Luton Rising

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February 2023

London Luton Airport Expansion

Planning Inspectorate Scheme Ref: TR020001

Volume 7 Other Documents

7.02 Transport Assessment - Part 3 of 4 (Chapters 9-10)

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7.02 TRANSPORT ASSESSMENT – PART 3 OF 4 (CHAPTERS 9-10)

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9 MODELLING METHODOLOGY

9.1 Overall approach

9.1.1 Two transport models have been used to appraise transport impacts as a result of the Proposed Development. These are:

a. the Central Bedfordshire and Luton Transport Model (CBLTM) which was identified as the best available tool to assess strategic impacts. Where strategic impacts have been identified, the CBLTM model is supplemented by local junction modelling as appropriate; and

b. a Vissim model used to assess impacts on the road network local to the airport.

9.1.2 The key objectives of the strategic modelling were:

a. to provide strategic growth forecasts for the Vissim model;

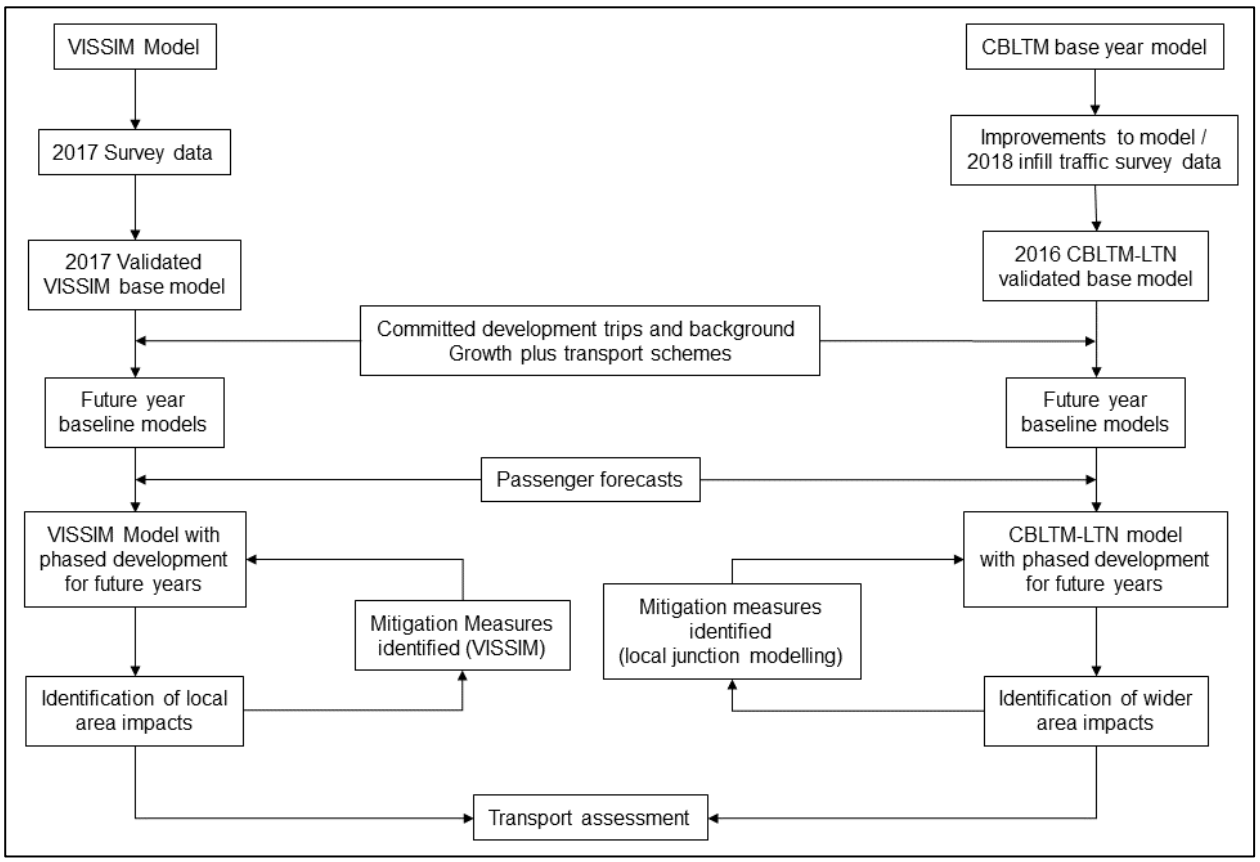
b. to provide traffic flows for the air quality and noise assessments undertaken as part of the **ES [TR020001/APP/5.01]**; and

c. to provide a strategic assessment of the potential off site pressure points on the transport network resulting from the Proposed Development.

9.1.3 The key objective of the Vissim model was to provide a detailed assessment of the road network operation and impact of the Proposed Development in the area local to the airport as shown in **Figure 9.2**, including assessing highway interventions to mitigate impacts.

9.1.4 The modelling approach is summarised below in **Figure 9.1**.

Figure 9.1: Modelling methodology



Central Bedfordshire and Luton Transport Model (CBLTM)

9.1.5 The original version of the CBLTM was developed in 2009 and included a base year of 2009. The purpose of the CBLTM was to provide an evidence base for current and future transport issues within the region, specifically focused on Central Bedfordshire and Luton. The model was designed to be used for combined development assessment and high-level transport scheme prioritisation, to support initial phases of business case development and to assess new public transport schemes.

9.1.6 In 2016 AECOM was commissioned to update this model to reflect a 2016 base year, which included the collection of new travel demand data including traffic data (mobile network data and public transport ticket data).

9.1.7 A Model Specification Report dated September 2018 (see **Appendix B**) was produced detailing the updates to be implemented to the CBLTM for the purpose of assessing the Proposed Development, creating a new version of the model suite, hereafter referred to as CBLTM-LTN. The CBLTM-LTN retains the base year of 2016 and provides more detail of the networks around the airport and extends the area over which the performance of the highway network can be assessed. The extent of the highway network included in the CBLTM-LTN has been agreed as appropriate with National Highways, LBC, CBC, and HCC as part of the Transport Assessment scoping exercise.

9.1.8 The CBLTM-LTN model suite of programs contains:

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 DfT's CTripEnd software).

9.1.9 When producing the model forecasts, all of these elements of the CBLTM-LTN suite have been used.

9.1.10 The peak periods in the CBLTM-LTN are 08:00–09:00 (AM peak) and 17:00–18:00 (PM peak).

9.1.11 Where local impacts are identified in the CBLTM-LTN model, local junction modelling has been undertaken following discussion with the relevant authorities. The operational performance of local junctions has been modelled using ARCADY for roundabouts and PICADY for the priority junctions.

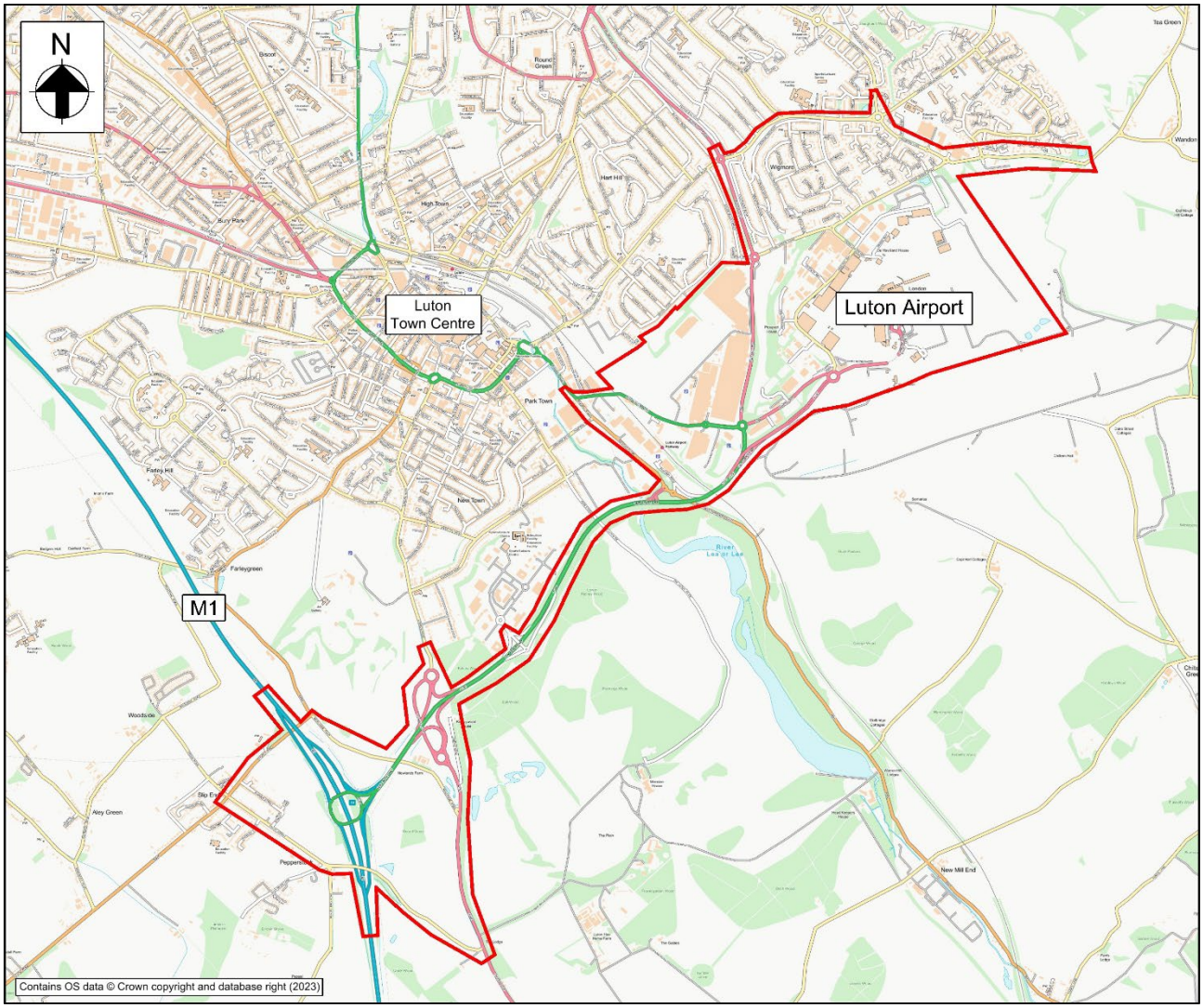
Vissim model

9.1.12 Traffic micro-simulation models, such as Vissim, simulate the behaviour of individual vehicles within a predefined road network. They are used to predict the likely impact of changes in traffic patterns resulting from changes in traffic flow or from changes to the physical environment, including development proposals. Micro-simulation is particularly useful in modelling congested road networks, due to its ability to simulate traffic delays and queueing conditions at interchanges, roundabouts, signal controlled junctions, and for corridors where traffic signals at successive junctions are coordinated.

9.1.13 A Vissim model has been developed specifically to appraise the impact of the Proposed Development. The Vissim model covers the strategic and local road network in the vicinity of the airport as shown on **Figure 9.2**. The area includes:

a. Junction 10 of the M1;
b. The M1 corridor either side of Junction 10;
c. The A1081 linking the airport to the M1;
d. various roads and junctions within the study area; and
e. circulation routes and car parking associated with the airport.

Figure 9.2: Vissim model study area



9.1.14 The Vissim model was developed for the AM peak (08:00–09:00) and PM peak (17:00–18:00) periods, which aligns with the CBLTM-LTN, and was based on a comprehensive set of traffic surveys conducted in October 2017. As a consequence, the base year for the Vissim model is 2017.

9.2 Data collection

CBLTM-LTN

9.2.1 The update applied to the CBLTM made best use of existing data and data collected as part of the development of the Vissim model. However, some new traffic counts were required for the strategic modelling.

Existing data

9.2.2 Existing data was sourced from the existing CBLTM, Hertfordshire's county-wide model (COMET) and National Highways WebTRIS database. This included traffic count data, journey time survey data, highway demand data and public transport data.

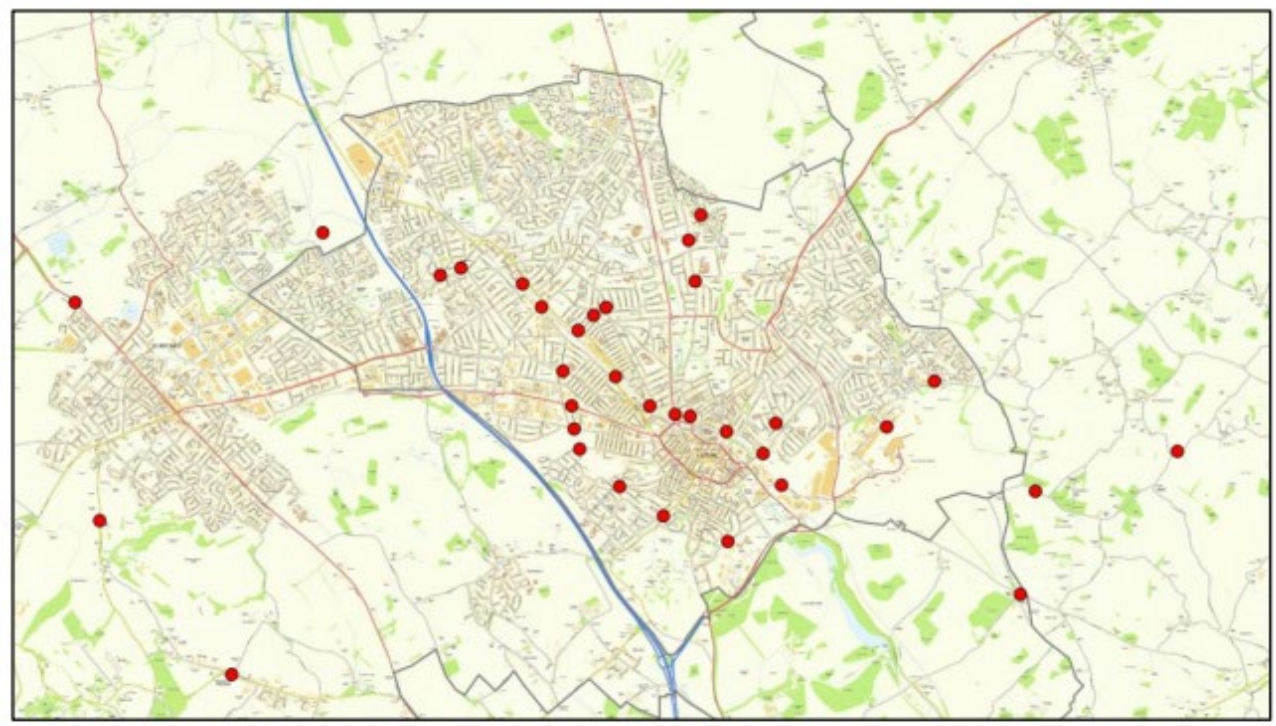
9.2.3 Details of the existing data used is provided in the Strategic Modelling: Data Collection Report, see **Appendix C**.

Surveys

9.2.4 Two phases of traffic survey data collection have been carried out as part of the development of the CBLTM-LTN. These were undertaken during July 2018 (Phase 1) and September 2018 (Phase 2).

9.2.5 The Phase 1 July 2018 traffic count surveys included 38 Automatic Traffic Count surveys across Luton, Central Bedfordshire and Hertfordshire. The surveys were undertaken between Monday 9 July and Sunday 22 July 2018 and recorded data continuously for the two-week period. The locations of the surveys are shown in **Figure 9.3**.

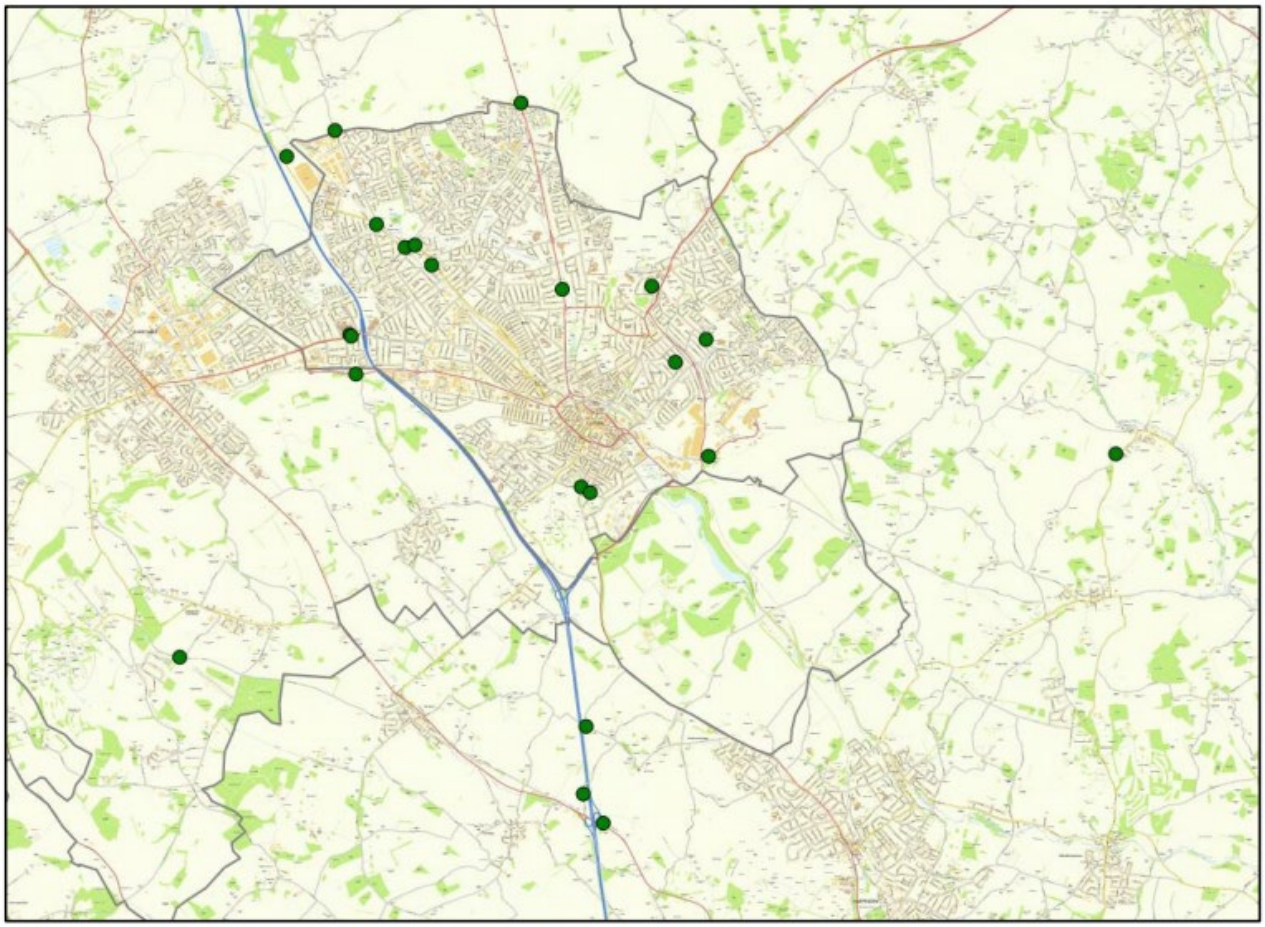
Figure 9.3: Phase 1: July 2018 Automatic Traffic Count survey locations



Map contains Ordnance Survey data © Crown copyright and database right 2019

9.2.6 The Phase 2 surveys, comprising 22 Automatic Traffic Counts were undertaken between Monday 10 September and Sunday 23 September 2018 covering a similar geographic area to the Phase 1 surveys. The locations of the Phase 2 surveys are shown in **Figure 9.4**.

Figure 9.4: Phase 2: September 2018 Automatic Traffic Count survey locations



Map contains Ordnance Survey data © Crown copyright and database right 2019

9.2.7 Full details of the surveys undertaken, and related analysis are provided in the Strategic Modelling: Data Collection Report, see **Appendix C**.

Vissim model

9.2.8 The Vissim model was developed with a combination of existing data and new traffic surveys. Data was extracted from WebTRIS to establish traffic volumes on the Strategic Road Network and traffic surveys including Automatic Traffic Counts, junction turning counts and journey time surveys were also carried out.

Existing data

9.2.9 Traffic volumes for the M1 were extracted from WebTRIS for the weekday AM and PM peak hours of 08:00-09:00 and 17:00-18:00.

9.2.10 Details of the existing data used in the model are provided in the Vissim Model Local Model Validation Report (LMVR), see **Appendix D**.

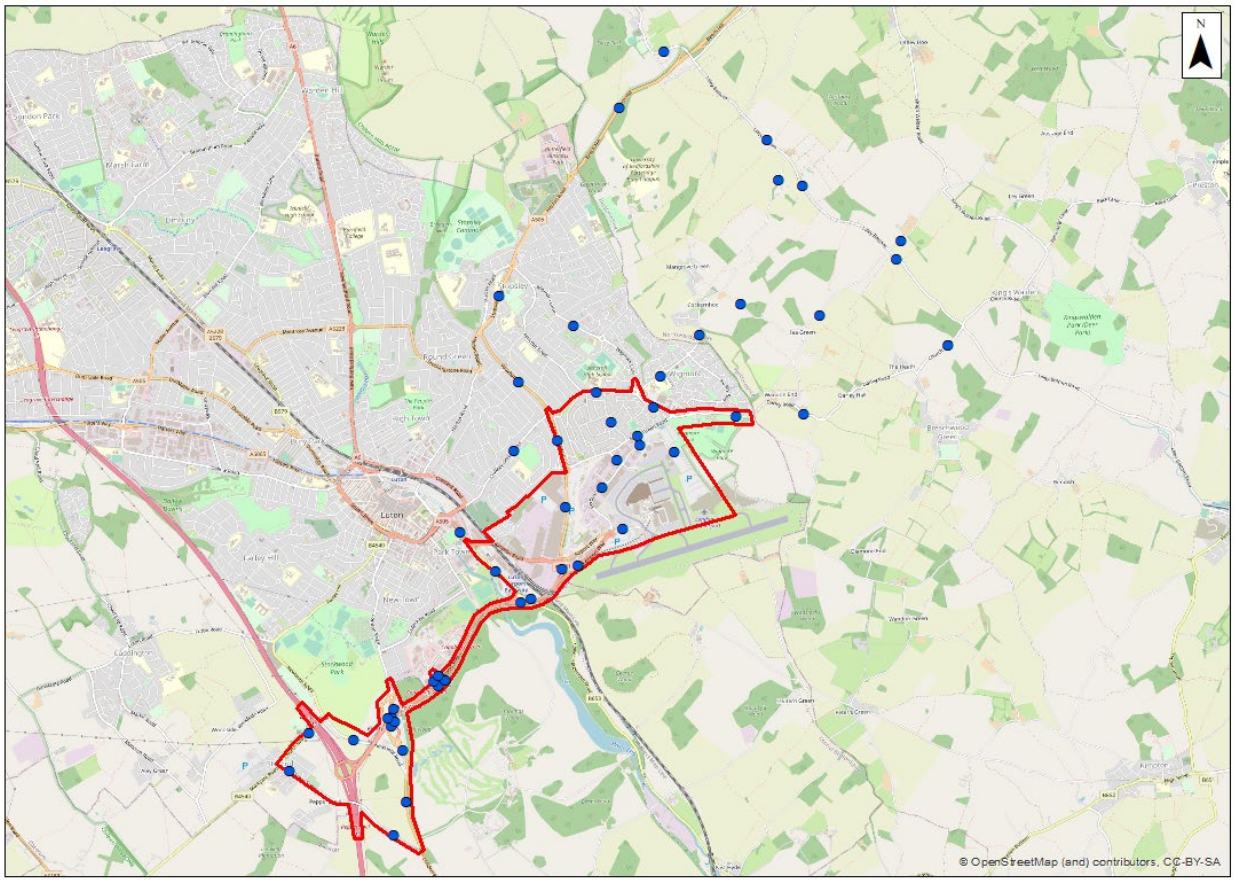
Surveys

9.2.11 Traffic data collection for the Vissim modelling comprised 51 Automatic Traffic Counts, 51 junction turning counts and six journey time surveys (both directions).

Automatic Traffic Counts were undertaken for two weeks between Monday 9 October and Sunday 22 October 2017, and junction turning counts were carried out on Wednesday 11 October 2017. Journey time surveys were carried out over three days, between Tuesday 17 October and Thursday 19 October 2017 on the local road network and between 16 October and 18 October 2018 on the M1 mainline and at junction 10.

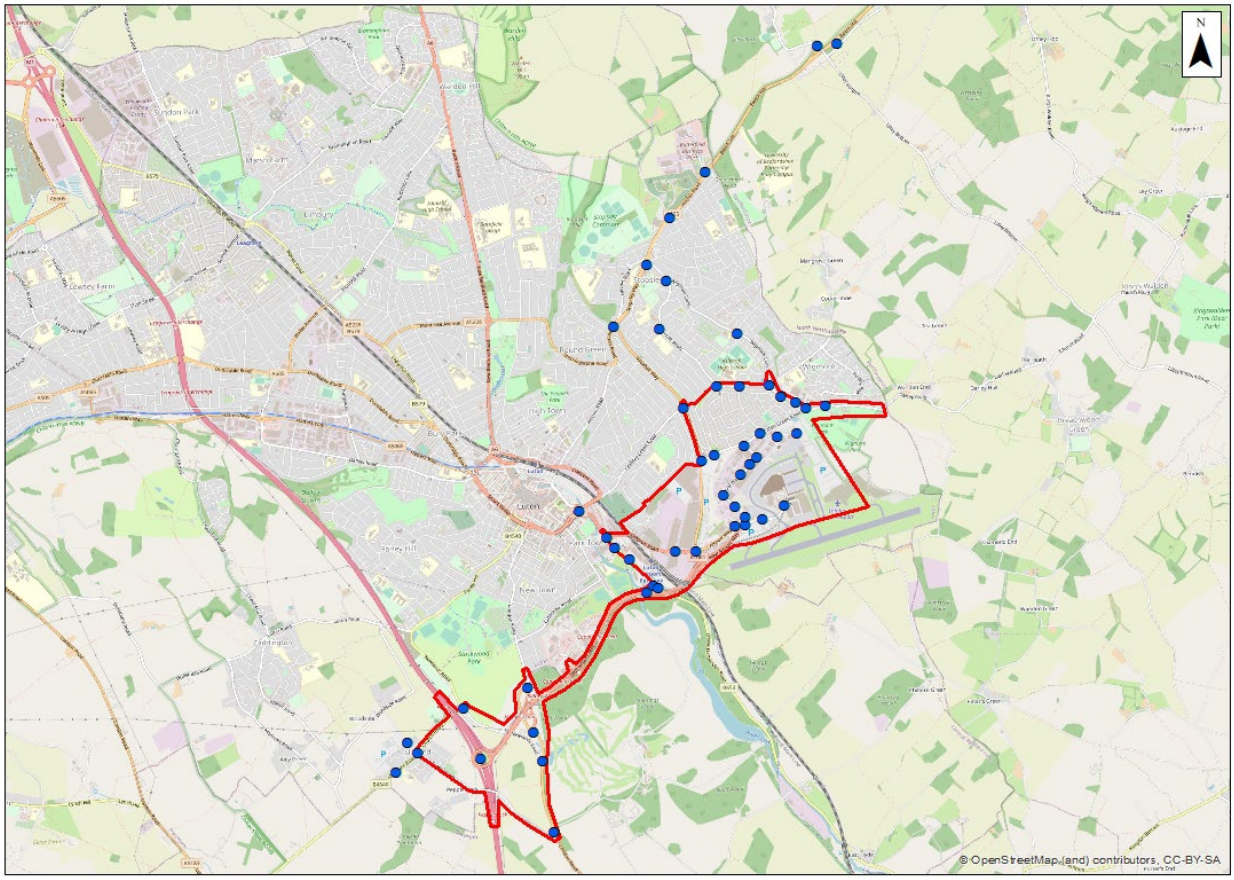
9.2.12 The locations of the Automatic Traffic Count and junction turning counts are shown in **Figure 9.5** and **Figure 9.6**, with the red line indicating the Vissim model study area.

Figure 9.5: October 2017 Automatic Traffic Count locations



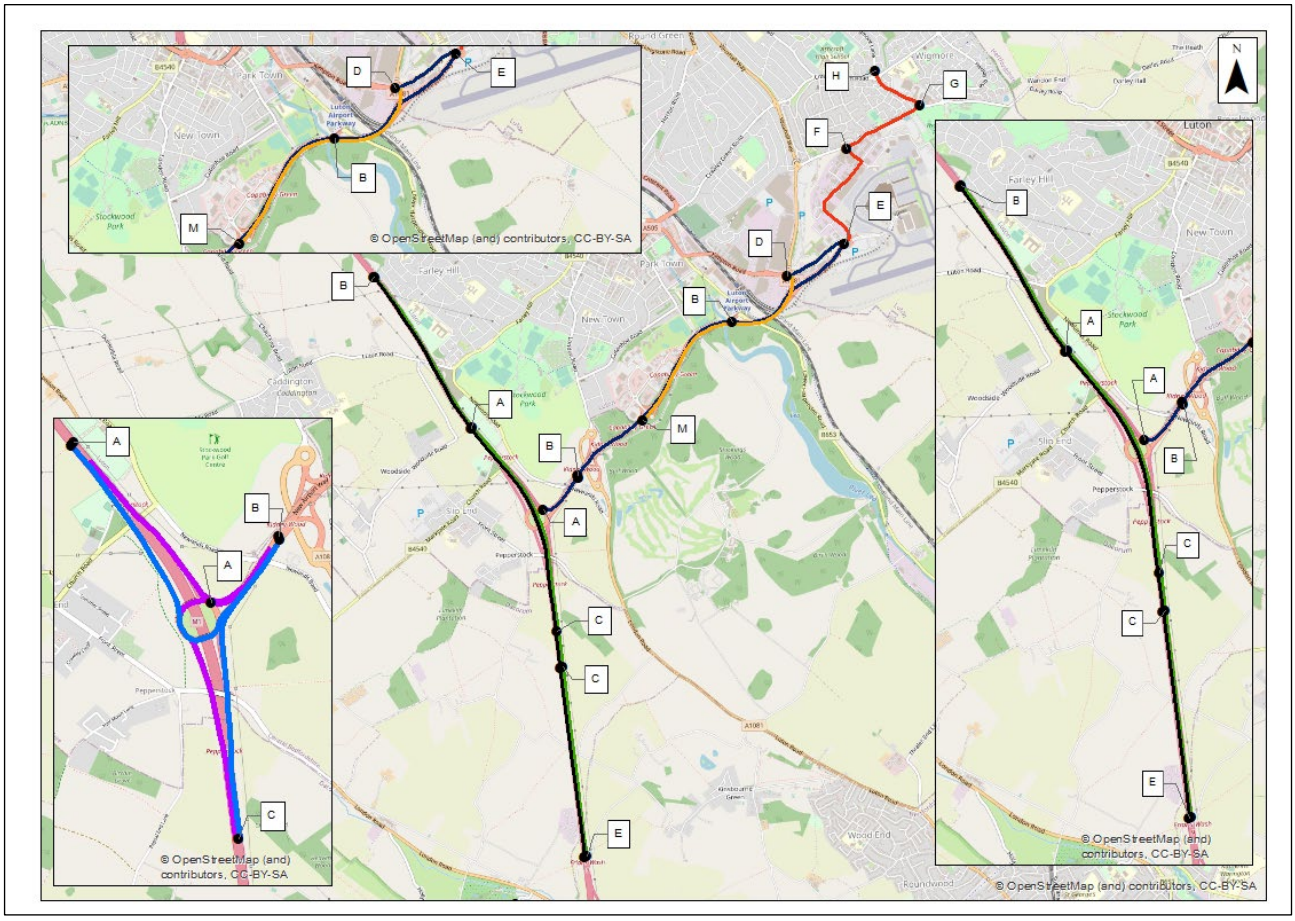
9.2.13 The Automatic Traffic Counts within the study area showed a weekday morning and evening peak hour of 07:45-08:45 and 17:00-18:00. It was noted that the AM peak hour in the surveys was different to the AM peak hour of 08:00-09:00 in the CBLTM-LTN. However, further analysis showed that the difference in the number of vehicles between 08:00-09:00 and 07:45-08:45 within the Vissim study area, was less than 1% and immaterial. The peak hours used in the Vissim modelling were therefore 08:00-09:00 and 17:00-18:00 for consistency with the CBLTM-LTN.

Figure 9.6: October 2017 Junction turning count locations



9.2.14 Journey time surveys were undertaken during the peak periods, along six separate routes. Three routes were on the local road network, one was on the M1 mainline and two were at M1 Junction 10. The routes are shown on **Figure 9.7**. The journey time surveys were used in the model validation process.

Figure 9.7: Journey time surveys



9.2.15 Full details of the surveys undertaken are provided in the Vissim Model LMVR, see **Appendix D**.

Base year model

9.2.16 As set out above, the base year for the CBLTM-LTN is 2016 and the base year for the Vissim model is 2017.

9.2.17 The calibration and validation of the 2016 base year model in the CBLTM-LTN covers the highway and public transport assignment models. The LMVR for the highway and public transport assignment models are included in **Appendix E**.

9.2.18 The LMVR for the Vissim model is included in **Appendix D**.

9.3 Assessment years and phases

9.3.1 The impact of the Proposed Development has been assessed for three future years when it is assumed that a maximum level of passenger throughout would be achieved. The proposed assessment years/phases are:

a. 2027, year of Assessment Phase 1 (21.5mppa);
b. 2039, year of Assessment Phase 2a (27mppa); and
c. 2043, year of Assessment Phase 2b (32mppa.

9.4 Modelling scenarios

9.4.1 **Table 9.1** below shows the modelling scenarios which have been tested.

Table 9.1: Modelling scenarios for Assessment Phases

Scenario	2027	2039	2043
Future Baseline (without Proposed Development)	18 mppa	18 mppa	18 mppa
Future Scenario with Proposed Development	21.5 mppa	27 mppa	32 mppa

9.4.2 Each scenario has been run for the AM and PM peak hours.

Future Baseline (without Proposed Development)

9.4.3 The Future Baseline represents the transport conditions in the future without the Proposed Development. The build-up of the Future Baseline in the CBLTM-LTN and Vissim model is summarised below.

CBLTM-LTN

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

9.4.5 Using the base year planning data as a starting point, growth has been added based on the residential and employment developments identified within an Uncertainty Log (see Strategic Modelling Forecasting Report in **Appendix F**), supplemented by information from TEMPro forecasts. The Future Baseline takes account of housing and employment proposals based on current Local Plans for Luton Borough, Central Bedfordshire, North Hertfordshire, St Albans District and Dacorum.

9.4.6 In terms of the passenger throughput assumed at the airport, the Future Baseline assumes 18 mppa in all future years, which is the current maximum permitted capacity for the airport.

9.4.7 Planned highway and public transport infrastructure schemes have also been included in the Future Baseline forecasts. In the Luton area, this includes a package of highway improvement schemes identified in the East Luton Study, which are planned to be carried out by LBC. These schemes were designed to address traffic pressures arising from planned growth in housing and employment identified in the Local Plan and growth in neighbouring districts. For traffic modelling purposes, it was agreed with LBC that these improvements would be in place by 2027. These schemes, which are considered to be committed schemes would be delivered by LBC and are summarised in **Table 9.2.**

Table 9.2: East Luton Highway Improvements – non airport expansion related

Ref	Location	Summary of improvements
1	A505 Vauxhall Way/Stopsley Way (works completed)	Upgrade from roundabout to signal controlled junction and amendments to the junction with Birchen Grove
2	A505 Vauxhall Way/Crawley Green Road	Upgrade from a roundabout to a signal-controlled junction to accommodate the proposed Vauxhall Way dualling (Ref. 9)
3	A505 Vauxhall Way/Eaton Green Road	Improvements to the roundabout to accommodate the proposed Vauxhall Way dualling (Ref. 9)
4	Windmill Road/Manor Road/St Mary's Roundabout/ Crawley Green Road	White line measures to introduce right turn bay from Windmill Road into Manor Road
5	A1081 New Airport Way/Kimpton Road/ Vauxhall Way	Upgrade roundabout to signal controlled junction to accommodate the proposed Vauxhall Way dualling (Ref. 9)
6	A1081 New Airport Way/B653/Gipsy Lane	Improvements to existing roundabout
7	Windmill Road/Kimpton Road	Upgrade to mini roundabout
8	Vauxhall Way Corridor	Dualling from Stopsley Way to Airport Way/Kimpton Road

9.4.8 It has been assumed that some transport schemes (e.g. East Luton improvements listed above) would be further modified as part of the airport mitigation. These enhancements are described in Chapter 9.

9.4.9 Also, National Highways would likely need to consider measures to address the existing constraints on the M1 corridor. Whilst there is no committed scheme, any improvement would most likely be in the form of a Smart Motorway upgrade (hard shoulder running scheme) as opposed to full motorway widening. Through discussion with National Highways a capacity upgrade has been included in the 2043 Future Baseline between M1 Junctions 9 and 10. The purpose of this was to prevent capacity constraints on the M1, potentially understating congestion at Junction 10. Whilst some form of capacity improvement is likely to be introduced by 2043, as there is no committed scheme, a sensitivity test (see Chapter 14) has also been undertaken in which no improvement to the M1 capacity between Junctions 9 and 10 is included.

9.4.10 Details of the developments and infrastructure included in the Future Baseline scenarios are contained in the Strategic Modelling Forecasting Report included in **Appendix F**.

Vissim Model

9.4.11 The Future Baseline traffic flows in the Vissim model have been produced by:

a. applying growth to the 2017 background traffic flows;
b. considering committed developments within the study area; and
c. including LBC infrastructure improvements.

9.4.12 Two factors were applied to growth the 2017 background traffic flows to 2027, 2039 and 2043. A yearly factor of 0.5% was applied to through traffic on the motorway and a yearly factor of 0.25% was applied to the internal roads of the study area. This approach was discussed and agreed with local highway authorities and National Highways through the Transport Modelling scoping exercise and subsequent engagement.

9.4.13 The following committed developments within the study area are expected to be operational by 2027 and are therefore included in the Future Baseline for 2027, 2039 and 2043:

a. Napier Park (including Bartlett Square);
b. Newlands Park;
c. Chiltern Academy (now operational); and
d. Discount Supermarket (now operational).

9.4.14 Junction improvements associated with the above committed developments were also included in the model.

9.4.15 The East Luton highway improvements (see **Table 9.2**) that are located within the Vissim study area are included in the Future Baseline for 2027, 2039 and 2043. This includes:

a. A505 Vauxhall Way Dualling;
b. Improvements to junctions at:
    i. A1081 New Airport Way/Kimpton Road/A505 Vauxhall Way;
    ii. A505 Vauxhall Way/Eaton Green Road;
    iii. A505 Vauxhall Way/Crawley Green Road;
    iv. Windmill Road/Kimpton Road; and
    v. A1081 New Airport Way/B653/Gipsy Lane.

9.4.16 The improvements to M1 Junction 10 as part of the M1 capacity upgrade scheme are included in the 2043 Future Baseline.

9.4.17 Further details of the developments and infrastructure included in the Future Baseline scenarios are contained in the Vissim Modelling Reports for 2027, 2039 and 2043 contained in **Appendix G**.

9.5 Forecast trip generation and distribution

9.5.1 Vehicular trip generation has been developed from an analysis of existing travel patterns, future year passenger and staff forecasts and flight schedules. This section outlines the development of the vehicular trip generation for passengers and staff.

Passenger trip generation

Future Year Passenger Forecasts

9.5.2 To inform the future modelling, York Aviation (YA) a specialist firm of air transport consultants, has undertaken a study into future year passenger forecasts based on development and growth at the airport. The forecasts produced by YA consider a Future Baseline (without Proposed Development) and a With Proposed Development scenario and have been provided for 2027, 2039 and 2043. These future year passenger forecasts form the Core Planning Case Forecast referenced in the Need Case **[TR020001/APP/7.04]** and are detailed in **Table 9.3** along with the actual passenger totals for 2016, 2017 and 2019.

Table 9.3: Core Planning Case Passenger Forecasts

Scenario	Actual Passenger Numbers (mppa)			Future Scenarios (mppa)		
	2016	2017	2019	2027 Assessment Phase 1	2039 Assessment Phase 2a	2043 Assessment Phase 2b
Future Baseline (without Proposed Development)	14.6	15.9	18	18	18	18
With Proposed Development	-	-	-	21.5	27	32

Notes:

1. 18 mppa is the maximum allowed under the existing planning consent.
2. 2016 passenger numbers have been used in the baseline (without Proposed Development) for the strategic model (CBLTM-LTN)
3. 2017 passenger numbers have been used in the baseline (without Proposed Development) for the Vissim model
4. 2019 data has not been used for the modelling or forecasting and has been provided for a reference only

9.5.3 **Table 9.3** shows air passenger numbers grew by circa 23% between 2016 and 2019. In 2019, the number of passengers had reached the permitted airport capacity of 18 mppa.

9.5.4 The expansion of T1 would add 3.5 mppa by 2027, an increase of c.19%. This equates to c.9,800 extra passengers per day (based on an October busy day).

9.5.5 By 2039 with T2, passenger numbers would have increased by a further 5.5 mppa to 27 mppa, an increase of c.26%. This represents c.26,700 extra passengers per day compared to 2019 (18 mppa).

9.5.6 By 2043 it is expected that air passenger numbers would have increased by an additional 5 mppa to 32 mppa, an increase of c.19%. There would be circa 41,900 extra passengers per day compared to 2019.

Future year passenger schedules

9.5.7 The estimation of travel demand has utilised the data from future year flight schedules and the forecast passenger numbers provided by YA. The flight schedules developed by YA provide an indication of the level of flight activity during a busy day in October for the future years. Further details are provided in the Need Case **[TR020001/APP/7.04]. Figure 9.8** to **Figure 9.10** show the forecast daily aircraft arrivals and departures for October 2027, 2039, and 2043.

Figure 9.8: October 2027 forecast flight schedule – 21.5 mppa

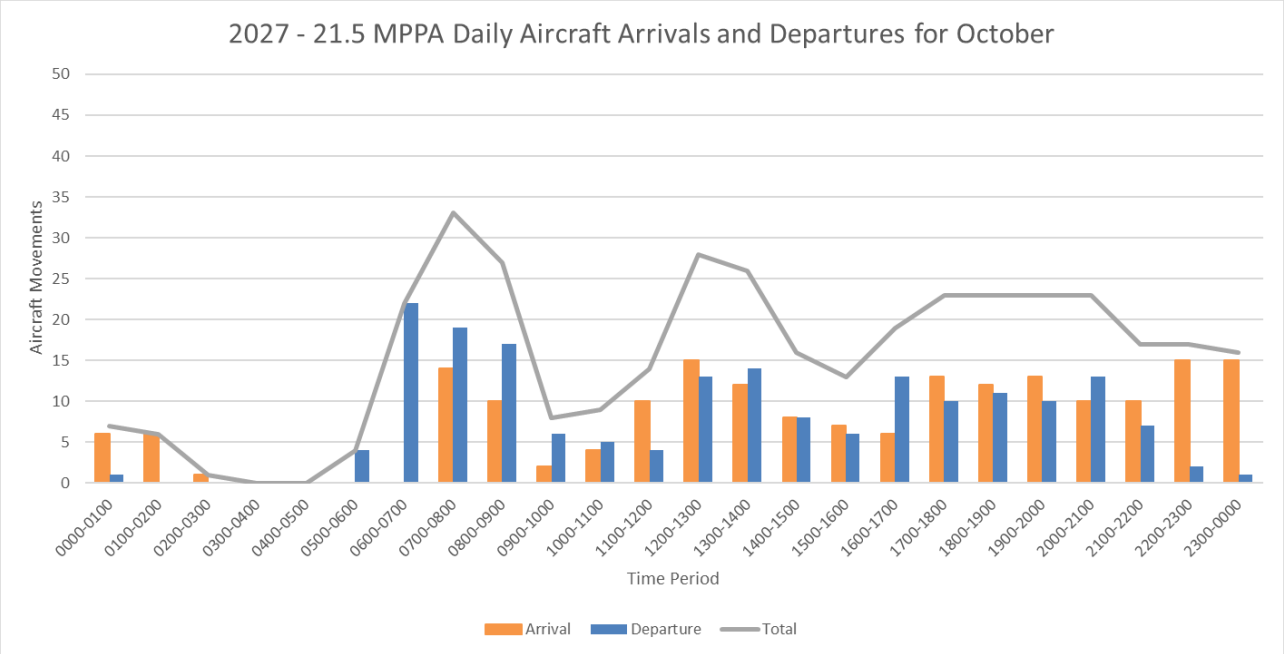


Figure 9.9: October 2039 forecast flight schedule – 27 mppa

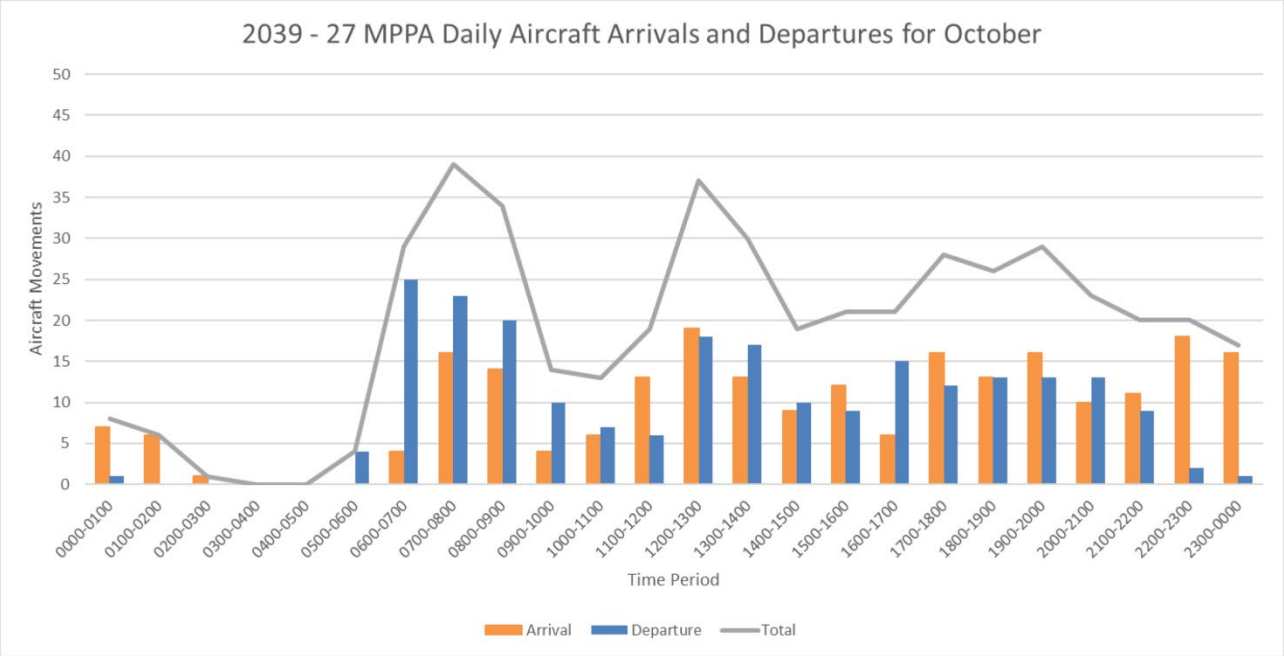
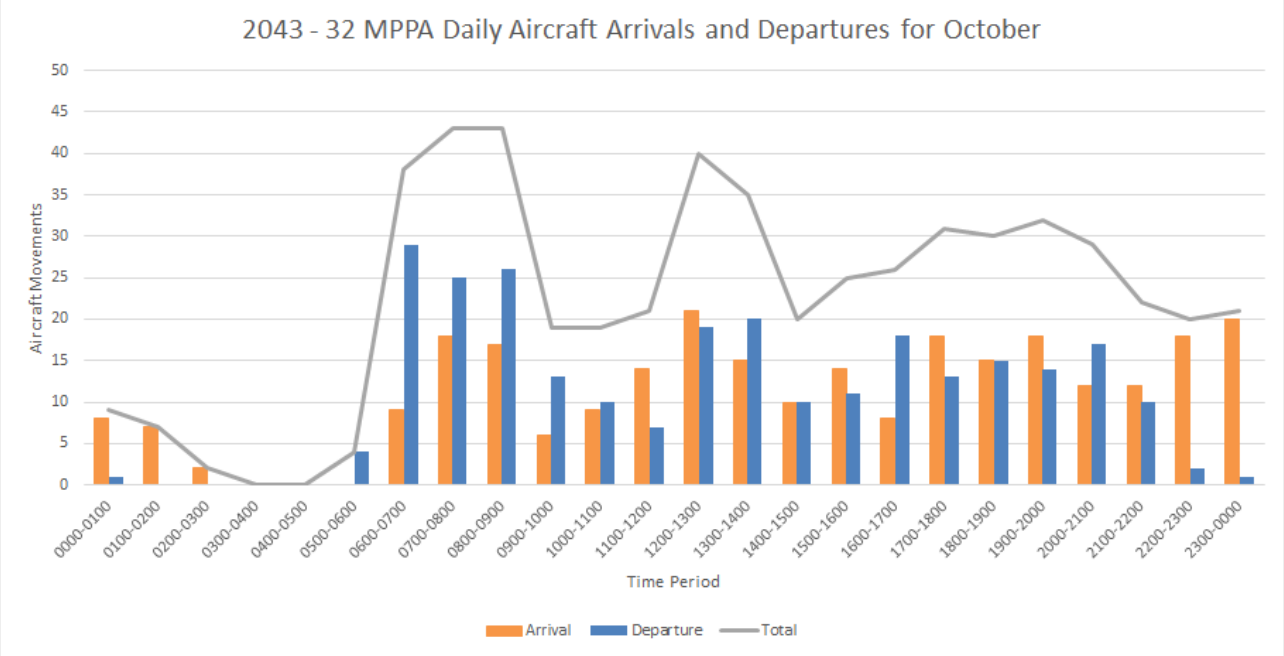


Figure 9.10: October 2043 forecast flight schedule – 32 mppa



9.5.8 The YA flight schedules included:

a. flight departure (or arrival) time;
b. airline;
c. type of plane;

d. destination;
e. size of plane (number of seats);
f. number of passengers on a plane (occupancy); and
g. whether a flight is domestic or international.

9.5.9 This information has been used alongside the following assumptions, to develop the future year peak hour passenger demand:

a. 80% of departing passengers appear on the highway network 2 hours 30 minutes before a flight;
b. 20% of departing passengers appear on the highway network 1 hour 30 minutes before a flight;
c. 80% of arriving passengers appear on the highway network 45 minutes after a flight;
d. 20% of arriving passengers appear on the highway network 1 hour after a flight; and
e. aircraft occupancy from the YA forecasts has been utilised as the basis for future year demand flows.

9.5.10 It should be noted that flight schedules have been used as the basis for estimating passenger travel demands as they provide information on changes in daily arrival/departure profiles which would not be apparent by simply taking existing travel patterns from Automatic Traffic Counts or car park data.

Mode share

9.5.11 The airport currently has a reasonably high public transport mode share and is committed to developing access to the airport by non-car modes. In recognition of this on-going commitment, the Applicant has developed an **FTP [TR020001/APP/7.13]** in support of the Proposed Development, and this sets out the methodology for how staff and passenger mode share Targets, amongst others, will be set for future Travel Plans. The aim of which will be to increase the share of people travelling to and from the airport by sustainable modes.

9.5.12 In addition to this, the **Green Controlled Growth (GCG) Framework [TR020001/APP/7.08]** includes two mode share 'Limits' for passengers and staff. If these Limits are breached, passenger growth at the airport can be stopped. The Limits are defined with reference to 'non-sustainable' mode share but are consistent with the assumptions around public transport and active travel mode share utilised within this Transport Assessment. In this way, the Limits support the uptake of sustainable transport modes at the airport, with the intent that the 'reasonable worst case' assessed here is never exceeded. Further details can be found in the **GCG Framework Explanatory Memorandum [TR020001/APP/7.07].**

9.5.13 Whilst the FTP establishes how future mode share Targets for the airport will be set (which can and should exceed the worst-case mode share assumptions in terms of highway impact, used here), it is recognised that Covid-19 has had an impact on surface access travel behaviours and choices. Covid-19 resulted in a

reduction in the number of people choosing public transport to access the airport and led to a corresponding increase in the percentage of car use. The operator is working hard to return both passenger throughput and public transport mode share to pre-Covid-19 levels and beyond, as demonstrated with the continued investment in Luton DART.

9.5.14 Notwithstanding this, for the purposes of this Transport Assessment and the testing of impacts set out within it, the future year public transport mode share has been taken on a more conservative basis that represents a reasonable worst-case scenario, as required by EIA regulations (Ref 9.1). The mode share assumptions used in the assessments contained within this Transport Assessment are summarised in **Table 9.4** below.

Table 9.4: Public transport mode share assumptions

Category	Future Baseline (without Proposed Development)	With Proposed Development		
	2027, 2039, 2043	Assessment Phase 1 2027	Assessment Phase 2a 2039	Assessment Phase 2b 2043
Staff*	27%	30%	35%	40%
Passengers	40%	40%	45%	45%

* The staff mode share assumptions for the Future Baseline and With Development mode share scenarios relates to the growth in staff or new staff in the future and as a result of the Proposed Development only and not existing staff, in order to assess a reasonable worst-case scenario.

9.5.15 It is assumed that in the Future Baseline (without Proposed Development), the public transport mode share would be constant at 40% for passengers and 27% for all additional staff above the current baseline, in 2027, 2039 and 2043.

9.5.16 With the Proposed Development, for the purposes of this assessment, no increase in passenger public transport mode share is assumed in Assessment Phase 1 since there is not a step change in the sustainable transport provision. Whilst it is the ambition to move to an improving mode share with the Proposed Development, adopting a 40% mode share provides a conservative estimate for highway capacity modelling purposes given the uncertainty on how mode share may recover post-pandemic. For Assessment Phase 2a, the public transport mode share is increased by 5% to 45% and this reflects the expansion of the airport to T2 including the extension of Luton DART and a new bus/coach station. For Assessment Phase 2b, for the purposes of this assessment, no further increase in public transport mode share is assumed since, as with Assessment Phase 1, there is not a step change in the sustainable transport provision in this phase.

9.5.17 For assessment purposes, the staff public transport mode share (for all new staff) has been assumed to increase from 27% in 2019 to 40% in 2043.

9.5.18 The supporting Public Transport Strategy Report (**Appendix H**) indicates that the airport could grow its passenger public transport mode share to around 50% (based on current service provision and available capacity on public transport). The operator's 19 mppa application also sets an ambition to grow passenger public transport mode share to 47%. The mode shares in **Table 9.4** have been adopted specifically for modelling purposes only and to ensure that the traffic related impacts on highway capacity are robustly tested.

9.5.19 The detailed mode split for passengers is shown in **Table 9.5.** The mode splits for the future year scenarios reflect the public transport mode share shown in **Table 9.4**.

Table 9.5: Passenger mode split (person trips)

Mode	Future Baseline (without Proposed Development)	With Proposed Development		
	2027, 2039, 2043	Assessment Phase 1 2027	Assessment Phase 2a 2039	Assessment Phase 2b 2043
Bus/coach	17.0%	17.0%	18.2%	18.2%
Rail	23.0%	23.0%	26.8%	26.8%
Taxi	17.0%	17.0%	15.5%	15.5%
Walk/Cycle	0.2%	0.2%	0.2%	0.2%
Private Car (Drop Off/ Pick Up)	26.0%	26.0%	23.5%	23.5%
Private Car (On Site Car Park)	9.5%	9.5%	8.7%	8.7%
Private Car (Off Site Car Park)	5.2%	5.2%	5.0%	5.0%
Rental Car	2.0%	2.0%	2.0%	2.0%
Other	0.1%	0.1%	0.1%	0.1%

Mode	Future Baseline (without Proposed Development)	With Proposed Development		
	2027, 2039, 2043	Assessment Phase 1 2027	Assessment Phase 2a 2039	Assessment Phase 2b 2043
Total	**100%**	**100%**	**100%**	**100%**

Trip generation

9.5.20 The vehicular trips generated by passengers, based on the flight schedules, passenger forecasts, mode share and landside arrival/departure patterns are summarised in **Table 9.6**. The vehicular trip generation includes private vehicle trips parking on-site and off-site, drop off, taxi, car hire and buses/coaches.

Table 9.6: Passenger vehicular trip generation - AM and PM peak hour

Inbound/ Outbound	Baseline	Future Baseline (Without Proposed Development)	With Proposed Development		
	2017 (15.9 mppa)	2027, 2039, 2043 (18 mppa)	Assessment Phase 1 2027	Assessment Phase 2a 2039	Assessment Phase 2b 2043
AM Peak					
Total Vehicles	**1713**	**1800**	**1972**	**2269**	**2709**
Inbound	789	830	917	1069	1275
Outbound	924	970	1056	1200	1434
PM Peak					
Total Vehicles	**1474**	**1579**	**1929**	**2041**	**2386**
Inbound	812	828	1006	1060	1240

Inbound/ Outbound	Baseline	Future Baseline (Without Proposed Development)	With Proposed Development		
	2017 (15.9 mppa)	2027, 2039, 2043 (18 mppa)	Assessment Phase 1 2027	Assessment Phase 2a 2039	Assessment Phase 2b 2043
Outbound	662	751	922	981	1146

Notes: Assumptions used in the vehicular trip generation calculation were:

1. A vehicle occupancy rate of 1.87 (excluding the driver for taxi and drop off);
2. Drop off and pick up trips have an inbound and outbound movement; and
3. A car hire trip has an inbound and outbound movement
4. Bus movements include shuttle buses, public buses and coaches. Baseline volumes were from traffic surveys. For future years, bus, coach and shuttle bus movements were changed in line with passenger growth and public transport mode share assumptions.

9.5.21 **Table 9.6** shows that in the Future Baseline, vehicular trips would increase slightly compared to 2017. This small change reflects the increase in passengers from 15.9 mppa to 18 mppa and the mode shift to public transport, as a result of ongoing sustainable travel measures being implemented by the airport.

9.5.22 By 2043, with the Proposed Development operational, the total passenger vehicle trips accessing the airport are expected to grow by 51% in the AM and PM peak hour, compared to the Future Baseline (without Proposed Development).

Staff trip generation

9.5.23 An assumption of 350 additional on-site staff for every additional 1 mppa was adopted as the basis for estimating future year staff trip generation from the Proposed Development. This is a conservative assumption as subsequent more detailed analysis of the expected on-site employment growth (provided as **Appendix 11.1** to the **ES** submitted as part of the application for development consent **[TR020001/APP/5.02]**) shows that the expected employment growth will be of the order of 320 additional on-site staff for every additional 1 mppa.

9.5.24 The detailed mode split for staff in the baseline and future year scenarios is shown in **Table 9.7**. The mode splits for the baseline are based on Staff Travel Survey data, and future year scenarios reflect the public transport mode share assumptions shown in **Table 9.4** and a reduction in car use.

Table 9.7: Staff mode split – Baseline and Future Years

Mode	Baseline	Future Baseline (Without Proposed Development)	With Proposed Development		
	2017	2027, 2039, 2043	Assessment Phase 1 2027	Assessment Phase 2a 2039	Assessment Phase 2b 2043
Bus/coach	9.0%	18.0%	20.0%	24.0%	28.0%
Rail	7.0%	9.0%	10.0%	11.0%	12.0%
Taxi	1.0%	1.0%	1.0%	1.0%	1.0%
Walk/Cycle	7.0%	9.0%	9.0%	12.0%	14.0%
Motorcycle	1.0%	1.0%	1.4%	1.6%	2.0%
Private Car (On Site Car Park)	75.0%	62.0%	58.6%	50.4%	43.0%
Private Car (Off Site Car Park)	0%	0%	0%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Notes: 2017 mode split has been used in the Vissim model baseline

9.5.25 Using the increase in the number of staff for each future year scenario (relative to the baseline), the mode split assumptions in **Table 9.7**, and the baseline peak hour staff vehicular trip generation, the future year trip generations were estimated as shown in **Table 9.8**.

Table 9.8: Forecast staff vehicular trip generation – AM and PM peak hour

Inbound/ Outbound	Baseline	Future Baseline (Without Proposed Development)	With Proposed Development		
	2017	2027, 2039, 2043	Assessment Phase 1 2027	Assessment Phase 2a 2039	Assessment Phase 2b 2043
AM Peak					
Total Vehicles	**1272**	**1348**	**1464**	**1600**	**1679**
Inbound	1047	1110	1205	1317	1382
Outbound	225	238	259	283	297
PM Peak					
Total Vehicles	**1170**	**1240**	**1347**	**1472**	**1545**
Inbound	247	262	284	310	326
Outbound	924	979	1063	1161	1219

* 2017 Baseline (Vissim model) shown for comparison purposes

HGV and LGV trip generation

9.5.26 The HGV and LGV trips generated by the Proposed Development are calculated by applying the percentage growth in passengers to the baseline HGV and LGV movements to/from the airport. The future year trip generation is shown in **Table 9.9**.

Table 9.9: Forecast HGV and LGV trip generation - AM and PM peak hour

Inbound/ Outbound	Baseline	Future Baseline (Without Proposed Development)	With Proposed Development		
	2017	2027, 2039, 2043	Assessment Phase 1 2027	Assessment Phase 2a 2039	Assessment Phase 2b 2043
AM Peak					
HGV					
Total Vehicles	**178**	**202**	**241**	**302**	**358**
Inbound	90	102	122	153	182
Outbound	88	99	119	149	177
LGV					
Total Vehicles	**199**	**225**	**269**	**338**	**400**
Inbound	100	113	135	170	201
Outbound	99	112	134	168	199
PM Peak					
HGV					
Total Vehicles	**149**	**169**	**202**	**253**	**300**
Inbound	76	86	102	128	152
Outbound	73	83	99	125	148
LGV					

Inbound/ Outbound	Baseline	Future Baseline (Without Proposed Development)	With Proposed Development		
	2017	2027, 2039, 2043	Assessment Phase 1 2027	Assessment Phase 2a 2039	Assessment Phase 2b 2043
Total Vehicles	**133**	**151**	**180**	**226**	**268**
Inbound	75	85	102	128	151
Outbound	58	66	78	98	117

* 2017 Baseline (Vissim model) shown for comparison purposes

Trip distribution

9.5.27 The distribution and assignment of passenger trips with the Proposed Development operational is based on CAA origin and destination data. For the Future Baseline scenarios, the trip distribution is based on the existing movement patterns established from the 2016 (CBLTM-LTN) and 2017 (Vissim) base models.

9.5.28 Future year trip distribution and assignment for staff, HGV and LGV trips are based on the movement patterns established from the 2016 (CBLTM-LTN) and 2017 (Vissim) base models.

9.6 Road traffic forecasts

9.6.1 Future Baseline traffic flows have been developed as described earlier in this chapter, with an adjustment of the airport trip generation made to suit the airport handling the permitted maximum capacity of 18 mppa i.e. the airport handled 14.6 mppa in 2016 (CBLTM-LTN baseline) and 15.9 mppa in 2017 (Vissim model baseline) so the airport trip generations were increased to reflect 18 mppa.

9.6.2 The process for adding the With Proposed Development traffic flows is described below for the CBLTM-LTN and the Vissim model respectively.

9.6.3 As set out in Chapter 8 of this Transport Assessment, the Proposed Development is described in three phases for the purposes of assessment: Assessment Phase 1, Assessment Phase 2a and Assessment Phase 2b. These are ‘Assessment Phases’. In practice, the Proposed Development will be delivered in undefined increments that appropriately respond to demand over time, which may differ from the Assessment Phases providing delivery does not give rise to impacts which are materially different to those reported in this Transport Assessment.

9.6.4 The three Assessment Phases of the Proposed Development comprise the works associated with the expansion of the airport and off-site mitigation measures (see **Table 8.1**). The assessment includes off-site mitigation measures associated with each Assessment Phase, however, the need and delivery of any mitigation measure will be dependent on the undefined incremental delivery of the Proposed Development. As such it is proposed to implement a monitoring regime with triggers to determine when each intervention is required. Notwithstanding this, and for assessment purposes, the works assumed in each Assessment Phase are summarised below.

CBLTM-LTN

9.6.5 To produce the With Development scenario in the CBLTM-LTN, the following incremental changes were made to the Future Baseline:

a. forecast airport travel matrices representing the assumed airport throughput in each forecast year were updated
b. proposed highway improvement schemes were added depending on the forecast year; and
c. network changes to represent the proposed T2, including the extension of Luton DART to serve T2.

9.6.6 The AAR has been included with staged delivery between Assessment Phase 2a and Assessment Phase 2b.

9.6.7 The GHP development has been included in the With Development scenario only.

9.6.8 Full details of the With Development scenario are provided in the Strategic Modelling Forecasting Report (see **Appendix F**).

Vissim model

9.6.9 To produce the With Development scenario in the Vissim model, the following changes were made to the Future Baseline:

a. baseline passenger demand has been replaced with Proposed Development passenger demand;
b. growth factors have been applied to the baseline staff vehicle trips, HGV and LGV trips in the airport zones;
c. the proposed highway improvement schemes were added to the relevant future year in line with **Table 8.1;**
d. highway network changes were made to represent the Proposed Development including T2;
e. the AAR has been included with staged delivery assumed between Assessment Phase 2a (2039) and Assessment Phase 2b (2043); and
f. the GHP development has been included with staged delivery assumed between Assessment Phase 2a (2039) and Assessment Phase 2b (2043).

9.6.10 Full details of the With Development scenario are provided in the Vissim Modelling Forecasting Report (see Appendix G).

10 HIGHWAY CAPACITY ASSESSMENTS

10.1 Baseline

10.1.1 As set out in Chapter 9.2, the base year for the CBLTM-LTN is 2016 and the base year for the Vissim model is 2017. Outputs from the base year models are summarised in the following sections.

2016 CBLTM-LTN

10.1.2 Outputs from the CBLTM-LTN include highway link traffic flows and highway link volume to capacity ratios (V/C).

10.1.3 The highway link traffic flows are presented for selected locations on the M1 and at non-M1 locations. The links were selected based on the magnitude of impact from the Proposed Development (flow differences), the location of the links relative to the Proposed Development and feedback from the highway authorities.

10.1.4 The highway link V/C indicates the operational performance of the highway link. Where the V/C is above 100%, the link is considered to be over its capacity.

10.1.5 The highway link V/C is presented for both the Luton borough and the wider road network (simulation network), although the detailed modelling of the road network in the Luton area, including junction performance, is covered by the Vissim model.

Link flows

10.1.6 The 2016 base traffic flows for selected locations along the M1 corridor are shown in **Table 10.1**.

Table 10.1: 2016 Traffic flows (vehicles) at selected locations along the M1

Location	Direction	AM peak hour (08:00-09:00)	PM peak hour (17:00-18:00)
M1 J9 & J10	Northbound	5,305	6,164
	Southbound	5,529	5,910
M1 within J10	Northbound	4,052	4,791
	Southbound	4,221	4,206
M1 J10 & J11	Northbound	4,580	5,704
	Southbound	5,254	4,945
M1 J10 Off-Slip	Northbound	1,253	1,373
M1 J10 On-Slip	Northbound	528	913
M1 J10 Off-Slip	Southbound	1,034	739
M1 J10 On-Slip	Southbound	1,309	1,704

10.1.7 The M1 corridor between Junctions 9 and 11 is heavily trafficked at peak times with between 4,200 and 5,600 southbound vehicles and between 4,000 and 5,400 northbound vehicles in the AM peak hour. In the PM peak hour, M1 traffic flows range between 4,200 and 6,000 southbound and 4,700 and 6,200 northbound. Traffic flows are generally higher in the PM peak hour.

10.1.8 At M1 Junction 10, the busiest slip roads in the AM and PM peak hours are the northbound off-slip and the southbound on-slip which carry in excess of 1,200 vehicles in both peaks.

10.1.9 The 2016 base traffic flows for selected non-M1 locations are shown in **Table 10.2**.

Table 10.2: 2016 Traffic flows (vehicles) at selected non-M1 locations

Location	Direction	AM peak hour (08:00-09:00)	PM peak hour (17:00-18:00)
A1081, between Capability Green and B653 Gipsy Lane	Eastbound	1,961	2,262
	Westbound	2,409	2,275
A505 Kimpton Road, west of Vauxhall Way	Eastbound	300	541
	Westbound	599	371
A505 Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	996	1,203
	Southbound	1,244	1,085
A505 Beech Hill, between Great Marlings and slip road to Lilley Bottom	Eastbound	912	1,161
	Westbound	1,284	1,031
Eaton Green Road, east of Colwell Rise	Eastbound	185	174
	Westbound	175	180
B653 Lower Harpenden Road, south of A1081	Northbound	622	754
	Southbound	630	535
A1081 London Road, between Half Moon Lane and Kinsbourne Green Lane	Northbound	790	700
	Southbound	794	800

10.1.10 The A1081, which is a dual two-lane carriageway connecting between the M1 and the airport carries the largest traffic volumes at peak times with c.4,500 vehicle movements (two way) in the AM and PM peak. The A505 Vauxhall Way, which is a two-lane single carriageway is also busy with c.2,300 vehicle movements (two way) in both peak hours. There is a similar volume of traffic, c.2,200 vehicles (two way) in the peak hours, using the A505 dual two-lane carriageway towards Lilley and Hitchin. All other roads carry less than 1,000 vehicles in each direction.

Link based V/C

10.1.11 The 2016 link-based V/C is shown in **Figure 10.1** for the simulation network and **Figure 10.2** for Luton borough.

Figure 10.1: 2016 Highway link-based V/C – simulation network

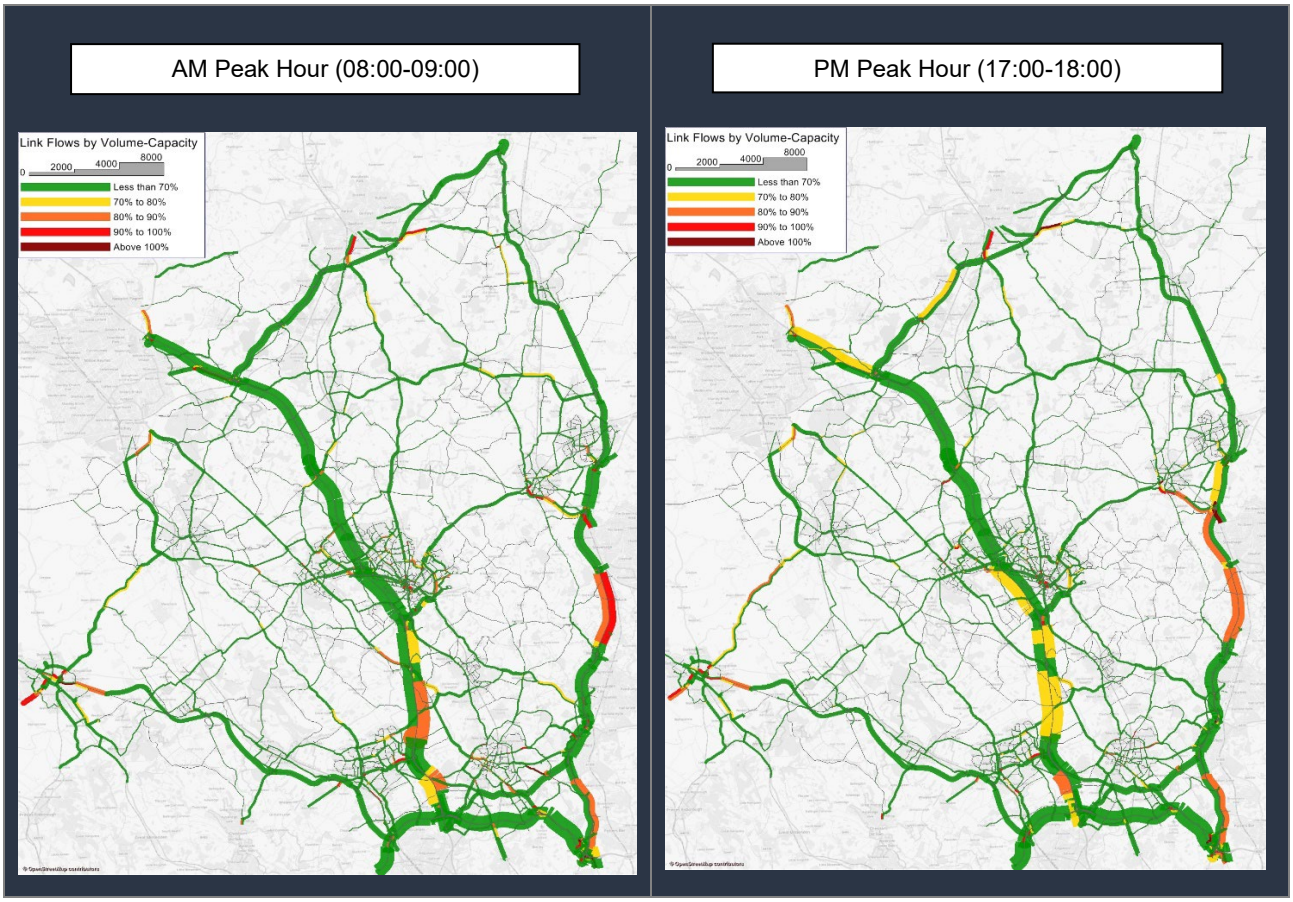


Figure 10.2: 2016 Highway link-based V/C – Luton borough

10.1.12 In the AM peak hour, the largest traffic volumes are on the M1 and M25 as would be expected. The M1 and M25 operate within capacity but there are several sections on the M1 between Luton and the M25 where the V/C is above 80%. The A1(M) generally operates within capacity but is approaching capacity (90-100%) between Stevenage and Welwyn on the southbound carriageway, whilst the northbound carriageway has a V/C of above 80%. The southbound carriageway of the A1(M) between the A414 and M25 is also above 80%. Beyond the SRN, there are various isolated sections where road links are above 80% or approaching capacity. This includes Vauxhall Way, Eaton Green Road and sections of the A505 in Luton as well as the A602 between Hitchin and Stevenage.

10.1.13 In the PM peak hour, the V/C is generally below 80% on the M1, and the V/C on the A1(M) is above 80% between Hitchin and Welwyn and between the A414 and M25. Some sections of the A602 between Stevenage and Hitchin also have a V/C of more than 80% similar to the AM peak. In the Luton area the locations with a higher V/C are similar to the AM peak, but generally less busy.

2017 Vissim modelling

10.1.14 For the purposes of assessing the performance of the network in different scenarios (for example, Do-Minimum and Do-Something scenarios) a number of outputs were compared, including:

a. network performance statistics which consider a number of parameters across the model including:
   i. average delay – the average delay per vehicle that has entered the network in the modelled period;
   ii. average speeds – the average speed for all vehicles that have entered the network in the modelled period; and
   iii. number of unreleased vehicles – the number of vehicles that were unable to enter the network in the modelled period;

b. journey times from the airport on a number of different routes; and

c. queues, delays and LoS at key junctions where the impact of additional airport traffic is expected to be greatest.

10.1.15 The Vissim model for the airport incorporated 2017 traffic survey data. Chapter 10 of this report has set out how that data was used to develop and validate a 2017 base model. This section sets out the 2017 baseline traffic conditions on the network and subsequent sections consider the Future Baseline conditions and the impact of the Proposed Development. In accordance with discussions with National Highways the model has been re-run 20 times for producing the output results.

Network performance

10.1.16 **Table 10.3** summarises the 2017 base model network performance statistics for the AM and PM peak hours.

Table 10.3: 2017 Base Model Network Statistics

Parameter	2017 AM Peak	2017 PM Peak
Average Delay Time per Vehicle (seconds), All Vehicle Types	63	88
Average Number of Stops per Vehicles, All Vehicle Types	3	4
Average Speed (mph), All Vehicle Types	29	30
Average Stopped Delay per Vehicle (seconds), All Vehicle Types	12	34
Number of Unreleased Vehicles	2	211

10.1.17 The table shows broadly similar network performance in the AM and PM peak hours.

Journey times

10.1.18 Journey times have been considered between the airport and destination points on corridors which may be impacted by the Proposed Development. These include:

a. Existing Terminal Area (I) to/from Luton Town Centre (G);

b. Existing Terminal Area (I) to/from Vauxhall Way north of Crawley Green Road (H);

c. Existing Terminal Area (I) to/from B653 Lower Harpenden Road (F) south of the A1081;

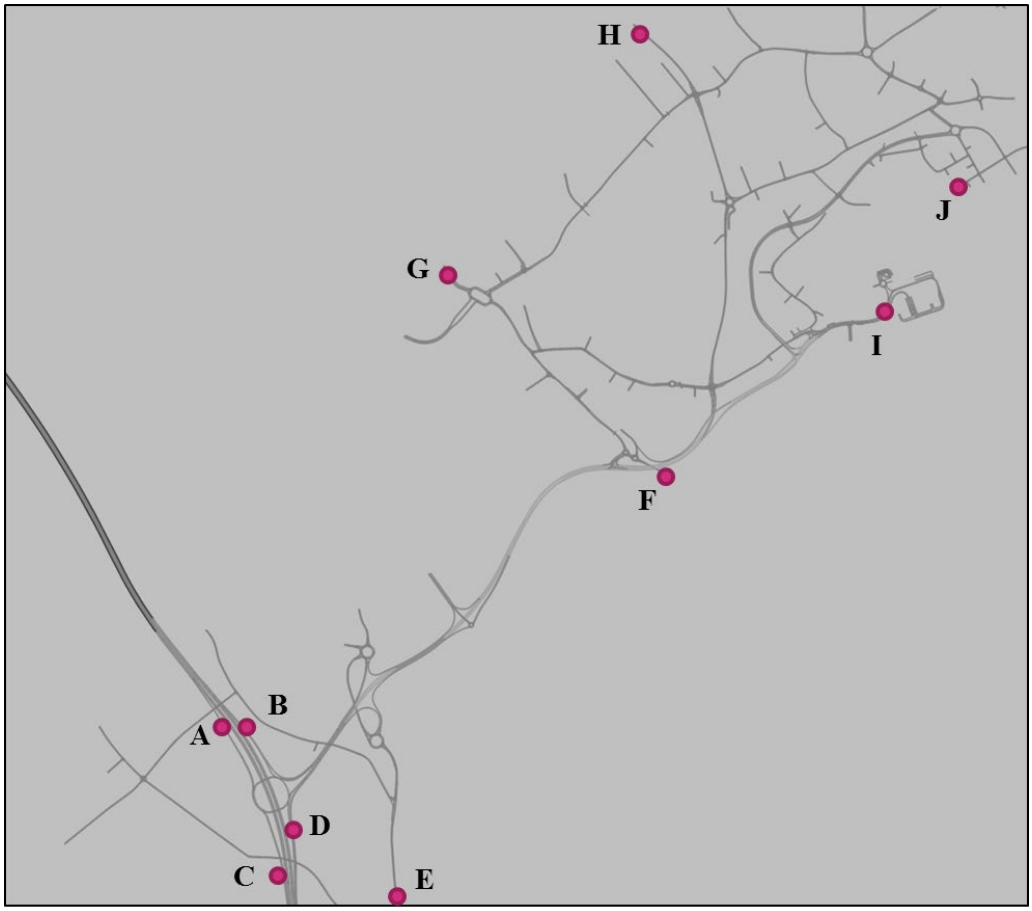
d. Existing Terminal Area (I) to/from A1081 London Road (E) close to Beech Tree Drive;

e. Existing Terminal Area (I) to/from M1 Junction 10 North on and off slips (A/B); and

f. Existing Terminal Area (I) to/from M1 Junction 10 South on and off slips (C/D).

10.1.19 **Figure 10.3** shows the journey time original and destinations points (location (J) is included to enable journey times for Terminal 2 to be reported).

Figure 10.3: Journey time origin and destinations points



10.1.20 **Table 10.4** summarises the 2017 base model journey times on the above routes for the AM and PM peak hours.

Table 10.4: 2017 Base Model Journey Times

Route	2017 AM Peak	2017 PM Peak
Luton Town Centre (G) to Existing Terminal Area (I)	262	469
Existing Terminal Area (I) to Luton Town Centre (G)	460	564
Vauxhall Way north of Crawley Green Road (H) to Existing Terminal Area (I)	301	329
Existing Terminal Area (I) to Vauxhall Way north of Crawley Green Road (H)	238	391

Route	2017 AM Peak	2017 PM Peak
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Existing Terminal Area (I)	169	271
Existing Terminal Area (I) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	491	608
A1081 London Road (E) close to Beech Tree Drive to Existing Terminal Area (I)	353	477
Existing Terminal Area (E) to A1081 London Road I close to Beech Tree Drive	311	320
M1 Junction 10 North off slip (B) to Existing Terminal Area (I)	267	361
Existing Terminal Area (I) to M1 Junction 10 North on slip (A)	318	345
M1 Junction 10 South off slip (C) to Existing Terminal Area (I)	326	434
Existing Terminal Area (I) to M1 Junction 10 South on slip (D)	345	291

10.1.21 The table shows that PM peak hour journey times are generally longer than the AM peak hour journey times.

Junction modelling

10.1.22 Junction performance has been considered at a number of locations in the model where it is expected that the Proposed Development may have an impact. These include:

a. M1 Junction 10 (1);

b. A1081 New Airport Way/London Road (north) roundabout (2);

c. A1081 New Airport Way/A1081 London Road (south) roundabout (3);

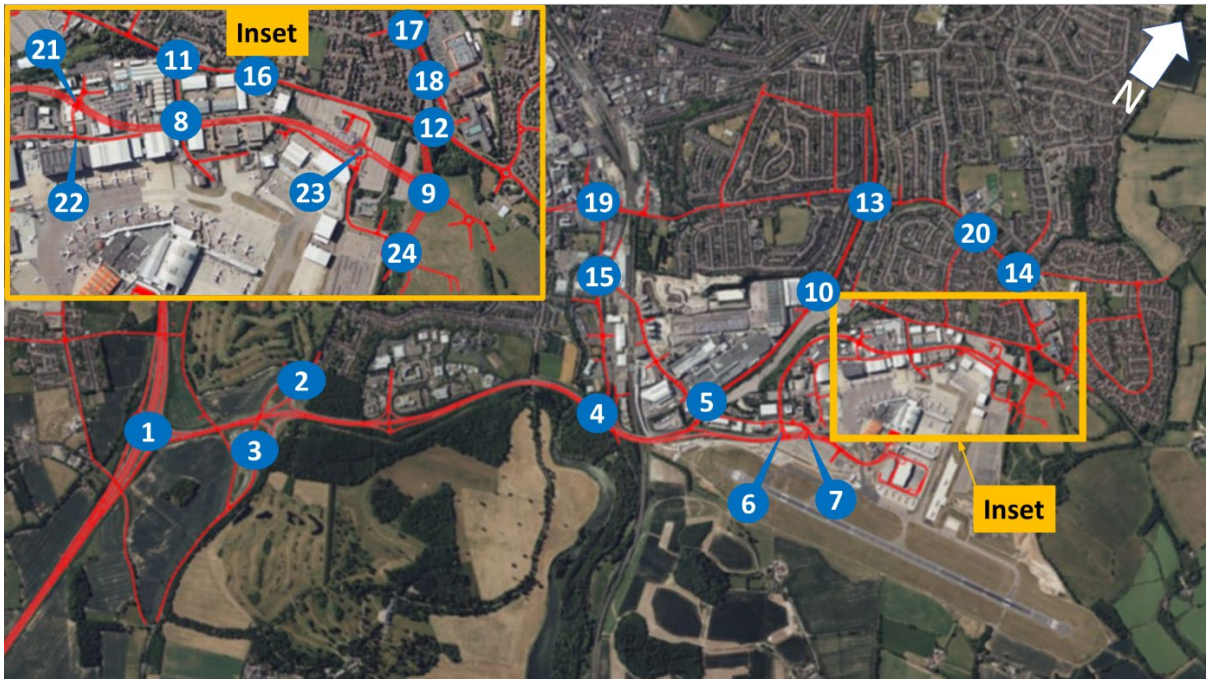
d. A1081 New Airport Way/B653/Gipsy Lane (incorporating the A1081 New Airport Way/B653 signals; the B653/Gipsy Lane roundabout and the B653 /B653 Lower Harpenden Road roundabout junctions) (4). The junctions have been considered together due to the close proximity of the three junctions;

e. Kimpton Road/A505 Vauxhall Way roundabout (5);

f. A1081 New Airport Way/Percival Way roundabout (7);
g. Percival Way/Frank Lester Way/President Way roundabout (8);
h. A505 Vauxhall Way/Eaton Green Road roundabout (10);
i. Eaton Green Road/Frank Lester Way roundabout (11);
j. Eaton Green Road/Wigmore Lane roundabout (12);
k. A505 Vauxhall Way/Crawley Green Road roundabout (13);
l. Crawley Green Road/Wigmore Lane roundabout (14);
m. Windmill Road/Kimpton Road roundabout (15);
n. Eaton Green Road/Lalleford Road roundabout (16);
o. Wigmore Lane/Raynham Way roundabout (17);
p. Wigmore Lane/Asda access roundabout (18);
q. Windmill Road/St Mary's Road/Crawley Green Road roundabout (19); and
r. Crawley Green Road/Lalleford Road roundabout (20).

10.1.23 **Figure 10.4** shows the location of each of the above junctions (locations (6), (9) and (21) to (24) are included as future new AAR junctions).

Figure 10.4: Junction locations



10.1.24 The junction performance has considered throughput, queues, delays and LoS at each of the junctions. LoS at junctions was assessed based on the criteria set out in the Highway Capacity Manual (2010)[1] as summarised in **Table 10.5**.

[1] Highway Capacity Manual (2010), *Highway Capacity Manual.* Available on HCM website, accessed on 17 February 2023.

Table 10.5: Definitions of LoS

Level of Service	Description	Average delay per vehicle (seconds)	
		Traffic Signals	Roundabouts / Priority
A	Free flow	⩽ 10	⩽10
B	Stable flow (slight delays)	> 10 and ⩽ 20	> 10 and ⩽ 15
C	Stable flow (acceptable delays)	> 20 and ⩽ 35	> 15 and ⩽ 25
D	Approaching unstable flow	> 35 and ⩽ 55	> 25 and ⩽ 35
E	Unstable flow	> 55 and ⩽ 80	> 35 and ⩽ 50
F	Forced flow	> 80	> 50

10.1.25 Most design or planning studies seek to achieve LoS C or D or better, to ensure an acceptable operating situation for road users albeit it is recognised that at peak times lower levels of service may be acceptable.

10.1.26 **Table 10.6** summarises the 2017 base model junction performance for M1 Junction 10 in the AM and PM peak hours.

Table 10.6: M1 Junction 10 (1) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
M1 southbound off-slip	1,231	0	10	1,003	0	0
A1081 New Airport Way	1,813	36	235	3,206	15	223
M1 northbound off-slip	1,784	26	194	1,600	58	255
Average delay (seconds)	21			9		

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Level of Service (LoS)	C			A		

10.1.27 The table shows that in the 2017 base model the junction operates with minimal delay and a maximum LoS C. Whilst there are intermittent queues, average queues are relatively short and do not extend beyond the available link lengths.

10.1.28 **Table 10.7** summarises the 2017 base model junction performance for the A1081 New Airport Way/London Road (north) roundabout in the AM and PM peak hours.

Table 10.7: A1081 New Airport Way/London Road (north) roundabout (2) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
London Road (north)	761	7	128	718	1	57
A1081 New Airport Way	691	2	65	951	32	226
London Road (south)	787	7	144	590	4	67
Average delay (seconds)	8			11		
Level of Service	A			B		

10.1.29 The table shows that in the 2017 base model the junction operates with minimal delay and a maximum LoS B. Whilst there are intermittent queues, average queues are relatively short and do not extend beyond the available link lengths.

10.1.30 **Table 10.8** summarises the 2017 base model junction performance for the A1081 New Airport Way / A1081 London Road (south) roundabout in the AM and PM peak hours.

Table 10.8: A1081 New Airport Way/A1081 London Road (south) roundabout (3) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
London Road (north)	770	2	44	845	4	55
A1081 New Airport Way	577	1	45	735	1	43
London Road (south)	897	0	0	717	0	12
Average delay (seconds)	3			4		
Level of Service	A			A		

10.1.31 The table shows that in the 2017 base model the junction operates well within capacity with minimal delay and a maximum LoS A.

10.1.32 **Table 10.9** summarises the 2017 base model junction performance for the A1081 New Airport Way/B653/Gipsy Lane network of junctions in the AM and PM peak hours.

Table 10.9: A1081 New Airport Way/B653/Gipsy Lane junctions (4) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
Gipsy Lane	987	10	162	989	11	189
Parkway Road	97	0	16	214	0	21
B653 Lower Harpenden Road	596	1	38	662	88	172

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
A1081 New Airport Way (east)	1,834	12	170	1,824	23	227
A1081 New Airport Way (west)	2,224	13	251	2,227	165	503
Average delay (seconds)	15			42		
Level of Service	B			D		

10.1.33 The table shows that in the 2017 base model AM peak the junction operates with minimal delay and a maximum LoS B. In the PM peak, the junction operates with an LoS D and queues begin to develop on the A1081 New Airport Way (west) however, due to the available length on this approach, the queues do not block any upstream junctions.

10.1.34 **Table 10.10** summarises the 2017 base model junction performance for the Kimpton Road/A505 Vauxhall Way roundabout in the AM and PM peak hours.

Table 10.10: Kimpton Road/A505 Vauxhall Way roundabout (5) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
A505 Vauxhall Way (north)	1,235	22	346	925	11	169
Airport Way (east)	313	2	35	740	26	223
A505 Vauxhall Way (south)	902	0	33	1,009	11	217
Kimpton Way (west)	430	1	33	292	27	145

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Average delay (seconds)	8			22		
Level of Service (LoS)	A			C		

10.1.35 The table shows that in the 2017 base model the junction operates with minimal delay and a maximum LoS C. Whilst there are intermittent queues, average queues are relatively short and do not extend beyond the available link lengths.

10.1.36 **Table 10.11** summarises the 2017 base model junction performance for the A1081 New Airport Way/Percival Way roundabout in the AM and PM peak hours.

Table 10.11: A1081 New Airport Way/Percival Way roundabout (7) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
Percival Way	851	3	125	850	4	128
Airport Way (east)	684	2	55	830	5	81
A1081 New Airport Way	829	1	37	1,164	34	192
Airport Way (west)	241	1	22	543	8	88
Average delay (seconds)	6			13		
Level of Service (LoS)	A			B		

10.1.37 The table shows that in the 2017 base model the junction operates with minimal delay and a maximum LoS B. Whilst there are intermittent queues, average queues are relatively short and do not extend beyond the available link lengths.

10.1.38 **Table 10.12** summarises the 2017 base model junction performance for the Percival Way/Frank Lester Way/President Way roundabout in the AM and PM peak hours.

Table 10.12: Percival Way/Frank Lester Way/President Way roundabout (8) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
Frank Lester Way	881	9	98	638	4	42
President Way	215	1	19	583	2	58
Airport Approach Road	28	0	10	54	0	11
Percival Way	609	1	73	844	146	464
Average delay (seconds)	7			15		
Level of Service (LoS)	A			B		

10.1.39 The table shows that in the 2017 base model the junction operates with minimal delay and a maximum LoS B. Whilst there are intermittent queues, average queues are relatively short and do not extend beyond the available link lengths. There are queues in the PM peak on Percival Way however as seen by the average delay and LoS, the junction continues to operate well.

10.1.40 **Table 10.13** summarises the 2017 base model junction performance for the A505 Vauxhall Way/Eaton Green Road roundabout in the AM and PM peak hours.

Table 10.13: A505 Vauxhall Way/Eaton Green Road roundabout (10) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
A505 Vauxhall Way (north)	883	28	269	892	53	347
Eaton Green Road	680	2	39	1,194	35	341
A505 Vauxhall Way (south)	997	0	19	1,225	174	497
Harrowden Road	103	0	8	24	1	11
Average delay (seconds)	10			29		
Level of Service (LoS)	B			D		

10.1.41 The table shows that in the 2017 base model AM peak the junction operates with minimal delay and a maximum LoS B. In the PM peak, the junction operates with an LoS D and queues begin to develop on the A505 Vauxhall Way (south) however, due to the available length on this approach, the queues do not block any upstream junctions.

10.1.42 **Table 10.14** summarises the 2017 base model junction performance for the Eaton Green Road/Frank Lester Way roundabout in the AM and PM peak hours.

Table 10.14: Eaton Green Road/Frank Lester Way roundabout (11) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
Eaton Green Rd (west)	613	1	39	852	95	414

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Eaton Green Rd (east)	1,107	11	178	788	5	100
Frank Lester Way	241	0	25	1,044	11	160
Average delay (seconds)	7			16		
Level of Service (LoS)	A			C		

10.1.43 The table shows that in the 2017 base model the junction operates with minimal delay and a maximum LoS C. Whilst there are intermittent queues, average queues are relatively short and do not extend beyond the available link lengths.

10.1.44 **Table 10.15** summarises the 2017 base model junction performance for the Eaton Green Road/Wigmore Road roundabout in the AM and PM peak hours.

Table 10.15: Eaton Green Road/Wigmore Road roundabout (12) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
Wigmore Lane	678	1	52	672	6	106
Wigmore Place	55	0	12	195	3	39
Eaton Green Road (east)	425	2	49	383	2	43
Eaton Green Road (west)	394	1	54	748	17	165
Average delay (seconds)	4			11		
Level of Service (LoS)	A			B		

10.1.45 The table shows that in the 2017 base model the junction operates with minimal delay and a maximum LoS B. Whilst there are intermittent queues, average queues are relatively short and do not extend beyond the available link lengths.

10.1.46 **Table 10.16** summarises the 2017 base model junction performance for the A505 Vauxhall Way/Crawley Green Road roundabout in the AM and PM peak hours.

Table 10.16: A505 Vauxhall Way/Crawley Green Road roundabout (13) 2017 model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
A505 Vauxhall Way (north)	796	51	296	901	63	348
Crawley Green Road (east)	665	34	181	580	71	284
A505 Vauxhall Way (south)	548	1	56	1,340	185	506
Crawley Green Road (west)	801	10	119	779	233	345
Average delay (seconds)	17			47		
Level of Service (LoS)	C			E		

10.1.47 The table shows that in the 2017 base model AM peak the junction operates with minimal delay and a maximum LoS C. Whilst there are intermittent queues, average queues are relatively short and do not extend beyond the available link lengths. In the PM peak, the junction operates with an LoS E and queues begin to develop on most of the approaches to the junction.

10.1.48 **Table 10.17** summarises the 2017 base model junction performance for the Crawley Green Road/Wigmore Lane roundabout in the AM and PM peak hours.

Table 10.17: Crawley Green Road/Wigmore Lane roundabout (14) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
Wigmore Lane (north)	959	4	125	583	1	30
Crawley Green Lane (east)	382	6	75	255	1	23
Wigmore Lane (south)	287	1	33	649	1	51
Crawley Green Lane (west)	527	0	23	787	4	114
Average delay (seconds)	7			5		
Level of Service (LoS)	A			A		

10.1.49 The table shows that in the 2017 base model the junction operates with minimal delay and a maximum LoS A.

10.1.50 **Table 10.18** summarises the 2017 base model junction performance for the Windmill Road/Kimpton Road roundabout in the AM and PM peak hours.

Table 10.18: Windmill Road Kimpton Road roundabout (15) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
Windmill Road (north)	957	33	278	803	13	178
Kimpton Road	491	45	69	495	44	69

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Windmill Road (south)	658	3	79	718	9	138
Average delay (seconds)	11			10		
Level of Service (LoS)	B			A		

10.1.51 The table shows that in the 2017 base model the junction operates with minimal delay and a maximum LoS B.

10.1.52 **Table 10.19** summarises the 2017 base model junction performance for the Eaton Green Road/Lalleford Road roundabout in the AM and PM peak hours.

Table 10.19: Eaton Green Road/Lalleford Road roundabout (16) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
Lalleford Road	474	2	51	361	2	52
Eaton Green Road (east)	704	11	137	789	9	134
Eaton Green Road (west)	484	1	47	991	58	256
Average delay (seconds)	6			13		
Level of Service (LoS)	A			B		

10.1.53 The table shows that in the 2017 base model the junction operates with minimal delay and a maximum LoS B.

10.1.54 **Table 10.20** summarises the 2017 base model junction performance for the Wigmore Lane/Raynham Way roundabout in the AM and PM peak hours.

Table 10.20: Wigmore Lane/Raynham Way roundabout (17) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
Wigmore Lane (north)	819	5	109	613	4	80
Twyford Drive	111	1	24	76	0	17
Wigmore Lane (south)	231	0	25	640	1	47
Raynham Way	124	0	12	142	0	19
Average delay (seconds)	5			4		
Level of Service (LoS)	A			A		

10.1.55 The table shows that in the 2017 base model the junction operates with minimal delay and a maximum LoS A.

10.1.56 **Table 10.21** summarises the 2017 base model junction performance for the Wigmore Lane/Asda access roundabout in the AM and PM peak hours.

Table 10.21: Wigmore Lane/Asda access roundabout (18) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
Wigmore Lane (north)	772	9	129	606	22	142
Asda Access	261	1	38	658	7	43
Wigmore Lane (south)	303	0	19	679	10	124

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Average delay (seconds)	6			11		
Level of Service (LoS)	A			B		

10.1.57 The table shows that in the 2017 base model the junction operates with minimal delay and a maximum LoS B.

10.1.58 **Table 10.22** summarises the 2017 base model junction performance for the Windmill Road/St Mary's Road/Crawley Green Road roundabout in the AM and PM peak hours.

Table 10.22: Windmill Road/St Mary's Road/Crawley Green Road roundabout (19) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
St Mary's Road	324	6	51	438	17	91
Crawley Green Road	1102	29	100	839	17	94
Windmill Road	772	23	96	905	29	190
A505 Park Viaduct	735	8	54	855	81	340
Average delay (seconds)	27			46		
Level of Service (LoS)	C			D		

10.1.59 The table shows that in the 2017 base model AM peak the junction operates with minimal delay and a maximum LoS C. In the PM peak, the junction operates with an LoS D. Whilst there are intermittent queues, average queues are relatively short and do not extend beyond the available link lengths.

10.1.60 **Table 10.23** summarises the 2017 base model junction performance for the Crawley Green Road/Lalleford Road roundabout in the AM and PM peak hours.

Table 10.23: Crawley Green Road Lalleford Road roundabout (20) 2017 Base model junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2017						
Crawley Green Road (east)	611	0	23	371	1	29
Lalleford Road	253	0	17	612	2	64
Crawley Green Road (west)	480	0	15	731	1	22
Average delay (seconds)	2			3		
Level of Service (LoS)	A			A		

10.1.61 The table shows that in the 2017 base model the junction operates with minimal delay and a maximum LoS A.

10.2 Future baseline

10.2.1 Outputs from CBLTM-LTN and Vissim model for the 2027, 2039 and 2043 Future Baseline are summarised in the following sections.

CBLTM-LTN

10.2.2 The CBLTM-LTN has tested two growth scenarios, namely:

a. Transport analysis guidance (TAG)-based; and

b. Local Plan Growth Alternative.

10.2.3 The TAG-based forecasts are based on TAG guidance (Ref 10.1) which is guidance provided by the Department for Transport on the approach to transport modelling and appraisal. The TAG-based forecasts include residential, employment and infrastructure developments which are considered to be 'near certain' or 'more than likely'. This does not include a number of large developments in the current Local Plans for the five districts (LBC, Central Bedfordshire, North Hertfordshire, St Albans District and Dacorum) which are

classed as ‘reasonably foreseeable’. These developments are detailed within **Table 3.5** and **Table 3.6** of the Forecasting Report (see **Appendix F**), and are:

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.

10.2.4 The Local Plan Growth Alternative assesses the forecast impacts of including proposed residential and employment developments classified as ‘reasonably foreseeable’. However, as the TAG-based approach is the standard required for the DCO, the Transport Assessment focusses on the findings associated with TAG-based scenario. The results of the Local Plan Growth Alternative scenario are provided in the Forecasting Report (see **Appendix F**).

10.2.5 Future Baseline TAG-based outputs for 2027, 2039 and 2043 are summarised in the following sections.

2027

Link flows

10.2.6 The 2027 Future Baseline traffic flows for selected locations along the M1 corridor are shown in **Table 10.24**.

Table 10.24: 2027 Future Baseline traffic flows (vehicles) at selected locations along M1 - change compared to 2016 shown in brackets

Location	Direction	AM peak hour (08:00-09:00)	PM peak hour (17:00-18:00)
M1 Jn9 & 10	Northbound	6,156 (16.0%)	6,942 (12.6%)
	Southbound	6,365 (15.1%)	6,440 (9.0%)
M1 within J10	Northbound	4,629 (14.2%)	5,467 (14.1%)
	Southbound	4,984 (18.1%)	4,729 (12.4%)
M1 J10 & J11	Northbound	5,376 (17.4%)	6,826 (19.7%)
	Southbound	6,615 (25.9%)	5,791 (17.1%)
M1 J10 Off-Slip	Northbound	1,527 (21.9%)	1,475 (7.5%)
M1 J10 On-Slip	Northbound	747 (41.5%)	1,360 (48.9%)
M1 J10 Off-Slip	Southbound	1,631 (57.8%)	1,063 (43.7%)
M1 J10 On-Slip	Southbound	1,381 (5.5%)	1,711 (0.4%)

10.2.7 In the AM peak hour, the growth in traffic from 2016 to 2027 is forecast to increase traffic flows on the M1 between Junctions 9 and 11 by between 15% and 26% on the southbound carriageway and between 14% and 18% on the northbound carriageway. In the PM peak hour, M1 traffic is forecast to grow by between 9% and 17% southbound and between 12% and 20% northbound. The highest growth in M1 traffic is generally between Junctions 10 and 11.

10.2.8 At M1 Junction 10, growth on the slip roads is more substantial. Growth on the northbound on-slip and southbound off-slip exceeds 40% in the AM and PM peak hour, which will in part be due to the lower flows on these roads in the baseline scenario. The growth on the other slip roads is below 10% except for the northbound off-slip in the AM peak hour.

10.2.9 The 2027 Future Baseline traffic flows for selected non-M1 locations are shown in **Table 10.25**.

Table 10.25: 2027 Future Baseline traffic flows (vehicles) at selected non-M1 locations - change compared to 2016 shown in brackets

Location	Direction	AM peak hour (08:00-09:00)	PM peak hour (17:00-18:00)
A1081, between Capability Green and B653 Gipsy Lane	Eastbound	2,440 (24.5%)	2,558 (13.1%)
	Westbound	2,775 (15.2%)	2,548 (12.0%)
A505 Kimpton Road, west of Vauxhall Way	Eastbound	553 (84.3%)	915 (69.1%)
	Westbound	959 (60.0%)	607 (63.7%)
A505 Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	844 (-15.2%)	1,337 (11.2%)
	Southbound	1,588 (27.7%)	1,161 (7.0%)
A505 Beech Hill, between Great Marlings and slip road to Lilley Bottom	Eastbound	931 (2.1%)	1,385 (19.3%)
	Westbound	1,530 (19.1%)	1,033 (0.2%)
Eaton Green Road, east of Colwell Rise	Eastbound	223 (20.9%)	225 (29.2%)
	Westbound	236 (35.3%)	169 (-6.0%)
B653 Lower Harpenden Road, south of A1081	Northbound	729 (17.2%)	822 (8.9%)
	Southbound	762 (20.9%)	693 (29.7%)
A1081 London Road, between Half Moon Lane and Kinsbourne Green Lane	Northbound	937 (18.7%)	912 (25.6%)
	Southbound	947 (19.2%)	1,253 (49.5%)

10.2.10 In the AM peak hour, the highest growth in traffic from 2016 to 2027 occurs on the A505 Kimpton Road, where eastbound traffic is forecast to grow by 84.3% and westbound traffic by 60%. On the other local roads, the change in traffic between 2016 and 2027 ranges between a reduction of 15.2% on the northbound carriageway of the A505 Vauxhall Way to an increase of 35.3% on the westbound carriageway of Eaton Green Road. Only the eastbound carriageway of the A505 Vauxhall Way in the AM peak shows a decrease in traffic, and generally traffic flows grow by more than 15%.

10.2.11 In the PM peak hour, the highest growth in traffic again occurs on the A505 Kimpton Road where traffic is forecast to increase by more than 60%. With the

exception of the westbound carriageway of Eaton Green Road, where traffic is forecast to reduce by 6% from 2016, all other roads are predicted to have increased traffic ranging from a 0.2% increase on the A505 Beech Hill to a 49.5% increase on the A1081 London Road.

Link based V/C

10.2.12 The 2027 Future Baseline link-based V/C is shown in **Figure 10.5** for the simulation network and **Figure 10.6** for Luton borough.

Figure 10.5: 2027 Future Baseline link-based V/C – simulation network

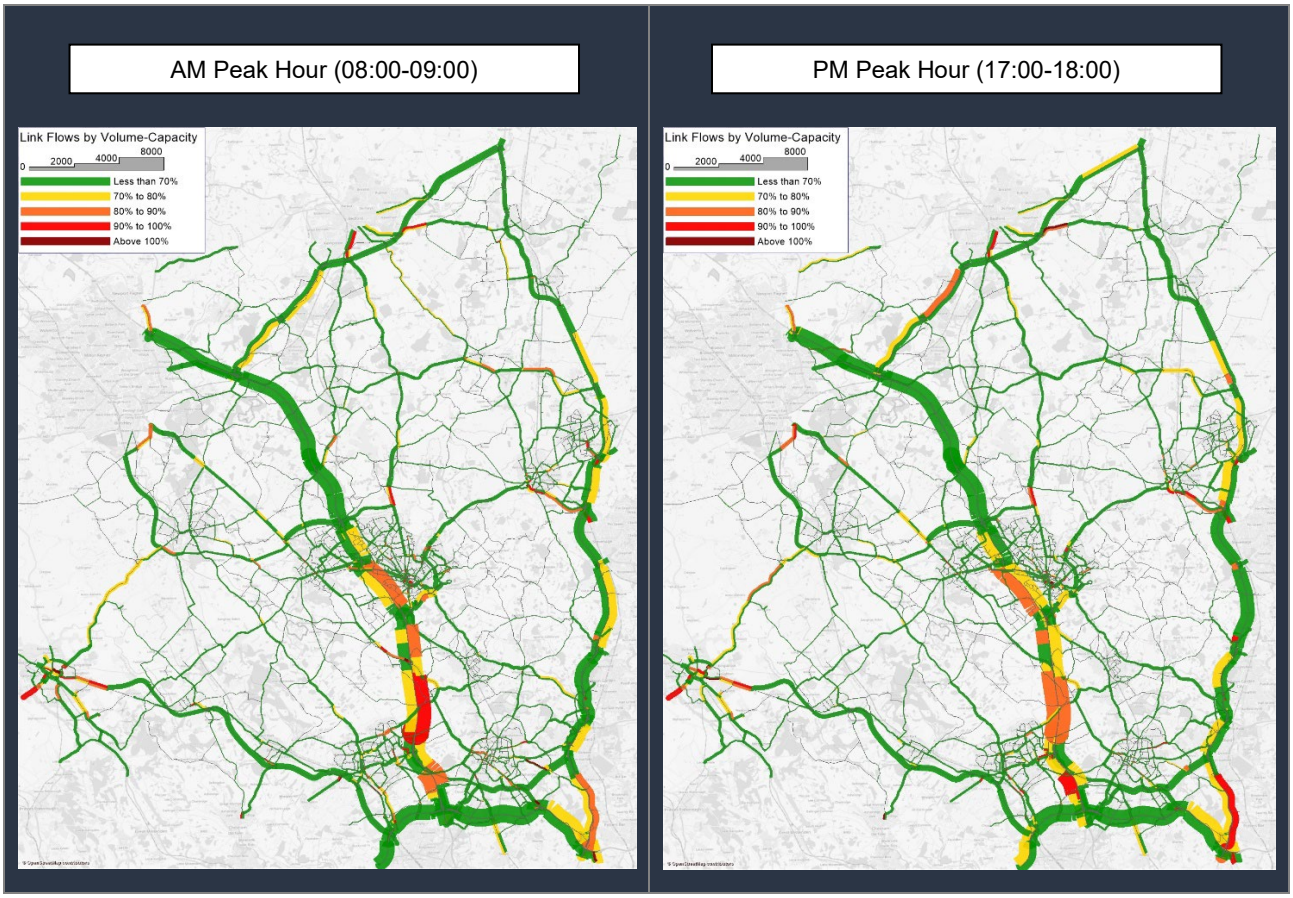
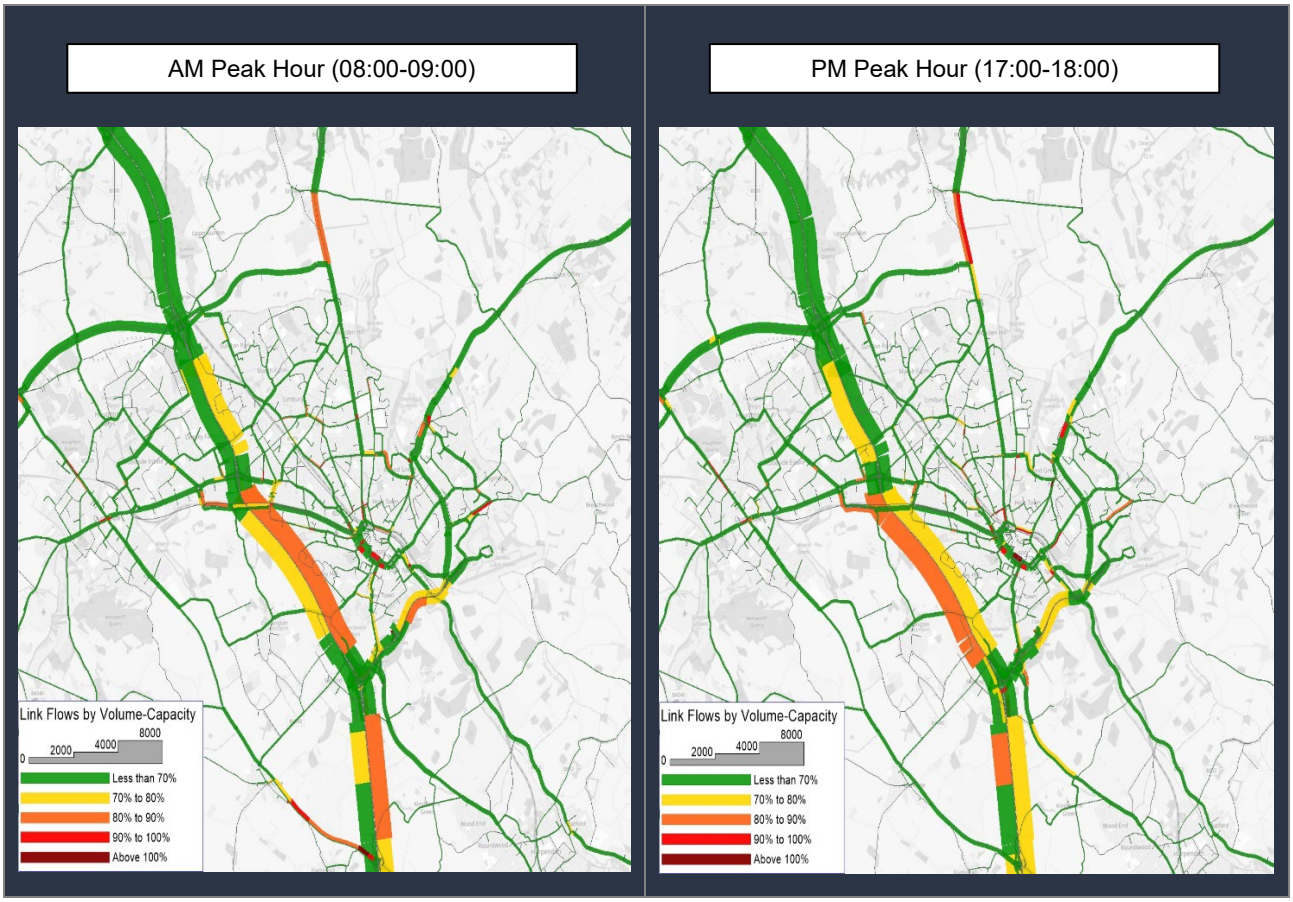


Figure 10.6: 2027 Future Baseline link-based V/C – Luton borough



10.2.13 In the AM peak hour, the growth in traffic to 2027 leads to a higher V/C on the M1 compared to 2016. Between Junction 8 and Junction 11a (north Luton), the M1 southbound carriageway would operate within its capacity but is approaching capacity between Junctions 8 and 9. The M1 northbound carriageway also operates within capacity but is approaching capacity around Junction 8. The M25 operates within capacity between Junctions 20 and 23 and the A1(M) operates within capacity, with the busiest section between the M25 and Junction 2. The operation of the A1(M) between Stevenage and Welwyn is improved compared to 2016, while other sections are slightly busier.

10.2.14 Beyond the SRN, there are various isolated sections where road links are above 80% V/C or approaching capacity. This includes sections of Eaton Green Road, the A1081 New Airport Way, the A505 in Luton town centre, as well as the A602 between Hitchin and Stevenage. The V/C on Vauxhall Way is improved compared to 2016, which is likely due to the committed East Luton highway improvements.

10.2.15 The busiest sections of the road network in the PM peak hour are generally similar to the AM peak. The V/C is generally higher on the M1 between junction 6 and 11a compared to 2016, particularly northbound, but the M1, M25 and A1(M) would continue to operate within their capacities. The operation of the A1(M) between Junctions 6 (Welwyn) and 8 (Stevenage) is improved, similar to the AM peak, but the southbound carriageway is approaching capacity between Junction

1 and 2. In Luton, the operation of the network is similar to 2016 except that Vauxhall Way has improved operation.

2039

Link flows

10.2.16 The 2039 Future Baseline traffic flows for selected locations along the M1 corridor are shown in **Table 10.26**.

Table 10.26: 2039 Future Baseline traffic flows (vehicles) at selected locations along M1 - change compared to 2016 shown in brackets

Location	Direction	AM peak hour (08:00-09:00)	PM peak hour (17:00-18:00)
M1 J9 & J10	Northbound	6,809 (28.4%)	7,293 (18.3%)
	Southbound	6,704 (21.3%)	6,846 (15.8%)
M1 within J10	Northbound	5,129 (26.6%)	5,811 (21.3%)
	Southbound	5,325 (26.2%)	5,145 (22.3%)
M1 J10 & J11	Northbound	5,954 (30.0%)	7,193 (26.1%)
	Southbound	7,132 (35.7%)	6,305 (27.5%)
M1 J10 Off-Slip	Northbound	1,680 (34.1%)	1,482 (8.0%)
M1 J10 On-Slip	Northbound	824 (56.1%)	1,382 (51.4%)
M1 J10 Off-Slip	Southbound	1,806 (74.8%)	1,160 (56.9%)
M1 J10 On-Slip	Southbound	1,379 (5.4%)	1,701 (-0.2%)

10.2.17 In the AM peak hour, the growth in traffic from 2016 to 2039 is forecast to increase traffic flows on the M1 between Junctions 9 and 11 by between 21% and 36% on the southbound carriageway and between 26% and 30% on the northbound carriageway. In the PM peak hour, M1 traffic is forecast to grow by between 15% and 28% southbound and between 18% and 27% northbound. The highest growth in M1 traffic is generally between Junctions 10 and 11 which is similar to 2027.

10.2.18 At M1 Junction 10, growth on the northbound on-slip and southbound off-slip is substantial compared to 2016, exceeding 50%. The growth on the other slip roads is generally below 10%, except for the northbound off-slip in the AM peak hour,

where growth would increase traffic flows by c.34%. The general pattern of growth is similar to 2027.

10.2.19 The 2039 Future Baseline traffic flows for selected non-M1 locations are shown in **Table 10.27**.

Table 10.27: 2039 Future Baseline traffic flows (vehicles) at selected non-M1 locations - change compared to 2016 shown in brackets

Location	Direction	AM peak hour (08:00-09:00)	PM peak hour (17:00-18:00)
A1081, between Capability Green and B653 Gipsy Lane	Eastbound	2,638 (34.6%)	2,620 (15.8%)
	Westbound	2,855 (18.5%)	2,687 (18.1%)
A505 Kimpton Road	Eastbound	685 (128.4%)	1,093 (102.0%)
	Westbound	1,268 (111.6%)	764 (106.1%)
A505 Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	901 (-9.5%)	1,391 (15.7%)
	Southbound	1,698 (36.6%)	1,200 (10.6%)
A505 Beech Hill, between Great Marlings and slip road to Lilley Bottom	Eastbound	991 (8.7%)	1,499 (29.1%)
	Westbound	1,665 (29.7%)	1,114 (8.0%)
Eaton Green Road, east of Colwell Rise	Eastbound	256 (38.6%)	246 (41.8%)
	Westbound	308 (76.2%)	200 (11.2%)
B653 Lower Harpenden Road, south of A1081	Northbound	787 (26.6%)	864 (14.5%)
	Southbound	814 (29.1%)	815 (52.4%)
A1081 London Road, between Half Moon Lane and Kinsbourne Green Lane	Northbound	1,027 (30.1%)	993 (36.8%)
	Southbound	1,098 (38.2%)	1,389 (65.7%)

10.2.20 In 2039, the general pattern of growth is similar to 2027. In the AM peak hour, the highest growth from 2016 to 2039 occurs on the A505 Kimpton Road, where traffic is forecast to grow by between 111% and 129%. On the other local roads, the change in traffic ranges between a reduction of 9.5% on the northbound carriageway of the A505 Vauxhall Way to an increase of c.76% on the westbound carriageway of Eaton Green Road.

10.2.21 In the PM peak hour, the highest growth in traffic again occurs on the A505 Kimpton Road where traffic is forecast to grow by more than 100%. Traffic is predicted to grow on all other local roads with increases ranging from 8% on the A505 Beech Hill to 65% on the A1081 London Road.

Link based V/C

10.2.22 The 2039 Future Baseline link-based V/C is shown in **Figure 10.7** for the simulation network and **Figure 10.8** for Luton borough.

Figure 10.7: 2039 Future Baseline link-based V/C – simulation network

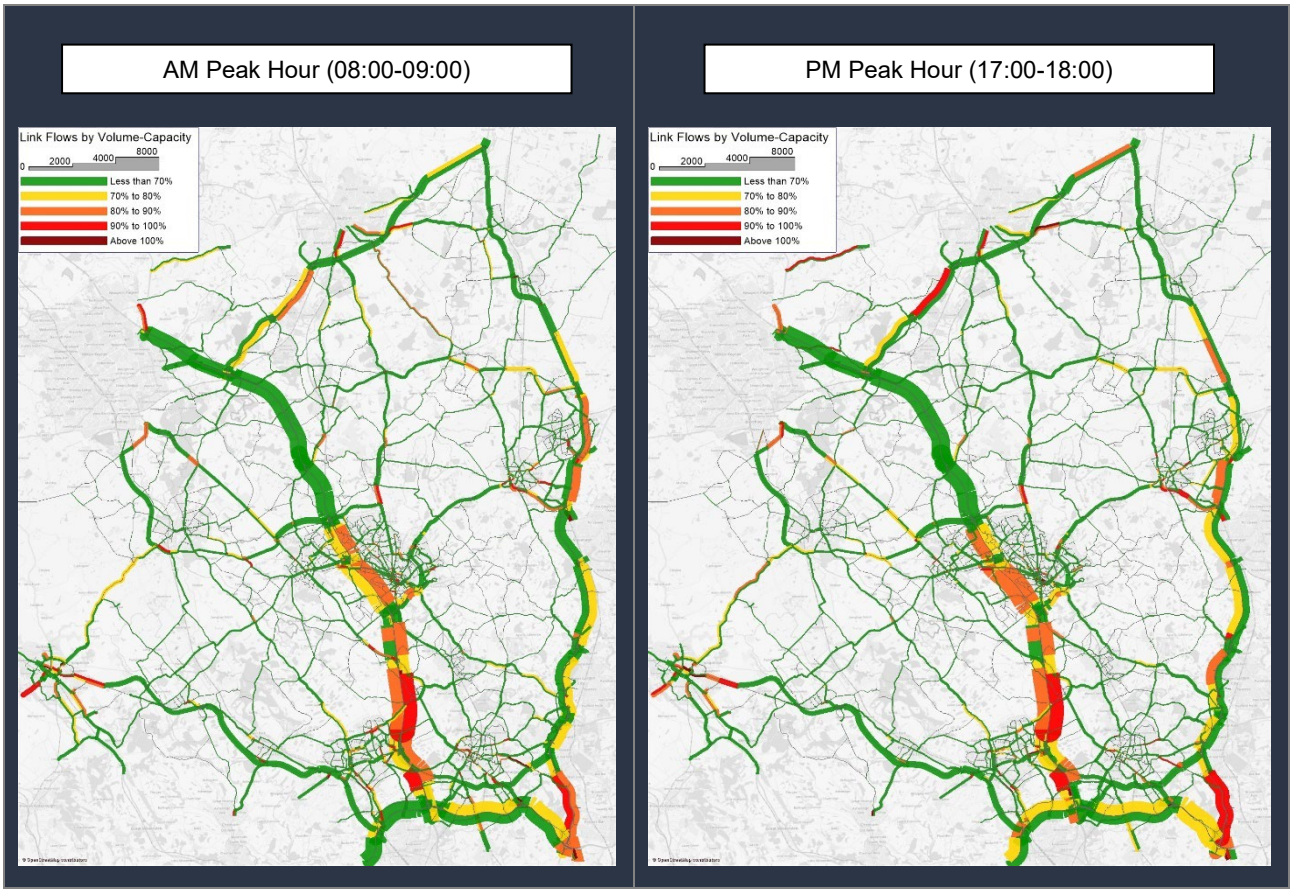
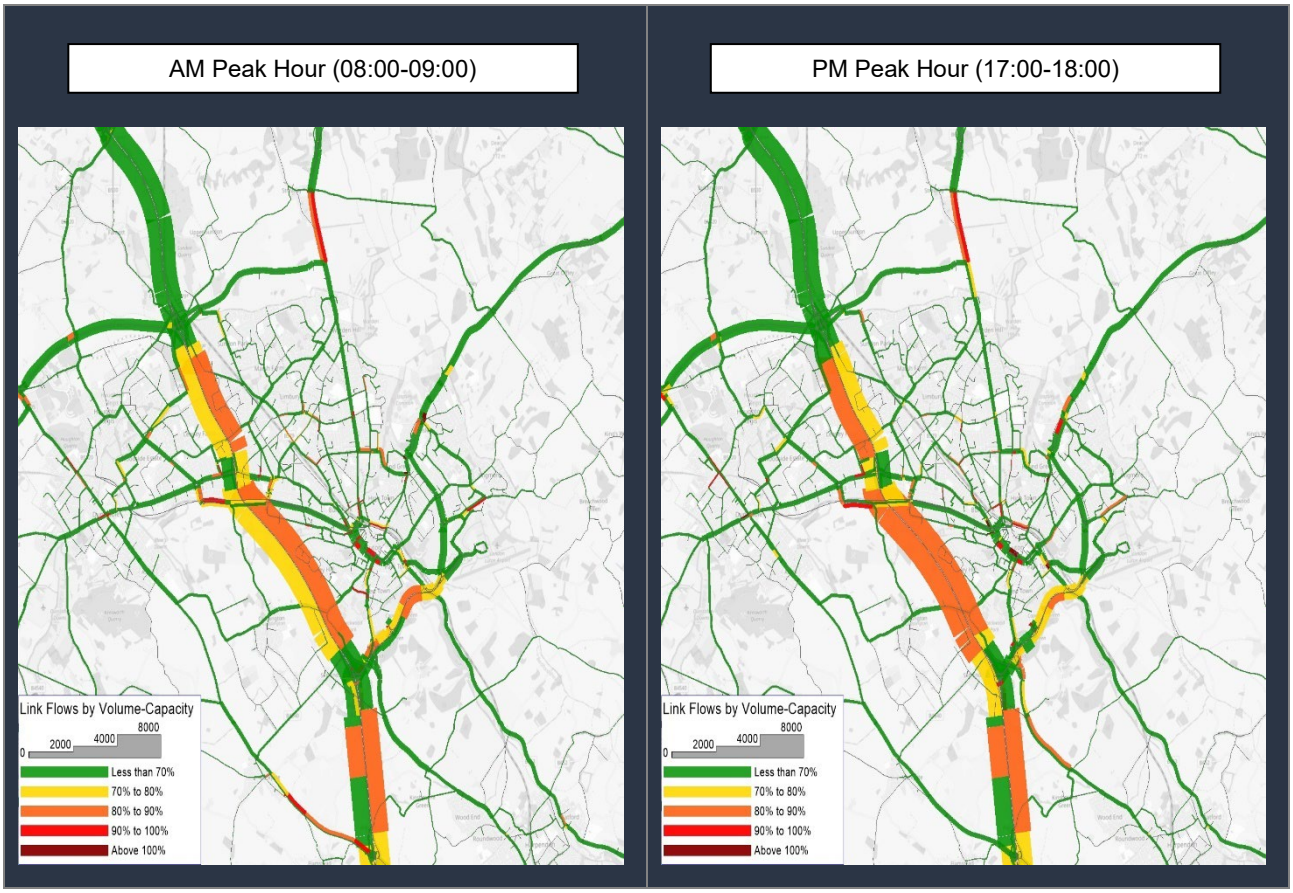


Figure 10.8: 2039 Future Baseline link-based V/C – Luton borough



10.2.23 In the AM peak hour, the growth in traffic to 2039 generally leads to a higher V/C on the M1, M25 and A1(M) compared to 2027. However, the operation of the M1, M25 between Junctions 21a and 23 and the A1(M) would remain within their capacities. The sections of the M1 and A1(M) that were approaching their capacity in 2027 remain in 2039. There is a slight worsening of the operation of the A1081 between the M1 and the airport, but this too would operate within its capacity. The operation of the rest of the network is generally similar to the 2027 Future Baseline.

10.2.24 In the PM peak hour, there is a worsening of the highway link operation compared to 2027, with a higher V/C on sections of the M1, M25 and A1(M) but these highway links would continue to operate within their capacities. By 2039, the M1 southbound carriageway between Junctions 8 and 9 would be approaching its capacity. The operation of the rest of the highway links is generally similar to 2027.

2043

Link flows

10.2.25 The 2043 Future Baseline traffic flows for selected locations along the M1 corridor are shown in **Table 10.28**.

Table 10.28: 2043 Future Baseline traffic flows (vehicles) at selected locations along M1 - change compared to 2016 shown in brackets

Location	Direction	AM peak hour (08:00-09:00)	PM peak hour (17:00-18:00)
M1 J9 & J10	Northbound	6,978 (31.5%)	7,637 (23.9%)
	Southbound	7,027 (27.1%)	7,785 (31.7%)
M1 within J10	Northbound	5,272 (30.1%)	6,090 (27.1%)
	Southbound	5,426 (28.6%)	5,157 (22.6%)
M1 J10 & J11	Northbound	6,163 (34.6%)	7,597 (33.2%)
	Southbound	7,304 (39.0%)	6,325 (27.9%)
M1 J10 Off-Slip	Northbound	1,707 (36.2%)	1,546 (12.7%)
M1 J10 On-Slip	Northbound	891 (60.9%)	1,507 (65.0%)
M1 J10 Off-Slip	Southbound	1,877 (81.6%)	1,167 (57.9%)
M1 J10 On-Slip	Southbound	1,600 (22.3%)	2,658 (54.2%)

10.2.26 In the AM peak hour, the growth in traffic from 2016 to 2043 is forecast to increase traffic flows on the M1 between Junctions 9 and 11 by between 27% and 39% on the southbound carriageway and between 30% and 35% on the northbound carriageway. In the PM peak hour, M1 traffic is forecast to grow by between 22% and 32% southbound and between 23% and 34% northbound. The highest growth in M1 traffic is generally between Junctions 10 and 11 but in 2043 there is also higher growth on the southbound carriageway between Junctions 9 and 10.

10.2.27 At M1 Junction 10, growth on the northbound on-slip and southbound off-slip is substantial compared to 2016 and slightly higher than in 2039. Growth on the northbound off-slip also increases slightly from 2039 but there is a marked increase in growth on the southbound on-slip where growth increases by 22.3% in the AM peak and 54.2% in the PM peak.

10.2.28 The 2043 Future Baseline traffic flows for selected non-M1 locations are shown in **Table 10.29**.

Table 10.29: 2043 Future Baseline traffic flows (vehicles) at selected non-M1 locations - change compared to 2016 shown in brackets

Location	Direction	AM peak hour (08:00-09:00)	PM peak hour (17:00-18:00)
A1081, between Capability Green and B653 Gipsy Lane	Eastbound	2,660 (35.7%)	2,626 (16.1%)
	Westbound	2,932 (21.7%)	2,975 (30.8%)
A505 Kimpton Road	Eastbound	699 (133.0%)	1,172 (116.7%)
	Westbound	1,299 (116.7%)	782 (110.9%)
A505 Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	895 (-10.1%)	1,397 (16.2%)
	Southbound	1,743 (40.2%)	1,285 (18.4%)
A505 Beech Hill, between Great Marlings and slip road to Lilley Bottom	Eastbound	983 (7.7%)	1,519 (30.9%)
	Westbound	1,702 (32.5%)	1,213 (17.6%)
Eaton Green Road, east of Colwell Rise	Eastbound	278 (50.6%)	239 (37.7%)
	Westbound	339 (94.0%)	211 (17.4%)
B653 Lower Harpenden Road, south of A1081	Northbound	810 (30.2%)	865 (14.7%)
	Southbound	823 (30.5%)	734 (37.3%)
A1081 London Road, between Half Moon Lane and Kinsbourne Green Lane	Northbound	1,055 (33.6%)	1,058 (45.7%)
	Southbound	994 (25.2%)	1,007 (20.1%)

10.2.29 In 2043, the general pattern of growth is similar to 2027 and 2039. In the AM peak hour, the highest growth from 2016 to 2043 occurs on the A505 Kimpton Road, where traffic is forecast to grow by between 116% and 133%. On the other local roads, the change in traffic ranges between a reduction of c.10% on the northbound carriageway of the A505 Vauxhall Way to an increase of c.94% on the westbound carriageway of Eaton Green Road. Compared to 2039, there are however some reductions in traffic forecast on the eastbound carriageway of the A505 Beech Hill and the southbound carriageway of the A1081 London Road. This may be a consequence of traffic reassignment due to constraints on the network.

10.2.30 In the PM peak hour, the highest growth in traffic again occurs on the A505 Kimpton Road where traffic is forecast to grow by more than 100%. Traffic is predicted to grow on all other local roads with increases ranging from 8% on the A505 Beech Hill to 65% on the A1081 London Road.

Link based V/C

10.2.31 The 2043 Future Baseline link-based V/C is shown in **Figure 10.9** for the simulation network and **Figure 10.10** for Luton borough.

Figure 10.9: 2043 Future Baseline link-based V/C – simulation network

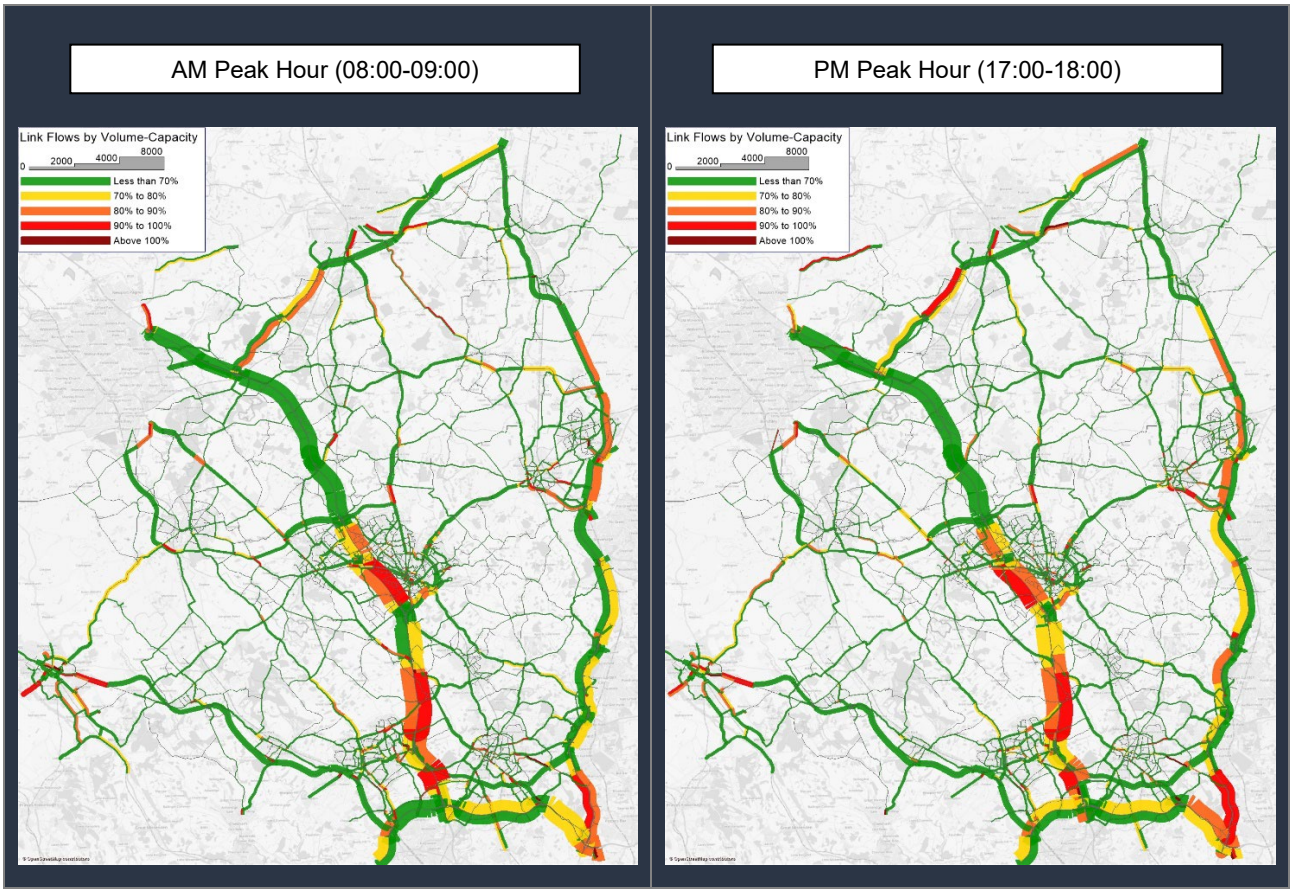
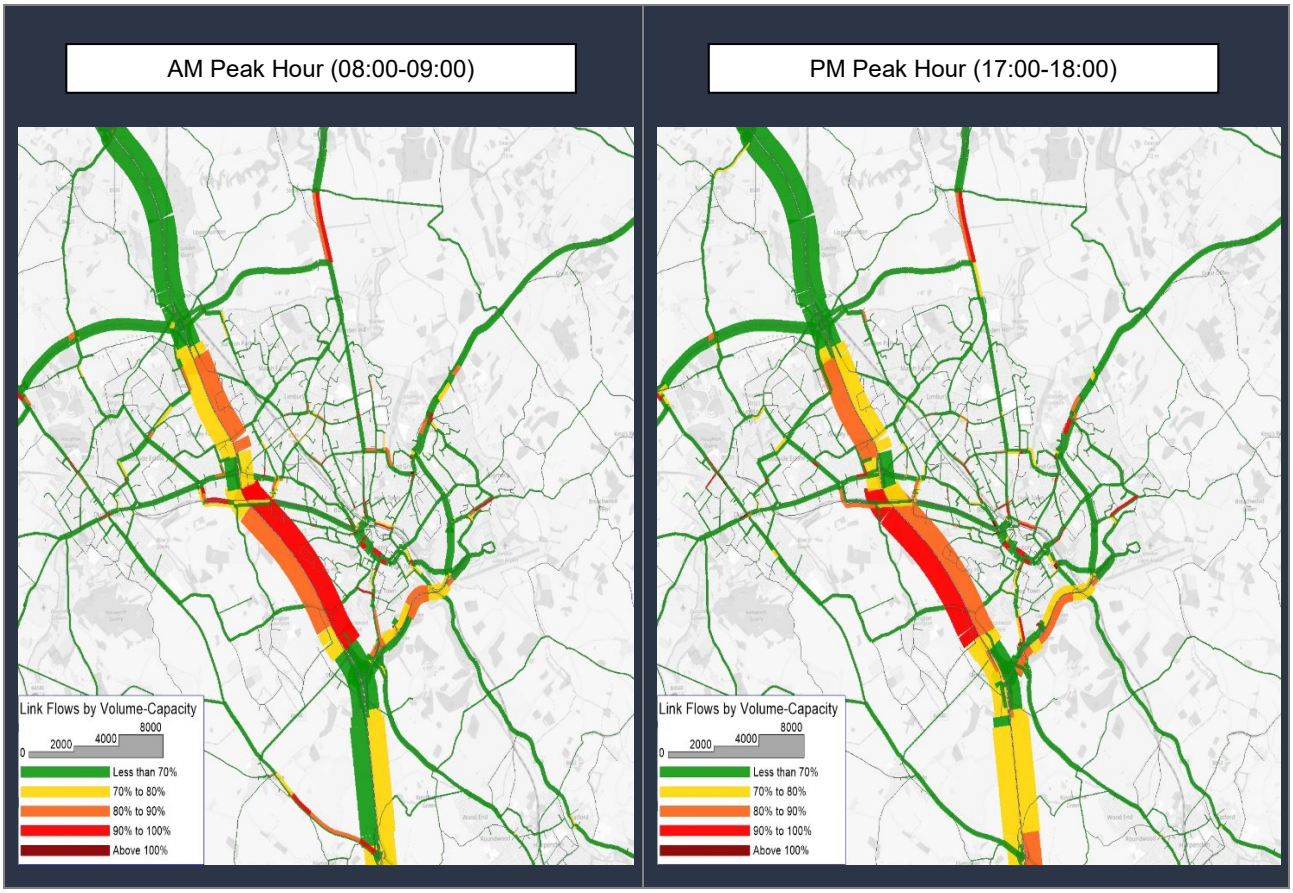


Figure 10.10: 2043 Future Baseline link-based V/C – Luton



10.2.32 In 2043, the operation of the highway links are generally similar to 2039. The M1, M25 and A1(M) would continue to operate within their capacities in the AM and PM peaks. The growth in traffic would however push some sections of the M1 closer to their capacities, particularly between Junctions 10 and 11, southbound in the AM peak and northbound in the PM peak. In addition, the A602 between Hitchin and the A1(M) would be approaching its capacity in the PM peak, and the A1081 between the M1 and the Kimpton Road/Vauxhall Way junction would be approaching its capacity in the AM and PM peak. The operation of the rest of the network would be similar to the 2039 Future Baseline.

Vissim modelling

This section sets out the traffic conditions on the network in 2027, 2039 and 2043. The section provides an overview of the future performance of the network without the Proposed Development but taking account of committed development and transport schemes as set out in Chapter 10 of this Transport Assessment.

Network performance

10.2.33 **Table 10.30** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) model network performance statistics for the AM and PM peak hours.

Table 10.30: 2027, 2039 and 2043 Future Baseline (without the Proposed Development) model network statistics

Parameter	AM Peak			PM Peak		
	2027	**2039**	**2043**	**2027**	**2039**	**2043**
Average Delay Time per Vehicle (seconds), All Vehicle Types	140	156	73	838	942	102
Average Number of Stops per Vehicles, All Vehicle Types	7	7	3	9	9	4
Average Speed (mph), All Vehicle Types	23	22	35	7	6	32
Average Stopped Delay per Vehicle (seconds), All Vehicle Types	49	52	29	757	860	49
Number of Unreleased Vehicles	298	860	82	12,536	14,625	843

10.2.34 **Table 10.30** shows there would be significant congestion in the network particularly in the PM peak hour. Average speeds are low and there would be a large number of unreleased vehicles. These queues and delays are largely attributed to congestion on the M1 and M1 Junction 10 which cause 'locking-up' of the network and which then impacts on the performance of the local network. The table shows that in 2043 the network performs with significantly improved operation in both the AM and PM peak hours. In the 2043 year models it has been assumed that National Highways will have implemented measures to address the Future Baseline congestion issues on the M1 and M1 Junction 10 which would 'unlock' both the M1 mainline and the junction and consequently reduce knock-on impacts on the local network including a substantial reduction in the number of unreleased vehicles.

Journey times

10.2.35 **Table 10.31** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) journey times for the AM and PM peak hours

Table 10.31: 2027, 2039 and 2043 Future Baseline (without the Proposed Development) journey times

Route	AM Peak			PM Peak		
	2027	**2039**	**2043**	**2027**	**2039**	**2043**
Luton Town Centre (G) to Existing Terminal Area (I)	354	356	338	369	359	304
Existing Terminal Area (I) to Luton Town Centre (G)	457	429	475	685	560	401
Vauxhall Way north of Crawley Green Road (H) to Existing Terminal Area (I)	261	286	264	366	330	316
Existing Terminal Area (I) to Vauxhall Way north of Crawley Green Road (H)	277	276	284	441	757	326
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Existing Terminal Area (I)	178	181	188	370	520	199
Existing Terminal Area (I) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	523	499	506	689	613	380
A1081 London Road (E) close to Beech Tree Drive to Existing Terminal Area (I)	517	509	643	528	472	667
Existing Terminal Area (I) to A1081 London Road (E) close to Beech Tree Drive	427	427	372	1,108	1,154	338

Route	AM Peak			PM Peak		
M1 Junction 10 North off slip (B) to Existing Terminal Area (I)	293	286	340	661	640	594
Existing Terminal Area (I) to M1 Junction 10 North on slip (A)	529	519	341	1,321	1,330	331
M1 Junction 10 South off slip (C) to Existing Terminal Area (I)	355	348	362	667	651	620
Existing Terminal Area (I) to M1 Junction 10 South on slip (D)	760	773	318	1,187	1,175	294

10.2.36 The model performance is also reflected in the journey times where journey times on most routes are generally worse in the PM peak hour than the AM peak hour.

Junction modelling

10.2.37 The following tables provide the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance.

10.2.38 **Table 10.32** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for M1 Junction 10 in the AM and PM peak hours.

Table 10.32: M1 Junction 10 (1) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
M1 southbound off-slip	1,428	81	1,452	147	728	2,010*
A1081 New Airport Way	1,956	624	1,219	788	1,196	1,219*
M1 northbound off-slip	1,979	129	788	405	1,410	2,010*

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Average delay (seconds)	48			36		
Level of Service (LoS)	D			D		
2039						
M1 southbound off-slip	1,402	81	1,477	77	808	2,010*
A1081 New Airport Way	1,913	657	1,220	606	1,199	1,219*
M1 northbound off-slip	1,907	103	665	295	1,562	2,010*
Average delay (seconds)	49			35		
Level of Service (LoS)	D			C		
2043						
M1 southbound off-slip	1,719	17	79	1,204	90	534
A1081 New Airport Way	2,344	0	5	3,981	14	158
M1 northbound off-slip	2,307	39	158	1,785	156	894
Average delay (seconds)	7			16		
Level of Service (LoS)	A			B		

* queue extends to end of the queue evaluation length' indicating very long predicted queues

10.2.39 **Table 10.32** shows that in 2027 and 2039 average delays and LoS are not considered to be excessive, however the reported values only reflect those vehicles which have passed through the junction. As can be seen from the table the demand through the junction would be low (particularly on the M1 southbound off-slip) and this reflects wider congestion on the network which limits the number of vehicles that pass through the junction. The 2043 results show a significant improvement in throughput and a substantial reduction in the queues reflecting the benefits associated with the M1 improvement works.

10.2.40 **Table 10.33** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the A1081 New Airport Way / London Road (north) roundabout in the AM and PM peak hours.

Table 10.33: A1081 New Airport Way / London Road (north) roundabout (2) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
London Road (north)	851	57	203	197	174	203
A1081 New Airport Way	960	288	1,219	154	1,234	1,360
London Road (south)	834	237	591	226	1	43
Newlands Park Access	66	0	12	377	0	20
Average delay (seconds)	43			61		
Level of Service	E			F		
2039						
London Road (north)	842	62	203	151	183	204
A1081 New Airport Way	930	278	1,188	102	1,295	1,361
London Road (south)	854	269	593	190	0	23
Newlands Park Access	66	0	13	377	0	17
Average delay (seconds)	44			62		
Level of Service	E			F		
2043						
London Road (north)	950	20	189	860	13	162

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
A1081 New Airport Way	1,207	13	185	1,254	224	838
London Road (south)	763	444	612	639	19	182
Newlands Park Access	66	0	11	377	5	65
Average delay (seconds)	24			15		
Level of Service	C			B		

10.2.41 **Table 10.33** shows that in 2027 and 2039 the junction would operate with a maximum LoS F indicating queues and delays at the junction. The operation of the junction would be impacted by queues and delays at M1 Junction 10, and these are reflected in the modelled performance of the junction. The 2043 results show that, as a result of the M1 improvement works, the junction would operate within capacity with minimal delay and a maximum LoS C.

10.2.42 **Table 10.34** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the A1081 New Airport Way / A1081 London Road (south) roundabout in the AM and PM peak hours.

Table 10.34: A1081 New Airport Way / A1081 London Road (south) roundabout (3) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
London Road (north)	685	158	603	144	592	630
A1081 New Airport Way	742	15	256	209	0	15
London Road (south)	1,032	35	210	475	200	327
Average delay (seconds)	39			82		
Level of Service	E			F		
2039						
London Road (north)	679	164	575	109	604	631
A1081 New Airport Way	739	12	186	165	0	20
London Road (south)	1,044	38	237	397	224	327
Average delay (seconds)	41			103		
Level of Service	E			F		
2043						
London Road (north)	820	2	45	879	49	280
A1081 New Airport Way	805	4	99	931	1	65
London Road (south)	941	124	330	1,184	0	41
Average delay (seconds)	32			12		

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Level of Service	D			B		

10.2.43 **Table 10.34** shows that in 2027 and 2039 the junction would operate with a maximum LoS F indicating queues and delays at the junction. The operation of the junction would be impacted by queues and delays at M1 Junction 10, and these are reflected in the modelled performance of the junction. The 2043 results show that, as a result of the M1 improvement works, the junction would operate with an improved performance.

10.2.44 **Table 10.35** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the A1081 New Airport Way / B653 / Gipsy Lane network of junctions in the AM and PM peak hours.

Table 10.35: A1081 New Airport Way / B653 / Gipsy Lane junctions (4) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
Gipsy Lane	931	7	97	339	191	271
Parkway Road	96	0	20	73	108	179
B653 Lower Harpenden Road	646	1	47	124	158	177
A1081 New Airport Way (east)	2,413	234	552	393	517	546
A1081 New Airport Way (west)	2,437	52	614	895	135	702
Average delay (seconds)	24			146		

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Level of Service	C			F		
2039						
Gipsy Lane	918	8	109	277	213	280
Parkway Road	96	0	20	55	120	180
B653 Lower Harpenden Road	659	2	68	100	161	177
A1081 New Airport Way (east)	2,417	209	548	332	533	555
A1081 New Airport Way (west)	2,387	44	545	712	53	516
Average delay (seconds)	23			138		
Level of Service	C			F		
2043						
Gipsy Lane	942	10	113	929	2	55
Parkway Road	97	0	20	214	0	27
B653 Lower Harpenden Road	662	0	32	863	11	122
A1081 New Airport Way (east)	2,512	253	552	2,121	77	368
A1081 New Airport Way (west)	2,720	130	790	2,293	710	1,118
Average delay (seconds)	23			34		

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Level of Service	C			C		

Table 10.35 shows that in 2027 and 2039 the junction would operate with a maximum LoS F indicating queues and delays at the junction particularly in the PM peak hour. The operation of the junction would be impacted by queues and delays at upstream junctions including M1 Junction 10 and these are reflected in the modelled performance of this junction. The 2043 results show that the junction would operate with a maximum LoS C.

10.2.45 **Table 10.36** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the Kimpton Road/A505 Vauxhall Way roundabout in the AM and PM peak hours.

Table 10.36: Kimpton Road/A505 Vauxhall Way roundabout (5) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
A505 Vauxhall Way (north)	1,557	42	329	353	615	1,031
Airport Way (east)	241	8	46	126	601	706
A505 Vauxhall Way (south)	930	17	92	597	25	162
Kimpton Way (west)	530	10	71	362	38	106
Average delay (seconds)	26			78		
Level of Service (LoS)	C			E		
2039						

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
A505 Vauxhall Way (north)	1,650	151	653	282	710	1,088
Airport Way (east)	233	8	44	127	578	721
A505 Vauxhall Way (south)	918	16	92	483	9	108
Kimpton Way (west)	533	10	71	346	113	228
Average delay (seconds)	31			70		
Level of Service (LoS)	C			E		
2043						
A505 Vauxhall Way (north)	1,595	61	367	1,329	25	154
Airport Way (east)	320	11	75	515	34	179
A505 Vauxhall Way (south)	1,278	36	151	1,455	30	172
Kimpton Way (west)	544	15	80	608	14	78
Average delay (seconds)	31			30		
Level of Service (LoS)	C			C		

10.2.46 **Table 10.36** shows that in 2027 and 2039 the junction would operate with a maximum LoS E indicating queues and delays at the junction particularly in the PM peak hour. The operation of the junction would be impacted by queues and delays at upstream junctions including M1 Junction 10 and these are reflected in the modelled performance of this junction. The 2043 results show that the junction would operate with a maximum LoS C.

10.2.47 **Table 10.37** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the A1081 New Airport Way/Percival Way roundabout in the AM and PM peak hours.

Table 10.37: A1081 New Airport Way/Percival Way roundabout (7) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
Percival Way	770	6	146	272	417	908
Airport Way (east)	958	7	89	230	141	199
A1081 New Airport Way	1,077	1	39	134	125	197
Airport Way (west)	236	1	31	158	9	39
Average delay (seconds)	8			61		
Level of Service (LoS)	A			F		
2039						
Percival Way	682	4	107	287	471	951
Airport Way (east)	958	5	77	285	128	198
A1081 New Airport Way	1,045	1	40	140	58	109
Airport Way (west)	226	1	26	151	0	24
Average delay (seconds)	7			26		
Level of Service (LoS)	A			D		
2043						
Percival Way	754	7	133	636	2	59

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Airport Way (east)	956	7	90	827	4	74
A1081 New Airport Way	955	2	40	659	1	31
Airport Way (west)	546	3	62	342	1	26
Average delay (seconds)	9			6		
Level of Service (LoS)	A			A		

10.2.48 **Table 10.37** shows that in 2027 and 2039 the junction would operate with a maximum LoS F indicating queues and delays at the junction particularly in the PM peak hour. The 2043 results show that the junction would operate with a maximum LoS A with minimal queues and delays.

10.2.49 **Table 10.38** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the Percival Way/Frank Lester Way/President Way roundabout in the AM and PM peak hours.

Table 10.38: Percival Way/Frank Lester Way/President Way roundabout (8) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
Frank Lester Way	861	8	77	320	28	96
President Way	264	1	22	404	160	541
Airport Approach Road	29	0	11	38	24	114
Percival Way	600	5	130	298	56	175
Average delay (seconds)	7			6		

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Level of Service (LoS)	A			A		
2039						
Frank Lester Way	859	11	73	250	20	61
President Way	264	1	26	379	180	538
Airport Approach Road	30	0	11	34	29	135
Percival Way	689	8	148	274	5	74
Average delay (seconds)	9			4		
Level of Service (LoS)	A			A		
2043						
Frank Lester Way	914	16	127	554	2	35
President Way	264	1	25	632	1	37
Airport Approach Road	30	0	11	56	0	11
Percival Way	759	12	178	409	2	68
Average delay (seconds)	11			5		
Level of Service (LoS)	B			A		

10.2.50 **Table 10.38** shows that the junction would operate with minimal delay and a maximum LoS B. Whilst there would be intermittent queues, average queues are relatively short and would not extend beyond the available link lengths.

10.2.51 **Table 10.39** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the A505 Vauxhall Way/Eaton Green Road roundabout in the AM and PM peak hours.

Table 10.39: A505 Vauxhall Way/Eaton Green Road roundabout (10) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
A505 Vauxhall Way (north)	1,236	10	96	375	92	374
Eaton Green Road	724	2	34	598	134	411
A505 Vauxhall Way (south)	1,161	5	100	801	54	180
Harrowden Road	104	1	17	18	4	17
Average delay (seconds)	7			8		
Level of Service (LoS)	A			A		
2039						
A505 Vauxhall Way (north)	1266	11	106	288	152	459
Eaton Green Road	799	3	56	528	199	486
A505 Vauxhall Way (south)	1175	6	105	749	96	400
Harrowden Road	104	1	17	18	3	22
Average delay (seconds)	8			29		
Level of Service (LoS)	A			D		
2043						

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
A505 Vauxhall Way (north)	1296	8	89	662	6	67
Eaton Green Road	711	3	43	1108	1	42
A505 Vauxhall Way (south)	1202	4	97	1724	20	173
Harrowden Road	105	1	16	25	0	11
Average delay (seconds)	7			10		
Level of Service (LoS)	A			A		

10.2.52 **Table 10.39** shows that the junction would operate with minimal delay and a maximum LoS A for most time periods. The operation of the junction would be impacted by queues and delays at upstream junctions in the 2039 PM peak hour and these are reflected in the modelled performance of this junction.

10.2.53 **Table 10.40** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the Eaton Green Road/Frank Lester Way roundabout in the AM and PM peak hours.

Table 10.40: Eaton Green Road/Frank Lester Way roundabout (11) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
Eaton Green Rd (west)	572	1	58	363	37	136
Eaton Green Rd (east)	1,091	9	140	513	51	195
Frank Lester Way	271	1	33	520	35	164

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Average delay (seconds)	7			8		
Level of Service (LoS)	A			A		
2039						
Eaton Green Rd (west)	527	1	36	262	2	58
Eaton Green Rd (east)	1,123	6	115	508	74	209
Frank Lester Way	356	1	39	431	37	144
Average delay (seconds)	6			8		
Level of Service (LoS)	A			A		
2043						
Eaton Green Rd (west)	544	3	63	573	7	102
Eaton Green Rd (east)	1,105	3	79	902	6	120
Frank Lester Way	378	1	36	771	7	126
Average delay (seconds)	6			9		
Level of Service (LoS)	A			A		

10.2.54 **Table 10.40** shows that the junction would operate with minimal delay and a maximum LoS A. Whilst there would be intermittent queues, average queues are relatively short and would not extend beyond the available link lengths.

10.2.55 **Table 10.41** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the Eaton Green Road/Wigmore Road roundabout in the AM and PM peak hours.

Table 10.41: Eaton Green Road/Wigmore Road roundabout (12) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
Wigmore Lane	639	2	63	440	13	106
Wigmore Place	56	0	10	160	8	44
Eaton Green Road (east)	436	1	42	319	35	200
Eaton Green Road (west)	387	1	47	400	6	114
Average delay (seconds)	4			7		
Level of Service (LoS)	A			A		
2039						
Wigmore Lane	627	2	66	475	31	129
Wigmore Place	56	0	12	146	11	46
Eaton Green Road (east)	441	1	44	299	51	233
Eaton Green Road (west)	409	1	56	291	1	54
Average delay (seconds)	5			7		
Level of Service (LoS)	A			A		
2043						
Wigmore Lane	578	2	57	625	4	76

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Wigmore Place	55	0	10	194	3	42
Eaton Green Road (east)	441	1	36	401	2	46
Eaton Green Road (west)	405	1	47	575	4	81
Average delay (seconds)	4			8		
Level of Service (LoS)	A			A		

10.2.56 **Table 10.41** shows that the junction would operate with minimal delay and a maximum LoS A. Whilst there would be intermittent queues, average queues are relatively short and would not extend beyond the available link lengths.

10.2.57 **Table 10.42** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the A505 Vauxhall Way/Crawley Green Road roundabout in the AM and PM peak hours.

Table 10.42: A505 Vauxhall Way/Crawley Green Road roundabout (13) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
A505 Vauxhall Way (north)	955	20	95	770	221	453
Crawley Green Road (east)	667	23	145	386	131	422
A505 Vauxhall Way (south)	809	12	60	758	71	170

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Crawley Green Road (west)	967	48	221	399	21	150
Saywell Road	56	0	20	24	3	15
Average delay (seconds)	26			45		
Level of Service (LoS)	C			D		
2039						
A505 Vauxhall Way (north)	964	19	96	663	381	492
Crawley Green Road (east)	676	24	153	347	119	413
A505 Vauxhall Way (south)	844	13	62	810	198	580
Crawley Green Road (west)	967	87	227	422	11	155
Saywell Road	57	2	31	23	0	6
Average delay (seconds)	30			83		
Level of Service (LoS)	C			F		
2043						
A505 Vauxhall Way (north)	967	20	96	1,058	21	82
Crawley Green Road (east)	701	24	146	484	18	124

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
A505 Vauxhall Way (south)	912	18	68	1,380	75	288
Crawley Green Road (west)	922	87	226	741	39	208
Saywell Road	59	2	29	22	0	12
Average delay (seconds)	32			35		
Level of Service (LoS)	C			C		

10.2.58 **Table 10.42** shows that in 2027 and 2039 the junction would operate with a maximum LoS D and F respectively, indicating queues and delays at the junction particularly in the PM peak hour.

10.2.59 **Table 10.43** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the Crawley Green Road/Wigmore Lane roundabout in the AM and PM peak hours.

Table 10.43: Crawley Green Road/Wigmore Lane roundabout (14) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
Wigmore Lane (north)	862	2	61	459	31	167
Crawley Green Lane (east)	404	5	67	236	30	147
Wigmore Lane (south)	233	0	22	598	19	101

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Crawley Green Lane (west)	506	0	27	561	3	113
Average delay (seconds)	6			5		
Level of Service (LoS)	A			A		
2039						
Wigmore Lane (north)	869	2	86	465	27	220
Crawley Green Lane (east)	411	4	67	247	20	185
Wigmore Lane (south)	230	0	25	480	0	38
Crawley Green Lane (west)	480	0	23	677	5	158
Average delay (seconds)	6			7		
Level of Service (LoS)	A			A		
2043						
Wigmore Lane (north)	871	2	76	535	2	44
Crawley Green Lane (east)	413	5	72	279	1	36
Wigmore Lane (south)	284	1	36	655	1	48
Crawley Green Lane (west)	494	0	28	959	9	174
Average delay (seconds)	6			8		

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Level of Service (LoS)	A			A		

10.2.60 **Table 10.43** shows that the junction would operate with minimal delay and a maximum LoS A. Whilst there would be intermittent queues, average queues are relatively short and would not extend beyond the available link lengths.

10.2.61 **Table 10.44** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the Windmill Road/Kimpton Road roundabout in the AM and PM peak hours.

Table 10.44: Windmill Road/Kimpton Road roundabout (15) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
Windmill Road (north)	983	184	575	404	383	563
Kimpton Road	685	42	74	290	52	70
Windmill Road (south)	692	14	120	415	12	94
Average delay (seconds)	19			22		
Level of Service (LoS)	C			C		
2039						
Windmill Road (north)	905	173	528	379	405	606
Kimpton Road	678	39	72	280	50	69
Windmill Road (south)	700	8	79	344	3	91

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Average delay (seconds)	18			22		
Level of Service (LoS)	C			C		
2043						
Windmill Road (north)	1,037	134	527	1,022	10	203
Kimpton Road	706	43	74	780	16	68
Windmill Road (south)	660	40	172	863	77	197
Average delay (seconds)	23			18		
Level of Service (LoS)	C			C		

10.2.62 **Table 10.44** shows that the junction would operate with a maximum LoS C. Whilst there would be intermittent queues, average delays and average queues are relatively short and average queues would not extend beyond the available link lengths.

10.2.63 **Table 10.45** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the Eaton Green Road/Lalleford Road roundabout in the AM and PM peak hours.

Table 10.45: Eaton Green Road/Lalleford Road roundabout (16) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
Lalleford Road	492	3	61	148	32	182

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Eaton Green Road (east)	690	56	261	479	128	538
Eaton Green Road (west)	433	8	102	540	28	202
Average delay (seconds)	17			8		
Level of Service (LoS)	C			A		
2039						
Lalleford Road	544	6	73	111	58	255
Eaton Green Road (east)	684	163	461	506	176	596
Eaton Green Road (west)	435	18	141	471	7	141
Average delay (seconds)	27			6		
Level of Service (LoS)	D			A		
2043						
Lalleford Road	581	9	99	309	1	36
Eaton Green Road (east)	630	136	406	744	15	168
Eaton Green Road (west)	465	31	177	801	33	216
Average delay (seconds)	28			13		
Level of Service (LoS)	D			B		

10.2.64 **Table 10.45** shows that the junction would operate with a maximum LoS D. Average delays are not considered to be long however queues would begin to develop particularly in the AM peak hour.

10.2.65 **Table 10.46** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the Wigmore Lane/Raynham Way roundabout in the AM and PM peak hours.

Table 10.46: Wigmore Lane/Raynham Way roundabout (17) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
Wigmore Lane (north)	733	4	102	483	4	73
Twyford Drive	109	1	24	68	5	33
Wigmore Lane (south)	191	0	20	580	15	81
Raynham Way	123	0	11	126	9	50
Average delay (seconds)	5			4		
Level of Service (LoS)	A			A		
2039						
Wigmore Lane (north)	712	4	111	555	34	196
Twyford Drive	110	1	23	65	7	52
Wigmore Lane (south)	190	0	21	453	1	48
Raynham Way	125	0	12	120	9	77
Average delay (seconds)	5			5		
Level of Service (LoS)	A			A		

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2043						
Wigmore Lane (north)	715	4	90	753	10	139
Twyford Drive	110	1	23	77	1	19
Wigmore Lane (south)	239	0	21	648	2	57
Raynham Way	124	0	15	143	0	21
Average delay (seconds)	4			6		
Level of Service (LoS)	A			A		

10.2.66 **Table 10.46** shows that the junction would operate with minimal delay and a maximum LoS A. Whilst there would be intermittent queues, average queues are relatively short and would not extend beyond the available link lengths.

10.2.67 **Table 10.47** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the Wigmore Lane/Asda access roundabout in the AM and PM peak hours.

Table 10.47: Wigmore Lane/Asda access roundabout (18) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
Wigmore Lane (north)	705	5	101	469	13	121
Asda Access	261	1	38	562	9	43
Wigmore Lane (south)	291	0	22	419	14	100

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Average delay (seconds)	5			6		
Level of Service (LoS)	A			A		
2039						
Wigmore Lane (north)	688	6	96	531	41	198
Asda Access	261	1	36	520	13	43
Wigmore Lane (south)	292	0	20	303	1	40
Average delay (seconds)	5			6		
Level of Service (LoS)	A			A		
2043						
Wigmore Lane (north)	684	5	91	745	10	135
Asda Access	261	1	33	655	7	43
Wigmore Lane (south)	297	0	16	496	3	65
Average delay (seconds)	4			7		
Level of Service (LoS)	A			A		

10.2.68 **Table 10.47** shows that the junction would operate with minimal delay and a maximum LoS A. Whilst there would be intermittent queues, average queues are relatively short and would not extend beyond the available link lengths.

10.2.69 **Table 10.48** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the Windmill Road/St Mary's Road/Crawley Green Road roundabout in the AM and PM peak hours.

Table 10.48: Windmill Road/St Mary's Road/Crawley Green Road roundabout (19) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
St Mary's Road	329	9	67	221	107	198
Crawley Green Road	1,036	58	104	412	71	99
Windmill Road	861	121	388	382	36	233
A505 Park Viaduct	841	15	94	371	450	471
Average delay (seconds)	43			78		
Level of Service (LoS)	D			E		
2039						
St Mary's Road	335	8	68	208	114	199
Crawley Green Road	993	46	103	353	70	101
Windmill Road	855	97	366	368	21	255
A505 Park Viaduct	815	36	110	426	448	472
Average delay (seconds)	41			73		
Level of Service (LoS)	D			E		
2043						
St Mary's Road	337	8	67	483	14	87
Crawley Green Road	1,069	56	104	812	24	98

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Windmill Road	867	195	408	1,088	195	401
A505 Park Viaduct	870	12	77	997	446	472
Average delay (seconds)	43			62		
Level of Service (LoS)	D			E		

10.2.70 **Table 10.48** shows that the junction would operate with a maximum LoS E with delays and queues developing particularly on the A505 Park Viaduct.

10.2.71 **Table 10.49** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the Crawley Green Road/Lalleford Road roundabout in the AM and PM peak hours.

Table 10.49: Crawley Green Road/Lalleford Road roundabout (20) 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
2027						
Crawley Green Road (east)	555	0	21	348	60	257
Lalleford Road	232	0	17	378	67	239
Crawley Green Road (west)	520	0	15	498	1	26
Average delay (seconds)	2			3		
Level of Service (LoS)	A			A		
2039						

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Crawley Green Road (east)	555	0	22	285	2	35
Lalleford Road	234	0	18	407	6	73
Crawley Green Road (west)	558	0	20	545	1	44
Average delay (seconds)	2			3		
Level of Service (LoS)	A			A		
2043						
Crawley Green Road (east)	617	0	27	361	1	32
Lalleford Road	209	0	18	454	1	45
Crawley Green Road (west)	562	0	17	986	1	37
Average delay (seconds)	2			3		
Level of Service (LoS)	A			A		

10.2.72 **Table 10.49** shows that the junction would operate with minimal delay and a maximum LoS A. Whilst there would be intermittent queues, average queues are relatively short and would not extend beyond the available link lengths.

10.3 With Proposed Development

10.3.1 As set out in Chapter 8 of this report, the Proposed Development is described in three phases for the purposes of assessment: Phase 1, Phase 2a and Phase 2b. These are 'Assessment Phases'. In practice, the Proposed Development will be delivered in undefined increments that appropriately respond to demand over time, which may differ from the Assessment Phases providing delivery does not give rise to impacts which are materially different to those reported in this Transport Assessment.

10.3.2 The three Assessment Phases of the Proposed Development comprise the works associated with the expansion of the airport and off-site mitigation measures. The assessment includes off-site mitigation measures associated with each Assessment Phase however, the need and delivery of any mitigation measure will be dependent on the undefined incremental delivery of the Proposed Development.

10.3.3 As such it is proposed to implement a monitoring regime with triggers to determine when each intervention is required. More detail is provided in section 15.3 and **Appendix I** of this report. **Appendix I** sets out the Outline Transport Related Impacts Monitoring and Mitigation Approach (Outline TRIMMA) which establishes the Applicant's approach to monitoring of traffic information to inform the need and delivery programme for the mitigation set out. Notwithstanding this, and for assessment purposes, the works assumed in each Assessment Phase are summarised below.

Assessment Phase 1 (2027)

10.3.4 The Assessment Phase 1 scheme includes the airport expansion to 21.5 mppa and the following associated mitigation measures:

a. M1 Junction 10 improvements and widening works (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-0009**);

b. A505 Vauxhall Way/Eaton Green Road part signalisation (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-0007**);

c. A1081 New Airport Way/B653/Gipsy Lane junction improvements and widening works (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-0005**);

d. Windmill Road/Kimpton Road signalisation (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-0006);**

e. A1081 New Airport Way/London Road (north) (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-0008**);

f. A1081 New Airport Way/Percival Way signalisation (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-00010**); and

g. Eaton Green Road/Lalleford Road signalisation (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-0011).**

Assessment Phase 2a (2039)

10.3.5 The Assessment Phase 2a scheme includes the airport expansion to 27 mppa and the following associated mitigation measures (in addition to the Assessment Phase 1 measures):

a. Western section of AAR between new signalised junction with A1081 New Airport Way and Provost Way/Percival Way (drawings **LLADCO-3C-ARP-SFA-HWM-DR-CE-00019** and **LLADCO-3C-ARP-SFA-HWM-DR-CE-00020**);

b. Eastern section of AAR between new signalised junctions with Frank Lester Way and Eaton Green Road (drawings **LLADCO-3C-ARP-SFA-HWM-DR-CE-00021** and **LLADCO-3C-ARP-SFA-HWM-DR-CE-00022**);

c. M1 Junction 10 improvements and widening works (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-00024** and **LLADCO-3C-ARP-SFA-HWM-DR-CE-00025**);

d. A1081 New Airport Way/A1081 London Road (south) part-time signalisation (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-00017**);

e. A1081 New Airport Way/A505 Kimpton Road/Vauxhall Way junction improvement (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-00016**);

f. Wigmore Lane/Crawley Green Road and Wigmore Lane/Raynham Way signalisation (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-00012**);

g. Eaton Green Road/Wigmore Lane signalisation (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-00013**);

h. Eaton Green Road/Frank Lester Way signalisation including Frank Lester Way one-way restriction (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-00014**);

i. Windmill Road/St. Mary's Road/Crawley Green Road signalisation (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-00015**);

j. Crawley Green Road/Lalleford Road signalisation (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-00018**);

k. A602 Park Way/A505 Upper Tilehouse Street junction improvements (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-0027**);

l. A505 Moormead Hill/B655 Pirton Road/Upper Tilehouse Street junction improvements (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-0026**); and

m. A602 Park Way/Stevenage Road junction improvements (drawing **LLADCO-3C-ARP-SFA-HWM-DR-CE-0028**).

Assessment Phase 2b (2043)

10.3.6 The Assessment Phase 2b scheme includes the airport expansion to 32 mppa and the following associated mitigation measures (in addition to the Assessment Phase 1 and Assessment Phase 2a measures):

a. Completed AAR including upgraded junctions with Provost Way/Percival Way and Frank Lester Way (drawings **LLADCO-3C-ARP-SFA-HWM-DR-CE-00031** and **LLADCO-3C-ARP-SFA-HWM-DR-CE-00032**); and

b. M1 Junction 10 improvements and widening works (drawings **LLADCO-3C-ARP-SFA-HWM-DR-CE-00029** and **LLADCO-3C-ARP-SFA-HWM-DR-CE-00030**).

10.3.7 The outputs from the CBLTM-LTN and Vissim model for the 2027, 2039 and 2043 with Proposed Development scenario are summarised in the following sections.

CBLTM-LTN

2027 with Assessment Phase 1

Link flows

10.3.8 The 2027 with Assessment Phase 1 traffic flows for selected locations along the M1 corridor are shown in **Table 10.50**.

Table 10.50: 2027 with Assessment Phase 1 traffic flows (vehicles) at selected locations along M1 – change compared to 2027 Future Baseline shown in brackets

Location	Direction	AM peak hour (08:00-09:00)	PM peak hour (17:00-18:00)
M1 J9 & J10	Northbound	6,197 (0.7%)	7,016 (1.1%)
	Southbound	6,364 (0.0%)	6,429 (-0.2%)
M1 within J10	Northbound	4,620 (-0.2%)	5,509 (0.8%)
	Southbound	4,982 (0.0%)	4,730 (0.0%)
M1 J10 & J11	Northbound	5,371 (-0.1%)	6,868 (0.6%)
	Southbound	6,629 (0.2%)	5,804 (0.2%)
M1 J10 Off-Slip	Northbound	1,576 (3.2%)	1,506 (2.1%)
M1 J10 On-Slip	Northbound	751 (0.5%)	1,358 (-0.1%)
M1 J10 Off-Slip	Southbound	1,647 (1.0%)	1,074 (1.1%)
M1 J10 On-Slip	Southbound	1,381 (0.0%)	1,699 (-0.7%)

10.3.9 **Table 10.50** shows that the impact on M1 traffic flows as a result of Assessment Phase 1 of the Proposed Development is small in the 2027 AM and PM peak hour. The impact on the M1 mainline is less than 1% in both peaks. The largest increase occurs on the northbound off-slip, where the impact is 3.2% (49 vehicles) in the AM peak and 2.1% (31 vehicles) in the PM peak.

10.3.10 The 2027 with Assessment Phase 1 traffic flows for selected non-M1 locations are shown in **Table 10.51**.

Table 10.51: 2027 with Assessment Phase 1 traffic flows (vehicles) at selected non-M1 locations – change compared to 2027 Future Baseline shown in brackets

Location	Direction	AM peak hour (08:00-09:00)	PM peak hour (17:00-18:00)
A1081, between Capability Green and B653 Gipsy Lane	Eastbound	2,558 (4.8%)	2,700 (5.6%)
	Westbound	2,782 (0.3%)	2,567 (0.7%)
A505 Kimpton Road	Eastbound	464 (-16.1%)	736 (-19.6%)
	Westbound	915 (-4.6%)	500 (-17.6%)
A505 Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	926 (9.8%)	1,441 (7.8%)
	Southbound	1,668 (5.0%)	1,213 (4.5%)
A505 Beech Hill, between Great Marlings and slip road to Lilley Bottom	Eastbound	928 (-0.4%)	1,355 (-2.2%)
	Westbound	1,525 (-0.4%)	1,013 (-2.0%)
Eaton Green Road, east of Colwell Rise	Eastbound	251 (12.6%)	256 (14.1%)
	Westbound	233 (-1.6%)	172 (1.7%)
B653 Lower Harpenden Road, south of A1081	Northbound	731 (0.4%)	866 (5.5%)
	Southbound	734 (-3.7%)	678 (-2.3%)
A1081 London Road, between Half Moon Lane and Kinsbourne Green Lane	Northbound	915 (-2.4%)	888 (-2.5%)
	Southbound	957 (1.0%)	1,317 (5.1%)

10.3.11 **Table 10.51** shows that the impact of Assessment Phase 1 of the Proposed Development on non-M1 locations is quite variable, with a reduction of almost 20% on the A505 Kimpton Road (eastbound) in the PM peak and an increase of 14.1% on Eaton Green Road (eastbound) in the PM peak. The highest percentage impacts are partly due to the lower baseline flows on these links. However, the reduction in traffic on Kimpton Road would amount to 286 vehicles (two way) in the PM peak. There is also a decrease on the A505 Beech Hill.

10.3.12 Generally, there are increases in traffic on the A1081 New Airport Way, A505 Vauxhall Way, Eaton Green Road, the B653 Lower Harpenden Road (PM peak) and the A1081 London Road (PM peak). The highest increases in traffic volumes

as a result of the Proposed Development were on the A1081 New Airport Way (161 vehicles in PM peak) and the A505 Vauxhall Way (162 vehicles in the AM peak).

Link based V/C

10.3.13 The 2027 with Assessment Phase 1 link-based V/C is shown in **Figure 10.11** for the simulation network and **Figure 10.12** for the LBC area.

Figure 10.11: 2027 with Assessment Phase 1 link-based V/C – simulation network

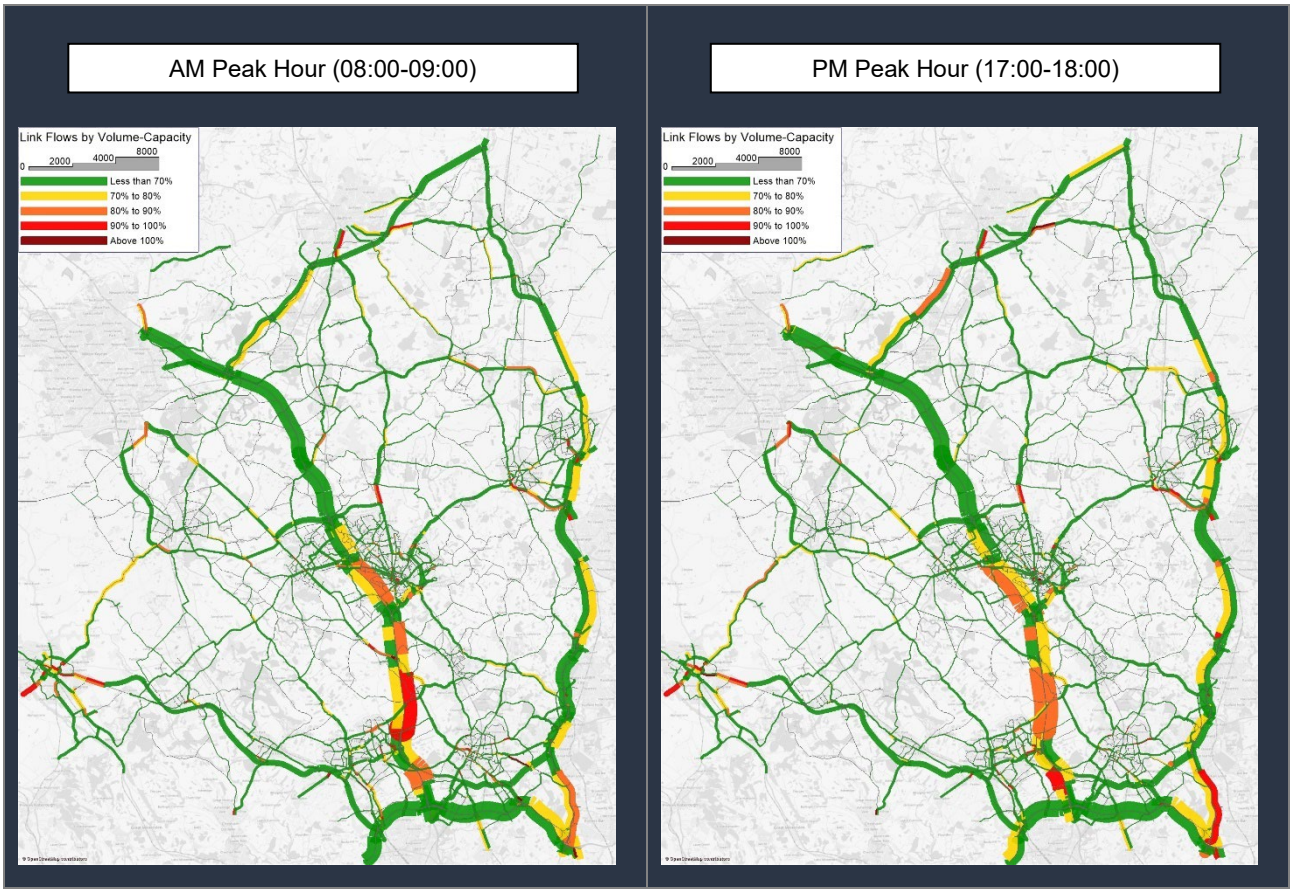
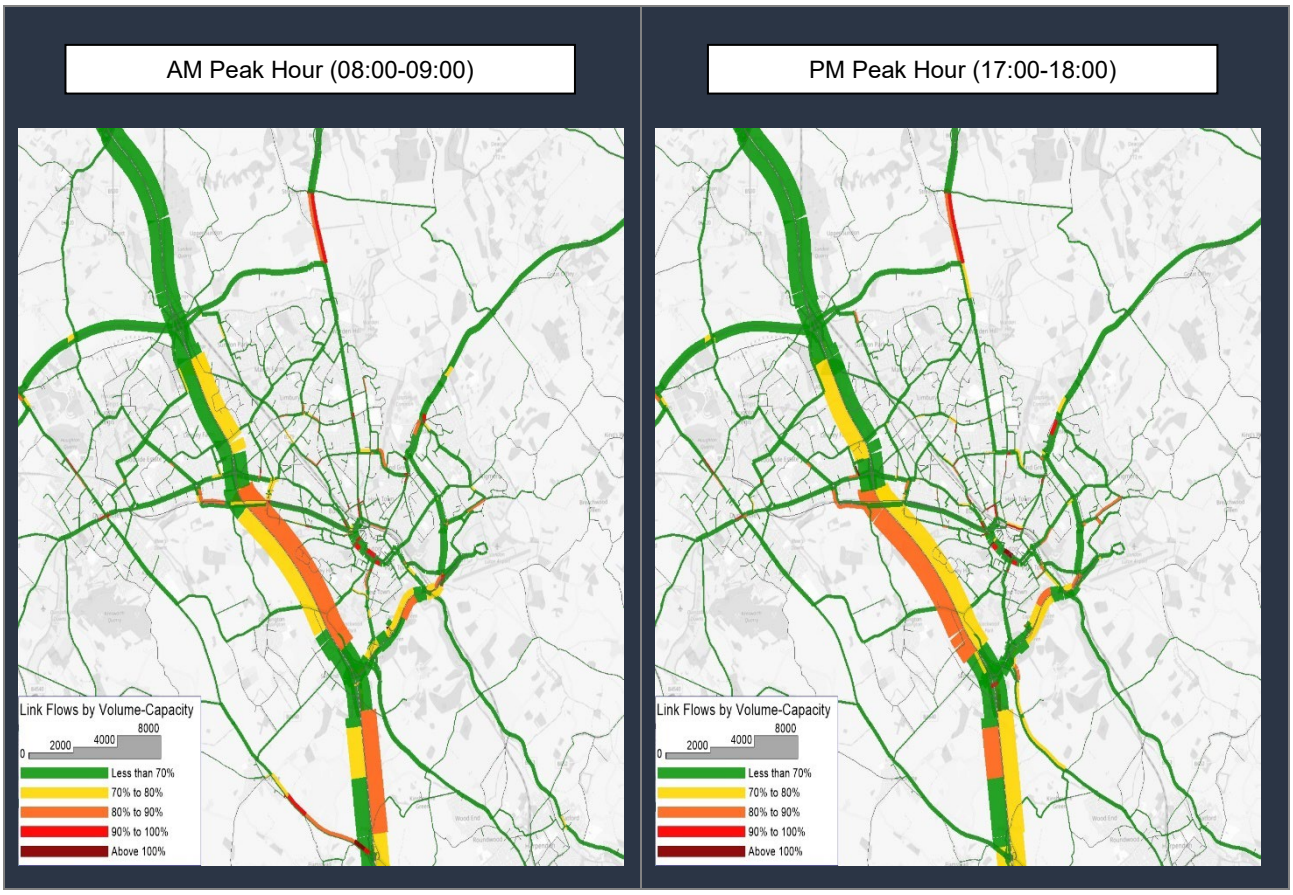


Figure 10.12: 2027 with Assessment Phase 1 link-based V/C – Luton Borough Council area



10.3.14 The V/C outside the LBC area is generally similar to the 2027 Future Baseline in the AM and PM peak, which indicates that the impact of Assessment Phase 1 of the Proposed Development is limited to the local area around the airport.

10.3.15 In the LBC area, the V/C is also generally similar to the 2027 Future Baseline but there are short sections of the eastbound carriageway of the A1081 New Airport Way on approach to the Kimpton Road/Vauxhall Way/Airport Way junction where the V/C would be higher as a result of the Proposed Development in the AM and PM peak. The link would however still operate within its capacity.

2039 with Assessment Phase 2a

Link flows

10.3.16 The 2039 with Assessment Phase 2a traffic flows for selected locations along the M1 corridor are shown in **Table 10.52**.

Table 10.52: 2039 with Assessment Phase 2a traffic flows (vehicles) at selected locations along M1 – change compared to 2039 Future Baseline shown in brackets

Location	Direction	AM peak hour (08:00-09:00)	PM peak hour (17:00-18:00)
M1 J9 & J10	Northbound	6,877 (1.0%)	7,276 (-0.2%)
	Southbound	6,778 (1.1%)	7,530 (10.0%)
M1 within J10	Northbound	5,085 (-0.9%)	5,737 (-1.3%)
	Southbound	5,292 (-0.6%)	4,924 (-4.3%)
M1 J10 & J11	Northbound	5,996 (0.7%)	7,295 (1.4%)
	Southbound	7,116 (-0.2%)	6,153 (-2.4%)
M1 J10 Off-Slip	Northbound	1,792 (6.7%)	1,538 (3.8%)
M1 J10 On-Slip	Northbound	911 (10.5%)	1,558 (12.7%)
M1 J10 Off-Slip	Southbound	1,825 (1.0%)	1,229 (5.9%)
M1 J10 On-Slip	Southbound	1,486 (7.8%)	2,606 (53.2%)

10.3.17 **Table 10.52** shows that the impact on the M1 mainline is small in the AM peak with a maximum increase of 1.1%. In the PM peak, the increase on the M1 mainline is also small except on the southbound carriageway between junctions 9 and 10, where the increase is 10% (684 vehicles).

10.3.18 At junction 10 the largest flow increase is on the M1 southbound on-slip, where the impact is over 50% (905 vehicles) in the PM peak. There are also increases of more than 10% on the M1 northbound on-slip in the AM and PM peak hour.

10.3.19 The 2039 with Assessment Phase 2a traffic flows for selected non-M1 locations are shown in **Table 10.53.**

Table 10.53: 2039 with Assessment Phase 2a traffic flows (vehicles) at selected non-M1 locations – change compared to 2039 Future Baseline shown in brackets

Location	Direction	AM peak hour (08:00-09:00)	PM peak hour (17:00-18:00)
A1081, between Capability Green and B653 Gipsy Lane	Eastbound	2,874 (8.9%)	2,786 (6.4%)
	Westbound	2,970 (4.0%)	3,150 (17.2%)
A505 Kimpton Road	Eastbound	608 (-11.3%)	831 (-24.0%)
	Westbound	1,263 (-0.4%)	678 (-11.2%)
A505 Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	1,073 (19.1%)	1,561 (12.2%)
	Southbound	1,750 (3.0%)	1,477 (23.1%)
A505 Beech Hill, between Great Marlings and slip road to Lilley Bottom	Eastbound	994 (0.3%)	1,502 (0.2%)
	Westbound	1,692 (1.6%)	1,219 (9.5%)
Eaton Green Road, east of Colwell Rise	Eastbound	219 (-14.5%)	281 (13.8%)
	Westbound	413 (34.2%)	213 (6.2%)
B653 Lower Harpenden Road, south of A1081	Northbound	851 (8.1%)	940 (8.8%)
	Southbound	778 (-4.4%)	765 (-6.1%)
A1081 London Road, between Half Moon Lane and Kinsbourne Green Lane	Northbound	991 (-3.5%)	954 (-3.9%)
	Southbound	1,087 (-1.0%)	1,094 (-21.2%)

10.3.20 The table shows that the impact of Assessment Phase 2a of the Proposed Development on non-M1 locations is quite variable, with a reduction of 24% on the A505 Kimpton Road (eastbound) in the PM peak and an increase of 34.1% on Eaton Green Road (westbound) in the AM peak. Like in Assessment Phase 1, the highest percentage impacts are on the links with the lowest baseline flows. However, the reduction in traffic on Kimpton Road would amount to 348 vehicles (two way) in the PM peak. The A1081 London Road would also experience a decrease in traffic.

10.3.21 Generally, there are increases in traffic on the A1081 New Airport Way, A505 Vauxhall Way, A505 Beech Hill, Eaton Green Road and the B653 Lower

Harpenden Road. The highest increases in traffic volumes as a result of the Proposed Development were on the A1081 New Airport Way (629 vehicles in PM peak) and the A505 Vauxhall Way (447 vehicles in the PM peak).

Link based V/C

10.3.22 The 2039 with Phase 2a link based V/C is shown in **Figure 10.13** for the simulation network and **Figure 10.14** for the LBC area.

Figure 10.13: 2039 with Assessment Phase 2a link based V/C – simulation network

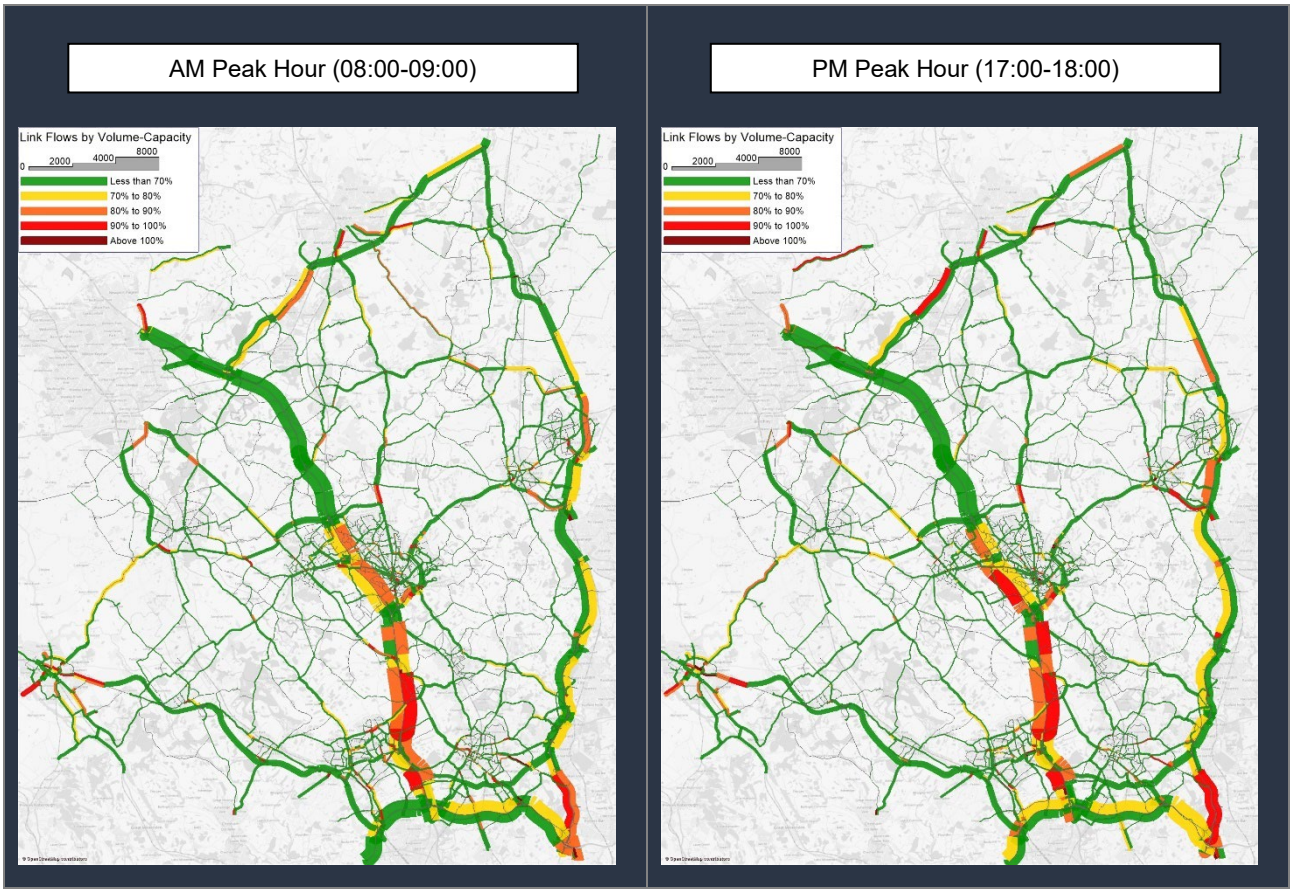
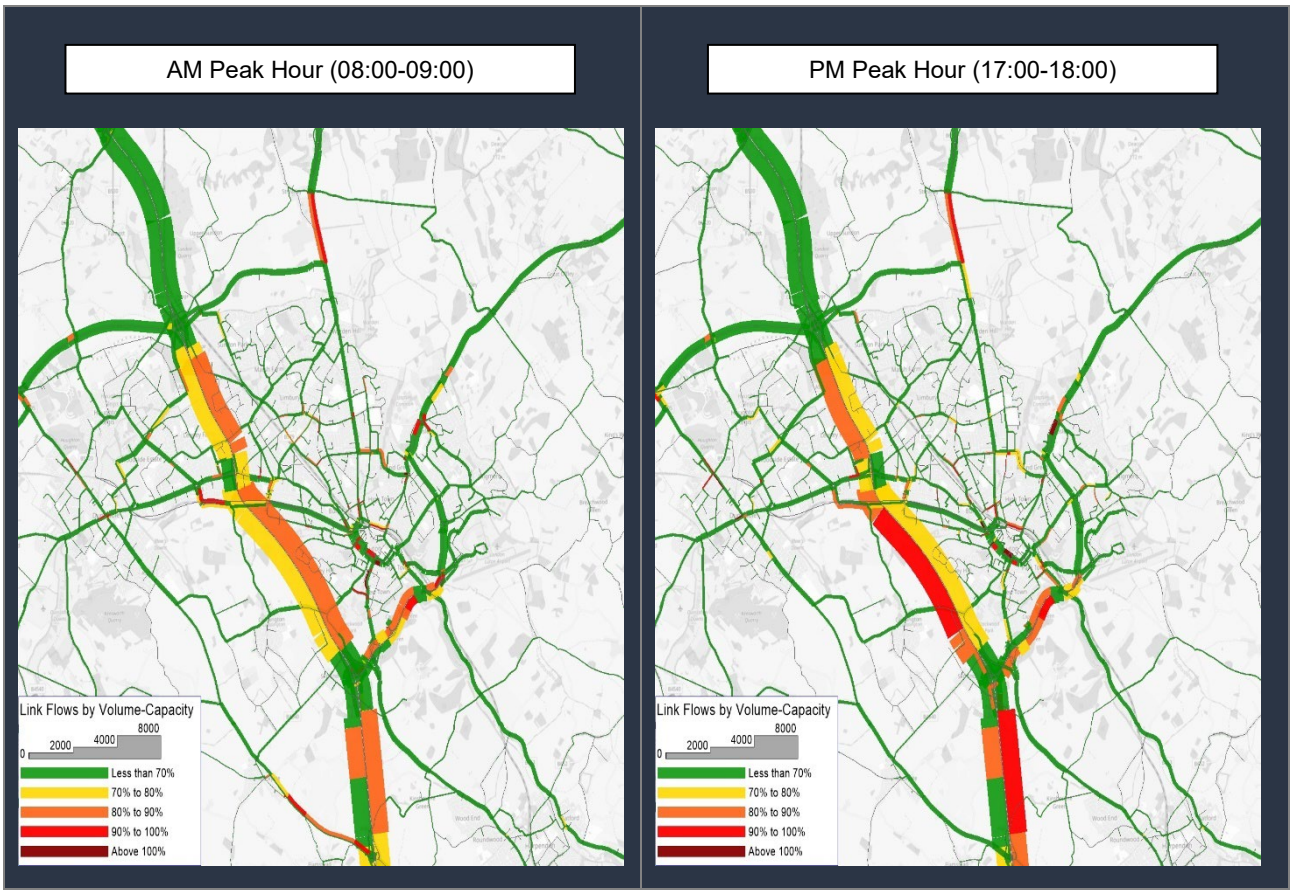


Figure 10.14: 2039 with Assessment Phase 2a link based V/C – Luton Borough Council area



10.3.23 The V/C outside the LBC area is generally similar to the 2039 Future Baseline in the AM and PM peak, which indicates that the impact of Phase 2a of the Proposed Development is limited to the local area around the airport.

10.3.24 In the LBC area, the V/C is also generally similar to the 2039 Future Baseline but there are short sections of the A1081 New Airport Way where the V/C has increased and is approaching its capacity in the AM and PM peak. In addition, in the PM peak, the Proposed Development results in the M1 northbound carriageway between junctions 10 and 11 and the southbound carriageway between junctions 9 and 10 approaching their link capacity. The M1 would nevertheless continue to operate within its capacity.

10.3.25 The B653 Gipsy Lane also has an increased V/C between the A1081 and Kimpton Road, in the PM peak. Eaton Green Road, between Frank Lester Way and Wigmore Lane would have improved performance as a result of the AAR compared to the 2039 Future Baseline.

2043 with Assessment Phase 2b

Link flows

10.3.26 The 2043 with Assessment Phase 2b traffic flows for selected locations along the M1 corridor are shown in **Table 10.54**.

Table 10.54: 2043 with Assessment Phase 2b traffic flows (vehicles) at selected locations along M1 – change compared to 2043 Future Baseline shown in brackets

Location	Direction	AM peak hour (08:00-09:00)	PM peak hour (17:00-18:00)
M1 J9 & J10	Northbound	7,145 (2.4%)	7,678 (0.5%)
	Southbound	7,080 (0.8%)	7,948 (2.1%)
M1 within J10	Northbound	5,169 (-2.0%)	6,078 (-0.2%)
	Southbound	5,419 (-0.1%)	5,110 (-0.9%)
M1 J10 & J11	Northbound	6,151 (-0.2%)	7,631 (0.4%)
	Southbound	7,339 (0.5%)	6,256 (-1.1%)
M1 J10 Off-Slip	Northbound	1,976 (15.8%)	1,600 (3.5%)
M1 J10 On-Slip	Northbound	982 (10.3%)	1,553 (3.0%)
M1 J10 Off-Slip	Southbound	1,919 (2.2%)	1,146 (-1.8%)
M1 J10 On-Slip	Southbound	1,661 (3.8%)	2,839 (8.0%)

10.3.27 **Table 10.54** shows that the impact on the M1 mainline is relatively small in the AM and PM peak with a maximum increase of 2.4%.

10.3.28 At Junction 10 the largest flow increase is on the M1 northbound off-slip, where the impact is 15.8% (269 vehicles) in the AM peak. There is also an increase of c.10% on the M1 northbound on-slip in the AM peak hour.

Table 10.55: 2043 with Assessment Phase 2b traffic flows (vehicles) at selected non-M1 locations – change compared to 2043 Future Baseline shown in brackets

Location	Direction	AM peak hour (08:00-09:00)	PM peak hour (17:00-18:00)
A1081, between Capability Green and B653 Gipsy Lane	Eastbound	3,037 (14.2%)	2,855 (8.7%)
	Westbound	3,100 (5.7%)	3,337 (12.2%)
A505 Kimpton Road	Eastbound	606 (-13.3%)	867 (-26.1%)
	Westbound	1,283 (-1.2%)	708 (-9.4%)
A505 Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	1,061 (18.5%)	1,575 (12.7%)
	Southbound	1,858 (6.6%)	1,556 (21.1%)
A505 Beech Hill, between Great Marlings and slip road to Lilley Bottom	Eastbound	999 (1.7%)	1,532 (0.8%)
	Westbound	1,759 (3.4%)	1,237 (2.0%)
Eaton Green Road, east of Colwell Rise	Eastbound	290 (4.3%)	442 (84.6%)
	Westbound	481 (41.8%)	223 (5.3%)
B653 Lower Harpenden Road, south of A1081	Northbound	888 (9.7%)	964 (11.3%)
	Southbound	743 (-9.7%)	758 (3.3%)
A1081 London Road, between Half Moon Lane and Kinsbourne Green Lane	Northbound	1,038 (-1.5%)	949 (-10.3%)
	Southbound	1,031 (3.7%)	1,093 (8.6%)

10.3.29 **Table 10.55** shows that the impact of Assessment Phase 2b of the Proposed Development on non-M1 locations is quite variable, with a reduction of 26.1% on the A505 Kimpton Road (eastbound) in the PM peak and an increase of 84.6% on Eaton Green Road (eastbound) in the PM peak. Like in Assessment Phase 1 and Assessment Phase 2a, the highest percentage impacts are on the links with the lowest baseline flows. However, the reduction in traffic on Kimpton Road would amount to 379 vehicles (two way) in the PM peak.

10.3.30 Generally, there are increases in traffic on the A1081 New Airport Way, A505 Vauxhall Way, A505 Beech Hill, Eaton Green Road, the B653 Lower Harpenden Road (PM peak) and the A1081 London Road (AM peak). The highest increases

in traffic volumes as a result of the Proposed Development were on the A1081 New Airport Way (591 vehicles in PM peak) and the A505 Vauxhall Way (449 vehicles in PM peak).

Link based V/C

10.3.31 The 2043 with Assessment Phase 2b link based V/C is shown in **Figure 10.15** for the simulation network and **Figure 10.16** for the LBC area.

Figure 10.15: 2043 with Assessment Phase 2b link based V/C – simulation network

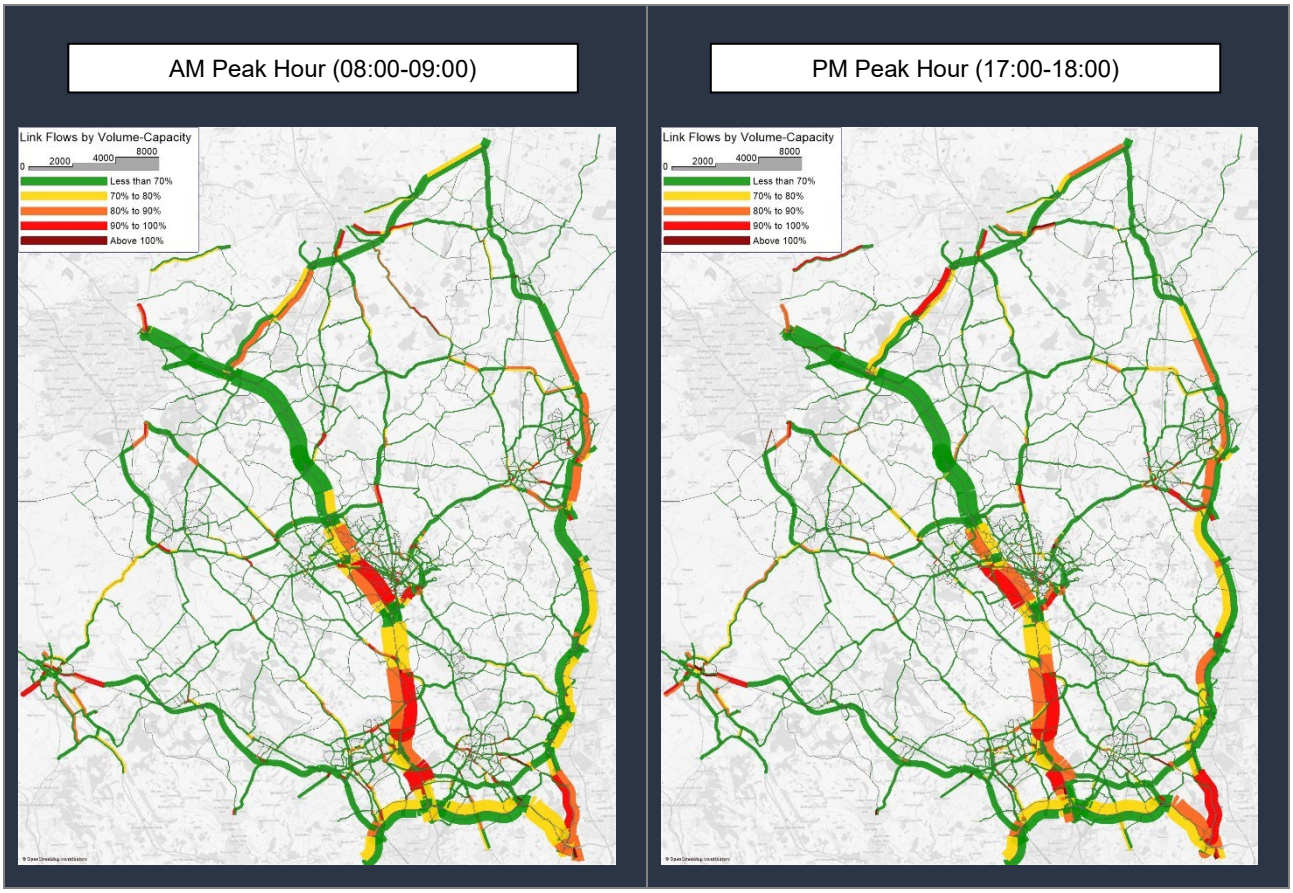
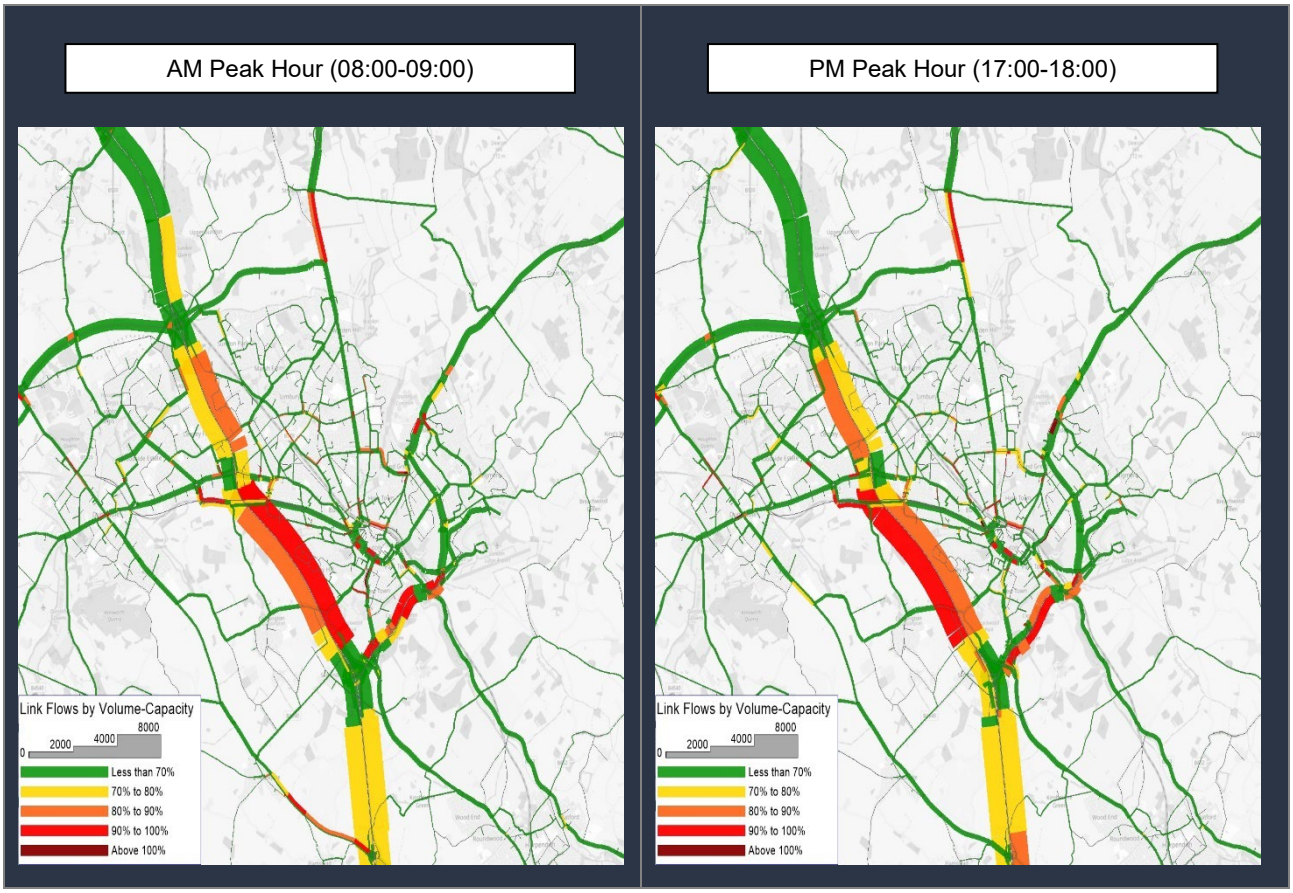


Figure 10.16: 2043 with Phase 2b link based V/C – Luton Borough Council area



10.3.32 The V/C outside the LBC area is generally similar to the 2043 Future Baseline in the AM and PM peak, which indicates that the impact of Assessment Phase 2b of the Proposed Development is limited to the local area around the airport.

10.3.33 In the LBC area, the V/C is also generally similar to the 2043 Future Baseline but there are longer sections of the A1081 New Airport Way where the V/C has increased and is approaching its capacity in the AM and PM peak. Similar to 2039 with Phase 2a, the B653 Gipsy Lane has an increased V/C between the A1081 and Kimpton Road in the PM peak. Eaton Green Road, which was approaching capacity between Frank Lester Way and Wigmore Lane in the 2043 Future Baseline, would have improved performance as a result of the completion of the AAR.

Summary of CBLTM-LTN with Proposed Development modelling

10.3.34 The three Assessment Phases and the associated mitigation measures have been tested in the CBLTM-LTN strategic model to consider the impacts of the Proposed Development across the wider area. The strategic modelling outputs indicate that the three Assessment Phases of the Proposed Development have a minimal impact on traffic flows and operation of the highway network outside the local area, with local area impacts considered in the Vissim model.

10.3.35 The percentage impacts on the M1 traffic volumes between junctions 9 and 11 are generally small and the M1 highway links would operate within their capacity in the future years with the Proposed Development in place. There would be more substantial increase in traffic on the slip roads at junction 10 and the operation impacts of this are considered in detail in the Vissim modelling.

10.3.36 Impacts on the local highway links are quite variable. In general, there is a decrease in traffic on the A505 Kimpton Road and an increase in traffic on the A1081 New Airport Way, A505 Vauxhall Way and Eaton Green Road in all the future years. The highest increases in traffic volumes are on the A1081 New Airport Way and the A505 Vauxhall Way. The V/C indicates that the highway links would operate within their capacity with little change from the Future Baseline. The AAR in Assessment Phase 2a and 2b would reduce traffic on Eaton Green Road between Frank Lester Way and Wigmore Lane improving its operation relative to the future baseline.

Vissim modelling

10.3.37 This section of the report considers the operational impacts in and around Luton and compares the Future Baseline without the Proposed Development with the Future Baseline with the Proposed Development and associated mitigation included for each Assessment Phase of development.

Assessment Phase 1 (2027)

Network performance

10.3.38 **Table 10.56** summarises the network performance statistics for the AM peak in Assessment Phase 1 for the future baseline and with the Proposed Development.

Table 10.56: 2027 AM Peak network statistics Assessment Phase 1 (future baseline and with the Proposed Development)

Parameter	Future Baseline	with Assessment Phase 1
Average Delay Time per Vehicle (seconds), All Vehicle Types	140	157
Average Number of Stops per Vehicles, All Vehicle Types	7	7
Average Speed (mph), All Vehicle Types	23	22
Average Stopped Delay per Vehicle (seconds), All Vehicle Types	49	60
Number of Unreleased Vehicles	298	559

10.3.39 **Table 10.56** shows that in Assessment Phase 1 with the Proposed Development there would be a small increase in average delays, but this would not significantly affect average travel speeds in the AM peak hour.

10.3.40 **Table 10.57** summarises the network performance statistics for the PM peak in Assessment Phase 1 for the future baseline and with the Proposed Development.

Table 10.57: 2027 PM Peak network statistics Assessment Phase 1 (future baseline and with the Proposed Development)

Parameter	Future Baseline	with Assessment Phase 1
Average Delay Time per Vehicle (seconds), All Vehicle Types	838	100
Average Number of Stops per Vehicles, All Vehicle Types	9	4
Average Speed (mph), All Vehicle Types	7	29
Average Stopped Delay per Vehicle (seconds), All Vehicle Types	757	37
Number of Unreleased Vehicles	12,536	1,015

10.3.41 **Table 10.57** shows that in Assessment Phase 1 with the Proposed Development there would be significant improvement in the network performance in the PM peak hour. This is as a consequence of the mitigation measures included within Assessment Phase 1 which improve the function of the network particularly around M1 Junction 10.

Journey times

10.3.42 **Table 10.58** summarises the modelled journey times for the AM peak in Assessment Phase 1 for the future baseline and with the Proposed Development.

Table 10.58: 2027 AM Peak journey times in seconds in Assessment Phase 1 (future baseline and with the Proposed Development)

Route	Future Baseline	with Assessment Phase 1
Luton Town Centre (G) to Existing Terminal Area (I)	354	422
Existing Terminal Area (I) to Luton Town Centre (G)	457	489

Route	Future Baseline	with Assessment Phase 1
Vauxhall Way north of Crawley Green Road (H) to Existing Terminal Area (I)	261	376
Existing Terminal Area (I) to Vauxhall Way north of Crawley Green Road (H)	277	339
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Existing Terminal Area (I)	178	208
Existing Terminal Area (I) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	523	481
A1081 London Road (E) close to Beech Tree Drive to Existing Terminal Area (I)	517	505
Existing Terminal Area (I) to A1081 London Road (E) close to Beech Tree Drive	427	462
M1 Junction 10 North off slip (B) to Existing Terminal Area (I)	293	297
Existing Terminal Area (I) to M1 Junction 10 North on slip (A)	529	531
M1 Junction 10 South off slip (C) to Existing Terminal Area (I)	355	358
Existing Terminal Area (I) to M1 Junction 10 South on slip (D)	760	781

10.3.43 **Table 10.58** shows that AM peak hour journey times would be generally longer with the Proposed Development in Assessment Phase 1 however the increases are not considered to be substantial. The journey time on the main access route to and from the M1 motorway would be largely unchanged.

10.3.44 **Table 10.59** summarises the modelled journey times for the PM peak in Assessment Phase 1 for the future baseline and with the Proposed Development.

Table 10.59: 2027 PM Peak journey times in seconds in Assessment Phase 1 (future baseline and with the Proposed Development)

Route	Future Baseline	with Assessment Phase 1
Luton Town Centre (G) to Existing Terminal Area (I)	369	435
Existing Terminal Area (I) to Luton Town Centre (G)	685	459
Vauxhall Way north of Crawley Green Road (H) to Existing Terminal Area (I)	366	341
Existing Terminal Area (I) to Vauxhall Way north of Crawley Green Road (H)	441	360
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Existing Terminal Area (I)	370	224
Existing Terminal Area (I) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	689	454
A1081 London Road (E) close to Beech Tree Drive to Existing Terminal Area (I)	528	437
Existing Terminal Area (I) to A1081 London Road (E) close to Beech Tree Drive	1,108	372
M1 Junction 10 North off slip (B) to Existing Terminal Area (I)	661	307
Existing Terminal Area (I) to M1 Junction 10 North on slip (A)	1,321	376
M1 Junction 10 South off slip (C) to Existing Terminal Area (I)	667	384

Route	Future Baseline	with Assessment Phase 1
Existing Terminal Area (I) to M1 Junction 10 South on slip (D)	1,187	406

10.3.45 **Table 10.59** shows that with the Proposed Development in Assessment Phase 1 there would be significant improvement in journey times between the airport and the M1 motorway in the PM peak hour. This is as a consequence of the benefits of the Assessment Phase 1 associated mitigation measures at M1 Junction 10 which not only mitigate the impact of the Proposed Development but would substantially improve journey times for all traffic using the junction.

Junction modelling

10.3.46 **Table 10.60** summarises the future baseline and the Proposed Development junction performance for M1 Junction 10 in the AM and PM peak hours in Assessment Phase 1.

Table 10.60: 2027 M1 Junction 10 (1) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
M1 southbound off-slip	1,428	81	1,452	1,733	3	60
A1081 New Airport Way	1,956	624	1,219	2,009	377	1,103
M1 northbound off-slip	1,979	129	788	2,155	30	106
Average delay (seconds)	48			34		
Level of Service (LoS)	D			C		
PM Peak						
M1 southbound off-slip	147	728	2,010	1,352	18	101

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
A1081 New Airport Way	788	1,196	1,219	3,969	313	1,105
M1 northbound off-slip	405	1,410	2,010	2,012	55	161
Average delay (seconds)	36			14		
Level of Service (LoS)	D			B		

10.3.47 **Table 10.60** shows that with the Proposed Development in Assessment Phase 1 the junctions' performance would be significantly improved particularly in the PM peak hour. The improvements are attributed to the mitigation measures at M1 Junction 10 which improve the capacity and function of the junction.

10.3.48 **Table 10.61** summarises the future baseline and the Proposed Development junction performance for the A1081 New Airport Way / London Road (north) roundabout in the AM and PM peak hours in Assessment Phase 1.

Table 10.61: 2027 A1081 New Airport Way / London Road (north) roundabout (2) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
London Road (north)	851	57	203	760	55	203
A1081 New Airport Way	960	288	1219	1093	75	442
London Road (south)	834	237	591	901	45	493
Newlands Park Access	66	0	12	66	2	21
Average delay (seconds)	43			49		
Level of Service	E			D		

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
PM Peak						
London Road (north)	761	7	128	718	1	57
A1081 New Airport Way	691	2	65	951	32	226
London Road (south)	787	7	144	590	4	67
Newlands Park Access	377	0	20	376	14	81
Average delay (seconds)	61			35		
Level of Service	F			C		

10.3.49 **Table 10.61** shows that with the Proposed Development in Assessment Phase 1 the junction's performance would be significantly improved particularly in the PM peak hour. The improvements are attributed in particular to the mitigation measures at the junction itself and to M1 Junction 10 which improve the operation of the junction.

10.3.50 **Table 10.62** summarises the future baseline and the Proposed Development junction performance for the A1081 New Airport Way/A1081 London Road (south) roundabout in the AM and PM peak hours in Assessment Phase 1.

Table 10.62: 2027 A1081 New Airport Way/A1081 London Road (south) roundabout (3) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
London Road (north)	685	158	603	593	284	633
A1081 New Airport Way	742	15	256	856	31	311

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
London Road (south)	1,032	35	210	939	79	329
Average delay (seconds)	39			68		
Level of Service	E			F		
PM Peak						
London Road (north)	144	592	630	798	158	538
A1081 New Airport Way	209	0	15	998	6	177
London Road (south)	475	200	327	1175	2	79
Average delay (seconds)	82			24		
Level of Service	F			C		

10.3.51 **Table 10.62** shows that with the Proposed Development in Assessment Phase 1 there would be an increase in delay at the junction in the AM peak hour however the performance of the junction would be significantly improved in the PM peak hour. The improvements are attributed in particular to the mitigation measures at M1 Junction 10 and the A1081 New Airport Way/London Road (north) roundabout particularly in the PM peak hour.

10.3.52 **Table 10.63** summarises the future baseline and Proposed Development junction performance for the A1081 New Airport Way/B653/Gipsy Lane network of junctions in the AM and PM peak hours in Assessment Phase 1.

Table 10.63: 2027 A1081 New Airport Way/B653/Gipsy Lane junctions (4) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Gipsy Lane	931	7	97	1016	22	193
Parkway Road	96	0	20	97	1	22
B653 Lower Harpenden Road	646	1	47	652	4	83
A1081 New Airport Way (east)	2,413	234	552	2,482	117	542
A1081 New Airport Way (west)	2,437	52	614	2,861	11	181
Average delay (seconds)	24			25		
Level of Service	C			C		
PM Peak						
Gipsy Lane	339	191	271	978	5	82
Parkway Road	73	108	179	216	1	34
B653 Lower Harpenden Road	124	158	177	852	31	174
A1081 New Airport Way (east)	393	517	546	2342	43	224
A1081 New Airport Way (west)	895	135	702	3006	19	294
Average delay (seconds)	136			25		

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Level of Service	F			C		

10.3.53 **Table 10.63** shows that with the Proposed Development in Assessment Phase 1 the junction's performance is significantly improved particularly in the PM peak hour. The improvements are attributed in particular to the mitigation measures at the junctions and to M1 Junction 10.

10.3.54 **Table 10.64** summarises the future baseline and Proposed Development junction performance for the Kimpton Road/A505 Vauxhall Way roundabout in the AM and PM peak hours in Assessment Phase 1.

Table 10.64: 2027 Kimpton Road/A505 Vauxhall Way signalised junction (5) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	1,557	42	329	1,812	268	912
Airport Way (east)	241	8	46	216	8	45
A505 Vauxhall Way (south)	930	17	92	1,157	15	105
Kimpton Way (west)	530	10	71	422	11	68
Average delay (seconds)	26			31		
Level of Service (LoS)	C			C		
PM Peak						

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
A505 Vauxhall Way (north)	353	615	1,031	1,521	41	290
Airport Way (east)	126	601	706	376	28	139
A505 Vauxhall Way (south)	597	25	162	1,650	48	396
Kimpton Way (west)	362	38	106	691	13	99
Average delay (seconds)	78			29		
Level of Service (LoS)	E			C		

10.3.55 **Table 10.64** shows that with the Proposed Development in Assessment Phase 1 development the junction's performance is significantly improved particularly in the PM peak hour. The improvements are attributed in particular to the mitigation measures at the junction itself and to M1 Junction 10 which improve the operation of the junction.

10.3.56 **Table 10.65** summarises the future baseline and Proposed Development junction performance for the A1081 New Airport Way/Percival Way roundabout in the AM and PM peak hours in Assessment Phase 1.

Table 10.65: 2027 A1081 New Airport Way/Percival Way signalised junction (7) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Percival Way	770	6	146	423	58	251
Airport Way (east)	958	7	89	1035	30	120
A1081 New Airport Way	1077	1	39	1174	47	199
Airport Way (west)	236	1	31	232	16	94
Average delay (seconds)	8			36		
Level of Service (LoS)	A			D		
PM Peak						
Percival Way	272	417	908	368	51	202
Airport Way (east)	230	141	199	984	29	106
A1081 New Airport Way	134	125	197	1088	41	169
Airport Way (west)	158	9	39	321	18	108
Average delay (seconds)	61			35		
Level of Service (LoS)	F			C		

10.3.57 **Table 10.65** shows that in the future baseline the junction is forecast to operate with queues and delay in the PM peak hour. To address the Future Baseline issues, the Assessment Phase 1 'with development' scheme includes an improvement to the junction which addresses the Future Baseline issues in the PM peak hour as well as the additional traffic generated by the Phase 1 development. Whilst the performance of the mitigation scheme indicates longer delays in the AM peak hour, overall delays are not considered to be substantial.

Whilst there would be intermittent queues, average queues would be relatively short and would not extend beyond the available link lengths.

10.3.58 **Table 10.66** summarises the future baseline and the Proposed Development junction performance for the Percival Way/Frank Lester Way/President Way roundabout in the AM and PM peak hours in Assessment Phase 1.

Table 10.66: 2027 Percival Way/Frank Lester Way/President Way roundabout (8) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Frank Lester Way	861	8	77	950	16	164
President Way	264	1	22	311	1	21
Airport Approach Road	29	0	11	33	0	9
Percival Way	600	5	130	643	7	157
Average delay (seconds)	7			10		
Level of Service (LoS)	A			A		
PM Peak						
Frank Lester Way	320	28	96	489	2	36
President Way	404	160	541	734	2	56
Airport Approach Road	38	24	114	57	0	11
Percival Way	298	56	175	548	25	242
Average delay (seconds)	6			9		
Level of Service (LoS)	A			A		

10.3.59 **Table 10.66** shows that with the Proposed Development in Assessment Phase 1 the junction would operate with minimal delay and a maximum LoS A. Whilst there would be intermittent queues, average queues would be relatively short and would not extend beyond the available link lengths.

10.3.60 **Table 10.67** summarises the future baseline and the Proposed Development junction performance for the A505 Vauxhall Way/Eaton Green Road revised roundabout in the AM and PM peak hours in Assessment Phase 1.

Table 10.67: 2027 A505 Vauxhall Way/Eaton Green Road revised roundabout (10) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	1,236	10	96	1,192	49	191
Eaton Green Road	724	2	34	1,062	34	326
A505 Vauxhall Way (south)	1,161	5	100	1,292	83	357
Harrowden Road	104	1	17	92	17	75
Average delay (seconds)	7			37		
Level of Service (LoS)	A			D		
PM Peak						
A505 Vauxhall Way (north)	375	92	374	998	29	124
Eaton Green Road	598	134	411	1,244	13	137
A505 Vauxhall Way (south)	801	54	180	2,058	80	320
Harrowden Road	18	4	17	25	2	14

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Average delay (seconds)	8			28		
Level of Service (LoS)	A			C		

10.3.61 **Table 10.67** shows that with the Proposed Development in Assessment Phase 1 development scheme the junction would operate with maximum LoS D. Whilst queues and delays would be extended when compared to the without development scenario, average queues would be relatively short and would not extend beyond the available link lengths.

10.3.62 **Table 10.68** summarises the future baseline and the Proposed Development junction performance for the Eaton Green Road/Frank Lester Way roundabout in the AM and PM peak hours in Assessment Phase 1.

Table 10.68: 2027 Eaton Green Road/Frank Lester Way roundabout (11) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Eaton Green Rd (west)	572	1	58	644	12	158
Eaton Green Rd (east)	1,091	9	140	1,152	37	221
Frank Lester Way	271	1	33	560	4	87
Average delay (seconds)	7			14		
Level of Service (LoS)	A			B		
PM Peak						
Eaton Green Rd (west)	363	37	136	896	182	518

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Eaton Green Rd (east)	513	51	195	687	14	193
Frank Lester Way	520	35	164	1,032	25	217
Average delay (seconds)	8			21		
Level of Service (LoS)	A			C		

10.3.63 **Table 10.68** shows that with the Proposed Development in Assessment Phase 1 the junction would operate with minimal delay and a maximum LoS C. Whilst there would be intermittent queues, average queues would be relatively short and would not extend beyond the available link lengths.

10.3.64 **Table 10.69** summarises the future baseline and the Proposed Development junction performance for the Eaton Green Road/Wigmore Road roundabout in the AM and PM peak hours Assessment Phase 1.

Table 10.69: 2027 Eaton Green Road/Wigmore Road roundabout (12) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane	639	2	63	649	2	65
Wigmore Place	56	0	10	55	0	11
Eaton Green Road (east)	436	1	42	438	2	50
Eaton Green Road (west)	387	1	47	375	1	58
Average delay (seconds)	4			5		

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Level of Service (LoS)	A			A		
PM Peak						
Wigmore Lane	511	3	71	475	31	129
Wigmore Place	194	2	37	146	11	46
Eaton Green Road (east)	391	2	46	299	51	233
Eaton Green Road (west)	742	15	149	291	1	54
Average delay (seconds)	4			7		
Level of Service (LoS)	A			A		

10.3.65 **Table 10.69** shows that with the Proposed Development in Assessment Phase 1 the junction would operate with minimal delay and a maximum LoS A. Whilst there would be intermittent queues, average queues would be relatively short and would not extend beyond the available link lengths.

10.3.66 **Table 10.70** summarises the future baseline and the Proposed Development junction performance for the A505 Vauxhall Way/Crawley Green Road signalised junction in the AM and PM peak hours Assessment Phase 1.

Table 10.70: 2027 A505 Vauxhall Way/Crawley Green Road signalised junction (13) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
A505 Vauxhall Way (north)	955	20	95	993	19	93
Crawley Green Road (east)	667	23	145	688	24	147
A505 Vauxhall Way (south)	809	12	60	843	16	72
Crawley Green Road (west)	967	48	221	990	67	225
Saywell Road	56	0	20	55	1	25
Average delay (seconds)	26			29		
Level of Service (LoS)	C			C		
PM Peak						
A505 Vauxhall Way (north)	770	221	453	1060	19	105
Crawley Green Road (east)	386	131	422	574	37	189
A505 Vauxhall Way (south)	758	71	170	1655	28	109
Crawley Green Road (west)	399	21	150	632	48	215
Saywell Road	24	3	15	19	0	13
Average delay (seconds)	45			30		
Level of Service (LoS)	D			C		

10.3.67 **Table 10.70** shows that with the Proposed Development in Assessment Phase 1 the junction would operate with minimal delay and a maximum LoS C. Whilst there would be intermittent queues, average queues would be relatively short and would not extend beyond the available link lengths.

10.3.68 **Table 10.71** summarises the future baseline and the Proposed Development junction performance for the Crawley Green Road/Wigmore Lane roundabout in the AM and PM peak hours Assessment Phase 1.

Table 10.71: 2027 Crawley Green Road/Wigmore Lane roundabout (14) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	862	2	61	880	3	111
Crawley Green Lane (east)	404	5	67	404	6	76
Wigmore Lane (south)	233	0	22	258	1	29
Crawley Green Lane (west)	506	0	27	516	0	25
Average delay (seconds)	6			7		
Level of Service (LoS)	A			A		
PM Peak						
Wigmore Lane (north)	459	31	167	529	1	37
Crawley Green Lane (east)	236	30	147	273	1	29
Wigmore Lane (south)	598	19	101	772	3	78
Crawley Green Lane (west)	561	3	113	877	10	190

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Average delay (seconds)	5			7		
Level of Service (LoS)	A			A		

10.3.69 **Table 10.71** shows that with the Proposed Development in Assessment Phase 1 the junction would operate with minimal delay and a maximum LoS A.

10.3.70 **Table 10.72** summarises the future baseline and the Proposed Development junction performance for the Windmill Road/Kimpton Road signalised junction in the AM and PM peak hours Assessment Phase 1.

Table 10.72: 2027 Windmill Road/Kimpton Road signalised junction (15) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Windmill Road (north)	983	184	575	1,015	224	548
Kimpton Road	685	42	74	683	51	102
Windmill Road (south)	692	14	120	657	17	148
Average delay (seconds)	19			21		
Level of Service (LoS)	C			C		
PM Peak						
Windmill Road (north)	404	383	563	1,004	352	669
Kimpton Road	290	52	70	592	37	96

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Windmill Road (south)	415	12	94	903	19	161
Average delay (seconds)	22			20		
Level of Service (LoS)	C			B		

10.3.71 In Phase 1, the junction is upgraded to a signalised junction. **Table 10.72** shows that with the Proposed Development in Assessment Phase 1 the junction would operate with minimal delay and a maximum LoS C. Whilst there would be intermittent queues, average queues are relatively short and would not extend beyond the available link lengths.

10.3.72 **Table 10.73** summarises the future baseline and the Proposed Development junction performance for the Eaton Green Road/Lalleford Road signalised junction in the AM and PM peak hours Assessment Phase 1.

Table 10.73: 2027 Eaton Green Road/Lalleford Road signalised junction (16) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Lalleford Road	492	3	61	573	54	228
Eaton Green Road (east)	690	56	261	693	171	485
Eaton Green Road (west)	433	8	102	405	10	90
Average delay (seconds)	17			34		
Level of Service (LoS)	C			C		

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
PM Peak						
Lalleford Road	148	32	182	163	9	60
Eaton Green Road (east)	479	128	538	635	133	460
Eaton Green Road (west)	540	28	202	1,047	59	246
Average delay (seconds)	8			29		
Level of Service (LoS)	A			C		

10.3.73 In the Proposed Development in Assessment Phase 1, the junction is assumed to be upgraded to a signalised junction. The table shows that with the Proposed Development in Assessment Phase 1 the junction would operate with minimal delay and a maximum LoS C. Whilst there would be increases in the average queues, average queues would not extend beyond the available link lengths.

10.3.74 **Table 10.74** summarises the future baseline and the Proposed Development junction performance for the Wigmore Lane/Raynham Way roundabout in the AM and PM peak hours Assessment Phase 1.

Table 10.74: 2027 Wigmore Lane/Raynham Way roundabout (17) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	733	4	102	780	5	115
Twyford Drive	109	1	24	110	1	24

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Wigmore Lane (south)	191	0	20	208	0	25
Raynham Way	123	0	11	125	0	13
Average delay (seconds)	5			5		
Level of Service (LoS)	A			A		
PM Peak						
Wigmore Lane (north)	483	4	73	662	5	87
Twyford Drive	68	5	33	77	0	17
Wigmore Lane (south)	580	15	81	754	3	72
Raynham Way	126	9	50	142	0	22
Average delay (seconds)	4			5		
Level of Service (LoS)	A			A		

10.3.75 **Table 10.74** shows that with the Phase 1 development the junction would operate with minimal delay and a maximum LoS A.

10.3.76 **Table 10.75** summarises the future baseline and the Proposed Development junction performance for the Wigmore Lane/Asda access roundabout in the AM and PM peak hours Assessment Phase 1.

Table 10.75: 2027 Wigmore Lane/Asda access roundabout (18) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	705	5	101	743	5	99
Asda Access	261	1	38	261	1	38
Wigmore Lane (south)	291	0	22	278	0	21
Average delay (seconds)	5			5		
Level of Service (LoS)	A			A		
PM Peak						
Wigmore Lane (north)	469	13	121	641	12	119
Asda Access	562	9	43	656	5	43
Wigmore Lane (south)	419	14	100	628	11	115
Average delay (seconds)	6			9		
Level of Service (LoS)	A			A		

10.3.77 **Table 10.75** shows that with the Proposed Development in Assessment Phase 1 the junction would operate with minimal delay and a maximum LoS A.

10.3.78 **Table 10.76** summarises the future baseline and the Proposed Development junction performance for the Windmill Road/St Mary's Road/Crawley Green Road roundabout in the AM and PM peak hours Assessment Phase 1.

Table 10.76: 2027 Windmill Road/St Mary's Road/Crawley Green Road roundabout (19) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
St Mary's Road	329	9	67	338	8	68
Crawley Green Road	1,036	58	104	1,060	64	104
Windmill Road	861	121	388	894	156	369
A505 Park Viaduct	841	15	94	845	13	81
Average delay (seconds)	43			45		
Level of Service (LoS)	D			D		
PM Peak						
St Mary's Road	221	107	198	479	38	136
Crawley Green Road	412	71	99	789	45	101
Windmill Road	382	36	233	875	95	343
A505 Park Viaduct	371	450	471	1128	163	384
Average delay (seconds)	78			67		
Level of Service (LoS)	E			E		

10.3.79 **Table 10.76** shows that with the Proposed Development in Assessment Phase 1 development the junction would operate with a similar level of delay and a maximum LoS E as in the without Phase 1 scenario.

10.3.80 **Table 10.77** summarises the future baseline and the Proposed Development junction performance for the Crawley Green Road/Lalleford Road roundabout in the AM and PM peak hours Assessment Phase 1.

Table 10.77: 2027 Crawley Green Road/Lalleford Road roundabout (20) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Crawley Green Road (east)	555	0	21	562	1	26
Lalleford Road	232	0	17	240	0	18
Crawley Green Road (west)	520	0	15	640	0	22
Average delay (seconds)	2			2		
Level of Service (LoS)	A			A		
PM Peak						
Crawley Green Road (east)	348	60	257	452	0	31
Lalleford Road	378	67	239	471	1	45
Crawley Green Road (west)	498	1	26	713	0	26
Average delay (seconds)	3			3		
Level of Service (LoS)	A			A		

10.3.81 **Table 10.77** shows that with the Proposed Development in Assessment Phase 1 development the junction would operate with minimal delay and a maximum LoS A.

Assessment Phase 1 Summary

10.3.82 **Table 10.78** summarises the future baseline and the Proposed Development in Assessment Phase 1 junction performance.

Table 10.78: 2027 junction performance summary Assessment Phase 1 (future baseline and with the Proposed Development)

Junction	Level of Service				Average Delays (seconds)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 1	Future Baseline	with Phase 1	Future Baseline	with Phase 1	Future Baseline	with Phase 1
M1 Junction 10 (1)	D	C	D	B	48	34	36	14
A1081 New Airport Way / London Road (north) roundabout (2)	E	D	F	C	43	49	61	35
A1081 New Airport Way / A1081 London Road (south) roundabout (3)	E	F	F	C	39	68	82	24
A1081 New Airport Way / B653 / Gipsy Lane junctions (4)	C	C	F	C	24	25	136	25
Kimpton Road / A505 Vauxhall Way signalised junction (5)	C	C	E	C	26	31	78	29
A1081 New Airport Way / Percival Way signalised junction (7)	A	D	F	C	8	36	61	35

Junction	Level of Service				Average Delays (seconds)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 1	Future Baseline	with Phase 1	Future Baseline	with Phase 1	Future Baseline	with Phase 1
Percival Way / Frank Lester Way / President Way roundabout (8)	A	A	A	A	7	10	6	9
A505 Vauxhall Way / Eaton Green Road revised roundabout (10)	A	D	A	C	7	37	8	28
Eaton Green Road / Frank Lester Way roundabout (11)	A	B	A	C	7	14	8	21
Eaton Green Road / Wigmore Road roundabout (12)	A	A	A	A	4	5	4	7
Vauxhall Way / Crawley Green Road signalised junction (13)	C	D	D	C	26	29	45	30
Crawley Green Road / Wigmore Lane roundabout (14)	A	A	A	A	6	7	5	7
Windmill Road / Kimpton Road signalised junction (15)	C	C	C	B	19	21	22	20
Eaton Green Road / Lalleford Road	C	C	A	C	17	34	8	29

Junction	Level of Service				Average Delays (seconds)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 1	Future Baseline	with Phase 1	Future Baseline	with Phase 1	Future Baseline	with Phase 1
signalised junction (16)								
Wigmore Lane / Raynham Way roundabout (17)	A	A	A	A	5	5	4	5
Wigmore Lane / Asda access roundabout (18)	A	A	A	A	5	5	6	9
Windmill Road / St Mary's Road / Crawley Green Road roundabout (19)	D	D	E	E	43	45	78	67
Crawley Green Road / Lalleford Road roundabout (20)	A	A	A	A	2	2	3	3
Notes: LoS (A): free flow; (B): Stable flow, slight delays; (C): stable flow, acceptable delays; (D): approaching unstable flow, tolerable delays; (E): unstable flow, intolerable delay and long queues; (F): congested, long delays and queues fail to clear.								

10.3.83 **Table 10.78** above shows that in the AM peak the network would generally operate with free flow or stable conditions and broadly similar in Assessment Phase 1 when compared with the future baseline. In the PM peak the network would generally operate with improved conditions in Assessment Phase 1 when compared with the future baseline. The Proposed Development in Assessment Phase 1 and associated junction mitigations are not considered to have a significant adverse impact on the operation of the highway network.

Assessment Phase 2a (2039)

Network performance

10.3.84 **Table** 10.79 summarises the network performance statistics for the AM peak in Assessment Phase 2a for the future baseline and with the Proposed Development.

Table 10.79: 2039 AM Peak network statistics Assessment Phase 2a (future baseline and with the Proposed Development)

Parameter	Future Baseline	with Assessment Phase 2a
Average Delay Time per Vehicle (seconds), All Vehicle Types	156	197
Average Number of Stops per Vehicles, All Vehicle Types	7	9
Average Speed (mph), All Vehicle Types	22	20
Average Stopped Delay per Vehicle (seconds), All Vehicle Types	52	79
Number of Unreleased Vehicles	860	1,826

10.3.85 **Table 10.79** shows that in Assessment Phase 2a with the Proposed Development there would be a small increase in average delays but that this does not significantly affect average travel speeds in the AM peak hour.

10.3.86 **Table 10.80** summarises the network performance statistics for the PM in Assessment Phase 1 for the future baseline and with the Proposed Development.

Table 10.80: 2039 PM Peak network statistics Assessment Phase 2a (future baseline and with the Proposed Development)

Parameter	Future Baseline	with Assessment Phase 2a
Average Delay Time per Vehicle (seconds), All Vehicle Types	942	217
Average Number of Stops per Vehicles, All Vehicle Types	9	9
Average Speed (mph), All Vehicle Types	6	21

Parameter	Future Baseline	with Assessment Phase 2a
Average Stopped Delay per Vehicle (seconds), All Vehicle Types	860	114
Number of Unreleased Vehicles	14,625	2,680

10.3.87 **Table 10.80** shows that in Assessment Phase 2a with the Proposed Development there would be a significant improvement in the network performance in the PM peak hour. This is as a consequence of the additional mitigation measures included at Assessment Phase 2a which build upon the Assessment Phase 1 measures, and which would improve the function of the network particularly around M1 Junction 10.

Journey times

10.3.88 **Table 10.81** summarises the modelled journey times for the AM peak in Assessment Phase 2a for the future baseline and with the Proposed Development. The table also incorporates the new journey times for routes to and from the new terminal.

Table 10.81: 2039 AM Peak journey times in seconds Assessment Phase 2a (future baseline and with the Proposed Development)

Route	Future Baseline	with Assessment Phase 2a
Luton Town Centre (G) to Existing Terminal Area (I)	356	364
Existing Terminal Area (I) to Luton Town Centre (G)	429	423
Vauxhall Way north of Crawley Green Road (H) to Existing Terminal Area (I)	286	319
Existing Terminal Area (I) to Vauxhall Way north of Crawley Green Road (H)	276	368
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Existing Terminal Area (I)	181	248

Route	Future Baseline	with Assessment Phase 2a
Existing Terminal Area (I) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	499	495
A1081 London Road (E) close to Beech Tree Drive to Existing Terminal Area (I)	509	411
Existing Terminal Area (I) to A1081 London Road (E) close to Beech Tree Drive	427	553
M1 Junction 10 North off slip (B) to Existing Terminal Area (I)	286	303
Existing Terminal Area (I) to M1 Junction 10 North on slip (A)	519	560
M1 Junction 10 South off slip (C) to Existing Terminal Area (I)	348	366
Existing Terminal Area (I) to M1 Junction 10 South on slip (D)	773	958
Luton Town Centre (G) to Proposed New Terminal Area (J)	-	444
Proposed New Terminal Area (J) to Luton Town Centre (G)	-	483
Vauxhall Way north of Crawley Green Road (H) to Proposed New Terminal Area (J)	-	321
Proposed New Terminal Area (J) to Vauxhall Way north of Crawley Green Road (H)	-	279
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Proposed New Terminal Area (J)	-	429

Route	Future Baseline	with Assessment Phase 2a
Proposed New Terminal Area (J) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	-	639
A1081 London Road (E) close to Beech Tree Drive to Proposed New Terminal Area (J)	-	607
Proposed New Terminal Area (J) to A1081 London Road (E) close to Beech Tree Drive	-	782
M1 Junction 10 North off slip (B) to Proposed New Terminal Area (J)	-	479
Proposed New Terminal Area (J) to M1 Junction 10 North on slip (A)	-	754
M1 Junction 10 South off slip (C) to Proposed New Terminal Area (J)	-	554
Proposed New Terminal Area (J) to M1 Junction 10 South on slip (D)	-	1,146

10.3.89 **Table 10.81** shows that AM peak hour journey times to the existing terminal area would be generally longer in Assessment Phase 2a however the increases are not considered to be substantial. The largest increase is for outbound trips from the existing terminal area to the M1 southbound of around 3 minutes.

10.3.90 **Table 10.82** summarises the modelled journey times for the PM peak in Assessment Phase 2a for the future baseline and with the Proposed Development.

Table 10.82: 2039 PM Peak journey times in seconds Assessment Phase 2a (future baseline and with the Proposed Development)

Route	Future Baseline	with Assessment Phase 2a
Luton Town Centre (G) to Existing Terminal Area (I)	359	435
Existing Terminal Area (I) to Luton Town Centre (G)	560	455

Route	Future Baseline	with Assessment Phase 2a
Vauxhall Way north of Crawley Green Road (H) to Existing Terminal Area (I)	330	491
Existing Terminal Area (I) to Vauxhall Way north of Crawley Green Road (H)	757	345
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Existing Terminal Area (I)	520	396
Existing Terminal Area (I) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	613	745
A1081 London Road (E) close to Beech Tree Drive to Existing Terminal Area (I)	472	737
Existing Terminal Area (I) to A1081 London Road (E) close to Beech Tree Drive	1,154	784
M1 Junction 10 North off slip (B) to Existing Terminal Area (I)	640	327
Existing Terminal Area (I) to M1 Junction 10 North on slip (A)	1,330	770
M1 Junction 10 South off slip (C) to Existing Terminal Area (I)	651	394
Existing Terminal Area (I) to M1 Junction 10 South on slip (D)	1,175	1,093
Luton Town Centre (G) to Proposed New Terminal Area (J)	-	480
Proposed New Terminal Area (J) to Luton Town Centre (G)	-	494
Vauxhall Way north of Crawley Green Road (H) to Proposed New Terminal Area (J)	-	350

Route	Future Baseline	with Assessment Phase 2a
Proposed New Terminal Area (J) to Vauxhall Way north of Crawley Green Road (H)	-	304
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Proposed New Terminal Area (J)	-	591
Proposed New Terminal Area (J) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	-	812
A1081 London Road (E) close to Beech Tree Drive to Proposed New Terminal Area (J)	-	890
Proposed New Terminal Area (J) to A1081 London Road (E) close to Beech Tree Drive	-	931
M1 Junction 10 North off slip (B) to Proposed New Terminal Area (J)	-	501
Proposed New Terminal Area (J) to M1 Junction 10 North on slip (A)	-	970
M1 Junction 10 South off slip (C) to Proposed New Terminal Area (J)	-	569
Proposed New Terminal Area (J) to M1 Junction 10 South on slip (D)	-	1,038

10.3.91 **Table 10.82** shows that in Assessment Phase 2a there would be a significant improvement journey times to the existing terminal area on a number of routes in the PM peak hour. This is as a consequence of the benefits of the Assessment Phase 2a mitigation measures which would substantially improve journey times for all traffic using the junctions.

Junction modelling

10.3.92

10.3.93 **Table** 10.83 summarises the future baseline and the Proposed Development junction performance for M1 Junction 10 in the AM and PM peak hours in Assessment Phase 2a.

Table 10.83: 2039 M1 Junction 10 (1) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
M1 southbound off-slip	1,402	81	1,477	1,697	24	592
A1081 New Airport Way	1,913	657	1,220	1,897	652	1,074
M1 northbound off-slip	1,907	103	665	2,121	32	111
Average delay (seconds)	49			47		
Level of Service (LoS)	D			D		
PM Peak						
M1 southbound off-slip	77	808	2,010	1,398	4	71
A1081 New Airport Way	606	1,199	1,219	3,534	905	1,075
M1 northbound off-slip	295	1,562	2,010	1,962	31	128
Average delay (seconds)	35			32		
Level of Service (LoS)	C			C		

10.3.94 **Table 10.83** shows that with the Proposed Development in Assessment Phase 2a the junction would continue to operate with similar levels of delay and LoS. Queues and throughput would be substantially improved, and this is attributed to the mitigation measures at M1 Junction 10 which improve the capacity and function of the junction.

10.3.95 **Table 10.84** summarises the future baseline and the Proposed Development junction performance for the A1081 New Airport Way/London Road (north) roundabout in the AM and PM peak hours in Assessment Phase 2a.

Table 10.84: 2039 A1081 New Airport Way/London Road (north) roundabout (2) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
London Road (north)	842	62	203	685	65	204
A1081 New Airport Way	930	278	1,188	963	205	996
London Road (south)	854	269	593	869	10	135
Newlands Park Access	66	0	13	66	5	32
Average delay (seconds)	44			67		
Level of Service	E			E		
PM Peak						
London Road (north)	151	183	204	727	106	205
A1081 New Airport Way	102	1295	1,361	1,301	137	615
London Road (south)	190	0	23	517	20	209
Newlands Park Access	377	0	17	375	34	124
Average delay (seconds)	62			78		
Level of Service	F			E		

10.3.96 **Table 10.84** shows that with the Proposed Development in Assessment Phase 2a the junction would continue to operate with similar levels of delay and LoS. Queues and throughput would be improved, and this is attributed to the mitigation measures at the junction itself and to M1 Junction 10 which improve the capacity and function of the junction.

10.3.97 **Table 10.85** summarises the future baseline and the Proposed Development junction performance for the A1081 New Airport Way/A1081 London Road (south) roundabout in the AM and PM peak hours in Assessment Phase 2a.

Table 10.85: 2039 A1081 New Airport Way/A1081 London Road (south) roundabout (3) junction performance Assessment Phase 2a (future baseline and with the Proposed Development) v

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
London Road (north)	679	164	575	537	273	631
A1081 New Airport Way	739	12	186	650	5	147
London Road (south)	1,044	38	237	1,067	1	21
Average delay (seconds)	41			49		
Level of Service	E			E		
PM Peak						
London Road (north)	109	604	631	760	507	630
A1081 New Airport Way	165	0	20	689	2	71
London Road (south)	397	224	327	1,072	177	331
Average delay (seconds)	103			115		
Level of Service	F			F		

10.3.98 **Table 10.85** shows that with the Proposed Development in Assessment Phase 2a the junction would continue to operate with similar levels of delay and LoS. Queues and throughput would be significantly improved in the PM peak hour, and this is attributed to the mitigation measures at the junction itself and to M1 Junction 10 which improve the capacity and function of the junction.

10.3.99 **Table 10.86** summarises the future baseline and the Proposed Development junction performance for the A1081 New Airport Way/B653/Gipsy Lane network of junctions in the AM and PM peak hours in Assessment Phase 2a.

Table 10.86: 2039 A1081 New Airport Way/B653/Gipsy Lane junctions (4) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Gipsy Lane	918	8	109	849	88	280
Parkway Road	96	0	20	123	5	73
B653 Lower Harpenden Road	659	2	68	498	51	179
A1081 New Airport Way (east)	2,417	209	548	2,344	201	555
A1081 New Airport Way (west)	2,387	44	545	2,776	79	646
Average delay (seconds)	23			49		
Level of Service	C			D		
PM Peak						
Gipsy Lane	277	213	280	629	161	279
Parkway Road	55	120	180	251	104	185
B653 Lower Harpenden Road	100	161	177	284	138	178
A1081 New Airport Way (east)	332	533	555	1,982	369	556

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
A1081 New Airport Way (west)	712	53	516	2,769	224	979
Average delay (seconds)	138			105		
Level of Service	F			F		

10.3.100 **Table 10.86** shows that with the Proposed Development in Assessment Phase 2a there would be an increase in average queues and delays in the AM peak hour although there would be no impact on any upstream junctions. In the PM peak hour there is a decrease in the average queues. The junction throughput would also be substantially improved in the PM peak hour and this is attributed in particular to the mitigation measures at the junctions and to M1 Junction 10.

10.3.101 **Table 10.87** summarises the future baseline and the Proposed Development junction performance for the Kimpton Road/A505 Vauxhall Way signalised junction in the AM and PM peak hours in Assessment Phase 2a.

Table 10.87: 2039 Kimpton Road/A505 Vauxhall Way signalised junction (5) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	1,650	151	653	1,550	245	1,052
Airport Way (east)	233	8	44	398	110	462
A505 Vauxhall Way (south)	918	16	92	969	18	98
Kimpton Way (west)	533	10	71	511	25	93

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Average delay (seconds)	31			48		
Level of Service (LoS)	C			D		
PM Peak						
A505 Vauxhall Way (north)	282	710	1088	1,187	543	1,054
Airport Way (east)	127	578	721	451	31	164
A505 Vauxhall Way (south)	483	9	108	961	20	111
Kimpton Way (west)	346	113	228	593	113	227
Average delay (seconds)	70			78		
Level of Service (LoS)	E			E		

10.3.102 **Table 10.87** shows that with the Proposed Development in Assessment Phase 2a there would be an increase in average queues and delays in the AM peak hour although they would not impact on any upstream junctions. In the PM peak hour there would be a decrease in the average queues. The junction throughput would also be substantially improved in the PM peak hour and this is attributed in particular to the mitigation measures at the junctions and to M1 Junction 10.

10.3.103 **Table 10.88** summarises the future baseline and the Proposed Development junction performance for the A1081 New Airport Way/Percival Way revised signalised junction in the AM and PM peak hours in Assessment Phase 2a.

Table 10.88: 2039 A1081 New Airport Way/Percival Way revised signalised junction (7) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Percival Way	682	4	107	-	-	-
Airport Way (east)	958	5	77	899	14	144
A1081 New Airport Way	1045	1	40	832	3	36
Airport Way (west)	226	1	26	248	3	33
Average delay (seconds)	7			11		
Level of Service (LoS)	A			B		
PM Peak						
Percival Way	287	471	951	-	-	-
Airport Way (east)	285	128	198	838	6	73
A1081 New Airport Way	140	58	109	588	2	27
Airport Way (west)	151	0	24	229	3	32
Average delay (seconds)	26			7		
Level of Service (LoS)	D			A		

10.3.104 In Assessment Phase 2a, the junction is modified further with the removal of the Percival Way approach which is downgraded as a result of the AAR. As a result, the table shows that with the Proposed Development in Assessment Phase 2a the junction would operate with minimal delay and a maximum LoS B. Whilst there would be intermittent queues, average queues would be relatively short and would not extend beyond the available link lengths.

10.3.105 **Table 10.89** summarises the future baseline and the Proposed Development junction performance for the Percival Way/Frank Lester Way/President Way signalised junction in the AM and PM peak hours in Assessment Phase 2a.

Table 10.89: 2039 Percival Way/Frank Lester Way/President Way signalised junction (8) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Frank Lester Way	859	11	73	-	-	-
President Way	264	1	26	1,201	25	152
Airport Approach Road	30	0	11	37	1	23
Percival Way	689	8	148	906	10	99
Average delay (seconds)	9			13		
Level of Service (LoS)	A			B		
PM Peak						
Frank Lester Way	250	20	61	-	-	-
President Way	379	180	538	962	63	304
Airport Approach Road	34	29	135	52	5	43
Percival Way	274	5	74	775	71	292
Average delay (seconds)	4			21		
Level of Service (LoS)	A			C		

10.3.106 **Table 10.89** shows that with the Proposed Development in Assessment Phase 2a the junction would operate with a maximum LoS C. There would be an

increase in average queues and delays in the although these would not impact on any upstream junctions.

10.3.107 **Table 10.90** summarises the future baseline and the Proposed Development junction performance for the A505 Vauxhall Way/Eaton Green Road revised roundabout in the AM and PM peak hours in Assessment Phase 2a.

Table 10.90: 2039 A505 Vauxhall Way/Eaton Green Road revised roundabout (10) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	1,266	11	106	1,304	37	256
Eaton Green Road	799	3	56	747	38	453
A505 Vauxhall Way (south)	1,175	6	105	1,120	9	121
Harrowden Road	104	1	17	103	1	17
Average delay (seconds)	8			17		
Level of Service (LoS)	A			C		
PM Peak						
A505 Vauxhall Way (north)	288	152	459	920	39	254
Eaton Green Road	528	199	486	988	145	477
A505 Vauxhall Way (south)	749	96	400	1351	14	142
Harrowden Road	18	3	22	25	0	9
Average delay (seconds)	29			33		

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Level of Service (LoS)	D			D		

10.3.108 **Table 10.90** shows that with the Proposed Development in Assessment Phase 2a the junction would operate with a maximum LoS D. There would be an increase in average queues and delays in the although these would not impact on any upstream junctions.

10.3.109 **Table 10.91** summarises the future baseline and the Proposed Development junction performance for the Eaton Green Road/Frank Lester Way signalised junction in the AM and PM peak hours in Assessment Phase 2a.

Table 10.91: 2039 Eaton Green Road/Frank Lester Way signalised junction (11) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Eaton Green Rd (west)	527	1	36	537	11	110
Eaton Green Rd (east)	1,123	6	115	416	4	102
Frank Lester Way	356	1	39	492	10	98
Average delay (seconds)	6			11		
Level of Service (LoS)	A			B		
PM Peak						
Eaton Green Rd (west)	262	2	58	576	53	249
Eaton Green Rd (east)	508	74	209	311	56	217
Frank Lester Way	431	37	144	856	73	196

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Average delay (seconds)	8			38		
Level of Service (LoS)	A			D		

10.3.110 In Assessment Phase 2a, the junction is modified and converted from a roundabout to a signalised junction. The table shows that with the Proposed Development in Assessment Phase 2a the junction would operate with minimal delay and a maximum LoS B in the AM peak hour. In the PM peak hour the junction would operate with increased delay and a maximum LoS D. Whilst there would be increased queues at the junction, average queues would be relatively short and would not extend beyond the available link lengths.

10.3.111 **Table 10.92** summarises future baseline and the Proposed Development junction performance for the Eaton Green Road/Wigmore Road signalised junction in the AM and PM peak hours. The revised junction layout incorporates a new arm for the AAR and this is also reported below.

Table 10.92: 2039 Eaton Green Road/Wigmore Road signalised junction (12) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane	627	2	66	703	14	99
Wigmore Place	56	0	12	57	2	22
Eaton Green Road (east)	441	1	44	445	13	75
Eaton Green Road (west)	409	1	56	792	51	267
AAR Link				126	6	31

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Average delay (seconds)	5			32		
Level of Service (LoS)	A			B		
PM Peak						
Wigmore Lane	475	31	129	428	18	94
Wigmore Place	146	11	46	193	3	40
Eaton Green Road (east)	299	51	233	397	20	84
Eaton Green Road (west)	291	1	54	534	17	129
AAR Link				304	9	51
Average delay (seconds)	7			36		
Level of Service (LoS)	A			D		

10.3.112 In Assessment Phase 2a, the junction is modified and converted from a roundabout to a signalised junction which incorporates a link to the AAR. The table shows that with the Proposed Development in Assessment Phase 2a the junction would operate with a maximum LoS D. Whilst there would be increased queues at the junction, average queues would be relatively short and would not extend beyond the available link lengths.

10.3.113 **Table 10.93** summarises future baseline and the Proposed Development junction performance for the A505 Vauxhall Way/Crawley Green Road signalised junction in the AM and PM peak hours in Assessment Phase 2a.

Table 10.93: 2039 A505 Vauxhall Way/Crawley Green Road signalised junction (13) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	964	19	96	1,139	29	121
Crawley Green Road (east)	676	24	153	783	126	249
A505 Vauxhall Way (south)	844	13	62	831	16	71
Crawley Green Road (west)	967	87	227	1,066	65	223
Saywell Road	57	2	31	58	0	18
Average delay (seconds)	30			40		
Level of Service (LoS)	C			D		
PM Peak						
A505 Vauxhall Way (north)	663	381	492	1,104	47	162
Crawley Green Road (east)	347	119	413	714	120	319
A505 Vauxhall Way (south)	810	198	580	1,167	27	118
Crawley Green Road (west)	422	11	155	774	19	173
Saywell Road	23	0	6	26	0	10

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Average delay (seconds)	83			41		
Level of Service (LoS)	F			D		

10.3.114 **Table 10.93** shows that with the Proposed Development in Assessment Phase 2a the junction would operate with a maximum LoS D. There would be an increase in average queues and delays in the AM peak hour however there would be a reduction in average queues and delays in the PM peak hour. Overall, average queues would not impact on any upstream junctions.

10.3.115 **Table 10.94** summarises the future baseline and the Proposed Development junction performance for the Crawley Green Road/Wigmore Lane signalised junction in the AM and PM peak hours in Assessment Phase 2a.

Table 10.94: 2039 Crawley Green Road/Wigmore Lane signalised junction (14) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	869	2	86	922	23	177
Crawley Green Lane (east)	411	4	67	416	8	86
Wigmore Lane (south)	230	0	25	372	3	36
Crawley Green Lane (west)	480	0	23	735	10	97
Average delay (seconds)	6			16		
Level of Service (LoS)	A			B		

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
PM Peak						
Wigmore Lane (north)	465	27	220	546	13	64
Crawley Green Lane (east)	247	20	185	280	3	45
Wigmore Lane (south)	480	0	38	889	19	108
Crawley Green Lane (west)	677	5	158	927	3	42
Average delay (seconds)	7			13		
Level of Service (LoS)	A			B		

10.3.116 In Assessment Phase 2a, the junction is modified and converted from a roundabout to a signalised junction. The table shows that with the Proposed Development in Assessment Phase 2a the modified junction would operate with minimal delay and a maximum LoS B. Average queues would be relatively short and would not extend beyond the available link lengths.

10.3.117 Assessment Phase 2a includes a new signalised junction between the A1081 New Airport Way and the AAR. **Table 10.95** summarises the Proposed Development in Assessment Phase 2a junction performance for the A1081 New Airport Way/ AAR signalised junction in the AM and PM peak hours.

Table 10.95: 2039 A1081 New Airport Way/AAR signalised junction (6) junction performance Assessment Phase 2a (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2a						
AAR	700	27	186	327	8	44

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
A1081 Airport Way (east)	850	23	150	816	8	64
A1081 Airport Way (west)	1,291	20	96	1,363	22	126
Average delay (seconds)	26			15		
Level of Service (LoS)	C			B		

10.3.118 **Table 10.95** shows that with the Proposed Development in Assessment Phase 2a the junction would operate with a maximum LoS C. Average delays and queues would be relatively short and would not extend beyond the available link lengths.

10.3.119 Assessment Phase 2a includes a new signalised junction between Eaton Green Road Link and AAR.

10.3.120 **Table 10.96** summarises the with Proposed Development in Assessment in Phase 2a junction performance for the Eaton Green Road Link/AAR signalised junction in the AM and PM peak hours.

Table 10.96: 2039 Eaton Green Road Link/AAR signalised junction (9) junction performance Assessment Phase 2a (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2a						
Eaton Green Road Link	1,172	27	117	418	12	65
AAR (east)	115	6	42	126	4	38
Terminal 2 Link	240	5	38	264	7	50
AAR (west)	251	4	32	375	4	31

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Average delay (seconds)	28			25		
Level of Service (LoS)	C			C		

10.3.121 **Table 10.96** shows that with the Proposed Development in Assessment Phase 2a the junction would operate with a maximum LoS C. Average delays and queues would be relatively short and would not extend beyond the available link lengths.

10.3.122 **Table 10.97** summarises the future baseline and the Proposed Development junction performance for the Windmill Road/Kimpton Road signalised junction in the AM and PM peak hours in Assessment Phase 2a.

Table 10.97: 2039 Windmill Road/Kimpton Road signalised junction (15) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Windmill Road (north)	905	173	528	911	239	532
Kimpton Road	678	39	72	695	40	73
Windmill Road (south)	700	8	79	622	21	147
Average delay (seconds)	18			23		
Level of Service (LoS)	C			C		
PM Peak						
Windmill Road (north)	379	405	606	861	267	662
Kimpton Road	280	50	69	485	43	72
Windmill Road (south)	344	3	91	791	36	187
Average delay (seconds)	22			26		
Level of Service (LoS)	C			C		

10.3.123 In Assessment Phase 1, the junction is upgraded to a signalised junction. The table shows that with the Proposed Development in Assessment Phase 2a the junction would operate with minimal delay and a maximum LoS C. Whilst there are queues, average queues would be relatively short and would not extend beyond the available link lengths.

10.3.124 **Table 10.98** summarises the future baseline and the Proposed Development junction performance for the Eaton Green Road Lalleford Road signalised junction in the AM and PM peak hours in Assessment Phase 2a.

Table 10.98: 2039 Eaton Green Road/Lalleford Road signalised junction (16) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Lalleford Road	544	6	73	500	47	202
Eaton Green Road (east)	684	163	461	123	1	37
Eaton Green Road (west)	435	18	141	717	14	146
Average delay (seconds)	27			22		
Level of Service (LoS)	D			C		
PM Peak						
Lalleford Road	111	58	255	154	24	182
Eaton Green Road (east)	506	176	596	269	40	325
Eaton Green Road (west)	471	7	141	892	26	201
Average delay (seconds)	6			19		
Level of Service (LoS)	A			B		

10.3.125 In Assessment Phase 1, the junction is upgraded to a signalised junction. The table shows that with the Proposed Development in Assessment Phase 2a the junction would operate with minimal delay and a maximum LoS C. Average delays and queues would be relatively short and would not extend beyond the available link lengths.

10.3.126 **Table 10.99** summarises future baseline and the Proposed Development junction performance for the Wigmore Lane/Raynham Way signalised junction in the AM and PM peak hours in Assessment Phase 2a.

Table 10.99: 2039 Wigmore Lane/Raynham Way signalised junction (17) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	712	4	111	930	12	144
Twyford Drive	110	1	23	110	4	35
Wigmore Lane (south)	190	0	21	294	1	24
Raynham Way	125	0	12	124	5	42
Average delay (seconds)	5			10		
Level of Service (LoS)	A			A		
PM Peak						
Wigmore Lane (north)	555	34	196	660	9	84
Twyford Drive	65	7	52	77	3	32
Wigmore Lane (south)	453	1	48	864	5	42
Raynham Way	120	9	77	144	6	47
Average delay (seconds)	5			10		
Level of Service (LoS)	A			A		

10.3.127 In Assessment Phase 2a, the junction is upgraded to a signalised junction. The table shows that with the Proposed Development in Assessment Phase 2a the junction would operate with minimal delay and a maximum LoS A.

10.3.128 **Table 10.100** summarises the future baseline and the Proposed Development junction performance for the Wigmore Lane/Asda access signalised junction in the AM and PM peak hours in Assessment Phase 2a.

Table 10.100: 2039 Wigmore Lane/Asda access signalised junction (18) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	688	6	96	864	12	59
Asda Access	261	1	36	261	4	36
Wigmore Lane (south)	292	0	20	287	4	46
Average delay (seconds)	5			14		
Level of Service (LoS)	A			B		
PM Peak						
Wigmore Lane (north)	531	41	198	640	11	59
Asda Access	520	13	43	657	14	61
Wigmore Lane (south)	303	1	40	586	16	92
Average delay (seconds)	6			19		
Level of Service (LoS)	A			B		

10.3.129 In Assessment Phase 2a, the junction is upgraded to a signalised junction. **Table 10.100** shows that with the Proposed Development in Assessment Phase 2a the junction would operate with minimal delay and a maximum LoS B.

10.3.130 **Table 10.101** summarises the future baseline and the Proposed Development junction performance for the Windmill Road/St Mary's Road/Crawley Green Road roundabout in the AM and PM peak hours in Assessment Phase 2a.

Table 10.101: 2039 Windmill Road/St Mary's Road/Crawley Green Road roundabout (19) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
St Mary's Road	335	8	68	335	7	76
Crawley Green Road	993	46	103	994	52	104
Windmill Road	855	97	366	842	18	164
A505 Park Viaduct	815	36	110	800	22	212
Average delay (seconds)	41			32		
Level of Service (LoS)	D			C		
PM Peak						
St Mary's Road	208	114	199	477	27	149
Crawley Green Road	353	70	101	739	45	101
Windmill Road	368	21	255	871	48	280
A505 Park Viaduct	426	448	472	891	340	470
Average delay (seconds)	73			80		
Level of Service (LoS)	E			E		

10.3.131 In Phase Assessment 2a, the junction is upgraded with additional capacity added in to the roundabout.

10.3.132 **Table 10.101** shows that with the Proposed Development in Assessment Phase 2a the junction would operate at a similar level as with the without Phase 2a scenario.

10.3.133 **Table 10.102** summarises the future baseline and the Proposed Development junction performance for the Crawley Green Road/Lalleford Road signalised junction in the AM and PM peak hours in Assessment Phase 2a.

Table 10.102: 2039 Crawley Green Road/Lalleford Road signalised junction (20) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Crawley Green Road (east)	555	0	22	778	17	115
Lalleford Road	234	0	18	233	11	64
Crawley Green Road (west)	558	0	20	734	12	124
Average delay (seconds)	2			17		
Level of Service (LoS)	A			B		
PM Peak						
Crawley Green Road (east)	285	2	35	651	27	132
Lalleford Road	407	6	73	521	17	128
Crawley Green Road (west)	545	1	44	674	29	181
Average delay (seconds)	3			23		
Level of Service (LoS)	A			C		

10.3.134 In Assessment Phase 2a, the junction is upgraded to a signalised junction. **Table 10.102** shows that with the Proposed Development in Assessment Phase 2a the junction would operate with minimal delay and a maximum LoS C.

10.3.135 Assessment Phase 2a includes a new roundabout junction between Provost Way and AAR. **Table 10.103** summarises the Proposed Development in Assessment Phase 2a junction performance for the Provost/AAR roundabout in the AM and PM peak hours.

Table 10.103: 2039 Provost Way/AAR roundabout (21) junction performance Assessment Phase 2a (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2a						
Provost Way (north)	284	3	50	108	5	43
AAR Provost Way (south)	547	0	22	333	0	8
AAR (west)	817	0	35	857	59	456
Average delay (seconds)	5			7		
Level of Service (LoS)	A			A		

10.3.136 **Table 10.103** shows that with the Proposed Development in Assessment Phase 2a the junction would operate with a maximum LoS A. Average delays and queues would be short and would not extend beyond the available link lengths.

10.3.137 Assessment Phase 2a includes a new roundabout junction between Provost Way and Percival Way to accommodate the AAR alignment.

10.3.138 **Table 10.104** summarises the Proposed Development in Assessment Phase 2a junction performance for the Provost Way/Percival Way roundabout in the AM and PM peak hours.

Table 10.104: 2039 Provost Way/Percival Way roundabout (22) junction performance Assessment Phase 2a (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2a						
Provost Way (north)	839	5	112	777	26	120
Percival Way (east)	922	1	91	472	2	48
Percival Way (west)	121	1	35	203	34	251
Average delay (seconds)	3			8		
Level of Service (LoS)	A			A		

10.3.139 **Table 10.104** shows that with the Proposed Development in Assessment Phase 2a the junction would operate with a maximum LoS A. Average delays and queues would be short and would not extend beyond the available link lengths.

10.3.140 Assessment Phase 2a includes a new roundabout junction between President Way and AAR. **Table 10.105** summarises the Proposed Development in Assessment Phase 2a junction performance for the President Way/AAR roundabout in the AM and PM peak hours.

Table 10.105: 2039 President Way/AAR roundabout (23) junction performance Assessment Phase 2a (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2a						
Car park access	135	0	33	341	9	109
AAR (east)	1,211	13	109	583	14	122
President Way	80	0	17	108	7	75
AAR (west)	652	3	55	416	0	25
Average delay (seconds)	7			8		
Level of Service (LoS)	A			A		

10.3.141 **Table 10.105** shows that with the Proposed Development in Assessment Phase 2a the junction would operate with a maximum LoS A. Average delays and queues would be short and would not extend beyond the available link lengths.

10.3.142 Phase 2a includes a new roundabout junction to access the new Terminal 2 area. **Table 10.106** summarises the Proposed Development in Assessment Phase 2a junction performance for the Terminal 2 access roundabout in the AM and PM peak hours.

Table 10.106: 2039 Terminal 2 access roundabout (24) junction performance Assessment Phase 2a (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2a						
AAR Link Road (north)	305	0	3	199	0	1

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Terminal 2 Short Stay Access (South)	241	0	12	218	0	9
Terminal 2 Drop Off Access (South)	-	-	-	-	-	-
President Way (west)	0	0	0	58	0	6
Average delay (seconds)	1			1		
Level of Service (LoS)	A			A		

10.3.143 **Table 10.106** shows that with the Proposed Development in Assessment Phase 2a the junction would operate with a maximum LoS A. Average delays and queues would be short and would not extend beyond the available link lengths.

Assessment Phase 2a summary

10.3.144 **Table 10.107** summarises the future baseline and the Proposed Development in Assessment Phase 2a junction performance.

Table 10.107: 2039 junction performance summary Assessment Phase 2a (future baseline and with the Proposed Development)

Junction	Level of Service				Average Delays (seconds)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a
M1 Junction 10 (1)	D	D	C	C	49	47	35	32
A1081 New Airport Way / London Road	E	E	F	E	44	67	62	78

Junction	Level of Service				Average Delays (seconds)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a
(north) roundabout (2)								
A1081 New Airport Way / A1081 London Road (south) roundabout (3)	E	E	F	F	41	49	103	115
A1081 New Airport Way / B653 / Gipsy Lane junctions (4)	C	D	F	F	23	49	138	105
Kimpton Road / A505 Vauxhall Way signalised junction (5)	C	D	E	E	31	48	70	78
A1081 New Airport Way / Percival Way signalised junction (7)	A	B	D	A	7	11	26	7
Percival Way / Frank Lester Way / President Way signalised junction (8)	A	B	A	C	9	13	4	21
A505 Vauxhall Way / Eaton Green Road revised roundabout (10)	A	C	D	D	8	17	29	33
Eaton Green Road / Frank Lester Way signalised junction (11)	A	B	A	D	6	11	8	38

Junction	Level of Service				Average Delays (seconds)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a
Eaton Green Road / Wigmore Road signalised junction (12)	A	B	A	D	5	32	7	36
Vauxhall Way / Crawley Green Road signalised junction (13)	C	D	F	D	30	40	83	41
Crawley Green Road / Wigmore Lane signalised junction (14)	A	B	A	B	6	16	7	13
A1081 New Airport Way / AAR signalised junction (6)	-	C	-	B	-	26	-	15
Eaton Green Road Link / AAR signalised junction (9)	-	C	-	C	-	28	-	25
Windmill Road / Kimpton Road signalised junction (15)	C	C	C	C	18	23	22	26
Eaton Green Road / Lalleford Road signalised junction (16)	D	C	A	B	27	22	6	19

Junction	Level of Service				Average Delays (seconds)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a
Wigmore Lane / Raynham Way signalised junction (17)	A	A	A	A	5	10	5	10
Wigmore Lane / Asda access signalised junction (18)	A	B	A	B	5	14	6	19
Windmill Road / St Mary's Road / Crawley Green Road roundabout (19)	D	C	E	E	41	32	73	80
Crawley Green Road / Lalleford Road signalised junction (20)	A	B	A	C	2	17	3	23
Provost Way / AAR roundabout (21)	-	A	-	A	-	5	-	7
Provost Way / Percival Way roundabout (22)	-	A	-	A	-	3	-	8
President Way / AAR roundabout (23)	-	A	-	A	-	7	-	8
Terminal 2 access roundabout (24)	-	A	-	A	-	1	-	1

Junction	Level of Service				Average Delays (seconds)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a
Notes: LoS (A): free flow; (B): stable flow, slight delays; (C): stable flow, acceptable delays; (D): approaching unstable flow, tolerable delays; €: unstable flow, intolerable delay and long queues; (F): congested, long delays and queues fail to clear.								

10.3.145 **Table 10.107** shows in the AM peak the network would generally operate with free flow or stable conditions and is broadly similar in Assessment Phase 2a when compared with the future baseline. Where there are longer queues and delays, these are broadly similar in Assessment Phase 2a and the future baseline. In the PM peak the network would generally operate comparatively in the Assessment Phase 2a and future baseline scenarios. Where there is a worsening in the LoS, conditions are still considered to be in the acceptable or tolerable range. The Proposed Development in Assessment Phase 2a and associated junction mitigations are not considered to have a significant adverse impact on the operation of the highway network.

Assessment Phase 2b (2043)

Network performance

10.3.146 **Table 10.108** summarises the network performance statistics for the AM peak in Assessment Phase 2b for the future baseline and with the Proposed Development.

Table 10.108: 2043 AM Peak network statistics Assessment Phase 2b (future baseline and with the Proposed Development)

Parameter	Future Baseline	with Assessment Phase 2b
Average Delay Time per Vehicle (seconds), All Vehicle Types	73	90
Average Number of Stops per Vehicles, All Vehicle Types	3	3

Parameter	Future Baseline	with Assessment Phase 2b
Average Speed (mph), All Vehicle Types	35	33
Average Stopped Delay per Vehicle (seconds), All Vehicle Types	29	40
Number of Unreleased Vehicles	82	97

10.3.147 **Table 10.108** shows that in Assessment Phase 2b with the Proposed Development there would be a small increase in average delays but that this would not significantly affect average travel speeds in the AM peak hour.

10.3.148 **Table 10.109** summarises the network performance statistics for the PM in Assessment Phase 2b for the future baseline and with the Proposed Development.

Table 10.109: 2043 PM Peak network statistics Assessment Phase 2b (future baseline and with the Proposed Development)

Parameter	Future Baseline	with Assessment Phase 2b
Average Delay Time per Vehicle (seconds), All Vehicle Types	102	70
Average Number of Stops per Vehicles, All Vehicle Types	4	2
Average Speed (mph), All Vehicle Types	32	36
Average Stopped Delay per Vehicle (seconds), All Vehicle Types	49	31
Number of Unreleased Vehicles	843	529

10.3.149 **Table 10.109** shows that in Assessment Phase 2b with the Proposed Development there would be an improvement in the network performance in the PM peak hour. This is as a consequence of the additional mitigation measures included in Assessment Phase 2b which build upon the Assessment Phase 1 and Phase 2a measures and which improve the function of the network particularly around M1 Junction 10.

Journey times

10.3.150 **Table 10.110** summarises the modelled journey times for the AM peak in Assessment Phase 2b for the future baseline and with the Proposed Development.

Table 10.110: 2043 AM Peak journey times in seconds Assessment Phase 2b (future baseline and with the Proposed Development)

Route	Future Baseline	with Assessment Phase 2b
Luton Town Centre (G) to Existing Terminal Area (I)	338	369
Existing Terminal Area (I) to Luton Town Centre (G)	475	439
Vauxhall Way north of Crawley Green Road (H) to Existing Terminal Area (I)	264	299
Existing Terminal Area (I) to Vauxhall Way north of Crawley Green Road (H)	284	298
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Existing Terminal Area (I)	188	271
Existing Terminal Area (I) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	506	490
A1081 London Road (E) close to Beech Tree Drive to Existing Terminal Area (I)	643	485
Existing Terminal Area (I) to A1081 London Road (E) close to Beech Tree Drive	372	374
M1 Junction 10 North off slip (B) to Existing Terminal Area (I)	340	408
Existing Terminal Area (I) to M1 Junction 10 North on slip (A)	341	356
M1 Junction 10 South off slip (C) to Existing Terminal Area (I)	362	432

Route	Future Baseline	with Assessment Phase 2b
Existing Terminal Area (I) to M1 Junction 10 South on slip (D)	318	312
Luton Town Centre (G) to Proposed New Terminal Area (J)	-	467
Proposed New Terminal Area (J) to Luton Town Centre (G)	-	586
Vauxhall Way north of Crawley Green Road (H) to Proposed New Terminal Area (J)	-	342
Proposed New Terminal Area (J) to Vauxhall Way north of Crawley Green Road (H)	-	353
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Proposed New Terminal Area (J)	-	415
Proposed New Terminal Area (J) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	-	695
A1081 London Road (E) close to Beech Tree Drive to Proposed New Terminal Area (J)	-	629
Proposed New Terminal Area (J) to A1081 London Road (E) close to Beech Tree Drive	-	550
M1 Junction 10 North off slip (B) to Proposed New Terminal Area (J)	-	552
Proposed New Terminal Area (J) to M1 Junction 10 North on slip (A)	-	531
M1 Junction 10 South off slip (C) to Proposed New Terminal Area (J)	-	573

Route	Future Baseline	with Assessment Phase 2b
Proposed New Terminal Area (J) to M1 Junction 10 South on slip (D)	-	499

10.3.151 **Table 10.110** shows that AM peak hour, journey times to the existing terminal area in Assessment Phase 2b are broadly in line with the future baseline. The Proposed Development in Assessment Phase 2b would include measures which mitigate the impact of the development on the highway network, working in conjunction with the improvements to the M1 corridor and M1 Junction 10 which are assumed to have been delivered by National Highways to address background issues on the motorway network in the AM peak hour.

10.3.152 **Table 10.111** summarises the modelled journey times for the PM peak in Assessment Phase 2b for the future baseline and with the Proposed Development.

Table 10.111: 2043 PM Peak journey times in seconds Assessment Phase 2b (future baseline and with the Proposed Development)

Route	Future Baseline	with Assessment Phase 2b
Luton Town Centre (G) to Existing Terminal Area (I)	304	345
Existing Terminal Area (I) to Luton Town Centre (G)	401	386
Vauxhall Way north of Crawley Green Road (H) to Existing Terminal Area (I)	316	271
Existing Terminal Area (I) to Vauxhall Way north of Crawley Green Road (H)	326	301
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Existing Terminal Area (I)	199	226
Existing Terminal Area (I) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	380	411
A1081 London Road (E) close to Beech Tree Drive to Existing Terminal Area (I)	667	476

Route	Future Baseline	with Assessment Phase 2b
Existing Terminal Area (I) to A1081 London Road (E) close to Beech Tree Drive	338	380
M1 Junction 10 North off slip (B) to Existing Terminal Area (I)	594	341
Existing Terminal Area (I) to M1 Junction 10 North on slip (A)	331	364
M1 Junction 10 South off slip (C) to Existing Terminal Area (I)	620	374
Existing Terminal Area (I) to M1 Junction 10 South on slip (D)	294	332
Luton Town Centre (G) to Proposed New Terminal Area (J)	-	516
Proposed New Terminal Area (J) to Luton Town Centre (G)	-	520
Vauxhall Way north of Crawley Green Road (H) to Proposed New Terminal Area (J)	-	331
Proposed New Terminal Area (J) to Vauxhall Way north of Crawley Green Road (H)	-	317
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Proposed New Terminal Area (J)	-	373
Proposed New Terminal Area (J) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	-	604
A1081 London Road (E) close to Beech Tree Drive to Proposed New Terminal Area (J)	-	610

Route	Future Baseline	with Assessment Phase 2b
Proposed New Terminal Area (J) to A1081 London Road (E) close to Beech Tree Drive	-	547
M1 Junction 10 North off slip (B) to Proposed New Terminal Area (J)	-	484
Proposed New Terminal Area (J) to M1 Junction 10 North on slip (A)	-	520
M1 Junction 10 South off slip (C) to Proposed New Terminal Area (J)	-	518
Proposed New Terminal Area (J) to M1 Junction 10 South on slip (D)	-	487

10.3.153 **Table 10.111** shows that with the Proposed Development in Assessment Phase 2b there would be a significant improvement journey times to the existing terminal area on a number of routes in the PM peak hour. This is as a consequence of the benefits of the mitigation measures included in Assessment Phase 2b working in conjunction with the improvements to the M1 corridor and M1 Junction 10 which are assumed to have been delivered by National Highways to address background issues on the motorway network.

Junction modelling

10.3.154 **Table 10.112** summarises the future baseline and the Proposed Development junction performance for M1 Junction 10 in the AM and PM peak hours in Assessment Phase 2b.

Table 10.112: 2043 M1 Junction 10 (1) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
M1 southbound off-slip	1,719	17	79	1,955	69	302
A1081 New Airport Way	2,344	0	5	2,885	0	6

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
M1 northbound off-slip	2,307	39	158	2,755	60	368
Average delay (seconds)	7			15		
Level of Service (LoS)	A			B		
PM Peak						
M1 southbound off-slip	1,204	90	534	1,481	18	84
A1081 New Airport Way	3,981	14	158	4,682	0	3
M1 northbound off-slip	1,785	156	894	2,431	40	177
Average delay (seconds)	16			7		
Level of Service (LoS)	B			A		

10.3.155 **Table 10.112** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with minimal delay and a maximum LoS B. Whilst there would be intermittent queues, average queues are relatively short and would not extend beyond the available link lengths. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of M1 Junction 10.

10.3.156 **Table 10.113** summarises the future baseline and the Proposed Development junction performance for the A1081 New Airport Way/London Road (north) roundabout in the AM and PM peak hours in Assessment Phase 2b.

Table 10.113: 2043 A1081 New Airport Way/London Road (north) roundabout (2) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
London Road (north)	950	20	189	957	5	110
A1081 New Airport Way	1,207	13	185	1,168	74	322
London Road (south)	763	444	612	895	15	183
Newlands Park Access	66	0	11	65	5	32
Average delay (seconds)	24			26		
Level of Service	C			C		
PM Peak						
London Road (north)	860	13	162	862	2	52
A1081 New Airport Way	1,254	224	838	1,460	61	301
London Road (south)	639	19	182	653	18	134
Newlands Park Access	377	5	65	375	36	124
Average delay (seconds)	15			29		
Level of Service	B			C		

10.3.157 **Table 10.113** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with a maximum LoS C. Whilst there would be intermittent queues, average queues would not extend beyond the available link lengths. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the A1081 New Airport Way/London Road (north) roundabout.

10.3.158 **Table 10.114** summarises the future baseline and the Proposed Development junction performance for the A1081 New Airport Way/A1081 London Road (south) roundabout in the AM and PM peak hours in Assessment Phase 2b.

Table 10.114: 2043 A1081 New Airport Way/A1081 London Road (south) roundabout (3) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
London Road (north)	820	2	45	816	1	48
A1081 New Airport Way	805	4	99	824	6	108
London Road (south)	941	124	330	1,083	0	10
Average delay (seconds)	32			5		
Level of Service	D			A		
PM Peak						
London Road (north)	879	49	280	905	13	124
A1081 New Airport Way	931	1	65	955	4	129
London Road (south)	1,184	0	41	1,182	0	22
Average delay (seconds)	12			7		
Level of Service	B			A		

10.3.159 **Table 10.114** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with minimal delay and a maximum LoS A. Whilst there are intermittent queues, average queues would be relatively short and would not extend beyond the available link lengths. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the A1081 New Airport Way/A1081 London Road (south) roundabout.

10.3.160 **Table 10.115** summarises the future baseline and the Proposed Development junction performance for the A1081 New Airport Way/B653/Gipsy Lane network of junctions in the AM and PM peak hours in Assessment Phase 2b.

Table 10.115: 2043 A1081 New Airport Way/B653/Gipsy Lane junctions (4) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Gipsy Lane	942	10	113	1,027	44	263
Parkway Road	97	0	20	130	0	24
B653 Lower Harpenden Road	662	0	32	689	6	85
A1081 New Airport Way (east)	2,512	253	552	3,072	127	528
A1081 New Airport Way (west)	2,720	130	790	3,460	178	1,109
Average delay (seconds)	23			33		
Level of Service	C			C		
PM Peak						
Gipsy Lane	929	2	55	961	6	96
Parkway Road	214	0	27	350	1	36
B653 Lower Harpenden Road	863	11	122	880	24	170
A1081 New Airport Way (east)	2,121	77	368	2,848	40	232
A1081 New Airport Way (west)	2,293	710	1,118	3,316	58	712
Average delay (seconds)	34			25		

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Level of Service	C			C		

10.3.161 **Table 10.115** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with a maximum LoS C and relatively short delays. Average queues would be either short or improved when compared to the future baseline. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the A1081 New Airport Way/ B653/Gipsy Lane junctions.

10.3.162 **Table 10.116** summarises the future baseline and the Proposed Development junction performance for the Kimpton Road/A505 Vauxhall Way roundabout in the AM and PM peak hours in Assessment Phase 2b.

Table 10.116: 2043 Kimpton Road/A505 Vauxhall Way signalised junction (5) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	1,595	61	367	1,979	217	714
Airport Way (east)	320	11	75	372	19	88
A505 Vauxhall Way (south)	1,278	36	151	875	15	76
Kimpton Way (west)	544	15	80	541	19	88
Average delay (seconds)	31			27		
Level of Service (LoS)	C			C		
PM Peak						

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
A505 Vauxhall Way (north)	1,329	25	154	1,383	69	357
Airport Way (east)	515	34	179	397	18	83
A505 Vauxhall Way (south)	1,455	30	172	1,049	19	94
Kimpton Way (west)	608	14	78	750	17	102
Average delay (seconds)	30			30		
Level of Service (LoS)	C			C		

10.3.163 **Table 10.116** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with a similar performance as the future baseline and with a maximum LoS C and relatively short delays. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the Kimpton Road/A505 Vauxhall Way signalised junction.

10.3.164 **Table 10.117** summarises the future baseline and the Proposed Development junction performance for the A1081 New Airport Way/Percival Way roundabout in the AM and PM peak hours in Assessment Phase 2b.

Table 10.117: 2043 A1081 New Airport Way / Percival Way revised signalised junction (7) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Percival Way	754	7	133	-	-	-
Airport Way (east)	956	7	90	962	7	88
A1081 New Airport Way	955	2	40	809	3	34
Airport Way (west)	546	3	62	325	4	32
Average delay (seconds)	9			8		
Level of Service (LoS)	A			A		
PM Peak						
Percival Way	636	2	59	-	-	-
Airport Way (east)	827	4	74	854	6	78
A1081 New Airport Way	659	1	31	691	2	27
Airport Way (west)	342	1	26	261	3	32
Average delay (seconds)	6			7		
Level of Service (LoS)	A			A		

10.3.165 **Table 10.117** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with minimal delay and a maximum LoS A. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the A1081 New Airport Way/Percival Way revised signalised junction.

10.3.166 **Table 10.118** summarises the future baseline and the Proposed Development junction performance for the Percival Way/Frank Lester Way/President Way revised signalised junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.118: 2043 Percival Way/Frank Lester Way/President Way revised signalised junction (8) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Frank Lester Way	914	16	127	-	-	-
President Way	264	1	25	1,258	19	108
Airport Approach Road	30	0	11	42	1	22
Percival Way	759	12	178	1,514	35	128
Average delay (seconds)	11			19		
Level of Service (LoS)	B			B		
PM Peak						
Frank Lester Way	554	2	35			
President Way	632	1	37	1,541	15	108
Airport Approach Road	56	0	11	61	2	27
Percival Way	409	2	68	1,436	32	145
Average delay (seconds)	5			16		
Level of Service (LoS)	A			B		

10.3.167 **Table 10.118** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with minimal delay and a maximum LoS B. The

Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the Percival Way/Frank Lester Way President Way revised signalised junction.

10.3.168 **Table 10.119** summarises the future baseline and the Proposed Development junction performance for the A505 Vauxhall Way/Eaton Green Road revised roundabout in the AM and PM peak hours in Assessment Phase 2b.

Table 10.119: 2043 A505 Vauxhall Way/Eaton Green Road revised roundabout (10) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	1,296	8	89	1,502	29	217
Eaton Green Road	711	3	43	1,005	11	197
A505 Vauxhall Way (south)	1,202	4	97	1,078	6	97
Harrowden Road	105	1	16	106	1	19
Average delay (seconds)	7			13		
Level of Service (LoS)	A			B		
PM Peak						
A505 Vauxhall Way (north)	662	6	67	1,098	14	98
Eaton Green Road	1,108	1	42	1,129	5	98
A505 Vauxhall Way (south)	1,724	20	173	1,503	21	140
Harrowden Road	25	0	11	26	0	11

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Average delay (seconds)	10			12		
Level of Service (LoS)	A			B		

10.3.169 **Table 10.119** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with minimal delay and a maximum LoS B. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the A505 Vauxhall Way/Eaton Green Road revised roundabout.

10.3.170 **Table 10.120** summarises the future baseline and the Proposed Development junction performance for the Eaton Green Road/Frank Lester Way signalised junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.120: 2043 Eaton Green Road/Frank Lester Way signalised junction (11) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Eaton Green Rd (west)	544	3	63	528	12	123
Eaton Green Rd (east)	1,105	3	79	559	4	80
Frank Lester Way	378	1	36	534	26	91
Average delay (seconds)	6			16		
Level of Service (LoS)	A			B		
PM Peak						
Eaton Green Rd (west)	573	7	102	497	21	131

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Eaton Green Rd (east)	902	6	120	431	14	79
Frank Lester Way	771	7	126	988	10	108
Average delay (seconds)	9			16		
Level of Service (LoS)	A			B		

10.3.171 **Table 10.120** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with minimal delay and a maximum LoS B. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the Eaton Green Road/Frank Lester Way signalised junction.

10.3.172 **Table 10.121** summarises the future baseline and the Proposed Development junction performance for the Eaton Green Road/Wigmore Road signalised junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.121: 2043 Eaton Green Road/Wigmore Road signalised junction (12) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane	578	2	57	814	25	130
Wigmore Place	55	0	10	55	2	26
Eaton Green Road (east)	441	1	36	457	14	83
Eaton Green Road (west)	405	1	47	752	37	239

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AAR Link	-	-	-	239	13	52
Average delay (seconds)	4			35		
Level of Service (LoS)	A			C		
PM Peak						
Wigmore Lane	625	4	76	419	20	95
Wigmore Place	194	3	42	195	3	43
Eaton Green Road (east)	401	2	46	402	22	92
Eaton Green Road (west)	575	4	81	537	22	135
AAR Link				601	25	92
Average delay (seconds)	8			43		
Level of Service (LoS)	A			D		

10.3.173 **Table 10.121** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with a maximum LoS D. Whilst there are increased queues at the junction, average queues would be relatively short and would not extend beyond the available link lengths. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the Eaton Green Road/Wigmore Road signalised junction.

10.3.174 **Table 10.122** summarises future baseline and the Proposed Development junction performance for the A505 Vauxhall Way/Crawley Green Road signalised junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.122: 2043 A505 Vauxhall Way/Crawley Green Road signalised junction (13) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	967	20	96	1333	40	159
Crawley Green Road (east)	701	24	146	836	111	233
A505 Vauxhall Way (south)	912	18	68	908	17	76
Crawley Green Road (west)	922	87	226	1054	68	226
Saywell Road	59	2	29	58	1	20
Average delay (seconds)	32			40		
Level of Service (LoS)	C			D		
PM Peak						
A505 Vauxhall Way (north)	1058	21	82	1145	18	97
Crawley Green Road (east)	484	18	124	866	35	216
A505 Vauxhall Way (south)	1380	75	288	1613	29	135
Crawley Green Road (west)	741	39	208	740	56	217

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Saywell Road	22	0	12	22	0	14
Average delay (seconds)	35			28		
Level of Service (LoS)	C			C		

10.3.175 **Table 10.122** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with a maximum LoS D. There would be an increase in average queues and delays in the AM peak hour however there would be a reduction in average queues and delays in the PM peak hour. Overall, average queues would not impact on any upstream junctions. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the A505 Vauxhall Way/Crawley Green Road signalised junction.

10.3.176 **Table 10.123** summarises the future baseline and the Proposed Development junction performance for the Crawley Green Road/Wigmore Lane signalised junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.123: 2043 Crawley Green Road/Wigmore Lane signalised junction (14) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	871	2	76	957	30	229
Crawley Green Lane (east)	413	5	72	419	8	88
Wigmore Lane (south)	284	1	36	393	3	39

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Crawley Green Lane (west)	494	0	28	827	29	165
Average delay (seconds)	6			21		
Level of Service (LoS)	A			C		
PM Peak						
Wigmore Lane (north)	535	2	44	555	14	64
Crawley Green Lane (east)	279	1	36	285	3	44
Wigmore Lane (south)	655	1	48	998	19	110
Crawley Green Lane (west)	959	9	174	1022	3	49
Average delay (seconds)	8			13		
Level of Service (LoS)	A			B		

10.3.177 In Assessment Phase 2a, the junction is modified and converted from a roundabout to a signalised junction in the with development scenario. **Table 10.123** shows that with the Proposed Development in Assessment Phase 2b the modified junction would operate with minimal delay and a maximum LoS C. Average queues would be relatively short and would not extend beyond the available link lengths. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the Crawley Green Road/Wigmore Lane signalised junction.

10.3.178 **Table 10.124** summarises the Proposed Development junction performance for the A1081 New Airport Way/AAR signalised junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.124: 2043 A1081 New Airport Way/AAR signalised junction (6) junction performance Assessment Phase 2b (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2b						
AAR	829	23	128	1,104	33	159
A1081 Airport Way (east)	941	7	63	810	7	59
A1081 Airport Way (west)	2,071	24	91	2,044	21	95
Average delay (seconds)	15			17		
Level of Service (LoS)	B			B		

10.3.179 **Table 10.124** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with a maximum LoS B. Average delays and queues would be relatively short and would not extend beyond the available link lengths. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the A1081 New Airport Way/AAR signalised junction.

10.3.180 **Table 10.125** summarises the Proposed Development junction performance for the Eaton Green Road Link/AAR signalised junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.125: 2043 Eaton Green Road Link/AAR signalised junction (9) junction performance Assessment Phase 2b (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2b						
Eaton Green Road Link	1,202	26	117	397	11	49

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AAR (east)	242	11	65	711	77	207
Terminal 2 Link	457	10	57	387	8	50
AAR (west)	873	32	139	800	14	62
Average delay (seconds)	32			31		
Level of Service (LoS)	C			C		

10.3.181 **Table 10.125** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with a maximum LoS C. Average delays and queues would be relatively short and would not extend beyond the available link lengths. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the A1081 New Airport Way/AAR signalised junction.

10.3.182 **Table 10.126** summarises the future baseline and the Proposed Development junction performance for the Windmill Road/Kimpton Road signalised junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.126: 2043 Windmill Road/Kimpton Road signalised junction (15) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Windmill Road (north)	1,037	134	527	1,042	222	482
Kimpton Road	706	43	74	782	40	72
Windmill Road (south)	660	40	172	731	26	152
Average delay (seconds)	23			19		

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Level of Service (LoS)	C			B		
PM Peak						
Windmill Road (north)	1,022	10	203	1,102	158	499
Kimpton Road	780	16	68	588	37	73
Windmill Road (south)	863	77	197	989	35	178
Average delay (seconds)	18			17		
Level of Service (LoS)	C			B		

10.3.183 In Assessment Phase 1, the junction is upgraded to a signalised junction. **Table 10.126** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with minimal delay and a maximum LoS B. Whilst there are queues, average queues would be relatively short and would not extend beyond the available link lengths. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the Windmill Road/Kimpton Road signalised junction.

10.3.184 **Table 10.127** summarises the future baseline and the Proposed Development junction performance for the Eaton Green Road/Lalleford Road signalised junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.127: 2043 Eaton Green Road/Lalleford Road signalised junction (16) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Lalleford Road	581	9	99	503	45	189

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Eaton Green Road (east)	630	136	406	245	3	52
Eaton Green Road (west)	465	31	177	681	13	138
Average delay (seconds)	28			21		
Level of Service (LoS)	D			C		
PM Peak						
Lalleford Road	309	1	36	128	4	39
Eaton Green Road (east)	744	15	168	415	5	85
Eaton Green Road (west)	801	33	216	1020	46	218
Average delay (seconds)	13			15		
Level of Service (LoS)	B			B		

10.3.185 In Assessment Phase 1, the junction is upgraded to a signalised junction. **Table 10.127** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with minimal delay and a maximum LoS C. Average delays and queues would be relatively short and would not extend beyond the available link lengths. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the Eaton Green Road/Lalleford Road signalised junction.

10.3.186 **Table 10.128** summarises the future baseline and the Proposed Development junction performance for the Wigmore Lane/Raynham Way signalised junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.128: 2043 Wigmore Lane/Raynham Way signalised junction (17) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	715	4	90	1,042	18	167
Twyford Drive	110	1	23	109	4	38
Wigmore Lane (south)	239	0	21	311	1	24
Raynham Way	124	0	15	124	5	41
Average delay (seconds)	4			10		
Level of Service (LoS)	A			A		
PM Peak						
Wigmore Lane (north)	753	10	139	695	10	99
Twyford Drive	77	1	19	78	3	29
Wigmore Lane (south)	648	2	57	964	4	47
Raynham Way	143	0	21	144	6	46
Average delay (seconds)	6			9		
Level of Service (LoS)	A			A		

10.3.187 In Assessment Phase 2a, the junction is upgraded to a signalised junction.

10.3.188 **Table 10.128** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with minimal delay and a maximum LoS A. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the Wigmore Lane/Raynham Way signalised junction.

10.3.189 **Table 10.129** summarises the future baseline and the Proposed Development junction performance for the Wigmore Lane/Asda access signalised junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.129: 2043 Wigmore Lane/Asda access signalised junction (18) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	684	5	91	970	15	63
Asda Access	261	1	33	262	4	39
Wigmore Lane (south)	297	0	16	320	5	45
Average delay (seconds)	4			16		
Level of Service (LoS)	A			B		
PM Peak						
Wigmore Lane (north)	745	10	135	659	20	88
Asda Access	655	7	43	659	26	62
Wigmore Lane (south)	496	3	65	737	29	135
Average delay (seconds)	7			29		
Level of Service (LoS)	A			C		

10.3.190 In Assessment Phase 2a, the junction is upgraded to a signalised junction. **Table 10.129** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with minimal delay and a maximum LoS C. Average

delays and queues would be relatively short and would not extend beyond the available link lengths. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the Wigmore Lane/Asda access signalised junction.

10.3.191 **Table 10.130** summarises the future baseline and the Proposed Development junction performance for the Windmill Road/St Mary's Road/Crawley Green Road roundabout in the AM and PM peak hours in Assessment Phase 2b.

Table 10.130: 2043 Windmill Road/St Mary's Road/Crawley Green Road roundabout (19) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
St Mary's Road	337	8	67	378	5	38
Crawley Green Road	1,069	56	104	1,071	56	105
Windmill Road	867	195	408	970	22	181
A505 Park Viaduct	870	12	77	877	11	79
Average delay (seconds)	43			31		
Level of Service (LoS)	D			C		
PM Peak						
St Mary's Road	483	14	87	522	10	56
Crawley Green Road	812	24	98	900	40	102
Windmill Road	1,088	195	401	1,050	20	175
A505 Park Viaduct	997	446	472	1,168	144	331
Average delay (seconds)	62			80		

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Level of Service (LoS)	E			D		

10.3.192 In Assessment Phase 2a, the junction is upgraded with additional capacity added to the roundabout. **Table 10.130** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with similar level of delay but shorter average queues and an improved LoS. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the Windmill Road/St Mary's Road/Crawley Green Road roundabout.

10.3.193 **Table 10.131** summarises the future baseline and the Proposed Development junction performance for the Crawley Green Road/Lalleford Road signalised junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.131: 2043 Crawley Green Road/Lalleford Road signalised junction (20) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Crawley Green Road (east)	617	0	27	808	18	113
Lalleford Road	209	0	18	236	11	65
Crawley Green Road (west)	562	0	17	800	14	133
Average delay (seconds)	2			18		
Level of Service (LoS)	A			B		
PM Peak						

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Crawley Green Road (east)	361	1	32	729	37	191
Lalleford Road	454	1	45	617	26	155
Crawley Green Road (west)	986	1	37	659	22	136
Average delay (seconds)	3			23		
Level of Service (LoS)	A			C		

10.3.194 In Assessment Phase 2a, the junction is upgraded to a signalised junction. **Table 10.131** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with minimal delay and a maximum LoS C. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the Crawley Green Road Lalleford Road signalised junction.

10.3.195 Assessment Phase 2a includes a new roundabout junction between Provost Way and AAR. In Assessment Phase 2b, the roundabout is upgraded to a signalised junction to accommodate the further upgrade to the AAR between Provost Way and Frank Lester Way. **Table 10.132** summarises the Proposed Development junction performance for the Provost/AAR roundabout in the AM and PM peak hours in Assessment Phase 2b.

Table 10.132: 2043 Provost Way/AAR signalised junction (21) junction performance Assessment Phase 2b (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2b						
Provost Way (north)	288	8	60	128	3	29

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AAR (east)	963	16	108	1178	17	97
AAR Provost Way (south)	117	4	41	259	8	69
AAR (west)	1469	14	89	1560	20	119
Average delay (seconds)	14			16		
Level of Service (LoS)	B			B		

10.3.196 **Table 10.132** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with a maximum LoS B. Average delays and queues would be short and would not extend beyond the available link lengths. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the Provost Way/AAR signalised junction.

10.3.197 Assessment Phase 2a includes a new roundabout junction between Provost Way and Percival Way to accommodate the AAR alignment. In Assessment Phase 2b, the roundabout is upgraded to a signalised junction to accommodate the further upgrade to the AAR between Provost Way and Frank Lester Way. **Table 10.133** summarises the Proposed Development junction performance for the Provost Way Link Road/Percival Way signalised junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.133: 2043 Provost Way Link Road/Percival Way signalised junction (22) junction performance Assessment Phase 2b (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2b						
Provost Way Link Road	417	0	0	309	0	1
Percival Way (east)	0	0	0	0	0	0

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Percival Way (west)	117	0	0	259	0	0
Average delay (seconds)	1			1		
Level of Service (LoS)	A			A		

10.3.198 **Table 10.133** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with a maximum LoS A. Average delays and queues would be short and would not extend beyond the available link lengths. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the Provost Way Link Road/Percival Way signalised junction.

10.3.199 Assessment Phase 2a includes a new roundabout junction between President Way and AAR.

10.3.200 **Table 10.134** summarises the Proposed Development junction performance for the President Way/AAR roundabout in the AM and PM peak hours in Assessment Phase 2b.

Table 10.134: 2043 President Way/AAR roundabout (23) junction performance Assessment Phase 2b (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2b						
Car park access	139	1	41	374	3	71
AAR (east)	1,332	13	110	1,111	9	75
President Way	15	0	9	25	0	13
AAR (west)	1,238	13	106	847	2	59
Average delay (seconds)	9			7		

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
Level of Service (LoS)	A			A		

10.3.201 **Table 10.134** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with a maximum LoS A. Average delays and queues would be short and would not extend beyond the available link lengths. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the President Way/AAR roundabout.

10.3.202 Assessment Phase 2a includes a new roundabout junction to access the new Terminal 2 area. **Table 10.135** summarises the Proposed Development junction performance for the Terminal 2 access roundabout in the AM and PM peak hours in Assessment Phase 2b.

Table 10.135: Terminal 2 access roundabout (24) junction performance Assessment Phase 2b (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2b						
AAR Link Road (north)	402	0	4	388	0	5
Terminal 2 Short Stay Access (South)	42	0	0	21	0	0
Terminal 2 Drop Off Access (South)	415	0	13	367	0	8
President Way (west)	1	0	2	0	0	0
Average delay (seconds)	1			1		
Level of Service (LoS)	A			A		

10.3.203 **Table 10.135** shows that with the Proposed Development in Assessment Phase 2b the junction would operate with a maximum LoS A. Average delays and queues would be short and would not extend beyond the available link lengths. The Proposed Development in Assessment Phase 2b is not considered to have a significant impact on the operation of the Terminal 2 access roundabout.

Assessment Phase 2b summary

10.3.204 **Table 10.136** summarises the future baseline and the Proposed Development in Assessment Phase 2b junction performance.

Table 10.136: junction performance summary Assessment Phase 2b (future baseline and with the Proposed Development)

Junction	Level of Service				Average Delays (seconds)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b
M1 Junction 10 (1)	A	B	B	A	7	15	16	7
A1081 New Airport Way / London Road (north) roundabout (2)	C	C	B	C	24	26	15	29
A1081 New Airport Way / A1081 London Road (south) roundabout (3)	D	A	B	A	32	5	12	7
A1081 New Airport Way / B653 / Gipsy Lane junctions (4)	C	C	C	C	23	33	34	25
Kimpton Road / A505 Vauxhall Way signalised junction (5)	C	C	C	C	31	27	30	30

Junction	Level of Service				Average Delays (seconds)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b
A1081 New Airport Way / Percival Way signalised junction (7)	A	A	A	A	9	8	6	7
Percival Way / Frank Lester Way / President Way signalised junction (8)	B	B	A	B	11	19	5	16
A505 Vauxhall Way / Eaton Green Road revised roundabout (10)	A	B	A	B	7	13	10	12
Eaton Green Road / Frank Lester Way signalised junction (11)	A	B	A	B	6	16	9	16
Eaton Green Road / Wigmore Road signalised junction (12)	A	C	A	D	4	35	8	43
Vauxhall Way / Crawley Green Road signalised junction (13)	C	D	C	D	32	40	35	28
Crawley Green Road / Wigmore Lane signalised junction (14)	A	C	A	B	6	21	8	13

Junction	Level of Service				Average Delays (seconds)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b
A1081 New Airport Way / AAR signalised junction (6)	-	B	-	B	-	15	-	17
Eaton Green Road Link / AAR signalised junction (9)	-	C	-	C	-	32	-	31
Windmill Road / Kimpton Road signalised junction (15)	C	B	C	B	23	19	18	17
Eaton Green Road / Lalleford Road signalised junction (16)	D	C	B	B	28	21	13	15
Wigmore Lane / Raynham Way signalised junction (17)	A	A	A	A	4	10	6	9
Wigmore Lane / Asda access signalised junction (18)	A	B	A	C	4	16	7	29
Windmill Road / St Mary's Road / Crawley Green Road roundabout (19)	D	C	E	D	43	31	62	80
Crawley Green Road / Lalleford Road	A	B	A	C	2	18	3	23

Junction	Level of Service				Average Delays (seconds)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b
signalised junction (20)								
Provost Way / AAR signalised junction (21)	-	B	-	B	-	14	-	16
Provost Way / Percival Way signalised junction (22)	-	A	-	A	-	1	-	1
President Way / AAR roundabout (23)	-	A	-	A	-	9	-	7
Terminal 2 access roundabout (24)	-	A	-	A	-	1	-	1
Notes: LoS (A): free flow; (B): stable flow, slight delays; (C): stable flow, acceptable delays; (D): approaching unstable flow, tolerable delays; (E): unstable flow, intolerable delay and long queues; (F): congested, long delays and queues fail to clear.								

10.3.205 **Table 10.136** shows in the AM and PM peak hours the network would generally operate with free flow or stable conditions and would be broadly similar in Assessment Phase 2b and the future baseline. The Proposed Development in Assessment Phase 2b and associated junction mitigations are not considered to have a significant adverse impact on the operation of the highway network.

10.4 Junction impacts – outside Vissim study area

10.4.1 The strategic modelling and the operational Vissim modelling have shown that the Proposed Development and associated off-site mitigation would have limited impact in either the LBC area or beyond. As part of the on-going discussions with affected highway authorities, HCC and CBC have requested further consideration regarding impacts around Hitchin and Caddington. As a consequence, this section provides further consideration of the impacts in these areas. These

impacts have been considered using local junction modelling as set out in Chapter 9.

10.4.2 The road network assessed comprises a number of roundabouts and priority junctions. The operational performance of these junctions has been modelled using ARCADY for roundabouts and PICADY for the priority junctions.

10.4.3 The operation of the roundabouts and priority junctions have been tested with a standard peak profile. This means that the peak hour flow is profiled so that the majority of the peak hour traffic arrives in the middle part of the hour with lower flows at the beginning and end.

10.4.4 The operational performance of the roundabouts and priority junctions was determined by the Ratio of Flow to Capacity (RFC) and queue lengths. The theoretical capacity threshold of a roundabout and priority junction is when the junction/an arm of the junction has an RFC of 0.85.

10.4.5 Junction model runs were carried out for the weekday AM (08:00–09:00) and PM (17:00–18:00) peak hour.

Hitchin

10.4.6 The A505 forms the main east-west route connecting Luton to Hitchin, Letchworth Garden City, Baldock and via the A602, Stevenage. The following junctions are the first points of impact as the A505 enters Hitchin and connects to the A602 and have been identified by HCC for further consideration:

a. A602 Park Way/A602 Stevenage Road/B656 Hitchin Hill/B656 London Road/Gosmore Road roundabout;

b. A505 Upper Tilehouse Street/A505 Paynes Park/A602 Park Way roundabout;

c. A505 Offley Road/Pirton Road/A505 Upper Tilehouse Street/Wratten Road West mini-roundabout;

10.4.7 In the Strategic Modelling Forecasting Report (see **Appendix F**), it is estimated that traffic at the A602/B656 Hitchin Hill junction (a) and the A505/A602 junction (b) would experience delays of between 60 and 120 seconds in some Future Baseline years. Forecast delays at the A505/Pirton Road junction (c) are generally less than 60 seconds in the Future Baseline (without the Proposed Development) scenarios.

10.4.8 With the Proposed Development in place, the delays forecast in the strategic model fall within the same ranges as the Future Baseline with delays of between 60 and 120 seconds at the A602/B656 Hitchin Hill junction (a) and the A505/A602 junction (b). Delays remain lower at the A505/Pirton Road junction (c). Whilst this indicates that the impacts of the Proposed Development are not expected to be substantive, detailed junction modelling has been undertaken to assess the impacts in more detail and is set out below.

Future Baseline (without Proposed Development)

10.4.9 The following tables provide the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance. The model run with the Future Baseline traffic flows represents the baseline from which the impact of the development would be measured. The detailed analysis is shown in **Appendix J** and the modelled junction turning movements for the 2027, 2039 and 2043 Future Baseline are shown in **Appendix K**.

10.4.10 **Table 10.137** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the A602 Park Way/A602 Stevenage Road/B656 Hitchin Hill/B656 London Road/Gosmore Road roundabout in the AM and PM peak hours.

Table 10.137: A602 Park Way/A602 Stevenage Road/B656 Hitchin Hill/B656 London Road/Gosmore Road roundabout – junction performance 2027, 2039 and 2043 Future Baseline (without the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (PCUs)	RFC*	Queue (PCUs)	Demand (PCUs)	RFC*	Queue (PCUs)
2027						
A602 Park Way	1376	-	299	1180	-	130
Hitchin Hill	446	-	4	634	-	24
A602 Stevenage Road	1096	-	245	1082	-	274
London Road	206	-	1	284	-	1
Gosmore Road	108	-	0	71	-	0
Average junction delay (seconds)	707			532		
2039						
A602 Park Way	1398	-	340	1241	-	159
Hitchin Hill	423	-	4	578	-	15

Arm	AM Peak			PM Peak		
	Demand (PCUs)	RFC*	Queue (PCUs)	Demand (PCUs)	RFC*	Queue (PCUs)
A602 Stevenage Road	1114	-	287	1090	-	290
London Road	259	-	1	337	-	1
Gosmore Road	115	-	0	75	-	0
Average junction delay (seconds)	795			572		
2043						
A602 Park Way	1397	-	345	1249	-	184
Hitchin Hill	433	-	5	578	-	13
A602 Stevenage Road	1126	-	292	1114	-	300
London Road	283	-	1	303	-	1
Gosmore Road	119	-	0	78	-	0
Average junction delay (seconds)	807			617		

* This junction has been modelled in lane simulation mode to better represent lane usage. ARCADY does not report RFC values when using lane simulation.

10.4.11 **Table 10.137** shows that there is predicted to be extensive queuing on both the A602 approaches to the roundabout in the 2027, 2039 and 2043 Future Baseline and in both the AM and PM peak hour. The length of the queues on the A602 indicates that there would be capacity problems in the 2027, 2039 and 2043 Future Baseline.

10.4.12 **Table 10.138** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the A505 Upper Tilehouse Street/A505 Paynes Park/A602 Park Way roundabout in the AM and PM peak hours.

Table 10.138: A505 Upper Tilehouse Street/A505 Paynes Park/A602 Park Way roundabout – junction performance 2027, 2039 and 2043 Future Baseline (without the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
2027						
Upper Tilehouse Street	1118	0.78	4	972	0.74	3
Paynes Park	955	0.43	1	1021	0.43	1
A602 Park Way	643	0.46	1	795	0.59	2
Average junction delay (seconds)	7			6		
2039						
Upper Tilehouse Street	1345	0.95	15	1159	0.85	6
Paynes Park	895	0.44	1	1006	0.43	1
A602 Park Way	670	0.48	1	761	0.56	1
Average junction delay (seconds)	20			9		
2043						
Upper Tilehouse Street	1360	0.97	18	1200	0.87	6
Paynes Park	898	0.44	1	1001	0.43	1
A602 Park Way	675	0.49	1	742	0.56	1
Average junction delay (seconds)	23			10		

10.4.13 **Table 10.138** shows that the roundabout would be operating within its theoretical capacity threshold in the 2027 AM and PM peak hour. By 2039, the growth in traffic would lead to the roundabout operating above its capacity in the AM peak hour with issues on Upper Tilehouse Street, and at capacity in the PM peak hour. The operation of the roundabout is slightly worsened in 2043 and is over capacity in both peak hours.

10.4.14 **Table 10.139** summarises the 2027, 2039 and 2043 Future Baseline (without the Proposed Development) junction performance for the A505 Offley Road/Pirton Road/A505 Upper Tilehouse Street/Wratten Road West mini roundabout in the AM and PM peak hours.

Table 10.139: A505 Offley Road/Pirton Road/A505 Upper Tilehouse Street/Wratten Road West mini-roundabout – junction performance 2027, 2039 and 2043 Future Baseline (without the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
2027						
A505 Offley Road	564	0.90	7	544	0.93	9
Pirton Road	517	0.95	10	396	0.71	2
Upper Tilehouse Street	706	0.75	3	757	0.80	4
Wratten Road West	15*	0.04	0	15*	0.04	0
Average junction delay (seconds)	40			31		
2039						
A505 Offley Road	837	1.33	139	664	1.18	62
Pirton Road	475	0.95	11	462	0.85	5
Upper Tilehouse Street	730	0.77	3	795	0.84	5
Wratten Road West	15*	0.04	0	15*	0.04	0
Average junction delay (seconds)	296			120		

Arm	AM Peak			PM Peak		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
2043						
A505 Offley Road	894	1.41	189	678	1.20	70
Pirton Road	436	0.88	6	489	0.90	7
Upper Tilehouse Street	748	0.79	4	834	0.88	7
Wratten Road West	15*	0.04	0	15*	0.04	0
Average junction delay (seconds)	389			140		

* The CBLTM-LTN did not include a traffic flow for Wratten Road West as it is a minor road. A nominal flow of 15 PCUs arriving and departing Wratten Road West has been included in the junction model.

10.4.15 **Table 10.139** shows that the roundabout would be operating above its theoretical capacity threshold in the 2027, 2039 and 2043 AM and PM peak hour with issues on the A505 Offley Road in particular. The operation of the roundabout gets progressively worse with the growth in traffic to 2043.

With Proposed Development

10.4.16 As set out at the beginning of Chapter 10 the Proposed Development includes a number of off-site junction improvements including the following:

a. A602 Park Way/Stevenage Road junction improvements (drawing LLADCO-3C-ARP-SFA-HWM-DR-CE-0028)

b. A602 Park Way/A505 Upper Tilehouse Street junction improvements (drawing LLADCO-3C-ARP-SFA-HWM-DR-CE-0027)

c. A505 Moormead Hill/B655 Pirton Road/Upper Tilehouse Street junction improvements (drawing LLADCO-3C-ARP-SFA-HWM-DR-CE-0026)

10.4.17 The improvements proposed at the above junctions are shown in **Appendix A** and are summarised in **Table 9.1** (Work No. 6k, 6l and 6m – see Section 9.3). The 'With Development' analysis identifies that the Proposed Development would have an insignificant impact on the operation of the junctions in 2027 in Assessment Phase 1 and therefore the improvements are proposed for implementation in 2039 (Assessment Phase 2a and Assessment Phase 2b).

10.4.18 The following tables provide the 2027, 2039 and 2043 with the Proposed Development) junction performance. The detailed analysis is shown in **Appendix**

J and the modelled junction turning movements for the 2027, 2039 and 2043 with Proposed Development are shown in **Appendix K**.

2027 Assessment Phase 1

10.4.19 **Table 10.140** summarises the future baseline and Proposed Development junction performance for the A602 Park Way/A602 Stevenage Road/B656 Hitchin Hill/B656 London Road/Gosmore Road roundabout junction in the AM and PM peak hours in Assessment Phase 1.

Table 10.140: A602 Park Way/A602 Stevenage Road/B656 Hitchin Hill/B656 London Road/Gosmore Road roundabout – junction performance 2027 Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	AM Peak					
	Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
A602 Park Way	1376	-	299	1375	-	281
Hitchin Hill	446	-	4	437	-	4
A602 Stevenage Road	1096	-	245	1087	-	251
B656 London Road	206	-	1	204	-	0
Gosmore Road	108	-	0	108	-	0
Average junction delay (seconds)	701			692		
	PM Peak					
A602 Park Way	1180	-	130	1189	-	141
Hitchin Hill	634	-	24	611	-	20
A602 Stevenage Road	1082	-	274	1084	-	270
B656 London Road	284	-	1	287	-	1
Gosmore Road	71	-	0	71	-	0

Arm	AM Peak					
	Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Average junction delay (seconds)	532			544		

* This junction has been modelled in lane simulation mode to better represent lane usage. ARCADY does not report RFC values when using lane simulation.

10.4.20 **Table 10.140** shows that the junction would experience significant queuing on both of the A602 approaches to the junction in the AM and PM peak, like in the Future Baseline. There is only a small change in traffic demand at the junction as a result of Assessment Phase 1 of the Proposed Development and as a consequence the impact on the predicted queue lengths is insignificant in both peaks.

10.4.21 **Table 10.141** summarises the future baseline and Proposed Development junction performance for the A505 Upper Tilehouse Street/A505 Paynes Park/A602 Park Way roundabout junction in the AM and PM peak hours in Assessment Phase 1.

Table 10.141: A505 Upper Tilehouse Street/A505 Paynes Park/A602 Park Way roundabout - junction performance 2027 Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	AM Peak					
	Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Upper Tilehouse Street	1118	0.78	4	1136	0.80	4
Paynes Park	955	0.43	1	949	0.43	1
A602 Park Way	643	0.46	1	645	0.46	1
Average junction delay (seconds)	7			7		

Arm	AM Peak					
	Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
	PM Peak					
Upper Tilehouse Street	972	0.74	3	983	0.75	3
Paynes Park	1021	0.43	1	1024	0.43	1
A602 Park Way	795	0.59	2	792	0.59	1
Average junction delay (seconds)	6			6		

10.4.22 **Table 10.141** shows that the junction would operate within its theoretical capacity threshold in the AM and PM peak hour. There is only a small change in traffic demand as a result of Assessment Phase 1 of the Proposed Development and as a consequence the impact on the operation of the junction is insignificant.

10.4.23 **Table 10.142** summarises the future baseline and Proposed Development junction performance for the A505 Offley Road/Pirton Road/A505 Upper Tilehouse Street/Wratten Road West mini-roundabout junction in the AM and PM peak hours in Assessment Phase 1.

Table 10.142: A505 Offley Road/Pirton Road/A505 Upper Tilehouse Street/Wratten Road West mini-roundabout - junction performance 2027 Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	AM Peak					
	Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
A505 Offley Road	564	0.90	7	581	0.93	9
Pirton Road	517	0.95	10	518	0.97	12

Arm	AM Peak					
	Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Upper Tilehouse Street	706	0.75	3	694	0.73	3
Wratten Road West	15*	0.04	0	15*	0.04	0
Average junction delay (seconds)	40			46		
	PM Peak					
A505 Offley Road	544	0.93	9	554	0.94	10
Pirton Road	396	0.71	2	398	0.72	2
Upper Tilehouse Street	757	0.80	4	752	0.79	4
Wratten Road West	15*	0.04	0	15*	0.01	0
Average junction delay (seconds)	31			33		

* The CBLTM-LTN did not include a traffic flow for Wratten Road West as it is a minor road. A nominal flow of 15 PCUs arriving and departing Wratten Road West has been included in the junction model.

10.4.24 **Table 10.142** shows that the junction would operate above its theoretical capacity threshold in the AM and PM peak hour, like in the future baseline. There is only a small change in traffic demand as a result of the Proposed Development and as a consequence the impact on the operation of the junction is insignificant.

2039 Assessment Phase 2a

10.4.25 **Table 10.143** summarises the future baseline and Proposed Development, (including the junction upgrade) junction performance for the A602 Park Way/A602 Stevenage Road/B656 Hitchin Hill/B656 London Road/Gosmore Road roundabout junction in the AM and PM peak hours in Assessment Phase 2a.

Table 10.143: A602 Park Way/A602 Stevenage Road/B656 Hitchin Hill/B656 London Road/Gosmore Road roundabout – junction performance 2039 Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	AM Peak					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
A602 Park Way	1398	-	340	1343	-	114
Hitchin Hill	423	-	4	468	-	3
A602 Stevenage Road	1114	-	287	1119	-	120
B656 London Road	259	-	1	263	-	1
Gosmore Road	115	-	0	115	-	0
Average junction delay (seconds)	795			263		
	PM Peak					
A602 Park Way	1241	-	159	1281	-	63
Hitchin Hill	578	-	15	549	-	5
A602 Stevenage Road	1090	-	290	1156	-	236
B656 London Road	337	-	1	319	-	1
Gosmore Road	75	-	0	77	-	0

Arm	AM Peak					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Average junction delay (seconds)	572			349		

* This junction has been modelled in lane simulation mode to better represent lane usage. ARCADY does not report RFC values when using lane simulation.

10.4.26 **Table 10.143** shows that the junction improvement would reduce the queue lengths and average junction delay with the Proposed Development in place, to a level lower than that predicted for the Future Baseline in the AM and PM peak. The Proposed Development and associated junction mitigation therefore has a beneficial impact on the operation of the junction.

10.4.27 **Table 10.144** summarises the future baseline and Proposed Development (including the junction upgrade) junction performance for the A505 Upper Tilehouse Street/A505 Paynes Park/A602 Park Way roundabout junction in the AM and PM peak hours in Assessment Phase 2a.

Table 10.144: A505 Upper Tilehouse Street/A505 Paynes Park/A602 Park Way roundabout – junction performance 2039 Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	AM Peak					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Upper Tilehouse Street	1345	0.95	15	1219	0.87	7
Paynes Park	895	0.44	1	1379	0.59	2
A602 Park Way	670	0.48	1	560	0.45	1
Average delay (seconds)	20			10		
	PM Peak					

Arm	AM Peak					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Upper Tilehouse Street	1159	0.85	6	1186	0.93	11
Paynes Park	1006	0.43	1	1410	0.60	2
A602 Park Way	761	0.56	1	726	0.59	1
Average junction delay (seconds)	9			14		

10.4.28 **Table 10.144** shows that the junction would operate at or above its theoretical capacity threshold in the AM and PM peak hour. The operation of the junction is improved in the AM peak hour despite the increase in total traffic, as rerouting results in less traffic on Upper Tilehouse Street. In the PM peak hour, the increase in traffic on Upper Tilehouse Street results in an increase in the maximum RFC and average junction delay at the junction however overall, average queues and delays are not considered to be substantial and are no worse than those experienced in the future baseline AM peak hour.

10.4.29 **Table 10.145** summarises the future baseline and Proposed Development (including the junction upgrade) junction performance for the A505 Offley Road/Pirton Road/A505 Upper Tilehouse Street/Wratten Road West mini-roundabout junction in the AM and PM peak hours in Assessment Phase 2a.

Table 10.145: A505 Offley Road/Pirton Road/A505 Upper Tilehouse Street/Wratten Road West mini-roundabout - junction performance 2039 Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	AM Peak					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
A505 Offley Road	837	1.33	139	579	0.87	6

Arm	AM Peak					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Pirton Road	475	0.95	11	600	1.12	43
Upper Tilehouse Street	730	0.77	3	975	0.79	4
Wratten Road West	15*	0.04	0	15*	0.06	0
Average junction delay (seconds)	296			76		
	PM Peak					
A505 Offley Road	664	1.18	62	681	1.16	60
Pirton Road	462	0.85	5	471	0.89	7
Upper Tilehouse Street	795	0.84	5	949	0.77	3
Wratten Road West	15*	0.04	0	15*	0.06	0
Average junction delay (seconds)	120			103		

* The CBLTM-LTN did not include a traffic flow for Wratten Road West as it is a minor road. A nominal flow of 15 PCUs arriving and departing Wratten Road West has been included in the junction model.

10.4.30 **Table 10.145** shows that the junction would operate above its theoretical capacity threshold in the AM and PM peak hour, like in the Future Baseline. The operation of the junction is improved in the AM peak hour despite the increase in total traffic, as rerouting results in less traffic on the A505 Offley Road. Average delays are also substantially reduced. In the PM peak hour, the proposed mitigation would improve the junction operation when compared to the Future Baseline.

2043 Assessment Phase 2b

10.4.31 **Table 10.146** summarises the future baseline and Proposed Development (including the junction upgrade) junction performance for the A602 Park Way/A602 Stevenage Road/B656 Hitchin Hill/B656 London Road/Gosmore Road roundabout junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.146: A602 Park Way/A602 Stevenage Road/B656 Hitchin Hill/B656 London Road / Gosmore Road roundabout – junction performance 2043 Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	AM Peak					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2b)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
A602 Park Way	1397	-	345	1359	-	137
Hitchin Hill	433	-	5	462	-	3
A602 Stevenage Road	1126	-	292	1150	-	157
B656 London Road	283	-	1	307	-	1
Gosmore Road	119	-	0	120	-	0
Average junction delay (seconds)	807			342		
	PM Peak					
A602 Park Way	1249	-	184	1312	-	73
Hitchin Hill	578	-	13	527	-	4
A602 Stevenage Road	1114	-	300	1160	-	233
B656 London Road	303	-	1	334	-	1
Gosmore Road	78	-	0	78	-	0
Average junction delay (seconds)	617			347		

* This junction has been modelled in lane simulation mode to better represent lane usage. ARCADY does not report RFC values when using lane simulation.

10.4.32 **Table 10.146** shows that the junction improvement would reduce the queue lengths and average junction delay with the Proposed Development in place, to a level lower than that predicted for the Future Baseline in the AM and PM peak.

The Proposed Development and associated junction mitigation are not considered to have an adverse impact on the operation of the junction.

10.4.33 **Table 10.147** summarises the future baseline and Proposed Development (including the junction upgrade) junction performance for the A505 Upper Tilehouse Street/A505 Paynes Park/A602 Park Way roundabout junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.147: A505 Upper Tilehouse Street/A505 Paynes Park/A602 Park Way roundabout - junction performance 2043 Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	AM Peak					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2b)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Upper Tilehouse Street	1360	0.97	18	1290	0.92	10
Paynes Park	898	0.44	1	1315	0.58	2
A602 Park Way	675	0.49	1	589	0.47	1
Average junction delay (seconds)	23			13		
	PM Peak					
Upper Tilehouse Street	1200	0.87	6	1271	0.96	16
Paynes Park	1001	0.43	1	1389	0.60	2
A602 Park Way	742	0.56	1	711	0.56	1
Average junction delay (seconds)	10			20		

10.4.34 **Table 10.147** shows that in the AM peak, the operation of the improved junction with the Proposed Development in place would be better than in the Future Baseline. In the PM peak the junction operation would be worse than in the Future Baseline with the Upper Tilehouse Street approach operating above its capacity. The queue length would not however block back to any other junctions and the

average junction delay remains relatively small and overall average delays are not materially worse than those experienced in the future baseline AM peak hour.

10.4.35 **Table 10.148** summarises the future baseline and Proposed Development (including the junction upgrade) junction performance for the A505 Offley Road/Pirton Road/A505 Upper Tilehouse Street/Wratten Road West mini-roundabout junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.148: A505 Offley Road/Pirton Road/A505 Upper Tilehouse Street/Wratten Road West mini-roundabout - junction performance 2043 Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	AM Peak					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2b)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
A505 Offley Road	894	1.41	189	603	0.91	8
Pirton Road	436	0.88	6	646	1.24	75
Upper Tilehouse Street	748	0.79	4	997	0.81	4
Wratten Road West	15*	0.04	0	15*	0.06	0
Average junction delay (seconds)	389			131		
	PM Peak					
A505 Offley Road	678	1.20	70	752	1.29	104
Pirton Road	489	0.90	7	486	0.92	8
Upper Tilehouse Street	834	0.88	7	960	0.78	3
Wratten Road West	15*	0.04	0	15*	0.06	0
Average junction delay (seconds)	140			198		

* The CBLTM-LTN did not include a traffic flow for Wratten Road West as it is a minor road. A nominal flow of 15 PCUs arriving and departing Wratten Road West has been included in the junction model.

10.4.36 **Table 10.148** shows that the junction would operate above its theoretical capacity threshold in the AM and PM peak hour, like in the future baseline. The operation of the junction would be improved in the AM peak hour despite the increase in total traffic, as rerouting results in less traffic on the A505 Offley Road. In the PM peak hour, the junction operation would be worsened with the maximum RFC and average junction delay increased. The junction location is constrained by properties on all sides and options to add further mitigation are limited. When the increased impact in the PM peak hour is balanced against the improvement in the AM peak hour, the overall impact is not considered to materially worsen the performance of the junction in Assessment Phase 2b.

Caddington

10.4.37 The following junctions have been identified by CBC for further consideration:

a. A1081 London Road/Newlands Road priority junction;
b. B4540 Church Road/Newlands Road priority junction;
c. Newlands Road/Luton Road/Farley Hill priority junction;
d. Luton Road/Chaul End Road priority junction; and
e. Chaul End Road/Hatters Way signalised junction.

10.4.38 The strategic modelling forecasts that delays at the Caddington junctions (d)-(h) would be low in the Future Baseline and that the delays would remain within the reported bandwidths with the Proposed Development in place. With the exception of the A1081 London Road/Newlands Road junction (d), which is forecast to experience delays of between 15 and 30 seconds, all other junctions are predicted to have delays below 15 seconds.

10.4.39 The strategic modelling outcomes have been discussed with CBC and further information on traffic impacts for the Proposed Development impacts in 2043, with Assessment Phase 2b representing the full development, have been provided as part of an ongoing dialogue. The traffic impact at each junction (d-h) is summarised in **Table 10.149**.

Table 10.149: Caddington junctions – 2043 traffic impact

Junction	Peak period	2043 Total Traffic Volume (PCUs)		Traffic Volume change (PCUs)	Percent change
		Future Baseline	With Development		
A1081 London Road/Newlands Road	AM	2,696	2,656	-40	-1%
	PM	2,641	2,591	-50	-2%
B4540 Church Road/Newlands Road	AM	1,351	1,364	13	1%
	PM	1,368	1,424	56	4%
Newlands Road/Luton Road/Farley Hill	AM	2,082	2,122	40	2%
	PM	2,239	2,493	254	11%
Luton Road/Chaul End Road	AM	1,899	1,960	61	3%
	PM	2,084	2,252	168	8%
Chaul End Road/Hatters Way	AM	2,892	2,935	43	1%
	PM	2,712	2,785	73	3%

10.4.40 The largest traffic impacts would occur at the Newlands Road/Luton Road/Farley Hill junction (11% in the PM peak hour) and at the Luton Road/Chaul End Road junction (8% in the PM peak hour). The percentage impact on the other three junctions would be generally below 4%, with traffic flows decreasing at the A1081 London Road/Newlands Road junction. The impacts at these junctions (d), (e) and (h) are well within daily variations and not therefore material.

10.4.41 Given the low traffic impact at junctions (d), (e) and (h), detailed junction modelling has been undertaken for the following junctions:

a. Newlands Road/Luton Road/Farley Hill priority junction; and

b. Luton Road/Chaul End Road priority junction.

Future Baseline (without Proposed Development)

10.4.42 The following tables provide the 2043 Future Baseline (without the Proposed Development) junction performance. The model run with the Future Baseline traffic flows represents the baseline from which the impact of the development would be measured. The detailed analysis is shown in **Appendix L** and the

modelled junction turning movements for the 2043 Future Baseline are shown in **Appendix M**.

10.4.43 **Table 10.150** summarises the 2043 Future Baseline (without the Proposed Development) junction performance for the Newlands Road/Luton Road/Farley Hill priority junction in the AM and PM peak hours.

Table 10.150: Newlands Road/Luton Road/Farley Hill priority junction – junction performance 2043 Future Baseline (without the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
2043						
Newlands Road (Left Turn)	167	0.94	5	394	1.28	50
Newlands Road (Right Turn)	182	0.92	6	223	1.26	29
Luton Road (Right Turn)	523	0.95	19	261	0.55	1
Average junction delay (seconds)	36			116		

10.4.44 **Table 10.150** shows that the junction would be operating above its theoretical capacity threshold in the 2043 AM and PM peak hour with all turning movements having capacity issues in at least one of the peak hours. The operation of the junction is worst in the PM peak hour.

10.4.45 **Table 10.151** summarises the 2043 Future Baseline (without the Proposed Development) junction performance for the Luton Road/Chaul End Road priority junction in the AM and PM peak hours.

Table 10.151: Luton Road/Chaul End Road priority junction - junction performance 2043 Future Baseline (without the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
2043						

Arm	AM Peak			PM Peak		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Chaul End Road (Left Turn)	319	1.39	53	289	1.65	59
Chaul End Road (Right Turn)	206	1.38	35	178	1.63	37
Luton Road (Ahead and Right)	544	0.69	3	1015	1.11	69
Dunstable Road (Ahead and Left)	830	0.55	1	602	0.36	1
Average junction delay (seconds)	171			263		

10.4.46 **Table 10.151** shows that the junction would be operating above its theoretical capacity threshold in the 2043 AM and PM peak hour. There are major capacity issues predicted on Chaul End Road in both peak hours and there are also issues on the Luton Road approach in the PM peak hour. The operation of the junction is worst in the PM peak hour.

With Proposed Development (Assessment Phase 2b)

10.4.47 The following tables provide the 2043 future baseline and with Assessment Phase 2b Proposed Development junction performance. The detailed analysis is shown in **Appendix L** and the modelled junction turning movements for the 2043 Proposed Development are shown in **Appendix M**.

10.4.48 **Table 10.152** summarises the future baseline and Proposed Development junction performance for the Newlands Road/Luton Road/Farley Hill priority junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.152: Newlands Road/Luton Road/Farley Hill priority junction - junction performance 2043 Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	AM Peak					
	Future Baseline			With Assessment Phase 2b		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Newlands Road (Left Turn)	167	0.94	5	171	0.96	6
Newlands Road (Right Turn)	182	0.92	6	199	0.93	7
Luton Road (Right Turn)	523	0.95	19	451	0.84	7
Average junction delay (seconds)	36			26		
	PM Peak					
Newlands Road (Left Turn)	394	1.28	50	436	1.55	99
Newlands Road (Right Turn)	223	1.26	29	236	1.53	54
Luton Road (Right Turn)	261	0.55	1	289	0.64	2
Average junction delay (seconds)	116			259		

10.4.49 **Table 10.152** shows that the junction would operate above its theoretical capacity threshold in the AM and PM peak hour, like in the Future Baseline. In the AM peak there would be a reduction in the turning traffic at the junction, particularly on the right turn from Luton Road which improves the operation of this approach and results in a reduction in average junction delay. In the PM peak, the largest increase in traffic is on Newlands Road which was already over capacity in the Future Baseline and as a consequence the junction operation is worsened.

10.4.50 **Table 10.153** summarises the future baseline and Proposed Development junction performance for the Luton Road/Chaul End Road priority junction in the AM and PM peak hours in Assessment Phase 2b.

Table 10.153: Luton Road/Chaul End Road priority junction - junction performance 2043 without and with Phase 2b

Arm	AM Peak					
	Future Baseline (without Phase 2b)			With Assessment Phase 2b		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Chaul End Road (Left Turn)	319	1.39	53	356	1.47	69
Chaul End Road (Right Turn)	206	1.38	35	201	1.46	40
Luton Road (Ahead and Right)	544	0.69	3	565	0.71	3
Dunstable Road (Ahead and Left)	830	0.55	1	838	0.55	1
Average junction delay (seconds)	171			221		
	PM Peak					
Chaul End Road (Left Turn)	289	1.65	59	350	3.63	167
Chaul End Road (Right Turn)	178	1.63	37	177	3.58	85
Luton Road (Ahead and Right)	1015	1.11	69	1111	1.25	141
Dunstable Road (Ahead and Left)	602	0.36	1	614	0.40	1

Arm	AM Peak					
	Future Baseline (without Phase 2b)			With Assessment Phase 2b		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Average junction delay (seconds)	263			939		

10.4.51 **Table 10.153** shows that the junction would operate above its theoretical capacity threshold in the AM and PM peak hour, like in the Future Baseline. In the AM peak, there is a relatively small increase in total traffic at the junction (3.2%), but the impact is more noticeable because the junction is operating well above its capacity on Chaul End Road in the Future Baseline. In the PM peak, the total traffic at the junction increases by 8.1% and this would have a substantial impact on the operation of the junction, partly due to the junction being well above its capacity in the Future Baseline.

10.4.52 Detailed junction analysis has shown that the Newlands Road/Luton Road/Farley Hill junction and Luton Road/Chaul End Road junction would have significant capacity issues in the 2043 Future Baseline. The changes in traffic flows as a result of the Proposed Development would potentially add to the baseline problems. Nevertheless, providing additional capacity at the junctions could attract more traffic to pass through the village of Caddington rather than using more appropriate roads. CBC has suggested that works to discourage trips routing through Slip End and/ or Caddington may need consideration, with the increase at the Luton Road/Chaul End Road junction in particular being substantial enough to merit further attention. The Applicant and operator would work with CBC to find appropriate solutions if issues were to arise as a result of the Proposed Development. As the junction is predicted to experience future baseline issues in the absence of the Proposed Development, the Applicant and operator would consider providing a proportionate contribution towards any measures.

10.5 Overall traffic modelling summary

10.5.1 A comprehensive approach to modelling the impact of the Proposed Development has been carried out, including strategic modelling, Vissim modelling and local junction capacity assessments. This modelling approach includes consideration of growth including committed developments and planned transport schemes. The modelling demonstrates that the impacts from the Proposed Development and mitigations included in the scheme at Assessment Phase 1, 2a and 2b (full development) would not have a significant adverse impact on the operation of the highway network in the local or wider area.

REFERENCES

Ref 9.1 Ministry of Housing, Communities and Local Government (2020) *Environmental Impact Assessment*. London, United Kingdom
Ref 10.1 DfT (2022) *Transport Analysis Guidance*. London, United Kingdom