



South West Hertfordshire

Interpretation of COMET Model Results

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1 Introduction

Hertfordshire County Council have developed a Countywide model COMET. This consists of a suite of models including a Variable Demand Model, Highways Model and Public Transport Model and has been used to test the cumulative impacts of Local Plan growth across the county.

A new 2036 Forecast Model run was undertaken in early 2019 with districts Local Plan development assumptions as of Autumn 2018. Local Plan growth plus transport mitigation measures as identified by the districts and boroughs has been tested.

Countywide results of the latest Local Plan Run 4 have been documented in the Forecasting Report. This note provides a more detailed assessment of the model results within the South West Herts area (encompassing Dacorum, Hertsmere, St Albans, Three Rivers and Watford) considering the cumulative impact of growth and potential transport schemes across this area and in other Hertfordshire districts.

The highway assignment component of the COMET model suite is in SATURN. SATURN is a tool that suits the strategic geographical scale of COMET, however, does not enable investigation of detailed sections of the highway network (e.g. detailed junction or corridor assessment). At this stage, therefore, the results presented here should be interpreted as high-level indications of likely traffic conditions.

The COMET model enables an interpretation of potential impacts across the whole area taking into account the influence of growth and schemes in other areas.

The COMET model uses Passenger Car Units (PCUs) to represent general traffic. This is common practice for traffic modelling software. In COMET, cars and LGVs are coded as 1 PCU, HGVs are coded as 2.2 PCUs.

In addition to the results presented in the main body of this note, detailed, district-based results, are presented in the Appendices:

- Appendix B – Dacorum
- Appendix C – Hertsmere
- Appendix D – St Albans
- Appendix E – Three Rivers
- Appendix F – Watford

2 Model Assumptions

2.1 Planning Assumptions

Planning assumptions are as per the COMET Local Plan Run 4 and are listed in Table 2-1 below. This is based on Tables 5.1 and 5.2 of the COMET Forecasting Report.

Table 2-1 COMET Model Local Plan Run 4 Planning Assumptions

	Dwellings 2014-2036¹	Jobs 2014-2036
Dacorum	19,859 ²	1,494 ³
Hertsmere	16,785 ²	6,314
St. Albans	17,749	6,213 ⁴
Three Rivers	4,069	8,275
Watford	10,313	11,193
SWH Total	68,775	33,489
County Overall	114,540	62,728

Source Table 1.1 Comet LP4 Forecasting Report Final June 2019

¹Includes as built in addition to local plan allocations and windfall allowance

²Includes some speculative sites with currently no planning status

³LEZ is coded in St Albans

⁴LEZ jobs gain is counterbalanced by employment loss

2.2 Infrastructure Assumptions

A number of schemes which were deemed as committed or highly likely along with appropriate access points from the key developments were already coded into model. In addition, there are general schemes identified in Local Plan Infrastructure Delivery Plans and other studies such as the SWH Growth and Transport Plan and Maylands Growth Corridor Study to accommodate growth. The schemes included in the South West Herts area are listed in Appendix A.

It should be noted that schemes have been included in the test regardless of their certainty level. Therefore, the model run includes a number of hypothetical conceptual schemes where no designs are yet available and therefore high level assumptions of their layout / impact have been used.

As all the schemes have been modelled together it is not possible to isolate the impacts of individual schemes in this forecast run.

Given the strategic nature of the COMET model it was not possible to include some of the more minor changes to the highway network. Where scheme elements were not coded this is indicated in the table.

3 Model Results

3.1 Flow Differences

Figure 3-1 and Figure 3-2 show the difference in flows between 2014 and 2036 models in the AM and PM peaks in South West Herts with green illustrating where flows increase and blue indicating where there are decreases in flow. This provides an indication of the impact of the planning data and growth information, alongside the impact of proposed schemes and mitigation schemes. As COMET also includes a Variable Demand and Public Transport model behavioural responses to congestion such as peak spreading and switching to other modes (especially rail) are also taken into account.

It should be noted that flow differences are only shown where the highway network coding in both models matches and therefore changes in flow on new infrastructure such as new link roads, do not show up.

Further detail for the key towns is given in the following pages.

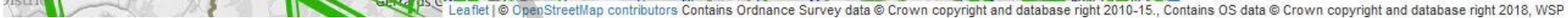


Figure 3-1 2036 - 2014 Actual Flow in South West Hertfordshire AM Peak (08:00 – 09:00)

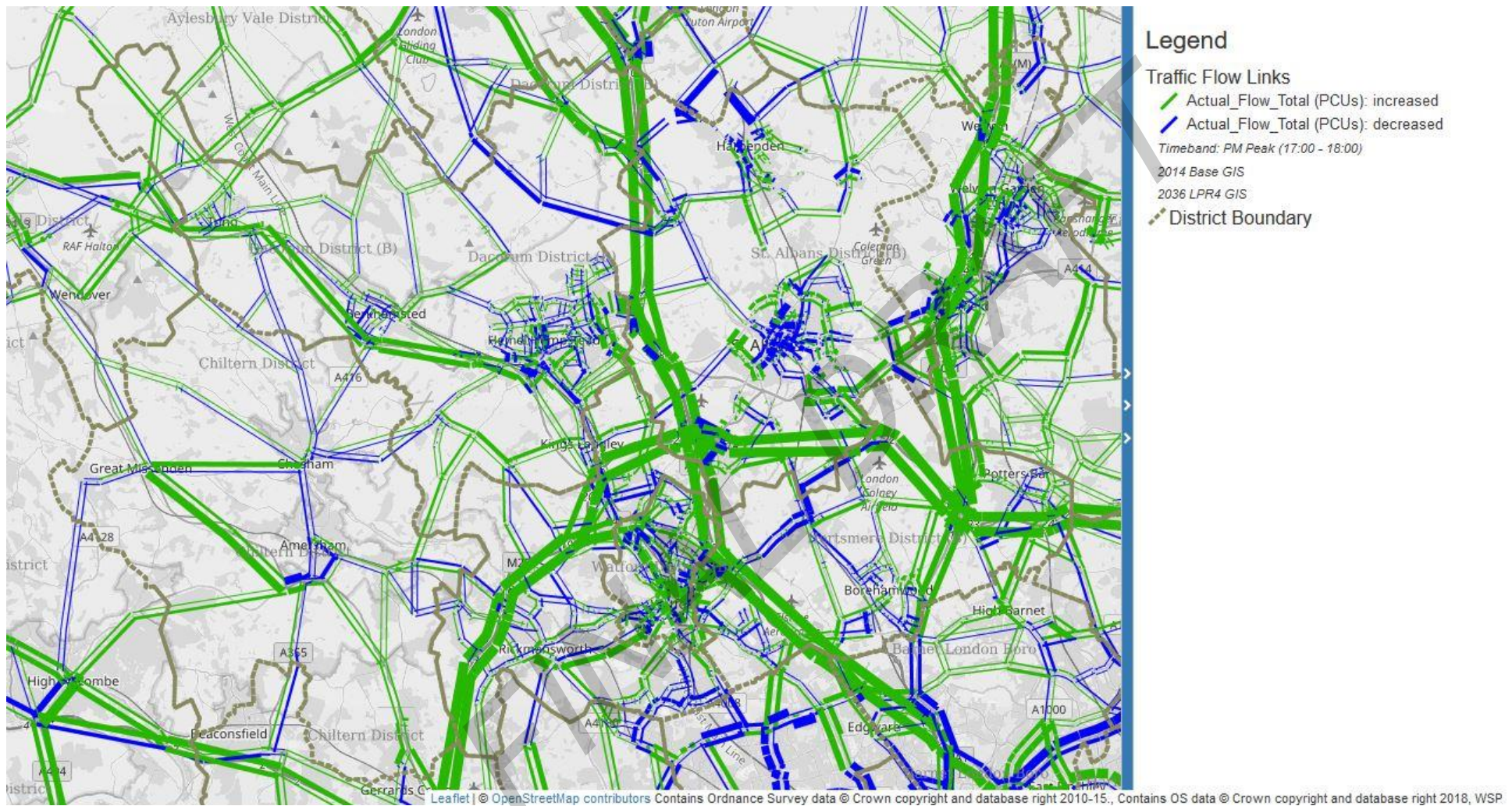


Figure 3-2 2036 - 2014 Actual Flow in South West Hertfordshire PM Peak (17:00 – 18:00)

The changes in flow between the base and future year are a combination of growth in the numbers of dwellings and jobs and the impact of new infrastructure schemes.

Key changes are outlined by District below, more detailed plans are included in the appendices.

3.1.1 Key Flow Changes in Dacorum (see Appendix B for detailed plans)

There is an increase in traffic flow on the A41 between Tring and Berkhamsted. This increase is largest northbound in the AM and southbound in the PM. This is a result of housing and employment growth in the area.

3.1.1.1 Hemel Hempstead:

Numerous roads in the South West Hemel Hempstead are forecast to experience a decrease in traffic volume. This is due to the scheme included to convert Fishery Road into a cycle and bus only road. This reduces capacity in the area and makes it less attractive to through traffic, causing traffic re-distribution.

There is a significant increase in traffic volume to the east of Hemel Hempstead as a result of development in the Maylands and East Hemel area. This includes an increase in traffic leaving the M1 to join the A414. The link road coded in the north Hemel area causes re-routing of traffic in the Potten End Area

LP Run 4 shows approximately 300 PCUs less on the A414 St. Albans Road, in both the AM and PM peaks, when compared to LP Run 3. This is because of a bus lane in each direction being coded into the model in line with the GTP proposals for a sustainable travel corridor. This bus lane reduces the road from a dual carriageway to a single carriageway, reducing the capacity of the road. This causes increased delay times and encourages traffic to re-route onto alternative roads.

To the south of Hemel Hempstead, LP Run 4 predicts the re-routing of traffic onto more minor roads in the AM peak. This is as a result of traffic avoiding the delays on the A41 approach to M25 J20.

3.1.1.2 Berkhamsted:

There is a reduction in the volume of traffic traveling southbound and northbound through Berkhamsted in both the AM and PM peaks. This is a result of the signalisation of the junction of A416 Kings Hill Way / A416 Kings Road / Shooters Way. This signalisation has been implemented since the 2014 Base Year was created. The scheme is designed to improve the pedestrian crossing facilities at the junction, however it does have the impact of increasing delay times and therefore encouraging re-routing of traffic away from the junction. Southbound traffic is re-routing onto Chesham Road in the AM and PM peaks. Chesham Road is one-way (southbound) for cars exiting the high street, northbound traffic is unable to re-route on Chesham Road, as a result there is a notable decrease (96 PCUs in the AM peak and 158 in the PM peak) in traffic flow northbound into Berkhamsted from A416 Chesham Road. Junction optimisation tests suggest that there is limited potential to improve junction optimisation through re-configured signal times.

This scheme was implemented in 2018, and therefore not included in the 2014 Base Year. Any future iterations of the base model will need to be updated to include the signalisation to ensure that the difference shown with the future year will be reflective of conditions.

Signalisation was coded into LP Run 3 as well as LP Run 4. However, a predicted increase in delay times experienced by all three arms of the junction means a greater level of reassignment is forecast in LP Run 4.

3.1.1.3 Tring:

The B488 Icknield Way is forecast to experience an increase in traffic flow in both the AM and PM peaks. This is due to planned developments outside of Hertfordshire, mainly Winslow in Buckinghamshire and Bicester in Oxfordshire. This increase in traffic flow is not forecast to increase delay times on Icknield Way in Tring, or to impact the traffic flow on other roads within Tring. However, the A41 past Tring is forecast to experience an increase in traffic flow of approximately 150 PCUs eastbound in the AM peak and approximately 120 PCUs westbound in the PM peak.

In comparison to LP Run 3, LP Run 4 shows a notable increase in westbound traffic flow on the B4635 in the AM peak. This is partly caused by a relative increase in traffic passing through Tring. Another cause is, a predicted increase in the number of vehicles entering Duckmore Lane.

3.1.2 Key flow changes in Hertsmere (see Appendix C for detailed plans)

It should be noted that the Hertsmere planning data includes a number of speculative sites which are not yet part of the local plan and therefore the traffic conditions can be considered a 'worst case scenario'. It should also be noted that the model includes a number of schemes from the emerging South Central GTP, not all of which will be taken forward.

The A1 corridor south of M25 J23 is forecast to experience an increase in northbound traffic flow in the AM peak of over 1000 PCUs. There is however, a decrease in the volume of traffic travelling southbound as traffic re-routes to avoid delay at Stirling Corner. In the PM peak, this section of the A1 is forecast to experience increases in traffic flow of approx. 500 PCUs in each direction.

3.1.2.1 Potters Bar:

Re-routing of traffic from Baker Street / Darkes Lane onto A1000 Hatfield Road / High Street is evident. Reductions in the average speed of traffic on Baker Street have been coded into the network to represent the potential impact of implementing sustainable transport measures. This reduced speed means that for many journeys the A1000 Hatfield Road / High Street is a faster route, leading the model to forecast the re-routing of traffic. This is the most significant difference between LP Run 3 and LP Run 4.

3.1.2.2 Borehamwood:

Numerous roads on the eastern side of Borehamwood are forecast to experience a significant increase in the volume of traffic in the AM peak. This is caused by a combination of employment development planned for the area in and around Borehamwood Industrial Park and re-routing of

southbound traffic away from the A1 Barnet Bypass to avoid delays at Stirling Corner. This is not forecast to occur in the PM peak.

No significant changes in travel flow predictions occur between LP Run 3 and LP Run 4 in the PM peak. LP Run 4 AM peak shows a decrease in traffic flow on the western side of Borehamwood in comparison to LP Run 3.

3.1.2.3 Radlett:

Re-routing away from Radlett is forecast for the AM peak. The 2014 Base Year shows traffic travelling to/from A414 North Orbital Road towards Watford via Radlett. This was also evident in Local Plan Run 3. Select Link Analysis of LP Run 4 shows that most of this traffic re-routes away from the area. It is assumed that most of the re-routed traffic will use the M1.

A cause for this re-routing is the coding of a scheme to convert the A5183 Watling Street / Park Road roundabout in Radlett into a signalised junction. Although this signalisation facilitates an increase in northbound traffic flow on A5183 Watling Street, it significantly increases delay times experienced by southbound traffic leading to reductions in traffic southbound and from the west. There is limited scope for signal optimisation at this junction. This encourages re-routing away from Radlett.

3.1.2.4 Bushey:

A411 High Street / Sparrows Herne is forecast to experience an increase in southbound traffic flow in the AM peak due to potential housing development in the Bushey and the wider Watford area. This increase in traffic volume is however not forecast to cause an increase in delay times through Bushey or significantly impact traffic flow on other roads in Bushey.

Apart from this, there are no significant differences in traffic flow forecasts between LP Run 3 and LP Run 4.

3.1.3 Key flow changes in St. Albans (see Appendix D for detailed plans)

3.1.3.1 St. Albans:

A 20mph zone has been coded into the model around St. Albans City centre. This has contributed to a forecast decrease in traffic flow around the city centre and re-routing of traffic towards the outskirts of St. Albans City. This is supported by Select Link Analysis, which shows a reduction in through trips.

Junction improvement schemes coded on the 'northern ring road' (Batchwood Drive / Beech Road / Marshalswick Lane) as well as improvement schemes coded into junctions on the A414 to the south of St. Albans reduce delays experienced and encourage more vehicles to use these routes.

LP Run 4 shows a decrease in traffic flow around St. Albans City centre when compared to LP Run 3.

3.1.3.2 Harpenden:

The model network has been enhanced in the 2036 Future Year so it is difficult to undertake a direct comparison with the base year. Increases in volume of traffic are predicted on the southern part of the A1081, B487 Redbourn Lane and on the Lower Luton Road in the AM peak.

There is no significant difference between traffic flows predicted in LP Run 3 and traffic flows predicted in LP Run 4.

3.1.3.3 Wheathampstead:

The 2036 Future Year predicts a significantly lower eastbound traffic flow on Brewhouse Hill and Church Street than was estimated in the 2014 Base Year. This is an artificial change because of enhancements to the model with more route choice due to the coding of Leasey Bridge Lane and Cherry Tree Lane into the future year model (LP Run 4). This makes it difficult to compare the results with the earlier LP run 3 (which did not have these additional links).

Select Link Analysis has been undertaken and this shows that traffic travelling from Harpenden Road towards A1 (M) J5 is no longer assumed to be traveling through the centre of Wheathampstead, as they were previously..

3.1.4 Key Flow Changes in Three Rivers (see Appendix E for detailed plans)

There is a significant increase in traffic flow forecasted for both the M1 and M25 in both the AM and PM peaks. On the M25 there are predicted increases in traffic flow of between 800 PCUs and 2500 PCUs. This is across both the AM and PM peaks, for both directions of travel.

3.1.4.1 Rickmansworth:

Significant changes in traffic flow patterns are predicted for Rickmansworth. A404 Riverside Drive is predicted an increase in traffic flow of over 600 PCUs in the AM peak and 800 PCUs in the PM peak. Meanwhile, A4145 Moor Lane eastbound is predicted a decrease in traffic flow of 120 PCUs in the AM peak and 220 in the PM peak.

To improve conditions for pedestrians and cyclists, partial signalisation has been coded at the A404 Riverside Drive / Church Street junction. An increase in traffic is predicted on the A404 in both directions in both the AM and PM peaks. The A404 London Road / A4145 Moor Lane causes blocking back on the western arm of the roundabout in the eastbound direction. This blocking back continues to the junction of Riverside Drive and Church Street. These junctions do not experience blocking back in the 2014 Base Year. In the 2036 Future Year, the blocking back restricts the potential increase in eastbound traffic flow in both the AM and PM peaks.

This represents a notable difference between LP Run 3 and LP Run 4. The enhancements to the A404 Riverside Drive / Church Street were not included in LP Run 3. As a result, the blocking back did not occur in LP Run 3.

3.1.4.2 Chorleywood:

Changes in traffic flow patterns are also predicted for Chorleywood in the AM peak.

These changes are caused by a wider re-routing of traffic passing through Chorleywood. Southbound traffic, instead of using station approach / Common Gate Road / Berry Lane towards Rickmansworth is routing onto the Shire Lane. Select Link Analysis undertaken shows this is the case for much of the traffic entering Chorleywood via The Parade and Green Street.

3.1.4.3 Abbott's Langley

In the AM peak, reductions in traffic flow are forecast on the A411 Watford Road. This is due to delays at M25 J20. There are some minor increases in delays on routes through Abbott's Langley and the Hunton Bridge area due to re-routing of traffic as a result of these delays.

3.1.5 Key Flow Changes in Watford (see Appendix F for detailed plans)

It should be noted a strategic model such as COMET cannot fully represent traffic conditions in a dense urban network such as Watford. It is therefore recommended that microsimulation modelling is also used to determine the impact of schemes and growth.

The A412 St. Albans Road near to Watford Junction Railway Station is forecast to experience a significant (up to 400 PCUs) increase in traffic flow. This is because of its proximity to the large employment and residential development planned for the area immediately to the north of Watford Junction.

The Exchange Road / Beechen Grove Gyratory is forecast to experience an increase of 200 to 400 PCUs in the AM peak and 1000 to 2000 PCUs in the PM peak. Blocking back is forecast to be experienced in the AM peak, as traffic on A411 Beechen Grove travelling away from the junction with A412 Rickmansworth Road enters the Gyratory. The blocking back is forecast to be experienced by traffic already on the Gyratory. However there is scope for further optimisation of the signals in the model.

A4008 Stephenson Way is forecast to experience an increase in northbound and southbound traffic in both the AM and PM peaks. This is a significant link between Watford and the M1, as a result of the number of employment and residential developments planned for Watford the increase in traffic flow on this road is significant.

Radlett Road is forecast to experience a decrease in northbound and southbound traffic volume of approximately 100 PCUs in the AM peak and a decrease in northbound traffic flow of approximately 800 PCUs in the PM peak, despite being close to an employment development that is expected to show a significant increase in jobs. This is the predicted result of the signalisation of the Radlett Road / Colonial Way junction. The signalisation of the junction increases delay times and encourages re-routing to other areas of Watford.

Numerous links and junctions are forecast to experience decreases in delay time in the PM peak. This causes re-routing around much of Watford. As a result, A411 Hempstead Road is forecast to experience an increase of approx. 650 PCUs in southbound traffic flow in the PM peak. It should be noted that this is not forecast to be the case in the AM peak.

In comparison to LP Run 3, LP Run 4 shows significantly more vehicles leaving Watford via the A4008 Stephenson Way in the AM peak (1000 PCUs) and more (1000 PCUs) entering Watford via A4008 Stephenson Way in the PM peak. This contributes to a higher volume of traffic using

the Beechen Gove / Exchange Road gyratory in both peaks. The main cause of this is the significant increase in the forecast employment growth for Watford from LP Run 3 to LP Run 4.

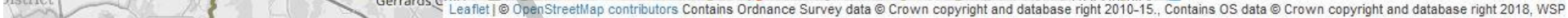
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3.2 Volume Capacity Ratios

Figure 3-3 to Figure 3-6 show the Volume to Capacity Ratios in the South West Hertfordshire area. This is a measure of link capacity and stress on the network. Those links with a Volume / Capacity (VC) Ratio of over 80% (shown in Orange) and 90% (shown in Red) are operating close to or at capacity. Links with a VC ratio below 80% are not shown. 2014 Base Year and 2036 Future Year plans are shown together to aid comparison.

It should be noted that the length of the lines is determined by the length of the highway link in the model and does not indicate the extent of queuing.

Further detail of the situation in link the key towns is given on the following pages and more detailed plans by district are included in the appendices.



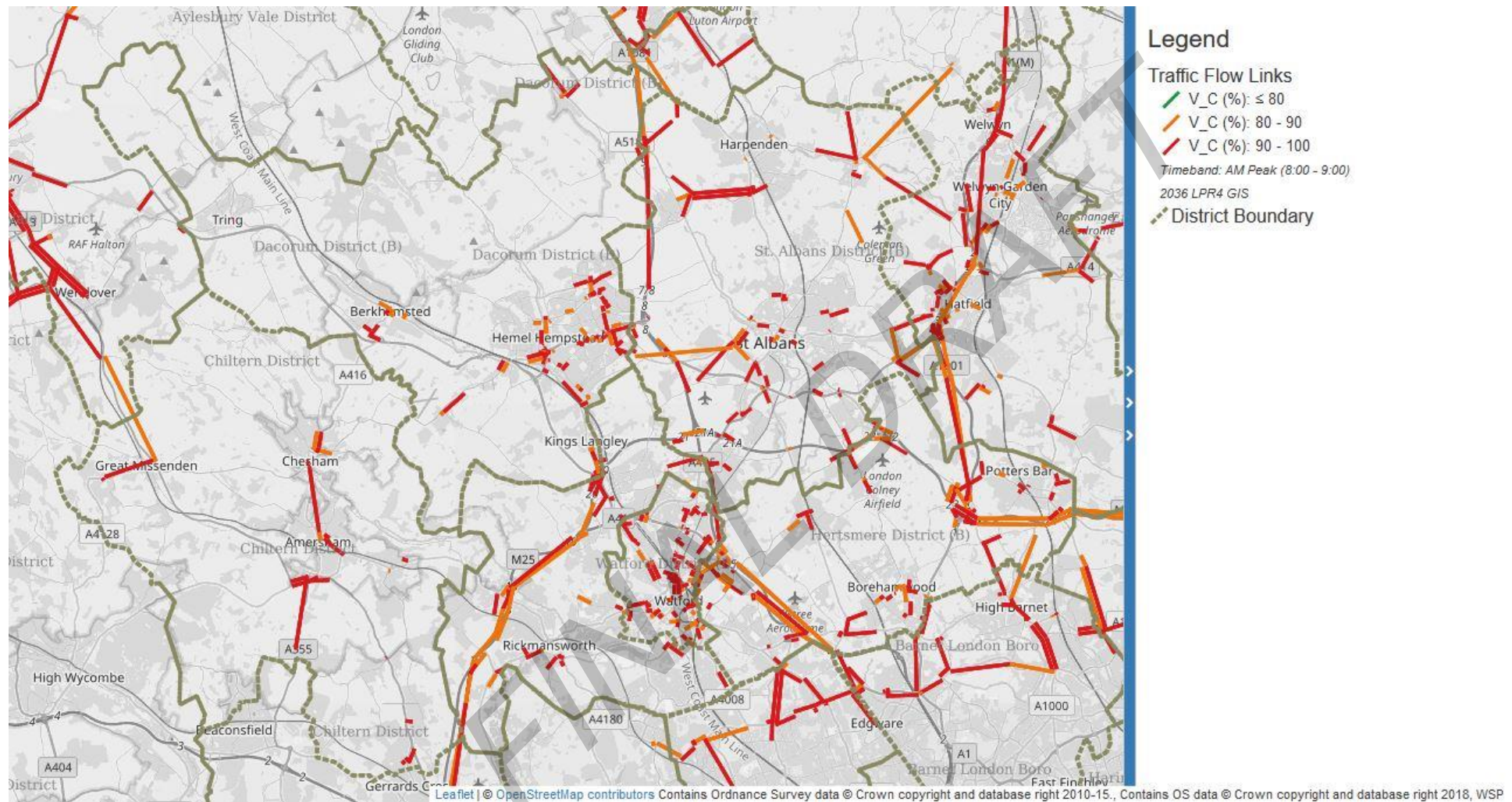


Figure 3-4 – 2036 Volume to Capacity Ratios in South West Hertfordshire – AM Peak (08:00 – 09:00)

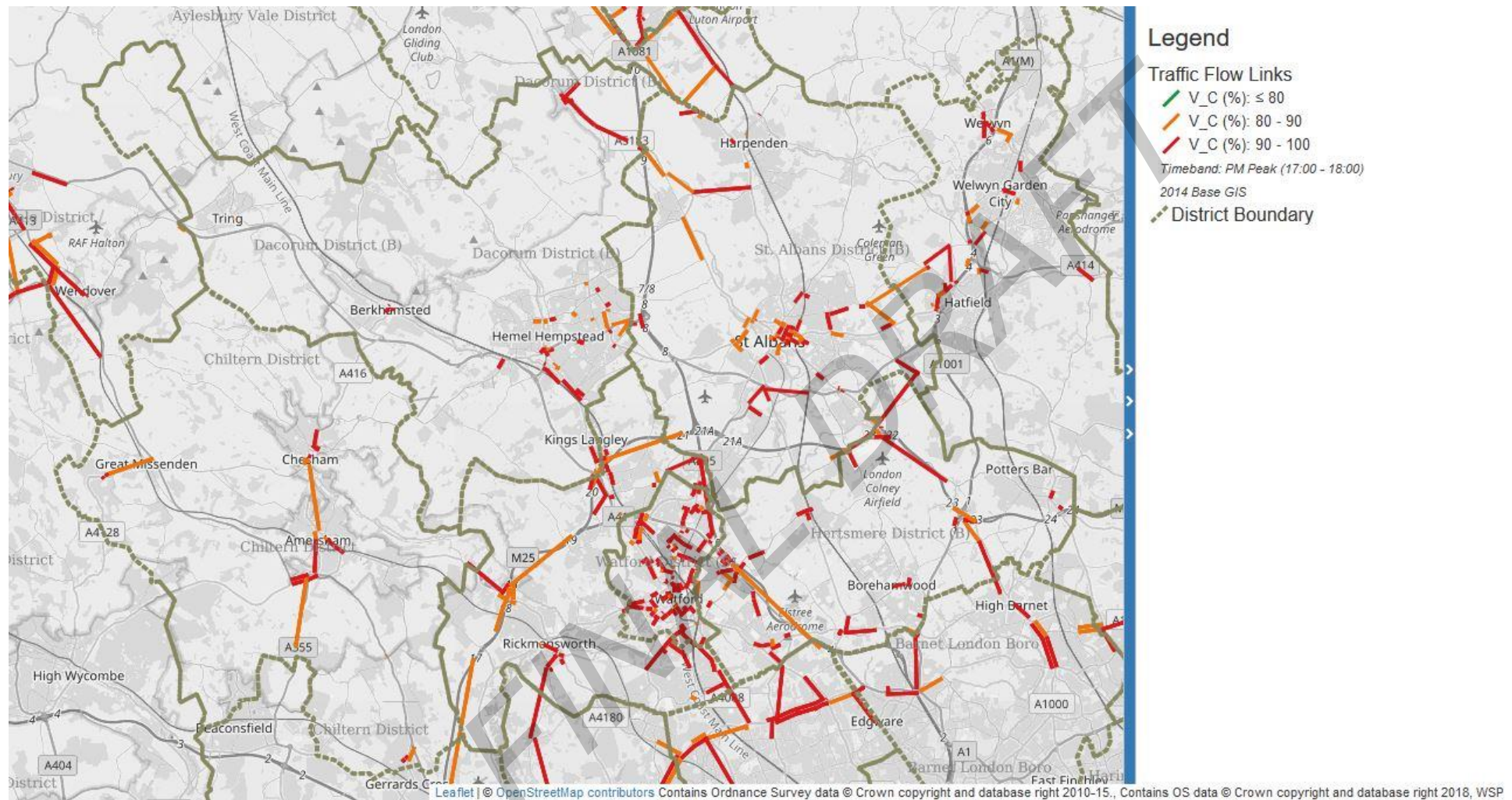
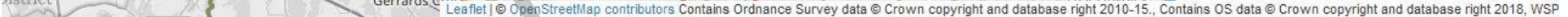


Figure 3-5 – 2014 Volume to Capacity Ratios in South West Hertfordshire – PM Peak (17:00 – 18:00)



3.2.1 Link Stress in Dacorum (See Appendix B for more detail)

In Dacorum, the main areas of stress in 2036 are as follows:

Hemel Hempstead

- Around the Maylands Business Park and East Hemel
- A4147 Redbourn Road-Swallowdale Lane area.
- The Plough Roundabout / Two Waters Road area
- A4251 London Road-Red Lion Lane / Apsley area
- St. Albans Hill between Lawn Lane and Leys Road

In the 2036 Future Year, there is an increase in the number of roads and areas affected when compared to the 2014 Base Year.

Berkhamsted:

The High Street / Kings Road experiences stress in both the 2014 base year and 2036 future year. The junction of Kingshill Way / Shooters Way / Kings Road is forecast to be a significant area of stress in the 2036 future year.

Markyate:

Approaches to the A5183 / B4540 junction are at capacity in both the base and future year.

M1 Junction 9: multiple approaches experience stress in both the base and future year.

3.2.2 Link Stress in Hertsmere (See Appendix C for more detail)

In Hertsmere, the main areas of stress in 2036 are as follows:

Potters Bar:

- A1000 Hatfield Road
- B156 The Causeway
- The approaches to M25 J24 from A111 Southgate Road
- A1 (M) North of the M25

There is a significant increase in stress in the area in the 2036 Future Year, particularly around the M25.

Borehamwood

- Allum Lane / Watling Street / Barnet Lane corridor
- Shenley Road
- Studio Way
- A5135 Elstree Way, Manor Way and Studio Way in the Hertsmere Industrial Park area

There is a notable increase in stress in the area in the 2036 Future Year.

Other areas of Hertsmere:

- M25 J24

- A41 through Hertsmere
- Watling Street and Park Road in Radlett
- Approaches to Elstree Crossroads

In comparison to the 2014 Base Year, the level of stress worsens on a number of key corridors. It should be noted, however, that LP Run4 represents a worst-case scenario as a number of speculative developments were coded into the planning data.

3.2.3 Link Stress in St. Albans (See Appendix D for more detail)

In St. Albans, the main areas of stress in 2036 are as follows:

Wheathampstead (AM Peak)

- Lower Luton Road
- Lamer Lane
- Codicote Road
- Cory-Wright Way
- Marford Road

Although stress is evident in the 2014 Base Year on Cory Wright Way and Marford Road, other links are also affected in the 2036 Future Year. The links are however generally operating within highway capacity in the PM peak.

Harpenden

St. Albans Road / Walkers Road / Redbourn Lane junction approaches are a significant area of stress in the 2036 Future Year in both the AM and PM peaks.

Redbourn

There are significant increases in stress on the following roads in the 2036 Future Year.

- Redbourn Lane
- Redbourn bypass
- Harpenden Lane

St. Albans

- Sandpit Lane, close to Verulam School playing fields (PM peak)
- Junction of Batchwood Drive / Beech Road / A1081 Harpenden Road
- St. Vincent Drive
- B4630 Watford Road / A5183 Watling Street corridor
- Hemel Hempstead Road / Bedmond Lane / King Harry Lane corridor

Numerous roads are forecast to experience less stress in 2036 than in the 2014 base year. These roads are mostly around the centre of St. Albans, St. Peter's Street for example. This is the predicted result of diversion of traffic away from the City Centre as a result of the coding of a 20mph zone in conjunction with improvements to key junctions on the northern ring road (Batchwood Drive, Beech Road and Marshalswick Lane) and the A414 to the south. Stress does, however, increase in the outlying areas in the 2036 Future Year as a result.

3.2.4 Link Stress in Three Rivers (See Appendix E for more detail)

In Three Rivers, the main areas of stress are as follows:

- M25 through Three Rivers, including approaches the junction 20
- Woodside Road / Chequers Lane, Garston Manor
- Tibbs Hill Road, Abbots Langley
- Langleybury Lane / Watford Road near Abbots Langley
- Dog Kennel Lane / Solesbridge Lane Corridor, Chorleywood
- Baldwins Lane, Croxley Green
- Oxhey Lane, Croxley Green
- A4125 Hampermill Lane / Brookdene Avenue, South Oxhey Park
- Uxbridge Road / Field Way corridor, Rickmansworth
- London Road / Harefield Road corridor, Rickmansworth
- Park Road / Scotts Hill corridor, Rickmansworth

The most significant increases in stress in the 2036 Future Year are forecast to be experienced around the M25 and the approaches to junction 20, as well as in the Rickmansworth and Batchworth areas in the PM peak

A412 Riverside Drive between the junction with Uxbridge Road / Rectory Lane and the junction with London Road / Moor Lane / Harefield Road is forecasted to have lower volume to capacity ratio than in the 2014 Base Year. This is because of schemes planned to increase the capacity of these junctions. The predicted impact of the proposed scheme on the London Road / Moor Lane / Harefield Road junction is explored in section 3.1.4.

3.2.5 Link Stress in Watford (See Appendix F for more detail)

In Watford, the main areas of stress in 2036 are as follows:

- A412 St. Albans Road / Sheepcot Lane / Garston Lane Corridor
- A411 Hemel Hempstead Road
- Radlett Road / Link Road corridor
- Rickmansworth Road / Harwoods Road / Whippendell Road / Vicarage Road area
- Wiggshall Road
- A411 Lower Highstreet / A411 Chalk Hill / A4008 Pinner Road area
- A4125 Eastbury Road / A4178 Deacons Hill / Oxhey Road Corridor
- Longspring / Bushey Mill Lane corridor
- Balmoral Road / Radlett Road corridor
- Courtlands Drive / Ridge Lane / North Western Avenue area

The network is already at capacity in a number of locations in the 2014 Base Year. However, there is a significant increase in stress forecast particularly for the Watford Junction / Clarendon Road area is predicted in the 2036 Future Year as a result of development in the area.

3.3 Junction Delays

Figure 3-7 to Figure 3-10 show the junction delays in the South West Hertfordshire area. Yellow dots represent a delay of 30 seconds or less. Orange dots represent delays of between 90 seconds and 150 seconds (1 minute and 2.5 minutes), red dots represent delays between 150 seconds and 300 seconds (2.5 and 5 minutes) and dark red dots represent delays of over 5 minutes. Delays of less than 30 seconds are not shown.

The results presented in the following sections represent the overall average junction delays for each district. 2014 Base Year delays are also shown to aid comparison.

Note that the numbers presented in this chapter are modelled times only. Whilst the model has been validated to journey time data on a route basis there have been no checks of delays at individual junctions and therefore the levels of delay should be considered indicative only.

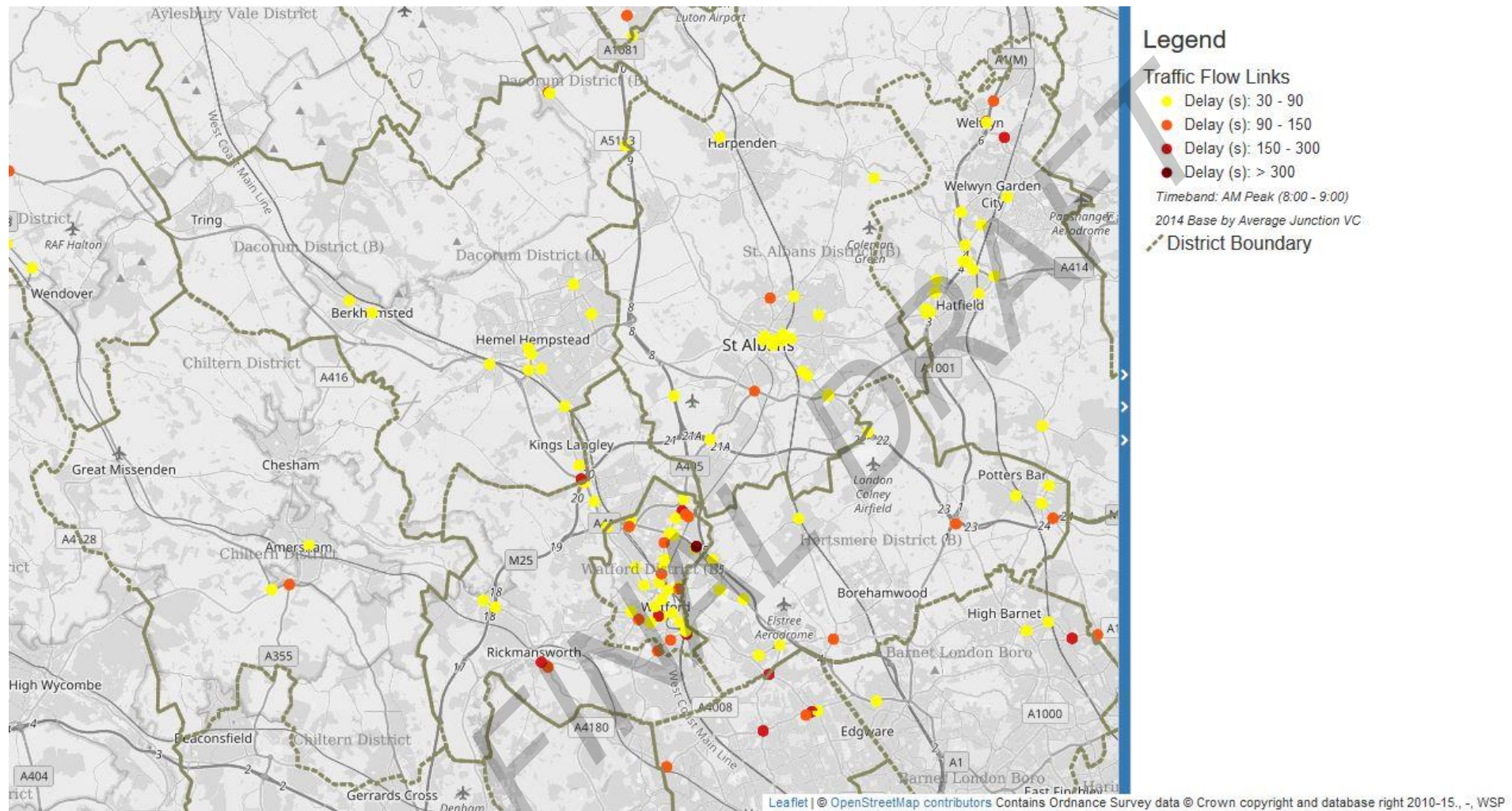


Figure 3-7 – 2014 Junction Delays in South West Hertfordshire– AM Peak (08:00 – 09:00)

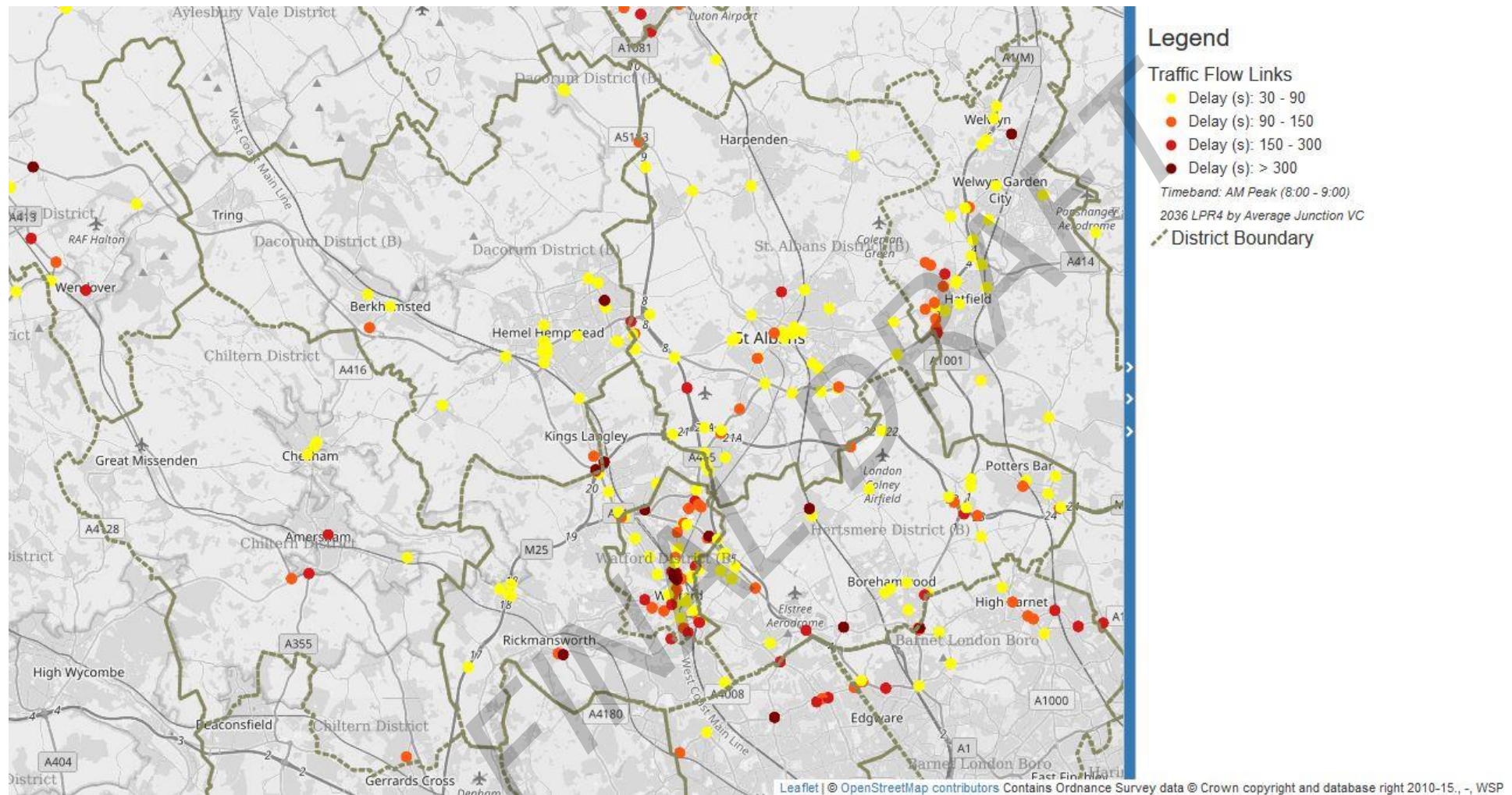


Figure 3-8 – 2036 Junction Delays in South West Hertfordshire – AM Peak (08:00 – 09:00)

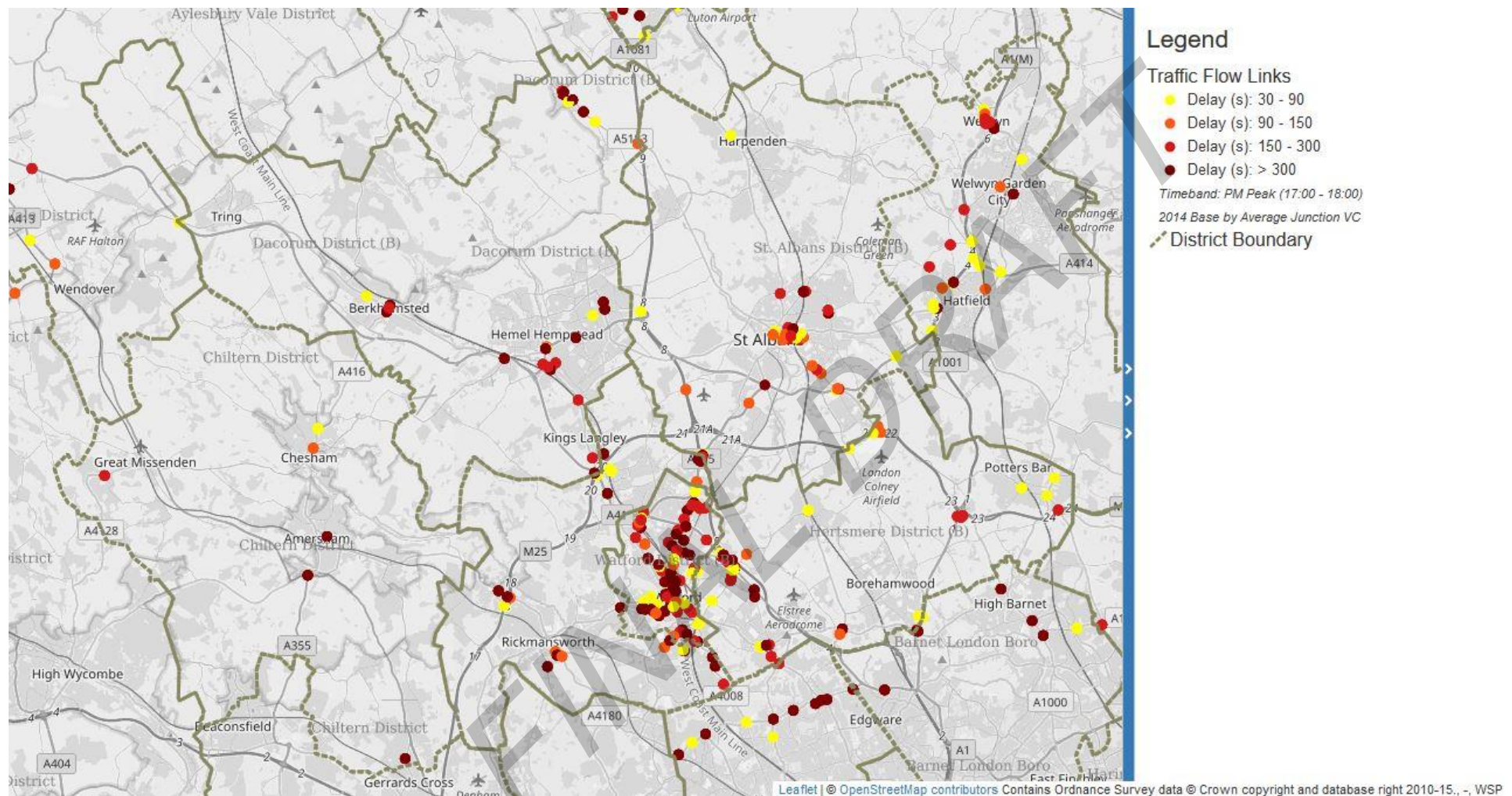


Figure 3-9 – 2014 Junction Delays in South West Hertfordshire – PM Peak (17:00 – 18:00)

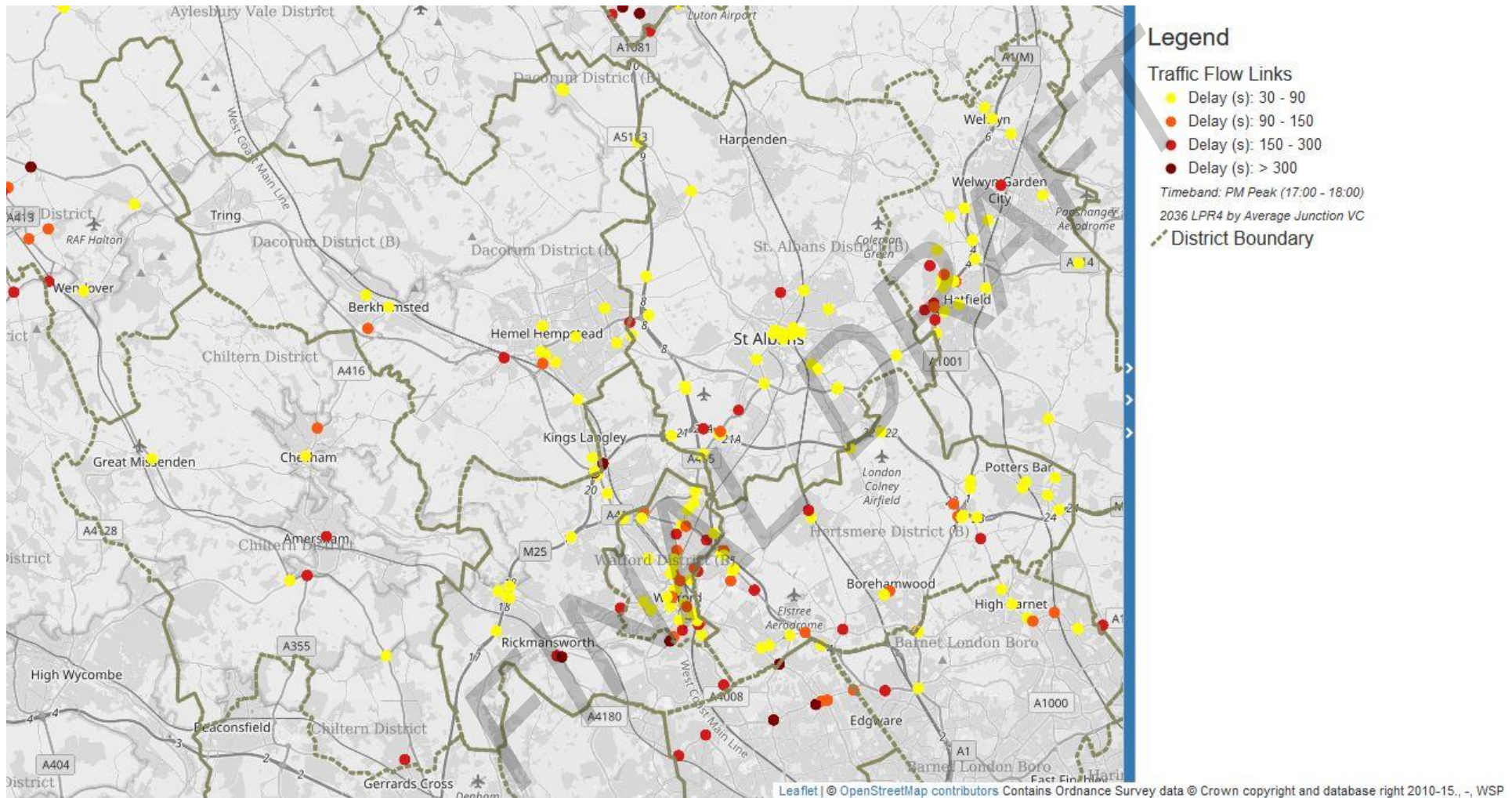


Figure 3-10 – 2036 Junction Delays in South West Hertfordshire – PM Peak (17:00 – 18:00)

3.3.1 Junction Delay in Dacorum (See Appendix B for more location detail)

Table 3-1 presents a combined list of the Top 20 worst overall average delay for the AM and Top 19 worst overall average delay in PM in Dacorum district. Delay represents the combined totals of delay felt by all arms of the junction. Many junctions are in the top 20 in both the AM and PM peaks, meanings the combined list of top 20s does not total 40.

Table 3-1 The Top 20 AM Overall Average Delay and Top 20 PM Overall Average Delay in Dacorum

COMET Node	Junction	AM (s)	Change from 2014	PM (s)	Change from 2014
2158	Maylands Avenue / Maxted Road, Hemel Hempstead	503	493 (>100%)	6	-185 (-97%)
2483	M25 J20, traffic entering junction from A41 Watford Road-northwestern arm	306	150 (96%)	76	17 (29%)
2448	Watford Road / Home Park Mill Link Road, Kings Langley	119	71 (>100%)	85	63 (>100%)
2485	M25 J20, clockwise off slip	116	40 (52%)	381	90 (31%)
2339	Shootersway / Kingshill Way / Kings Road, Berkhamsted	108	105 (>100%)	114	111 (>100%)
2463	M1 Junction 9 / A5183 Western Roundabout, Flamstead	93	47 (>100%)	78	19 (32%)
2210	A4251 London Road / Rucklers Lane, Hemel Hempstead	89	34 (61%)	58	11 (24%)
2405	A5183 / High Street, Markyate	81	-13 (-14%)	59	-6 (-9%)
2388	Leighton Buzzard Road / Waterhouse Street, Hemel Hempstead	81	-8 (-9%)	24	0 (-1%)
2389	High Street / Kings Road, Berkhamsted	75	20 (37%)	131	67 (>100%)
2363	A4251 London Road / Box Lane, Hemel Hempstead	71	30 (74%)	265	74 (39%)
2357	Hempstead Road / High Street / Chesham Road / Newhouse Road, Bovingdon	68	57 (>100%)	11	2 (19%)
2347	Two Waters Junction, Hemel Hempstead	68	9 (16%)	75	12 (20%)
2456	Leverstock Green Road / Bedmond Road, Leverstock Green	68	63 (>100%)	32	28 (>100%)
2384	St. John's Road / A4146 Station Road, Hemel Hempstead	61	58 (>100%)	64	60 (>100%)
2387	A4146 Leighton Buzzard Road / Combe Street, Hemel Hempstead	58	48 (>100%)	34	25 (>100%)
2394	Plough Roundabout - A414 Two Waters Road, Hemel Hempstead	52	14 (38%)	18	-26 (-59%)
2450	Maylands Avenue / Wood Lane End, Hemel Hempstead	45	-16 (-26%)	44	-25 (-36%)
2435	St. Agnells Lane / Redbourn Road / A4147 Link Road, Hemel Hempstead	44	12 (39%)	21	6 (38%)

2406	A5183 / Luton Road, Markyate	41	4 (11%)	43	1 (1%)
2192	A414 St. Albans Road / Jarman Way, Hemel Hempstead	37	16 (79%)	36	11 (44%)
2507	Lawn Lane / Durrants Hill Road, Hemel Hempstead	27	-10 (-26%)	36	-17 (-33%)
2338	Gossoms End / Billet Lane, Berkhamstead	32	0 (1%)	36	3 (8%)
16010	A414 Two Waters Road / Corner Hall, Hemel Hempstead (model enhancement)	37	-	32	-

The longest delays in the AM peak are forecast to be experienced by the junction of Maylands Avenue / Maxted Road in Hemel Hempstead (node 2158). This also represents the biggest increase in delay time in the AM peak as this junction is not experiencing significant delays in the 2014 Base Year. This delay is caused by the significant amount of traffic being generated by the Maylands and East Hemel development. In the PM peak, this junction is forecast to experience the largest decrease in delay times due to changes in model coding in the area. It should be noted that this delay is being overstated by the model as in this area, the model zones are relatively large and not all access points are coded, so traffic is concentrated on a limited number of links which over states delay.

The longest delays in the PM peak are forecast to be experienced by M25 J20 clockwise off slip / A41 westbound (node 2485). The delay is experienced by traffic already on the junction and is partly due to the forecast increase in volume of traffic on the M25. Also, a change to the signal timings gives more green time to traffic on the clockwise off-slip entering the junction and less green time to traffic already on the junction. This creates longer delay times and causes blocking back on the junction.

The junction of A4251 London Road / Box Lane in Hemel Hempstead (node 2363) is forecast to experience delay times in the PM peak in 2036 of 265 seconds (more than 4 minutes). This represents an increase in delay times of 39% when compared to the 2014 Base Year. This increase in delay times will be mostly felt by traffic on Box Lane entering A4251 London Road, eastbound and westbound. This is caused a forecast increase in traffic flow on A4251, both directions, giving traffic on Box Lane fewer opportunities to enter the junction.

A decrease in journey times is forecast to be experienced by the junction of Lawn Lane / Durrants Hill Road in Hemel Hempstead (node 2507). The largest decrease in delay times is forecast to be experienced by traffic turning right from Lawn Lane into Durrants Hill Road (26 seconds). This decrease in journey times will be felt by all turning movements on all arms of the junction. This is partly due to a coded 20mph zone which would encourage the re-routing of traffic onto other roads and therefore reduce stress on the junction.

3.3.1.1 Delays in Decorum in Local Plan Run 3vs Local Plan Run 4

In Dacorum, the main difference between Local Plan Run 4 and the previous model is the repurposing of the A414 St. Albans Road, Hemel Hempstead to include a bus lane.

When LP Run 4 is compared to LP Run 3, Most junctions do not see an increase in delay times of over 30 seconds in the AM peak. Exceptions to this are:

- Maylands Avenue / Maxted Road, Hemel Hempstead
- St. John's Road / A4146 Station Road, Hemel Hempstead
- A4147 Leverstock Green Road / Malmes Croft, Hemel Hempstead

When LP Run 4 is compared to LP Run 3, Most junctions do not see a reduction in delay times of over 30 seconds in the AM peak. Exceptions to this are:

- Eastman Way / Swallowdale Lane / A4147 Maylands Avenue, Hemel Hempstead
- London Road / Fishery Road, Hemel Hempstead
- Lawn Lane / Durrants Hill Road, Hemel Hempstead

When LP Run 4 is compared to LP Run 3, Most junctions do not see an increase in delay times of over 30 seconds in the PM peak between the forecasts. Exceptions to this are:

- High Street / Kings Road, Berkhamsted
- Shootersway / Kingshill Way / Kings Road, Berkhamsted
- St. John's Road / A4146 Station Road, Hemel Hempstead

The only junction to see a decrease in delay time of more than 30 seconds, in LP Run 4 PM peak compared to LP Run 3 is the junction of Lawn Lane / Durrants Hill Road, Hemel Hempstead.

3.3.2 Junction Delay in Hertsmere (See Appendix C for more location detail)

Table 3-2 presents a combined list of the Top 20 worst overall average delay for the AM and Top 20 worst overall average delay in PM in Hertsmere district. Delay represents the combined totals of delay felt by all arms of the junction. Many junctions are in the top 20 in both the AM and PM peaks, meaning the combined list of top 20s does not total 40.

Table 3-2 The Top 20 AM Overall Average Delay and Top 20 PM Overall Average Delay in Hertsmere District

COMET Node	Junction	AM (s)	Change from 2014	PM (s)	Change from 2014
4213	A411 Barnet Lane / A411 Watford Road / A5183 High Street, Elstree	400	308 (>100%)	295	127 (76%)
4208	Park Road / Watling Street, Radlett	355	326 (>100%)	248	164 (>100%)
4268	A1 Barnet Bypass / Newark Green / Rowley Lane, Borehamwood	175	174 (>100%)	2	0 (-9%)
4207	A41 / A411 Elstree Road, Elstree	175	145 (>100%)	94	66 (>100%)
4257	Bignell's Corner M25 Junction 23 – M25 Westbound Offslip / St Albans Road	152	61 (66%)	54	40 (>100%)
4238	Bignell's Corner M25 Junction 23 – A1 to M25 onslip	142	139 (>100%)	114	111 (>100%)
4279	Potters Bar Interchange M25 J24 – M25 Eastbound Offslip / A111	130	23 (21%)	81	27 (49%)
4198	A41 North Western Avenue / Sandy Lane, Bushey	105	57 (>100%)	162	94 (>100%)
4250	Mutton Lane / Darkes Lane / Baker Street, Potters Bar	96	53 (>100%)	44	-1 (-2%)

COMET Node	Junction	AM (s)	Change from 2014	PM (s)	Change from 2014
4286	Bignell's Corner M25 Junction 23 - traffic on onslip merging with M25 clockwise	90	86 (>100%)	47	35 (>100%)
4095	B5378 Shenley Road / Clarendon Road, Borehamwood	90	76 (>100%)	38	25 (>100%)
4202	Berrygrove Interchange M1 Junction 5 - A41 northbound offslip (Otterspool Way) / Interchange Circulatory	87	64 (>100%)	23	-12 (-34%)
4159	A1000 Hatfield Road / The Causeway / Cotton Road, Potters Bar	87	26 (43%)	35	3 (11%)
4251	Darkes Lane / The Walk, Potters Bar	81	79 (>100%)	62	59 (>100%)
4237	Blanche Lane / Earls Lane, Ridge	77	67 (>100%)	21	10 (95%)
4255	High Street / Southgate Road / Barnet Road / Mutton Lane, Potters Bar	68	28 (71%)	61	12 (25%)
4194	A41 / B462 Hartspring Lane / B462 Radlett Road, Watford	67	54 (>100%)	68	10 (16%)
4203	Little Bushey Lane / Elstree Road / The Rutts, Bushey Heath	66	6 (11%)	81	-7 (-8%)
9321	Stephenson Way / Colonial Way Roundabout, Watford	65	50 (>100%)	195	163 (>100%)
4121	Bignells Corner M25 Junction 23 - Swanland Road. Northeast arm of junction	60	52 (>100%)	21	11 (>100%)
4248	A1081 / Dancers Hill Road, Barnet	40	29 (>100%)	162	145 (>100%)
4191	Hartspring Lane / Bushey Mill Lane	49	7 (17%)	139	-8 (-5%)
4105	Shenley Road, Eldon Avenue, Borehamwood	44	27 (>100%)	125	109 (>100%)
4139	Berrygrove Interchange M1 Junction 5 - southbound Offslip	22	-13 (-37%)	105	58 (>100%)
4263	Bignell's Corner M25 Junction 23 - A1M northbound offslip / Circulatory	29	9 (43%)	100	44 (78%)
4262	Bignell's Corner M25 Junction 23 - St Albans Road / Circulatory / A1M Onslip	21	-3 (-14%)	80	27 (52%)
4332	Bignells Corner M25 Junction 23 - traffic on onslip merging with A1 (M) northbound	44	39 (>100%)	75	71 (>100%)
4188	Berrygrove Interchange M1 Junction 5 - A41 southbound Offslip / Circulatory	13	2 (15%)	75	-31 (-30%)

The longest delays in the AM and PM peaks are forecast to be experienced by the junction of A411 Barnet Lane / A411 Watford Road / A5183 High Street in Elstree (node 4213). In the AM peak, this increase in delay times is mostly for traffic on Barnet Lane and High Street, the northern and eastern arms of the junction. This increase in delay times is caused by an increase

in traffic flow on these arms, which are already operating at approx. 101% vehicle capacity in the 2014 Base Year.

In the PM peak, delay times experienced by the northern, eastern and southern arms of the junction are forecast to decrease. The junction is forecast to experience an overall increase in delay times because the western arm, A411 Watford Road, is forecast to experience a significant increase in delay times. This is caused by an increase in the volume of traffic turning left (northbound) onto the High Street. It should be noted that a scheme has already been implemented to widen the western approach of the junction from 2 to 3 lanes, which is not fully represented in the model so the predicted increase in delay times for the western approach is therefore likely to be being overstated by the model.

Bignells Corner is the junction of M25 / A1 (M) / A1 / A1081 St. Albans Road. It is also known as M25 J23. As a large junction, it is coded into the 2014 Base Year and 2036 Future Year as multiple nodes. Bignells Corner is forecast to experience significant increases in delay times in both the AM and PM peaks on a number of approaches. This is a result of increased traffic flow through the junction causing more queueing and, in some instances, blocking back. Meanwhile, in the PM the M25 anticlockwise off-slip and A1081 St. Albans eastbound off-slip are forecast to experience decreases in delay times in the 2036 Future Year, in comparison to the 2014 Base Year. A shift in the turning movement volumes has aided this reduction in delay.

The biggest percentage increase in delay times in the AM peak is forecast to be experienced by the junction of A1 Barnet Bypass / Newark Green / Rowley Lane (node 4268). This increase in delay is not forecast to affect traffic leaving the northbound carriageway of the A1 Barnet Bypass. The increase in delay will be felt entirely by traffic leaving the A1 southbound and entering Rowley Lane.

A potential scheme to create a more pleasant environment for pedestrians and cyclists includes signalisation of the junction of Darkes Lane / The Walk in Potters Bar. This signalisation has been added to the 2036 Future Year and increases traffic delay. As there was no junction delay for this traffic in the 2014 Base Year the delay time now forecast is shown as a high (>100%) percentage increase in Table 3-2. The signal timings currently coded are generic and each stage has been given equal green and inter-green times. Some signal optimisation could therefore be carried out.

3.3.2.1 Delays in Hertsmere in Local Plan Run 3 vs Local Plan Run 4

When LP Run 4 is compared to LP Run 3, Most junctions do not see an increase in delay times of over 30 seconds in the AM peak. Exceptions to this are:

- The Walk / Darkes Lane, Potters Bar
- Some of the slip roads on Bignell's Corner M25 J23
- A5183 Watling Street / Park Road, Radlett
- Park Avenue / Bushey Mill Lane, Bushey
- A41 North Western Avenue / A411 Watford Road

When LP Run 4 is compared to LP Run 3, Most junctions do not see a reduction in delay times of over 30 seconds in the AM peak. Exceptions to this are:

- A5183 Watling Street / The Drive, Radlett
- Radlett Road / Hartspring Lane / Park Avenue, Bushey

When LP Run 4 is compared to LP Run 3, Most junctions do not see an increase in delay times of over 30 seconds in the PM peak. Exceptions to this are:

- The Walk / Darkes Lane, Potters Bar
- A5183 Watling Street / Park Road, Radlett
- A5183 Watling Street / B462 Watford Road / B462 Shenley Hill, Radlett
- Radlett Road / Hartspring Lane / Park Avenue, Bushey
- Bushey Mill Lane / Hartspring Lane / Little Bushey Lane / Aldenham Road, Bushey
- A5183 High Street / A411 Barnet Lane / A5183 Elstree Hill South / A411 Watford Road, Elstree

When LP Run 4 is compared to LP Run 3, Most junctions do not see a reduction in delay times of over 30 seconds in the PM peak. Exceptions to this are:

- Berrygrove Interchange M1 J5, A41 Otterspool Way North Eastbound off-slip
- A411 Elstree Way / Woodstock Road, Bushey

3.3.3 Junction Delay in St. Albans (See Appendix D for more location detail)

Table 3-3 presents a combined list of the Top 20 worst overall average delay for the AM and Top 20 worst overall average delay in PM in Hertsmere district. Delay represents the combined totals of delay felt by all arms of the junction. Many junctions are in the top 20 in both the AM and PM peaks, meanings the combined list of top 20s does not total 40. A number of the junctions within St Albans district are expected to be improved, or form part of improvement schemes. Where this is the case it is difficult to give direct comparisons

Table 3-3 The Top 20 Am Overall Average Delay and Top 20 PM Overall Average Delay in Three Rivers District

COMET Node	Junction	AM (s)	Change from 2014	PM (s)	Change from 2014
6454	M1 Mainline southbound – Jct 7-6 Offslip Approach	253	179 (>100%)	75	-16 (-18%)
6348	Ancient Briton Junction (Beech Road / Harpenden Road / Batchwood Drive), St Albans	217	96 (79%)	151	44 (41%)
6802	A405 North Orbital Road / B4630 Watford Road, Chiswell Green	148	134 (>100%)	252	239 (>100%)
6322	King Harry Lane / Watford Road, St. Albans	115	101 (>100%)	73	60 (>100%)
6473	London Colney Roundabout-southbound traffic on A1081 London Road entering the junction / Eastbound traffic on A414 North Orbital Road exiting the junction	111	70 (>100%)	61	24 (66%)
6175	M25 J21a-M25 anti-clockwise off-slip / A405 Southbound exiting junction	96	93 (>100%)	54	52 (>100%)
6414	B556 Harper Lane / B556 Bell Lane / Shenleybury Lane, London Colney	95	77 (>100%)	65	49 (>100%)
6340	Peahen Junction-Chequer Street / London Road / Holywell Hill / High Street,	92	25 (37%)	80	17 (27%)

	St. Albans				
6169	M25 J21a-M25 clockwise off-slip / A405 northbound exiting junction	85	83 (>100%)	127	125 (>100%)
6155	M25 Junction 21A Eastbound Offslip Diverge	72	70 (>100%)	197	195 (>100%)
6482	London Colney Roundabout-northbound traffic on A1081 London Road exiting the junction / Eastbound traffic on A414 North Orbital Road entering the junction	70	4 (6%)	32	3 (11%)
6389	B5378 Shenley Lane / A414 North Orbital Road, St. Albans	64	62 (>100%)	3	1 (23%)
6519	A1081 London Road / St Vincent Drive, St. Albans	60	-	63	-
6428	Colney Heath Longabout-Southern arm, High Street	58	54 (>100%)	75	70 (>100%)
6310	A1081 St. Albans Road / Walkers Road / Redbourn Lane, Harpenden	57	43 (>100%)	21	8 (63%)
6514	Park Street Roundabout-traffic entering the junction from 405 North Orbital Road (southwestern arm)	56	-	22	-
6296	Hill Roundabout-A4147 Hemel Hempstead Road / A4147 Bluehouse Hill / King Harry Lane, St. Albans	55	40 (>100%)	23	9 (64%)
6292	M25 J21a-M25 anti-clockwise on-slip / A405 northbound, entering junction	9	4 (83%)	82	65 (>100%)
6096	M25 J21a-traffic leaving junction and merging with M25 anti-clockwise. Merges at 2 points	47	45 (>100%)	81	79 (>100%)
6170	M25 J21a-M25 clockwise on-slip / A405 southbound, entering junction	18	-40 (-69%)	48	43 (>100%)
2543	M1 J8-southbound off-slip	42	-	47	-
6395	Marshalwick Lane / Sandpit Lane / Beechwood Av., St. Albans	50	-15 (-23%)	44	-39 (-47%)
6446	M25 J21/ M1 northbound on-slip, traffic merging with M1 northbound	9	-	43	12 (40%)

Ancient Briton Junction (node 6348) is the junction of Beech Road / Harpenden Road / Batchwood Drive in St. Albans. It is showing delay times of more than 100 seconds in the AM and PM peaks in the 2014 Base Year. These delays are forecast to increase to 217 seconds (approx. 3½ minutes) in the AM peak and 151 seconds (2½ minutes) in the PM peak. In the AM peak, this increase is predicted to be greatest for east/west traffic on Beech Road and Batchwood Drive and is caused by an increase in traffic flow of approx. 240 PCUs entering the junction. All arms are forecast to experience an increase in traffic flow, however, the impact of this on Batchwood Drive is mitigated by changes to traffic light timings giving more green time to this arm.

Significant increases in delay times are forecast for M25 J21 and J21a, the interchanges with the M1 and A405 North Orbital Road, 3 nodes are forecast to see increases in delay times of more than 45 seconds, 1 node is expected to experience an increase in delay times of 93 seconds and 1 is expected to experience an increase of 123 seconds (2 minutes). This is because of a significant increase in traffic flow through this junction, for example an additional 385 PCUs are forecast to enter the junction from the southern arm and 478 more PCUs are forecast to enter the junction from the M25 clockwise off-slip in the 2036 Future Year than the 2014 Base Year. Some mitigation schemes are proposed by Highways England but large increases in delay times are still forecast.

However, the number of PCUs entering the junction from the A405 northern arm (node 6170) is forecast to decrease by approx. 1000 PCUs in the AM peak and approx. 300 PCUs in the PM peak. Select Link Analysis shows that a key factor in this is the planned new spine road (originally part of Radlett Rail Freight but has been kept in the model as part of the proposed Park Street Garden Village scheme). The spine road would create a new link between the A414 North Orbital Road and the M25, creating the potential for traffic to re-route away from M25 J21a.

Delays experienced by traffic using the Colney Heath Longabout is forecast to experience increases in delay times in both the AM and PM peaks. This is because of a planned safety scheme for the longabout. As part of this scheme, the entrance to the longabout from Colney Heath High Street (node 6428) will be signalised and a filter lane allowing traffic exiting the High Street to turn right toward Hatfield will be added. Delays experienced by traffic entering the longabout from the High Street are predicted to increase by 160 seconds. Traffic travelling on the A414 North Orbital Road westbound, past the High Street, will experience an increase in delay times of 45 seconds. Also, traffic signals installed on the eastbound carriageway to allow traffic on the proposed right turn filter lane will create delays of 15 seconds.

The junction of Marshalwick Lane / Sandpit Lane / Beechwood Avenue in St. Albans (node 6395) is predicted to experience reductions in delay times of 15 seconds in the AM peak and 39 seconds in the PM peak. A key factor in this is the widening of the eastern, southern and western arm of the junction increasing capacity. This enables a decrease in delay times despite increases in traffic flow on the eastern, southern and western arms of the junction in the AM peak respectively. Also, the 2036 Future Year model has been enhanced to include Homewood Road / Woodstock Road North this is a north/south link to the west of the Marshalwick Lane / Sandpit Lane / Beechwood Avenue junction. Select Link Analysis shows that the inclusion of this link into the model means most southbound traffic is now using this link rather than the junction. This contributes to the decrease in traffic entering the junction from the northern (Marshalwick Lane) arm. This is the case in both the AM and PM peak.

3.3.3.1 Delays in St. Albans in Local Plan Run 3 vs Local Plan Run 4

In St. Albans the main difference between LP Run 3 and LP Run 4 is the addition of more housing sites. These include the area in the south of St. Albans previously designated as a rail freight yard, sizable developments to the east and north of St. Albans and a significant development in the north east of Harpenden. The Maylands development has also been expanded.

Most junctions do not see an increase in delay times of over 30 seconds in the AM peak. Exceptions to this are:

- M1 Mainline southbound - Offslip Approach
- Peahen Junction-Chequer Street / London Road / Holywell Hill / High Street, St. Albans
- M25 J21a-M25 anti-clockwise off-slip / A405 Southbound exiting junction
- M1 J8-southbound off-slip
- B5378 Shenley Lane / A414 North Orbital Road, St. Albans

Most junctions do not see a reduction in delay times of over 30 seconds in the AM peak.

Exceptions to this are:

- M25 J21-M25 clockwise off-slip / A405 northbound exiting junction
- M25 J21-M25 anti-clockwise on-slip / A405 northbound, entering junction
- Oaklands Lane / A1057 Hatfield Road / Station Road, St. Albans
- B653 Marford Road / Marford Road / B653 Cory-Wright Way, Wheathampstead
- A1081 westbound - entering London Colney Roundabout, London Colney
- A5183 Watling Street arm of Park Street Roundabout, St. Albans
- B651 Watling Street / Church Street, Wheathampstead

Most junctions do not see an increase in delay times of over 30 seconds in the PM peak.

Exceptions to this are:

- M25 Junction 21A Eastbound Offslip Diverge
- M1 J8-southbound off-slip

Most junctions do not see a reduction in delay times of over 30 seconds in the PM peak.

Exceptions to this are:

- M25 J21-M25 anti-clockwise on-slip / A405 northbound, entering junction
- M25 J21-traffic leaving junction and merging with M25 anti-clockwise.
- B556 Harper Lane / B556 Bell Lane / Shenleybury Lane, London Colney
- B653 Marford Road / Marford Road / B653 Cory-Wright Way, Wheathampstead
- A5183 Watling Street arm of Park Street Roundabout, St. Albans

3.3.4 Junction Delay in Three Rivers (See Appendix E for more location detail)

Table 3-4 presents a combined list of the Top 20 worst overall average delay for the AM and Top 20 worst overall average delay in PM in Three Rivers district. Delay represents the combined totals of delay felt by all arms of the junction. Many junctions are in the top 20 in both the AM and PM peaks, meanings the combined list of top 20s does not total 40. A number of junctions in the table below are forecast to experience delay times of less than 30 seconds.

Table 3-4 The Top 20 AM Overall Average Delay and Top 20 PM Overall Average Delay in Three Rivers District

COMET Node	Junction	AM (s)	Change from 2014	PM (s)	Change from 2014
8178	London Road / Moor Lane, Rickmansworth	353	203 (>100%)	313	154 (97%)
8254	Traffic exiting M25 J20 onslip, merging with M25 clockwise traffic	316	312 (>100%)	354	346 (>100%)
8213	A4125 Hampermill Lane / Brookdene Avenue, Watford Heath	183	43 (31%)	330	104 (46%)
8257	A404 London Road / Harefield Road,	103	89 (>100%)	191	-77 (-29%)

	Rickmansworth				
8219	Hunton Bridge Interchange-A41 North Western Avenue westbound entering junction / A411 Hemel Hempstead Road southbound exiting junction	93	48 (>100%)	21	2 (8%)
8193	A41 Watford Road / Bridge Road / Langleybury Lane, Abbots Langley	89	26 (41%)	77	19 (34%)
8188	M25 J20-A41 Watford Road northbound entering junction / M25 anti clockwise on-slip	57	11 (24%)	88	26 (43%)
8253	M25 J20-M25 anti clockwise off-slip / A41 Watford Road southbound exiting junction	55	12 (27%)	21	3 (15%)
8163	A404 Rickmansworth Road / Solesbridge Lane / Dog Kennel Lane, Rickmansworth	51	15 (41%)	39	13 (52%)
8222	M1 J6-southbound on-slip merging with M1	49	46 (>100%)	2	0 (20%)
8246	M1 J6-northbound on-slip merging with M1	43	-	53	23 (79%)
8229	M1 J6-J5 southbound carriageway narrows from 4 lanes to 3 lanes	40	33 (>100%)	0	-
8223	A4008 Oxhey Lane / B4542 Little Oxhey Lane, South Oxhey	38	15 (64%)	150	103 (>100%)
8166	M25 J18-traffic entering/exiting A404 Rickmansworth Road	37	8 (28%)	40	-9 (-19%)
8210	Tibbs Hill Road / Hill Farm Avenue / Aerodrome Way / Cunningham Way, Leavesden	37	16 (73%)	21	3 (19%)
8247	M25 J18-M25 anti-clockwise off-slip / M25 anti-clockwise on-slip / A404 Rickmansworth Road	36	-12 (-25%)	53	-2 (-4%)
8236	M25 J17-J16 M25 anti-clockwise narrows from 5 lanes to 4 lanes	36	-	27	-
8198	Hunton Bridge Interchange-A41 Hemel Hempstead Road (norther arm) entering and exiting the junction	32	31 (>100%)	1	-19 (-96%)
8249	M25 J19-anti-clockwise on-slip merging with M25	27	-	33	-
8239	M25 J17-clockwise on-slip merging with M25	24	-	45	26 (>100%)
8199	A412 Watford Road / Baldwins Lane, Croxley Green	16	2 (16%)	295	-243 (-45%)
8221	Chequers Lane / A405 North Orbital Road (close to M1 J6)	18	-1 (-8%)	89	81 (>100%)

Changes to traffic patterns in Rickmansworth are forecast to cause significant increases to delay times in the AM peak. These changes result in blocking back at the junctions of A404 London Road / Harefield Road (node 8257) and London Road / Moor Lane (node 8178). Increasing delay time experienced by traffic travelled eastbound on the A404 by more than 3 minutes at both of these junctions. The blocking back is forecast to originate at the junction of A404 Riverside Drive / Church Street / Ebury Way / A404 London Road (not shown in the table above).

The models predict a significant increase in delay times, in the PM peak, for the Hunton Bridge Interchange which consists of A41 Hempstead Road / A41 North Western Avenue / A411 Hempstead Road / Slip roads for M25 J19 (delays are forecast for node 8219 and node 8198). This is caused by a significant increase in traffic flow. Despite the coded improvement measures here delay times are still forecast to increase.

3.3.4.1 Delays in Three Rivers in Local Plan Run 3 vs Local Plan Run 4

Most junctions do not see an increase in delay times of over 30 seconds in the AM peak.

Exceptions to this are:

- London Road / Moor Lane, Rickmansworth
- A404 London Road / Harefield Road, Rickmansworth
- Hunton Bridge Interchange-A41 North Western Avenue westbound entering junction / A411 Hemel Hempstead Road southbound exiting junction
- M1 J6-southbound on-slip merging with M1

Most junctions do not see a reduction in delay times of over 30 seconds in the AM peak.

Exceptions to this are:

- A404 Riverside Drive / Church Street / Ebury Way / A404 London Road, Rickmansworth Road
- M25 J18-traffic entering/exiting A404 Rickmansworth Road

Most junctions do not see an increase in delay times of over 30 seconds in the PM peak.

Exceptions to this are:

- London Road / Moor Lane, Rickmansworth
- Chequers Lane / A405 North Orbital Road (close to M1 J6)

Most junctions do not see a reduction in delay times of over 30 seconds in the PM peak.

Exceptions to this are:

- A412 Watford Road / Baldwins Lane, Croxley Green
- A404 London Road / Harefield Road, Rickmansworth
- A404 Riverside Drive / Church Street / Ebury Way / A404 London Road, Rickmansworth Road
- Hunton Bridge Interchange-A41 North Western Avenue westbound entering junction / A411 Hemel Hempstead Road southbound exiting junction
-

3.3.5 Junction Delay in Watford (See Appendix F for more location detail)

Table 3-5 presents a combined list of the Top 20 worst overall average delay for the AM and Top 20 worst overall average delay in PM in Watford Borough. Delay represents the combined totals of delay felt by all arms of the junction. Many junctions are in the top 20 in both the AM and PM peaks, meanings the combined list of top 20s does not total 40..

Table 3-5 The Top 20 AM Overall Average Delay and Top 20 PM Overall Average Delay in Watford District

COMET Node	Junction	AM (s)	Change from 2014	PM (s)	Change from 2014
9215	Clarendon Road / St John's Road, Watford	600+	>600 (>100%)	16	2 (17%)
9063	Westland Road / Shady Lane	600+	>600 (>100%)	5	1 (12%)
9345	Westland Road / Station Road	600	598 (>100%)	142	140 (>100%)
9117	Westlea Avenue / Meriden Way, Watford	403	42 (12%)	3	0 (1%)
9174	Aerodrome Way / Ashfields	318	202 (>100%)	110	-141 (-56%)
9064	Clarendon Road / Shady Lane, Watford	301	299 (>100%)	3	1 (22%)
9214	Station Road / Woodford Road, Watford	229	225 (>100%)	4	0 (10%)
9052	Rickmansworth Road / Metropolitan Station Approach, Watford	221	135 (>100%)	55	27 (97%)
9197	A412 St Albans Road / Station Road / Langley Road, Watford	203	131 (>100%)	70	-3 (-4%)
9355	Farraline Road, Watford	190	-21 (-10%)	124	-5 (-4%)
9243	A4008 Pinner Road / A4008 Aldenham Road, Bushey	169	-39 (-19%)	258	-37 (-13%)
9233	St Albans Road / Garston Lane	167	9 (6%)	50	-4 (-7%)
9236	Radlett Road / Colonial Way	161	147 (>100%)	146	123 (>100%)
9013	Oxhey Road / Kingsfield Road	154	151 (>100%)	3	0 (7%)
9206	A412 St Albans Road / Leavesden Road	149	65 (77%)	1	0 (-18%)
9023	A4145 Vicarage Road / Watford General Hospital access road	148	9 (7%)	5	-1 (-17%)
9225	A4125 Eastbury Road / A4178 Deacons Hill / Oxhey Road, Watford	147	32 (28%)	171	29 (21%)
9124	Garston Lane / Fourth Avenue	145	-35 (-20%)	2	0 (1%)
9216	A411 Beechen Grove / Clarendon Road	145	130 (>100%)	33	22 (>100%)
9245	A41 Colne Way / Westlea Avenue	111	26 (30%)	205	-11 (-5%)
9212	A412 St Albans Road / Bushey Mill Lane	133	39 (42%)	204	-161 (-44%)
9094	A41 Colne Way / Asda	41	-12 (-23%)	137	-113 (-45%)
9035	A411 Exchange Road / Marlborough Road	90	82 (>100%)	121	-333 (-73%)
9034	Lower High Street / New Road / Wellspring Way	10	1 (15%)	95	85 (>100%)
9217	A412 St Albans Road / Gammons Lane / Balmoral Lane	73	14 (24%)	94	12 (15%)
9001	A4125 Eastbury Road / Silk Mill Road	3	1 (33%)	91	57 (>100%)
9220	St John's Road / Woodford Road / Orphanage Road / Queens Road	142	79 (>100%)	91	42 (84%)

Junctions in the area of Station Road / Clarendon Road / Westland Road / Shady Lane are forecast to experience severe increases in delay times. Various junctions are forecast to experience blocking back in the AM peak, this blocking back then affects traffic flow through surrounding junctions. One cause of this is the cycleway on Station Road which reduces the capacity of carriageway. Another factor is the forecast increase in demand flow (the number of vehicles wishing to use the roads) in the area. This blocking back extends to the Exchange Road / Beechen Grove Gyratory, causing blocking back on the northwest side of the gyratory.

The junction of Clarendon Road / St. Johns Road is forecast to experience blocking back in the 2036 Future Year. This blocking back extends to the Beechen Grove / Exchange Road gyratory. Blocking back then occurs at the junction of Clarendon Road / Exchange Road and the junction of Exchange Road / Beechen Grove.

There are also significant delays forecast at junctions along the key route corridors such as the A412, A41, A4125 and A4008.

As previously noted, a strategic model such as COMET will not be able to fully replicate all the vehicle movements in a dense, congested environment such as central Watford and it is recommended that microsimulation modelling is undertaken to ascertain the impacts of developments in more detail.

3.3.5.1 Delays in Local Plan Run 3 vs Local Plan Run 4

In Watford, the main difference between LP Run 3 and LP Run 4 is the reduction of Ascot Road to a single carriageway with a bus lane in each direction on what is currently a dual carriageway section. There are also some significant changes in forecast junction delays probably as a result of changes in planning data elsewhere in Hertfordshire, North London and Buckinghamshire which has led to increased traffic demand and changes in traffic patterns estimated by the model.

The following junctions all experienced an increase in delay times of over 30 seconds in the AM peak:

- Clarendon Road / St John's Road, Watford
- Westlea Avenue / Meriden Way, Watford
- Clarendon Road / Shady Lane, Watford
- A412 St Albans Road / Station Road / Langley Road, Watford
- Aerodrome Way / Ashfields
- A411 Beechen Grove / Clarendon Road
- Garston Lane / Fourth Avenue
- Dome Roundabout-A412 St. Albans Road southbound entering roundabout / A41 Colne Way eastbound exiting roundabout, Watford
- A412 St. Albans Road / Lowestoft Road, Watford
- Pinner Road / Chalk Hill
- A4145 Vicarage Road / Watford General Hospital access road
- Radlett Road / Colonial Way
- Radlett Road / Balmoral Road, Watford
- M1 J5 southbound off-slip. Traffic leaving main carriageway
- Oxhey Road / Kingsfield Road
- Dome Roundabout-A412 St. Albans Road northbound exiting roundabout

The following junctions all experienced a decrease in delay times of over 30 seconds in the AM peak:

- Westland Road / Station Road
- Meriden Way / Garsmouth Way
- A4145 Hagden Lane / Brightwell Road
- St John's Road / Woodford Road / Orphanage Road / Queens Road
- Rickmansworth Road / Metropolitan Station Approach, Watford
- Station Road / Woodford Road, Watford
- Farraline Road, Watford
- A412 St Albans Road / Leavesden Road
- Radlett Road / Orphanage Road
- A411 Exchange Road / Marlborough Road
- Queens Av. / Whippendell Road / Euston Av.
- Dome Roundabout-A41 North Western Av. Eastbound entering roundabout
- Ashfields / North Western Av. / Silver Dell / Courtlands Drive / Courtlands Close
- A4178 Wigganham Road / Farraline Road
- A411 Waterfields Way / A411 Lower High Street / A411 Dalton Way / Lower High Street
- Radlett Road / Link Road
- Westland Road / Wellington Road
- Vicarage Road / Banbury Street
- Orphanage Road / Reed Crescent
- A411 Beechen Grove entering gyratory

The following junctions all experienced an increase in delay times of over 30 seconds in the PM peak:

- Radlett Road / Colonial Way
- A411 Beechen Grove entering gyratory (north west arm)
- Lower High Street / New Road / Wellspring Way

The following junctions all experienced a decrease in delay times of over 30 seconds in the PM peak:

- A412 St Albans Road / Bushey Mill Lane
- A411 Hempstead Road / Langley Road
- Aerodrome Way / Ashfields
- A411 Exchange Road / Marlborough Road
- Rickmansworth Road / Metropolitan Station Approach, Watford
- A412 St Albans Road / Gammons Lane / Balmoral Lane
- Pinner Road / Chalk Hill
- Queens Av. / Whippendell Road / Euston Av.
- Vicarage Road / Banbury Street
- Radlett Road / Orphanage Road
- Dome Roundabout-A412 St. Albans Road northbound entering roundabout / A41 North Western Avenue exiting roundabout
- Oxhey Road / Kingsfield Road

4 Conclusions

The COMET modelling work has tested the impact of implementing committed schemes, highly likely transport schemes, and highway improvement schemes identified in various strategy documents including the South West Hertfordshire and South Central Growth and Transport Plans, the emerging A414 Strategy and District IDPs; compared to the Base Year 2014.

The run was undertaken for the districts in early 2019 based on the current planning data and assumed schemes at the time, including a number which are hypothetical.

The purpose of the run is to allow for the identification of the high-level impact of the schemes and whether there is a need to mitigate the additional pressure from development growth.

It should be noted that due to the strategic nature of the model this comparison provides an indication of potential scheme impacts and scheme design and development should be underpinned by more detailed operational models and local assessment as more detail becomes known, particularly in congested urban environments.

The schemes already in the model will undoubtedly be making conditions better but given the level of development growth there is still stress on the network. As developments are brought forward it may be necessary for more detailed local or micro simulation models to be prepared to assess the impact of a given development. There is also a need to review the schemes to ensure they are operating as expected, particularly where signalisation schemes have been put forward.

It should be noted that many of the schemes are highway mitigation measures. Whilst the interventions do appear to offer some localised capacity improvements in some instances, the consequence is that there is increased traffic and re routing. It is therefore important that they form part of a balanced transport strategy which includes improvements to sustainable transport.

It is also suggested that the outputs from the COMET model are used to identify key future travel movements and that opportunities to improve sustainable travel to meet these demands are explored further as part of ongoing transport strategy and development planning work.

Appendix A – Schemes relevant to South West Hertfordshire included in the Model

Original Scheme ID	District	Location	Scheme
39	Dacorum	A414 Breakspear Way / Maylands Lane, Hemel Hempstead	Lane reallocation
3CTL	Dacorum	Swallowdale Lane / Three Cherry Trees Lane, Hemel Hempstead	Junction Signalisation
40 (D/32) / PR10	Dacorum	Two Waters Road / London Road, Hemel Hempstead	Rearrangement of junction & signal optimisation
D/24	Dacorum	Leighton Buzzard Road / Queensway Roundabout	Part-time signals at the Leighton Buzzard Rd / Queensway roundabout with widening to allow two lanes& intro of yellow box junction. Leighton Buzzard Road / Queensway lane reallocation - 2 lanes SB on LBR
D/25 / PR27 / MG_SC4	Dacorum	Between Boundary Way and Wood Lane End	New link between Boundary Way and Wood Lane End (assume single carriageway with 3-way traffic and 30mph. Buncefield Lane north of Boundary Way (between Boundary Way and Cherry Tree Lane and between the A414 and Green Lane will become a quietway so does not need to be added).
D/26	Dacorum	Link Road / Redbourn Road roundabout	Junction modification
D/27	Dacorum	Redbourn Road / Shenley Road, Hemel Hempstead	T/18 removal of approach flare on eastern arm
D/28	Dacorum	Station Road / St Johns Road / Heath Lane, Hemel Hempstead	New mini roundabout
D/29	Dacorum	London Road / Nash Mills Road / Red Lion Lane, Hemel Hempstead	Signal optimisation
D/31	Dacorum	Maylands Avenue / Wood Lane End, Hemel Hempstead	Signal optimisation
D/35	Dacorum	Leighton Buzzard Road north of Plough Roundabout	Signal optimisation
	Dacorum	New Development	New development access-Tring / Berkhamsted
MG S3 / PR28 / PR97 / PR98 / PR99	Dacorum	Cherry Trees Lane and Buncefield Lane quietways	Closing the existing narrow country lanes within the industrial area of Cherry Trees Lane, Buncefield Lane (north) and Buncefield Lane (south) to through traffic
MG S6	Dacorum		New pedestrian / cycle crossings in Maylands area - Maylands Growth Corridor study SC3-6
MG SC1h	Dacorum	A414 / Green Lanes	Interim at grade signalisation scheme
MG SC7	Dacorum	Redbourn Area	HGV restrictions on B487 and A5183
PR14	Dacorum	Lawn Lane arm of Plough Roundabout	Model closure of this link to vehicles and diversion of vehicles to Durant's Hill Road /

			London Road.
PR35	Dacorum	Junction 10 Southbound On slip	Capacity Improvement
PR67	Dacorum	Fishery Road, Hemel Hempstead	Model closure of this link to non bus vehicles. NB: Replaces previous LP3 scheme D/34 (signalisation of London Rd /Fishery Road)
PR9	Dacorum	A4251 London Road Hemel Hempstead	Model as reduced speed along link to simulate impact of cycle lane and road narrowing
SM10	Dacorum	M1	Dedicated coach Luton to Hemel along M1
SM32	Dacorum	Apsley / Two Waters Road	Ped / cycle improvement.
SM4a	Dacorum	Plough Roundabout	Bus priority lanes on A414 WB, Station Road and Two Waters Road approaches
SM5a	Dacorum	A414 Hemel Hempstead	Multi-Purpose Street
T/17 / Dac_Shooters Way	Dacorum	Kingshill / Shootersway, Berkhamsted	improvements including traffic lights and pedestrian crossings required in association with MU/6: Land at Durrants Lane / Shootersway (Egerton Rothesay School) and Local Allocation LA4: Hanburys.
T/18	Dacorum	High Street Corridor	Extension of 20mph zone and pedestrian crossing facilities
T/21	Dacorum	Icknield Way, Tring	New junctions to development with associated highway improvements, including new cycle and pedestrian routes in line with the site master plan. New layout plans available. Assume priority junction at highlighted T junctions, refer to LA5 layout plan
T/23	Dacorum	Chesham Road / Molyneux Avenue	New access to LA6 development
T/8	Dacorum	Bedmond Road / Leverstock	Bedmond Road / Leverstock Junction Upgrade
T/9	Dacorum	Leighton Buzzard Road / Combe Street, Hemel Hempstead	Junction Signalisation
	Dacorum	The Avenue, Hemel Hempstead	Development site Secondary site access onto The Avenue (extension of existing spur)
	Dacorum	A4147 Link Road (Location between Piccotts End Road and Aycliffe Drive), Hemel Hempstead	New roundabout access
	Dacorum	Fletcher Way, Hemel Hempstead	T Junction onto Fletcher Way, Hemel Hempstead
	Dacorum	M1 - A5	M1 A5 Link Road (implemented since 2014)
	Dacorum	A4146 Waterend	A4146 HGV ban at Waterend (implemented since 2014)
MG S2 / SM6b	Dacorum / St Albans	A414 to B487 Redbourn Road, Maylands Area, Hemel Hempstead	New spine road from B487 Rebourn Road to A414 St Albans Rd - dual carriageway up to new link from M1. Single carriageway north of here.
MGC S1c/ SM7c	Dacorum / St Albans	M1 junction 8, Hemel Hempstead	Junction 8 - Major reconfiguration to provide direct access into Maylands
SM5b	Dacorum / St Albans	North Hemel, Hemel Hempstead	New link road serving North Hemel development
324	Dacorum / Watford	324 route	Route now renamed 520 and W1-4. Frequency reduction from Aylesbury to Hemel from 3ph to 2ph. Increase from Hemel to Watford from 3ph

			to 4ph
300/301	Dacorum /St Albans /Wel Hat /Stevenage /North Herts	300 /301 route	Route now becomes 300, 301 and 303
Bk St cycle	Hertsmere	Baker Street	New on street cycle lanes within existing road width
A1 Els Wy	Hertsmere	A1 / A5135 junction	Rephasing of signals
Ba St Dk La	Hertsmere	B556 / Baker Street / Darkes Lane	Rephasing of signals
Bell La	Hertsmere	B556/ B5378 roundabout north of Shenley, S of M25 Jct 22	Convert to signalised junction & optimise timings with potential widening of approaches
Da Hill	Hertsmere	A1081 / Trotters Bottom / Dancers Hill rbt	Convert to signalised junction and optimise timings
HMER1 / SM131	Hertsmere	A1 / A411 Barnet Lane (Stirling Corner) - Borehamwood	Changes to signal staging and timing
ITP 17008	Hertsmere	Bushey Hall Road, Bushey Grove Road, Greatham Road	Traffic calming & pedestrian enhancements
ITP12056	Hertsmere	Borehamwood – Station Road/Theobald St/Allum Lane junction	Upgrade of junction to continental roundabout
New	Hertsmere	A409 Common Rd /A4140 High Road	Rephasing of signals
New	Hertsmere	Sandy Lane / A41 junction	Rephasing of signals
New	Hertsmere	A41 corridor parallel to M1	Signalisation strategy to link junctions
New	Hertsmere	North of borough	Diversion of existing 84 bus service to serve development
Pk Rd	Hertsmere	Park Road / Watling Street	Convert to signalised junction & optimise timings
SL Jct	Hertsmere	A4008 /Radlett Road roundabout	Convert to signalised junction & optimise timings
SM 123	Hertsmere	Elstree Way Corridor	Junction improvement with replacement of the Tesco roundabout with signals
SM113	Hertsmere	Darkes Lane / The Walk junction by station	Junction improvements at Darkes Lane/The Walk to improve conditions for pedestrians and cyclists as well as broader urban realm enhancements along the high street.
	Hertsmere	M25 j18-25	Smart motorway with hard shoulder running (implemented since 2014)
	North Herts / Stevenage / Welwyn Hatfield / Hertsmere	Great Northern rail line	Thameslink Timetable and route changes (implemented in 2018 /19)
New	Hertsmere	New Development	Diversion of existing 84 bus service to serve the new Development
33	Three Rivers	Woodside Road, Abbots Langley	New roundabout serving development north of Meadowside junction
34	Three Rivers	Uxbridge Road, Mile End, Rickmansworth	New access for 4fe secondary school - access proposed via new roundabout junction on Uxbridge Road (at junction with Long Lane)

PR86	Three Rivers	A404 Riverside Drive, Church St Roundabout	Model partial signalisation
SM1 /SM30	Three Rivers	M25 Junction 20	Capacity improvements
TR_1 /PR87& ITP17006	Three Rivers	A412 / A402 Rickmansworth	Additional capacity at the A412 / A404 roundabout to the west of Rickmansworth Town Centre
TR_2 /SM1	Three Rivers	M25 spur, Hunton Bridge	M25 spur approach to Hunton Bridge roundabout - widening approach / circulation or signalisation
TR_3	Three Rivers	Glen Way and Grove Mill Lane at junctions with Hempstead Road (Watford)	Provision of additional right turn lanes into and out of Glen Way and Grove Mill Lane at their junctions with A411 Hempstead Road. Glen Way is not coded in COMET, so not included. A flared approach will be coded out of Grove Mill Ln, however, the right turn lane into Grove Mill Ln already exists (so no change will be made on this arm).
TR_4	Three Rivers	Eastbury Road / Deacons Hill, Watford	Left turn lane from Deacons Hill to Eastbury Road
724	East Herts / Wel Hat /St Albans / Watford /Three Rivers	724 route	Rationalisation of existing 724 route into route 724, & 302 - splitting it into sections with improved frequency over shorter distances eg WGC to Hertford 1bph to 2bph
10337_HL_09	St. Albans	A1081 Luton Road / The Common, Harpenden	A1081 Luton Road / The Common capacity enhancements
10338-HL-07	St. Albans	A1081 Luton Road, Harpenden	NW Harpenden Development accesses
10338-HL-07	St. Albans	A1081 Luton Rd / Redbourn Lane, Harpenden	A1081 Luton Rd / Redbourn Lane capacity enhancements
10338-HL-08	St. Albans	A1081 Luton Rd /Station Road, Harpenden	A1081 Luton Rd /Station Road capacity enhancements
60534762-SADC-DWG_SITE 10	St. Albans	B653 Cory Wright Way/Marford Road, Wheathampstead	B653 Cory Wright Way/Marford Road, Wheathampstead junction improvement
60534762-SADC-DWG_SITE A	St. Albans	A4147 Hemel Hempstead Road / King Harry Lane, St Albans	A4147 Hemel Hempstead Road / King Harry Lane junction improvement
60534762-SADC-DWG_SITE2 / SM176 /SM170	St. Albans	A414-A1081-London Colney Roundabout, London Colney	A414-A1081-London Colney Roundabout junction improvement
60534762-SADC-DWG_SITE6	St. Albans	St Albans Road/Sandridge Road/Marshalswick Lane/Beech Road, St Albans	St Albans Road/Sandridge Road/Marshalswick Lane/Beech Road - junction improvement
60534762-SADC-DWG_SITE8	St. Albans	A5183 Redbourn Road/A4147 Bluehouse Hill/Batchwood Drive Roundabout, St Albans	A5183 Redbourn Road/A4147 Blue House Hill/Batchwood Drive Roundabout junction improvement
60534762-SADC-DWG_SITEB	St. Albans	A1081 Luton Road/ Park Hill Junction, Harpenden	A1081 Luton Road/ Park Hill Junction optimisation

60534762-SADC-DWG_SITEE	St. Albans	Hatfield Road/Station Road, Smallford Roundabout	Hatfield Road/Station Road, Smallford Roundabout junction improvement
A414CHL / SM178	St. Albans	A414 / Colney Heath Lane / High Street, Colney Heath	A414 Colney Heath longabout safety scheme
New	St. Albans	North East Harpenden Access	New access from North East Harpenden development site (site NEH)
New	St. Albans	Chiswell Green Lane	New access from Chiswell Green development (site CG)
New	St. Albans	A5183 Frogmore & A414	New access from Park Street Garden Village
New	St. Albans	Shenley Lane	New access from West of London Colney development
New	St. Albans	A1081 Harpenden Road	New access from North of St Albans development
PR140 //SM166 /SM143	St. Albans	Central St Albans	Expanded 20mph zone in St Albans including Victoria Street, Bricket Road and Catherine Street.
PR141	St. Albans	A1081 St Peter's Street Pedestrian Crossing	Reduced severance for pedestrians along A1081 St Peter's Road with a new signal-controlled crossing adjacent to the small shopping parade and St Peter's churchyard between St Peter's Close and Grange Street.
PR175	St. Albans	Peahen Junction	Reconfigure the signal timings so that the Holywell Hill and Chequer Street arms run separately.
PR193 /190 /192	St. Albans	High Street	A 20mph speed limit introduced on the section of the High Street adjacent to the shopping parade.
PR194	St. Albans	Non-strategic roads	A 20mph speed limit introduced on all roads within London Colney
PR199 /SM65 /SM66 /SM67 /PR68 /SM198	St. Albans	Coopers Green Lane Speed Limit Reduction	Reduced speed limit along Coopers Green Lane to support active transport infrastructure
PR36(SWH)	St. Albans	A1081 Harpenden Town Centre & Station Road	Narrowing of road, more crossings and speed tables
SC SM177	St. Albans	A414 / A405 (Park Street), Park Street	A414 / A405 (Park Street) roundabout signalisation
SL 1	St. Albans	Sandpit Lane, St Albans	Oaklands development new access onto Sandpit Lane
SL 2	St. Albans	Sandpit Lane / House Lane, St Albans	Sandpit Lane / House Lane enlargement of existing roundabout
SL 3	St. Albans	Sandpit Lane / Marshalswick Lane, St Albans	Sandpit Lane / Marshalswick Lane junction improvements
SL 4	St. Albans	Sandpit Lane / Coopers Green Lane, St Albans	Sandpit Lane / Coopers Green Lane junction improvements
SL 5	St. Albans	Sandpit Lane / Barnfield Road, St Albans	Sandpit Lane / Barnfield Road junction improvement
SM142a	St. Albans	St Peter's Street/Victoria Street	Junction Reconfiguration including footway widening and closure of Victoria St (up to the Maltings GP surgery) to through traffic except buses. Change signals to single way working.
SM174	St. Albans	London Road/Watsons	Reconfigure the junction to rationalise surplus

		Walk/Lattimore Road junction alterations	road space for example the right turn filter lanes on London Road to improve the environment for pedestrians and cyclists.
SM179	St. Albans	A414 Smart Traffic Management	A review of traffic speed limits and measures required to improve compliance along the A414 Between the Park Street Roundabout and the A1(M) Junction 3). Modelled as 50mph speed limit
SM200	St. Albans	B4630 Watford Road Improvements	Intervention to reduce traffic: Currently B road with highest flows in Hertfordshire. On road cycle lane in each direction (removing central hatched areas) and improved footways and crossing facilities around the shopping parades on both sides of the road.
SM201	St. Albans	A405/B4630 Watford Road junction reconfiguration	Conversion of the existing roundabout to a signal-controlled crossroads with more priority given to the A405 arms.
	St. Albans	A414 North Orbital Road	Radlett Rail freight, new access junction onto A414 and new spine road connecting to A5183 Radlett Road (south of Frogmore)
	St. Albans	M25 junction 21a	M25 junction 21a capacity improvements (Radlett Rail freight mitigation)
	St. Albans	M25 junction 22	M25 junction 22 capacity improvements (Radlett Rail freight mitigation)
	St. Albans	A405 / B4630 Watford Road, Chiswell Green, Chiswell Green	New Arm to roundabout to serve new hotel development
SM66 / PR68	Wel Hat / St Albans	Coopers Green Lane NE of Hatfield Avenue (towards Welwyn Garden City)	Coopers Green Lane Active Travel Infrastructure - multimodal corridor with reduced traffic speeds and pedestrian and cycle provision
PR160/SL7 /PR100	St. Albans	St Albans Abbey station - city station	SC1 Abbey Line Shuttle increase in frequency to 15-20 mins to tie in with frequency increase on Abbey Line
PR170	St. Albans	Hatfield Road Bus Priority and Improvements	Modelled as improvement in end to end bus journey times and 10% increase in speed.
PR191	St. Albans	Improved London Colney-St Albans bus services	Double frequency of bus routes through London Colney including routes 84, 358, 602 and 658.
PR197	St. Albans	St Albans-Hatfield Local Bus Route Improvements	Revised 724 service with increased frequency & more stops.
SM13	St. Albans	Park Street station	Potential new Park and rail facility south of A414 and east of A405 linked to existing / relocated Park Street station
ALF1 /T1	Watford / St. Albans	Abbey Line	Frequency improvements (every 20 minutes)
20mph	Watford		Implement 20 mph zone in defined areas
Health Campus Link	Watford	Thomas Sawyer Way, Watford	New link road from Dalton Way providing access to Watford Health Campus (implemented since 2014)
PR45	Watford	Ascot Road	Reduction of Ascot Road to single carriageway with bus lane in each direction on current dual carriageway section
PR85	Watford	Ascot Road, Whippendell Road, Rickmansworth Road	Road Space Consolidation
Wat New_2	Watford	A411 Hempstead Road /	Modification to roundabout, new exit from central

		The Avenue (Town Hall) junction, Watford	Avenue car park onto A411 enabling vehicles to exit to the north without having to travel around the junction
Wat_New_3	Watford	High Street, Watford	Restriction of High Street between Beechen Grove to Market Street to buses (and local access) only. Narrow street with bus stops on road (rather than in laybys). Road remains one way northbound.
Wat_New_4	Watford	Clarendon Road South, Watford	Clarendon Road converted to one way operation southwest bound south of Beechen Grove (Section Beechen Grove - Market Street).
SM12b / SM28a	Watford	Tolpits Lane to Hampermill Lane	Colne sustainable link (cycle / bus). New link over the River from Tolpits Lane to Hampermill Lane for buses / cycles

FINAL DRAFT

Appendix D – St Albans

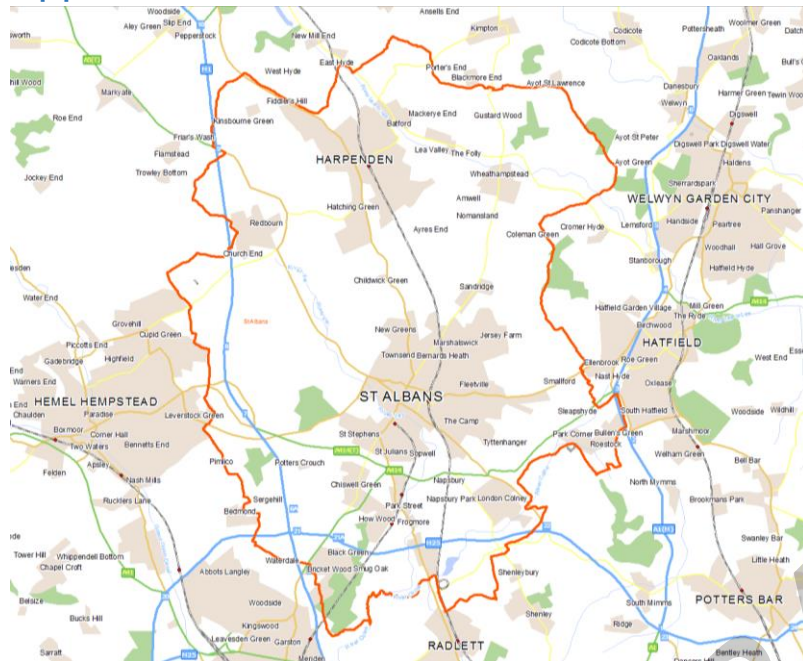


Figure 1 – Map showing St Albans District Boundary

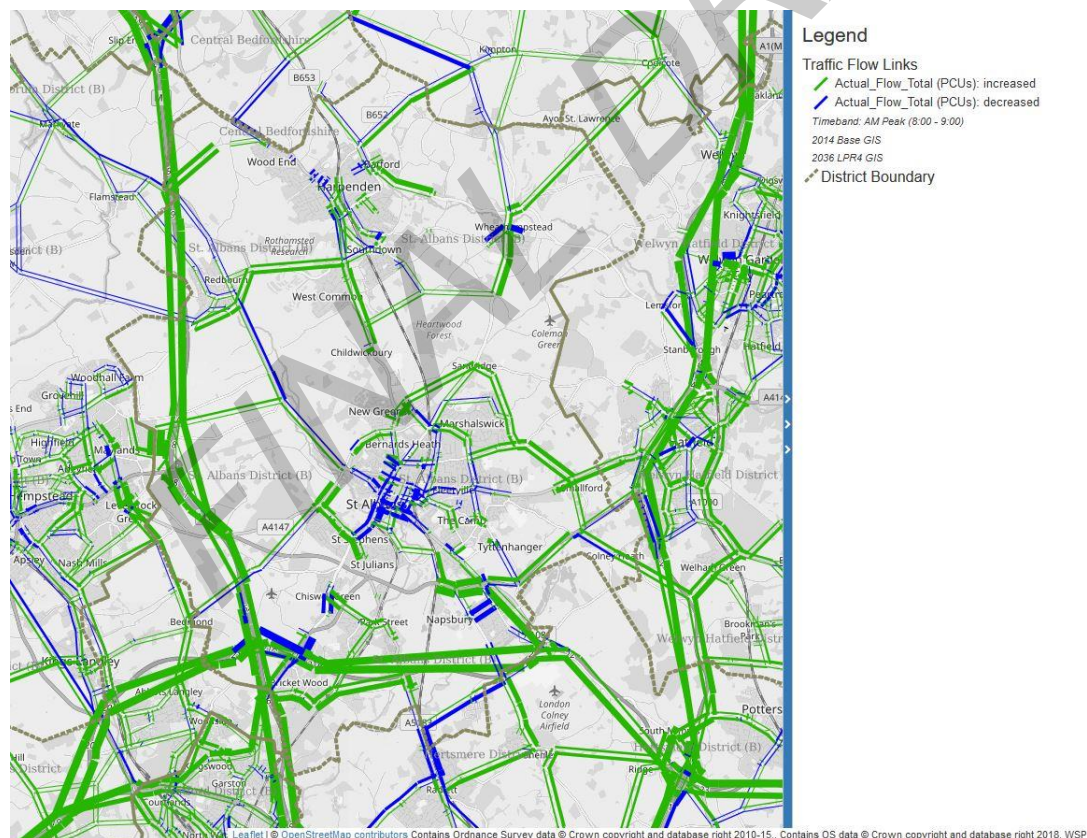


Figure 2 - 2036 – 2014 Actual Flow Difference (PCUs) AM Peak (08:00 – 09:00)

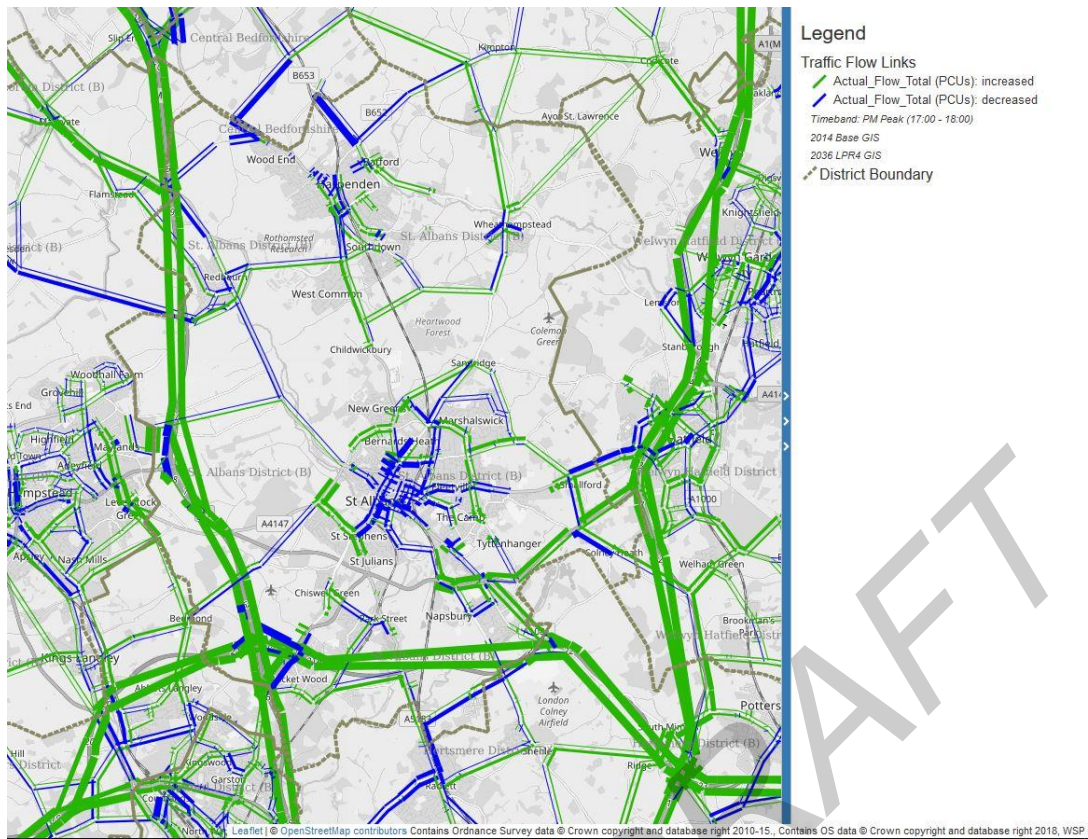


Figure 3 - 2036 – 2014 Actual Flow Difference (PCUs) PM Peak (17:00 – 18:00)

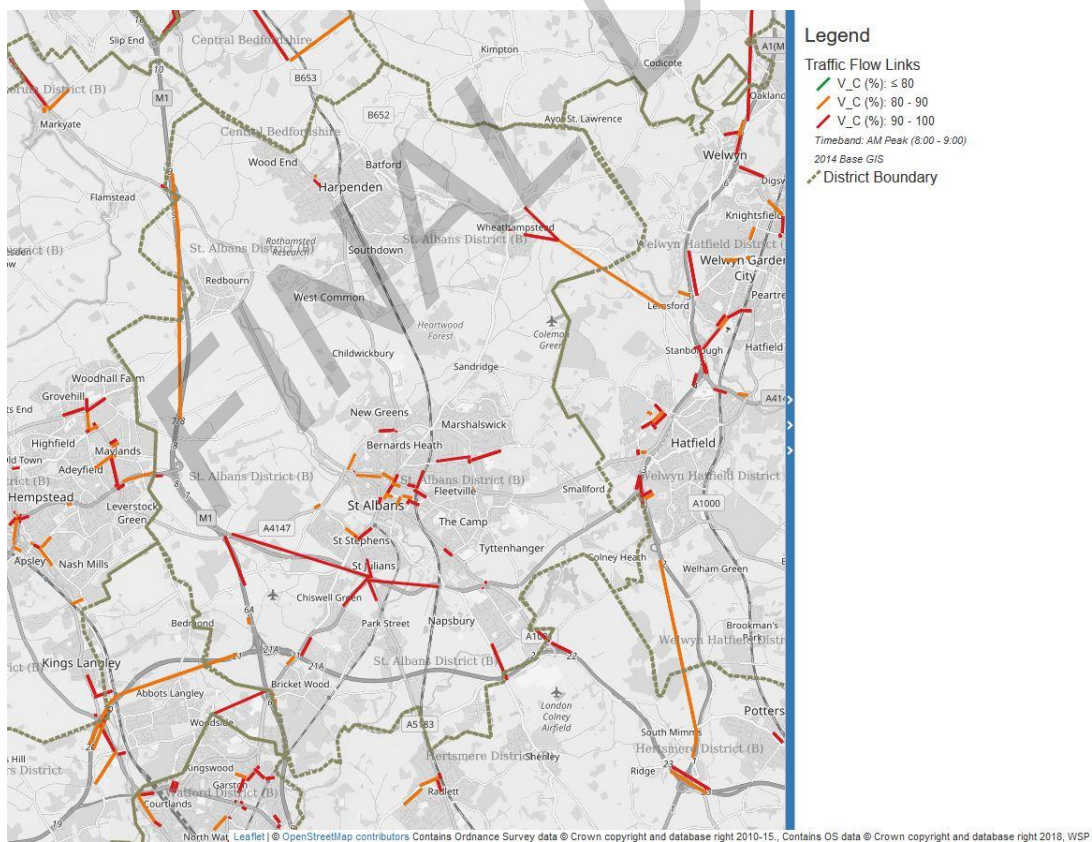


Figure 4 – 2014 Volume to Capacity Ratios in St Albans AM Peak (08:00 – 09:00)

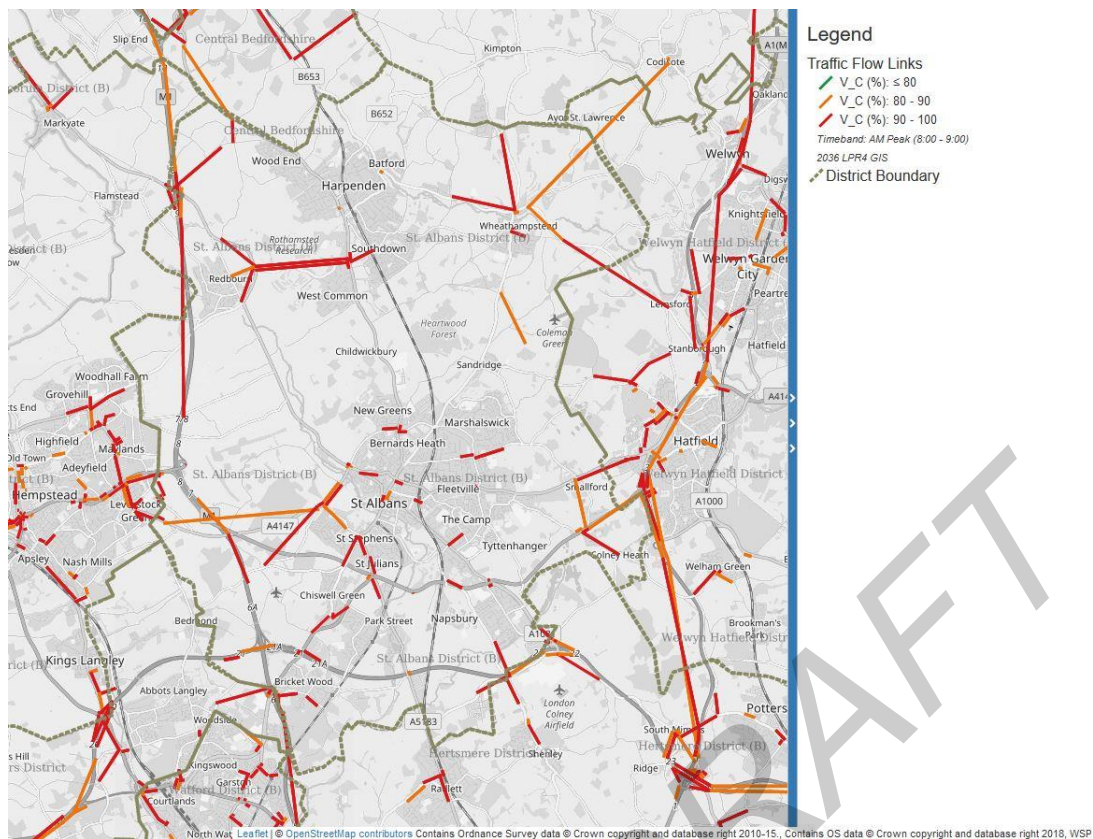


Figure 5 – 2036 Volume to Capacity Ratios in St Albans AM Peak (08:00 – 09:00)

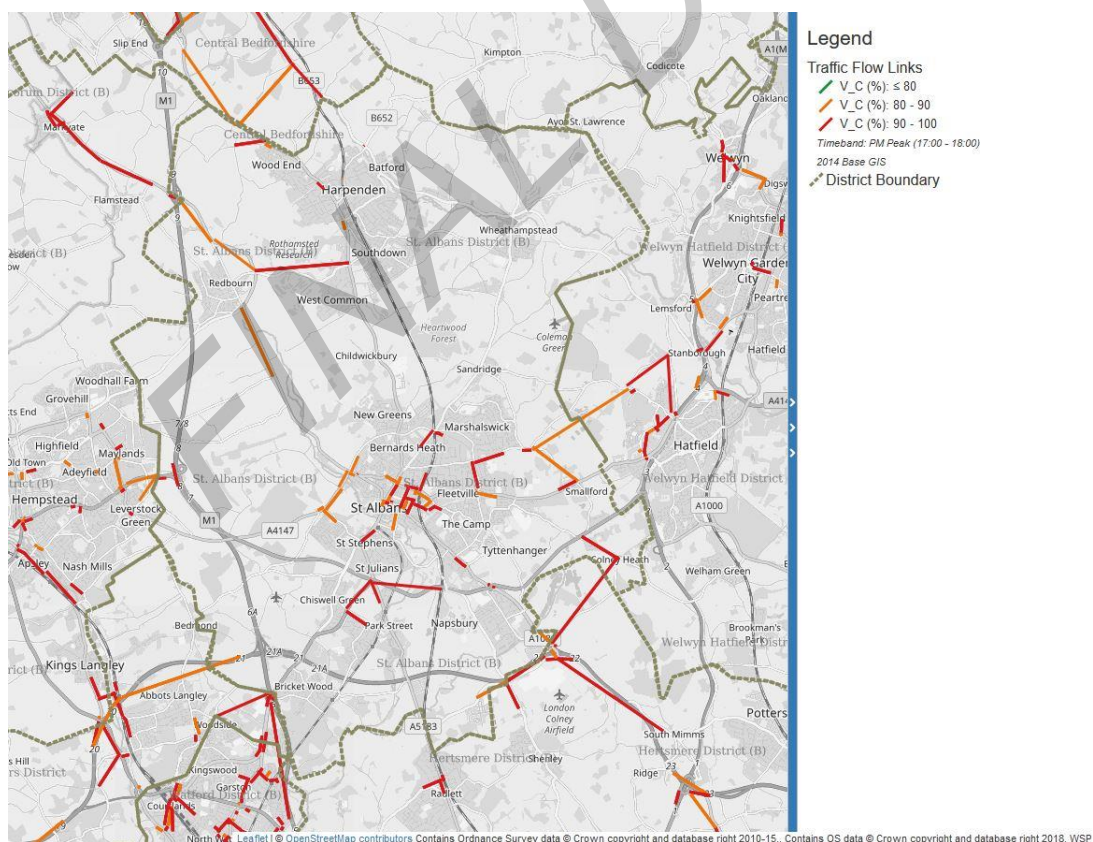


Figure 6 – 2014 Volume to Capacity Ratios in St Albans PM Peak (17:00 – 18:00)

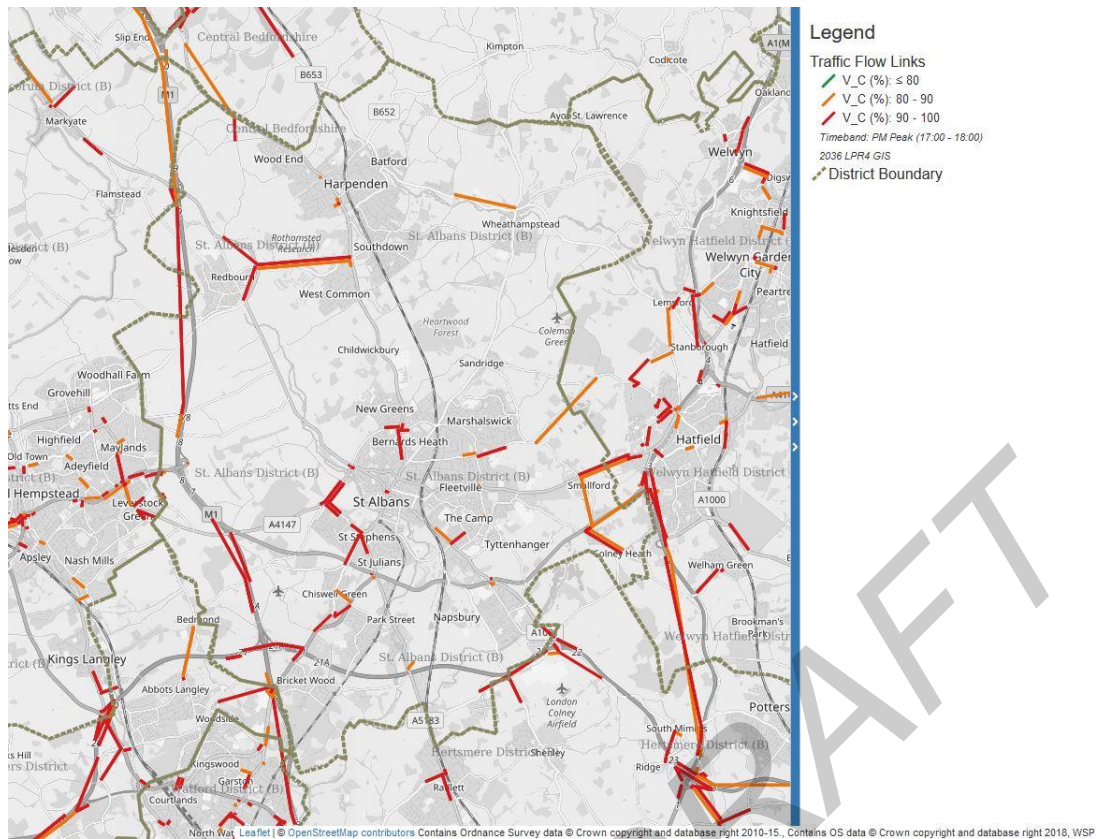


Figure 7 – 2036 Volume to Capacity Ratios in St Albans PM Peak (17:00 – 18:00)

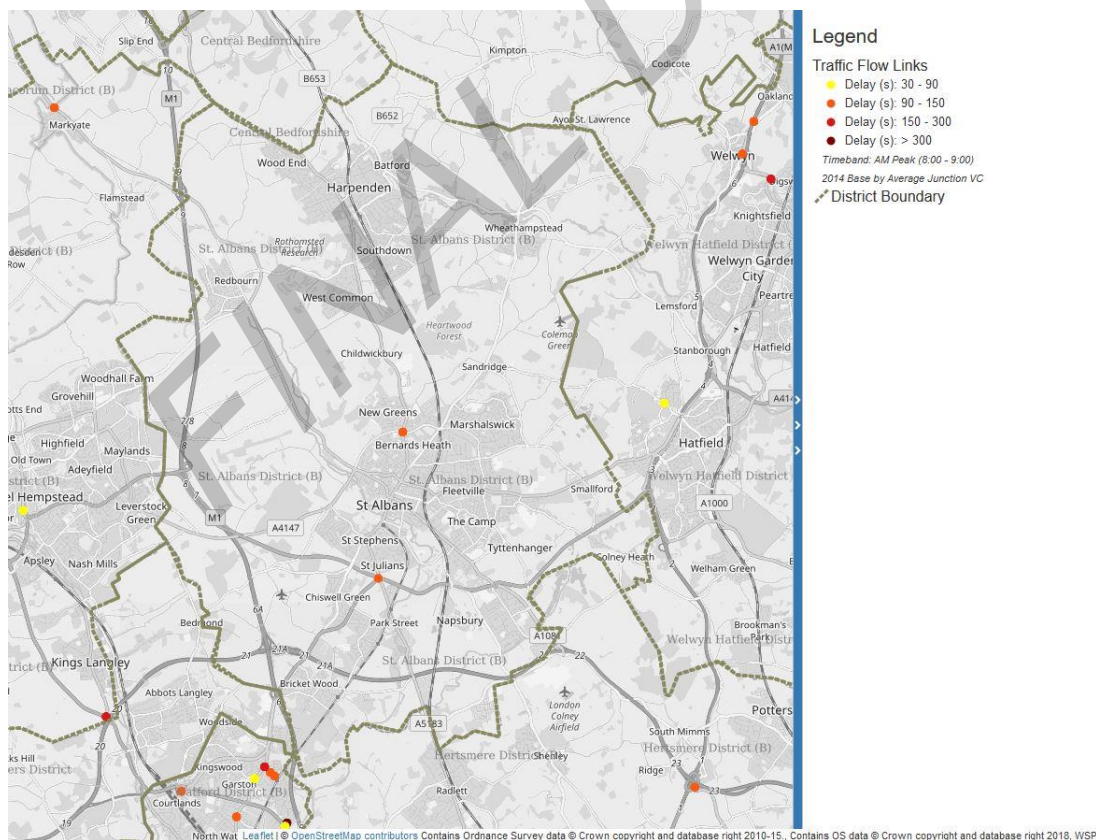
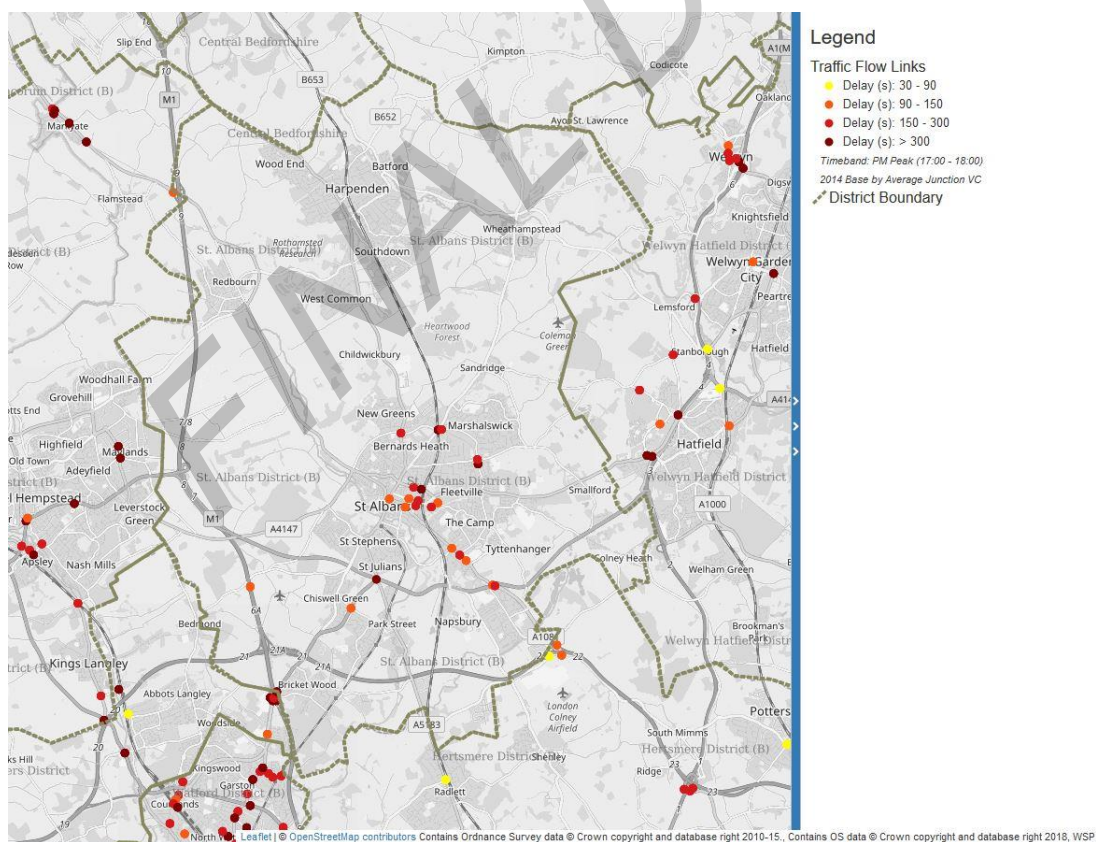
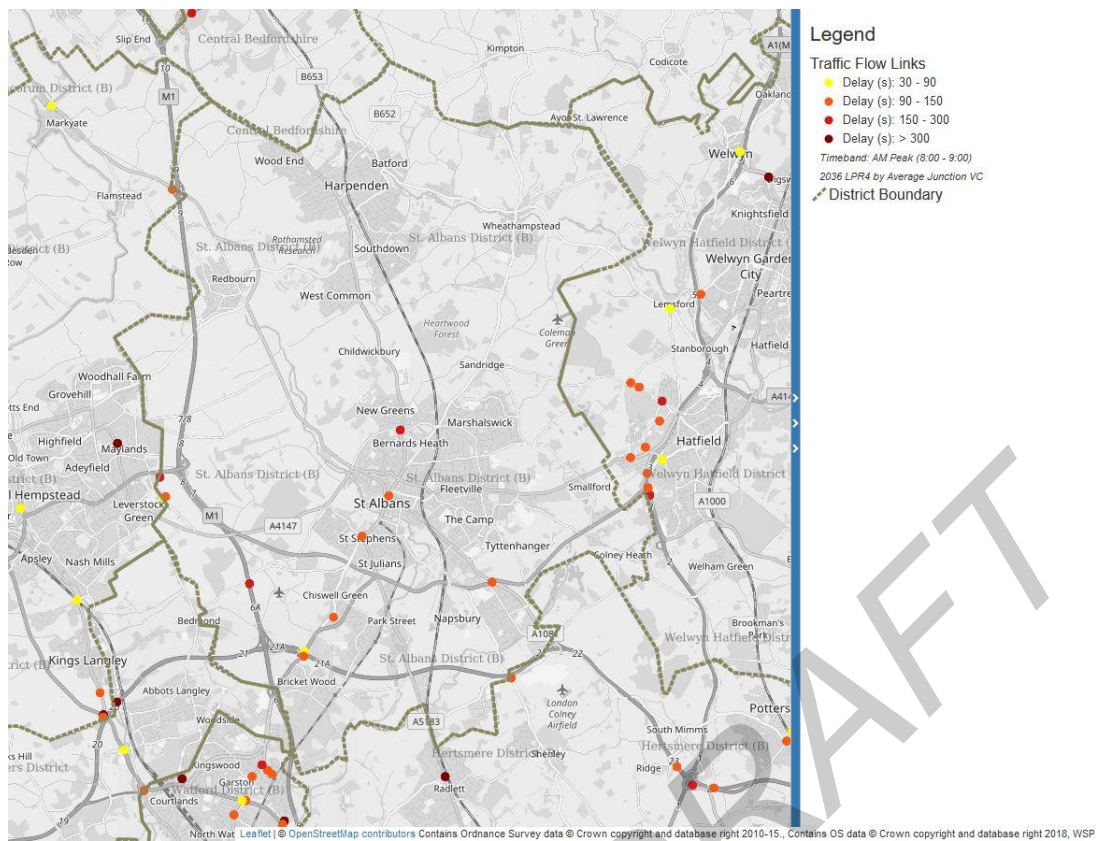


Figure 8 - 2014 Junction Delays in St Albans AM Peak (08:00 – 09:00)



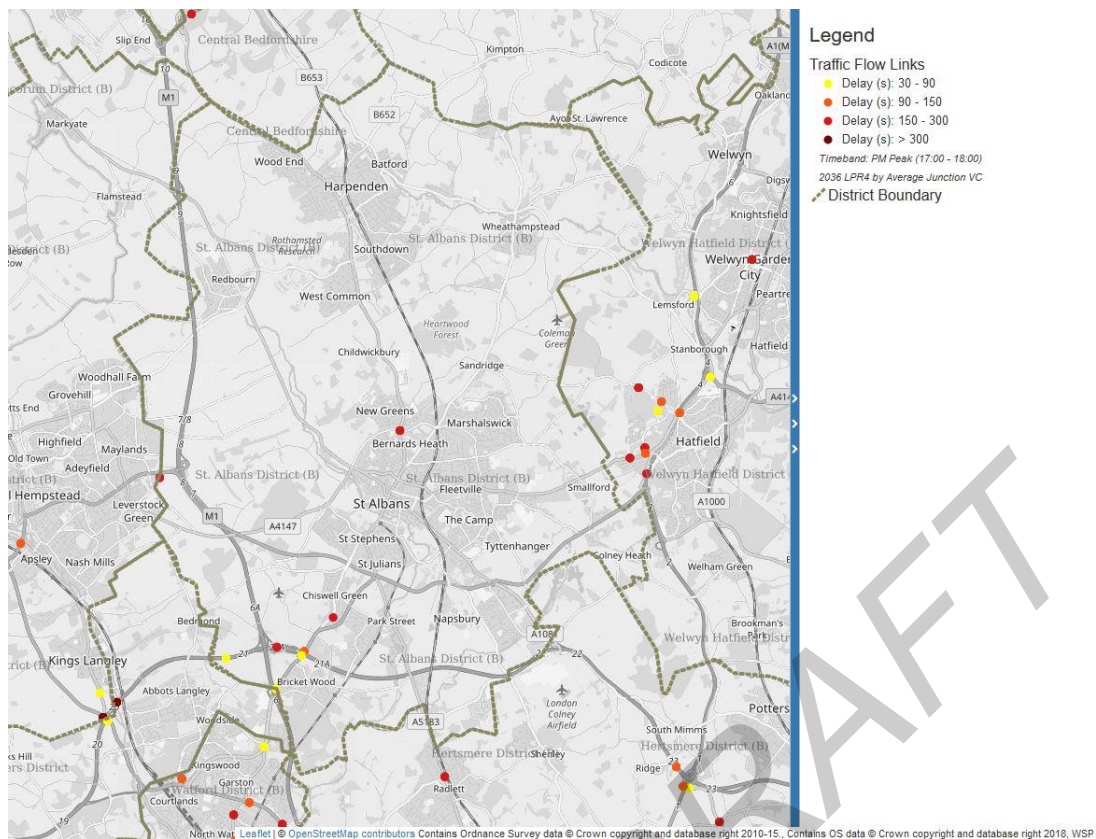


Figure 11 – 2036 Junction Delays in St Albans PM Peak (17:00 – 18:00)

Local Plan Run 4 vs Local Plan Run 3

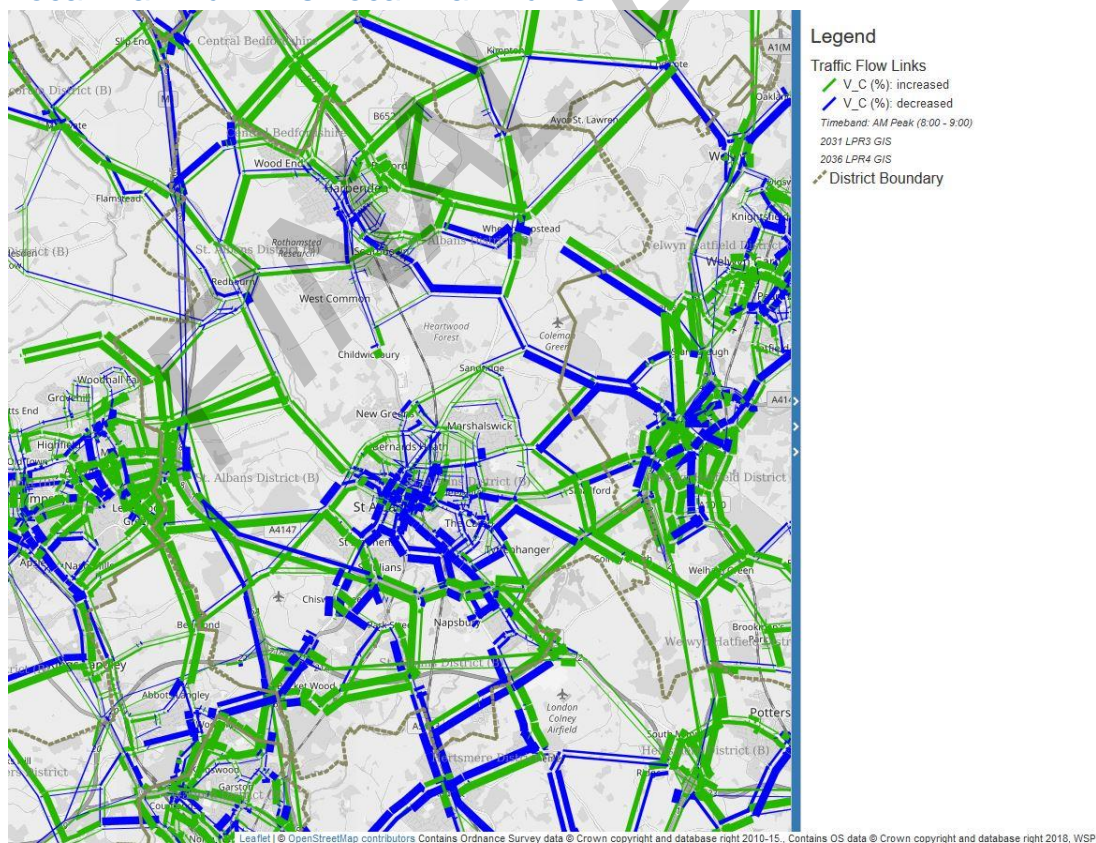


Figure 12 - Change in Actual Flow between LP Run 4 and LP Run 3 AM Peak (8:00 – 9:00)

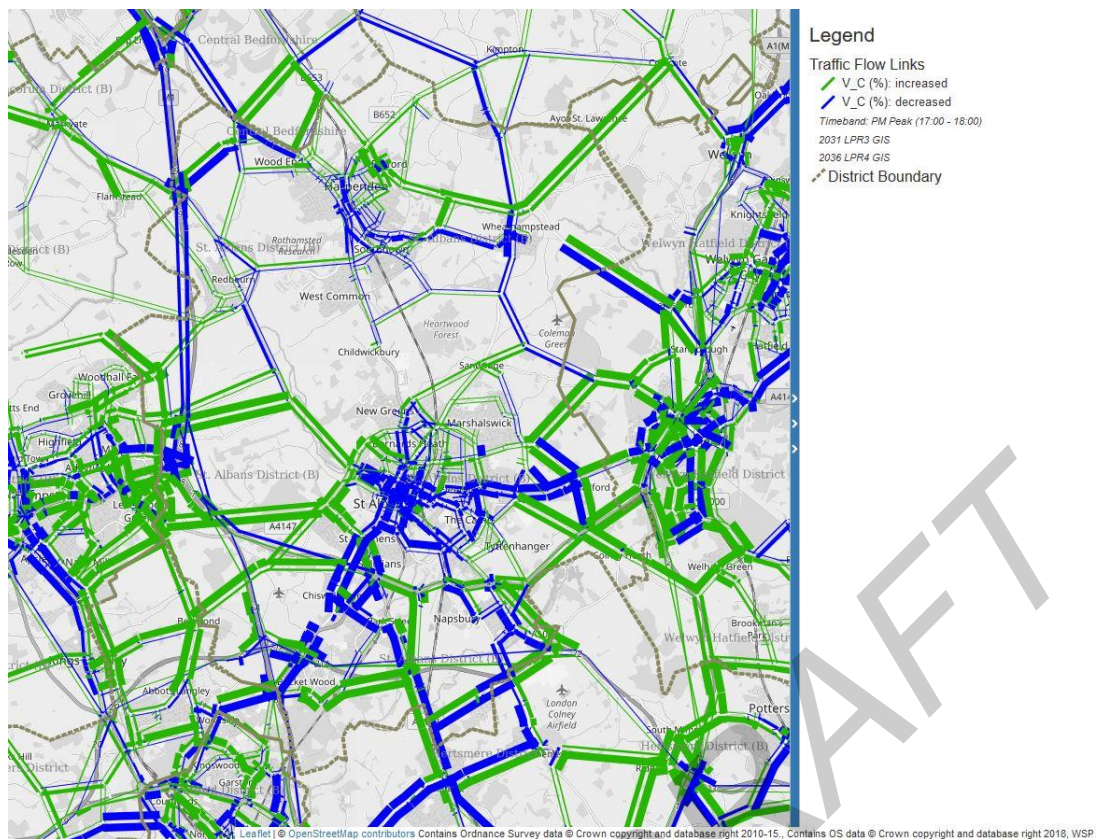


Figure 13 - Change in Actual Flow between LP Run 4 and LP Run 3 AM Peak (17:00 – 18:00)

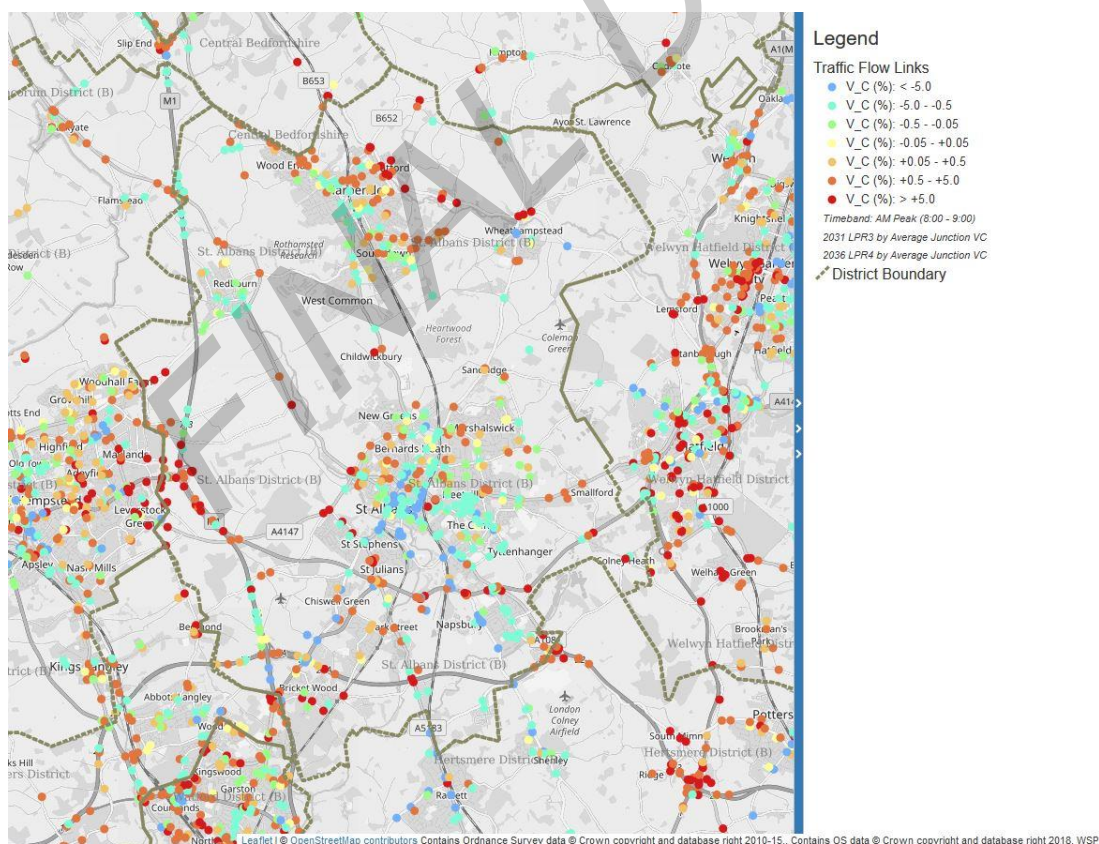


Figure 14 – Change in Delay Local Plan Run 4 to Local Plan Run 3 AM Peak (8:00 – 9:00)

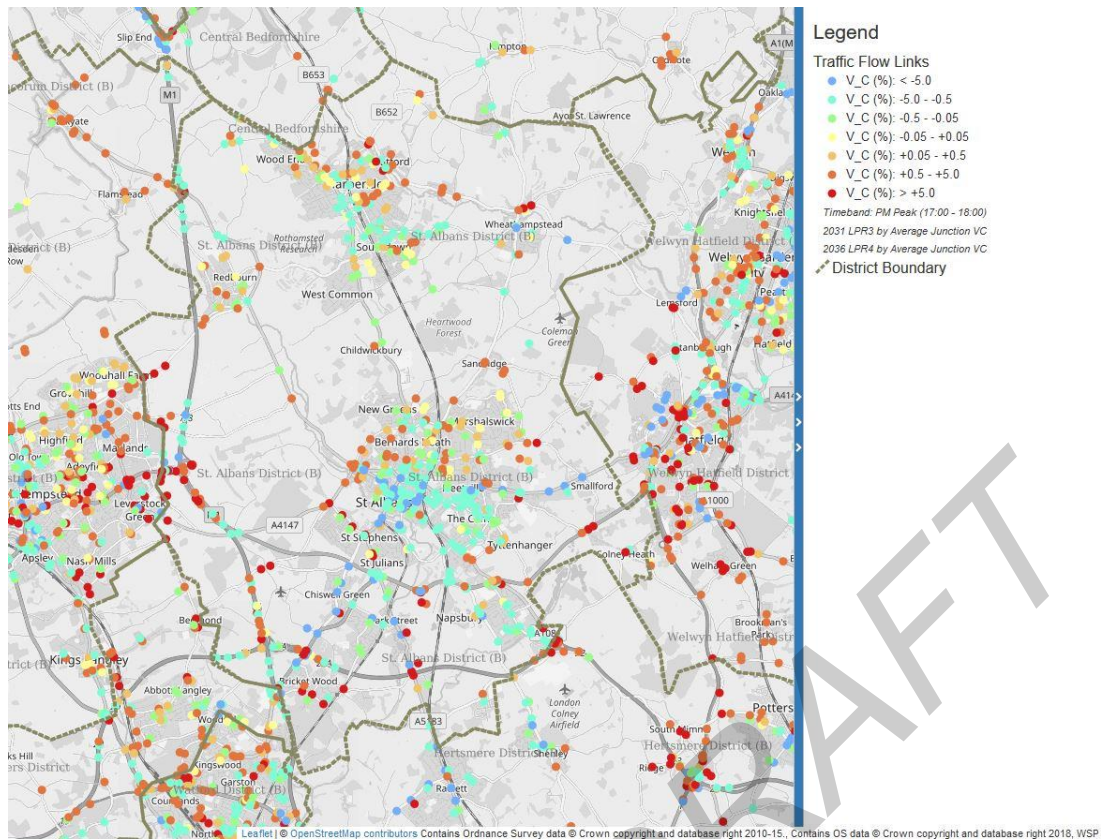


Figure 15 – Change in Delay Local Plan Run 4 to Local Plan Run 3 PM Peak (17:00 – 18:00)