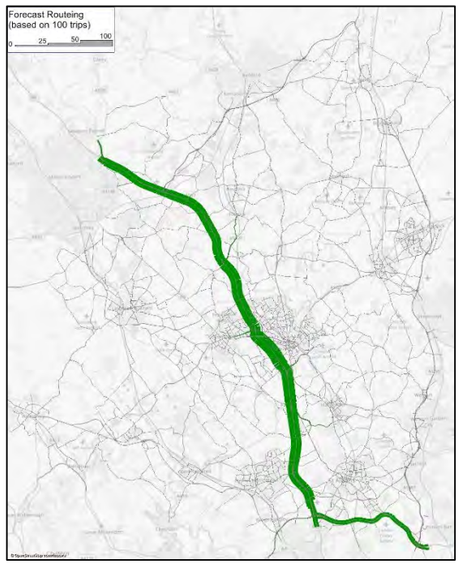
M1 Junction 10 to 11 (all vehicles)

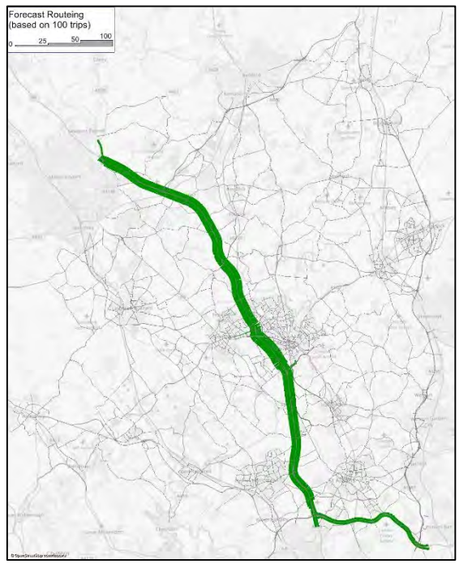


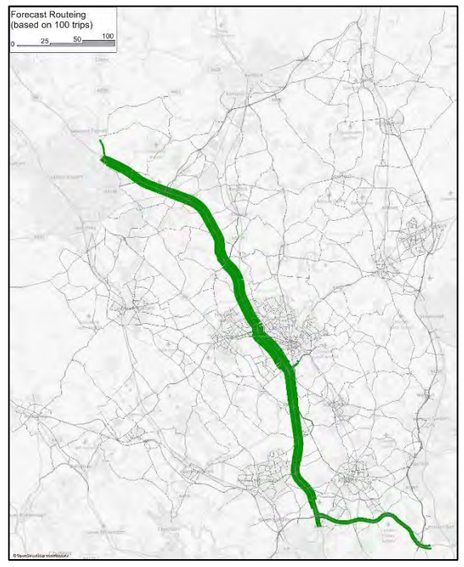




M1 Junction 10 to 11 (HGV vehicles)





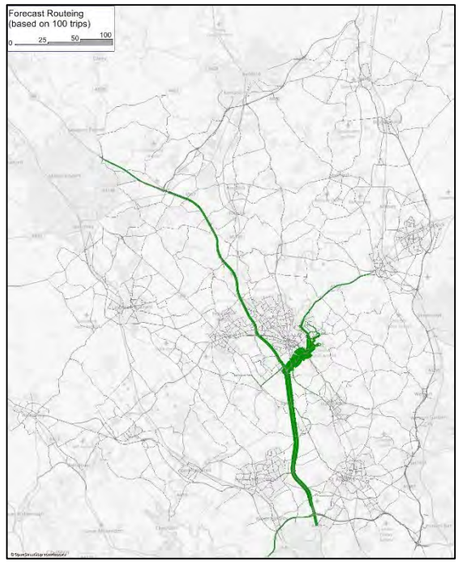


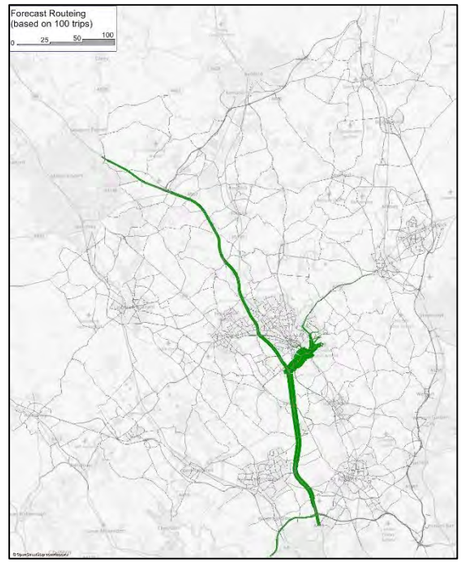
AM Peak Hour (08:00 to 09:00)

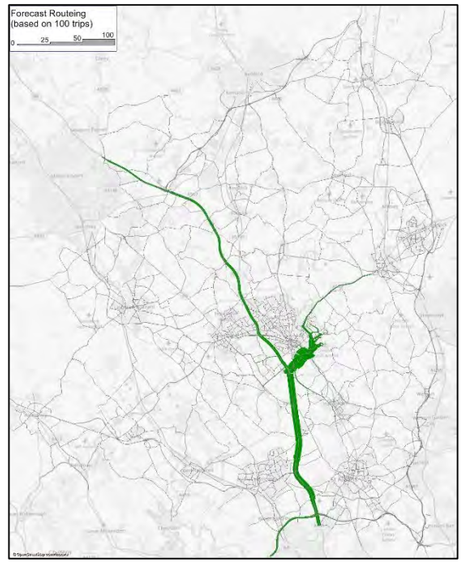
Interpeak Hour (between 10:00 to 16:00)

PM Peak Hour (17:00 to 18:00)

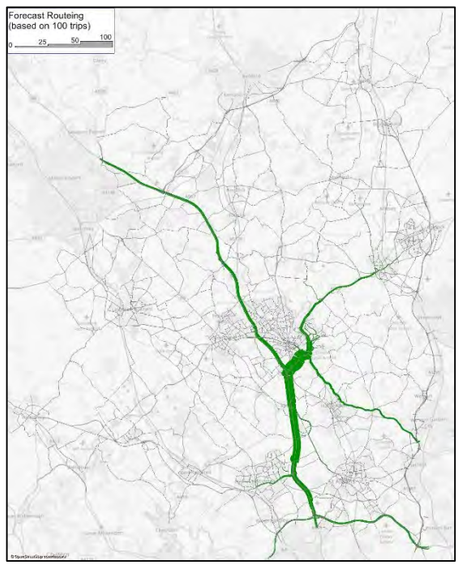
A1081 (all vehicles)

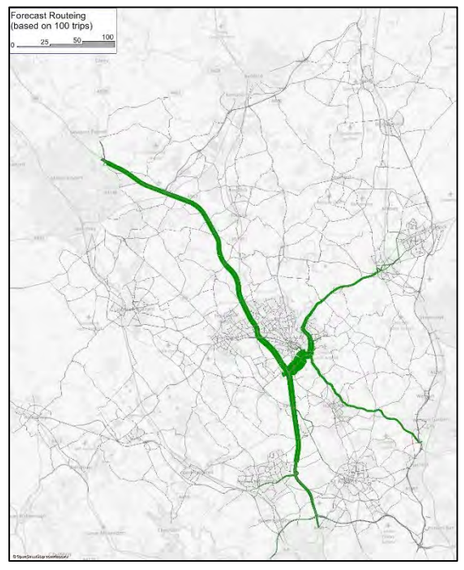


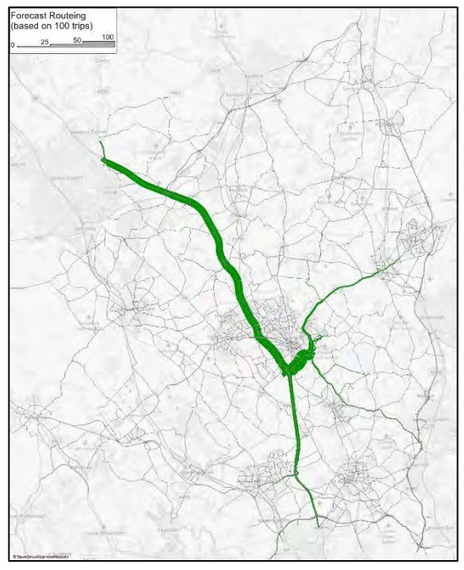


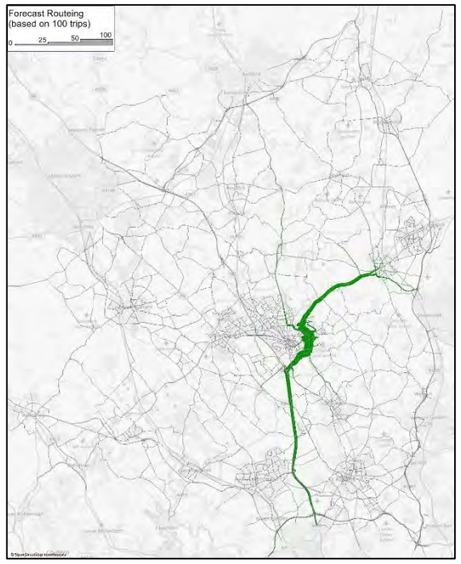
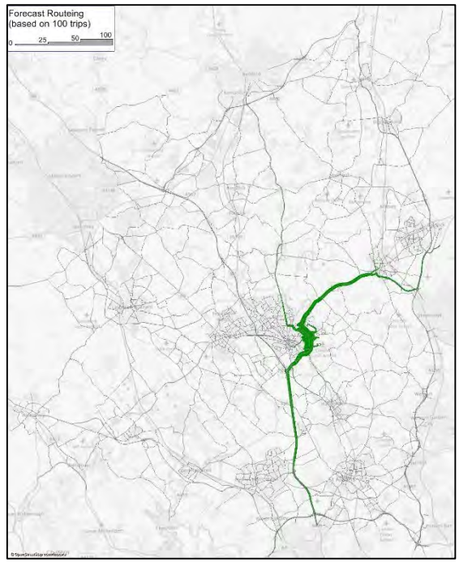
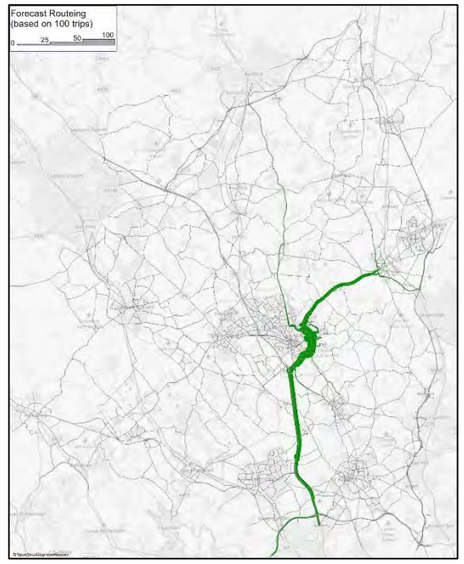
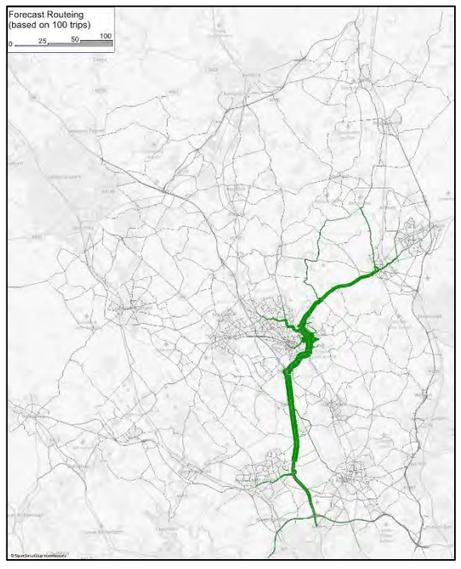
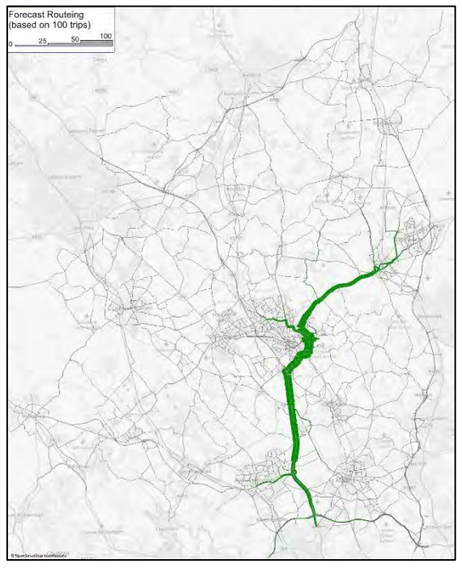
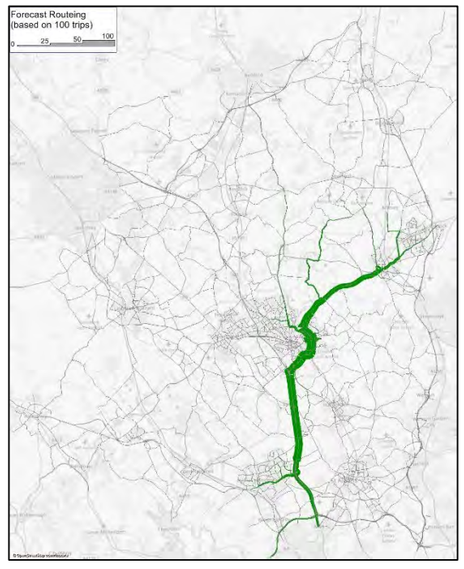


A1081 (HGV vehicles)







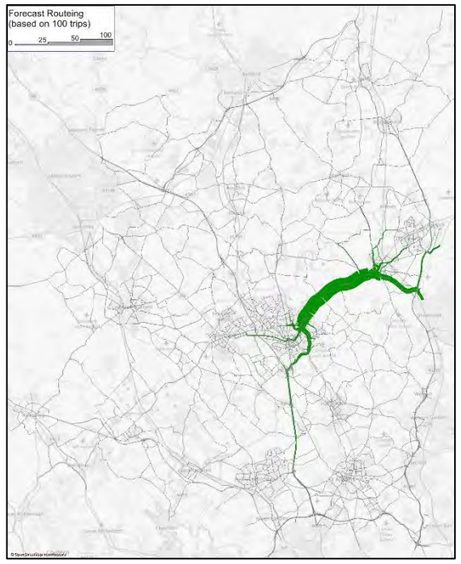
	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)
Vauxhall Way (all vehicles)			
Vauxhall Way (HGV vehicles)			

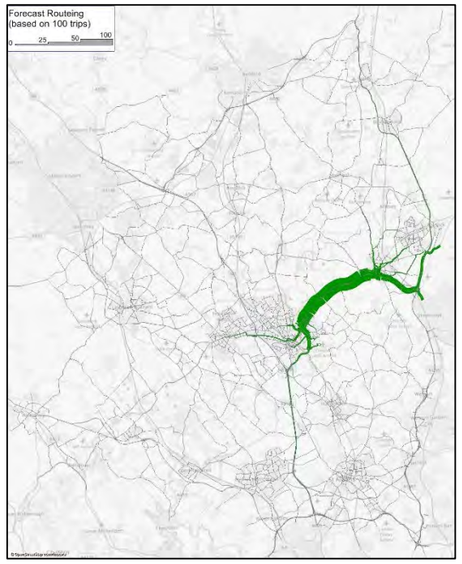
AM Peak Hour (08:00 to 09:00)

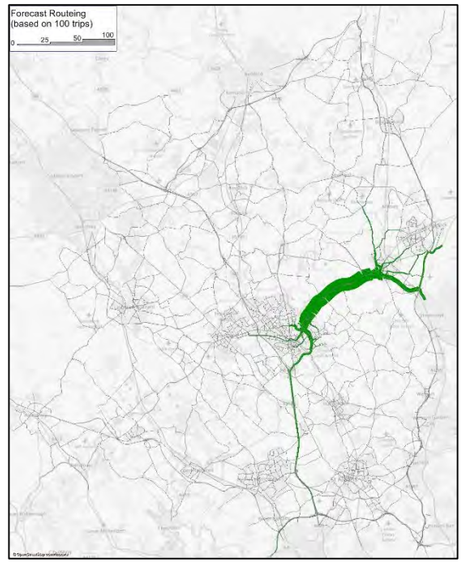
Interpeak Hour (between 10:00 to 16:00)

PM Peak Hour (17:00 to 18:00)

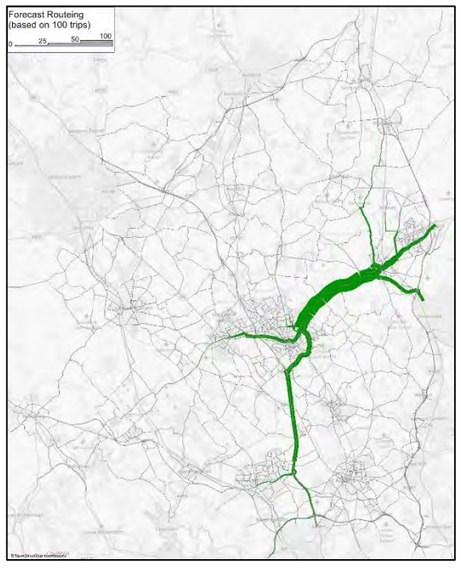
A505 (all vehicles)

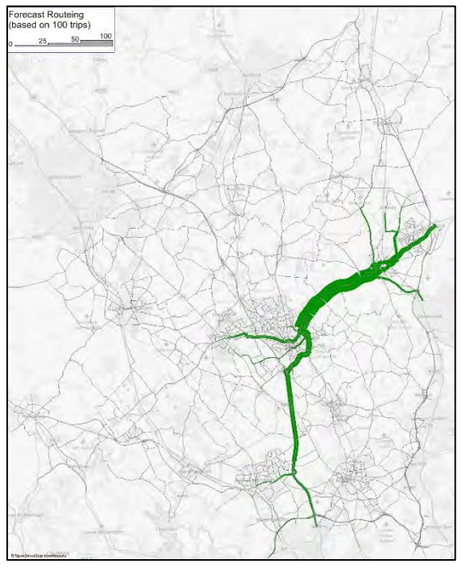






A505 (HGV vehicles)





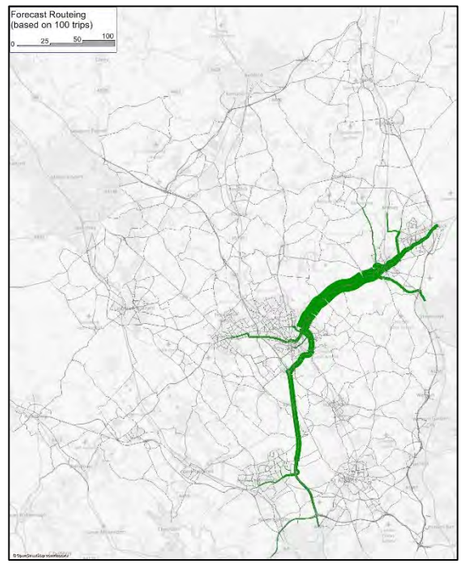
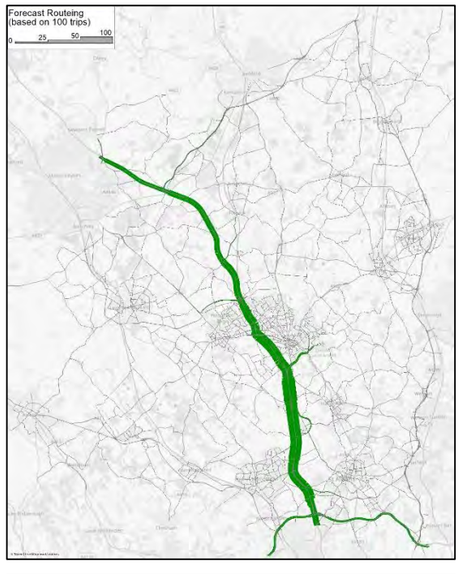
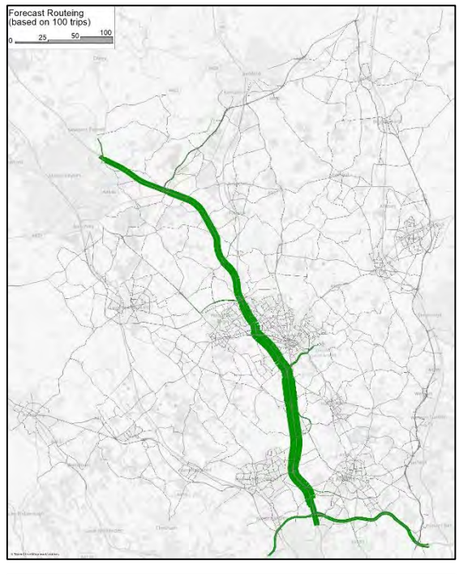
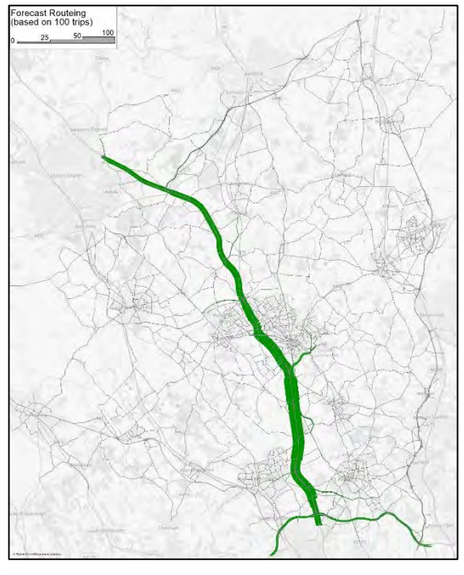
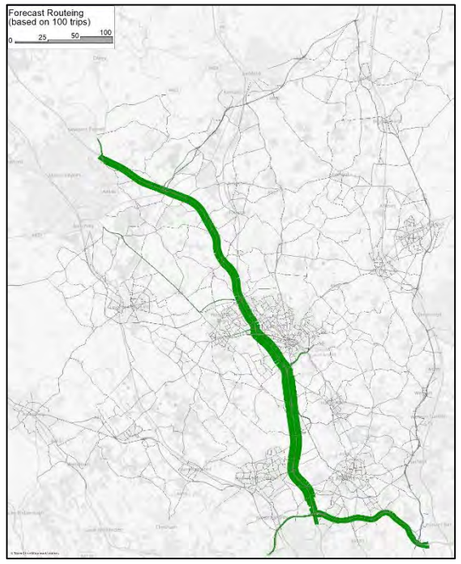
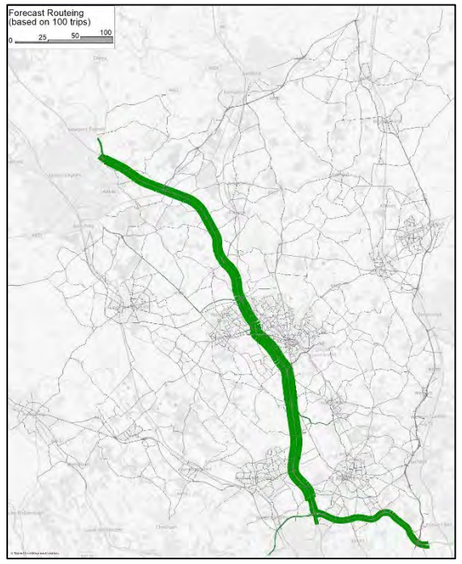
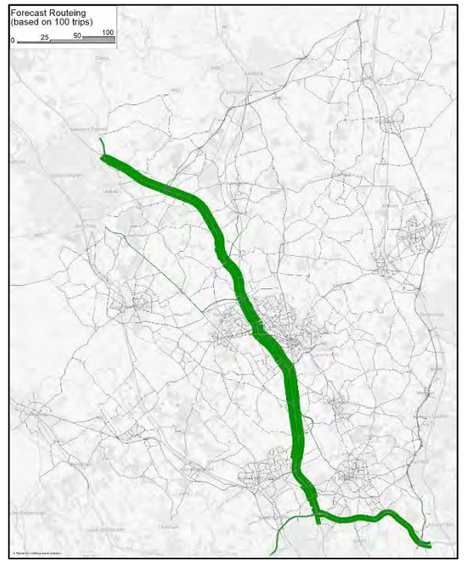


Figure I.2: Forecast Vehicle Routeing, 2043 TAG-based “Without” Expansion

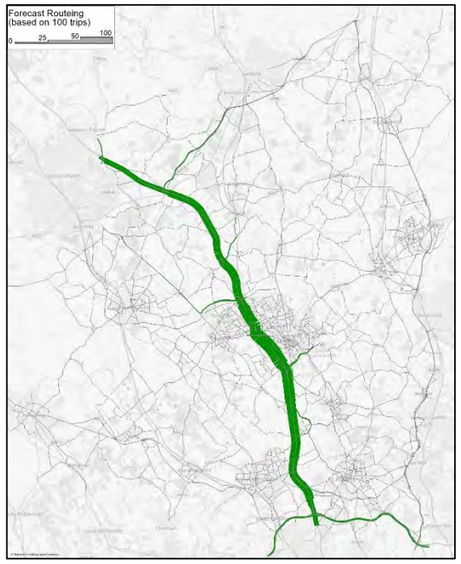
	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)
M1 Junction 9 to 10 (all vehicles)			
M1 Junction 9 to 10 (HGV vehicles)			

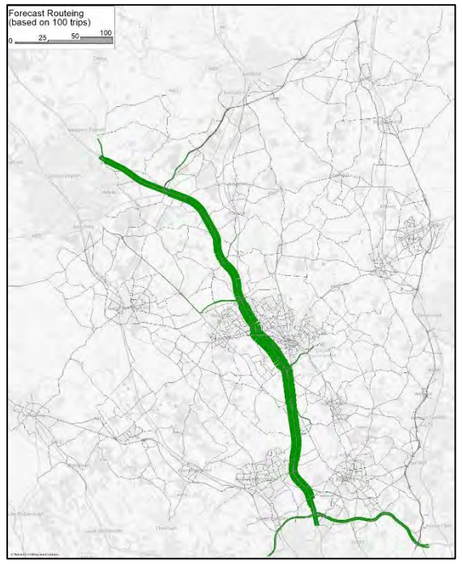
AM Peak Hour (08:00 to 09:00)

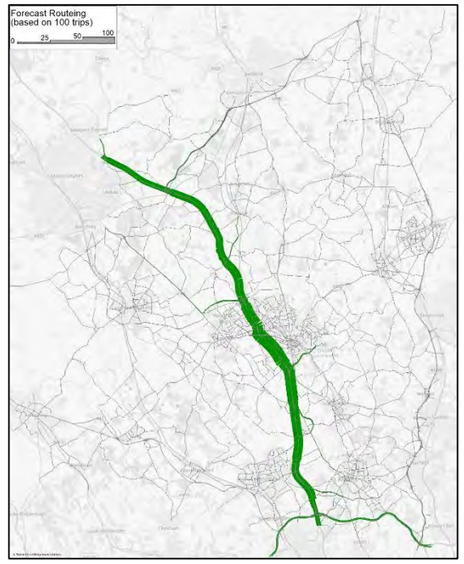
Interpeak Hour (between 10:00 to 16:00)

PM Peak Hour (17:00 to 18:00)

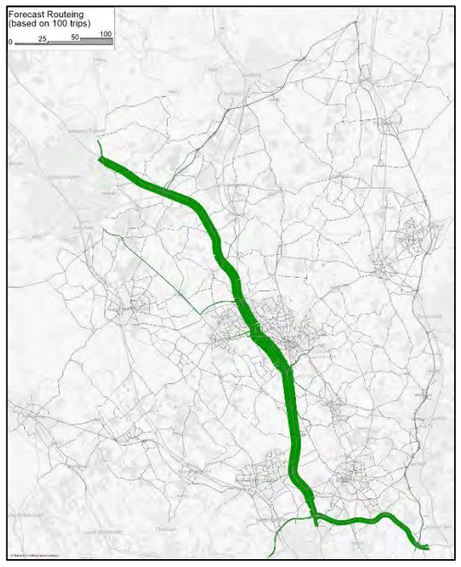
M1 Junction 10 to 11 (all vehicles)

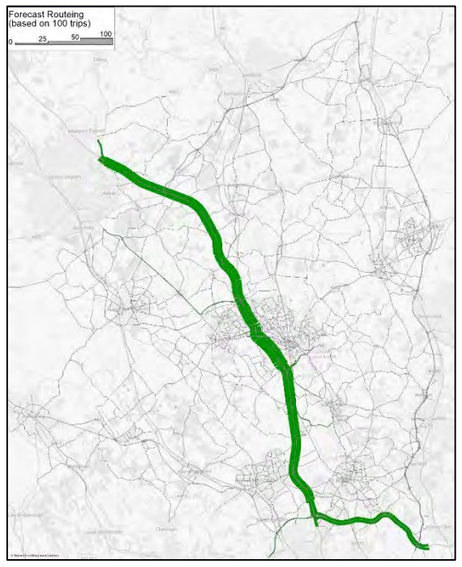


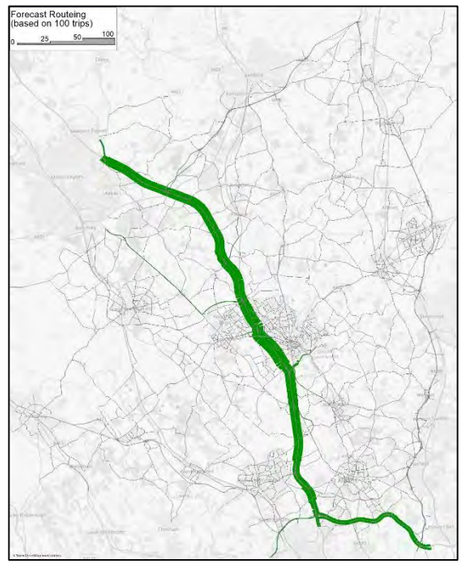


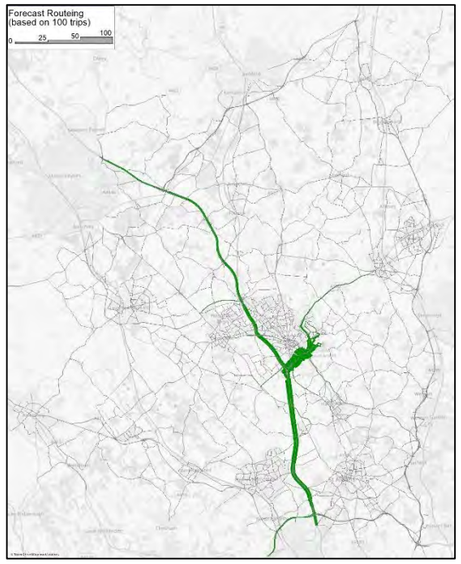
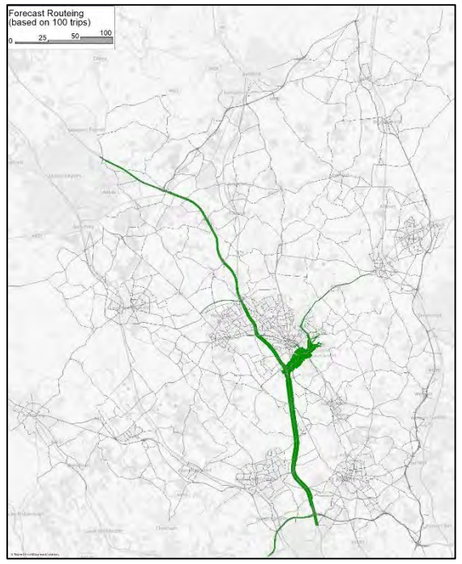
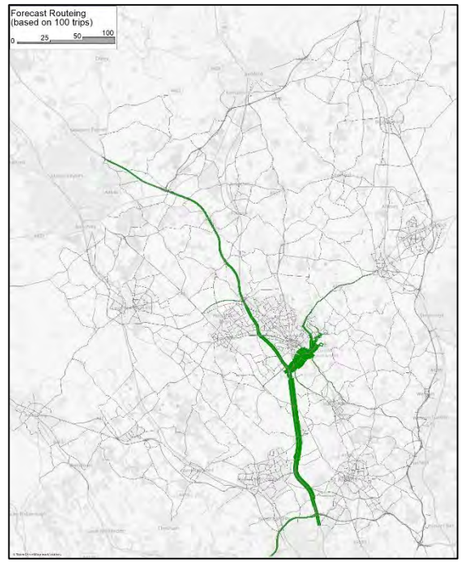
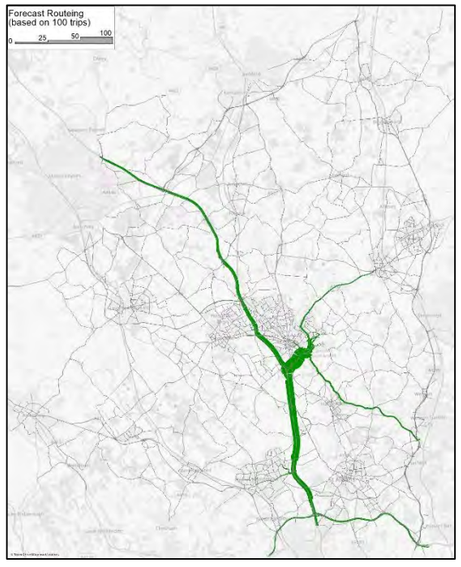
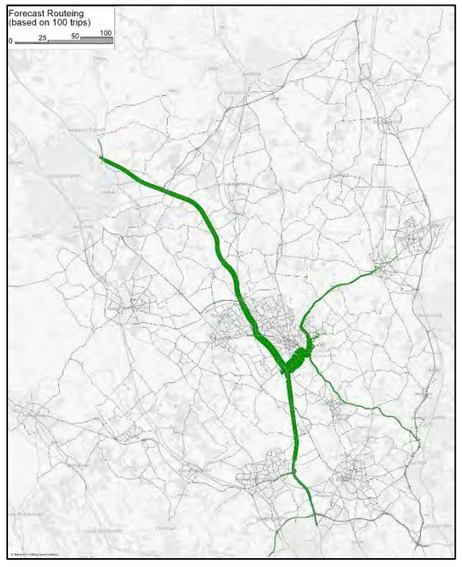
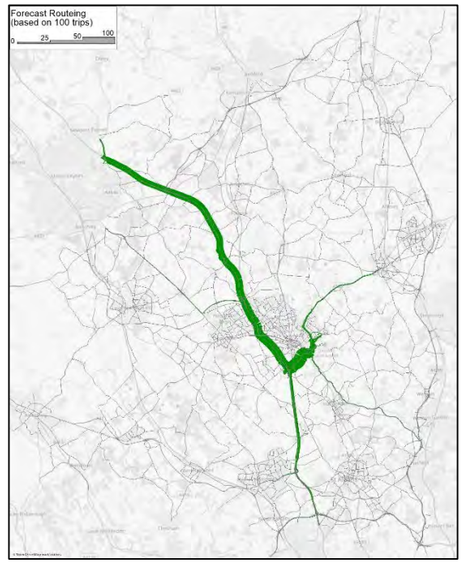


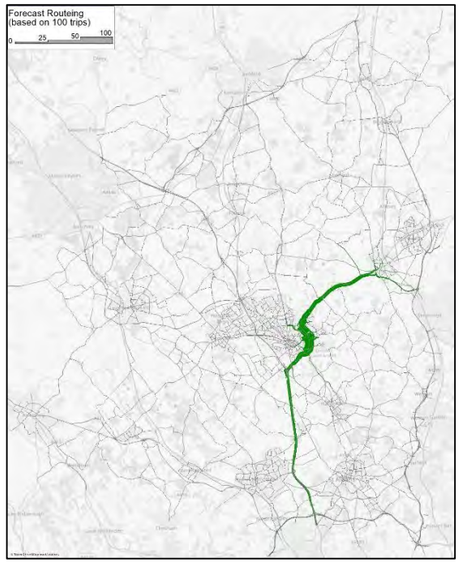
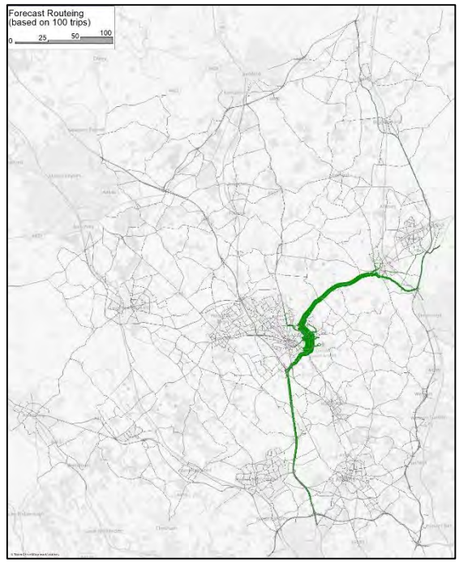
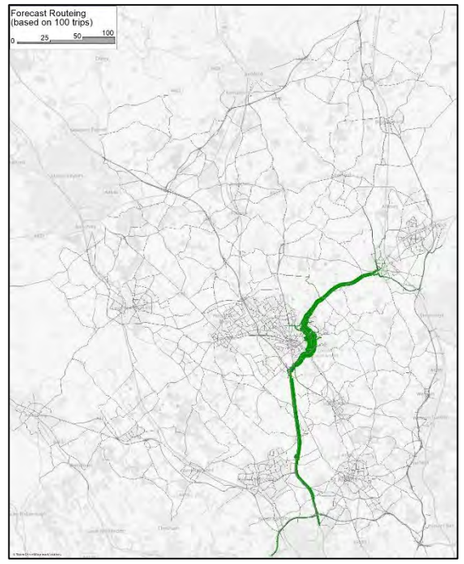
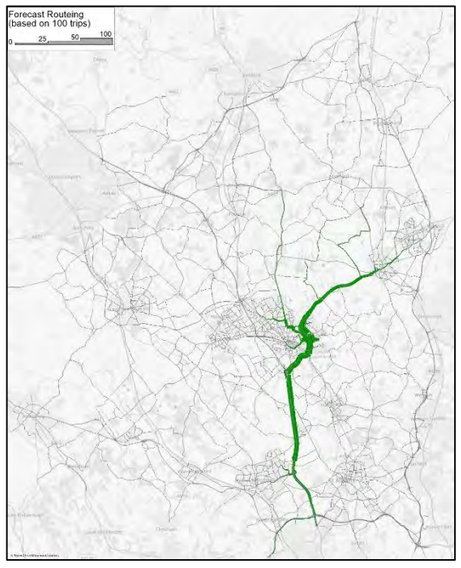
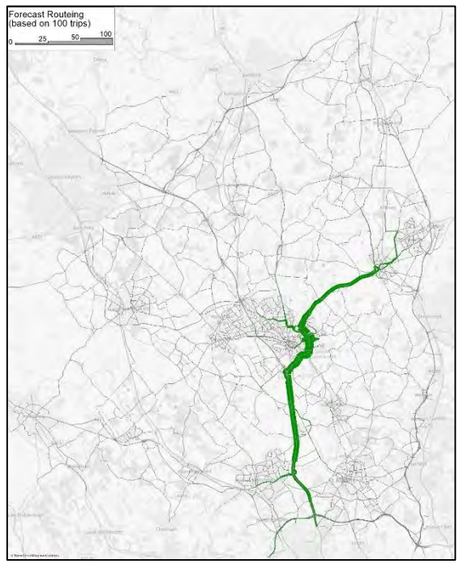
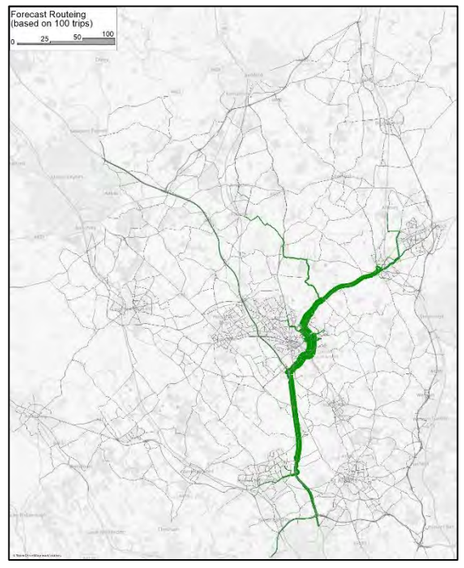
M1 Junction 10 to 11 (HGV vehicles)







	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)
A1081 (all vehicles)			
A1081 (HGV vehicles)			

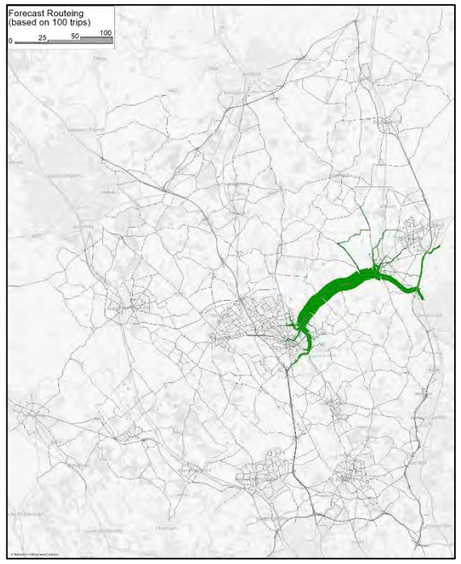
	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)
Vauxhall Way (all vehicles)			
Vauxhall Way (HGV vehicles)			

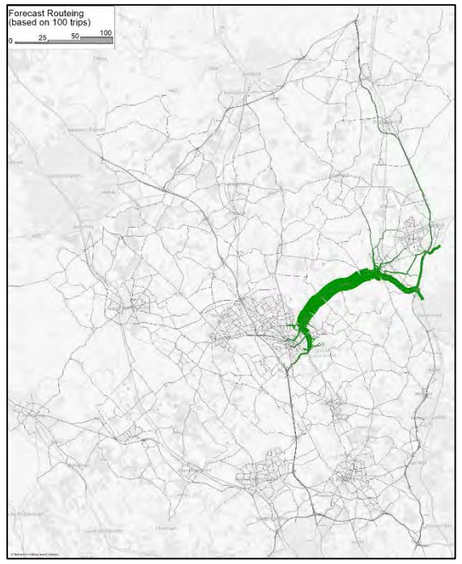
AM Peak Hour (08:00 to 09:00)

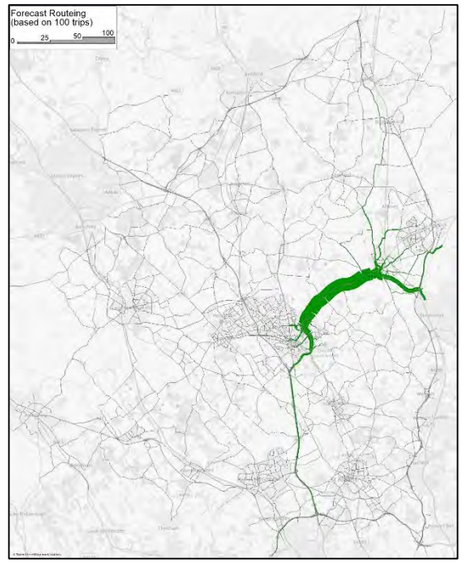
Interpeak Hour (between 10:00 to 16:00)

PM Peak Hour (17:00 to 18:00)

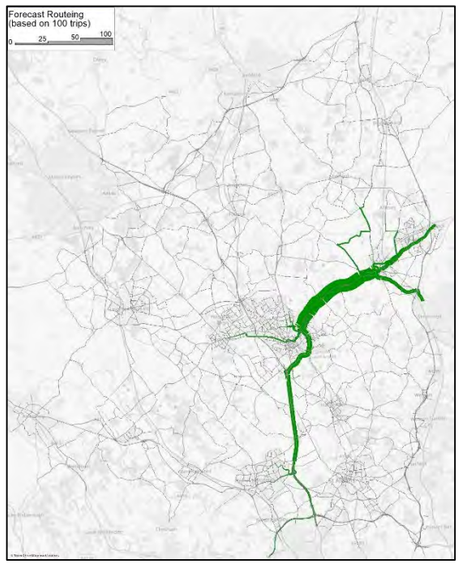
A505 (all vehicles)

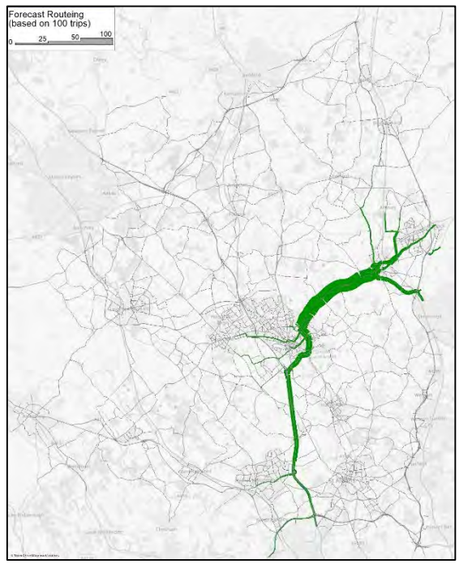






A505 (HGV vehicles)





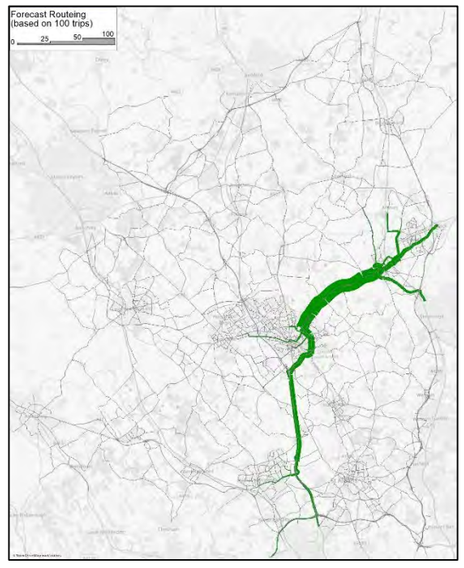
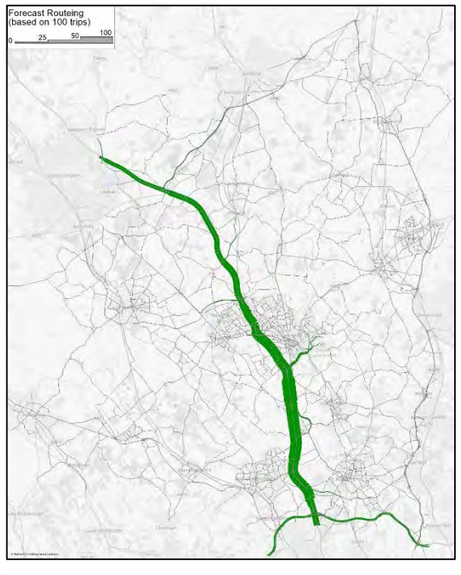
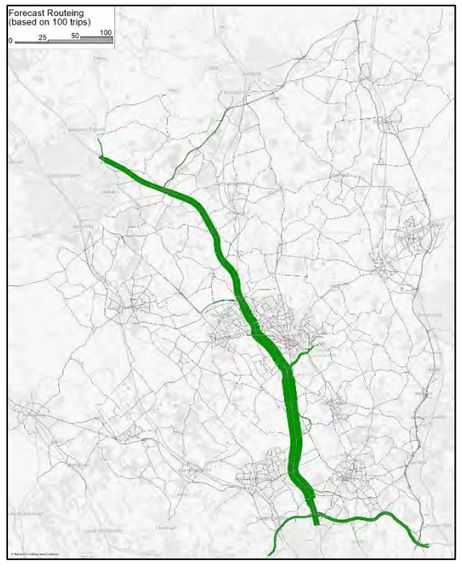
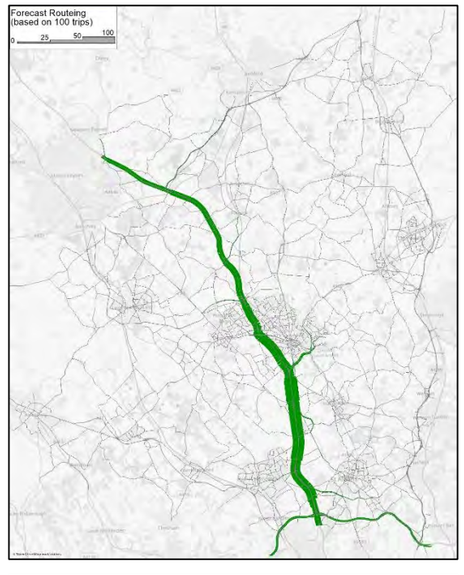
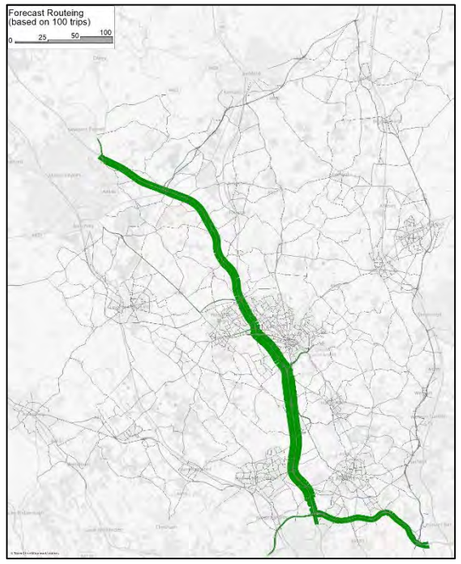
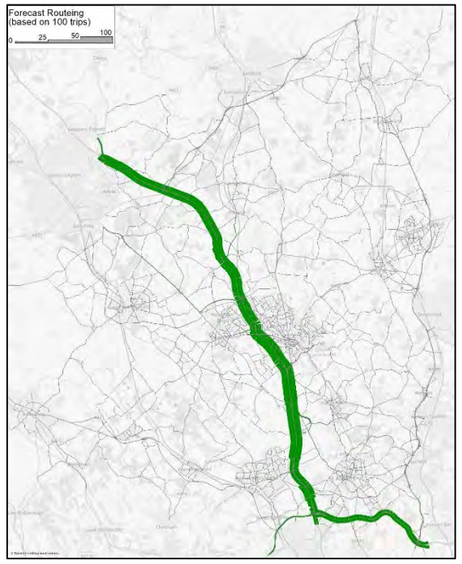
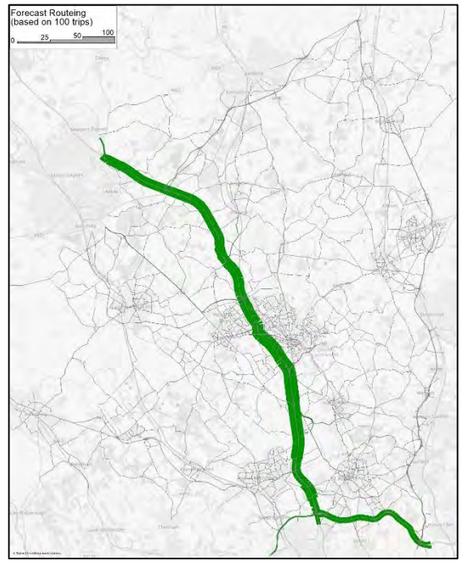


Figure I.3: Forecast Vehicle Routeing, 2043 TAG-based “With” Expansion

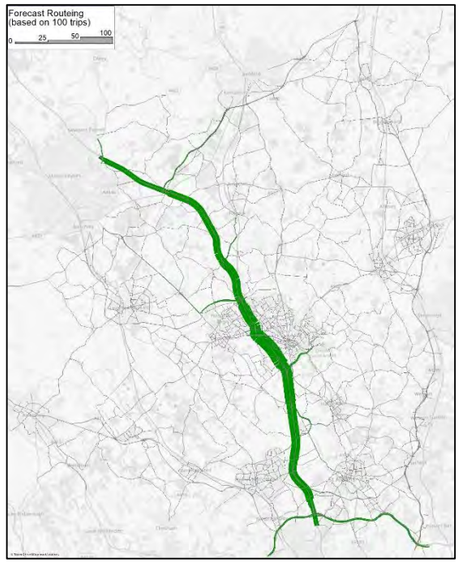
	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)
M1 Junction 9 to 10 (all vehicles)			
M1 Junction 9 to 10 (HGV vehicles)			

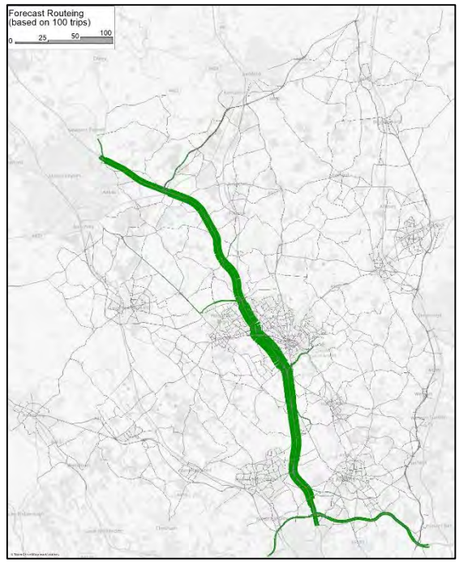
AM Peak Hour (08:00 to 09:00)

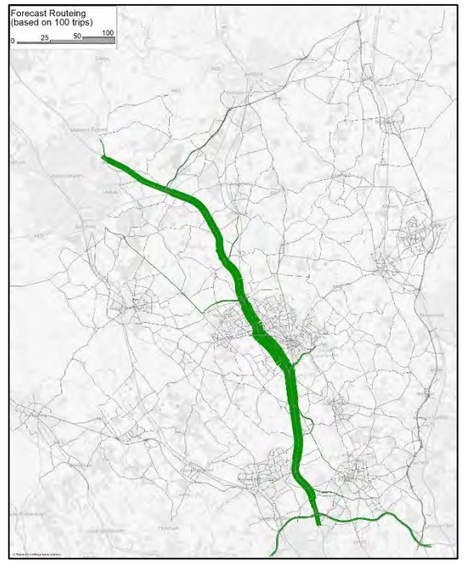
Interpeak Hour (between 10:00 to 16:00)

PM Peak Hour (17:00 to 18:00)

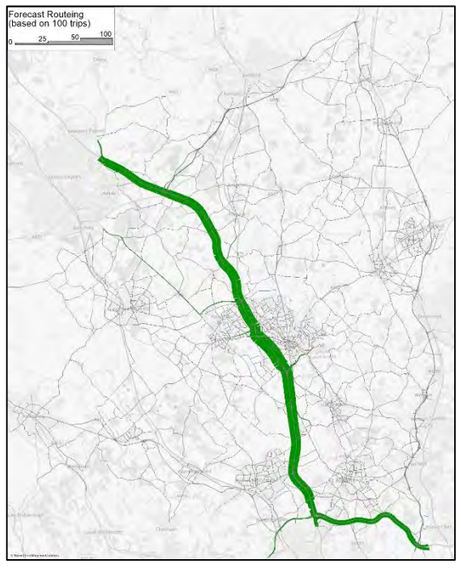
M1 Junction 10 to 11 (all vehicles)

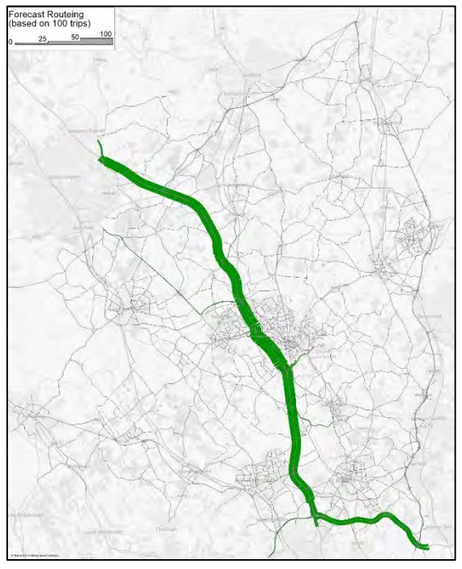


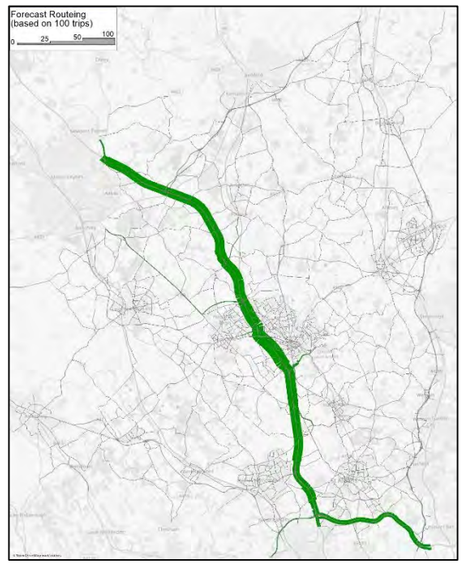




M1 Junction 10 to 11 (HGV vehicles)





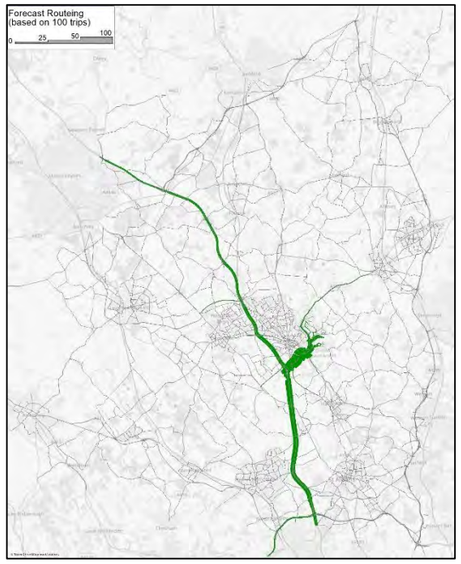


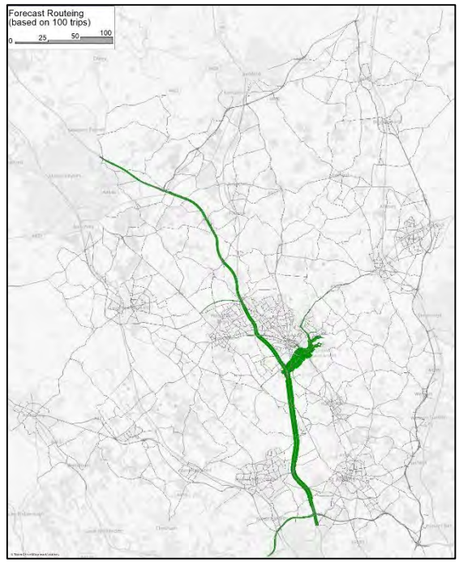
AM Peak Hour (08:00 to 09:00)

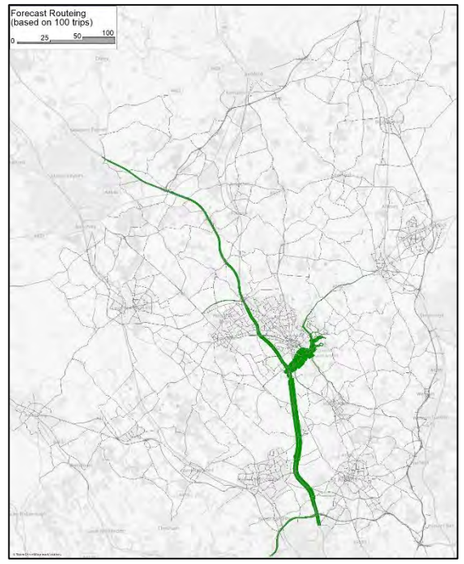
Interpeak Hour (between 10:00 to 16:00)

PM Peak Hour (17:00 to 18:00)

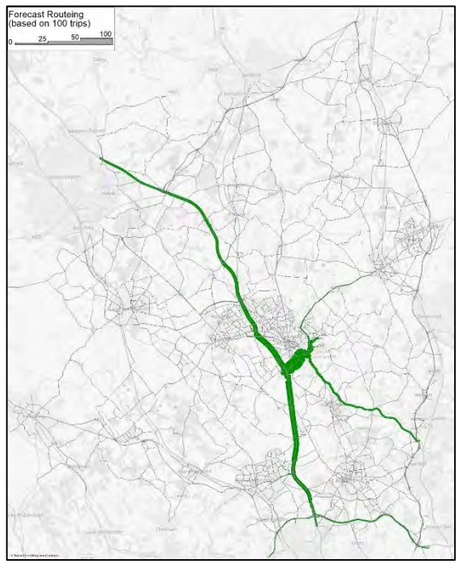
A1081 (all vehicles)

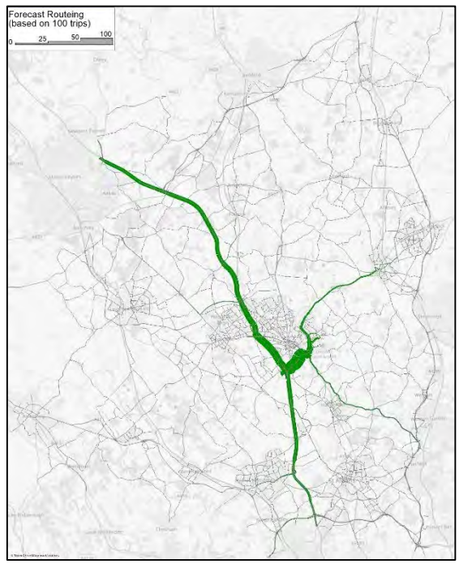


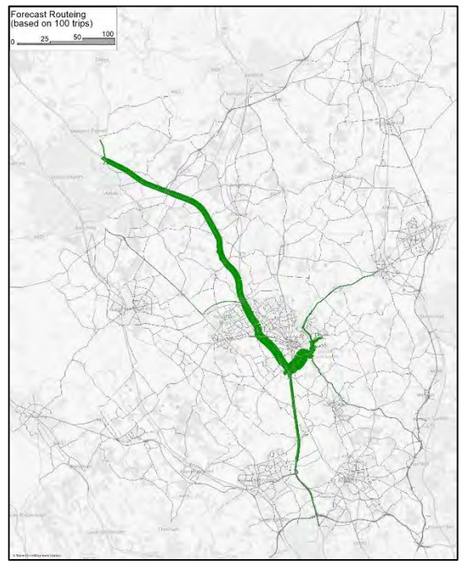


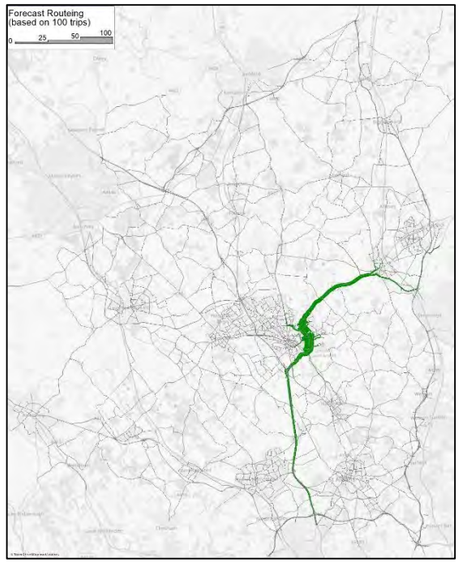
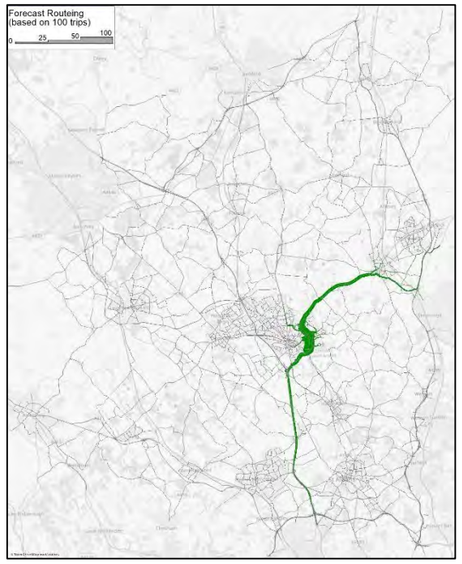
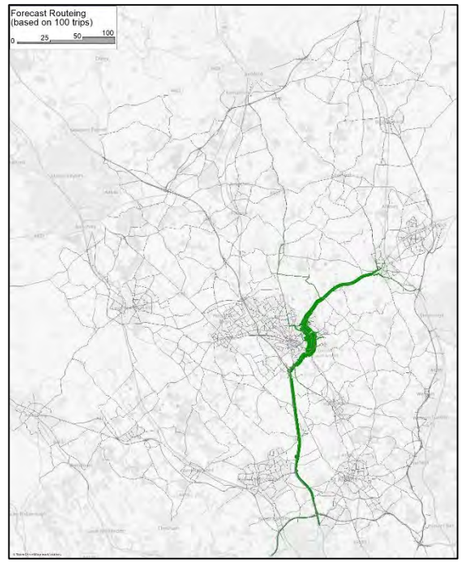
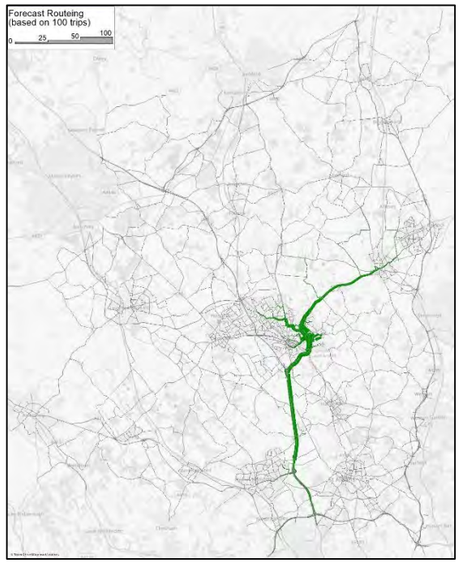
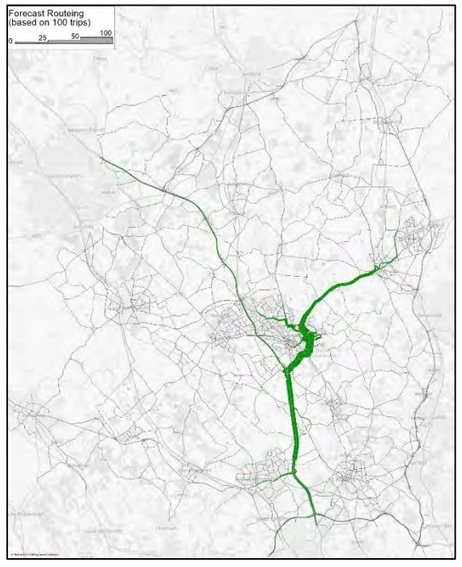
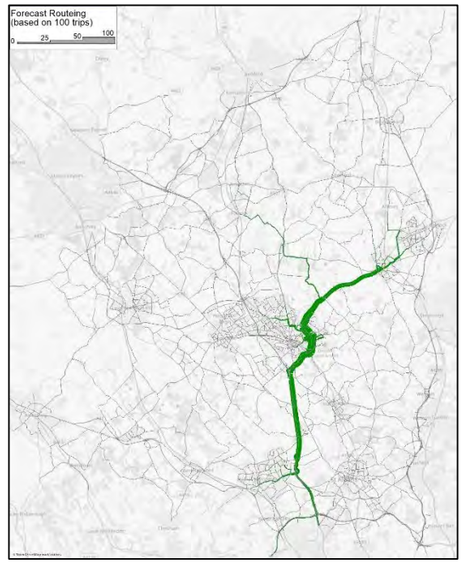


A1081 (HGV vehicles)







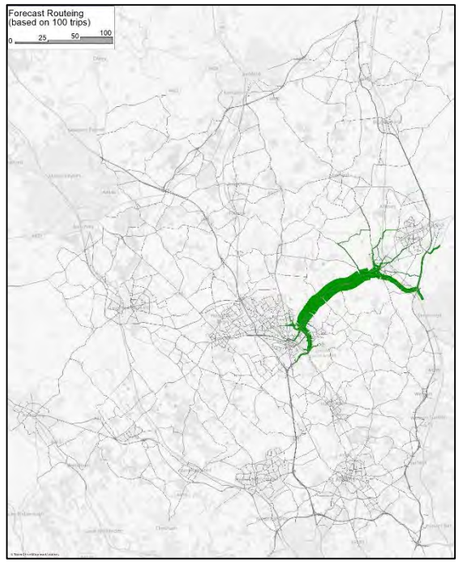
	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)
Vauxhall Way (all vehicles)			
Vauxhall Way (HGV vehicles)			

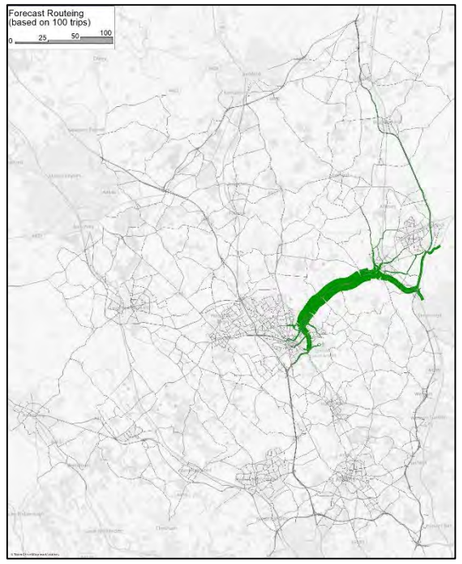
AM Peak Hour (08:00 to 09:00)

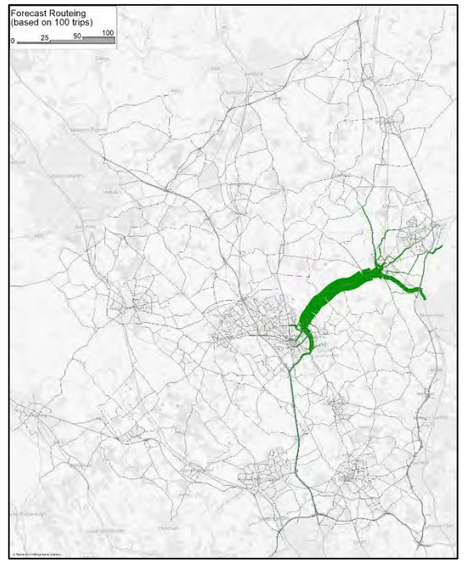
Interpeak Hour (between 10:00 to 16:00)

PM Peak Hour (17:00 to 18:00)

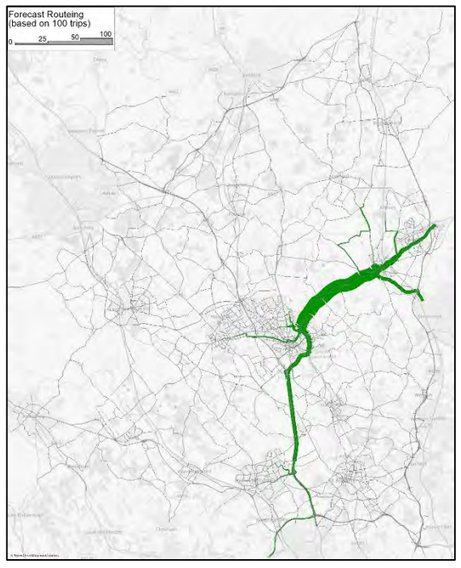
A505 (all vehicles)

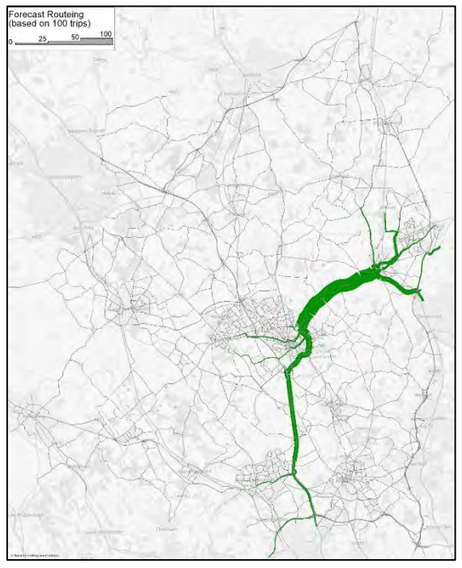






A505 (HGV vehicles)





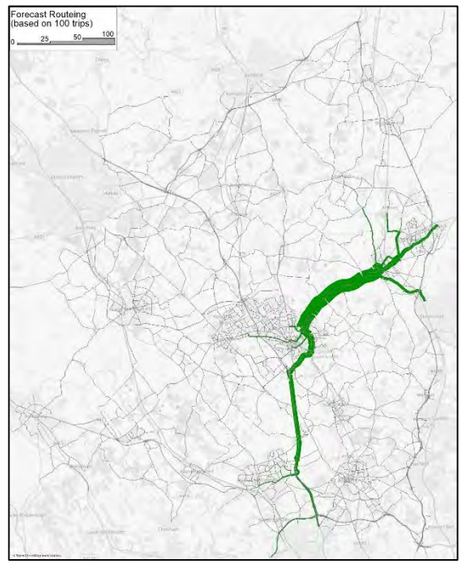
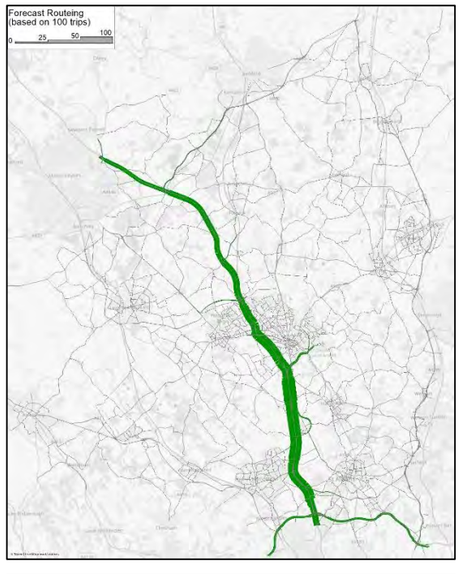
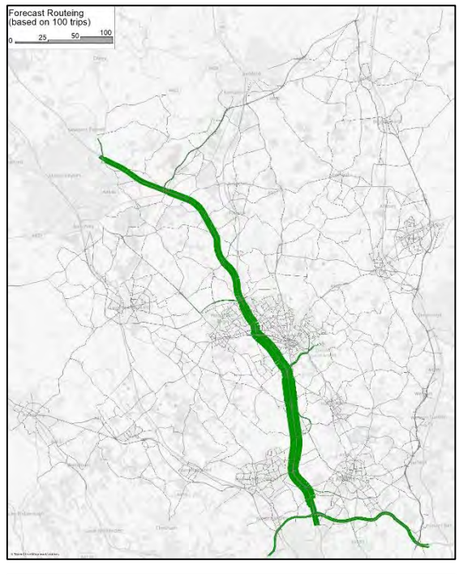
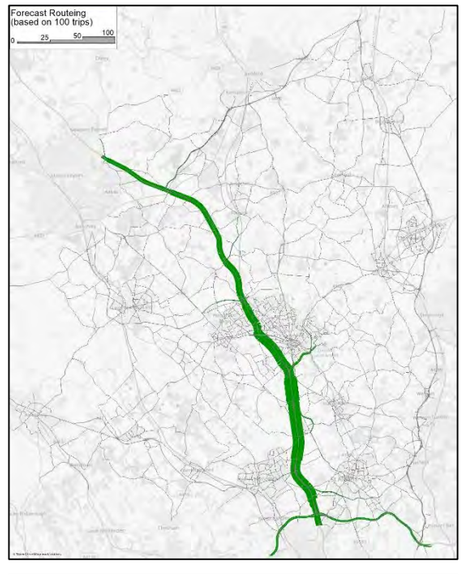
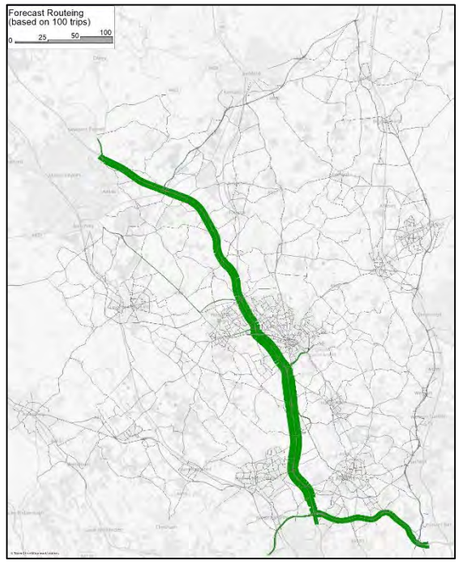
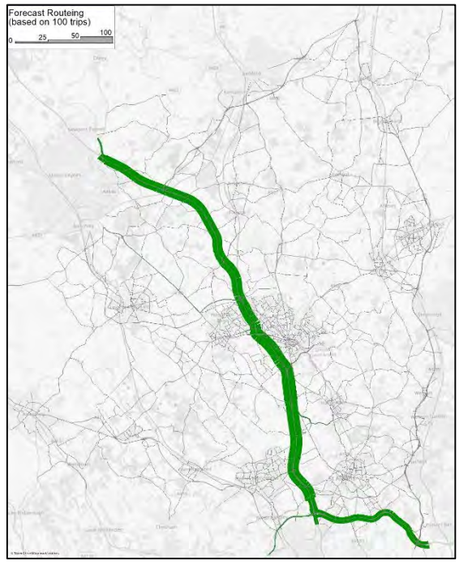
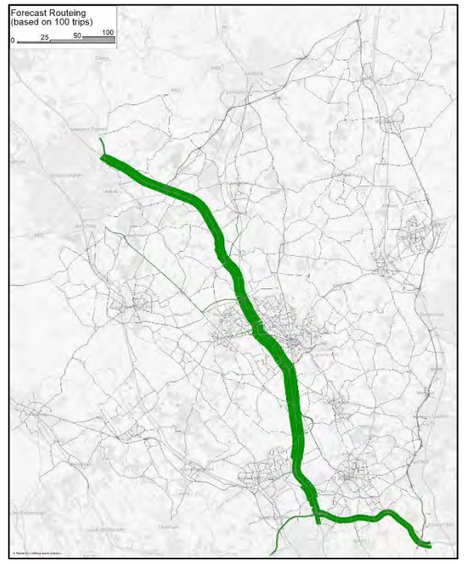


Figure I.4: Forecast Vehicle Routeing, 2043 Local Plan Growth Alternative Scenario “Without” Expansion

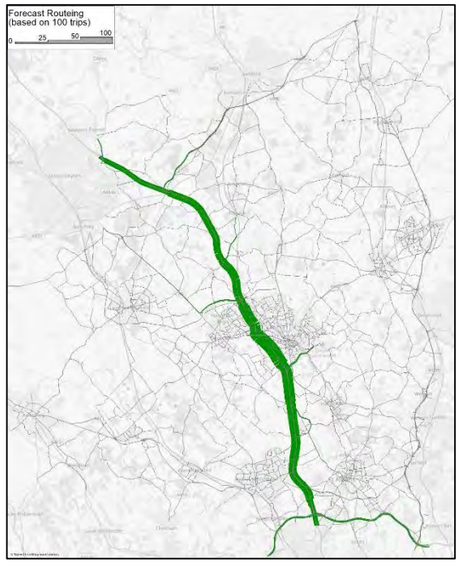
	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)
M1 Junction 9 to 10 (all vehicles)			
M1 Junction 9 to 10 (HGV vehicles)			

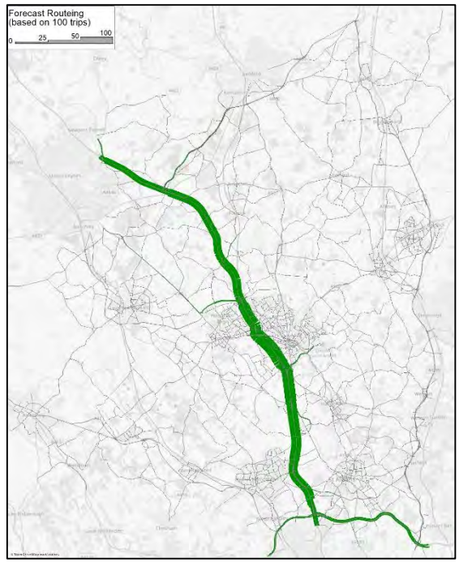
AM Peak Hour (08:00 to 09:00)

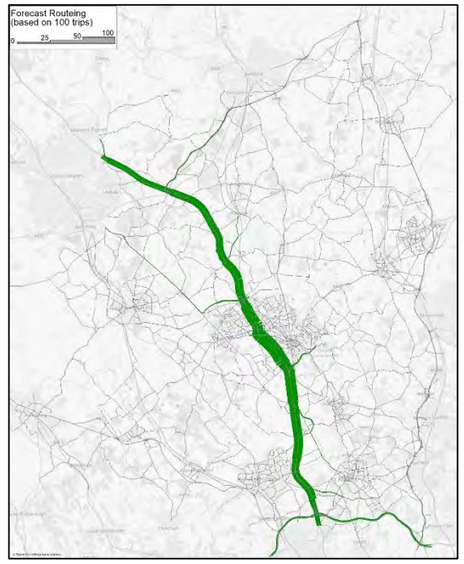
Interpeak Hour (between 10:00 to 16:00)

PM Peak Hour (17:00 to 18:00)

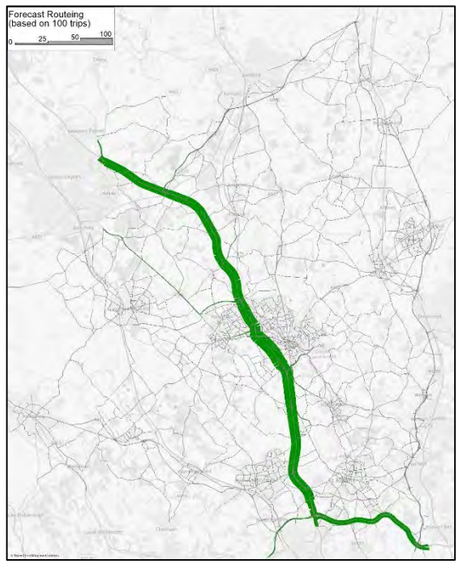
M1 Junction 10 to 11 (all vehicles)

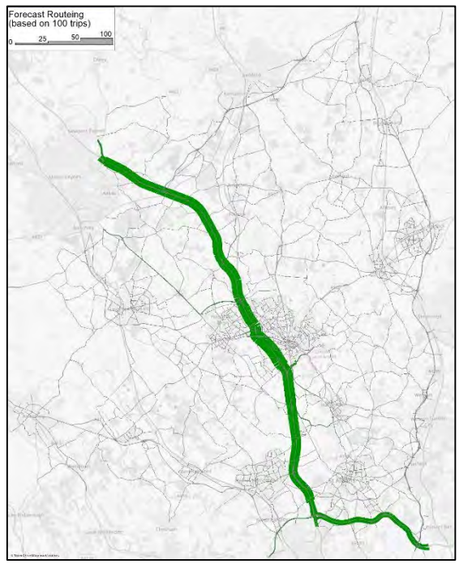


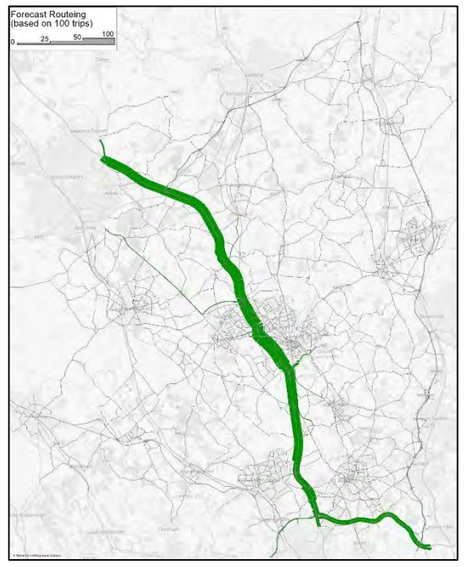




M1 Junction 10 to 11 (HGV vehicles)





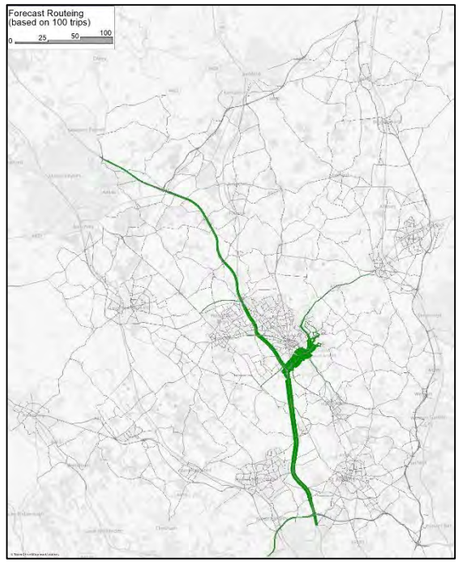


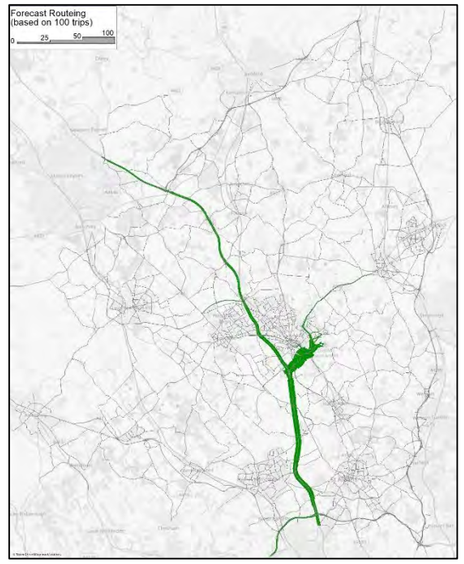
AM Peak Hour (08:00 to 09:00)

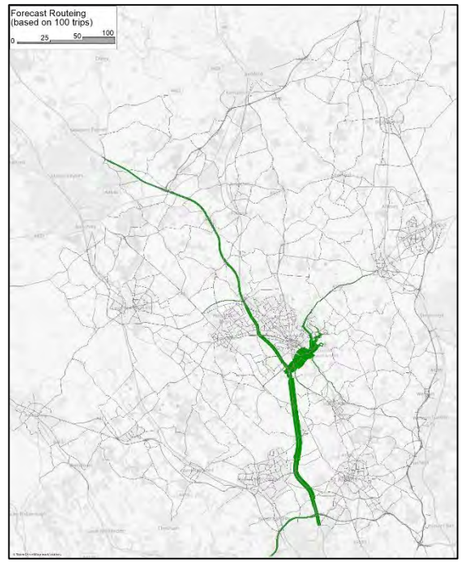
Interpeak Hour (between 10:00 to 16:00)

PM Peak Hour (17:00 to 18:00)

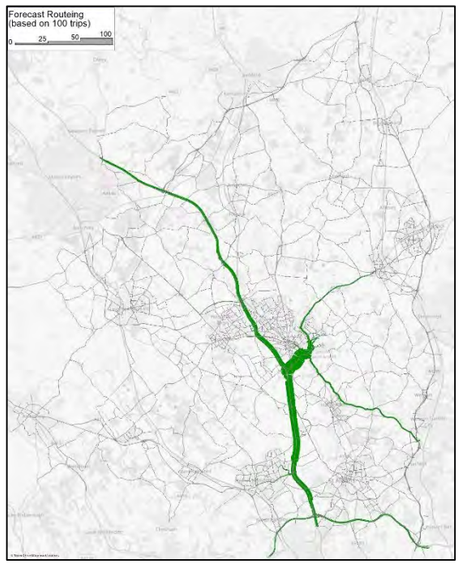
A1081 (all vehicles)

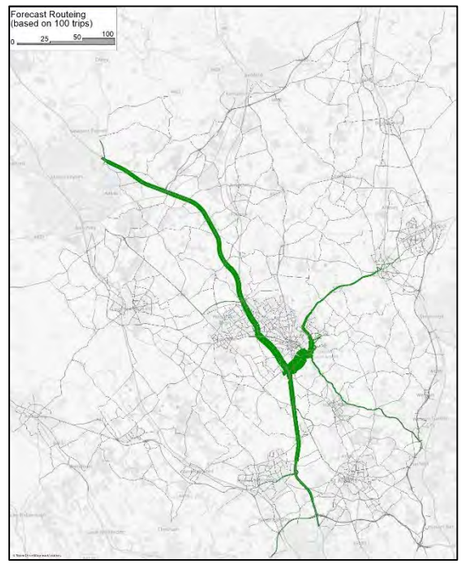


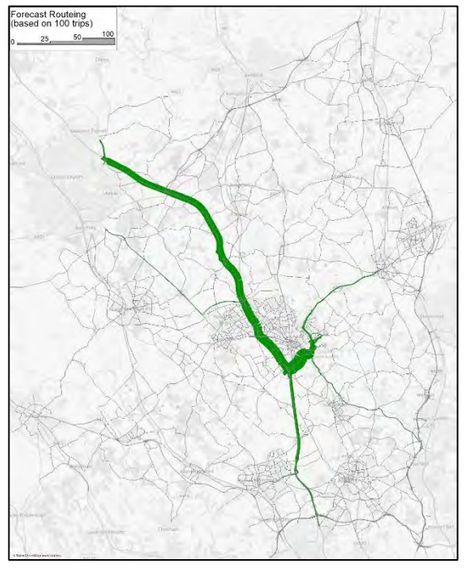




A1081 (HGV vehicles)





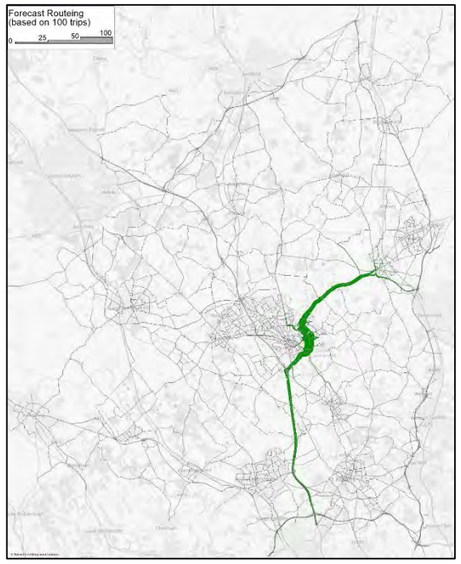


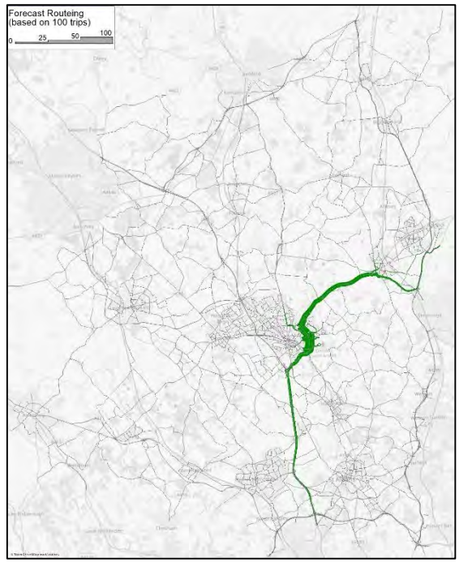
AM Peak Hour (08:00 to 09:00)

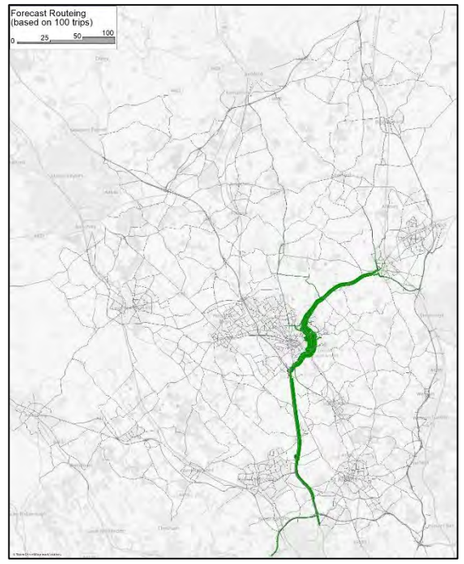
Interpeak Hour (between 10:00 to 16:00)

PM Peak Hour (17:00 to 18:00)

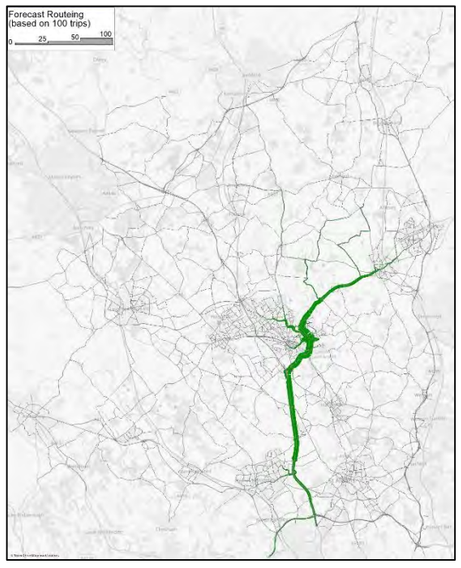
Vauxhall Way (all vehicles)

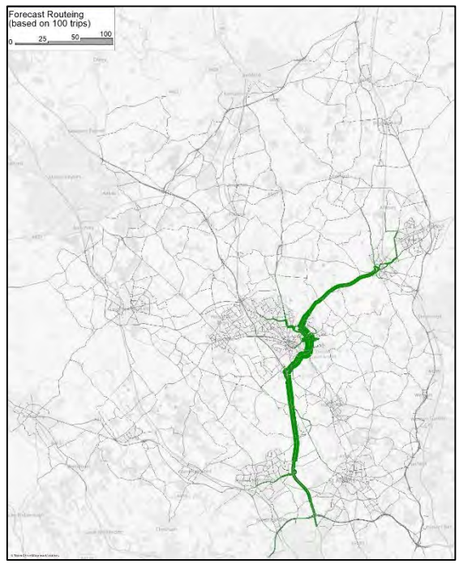


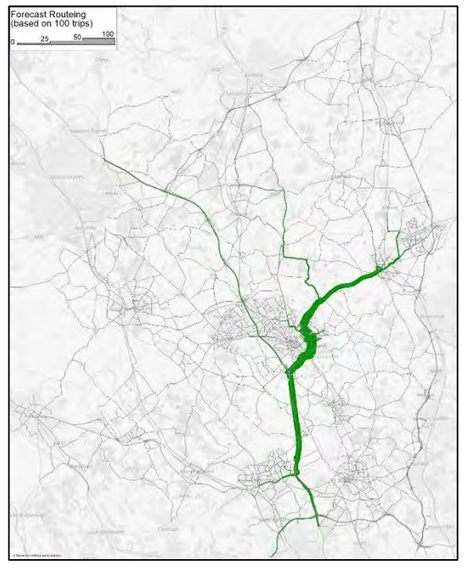




Vauxhall Way (HGV vehicles)





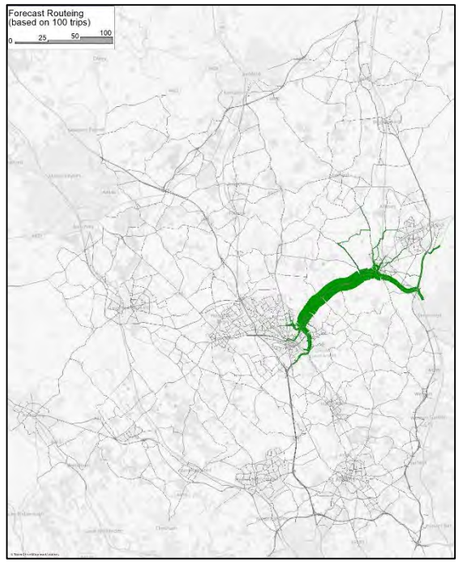


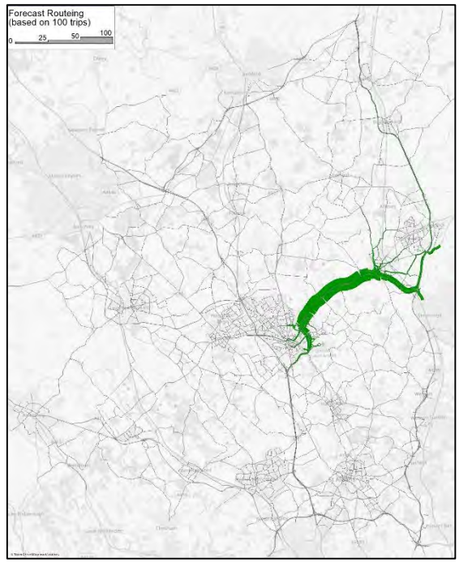
AM Peak Hour (08:00 to 09:00)

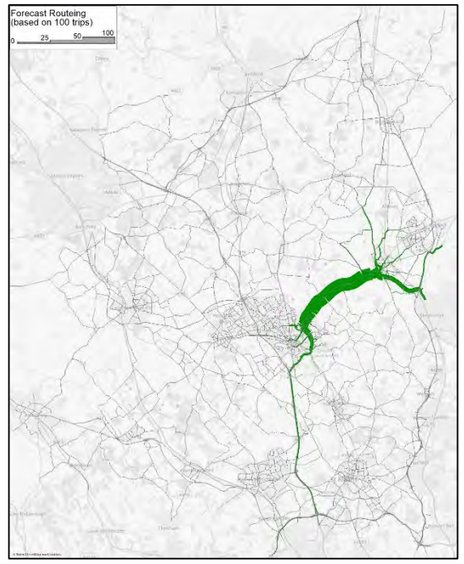
Interpeak Hour (between 10:00 to 16:00)

PM Peak Hour (17:00 to 18:00)

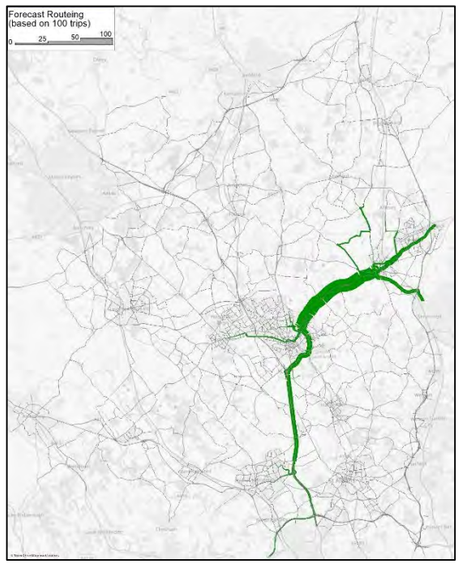
A505 (all vehicles)

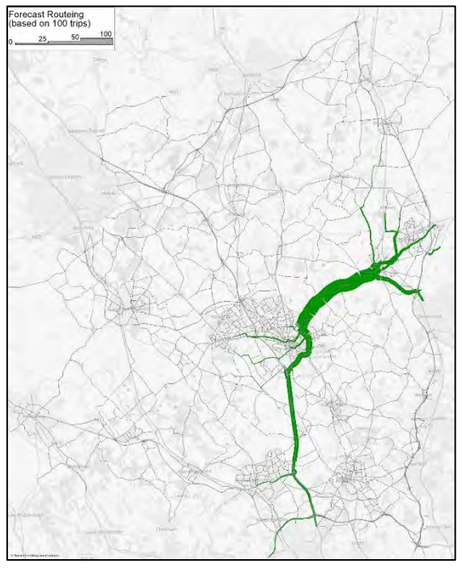






A505 (HGV vehicles)





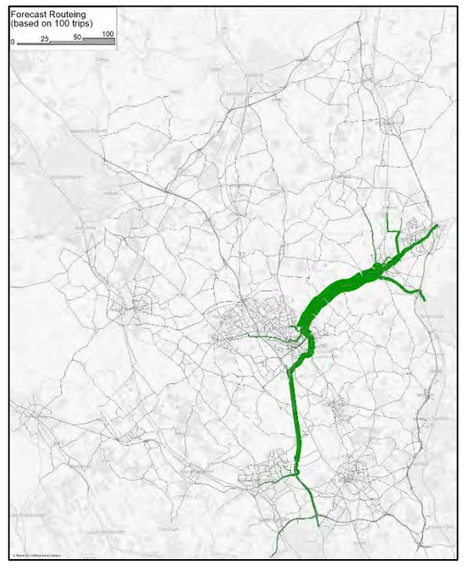
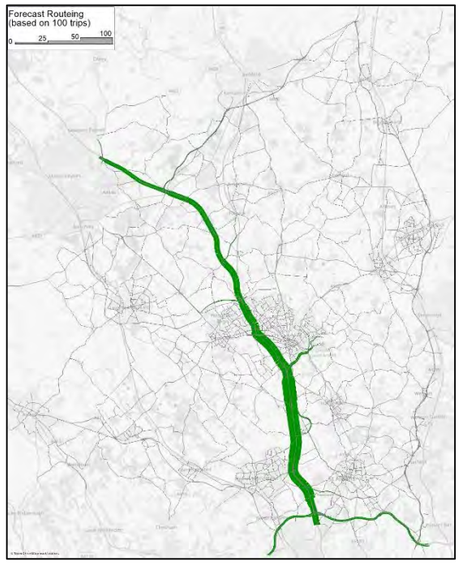
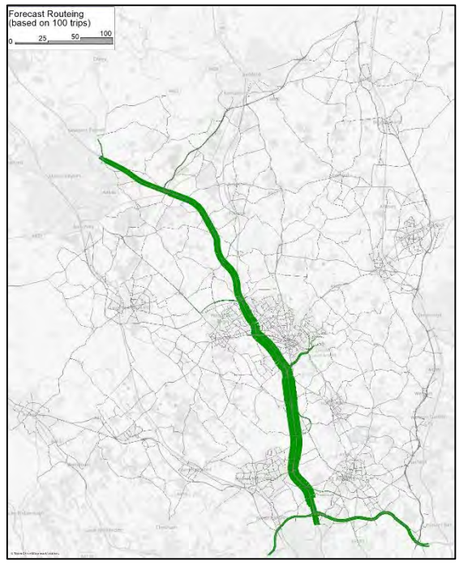
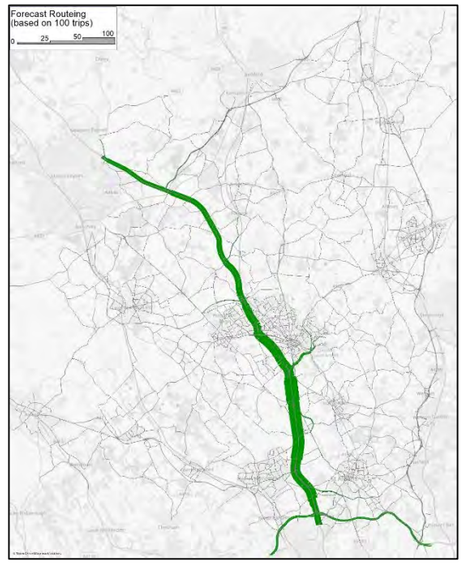
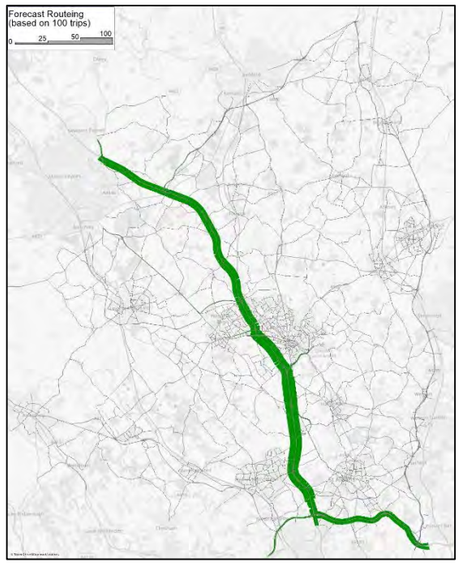
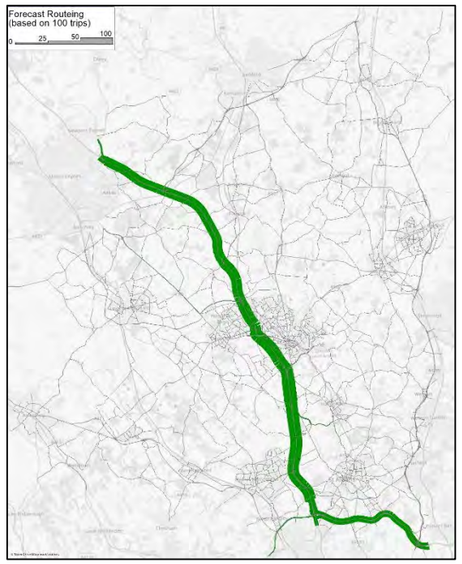
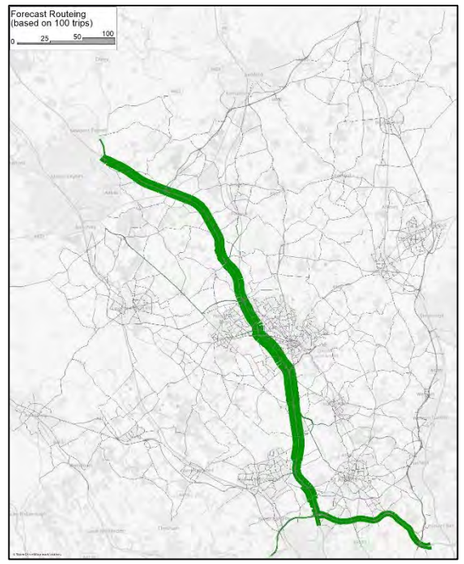
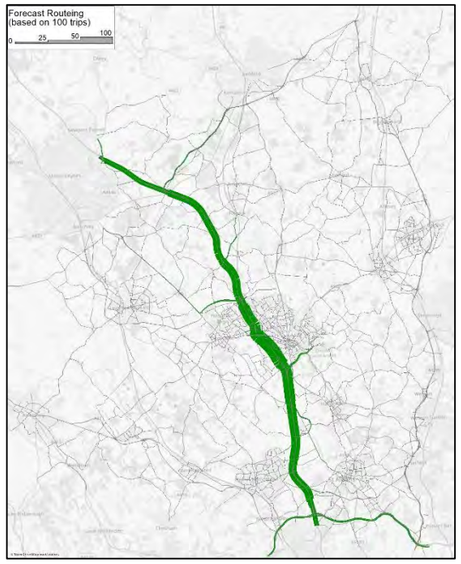
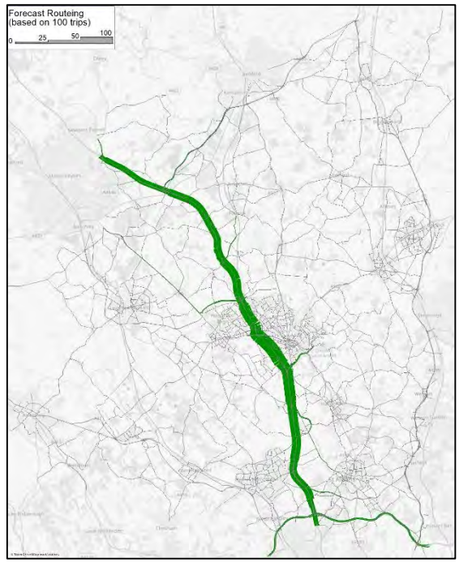
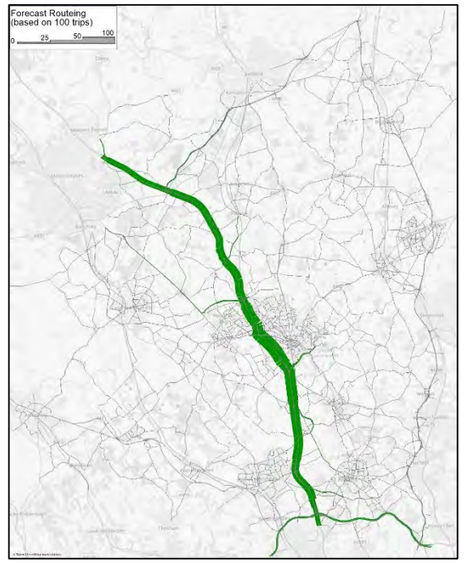
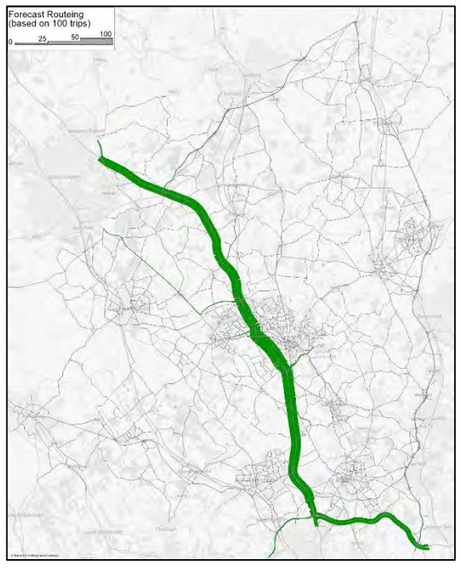
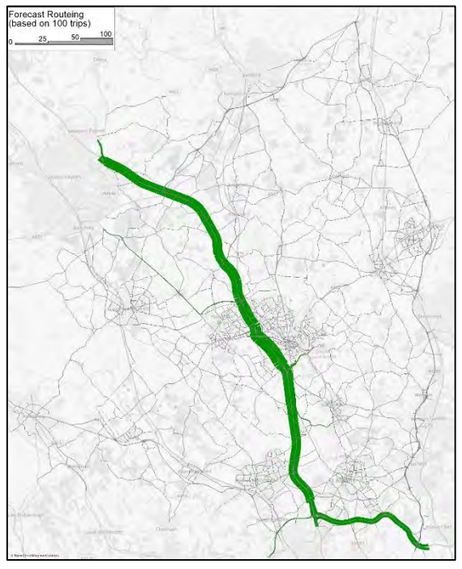
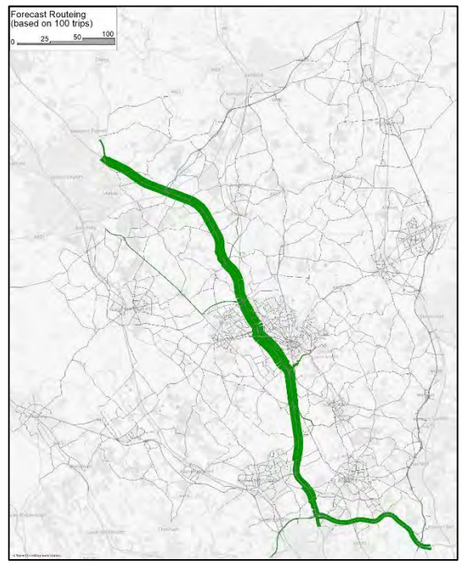


Figure I.5: Forecast Vehicle Routeing, 2043 Local Plan Growth Alternative Scenario “With” Expansion

	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)
M1 Junction 9 to 10 (all vehicles)			
M1 Junction 9 to 10 (HGV vehicles)			

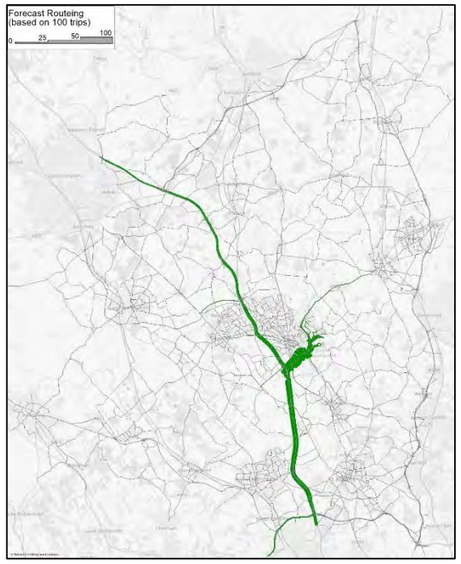
	AM Peak Hour (08:00 to 09:00)	Interpeak Hour (between 10:00 to 16:00)	PM Peak Hour (17:00 to 18:00)
M1 Junction 10 to 11 (all vehicles)			
M1 Junction 10 to 11 (HGV vehicles)			

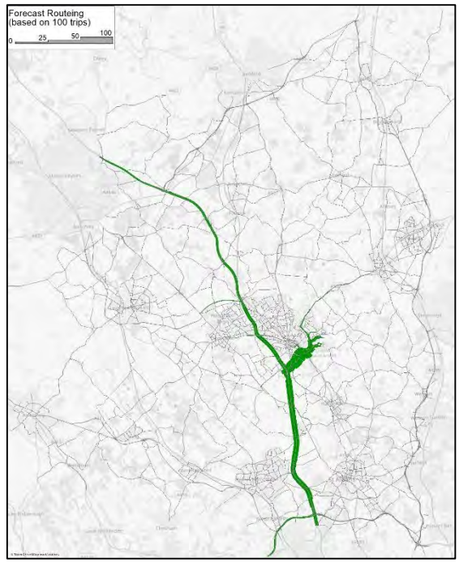
AM Peak Hour (08:00 to 09:00)

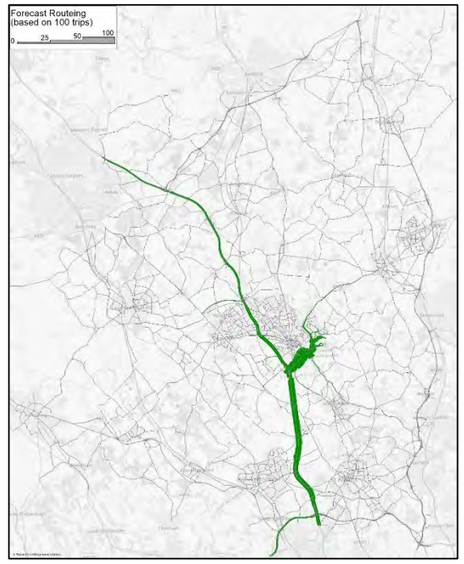
Interpeak Hour (between 10:00 to 16:00)

PM Peak Hour (17:00 to 18:00)

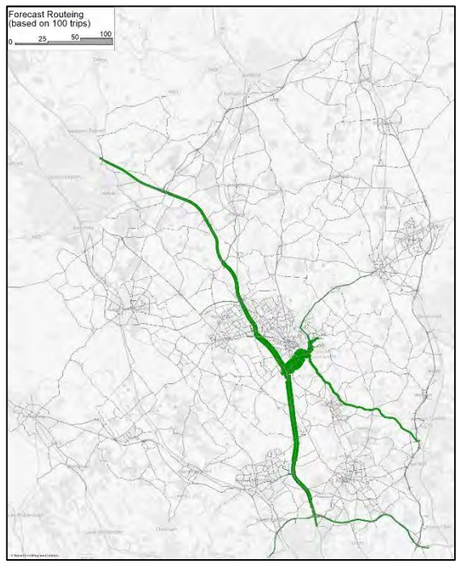
A1081 (all vehicles)

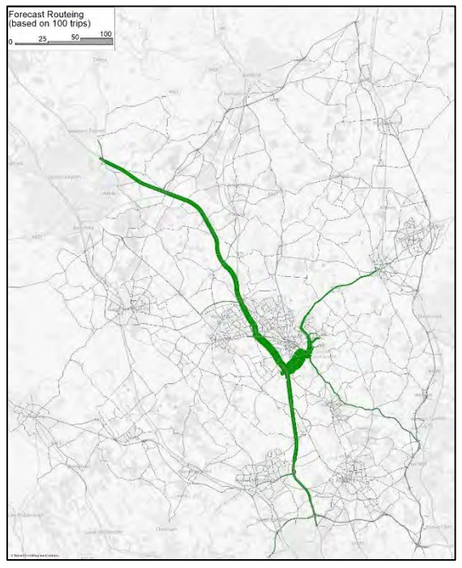


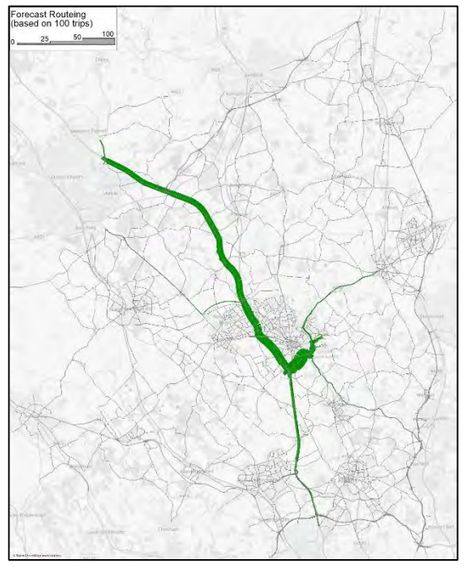




A1081 (HGV vehicles)





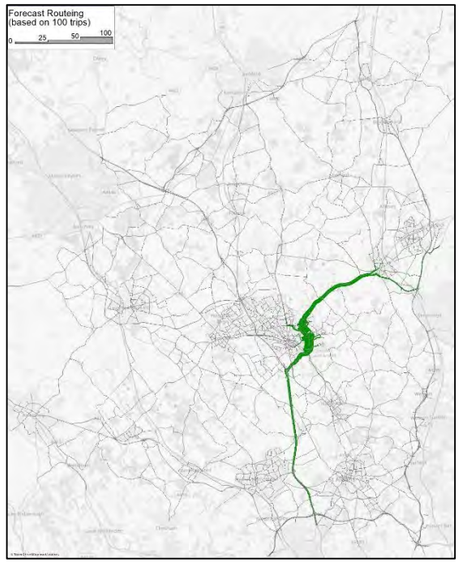


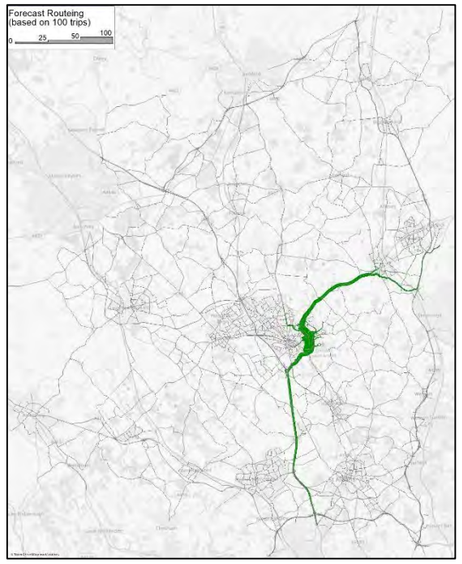
AM Peak Hour (08:00 to 09:00)

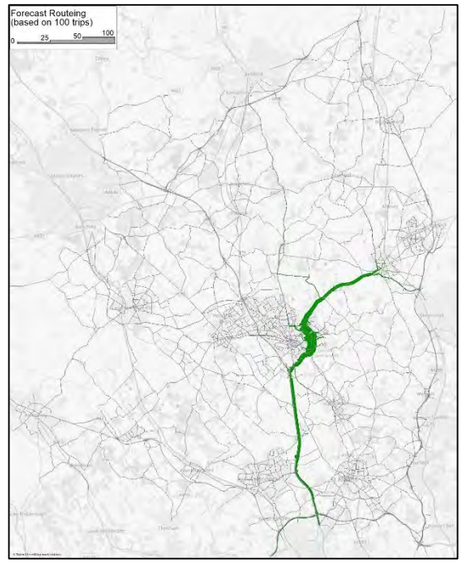
Interpeak Hour (between 10:00 to 16:00)

PM Peak Hour (17:00 to 18:00)

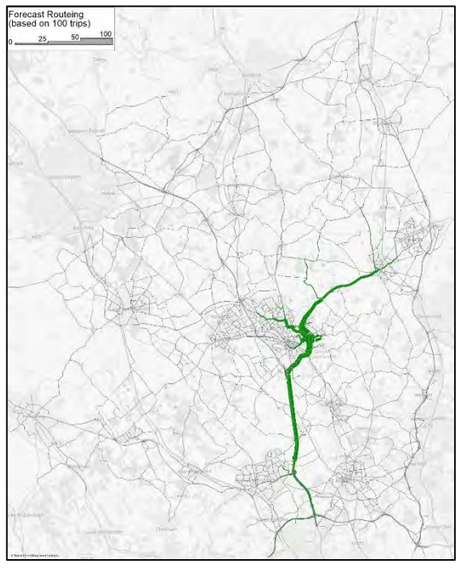
Vauxhall Way (all vehicles)

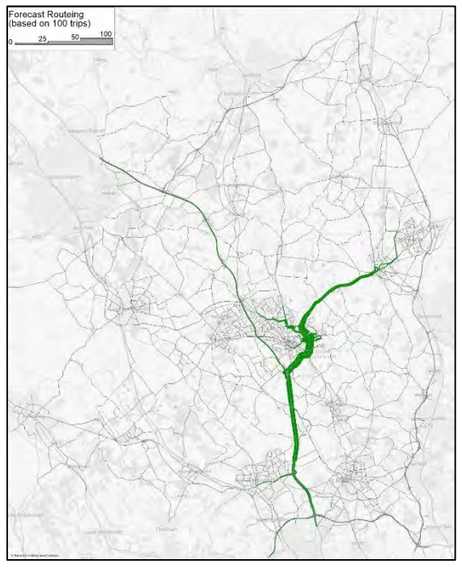


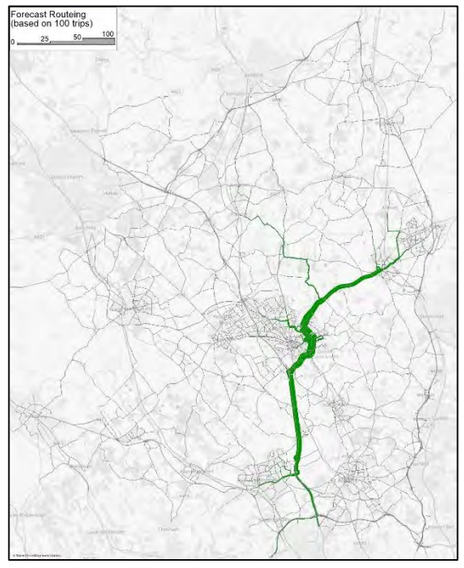




Vauxhall Way (HGV vehicles)





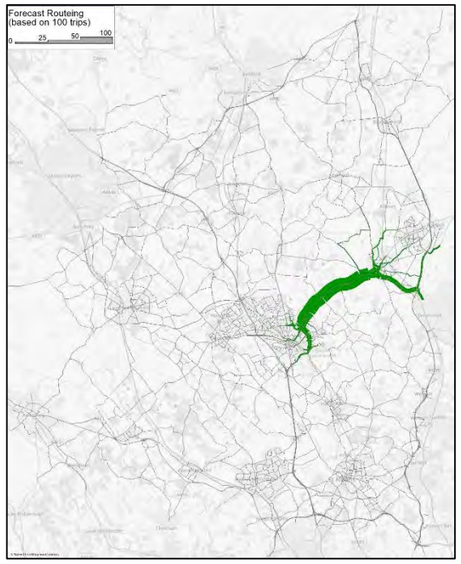


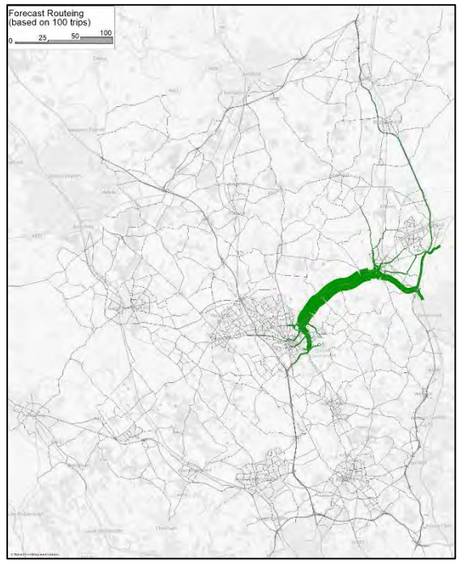
AM Peak Hour (08:00 to 09:00)

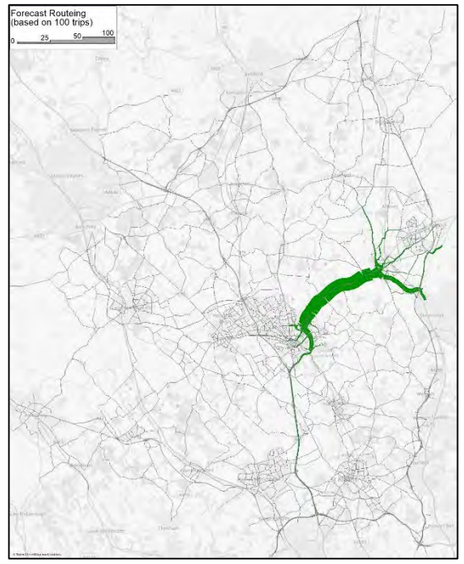
Interpeak Hour (between 10:00 to 16:00)

PM Peak Hour (17:00 to 18:00)

A505 (all vehicles)







A505 (HGV vehicles)