Solihull Local Plan

Forecasting Report

October 2020

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Executive summary

This report covers the method used to create the forecasting models for the Solihull Local Plan, for the purpose of modelling future travel demand, using PRISM 5.2. The modelled forecast years are 2026 and 2036. PRISM 5.2 models an average hour within the weekday peak periods. The peak periods are outlined below:

- AM period – 0700 to 0930;
- IP period – 0930 to 1530; and
- PM period – 1530 to 1900.

The PRISM highway assignment user classes are:

- Car Employers Business (CB);
- Car Commute (CC);
- Car Other (CO);
- Light goods vehicles (LGV); and
- Heavy goods vehicles (HGV).

Highway networks have been produced for all three time periods, for both 2026 and 2036 forecast years. These have been produced for all three forecasting scenarios: the Solihull Local Plan (SLP); the Draft Local Plan (DLP) and the Draft Local Plan with mitigation (DLP M). These networks have been developed from the PRISM Core Scenarios for each forecast year with updates to the highway schemes and planning data.

There is overall forecast demand increase between the SLP and DLP scenarios as expected due to the growth in developments. This has an impact on junction capacity, with many junctions deteriorating between the two forecast scenarios for both years and reflected across all time periods. The differences are as expected, with more delay in the DLP scenario.

There is rerouting of forecast traffic volumes as expected in the DLP with mitigation scenario, when compared to the DLP. The most significant differences are forecast in Balsall Common, with a reduction in traffic on the A452 High Street, and vehicles using the Balsall Common Bypass.

When comparing the Public Transport forecast passenger flows for SLP and DLP, overall, there is an increase in bus and rail trips in the Solihull area. This is as expected, due to the increase in developments within Solihull. The DLP vs DLP with mitigation scenario shows a more significant difference, with forecast passenger increases for bus and rail demand to Solihull Town Centre.

Overall, there is an increase in forecast passengers boarding and alighting at the rail stations in Solihull between SLP and DLP due to the increased number of developments in the 2036 DLP scenario. When comparing the DLP scenario with the DLP with mitigation scenario, an increase in passengers is forecast at Solihull Station and Birmingham International, due to the increased connectivity from the EBS metro and A45 Sprint.

1 Introduction

1.1 Study Background

Mott MacDonald has been commissioned by Solihull Metropolitan Borough Council (SMBC) to develop an evidence base for the update of the Solihull Local Plan.

The Model Validation Report (MVR) was provided to SMBC on 21/11/2019 and included:

- details of the base year network and matrix build;
- journey time and traffic count data used to support the update of the base year;
- method and results of the calibration and validation process; and
- appendices to support the analysis undertaken post calibration.

For further details of validation results, please see "403717_Solihull_LMVR_20191121.pdf".

The forecast year models were created using PRISM 5.2 for the years 2026 and 2036. This report outlines the method used to produce the forecast year models from the validated 2016 base model, along with the method of producing future year trip matrices. The forecast scenarios are as follows:

- 2026 and 2036 Solihull Local Plan (SLP) – The "business as usual" scenario;
- 2026 and 2036 Draft Local Plan (DLP) – The scenario containing the additional housing and employment developments as in the Solihull Draft Local Plan; and
- 2026 and 2036 DLP with mitigation (DLP M) – The scenario which contains highway and PT schemes to mitigate the additional trips that are generate from the developments in the DLP scenario.

The developments and transport schemes in each scenario are detailed in the scenario description note.

1.2 Transport Modelling Background

All modelling has been undertaken in PRISM and using VISUM 16.01-14 and is based on guidance in TAG.

1.3 Generalised Cost of Travel

Generalised cost refers to both the monetary (vehicle operating cost and toll) and non-monetary (travel time) costs of a journey. Generalised cost parameters were calculated based on the vehicle operating costs and values of time in the TAG data book (May 2019 v1.12), using the VOT/VOC spreadsheet provided by Highways England, as described in the PRISM P5.2 Model Validation Report.

TAG provides values of time in units of £/hr per person, these are converted to units of 100pence/second per vehicle for use in the PRISM highway model. The two tables below present the Value of Time (VOT) and Vehicle Operating Cost (VOC) parameters for the 2016 base year, and each of the future years. Both are presented in units input to VISUM.

Table 1.1: Highway assignment value of time (100p/s per vehicle, 2010 prices)

Year	Time-period	Car Business	Car Commute	Car Other	LGV	HGV
2016	AM	50.37	33.78	23.30	36.81	72.28
	IP	51.61	34.33	24.82	36.81	72.28
	PM	51.10	33.89	24.40	36.81	72.28
2026	AM	56.16	37.66	25.99	41.04	80.60
	IP	57.55	38.28	27.68	41.04	80.60
	PM	56.97	37.79	27.21	41.04	80.60
2036	AM	67.48	45.25	31.22	49.31	96.84
	IP	69.15	45.99	33.26	49.31	96.84
	PM	69.75	45.41	32.70	49.31	96.84

Table 1.2: Highway assignment vehicle operating cost (pence per kilometre per vehicle, 2010 prices)

Year	Time-period	Car Business	Car Commute	Car Other	LGV	HGV
2016	AM	1.26	0.59	0.59	1.44	4.15
	IP	1.23	0.58	0.58	1.42	4.05
	PM	1.26	0.59	0.59	1.44	4.15
2026	AM	1.17	0.54	0.54	1.46	4.56
	IP	1.15	0.53	0.53	1.44	4.45
	PM	1.17	0.54	0.54	1.46	4.56
2036	AM	1.00	0.48	0.48	1.41	4.75
	IP	0.98	0.47	0.47	1.39	4.64
	PM	1.00	0.48	0.48	1.41	4.75

2 Traffic Demand Forecasting

Highway demand matrices for the 2026 and 2036 forecast years have been produced using a pivoting process to apply growth from the Solihull base to the Solihull forecast year model scenario. Growth was applied to the validated matrices for the Solihull Local Plan base year models. The forecast year demand matrices are based on the same zone system as the base year demand matrices. The method for the matrix disaggregation, using INRIX Origin Destination (OD) data, was outlined in the Model Validation Report (MVR). The future year matrices grow in line with the developments in the Uncertainty Log.

2.1 Development Uncertainty Log

For PRISM 5, an Uncertainty Log in line with TAG guidance has been produced that includes the latest assumptions about the likely future year transport schemes and developments. Solihull MBC updated the developments in the uncertainty log for Solihull for each of the development scenarios, SLP and DLP. The assumptions for the rest of the West Midlands remain the same as in PRISM 5. For more information on the approach to developing the Uncertainty Log, see the PRISM 5 Future Year report. The developments in the Uncertainty Log are controlled to NTEM at a West Midlands regional level.

2.2 Control to NTEM

The planning data is controlled to NTEM in accordance with TAG criteria detailed in Unit M4. The process for the SLP and DLP is different to the PRISM 5 core scenarios as it has been agreed that Solihull should not be constrained to NTEM.

The approach in PRISM is to constrain the population and job forecasts to NTEM as follows:

- A comparison between the Uncertainty log and NTEM 7.2 for each district is undertaken to determine the shortfall.
- The Districts within the West Midlands Metropolitan Area (WMMA) are assumed to absorb a proportion of the shortfall.
- The remaining shortfall is then spread amongst the West Midlands Shire Districts, effectively controlling to NTEM at the West Midlands Regional level.

More details on the constraint to NTEM can be found in the PRISM 5 forecasting report.

For the Solihull Local Plan, we have adopted a very similar method. The population and jobs are controlled to NTEM on a West Midlands Regional level, with Solihull excluded. This means that for Solihull, the housing, population and employment figures remain the same as the figures provided in the Uncertainty Log. The SLP scenario and the DLP scenario use the same method to control to NTEM. This is so that the outputs from the two scenarios will be comparable. A comparison between the SLP and DLP Scenarios with NTEM projections was provided in the Scenario Description Note.

2.3 Future Year matrices

The forecast year trip matrices produced were used for the forecast year local highway assignments. The demand matrices for car differ between the SLP, DLP and DLP M. The matrix totals are broken down into modes and displayed in Table 2.1. The absolute difference of each scenario is displayed in Table 2.2.

The demand model does not calculate forecasts for goods vehicles and therefore future growth in LGV and HGV trips must come from an external source. Goods vehicle growth does not take account of specific developments in the Uncertainty Log. Global factors have been applied to the base year matrices to create 2026 and 2036 which have been derived from DfT's Road Traffic Forecasts 2018 (RFT18). For more information see the PRISM 5 Future Year Report.

Table 2.1: Matrix Totals

		2016	2026			2036		
			SLP	DLP	DLP M	SLP	DLP	DLP M
AM	CB	49,576	56,230	56,234	56,213	59,597	59,731	59,714
	CC	254,039	274,361	274,390	274,003	292,265	293,378	293,045
	CO	198,989	227,253	227,092	226,837	249,426	250,137	249,879
	LGV	42,991	50,170	50,170	50,170	56,877	56,877	56,877
	HGV	25,172	25,046	25,046	25,046	25,650	25,650	25,650
IP	CB	39,880	45,644	45,643	45,607	49,080	49,174	49,135
	CC	76,354	84,317	84,320	84,213	91,066	91,429	91,333
	CO	339,728	376,503	376,259	375,904	409,642	411,106	410,712
	LGV	43,645	50,934	50,934	50,934	57,742	57,742	57,742
	HGV	24,705	24,581	24,581	24,581	25,174	25,174	25,174
PM	CB	54,320	61,525	61,532	61,503	65,393	65,566	65,534
	CC	239,646	259,514	259,549	259,124	276,608	277,671	277,246
	CO	267,919	298,759	298,568	298,180	325,315	326,434	325,989
	LGV	34,662	40,450	40,450	40,450	45,858	45,858	45,858
	HGV	20,600	20,496	20,496	20,496	20,990	20,990	20,990

Table 2.2: Absolute Difference

		2016			2026		2036	
		SLP (26) - Base	DLP (26) - Base	DLP M (26) - Base	DLP- SLP	DLP M - DLP	DLP- SLP	DLP M - DLP
AM	CB	6,654	6,658	6,637	4	-21	134	-17
	CC	20,322	20,351	19,964	29	-387	1,113	-333
	CO	28,264	28,103	27,848	-161	-255	711	-258
	LGV	7,179	7,179	7,179	0	0	0	0
	HGV	-126	-126	-126	0	0	0	0
IP	CB	5,764	5,763	5,727	-1	-36	94	-39
	CC	7,963	7,966	7,859	3	-107	363	-96
	CO	36,775	36,531	36,176	-244	-355	1,464	-394
	LGV	7,289	7,289	7,289	0	0	0	0
	HGV	-124	-124	-124	0	0	0	0
PM	CB	7,205	7,212	7,183	7	-29	173	-32
	CC	19,868	19,903	19,478	35	-425	1,063	-425
	CO	30,840	30,649	30,261	-191	-388	1,119	-446
	LGV	5,788	5,788	5,788	0	0	0	0
	HGV	-104	-104	-104	0	0	0	0

As illustrated in Table 2.2, the car matrix totals in the DLP scenario in 2036 are greater than the matrix totals for the SLP scenario due to the significant increase in housing and jobs in the 2036 DLP scenario. This growth is not reflected in the 2026 with minor changes to the matrix totals. This is because the majority of DLP development is built post 2026.

The DLP M scenario shows a decrease in matrix totals, because this scenario includes PT mitigation schemes including the A45 Sprint, A34 Sprint and the East Birmingham to Solihull (EBS) Metro schemes. This is forecast to cause some mode shift from private transport to public transport.

3 Network Building

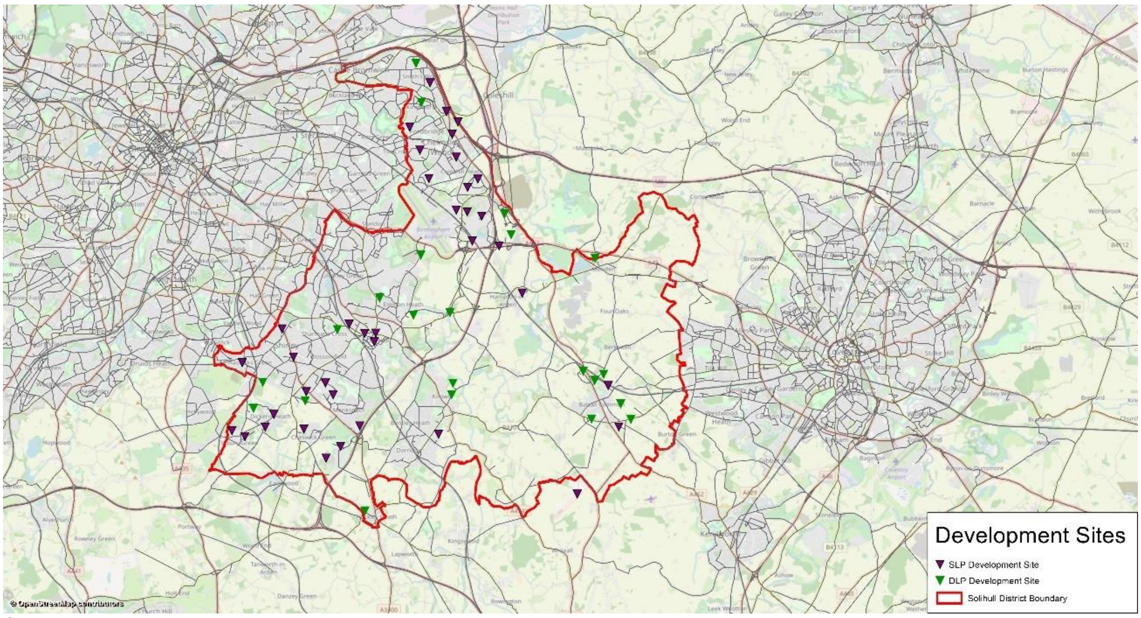
3.1 Solihull Local Plan Transport Networks

The SLP forecast year highway networks include all highway schemes from the full PRISM 5.2 core scenarios. Additional schemes have been included in the SLP scenario as agreed with SMBC. These additional schemes are:

- Damson Parkway (JLR);
- Signals at Creynolds Lane to Stratford Road; and
- Blossomfield Road.

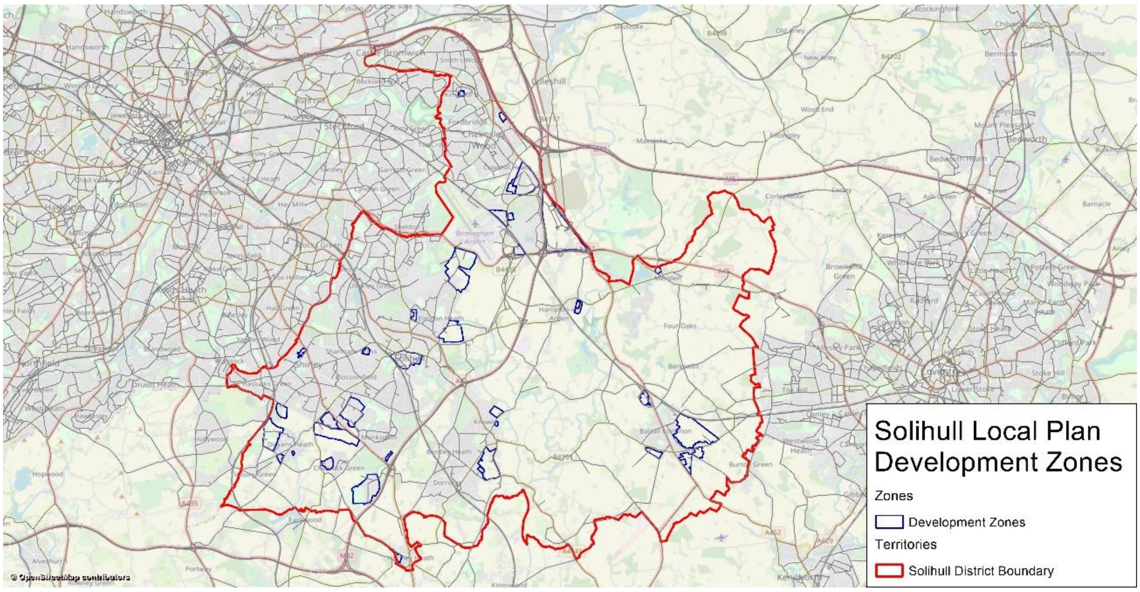
Figure 3.1 shows the locations of the developments which have been included in the planning data for the SLP and DLP scenarios. Figure 3.2 highlights the 37 developments which have an individual zone. These are locations where generally over 100 new dwellings or new jobs are planned.

Figure 3.1: Location of Development Sites



Source: Mott MacDonald

Figure 3.2: Location of Development Zones



Source: Mott MacDonald

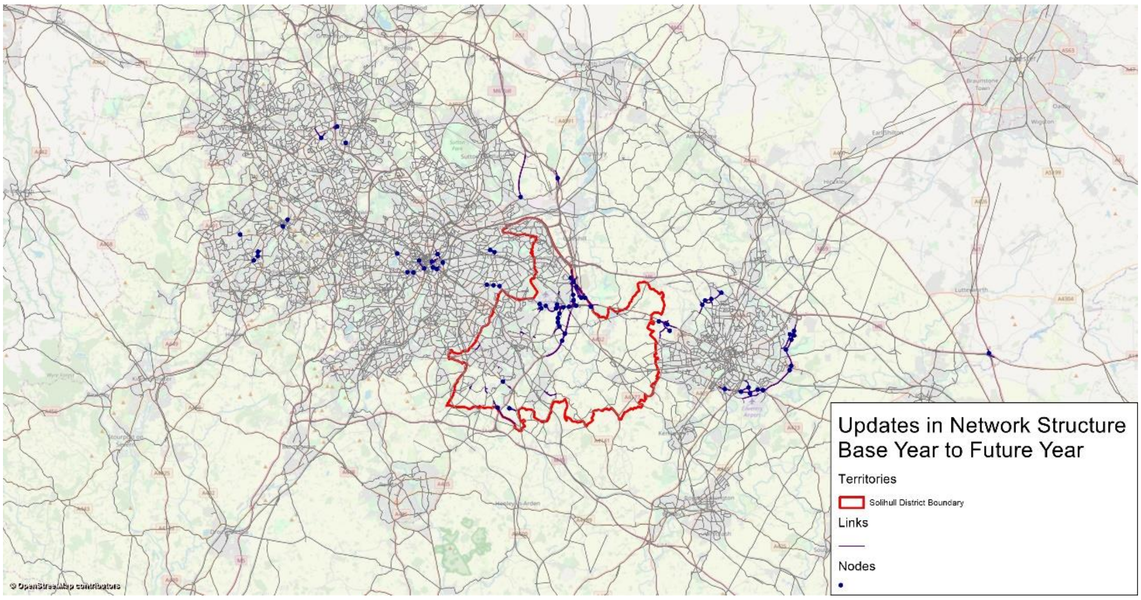
The network updates from the Solihull Base network and the Solihull Future Year network are displayed in the figures below. Figure 3.3 shows the differences in the wider PRISM area, and Figure 3.4 focuses on the Solihull local area. The main updates from PRISM Core 2016 to PRISM Core 2026 are shown in Table 3.1, consistent with TfWMs (then current) Uncertainty Log for PRISM 5.2.

Table 3.1: Highway schemes in PRISM 5 core scenarios

MM ID	Scheme Name	District	Year
9	Holloway Circus	Birmingham	2026
11	Ashted Circus	Birmingham	2026
6	A457 Dudley Road	Birmingham	2026
24	Iron Lane	Birmingham	2026
34	Paradise Circus	Birmingham	2026
218	Curzon Circle and Garrison Circus (HS2)	Birmingham	2026
12	20mph zones Phase A	Birmingham	2026
13	20mph zones Phase B	Birmingham	2026
40	Curzon Street Masterplan (HS2)	Birmingham	2026
39	Metro: Five Ways Highway Works	Birmingham	2026
156	Metro: Centenary Square/Edgbaston/Five Ways highway	Birmingham	2026
154	Metro: Birmingham Eastside Extension (BEE)	Birmingham	2026
18	Bromford Gyratory Phase 1	Birmingham	2026
A	Southside Link - Ladywell Walk closure and Thorp Street one-way direction	Birmingham	2026
B	Minworth Island roundabout	Birmingham	2026
59	A45 Bridge	Coventry	2026
64	A46 Walsgrave and Binley	Coventry	2026

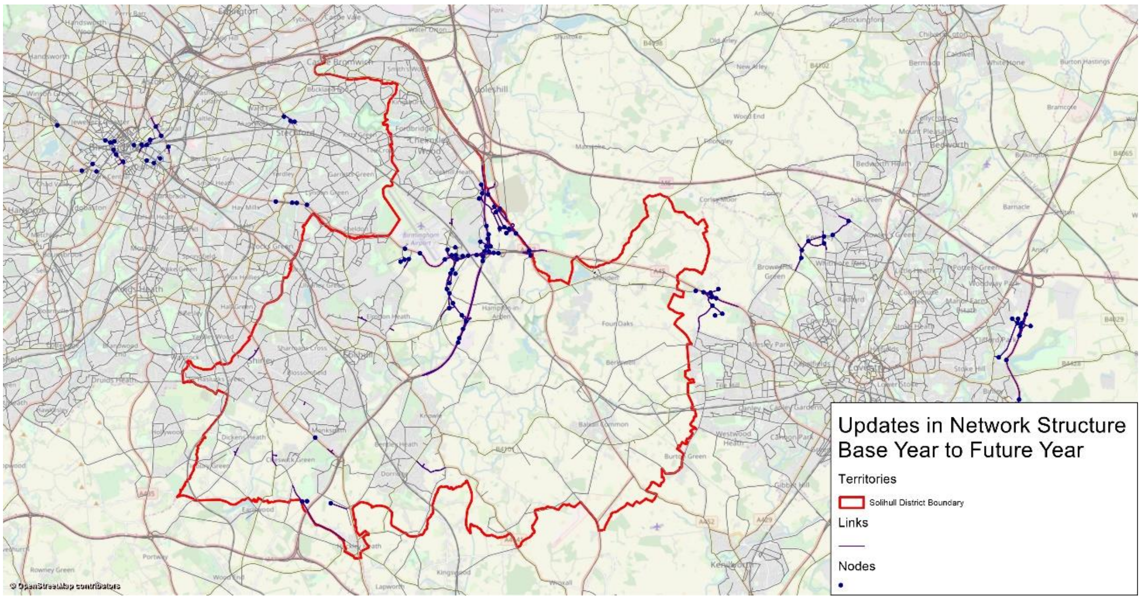
MM ID	Scheme Name	District	Year
76	A45/A46 Tollbar End	Coventry	2026
67	SUE Site Access Improvements Eastern Green	Coventry	2026
56	Gateway Mitigation Schemes	Coventry	2026
69	Keresley Link Road	Coventry	2026
215	A45/A452 Stonebridge Roundabout Improvement	Coventry	2026
88	A4101 Pensnet Strategic Access Improvement Scheme	Dudley	2026
145	Wednesbury to Brierley Hill Extension	Dudley	2026
98	Hard Shoulder Running M5 J4a-J6	HA	2026
99	Hard Shoulder Running M6 J2-J4	HA	2026
212	M1 Junction 19	HA	2026
206	M42 Junction 6	Solihull	2026
113	UKC Interchange (HS2)	Solihull	2026
171	M6 J10 - Junction Improvement	Walsall	2026
172	Eastern Opportunity Area - A461 Lichfield Road Junction	Walsall	2026
174	DSDA - Bentley Road South	Walsall	2026
178	City North Gateway Phase 1 M54 J2 to Springfield	Wolverhampton	2026
179	Wolverhampton City Centre Public Realm	Wolverhampton	2026

Figure 3.3: Network Structure Updates between 2016 and Future Years (PRISM)



Source: Mott MacDonald

Figure 3.4: Network Structure Updates between 2016 and Future Years (Solihull)



Source: Mott MacDonald

3.1.1 SLP Planning Data

The planning data was reviewed with information provided by SMBC (01/09/2020). Table 3.2 shows the total additional planning data for the SLP Scenario. Additional information on the planning data is detailed in the scenario description note. Graphs showing the difference in planning data at a zonal level for the West Midlands are presented in Appendix D.

Table 3.2: Planning Data for SLP Scenario

	2026	2036
Dwellings (Including Windfall)	6,871	12,063
Employment (jobs)	11,206	15,588
Enrolments	420	420

Source: SMBC

3.2 Draft Local Plan Networks

The DLP highway networks are the same as those developed for the SLP as there are no additional highway schemes being incorporated into the scenario. The only difference between the two is the planning data.

3.2.1 DLP Planning Data

The planning data for the DLP Scenario was reviewed following information provided by SMBC (01/09/2020).Table 3.3 shows the planning data used for the DLP scenarios, which includes the SLP planning data. Further information on the developments included in the DLP scenario are provided in the scenario description note issued. Graphs showing the difference in planning data at a zonal level for the West Midlands are presented in Appendix D.

Table 3.3: Planning data for DLP Scenario

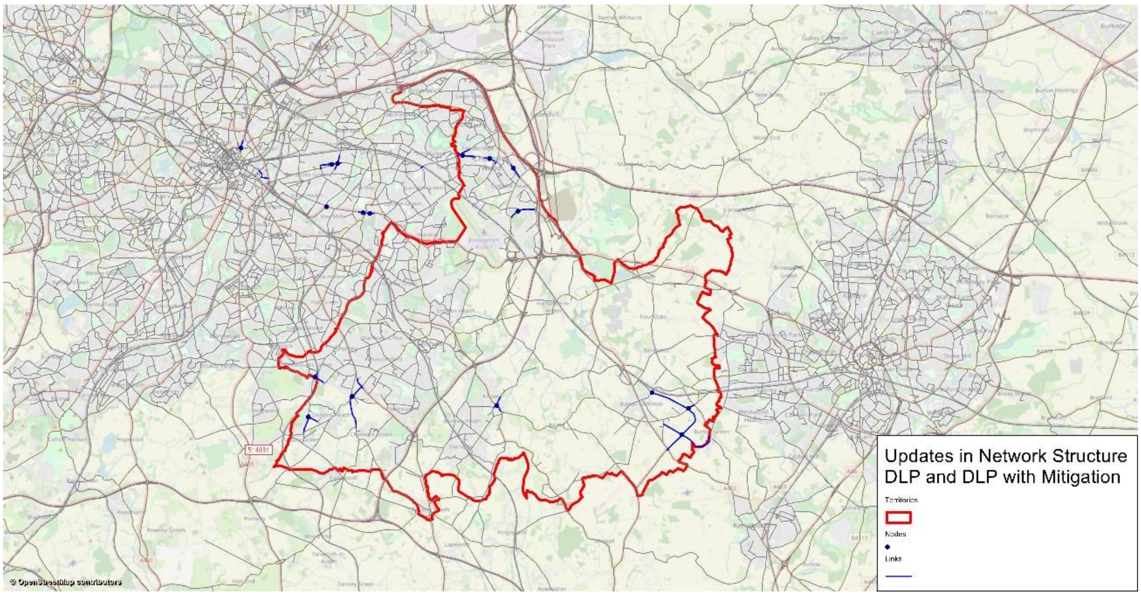
	2026	2036
Dwellings (including Windfall)	8,263	18,093
Employment (jobs)	12,370	23,566
Enrolments	2,100	2,100

Source: SMBC

3.3 Draft Local Plan with Mitigation

The DLP with mitigation (DLP M) transport networks have been updated with several mitigation schemes, additional to the DLP network. The difference between the networks is shown below in Figure 3.5, with schemes listed in Table 3.4 There is no difference in the planning data between the DLP and DLP M scenario. All mitigation schemes have been assumed to be in place by 2026.

Figure 3.5: Network Structure Updates between DLP and DLP with Mitigation



Source: Mott MacDonald

Table 3.4: Proposed Mitigation Schemes

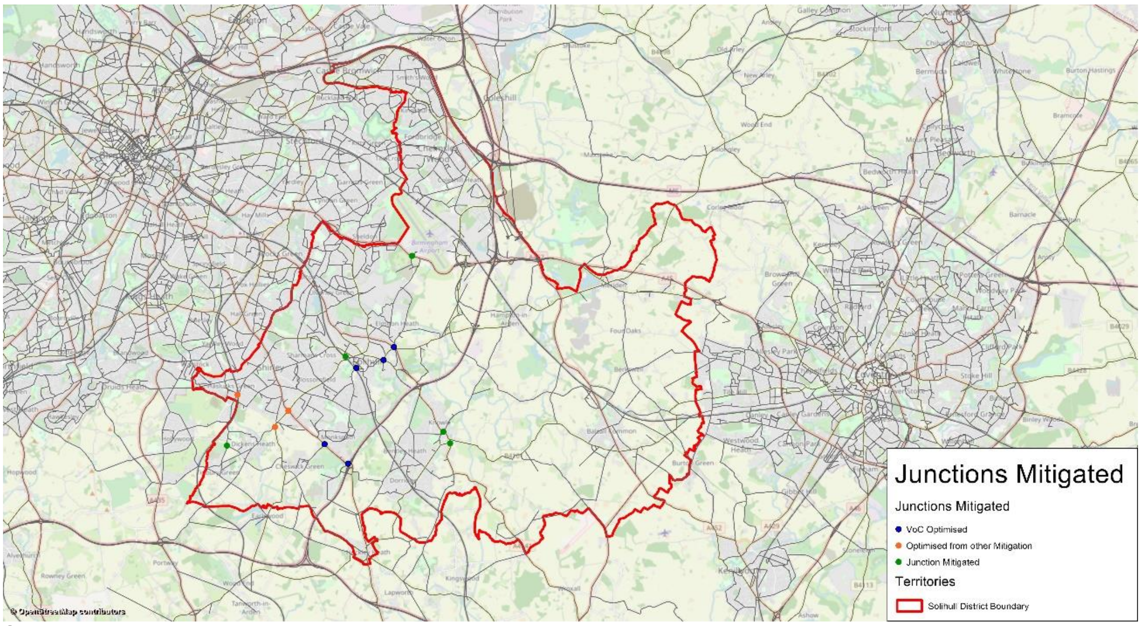
Scheme Name	Borough
PT Schemes	
A34 Sprint	Solihull
A45 Sprint	Solihull
EBS Metro	Solihull
Highway Schemes	
Damson Parkway Junction	Bickenhill
Balsall Common Bypass	Balsall Common
Station Road – Restriction of through movement	Solihull
A452 Balsall Common High Street Speed Reduction to 20mph	Balsall Common
Update Dickens Heath/Tanworth Lane to signalised junction	Dickens Heath

Scheme Name	Borough
Upgrade Haslucks Green / Green Lane to a signalised junction	Shirley
Update Blackford Road/ Dog Kennel Lane/ Tanworth Lane to a four-arm roundabout	Dickens Heath
Tilehouse Lane/Birchy Leasowes junction update a roundabout	Whitlocks End
Updated Haslucks Green Road/Bills Lane to a mini roundabout	Shirley
A452 dual carriageway update from Chester Road to Hedingham Junction	Solihull
Upgrade the A452 to a two lane exit northbound to Chester Road	Solihull
Update Station Road / Wilsons Road to a signalised junction	Knowle
Upgrade Warwick Road/Hampton Road/Lodge Road to two mini roundabouts	Knowle
A34 Package -Priority Bus Lane -Junction improvements and signalisation	Solihull
Signal optimisation for the Solihull Bypass/Hampton Lane junction	Solihull
Signal optimisation for the Coventry Road/Damson Parkway junction	Elmdon
Signal optimisation for the A34 Stratford Road on-Slip junction	Solihull
Signal optimisation for the Monkspath Hall Road / Princes Road junction	Shirley
Signal optimisation for the M42 On-slip junction	Solihull
Signal optimisation for the Warwick Road/Hampton Lane junction	Solihull
Signal optimisation for the Stratford Road/Creynolds Lane junction	Cheswick Green

Source: Mott MacDonald

Due to forecast traffic flows, several junctions were highlighted as warranting some form of mitigation, either with signal optimisation or other mitigation measures. A number of these junctions were flagged through additional Volume over Capacity (V/C) analysis on the DLP scenario. Figure 3.6 below displays all the junctions which have been mitigated. Table 3.5 has the justification for updating each of the junctions optimised as a result of the V/C analysis.

Figure 3.6: Mitigated Junctions



Source: Mott MacDonald

Table 3.5: V/C Analysis

Junction name	V/C (Max across Time Periods)	Explanation	Mitigation Proposed
Solihull Bypass/Hampton Lane	100	Junction is already forecast to be at capacity in the SLP scenario and made worse in DLP by an increased number of vehicles forecast to use this junction and turning left onto the bypass. This forecast increase could be due to the East of Solihull Development	Additional capacity to better utilise the green time and enable more capacity at the left turn.
Coventry Road/Damson Parkway/Airport New Road	100	Junction already forecast to be at capacity in SLP	There are multiple turns at this junction forecast to operate at or above 100% capacity. Optimising signals may help mitigate the impact of this.
A34 Roundabout On-Slip	100	Junction already forecast to be at capacity in SLP	The roundabout is already forecast to operate at capacity. To increase the green time for this approach, other arms could be negatively affected but there is capacity to do so.
Stratford Road / Creynolds Lane	100	Junction already forecast to be at capacity in SLP. Small increase in demand at this junction.	Only one movement at the junction is forecast to operate over 95% capacity, there is available capacity at the junction, so signals could be optimised to improve northbound movement.
Monkspath Hall Road /Princes Way	100	Junction already forecast to be at capacity in SLP but made worse by increase number of vehicles using the junction.	The right turns are forecast to operate at capacity (different in each time period), but there is capacity within the junction to allocate additional green time to this movement.
M42 On slip North Junction 4	100	Minimal increase in forecast traffic, and delay is stable. There is not a large difference forecast between the two networks	Two of the junctions at this roundabout are forecast to operate at capacity. Change to the green time could impact the other movements on the roundabout but more green time at the Stratford Road junctions could improve performance.
Warwick Road/Hampton Lane	100	Increase in traffic forecast to use this junction. Due to the location of Junction this could be due to additional development within Solihull Town Centre	Left turn to Warwick Road is operating at 85% capacity, other turns at this junction are forecast to operate with available capacity, an adjustment in signal timings could reduce this. The junction appears to be operating within capacity in the IP, but signals can be adjusted in PM.

Source: Mott MacDonald

4 Forecast Year Outputs

Upon completion of the matrix and network builds for the 2026 and 2036 highway models, the three scenarios were run through the Variable Demand Model (VDM). Following the VDM runs, results were extracted and are reported below.

4.1 Assignment Convergence

4.1.1 Convergence Criteria

Table 4.1 describes the assignment convergence criteria in TAG and its applicability to the convergence criteria in the VISUM software.

Table 4.1: TAG highway assignment convergence criteria

Measure of Convergence	Description	Acceptability guideline	Use in VISUM
Delta	The difference between the costs along the chosen routes and those along the minimum cost routes, summed across the whole network, and expressed as the percentage of the minimum costs	Less than 0.1% or at least stable with convergence fully documented and all other criteria met	A delta statistic is reported for the embedded assignment. Analogous to criteria 7 in the table below.
%GAP	Like Delta, however the costs are calculated directly from simulation[1] rather than delay curves.	Less than 0.1% or at least stable with convergence fully documented and all other criteria met	Visum 16 does not measure %GAP, however Mott MacDonald have developed a tool to measure it as described below Analogous to criteria 0 in the table below.
(P)<1%	The percentage of links with flow change less than 1%.	More than 98% for four consecutive iterations	Visum measures GEH of volume difference rather than percentage difference. Analogous to criteria 1 and 2 (for links and turns, respectively) in the table below.
(P2) <1%	The percentage of links with cost change less than 1%.	More than 98% for four consecutive iterations	Visum measures percentage difference in delay rather than total cost (combination of delay, distance and toll) and so potentially stricter. Analogous to criteria 3 and 4 (for links and turns, respectively) in the table below.

Source: TAG Unit M3-1 (Section 3.3.17, Table 4)

[1] For VISUM, the ‘from simulation costs’ are those calculated on turns directly from the ICA calculation, and on links from the volume delay function plus any queuing penalty. The costs used in the subordinate assignment (and for the delta statistic) are derived from modified delay curves on turns and links that were estimated based on the ICA results.

The convergence criteria measured by VISUM 16 are defined as criteria 1-7 in Table 4.2.

A more detailed description of these criteria can be found in the PRISM 5.0 Model Validation Report.

Table 4.2: PRISM 5.2.1 highway assignment convergence criteria

	Description of test	Acceptability guidelines
Overall Assignment		
0	%GAP: Using costs calculated from ICA, the difference between the costs along the chosen routes and those along the minimum cost routes, summed across the whole network, and expressed as the percentage of the minimum costs (referred to as '%GAP' in TAG unit M3-1 section C.2.7)	Less than 0.1%
1	The link volumes from the current embedded assignment and the previous embedded assignment are close	More than 95% of links have a difference in volume less than GEH 1
2	The turn volumes from the current embedded assignment and the previous embedded assignment are close	More than 95% of turns have a difference in volume less than GEH 1
3	The turn volumes from the current embedded assignment and the "smoothed" turn volumes used in ICA are close	More than 95% of turns have a difference in volume less than GEH 1
4	The final link delays from the embedded assignment and those obtained from running ICA/Blocking Back are close, i.e. testing if the link VDFs are a good estimate of delay	More than 98% of turns have a relative difference in delay less than 1%
5	The final turn delays on links from the embedded assignment and those obtained from running ICA/Blocking Back are close, i.e. testing if the turn VDFs are a good estimate of delay	More than 98% of turns have a relative difference in delay less than 1%
6	The mean deviation in queue lengths on links is sufficiently small i.e. the queues have stabilised.	Less than 1 vehicle
Embedded Assignment		
7	DELTA: The difference between the costs along the chosen routes and those along the minimum cost routes, summed across the whole network, and expressed as the percentage of the minimum costs (referred to as 'delta' in TAG unit M3-1 section C.2.4)	Less than 0.05%

4.1.2 Assignment Convergence

The highway assignment performance of the Solihull forecast year models against the convergence criteria has been recorded for the final four consecutive iterations, as shown in the tables below. The convergence of all forecast year highway assignments meets the TAG criteria and results are summarised below in Table 4.3 and in Appendix A.

Table 4.3: Highway Convergence SLP 2026

Time Period	Iteration	Criteria							
		0	1	2	3	4	5	6	7
AM	11		99.7%	99.7%	99.9%	99.7%	97.2%	0.149	0.00%
	12		99.9%	99.8%	99.9%	99.7%	97.7%	0.102	0.00%
	13		99.9%	99.9%	99.9%	99.7%	97.8%	0.114	0.00%
	14	0.04%	99.8%	99.7%	99.9%	99.7%	98.1%	0.096	0.00%
IP	7		99.9%	99.8%	99.9%	99.9%	96.2%	0.17	0.00%
	8		99.9%	99.9%	99.9%	99.9%	97.3%	0.156	0.00%
	9		99.9%	99.9%	100.0%	99.9%	97.7%	0.156	0.00%

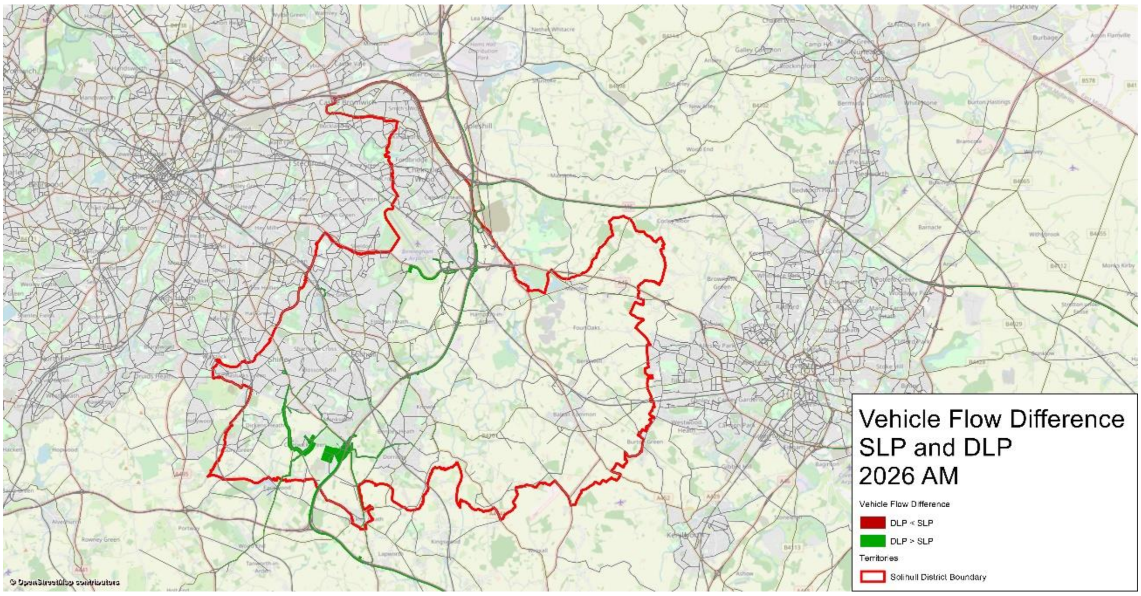
Time Period	Iteration	Criteria							
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	10	0.02%	100.0%	99.9%	100.0%	99.9%	98.3%	0.142	0.00%
PM	88		99.8%	99.8%	99.9%	99.7%	97.9%	0.069	0.00%
	89		99.8%	99.8%	99.9%	99.7%	98.0%	0.095	0.00%
	90		99.8%	99.8%	99.9%	99.8%	97.9%	0.111	0.00%
	91	0.05	99.8%	99.7%	99.9%	99.8%	98.1%	0.097	0.00%
Target	**-**	**0.1%**	**95%**	**95%**	**95%**	**98%**	**98%**	**1**	**0.05%**

4.2 Forecast Highway Traffic Flows

The forecast traffic flows in total vehicles were compared between the various scenarios for each forecast year and plots were created to display the forecast flow change between networks.

In the comparison between SLP and DLP forecast for 2026, overall, there are minor traffic flow changes forecast in certain parts of the network. In the AM, there is a small forecast reduction in vehicles (circa 30 vehicles, <5%) travelling east on Coventry Road, towards the airport from the junction with Damson Parkway. This forecast reduction is also reflected in the other time periods. There are increases in forecast vehicle trips in other areas of the network, such as M42 north and south bound, and local roads within Cheswick Green, as expected. See Figure 4.1 below for the AM flow difference plot and see Appendix B for the corresponding IP and PM plots.

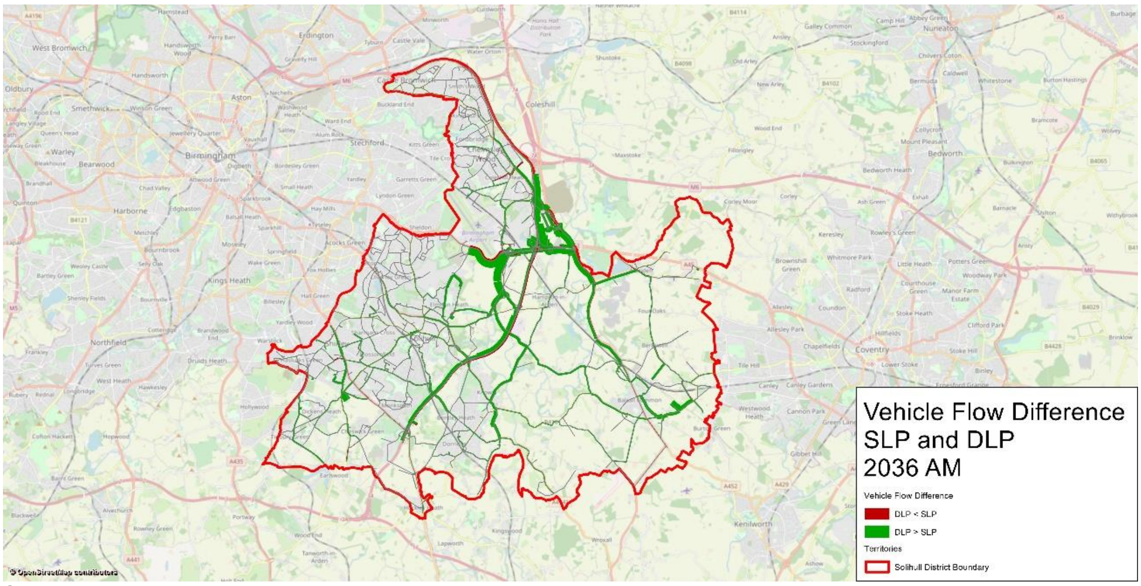
Figure 4.1: Vehicle Flow Differences SLP vs DLP 2026 AM



Source: Mott MacDonald

The comparison plots between SLP and DLP in 2036 show an increase in forecast demand across the network, which is as expected given the greater increase in households and jobs in this scenario. There is a greater increase in forecast vehicle trips across the network than in 2026. In the AM there is some rerouting forecast through Balsall Common, with more vehicles forecast to use Meeting House Lane, potentially to access the Barretts Farm development (circa 50 vehicles). There is a small reduction forecast in vehicles travelling south on the M42 (circa 40 vehicles, <1%). Overall, trips increase as expected throughout the network, with additional development demand generating more trips in the area. Figure 4.2 below shows the traffic flow differences for 2036 AM. The IP shows a more overall forecast increase on the network while the PM network shows similar patterns to the AM, with a small increase in forecast vehicle demand across the network. Plots showing information on the flow differences for 2036 IP and PM are in Appendix B.

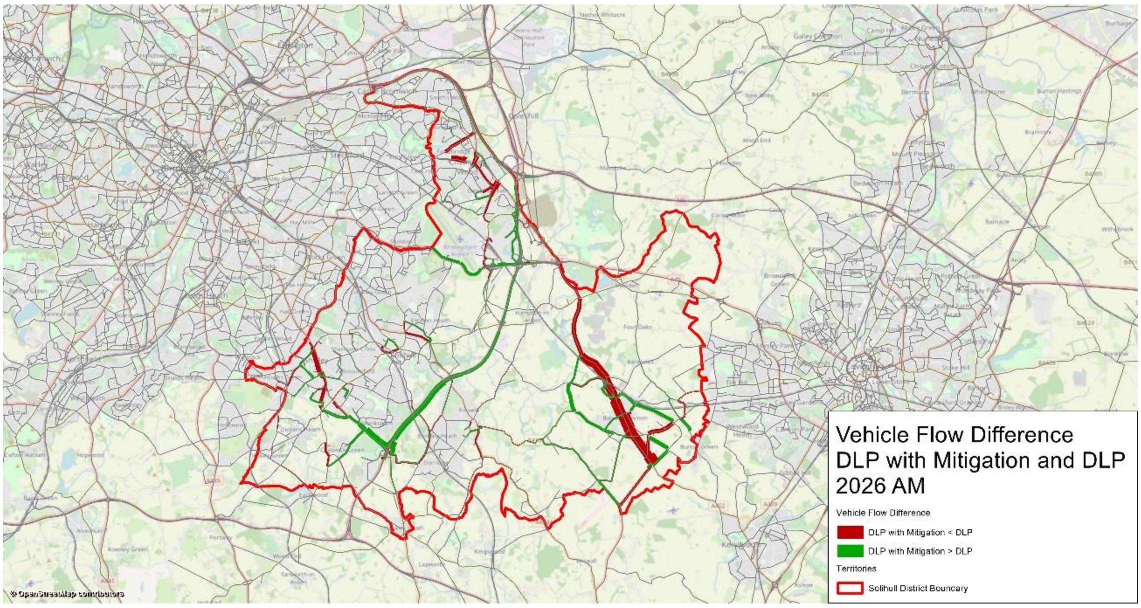
Figure 4.2: Vehicle Flow Differences: SLP vs DLP 2036 AM



Source: Mott MacDonald

The flow difference plots comparing the DLP scenario with the DLP M scenario in 2026 show that in all time periods, there is rerouting forecast through Balsall Common, with fewer vehicles forecast to use the A452 (circa 390 vehicles) and using the bypass and surrounding local roads, as expected. There are some minor volume differences forecast throughout Solihull, with an increase in vehicles using the M42 in the AM. Figure 4.3 shows the difference in the 2026 AM networks, with the IP and PM time periods displayed in Appendix B.

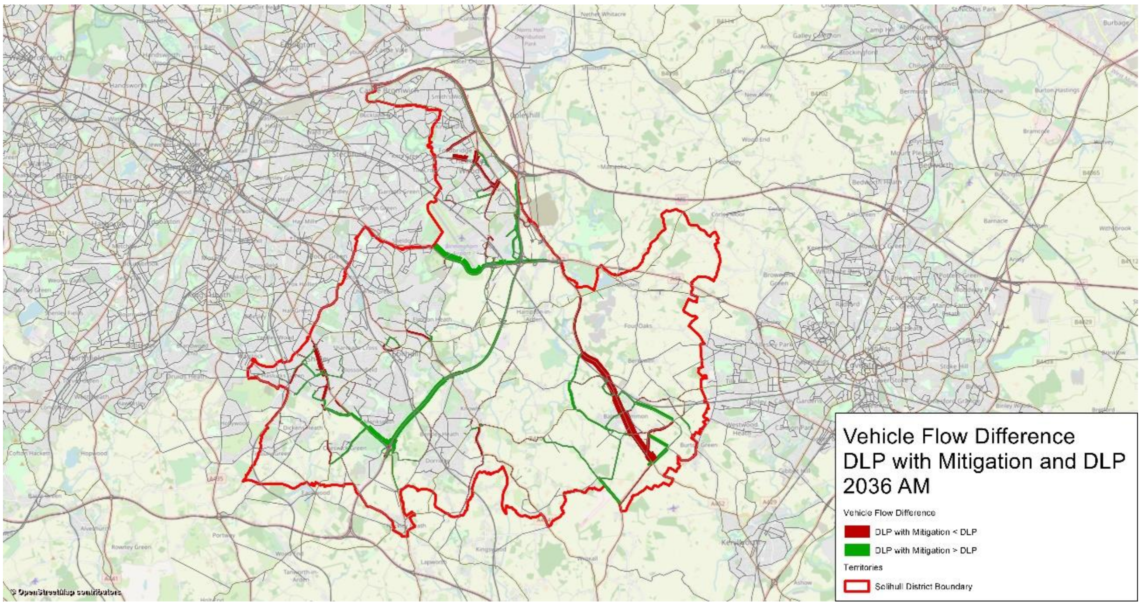
Figure 4.3: Vehicle Flow Differences: DLP vs DLP with Mitigation 2026 AM



Source: Mott MacDonald

The 2036 comparison plots for DLP and DLP M show that the traffic is forecast to re-route from the A452 Kenilworth Road, through Balsall Common, and use more local roads including the bypass. There is also an increase in forecast trips travelling on the M42, and the A45 Coventry Road. Overall, forecast traffic has reassigned as expected with the mitigation measures in place. This pattern is consistent across the AM, IP and PM time periods. Figure 4.4 displays the flow differences between the AM networks, with the IP and PM displayed in Appendix B.

Figure 4.4: Vehicle Flow Differences: DLP vs DLP with Mitigation 2036 AM



Source: Mott MacDonald

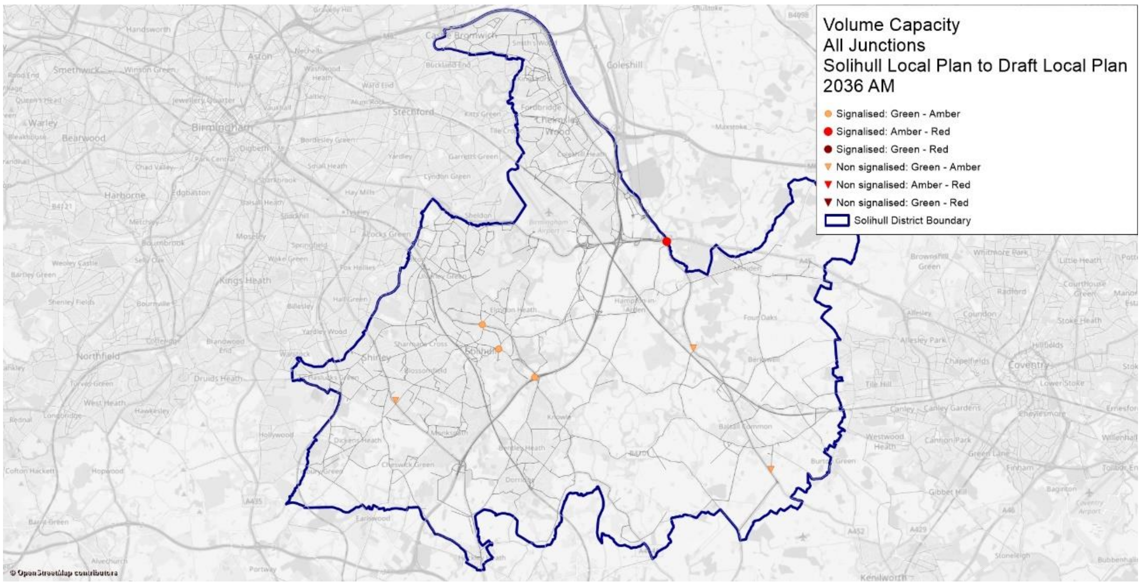
4.3 Junction Capacities

In the AM, the junction capacity in the Solihull area is forecast to deteriorate overall for both signalised and non-signalised junctions in the DLP scenario in comparison to the SLP. This is representative for both years. There are some junctions in 2036 DLP which have a lower V/C for a single turn, but overall, the junction performance is forecast to deteriorate.

In the IP, for both forecast years the junction capacity is generally forecast to deteriorate in the DLP scenario compared to the SLP.

For 2026 PM in general, the SLP junctions which are forecast to be over capacity are also over capacity in the DLP scenario and do not shift into a more severe category. For 2036 however, some junctions are categorised as ‘amber’ in SLP, where amber is a maximum V/C between 75% and 85%, but categorised as ‘red’ in the DLP, where red is a V/C of greater than 85. This is for both signalised and non-signalised junctions in the network. Figure 4.5 displays the difference in V/C between the DLP and SLP 2036 AM. V/C plots for each scenario and the comparison plots are in Appendix C.

Figure 4.5: Junction Capacity: SLP vs DLP 2036 AM



Source: Mott MacDonald

A review of the worst maximum V/C for junctions across all 3 time periods, indicated that 7 junctions were forecast to operate above capacity.

Multiple mitigation measures were tested to help reduce the number of junctions operating at or close to capacity. Of the 7 junctions highlighted for signal optimisation, in the AM all of them had the potential for an increase in available capacity. Junctions which were not altered as part of the DLP M scenario, are forecast to benefit positively from the combined mitigation measures.

Table 4.4 shows a comparison of V/C ratios forecast for the DLP M scenario. Several of the movements at these junctions are forecast to improve by adjusting signal timings and allowing for extra capacity at the junction. However, many junctions still remain at or close to capacity. It is possible that the performance of these junctions could potentially be improved following additional analysis.

Table 4.4: Optimised Junctions V/C

	SLP 2036			DLP 2036			DLP M 2036		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
Solihull Bypass/Hampton Lane	95.6	98.8	100.0	98.0	99.0	100.0	91.0	100.0	100.0
Coventry Road/Damson Parkway/Airport New Road	102.3	102.2	102.3	101.4	101.0	100.0	100.0	100.0	100.0
A34 Roundabout On-slip	100.0	100.0	100.0	100.0	100.0	100.0	52.4	100.0	100.8
Stratford Road / Creynolds Lane	99.9	92.8	98.4	100.0	92.7	97.7	99.9	93.0	100.0
Monkspath Hall Road /Princes Way	95.1	71.3	95.1	96.5	74.5	95.6	85.4	73.4	96.0
M42 On slip North Junction 4	100.0	77.1	100.0	100.0	79.2	100.0	57.8	78.5	100.1
Warwick Road/Hampton Lane	73.7	84.1	100.0	75.2	85.6	100.0	72.3	86.1	100.0

Source: Mott MacDonald

4.4 Public Transport Outputs

4.4.1 PT Patronage

The forecast PT networks are consistent between the SLP and DLP scenarios, with the only difference between the models being the planning data. There are additional PT measures added to the DLP M scenario, including A34 Sprint, A45 Sprint and EBS Metro.

Table 4.5 shows the total PT patronage figures per year over a 12-hour period. The forecast passenger trips between the SLP and DLP are relatively consistent in 2026, with a minimal increase due to the additional future developments. The difference between the DLP and DLP M for 2026 is also minimal, with a larger forecast PT patronage, due to the A34 and A45 Sprint and EBS metro schemes. These changes are intensified for the 2036 scenarios as expected, attributed to the increase in households and jobs in the 2036 DLP and DLP M scenarios.

Table 4.5: Total Boarding's (12hr)

Scenario	Year	All PT
SLP	2026	28,693
DLP	2026	29,025
DLP M	2026	29,457
DLP – SLP Difference	2026	332
DLP M – DLP Difference	2026	432
DLP M – SLP Difference	2026	764
SLP	2036	29,918
DLP	2036	31,423
DLP M	2036	31,903
DLP – SLP Difference	2036	1,505
DLP M – DLP Difference	2036	481
DLP M – SLP Difference	2036	1,986

Source: Mott MacDonald

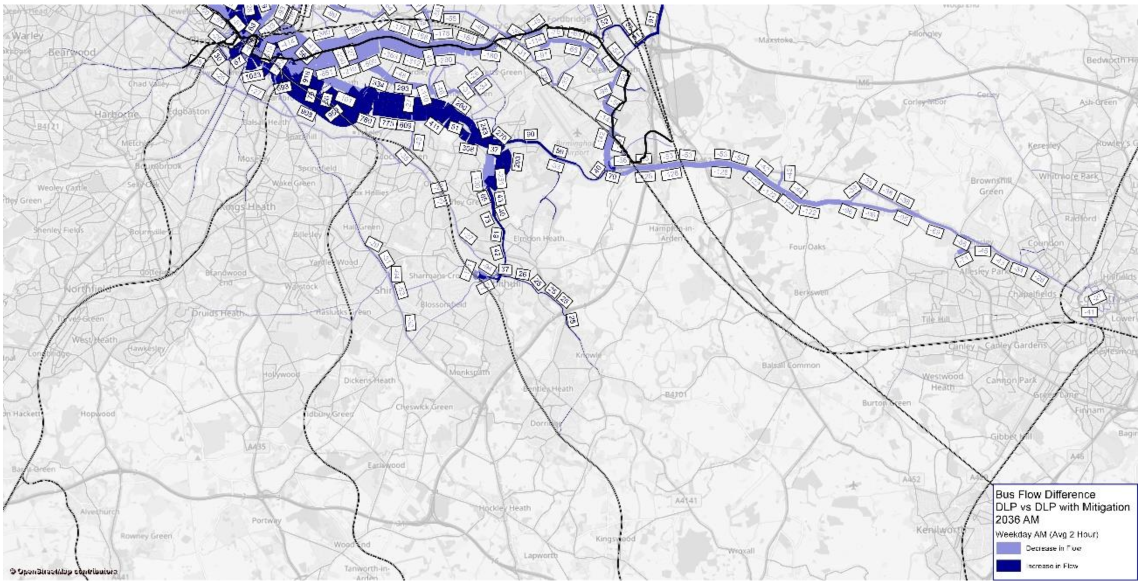
4.4.2 PT Flow Difference Plots

The forecast passenger flows were compared between the various scenarios for each forecast year for bus, metro and rail and plots were created to display the forecast flow difference between networks.

Overall, there is an increase forecast in bus and rail trips in the Solihull area with the DLP scenario when comparing to the SLP. This is as expected, due to the increase in developments within Solihull. These plots can be found in Appendix E for reference.

When comparing the DLP with the DLP M scenario, there are some significant differences. The 2036 AM bus plots show a large forecast increase in patronage to Solihull Town Centre and minor increases along the A45. There is a small decrease in forecast bus passengers north of the A45, around the airport and towards Coventry. These differences are due to the introduction of the A45 SPRINT scheme in the DLP M scenario which competes with local bus routes and provides improved connectivity between Birmingham City Centre and Birmingham International. This pattern is also forecast in the IP and PM. See Figure 4.6 for the 2036 AM DLP vs DLP M plot. All other time periods and years can be found in Appendix E.

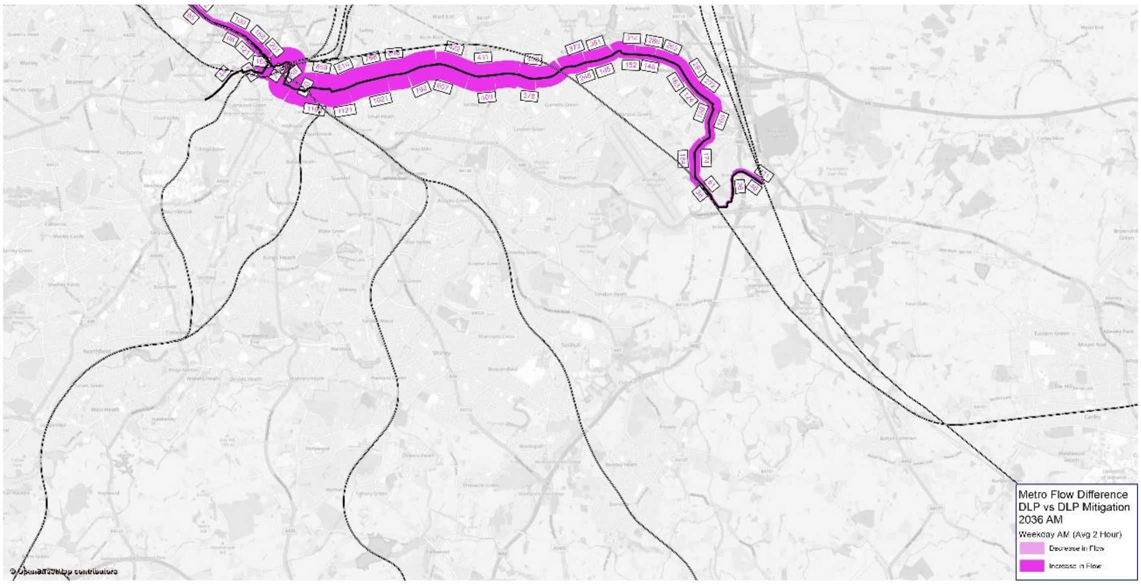
Figure 4.6: 2036 AM Bus Flow Difference, DLP and DLP with Mitigation



Source: Mott MacDonald

The Metro comparison plots show the route for the new EBS metro. Figure 4.7 below shows the difference in forecast metro patronage for 2036 AM, between DLP and DLP M. The remaining plots are found in Appendix E.

Figure 4.7: 2036 AM Metro Difference: DLP and DLP with Mitigation



Source: Mott MacDonald

When comparing the DLP with the DLP M scenario, the 2036 AM rail patronage plots show a general increase in forecast rail passenger demand towards Solihull with a minor reduction towards Birmingham. The increase towards Solihull is to be expected due to the increased connectivity from the Sprint scheme. This can also be seen in the PM plots. All time periods show a reduction in forecast rail passengers to and from Coventry. This is due to the reduction in services to Coventry. See Figure 4.8 for the 2036 AM DLP vs DLP M plot. All other time periods and years can be found in Appendix E.

Figure 4.8: 2036 AM Rail Patronage: DLP and DLP with Mitigation

Source: Mott MacDonald

4.4.3 Rail Boarding and Alighting

The number of passengers boarding and alighting the rail stations within Solihull have been extracted and compared for each scenario. The 12 hour boarding and alighting totals are displayed in Table 4.6 below.

The comparison between SLP and DLP in 2026 shows little change in the forecast number of passengers boarding and alighting the rail stations which is to be expected. There is a visible increase in forecast passengers in the 2036 scenario due to the increased number of developments in the 2036 DLP scenario.

There is a greater difference in passengers boarding and alighting when comparing the DLP scenario with the DLP M scenario, more so in 2036 than 2026. There is an increase in forecast passengers at Birmingham International, due to the increased connectivity from the EBS metro and A45 Sprint. In contrast, there is a forecast reduction of passengers boarding and alighting at Marston Green. This could be due to the new EBS metro being more attractive for local trips to this area and greater connectivity at Birmingham International.

Table 4.6: Number of passengers boarding and alighting (12-hour totals)

	2026					2036				
Station	**SLP**	**DLP**	**DLP M**	**DLP - SLP**	**DLP M - DLP**	**SLP**	**DLP**	**DLP M**	**DLP - SLP**	**DLP M - DLP**
Whitlocks End	2,388	2,395	2,415	7	20	2,528	2,645	2,671	117	26
Shirley	2,946	3,001	3,031	55	30	3,003	3,086	3,124	83	38
Olton	2,703	2,686	2,503	-17	-183	3,011	3,003	2,765	-8	-238
Solihull	8,388	8,502	8,494	114	-8	9,899	10,096	10,070	197	-26
Widney Manor	1,370	1,372	1,391	2	19	1,400	1,419	1,444	19	25
Marston Green	3,116	3,115	2,417	-1	-698	3,221	3,261	2,480	40	-781
Dorridge	5,088	5,049	5,126	-39	77	5,322	5,422	5,516	100	94
Birmingham International	13,851	13,894	14,530	43	636	16,768	17,328	17,637	560	309
Hampton-in-Arden	709	727	702	18	-25	773	828	799	55	-29
Berkswell	1,744	1,673	1,656	-71	-17	1,769	2,159	2,168	390	9

Source: Mott MacDonald

Boarding and Alighting tables by time period can be found in Appendix E.

5 Summary

The comparison of the SLP and DLP modelling outputs present that there is a greater impact on the highway network with the additional demand generated from the developments in the DLP scenario. There is a minor increase in PT trips generated from the VDM run of the DLP scenario, which is expected from the additional development attractions. The increase in forecast highway vehicle trips is as expected, and the associated impact with decreasing available junction capacity is as anticipated.

The DLP with mitigation scenario has been developed to mitigate the impacts that the additional demand of the DLP development sites have on the highway network. The mitigation schemes were collated from several additional sources which impacted areas in a number of Solihull parishes. There has been minor rerouting throughout the Solihull Borough, but the most distinct change is through Balsall Common.

The Balsall Common bypass, has had the largest impact on the highway network, removing vehicles from the A452 and rerouting them via the bypass, this is reflected in all scenarios where the bypass is operational.

A single iteration of signal optimisation was undertaken which mitigated some of the impacts of the DLP relative to the SLP. However, further iterations of signal optimisation, and modelling, can be undertaken, which may further improve forecast performance.

When comparing the Public Transport forecast passenger flows for SLP and DLP, overall, there is an increase in bus and rail trips in the Solihull area. This is as expected, due to the increase in developments within Solihull. The DLP vs DLP with mitigation scenario shows a more significant difference, with forecast passenger increases for bus and rail demand to Solihull Town Centre.

Overall, there is an increase in forecast passengers boarding and alighting at the rail stations in Solihull between SLP and DLP due to the increased number of developments in the 2036 DLP scenario. When comparing the DLP scenario with the DLP with mitigation scenario, an increase in passengers is forecast at Solihull Station and Birmingham International, due to the increased connectivity from the EBS metro and A45 Sprint.

A. Highway Convergence

Table 5.1: Highway Convergence SLP 2036

Time Period	Iteration	Criteria							
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
AM	24		99.7%	99.6%	99.9%	99.6%	97.8%	0.265	0.00%
	25		99.8%	99.7%	100.0%	99.6%	98.0%	0.246	0.00%
	26		99.8%	99.6%	99.9%	99.6%	97.8%	0.189	0.00%
	27	0.05%	99.8%	99.8%	100.0%	99.6%	98.2%	0.186	0.02%
IP	9		99.9%	99.9%	99.9%	99.9%	97.0%	0.127	0.00%
	10		99.9%	99.8%	100.0%	99.9%	97.4%	0.151	0.08%
	11		99.9%	99.8%	99.9%	99.9%	97.8%	0.104	0.00%
	12	0.02%	99.9%	99.9%	99.9%	99.9%	98.2%	0.084	0.00%
PM	36		99.8%	99.7%	99.9%	99.5%	97.6%	0.221	0.00%
	37		99.9%	99.8%	100.0%	99.5%	97.8%	0.184	0.00%
	38		99.9%	99.8%	100.0%	99.6%	97.9%	0.141	0.00%
	39	0.06%	99.9%	99.9%	100.0%	99.6%	98.0%	0.106	0.00%
Target		**0.1%**	**95%**	**95%**	**95%**	**98%**	**98%**	**1**	**0.05%**

Table 5.2: Highway Convergence DLP 2026

Time Period	Iteration	Criteria							
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
AM	12		99.8%	99.7%	99.9%	99.7%	97.7%	0.109	0.00%
	13		99.9%	99.8%	99.9%	99.7%	98.0%	0.105	0.00%
	14		99.9%	99.8%	99.9%	99.7%	98.0%	0.092	0.00%
	15	0.04%	99.8%	99.8%	99.9%	99.7%	98.1%	0.069	0.00%
IP	6		99.9%	99.8%	99.8%	99.7%	95.2%	0.132	0.00%
	7		99.9%	99.9%	99.9%	99.9%	96.7%	0.074	0.00%
	8		100.0%	99.9%	99.9%	99.9%	97.6%	0.108	0.00%
	9	0.01%	99.9%	99.9%	99.9%	99.9%	98.0%	0.043	0.00%
PM	20		99.9%	99.8%	99.9%	99.7%	97.8%	0.117	0.00%
	21		99.9%	99.8%	99.9%	99.7%	97.9%	0.104	0.00%
	22		99.8%	99.7%	99.9%	99.7%	98.0%	0.186	0.00%
	23	0.05%	99.8%	99.7%	100.0%	99.7%	98.2%	0.181	0.00%
Target		**0.1%**	**95%**	**95%**	**95%**	**98%**	**98%**	**1**	**0.05%**

Table 5.3: Highway Convergence DLP 2036

Time Period	Iteration	Criteria							
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
AM	22		99.7%	99.6%	99.9%	99.6%	97.6%	0.234	99.7%
	23		99.9%	99.8%	100.0%	99.6%	97.9%	0.226	99.9%
	24		99.9%	99.9%	100.0%	99.7%	97.8%	0.187	99.9%

Time Period	Iteration	Criteria							
		0	1	2	3	4	5	6	7
	25	0.06%	99.8%	99.8%	99.9%	99.7%	98.1%	0.117	99.8%
IP	9		99.9%	99.8%	99.9%	99.9%	96.8%	0.107	0.00%
	10		99.9%	99.9%	99.9%	99.9%	97.4%	0.091	0.00%
	11		99.9%	99.9%	100.0%	99.9%	97.7%	0.074	0.00%
	12	0.02%	99.9%	99.9%	100.0%	99.9%	98.0%	0.135	0.00%
PM	55		99.9%	99.8%	99.9%	99.6%	97.7%	0.169	0.00%
	56		99.9%	99.8%	100.0%	99.6%	97.7%	0.177	0.00%
	57		99.9%	99.8%	100.0%	99.6%	97.9%	0.199	0.00%
	58	0.07%	99.9%	99.9%	100.0%	99.6%	98.0%	0.134	0.00%
Target	**-**	**0.1%**	**95%**	**95%**	**95%**	**98%**	**98%**	**1**	**0.05%**

Table 5.4: Highway Convergence DLP with Mitigation 2026

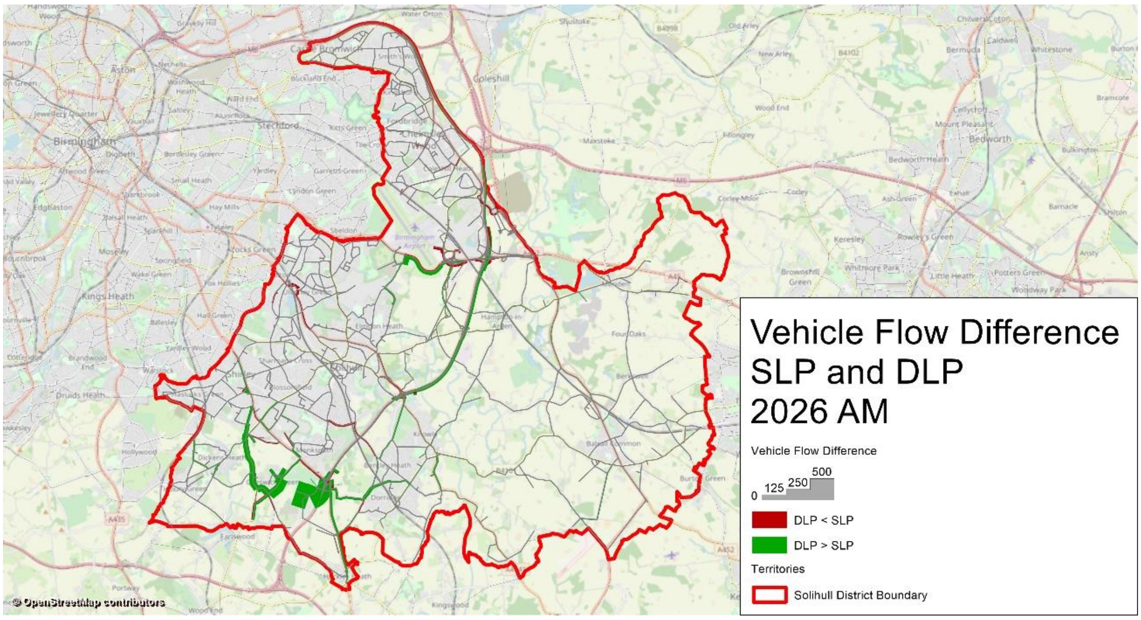
Time Period	Iteration	Criteria							
		0	1	2	3	4	5	6	7
AM	12		99.8%	99.6%	99.9%	99.7%	97.2%	0.245	0.00%
	13		99.9%	99.8%	99.9%	99.7%	97.6%	0.149	0.00%
	14		99.8%	99.7%	99.9%	99.7%	97.9%	0.099	0.00%
	15	0.03%	99.9%	99.8%	99.9%	99.7%	98.1%	0.07	0.00%
IP	7		100.0%	99.9%	99.9%	99.9%	96.5%	0.061	0.00%
	8		100.0%	99.9%	99.9%	99.9%	97.5%	0.067	0.00%
	9		100.0%	99.9%	100.0%	99.9%	97.9%	0.069	0.00%
	10	0.02%	100.0%	100.0%	100.0%	99.9%	98.4%	0.086	0.00%
PM	44		99.9%	99.8%	99.9%	99.6%	97.9%	0.201	0.00%
	45		99.7%	99.5%	99.9%	99.5%	97.5%	0.338	0.00%
	46		99.8%	99.7%	99.9%	99.6%	97.8%	0.321	0.00%
	47	0.05%	99.9%	99.9%	100.0%	99.7%	98.0%	0.204	0.00%
Target	**-**	**0.1%**	**95%**	**95%**	**95%**	**98%**	**98%**	**1**	**0.05%**

Table 5.5: Highway Convergence DLP with Mitigation 2036

Time Period	Iteration	Criteria							
		0	1	2	3	4	5	6	7
AM	19		99.8%	99.8%	99.9%	99.6%	97.8%	0.084	0.00%
	20		99.8%	99.7%	100.0%	99.5%	97.8%	0.184	0.00%
	21		99.9%	99.9%	100.0%	99.6%	97.9%	0.162	0.00%
	22	0.06%	99.9%	99.9%	100.0%	99.6%	98.1%	0.087	0.00%
IP	9		100.0%	99.9%	99.9%	99.9%	97.1%	0.119	0.00%
	10		100.0%	100.0%	100.0%	99.9%	97.6%	0.114	0.00%
	11		100.0%	99.9%	100.0%	99.9%	97.9%	0.072	0.00%
	12	0.02%	100.0%	99.9%	100.0%	99.9%	98.1%	0.096	0.00%
PM	85		99.7%	99.5%	99.9%	99.5%	98.1%	0.682	0.00%
	86		99.7%	99.5%	99.8%	99.4%	98.0%	0.734	0.00%
	87		99.6%	99.5%	99.8%	99.4%	98.0%	0.744	0.00%
	88	0.09%	99.7%	99.6%	99.8%	99.5%	98.2%	0.172	0.00%
Target	**-**	**0.1%**	**95%**	**95%**	**95%**	**98%**	**98%**	**1**	**0.05%**

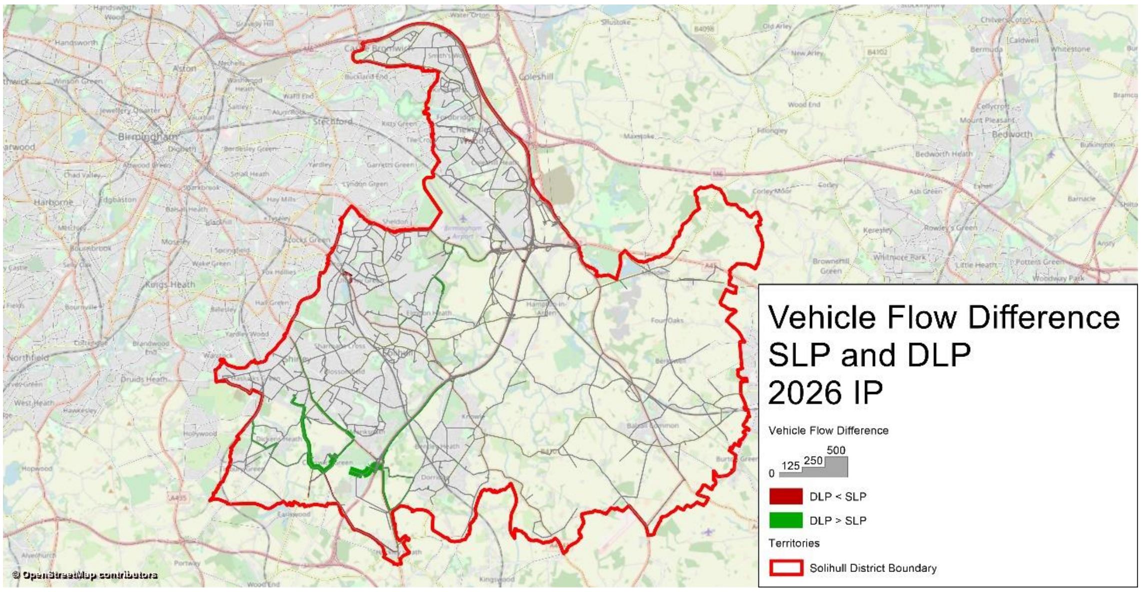
B. Model Flow Comparisons

Figure B.1: Vehicle Flow Differences: SLP and DLP 2026 AM



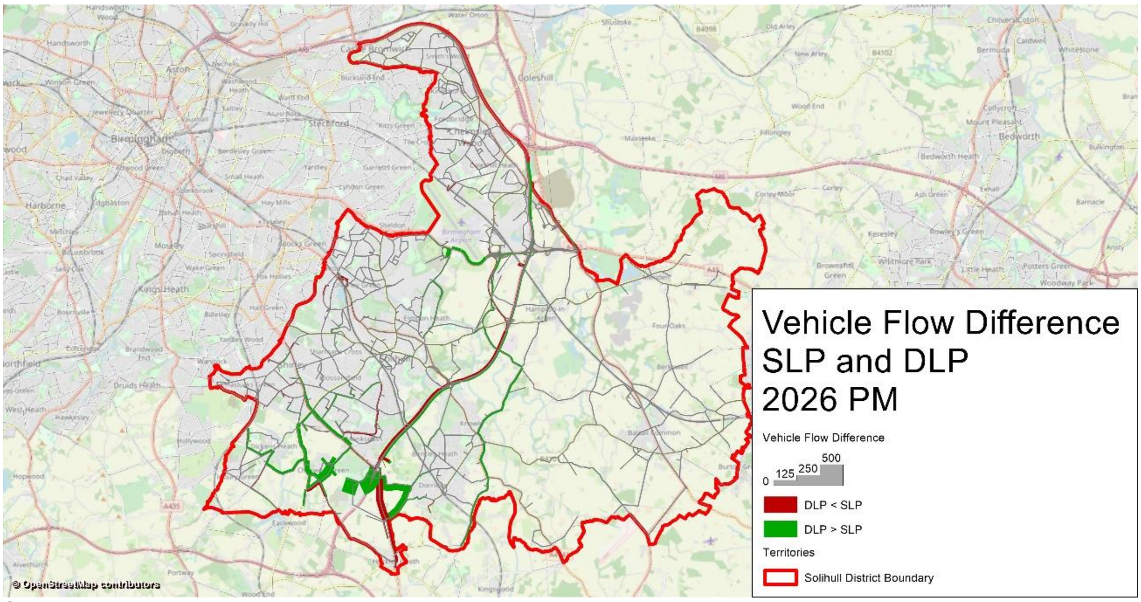
Source: Mott MacDonald

Figure B.2: Vehicle Flow Differences: SLP and DLP 2026 IP



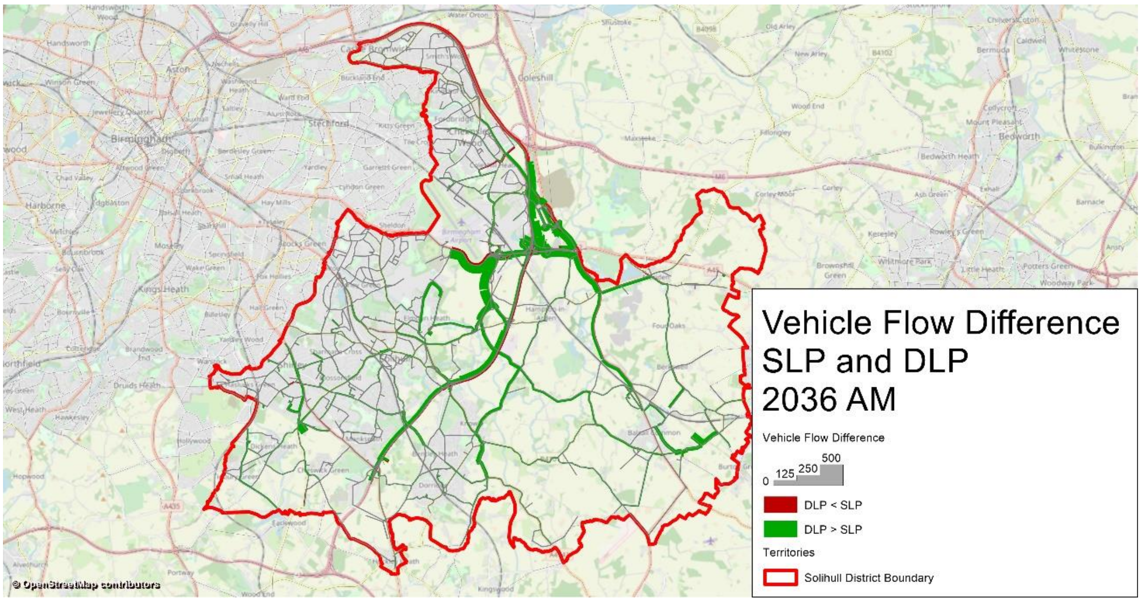
Source: Mott MacDonald

Figure B.3: Vehicle Flow Differences: SLP and DLP 2026 PM



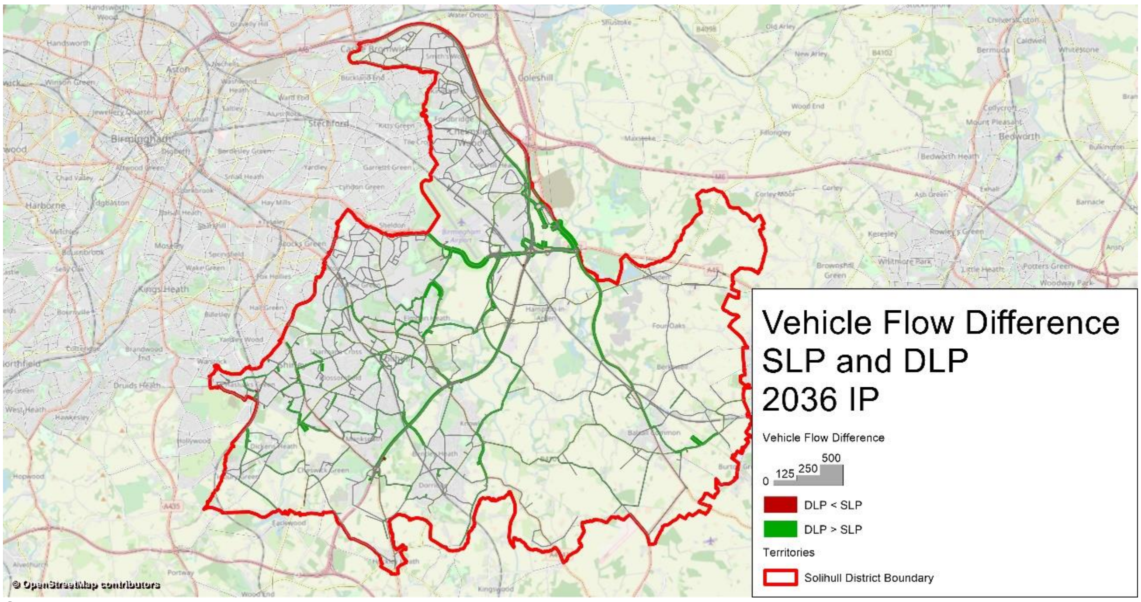
Source: Mott MacDonald

Figure B.4: Vehicle Flow Differences: SLP and DLP 2036 AM



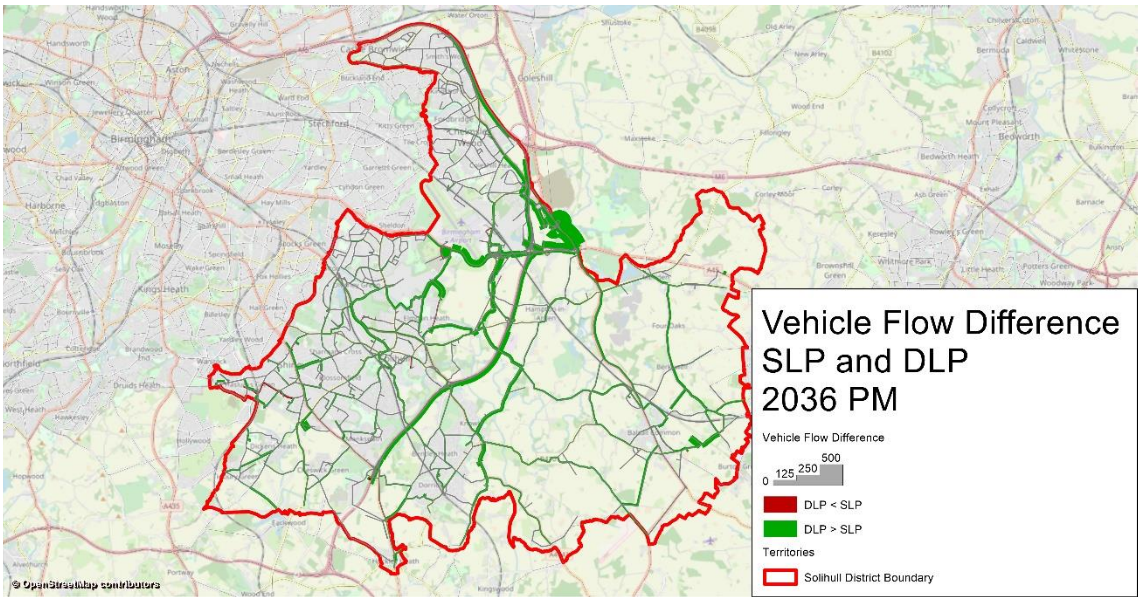
Source: Mott MacDonald

Figure B.5: Vehicle Flow Differences: SLP and DLP 2036 IP



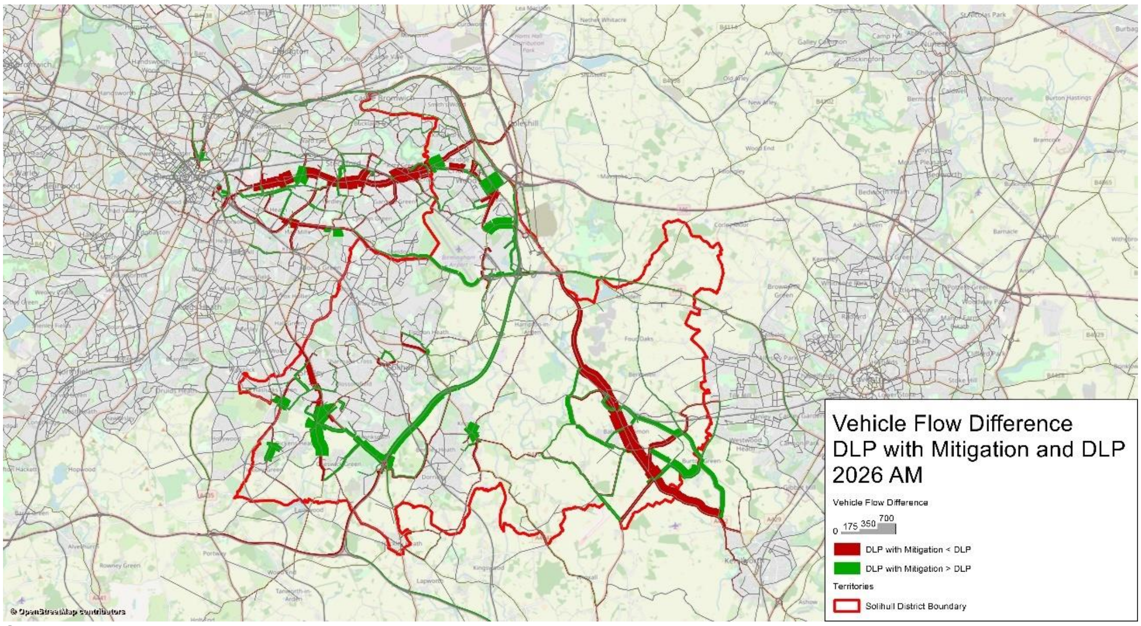
Source: Mott MacDonald

Figure B.6: Vehicle Flow Differences: SLP and DLP 2036 PM



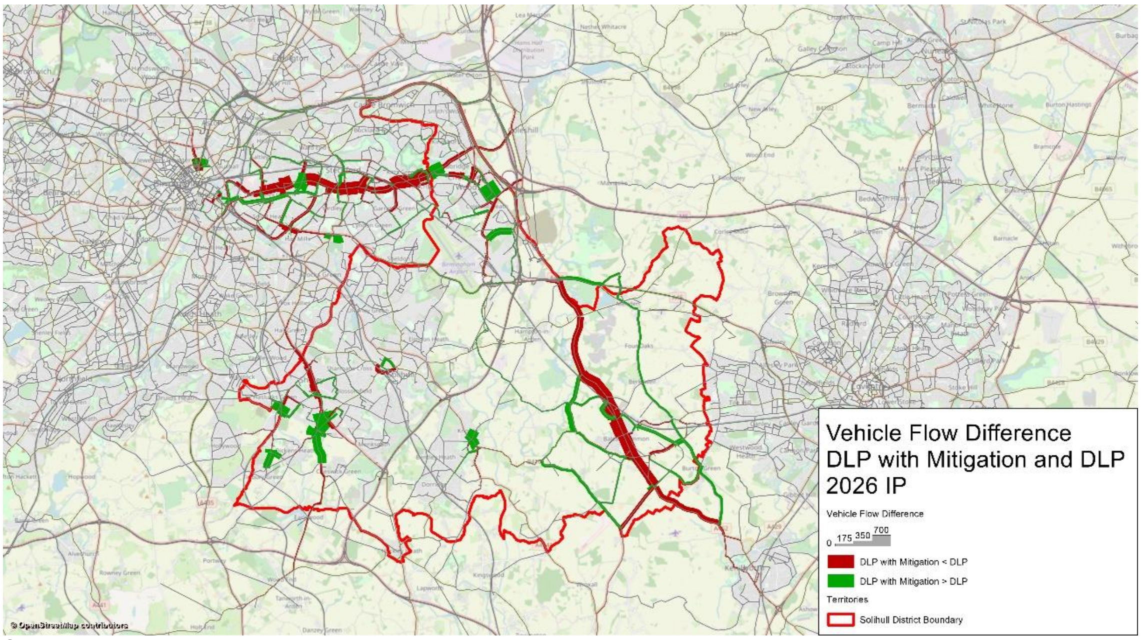
Source: Mott MacDonald

Figure B.7: Vehicle Flow Difference: DLP and DLP with Mitigation 2026 AM



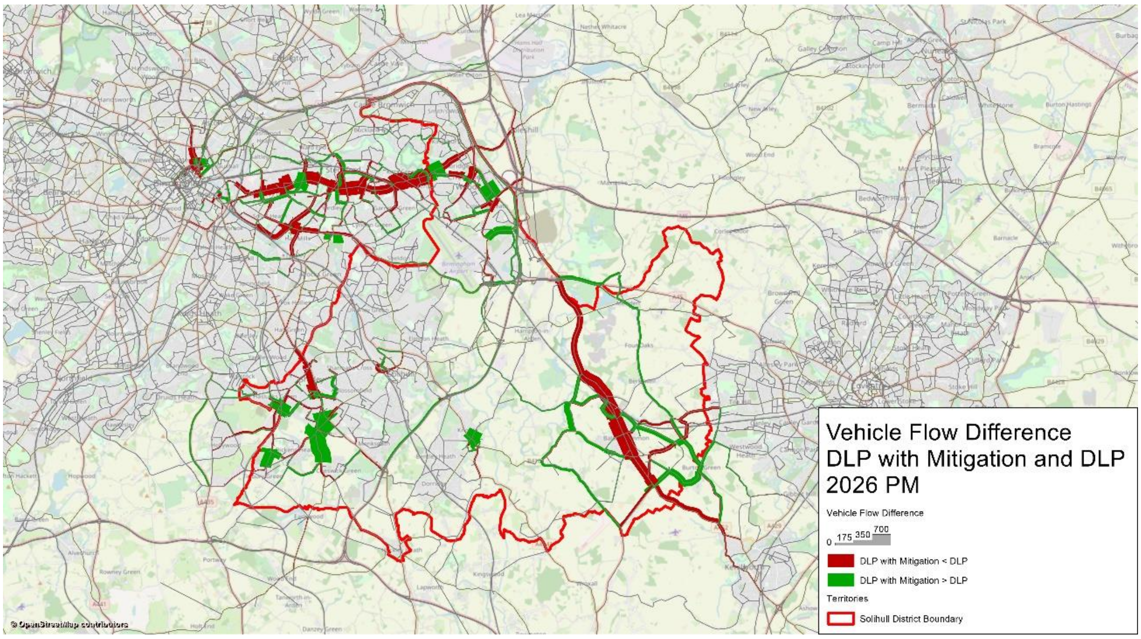
Source: Mott MacDonald

Figure B.8: Vehicle Flow Difference: DLP and DLP with Mitigation 2026 IP



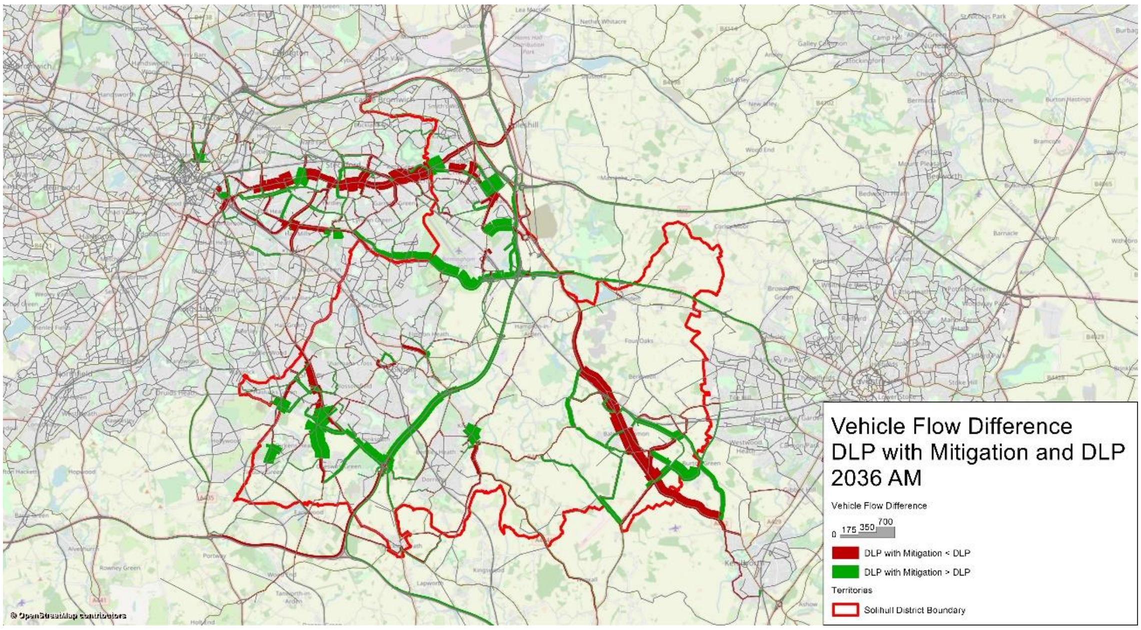
Source: Mott MacDonald

Figure B.9: Vehicle Flow Difference: DLP and DLP with Mitigation 2026 PM



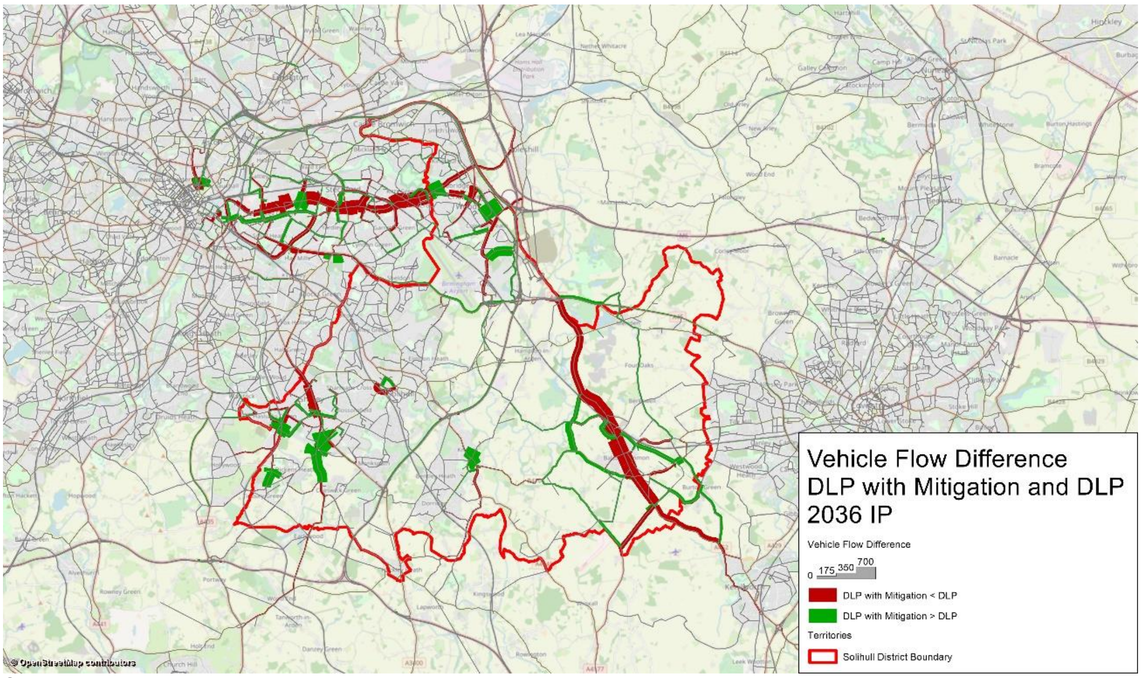
Source: Mott MacDonald

Figure B.10: Vehicle Flow Difference: DLP and DLP with Mitigation 2036 AM



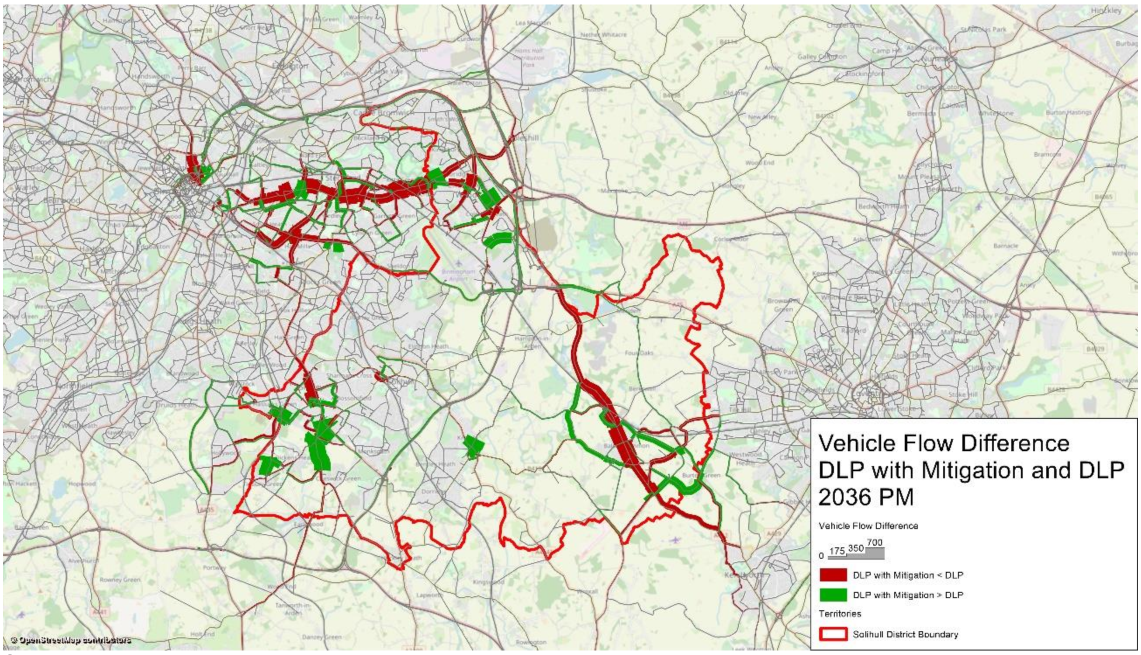
Source: Mott MacDonald

Figure B.11: Vehicle Flow Difference: DLP and DLP with Mitigation 2036 IP



Source: Mott MacDonald

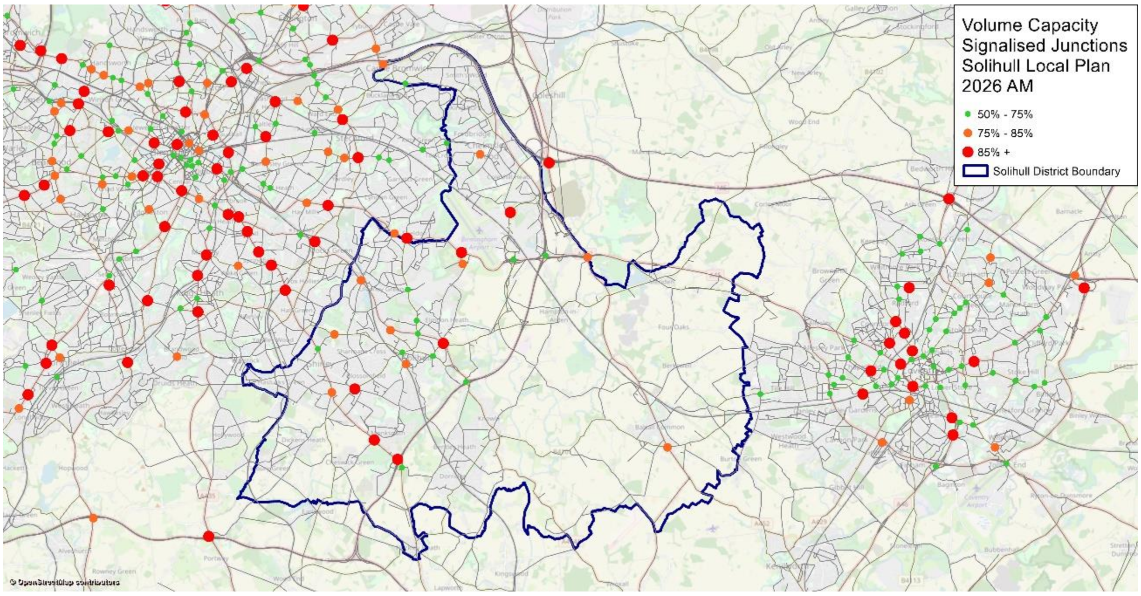
Figure B.12: Vehicle Flow Difference: DLP and DLP with Mitigation 2036 PM



Source: Mott MacDonald

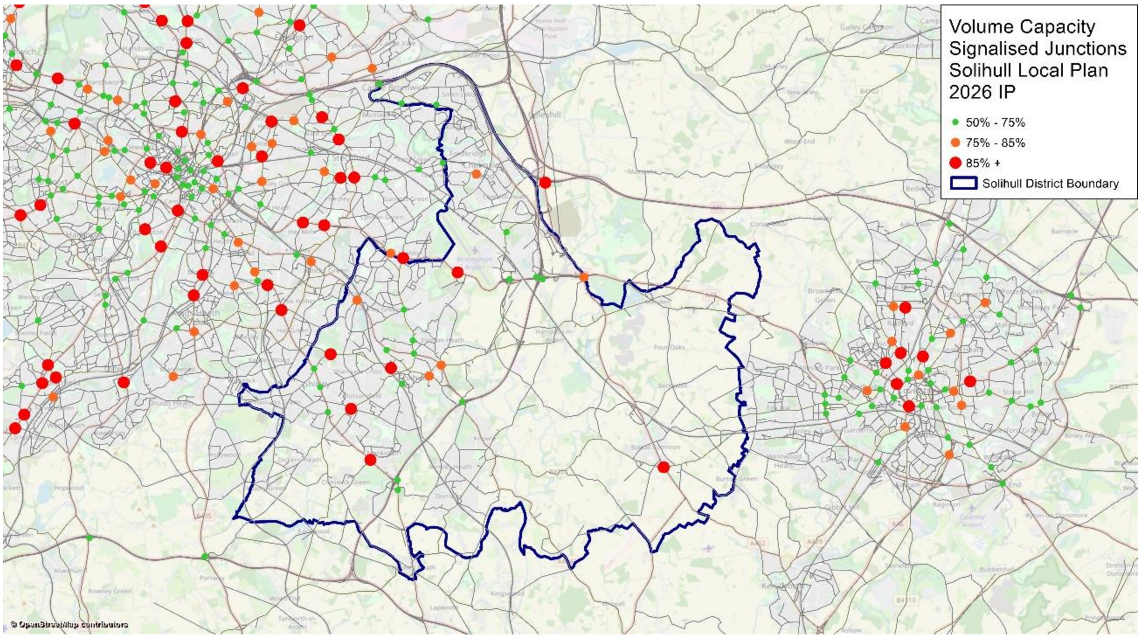
C. Junction Capacity Plots

Figure C.13: Volume over Capacity- Signalised Junctions: SLP 2026 AM



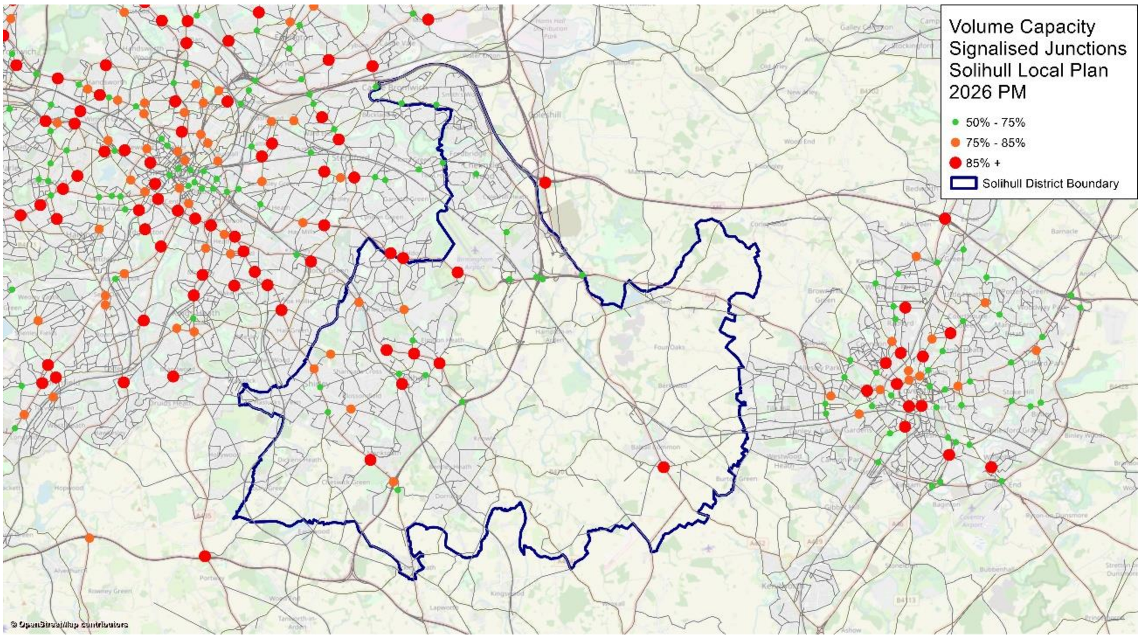
Source: Mott MacDonald

Figure C.14: Volume over Capacity- Signalised Junctions: SLP 2026 IP



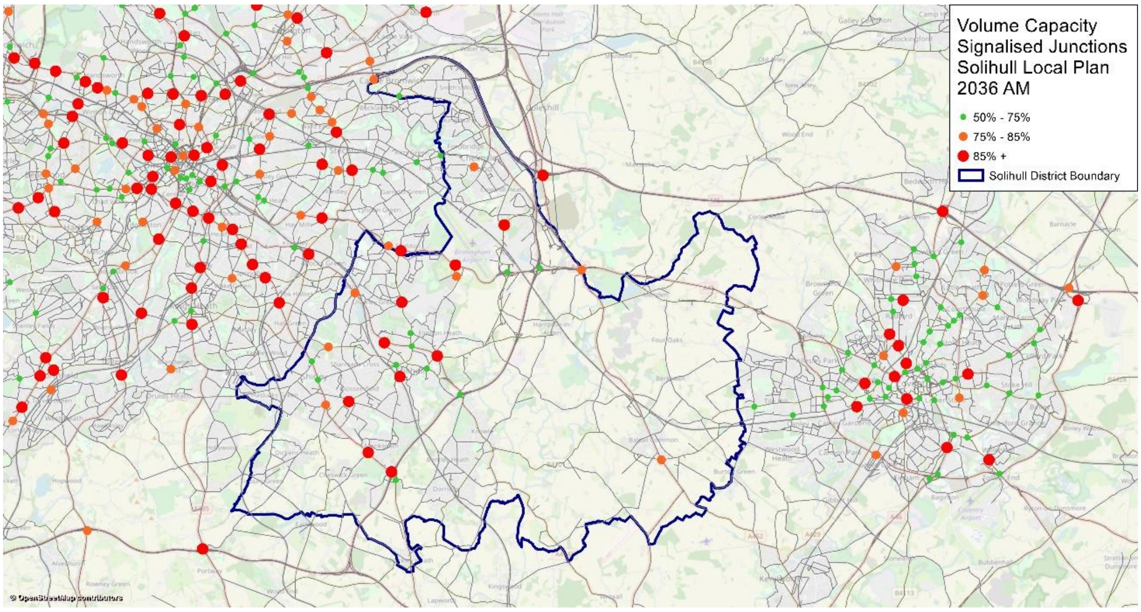
Source: Mott MacDonald

Figure C.15: Volume over Capacity- Signalised Junctions: SLP 2026 PM



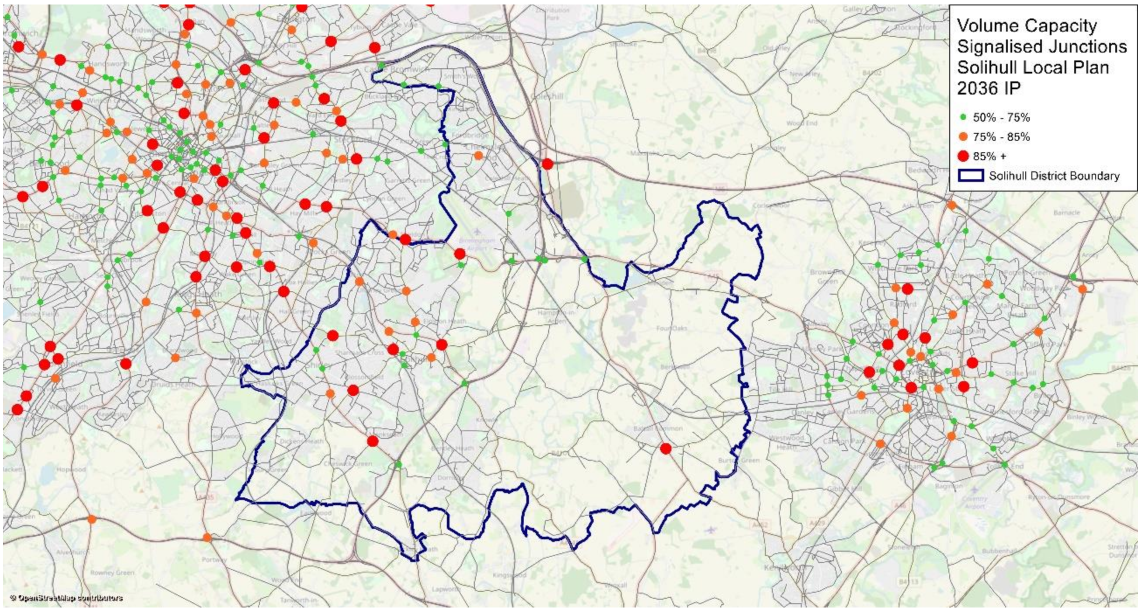
Source: Mott MacDonald

Figure C.16: Volume over Capacity- Signalised Junctions: SLP 2036 AM



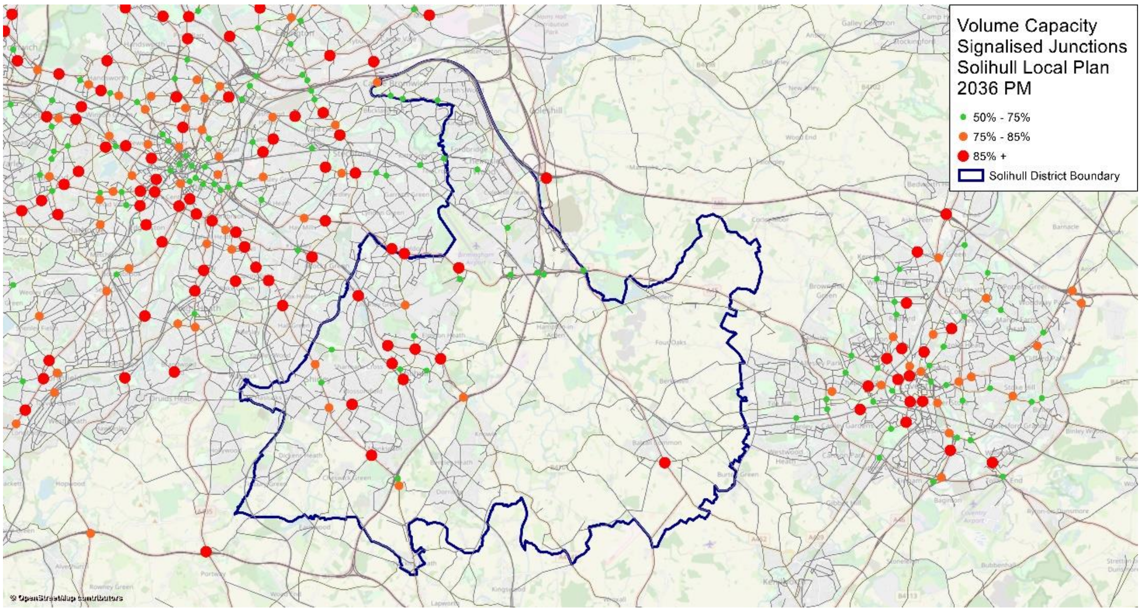
Source: Mott MacDonald

Figure C.17: Volume over Capacity- Signalised Junctions: SLP 2036 IP



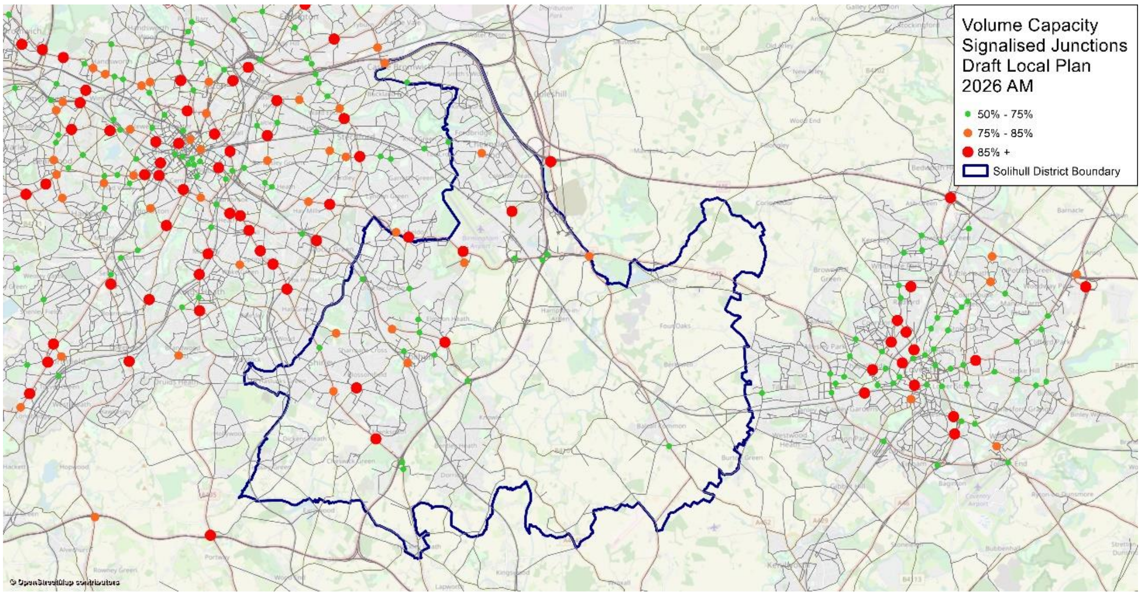
Source: Mott MacDonald

Figure C.18: Volume over Capacity- Signalised Junctions: SLP 2036 PM



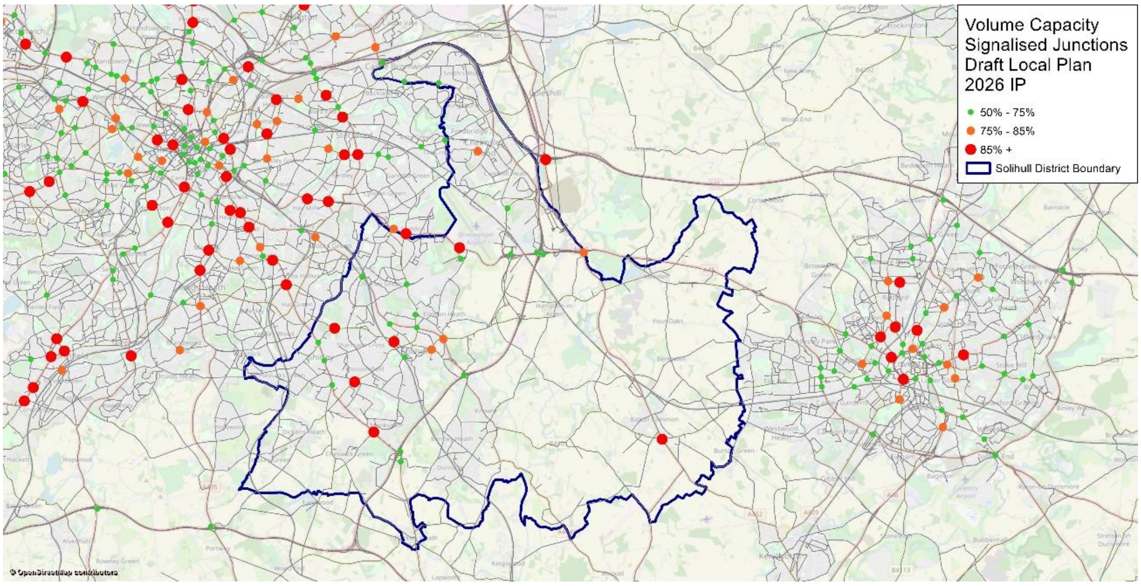
Source: Mott MacDonald

Figure C.19: Volume over Capacity- Signalised Junctions: DLP 2026 AM



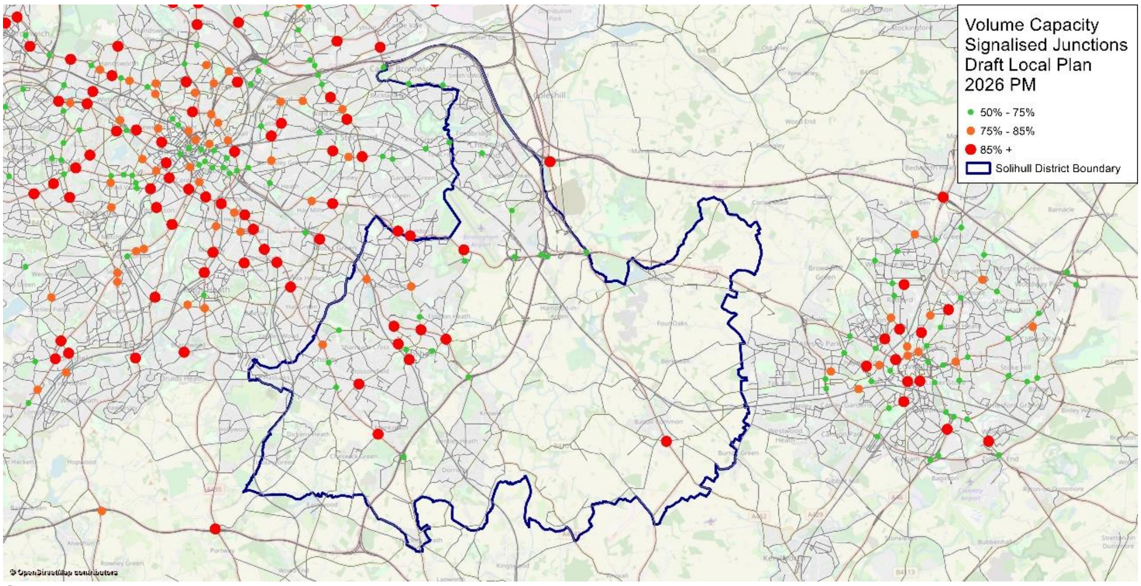
Source: Mott MacDonald

Figure C.20: Volume over Capacity- Signalised Junctions: DLP 2026 IP



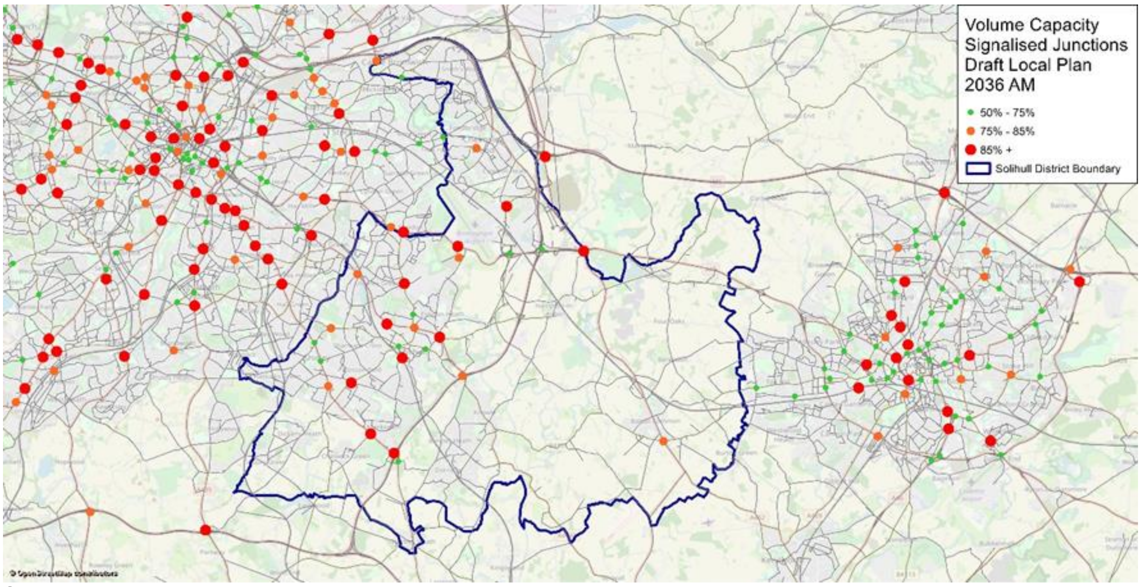
Source: Mott MacDonald

Figure C.21: Volume over Capacity- Signalised Junctions: DLP 2026 PM



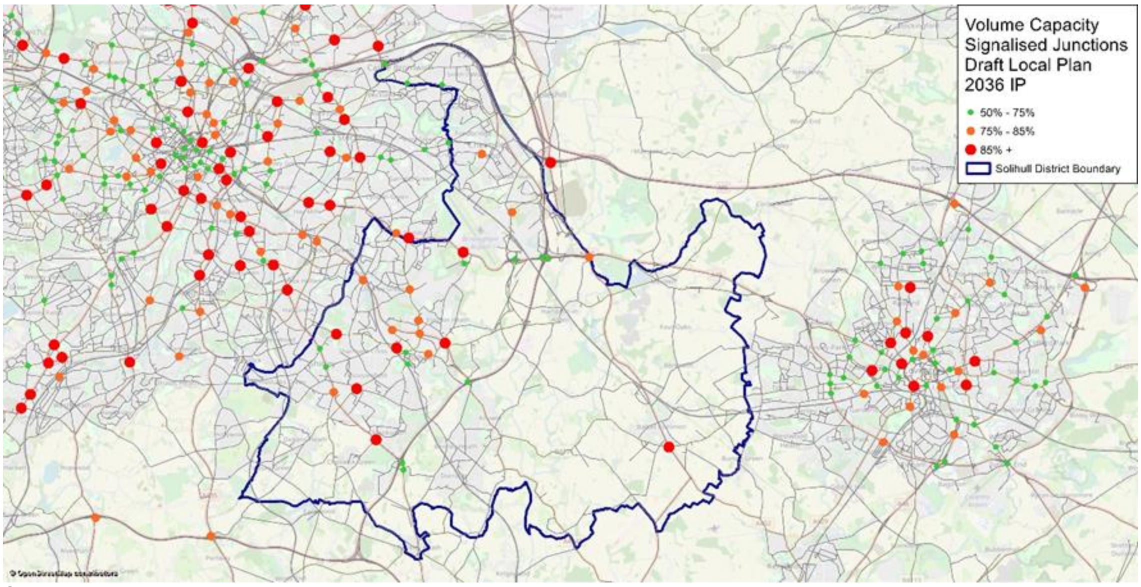
Source: Mott MacDonald

Figure C.22: Volume over Capacity- Signalised Junctions: DLP 2036 AM



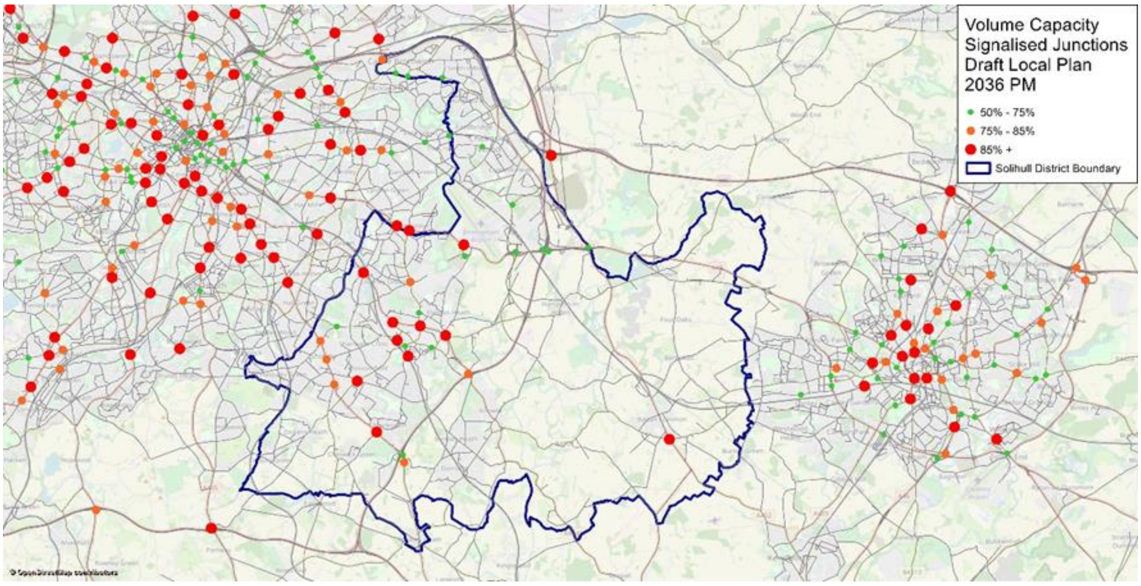
Source: Mott MacDonald

Figure C.23: Volume over Capacity- Signalised Junctions: DLP 2036 IP



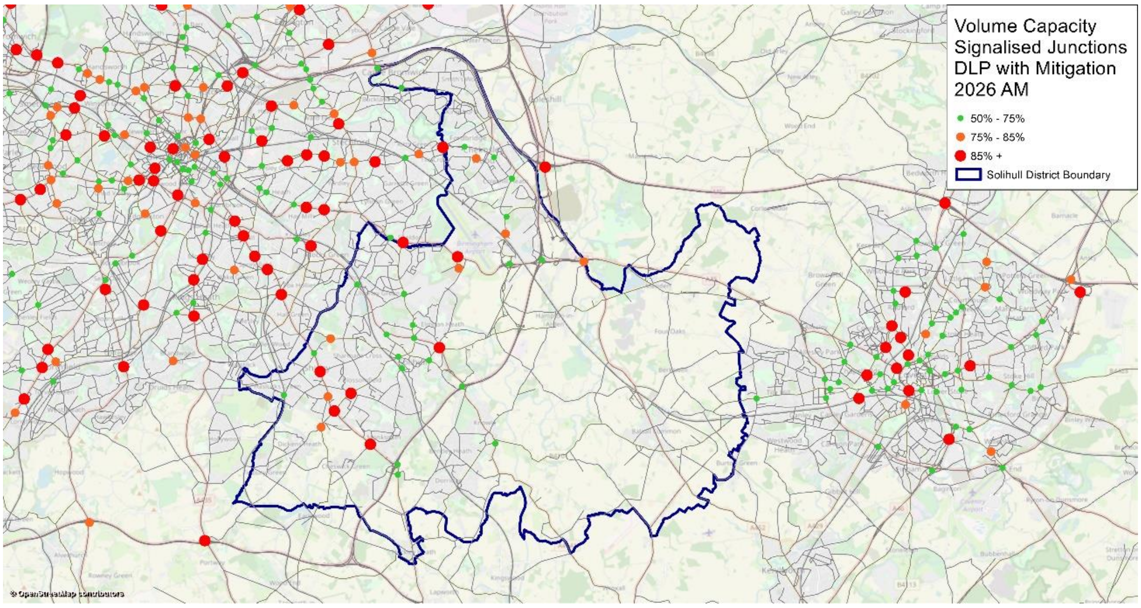
Source: Mott MacDonald

Figure C.24: Volume over Capacity- Signalised Junctions: DLP 2036 PM



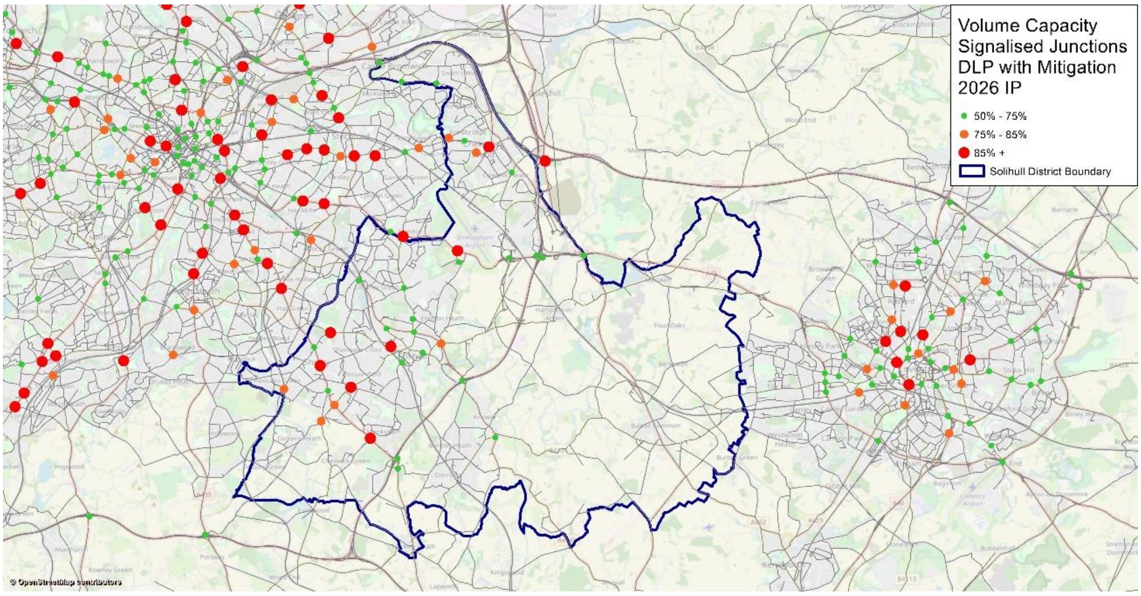
Source: Mott MacDonald

Figure C.25: V/C Signalised Junctions: DLP with Mitigation 2026 AM



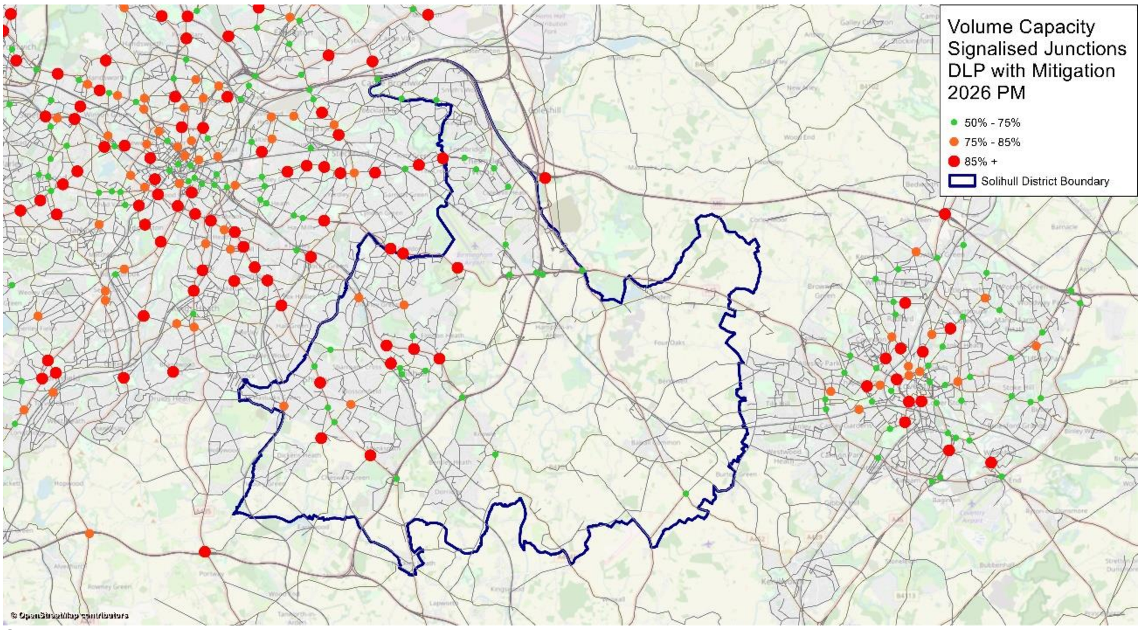
Source: Mott MacDonald

Figure C.26: V/C Signalised Junctions: DLP with Mitigation 2026 IP



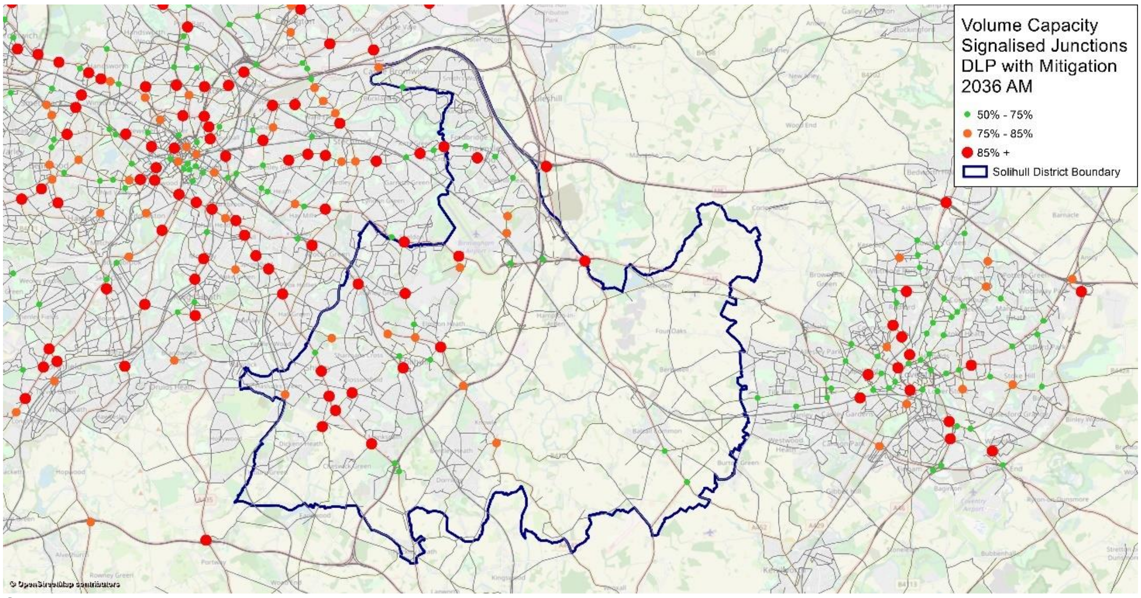
Source: Mott MacDonald

Figure C.27: V/C Signalised Junctions: DLP with Mitigation 2026 PM



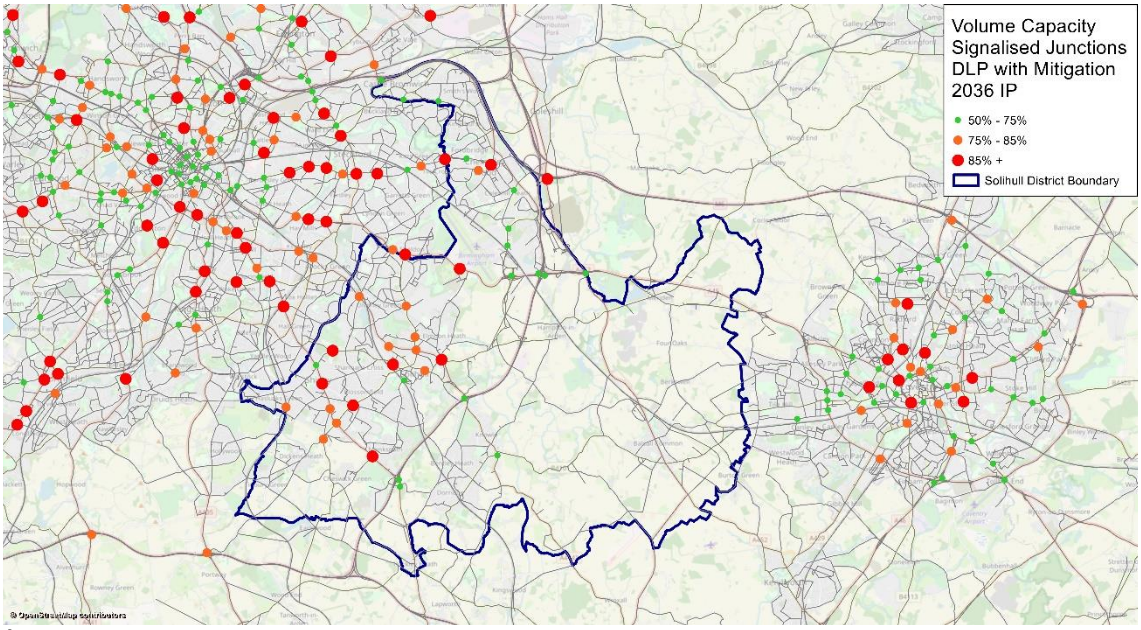
Source: Mott MacDonald

Figure C.28: V/C Signalised Junctions: DLP with Mitigation 2036 AM



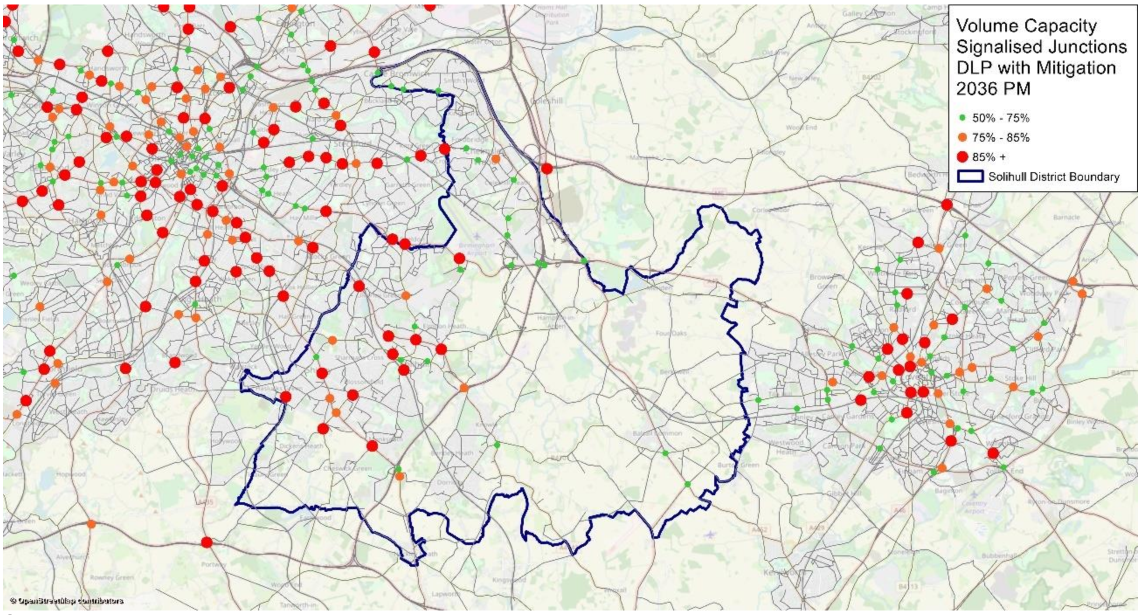
Source: Mott MacDonald

Figure C.29: V/C Signalised Junctions: DLP with Mitigation 2036 IP



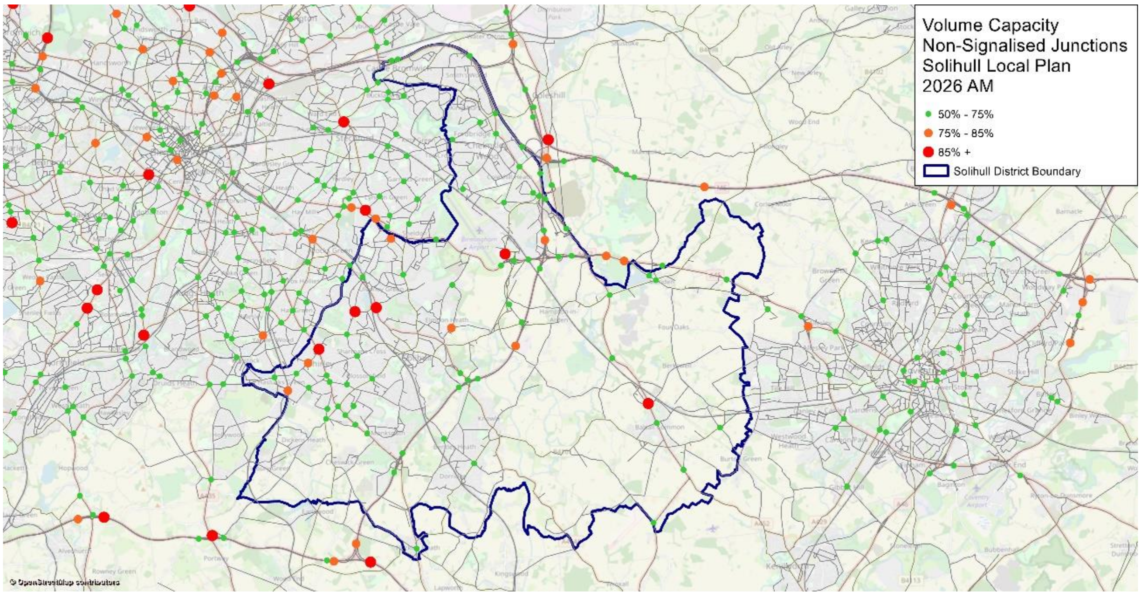
Source: Mott MacDonald

Figure C.30: V/C Signalised Junctions: DLP with Mitigation 2036 PM



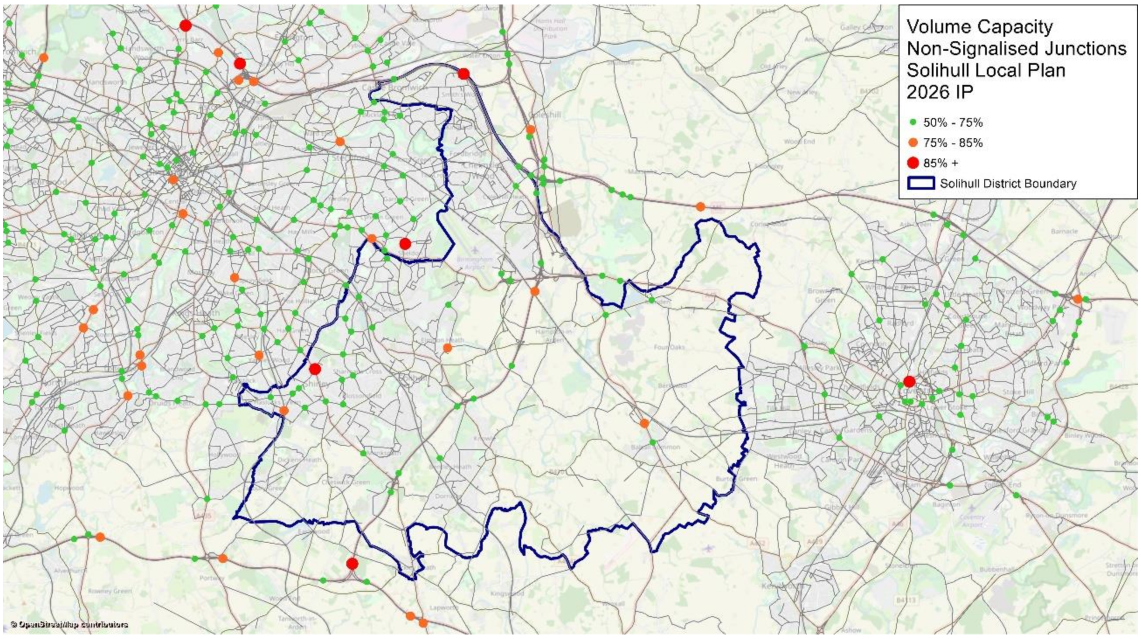
Source: Mott MacDonald

Figure C.31: Volume over Capacity- Non-Signalised Junctions: SLP 2026 AM



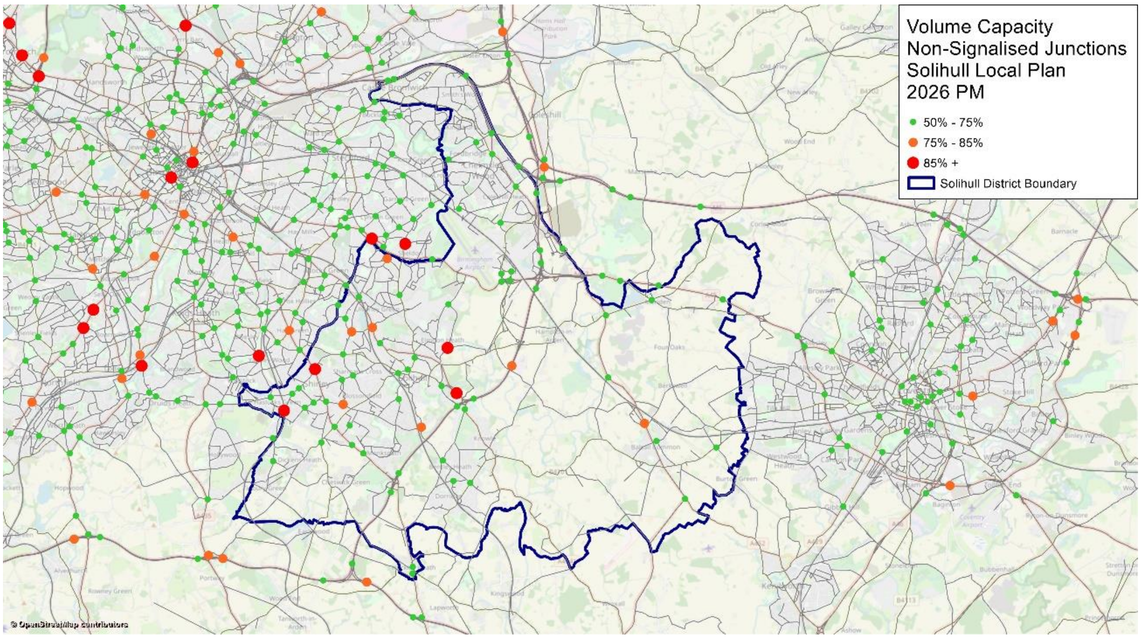
Source: Mott MacDonald

Figure C.32: Volume over Capacity- Non-Signalised Junctions: SLP 2026 IP



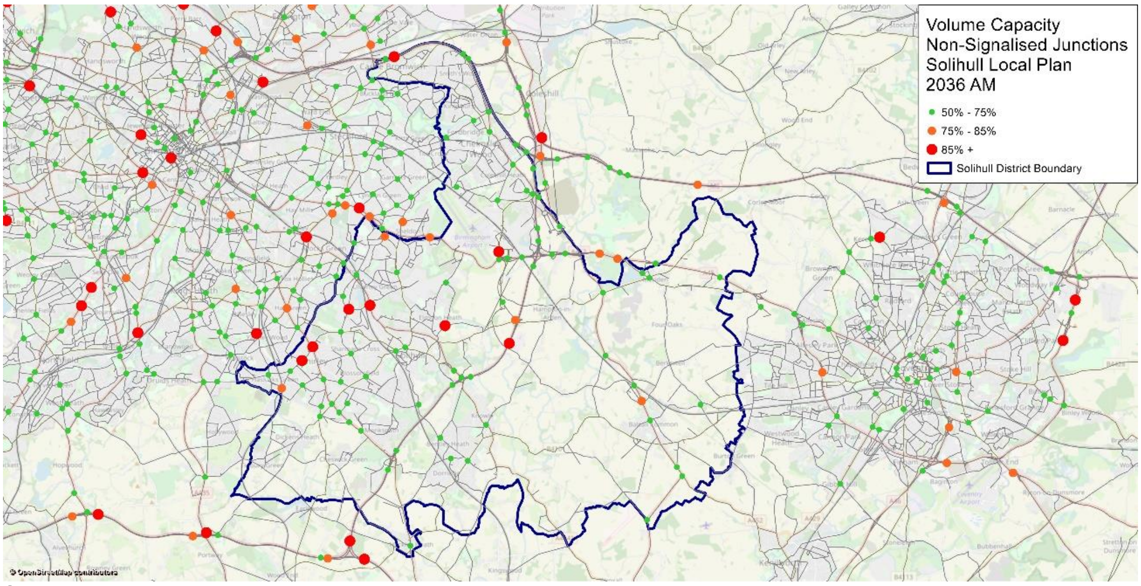
Source: Mott MacDonald

Figure C.33: Volume over Capacity- Non-Signalised Junctions: SLP 2026 PM



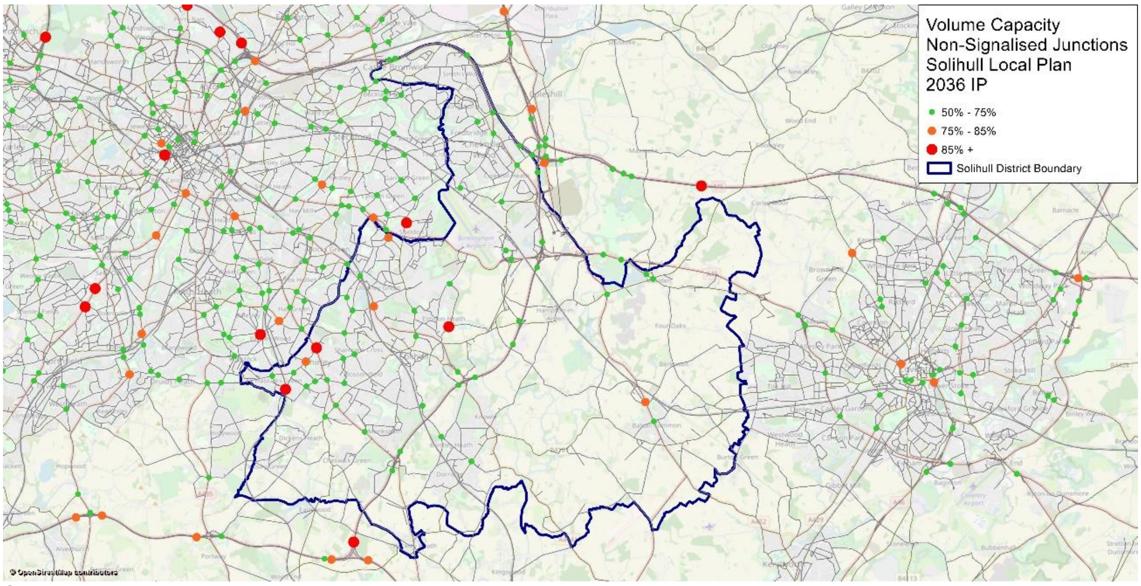
Source: Mott MacDonald

Figure C.34: Volume over Capacity- Non-Signalised Junctions: SLP 2036 AM



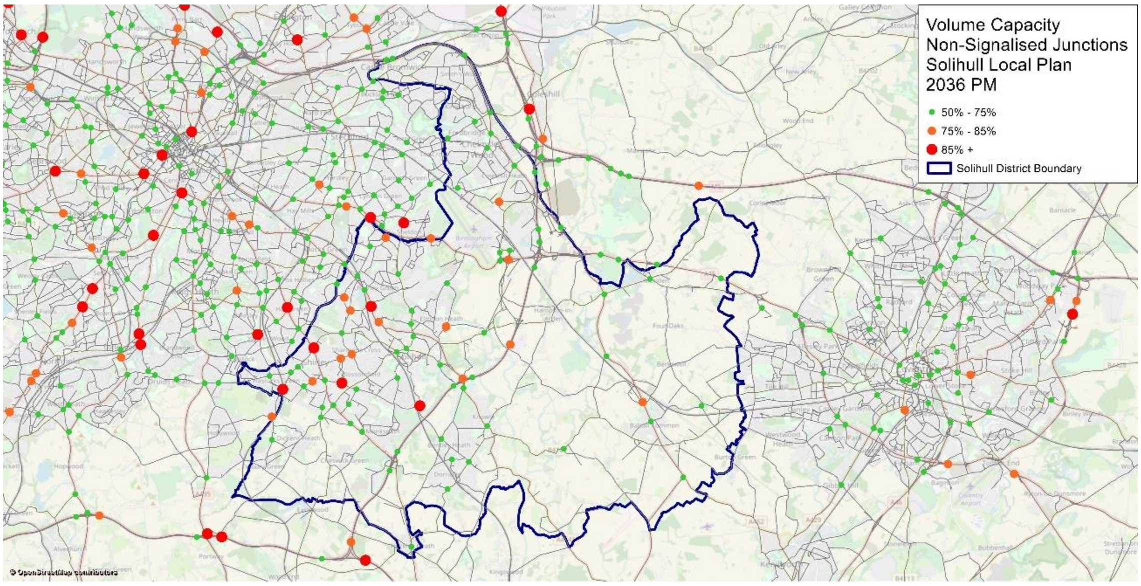
Source: Mott MacDonald

Figure C.35: Volume over Capacity- Non-Signalised Junctions: SLP 2036 IP



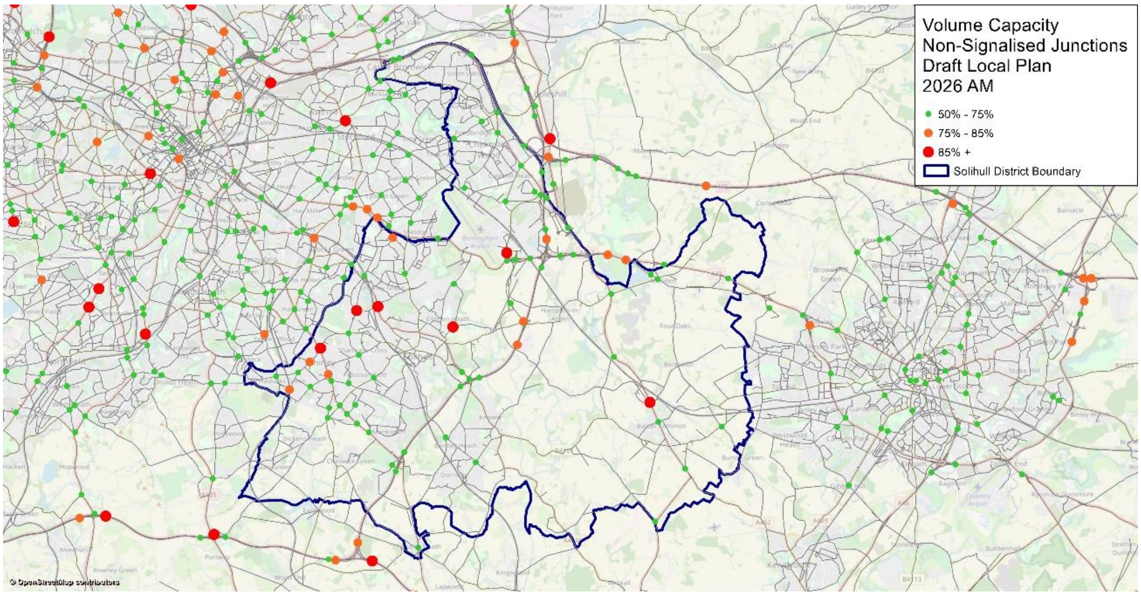
Source: Mott MacDonald

Figure C.36: Volume over Capacity- Non-Signalised Junctions: SLP 2036 PM



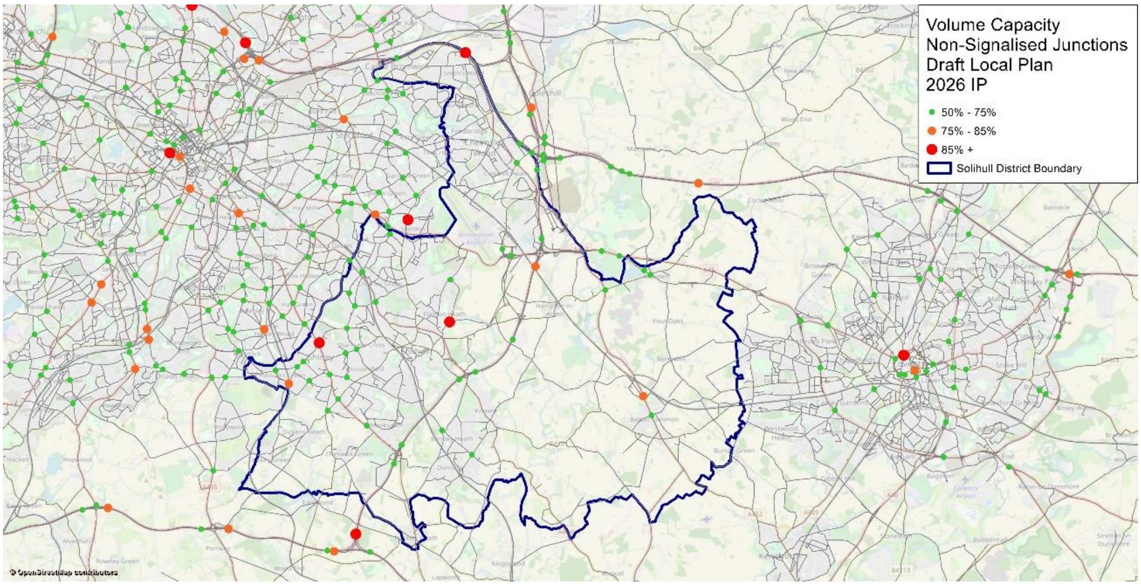
Source: Mott MacDonald

Figure C.37: Volume over Capacity- Non-Signalised Junctions: DLP 2026 AM



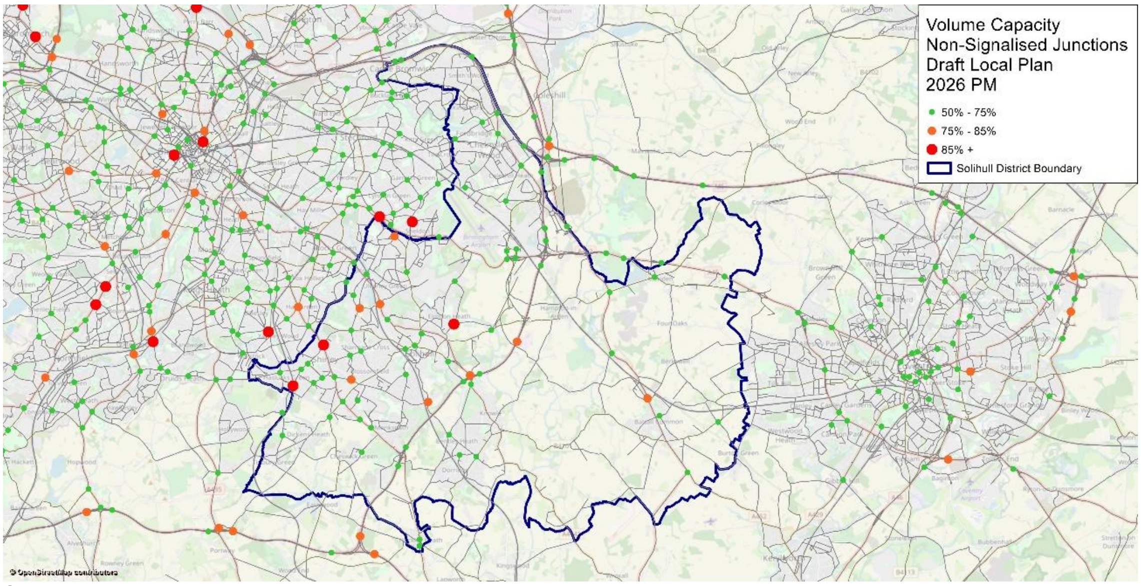
Source: Mott MacDonald

Figure C.38: Volume over Capacity- Non-Signalised Junctions: DLP 2026 IP



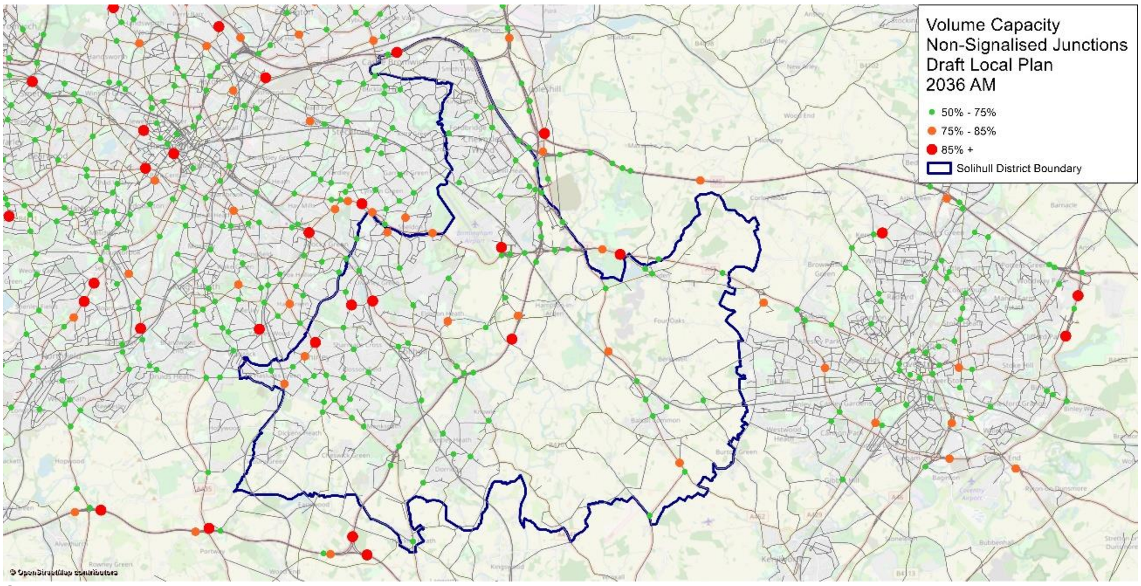
Source: Mott MacDonald

Figure C.39: Volume over Capacity- Non-Signalised Junctions: DLP 2026 PM



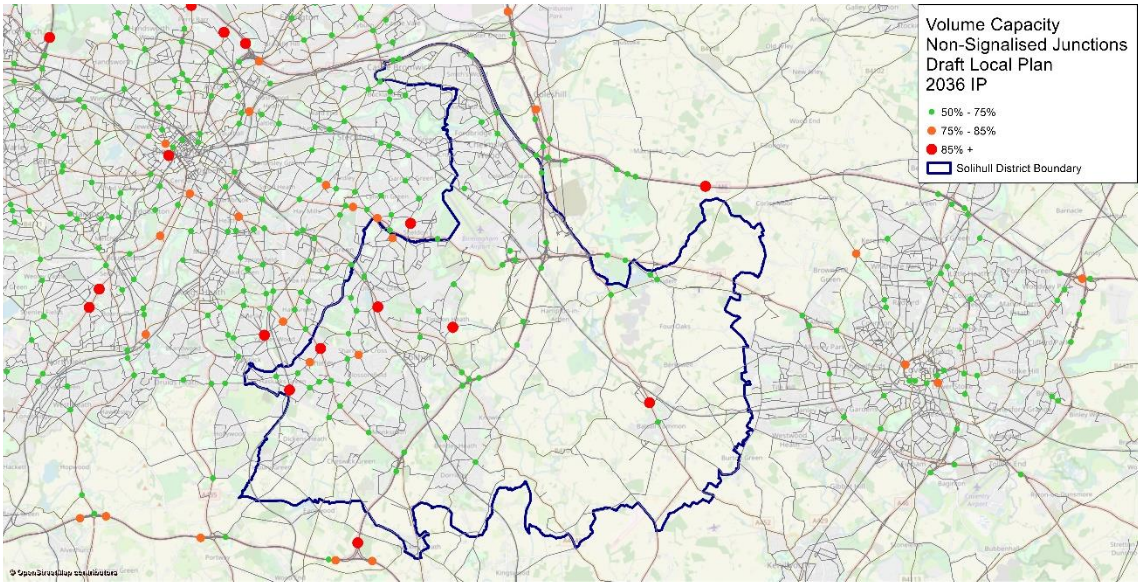
Source: Mott MacDonald

Figure C.40: Volume over Capacity- Non-Signalised Junctions: DLP 2036 AM



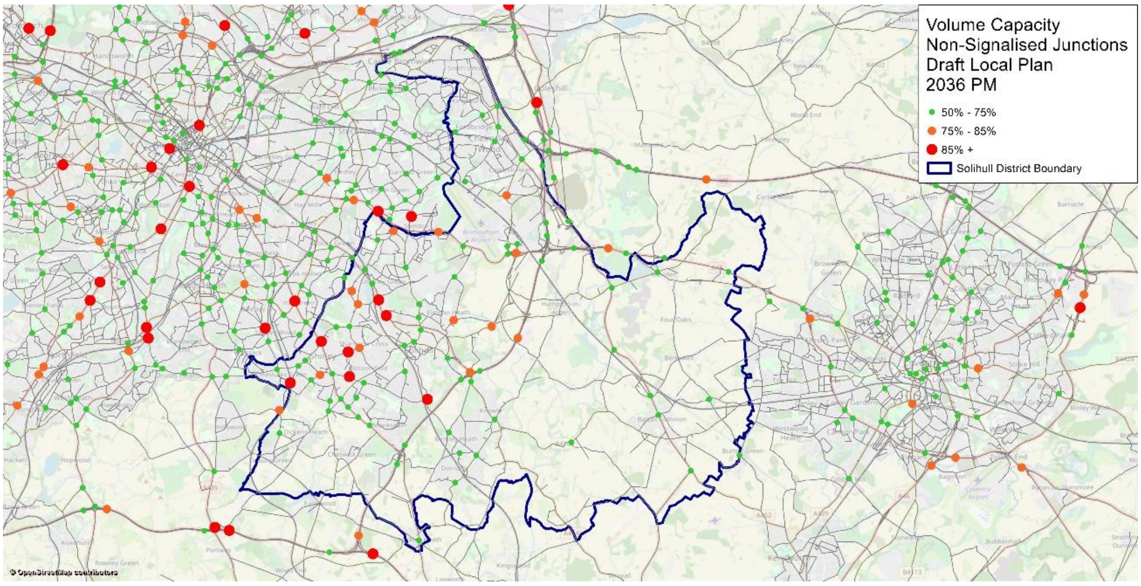
Source: Mott MacDonald

Figure C.41: Volume over Capacity- Non-Signalised Junctions: DLP 2036 IP



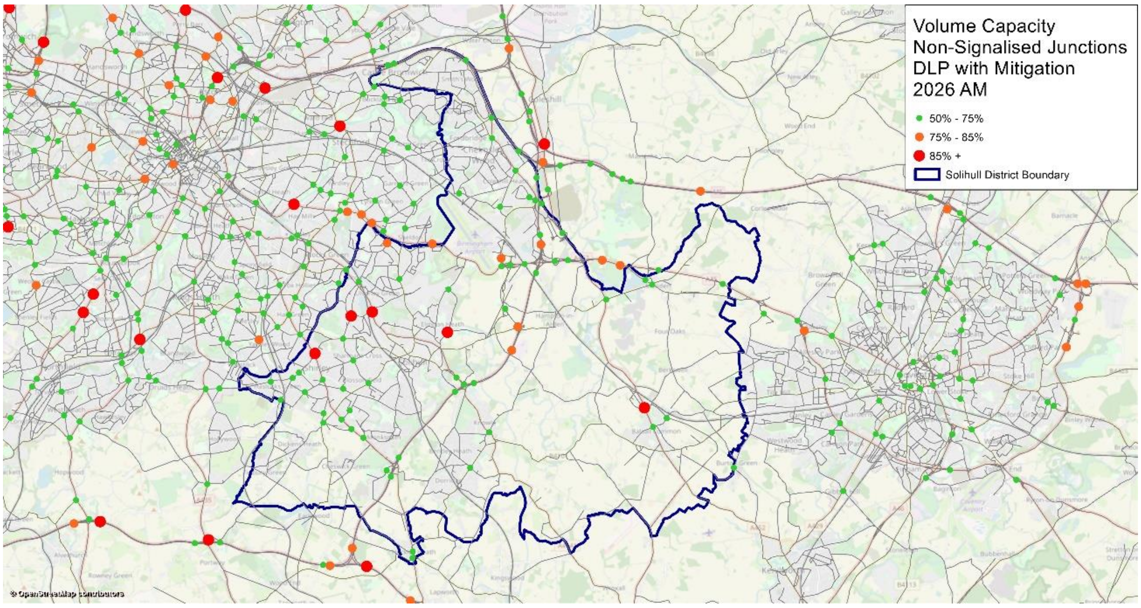
Source: Mott MacDonald

Figure C.42: Volume over Capacity- Non-Signalised Junctions: DLP 2036 PM



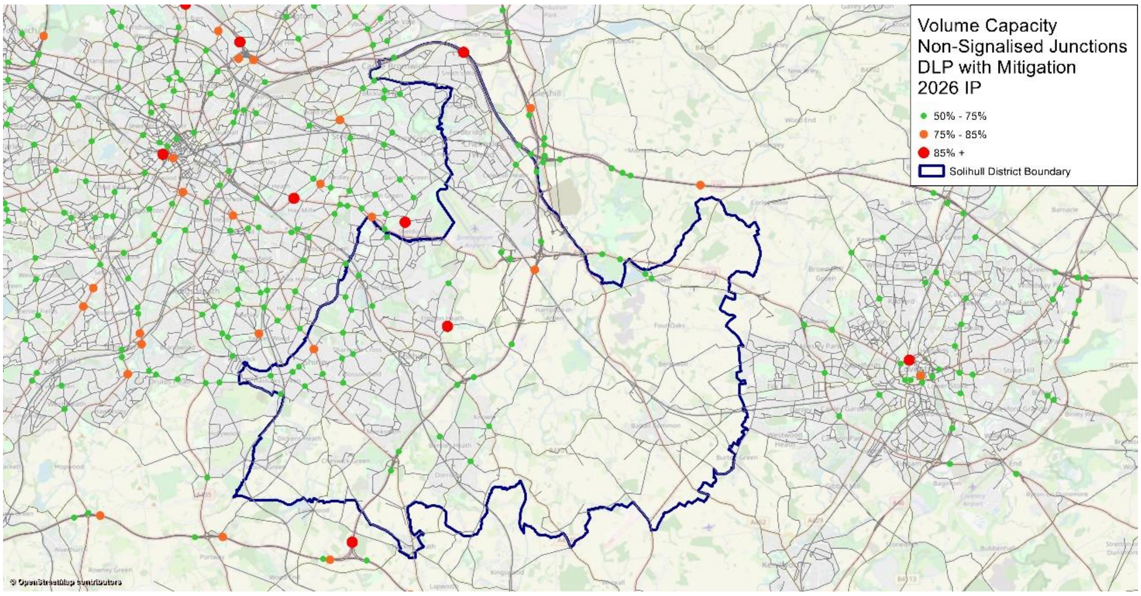
Source: Mott MacDonald

Figure C.43: V/C: Non-Signalised Junctions DLP with Mitigation 2026 AM



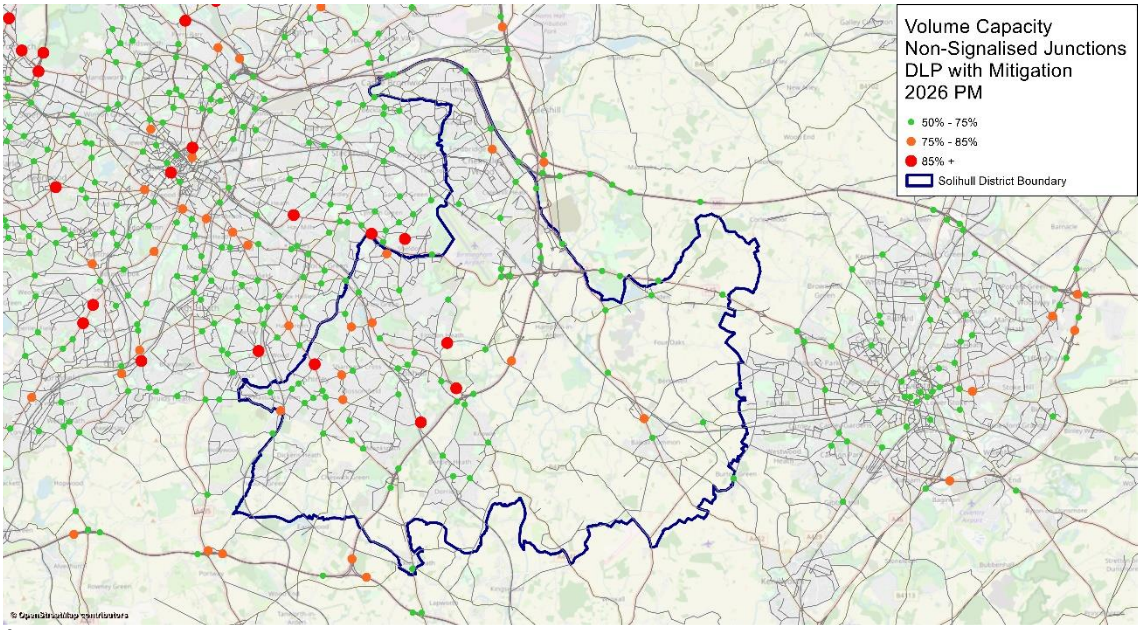
Source: Mott MacDonald

Figure C.44: V/C: Non-Signalised Junctions DLP with Mitigation 2026 IP



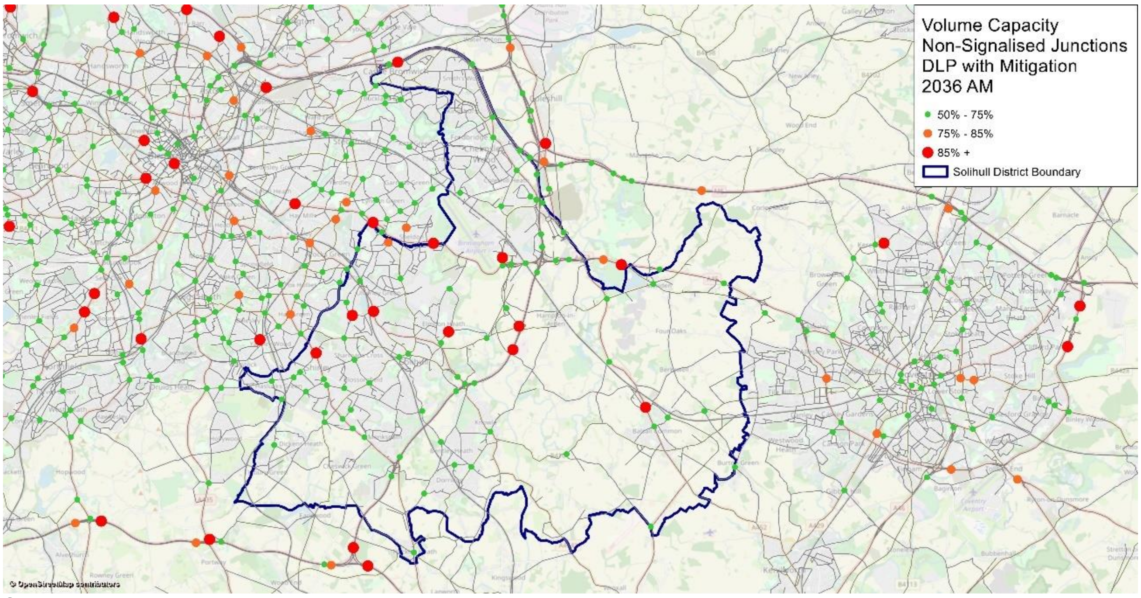
Source: Mott MacDonald

Figure C.45: V/C: Non-Signalised Junctions DLP with Mitigation 2026 PM



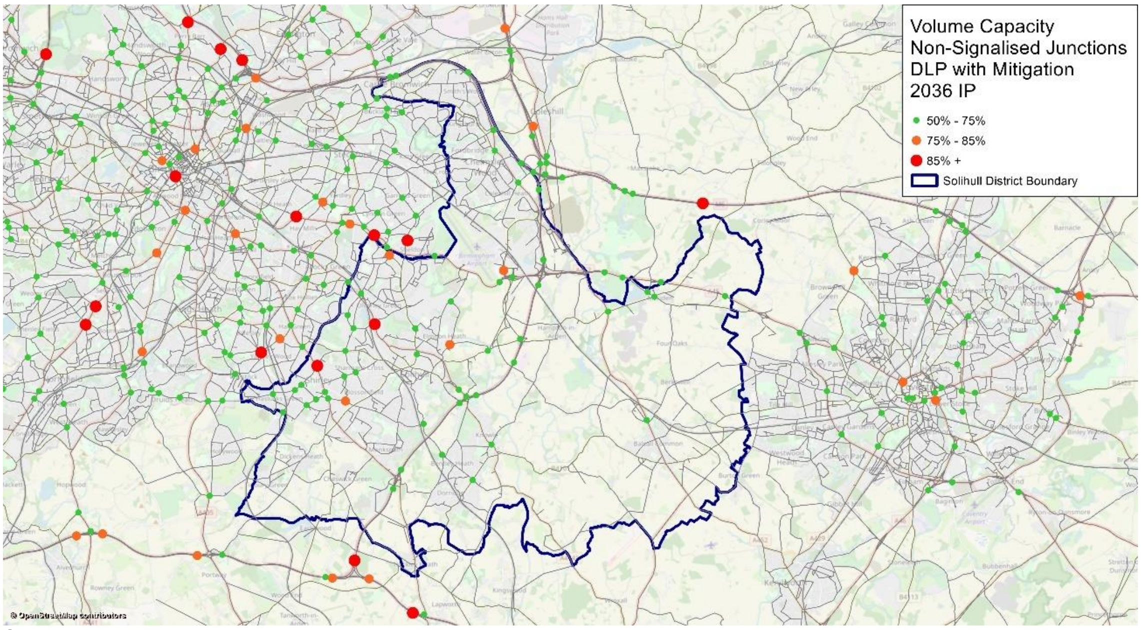
Source: Mott MacDonald

Figure C.46: V/C: Non-Signalised Junctions DLP with Mitigation 2036 AM



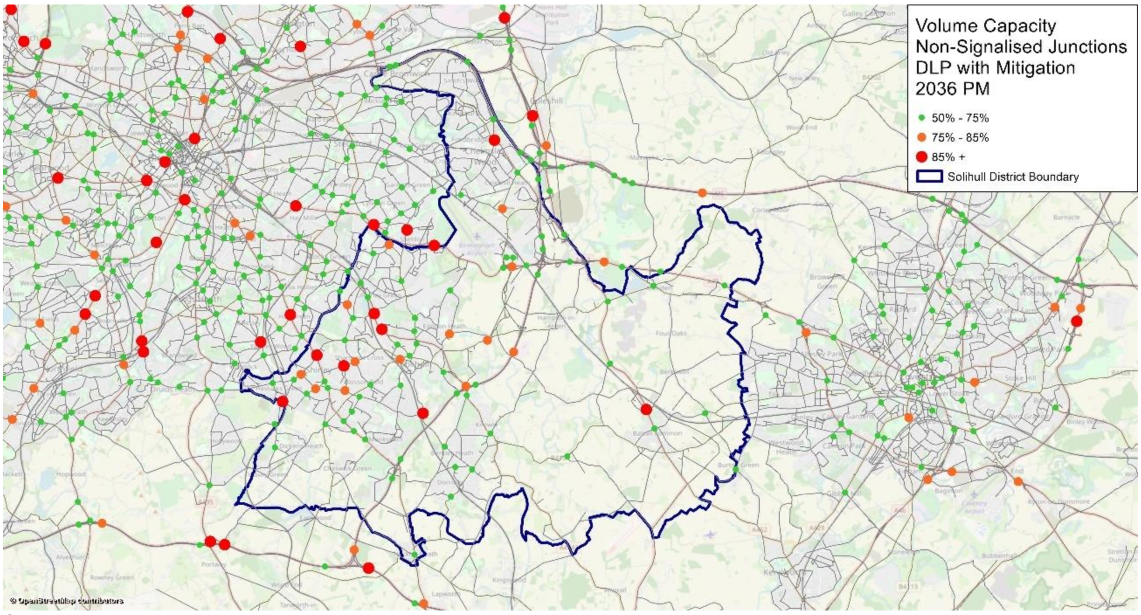
Source: Mott MacDonald

Figure C.47: V/C: Non-Signalised Junctions DLP with Mitigation 2036 IP



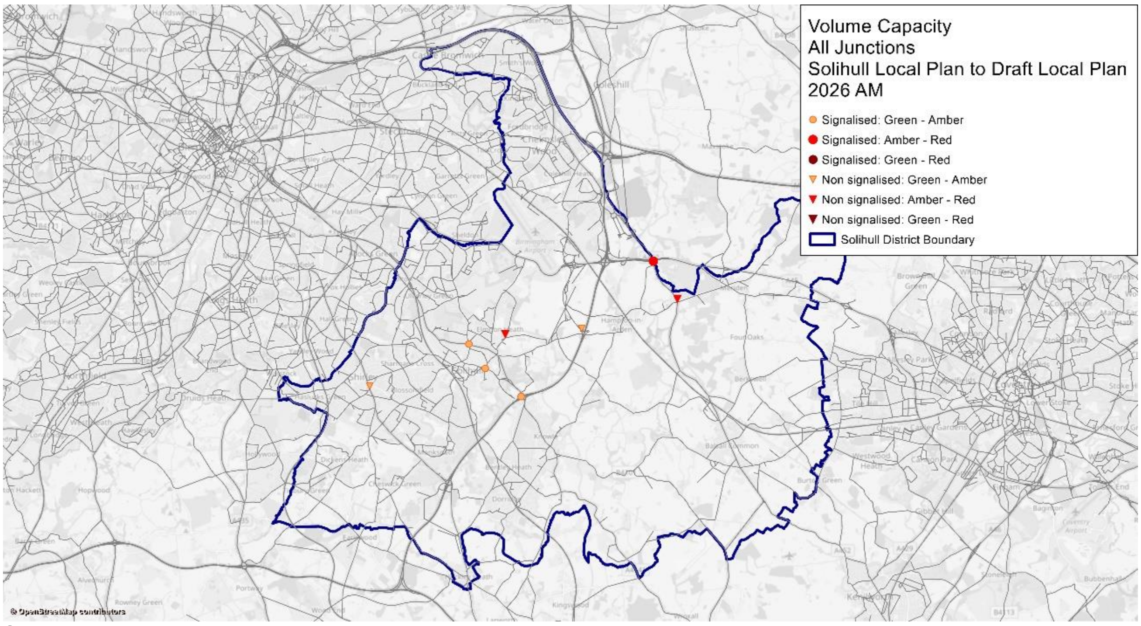
Source: Mott MacDonald

Figure C.48: V/C: Non-Signalised Junctions DLP with Mitigation 2036 PM



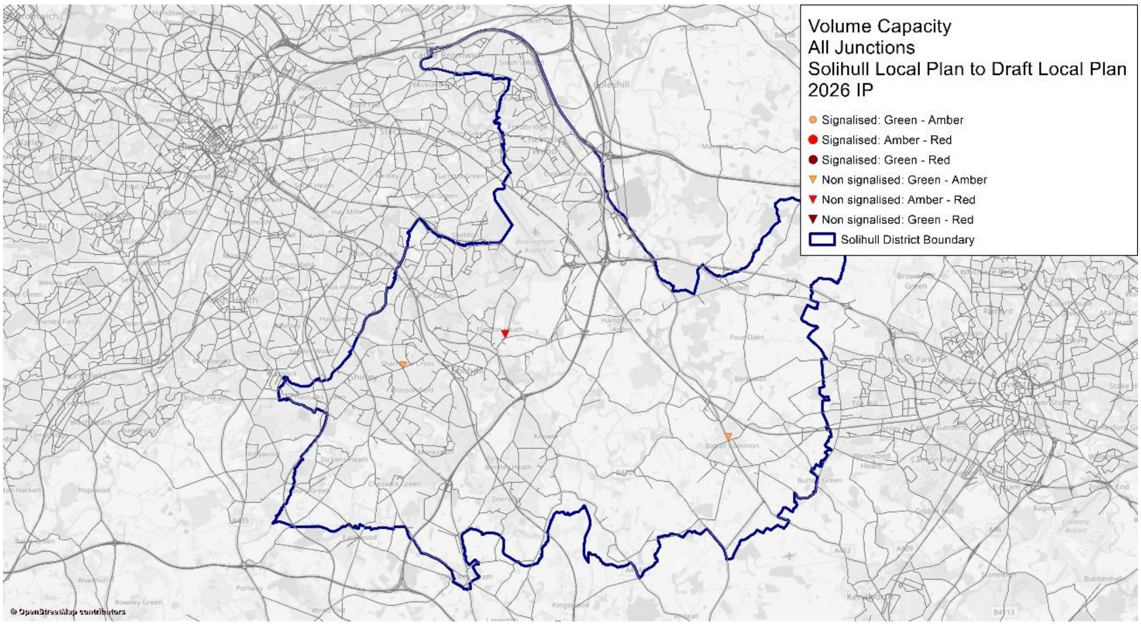
Source: Mott MacDonald

Figure C.49: V/C Comparison: SLP and DLP 2026 AM



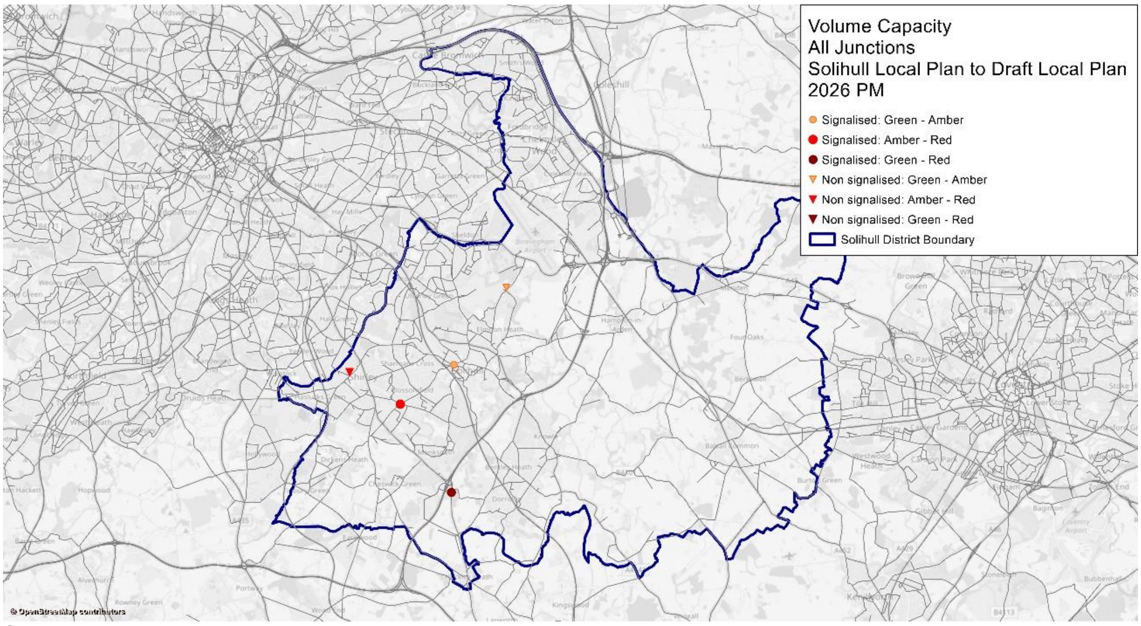
Source: Mott MacDonald

Figure C.50: V/C Comparison: SLP and DLP 2026 IP



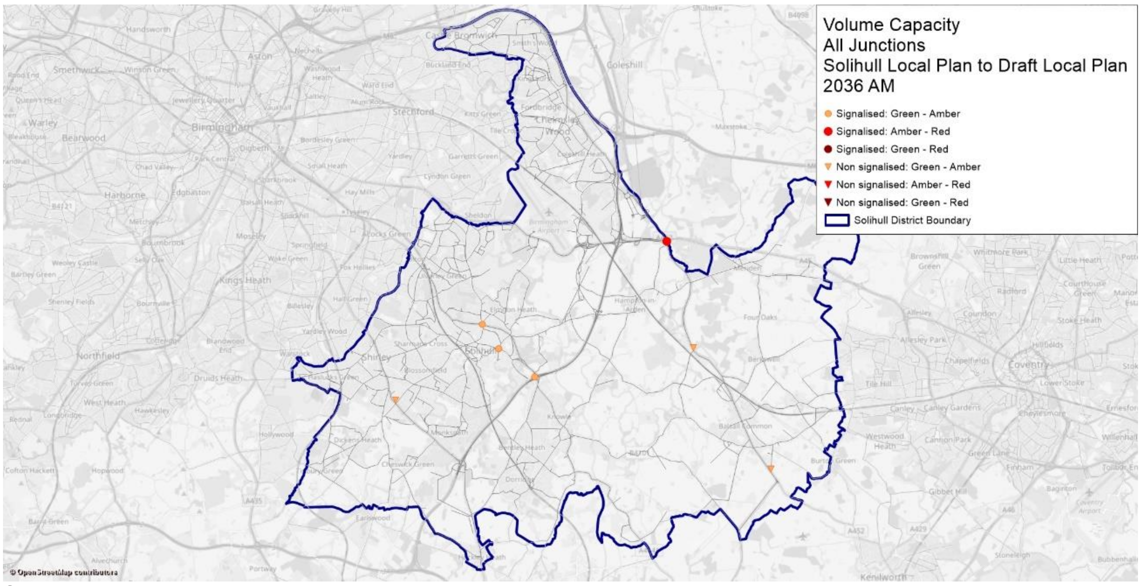
Source: Mott MacDonald

Figure C.51: V/C Comparison: SLP and DLP 2026 PM



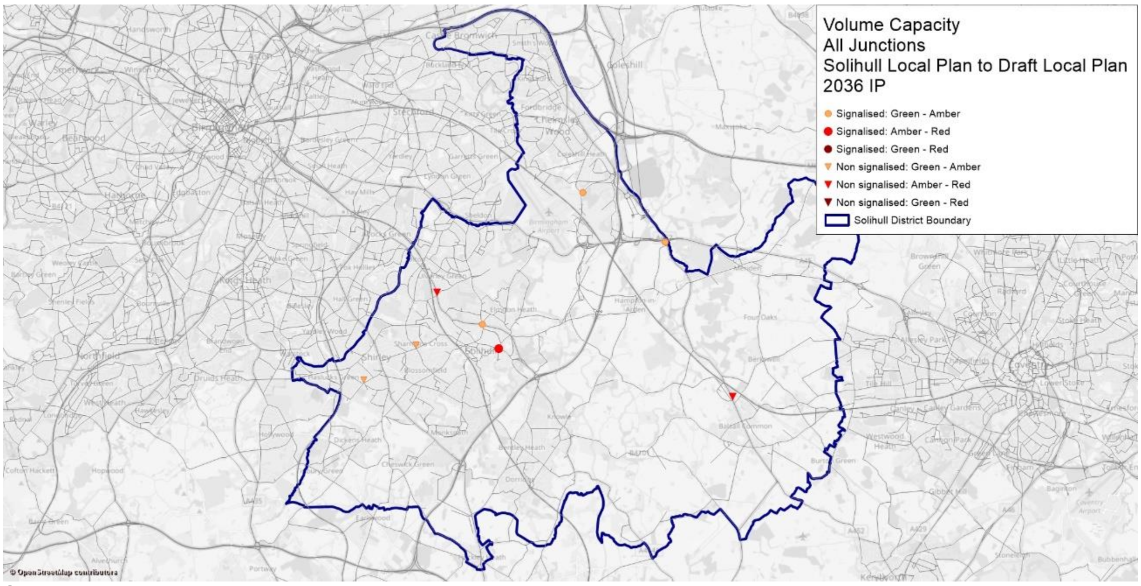
Source: Mott MacDonald

Figure C.52: V/C Comparison: SLP and DLP 2036 AM



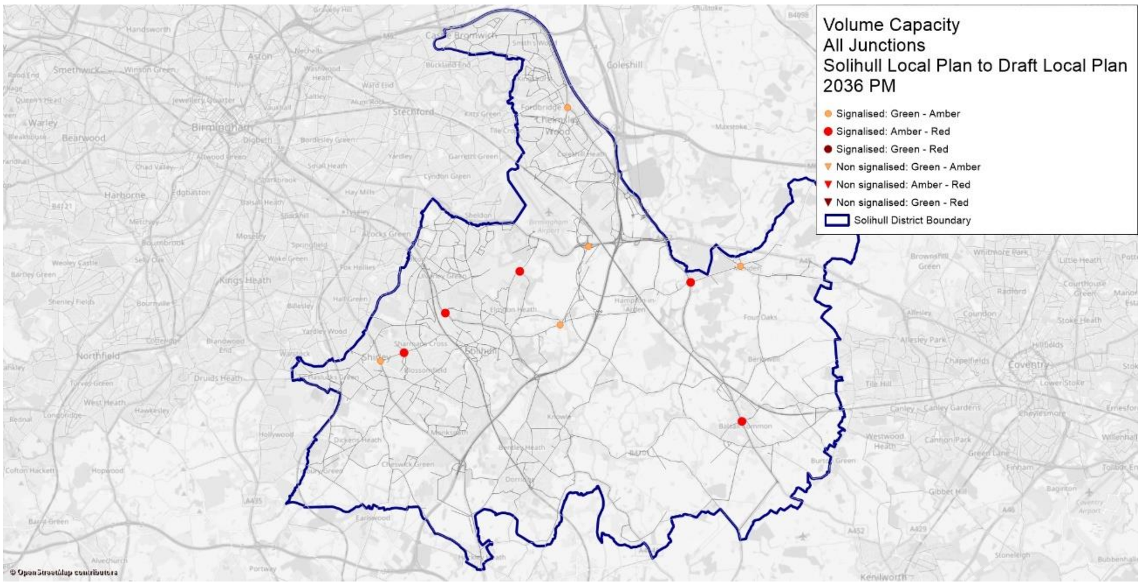
Source: Mott MacDonald

Figure C.53: V/C Comparison: SLP and DLP 2036 IP



Source: Mott MacDonald

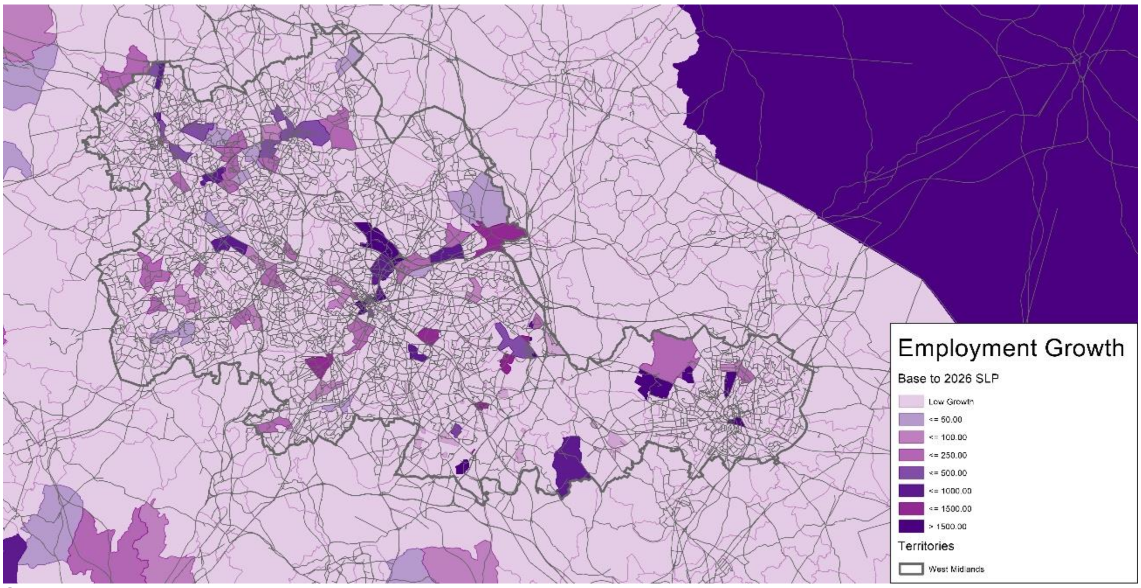
Figure C.54: V/C Comparison: SLP and DLP 2036 PM



Source: Mott MacDonald

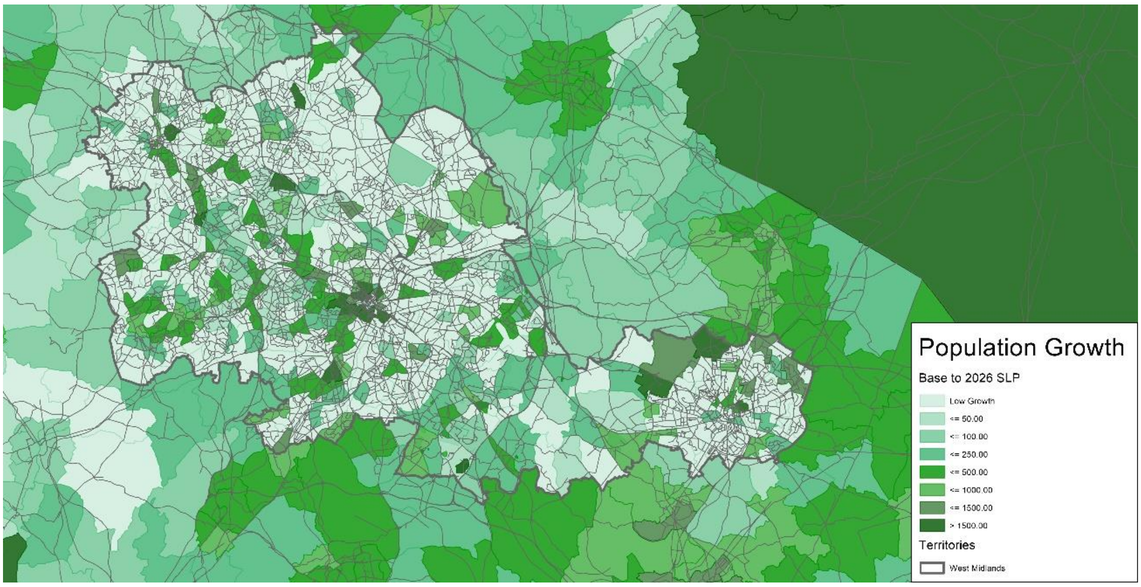
D. Planning Data Growth Plots

Figure D.55: Employment Growth: 2016 Base to 2026 SLP



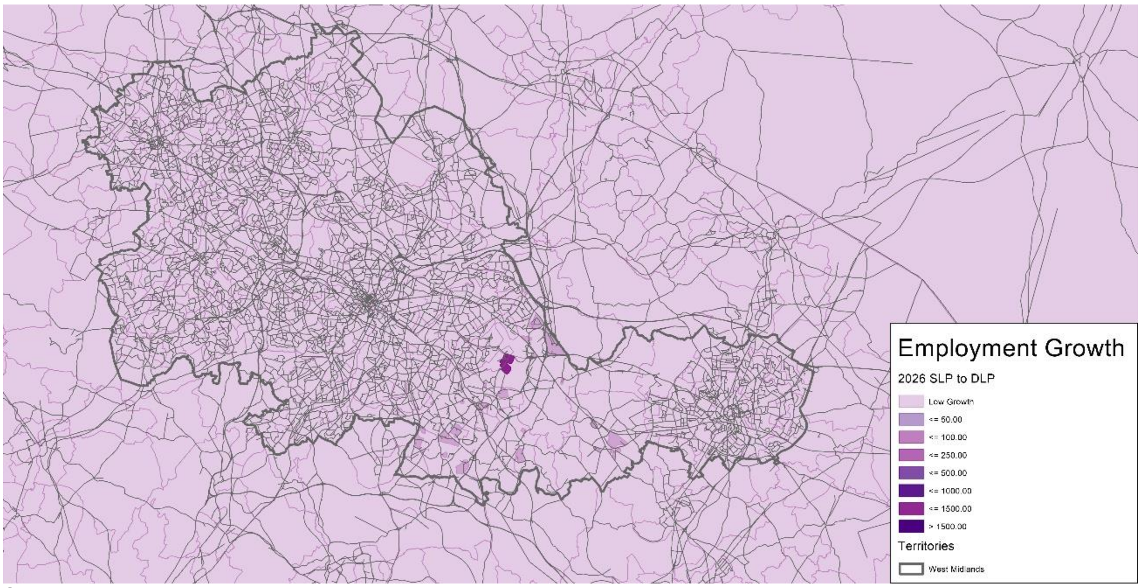
Source: Mott MacDonald

Figure D.56: Population Growth: 2016 Base to 2026 SLP



Source: Mott MacDonald

Figure D.57: Employment Growth: 2026 SLP to 2026 DLP

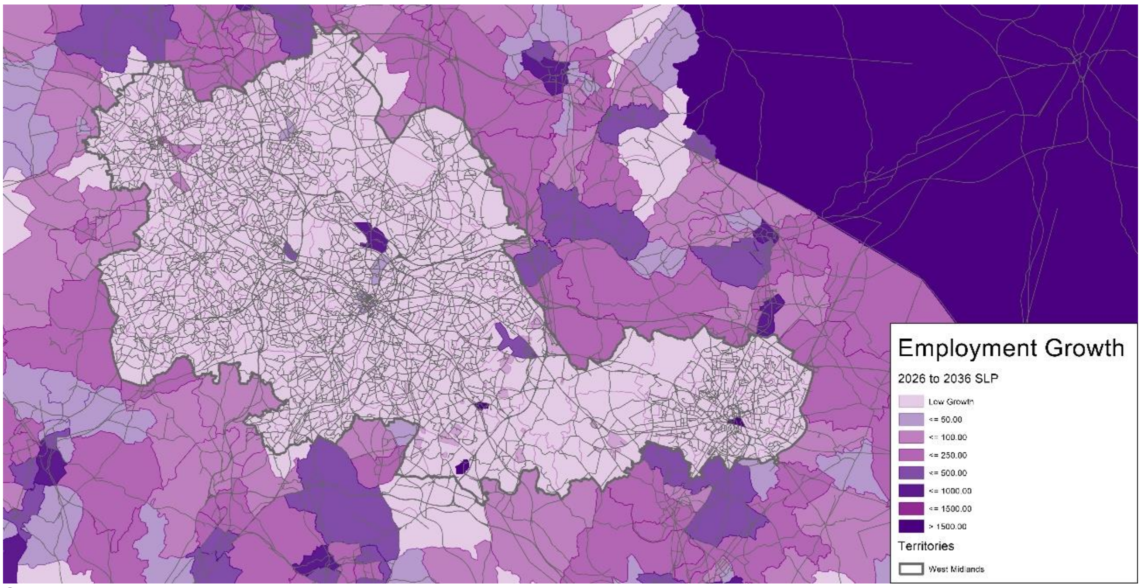


Source: Mott MacDonald

Figure D.58: Population Growth: 2026 SLP to 2026 DLP

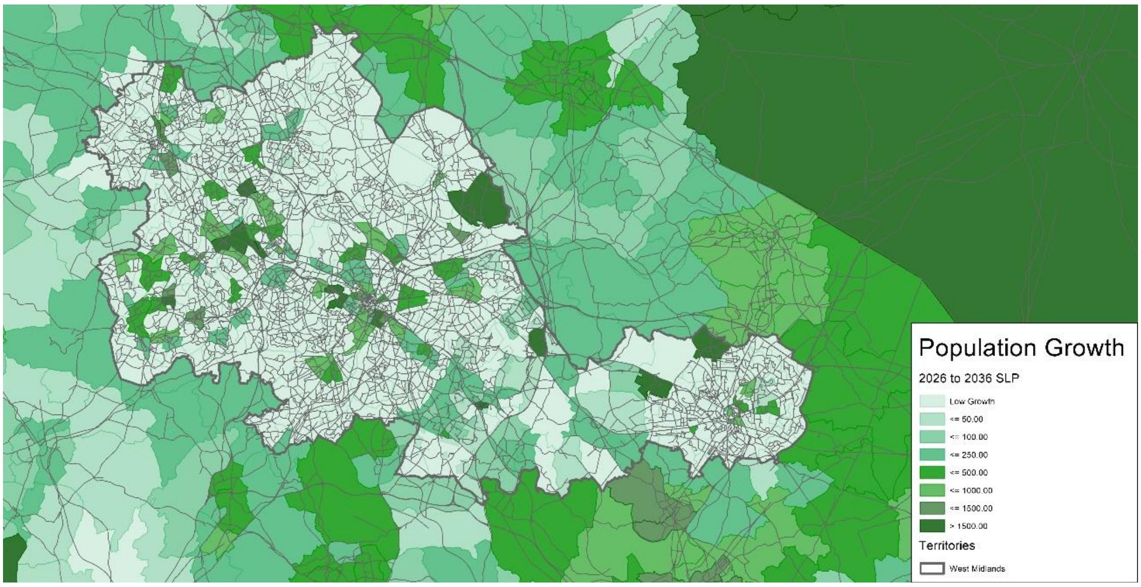
Source: Mott MacDonald

Figure D.59: Employment Growth: 2026 SLP to 2036 SLP



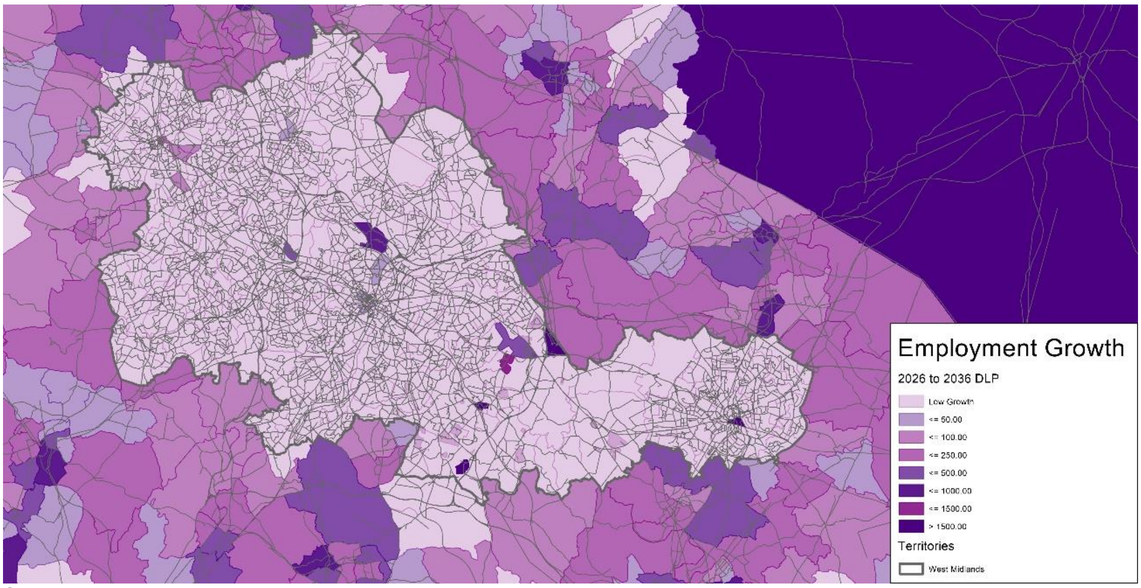
Source: Mott MacDonald

Figure D.60: Population Growth: 2026 SLP to 2036 SLP



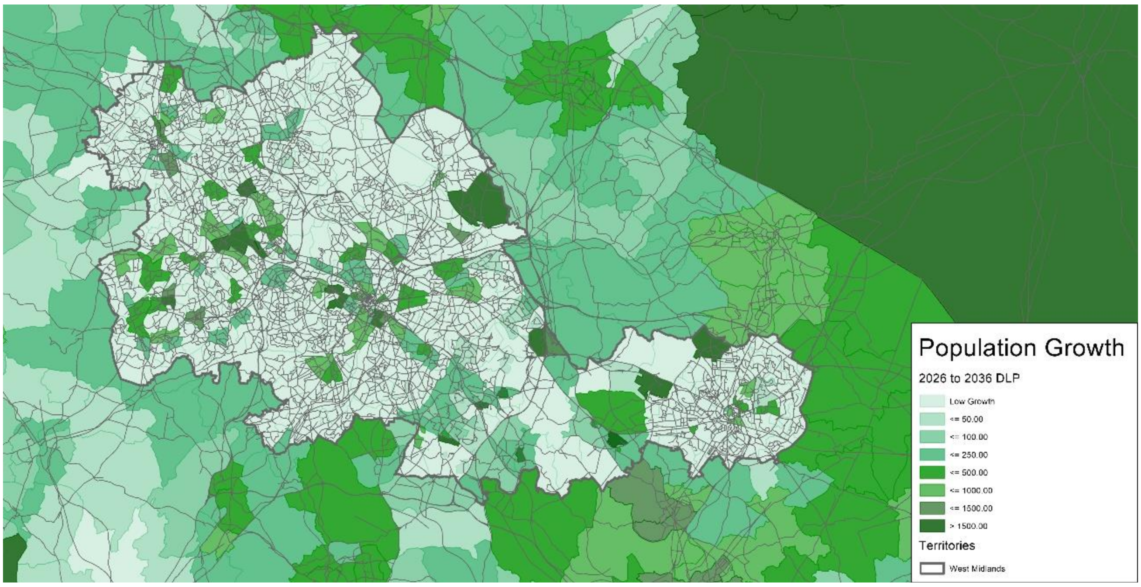
Source: Mott MacDonald

Figure D.61: Employment Growth: 2026 DLP to 2036 DLP



Source: Mott MacDonald

Figure D.62: Population Growth: 2026 DLP to 2036 DLP

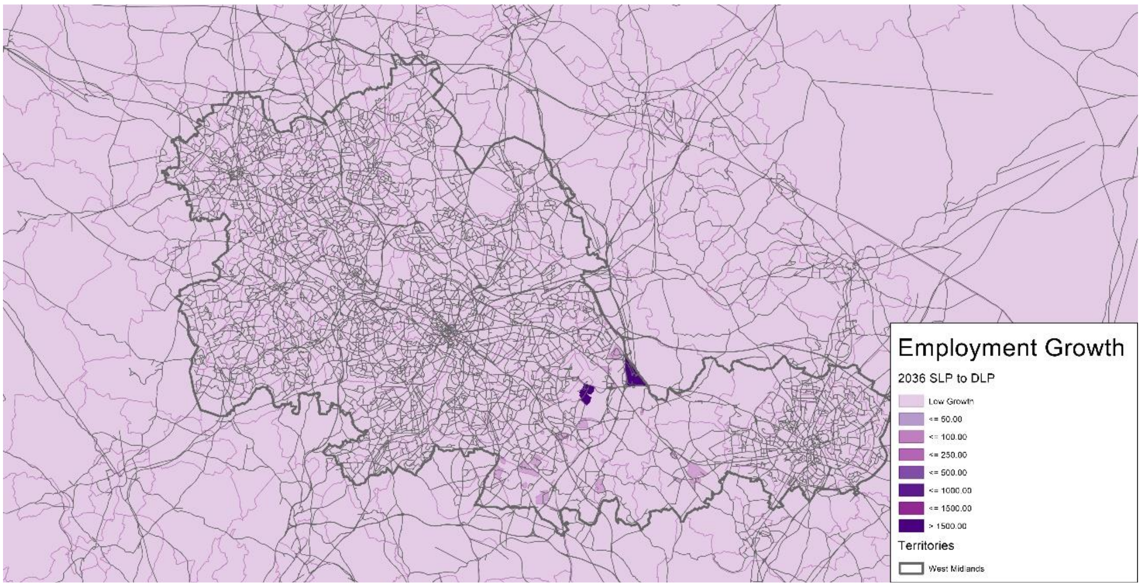


Source: Mott MacDonald

Figure D.63: Employment Growth: 2036 SLP to 2036 DLP

Source: Mott MacDonald

Figure D.64: Population Growth: 2036 SLP to 2036 DLP



Source: Mott MacDonald

E. PT Comparison Plots

Figure E.65: Bus Patronage: 2026 SLP and DLP AM

Source: Mott MacDonald

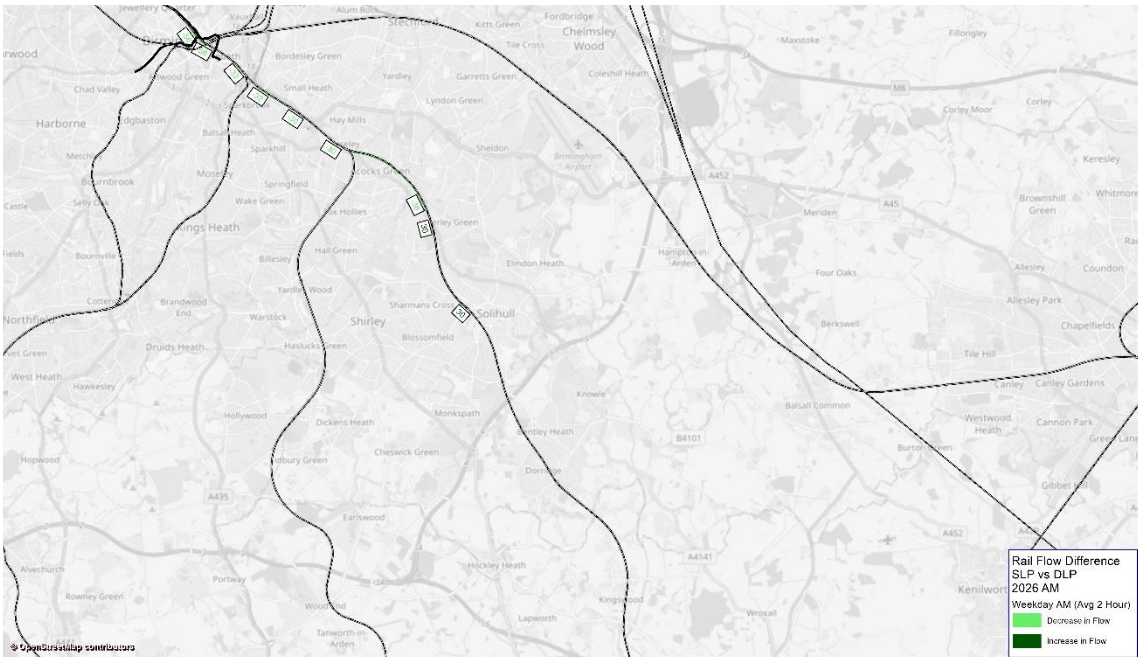
Figure E.66: Bus Patronage: 2026 SLP and DLP IP

Source: Mott MacDonald

Figure E.67: Bus Patronage: 2026 SLP and DLP PM

Source: Mott MacDonald

Figure E.68: Rail Patronage: 2026 SLP and DLP AM



Source: Mott MacDonald

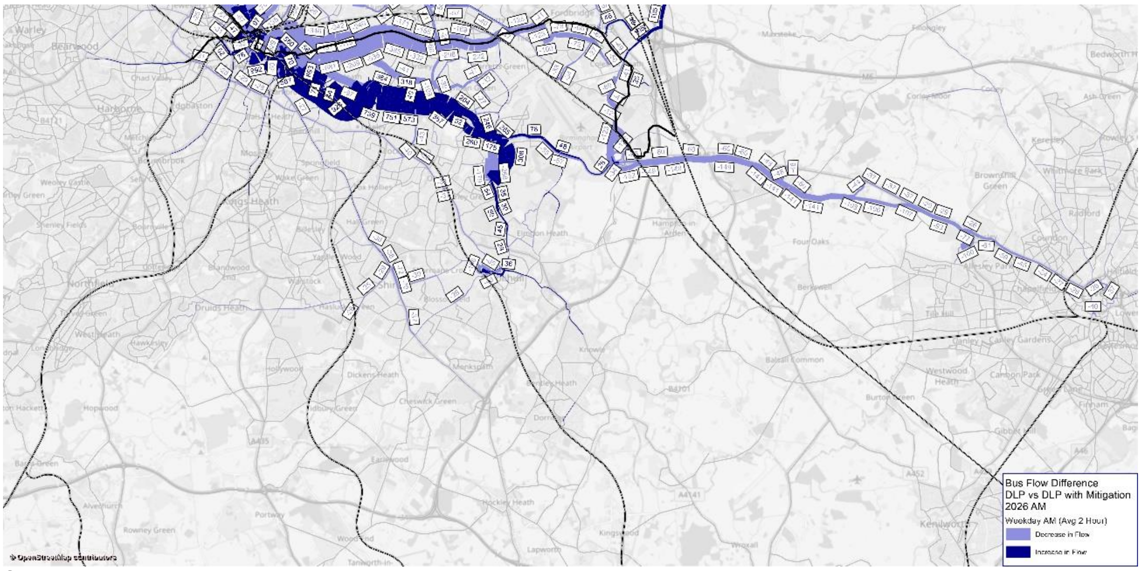
Figure E.69: Rail Patronage: 2026 SLP and DLP IP

Source: Mott MacDonald

Figure E.70: Rail Patronage: 2026 SLP and DLP PM

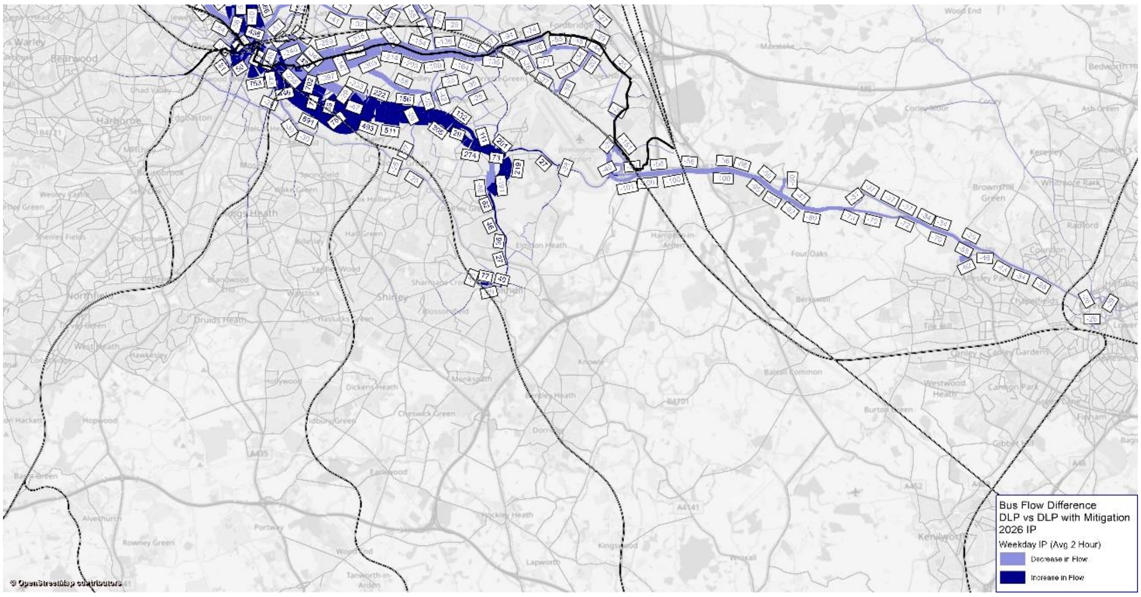
Source: Mott MacDonald

Figure E.71: Bus Patronage: 2026 DLP and DLP with Mitigation AM



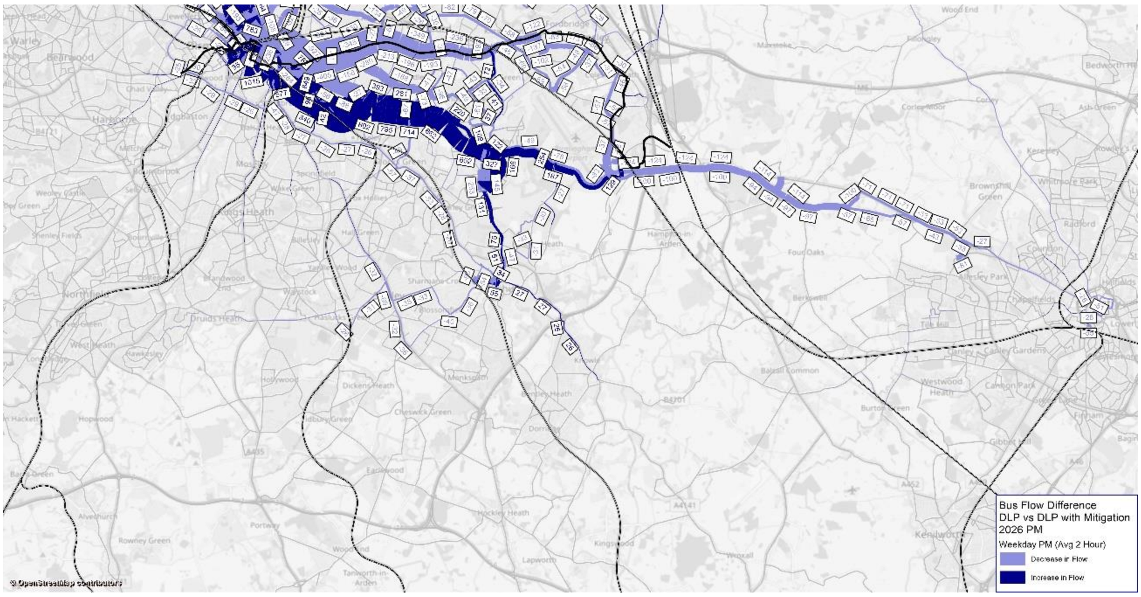
Source: Mott MacDonald

Figure E.72: Bus Patronage: 2026 DLP and DLP with Mitigation IP



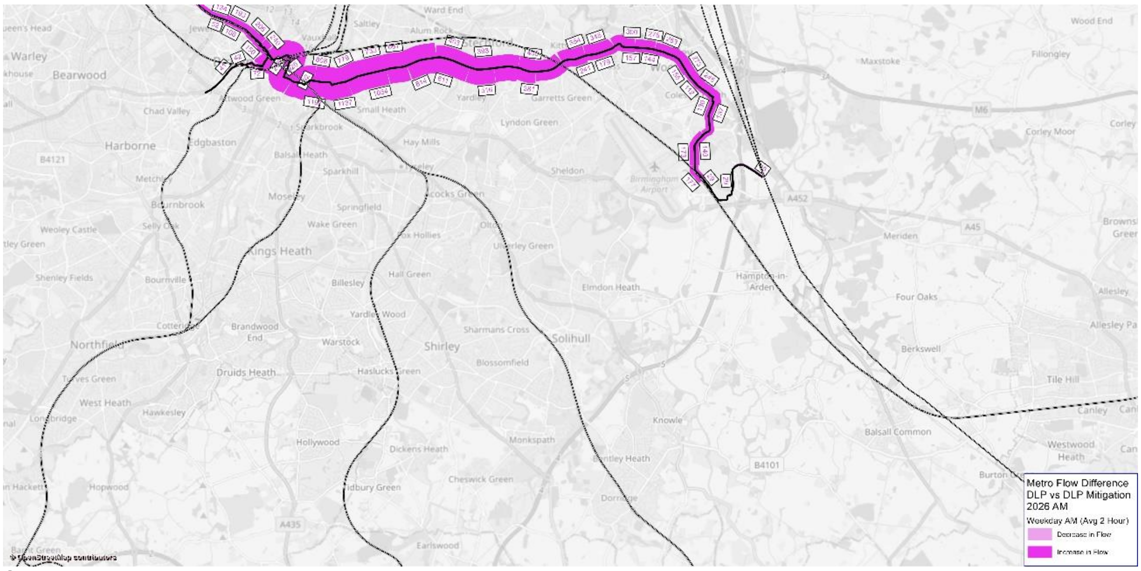
Source: Mott MacDonald

Figure E.73: Bus Patronage: 2026 DLP and DLP with Mitigation PM



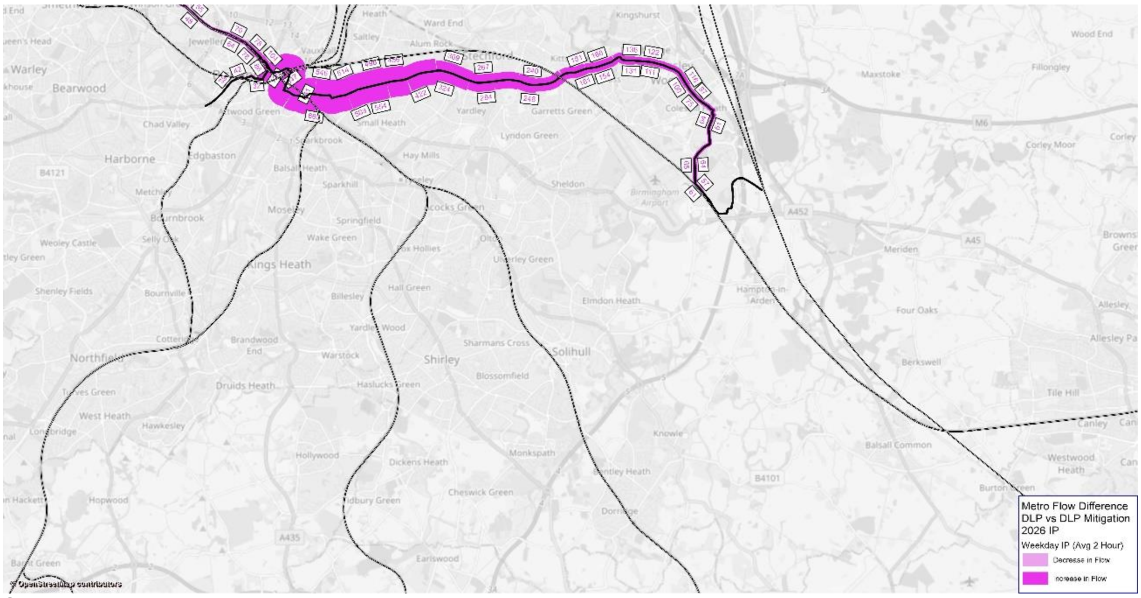
Source: Mott MacDonald

Figure E.74: Metro Patronage: 2026 DLP and DLP with Mitigation AM



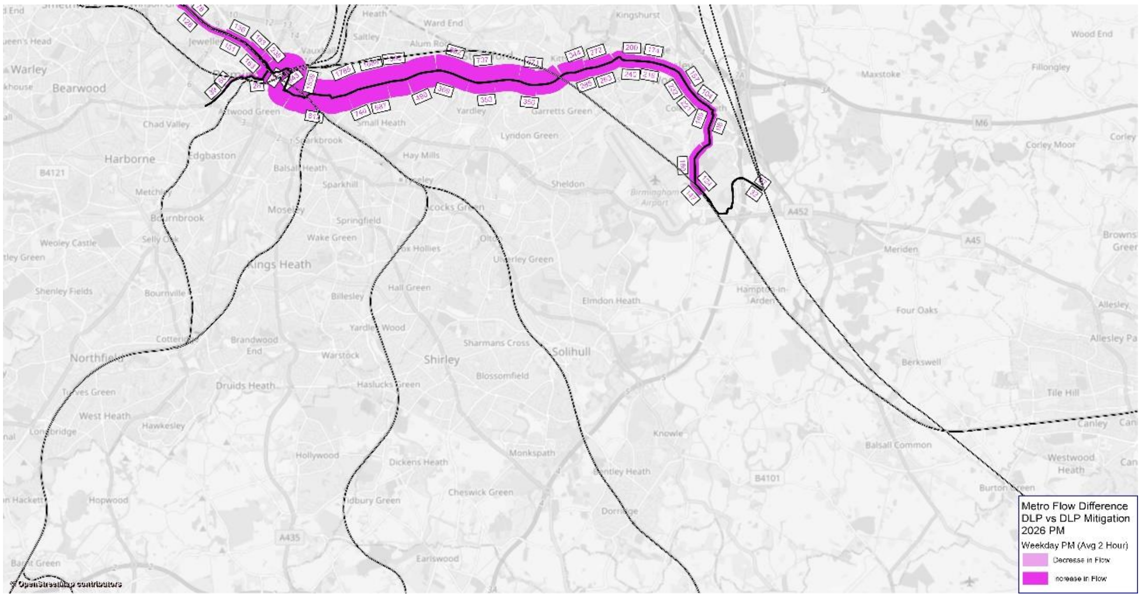
Source: Mott MacDonald

Figure E.75: Metro Patronage: 2026 DLP and DLP with Mitigation IP



Source: Mott MacDonald

Figure E.76: Metro Patronage: 2026 DLP and DLP with Mitigation PM



Source: Mott MacDonald

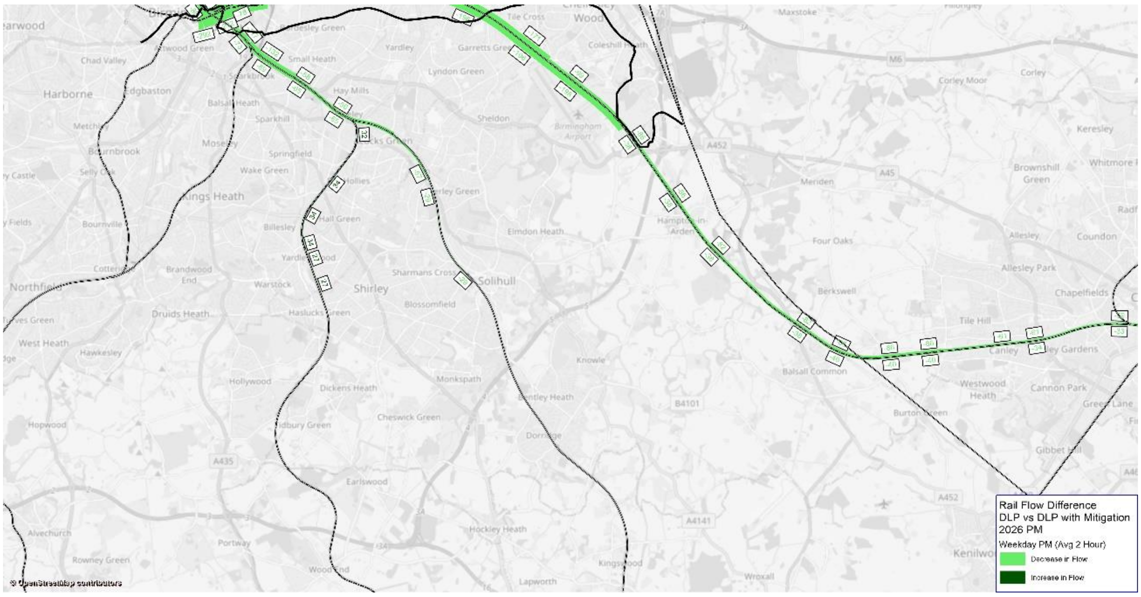
Figure E.77: Rail Patronage:2026 DLP and DLP with Mitigation AM

Source: Mott MacDonald

Figure E.78: Rail Patronage:2026 DLP and DLP with Mitigation IP

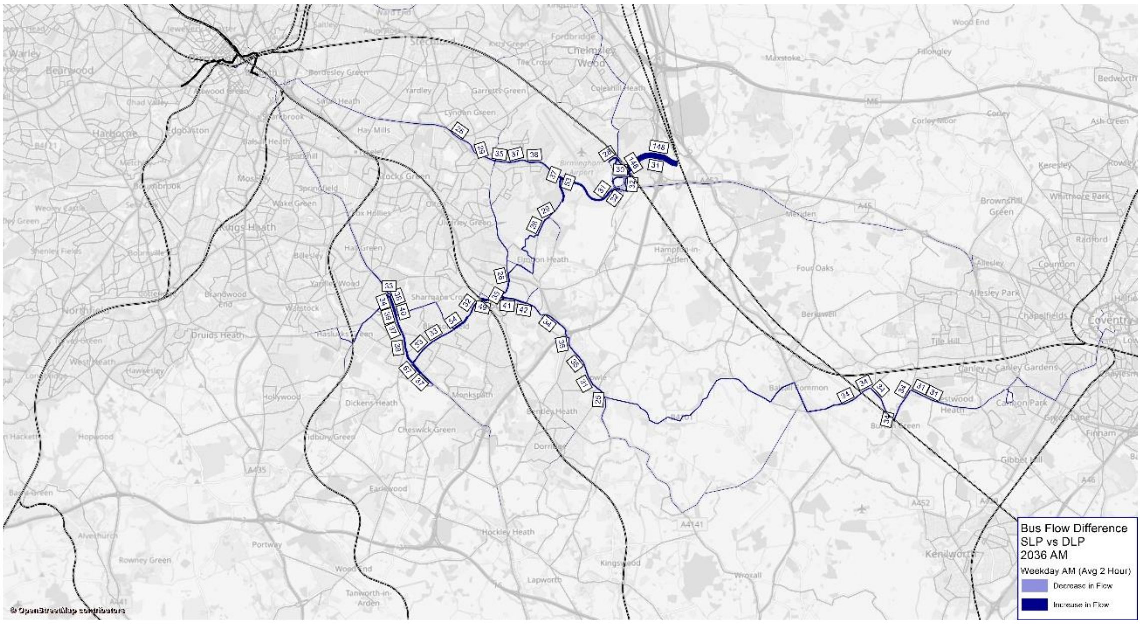
Source: Mott MacDonald

Figure E.79: Rail Patronage:2026 DLP and DLP with Mitigation PM



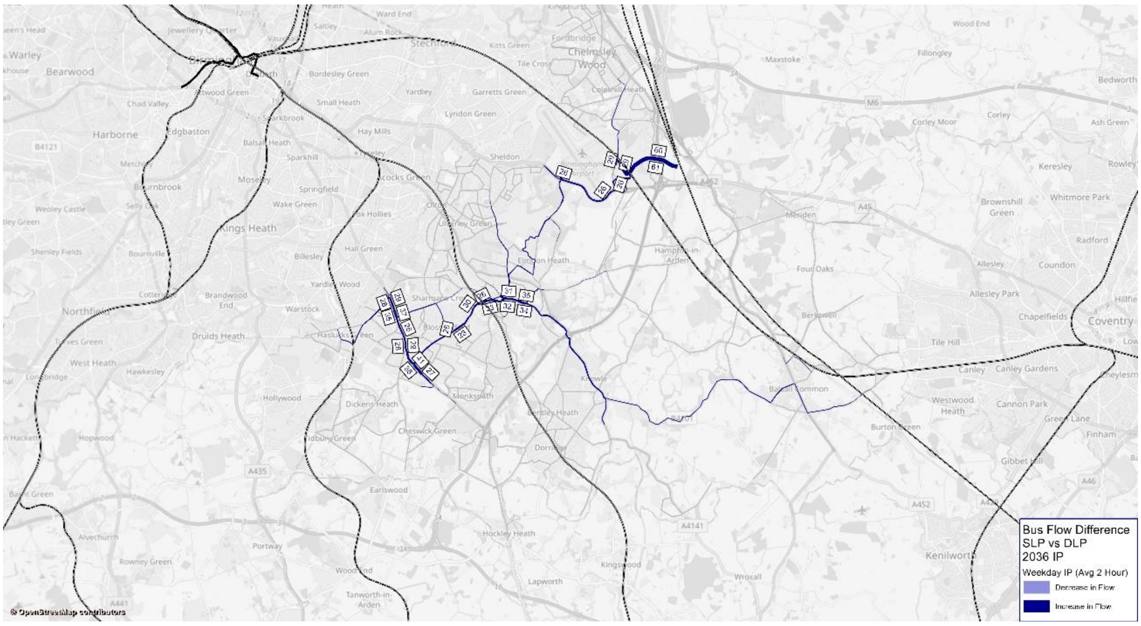
Source: Mott MacDonald

Figure E.80: Bus Patronage: 2036 SLP and DLP AM



Source: Mott MacDonald

Figure E.81: Bus Patronage: 2036 SLP and DLP IP



Source: Mott MacDonald

Figure E.82: Bus Patronage: 2036 SLP and DLP PM

Source: Mott MacDonald

Figure E.83: Rail Patronage: 2036 SLP and DLP AM

Source: Mott MacDonald

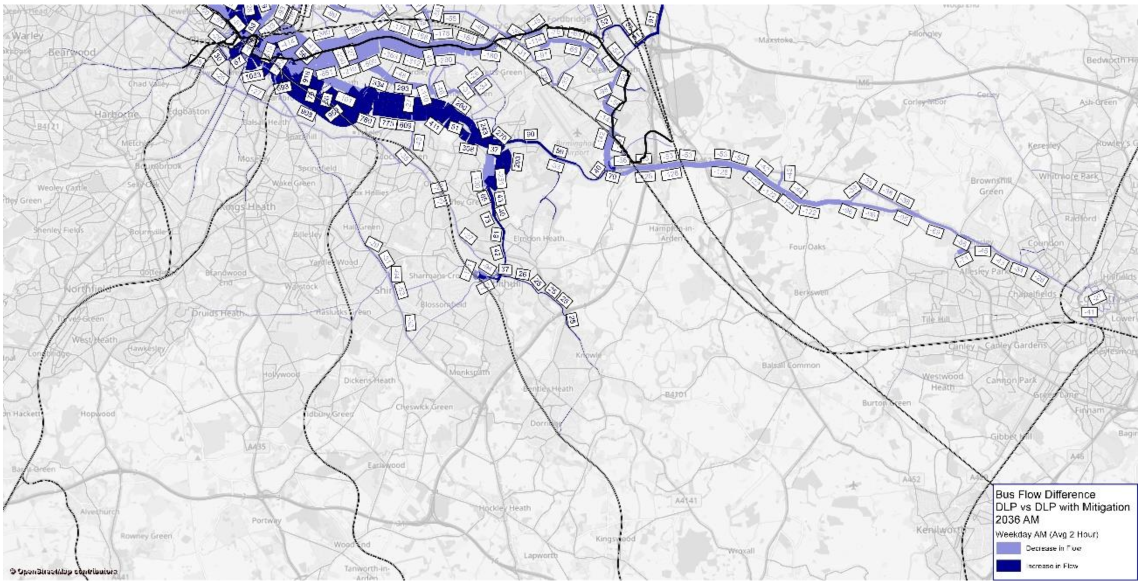
Figure E.84: Rail Patronage: 2036 SLP and DLP IP

Source: Mott MacDonald

Figure E.85: Rail Patronage: 2036 SLP and DLP PM

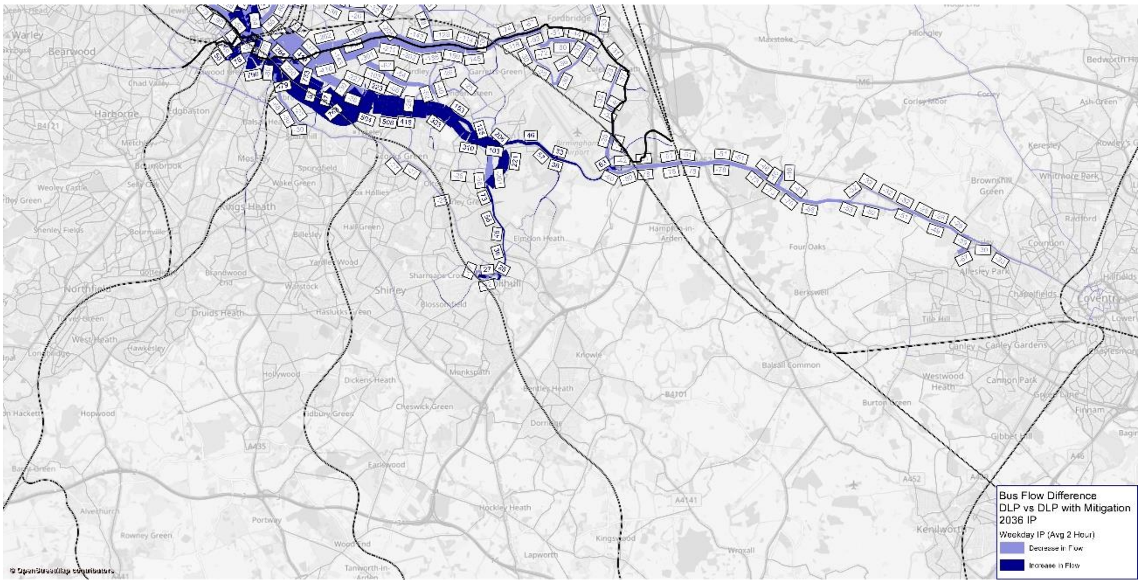
Source: Mott MacDonald

Figure E.86: Bus Patronage: 2036 DLP and DLP with Mitigation AM



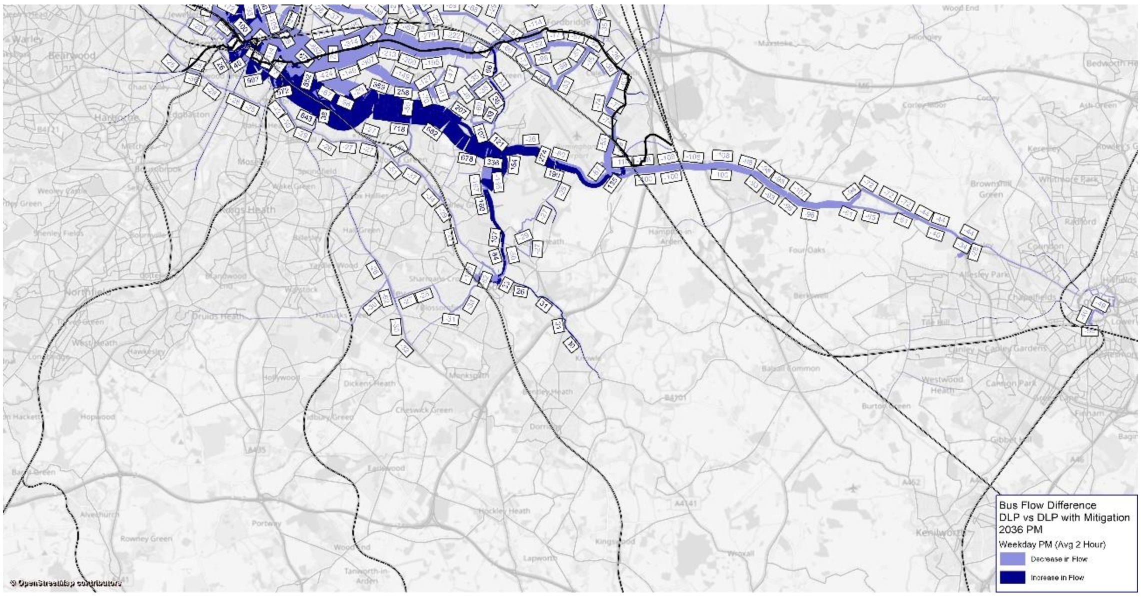
Source: Mott MacDonald

Figure E.87: Bus Patronage: 2036 DLP and DLP with Mitigation IP



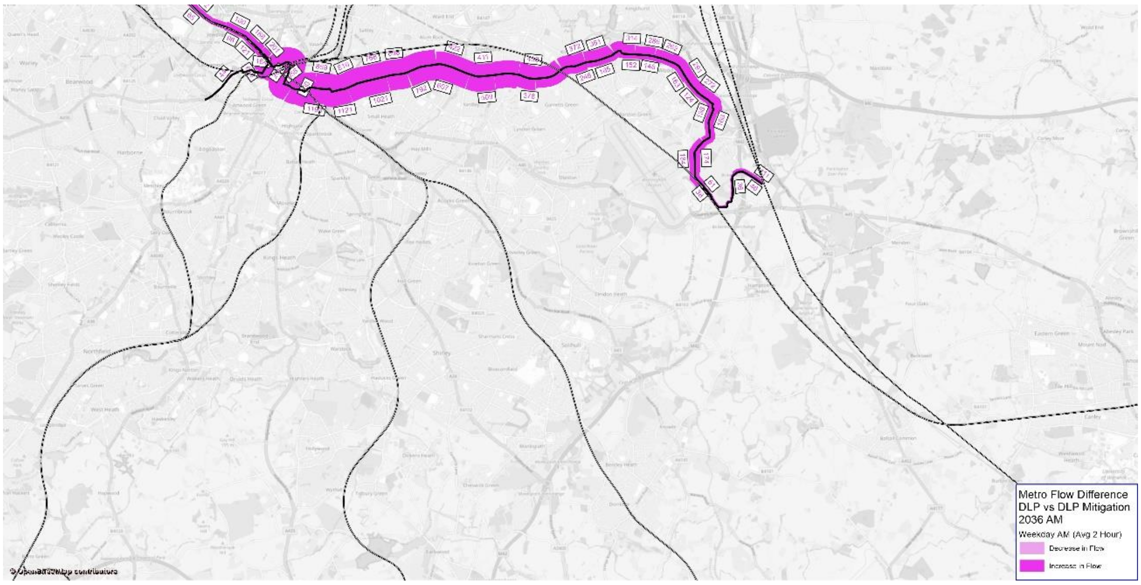
Source: Mott MacDonald

Figure E.88: Bus Patronage: 2036 DLP and DLP with Mitigation PM



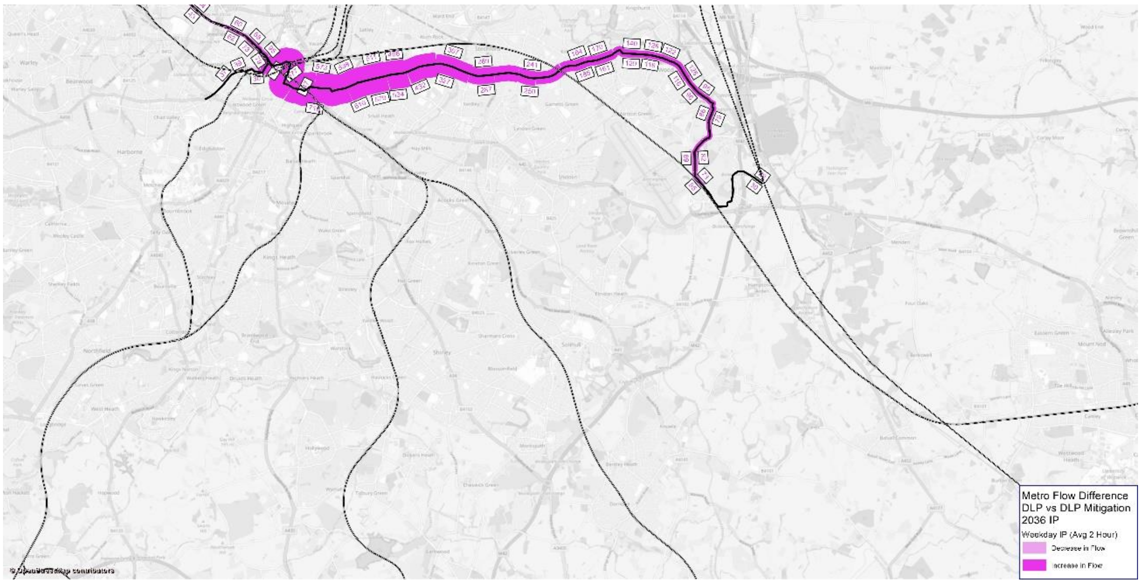
Source: Mott MacDonald

Figure E.89: Metro Patronage: 2036 DLP and DLP with Mitigation AM



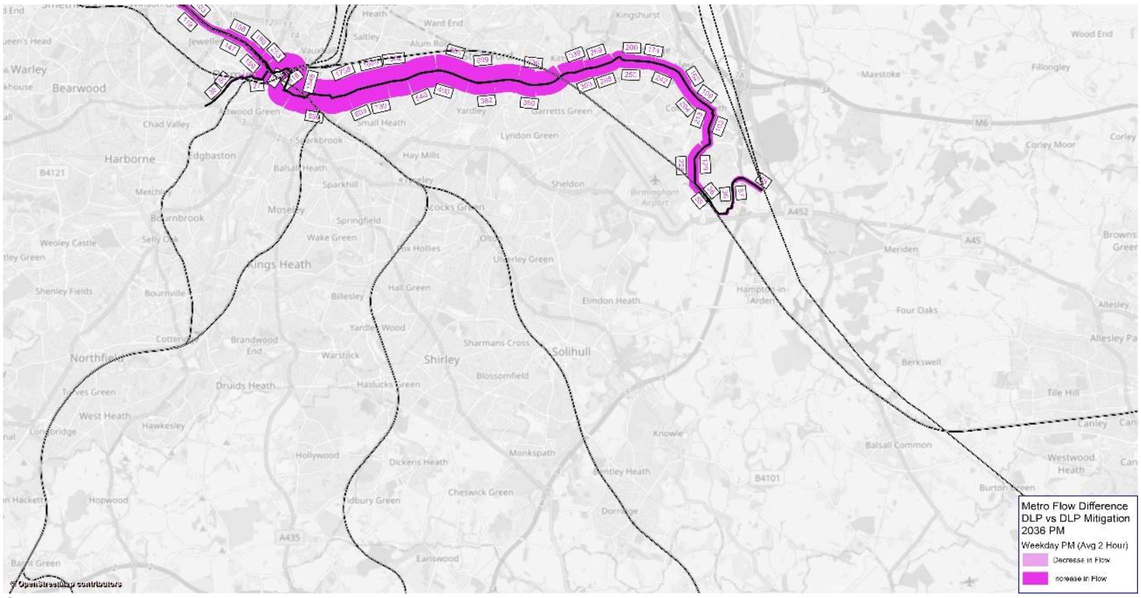
Source: Mott MacDonald

Figure E.90: Metro Patronage: 2036 DLP and DLP with Mitigation IP



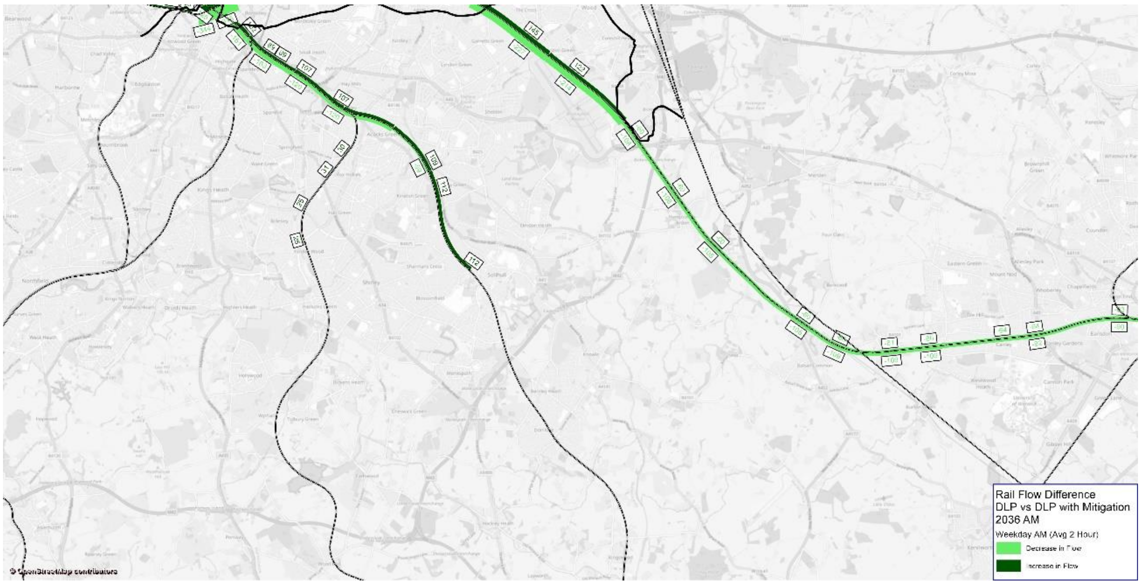
Source: Mott MacDonald

Figure E.91: Metro Patronage: 2036 DLP and DLP with Mitigation PM



Source: Mott MacDonald

Figure E.92: Rail Patronage: 2036 DLP and DLP with Mitigation AM

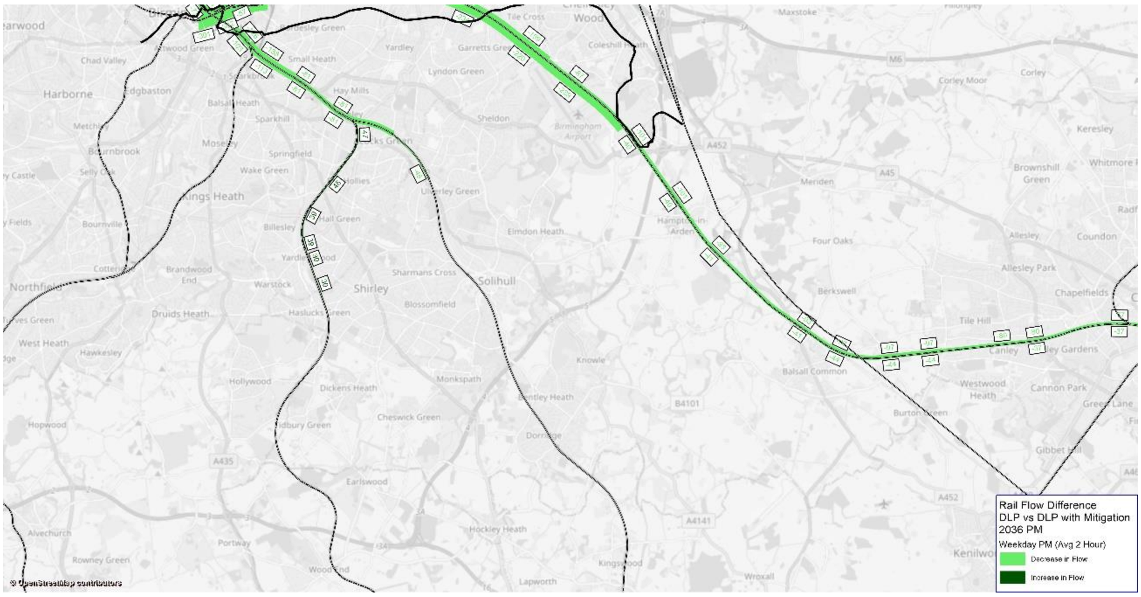


Source: Mott MacDonald

Figure E.93: Rail Patronage: 2036 DLP and DLP with Mitigation IP

Source: Mott MacDonald

Figure E.94: Rail Patronage: 2036 DLP and DLP with Mitigation PM



Source: Mott MacDonald

F. PT Boarding and Alighting Tables

Table 5.6: Boarding and Alighting figures for Solihull Rail Stations (2026)

Rail Station	2026 AM			2026 IP			2026 PM		
	SLP	DLP	DLP M	SLP	DLP	DLP M	SLP	DLP	DLP M
Whitlocks End	645	649	653	116	117	117	706	705	713
Shirley	715	726	730	293	299	301	670	684	695
Olton	734	668	627	212	225	224	658	671	600
Solihull	1,924	1,951	2,006	940	946	949	1,808	1,842	1,793
Widney Manor	412	415	423	117	117	117	288	288	293
Marston Green	856	855	710	315	317	238	628	626	467
Dorridge	1,089	1,088	1,102	506	500	504	1,262	1,251	1,278
Birmingham International	2,968	2,979	3,208	1,600	1,606	1,690	3,052	3,058	3,116
Hampton-in-Arden	154	157	150	94	96	95	135	138	131
Berkswell	423	414	415	226	213	205	307	297	298
Whitlocks End	715	649	653	116	117	117	706	705	713

Source: Mott MacDonald

Table 5.7: Boarding and Alighting figures for Solihull Rail Stations (2036)

Rail Station	2026 AM			2026 IP			2026 PM		
	SLP	DLP	DLP M	SLP	DLP	DLP M	SLP	DLP	DLP M
Whitlocks End	676	698	704	142	156	157	718	745	755
Shirley	749	761	769	279	289	290	702	726	739
Olton	794	788	745	256	257	230	714	712	653
Solihull	2,332	2,370	2,431	1,100	1,127	1,117	2,104	2,144	2,104
Widney Manor	404	408	417	126	129	128	295	299	306
Marston Green	868	878	731	330	334	234	653	664	494
Dorridge	1,139	1,156	1,175	526	539	546	1,326	1,348	1,378
Birmingham International	3,634	3,755	3,881	1,986	2,055	2,124	3,581	3,698	3,666
Hampton-in-Arden	164	174	169	100	106	106	155	167	154
Berkswell	436	495	498	219	283	281	325	395	400
Whitlocks End	676	698	704	142	156	157	718	745	755

Source: Mott MacDonald

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