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Whilst the modelling work outlined in this report has been carried out using the Leicester and Leicestershire Integrated Transport Model (LLITM), its findings and any conclusions do not necessarily represent the views of Leicestershire County Council as the Highway Authority.

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Contents

1. Introduction 9
1.1. Background 9
1.2. Report Assumptions 9
2. Mitigation Packages 12
2.1. Modelling Assumptions 12
2.2. Low and High Growth Packages 12
2.3. Costing 15
2.4. Recap of Option Testing Demand 15
2.5. Presentation of Modelling Output 16
3. Results Overview 18
3.2. Summary Statistics Comparison 18
3.3. Key Area 1 - Loughborough 25
3.4. Key Area 2 - Shepshed 42
3.5. Key Area 3 - Cotes & East Loughborough 44
3.6. Key Area 4 – "Leicester Urban Area" and City (North) 51
3.7. Key Area 5 – M1 Junctions within AoI 63
4. Results: Option 1 – Urban Concentration A (Low Growth) 66
4.1. Development Assumptions 66
4.2. Modelling Outputs 66
5. Results: Option 2 – Urban Concentration B (Low Growth) 75
5.1. Development Assumptions 75
5.2. Modelling Outputs 75
6. Results: Option 3 – Dispersed Settlement Hierarchy Distribution (Low Growth) 84
6.1. Development Assumptions 84
6.2. Modelling Outputs 84
7. Results: Option 4 – Urban Concentration and New Settlement (Low Growth) 93
7.1. Development Assumptions 93
7.2. Modelling Outputs 93
8. Results: Option 5 – Urban Concentration (High Growth) 102
8.1. Development Assumptions 102
8.2. Modelling Outputs 102
9. Results: Option 6 – Dispersed Settlement Hierarchy Distribution (High Growth) 112
9.1. Development Assumptions 112
9.2. Modelling Outputs 112
10. Results: Option 7 – Urban Concentration and New Settlement (High Growth) 122
10.1. Development Assumptions 122
10.2. Modelling Outputs 122
11. APPENDICES 132
11.1. APPENDIX A: Summary Statistic Overview 132
11.2. APPENDIX B: Flagged Junctions – Volume over Capacity Changes 133
11.3. APPENDIX C: Flagged Junctions – Heavily Congested Delays per PCU 135
11.4. APPENDIX D: Residential Development Included in LLITM 137
11.5. APPENDIX E: Employment Development Included in LLITM 144

11.6. APPENDIX F: Highway Infrastructure Included in LLITM 145
12. ADDENDUM (May 2019) 146
12.1. Background 146
12.2. Additional Run: ID 1(a) – Low Growth Mitigation Network with Core Demand 146
13. Contact Details 158

Table of Figures

Figure 1-1: Flagged Junctions from Amended Core to Options (Low Growth), Combined Peak 10
Figure 1-2: Flagged Junctions from Amended Core to Options (High Growth), Combined Peak 11
Figure 2-1: Map of Mitigated Junctions by Low and High Growth Options 14
Figure 3-1: Combined Peak Hour Over-Capacity Queues (PCU.hrs) 19
Figure 3-2: Combined Peak Hour Total Travel Time (PCU.hrs) 20
Figure 3-3: Combined Peak Hour Total Travel Distance (PCU.kms) 21
Figure 3-4: Combined Peak Hour Total Travel Distance on Heavily Congested Links (PCU.kms) 22
Figure 3-5: Combined Peak Hour Total PCU Delay per KM (secs/km) 23
Figure 3-6: Loughborough Journey Time Routes 26
Figure 3-7: Forest Road (Eastbound) Journey Time Comparison, 2036 Option 1, AM Peak 28
Figure 3-8: Forest Road (Westbound) Journey Time Comparison, 2036 Option 1, AM Peak 28
Figure 3-9: Epinal Way (Northbound) Journey Time Comparison, 2036 Option 5, PM Peak 30
Figure 3-10: Flow Difference (Mitigation – Option), Option 5 (PM Peak), Loughborough 31
Figure 3-11: Gateway Junctions, Loughborough 32
Figure 3-12: Loughborough Cordon – Outbound Links (Red) 34
Figure 3-13: Sectors used for Loughborough Outbound Trips Select Link Analysis 35
Figure 3-14: A6 & A6004 Junctions, Loughborough 37
Figure 3-15: Flow Difference Plot, Option 1 (AM Peak), Loughborough 39
Figure 3-16: Loughborough – Option 1 Junction Analysis, AM Peak 41
Figure 3-17: Loughborough – Option 3 Junction Analysis, AM Peak 41
Figure 3-18: A512 Junctions, Shepshed 42
Figure 3-19: Loughborough – Option 4 Junction Analysis, AM Peak 45
Figure 3-20: Cotes Journey Time Route Ends and Loughborough Town Centre Car Park Locations 47
Figure 3-21: Cotes Journey Time Comparison, 2036 Option 4, AM Peak 48
Figure 3-22: Cotes Select Link Analysis, Option 4 AM Peak (from Option Testing Report) 49
Figure 3-23: Syston Junctions 51
Figure 3-24: A46 and A563 Junctions 53
Figure 3-25: Flow Difference (Option minus Core), Option 1 (AM Peak), Leicester Urban Area & City (North) 55
Figure 3-26: Flow Difference (Mitigation minus Option), Option 1 (AM Peak), Leicester Urban Area & City (North) 55
Figure 3-27: Flow Difference (Mitigation minus Option), Option 5 (AM Peak), Leicester Urban Area & City (North) 57

Figure 3-28: City Journey Time Routes....59
Figure 3-29: ODDR (Anticlockwise) Journey Time Comparison, 2036 Option 5, PM Peak 62
Figure 4-1: Flow Difference Plot, Option 1 (AM Peak) 67
Figure 4-2: Flow Difference Plot, Option 1 (PM Peak) 68
Figure 4-3: Delay Difference Plot, Option 1 (AM Peak)....69
Figure 4-4: Delay Difference Plot, Option 1 (PM Peak)....70
Figure 4-5: Junction Analysis, Option 1 (AM Peak)....71
Figure 4-6: Junction Analysis, Option 1 (PM Peak)....72
Figure 5-1: Flow Difference Plot, Option 2 (AM Peak) 76
Figure 5-2: Flow Difference Plot, Option 2 (PM Peak) 77
Figure 5-3: Delay Difference Plot, Option 2 (AM Peak)....78
Figure 5-4: Delay Difference Plot, Option 2 (PM Peak)....79
Figure 5-5: Junction Analysis, Option 2 (AM Peak)....80
Figure 5-6: Junction Analysis, Option 2 (PM Peak)....81
Figure 6-1: Flow Difference Plot, Option 3 (AM Peak) 85
Figure 6-2: Flow Difference Plot, Option 3 (PM Peak) 86
Figure 6-3: Delay Difference Plot, Option 3 (AM Peak)....87
Figure 6-4: Delay Difference Plot, Option 3 (PM Peak)....88
Figure 6-5: Junction Analysis, Option 3 (AM Peak)....89
Figure 6-6: Junction Analysis, Option 3 (PM Peak)....90
Figure 7-1: Flow Difference Plot, Option 4 (AM Peak) 94
Figure 7-2: Flow Difference Plot, Option 4 (PM Peak) 95
Figure 7-3: Delay Difference Plot, Option 4 (AM Peak)....96
Figure 7-4: Delay Difference Plot, Option 4 (PM Peak)....97
Figure 7-5: Junction Analysis, Option 4 (AM Peak)....98
Figure 7-6: Junction Analysis, Option 4 (PM Peak)....99
Figure 8-1: Flow Difference Plot, Option 5 (AM Peak) 103
Figure 8-2: Flow Difference Plot, Option 5 (PM Peak) 104
Figure 8-3: Delay Difference Plot, Option 5 (AM Peak)....105
Figure 8-4: Delay Difference Plot, Option 5 (PM Peak)....106
Figure 8-5: Junction Analysis, Option 5 (AM Peak)....107
Figure 8-6: Junction Analysis, Option 5 (PM Peak)....108
Figure 9-1: Flow Difference Plot, Option 6 (AM Peak) 113
Figure 9-2: Flow Difference Plot, Option 6 (PM Peak 114
Figure 9-3: Delay Difference Plot, Option 6 (AM Peak)....115
Figure 9-4: Delay Difference Plot, Option 6 (PM Peak)....116
Figure 9-5: Junction Analysis, Option 6 (AM Peak)....117
Figure 9-6: Junction Analysis, Option 6 (PM Peak)....118
Figure 10-1: Flow Difference Plot, Option 7 (AM Peak) 123
Figure 10-2: Flow Difference Plot, Option 7 (PM Peak) 124
Figure 10-3: Delay Difference Plot, Option 7 (AM Peak)....125
Figure 10-4: Delay Difference Plot, Option 7 (PM Peak)....126
Figure 10-5: Junction Analysis, Option 7 (AM Peak)....127
Figure 10-6: Junction Analysis, Option 7 (PM Peak)....128

Figure 12-1: Flow Difference Plot, HE1(a) minus Core (AM Peak) 147
Figure 12-2: Flow Difference Plot, HE1(a) minus Core (PM Peak) 148
Figure 12-3: Link Delay Difference Plot, HE1(a) minus Core (AM Peak) 149
Figure 12-4: Link Delay Difference Plot, HE1(a) minus Core (PM Peak) 150
Figure 12-5: Volume/Capacity Category Change, Core vs HE1(a) (AM Peak) 151
Figure 12-6: Volume/Capacity Category Change, Core vs HE1(a) (PM Peak) 152
Figure 12-7: Node Delay Difference Plot, HE1(a) minus Core (AM Peak) 153
Figure 12-8: Node Delay Difference Plot, HE1(a) minus Core (PM Peak) 154
Figure 12-9: Key Junction Volume/Capacity, Core vs HE1(a) (AM Peak) 155
Figure 12-10: Key Junction Volume/Capacity, Core vs HE1(a) (PM Peak) 156

Table of Tables

Table 2-1: Junctions Mitigated (Low and High Growth) 13
Table 2-2: Development Options (supplied by Charnwood BC) 16
Table 3-1: Area of Influence Average Speed (Kph, Combined AM and PM Peak) 22
Table 3-2: Loughborough Journey Times – Differences to Core, AM Peak 26
Table 3-3: Loughborough Journey Times – Mitigation minus Option, AM Peak 26
Table 3-4: Loughborough Journey Times – Differences to Core, PM Peak 27
Table 3-5: Loughborough Journey Times – Mitigation minus Option, PM Peak 27
Table 3-6: Key Junctions on Outer Edge of Loughborough - VoCs and % Delay Changes against Core, AM Peak 33
Table 3-7: Difference in Flows (PCUs) on Links Approaching Gateway Junctions (Mitigation minus Option, AM Peak) 33
Table 3-8: Origin of Trips Crossing at Least One Link of Loughborough Outbound Cordon, Option 1 AM Peak 35
Table 3-9: Origin/Destination Matrix of Mitigation minus Option Trips Crossing at Least One Link of Loughborough Outbound Cordon, Option 1 AM Peak 36
Table 3-10: Key Junctions on A6004 (Loughborough) - VoCs and % Delay Changes against Core, AM Peak 38
Table 3-11: Key Junctions on A6 (Loughborough) - VoCs and % Delay Changes against Core, AM Peak 38
Table 3-12: Key Junctions on A512 (Shepshed) - VoCs and % Delay Changes against Core, AM Peak 42
Table 3-13: Cotes Journey Time Comparison, 2036 Option 4, AM Peak 48
Table 3-14: Rempstone Crossroads - VoCs and % Delay Changes against Core, AM Peak 50
Table 3-15: Key Junctions in Syston - VoCs and % Delay Changes against Core, AM Peak 52
Table 3-16: Key Junctions on A46 & ODDR - VoCs and Delay per PCU Changes against Core, AM Peak 54
Table 3-17: Change in Trips between Option and Mitigation Scenarios Crossing at Least One Link on A46 between Hobby Horse and A50, Option 5 AM Peak 57
Table 3-18: City Journey Times – Differences, AM Peak 60
Table 3-19: City Journey Times – Differences, PM Peak 60
Table 3-20: 'Average Flow' along City Journey Time Routes - Differences, AM Peak 60
Table 3-21: 'Average Flow' along City Journey Time Routes - Differences, PM Peak 60
Table 3-22: M1 Junction 21a Volume/Capacity (%), AM Peak 63
Table 3-23: M1 Junction 21a Volume/Capacity (%), PM Peak 63
Table 3-24: M1 Junction 22 Volume/Capacity (%), AM Peak 63
Table 3-25: M1 Junction 22 Volume/Capacity (%), PM Peak 63
Table 3-26: M1 Junction 23 Volume/Capacity (%), AM Peak 64
Table 3-27: M1 Junction 23 Volume/Capacity (%), PM Peak 64
Table 3-28: M1 Junction 23a Volume/Capacity (%), AM Peak 64
Table 3-29: M1 Junction 23a Volume/Capacity (%), PM Peak 64
Table 3-30: M1 Junction 24 Volume/Capacity (%), AM Peak 64
Table 3-31: M1 Junction 24 Volume/Capacity (%), PM Peak 64
Table 4-1: Option 1 Development Assumptions (provided by Charnwood Borough Council) 66

Table 4-2: Junction Analysis – Volume over Capacity (%) Category Changes, Option 1 73
Table 4-3: Junction Analysis –Nodes Heavily Congested in All (Core, Option and Mitigation) Scenarios with 'Significant' Delay Changes (seconds per PCU), Option 1 74
Table 5-1: Option 2 Development Assumptions (provided by Charnwood Borough Council) 75
Table 5-2: Junction Analysis – Volume over Capacity (%) Category Changes, Option 2 82
Table 5-3: Junction Analysis –Nodes Heavily Congested in All (Core, Option and Mitigation) Scenarios with 'Significant' Delay Changes (seconds per PCU), Option 2 83
Table 6-1: Option 3 Development Assumptions (provided by Charnwood Borough Council) 84
Table 6-2: Junction Analysis – Volume over Capacity (%) Category Changes, Option 3 91
Table 6-3: Junction Analysis –Nodes Heavily Congested in All (Core, Option and Mitigation) Scenarios with 'Significant' Delay Changes (seconds per PCU), Option 3 92
Table 7-1: Option 4 Development Assumptions (provided by Charnwood Borough Council) 93
Table 7-2: Junction Analysis – Volume over Capacity (%) Category Changes, Option 4 100
Table 7-3: Junction Analysis –Nodes Heavily Congested in All (Core, Option and Mitigation) Scenarios with 'Significant' Delay Changes (seconds per PCU), Option 4 101
Table 8-1: Option 5 Development Assumptions (provided by Charnwood Borough Council) .. 102
Table 8-2: Junction Analysis – Volume over Capacity (%) Category Changes, Option 5 110
Table 8-3: Junction Analysis –Nodes Heavily Congested in All (Core, Option and Mitigation) Scenarios with 'Significant' Delay Changes (seconds per PCU), Option 5 111
Table 9-1: Option 6 Development Assumptions (provided by Charnwood Borough Council) .. 112
Table 9-2: Junction Analysis – Volume over Capacity (%) Category Changes, Option 6 120
Table 9-3: Junction Analysis –Nodes Heavily Congested in All (Core, Option and Mitigation) Scenarios with 'Significant' Delay Changes (seconds per PCU), Option 6 121
Table 10-1: Option 7 Development Assumptions (provided by Charnwood Borough Council) 122
Table 10-2: Junction Analysis – Volume over Capacity (%) Category Changes, Option 7 130
Table 10-3: Junction Analysis –Nodes Heavily Congested in All (Core, Option and Mitigation) Scenarios with 'Significant' Delay Changes (seconds per PCU), Option 7 131
Table 11-1: Area of Influence Summary Statistics for Core, Option and Mitigation Scenarios showing Change in Over-Capacity Queues (PCU.hours), Total Travel Time (PCU.hours), and Total Travel Distance (PCU.kms)..... 132
Table 11-2: Volume/Capacity Change Junctions, VoC (%), AM Peak 133
Table 11-3: Volume/Capacity Change Junctions, VoC (%), PM Peak 134
Table 11-4: Heavily Congested Junctions, Delay per PCU (seconds), AM Peak..... 135
Table 11-5: Heavily Congested Junctions, Delay per PCU (seconds), PM Peak..... 136
Table 12-1: Details of Additional Model Runs 146
Table 12-2: Core and HE1(a) Volume/Capacity Values for Key Junctions 157
Table 12-3: Core vs HE1(a) – Summary Statistics..... 157

1. Introduction

1.1. Background

1.1.1. In developing their Local Plan, Charnwood Borough Council (CBC) is seeking to identify an appropriate strategy for development in the Borough. As part of the evidence for this choice, a number of development options were explored in an 'Option Testing' report (dated 13 November 2018).

1.1.2. The identified options tested different patterns of development including focusing development in urban areas, more dispersed patterns of development and inclusion of a new settlement.

1.1.3. CBC approached Leicestershire County Council (LCC) to undertake a further 'high level' highway impact appraisal for mitigating the seven potential Local Plan options across the Borough and adjoining Local Authority areas.[1]

1.2. Report Assumptions

1.2.1. Post-issue of the 'Option Testing' report, the 2036 Core scenario was amended to incorporate the A46/Anstey Lane Growth and Housing Fund committed scheme.

1.2.2. Sensitivity testing showed that this did not have a fundamental impact upon results; therefore wholesale re-reporting was not proportionate. Instead, Figure 1-1 (Low Growth) and Figure 1-2 (High Growth) are reproduced for reference to show the impacted junctions between the amended Core and Option scenarios.[2] Within this report, all analysis that references Core results takes the values from the amended Core.

1.2.3. Terminology for scenarios in the following chapters is as below:

- 2036 Core: LLITM scenario with committed developments and schemes
- 2036 Option: Core + additional demand generated by Charnwood local plan modelling (option testing)
- 2036 Mitigation: Core + additional demand generated by Charnwood local plan modelling AND highway network mitigation measures (mitigation testing).

[1] It should be noted that LCC in its role as LLITM owner and operator is independent of LCC in its capacity as the Local Highway Authority.

[2] Flagged are any junctions which change volume/capacity category between Core and Option, or any junctions which are heavily congested in both scenarios that incur an additional delay per PCU (>20 seconds).

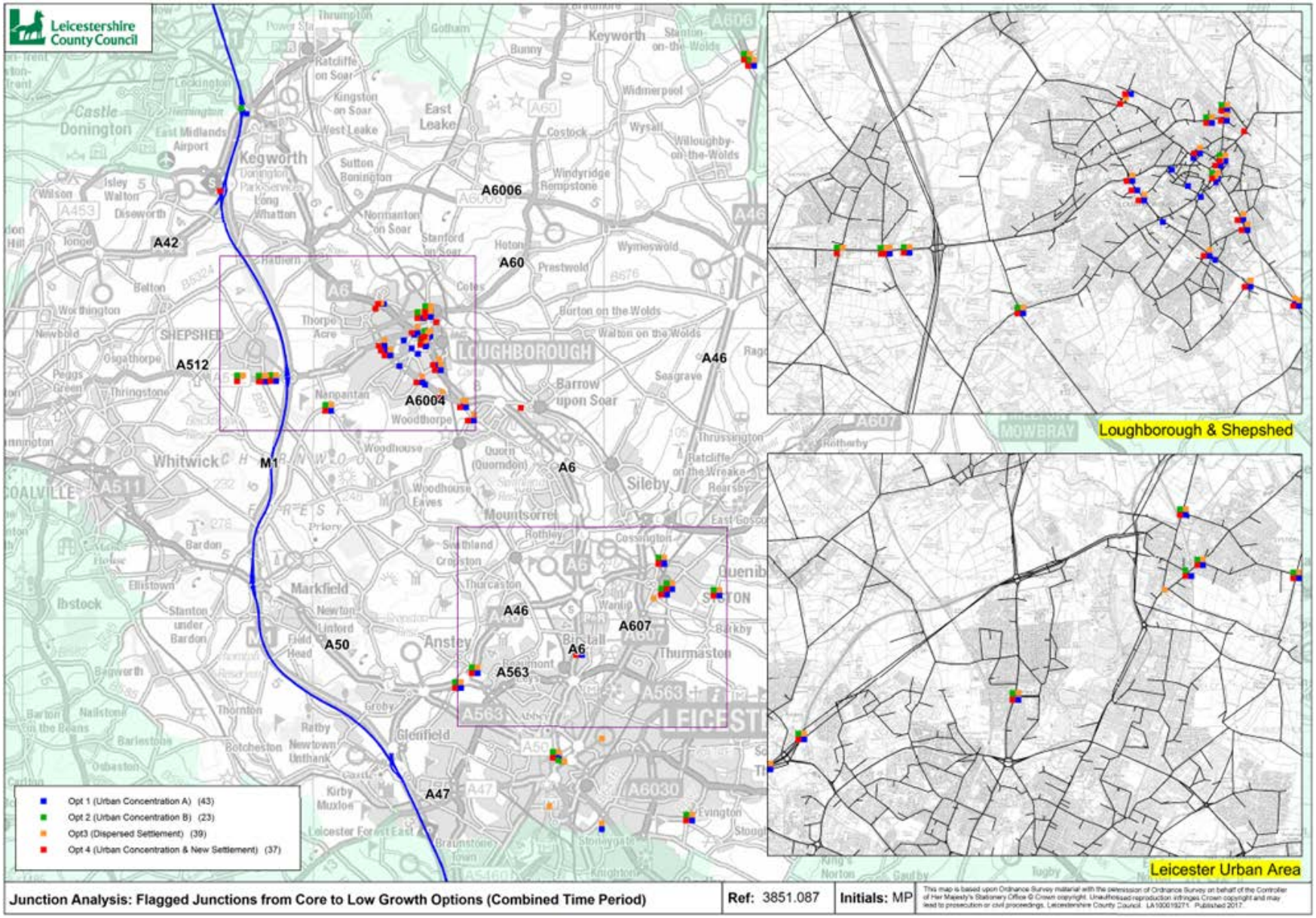


Figure 1-1: Flagged Junctions from Amended Core to Options (Low Growth), Combined Peak

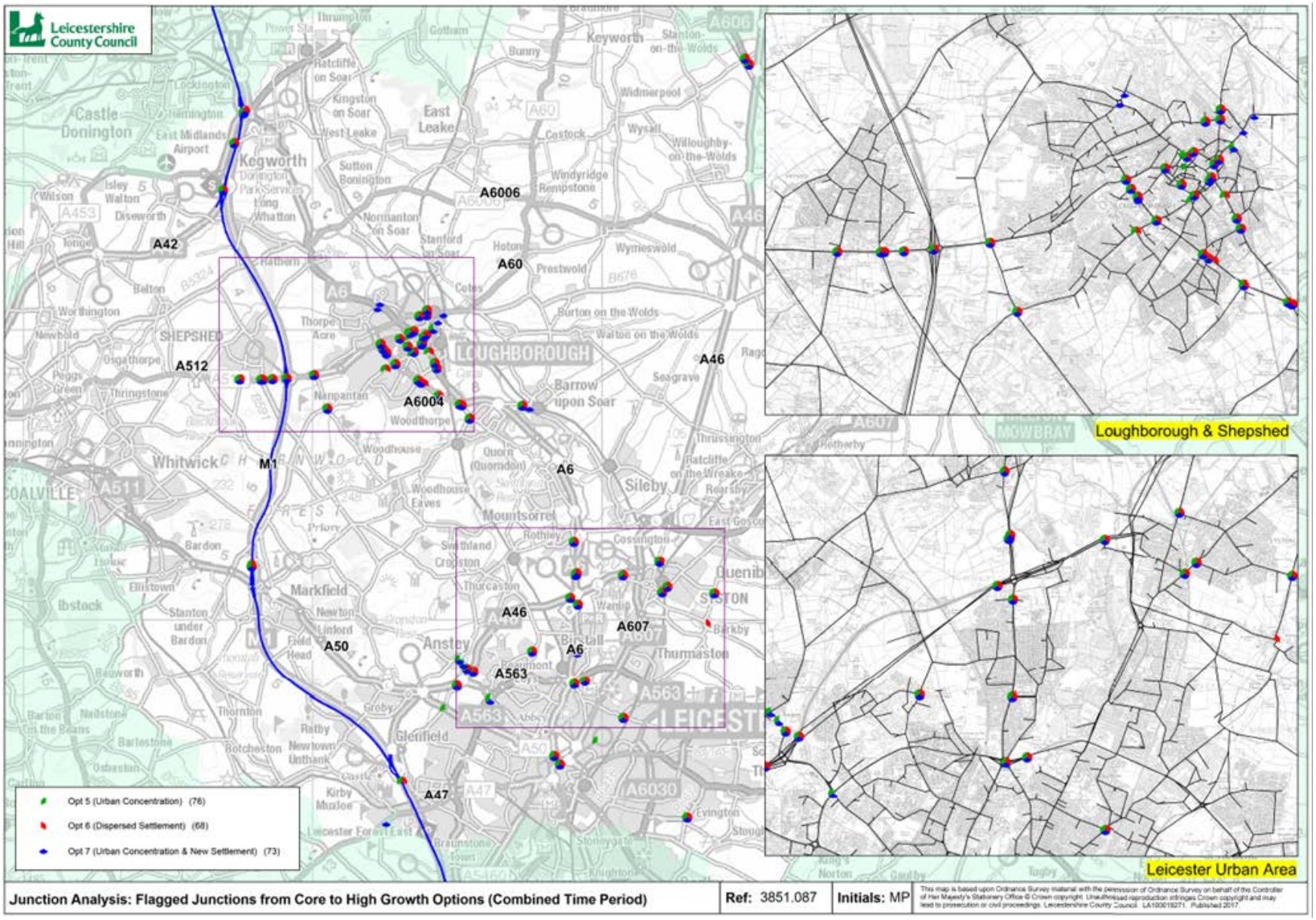


Figure 1-2: Flagged Junctions from Amended Core to Options (High Growth), Combined Peak

2. Mitigation Packages

2.1. Modelling Assumptions

2.1.1. In terms of mitigating junctions, individual schemes have not been modelled. Instead, assumed capacity uplifts have been modelled to mimic desired improvements from schemes at the identified junctions:

- Junctions located in Charnwood are modelled with 20% capacity uplifts,
- The SRN junctions and links are modelled with 20% capacity uplifts,
- Junctions located in Leicester City are modelled with 10% capacity uplifts.

2.1.2. This simplified approach is proportionate for the purposes of this high-level option sifting stage where detailed scheme designs simply do not exist for the majority of junctions identified as requiring mitigation.

2.1.3. Percentage capacity uplifts also serve to show a ‘best-case’ outcome for any potential schemes at identified junctions. For example, if a 20% junction capacity increase fails to mitigate the development impacts satisfactorily, it suggests that a substantial scheme might be required instead (and vice versa).

2.1.4. The reason that a lower 10% capacity uplift has been applied to junctions within the City is that it is deemed more challenging to implement more ‘radical’ junction improvements due to limits imposed by the heavily built-up nature of the urban form around most of these junctions.

2.1.5. Due to the reasons outlined above, this approach was agreed as appropriate for this stage of the modelling process with both LCC (as LHA for Leicestershire) and Leicester City Council (as LHA for Leicester City).

2.2. Low and High Growth Packages

2.2.1. After feedback from the client and stakeholders, two packages were proposed for mitigation modelling; a Low Growth package and an enhanced High Growth package (Table 2-1 and Figure 2-1).

Junction	Area	OP1	OP2	OP3	OP4	OP5	OP6	OP7
Snells Nook Crossroads	Loughborough	Y	Y	Y	Y	Y	Y	Y
A6/A6004	Loughborough	Y	Y	Y	Y	Y	Y	Y
A6004/Park Road	Loughborough	Y	Y	Y	Y	Y	Y	Y
A6004/Forest Road	Loughborough	Y	Y	Y	Y	Y	Y	Y
A6004/A512	Loughborough	Y	Y	Y	Y	Y	Y	Y
Epinal Way Ped Crossings	Loughborough	Y	Y	Y	Y	Y	Y	Y
Alan Moss Road/Epinal Way	Loughborough	Y	Y	Y	Y	Y	Y	Y
Alan Moss Road/A6/Belton Road	Loughborough	Y	Y	Y	Y	Y	Y	Y
A6/Shelthorpe Road	Loughborough	Y	Y	Y	Y	Y	Y	Y
A60/Station Boulevard	Loughborough	Y	Y	Y	Y	Y	Y	Y
Station Boulevard/Meadow Lane	Loughborough	Y	Y	Y	Y	Y	Y	Y
Meadow Lane/Belton Road	Loughborough	Y	Y	Y	Y	Y	Y	Y
Queniborough Road/Barkby Road	Syston	Y	Y	Y	Y	Y	Y	Y
Melton Road/Wanlip Road	Syston	Y	Y	Y	Y	Y	Y	Y
Fosse Way/High Street	Syston	Y	Y	Y	Y	Y	Y	Y
Melton Road/Goodes Lane	Syston	Y	Y	Y	Y	Y	Y	Y
A512/Ingleberry Road	Shepshed	Y	Y	Y	Y	Y	Y	Y
A512/Leicester Road	Shepshed	Y	Y	Y	Y	Y	Y	Y
A512/Iveshead Road	Shepshed	Y	Y	Y	Y	Y	Y	Y
A46/A6	SRN	Y	Y	Y	Y	Y	Y	Y
Hobby Horse	SRN	Y	Y	Y	Y	Y	Y	Y
A46/Wanlip Road	SRN	Y	Y	Y	Y	Y	Y	Y
A46/Anstey Lane	SRN	Y	Y	Y	Y	Y	Y	Y
M1 J23/A42	SRN	Y	Y	Y	Y	Y	Y	Y
Bennion Road/Beaumont Leys Ln	City					Y	Y	Y
A50/ODDR	City					Y	Y	Y
A50/Gynsill Lane	City					Y	Y	Y
A6/Blackbird Road	City					Y	Y	Y
Anstey Lane/ODDR	City					Y	Y	Y
Red Hill Circle	City					Y	Y	Y
The Nook	Anstey					Y	Y	Y
A512/Snell's Nook Lane	Loughborough					Y	Y	Y
A6004/Beacon Road	Loughborough					Y	Y	Y
L'boro Rd/Woodhouse Rd/Farley Way	Quorn					Y	Y	Y
A46 Link Capacity Increase	SRN					Y	Y	Y

Table 2-1: Junctions Mitigated (Low and High Growth)

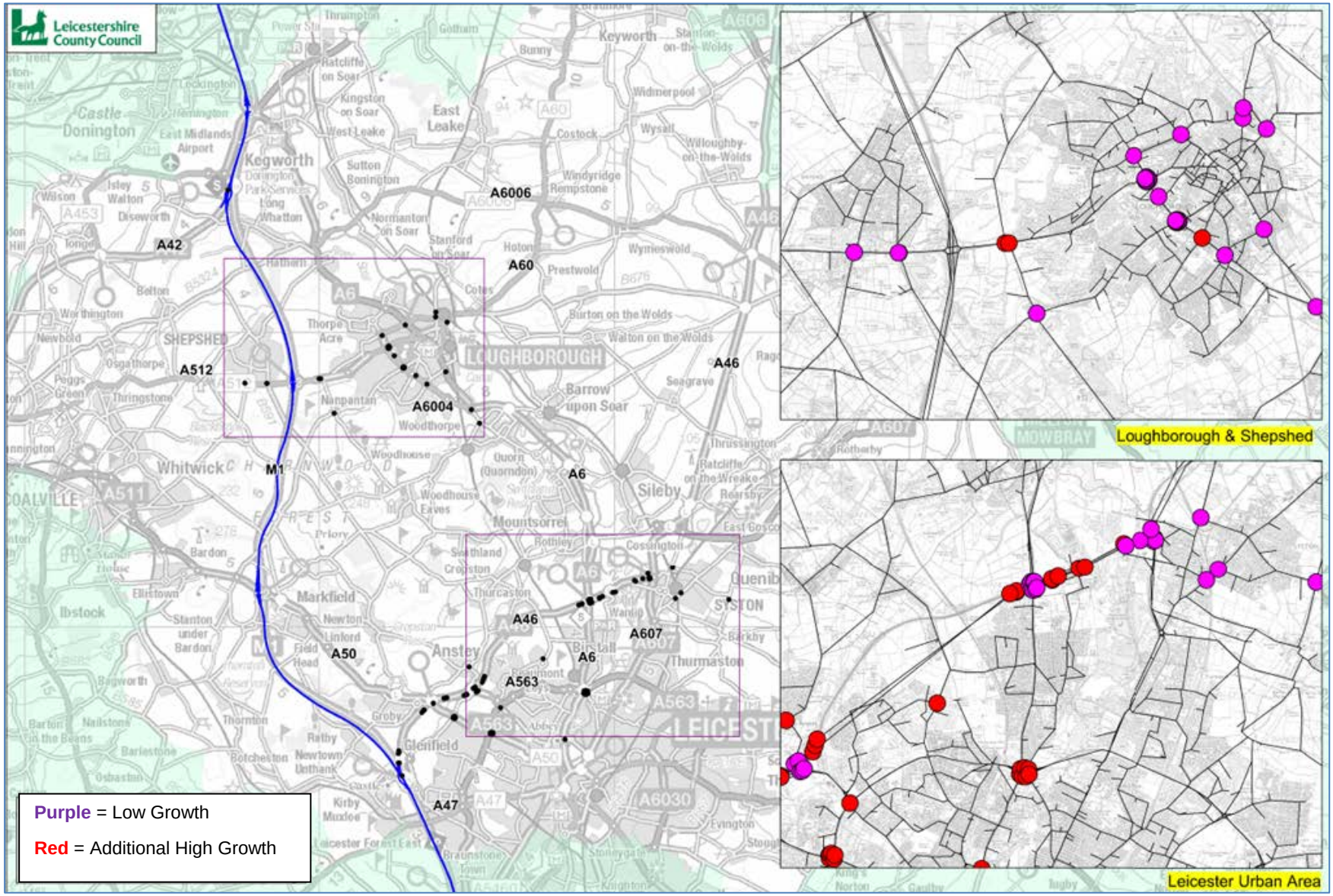


Figure 2-1: Map of Mitigated Junctions by Low and High Growth Options

2.2.2. The decision was made not to vary mitigation packages within the Low or High Growth scenarios for a number of reasons.

2.2.3. Firstly, as this is a high level sifting exercise it was deemed acceptable not to create various 'bespoke' packages beyond a Low and High Growth difference (additional resource would have been required to, for example, create a Low Growth Option 1 package and a Low Growth Option 3 package). Key junctions which are identified for mitigation generally occur across a majority of options and are therefore included in all options within a Low or High Growth context.

2.2.4. Secondly, by only modelling two packages (Low and High Growth) it ensures consistency and reduces any potential confusion about what is and is not included in different options with either a Low or High Growth option.

2.2.5. Future modelling of perhaps one or two final options could investigate more 'bespoke' packages, but for this high-level stage of the process the above is deemed proportionate and acceptable for the client.

2.2.6. The High Growth package features a substantial mitigation along the A46 in terms of link capacity increase for a 7.5-mile part of the network between the M1 J21a and the A46/A607 ("Hobby Horse") roundabout. The mitigation modelled increases the link capacity from two lanes to three lanes.

2.3. Costing

2.3.1. No costings of these potential mitigation packages have been undertaken at this stage of the modelling process.

2.3.2. However, in the High Growth scenarios, it is worth considering that the mitigation of the A46 in terms of link capacity increase would incur substantial additional costs. For example, a scheme of a similar nature undertaken by Highways England was the 'A1 Leeming to Barton improvement', where a 12-mile route was upgraded from dual carriageway to 3-lane motorway. The cost of this scheme was £400 million.[3]

2.4. Recap of Option Testing Demand

2.4.1. Charnwood BC presented seven development options for modelling. Of the seven options modelled, four represent 'Low Growth' scenarios (8,100 dwellings), and a further three represent 'High Growth' scenarios (15,700 dwellings).

[3] https://highwaysengland.co.uk/projects/a1-leeming-to-barton-improvement/

2.4.2. Table 2-2 lists the options modelled, and details the quantities of dwellings located in key areas of interest such as Loughborough, Shepshed, the 'Leicester Urban Area' (i.e. Birstall, Thurcaston, Thurmaston, Syston) and the Cotes New Settlement.

Option	Title	Growth	Dwellings					
			Lboro	Shep	LUA	Cotes	Other	Total
1	Urban Concentration A	Low	4,000	500	3,000	0	600	8,100
2	Urban Concentration B	Low	800	2,200	3,000	0	2,100	8,100
3	Dispersed Settlement Hierarchy	Low	2,000	2,200	1,000	0	2,900	8,100
4	Urban Concentration & New Settlement	Low	2,000	1,500	2,500	1,000	1,100	8,100
5	Urban Concentration	High	5,150	2,650	3,300	0	4,600	15,700
6	Dispersed Settlement Hierarchy	High	4,600	2,500	3,300	0	5,300	15,700
7	Urban Concentration & New Settlement	High	3,300	2,600	3,900	1,500	4,400	15,700

Table 2-2: Development Options (supplied by Charnwood BC)

2.5. Presentation of Modelling Output

2.5.1. Chapter 3 presents a review of mitigation performance by considering the impact of Area of Influence (AoI) summary statistics and assessing network performance at key 'congestion hotspots' within Charnwood. This section also includes a discussion of journey times along key routes within Loughborough (as an indicator of mitigation performance on the most congested part of the District).

2.5.2. Due to the amount of modelled output contained in this report, Chapters 4 to 10 present the results by Option. The following outputs are included in these chapters:

- Link flow difference plots (PCUs[4]) – 2036 Mitigation minus 2036 Option. Flow differences between -20 and +20 PCUs have been excluded, as this level of impact is deemed minimal to network performance.

- Link delay difference plots (seconds) - 2036 Mitigation minus 2036 Option. Delay differences between -10 and +10 seconds have been excluded from the mapping due to the minimal significance of this level of link delay change.

[4] In LLITM traffic flow is expressed in passenger car units per hour (PCUs/hr). The concept of the PCU is used to convert different vehicle types into a standard passenger car unit for ease and accuracy of assessment.

- Junction analysis plots – these plots highlight two different metrics in order to assess junction performance across nodes (proxy for junctions):

    - Volume/capacity ranges: This metric highlights nodes where the volume/capacity value for the junction changes between either of the Core, Option and Mitigation scenarios. Nodes are mapped which change to either a congested (85-100%) or heavily congested (>100%) category.[5]

    - Heavily congested nodes: Also flagged are nodes which are consistently 'heavily congested' (i.e. volume over capacity value of >=100%) in all of the Core, Option and Mitigation scenarios. These represent significant problems for network congestion, and where mitigated, show that even an 'optimistic' 20% capacity improvement does not remove the junction from the 'heavily congested' category. A table of delay per PCU (seconds) changes (in terms of % difference to the Core) is also provided for these junctions to show any delay difference as a result of the Option and Mitigation modelling.

[5] The mapping has excluded any node which, even if it increases into a higher volume/capacity category, has increased by <5 %. This is because a node could increase from 84 (approaching congestion) to 86 (congested), but in reality this would not represent a significant change in junction operation, rather a minor change which happens to cross over the category boundary. Also, if a node has a VoC of (for example) 101 in the Core, 102 in the Option, and 99 in the Mitigation, then this is treated as being 'heavily congested' in all three scenarios.

3. Results Overview

3.1.1. This summary section brings together a number of the themes which run through the more detailed analytical outputs presented in Chapters 4-10. Included is:

- AoI summary statistic comparison
- Journey time comparison
- Key area – Loughborough
- Key area – Shepshed
- Key area – Cotes
- Key area – "Leicester Urban Area"
- Key area – M1

3.2. Summary Statistics Comparison

3.2.1. A range of network level summary statistics for the AoI (Charnwood boundary + 5km buffer) is reported below in terms of:

- Over-capacity queues (PCU.hours),
- Total travel time (PCU.hours),
- Total travel distance (PCU. Kilometres),
- Total travel distance on heavily congested links (PCU.Kilometres), and
- Total PCU link delay per km (seconds/Kilometre).

3.2.2. These are presented by showing the Core level (no development, no mitigation) as a baseline across the plots, with the Option and Mitigation values plotted against it. This can help to demonstrate the performance of the mitigated options relative to each other. It wouldn't necessarily be expected for a mitigated network to return to a Core level due to additional demand on the network.

3.2.3. The AM and PM Peak periods have been combined to produce a singular 'combined peak' output.

Over-Capacity Queues

3.2.4. Over-capacity queues represent the extra time spent in queues at over-capacity junctions in the AoI.[6]

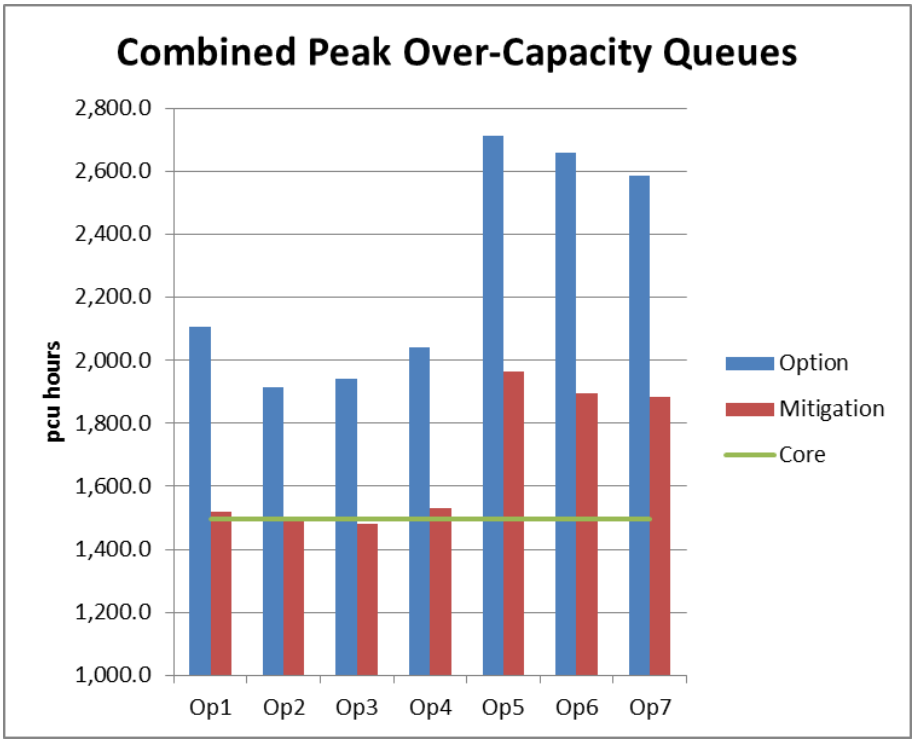


Figure 3-1: Combined Peak Hour Over-Capacity Queues (PCU.hrs)

3.2.5. Figure 3-1 illustrates that in the Option scenarios, over-capacity queues increase substantially in all scenarios, as would be expected due to the additional demand loaded into the network with no mitigation measures.

3.2.6. The impact of the mitigation measures is to mostly alleviate Options 1-4 (Low Growth) with regards to this network summary statistic by lowering over-capacity queues back to approximately the level they were in the Core scenario.

3.2.7. However, in Options 5-7 (High Growth), mitigated over-capacity queues are significantly higher than the Low Growth options, and show additional impact against the Core. A mitigated High Growth network operates to a similar extent as an unmitigated (with development demand) Low Growth network in terms of over-capacity queues.

[6] SATURN manual, section 17.8.

Total Travel Time & Total Travel Distance

3.2.8. Total travel time represents the sum of both link and junction times experienced by PCUs in the scenario. Total travel distance represents the total kilometres travelled by PCUs on the network.[7]

3.2.9. Where demand between scenarios is constant, the basic principle is that if travel time/distance increases then trips (at a network level) are either incurring additional delays on existing routes, or re-routing to other longer distance routes that take a quicker total travel time in order to avoid congested parts of the network. A decrease in travel time/distance represents the inverse of the above.

3.2.10. These can be push or pull factors; for example trips are forced to re-route to longer distances in order to avoid congested parts of the network (push factor), or mitigated routes become more attractive and induce additional trips from more direct (but slower journey time) routes onto longer (but faster journey time) links (pull factor).

3.2.11. It should be noted that, where demand between scenarios is different (e.g. between Core and Option/Mitigation) there would naturally occur some change in total travel time/distance, just on the basis of there being more trips on the network. Therefore, in these summary statistics it is not expected that the Mitigation brings total travel time/distance back to Core levels, as there are more trips on the network.

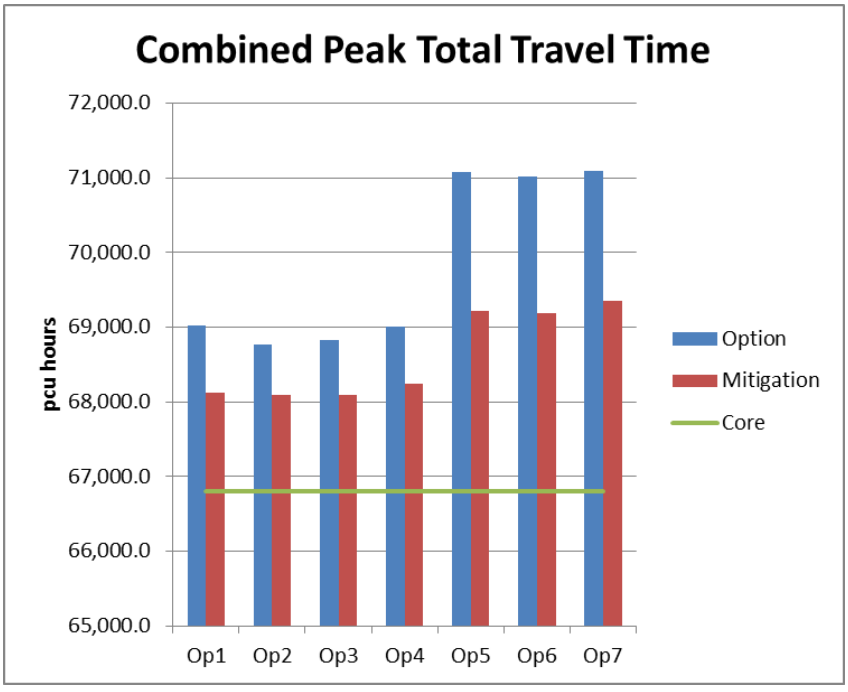


Figure 3-2: Combined Peak Hour Total Travel Time (PCU.hrs)

[7] SATURN manual, section 17.8.

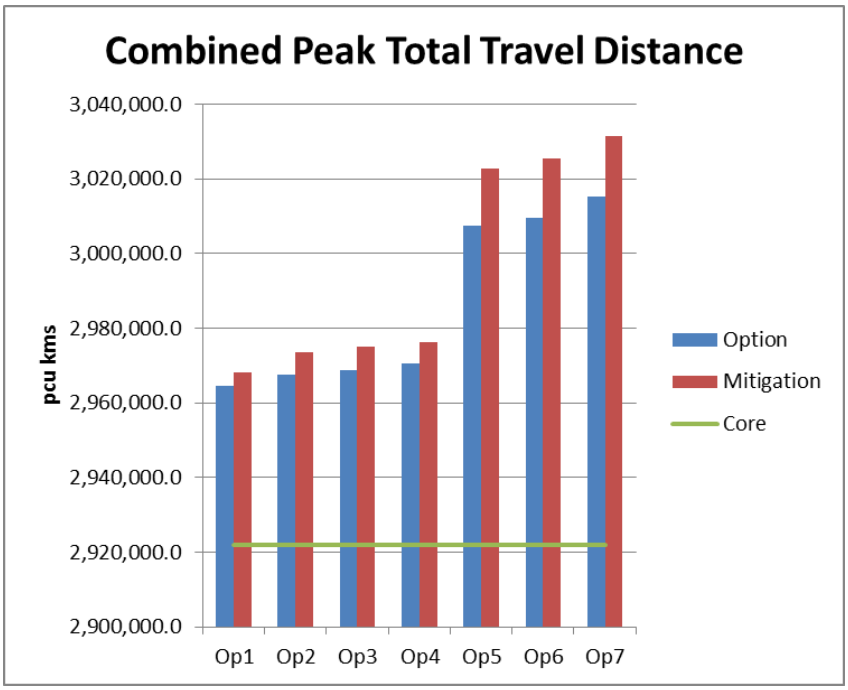


Figure 3-3: Combined Peak Hour Total Travel Distance (PCU.kms)

3.2.12. Figure 3-2 shows that the mitigation packages does, unsurprisingly, reduce total travel times when compared against the Option scenarios. This indicates there to be a 'mitigation induced' improvement in overall network journey time performance.

3.2.13. Figure 3-3 shows that the mitigation packages cause an increase in total travel distance when compared to the Option scenarios. This is likely the impact of the pull factors being realised; in the Low Growth options capacity improvements to areas such as Epinal Way, the A6 and A60 result in some delay relief and therefore encourages some trips onto these longer distance routes from more direct (but perhaps less desirable due to issues of rat-running etc.) routes.

3.2.14. One further consideration of longer total travel distances is the effect on air quality as a result of increasing the total of amount of PCU kilometres on the network. However, this may be offset by a reduction of flows and easing of congestion in more built-up areas, so may be an acceptable side-effect. Option flow difference plots (see Chapters 4-10) should be analysed further by the client to investigate if flows are being routed into more 'acceptable' corridors of movement between the Option and Mitigation scenarios.

3.2.15. In order to standardise the total travel time and total travel distance metrics the average speed over the AoI has been calculated and is shown in Table 3-1.

Scenario	Option	Mitigation	Difference
1	42.9	43.6	0.6
2	43.1	43.7	0.5
3	43.1	43.7	0.6
4	43.0	43.6	0.6
5	42.3	43.7	1.4
6	42.4	43.7	1.3
7	42.4	43.7	1.3

Table 3-1: Area of Influence Average Speed (Kph, Combined AM and PM Peak)

3.2.16. It is clear that the mitigation strategies have improved overall network performance with speeds increasing when compared with their option equivalent.

Total Travel Distance on Heavily Congested Links

3.2.17. One method to further sift the total travel distance analysis is to examine the total travel distance across only heavily congested links within the AoI.[8]

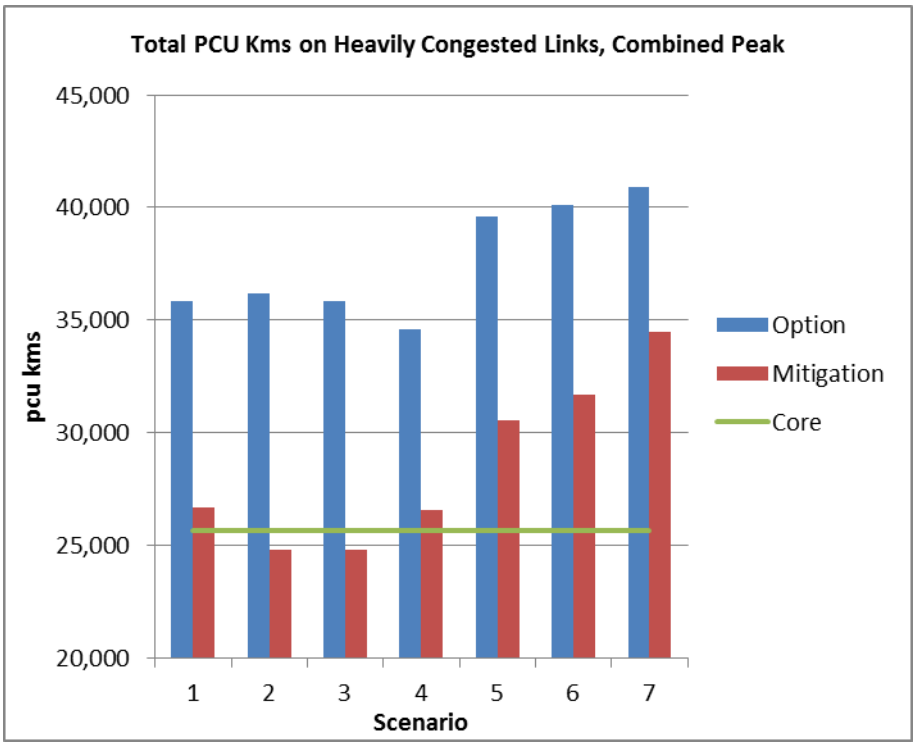


Figure 3-4: Combined Peak Hour Total Travel Distance on Heavily Congested Links (PCU.kms)

3.2.18. Figure 3-4 illustrates a similar context to previous summary statistics; Options 2 and 3 (Low Growth) Mitigation scenarios are most successfully mitigated across the Options, whereas Options 1 and 4 (Low Growth) operate marginally worse.

[8] A 'heavily congested link' is characterised as having a link volume/capacity ratio of >=100%.

High Growth Mitigation scenarios demonstrate significant additional congestion even when modelled with an enhanced mitigation package.

Total PCU Link Delay per KM

3.2.19. The PCU delay per kilometre metric translates the aggregate link delays into a delay per individual PCU per 1 kilometre of network. This is useful for converting high level network statistics into a metric easily relatable to individuals' everyday experience of the road network.

3.2.20. It should be noted that this metric accounts for link delays only; junction delays are not captured within this value.

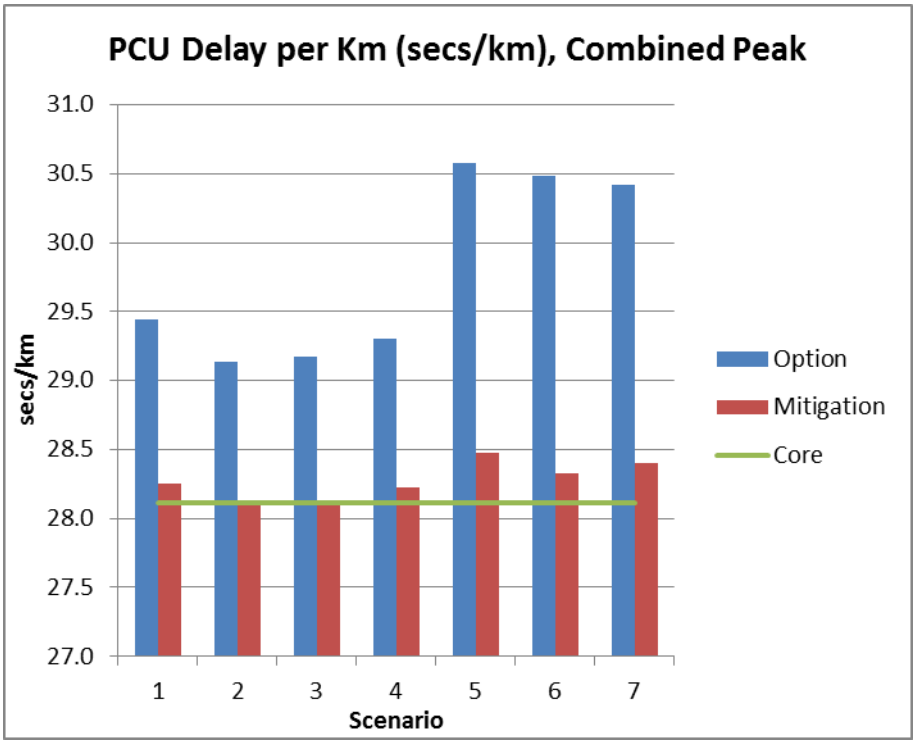


Figure 3-5: Combined Peak Hour Total PCU Delay per KM (secs/km)

3.2.21. Figure 3-5 shows that, at an AOI network-wide-level, Options 2 and 3 (Low Growth) perform marginally better than Options 1 and 4 (Low Growth), with a further increase to the High Growth options. However, there isn't substantial variation between any of the options regarding this metric.

AoI Summary Statistic Conclusion

3.2.22. Similar profiles emerge in the above summary statistics, insofar as Options 2 and 3 display the most positive results, with Options 1 and 4 operating to a similar, but slightly worse off, standard. Options 5, 6 and 7 (even with an enhanced high

growth mitigation package) still perform the worst of all scenarios and display few signs at an AoI level of being reasonably mitigated.

3.2.23. It should also be considered that the mitigation packages modelled for both the Low and High Growth scenarios are perhaps considered ‘optimistic’; the 20% capacity improvements across mitigated junctions in Charnwood (10% for High Growth City mitigated junctions) is a high level approach, and realistically these levels of improvements may not be achievable at all mitigated junctions.

3.3. Key Area 1 - Loughborough

3.3.1. The Loughborough allocated development varies by option:

- Option 1 4,000 dwellings
- Option 2 800 dwellings
- Options 3 & 4 2,000 dwellings
- Option 5 5,150 dwellings
- Option 6 4,600 dwellings
- Option 7 3,300 dwellings

3.3.2. As demonstrated in the original Option testing report, Loughborough is the most congested part of the District. As a result, it is within this area that the largest quantity of mitigation has been targeted (see chapter 2).

3.3.3. A small number of journey time outputs were collated to demonstrate the impact on journey times between the Option and Mitigation scenarios along a number of key routes through Loughborough (Figure 3-6):[9]

- "**Epinal Way**" (Quorn/A6/A6004 roundabout <> Bishop Meadow roundabout),
- "**A6**" (Quorn/A6/A6004 roundabout <>Bishop Meadow roundabout),
- "**A60**" (Loughborough Rd/Barrow Rd <> A6),
- "**A512/Belton Rd**" (Ingelberry Rd <> Meadow Lane), and
- "**Forest Rd**" (Snells Nook crossroads <> Woodgate).

[9] Journey times are calculated by summing the link time and junction time. It is assumed that when a journey starts at a particular junction, it does not incur the junction delay at that start point, but when the route ends at a junction, the junction delay is included to represent the journey crossing the junction 'stop-line'.

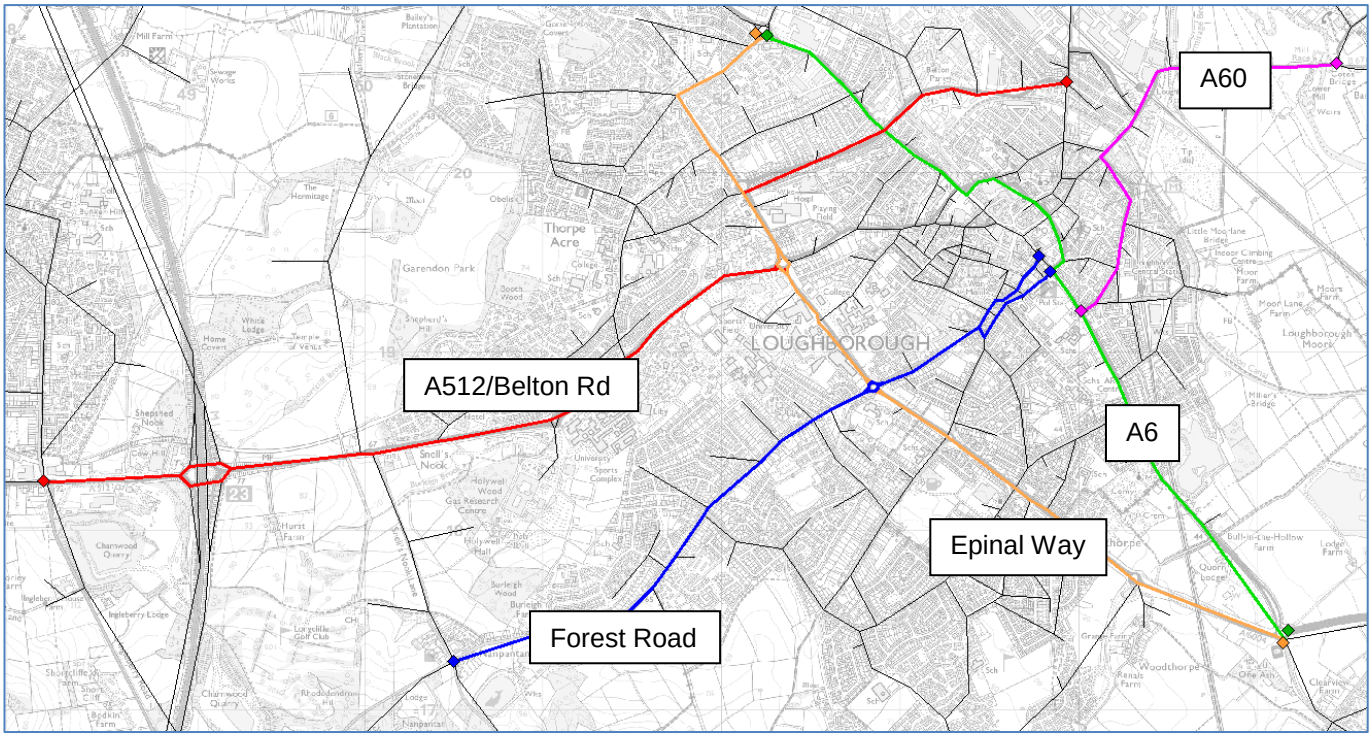


Figure 3-6: Loughborough Journey Time Routes

3.3.4. Table 3-2 and Table 3-4 show the differences in journey times between the Core and Option scenarios and Core and Mitigation scenarios for the AM and PM Peak periods respectively. Table 3-3 and Table 3-5 show the differences between Option and Mitigation.

Route	Direction	Core JT	Opt1 - Core	Opt2 - Core	Opt3 - Core	Opt4 - Core	Opt5 - Core	Opt6 - Core	Opt7 - Core	Mit1 - Core	Mit2 - Core	Mit3 - Core	Mit4 - Core	Mit5 - Core	Mit6 - Core	Mit7 - Core
A512-Belton Rd	EB	17:01	01:19	00:52	01:28	01:24	02:53	02:51	02:59	-01:27	-01:05	-00:59	-00:58	-01:29	-01:39	-01:22
	WB	12:57	00:20	00:05	00:09	00:10	00:36	00:32	00:23	-00:06	-00:12	-00:08	-00:09	-00:08	-00:09	-00:07
Forest Rd	EB	11:29	06:09	01:12	02:54	02:55	08:35	07:39	05:58	00:51	-01:05	-00:25	-00:27	02:41	01:55	01:02
	WB	09:58	05:49	00:46	02:12	02:12	08:41	07:34	04:59	01:04	-01:13	-00:37	-00:28	03:01	02:18	00:53
A60	NB	06:13	00:24	00:23	00:22	00:24	00:37	00:32	01:02	00:16	00:07	00:13	00:18	00:07	00:05	00:27
	SB	09:35	-00:12	00:19	00:26	01:05	00:09	00:20	01:58	-01:45	-01:09	-01:14	-00:43	-01:48	-01:35	-00:35
A6	NB	14:06	01:49	01:12	01:13	01:04	02:17	02:10	02:44	-00:19	-00:28	-00:22	-00:17	-00:15	-00:19	-00:08
	SB	13:05	03:02	00:44	01:51	01:40	04:39	04:14	03:17	-00:24	-01:32	-01:12	-01:20	00:27	00:07	-00:16
Epinal Way	NB	11:57	01:57	00:39	01:04	00:58	03:11	02:56	02:29	00:13	-00:14	00:05	00:04	00:16	00:08	00:05
	SB	11:50	03:49	00:46	02:08	01:51	05:46	05:14	04:03	-00:29	-01:56	-01:17	-01:24	00:39	00:18	-00:13

Table 3-2: Loughborough Journey Times – Differences to Core, AM Peak

Route	Direction	Mit1 - Opt1	Mit2 - Opt2	Mit3 - Opt3	Mit4 - Opt4	Mit5 - Opt5	Mit6 - Opt6	Mit7 - Opt7
A512-Belton Rd	EB	-02:45	-01:57	-02:26	-02:22	-04:22	-04:29	-04:21
	WB	-00:26	-00:17	-00:17	-00:19	-00:43	-00:41	-00:31
Forest Rd	EB	-05:17	-02:17	-03:20	-03:22	-05:54	-05:44	-04:56
	WB	-04:45	-01:59	-02:49	-02:40	-05:40	-05:16	-04:06
A60	NB	-00:08	-00:16	-00:09	-00:06	-00:30	-00:27	-00:35
	SB	-01:33	-01:28	-01:40	-01:48	-01:57	-01:56	-02:33
A6	NB	-02:08	-01:40	-01:35	-01:21	-02:31	-02:29	-02:52
	SB	-03:26	-02:16	-03:03	-03:00	-04:12	-04:07	-03:33
Epinal Way	NB	-01:44	-00:53	-00:59	-00:54	-02:56	-02:48	-02:25
	SB	-04:17	-02:42	-03:25	-03:16	-05:08	-04:56	-04:17

Table 3-3: Loughborough Journey Times – Mitigation minus Option, AM Peak

Route	Direction	Core JT	Opt1 - Core	Opt2 - Core	Opt3 - Core	Opt4 - Core	Opt5 - Core	Opt6 - Core	Opt7 - Core	Mit1 - Core	Mit2 - Core	Mit3 - Core	Mit4 - Core	Mit5 - Core	Mit6 - Core	Mit7 - Core
A512-Belton Rd	EB	16:04	01:01	01:01	01:07	01:27	02:02	01:54	02:34	-00:52	-01:06	-01:02	-00:42	-01:09	-01:07	-00:28
	WB	17:10	00:41	00:41	00:47	01:05	01:14	01:13	01:38	-01:16	-01:06	-01:01	-00:58	-01:18	-01:19	-01:07
Forest Rd	EB	09:09	00:24	00:24	00:28	00:41	00:39	00:36	00:59	-00:14	-00:23	-00:21	-00:16	-00:08	-00:09	-00:09
	WB	10:49	00:44	00:44	01:10	01:22	01:50	01:44	01:52	-00:32	-01:05	-00:52	-00:45	-00:13	-00:24	-00:49
A60	NB	07:46	00:13	00:13	00:16	00:49	00:14	00:21	01:47	-00:43	-00:24	-00:26	00:05	-00:43	-00:37	00:24
	SB	06:02	00:14	00:14	00:29	00:28	01:26	01:18	01:00	00:40	00:17	00:29	00:27	01:13	01:04	00:54
A6	NB	10:58	00:02	00:02	00:10	00:07	00:43	00:37	00:23	-00:02	-00:12	-00:06	-00:07	00:11	00:09	00:03
	SB	13:54	00:46	00:46	01:03	01:18	03:24	03:00	02:55	-01:14	-01:38	-01:26	-01:23	-00:09	-00:18	-01:10
Epinal Way	NB	09:23	-00:00	-00:00	00:08	00:06	01:27	01:20	00:23	00:19	-00:16	-00:06	-00:08	01:04	01:00	00:10
	SB	12:14	01:10	01:10	01:32	01:45	04:05	03:37	03:28	-00:40	-01:11	-00:58	-00:57	00:18	00:10	00:01

Table 3-4: Loughborough Journey Times – Differences to Core, PM Peak

Route	Direction	Mit1 - Opt1	Mit2 - Opt2	Mit3 - Opt3	Mit4 - Opt4	Mit5 - Opt5	Mit6 - Opt6	Mit7 - Opt7
A512-Belton Rd	EB	-01:53	-02:07	-02:09	-02:08	-03:11	-03:01	-03:03
	WB	-01:56	-01:46	-01:48	-02:03	-02:32	-02:32	-02:45
Forest Rd	EB	-00:37	-00:47	-00:48	-00:56	-00:47	-00:44	-01:08
	WB	-01:17	-01:50	-02:01	-02:08	-02:03	-02:08	-02:41
A60	NB	-00:56	-00:37	-00:42	-00:44	-00:56	-00:58	-01:22
	SB	00:25	00:02	-00:00	-00:01	-00:12	-00:14	-00:05
A6	NB	-00:04	-00:14	-00:16	-00:14	-00:31	-00:28	-00:21
	SB	-02:01	-02:24	-02:29	-02:42	-03:32	-03:18	-04:06
Epinal Way	NB	00:20	-00:15	-00:14	-00:14	-00:23	-00:21	-00:14
	SB	-01:50	-02:21	-02:30	-02:42	-03:47	-03:27	-03:27

Table 3-5: Loughborough Journey Times – Mitigation minus Option, PM Peak

3.3.5. In both time periods:

- **Options 2 and 3** generally show a strong level of journey time relief (compared to the Core) across the key routes when mitigated.
- **Option 4** encounters some issues with the **A60** even when mitigated, which is likely an effect of the additional demand generated by the Cotes new settlement, which is in close proximity to the A60 journey time route.
- **Option 1** still experiences problems with the **Forest Road** route post-mitigation; this appears logical as this scenario features Loughborough intensive development, particularly to the South and South-West of the town, with additional trips loading onto Forest Road and other parts of the nearby already congested network.
- **Options 5, 6 and 7** show difficulty in mitigating the **A60**, **Forest Road**, and **Epinal Way** (there is some relief to the A512-Belton Road route, and little significant change on the A6 in the High Growth options.) As is consistent with the 'summary statistic' analysis, this suggests that even with enhanced mitigation packages it is still troublesome to fully mitigate the effects of High Growth demand on the highway network.

3.3.6. In the AM Peak, the main problem route post-mitigation is **Forest Road** in Option 1 (Low Growth) and Options 5-7 (High Growth).

3.3.7. Figure 3-7 and Figure 3-8 show the Core, Option and Mitigation cumulative journey times from Snell's Nook Crossroads to Woodgate (eastbound) and Southfield Road to Snell's Nook Crossroads (westbound) in the Option 1 AM Peak scenarios.

Figure 3-7: Forest Road (Eastbound) Journey Time Comparison, 2036 Option 1, AM Peak

Figure 3-8: Forest Road (Westbound) Journey Time Comparison, 2036 Option 1, AM Peak

3.3.8. Eastbound in the AM Peak, the main deviation in journey times between the three scenarios occurs when the route crosses the A6004 (Epinal Way). This is relieved to some extent as the Mitigation journey time does reduce compared to the Option scenario at this point of the route, but not to the point that it returns to the same level as the Core scenario.

3.3.9. Westbound, the plot shows that the journey time is fairly consistent between Core, Option and Mitigation scenarios until the end point of the route when passing through the Snell's Nook Crossroads. This heavily congested junction is one of the worst performing in the Core scenario (a delay per PCU of around 200 seconds) and experiences a sharp increase in delay as a result of the Option scenario demand. This does get relieved to some extent in the Mitigation scenario (this junction receives a 20% capacity increase), but this is not enough to even bring the delays back down to the (already heavily congested) Core levels.

3.3.10. These impacts are likely a result of the additional demand loaded into South/South-West Loughborough in Option 1 (compared to the other three Low Growth options). A similar narrative is also evident in the High Growth scenarios.

3.3.11. What these results suggest is that in the Loughborough-intensive Low Growth scenario (Option 1), and the High Growth scenarios, east-west movements are impacted by increased congestion in areas such as A6004 (Epinal Way) and Snell's Nook Crossroads, and it is difficult to mitigate these with even a 20% increase in capacity at certain junctions in the vicinity of these routes. Options 2, 3 and 4, with less development designated in the South-West of Loughborough, are more responsive to the proposed mitigation measures by returning journey times on these routes to Core levels.

3.3.12. In the PM Peak, a number of routes still incur additional congestion when compared to the Core post-mitigation; **A60** (westbound only, all options), and **Epinal Way** (northbound only, Options 5 and 6 only).

3.3.13. Many of the junctions which are flagged in the A60 route are discussed in the subsequent section on Cotes, and therefore analysis will not be repeated here. Figure 3-9 shows the Core, Option and Mitigation cumulative journey time from A6/A6004 roundabout to Bishop Meadow roundabout via Epinal Way (northbound) in the Option 5 PM Peak scenario.

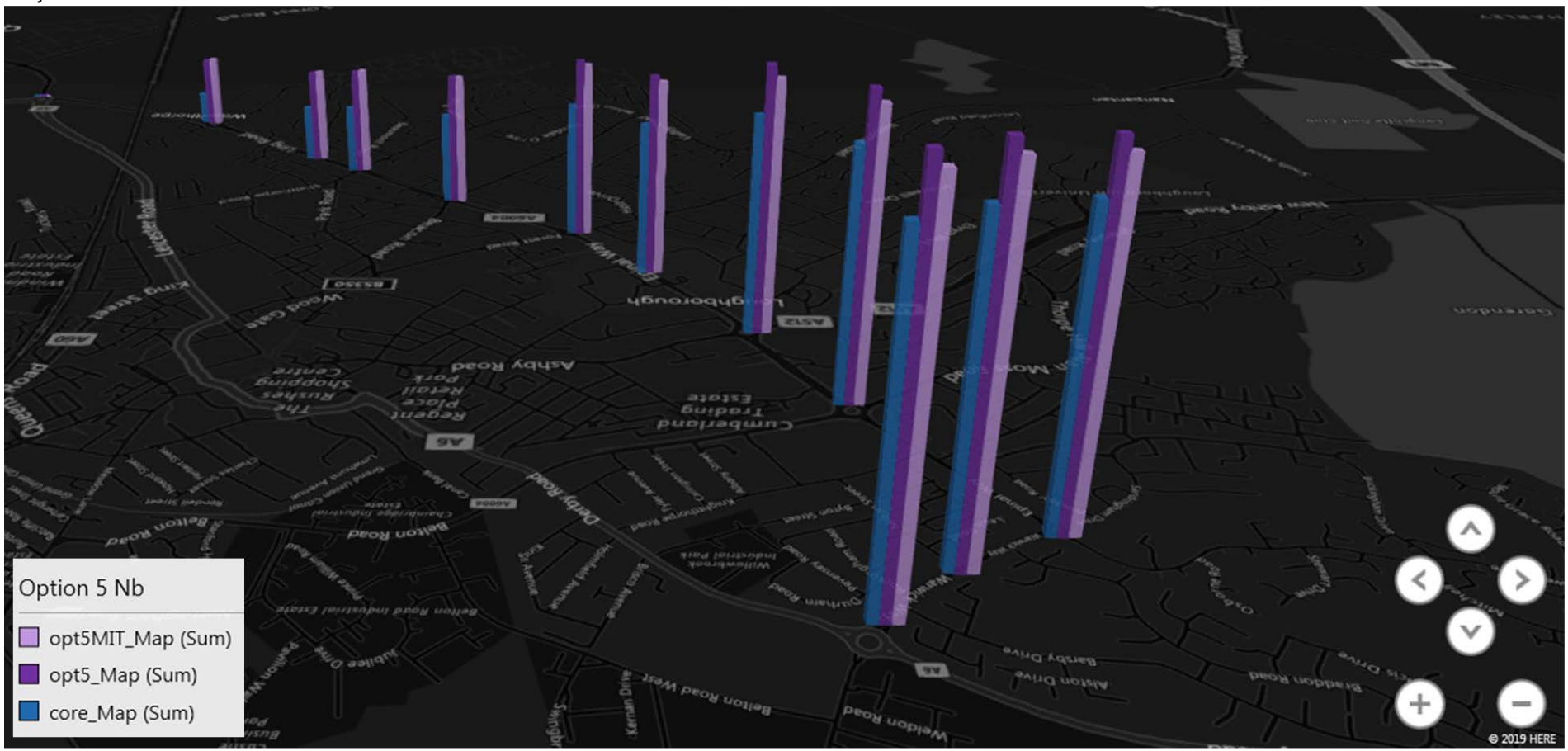


Figure 3-9: Epinal Way (Northbound) Journey Time Comparison, 2036 Option 5, PM Peak

3.3.14. In the High Growth scenarios, one of the side-effects of mitigating junctions along Epinal Way is that flows increase along the route, suggesting that there is latent demand wishing to use these routes which is realised when mitigation is undertaken. Therefore, as is displayed in Figure 3-9, journey time relief in the mitigation scenario may not be substantial enough to return to Core levels, but as the mitigation impact has attracted more trips (Figure 3-10) through the increased junction capacities, this suggests that mitigating Epinal Way can assist in reducing flows on less desirable routes and encourages more trips to use the A-road.

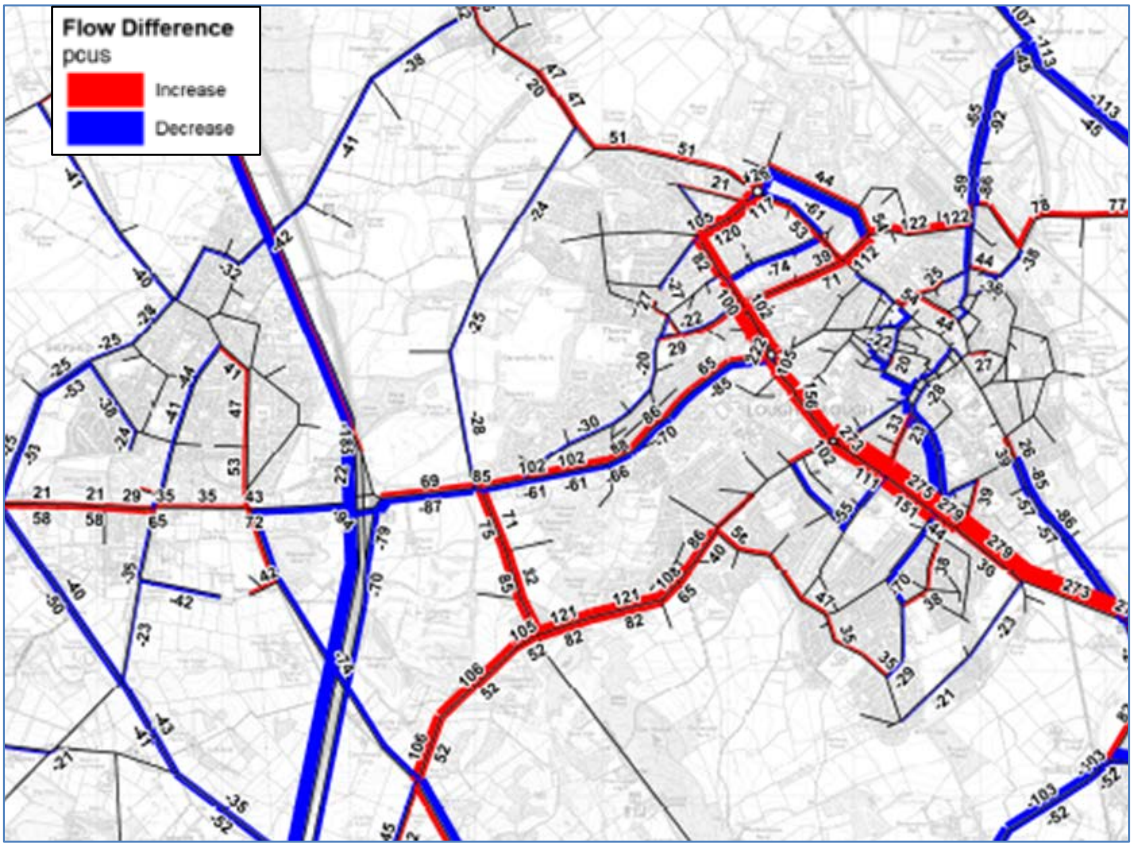


Figure 3-10: Flow Difference (Mitigation – Option), Option 5 (PM Peak), Loughborough

3.3.15. The overall outcome of mitigating Epinal Way is that delays are generally not being reduced by a substantial amount in this corridor, because any relief that was being generated by the mitigation of A6004 junctions is offset by the additional demand filling the capacity.

3.3.16. There is some minor relief between the Option and Mitigation scenarios, suggesting the mitigation does have *some* effect with regards reducing journey times, but not enough to bring the journey time back down to Core levels. The Mitigation scenario journey time remains around one minute greater than the Core.

3.3.17. This is consistent with previous High Growth scenario analysis; with the proposed mitigation package, it is very difficult to mitigate to a reasonable extent the High Growth scenarios, particularly in and around Loughborough.

3.3.18. However, it may be that a policy objective is not to reduce journey times, but in fact encourage flows from less desirable routes onto the main roads. This stresses the importance of considering numerous different outputs depending on the policy objective being considered for an individual part of the network.

Gateway Junctions

3.3.19. The junction analysis plots in the Option chapters highlight one of the major problems encountered when attempting to mitigate Loughborough; the majority of the junctions which serve as the main gateways at the edge of the town are heavily congested in the Core, Option and Mitigation scenarios.

3.3.20. Table 3-6 shows, for the AM Peak scenarios, the volume/capacity (%) values, and delay per PCU % changes from Core to Option/Mitigation[10], for five main gateways (red dots in Figure 3-11):

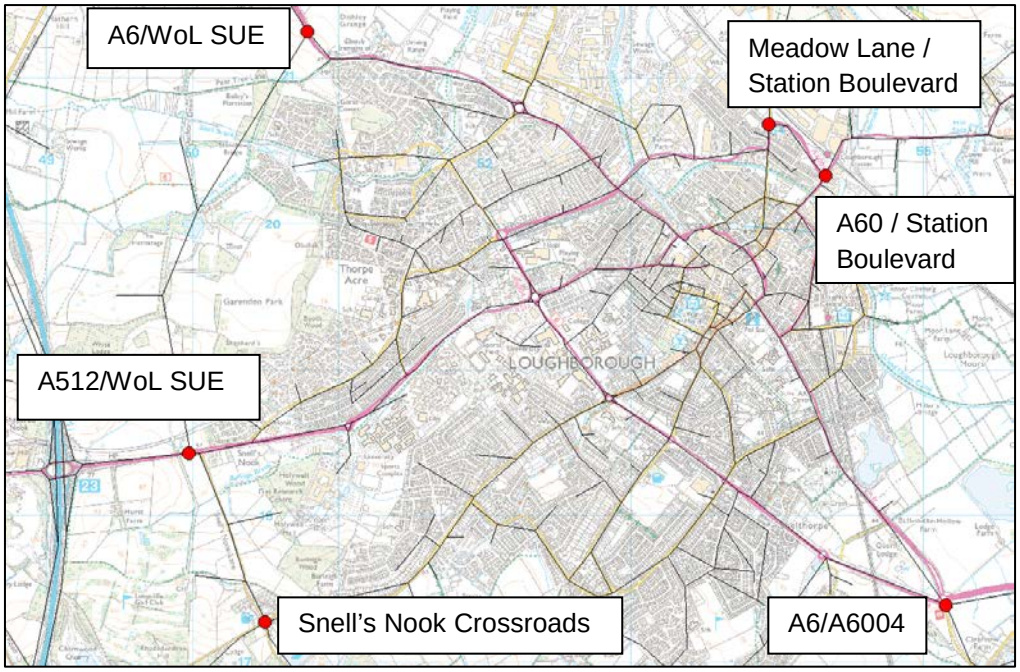


Figure 3-11: Gateway Junctions, Loughborough

[10] Delay per PCU values are a flow-weighted average delay across a node (proxy for junction), as output by SATURN. There are a number of limitations here; 1) LLITM is not validated on turning movements, and therefore turning movement delays should also be treated with caution, and 2) the flow-weighted delay average means that, for example, if a junction has one heavily delayed arm and three free-flowing arms, the delays on the heavily delayed arms would be dampened down the free-flowing arm delays in the overall flow-weighted delay average. Therefore, absolute values have not been quoted here as turning movement delays should be treated with caution. Instead, percentage changes from the Core to the Option/Mitigation are used as these are more indicative of the general trend experienced at a junction between the scenarios, without getting involved in quoting exact values.

Scenario	A512/WoLSUE North		A512/WoLSUE South		Nanpantan Rd/Snell's Nook Ln		A6/A6004 (Quorn)		A60/Station Boulevard		Meadow Ln/Station Boulevard	
	VoC%	Delay % Diff	VoC%	Delay % Diff	VoC%	Delay % Diff	VoC%	Delay % Diff	VoC%	Delay % Diff	VoC%	Delay % Diff
Core	**102**		**105**		**106**		**107**		**107**		**103**	
Opt 1	100	-44%	102	-32%	115	75%	115	115%	107	-4%	102	-6%
Mit 1	99	-44%	101	-40%	107	-5%	106	-9%	102	-45%	96	-50%
Opt 2	102	0%	106	7%	107	18%	109	27%	107	9%	104	6%
Mit 2	102	-1%	104	-9%	105	-21%	101	-50%	103	-31%	99	-35%
Opt 3	102	-9%	105	-5%	109	35%	111	65%	109	12%	104	11%
Mit 3	102	-6%	103	-18%	105	-16%	103	-30%	103	-34%	99	-39%
Opt 4	102	-8%	105	-3%	108	33%	111	55%	110	26%	106	24%
Mit 4	102	-3%	104	-15%	105	-15%	103	-34%	104	-24%	100	-26%
Opt 5	100	-41%	102	-34%	120	123%	118	173%	108	4%	103	1%
Mit 5	97	-56%	92	-71%	111	19%	109	37%	101	-47%	95	-53%
Opt 6	100	-34%	102	-32%	118	107%	117	157%	108	9%	104	7%
Mit 6	99	-50%	93	-71%	110	9%	108	25%	102	-42%	97	-48%
Opt 7	100	-34%	103	-20%	114	75%	114	124%	110	36%	108	45%
Mit 7	98	-52%	97	-66%	106	-8%	107	3%	105	-18%	100	-26%

Table 3-6: Key Junctions on Outer Edge of Loughborough - VoCs and % Delay Changes against Core, AM Peak

3.3.21. In the Low Growth mitigation, Snell's Nook crossroads, A6/A6004, A60/Station Boulevard and Meadow Lane/Station Boulevard, are all mitigated with a 20% capacity increase across the junction.

3.3.22. In terms of volume/capacity, there is no substantial difference between the Core, Option and Mitigation scenarios for any of these six junctions. What this demonstrates is that these junctions are operating to their maximum limit, even in the Core scenario. The 20% capacity improvement in the mitigation scenario merely attracts increased flows (Table 3-7), and therefore does not provide any relief in terms of congestion to any significant level at the gateways at the outer edge of the town. This is because these junctions are carrying more traffic when mitigated.

Junction	Opt 1	Opt 2	Opt 3	Opt 4	Opt 5	Opt 6	Opt 7
A512/WoLSUE	-25	37	27	39	203	209	284
A6/WoLSUE	-51	-60	-70	-59	-118	-120	-137
Meadow Ln/Station Boulevard	152	135	153	145	127	152	152
A60/Station Boulevard	72	75	67	70	45	35	55
A6/A6004	222	161	177	166	311	310	298
Snells Nook Crossroads	271	247	250	256	270	271	254

Mitigated in High Growth only

Mitigated in Low & High Growth

Table 3-7: Difference in Flows (PCUs) on Links Approaching Gateway Junctions (Mitigation minus Option, AM Peak)

3.3.23. In the High Growth scenarios, there is slightly more relief at the WoLSUE junctions, as these are mitigated in these scenarios. The above points however remain, that the gateways to Loughborough are at capacity even in the Core, and are difficult to mitigate in terms of congestion relief due to increased flows.

3.3.24. One point to consider is that by adding any substantial additional demand into Loughborough in the Option and Mitigation scenarios, a re-routing of some longer distances trips occurs.

3.3.25. This is because the additional demand in Loughborough automatically loads onto the local network first. This then forces some longer-distance trips to re-route, as the Loughborough-generated demand fills up some of the capacity at these junctions before all of the previous longer-distance trips have a chance to route through the junctions. This, as illustrated in the summary statistic discussion, has a repercussion in that travel distance and/or travel time can increase as some longer distance trips re-route to avoid these areas.

3.3.26. This was further explored through undertaking a select link analysis on outbound trips crossing the Loughborough cordon (as defined in Figure 3-12) in the Option 1 AM Peak ('Loughborough-intensive' Low Growth scenario).

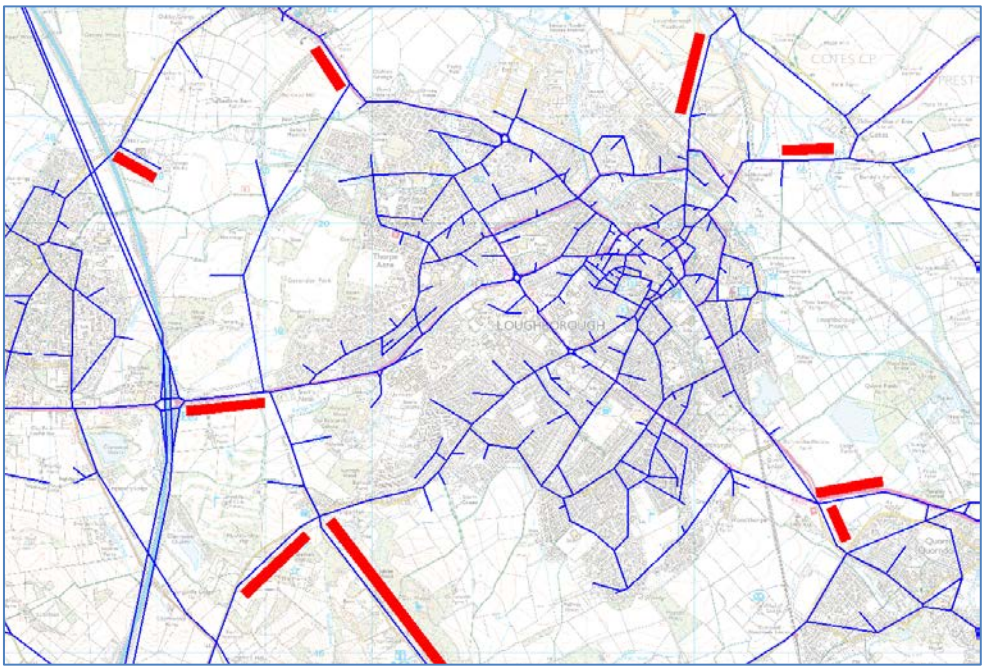


Figure 3-12: Loughborough Cordon – Outbound Links (Red)

3.3.27. Trips crossing through one of these outbound links were grouped by sector as per Figure 3-13.

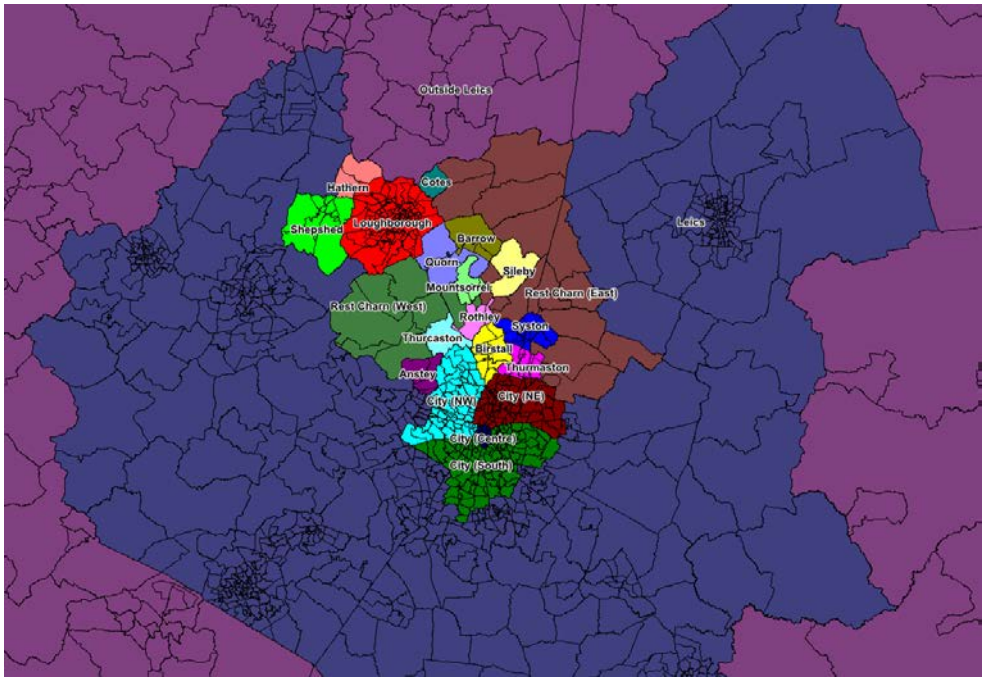


Figure 3-13: Sectors used for Loughborough Outbound Trips Select Link Analysis

3.3.28. Table 3-8 shows the origin sector of trips passing through a minimum of one of these outbound cordon links; this therefore captures both trips originating within the cordon, and trips passing through the cordon from outside of Loughborough.[11]

3.3.29. Table 3-9 is a more detailed breakdown on the 'Mitigation minus Option' column from Table 3-8. It shows the origins and destinations of the additional trips that pass through one of these outbound cordon links when the mitigation is implemented.

Sector	Core	Option	Option-Core	Mitigation	Mitigation-Option	Mitigation-Core
Loughborough	4,469	5,152	683	5,153	1	684
Shepshed	240	328	88	329	1	89
"Leicester Urban Area"	68	58	-9	91	33	24
Rest Charnwood	196	162	-34	235	73	39
City	21	16	-5	44	28	22
Other	167	163	-4	203	39	35
Total	**5,162**	**5,880**	**718**	**6,056**	**176**	**894**

Table 3-8: Origin of Trips Crossing at Least One Link of Loughborough Outbound Cordon, Option 1 AM Peak

[11] "Leicester Urban Area" refers to Anstey, Birstall, Syston, Rothley, Thurmaston, and Thurcaston.

		Loughborough	Shepshed	"Leicester Urban Area"	Rest Charnwood	Leicester City	Other Leics	Outside Leics	
	176	**1**	**0**	**10**	**16**	**8**	**36**	**104**	*Destination*
Loughborough	**1**	-1	0	0	2	0	0	0	
Shepshed	**1**	0	0	1	0	0	0	0	
"Leicester Urban Area"	**33**	0	0	0	1	0	9	22	
Rest Charnwood	**73**	1	0	4	5	7	20	37	
Leicester City	**28**	0	0	0	1	0	2	25	
Other Leics	**22**	1	0	1	3	0	3	14	
Outside Leics	**17**	1	0	5	3	1	2	5	
	Origin								

Table 3-9: Origin/Destination Matrix of Mitigation minus Option Trips Crossing at Least One Link of Loughborough Outbound Cordon, Option 1 AM Peak

3.3.30. These tables illustrate a number of points. One is that, when the Option 1 demand is loaded into the Option scenario, the additional Loughborough trips, and some of the Shepshed trips, get the first chance to use the Loughborough network. Trips originating from distances further away from Loughborough which previously passed through in the Core are forced to re-route around the cordon; e.g. there is a reduction of 34 trips originating from the 'Rest of Charnwood' passing through these links (see Option – Core column in Table 3-8).

3.3.31. When the mitigation is modelled, there is no change between the Option and Mitigation scenarios in the Loughborough and Shepshed trips which suggests there is no latent demand unable to access the network from these areas. The movements that do increase trips passing through one of the outbound Loughborough cordon links are through trips from other areas of Charnwood; e.g. 'Rest of Charnwood' to 'Outside Leics' (37 trips, 21%), 'Leicester Urban Area' to 'Outside Leics' (25 trips, 14%), and 'Rest of Charnwood' to 'Other Leicestershire' (20 trips, 11% - Table 3-9). Some of the mitigated junctions within Loughborough become more attractive due to some reductions in delay and congestion.

3.3.32. The second point is that, even in the Mitigation scenario, the majority of trips passing through the outbound cordon originate from within Loughborough (~85%, see 'Mitigation' column in Table 3-8). Of the additional 894 trips passing through one of the outbound cordon links when comparing the Core to Mitigation, around 75% of the additional trips come from Loughborough (see 'Mitigation minus Core' column in Table 3-8). This shows that the majority of the additional pressure on these 'gateway' junctions comes from trips derived from Loughborough development. The more development that is allocated to Loughborough logically results in more pressure on these already heavily congested junctions on the edge of the town.

A6004/A6 Junctions

3.3.33. One of the other key issues within Loughborough relates to trips along the A6004 and A6, the main north-south routes through the town.

3.3.34. For the AM Peak scenarios, Table 3-10 and Table 3-11 show the volume/capacity (%) values, and delay per PCU % changes from Core to Option/Mitigation, for the main junctions along these routes (red dots Figure 3-14) - any entry with an absolute delay difference of less than ten seconds has been omitted. This table acts as a summary of much of the detail found in the junction analysis plots in the individual option chapters.

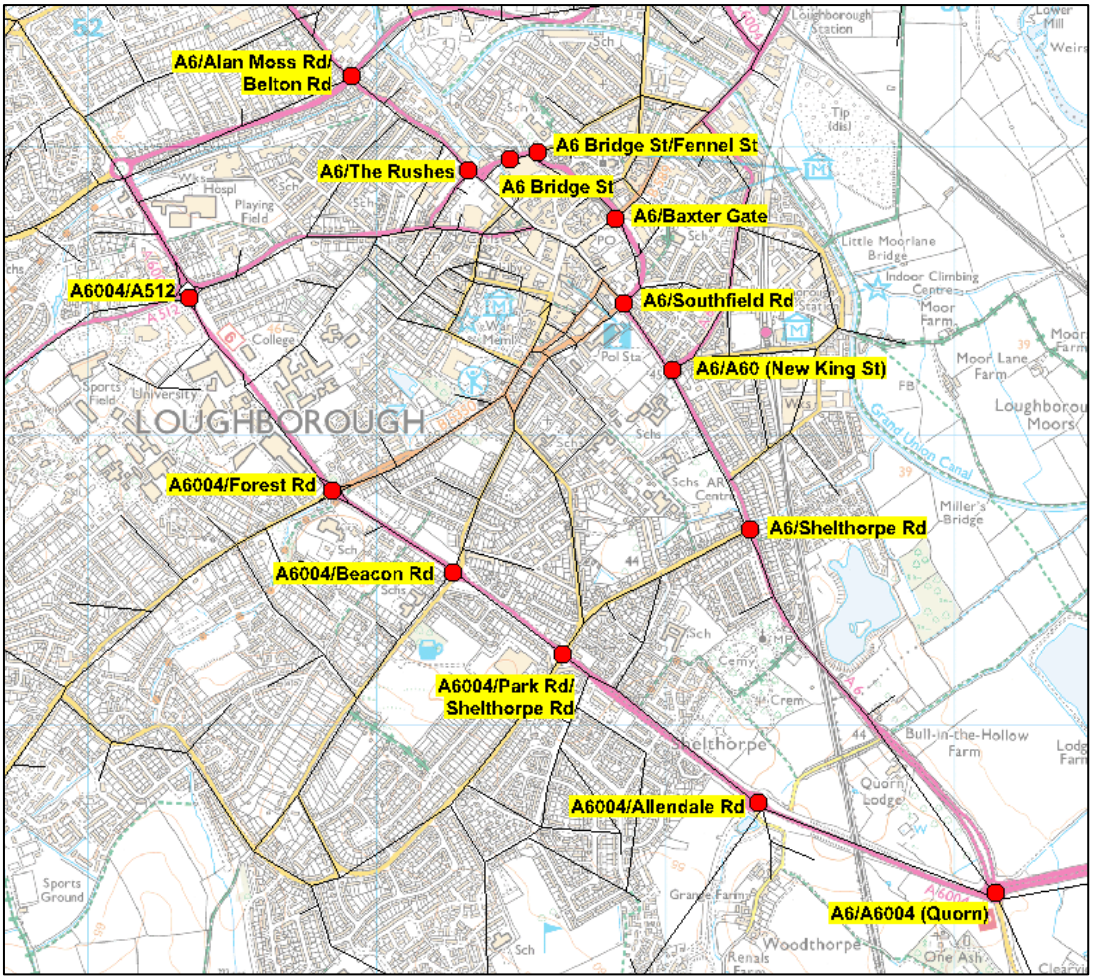


Figure 3-14: A6 & A6004 Junctions, Loughborough

Description	Scenario	Volume Over Capacity (%)								Core Delay (secs) and % Differences from Core							
		Core	1	2	3	4	5	6	7	Core	1	2	3	4	5	6	7
A6/A6004 (Quorn)	Option	107	115	109	111	111	118	117	114	56	115%	27%	65%	55%	173%	157%	124%
	Mit		106	101	103	103	109	108	107			-50%	-30%	-34%	37%	25%	
A6004/Allendale Rd	Option	86	78	87	84	85	75	77	83	16							
	Mit		83	89	86	87	83	86	91								
A6004/Park Rd/Shelthorpe Rd	Option	89	101	94	101	101	106	105	101	18					72%		
	Mit		91	67	74	73	104	103	101								
A6004/Beacon Rd	Option	100	101	101	101	101	102	101	102	28	36%				62%	50%	51%
	Mit		102	103	103	103	99	98	98		71%	75%	78%	74%			
A6004/Forest Rd	Option	94	103	94	97	99	105	103	102	81	78%		20%	31%	103%	85%	60%
	Mit		97	80	84	87	101	100	95			-20%	-18%	-16%	28%	15%	
A6004/A512	Option	102	106	103	104	104	108	107	106	146	37%	7%	18%	17%	55%	51%	42%
	Mit		101	97	99	100	102	102	102		-8%	-27%	-20%	-19%			
A6/Alan Moss Rd/Belton Rd	Option	100	101	101	101	101	101	101	102	54	32%	21%			29%	26%	33%
	Mit		89	81	80	80	97	96	93		-24%	-25%	-24%	-25%	-21%	-25%	-24%

Table 3-10: Key Junctions on A6004 (Loughborough) - VoCs and % Delay Changes against Core, AM Peak

Description	Scenario	Volume Over Capacity (%)								Core Delay (secs) and % Differences from Core							
		Core	1	2	3	4	5	6	7	Core	1	2	3	4	5	6	7
A6/A6004 (Quorn)	Option	107	115	109	111	111	118	117	114	56	115%	27%	65%	55%	173%	157%	124%
	Mit		106	101	103	103	109	108	107			-50%	-30%	-34%	37%	25%	
A6/Shelthorpe Rd	Option	102	115	105	110	109	119	118	115	54	83%		46%	40%	124%	113%	87%
	Mit		102	100	101	100	106	105	103			-36%	-23%	-25%	19%		
A6/A60 (New King St)	Option	84	85	85	85	85	85	85	85	27							
	Mit		85	85	85	85	85	85	85								
A6/Southfield Rd	Option	104	105	105	106	106	107	106	107	93							14%
	Mit		104	103	103	104	103	103	104								
A6/Baxter Gate	Option	103	109	107	110	110	107	109	109	61	52%	23%	44%	42%	54%	54%	54%
	Mit		105	100	102	102	108	107	105			-22%			28%	21%	
A6 Bridge St/Fennel St	Option	103	101	102	101	101	101	101	101	72							
	Mit		103	100	101	102	103	103	101								
A6 (Bridge St)	Option	101	105	103	104	103	105	104	105	39	98%	48%	69%	63%	99%	106%	99%
	Mit		100	95	96	95	103	102	101			-51%	-44%	-50%	43%		
A6/The Rushes	Option	90	101	90	94	93	105	105	102	29	114%		37%	37%	223%	205%	137%
	Mit		91	93	92	91	90	90	92								
A6/Alan Moss Rd/Belton Rd	Option	100	101	101	101	101	101	101	102	54	32%	21%			29%	26%	33%
	Mit		89	81	80	80	97	96	93		-24%	-25%	-24%	-25%	-21%	-25%	-24%

Table 3-11: Key Junctions on A6 (Loughborough) - VoCs and % Delay Changes against Core, AM Peak

3.3.35. These results show that, when mitigated, a number of the Options demonstrate some relief.

3.3.36. On the A6004 route, Options 2 and 3 exhibit some relief at the Park Rd/Shelthorpe Rd, Forest Rd, and Alan Moss Rd/Belton Rd junctions, with all three junctions mitigated to uncongested (<85% volume/capacity) levels. Option 4 mitigated to a similar profile, just to a lesser extent.

3.3.37. Option 1 however shows more limited mitigation impact; these three junctions are only mitigated from heavily congested to congested levels (volume/capacity 85-100%). As discussed previously, Option 1 is the most Loughborough-intensive development option of the Low Growth scenarios (Table 2-2); this adds significant extra demand and pressure onto the network. The mitigation modelling here suggests that in Option 1, the key A6004 route cannot be successfully mitigated (in terms of journey time and congestion relief) and would likely require a more radical mitigation measure to be considered from a highway network perspective. However, as discussed previously, if the policy objective is to shift trips off more minor routes and onto key corridors such as the A6004, then the flow difference plot for Option 1 (Figure 3-15) shows some success here; there is a reduction of trips routing through central Loughborough, and increases in flows on routes such as Epinal Way and Alan Moss Road.

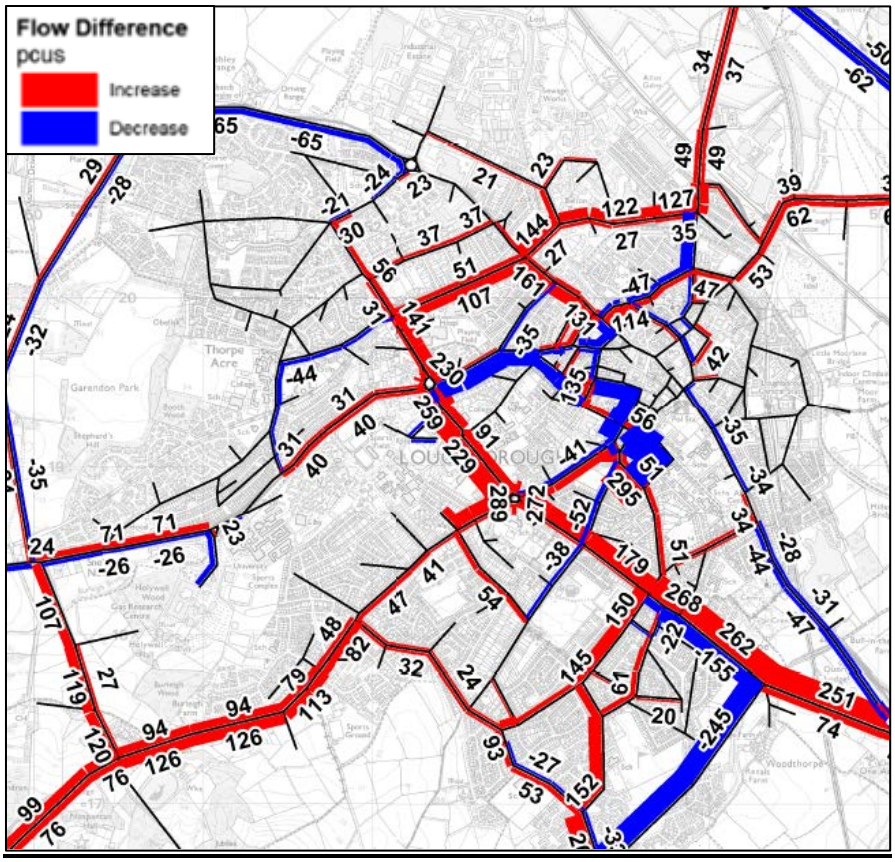


Figure 3-15: Flow Difference Plot, Option 1 (AM Peak), Loughborough

3.3.38. Figure 3-16 and Figure 3-17 show the difference in junction performance (i.e. congestion) between Option 1 (highest development allocated for Loughborough, 4,000 dwellings) and Option 3 (a medium development allocation of 2,000 dwellings).

3.3.39. Performance along the A6 and the area in the vicinity of the station is roughly the same between the high intensity and medium intensity developments.

3.3.40. However, as previously stated, the main issue is along the A6004; Option 3 shows a more improved degree of mitigation than Option 1.

3.3.41. It is important to consider all output included in the Option chapters, including flow differences, delay differences and junction performance, and weigh up against the desired policy objectives for each individual area of the network. For example, as stated in the Option Testing report, it may be acceptable for a Loughborough intensive option to produce less delay/congestion relief on key corridors, as a public transport mitigation package is also being considered which would alleviate some of these pressures.

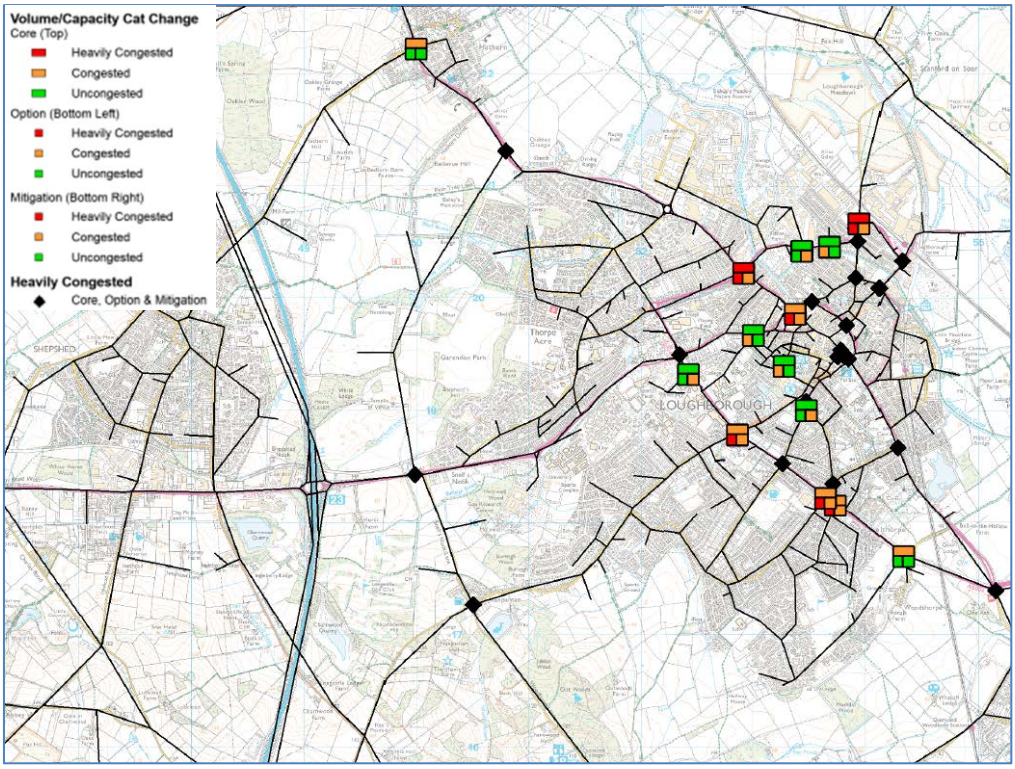


Figure 3-16: Loughborough – Option 1 Junction Analysis, AM Peak

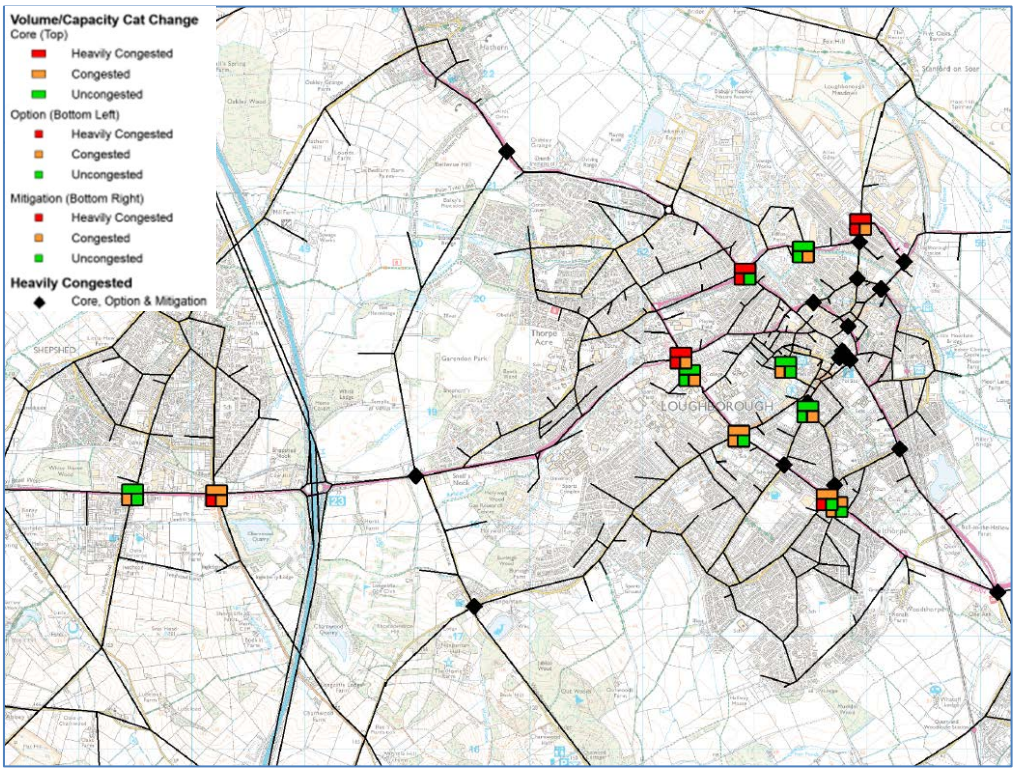


Figure 3-17: Loughborough – Option 3 Junction Analysis, AM Peak

3.4. Key Area 2 - Shepshed

3.4.1. Shepshed is another of the main areas allocated development with the option testing:

- Option 1 500 dwellings
- Options 2 & 3 2,200 dwellings
- Option 4 1,500 dwellings
- Option 5 2,650 dwellings
- Option 6 2,500 dwellings
- Option 7 2,600 dwellings

3.4.2. For the AM Peak scenarios, Table 3-12 shows the volume/capacity (%) values, and delay per PCU % changes from Core to Option/Mitigation, for main junctions of interest (red dots in Figure 3-18) - any entry with an absolute delay difference of less than ten seconds has been omitted.

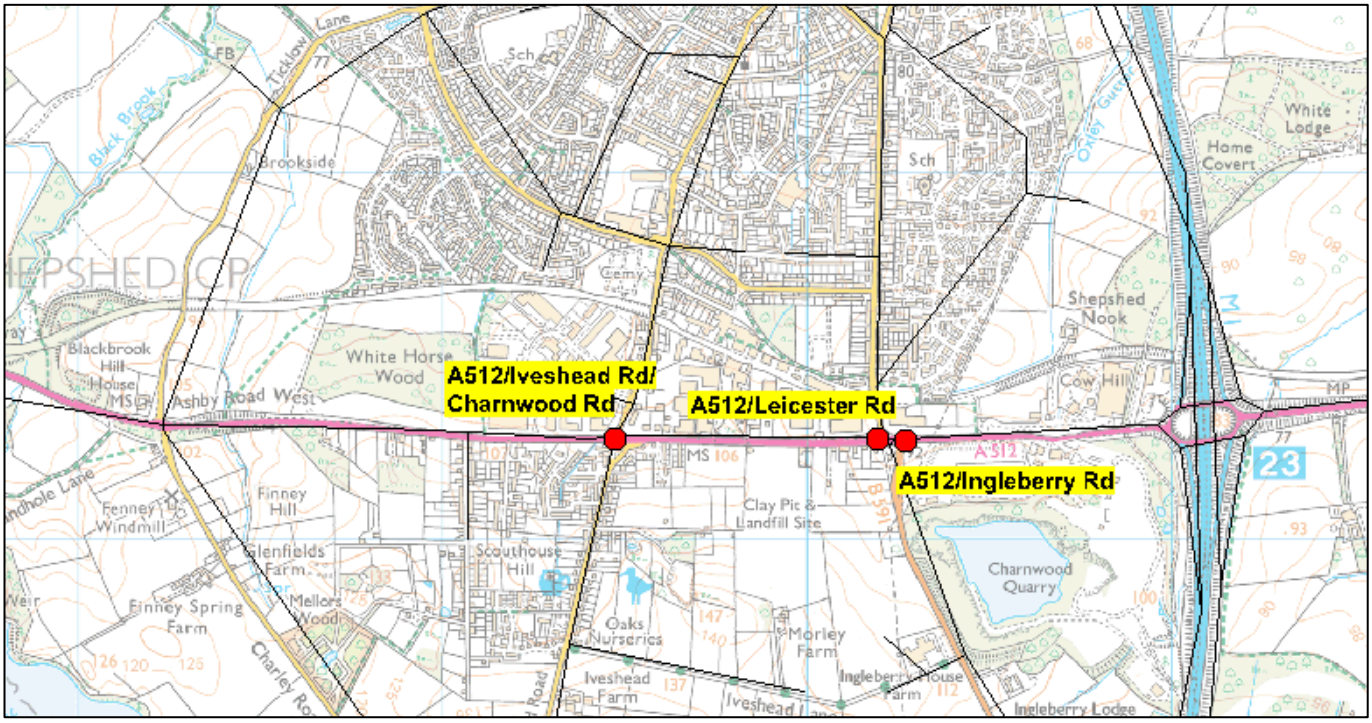


Figure 3-18: A512 Junctions, Shepshed

Description	Scenario	Volume Over Capacity (%)								Core Delay (secs) and % Differences from Core							
		Core	1	2	3	4	5	6	7	Core	1	2	3	4	5	6	7
A512/Iveshead Rd/Charnwood Rd	Option	78	83	88	88	85	89	89	89	40							
	Mit		69	82	83	75	84	84	84								
A512/Leicester Rd	Option	73	73	80	80	76	80	81	81	23							
	Mit		63	71	71	65	70	71	72								
A512/Ingleberry Rd	Option	95	99	100	101	99	103	102	103	30					39%	35%	39%
	Mit		92	96	96	94	96	96	96								

Table 3-12: Key Junctions on A512 (Shepshed) - VoCs and % Delay Changes against Core, AM Peak

3.4.3. Options 1 is the least impacted in Shepshed, which is a logical result as this is the option with the least development modelled (500 dwellings).

3.4.4. The remaining six options perform roughly to the same level; these options feature at least three times the dwellings as Option 1, so it is rational that these options would display more impedance.

3.4.5. It is encouraging however that these junctions can successfully be mitigated back down to approximately the same standard as was evident in the Core scenario, even in the High Growth scenarios.

3.5. Key Area 3 - Cotes & East Loughborough

3.5.1. Options 4 (Low Growth) and 7 (High Growth) feature the Cotes new settlement, located to the east of Loughborough:

- Option 4 1,000 dwellings
- Option 7 1,500 dwellings

3.5.2. As discussed in the Option testing report, the trip distribution from Cotes demand showed a significant interaction between trips routing to/from Cotes and the A6 via Barrow-upon-Soar and Slash Lane.

3.5.3. No mitigation was considered for junctions within Barrow due to geographical limitations; for example the Bridge Street signalised river crossing is limited for capacity expansion by the constraints of the existing bridge, and therefore achieving a 20% capacity increase in this part of the network is unrealistic.

3.5.4. This type of route, as discussed in the Options Testing report, also diverts through parts of the district liable to flooding (such as Slash Lane), which adds further pressure to future network resilience.

3.5.5. One of the other issues that became apparent during the mitigation modelling was the difficulty of relieving congestion on the eastern side of Loughborough (between the A6 and the railway station).

3.5.6. Figure 3-19 shows flagged impacted junctions in the 2036 Option 4 (AM Peak) analysis.

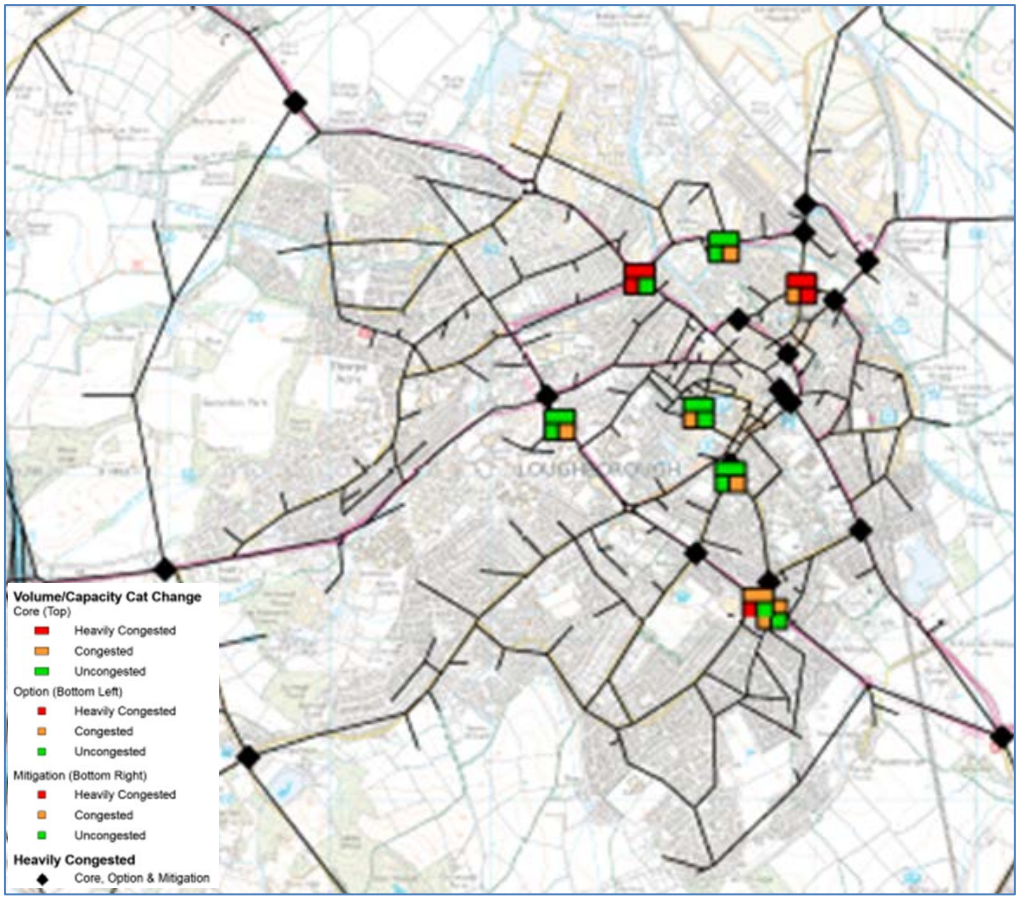


Figure 3-19: Loughborough – Option 4 Junction Analysis, AM Peak

3.5.7. There are a significant amount of junctions on the eastern side of Loughborough which are heavily congested in the Core, Option and Mitigation scenarios (as is evident from the abundance of black diamonds in Figure 3-19).

3.5.8. Of these junctions, the mitigation package provided 20% capacity increase at Station Boulevard/A60, Station Boulevard/Meadow Lane, and Belton Road/Meadow Lane. However, this was not extensive enough to reduce impedance at these junctions to a volume/capacity ratio of <100%.

3.5.9. A further issue in this area is that other congested junctions, such as the A60 Nottingham Road/Queen's Road, cannot be readily mitigated due to geographical constraints (i.e. junction tightly bound by built-up area). This makes implementing an effective mitigation package in this area more challenging; even if a nearby junction is mitigated, junctions further towards the town centre cannot be improved without more radical intervention, and therefore pinch-points in the network remain.[12]

[12] It should be noted that these geographical constraints would also present similar challenges for other modes of travel; for example sustainable transport measures based on cycling/walking interventions would still be constrained by the built-up area, narrow streets, etc. It is not a situation unique to highway interventions.

3.5.10. In addition to this, for any trips travelling between Cotes and Loughborough town centre, there are also a multitude of heavily congested junctions on the A6 (A6 Bridge Street, A6/ Southfield Road, and A6/Baxter Gate) which restrict almost all potential routes into the town centre.

3.5.11. An investigation of journey times between some of the possible development sites and Loughborough town centre was undertaken to highlight the relative difficulties associated with accessing the Central Business District (CBD). This was undertaken to establish whether the closeness of the Cotes site to the CBD was also reflected in its vehicular accessibility. The forecast journey times were extracted for the following routes:

- **Cotes** – via A60 and A6
- **Loughborough South-West** – via Forest Road, journey of a similar distance to Cotes-Loughborough centre
- **Shepshed South** – via A512, longer distance journey accessing Loughborough centre from one western route
- **Shepshed North** – via Hathern Road and A6, longer distance journey accessing Loughborough centre from another western route

3.5.12. Figure 3-21 maps cumulative journey times for these four routes in the 2036 AM Peak period. The corresponding data table (Table 3-13) provides further details on route distance, journey time and average speed for the Option and Mitigation scenarios.

3.5.13. Figure 3-20 shows the end points for each journey time route in relation to the location of the main car parks in Loughborough town centre. These routes have been selected as to best represent the likely end point for a trip parking in Loughborough town centre. However, the journey time routes have not all been mapped to the same end point (i.e. the car park itself) as this would obliterate some of the detail presented in Figure 3-21 (if all taken to the same point, then the bars would overlap one another). Therefore, the journey time routes represent the point at which the journey would penetrate the town centre on the way to the nearest car park. The full journey time route is mapped as an inset in Figure 3-21.

3.5.14. The Cotes journey time route has assumed that a trip parking in Loughborough town centre would terminate at car parks in the Beehive area. There is a possibility that trips may travel north round the A6 and Bridge Street to the Rushes car park, but this would still require travelling through congested junctions. Figure 3-20 shows the added difficulty of trips from the east of Loughborough accessing the car parks in Loughborough town centre, which are more plentiful and well-located for trips from the west of the town.

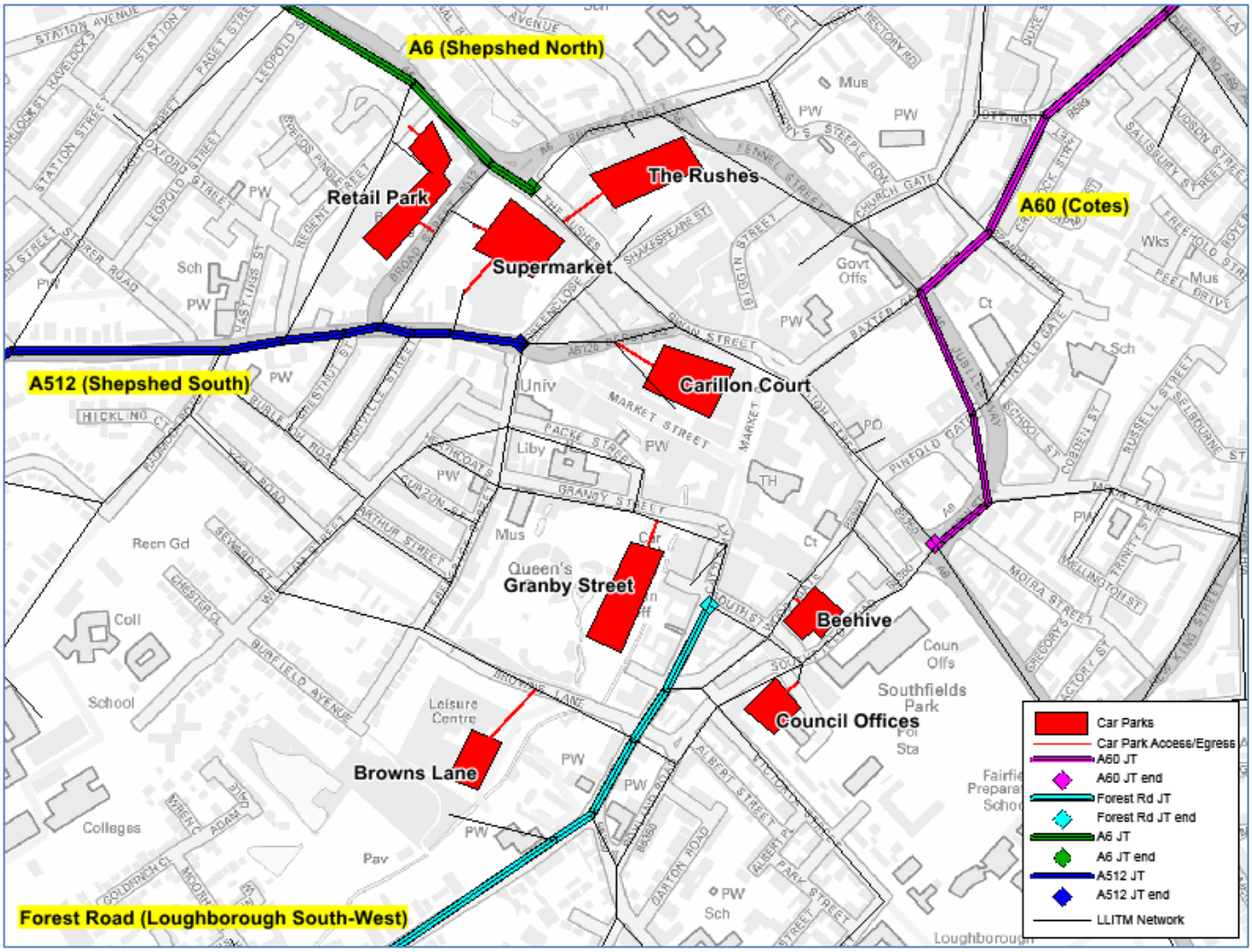


Figure 3-20: Cotes Journey Time Route Ends and Loughborough Town Centre Car Park Locations

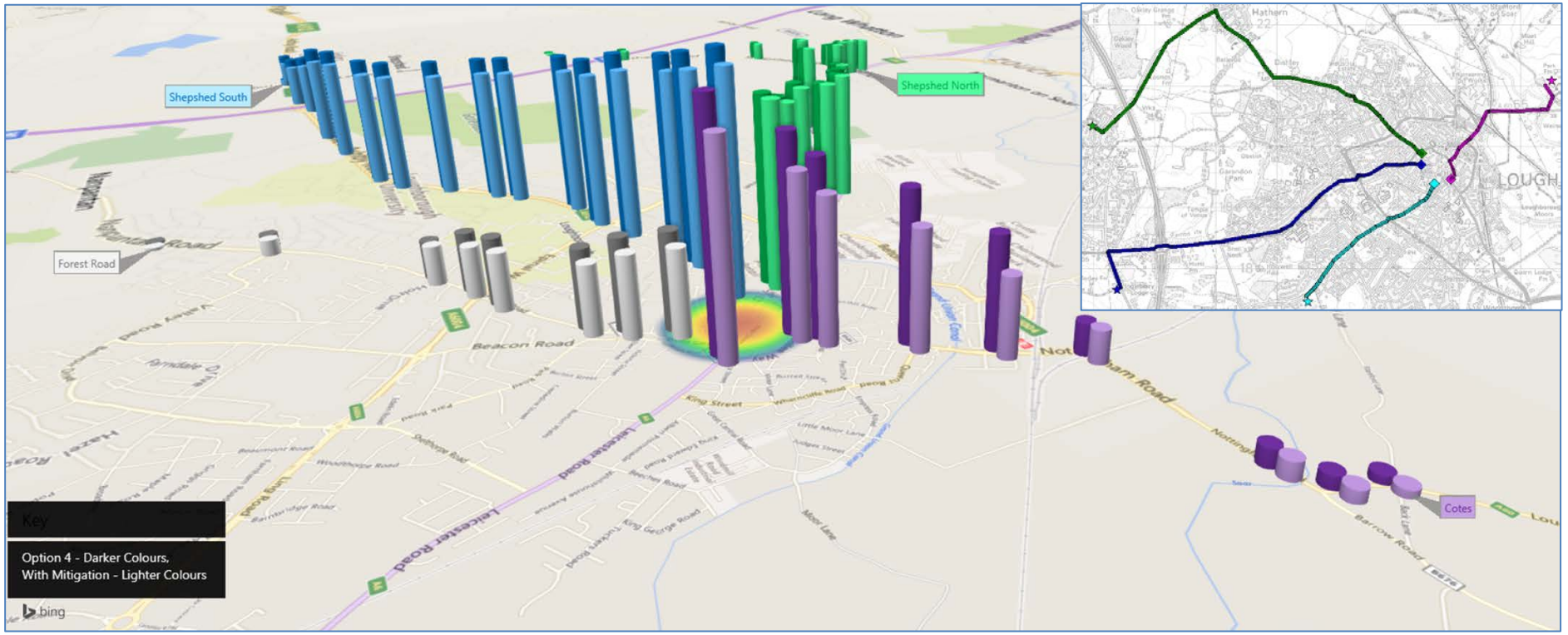


Figure 3-21: Cotes Journey Time Comparison, 2036 Option 4, AM Peak

Route	Direction	Distance (mi)	Journey Time (mm:ss) - Option	Avg. Speed (mph) - Option	Journey Time (mm:ss) - Mitigation	Avg. Speed (mph) - Mitigation
Shepshed North	SB	4.5	13:43	20	13:34	20
Forest Road	EB	1.8	06:50	16	06:09	18
Shepshed South	EB	4.0	16:54	14	15:54	15
Cotes	WB	1.8	14:24	7	12:38	8

Table 3-13: Cotes Journey Time Comparison, 2036 Option 4, AM Peak

3.5.15. This demonstrates the inherent challenges for trips between Cotes and Loughborough centre; even though the distance is 'closer' compared to other options (less than 2 miles from the town centre), due to the amount of heavily congested junctions in this area journey times accrue sharply. It takes roughly the same amount of time to travel from Shepshed North to Loughborough town centre as from Cotes, despite the former being around twice the distance further away.

3.5.16. Although the Cotes (A60) route and Forest Road routes are of approximately the same distance from Loughborough town centre, the average speed on the latter route is around twice as fast as the former. This is partly due to wider route choice existing for trips from West of Loughborough; there are a wider range of potential routes into the centre from the West (e.g. Forest Road, A512, A6), than if coming from the East (restricted to A60 and Meadow Lane, and both routes converge onto heavily congested junctions).

3.5.17. Outside of Charnwood, one of the main junctions of interest in the vicinity of Cotes is Rempstone Crossroads (A60/A6006).

3.5.18. As was discussed in the Option Testing report, there is some forecast demand from Cotes travelling to/from Nottingham which passes through this junction (see red dot on Figure 3-22.

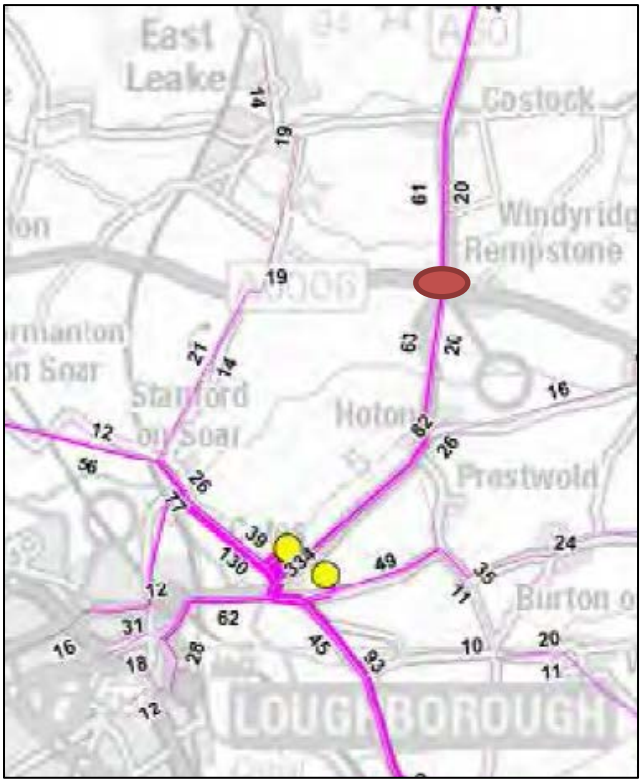


Figure 3-22: Cotes Select Link Analysis, Option 4 AM Peak (from Option Testing Report)

3.5.19. Rempstone Crossroads is however already heavily congested in the Core scenario (Table 3-14 shows the volume/capacity (%) values, and delay per PCU % changes from Core to Option/Mitigation for in the AM Peak, any entry with an absolute delay difference of less than ten seconds has been omitted). So although some additional trips are generated from Cotes that use this junction, the junction analysis metrics show that the junction is still performing poorly in all scenarios.

Scenario	Rempstone Crossroads	
	VoC%	Delay % Diff
Core	**104**	
Opt 1	103	-13%
Mit 1	104	-14%
Opt 2	104	-7%
Mit 2	104	-13%
Opt 3	103	
Mit 3	104	
Opt 4	104	
Mit 4	104	
Opt 5	104	
Mit 5	104	
Opt 6	104	
Mit 6	104	
Opt 7	104	
Mit 7	105	

Table 3-14: Rempstone Crossroads - VoCs and % Delay Changes against Core, AM Peak

3.5.20. It is worth noting however that, even though the junction performs poorly in all scenarios, in Option 4 and Option 7 (Cotes scenarios) the delay per PCU difference across the junction gets worse, whereas in the other scenarios there is some minor relief.

3.6. Key Area 4 – "Leicester Urban Area" and City (North)

3.6.1. One of the other key areas for consideration is the interaction between areas in the vicinity of the Leicester Western Bypass (A46) such as Birstall, Syston, Anstey, Thurcaston, Thurmaston and Rothley (hereafter referred to as the 'Leicester Urban Area'/LUA) and Leicester City.

Syston

3.6.2. Syston is the main allocated site for development within the LUA, with the following option profiles:

- Options 1 & 2 2,000 dwellings
- Option 3 725 dwellings
- Option 4 1,700 dwellings
- Options 5 & 7 2,275 dwellings
- Option 6 2,475 dwellings

3.6.3. Table 3-15 shows the volume/capacity (%) values, and delay per PCU % changes from Core to Option/Mitigation for a selection of key junctions in the AM Peak within Syston (red dots in Figure 3-23) – any entry with an absolute delay difference of less than ten seconds has been omitted.

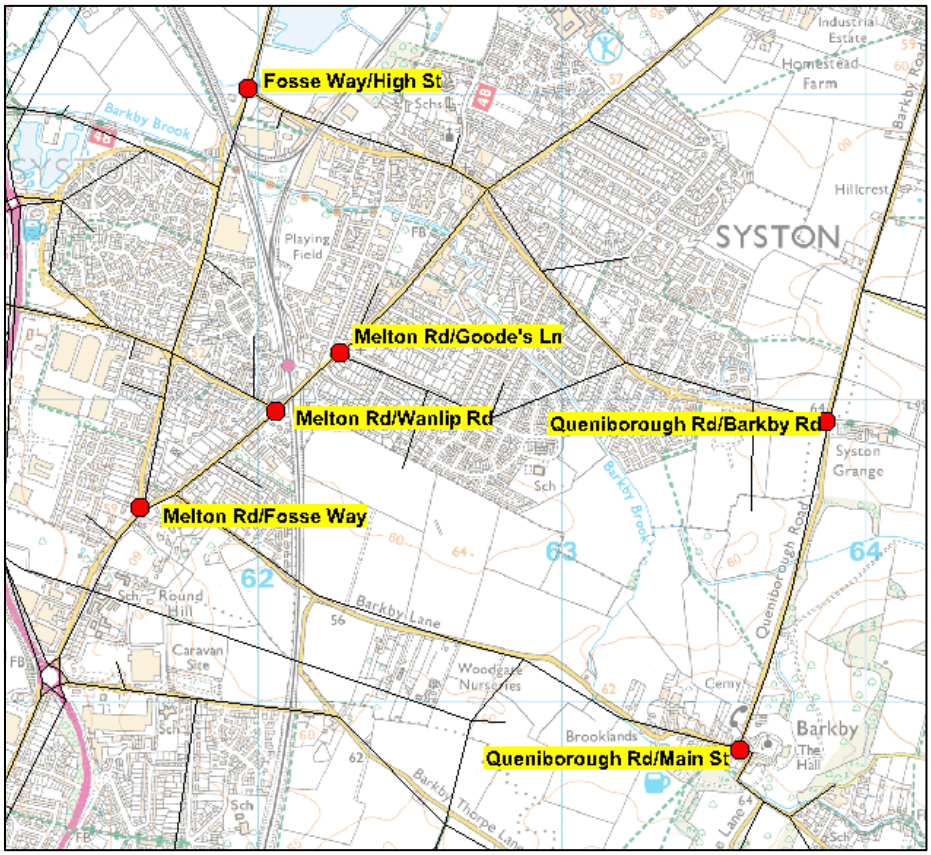


Figure 3-23: Syston Junctions

Description	Scenario	Volume Over Capacity (%)								Core Delay (secs) and % Differences from Core							
		Core	1	2	3	4	5	6	7	Core	1	2	3	4	5	6	7
Fosse Way/High St	Option	64	103	103	89	102	103	104	103	28	135%	137%		121%	145%	166%	148%
	Mit		86	87	56	80	90	94	91							41%	
Queniborough Rd/Barkby Rd	Option	86	103	103	90	102	102	104	102	57	75%	75%		70%	75%	91%	75%
	Mit		93	93	78	89	95	97	95						18%	25%	
Melton Rd/Goode's Ln	Option	49	100	100	57	77	96	101	96	4	268%	290%				446%	
	Mit		64	64	52	62	65	67	65								
Melton Rd/Wanlip Rd	Option	99	104	104	102	106	104	104	104	21	356%	355%	84%	331%	403%	444%	407%
	Mit		102	102	94	101	102	104	102		72%	73%			105%	166%	109%
Melton Rd/Fosse Way	Option	77	81	82	79	81	83	84	83	12							
	Mit		83	83	81	83	84	85	84								
Queniborough Rd/Main St	Option	49	69	69	59	64	76	87	76	5							
	Mit		62	63	58	60	71	79	71								

Table 3-15: Key Junctions in Syston - VoCs and % Delay Changes against Core, AM Peak

3.6.4. The Core scenario shows a handful of congested junctions, but a number are also uncongested which suggests that the baseline network performance level of demand was not at its maximum (unlike Loughborough).

3.6.5. Option 3 suffers the least additional impact from Core to Option, which is a sensible result as this is the option with the least amount of dwellings allocated for the area (~700 dwellings).

3.6.6. The remaining options all follow a similar profile, where four of the junctions within Syston are moved into the heavily congested category in the Option scenarios.

3.6.7. In the mitigation package, Fosse Way/High Street, Melton Road/Goodes Lane, Melton Road/Wanlip Road, and Queniborough Road/Barkby Road are all mitigated with a 20% capacity increase at the junction.

3.6.8. The results show a mixed outcome regarding the success of the mitigation package. For example, Fosse Way/High Street is mitigated back to the Core level in only Options 3 and 4, in the others it is mitigated slightly but not back to an uncongested state. Queniborough Road/Barkby Road is generally mitigated back to its Core level (except Option 3 where it is actually improved).

3.6.9. The Melton Road/Wanlip Road junction however only returns to its Core standard in Option 3. In the remaining options, it remains heavily congested

3.6.10. Encouragingly though, this is the only junction which exhibits such a profile. This generally suggests that if appropriately mitigated, Syston is able to accommodate a certain degree of development before the network performance declines significantly. The High Growth options in this area also show the network can accommodate the additional demand (although the difference between, for example Option 1 and Option 6 is only ~500 extra dwellings). This is unlike Loughborough where the High Growth analysis suggested the network could not accommodate the extra demand.

A46 & Outer District Distributor (ODDR) Junctions

3.6.11. On the main routes for trips between Charnwood and Leicester City, Table 3-16 shows the volume/capacity (%) values, and delay (secs) changes from Core to Option/Mitigation for a selection of key junctions in the AM Peak (red dots Figure 3-24). Junctions with a delay per PCU difference of between -10 and 10 seconds are omitted.

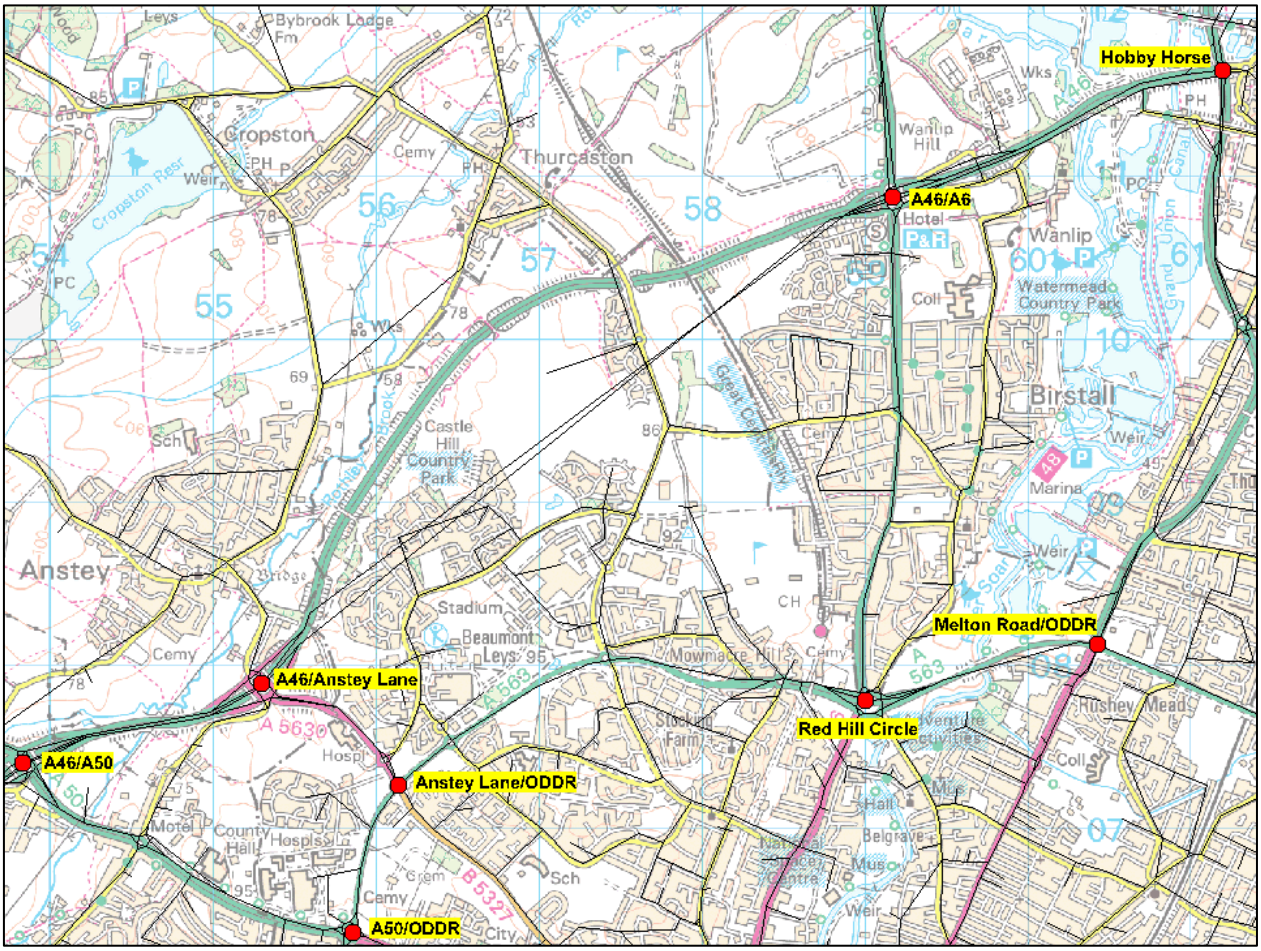


Figure 3-24: A46 and A563 Junctions

Description	Scenario	Volume Over Capacity (%)								Core Delay (secs) and % Differences from Core							
		Core	1	2	3	4	5	6	7	Core	1	2	3	4	5	6	7
Hobby Horse	Option	98	99	98	99	98	99	99	99	79							
	Mit		91	91	91	91	95	95	95		-16%	-17%	-17%	-17%			
A46/A6	Option	100	100	101	101	101	102	102	101	85					18%	18%	21%
	Mit		100	100	100	100	100	100	101								
A46/Anstey Ln	Option	93	94	94	94	94	95	94	95	65							
	Mit		79	80	80	80	95	95	95		-18%	-18%	-18%	-18%			
A46/A50	Option	102	102	102	102	102	103	103	103	72							
	Mit		102	102	102	102	102	102	102								
A50/ODDR	Option	94	92	92	91	93	92	92	92	86							
	Mit		91	93	93	91	89	89	92								
Anstey Ln/ODDR	Option	101	101	101	101	101	101	101	101	31							
	Mit		101	101	101	101	98	98	97								
Red Hill Circle	Option	99	100	100	99	100	101	101	101	109	11%	12%		10%	24%	29%	27%
	Mit		100	100	100	100	97	97	97		13%	13%		11%	-15%	-14%	-14%
ODDR/Melton Rd	Option	101	102	102	102	102	103	103	103	79						13%	
	Mit		103	102	102	102	102	102	102								

Table 3-16: Key Junctions on A46 & ODDR - VoCs and Delay per PCU Changes against Core, AM Peak

3.6.12. It is apparent that all of the main junctions in this subset are already incurring high degrees of congestion in the Core scenario.

3.6.13. Even when the additional Charnwood demand is loaded onto the network in the Option scenarios, these junctions do not experience any substantial shift in performance. This is because this part of the network is already operating at maximum capacity, and cannot accommodate substantial additional flows.

3.6.14. Due to the additional route choice available in this area, some of the more minor routes accommodate some of the demand, and also longer-distance trips have the capability to re-route. Flow difference plots are displayed below for Option 1 AM Peak in this area for the 'Option minus Core' (Figure 3-25) and 'Mitigation minus Option' (Figure 3-26) scenarios. These show little flow difference changes between any of the three scenarios. In the 'Option minus Core' there is some seepage of additional trips onto more minor routes, and the 'Mitigation minus Option' appears to reduce some trips on minor routes and shows an increase of trips on more major routes (for example a reduction along Ashton Green Road and an increase on the A6).

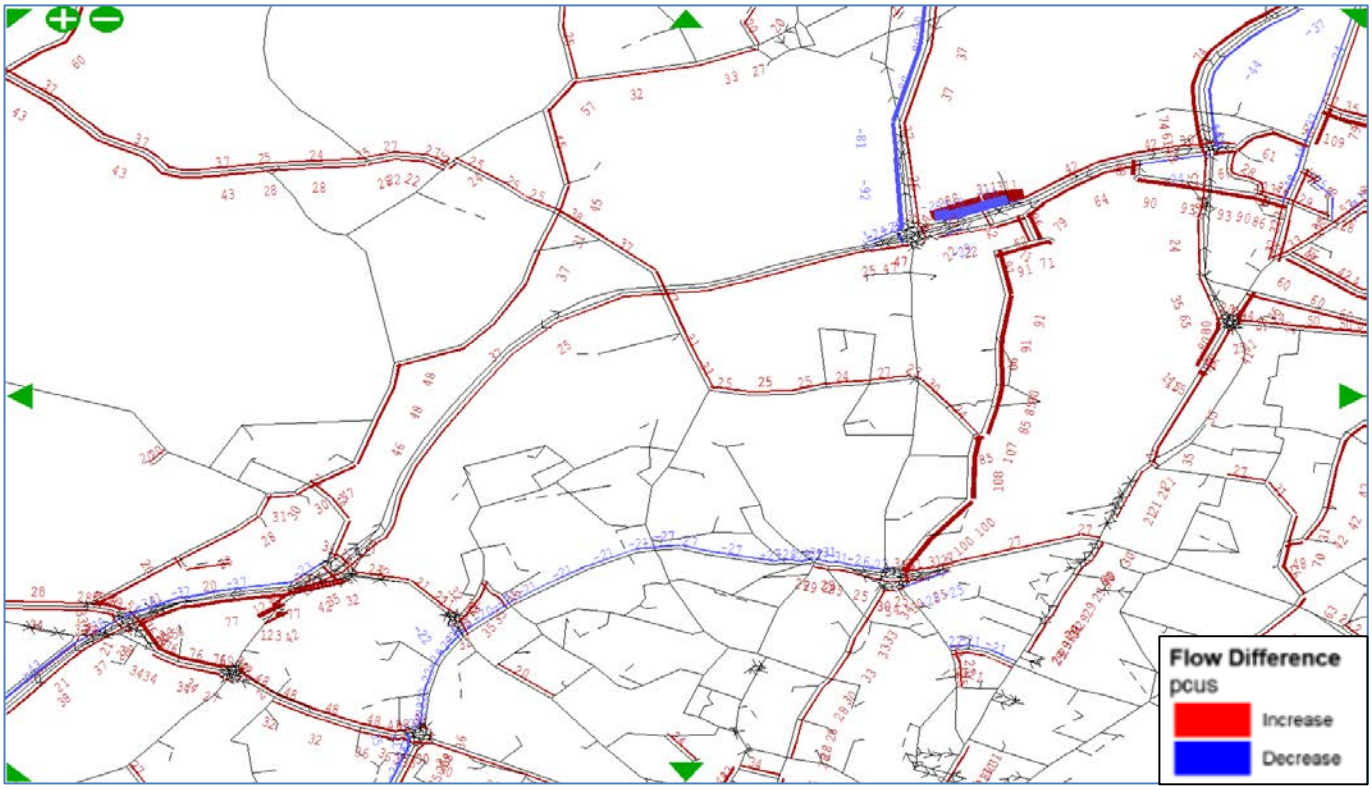


Figure 3-25: Flow Difference (Option minus Core), Option 1 (AM Peak), Leicester Urban Area & City (North)

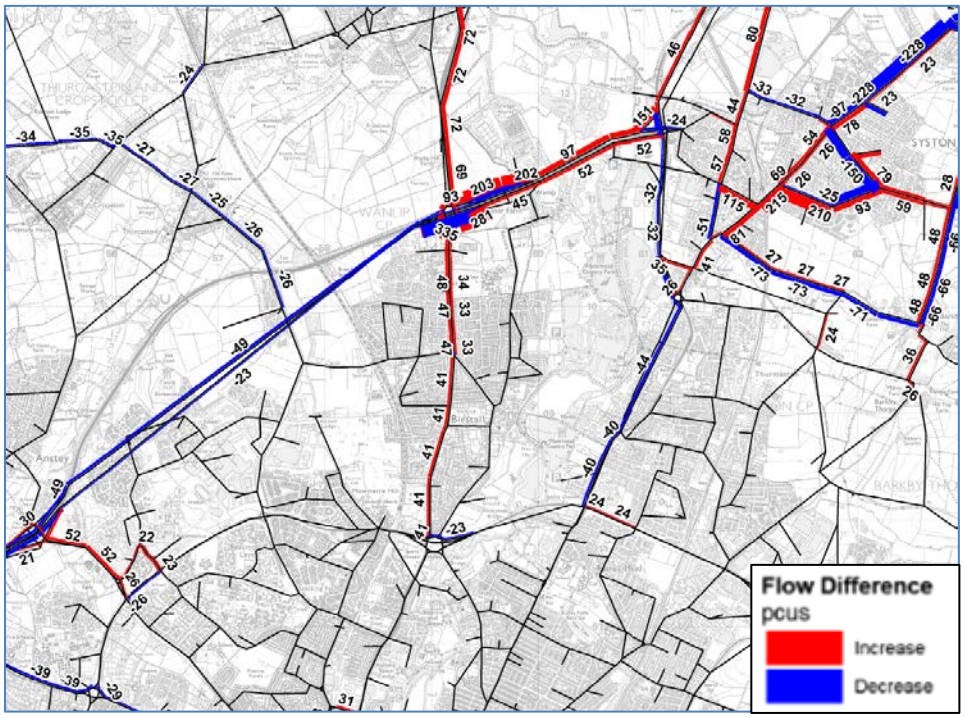


Figure 3-26: Flow Difference (Mitigation minus Option), Option 1 (AM Peak), Leicester Urban Area & City (North)

3.6.15. Regarding mitigation impacts, Table 3-16 shows there is again little substantial impact on this part of the network. In the Low Growth scenarios, there is mitigation in the form of capacity increase at the junctions along the A46 (A50,

Anstey Lane, A6 and Hobby Horse). However, the only junctions to incur any significant relief are the A46/Anstey Lane junction, which reduces from a congested level to an uncongested level, and the Hobby Horse junction which shows a ~10 second delay per PCU decrease from Mitigation to Core.[13]

3.6.16. In the High Growth options, there is further mitigation (in the form of 10% capacity improvement at the A50/ODDR, Anstey Lane/ODDR and A6/ODDR). The only junction to display any noteworthy relief due to the mitigation is the Red Hill Circle (A6/ODDR) junction; in Option 1 delays per PCU increased ~30 seconds against the Core, but when mitigation was implemented the delays decreased by ~15 seconds against the Core. However, the junction remains severely impeded in terms of congestion (volume/capacity ratios of approaching 100%). There is also some minor relief in the mitigation scenario for A50/ODDR and Anstey Lane/ODDR, with ~10 second delay reduction against the Core.

A46 Link Capacity Increase

3.6.17. In the High Growth mitigation options, there is a substantial increase in flows along the A46 between M1 J21a and the Hobby Horse junction. This is a result of the mitigation increasing capacity along the links and on slip-roads (the Low Growth options only increased capacity at each junction gyratory).

3.6.18. For example, Figure 3-27 shows the Option5 (AM Peak) flow difference plot for the 'Mitigation minus Option'. This shows an increase of ~500 PCUs eastbound (+13%) and ~750 PCUs westbound (+18%) between the Anstey Lane and A6 junctions on the A46.

[13] Delay per PCU values are a flow-weighted average delay across a node (proxy for junction), as output by SATURN. There are a number of limitations here; 1) LLITM is not validated on turning movements, and therefore turning movement delays should also be treated with caution, and 2) the flow-weighted delay average means that, for example, if a junction has one heavily delayed arm and three free-flowing arms, the delays on the heavily delayed arms would be dampened down the free-flowing arm delays in the overall flow-weighted delay average. Therefore, absolute values should be treated with caution, but are useful for presenting a general trend of network performance from the Core to the Option/Mitigation.

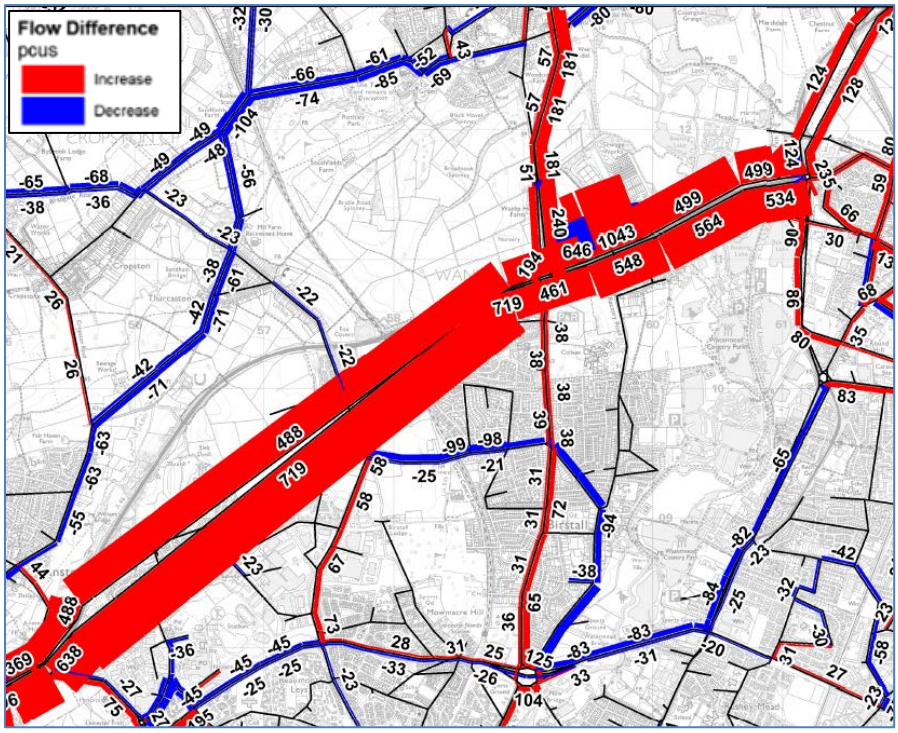


Figure 3-27: Flow Difference (Mitigation minus Option), Option 5 (AM Peak), Leicester Urban Area & City (North)

3.6.19. This mitigation appears to relieve some of the more minor routes in the area; e.g. there is a reduction of flow through areas such as Thurcaston and Cropston.

3.6.20. A select link analysis was undertaken to investigate the origin and destination of the trips using any part of the A46 between the 'Hobby Horse' and A50 junctions in Option 5 Option and Mitigation scenarios (AM Peak). This is in order to gain an understanding of the change in trip distribution when link capacity is increased on this key strategic route.

3.6.21. Table 3-17 shows the origin and destination sector of additional trips using the A46 in Option 5 (AM Peak).[14]

		Loughborough	Shepshed	"Leicester Urban Area"	Rest Charnwood	Leicester City	Other Leics	Outside Leics	
	1,399	49	5	166	99	189	447	444	*Destination*
Loughborough	95	0	0	0	0	31	45	19	
Shepshed	1	0	0	0	1	0	1	0	
"Leicester Urban Area"	195	20	4	7	24	33	72	35	
Rest Charnwood	128	2	1	16	2	19	60	28	
Leicester City	273	16	0	23	36	0	122	75	
Other Leics	301	11	0	80	21	63	78	47	
Outside Leics	406	1	0	38	16	43	69	240	
	Origin								

Table 3-17: Change in Trips between Option and Mitigation Scenarios Crossing at Least One Link on A46 between Hobby Horse and A50, Option 5 AM Peak

[14] Leicester Urban Area" refers to Anstey, Birstall, Syston, Rothley, Thurmaston, and Thurcaston.

3.6.22. Of the additional trips using the A46 between Option and Mitigation, 30% originate from within Charnwood, and 23% terminate within Charnwood. This shows that the increased link capacity on the A46 does serve a direct benefit for a decent proportion of trips to/from Charnwood. Also, it understandably attracts a large increase in more strategic trips; for example trips from Leicestershire (minus Charnwood or City) to Leicestershire (minus Charnwood or City)' make up ~17% of the increase in trips along the A46.

3.6.23. Overall, on the main strategic junctions in and around the north of Leicester City, there is not a vast change in terms of junction performance between Core, Option or Mitigation scenarios in the Low Growth scenarios. This is likely a result of the already congested nature in the Core resulting in this part of the network being unable to accommodate much extra demand.

3.6.24. In the High Growth scenarios, the A46 link capacity increase does attract a substantial amount of additional trips. However, junctions along the route remain at similar congestion levels to what was exhibited in the Core; this suggests that the additional capacity is filled fairly quickly, and the area of the network operates at a consistent congestion level between the scenarios.

Corridor Journey Time Analysis

3.6.25. In order to further demonstrate the impact of any increase in delays between Option and Mitigation scenarios along key corridors into the City, journey time analysis on a number of key routes was undertaken (Figure 3-28):[15]

- "**A50**" (ODDR <> Vaughan Way),
- "**Anstey Lane**" (ODDR <> Ravensbridge Drive/A6),
- "**A6**" (ODDR <> Sanvey Gate),
- "**Melton Road**" (ODDR <> St. Matthew's Way), and
- "**Loughborough Road**" (ODDR <> Melton Road).
- "**ODDR**" (A50 <> Melton Road)

[15] Journey times are calculated by summing the link time and junction time. It is assumed that when a journey starts at a particular junction, it does not incur the junction delay at that start point, but when the route ends at a junction, the junction delay is included to represent the journey crossing the junction 'stop-line'.

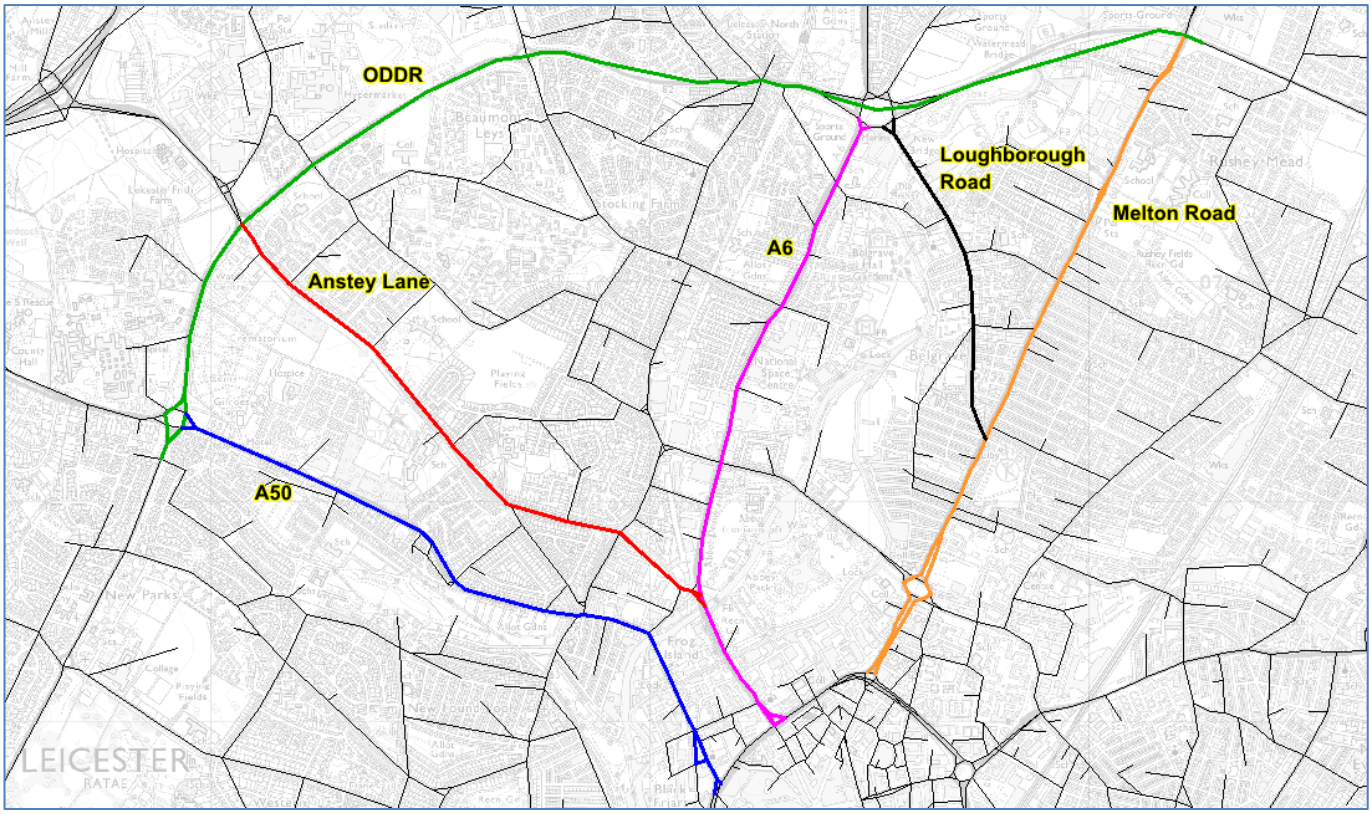


Figure 3-28: City Journey Time Routes

3.6.26. Table 3-18 and Table 3-19 show the differences in journey times between the Core and Option scenarios and Option and Mitigation scenarios for the AM and PM Peak periods respectively.

3.6.27. Table 3-20 and Table 3-21 show the differences in 'average flow'[16] between the Core and Option scenarios and Option and Mitigation scenarios for the AM and PM Peak periods respectively.

[16] Average flow' is a flow-weighted calculation on the following basis for each journey time route: (sum flow*distance for all links) / (sum distance for all links).

Route	Direction	Core JT	Opt1 - Core	Opt2 - Core	Opt3 - Core	Opt4 - Core	Opt5 - Core	Opt6 - Core	Opt7 - Core	Mit1 - Opt1	Mit2 - Opt2	Mit3 - Opt3	Mit4 - Opt4	Mit5 - Opt5	Mit6 - Opt6	Mit7 - Opt7
A50	IB	09:10	00:25	00:30	00:31	00:23	00:50	00:50	00:54	00:01	-00:03	-00:02	00:03	00:11	00:10	00:06
	OB	06:56	00:02	00:02	00:01	00:02	00:01	00:02	00:01	-00:00	00:00	00:00	00:00	-00:05	-00:05	-00:06
Anstey Ln	IB	07:24	00:11	00:14	00:13	00:09	00:17	00:18	00:19	00:02	-00:03	-00:02	00:04	-00:15	-00:17	-00:20
	OB	06:05	00:00	-00:01	-00:00	-00:01	00:00	00:01	-00:00	00:00	00:00	-00:00	00:01	-00:17	-00:17	-00:18
A6	IB	06:32	00:20	00:23	00:22	00:16	00:23	00:30	00:32	-00:04	-00:07	-00:07	00:01	-00:23	-00:28	-00:31
	OB	07:02	-00:06	-00:04	-00:05	-00:04	-00:10	-00:10	-00:08	-00:02	-00:01	-00:01	-00:02	-00:12	-00:12	-00:13
Loughborough Rd	IB	06:03	00:28	00:30	00:33	00:25	00:39	00:41	00:43	-00:00	-00:03	-00:06	00:03	00:16	00:12	00:13
	OB	04:36	-00:00	00:00	-00:00	00:00	-00:00	-00:00	00:00	00:00	-00:00	-00:00	-00:00	-00:01	-00:01	-00:01
Melton Rd	IB	08:00	00:06	00:07	00:05	00:05	00:10	00:10	00:10	-00:00	00:00	-00:01	00:01	-00:09	-00:08	-00:08
	OB	08:58	-00:01	-00:00	-00:01	-00:00	-00:03	-00:02	-00:01	00:01	00:00	00:00	00:00	-00:06	-00:07	-00:07
ODDR	CW	12:14	00:00	00:01	00:06	00:05	00:09	00:03	00:08	-00:05	-00:02	-00:04	-00:07	-00:31	-00:28	-00:30
	ACW	15:04	00:26	00:30	00:21	00:25	00:49	00:57	00:52	00:05	00:04	00:01	00:05	-01:17	-01:24	-01:20

Table 3-18: City Journey Times – Differences, AM Peak

Route	Direction	Core JT	Opt1 - Core	Opt2 - Core	Opt3 - Core	Opt4 - Core	Opt5 - Core	Opt6 - Core	Opt7 - Core	Mit1 - Opt1	Mit2 - Opt2	Mit3 - Opt3	Mit4 - Opt4	Mit5 - Opt5	Mit6 - Opt6	Mit7 - Opt7
A50	IB	08:01	00:02	00:02	00:01	00:02	00:07	00:09	00:08	-00:00	00:01	-00:01	-00:01	-00:01	-00:01	-00:01
	OB	07:18	00:08	00:08	00:08	00:07	00:13	00:11	00:12	-00:02	-00:01	-00:01	-00:01	-00:00	-00:00	-00:01
Anstey Ln	IB	06:06	-00:00	-00:00	-00:01	-00:01	00:01	00:01	00:01	-00:00	00:00	00:01	00:00	00:02	00:00	00:02
	OB	06:30	00:07	00:07	00:06	00:05	00:10	00:08	00:09	-00:00	00:02	00:03	00:03	-00:03	-00:02	-00:02
A6	IB	05:42	-00:03	-00:03	-00:04	-00:03	-00:07	-00:06	-00:06	00:00	00:01	00:01	00:01	-00:01	-00:02	-00:02
	OB	08:38	00:31	00:31	00:26	00:29	00:52	00:51	00:53	00:03	00:03	00:05	00:02	-00:22	-00:18	-00:23
Loughborough Rd	IB	06:16	00:03	00:03	00:01	00:03	00:03	00:05	00:04	-00:01	-00:01	-00:01	-00:01	-00:10	-00:09	-00:09
	OB	05:59	00:10	00:10	00:12	00:07	00:25	00:22	00:25	-00:02	-00:04	-00:02	00:00	00:01	00:04	00:00
Melton Rd	IB	07:24	-00:02	-00:02	-00:02	-00:02	-00:05	-00:04	-00:04	00:00	00:00	00:00	00:01	-00:02	-00:02	-00:02
	OB	09:49	00:19	00:19	00:15	00:18	00:33	00:37	00:34	00:00	-00:01	-00:05	-00:03	-00:16	-00:18	-00:18
ODDR	CW	13:35	00:35	00:35	00:28	00:33	00:55	00:56	00:55	00:03	00:02	-00:01	00:00	-01:14	-01:08	-01:16
	ACW	12:27	00:05	00:05	00:05	00:04	00:07	00:06	00:09	-00:09	-00:06	-00:05	-00:06	-00:29	-00:29	-00:31

Table 3-19: City Journey Times – Differences, PM Peak

Route	Core Avg Flow	Opt1 - Core	Opt2 - Core	Opt3 - Core	Opt4 - Core	Opt5 - Core	Opt6 - Core	Opt7 - Core	Mit1 - Opt1	Mit2 - Opt2	Mit3 - Opt3	Mit4 - Opt4	Mit5 - Opt5	Mit6 - Opt6	Mit7 - Opt7
A50 Inbound	*1,011*	5	3	8	13	28	13	21	-18	1	-4	-21	-25	-17	-11
A50 Outbound	*857*	18	20	16	13	16	25	22	4	-5	-3	7	-20	-26	-38
Anstey Lane Inbound	*802*	16	19	17	13	25	25	27	8	7	8	13	-12	-14	-17
Anstey Lane Outbound	*575*	4	-2	-1	0	2	0	0	2	7	5	5	17	20	18
A6 Inbound	*1,512*	28	32	29	28	39	38	41	2	-6	-1	1	33	38	30
A6 Outbound	*1,097*	-9	-5	-5	-3	-21	-20	-16	-3	-1	-3	-3	-3	-5	-7
Loughborough Rd Inbound	*736*	8	9	7	7	18	18	17	2	3	3	4	-1	-2	1
Loughborough Rd Outbound	*447*	-3	-2	-3	-1	-5	-4	-2	0	0	-1	-1	-5	-5	-5
Melton Rd Inbound	*1,145*	23	25	18	20	35	38	37	0	1	-1	3	-24	-23	-22
Melton Rd Outbound	*941*	-4	-2	-2	-1	-9	-8	-5	1	1	1	0	-17	-18	-17
ODDR Clockwise	*1,218*	-12	-14	-7	-5	-14	-25	-20	-4	7	4	-7	-20	-14	-14
ODDR Anti-Clockwise	*1,409*	11	11	8	8	16	18	16	0	-2	-1	2	-7	-9	-9

Table 3-20: 'Average Flow' along City Journey Time Routes - Differences, AM Peak

Route	Core Avg Flow	Opt1 - Core	Opt2 - Core	Opt3 - Core	Opt4 - Core	Opt5 - Core	Opt6 - Core	Opt7 - Core	Mit1 - Opt1	Mit2 - Opt2	Mit3 - Opt3	Mit4 - Opt4	Mit5 - Opt5	Mit6 - Opt6	Mit7 - Opt7
A50 Inbound	*939*	21	21	19	22	24	29	28	3	1	-1	-1	-9	3	-12
A50 Outbound	*880*	22	22	22	20	28	25	24	-6	-3	-1	-2	4	2	2
Anstey Lane Inbound	*660*	-9	-9	-12	-9	-6	-7	-2	1	1	3	1	11	3	12
Anstey Lane Outbound	*845*	21	21	20	17	34	30	28	-2	-1	0	1	16	18	20
A6 Inbound	*1,196*	-20	-20	-24	-20	-45	-41	-39	1	5	5	6	18	15	17
A6 Outbound	*1,607*	40	40	33	38	61	60	65	7	7	10	6	7	10	2
Loughborough Rd Inbound	*552*	-1	-1	-1	-1	-2	0	-1	3	2	0	1	0	0	1
Loughborough Rd Outbound	*587*	0	0	1	0	1	1	0	2	2	1	1	7	7	6
Melton Rd Inbound	*927*	-9	-9	-8	-8	-22	-19	-20	0	1	0	2	-15	-13	-15
Melton Rd Outbound	*1,079*	18	18	16	17	25	28	26	-4	-6	-9	-7	-25	-26	-28
ODDR Clockwise	*1,297*	26	26	20	27	41	42	41	9	5	2	3	-42	-40	-44
ODDR Anti-Clockwise	*1,257*	16	16	17	14	21	17	21	-16	-9	-8	-10	-53	-52	-59

Table 3-21: 'Average Flow' along City Journey Time Routes - Differences, PM Peak

3.6.28. In the Low Growth mitigation scenarios, there is minimal impact upon any of the journey time routes; this is largely understandable as no mitigation was proposed for junctions within the City in the Low Growth mitigation runs. Also, the 'average flow' along these routes also show no substantial change from Option to Mitigation runs; this is largely because the network is already congested in the Core, and there is little scope to accommodate additional flows without intervention.

3.6.29. The effect of the High Growth mitigation is a slightly more complex issue. To recap, in these scenarios mitigation was applied to the following junctions of interest for analysis of the City network:

- Bennion Road/Beaumont Leys Lane
- A50/ODDR
- A50/Gynsill Lane
- A6/Blackbird Road
- Anstey Lane/ODDR
- Red Hill Circle
- A46 Link Capacity upgrade.

3.6.30. The High Growth mitigation shows a more varied outcome; a majority of the routes again show fairly minimal changes (less than 20 seconds). However, the ODDR in both time periods has journey time differences of ~>30 seconds.

3.6.31. Figure 3-29 shows the Core, Option and Mitigation cumulative journey time from Melton Road to A50 along the ODDR in the Option 5 AM Peak scenario.

3.6.32. In the PM Peak, the ODDR shows in Table 3-21 average flows decreasing across this route. The addition of the A46 link capacity increase in the High Growth mitigation acts as a distributor for trips which previously traversed along key routes in the City, thus providing flow relief. This, in turn, can then assist delay reduction. There is also capacity increase at three junctions along the ODDR, which again contributes towards the reduction in delays for the remaining trips.

Figure 3-29: ODDR (Anticlockwise) Journey Time Comparison, 2036 Option 5, PM Peak

3.7. Key Area 5 – M1 Junctions within AoI

3.7.1. The stretch of the M1 from Junction 21a to Junction 24 is located within the AoI. The following tables detail the junction performance (in terms of volume/capacity) for the AM and PM Peak periods.

M1 Junction 21a

Description	Metric	Core	Opt1	Opt1_MIT	Opt2	Opt2_MIT	Opt3	Opt3_MIT	Opt4	Opt4_MIT	Opt5	Opt5_MIT	Opt6	Opt6_MIT	Opt7	Opt7_MIT
NB Diverge	VoC	57	58	58	58	58	58	58	58	58	59	57	59	57	58	57
NB Diverge	VoC	87	86	85	86	85	86	86	86	85	84	88	84	88	84	89
SB Merge	VoC	77	78	78	78	78	78	78	78	78	79	69	79	69	79	69
SB Merge	VoC	91	91	91	91	91	91	91	90	91	90	99	91	99	91	99
SB Merge	VoC	98	99	99	99	99	99	99	99	99	101	102	101	102	100	102

Table 3-22: M1 Junction 21a Volume/Capacity (%), AM Peak

Description	Metric	Core	Opt1	Opt1_MIT	Opt2	Opt2_MIT	Opt3	Opt3_MIT	Opt4	Opt4_MIT	Opt5	Opt5_MIT	Opt6	Opt6_MIT	Opt7	Opt7_MIT
NB Diverge	VoC	54	54	54	54	54	54	54	54	54	54	53	54	53	54	53
NB Diverge	VoC	86	87	87	87	87	87	87	87	87	87	98	87	97	87	98
SB Merge	VoC	66	65	66	65	65	66	66	65	66	64	53	64	53	64	54
SB Merge	VoC	84	83	83	83	83	83	83	83	83	82	84	82	84	83	85
SB Merge	VoC	89	89	89	89	89	89	89	89	89	87	88	88	88	88	88

Table 3-23: M1 Junction 21a Volume/Capacity (%), PM Peak

M1 Junction 22

Description	Metric	Core	Opt1	Opt1_MIT	Opt2	Opt2_MIT	Opt3	Opt3_MIT	Opt4	Opt4_MIT	Opt5	Opt5_MIT	Opt6	Opt6_MIT	Opt7	Opt7_MIT
NB Diverge	VoC	51	50	51	50	51	50	51	50	51	50	49	50	49	50	49
NB Merge	VoC	81	84	78	84	80	84	80	83	79	87	85	87	84	87	85
SB Diverge	VoC	63	64	64	64	63	64	64	64	64	66	64	65	64	65	64
SB Merge	VoC	55	56	55	55	55	56	55	55	55	56	55	56	55	56	55
Gyratory	VoC	102	102	101	102	101	102	101	101	101	102	101	102	101	102	101

Table 3-24: M1 Junction 22 Volume/Capacity (%), AM Peak

Description	Metric	Core	Opt1	Opt1_MIT	Opt2	Opt2_MIT	Opt3	Opt3_MIT	Opt4	Opt4_MIT	Opt5	Opt5_MIT	Opt6	Opt6_MIT	Opt7	Opt7_MIT
NB Diverge	VoC	56	56	56	56	57	57	57	56	56	56	53	56	54	56	53
NB Merge	VoC	72	75	72	73	69	73	70	74	71	74	74	75	74	74	73
SB Diverge	VoC	59	60	59	60	59	60	59	60	59	62	61	61	60	61	60
SB Merge	VoC	52	52	52	52	52	52	52	52	52	51	51	52	51	52	51
Gyratory	VoC	102	102	102	102	102	102	102	102	102	101	102	101	102	102	102

Table 3-25: M1 Junction 22 Volume/Capacity (%), PM Peak

M1 Junction 23

Description	Metric	Core	Opt1	Opt1_MIT	Opt2	Opt2_MIT	Opt3	Opt3_MIT	Opt4	Opt4_MIT	Opt5	Opt5_MIT	Opt6	Opt6_MIT	Opt7	Opt7_MIT
NB Diverge	VoC	61	62	61	62	62	62	61	61	61	62	61	62	61	62	61
NB Merge	VoC	67	70	74	70	75	71	76	70	75	75	82	75	82	74	81
SB Diverge	VoC	65	64	64	64	64	64	64	64	64	63	63	63	63	64	64
SB Merge	VoC	61	61	61	61	61	61	61	61	61	61	60	61	60	61	60
Gyratory	VoC	86	84	82	85	83	85	83	83	82	87	81	86	81	87	82

Table 3-26: M1 Junction 23 Volume/Capacity (%), AM Peak

Description	Metric	Core	Opt1	Opt1_MIT	Opt2	Opt2_MIT	Opt3	Opt3_MIT	Opt4	Opt4_MIT	Opt5	Opt5_MIT	Opt6	Opt6_MIT	Opt7	Opt7_MIT
NB Diverge	VoC	63	63	63	63	63	63	63	63	63	63	60	63	60	63	60
NB Merge	VoC	67	66	66	66	66	66	66	67	66	65	62	65	63	66	63
SB Diverge	VoC	62	65	65	64	65	65	65	64	65	66	67	66	67	66	67
SB Merge	VoC	55	56	55	55	55	55	55	56	55	56	56	56	55	56	55
Gyratory	VoC	87	96	96	97	95	98	97	96	95	101	100	101	100	100	100

Table 3-27: M1 Junction 23 Volume/Capacity (%), PM Peak

M1 Junction 23a

Description	Metric	Core	Opt1	Opt1_MIT	Opt2	Opt2_MIT	Opt3	Opt3_MIT	Opt4	Opt4_MIT	Opt5	Opt5_MIT	Opt6	Opt6_MIT	Opt7	Opt7_MIT
NB Diverge	VoC	79	81	86	80	88	82	86	79	86	84	86	83	87	83	87
NB Merge	VoC	105	106	102	106	102	106	102	106	102	107	102	107	102	107	102
SB Merge	VoC	92	90	91	90	91	90	91	91	91	89	89	89	89	90	90

Table 3-28: M1 Junction 23a Volume/Capacity (%), AM Peak

Description	Metric	Core	Opt1	Opt1_MIT	Opt2	Opt2_MIT	Opt3	Opt3_MIT	Opt4	Opt4_MIT	Opt5	Opt5_MIT	Opt6	Opt6_MIT	Opt7	Opt7_MIT
NB Diverge	VoC	79	77	81	78	81	77	82	78	82	75	77	75	77	75	78
NB Merge	VoC	100	100	92	100	92	100	92	100	93	100	91	100	91	100	92
SB Merge	VoC	88	90	90	90	91	90	91	90	90	92	92	92	92	91	92

Table 3-29: M1 Junction 23a Volume/Capacity (%), PM Peak

M1 Junction 24

Description	Metric	Core	Opt1	Opt1_MIT	Opt2	Opt2_MIT	Opt3	Opt3_MIT	Opt4	Opt4_MIT	Opt5	Opt5_MIT	Opt6	Opt6_MIT	Opt7	Opt7_MIT
NB Diverge	VoC	79	79	85	79	85	80	86	80	85	80	87	80	87	80	87
NB Merge	VoC	62	63	67	63	67	63	68	63	67	63	69	63	69	63	69
SB Diverge	VoC	69	69	69	69	69	69	69	69	69	69	68	69	68	69	68
SB Merge	VoC	71	72	71	71	71	71	71	71	71	71	70	71	70	71	71
SB Merge	VoC	100	99	99	99	99	99	99	99	100	99	98	98	99	99	99
Gyratory	VoC	104	105	104	105	104	104	104	104	104	105	104	106	104	106	104

Table 3-30: M1 Junction 24 Volume/Capacity (%), AM Peak

Description	Metric	Core	Opt1	Opt1_MIT	Opt2	Opt2_MIT	Opt3	Opt3_MIT	Opt4	Opt4_MIT	Opt5	Opt5_MIT	Opt6	Opt6_MIT	Opt7	Opt7_MIT
NB Diverge	VoC	86	85	87	86	87	85	87	86	87	84	83	85	84	85	84
NB Merge	VoC	71	70	72	71	71	70	71	71	72	69	69	69	69	70	69
SB Diverge	VoC	62	63	63	63	63	63	63	63	63	64	64	64	64	64	64
SB Merge	VoC	63	65	65	64	65	65	65	64	65	66	66	66	66	65	65
SB Merge	VoC	91	93	93	93	93	93	93	93	93	94	94	94	94	94	94
Gyratory	VoC	100	101	101	101	101	101	101	101	101	101	101	101	101	101	101

Table 3-31: M1 Junction 24 Volume/Capacity (%), PM Peak

3.7.2. Generally, in both the AM and PM Peak periods, there is little substantial change at most of the motorway junctions.

3.7.3. The one junction where mitigation was targeted was at the A42/M1 Junction 23a merge, where a 10% capacity increase was modelled in both Low and High Growth scenarios.

3.7.4. In Table 3-28 and Table 3-29, the northbound merge at Junction 23 shows a decent VoC reduction (~4-5% in the AM Peak, ~7-8% in the PM Peak).

4. Results: Option 1 – Urban Concentration A (Low Growth)

4.1. Development Assumptions

Settlement	Dwellings	Notable Sites
Leicester Urban Area (Birstall, Thurmaston and Syston)	3,000	Majority of available sites (total 3,346) including one large site at Syston (1,200 homes, south of Syston)
Loughborough	4,000	Mix of sites includes at least one large site (3,000 south west of Loughborough)
Shepshed	500	Large and medium sites west of Shepshed and mix of small and medium sized sites in and around the town.
Anstey	100	A mix of small and medium sized sites, total of 600 homes at the Service Centres
Barrow Upon Soar	100	
Mountsorrel	100	
Quorn	100	
Rothley	100	
Sileby	100	
Total	**8,100**	

Table 4-1: Option 1 Development Assumptions (provided by Charnwood Borough Council)

4.2. Modelling Outputs

4.2.1. The following outputs are produced:

- Flow Difference Plots (Figure 4-1, Figure 4-2)
- Delay Difference Plots (Figure 4-3, Figure 4-4)
- Junction Analysis (Figure 4-5, Figure 4-6, Table 4-2, Table 4-3)

FLOW DIFFERENCE (MITIGATION – OPTION)

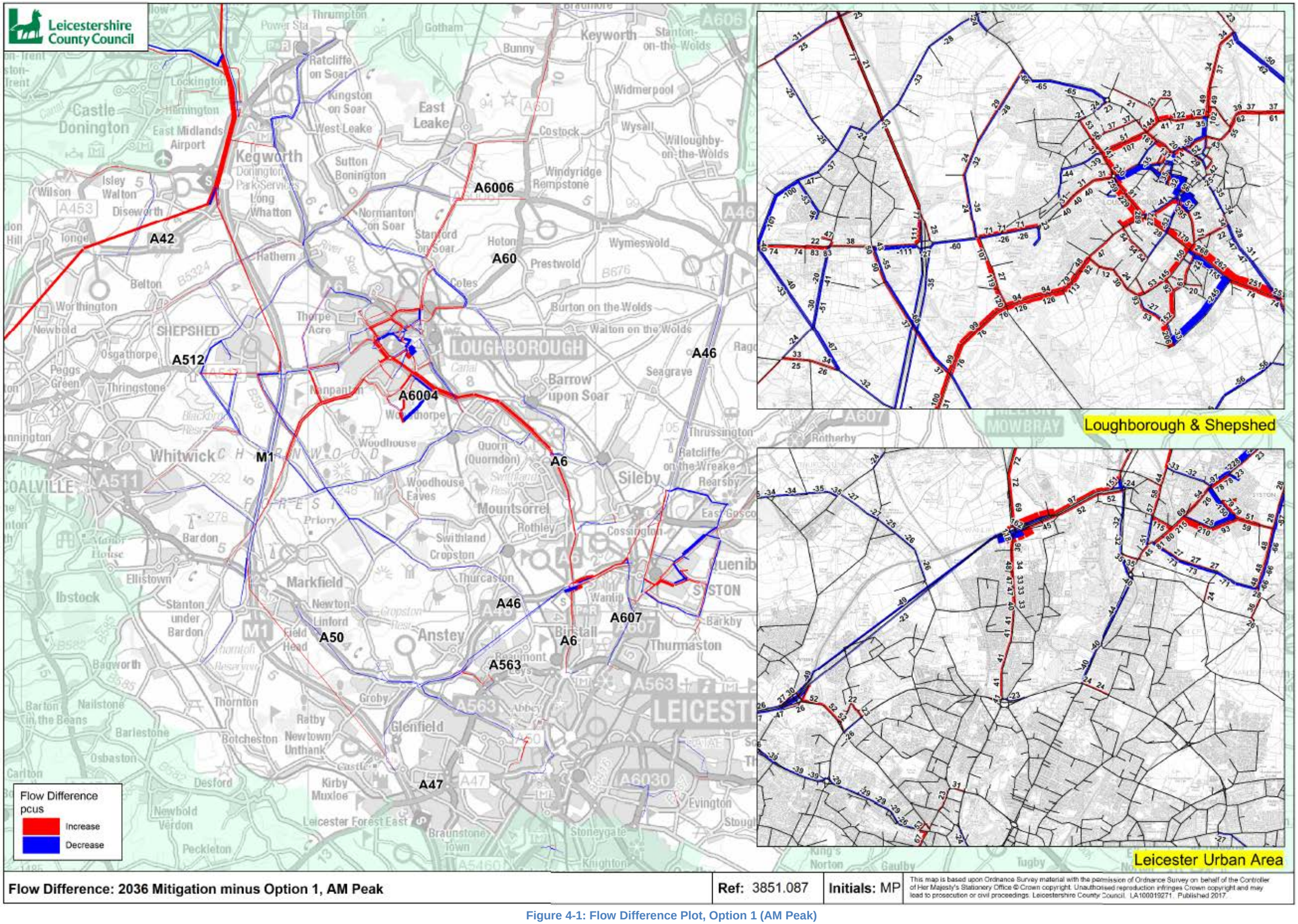


Figure 4-1: Flow Difference Plot, Option 1 (AM Peak)

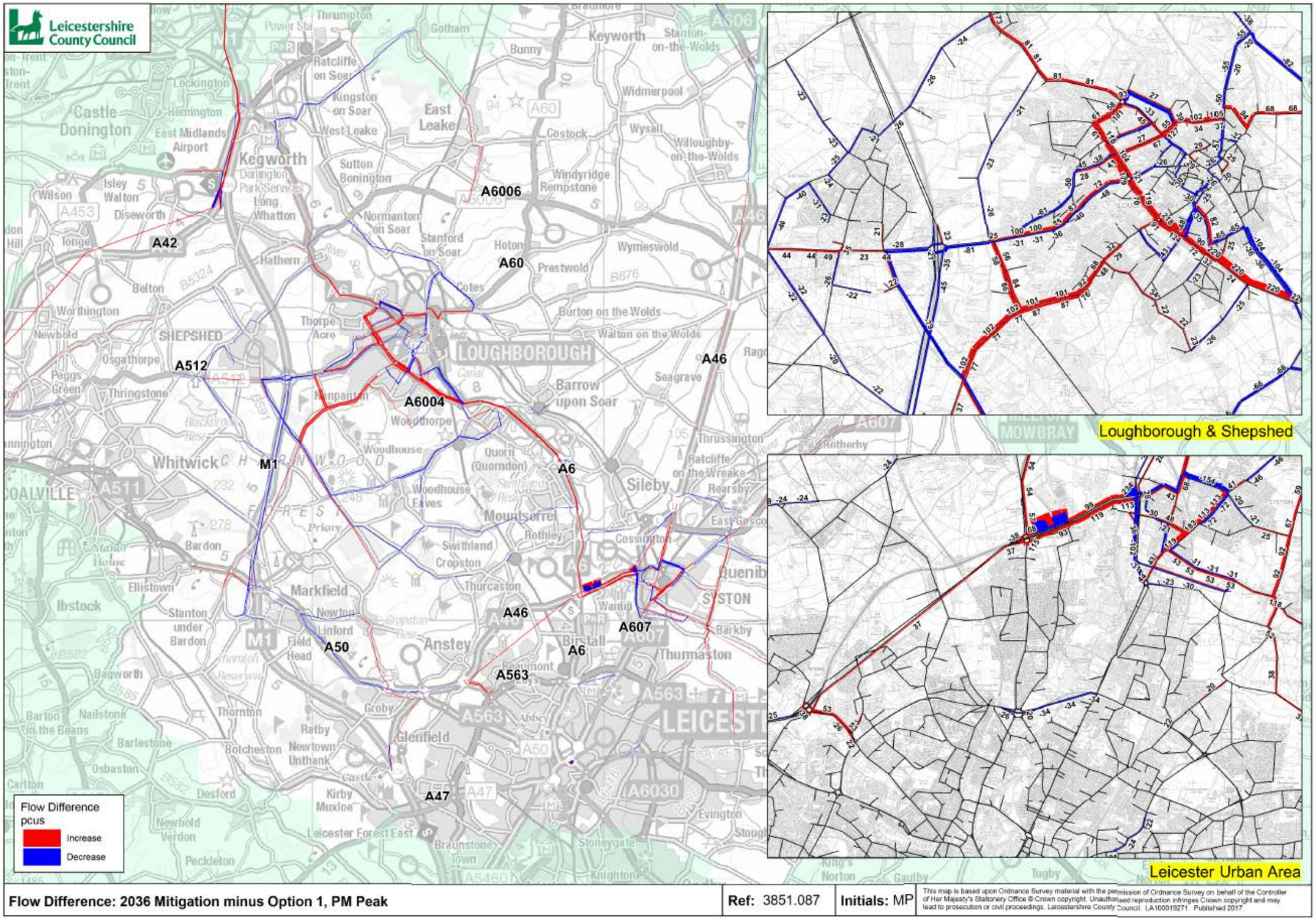


Figure 4-2: Flow Difference Plot, Option 1 (PM Peak)

DELAY DIFFERENCE (MITIGATION – OPTION)

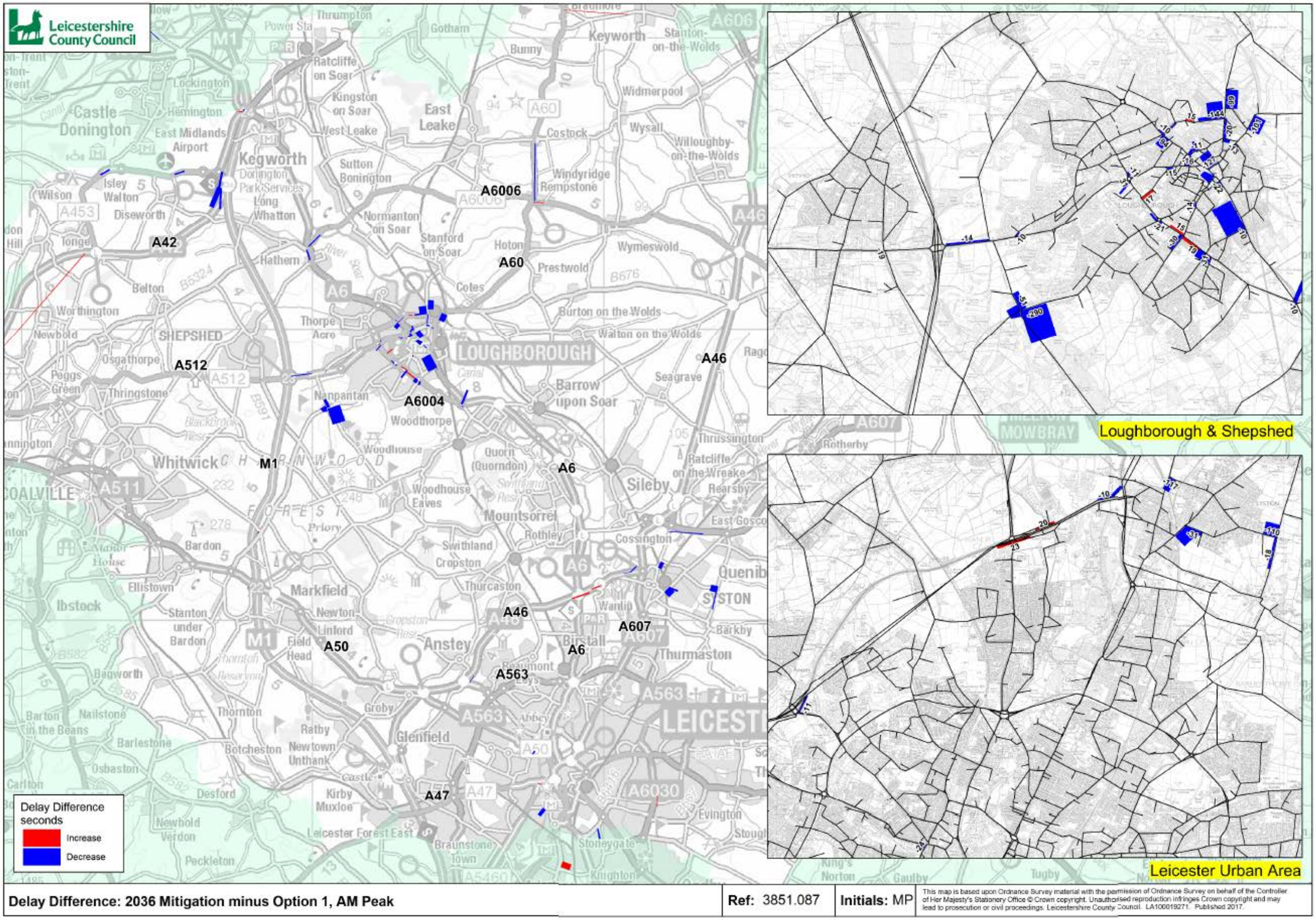


Figure 4-3: Delay Difference Plot, Option 1 (AM Peak)

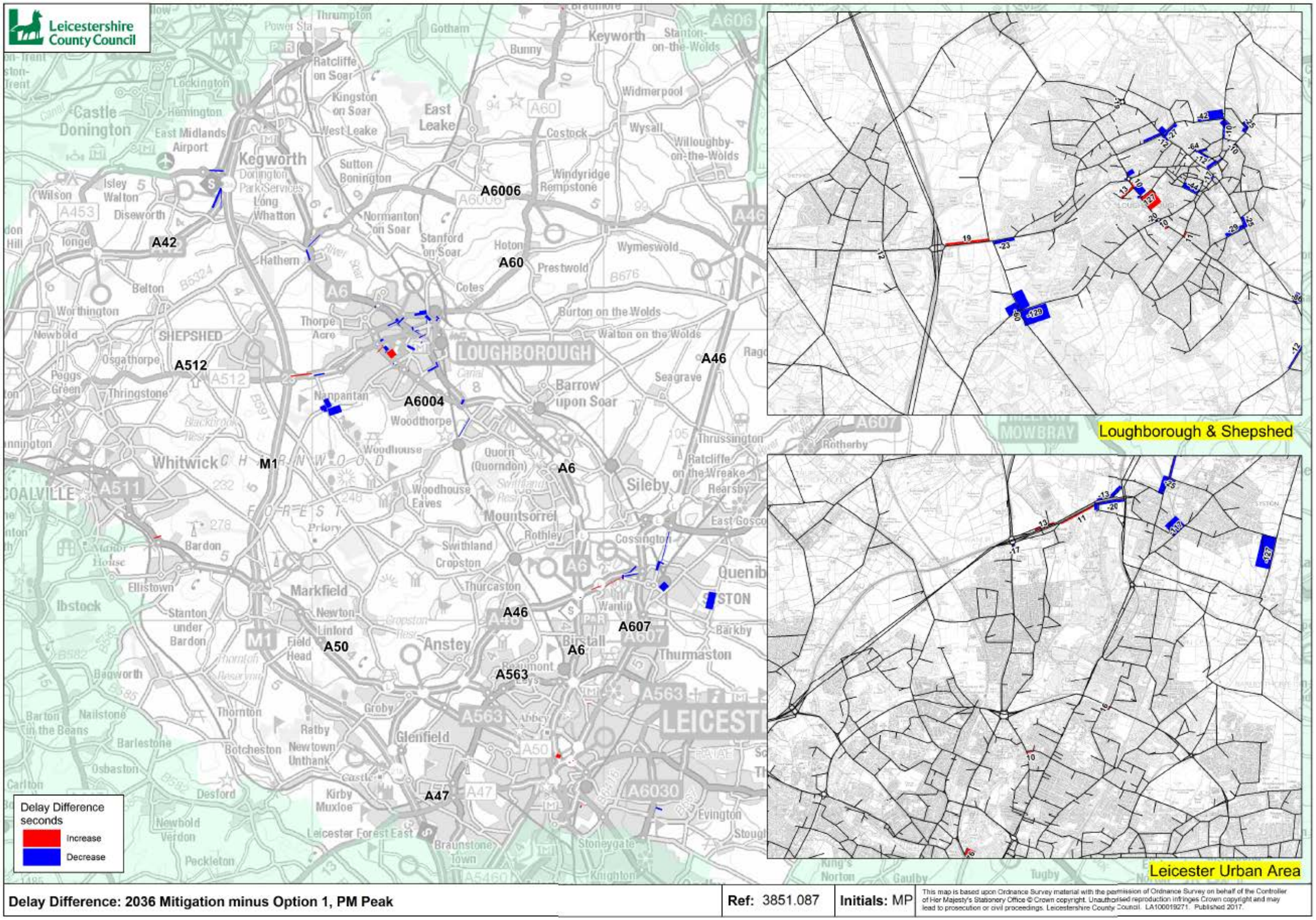


Figure 4-4: Delay Difference Plot, Option 1 (PM Peak)

JUNCTION PERFORMANCE

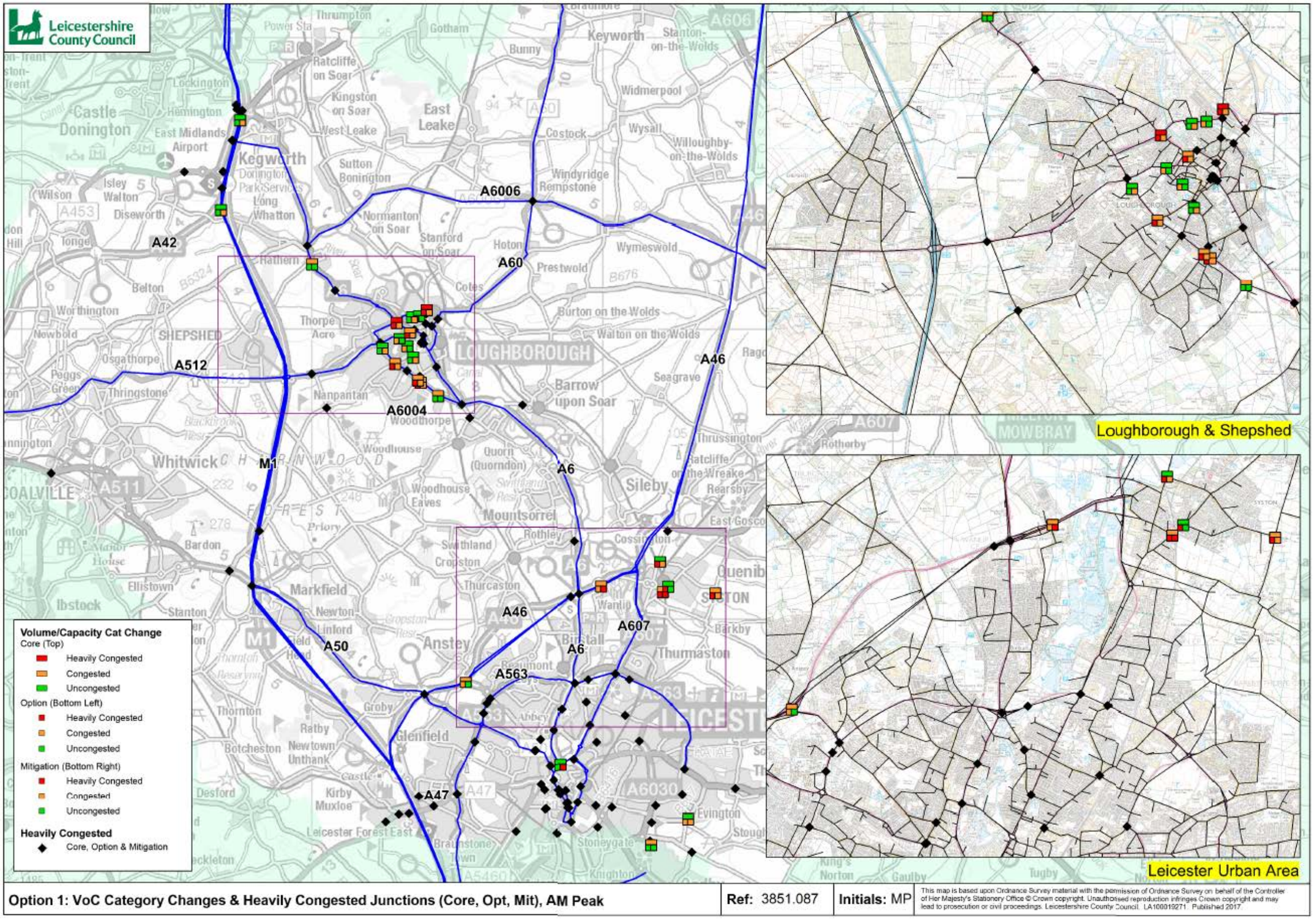


Figure 4-5: Junction Analysis, Option 1 (AM Peak)

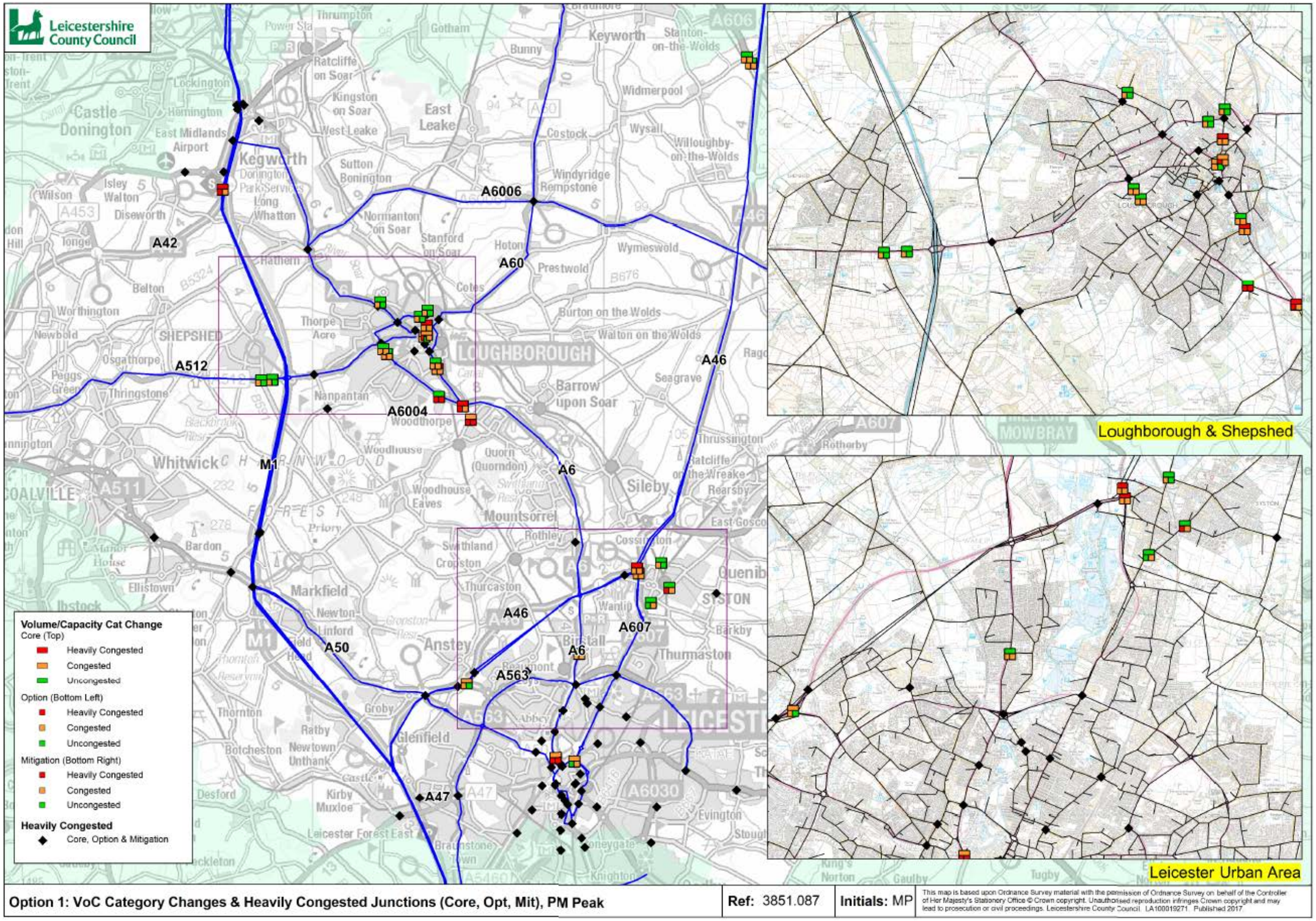


Figure 4-6: Junction Analysis, Option 1 (PM Peak)

Node	Junction	Area	Core AM VoC	Option AM VoC	Mitigation AM VoC	Core PM VoC	Option PM VoC	Mitigation PM VoC
1939	A46 (Wanlip Slip On EB)	A46	93	95	100	-	-	-
3449	A46 NB (Hobby Horse)	A46	-	-	-	100	99	93
99993	A46/Anstey Ln	A46	93	94	79	94	98	82
1748	A6/School Ln	Birstall	-	-	-	82	91	90
1645	Belgrave Gate/Humberstone Gate	City (Centre)	-	-	-	95	54	96
1428	A6 (St Margaret's Way)	City (NE)	-	-	-	94	104	108
1492	A6/Vaughan Way	City (NW)	47	51	100	-	-	-
2412	Main St/Biggin Hill Rd (Evington)	City (SE)	80	87	88	-	-	-
60371	A6/Shepshed Rd	Hathern	89	84	81	-	-	-
7304	Frederick St/Arthur St	Loughborough	82	89	84	-	-	-
60002	A6004 (Ling Rd)	Loughborough	95	100	95	-	-	-
60062	A6/The Rushes	Loughborough	90	101	91	-	-	-
60098	The Coneries/Sparrow Hill	Loughborough	-	-	-	95	100	95
60100	Meadow Ln/Toothill Rd	Loughborough	-	-	-	100	90	93
60118	A6004/Park Rd/Shelthorpe Rd	Loughborough	89	101	91	-	-	-
60123	A6004/Allendale Rd	Loughborough	86	78	83	84	100	101
60126	A6/Shelthorpe Rd	Loughborough	-	-	-	101	97	94
60140	A60 Nottm Rd/Morley St	Loughborough	78	77	85	-	-	-
60148	A6/Alan Moss Rd/Belton Rd	Loughborough	100	101	89	-	-	-
60538	A6/Beeches Rd	Loughborough	-	-	-	80	91	89
61009	Woodgate/Pack Horse Ln	Loughborough	15	101	14	-	-	-
61020	A6/Baxter Gate	Loughborough	-	-	-	87	89	72
65066	A6004/University Rd	Loughborough	76	70	90	80	87	95
65067	A6004 (Epinal Way)	Loughborough	-	-	-	92	100	85
65070	A6004/Radmoor Rd	Loughborough	-	-	-	81	88	97
65071	A512/Radmoor Rd	Loughborough	84	91	82	-	-	-
65074	Beacon Rd/Park Rd	Loughborough	83	58	88	-	-	-
69015	Belton Rd/Jubilee Dr	Loughborough	77	75	90	-	-	-
69936	Bishop Meadow Rd/Weldon Rd	Loughborough	-	-	-	81	86	76
73778	A6 (Bridge St)	Loughborough	-	-	-	99	101	77
74101	A6004 (Epinal Way)	Loughborough	-	-	-	73	79	86
78902	Belton Rd	Loughborough	48	92	53	75	97	50
78903	Meadow Ln/Station Boulevard	Loughborough	103	102	96	79	85	70
99996	A6004/Forest Rd	Loughborough	94	103	97	-	-	-
50520	M1 Junction 23a Diverge (NB)	M1	79	81	86	-	-	-
50523	M1 Junction 23a/A42	M1	-	-	-	100	100	92
50539	M1 Junction 24 Diverge (NB)	M1	79	79	85	-	-	-
73421	Stoughton Dr (S)	Oadby & Wigston	95	33	33	-	-	-
79972	A606	Outside Leics	-	-	-	82	90	88
79974	A606	Outside Leics	-	-	-	82	93	90
60195	Loughborough Rd/Farley Way	Quorn	-	-	-	96	101	101
60362	A6/A6004 (Quorn)	Quorn	-	-	-	101	103	96
74116	A6004 (Terry Yardley Way)	Quorn	87	80	85	84	95	95
7306	A512 (Ashby Rd E)	Shepshed	-	-	-	77	86	82
60095	A512/Ingleberry Rd	Shepshed	-	-	-	82	88	78
76150	A512 (Ashby Rd E)	Shepshed	-	-	-	77	86	82
2227	Melton Rd/Fosse Way	Syston	-	-	-	78	82	91
2280	Fosse Way/High St	Syston	64	103	86	83	95	83
2508	Queniborough Rd/Barkby Rd	Syston	86	103	93	-	-	-
7041	Melton Rd/Goode's Ln	Syston	49	100	64	77	102	88
78892	Melton Rd/Wanlip Rd	Syston	99	104	102	-	-	-
99994	Hobby Horse	Syston	-	-	-	100	99	93

Table 4-2: Junction Analysis – Volume over Capacity (%) Category Changes, Option 1

Node	Junction	Area	Core AM Delay	Option AM Delay	Mitigation AM Delay	Core PM Delay	Option PM Delay	Mitigation PM Delay
9508	A46 (Anstey Ln Slip Off EB)	A46	-	-	-	13	35	40
9715	A46 (Anstey Ln Slip On EB)	A46	-	-	-	63	116	119
1607	A46/A6 (Slip on WB)	A46	49	65	78	-	-	-
2047	A46/Wanlip Rd (Slip on WB)	A46	-	-	-	32	45	21
1935	Victoria Park Rd/Queens Rd	City (SE)	43	64	56	-	-	-
60366	A512/WoLSUE North	Loughborough	67	37	37	-	-	-
60193	A512/WoLSUE South	Loughborough	85	57	51	-	-	-
73778	A6 (Bridge St)	Loughborough	39	78	36	-	-	-
60148	A6/Alan Moss Rd/Belton Rd	Loughborough	-	-	-	67	76	51
61020	A6/Baxter Gate	Loughborough	61	93	65	-	-	-
99998	A6/Bishop Meadow Roundabout	Loughborough	-	-	-	142	132	99
60126	A6/Shelthorpe Rd	Loughborough	54	99	50	-	-	-
69941	A60/Station Boulevard	Loughborough	140	135	77	59	60	41
99997	A6004/A512	Loughborough	146	200	135	104	115	90
60186	A6004/Beacon Rd	Loughborough	28	38	48	-	-	-
61000	Forest Rd/Browns Ln	Loughborough	-	-	-	47	67	54
60099	Meadow Ln/Ratcliffe Rd/Belton Rd	Loughborough	79	113	67	108	104	69
60198	Nanpantan Rd/Snell's Nook Ln	Loughborough	207	362	196	171	278	184
60108	Woodgate/Pinfold Gate	Loughborough	153	245	162	-	-	-
50523	M1 Junction 23a/A42	M1	54	71	26	-	-	-
50543	M1 Junction 24	M1	49	71	57	-	-	-
50492	A42/A453 (EMA)	NW Leics	129	141	115	60	62	59
76923	Rempstone Crossroads	Outside Leics	163	142	140	117	120	118
60362	A6/A6004 (Quorn)	Quorn	56	120	51	-	-	-
2508	Queniborough Rd/Barkby Rd	Syston	-	-	-	87	149	93

Table 4-3: Junction Analysis –Nodes Heavily Congested in All (Core, Option and Mitigation) Scenarios with 'Significant' Delay Changes (seconds per PCU), Option 1

5. Results: Option 2 – Urban Concentration B (Low Growth)

5.1. Development Assumptions

Settlement	Dwellings	Notable Sites
Leicester Urban Area (Birstall, Thurmaston and Syston)	3,000	Majority of available sites (total 3,346) including one large site at Syston (1,200 homes, south of Syston)
Loughborough	800	A mix of small and medium sized sites in and around the town.
Shepshed	2,200	Majority of available sites (total 2,686) including large and medium sites west of Shepshed and mix of small and medium sized sites in and around the town.
Anstey	400	A mix of small and medium sized sites, total of 2,100 in the Service Centres.
Barrow Upon Soar	400	
Mountsorrel	100	
Quorn	400	
Rothley	400	
Sileby	400	
Total	**8,100**	

Table 5-1: Option 2 Development Assumptions (provided by Charnwood Borough Council)

5.2. Modelling Outputs

5.2.1. The following outputs are produced:

- Flow Difference Plots (Figure 5-1, Figure 5-2)
- Delay Difference Plots (Figure 5-3, Figure 5-4)
- Junction Analysis (Figure 5-5, Figure 5-6, Table 5-2, Table 5-3)

FLOW DIFFERENCE (MITIGATION – OPTION)

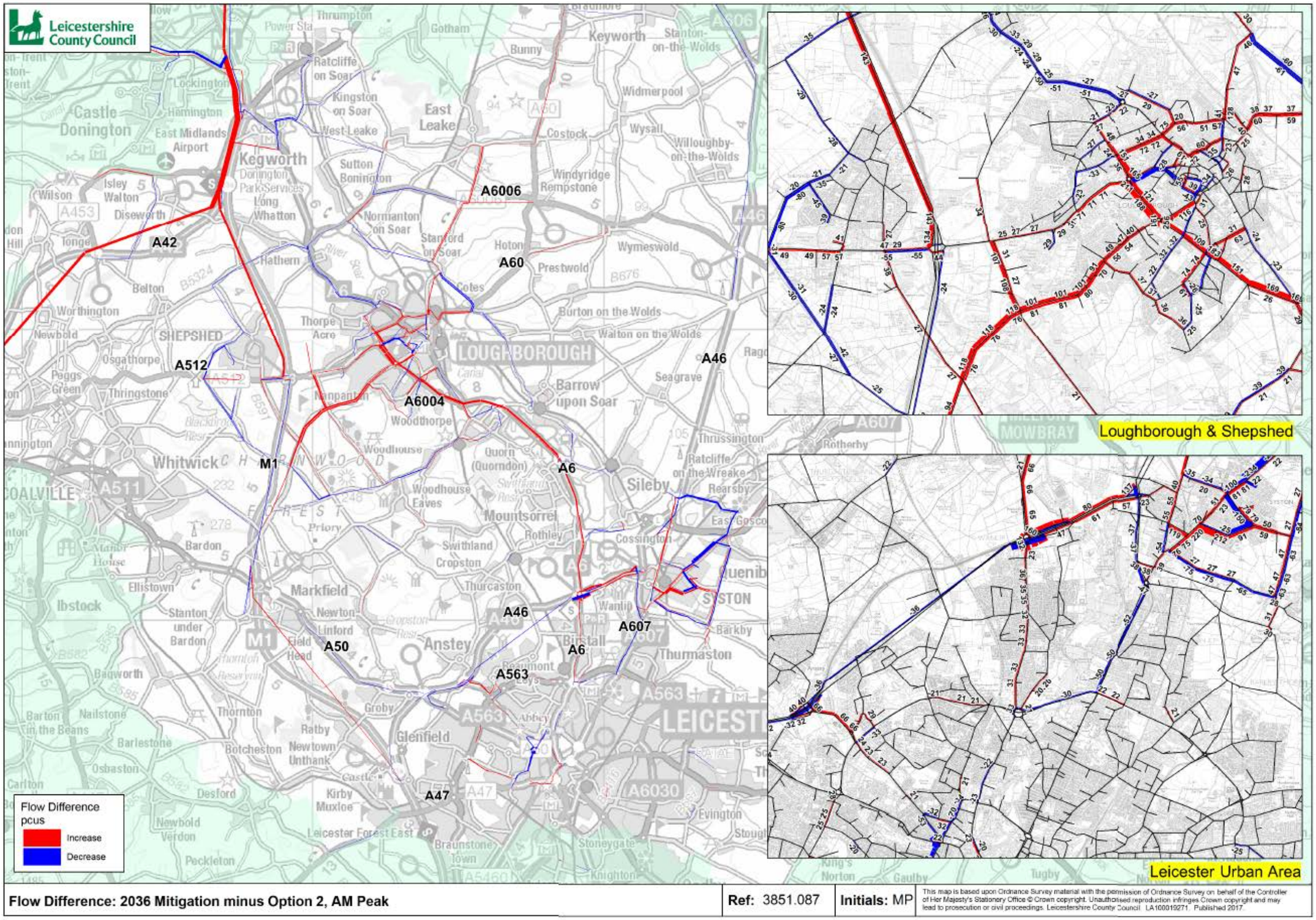


Figure 5-1: Flow Difference Plot, Option 2 (AM Peak)

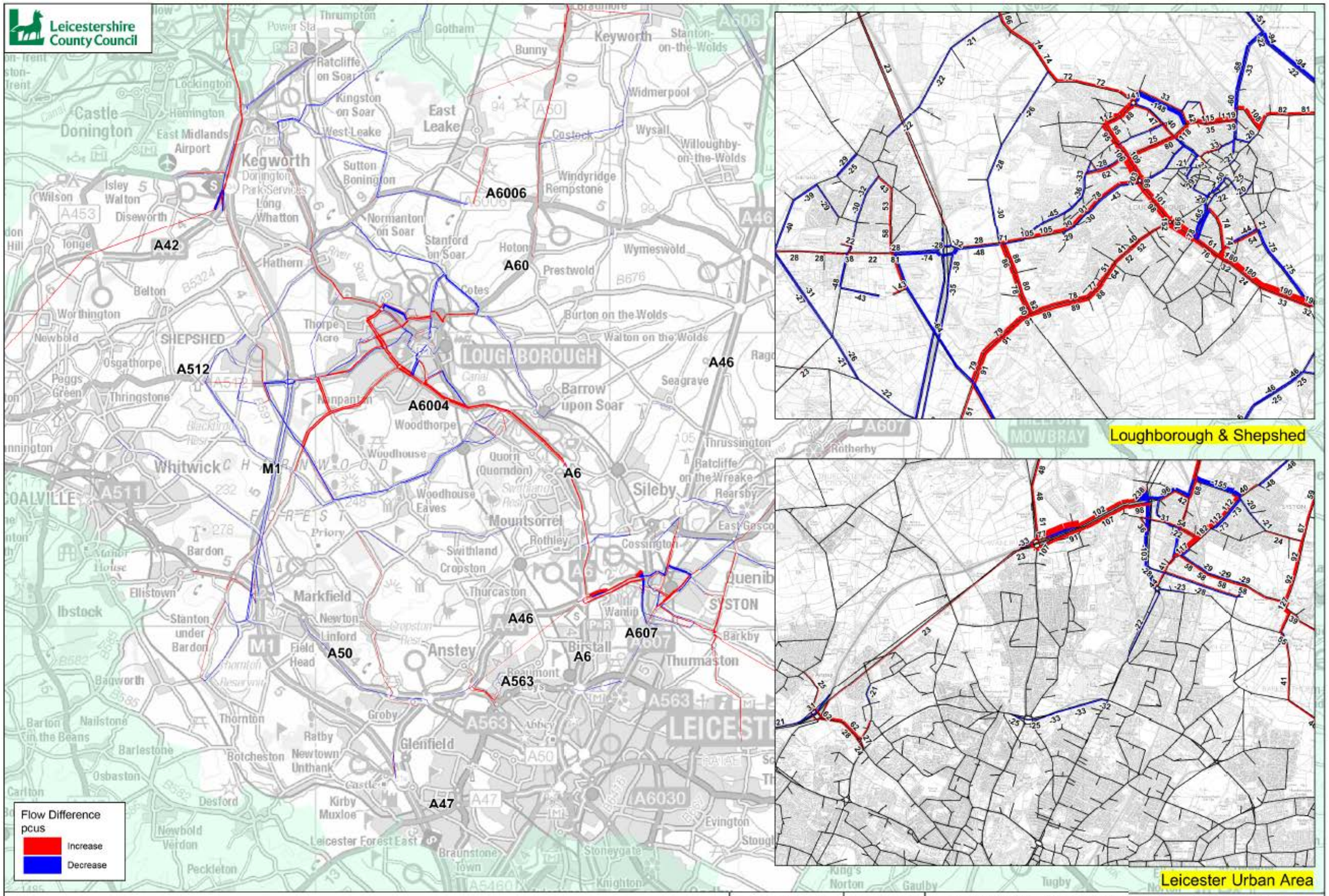


Figure 5-2: Flow Difference Plot, Option 2 (PM Peak)

DELAY DIFFERENCE (MITIGATION – OPTION)

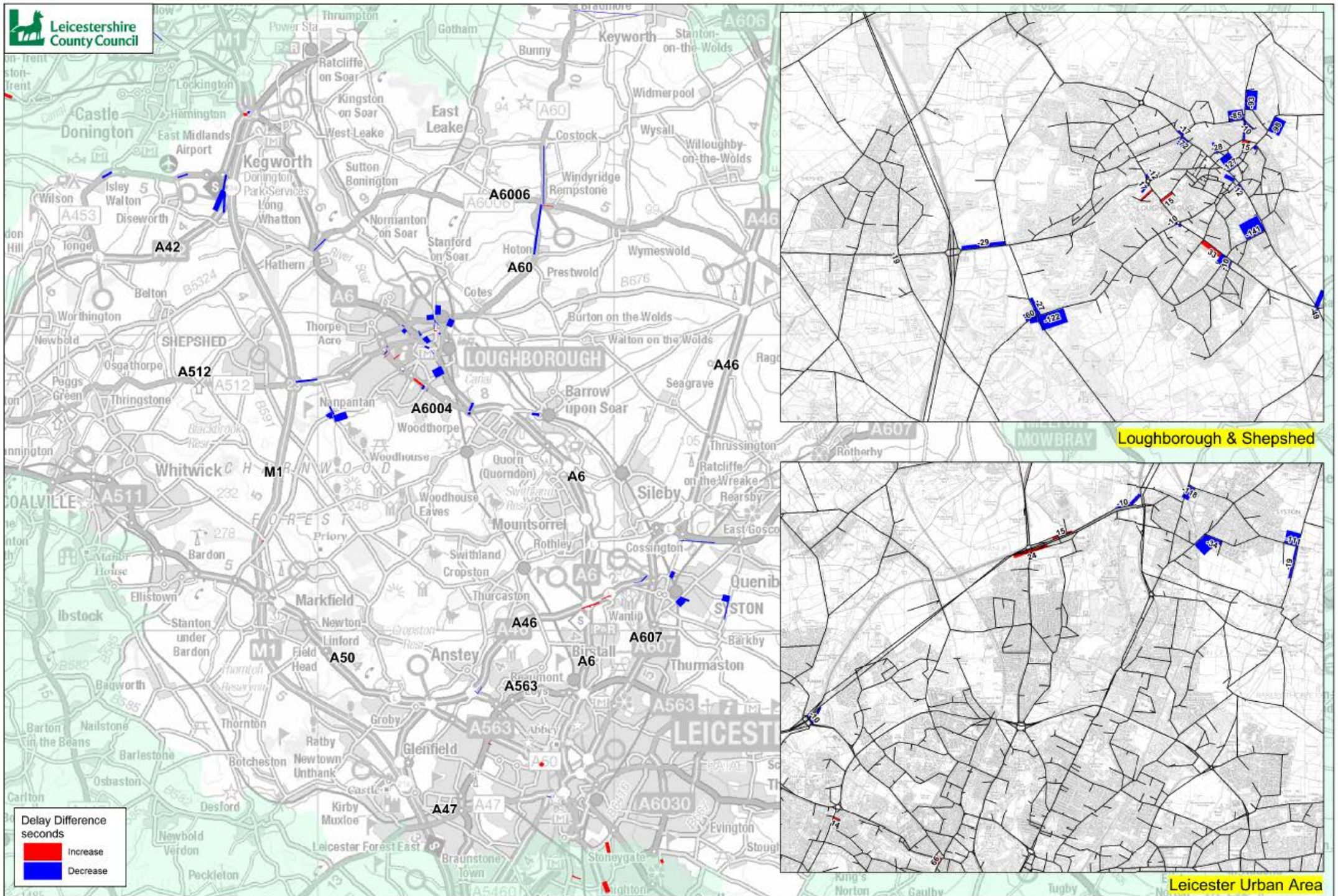


Figure 5-3: Delay Difference Plot, Option 2 (AM Peak)

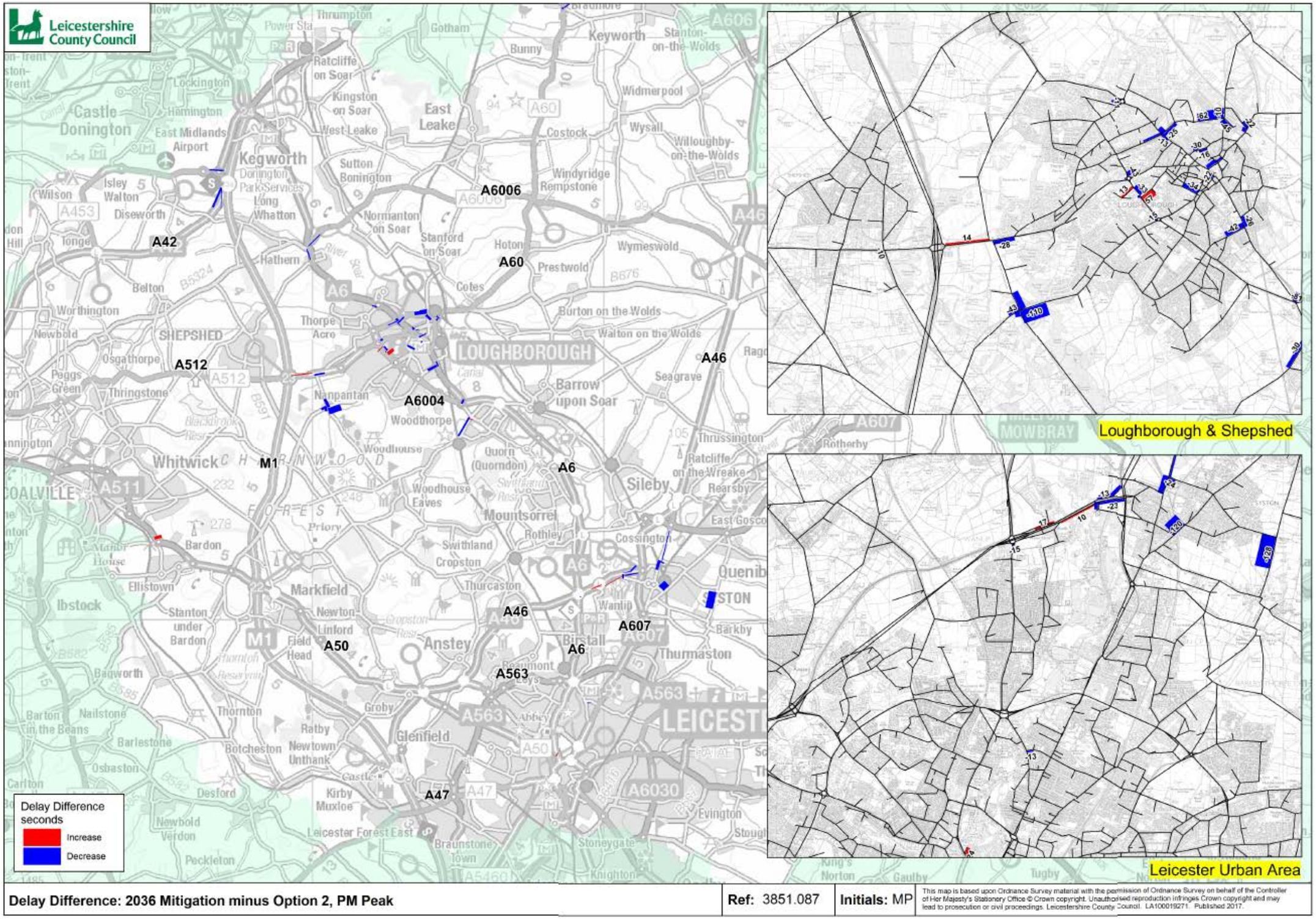


Figure 5-4: Delay Difference Plot, Option 2 (PM Peak)

JUNCTION ANALYSIS

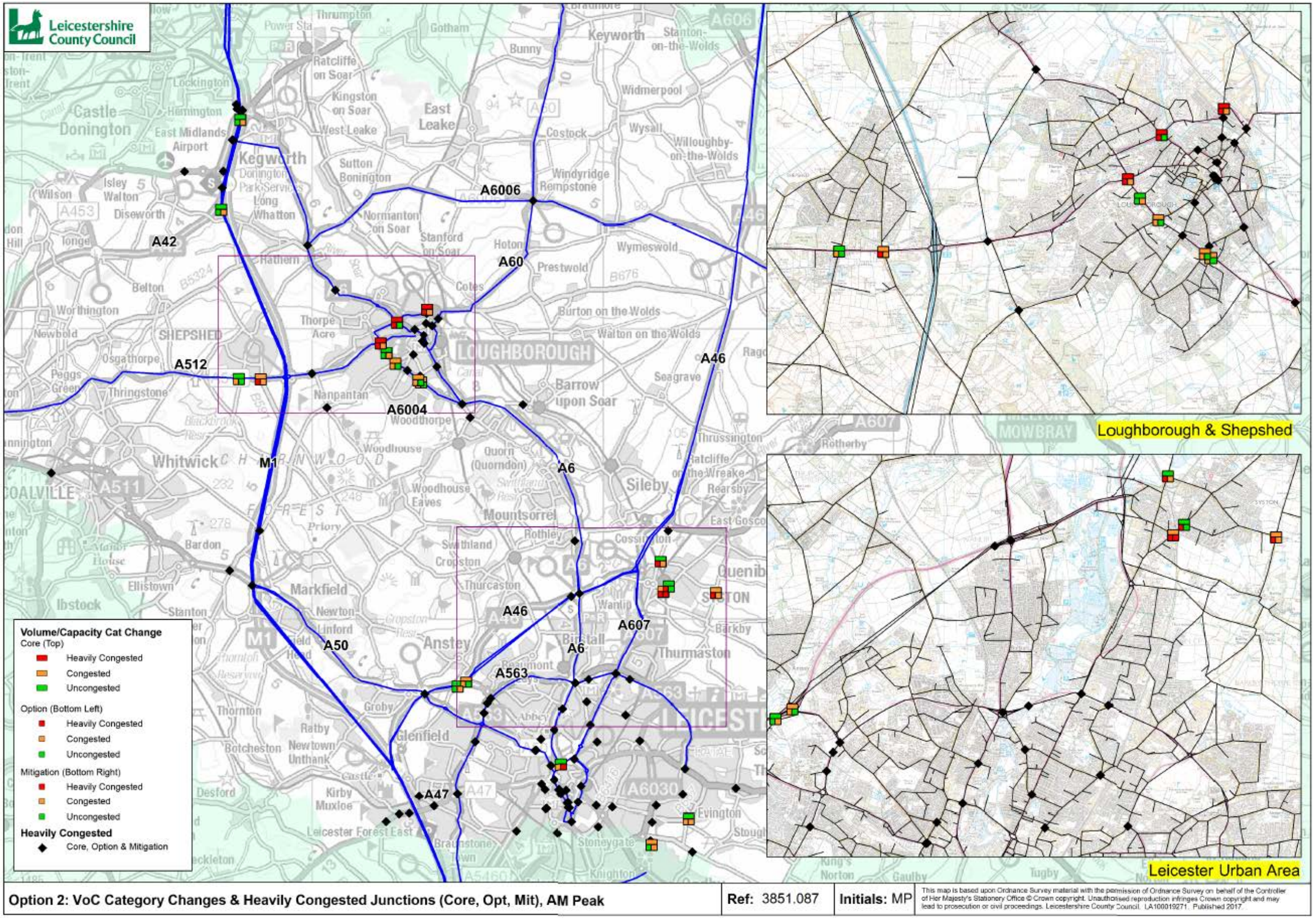


Figure 5-5: Junction Analysis, Option 2 (AM Peak)

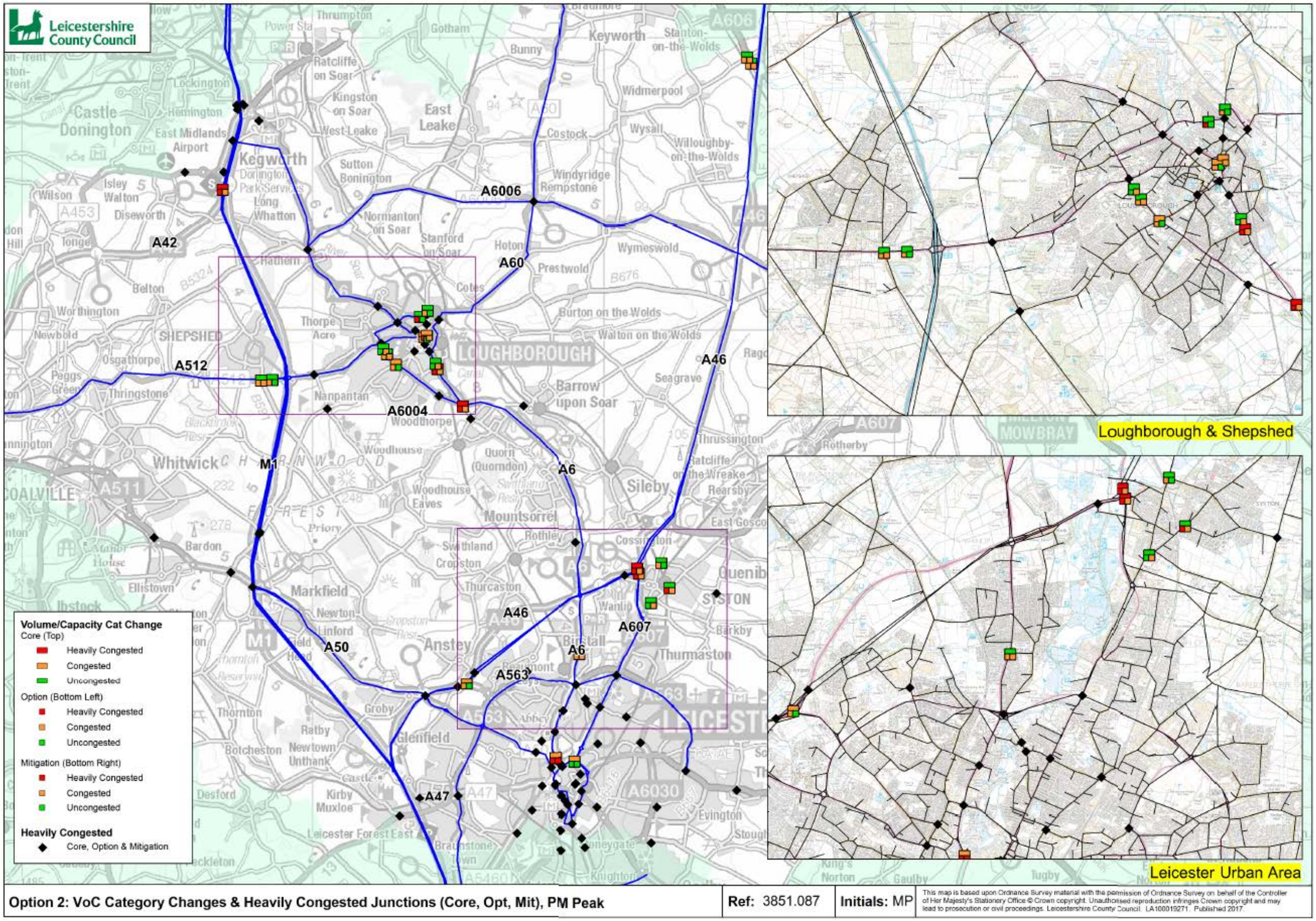


Figure 5-6: Junction Analysis, Option 2 (PM Peak)

Node	Junction	Area	Core AM VoC	Option AM VoC	Mitigation AM VoC	Core PM VoC	Option PM VoC	Mitigation PM VoC
3449	A46 NB (Hobby Horse)	A46	-	-	-	100	100	93
9555	A46 (Anstey Ln Slip On WB)	A46	81	84	86	-	-	-
99993	A46/Anstey Ln	A46	93	94	80	94	97	81
1748	A6/School Ln	Birstall	-	-	-	82	89	89
1645	Belgrave Gate/Humberstone Gate	City (Centre)	-	-	-	95	56	52
1428	A6 (St Margaret's Way)	City (NE)	-	-	-	94	109	110
1492	A6/Vaughan Way	City (NW)	47	88	100	-	-	-
2412	Main St/Biggin Hill Rd (Evington)	City (SE)	80	88	88	-	-	-
60002	A6004 (Ling Rd)	Loughborough	95	92	82	-	-	-
60098	The Coneries/Sparrow Hill	Loughborough	-	-	-	95	100	94
60118	A6004/Park Rd/Shelthorpe Rd	Loughborough	89	94	67	-	-	-
60126	A6/Shelthorpe Rd	Loughborough	-	-	-	101	101	87
60140	A60 Nottm Rd/Morley St	Loughborough	78	80	87	-	-	-
60148	A6/Alan Moss Rd/Belton Rd	Loughborough	100	101	81	-	-	-
60538	A6/Beeches Rd	Loughborough	-	-	-	80	83	85
61020	A6/Baxter Gate	Loughborough	-	-	-	87	91	80
65066	A6004/University Rd	Loughborough	-	-	-	80	83	90
65067	A6004 (Epinal Way)	Loughborough	-	-	-	92	96	81
65070	A6004/Radmoor Rd	Loughborough	78	77	85	81	85	91
73778	A6 (Bridge St)	Loughborough	101	103	95	99	100	79
78902	Belton Rd	Loughborough	-	-	-	75	100	50
78903	Meadow Ln/Station Boulevard	Loughborough	103	104	99	79	85	69
99996	A6004/Forest Rd	Loughborough	94	94	80	90	93	83
99997	A6004/A512	Loughborough	102	103	97	-	-	-
50520	M1 Junction 23a Diverge (NB)	M1	79	80	88	-	-	-
50523	M1 Junction 23a/A42	M1	-	-	-	100	100	92
50539	M1 Junction 24 Diverge (NB)	M1	79	79	85	-	-	-
73421	Stoughton Dr (S)	Oadby & Wigston	95	33	96	-	-	-
79972	A606	Outside Leics	-	-	-	82	90	88
79974	A606	Outside Leics	-	-	-	82	95	91
60362	A6/A6004 (Quorn)	Quorn	-	-	-	101	103	96
74116	A6004 (Terry Yardley Way)	Quorn	-	-	-	84	85	94
73889	A6/Broadnook	Rest Charnwood (West)	82	85	87	-	-	-
7306	A512 (Ashby Rd E)	Shepshed	-	-	-	77	88	84
60064	A512/Iveshead Rd/Charnwood Rd	Shepshed	78	88	82	-	-	-
60095	A512/Ingleberry Rd	Shepshed	95	100	96	82	98	93
76036	A512/Leicester Rd	Shepshed	-	-	-	81	87	80
76150	A512 (Ashby Rd E)	Shepshed	-	-	-	77	88	84
2227	Melton Rd/Fosse Way	Syston	-	-	-	78	82	91
2280	Fosse Way/High St	Syston	64	103	87	83	96	83
2508	Queniborough Rd/Barkby Rd	Syston	86	103	93	-	-	-
7041	Melton Rd/Goode's Ln	Syston	49	100	64	77	103	88
78892	Melton Rd/Wanlip Rd	Syston	99	104	102	-	-	-
99994	Hobby Horse	Syston	-	-	-	100	100	93

Table 5-2: Junction Analysis – Volume over Capacity (%) Category Changes, Option 2

Node	Junction	Area	Core AM Delay	Option AM Delay	Mitigation AM Delay	Core PM Delay	Option PM Delay	Mitigation PM Delay
1607	A46/A6 (Slip on WB)	A46	49	63	77	-	-	-
2047	A46/Wanlip Rd (Slip on WB)	A46	-	-	-	32	46	20
9508	A46 (Anstey Ln Slip Off EB)	A46	-	-	-	13	35	41
9715	A46 (Anstey Ln Slip On EB)	A46	-	-	-	63	107	109
60044	Barrow Rd/Bridge St	Barrow	72	87	65	-	-	-
60099	Meadow Ln/Ratcliffe Rd/Belton Rd	Loughborough	79	90	61	108	108	73
60108	Woodgate/Pinfold Gate	Loughborough	153	192	117	-	-	-
60126	A6/Shelthorpe Rd	Loughborough	54	62	35	-	-	-
60148	A6/Alan Moss Rd/Belton Rd	Loughborough	-	-	-	67	71	50
60186	A6004/Beacon Rd	Loughborough	28	34	49	-	-	-
60198	Nanpantan Rd/Snell's Nook Ln	Loughborough	207	244	163	171	202	136
61020	A6/Baxter Gate	Loughborough	61	75	48	-	-	-
65097	A6 Bridge St/Fennel St	Loughborough	72	71	63	74	81	59
69941	A60/Station Boulevard	Loughborough	140	152	96	59	61	43
99997	A6004/A512	Loughborough	-	-	-	104	107	87
99998	A6/Bishop Meadow Roundabout	Loughborough	-	-	-	142	161	112
50523	M1 Junction 23a/A42	M1	54	73	25	-	-	-
50543	M1 Junction 24	M1	49	71	35	-	-	-
50544	M1 Junction 24	M1	152	143	168	-	-	-
50492	A42/A453 (EMA)	NW Leics	129	143	119	60	61	57
76923	Rempstone Crossroads	Outside Leics	163	151	142	117	122	118
60362	A6/A6004 (Quorn)	Quorn	56	71	28	-	-	-
2508	Queniborough Rd/Barkby Rd	Syston	-	-	-	87	150	93

Table 5-3: Junction Analysis –Nodes Heavily Congested in All (Core, Option and Mitigation) Scenarios with 'Significant' Delay Changes (seconds per PCU), Option 2

6. Results: Option 3 – Dispersed Settlement Hierarchy Distribution (Low Growth)

6.1. Development Assumptions

Settlement	Dwellings	Notable Sites
Leicester Urban Area (Birstall, Thurmaston and Syston)	1,000	Mix of sites
Loughborough	2,000	Mix of sites including one large site (1,100 south of Loughborough)
Shepshed	2,200	Large and medium sites west of Shepshed and mix of small and medium sized sites in and around the town.
Anstey	300	A mix of small and medium sized sites, total of 1,600 homes at the Service Centres
Barrow Upon Soar	300	
Mountsorrel	100	
Quorn	300	
Rothley	300	
Sileby	300	
Barkby	100	A mix of small and medium sized sites, total of 1,400
Burton on the Wolds	100	
Cossington	100	
East Goscote	100	
Hathern	100	
Newtown Linford	100	
Queniborough	100	
Rearsby	100	
Seagrave	100	
Swithland	0	
Thrussington	100	
Thurcaston	100	
Woodhouse Eaves	100	
Wymeswold	100	
Total	**8,100**	

Table 6-1: Option 3 Development Assumptions (provided by Charnwood Borough Council)

6.2. Modelling Outputs

6.2.1. The following outputs are produced:

- Flow Difference Plots (Figure 6-1, Figure 6-2)
- Delay Difference Plots (Figure 6-3, Figure 6-4)
- Junction Analysis (Figure 6-5, Figure 6-6, Table 6-2, Table 6-3)

FLOW DIFFERENCE (MITIGATION – OPTION)

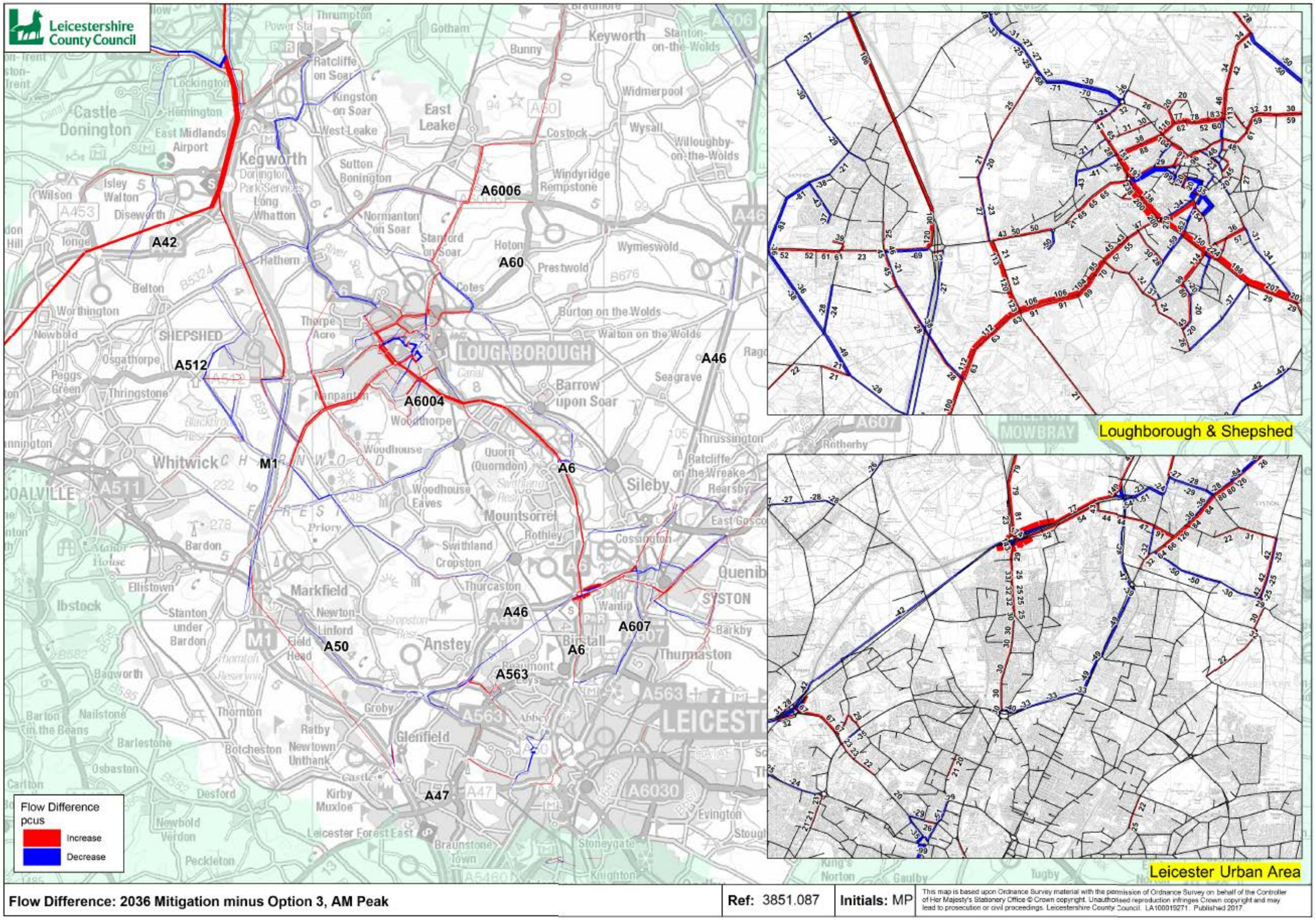


Figure 6-1: Flow Difference Plot, Option 3 (AM Peak)

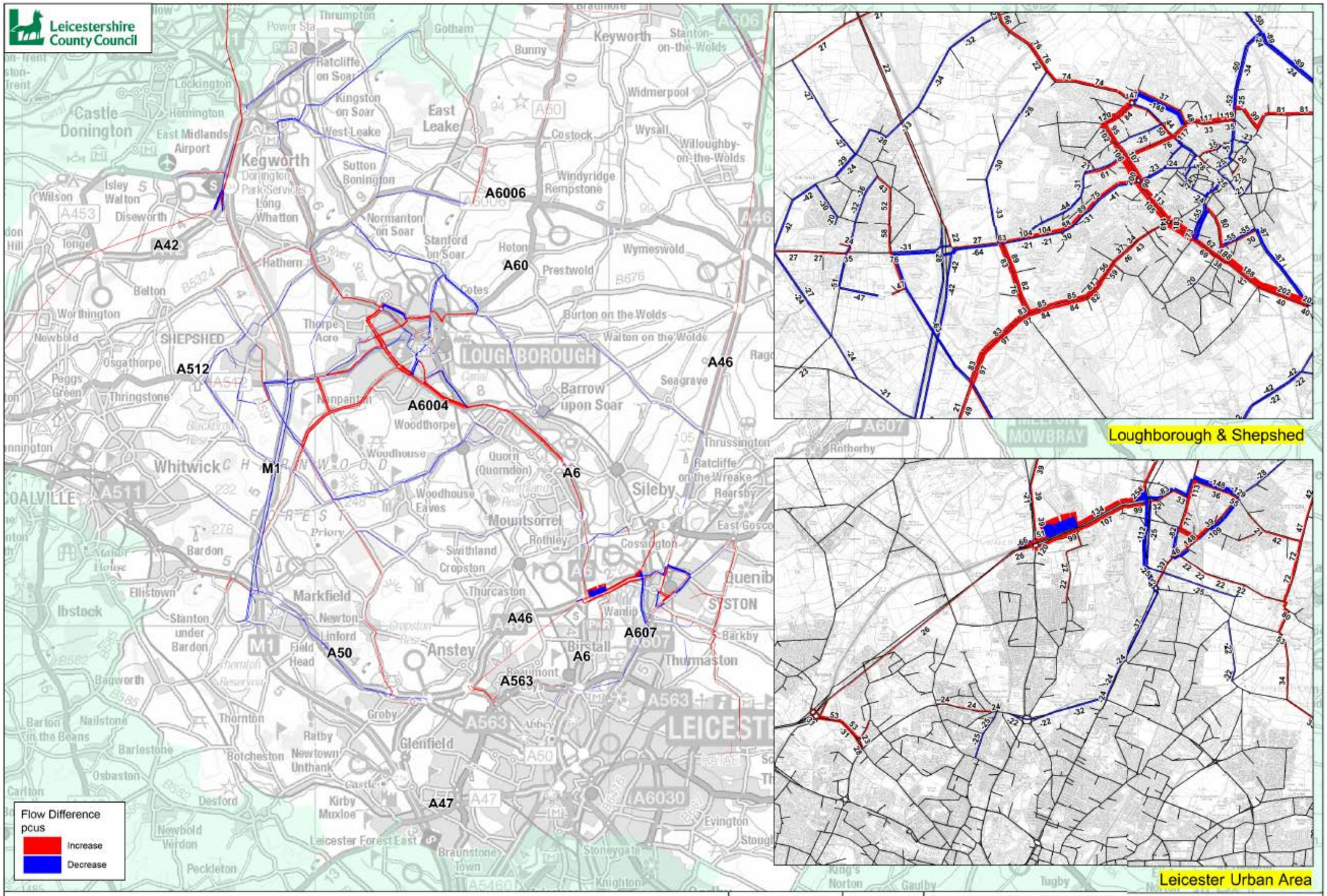


Figure 6-2: Flow Difference Plot, Option 3 (PM Peak)

DELAY DIFFERENCE (MITIGATION – OPTION)

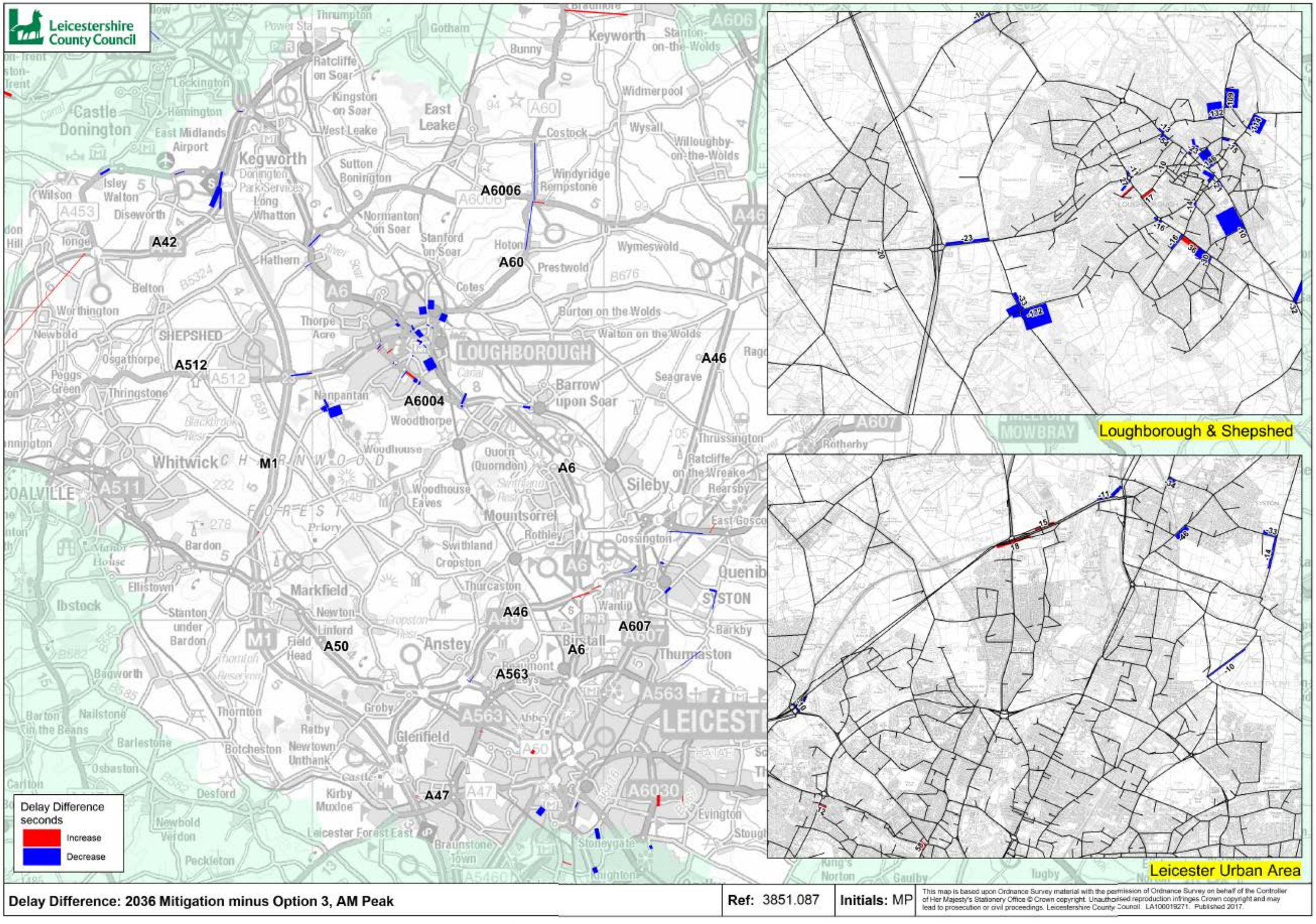


Figure 6-3: Delay Difference Plot, Option 3 (AM Peak)

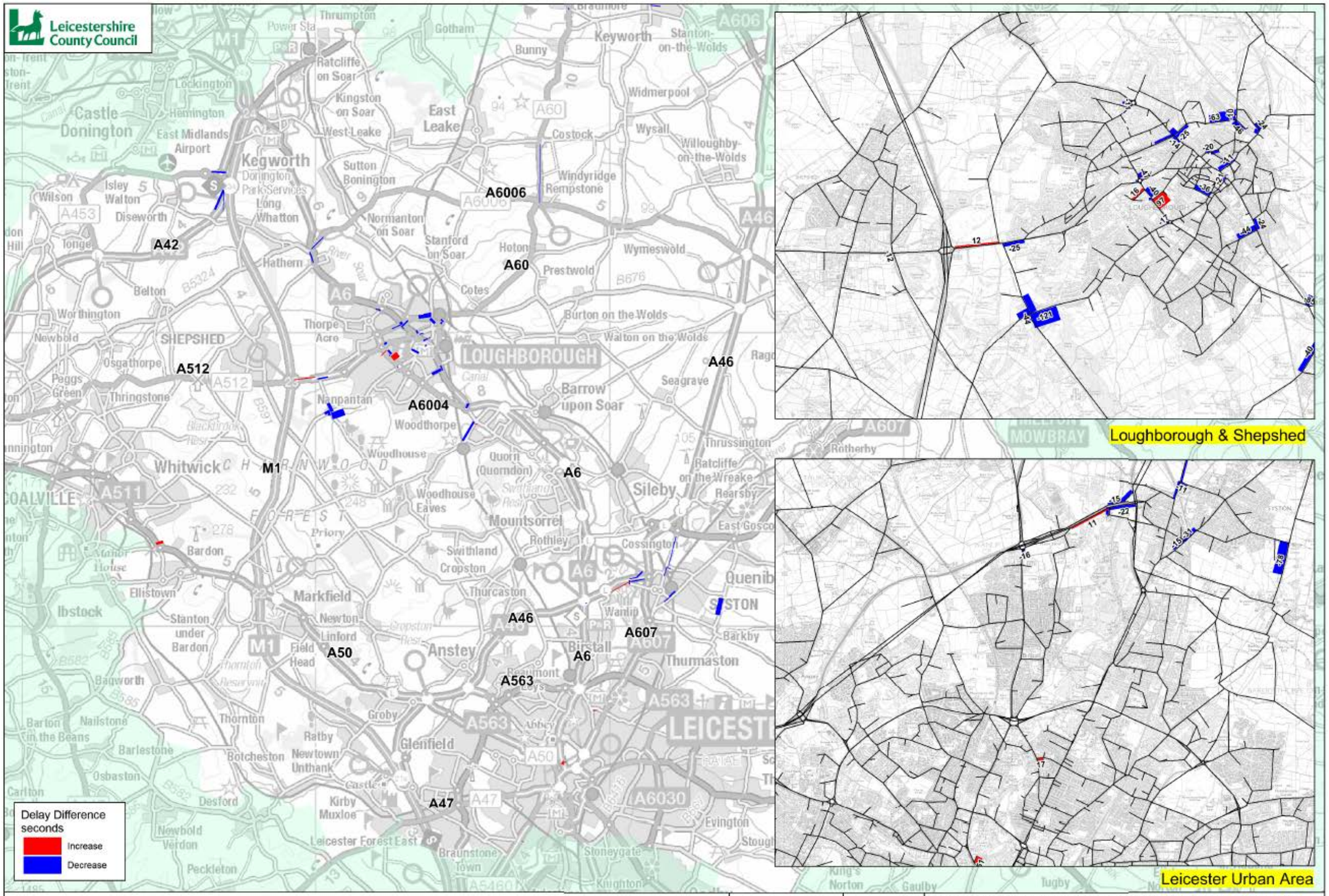


Figure 6-4: Delay Difference Plot, Option 3 (PM Peak)

JUNCTION PERFORMANCE

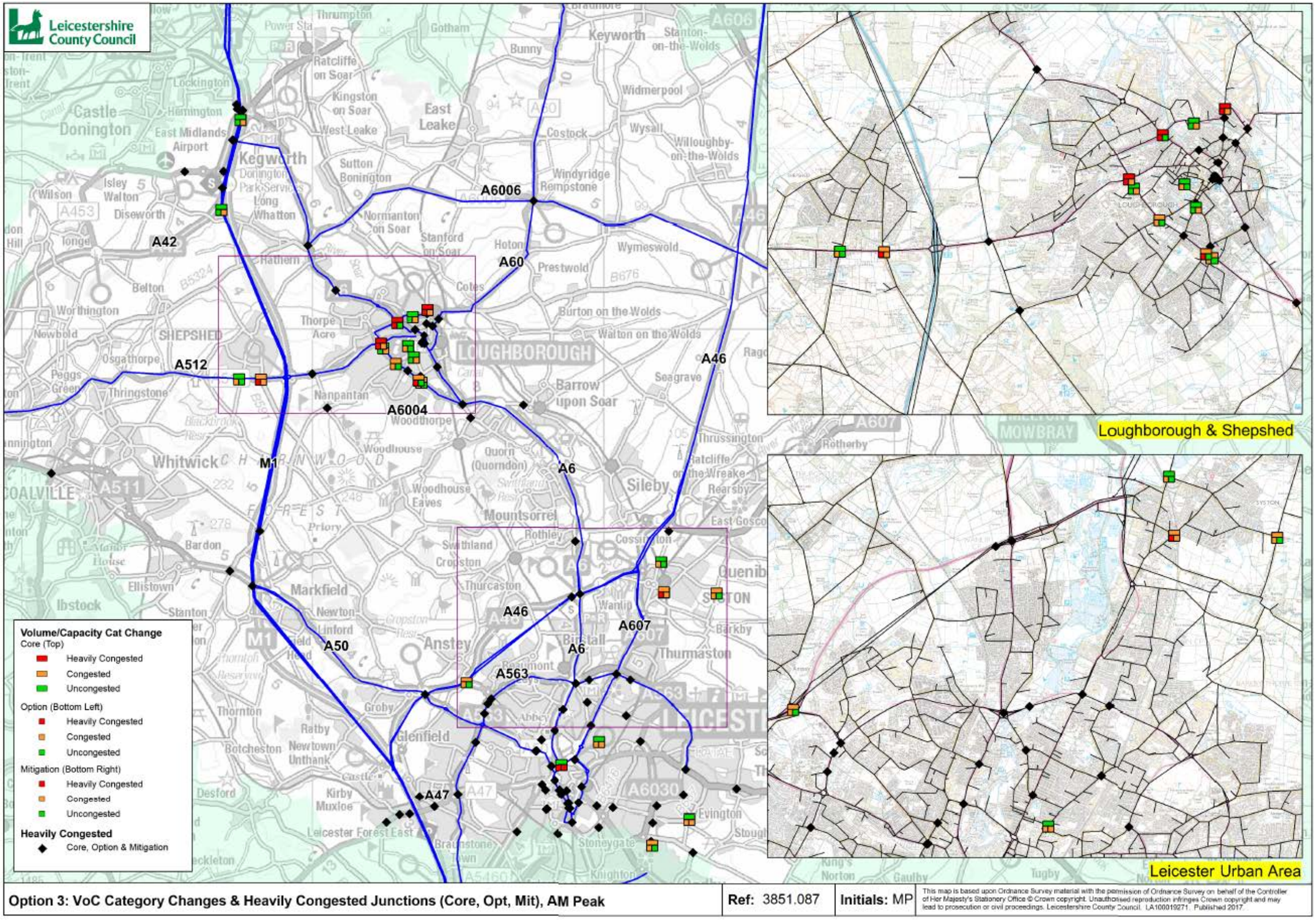


Figure 6-5: Junction Analysis, Option 3 (AM Peak)

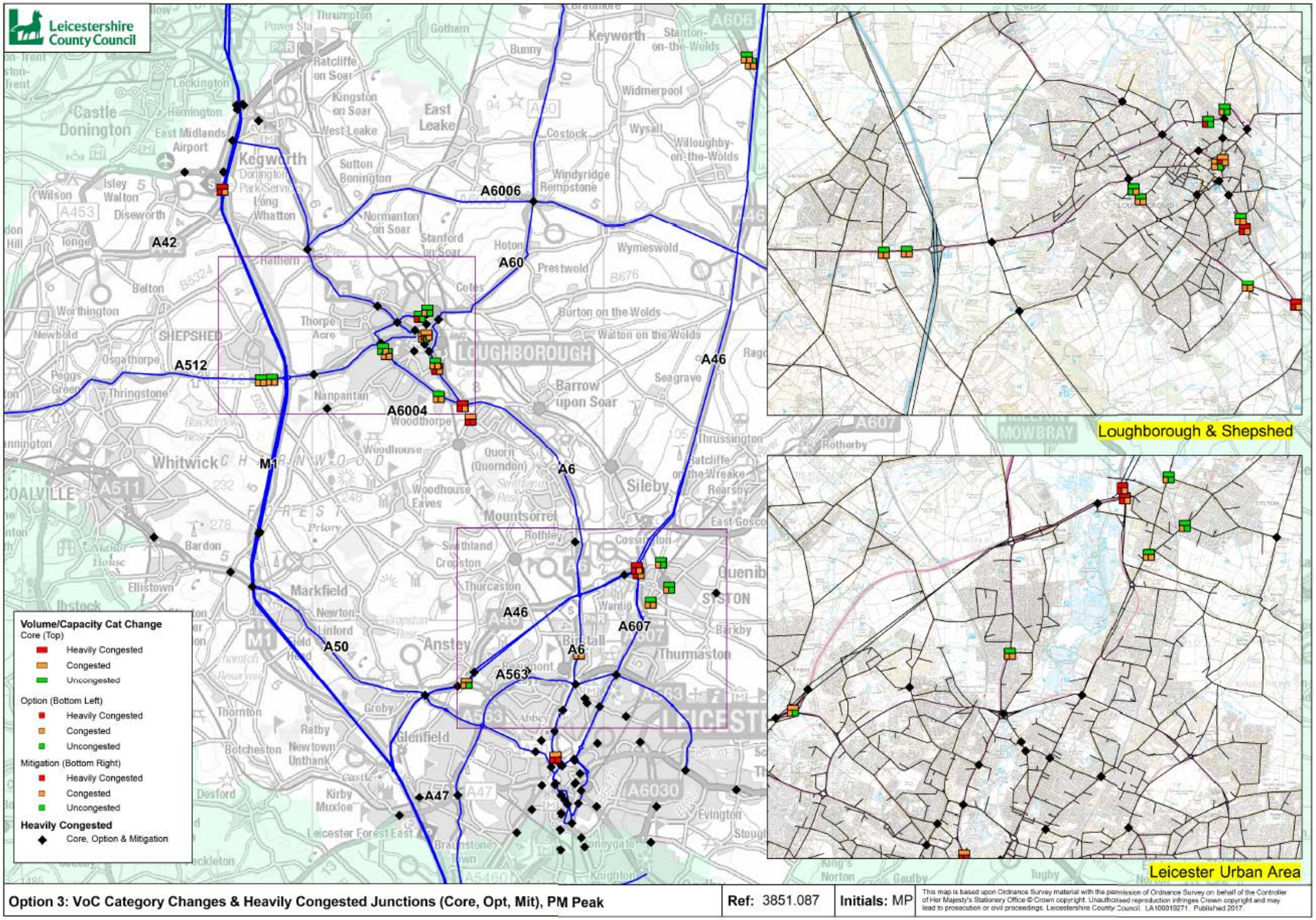


Figure 6-6: Junction Analysis, Option 3 (PM Peak)

Node	Junction	Area	Core AM VoC	Option AM VoC	Mitigation AM VoC	Core PM VoC	Option PM VoC	Mitigation PM VoC
3449	A46 NB (Hobby Horse)	A46	-	-	-	100	100	94
99993	A46/Anstey Ln	A46	93	94	80	94	97	81
1748	A6/School Ln	Birstall	-	-	-	82	87	89
1428	A6 (St Margaret's Way)	City (NE)	-	-	-	94	105	108
3259	Catherine St/Brandon St	City (NE)	68	99	99	-	-	-
1492	A6/Vaughan Way	City (NW)	47	100	100	-	-	-
2412	Main St/Biggin Hill Rd (Evington)	City (SE)	80	85	86	-	-	-
7304	Frederick St/Arthur St	Loughborough	82	86	80	-	-	-
60002	A6004 (Ling Rd)	Loughborough	95	97	84	-	-	-
60098	The Coneries/Sparrow Hill	Loughborough	-	-	-	95	100	95
60118	A6004/Park Rd/Shelthorpe Rd	Loughborough	89	101	74	-	-	-
60123	A6004/Allendale Rd	Loughborough	-	-	-	84	93	96
60126	A6/Shelthorpe Rd	Loughborough	-	-	-	101	100	87
60140	A60 Nottm Rd/Morley St	Loughborough	78	79	87	-	-	-
60148	A6/Alan Moss Rd/Belton Rd	Loughborough	100	101	80	-	-	-
60538	A6/Beeches Rd	Loughborough	-	-	-	80	85	88
61009	Woodgate/Pack Horse Ln	Loughborough	15	87	13	-	-	-
61020	A6/Baxter Gate	Loughborough	-	-	-	87	90	74
65066	A6004/University Rd	Loughborough	76	72	85	80	84	92
65067	A6004 (Epinal Way)	Loughborough	-	-	-	92	97	83
65070	A6004/Radmoor Rd	Loughborough	-	-	-	81	86	94
65074	Beacon Rd/Park Rd	Loughborough	83	72	87	-	-	-
69015	Belton Rd/Jubilee Dr	Loughborough	77	77	87	-	-	-
73778	A6 (Bridge St)	Loughborough	101	104	96	99	100	79
78902	Belton Rd	Loughborough	-	-	-	75	100	50
78903	Meadow Ln/Station Boulevard	Loughborough	103	104	99	79	86	70
99996	A6004/Forest Rd	Loughborough	94	97	84	-	-	-
99997	A6004/A512	Loughborough	102	104	99	-	-	-
50520	M1 Junction 23a Diverge (NB)	M1	79	82	86	-	-	-
50523	M1 Junction 23a/A42	M1	-	-	-	100	100	92
50539	M1 Junction 24 Diverge (NB)	M1	79	80	86	-	-	-
73421	Stoughton Dr (S)	Oadby & Wigston	95	96	33	-	-	-
79972	A606	Outside Leics	-	-	-	82	88	89
79974	A606	Outside Leics	-	-	-	82	94	92
60195	Loughborough Rd/Farley Way	Quorn	-	-	-	96	101	100
60362	A6/A6004 (Quorn)	Quorn	-	-	-	101	103	96
74116	A6004 (Terry Yardley Way)	Quorn	-	-	-	84	89	92
73889	A6/Broadnook	Rest Charnwood (West)	82	85	88	-	-	-
7306	A512 (Ashby Rd E)	Shepshed	-	-	-	77	90	85
60064	A512/Iveshead Rd/Charnwood Rd	Shepshed	78	88	83	-	-	-
60095	A512/Ingleberry Rd	Shepshed	95	101	96	82	98	93
76036	A512/Leicester Rd	Shepshed	-	-	-	81	87	80
76150	A512 (Ashby Rd E)	Shepshed	-	-	-	77	90	85
2227	Melton Rd/Fosse Way	Syston	-	-	-	78	90	89
2280	Fosse Way/High St	Syston	64	89	56	83	85	76
2508	Queniborough Rd/Barkby Rd	Syston	86	90	78	-	-	-
7041	Melton Rd/Goode's Ln	Syston	-	-	-	77	94	73
78892	Melton Rd/Wanlip Rd	Syston	99	102	94	-	-	-
99994	Hobby Horse	Syston	-	-	-	100	100	94

Table 6-2: Junction Analysis – Volume over Capacity (%) Category Changes, Option 3

Node	Junction	Area	Core AM Delay	Option AM Delay	Mitigation AM Delay	Core PM DelayC	Option PM Delay	Mitigation PM Delay
1607	A46/A6 (Slip on WB)	A46	49	61	72	-	-	-
2047	A46/Wanlip Rd (Slip on WB)	A46	-	-	-	32	44	20
9508	A46 (Anstey Ln Slip Off EB)	A46	-	-	-	13	35	40
9715	A46 (Anstey Ln Slip On EB)	A46	-	-	-	63	104	109
1935	Victoria Park Rd/Queens Rd	City (SE)	43	64	44	-	-	-
1318	Upperton Rd/Watkin Rd	City (SW)	132	154	142	-	-	-
60099	Meadow Ln/Ratcliffe Rd/Belton Rd	Loughborough	79	106	64	108	107	73
60108	Woodgate/Pinfold Gate	Loughborough	153	224	138	-	-	-
60126	A6/Shelthorpe Rd	Loughborough	54	79	42	-	-	-
60148	A6/Alan Moss Rd/Belton Rd	Loughborough	-	-	-	67	74	50
60186	A6004/Beacon Rd	Loughborough	28	35	50	-	-	-
60198	Nanpantan Rd/Snell's Nook Ln	Loughborough	207	279	173	171	222	150
61020	A6/Baxter Gate	Loughborough	61	87	55	-	-	-
69941	A60/Station Boulevard	Loughborough	140	157	92	59	63	43
99997	A6004/A512	Loughborough	-	-	-	104	110	88
99998	A6/Bishop Meadow Roundabout	Loughborough	-	-	-	142	165	111
50523	M1 Junction 23a/A42	M1	54	72	26	-	-	-
50492	A42/A453 (EMA)	NW Leics	129	141	115	60	62	57
60362	A6/A6004 (Quorn)	Quorn	56	92	39	-	-	-
2508	Queniborough Rd/Barkby Rd	Syston	-	-	-	87	116	79

Table 6-3: Junction Analysis –Nodes Heavily Congested in All (Core, Option and Mitigation) Scenarios with 'Significant' Delay Changes (seconds per PCU), Option 3

7. Results: Option 4 – Urban Concentration and New Settlement (Low Growth)

7.1. Development Assumptions

Settlement	Dwellings	Notable Sites
Leicester Urban Area (Birstall, Thurmaston and Syston)	2,500	Majority of available sites (total 3,346) including one large site at Syston (1,200 homes, south of Syston)
Loughborough	2,000	Mix of sites including one large site (1,000 south west of Loughborough – part of site promoted)
Shepshed	1,500	Large and medium sites west of Shepshed and mix of small and medium sized sites in and around the town.
Anstey	200	A mix of small and medium sized sites, a total of 1,100 homes at the Service Centres
Barrow Upon Soar	200	
Mountsorrel	100	
Quorn	200	
Rothley	200	
Sileby	200	
Cotes New Settlement	1,000	
Total	**8,100**	

Table 7-1: Option 4 Development Assumptions (provided by Charnwood Borough Council)

7.2. Modelling Outputs

7.2.1. The following outputs are produced:

- Flow Difference Plots (Figure 7-1, Figure 7-2)
- Delay Difference Plots (Figure 7-3, Figure 7-4)
- Junction Analysis (Figure 7-5, Figure 7-6, Table 7-2, Table 7-3)

FLOW DIFFERENCE (MITIGATION – OPTION)

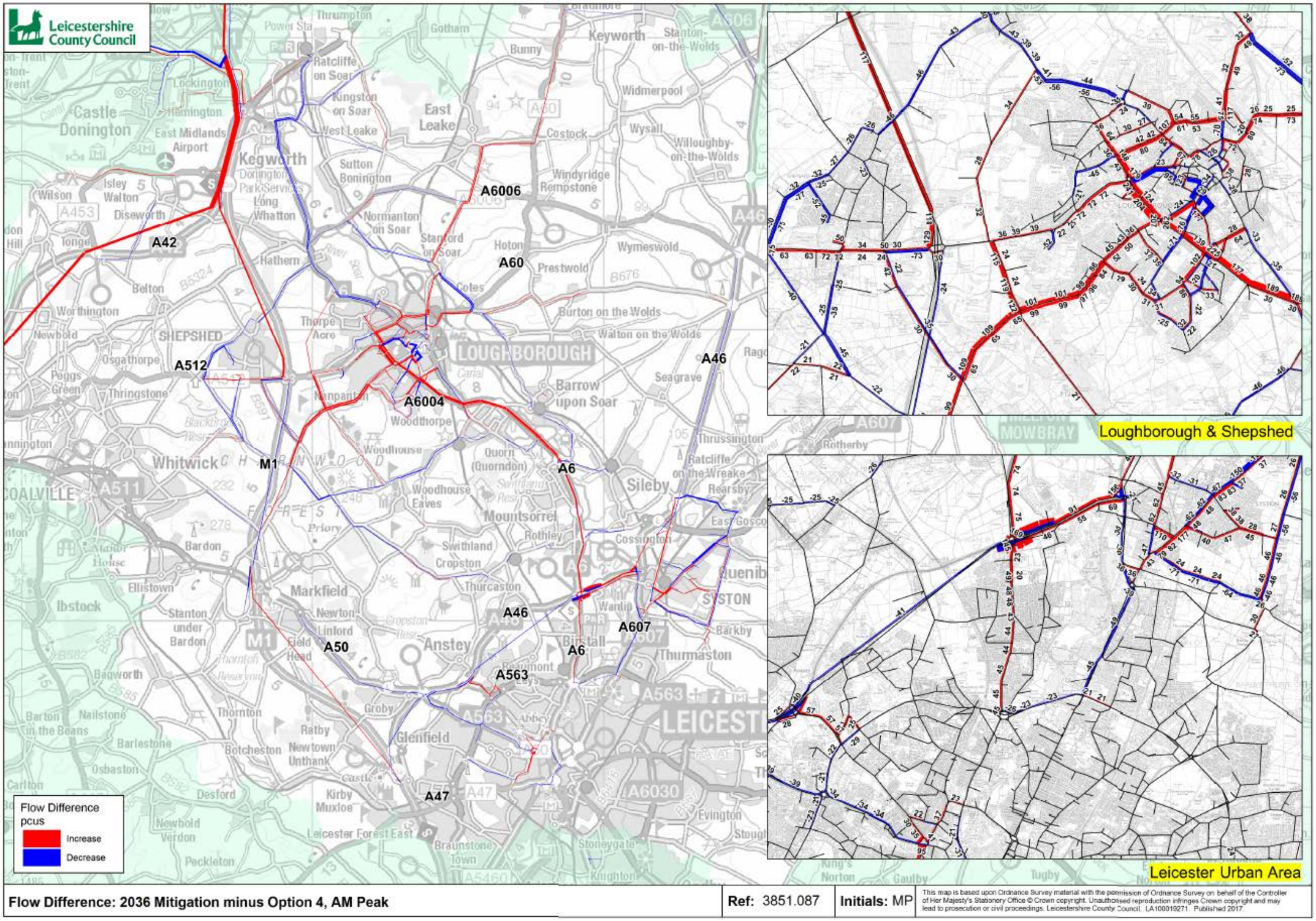


Figure 7-1: Flow Difference Plot, Option 4 (AM Peak)

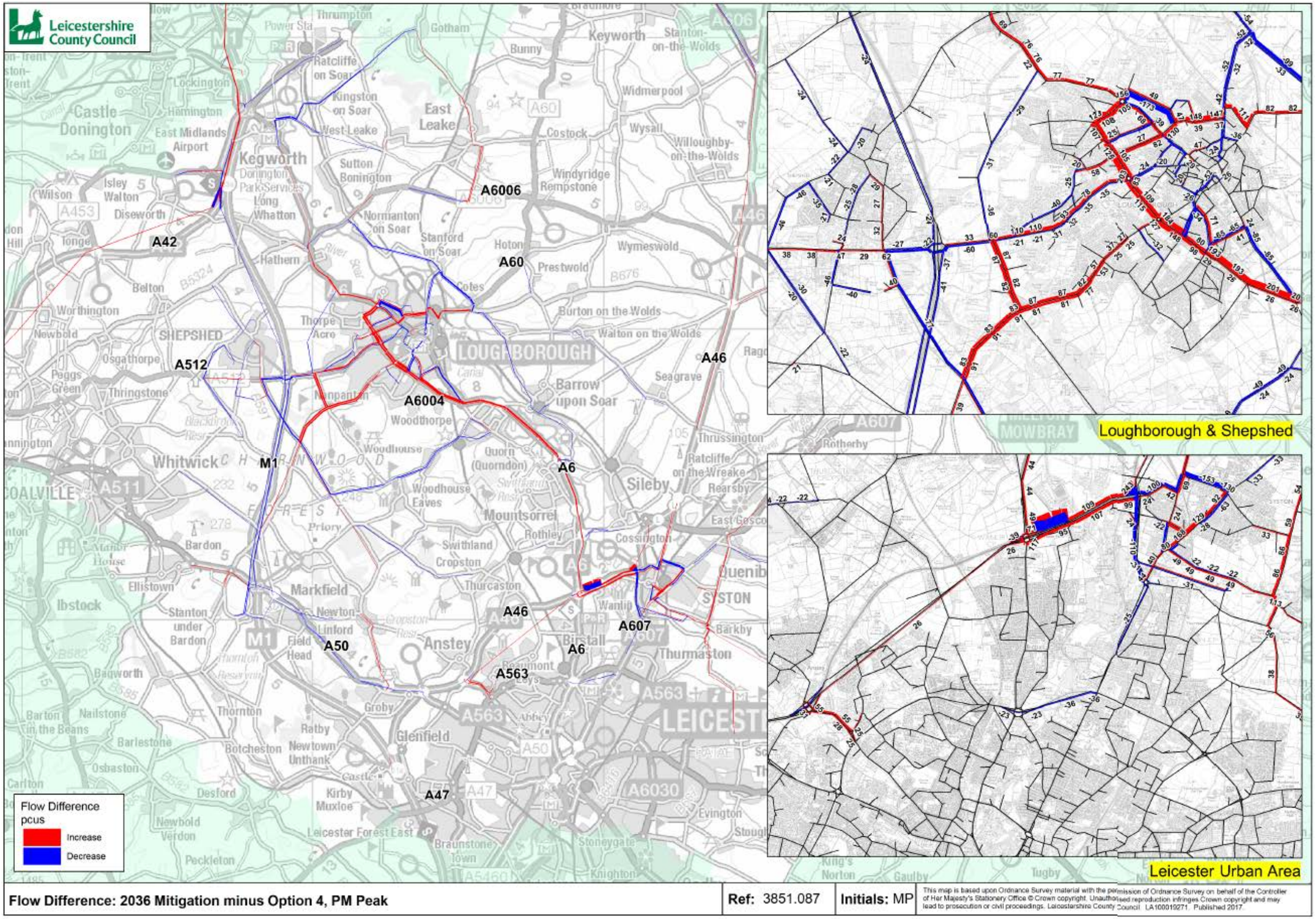


Figure 7-2: Flow Difference Plot, Option 4 (PM Peak)

DELAY DIFFERENCE (MITIGATION – OPTION)

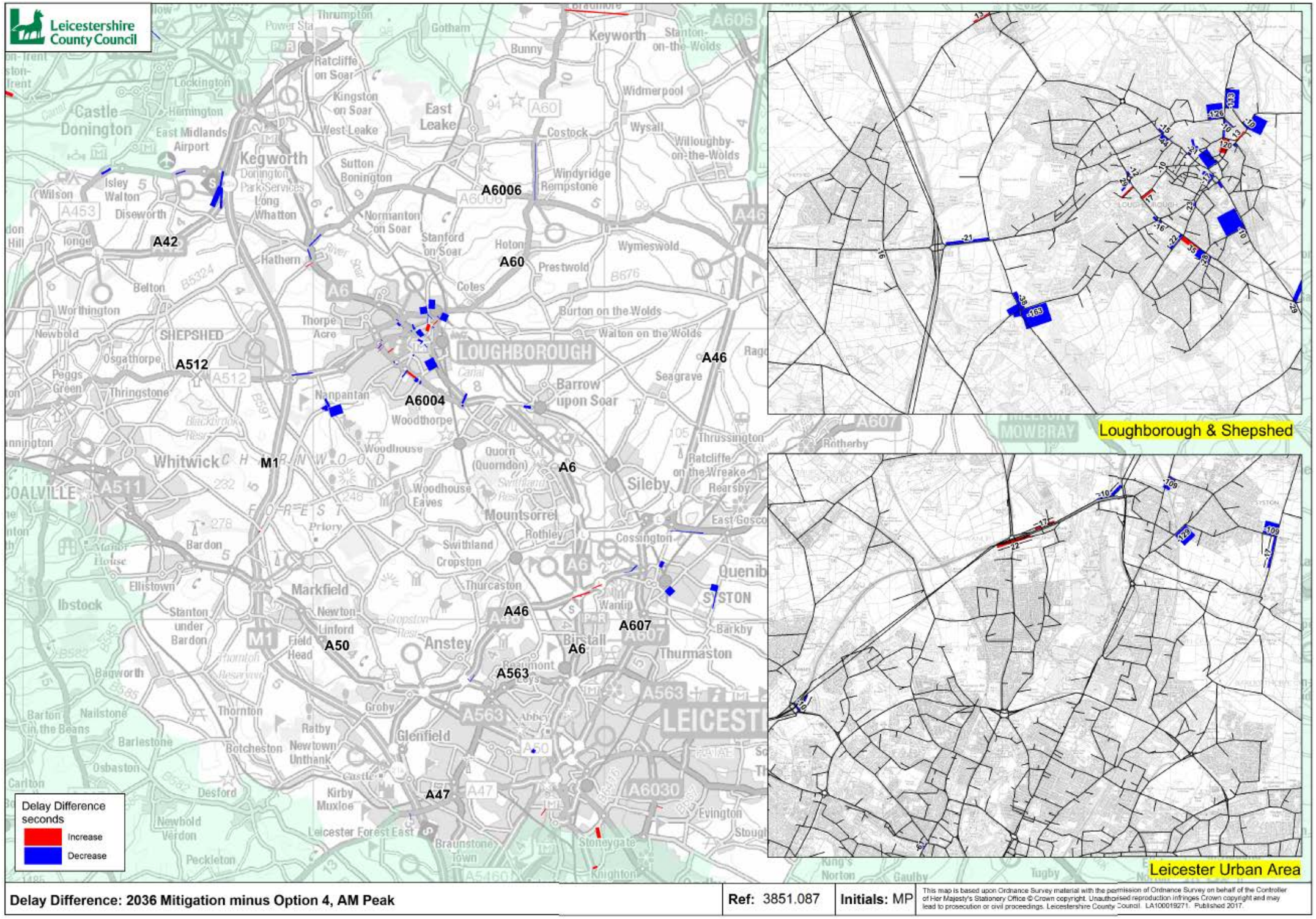
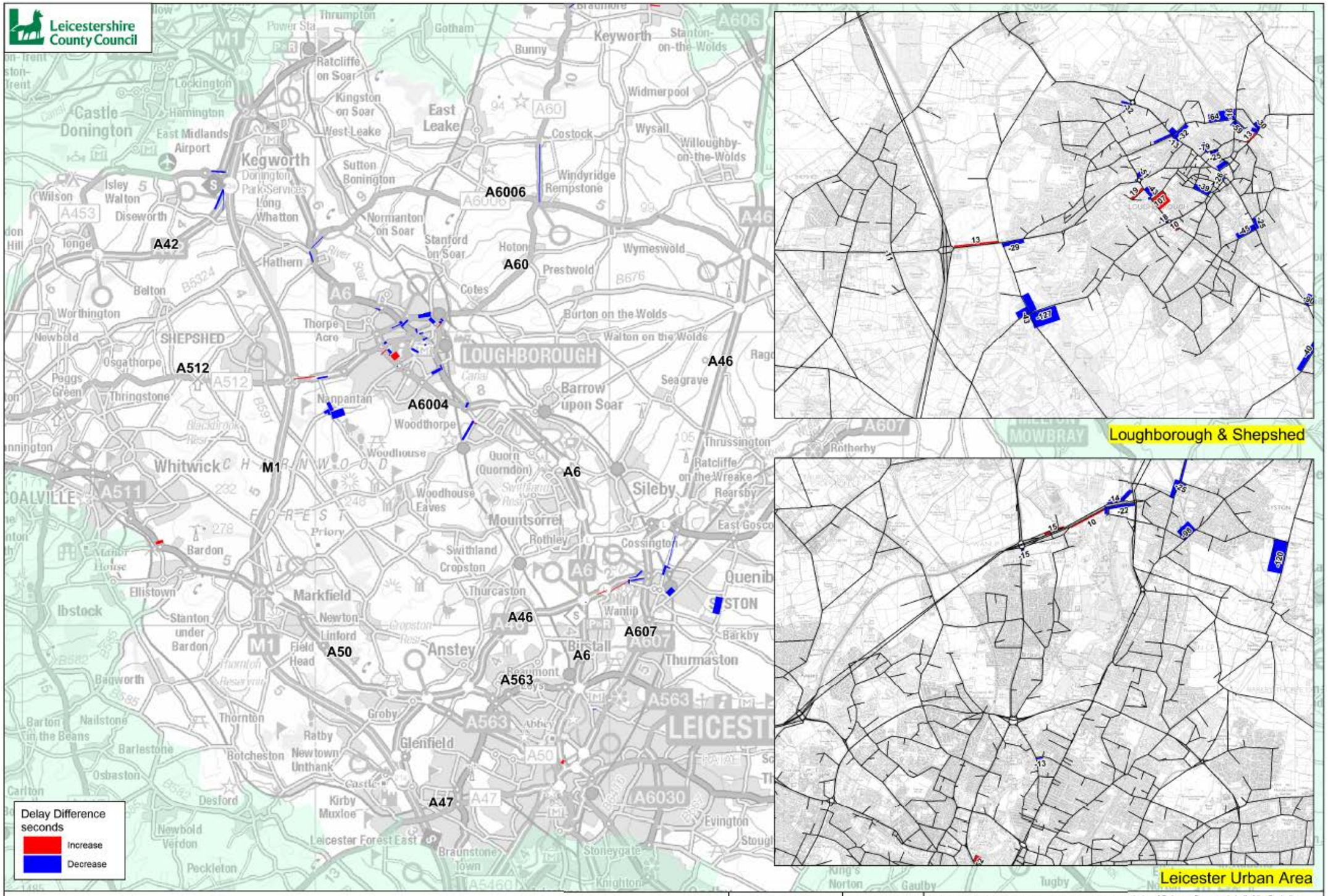


Figure 7-3: Delay Difference Plot, Option 4 (AM Peak)



Delay Difference: 2036 Mitigation minus Option 4, PM Peak4 | **Ref:** 3851.087 | **Initials:** MP

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Figure 7-4: Delay Difference Plot, Option 4 (PM Peak)

JUNCTION PERFORMANCE

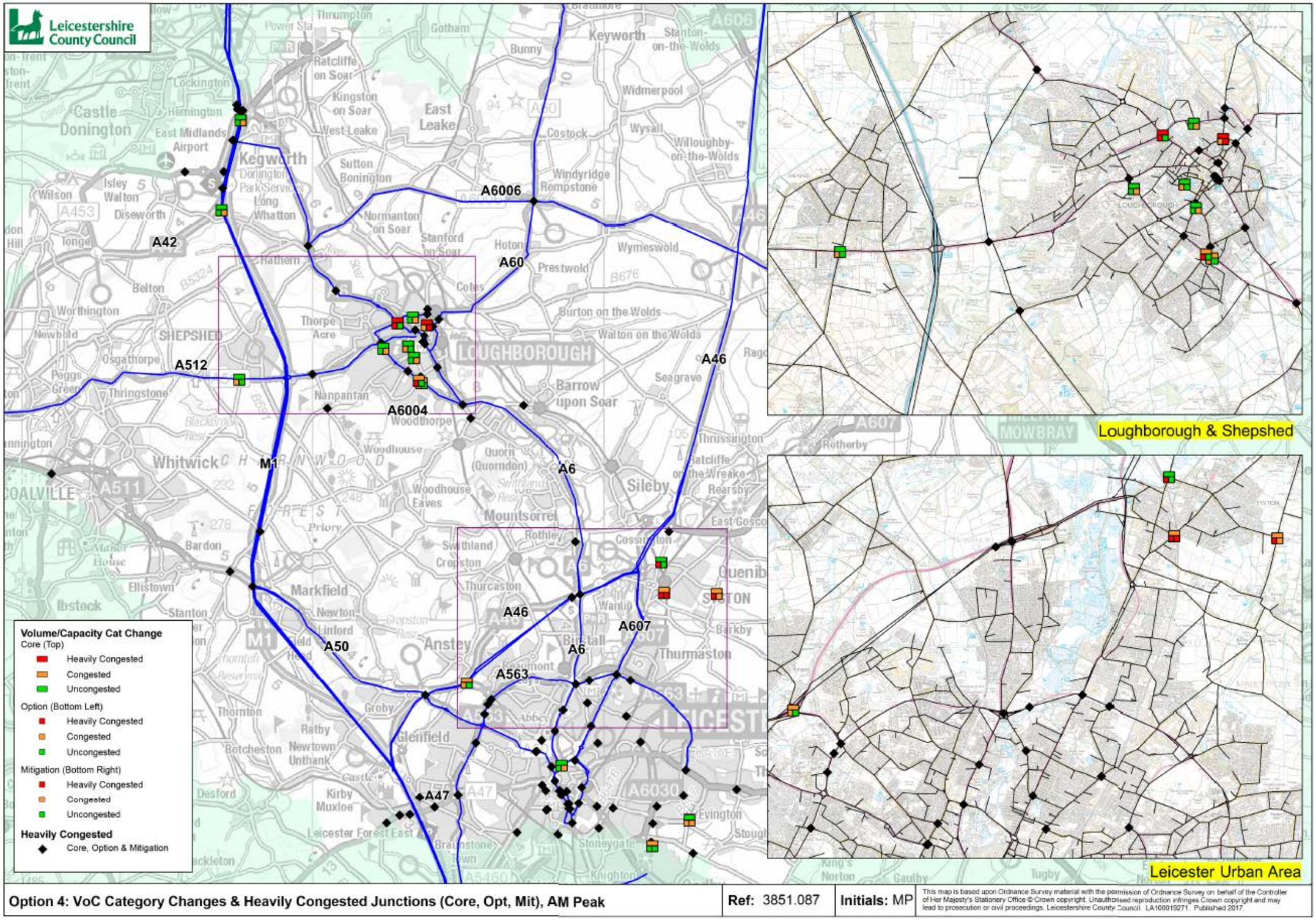

Figure 7-5: Junction Analysis, Option 4 (AM Peak)

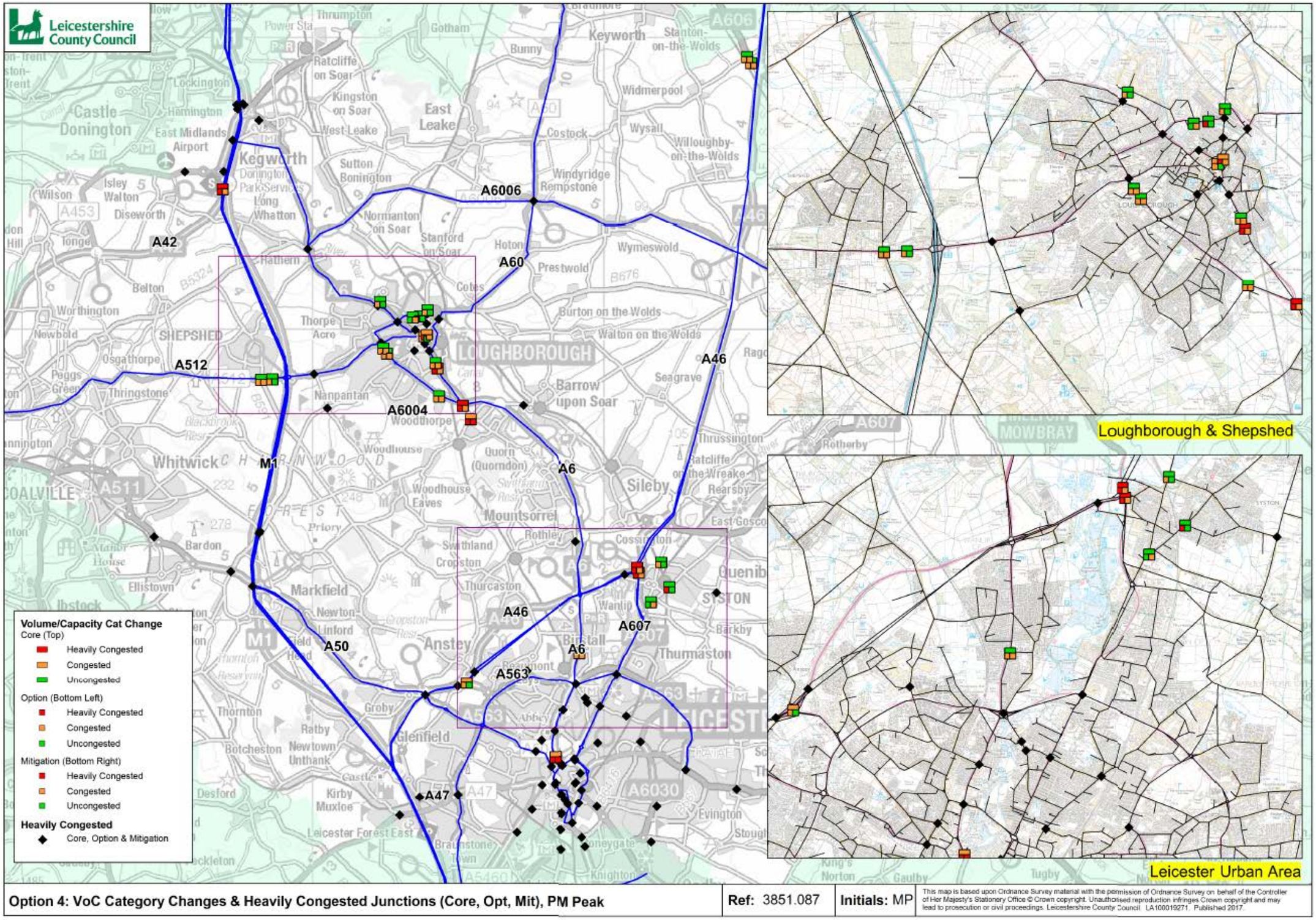

Figure 7-6: Junction Analysis, Option 4 (PM Peak)

Node	Junction	Area	Core AM VoC	Option AM VoC	Mitigation AM VoC	Core PM VoC	Option PM VoC	Mitigation PM VoC
3449	A46 NB (Hobby Horse)	A46	-	-	-	100	100	93
99993	A46/Anstey Ln	A46	93	94	80	94	98	82
1748	A6/School Ln	Birstall	-	-	-	82	89	89
1428	A6 (St Margaret's Way)	City (NE)	-	-	-	94	106	109
1492	A6/Vaughan Way	City (NW)	47	72	99	-	-	-
2412	Main St/Biggin Hill Rd (Evington)	City (SE)	80	86	87	-	-	-
7304	Frederick St/Arthur St	Loughborough	82	86	81	-	-	-
60002	A6004 (Ling Rd)	Loughborough	95	97	80	-	-	-
60098	The Coneries/Sparrow Hill	Loughborough	-	-	-	95	101	98
60100	Meadow Ln/Toothill Rd	Loughborough	100	98	107	-	-	-
60118	A6004/Park Rd/Shelthorpe Rd	Loughborough	89	101	73	-	-	-
60123	A6004/Allendale Rd	Loughborough	-	-	-	84	90	91
60126	A6/Shelthorpe Rd	Loughborough	-	-	-	101	101	87
60140	A60 Nottm Rd/Morley St	Loughborough	78	78	90	-	-	-
60148	A6/Alan Moss Rd/Belton Rd	Loughborough	100	101	80	-	-	-
60289	A60/Brush	Loughborough	79	80	85	-	-	-
60538	A6/Beeches Rd	Loughborough	-	-	-	80	87	87
61020	A6/Baxter Gate	Loughborough	-	-	-	87	92	81
65066	A6004/University Rd	Loughborough	76	73	85	80	85	92
65067	A6004 (Epinal Way)	Loughborough	-	-	-	92	98	83
65070	A6004/Radmoor Rd	Loughborough	-	-	-	81	87	94
65074	Beacon Rd/Park Rd	Loughborough	83	69	87	-	-	-
69015	Belton Rd/Jubilee Dr	Loughborough	77	80	86	74	70	85
69936	Bishop Meadow Rd/Weldon Rd	Loughborough	-	-	-	81	86	77
73778	A6 (Bridge St)	Loughborough	101	103	95	99	102	79
78902	Belton Rd	Loughborough	-	-	-	75	100	51
78903	Meadow Ln/Station Boulevard	Loughborough	-	-	-	79	89	72
50520	M1 Junction 23a Diverge (NB)	M1	79	79	86	-	-	-
50523	M1 Junction 23a/A42	M1	-	-	-	100	100	93
50539	M1 Junction 24 Diverge (NB)	M1	79	80	85	-	-	-
73421	Stoughton Dr (S)	Oadby & Wigston	95	33	33	-	-	-
79972	A606	Outside Leics	-	-	-	82	92	90
79974	A606	Outside Leics	-	-	-	82	99	97
60195	Loughborough Rd/Farley Way	Quorn	-	-	-	96	101	100
60362	A6/A6004 (Quorn)	Quorn	-	-	-	101	103	97
74116	A6004 (Terry Yardley Way)	Quorn	-	-	-	84	88	93
73889	A6/Broadnook	Rest Charnwood (West)	82	84	87	-	-	-
7306	A512 (Ashby Rd E)	Shepshed	-	-	-	77	87	83
60064	A512/Iveshead Rd/Charnwood Rd	Shepshed	78	85	75	-	-	-
60095	A512/Ingleberry Rd	Shepshed	-	-	-	82	90	85
76036	A512/Leicester Rd	Shepshed	-	-	-	81	85	75
76150	A512 (Ashby Rd E)	Shepshed	-	-	-	77	87	83
2227	Melton Rd/Fosse Way	Syston	-	-	-	78	84	90
2280	Fosse Way/High St	Syston	64	102	80	83	94	79
2508	Queniborough Rd/Barkby Rd	Syston	86	102	89	-	-	-
7041	Melton Rd/Goode's Ln	Syston	-	-	-	77	102	84
78892	Melton Rd/Wanlip Rd	Syston	99	106	101	-	-	-
99994	Hobby Horse	Syston	-	-	-	100	100	93

Table 7-2: Junction Analysis – Volume over Capacity (%) Category Changes, Option 4

Node	Junction	Area	Core AM Delay	Option AM Delay	Mitigation AM Delay	Core PM Delay	Option PM Delay	Mitigation PM Delay
1607	A46/A6 (Slip on WB)	A46	49	61	74	-	-	-
2047	A46/Wanlip Rd (Slip on WB)	A46	-	-	-	32	45	20
9508	A46 (Anstey Ln Slip Off EB)	A46	-	-	-	13	35	38
9715	A46 (Anstey Ln Slip On EB)	A46	-	-	-	63	107	109
60044	Barrow Rd/Bridge St	Barrow	72	97	72	-	-	-
60099	Meadow Ln/Ratcliffe Rd/Belton Rd	Loughborough	79	105	66	108	116	80
60108	Woodgate/Pinfold Gate	Loughborough	153	220	134	-	-	-
60126	A6/Shelthorpe Rd	Loughborough	54	76	40	-	-	-
60148	A6/Alan Moss Rd/Belton Rd	Loughborough	-	-	-	67	76	51
60186	A6004/Beacon Rd	Loughborough	28	35	49	-	-	-
60198	Nanpantan Rd/Snell's Nook Ln	Loughborough	207	275	175	171	229	150
61020	A6/Baxter Gate	Loughborough	61	86	55	-	-	-
69941	A60/Station Boulevard	Loughborough	140	176	106	59	72	44
78903	Meadow Ln/Station Boulevard	Loughborough	89	110	65	-	-	-
99997	A6004/A512	Loughborough	146	172	119	104	111	89
99998	A6/Bishop Meadow Roundabout	Loughborough	-	-	-	142	171	115
50523	M1 Junction 23a/A42	M1	54	75	26	-	-	-
50492	A42/A453 (EMA)	NW Leics	129	138	116	60	62	59
60362	A6/A6004 (Quorn)	Quorn	56	86	36	-	-	-
2508	Queniborough Rd/Barkby Rd	Syston	-	-	-	87	142	88

Table 7-3: Junction Analysis –Nodes Heavily Congested in All (Core, Option and Mitigation) Scenarios with 'Significant' Delay Changes (seconds per PCU), Option 4

8. Results: Option 5 – Urban Concentration (High Growth)

8.1. Development Assumptions

Settlement	Dwellings	Notable Sites
Leicester Urban Area (Birstall, Thurmaston and Syston)	3,300	Majority of available sites (total 3,346) including one large site at Syston (1,200 homes, south of Syston)
Loughborough	5,150	Majority of available sites (total 5,154) includes large sites South and South West of Loughborough
Shepshed	2,650	Majority of available sites (total 2,686) including large site west of Shepshed.
Anstey	950	Majority of available sites, a total of 4,600 homes at the Service Centres
Barrow Upon Soar	950	
Mountsorrel	100	
Quorn	700	
Rothley	850	
Sileby	950	
Markfield	200	
Total	**15,700**	

Table 8-1: Option 5 Development Assumptions (provided by Charnwood Borough Council)

8.2. Modelling Outputs

8.2.1. The following outputs are produced:

- Flow Difference Plots (Figure 8-1, Figure 8-2)
- Delay Difference Plots (Figure 8-3, Figure 8-4)
- Junction Analysis (Figure 8-5, Figure 8-6, Table 8-2, Table 8-3)

FLOW DIFFERENCE (MITIGATION – OPTION)

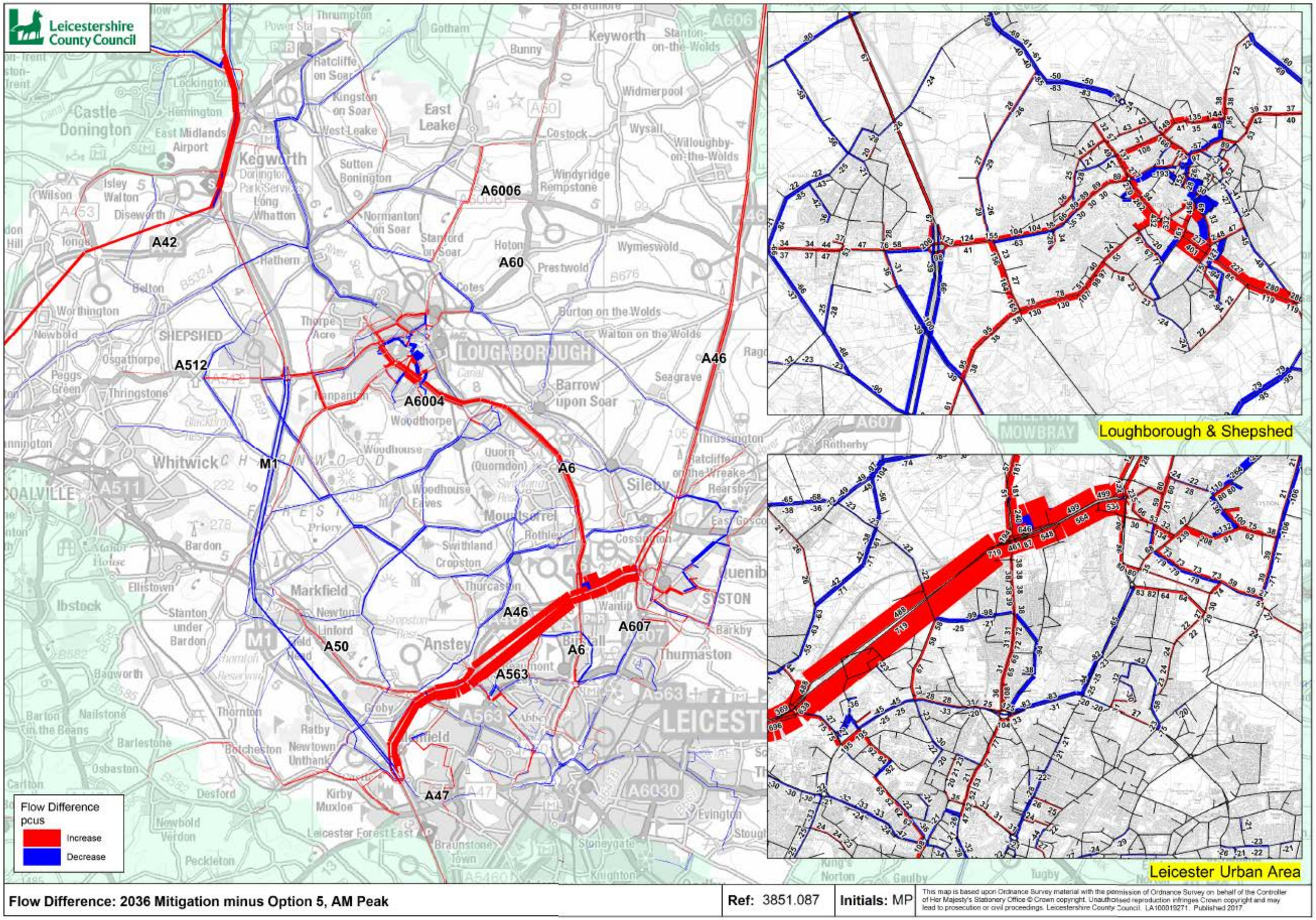

Figure 8-1: Flow Difference Plot, Option 5 (AM Peak)

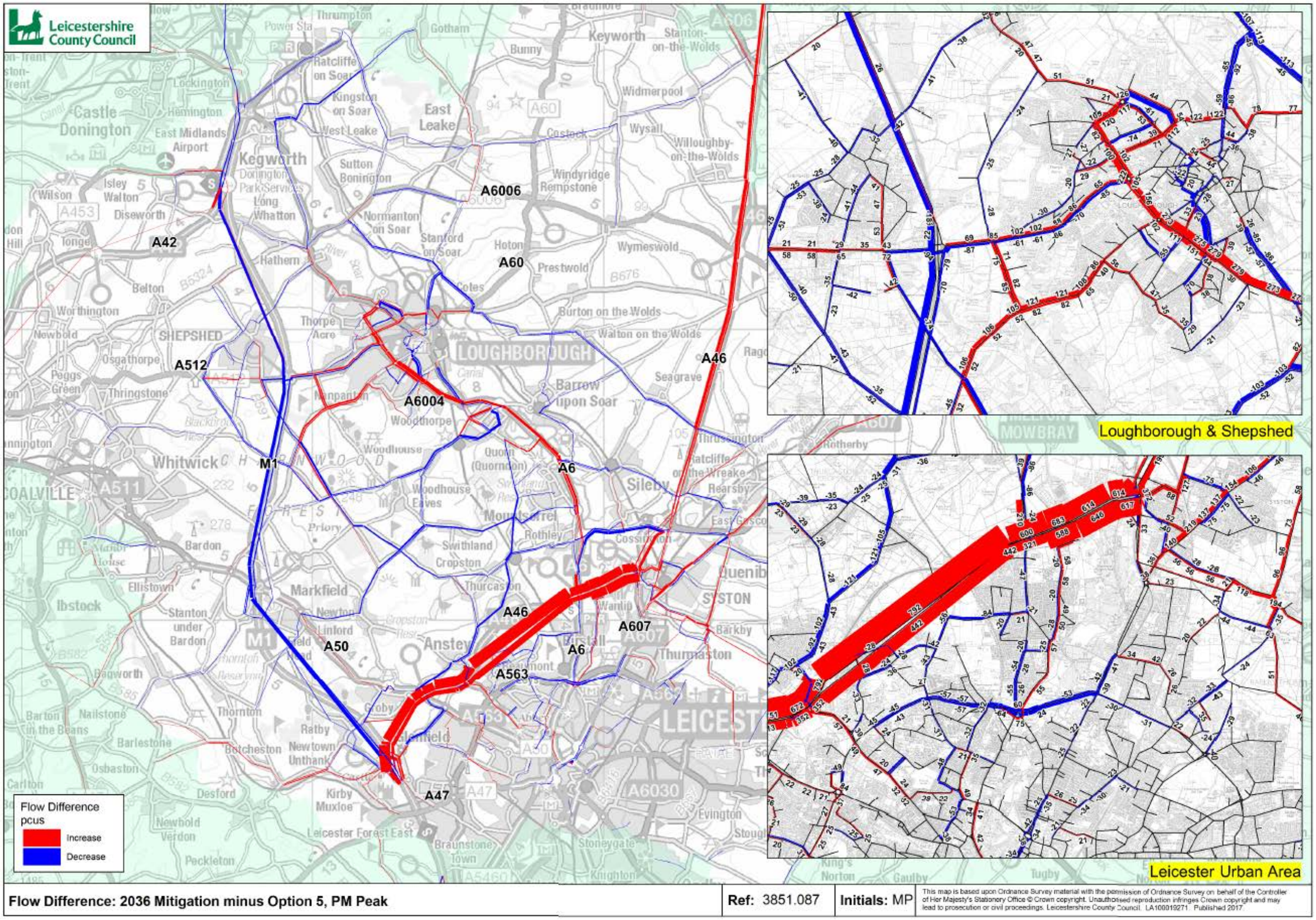

Figure 8-2: Flow Difference Plot, Option 5 (PM Peak)

DELAY DIFFERENCE (MITIGATION – OPTION)

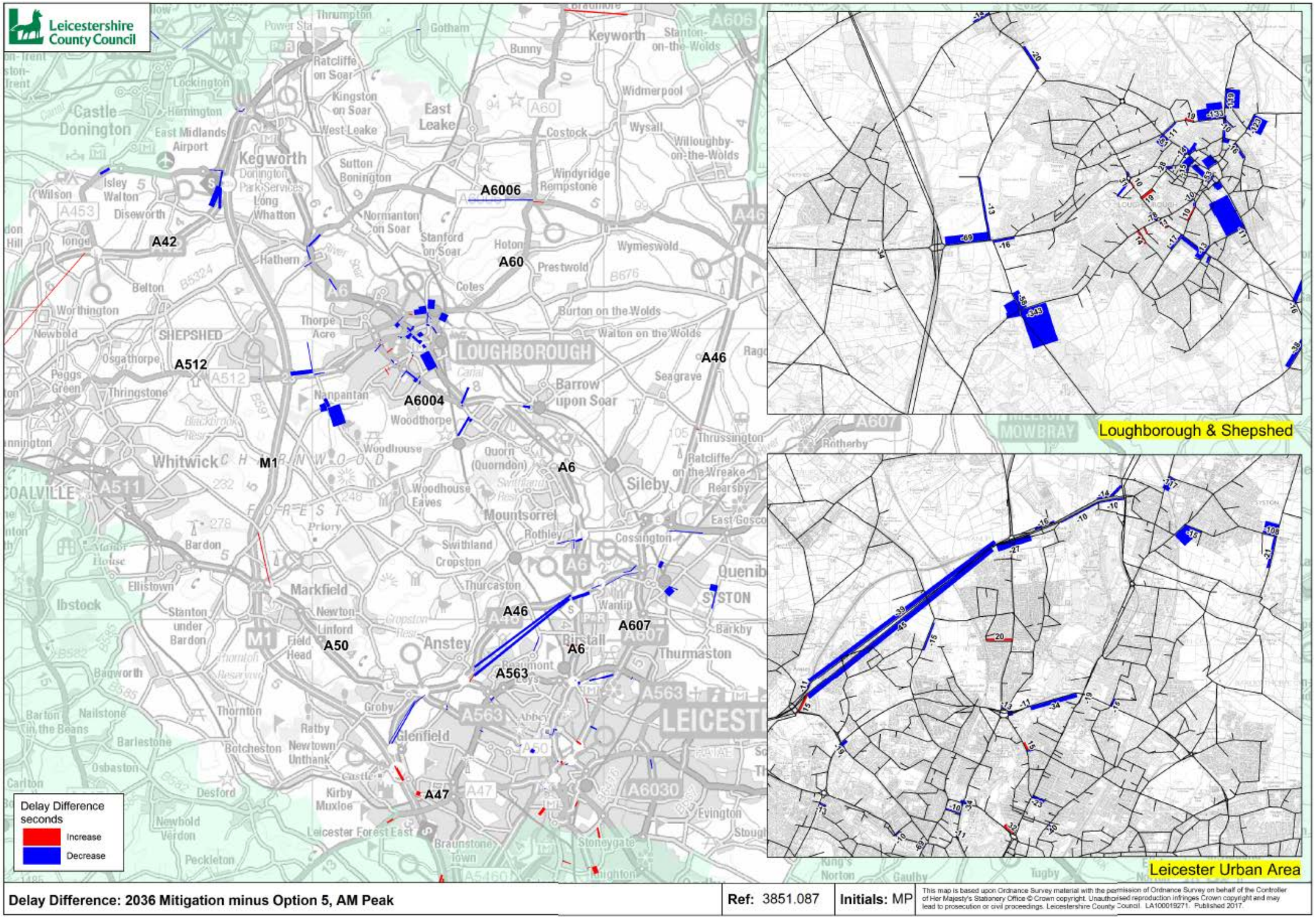

Figure 8-3: Delay Difference Plot, Option 5 (AM Peak)

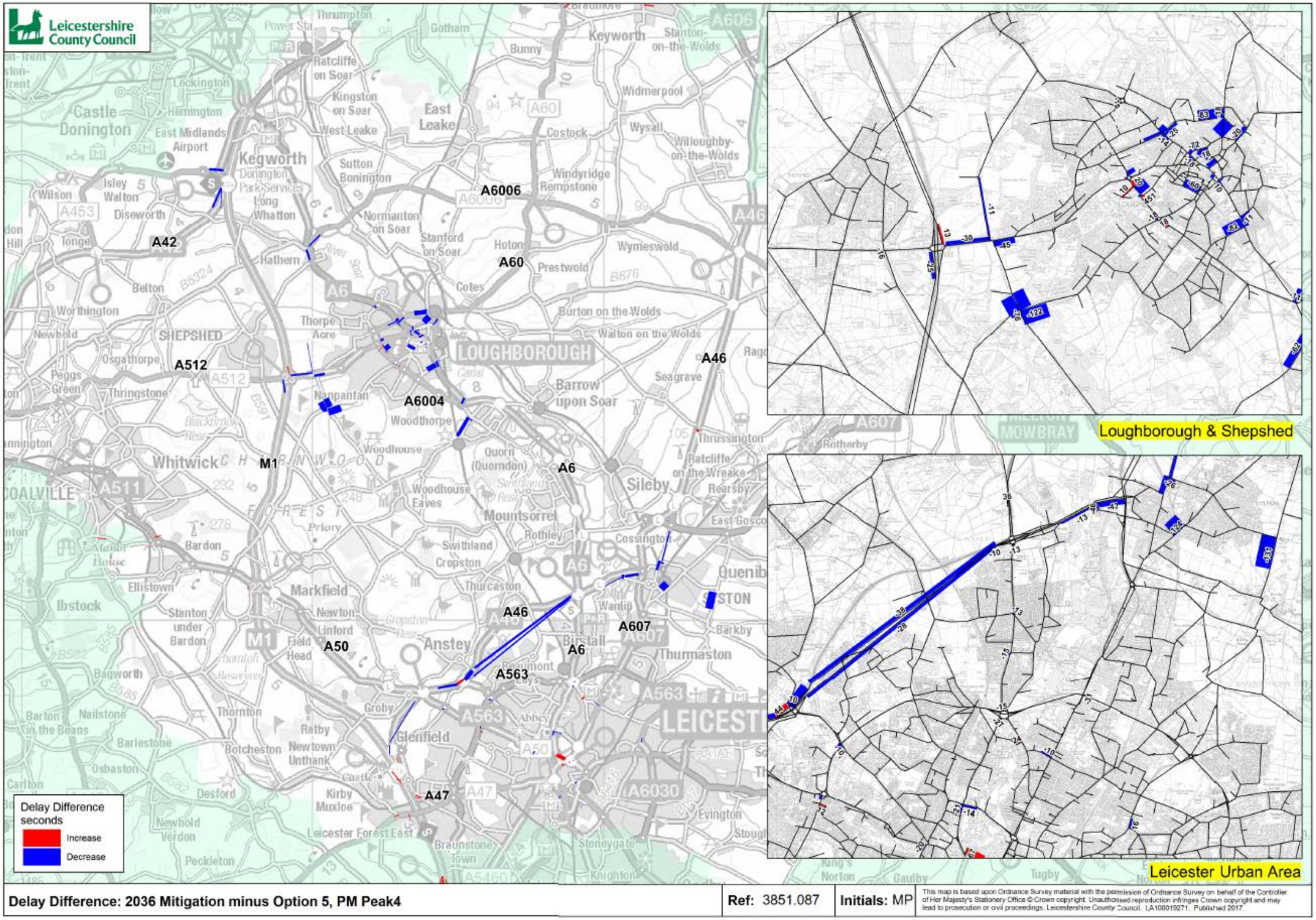

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Figure 8-4: Delay Difference Plot, Option 5 (PM Peak)

JUNCTION PERFORMANCE

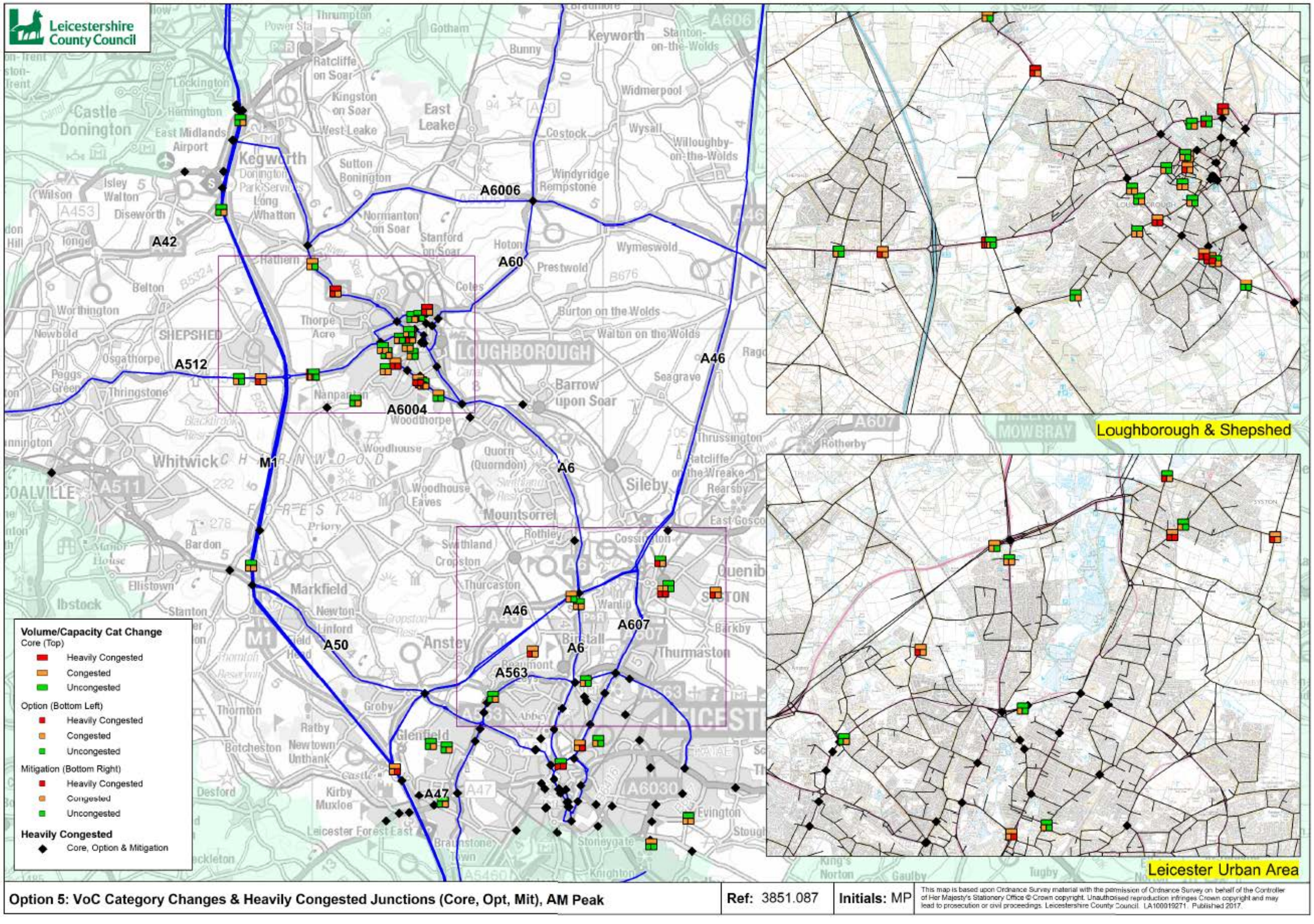


Figure 8-5: Junction Analysis, Option 5 (AM Peak)

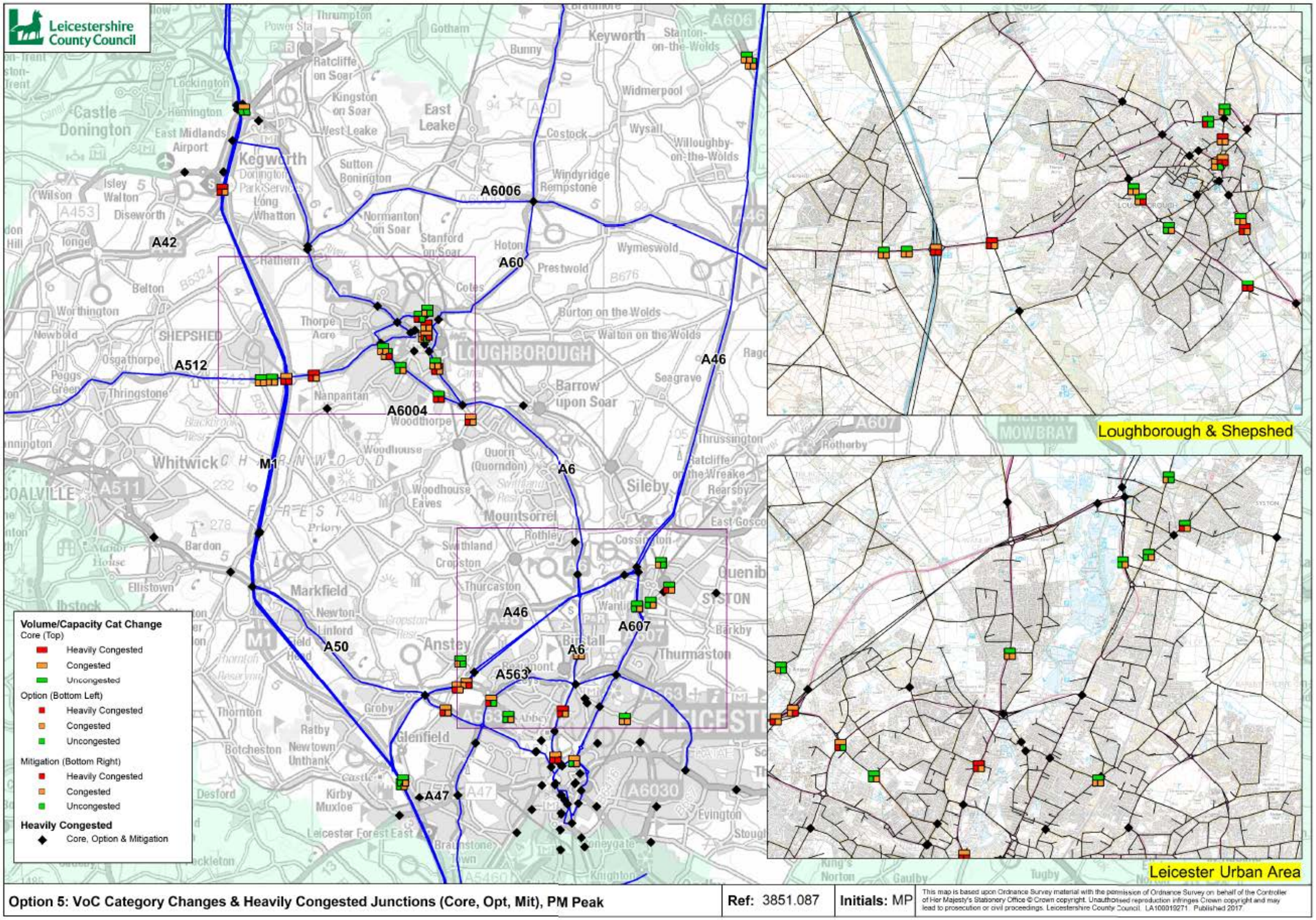


Figure 8-6: Junction Analysis, Option 5 (PM Peak)

Node	Junction	Area	Core AM VoC	Option AM VoC	Mitigation AM VoC	Core PM VoC	Option PM VoC	Mitigation PM VoC
1613	A46 (A6 Slip Off EB)	A46	88	87	81	-	-	-
9508	A46 (Anstey Ln Slip Off EB)	A46	-	-	-	98	102	88
99993	A46/Anstey Ln	A46	-	-	-	94	95	101
9660	Leicester Rd	Anstey	-	-	-	77	89	89
72051	The Nook	Anstey	-	-	-	68	85	74
72052	Leicester Rd	Anstey	-	-	-	74	86	86
1748	A6/School Ln	Birstall	-	-	-	82	95	86
7402	A6/Birstall Meadow Rd	Birstall	83	89	91	-	-	-
69960	A6 (Red Hill)	Birstall	79	80	86	-	-	-
76015	A6 (Red Hill)	Birstall	79	80	86	-	-	-
9295	Ratby Ln	Blaby	-	-	-	75	77	88
9391	Dominion Rd/Park Drive	Blaby	78	83	88	-	-	-
9455	Dominion Rd/Tournament Rd	Blaby	76	79	89	-	-	-
99991	A50/Gynsill Ln	Blaby	-	-	-	93	100	92
1645	Belgrave Gate/Humberstone Gate	City (Centre)	-	-	-	95	58	96
1428	A6 (St Margaret's Way)	City (NE)	-	-	-	94	110	119
1513	A6/Beaumont Leys Ln	City (NE)	-	-	-	100	100	92
1770	Belgrave Circle	City (NE)	94	98	101	-	-	-
1855	ODDR (Watermead Way)	City (NE)	84	89	82	-	-	-
2055	Catherine St/Gipsy Ln	City (NE)	-	-	-	82	88	85
3259	Catherine St/Brandon St	City (NE)	68	98	58	-	-	-
1035	Anstey Ln/Great Meadow Rd	City (NW)	-	-	-	81	84	88
1226	Bennion Rd/Beaumont Leys Ln	City (NW)	94	100	93	-	-	-
1492	A6/Vaughan Way	City (NW)	47	100	102	-	-	-
9876	Anstey Ln/ODDR	City (NW)	-	-	-	92	100	84
9897	ODDR (Krefeld Way)	City (NW)	82	80	91	-	-	-
2412	Main St/Biggin Hill Rd (Evington)	City (SE)	80	90	90	-	-	-
9427	A47/Golf Course Ln	City (SW)	79	81	85	-	-	-
60371	A6/Shepshed Rd	Hathern	89	93	80	-	-	-
7304	Frederick St/Arthur St	Loughborough	82	92	87	-	-	-
7405	A6/Broad St	Loughborough	71	91	74	-	-	-
60002	A6004 (Ling Rd)	Loughborough	95	107	105	-	-	-
60048	A6004/Woodthorpe Rd	Loughborough	73	90	95	-	-	-
60062	A6/The Rushes	Loughborough	90	105	90	-	-	-
60098	The Coneries/Sparrow Hill	Loughborough	-	-	-	95	100	100
60100	Meadow Ln/Toothill Rd	Loughborough	-	-	-	100	94	90
60118	A6004/Park Rd/Shelthorpe Rd	Loughborough	89	106	104	-	-	-
60123	A6004/Allendale Rd	Loughborough	86	75	83	84	101	101
60126	A6/Shelthorpe Rd	Loughborough	-	-	-	101	101	96
60140	A60 Nottm Rd/Morley St	Loughborough	78	79	87	-	-	-
60145	Forest Rd/Park Rd	Loughborough	50	87	64	-	-	-
60193	A512/WoLSUE South	Loughborough	105	102	92	-	-	-
60205	A6 (Derby Rd)	Loughborough	87	83	80	-	-	-
60358	A512/Snell's Nook Ln	Loughborough	69	92	72	101	101	96
60366	A512/WoLSUE North	Loughborough	102	100	97	-	-	-
60380	Ashby Rd/Greenclose Ln	Loughborough	90	100	94	-	-	-
60538	A6/Beeches Rd	Loughborough	-	-	-	80	94	96
61009	Woodgate/Pack Horse Ln	Loughborough	15	106	14	-	-	-
61020	A6/Baxter Gate	Loughborough	-	-	-	87	91	80
65002	Nanpantan Rd/Dev Site	Loughborough	41	77	87	-	-	-
65018	Forest Rd/Outwoods Dr	Loughborough	63	87	88	-	-	-
65049	A6 (Derby Rd)	Loughborough	87	82	79	-	-	-
65050	A6 (Derby Rd)	Loughborough	87	83	80	-	-	-
65066	A6004/University Rd	Loughborough	76	90	94	80	89	98
65067	A6004 (Epinal Way)	Loughborough	-	-	-	92	102	87
65070	A6004/Radmoor Rd	Loughborough	78	74	85	81	88	114
65071	A512/Radmoor Rd	Loughborough	84	92	84	-	-	-
69015	Belton Rd/Jubilee Dr	Loughborough	77	76	92	-	-	-
73775	Queen's Rd/Salisbury St	Loughborough	28	85	29	-	-	-
73778	A6 (Bridge St)	Loughborough	-	-	-	99	103	98
74101	A6004 (Epinal Way)	Loughborough	-	-	-	73	79	88
78902	Belton Rd	Loughborough	48	101	53	75	101	51
78903	Meadow Ln/Station Boulevard	Loughborough	103	103	95	79	96	75
78905	A6004/Squirrel Way	Loughborough	-	-	-	70	69	86
99996	A6004/Forest Rd	Loughborough	94	105	101	-	-	-

2932	M1 Junction 21a Merge (SB)	M1	93	97	100	-	-	-
9292	M1 Junction 21a Diverge (NB)	M1	-	-	-	82	83	89
40470	M1 Junction 22 Merge (NB)	M1	81	87	85	-	-	-
50487	M1 Junction 24/A6	M1	-	-	-	86	81	82
50520	M1 Junction 23a Diverge (NB)	M1	79	84	86	-	-	-
50523	M1 Junction 23a/A42	M1	-	-	-	100	100	91
50539	M1 Junction 24 Diverge (NB)	M1	79	80	87	-	-	-
99999	M1 Junction 23	M1	-	-	-	87	101	100
73421	Stoughton Dr (S)	Oadby & Wigston	95	34	33	-	-	-
79972	A606	Outside Leics	-	-	-	82	91	91
79974	A606	Outside Leics	-	-	-	82	92	94
60195	Loughborough Rd/Farley Way	Quorn	-	-	-	96	101	99
74116	A6004 (Terry Yardley Way)	Quorn	87	77	84	84	91	91
73889	A6/Broadnook	Rest Charnwood (West)	82	88	94	-	-	-
73890	A6/Broadnook	Rest Charnwood (West)	-	-	-	78	100	100
73891	A6/Broadnook	Rest Charnwood (West)	-	-	-	21	108	281
7306	A512 (Ashby Rd E)	Shepshed	-	-	-	77	95	90
60064	A512/Iveshead Rd/Charnwood Rd	Shepshed	78	89	84	-	-	-
60095	A512/Ingleberry Rd	Shepshed	95	103	96	82	99	96
76036	A512/Leicester Rd	Shepshed	-	-	-	81	87	80
76150	A512 (Ashby Rd E)	Shepshed	-	-	-	77	95	90
2227	Melton Rd/Fosse Way	Syston	-	-	-	78	84	94
2280	Fosse Way/High St	Syston	64	103	90	83	96	81
2508	Queniborough Rd/Barkby Rd	Syston	86	102	95	-	-	-
7041	Melton Rd/Goode's Ln	Syston	49	96	65	77	102	90
78892	Melton Rd/Wanlip Rd	Syston	99	104	102	-	-	-
76033	A607	Thurmaston	-	-	-	82	83	88

Table 8-2: Junction Analysis – Volume over Capacity (%) Category Changes, Option 5

Node	Junction	Area	Core AM Delay	Option AM Delay	Mitigation AM Delay	Core PM Delay	Option PM Delay	Mitigation PM Delay
1607	A46/A6 (Slip on WB)	A46	49	82	47	-	-	-
2047	A46/Wanlip Rd (Slip on WB)	A46	-	-	-	32	60	17
9715	A46 (Anstey Ln Slip On EB)	A46	-	-	-	63	137	79
60044	Barrow Rd/Bridge St	Barrow	72	98	77	-	-	-
73335	A47/Warren Ln	Blaby	26	33	51	-	-	-
75007	Belvoir St	City (Centre)	-	-	-	440	441	419
1420	A6/Blackbird Rd	City (NE)	72	83	61	60	65	55
2751	Loughborough Rd/Checketts Rd	City (NE)	56	73	78	73	78	77
9734	A563 (Watermead Way)	City (NE)	28	39	16	-	-	-
99988	Red Hill Circle	City (NE)	109	135	93	94	99	83
60057	A6/Southfield Rd	Loughborough	-	-	-	52	75	65
60085	A6/A60 (New King St)	Loughborough	-	-	-	36	68	65
60099	Meadow Ln/Ratcliffe Rd/Belton Rd	Loughborough	79	122	80	108	120	74
60108	Woodgate/Pinfold Gate	Loughborough	153	250	202	-	-	-
60126	A6/Shelthorpe Rd	Loughborough	54	121	64	-	-	-
60148	A6/Alan Moss Rd/Belton Rd	Loughborough	54	70	43	67	79	52
60198	Nanpantan Rd/Snell's Nook Ln	Loughborough	207	461	245	171	328	210
61000	Forest Rd/Browns Ln	Loughborough	-	-	-	47	79	63
61020	A6/Baxter Gate	Loughborough	61	94	78	-	-	-
69941	A60/Station Boulevard	Loughborough	140	146	75	59	65	50
73778	A6 (Bridge St)	Loughborough	39	78	56	-	-	-
99997	A6004/A512	Loughborough	146	227	143	104	118	90
99998	A6/Bishop Meadow Roundabout	Loughborough	-	-	-	142	158	97
9293	M1 Junction 21a Merge (SB)	M1	12	34	54	-	-	-
50523	M1 Junction 23a/A42	M1	54	86	28	-	-	-
50543	M1 Junction 24	M1	49	70	55	-	-	-
50492	A42/A453 (EMA)	NW Leics	129	147	124	60	60	54
76088	A453/Ashby Rd	NW Leics	132	158	148	-	-	-
60362	A6/A6004 (Quorn)	Quorn	56	152	76	27	55	26
1669	A6/Hallfields Ln/Cossington Ln	Rothley	93	114	98	85	111	111
2508	Queniborough Rd/Barkby Rd	Syston	-	-	-	87	156	99

Table 8-3: Junction Analysis –Nodes Heavily Congested in All (Core, Option and Mitigation) Scenarios with 'Significant' Delay Changes (seconds per PCU), Option 5

9. Results: Option 6 – Dispersed Settlement Hierarchy Distribution (High Growth)

9.1. Development Assumptions

Settlement	Dwellings	Notable Sites
Leicester Urban Area (Birstall, Thurmaston and Syston)	3,300	Majority of available sites (total 3,346) including one large site at Syston (1,200 homes, south of Syston)
Loughborough	4,600	Majority of available sites (total 5,154) includes large sites South and South West of Loughborough
Shepshed	2,500	Majority of available sites (total 2,686) including large site west of Shepshed.
Anstey	600	A mix of small and medium sized sites, total of 3,100 homes at the Service Centres
Barrow Upon Soar	600	
Mountsorrel	100	
Quorn	600	
Rothley	600	
Sileby	600	
Barkby	200	A mix of small and medium sized sites, total of 2,200
Burton on the Wolds	200	
Cossington	200	
East Goscote	200	
Hathern	100	
Newtown Linford	200	
Queniborough	200	
Rearsby	200	
Seagrave	100	
Swithland	0	
Thrussington	100	
Thurcaston	200	
Woodhouse Eaves	100	
Wymeswold	200	
Total	**15,700**	

Table 9-1: Option 6 Development Assumptions (provided by Charnwood Borough Council)

9.2. Modelling Outputs

9.2.1. The following outputs are produced:

- Flow Difference Plots (Figure 9-1, Figure 9-2)
- Delay Difference Plots (Figure 9-3, Figure 9-4)
- Junction Analysis (Figure 9-5, Figure 9-6, Table 9-2, Table 9-3)

FLOW DIFFERENCE (MITIGATION – OPTION)

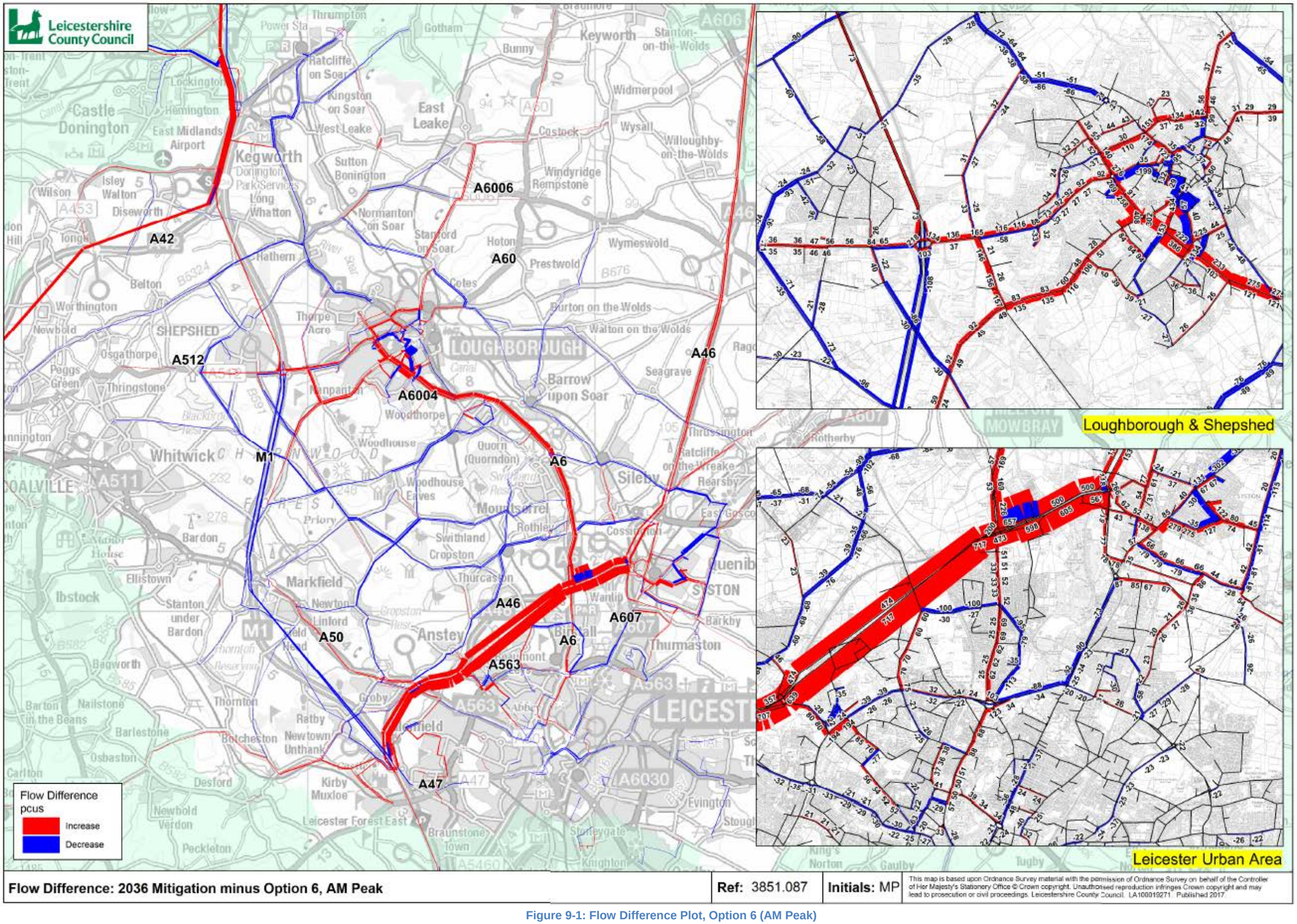


Figure 9-1: Flow Difference Plot, Option 6 (AM Peak)

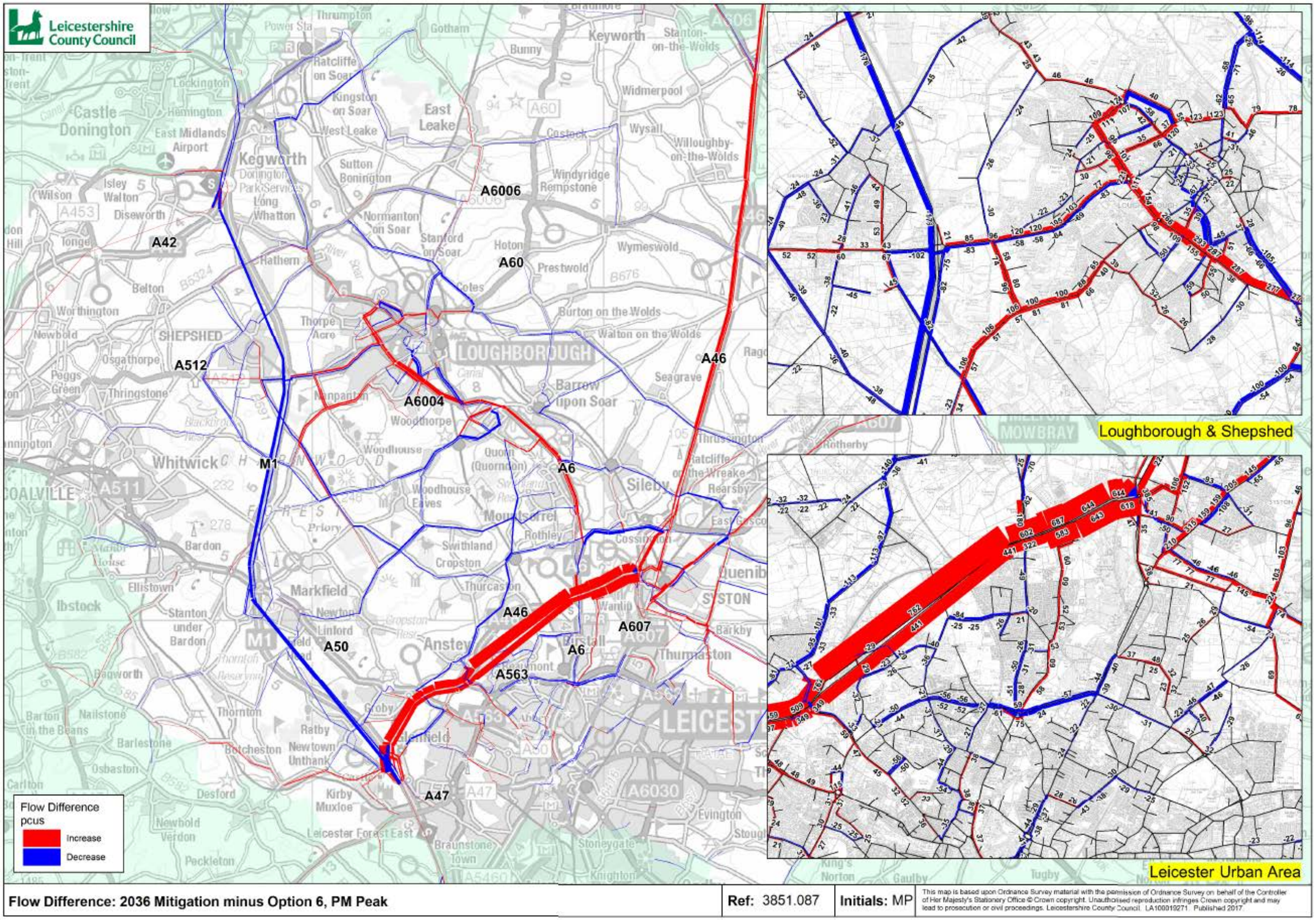


Figure 9-2: Flow Difference Plot, Option 6 (PM Peak

DELAY DIFFERENCE (MITIGATION – OPTION)

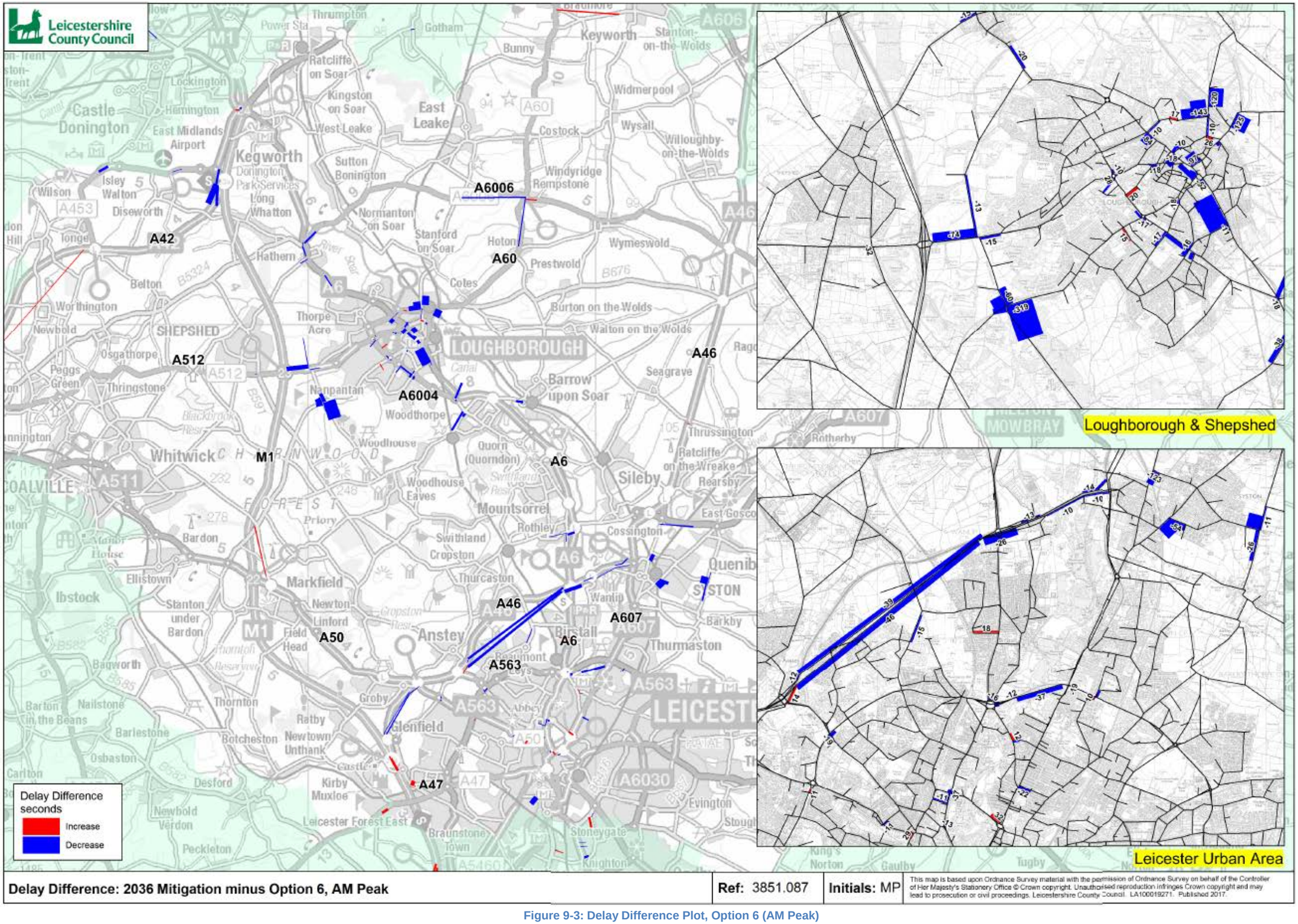


Figure 9-3: Delay Difference Plot, Option 6 (AM Peak)

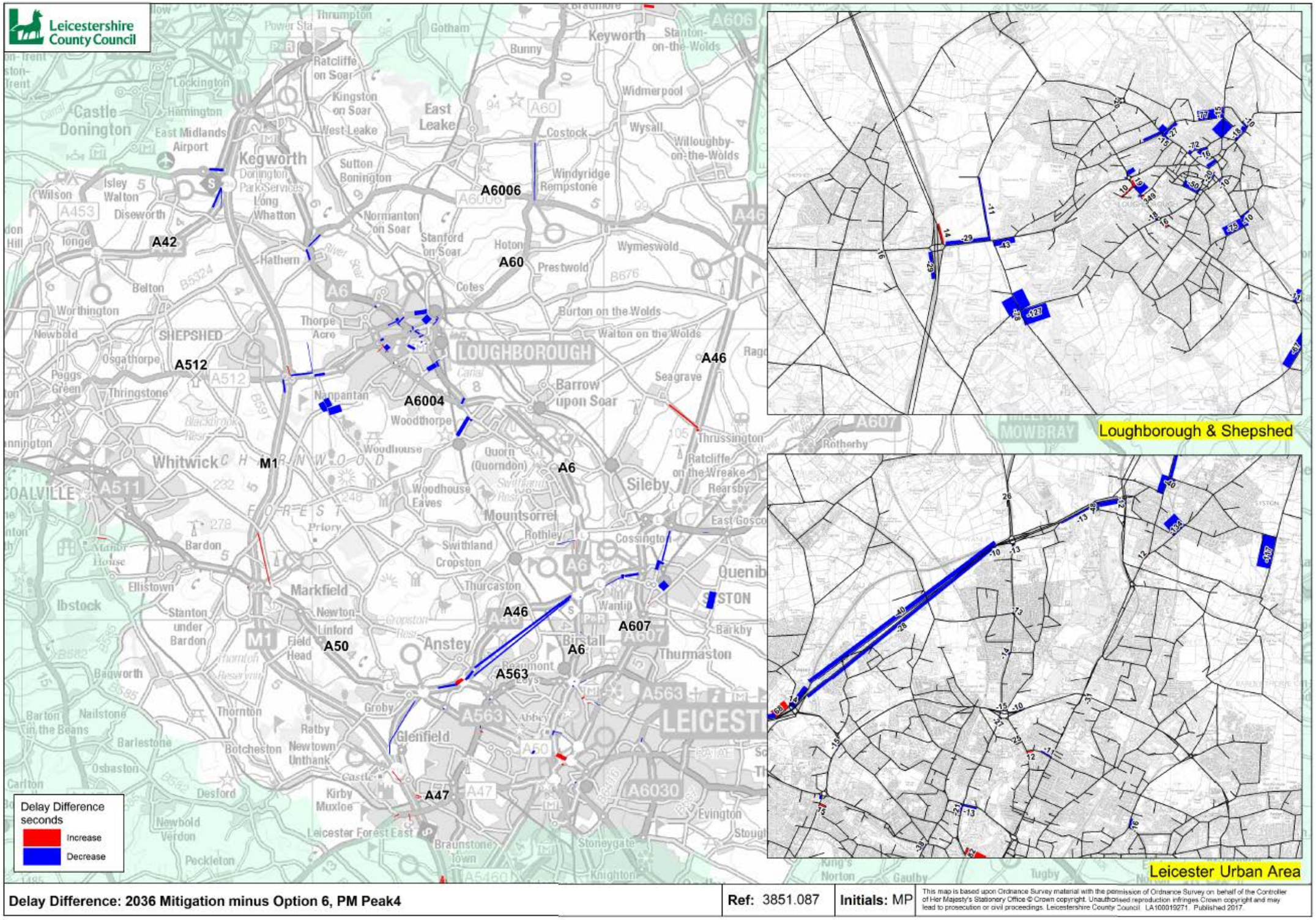


Figure 9-4: Delay Difference Plot, Option 6 (PM Peak)

JUNCTION PERFORMANCE

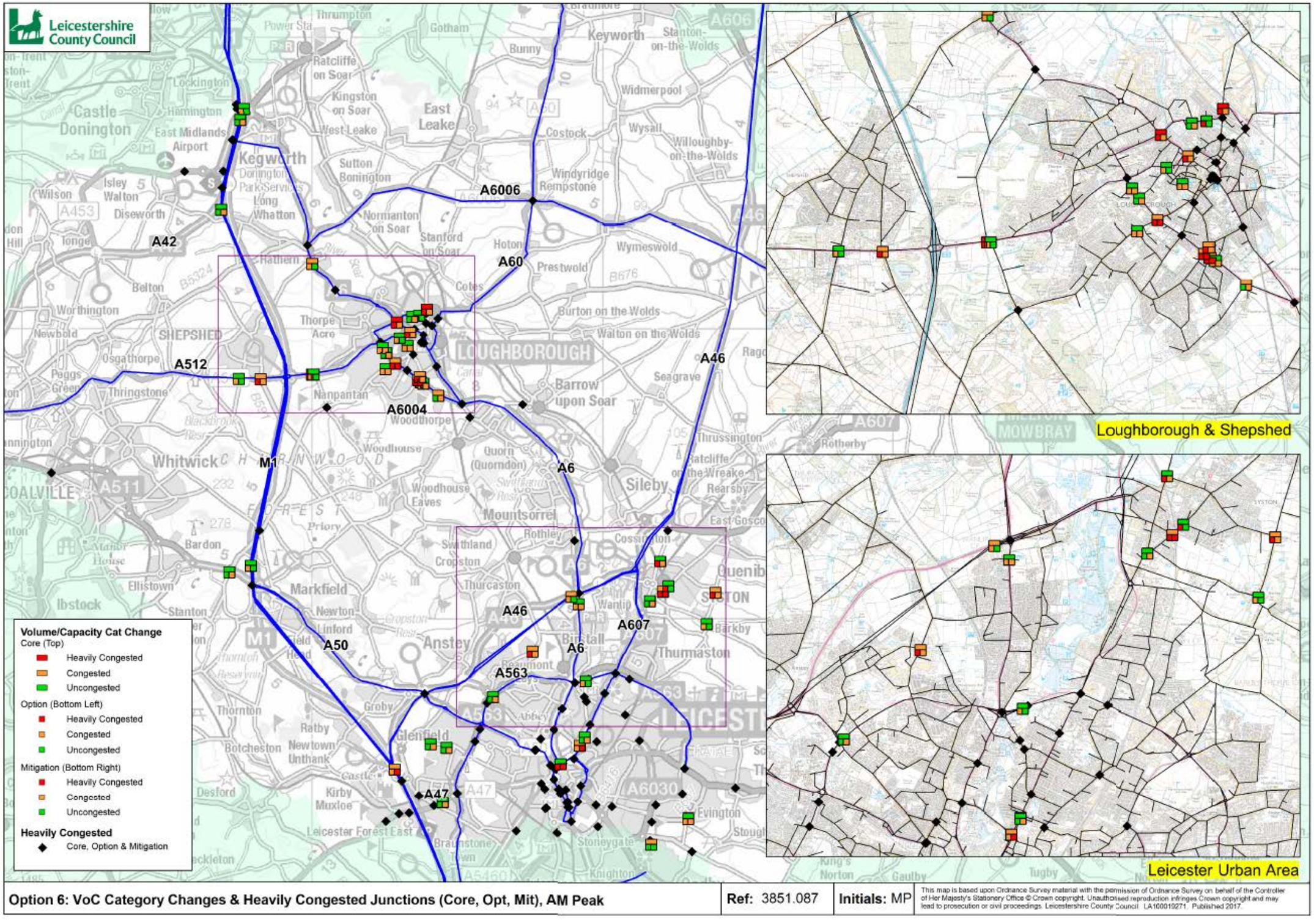


Figure 9-5: Junction Analysis, Option 6 (AM Peak)

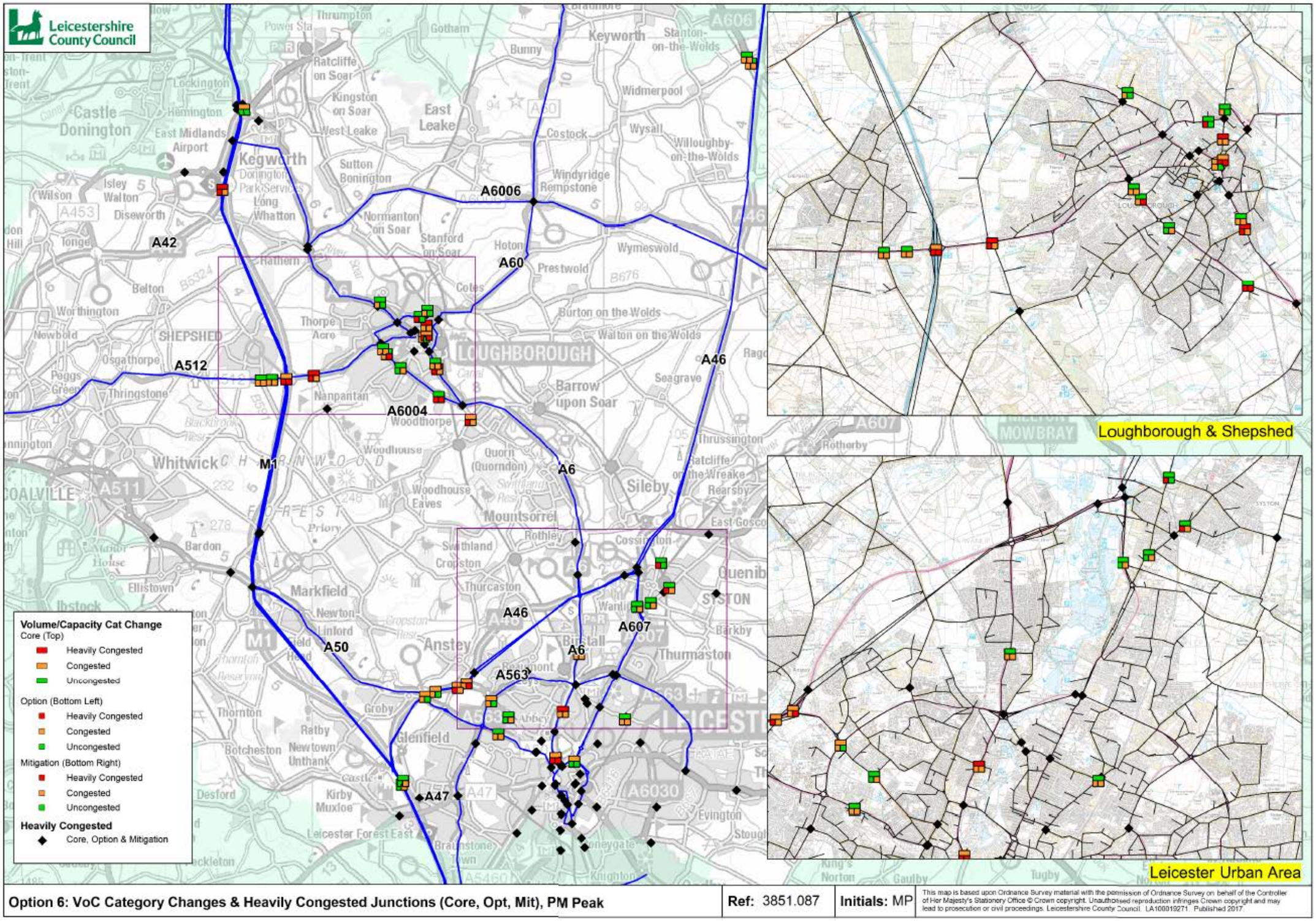


Figure 9-6: Junction Analysis, Option 6 (PM Peak)

Project Reference: 3851.087

Node	Junction	Area	Core AM VoC	Option AM VoC	Mitigation AM VoC	Core PM VoC	Option PM VoC	Mitigation PM VoC
1613	A46 (A6 Slip Off EB)	A46	88	87	81	-	-	-
9362	A46 (EB)	A46	-	-	-	88	86	81
9407	A46 (A50 Slip On EB)	A46	-	-	-	88	86	81
9508	A46 (Anstey Ln Slip Off EB)	A46	-	-	-	98	102	87
99993	A46/Anstey Ln	A46	-	-	-	94	96	102
9660	Leicester Rd	Anstey	-	-	-	77	86	84
1748	A6/School Ln	Birstall	-	-	-	82	95	87
7402	A6/Birstall Meadow Rd	Birstall	83	88	91	-	-	-
69960	A6 (Red Hill)	Birstall	79	80	86	-	-	-
76015	A6 (Red Hill)	Birstall	79	80	86	-	-	-
9295	Ratby Ln	Blaby	-	-	-	75	77	87
9391	Dominion Rd/Park Drive	Blaby	78	83	88	-	-	-
9455	Dominion Rd/Tournament Rd	Blaby	76	79	89	-	-	-
1645	Belgrave Gate/Humberstone Gate	City (Centre)	-	-	-	95	59	64
1428	A6 (St Margaret's Way)	City (NE)	-	-	-	94	110	120
1513	A6/Beaumont Leys Ln	City (NE)	-	-	-	100	98	92
1770	Belgrave Circle	City (NE)	94	97	101	-	-	-
1855	ODDR (Watermead Way)	City (NE)	84	89	81	-	-	-
2055	Catherine St/Gipsy Ln	City (NE)	-	-	-	82	89	86
3001	Belgrave Rd/Dorset St	City (NE)	72	76	85	-	-	-
1035	Anstey Ln/Great Meadow Rd	City (NW)	-	-	-	81	83	87
1226	Bennion Rd/Beaumont Leys Ln	City (NW)	94	100	93	-	-	-
1492	A6/Vaughan Way	City (NW)	47	100	102	-	-	-
9876	Anstey Ln/ODDR	City (NW)	-	-	-	92	99	83
9897	ODDR (Krefeld Way)	City (NW)	82	80	92	-	-	-
9953	A50/Heathley Park Dr	City (NW)	-	-	-	82	86	87
2412	Main St/Biggin Hill Rd (Evington)	City (SE)	80	91	91	-	-	-
9427	A47/Golf Course Ln	City (SW)	79	81	86	-	-	-
60371	A6/Shepshed Rd	Hathern	89	93	80	-	-	-
49973	A511/Copt Oak Rd	Hinckley & Bosworth	83	82	87	-	-	-
7304	Frederick St/Arthur St	Loughborough	82	91	86	-	-	-
60002	A6004 (Ling Rd)	Loughborough	95	106	104	-	-	-
60048	A6004/Woodthorpe Rd	Loughborough	73	88	93	-	-	-
60062	A6/The Rushes	Loughborough	90	105	90	-	-	-
60098	The Coneries/Sparrow Hill	Loughborough	-	-	-	95	101	100
60100	Meadow Ln/Toothill Rd	Loughborough	-	-	-	100	93	89
60118	A6004/Park Rd/Shelthorpe Rd	Loughborough	89	105	103	-	-	-
60123	A6004/Allendale Rd	Loughborough	86	77	86	84	101	102
60126	A6/Shelthorpe Rd	Loughborough	-	-	-	101	101	96
60140	A60 Nottm Rd/Morley St	Loughborough	78	79	86	-	-	-
60148	A6/Alan Moss Rd/Belton Rd	Loughborough	100	101	96	-	-	-
60193	A512/WoLSUE South	Loughborough	105	102	93	-	-	-
60205	A6 (Derby Rd)	Loughborough	87	84	80	-	-	-
60358	A512/Snell's Nook Ln	Loughborough	69	91	71	101	101	96
60538	A6/Beeches Rd	Loughborough	-	-	-	80	94	95
61009	Woodgate/Pack Horse Ln	Loughborough	15	105	14	-	-	-
61020	A6/Baxter Gate	Loughborough	-	-	-	87	91	76
65018	Forest Rd/Outwoods Dr	Loughborough	63	85	86	-	-	-
65049	A6 (Derby Rd)	Loughborough	87	83	80	-	-	-
65050	A6 (Derby Rd)	Loughborough	87	84	80	-	-	-
65066	A6004/University Rd	Loughborough	76	89	93	80	88	97
65067	A6004 (Epinal Way)	Loughborough	-	-	-	92	102	87
65070	A6004/Radmoor Rd	Loughborough	78	75	85	81	88	108
65071	A512/Radmoor Rd	Loughborough	84	92	84	-	-	-
65076	Park Rd/Shelthorpe Rd	Loughborough	99	100	94	-	-	-
69015	Belton Rd/Jubilee Dr	Loughborough	77	75	91	-	-	-
69936	Bishop Meadow Rd/Weldon Rd	Loughborough	-	-	-	81	85	76
73778	A6 (Bridge St)	Loughborough	-	-	-	99	103	98
74101	A6004 (Epinal Way)	Loughborough	-	-	-	73	79	88
78902	Belton Rd	Loughborough	48	101	53	75	101	51
78903	Meadow Ln/Station Boulevard	Loughborough	103	104	97	79	93	75
78905	A6004/Squirrel Way	Loughborough	-	-	-	70	70	86
99996	A6004/Forest Rd	Loughborough	94	103	100	-	-	-
2932	M1 Junction 21a Merge (SB)	M1	93	96	100	-	-	-
9292	M1 Junction 21a Diverge (NB)	M1	-	-	-	82	83	88

40470	M1 Junction 22 Merge (NB)	M1	81	87	84	-	-	-
50487	M1 Junction 24/A6	M1	57	88	58	86	81	82
50520	M1 Junction 23a Diverge (NB)	M1	79	83	87	-	-	-
50523	M1 Junction 23a/A42	M1	-	-	-	100	100	91
50539	M1 Junction 24 Diverge (NB)	M1	79	80	87	-	-	-
99999	M1 Junction 23	M1	-	-	-	87	101	100
73421	Stoughton Dr (S)	Oadby & Wigston	95	34	33	-	-	-
79972	A606	Outside Leics	-	-	-	82	92	89
79974	A606	Outside Leics	-	-	-	82	94	91
60195	Loughborough Rd/Farley Way	Quorn	-	-	-	96	101	99
74116	A6004 (Terry Yardley Way)	Quorn	87	79	87	84	92	92
73889	A6/Broadnook	Rest Charnwood (West)	82	88	93	-	-	-
73890	A6/Broadnook	Rest Charnwood (West)	-	-	-	78	100	100
73891	A6/Broadnook	Rest Charnwood (West)	-	-	-	21	100	189
7306	A512 (Ashby Rd E)	Shepshed	-	-	-	77	95	89
60064	A512/Iveshead Rd/Charnwood Rd	Shepshed	78	89	84	-	-	-
60095	A512/Ingleberry Rd	Shepshed	95	102	96	82	99	95
76036	A512/Leicester Rd	Shepshed	-	-	-	81	87	80
76150	A512 (Ashby Rd E)	Shepshed	-	-	-	77	95	89
2227	Melton Rd/Fosse Way	Syston	77	84	85	78	80	96
2280	Fosse Way/High St	Syston	64	104	94	83	100	82
2477	Queniborough Rd/Main St	Syston	49	87	79	-	-	-
2508	Queniborough Rd/Barkby Rd	Syston	86	104	97	-	-	-
7041	Melton Rd/Goode's Ln	Syston	49	101	67	77	102	96
78892	Melton Rd/Wanlip Rd	Syston	99	104	104	-	-	-
76033	A607	Thurmaston	-	-	-	82	82	88

Table 9-2: Junction Analysis – Volume over Capacity (%) Category Changes, Option 6

Node	Junction	Area	Core AM Delay	Option AM Delay	Mitigation AM Delay	Core PM Delay	Option PM Delay	Mitigation PM Delay
1607	A46/A6 (Slip on WB)	A46	49	88	48	-	-	-
2047	A46/Wanlip Rd (Slip on WB)	A46	-	-	-	32	57	16
9715	A46 (Anstey Ln Slip On EB)	A46	-	-	-	63	140	104
60044	Barrow Rd/Bridge St	Barrow	72	93	72	-	-	-
73335	A47/Warren Ln	Blaby	26	22	51	-	-	-
75007	Belvoir St	City (Centre)	-	-	-	440	437	419
1420	A6/Blackbird Rd	City (NE)	72	85	62	60	65	55
2751	Loughborough Rd/Checketts Rd	City (NE)	56	74	77	73	77	80
9734	A563 (Watermead Way)	City (NE)	28	41	16	-	-	-
99988	Red Hill Circle	City (NE)	109	141	94	94	100	83
60085	A6/A60 (New King St)	Loughborough	-	-	-	36	64	61
60099	Meadow Ln/Ratcliffe Rd/Belton Rd	Loughborough	79	123	79	108	121	74
60108	Woodgate/Pinfold Gate	Loughborough	153	246	188	-	-	-
60126	A6/Shelthorpe Rd	Loughborough	54	115	61	-	-	-
60148	A6/Alan Moss Rd/Belton Rd	Loughborough	-	-	-	67	79	52
60198	Nanpantan Rd/Snell's Nook Ln	Loughborough	207	428	225	171	313	199
60366	A512/WoLSUE North	Loughborough	67	44	33	-	-	-
61000	Forest Rd/Browns Ln	Loughborough	-	-	-	47	74	62
61020	A6/Baxter Gate	Loughborough	61	94	74	-	-	-
69941	A60/Station Boulevard	Loughborough	140	152	81	59	66	48
73778	A6 (Bridge St)	Loughborough	39	81	48	-	-	-
99997	A6004/A512	Loughborough	146	220	142	104	117	90
99998	A6/Bishop Meadow Roundabout	Loughborough	-	-	-	142	149	98
9293	M1 Junction 21a Merge (SB)	M1	12	32	52	-	-	-
50523	M1 Junction 23a/A42	M1	54	87	27	-	-	-
50543	M1 Junction 24	M1	49	78	53	-	-	-
50544	M1 Junction 24	M1	152	157	174	-	-	-
50492	A42/A453 (EMA)	NW Leics	129	149	121	60	61	54
76088	A453/Ashby Rd	NW Leics	132	157	155	-	-	-
60362	A6/A6004 (Quorn)	Quorn	56	143	69	27	52	25
1669	A6/Hallfields Ln/Cossington Ln	Rothley	93	116	99	85	108	111
2508	Queniborough Rd/Barkby Rd	Syston	-	-	-	87	167	121

Table 9-3: Junction Analysis –Nodes Heavily Congested in All (Core, Option and Mitigation) Scenarios with 'Significant' Delay Changes (seconds per PCU), Option 6

10. Results: Option 7 – Urban Concentration and New Settlement (High Growth)

10.1. Development Assumptions

Settlement	Dwellings	Notable Sites
Leicester Urban Area (Birstall, Thurmaston and Syston)	3,900	Majority of available sites (total 3,346) including a large site at Syston (1,200 homes, south of Syston) and plus a large site at Thurcaston (600 homes north east of Thurcaston)
Loughborough	3,300	Majority of available sites (total 5,154) includes large sites at South (1,000) and South West of Loughborough (1,500)
Shepshed	2,600	Majority of available sites (total 2,686) including large site west of Shepshed.
Anstey	950	A mix of small and medium sized sites, a total of 4,400 homes at the Service Centres
Barrow Upon Soar	900	
Mountsorrel	100	
Quorn	700	
Rothley	850	
Sileby	900	
Cotes New Settlement	1,500	
Total	**15,700**	

Table 10-1: Option 7 Development Assumptions (provided by Charnwood Borough Council)

10.2. Modelling Outputs

10.2.1. The following outputs are produced:

- Flow Difference Plots (Figure 10-1, Figure 10-2)
- Delay Difference Plots (Figure 10-3, Figure 10-4)
- Junction Analysis (Figure 10-5, Figure 10-6, Table 10-2, Table 10-3)

FLOW DIFFERENCE (MITIGATION – OPTION)

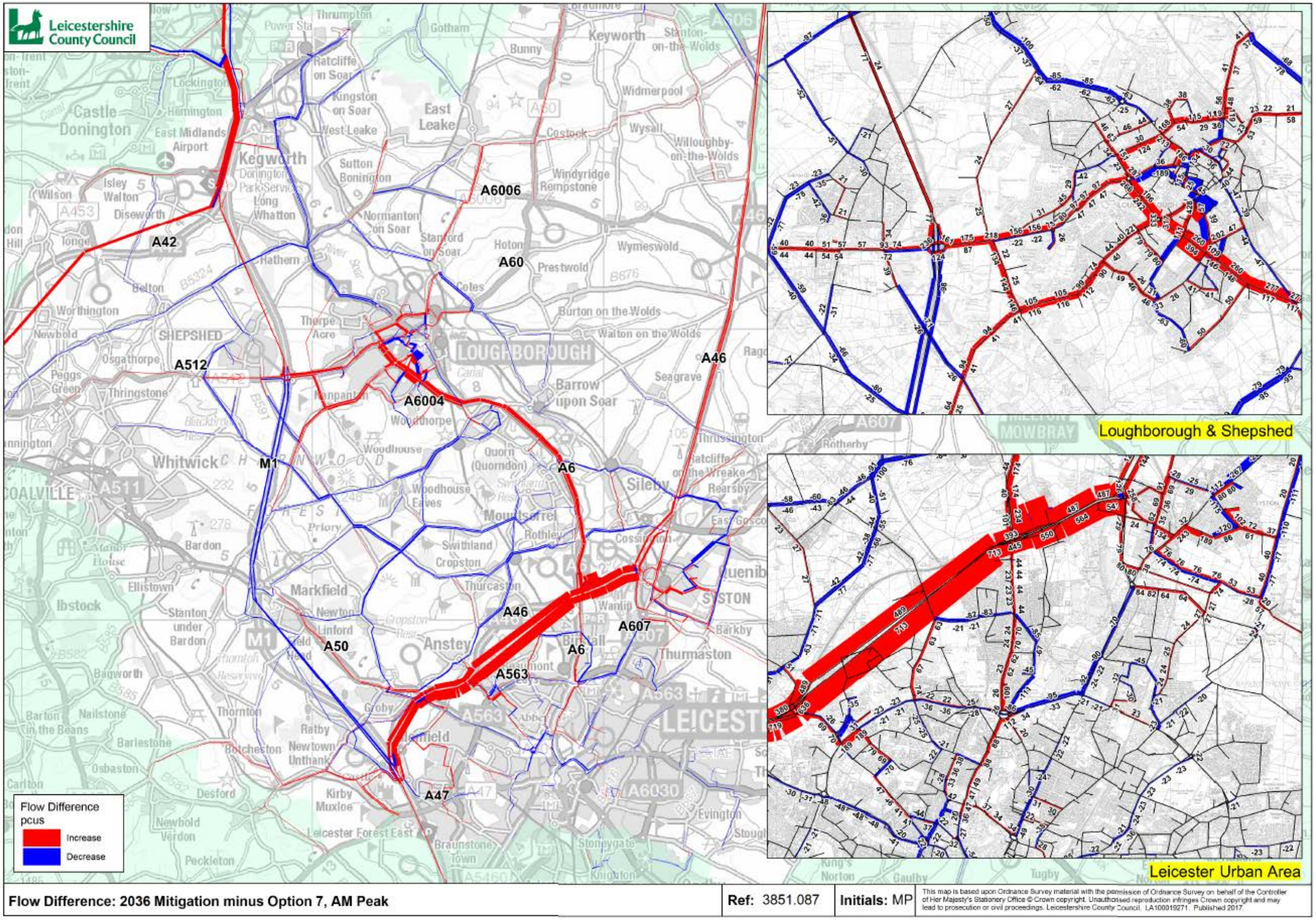


Figure 10-1: Flow Difference Plot, Option 7 (AM Peak)

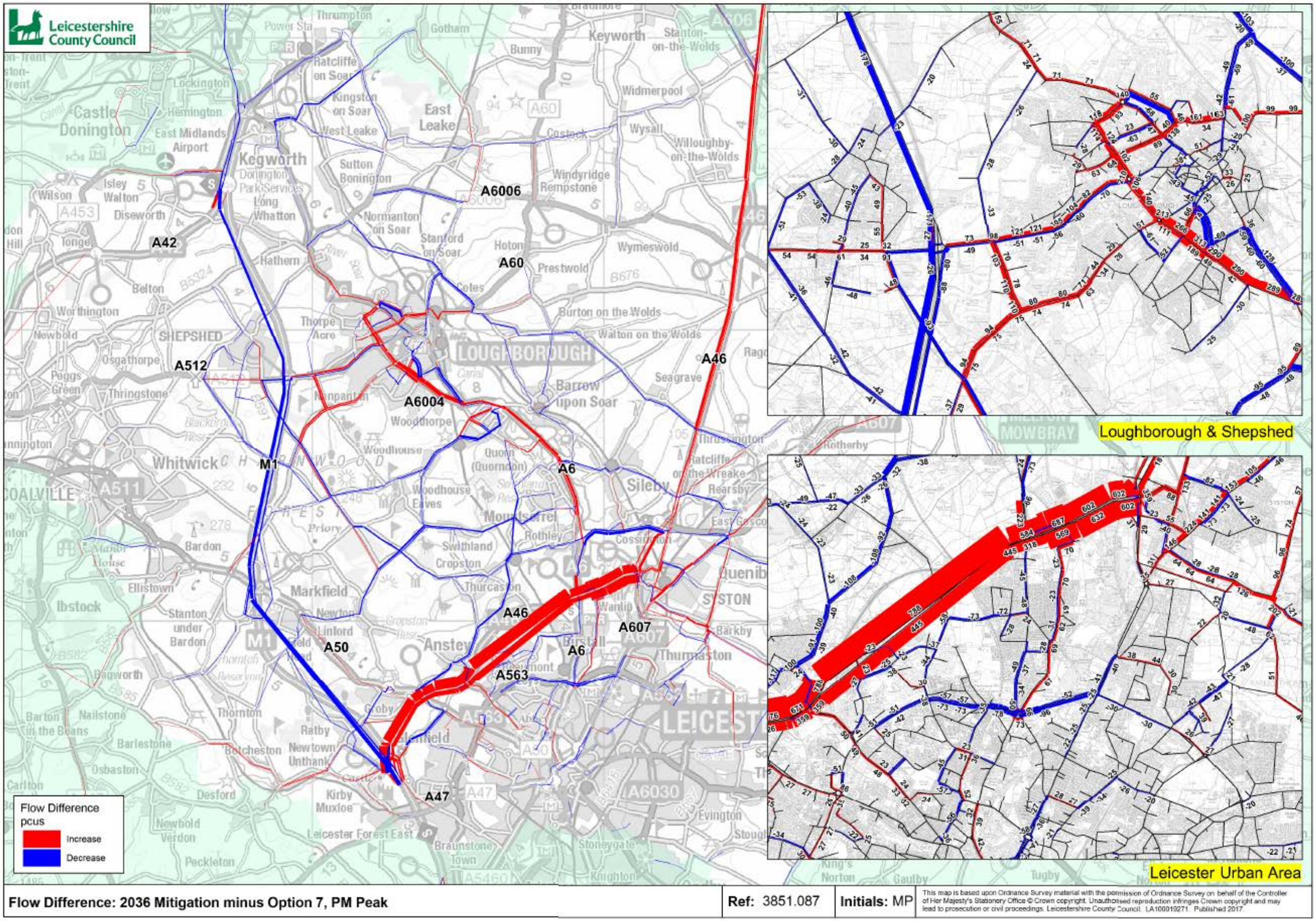


Figure 10-2: Flow Difference Plot, Option 7 (PM Peak)

DELAY DIFFERENCE (MITIGATION – OPTION)

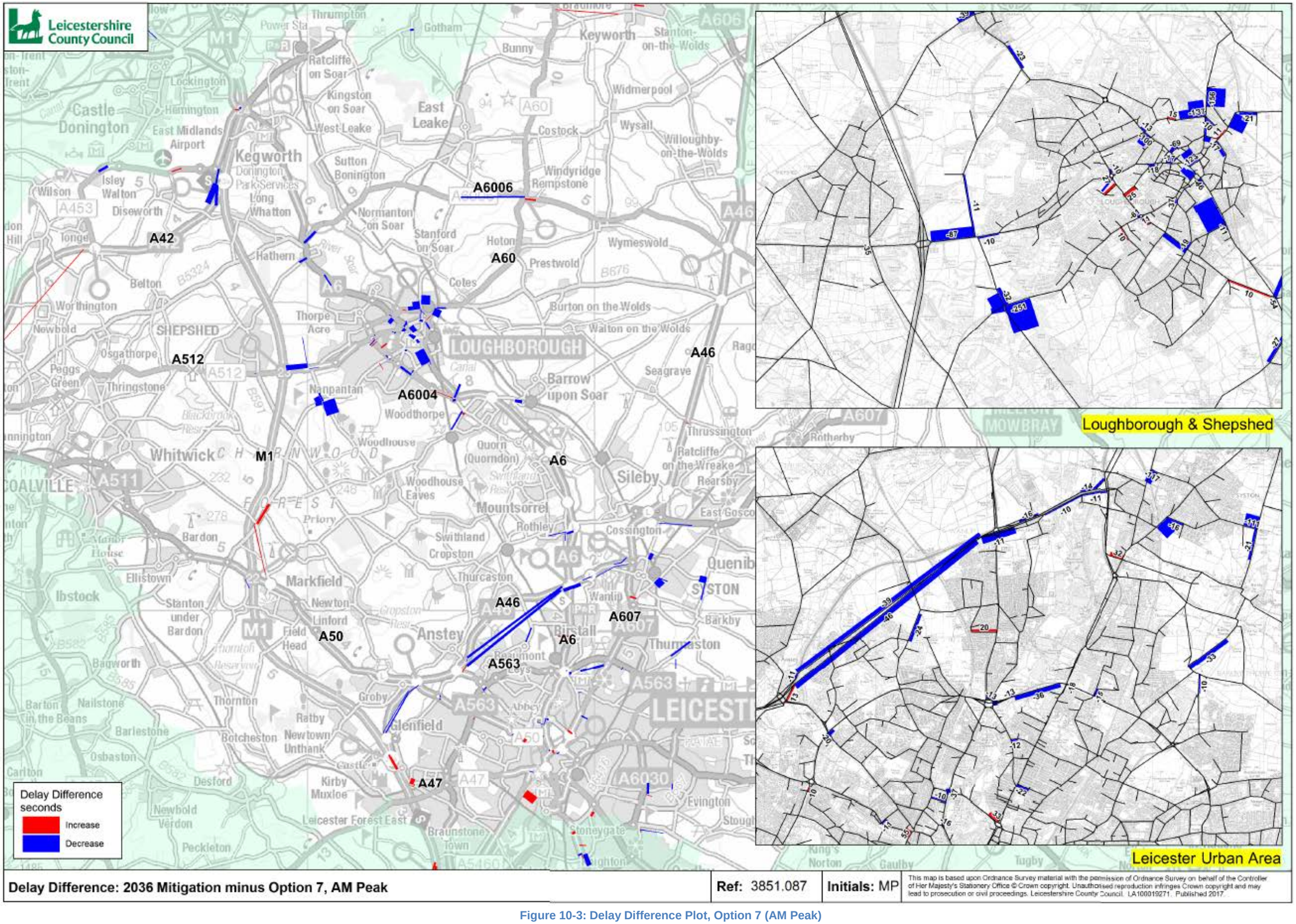


Figure 10-3: Delay Difference Plot, Option 7 (AM Peak)

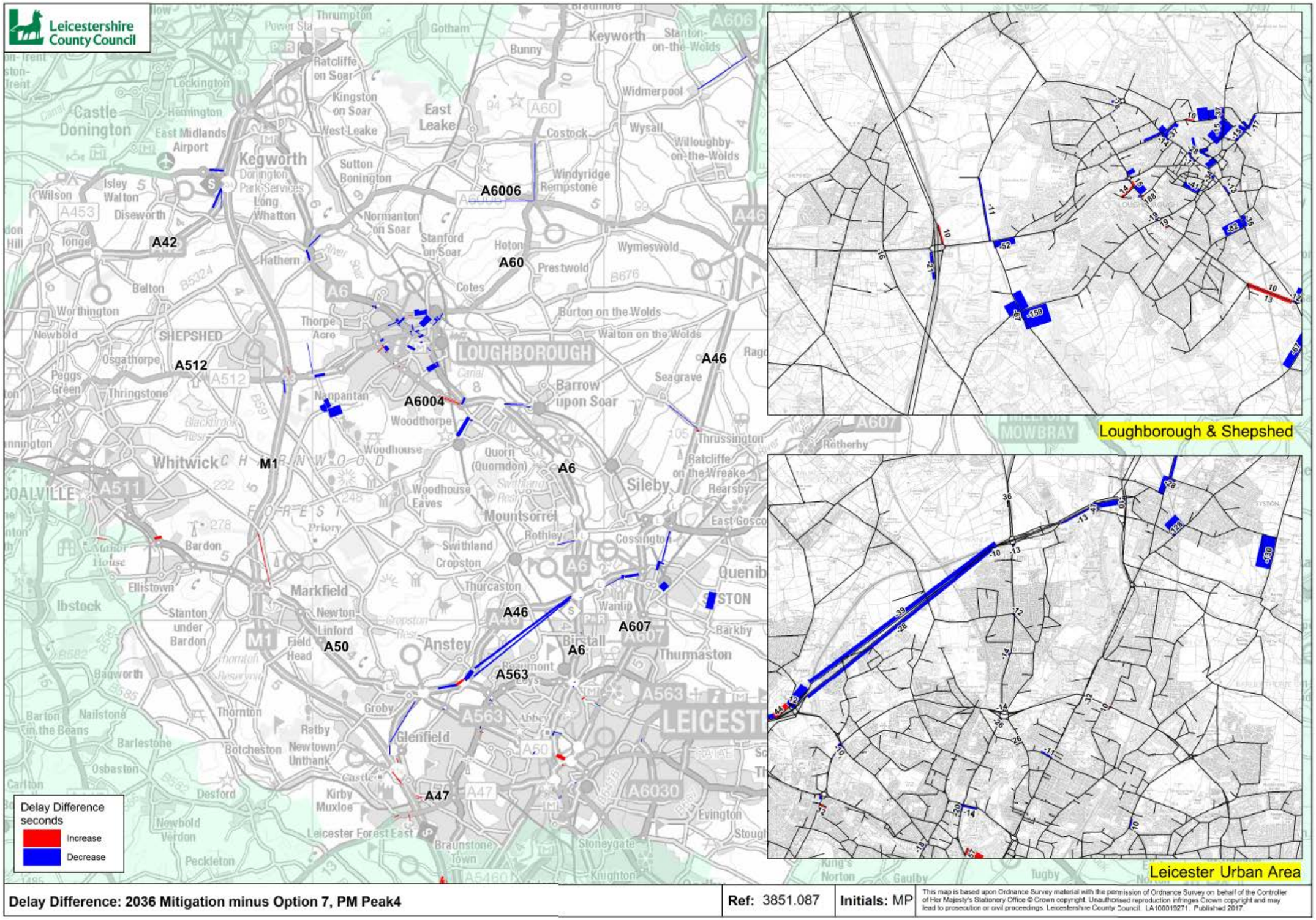


Figure 10-4: Delay Difference Plot, Option 7 (PM Peak)

JUNCTION PERFORMANCE

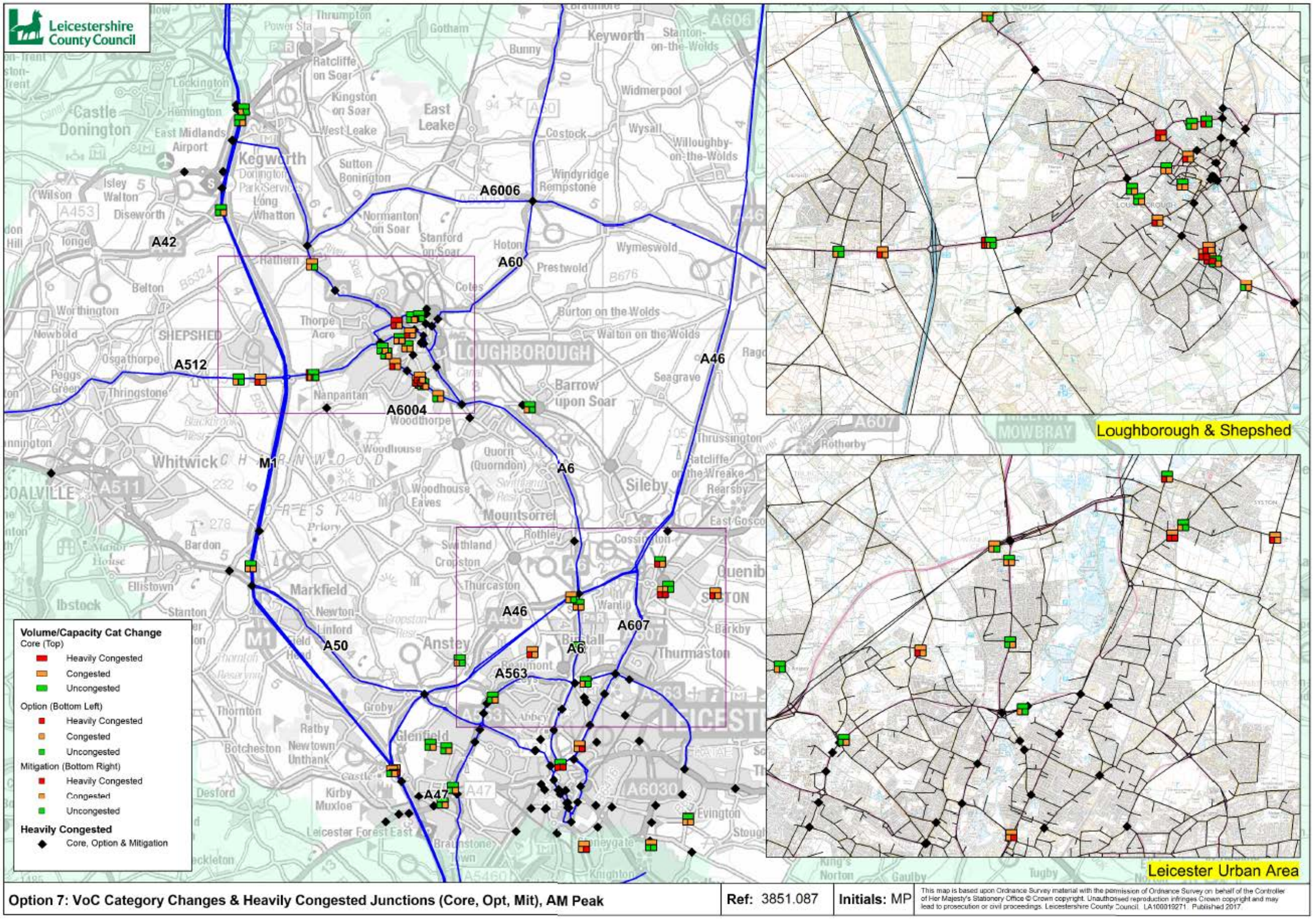


Figure 10-5: Junction Analysis, Option 7 (AM Peak)

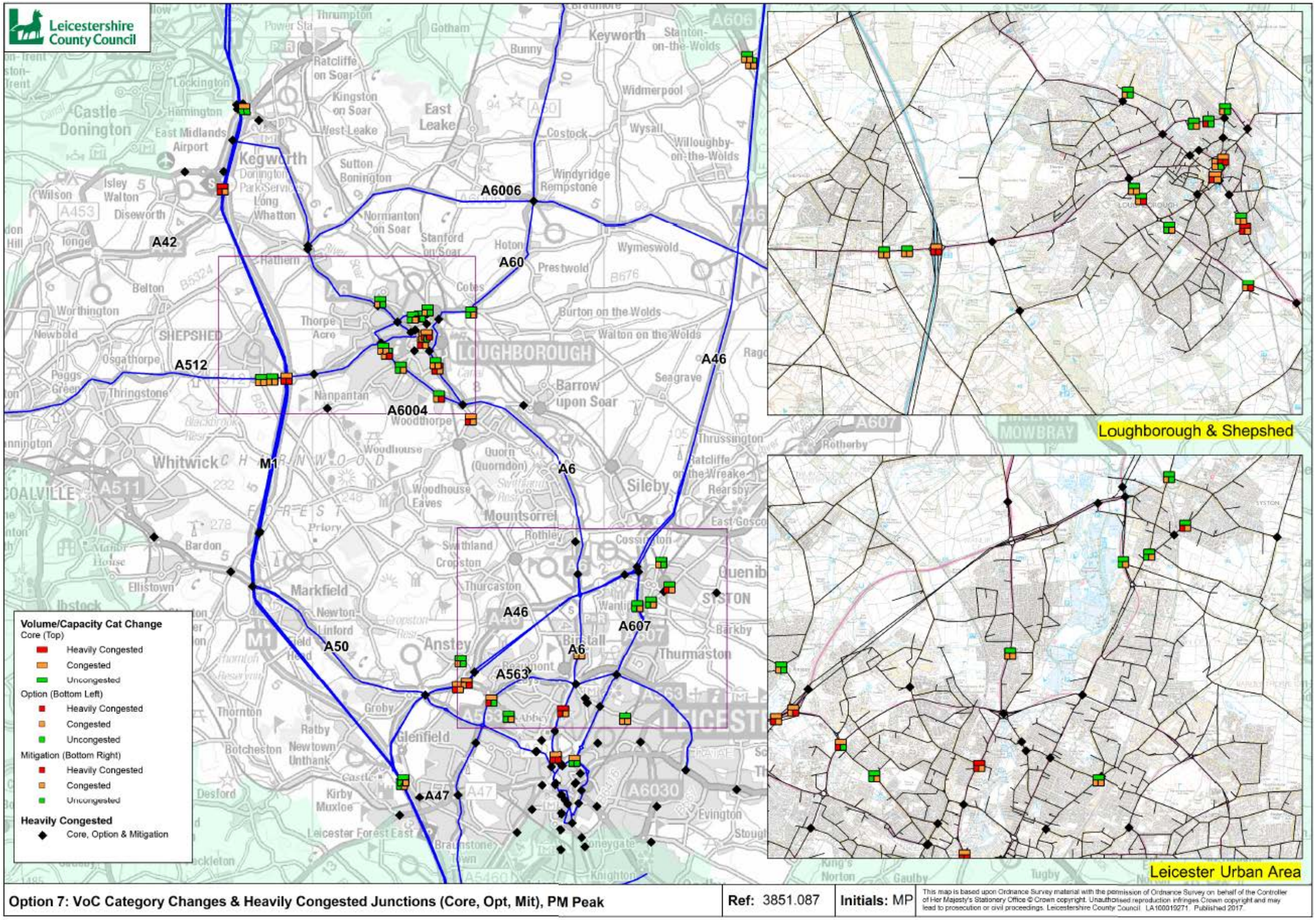


Figure 10-6: Junction Analysis, Option 7 (PM Peak)

Project Reference: 3851.087

Node	Junction	Area	Core AM VoC	Option AM VoC	Mitigation AM VoC	Core PM VoC	Option PM VoC	Mitigation PM VoC
1613	A46 (A6 Slip Off EB)	A46	88	88	82	-	-	-
9508	A46 (Anstey Ln Slip Off EB)	A46	-	-	-	98	102	89
99993	A46/Anstey Ln	A46	-	-	-	94	95	101
9660	Leicester Rd	Anstey	-	-	-	77	90	90
72051	The Nook	Anstey	68	85	66	68	88	77
72052	Leicester Rd	Anstey	-	-	-	74	87	87
60115	Bridge St/High St	Barrow	55	87	82	-	-	-
1748	A6/School Ln	Birstall	-	-	-	82	94	85
2964	A6 (Loughborough Rd)	Birstall	79	80	85	-	-	-
7402	A6/Birstall Meadow Rd	Birstall	83	89	92	-	-	-
69959	A6/Johnson Rd	Birstall	74	74	85	-	-	-
69960	A6 (Red Hill)	Birstall	79	80	86	-	-	-
76015	A6 (Red Hill)	Birstall	79	80	86	-	-	-
9295	Ratby Ln	Blaby	-	-	-	75	77	87
9391	Dominion Rd/Park Drive	Blaby	78	83	88	-	-	-
9455	Dominion Rd/Tournament Rd	Blaby	76	79	89	-	-	-
1645	Belgrave Gate/Humberstone Gate	City (Centre)	-	-	-	95	63	75
1428	A6 (St Margaret's Way)	City (NE)	-	-	-	94	111	120
1513	A6/Beaumont Leys Ln	City (NE)	-	-	-	100	100	92
1770	Belgrave Circle	City (NE)	94	98	101	-	-	-
1855	ODDR (Watermead Way)	City (NE)	84	90	81	-	-	-
2055	Catherine St/Gipsy Ln	City (NE)	-	-	-	82	88	85
1035	Anstey Ln/Great Meadow Rd	City (NW)	-	-	-	81	83	87
1226	Bennion Rd/Beaumont Leys Ln	City (NW)	94	101	94	-	-	-
1492	A6/Vaughan Way	City (NW)	47	100	103	-	-	-
9514	Scudamore Rd/Liberty Rd	City (NW)	77	78	85	-	-	-
9876	Anstey Ln/ODDR	City (NW)	-	-	-	92	100	84
9897	ODDR (Krefeld Way)	City (NW)	82	80	91	-	-	-
2412	Main St/Biggin Hill Rd (Evington)	City (SE)	80	91	90	-	-	-
3233	Welford Rd/Oakland Rd	City (SW)	95	93	101	-	-	-
9427	A47/Golf Course Ln	City (SW)	79	81	85	-	-	-
60371	A6/Shepshed Rd	Hathern	89	96	79	-	-	-
7304	Frederick St/Arthur St	Loughborough	82	90	85	-	-	-
60002	A6004 (Ling Rd)	Loughborough	95	102	102	-	-	-
60048	A6004/Woodthorpe Rd	Loughborough	73	84	91	-	-	-
60062	A6/The Rushes	Loughborough	90	102	92	-	-	-
60098	The Coneries/Sparrow Hill	Loughborough	-	-	-	95	101	101
60108	Woodgate/Pinfold Gate	Loughborough	-	-	-	95	100	92
60118	A6004/Park Rd/Shelthorpe Rd	Loughborough	89	101	101	-	-	-
60123	A6004/Allendale Rd	Loughborough	86	83	91	84	99	101
60126	A6/Shelthorpe Rd	Loughborough	-	-	-	101	101	92
60140	A60 Nottm Rd/Morley St	Loughborough	78	83	90	-	-	-
60148	A6/Alan Moss Rd/Belton Rd	Loughborough	100	102	93	-	-	-
60193	A512/WoLSUE South	Loughborough	105	103	97	-	-	-
60205	A6 (Derby Rd)	Loughborough	87	87	82	-	-	-
60289	A60/Brush	Loughborough	79	97	85	-	-	-
60358	A512/Snell's Nook Ln	Loughborough	69	86	69	-	-	-
60538	A6/Beeches Rd	Loughborough	-	-	-	80	92	94
61009	Woodgate/Pack Horse Ln	Loughborough	15	102	14	-	-	-
61020	A6/Baxter Gate	Loughborough	-	-	-	87	95	83
65049	A6 (Derby Rd)	Loughborough	87	87	81	-	-	-
65050	A6 (Derby Rd)	Loughborough	87	87	82	-	-	-
65066	A6004/University Rd	Loughborough	76	69	91	80	87	96
65067	A6004 (Epinal Way)	Loughborough	-	-	-	92	100	86
65070	A6004/Radmoor Rd	Loughborough	78	71	85	81	88	101
65071	A512/Radmoor Rd	Loughborough	84	93	86	-	-	-
65076	Park Rd/Shelthorpe Rd	Loughborough	99	100	93	-	-	-
69015	Belton Rd/Jubilee Dr	Loughborough	77	76	91	74	69	85
69936	Bishop Meadow Rd/Weldon Rd	Loughborough	-	-	-	81	87	78
73775	Queen's Rd/Salisbury St	Loughborough	28	90	29	-	-	-
73778	A6 (Bridge St)	Loughborough	-	-	-	99	103	78
74101	A6004 (Epinal Way)	Loughborough	-	-	-	73	79	87
78902	Belton Rd	Loughborough	48	100	53	75	102	52
78903	Meadow Ln/Station Boulevard	Loughborough	-	-	-	79	98	77
78905	A6004/Squirrel Way	Loughborough	-	-	-	70	71	87

99996	A6004/Forest Rd	Loughborough	94	102	95	-	-	-
2932	M1 Junction 21a Merge (SB)	M1	93	96	101	-	-	-
9263	M1 Junction 21a Diverge (NB)	M1	87	84	89	-	-	-
9292	M1 Junction 21a Diverge (NB)	M1	-	-	-	82	83	89
40470	M1 Junction 22 Merge (NB)	M1	81	87	85	-	-	-
50487	M1 Junction 24/A6	M1	57	88	58	86	80	82
50520	M1 Junction 23a Diverge (NB)	M1	79	83	87	-	-	-
50523	M1 Junction 23a/A42	M1	-	-	-	100	100	92
50539	M1 Junction 24 Diverge (NB)	M1	79	80	87	-	-	-
99999	M1 Junction 23	M1	-	-	-	87	100	100
73421	Stoughton Dr (S)	Oadby & Wigston	95	34	41	-	-	-
79972	A606	Outside Leics	-	-	-	82	91	88
79974	A606	Outside Leics	-	-	-	82	94	87
60195	Loughborough Rd/Farley Way	Quorn	-	-	-	96	101	99
74116	A6004 (Terry Yardley Way)	Quorn	87	84	91	84	92	93
60254	A60 Nottm Rd/Barrow Rd	Rest Charnwood (East)	-	-	-	69	82	88
73889	A6/Broadnook	Rest Charnwood (West)	82	89	94	-	-	-
73890	A6/Broadnook	Rest Charnwood (West)	-	-	-	78	100	100
73891	A6/Broadnook	Rest Charnwood (West)	-	-	-	21	89	256
7306	A512 (Ashby Rd E)	Shepshed	-	-	-	77	94	89
60064	A512/Iveshead Rd/Charnwood Rd	Shepshed	78	89	84	-	-	-
60095	A512/Ingleberry Rd	Shepshed	95	103	96	82	99	95
76036	A512/Leicester Rd	Shepshed	-	-	-	81	87	80
76150	A512 (Ashby Rd E)	Shepshed	-	-	-	77	94	89
2227	Melton Rd/Fosse Way	Syston	-	-	-	78	84	94
2280	Fosse Way/High St	Syston	64	103	91	83	97	82
2508	Queniborough Rd/Barkby Rd	Syston	86	102	95	-	-	-
7041	Melton Rd/Goode's Ln	Syston	49	96	65	77	102	90
78892	Melton Rd/Wanlip Rd	Syston	99	104	102	-	-	-
76033	A607	Thurmaston	-	-	-	82	84	88

Table 10-2: Junction Analysis – Volume over Capacity (%) Category Changes, Option 7

Node	Junction	Area	Core AM Delay	Option AM Delay	Mitigation AM Delay	Core PM Delay	Option PM Delay	Mitigation PM Delay
1607	A46/A6 (Slip on WB)	A46	49	81	44	-	-	-
2047	A46/Wanlip Rd (Slip on WB)	A46	-	-	-	32	60	16
9715	A46 (Anstey Ln Slip On EB)	A46	-	-	-	63	135	77
60044	Barrow Rd/Bridge St	Barrow	72	127	97	61	106	91
73335	A47/Warren Ln	Blaby	26	48	51	-	-	-
1420	A6/Blackbird Rd	City (NE)	72	85	62	60	65	55
2751	Loughborough Rd/Checketts Rd	City (NE)	56	76	77	73	81	79
9734	A563 (Watermead Way)	City (NE)	28	40	16	-	-	-
99988	Red Hill Circle	City (NE)	109	138	94	94	99	83
1318	Upperton Rd/Watkin Rd	City (SW)	132	122	148	-	-	-
60099	Meadow Ln/Ratcliffe Rd/Belton Rd	Loughborough	79	120	80	108	144	90
60108	Woodgate/Pinfold Gate	Loughborough	153	245	176	-	-	-
60126	A6/Shelthorpe Rd	Loughborough	54	102	56	-	-	-
60148	A6/Alan Moss Rd/Belton Rd	Loughborough	-	-	-	67	79	52
60198	Nanpantan Rd/Snell's Nook Ln	Loughborough	207	362	191	171	271	164
60358	A512/Snell's Nook Ln	Loughborough	-	-	-	44	55	32
60366	A512/WoLSUE North	Loughborough	67	44	32	-	-	-
61000	Forest Rd/Browns Ln	Loughborough	-	-	-	47	68	57
61020	A6/Baxter Gate	Loughborough	61	94	67	-	-	-
69941	A60/Station Boulevard	Loughborough	140	191	115	59	85	51
73778	A6 (Bridge St)	Loughborough	39	78	40	-	-	-
78903	Meadow Ln/Station Boulevard	Loughborough	89	129	66	-	-	-
99997	A6004/A512	Loughborough	146	208	140	104	115	90
99998	A6/Bishop Meadow Roundabout	Loughborough	-	-	-	142	170	105
9293	M1 Junction 21a Merge (SB)	M1	12	31	49	-	-	-
50523	M1 Junction 23a/A42	M1	54	88	27	-	-	-
50543	M1 Junction 24	M1	49	78	53	-	-	-
50544	M1 Junction 24	M1	152	158	173	-	-	-
50312	A453/EMA	NW Leics	44	53	66	-	-	-
50492	A42/A453 (EMA)	NW Leics	129	149	123	60	62	57
76088	A453/Ashby Rd	NW Leics	132	154	148	-	-	-
60362	A6/A6004 (Quorn)	Quorn	56	125	57	27	58	25
1669	A6/Hallfields Ln/Cossington Ln	Rothley	93	120	102	85	114	113
2508	Queniborough Rd/Barkby Rd	Syston	-	-	-	87	156	99

Table 10-3: Junction Analysis –Nodes Heavily Congested in All (Core, Option and Mitigation) Scenarios with 'Significant' Delay Changes (seconds per PCU), Option 7

11. APPENDICES

11.1. APPENDIX A: Summary Statistic Overview

AM PEAK		Core	Op1	Op2	Op3	Op4	Op5	Op6	Op7
Over-Capacity Queues (pcu.hrs)	Option	987.9	1,364.3	1,238.0	1,283.7	1,334.7	1,753.1	1,721.2	1,661.7
	Mitigation	-	940.9	944.8	932.7	969.4	1,122.8	1,102.0	1,096.4
Total Travel Time (pcu.hrs)	Option	34,250.3	35,376.0	35,252.0	35,304.2	35,368.2	36,460.7	36,405.6	36,448.0
	Mitigation	-	34,861.0	34,918.2	34,891.9	34,973.0	35,334.0	35,333.7	35,479.6
Total Travel Distance (pcu.kms)	Option	1,472,955.0	1,491,825.3	1,494,673.2	1,494,263.0	1,495,302.7	1,511,717.6	1,512,166.7	1,515,466.2
	Mitigation	-	1,495,737.7	1,500,321.7	1,499,966.3	1,500,722.9	1,524,109.8	1,524,891.8	1,529,419.8
Average Speed (kph)	Option	43.0	42.2	42.4	42.3	42.3	41.5	41.5	41.6
	Mitigation	-	42.9	43.0	43.0	42.9	43.1	43.2	43.1

PM PEAK		Core	Op1	Op2	Op3	Op4	Op5	Op6	Op7
Over-Capacity Queues (pcu.hrs)	Option	507.9	743.3	675.1	659.0	705.7	960.0	937.6	924.9
	Mitigation	-	578.8	549.5	549.9	559.3	843.1	792.8	786.8
Total Travel Time (pcu.hrs)	Option	32,550.2	33,655.7	33,521.5	33,529.5	33,646.7	34,614.3	34,621.0	34,652.5
	Mitigation	-	33,260.0	33,169.2	33,203.9	33,268.4	33,887.5	33,860.8	33,880.7
Total Travel Distance (pcu.kms)	Option	1,448,974.3	1,472,622.3	1,472,773.1	1,474,488.1	1,475,354.0	1,495,776.4	1,497,481.3	1,499,920.4
	Mitigation	-	1,472,402.3	1,473,170.6	1,474,986.6	1,475,591.4	1,498,609.0	1,500,495.0	1,502,144.3
Average Speed (kph)	Option	44.5	43.8	43.9	44.0	43.8	43.2	43.3	43.3
	Mitigation	-	44.3	44.4	44.4	44.4	44.2	44.3	44.3

COMBINED		Core	Op1	Op2	Op3	Op4	Op5	Op6	Op7
Over-Capacity Queues (pcu.hrs)	Option	1,495.8	2,107.6	1,913.1	1,942.7	2,040.4	2,713.1	2,658.8	2,586.6
	Mitigation	-	1,519.7	1,494.3	1,482.6	1,528.7	1,965.9	1,894.8	1,883.2
Total Travel Time (pcu.hrs)	Option	66,800.5	69,031.7	68,773.5	68,833.7	69,014.9	71,075.0	71,026.6	71,100.5
	Mitigation	-	68,121.0	68,087.4	68,095.8	68,241.4	69,221.5	69,194.5	69,360.3
Total Travel Distance (pcu.kms)	Option	2,921,929.3	2,964,447.6	2,967,446.3	2,968,751.1	2,970,656.7	3,007,494.0	3,009,648.0	3,015,386.6
	Mitigation	-	2,968,140.0	2,973,492.3	2,974,952.9	2,976,314.3	3,022,718.8	3,025,386.8	3,031,564.1

Table 11-1: Area of Influence Summary Statistics for Core, Option and Mitigation Scenarios showing Change in Over-Capacity Queues (PCU.hours), Total Travel Time (PCU.hours), and Total Travel Distance (PCU.kms)

11.2. APPENDIX B: Flagged Junctions – Volume over Capacity Changes

Node	Junction	Area	36_core_am	36_opt1_am	36_opt1_mit_am	36_opt2_am	36_opt2_mit_am	36_opt3_am	36_opt3_mit_am	36_opt4_am	36_opt4_mit_am	36_opt5_am	36_opt5_mit_am	36_opt6_am	36_opt6_mit_am	36_opt7_am	36_opt7_mit_am
1613	A46 (A6 Slip Off EB)	A46	88	-	-	-	-	-	-	-	-	87	81	87	81	88	82
1939	A46 (Wanlip Slip On EB)	A46	93	95	100	-	-	-	-	-	-	-	-	-	-	-	-
9555	A46 (Anstey Ln Slip On WB)	A46	81	-	-	84	86	-	-	-	-	-	-	-	-	-	-
99993	A46/Anstey Ln	A46	93	94	79	94	80	94	80	94	80	-	-	-	-	-	-
72051	The Nook	Anstey	68	-	-	-	-	-	-	-	-	-	-	-	-	85	66
60115	Bridge St/High St	Barrow	55	-	-	-	-	-	-	-	-	-	-	-	-	87	82
2964	A6 (Loughborough Rd)	Birstall	79	-	-	-	-	-	-	-	-	-	-	-	-	80	85
7402	A6/Birstall Meadow Rd	Birstall	83	-	-	-	-	-	-	-	-	89	91	88	91	89	92
69959	A6/Johnson Rd	Birstall	74	-	-	-	-	-	-	-	-	-	-	-	-	74	85
69960	A6 (Red Hill)	Birstall	79	-	-	-	-	-	-	-	-	80	86	80	86	80	86
76015	A6 (Red Hill)	Birstall	79	-	-	-	-	-	-	-	-	80	86	80	86	80	86
9391	Dominion Rd/Park Drive	Blaby	78	-	-	-	-	-	-	-	-	83	88	83	88	83	88
9455	Dominion Rd/Tournament Rd	Blaby	76	-	-	-	-	-	-	-	-	79	89	79	89	79	89
1770	Belgrave Circle	City (NE)	94	-	-	-	-	-	-	-	-	98	101	97	101	98	101
1855	ODDR (Watermead Way)	City (NE)	84	-	-	-	-	-	-	-	-	89	82	89	81	90	81
3001	Belgrave Rd/Dorset St	City (NE)	72	-	-	-	-	-	-	-	-	-	-	76	85	-	-
3259	Catherine St/Brandon St	City (NE)	68	-	-	-	-	99	99	-	-	98	58	-	-	-	-
1226	Bennion Rd/Beaumont Leys Ln	City (NW)	94	-	-	-	-	-	-	-	-	100	93	100	93	101	94
1492	A6/Vaughan Way	City (NW)	47	51	100	88	100	100	100	72	99	100	102	100	102	100	103
9514	Scudamore Rd/Liberty Rd	City (NW)	77	-	-	-	-	-	-	-	-	-	-	-	-	78	85
9897	ODDR (Krefeld Way)	City (NW)	82	-	-	-	-	-	-	-	-	80	91	80	92	80	91
2412	Main St/Biggin Hill Rd (Evington)	City (SE)	80	87	88	88	88	85	86	86	87	90	90	91	91	91	90
3233	Welford Rd/Oakland Rd	City (SW)	95	-	-	-	-	-	-	-	-	-	-	-	-	93	101
9427	A47/Golf Course Ln	City (SW)	79	-	-	-	-	-	-	-	-	81	85	81	86	81	85
60371	A6/Shepshed Rd	Hathern	89	84	81	-	-	-	-	-	-	93	80	93	80	96	79
49973	A511/Copt Oak Rd	Hinckley & Bosworth	83	-	-	-	-	-	-	-	-	-	-	82	87	-	-
7304	Frederick St/Arthur St	Loughborough	82	89	84	-	-	86	80	86	81	92	87	91	86	90	85
7405	A6/Broad St	Loughborough	71	-	-	-	-	-	-	-	-	91	74	-	-	-	-
60002	A6004 (Ling Rd)	Loughborough	95	100	95	92	82	97	84	97	80	107	105	106	104	102	102
60048	A6004/Woodthorpe Rd	Loughborough	73	-	-	-	-	-	-	-	-	90	95	88	93	84	91
60062	A6/The Rushes	Loughborough	90	101	91	-	-	-	-	-	-	105	90	105	90	102	92
60100	Meadow Ln/Toothill Rd	Loughborough	100	-	-	-	-	-	-	98	107	-	-	-	-	-	-
60118	A6004/Park Rd/Shelthorpe Rd	Loughborough	89	101	91	94	67	101	74	101	73	106	104	105	103	101	101
60123	A6004/Allendale Rd	Loughborough	86	78	83	-	-	-	-	-	-	75	83	77	86	83	91
60140	A60 Nottm Rd/Morley St	Loughborough	78	77	85	80	87	79	87	78	90	79	87	79	86	83	90
60145	Forest Rd/Park Rd	Loughborough	50	-	-	-	-	-	-	-	-	87	64	-	-	-	-
60148	A6/Alan Moss Rd/Belton Rd	Loughborough	100	101	89	101	81	101	80	101	80	-	-	101	96	102	93
60193	A512/WoLSUE South	Loughborough	105	-	-	-	-	-	-	-	-	102	92	102	93	103	97
60205	A6 (Derby Rd)	Loughborough	87	-	-	-	-	-	-	-	-	83	80	84	80	87	82
60289	A60/Brush	Loughborough	79	-	-	-	-	-	-	80	85	-	-	-	-	97	85
60358	A512/Snell's Nook Ln	Loughborough	69	-	-	-	-	-	-	-	-	92	72	91	71	86	69
60366	A512/WoLSUE North	Loughborough	102	-	-	-	-	-	-	-	-	100	97	-	-	-	-
60380	Ashby Rd/Greenclose Ln	Loughborough	90	-	-	-	-	-	-	-	-	100	94	-	-	-	-
61009	Woodgate/Pack Horse Ln	Loughborough	15	101	14	-	-	87	13	-	-	106	14	105	14	102	14
65002	Nanpantan Rd/Dev Site	Loughborough	41	-	-	-	-	-	-	-	-	77	87	-	-	-	-
65018	Forest Rd/Outwoods Dr	Loughborough	63	-	-	-	-	-	-	-	-	87	88	85	86	-	-
65049	A6 (Derby Rd)	Loughborough	87	-	-	-	-	-	-	-	-	82	79	83	80	87	81
65050	A6 (Derby Rd)	Loughborough	87	-	-	-	-	-	-	-	-	83	80	84	80	87	82
65066	A6004/University Rd	Loughborough	76	70	90	-	-	72	85	73	85	90	94	89	93	69	91
65070	A6004/Radmoor Rd	Loughborough	78	-	-	77	85	-	-	-	-	74	85	75	85	71	85
65071	A512/Radmoor Rd	Loughborough	84	91	82	-	-	-	-	-	-	92	84	92	84	93	86
65074	Beacon Rd/Park Rd	Loughborough	83	58	88	-	-	72	87	69	87	-	-	-	-	-	-
65076	Park Rd/Shelthorpe Rd	Loughborough	99	-	-	-	-	-	-	-	-	-	-	100	94	100	93
69015	Belton Rd/Jubilee Dr	Loughborough	77	75	90	-	-	77	87	80	86	76	92	75	91	76	91
73775	Queen's Rd/Salisbury St	Loughborough	28	-	-	-	-	-	-	-	-	85	29	-	-	90	29
73778	A6 (Bridge St)	Loughborough	101	-	-	103	95	104	96	103	95	-	-	-	-	-	-
78902	Belton Rd	Loughborough	48	92	53	-	-	-	-	-	-	101	53	101	53	100	53
78903	Meadow Ln/Station Boulevard	Loughborough	103	102	96	104	99	104	99	-	-	103	95	104	97	-	-
99996	A6004/Forest Rd	Loughborough	94	103	97	94	80	97	84	-	-	105	101	103	100	102	95
99997	A6004/A512	Loughborough	102	-	-	103	97	104	99	-	-	-	-	-	-	-	-
2932	M1 Junction 21a Merge (SB)	M1	93	-	-	-	-	-	-	-	-	97	100	96	100	96	101
9263	M1 Junction 21a Diverge (NB)	M1	87	-	-	-	-	-	-	-	-	-	-	-	-	84	89
40470	M1 Junction 22 Merge (NB)	M1	81	-	-	-	-	-	-	-	-	87	85	87	84	87	85
50487	M1 Junction 24/A6	M1	57	-	-	-	-	-	-	-	-	-	-	88	58	88	58
50520	M1 Junction 23a Diverge (NB)	M1	79	81	86	80	88	82	86	79	86	84	86	83	87	83	87
50539	M1 Junction 24 Diverge (NB)	M1	79	79	85	79	85	80	86	80	85	80	87	80	87	80	87
73421	Stoughton Dr (S)	Oadby & Wigston	95	33	33	33	96	96	33	33	33	34	33	34	33	34	41
74116	A6004 (Terry Yardley Way)	Quorn	87	80	85	-	-	-	-	-	-	77	84	79	87	84	91
73889	A6/Broadnook	Rest Charnwood (West)	82	-	-	85	87	85	88	84	87	88	94	88	93	89	94
60064	A512/Iveshead Rd/Charnwood Rd	Shepshed	78	-	-	88	82	88	83	85	75	89	84	89	84	89	84
60095	A512/Ingleberry Rd	Shepshed	95	-	-	100	96	101	96	-	-	103	96	102	96	103	96
2227	Melton Rd/Fosse Way	Syston	77	-	-	-	-	-	-	-	-	-	-	84	85	-	-
2280	Fosse Way/High St	Syston	64	103	86	103	87	89	56	102	80	103	90	104	94	103	91
2477	Queniborough Rd/Main St	Syston	49	-	-	-	-	-	-	-	-	-	-	87	79	-	-
2508	Queniborough Rd/Barkby Rd	Syston	86	103	93	103	93	90	78	102	89	102	95	104	97	102	95
7041	Melton Rd/Goode's Ln	Syston	49	100	64	100	64	-	-	-	-	96	65	101	67	96	65
78892	Melton Rd/Wanlip Rd	Syston	99	104	102	104	102	102	94	106	101	104	102	104	104	104	102

Table 11-2: Volume/Capacity Change Junctions, VoC (%), AM Peak

Node	Junction	Area	36_core_pm	36_opt1_pm	36_opt1_mit_pm	36_opt2_pm	36_opt2_mit_pm	36_opt3_pm	36_opt3_mit_pm	36_opt4_pm	36_opt4_mit_pm	36_opt5_pm	36_opt5_mit_pm	36_opt6_pm	36_opt6_mit_pm	36_opt7_pm	36_opt7_mit_pm
3449	A46 NB (Hobby Horse)	A46	100	99	93	100	93	100	94	100	93	-	-	-	-	-	-
9362	A46 (EB)	A46	88	-	-	-	-	-	-	-	-	-	-	86	81	-	-
9407	A46 (A50 Slip On EB)	A46	88	-	-	-	-	-	-	-	-	-	-	86	81	-	-
9508	A46 (Anstey Ln Slip Off EB)	A46	98	-	-	-	-	-	-	-	-	102	88	102	87	102	89
99993	A46/Anstey Ln	A46	94	98	82	97	81	97	81	98	82	95	101	96	102	95	101
9660	Leicester Rd	Anstey	77	-	-	-	-	-	-	-	-	89	89	86	84	90	90
72051	The Nook	Anstey	68	-	-	-	-	-	-	-	-	85	74	-	-	88	77
72052	Leicester Rd	Anstey	74	-	-	-	-	-	-	-	-	86	86	-	-	87	87
1748	A6/School Ln	Birstall	82	91	90	89	89	87	89	89	89	95	86	95	87	94	85
9295	Ratby Ln	Blaby	75	-	-	-	-	-	-	-	-	77	88	77	87	77	87
99991	A50/Gynsill Ln	Blaby	93	-	-	-	-	-	-	-	-	100	92	-	-	-	-
1645	Belgrave Gate/Humberstone Gate	City (Centre)	95	54	96	56	52	-	-	-	-	58	96	59	64	63	75
1428	A6 (St Margaret's Way)	City (NE)	94	104	108	109	110	105	108	106	109	110	119	110	120	111	120
1513	A6/Beaumont Leys Ln	City (NE)	100	-	-	-	-	-	-	-	-	100	92	98	92	100	92
2055	Catherine St/Gipsy Ln	City (NE)	82	-	-	-	-	-	-	-	-	88	85	89	86	88	85
1035	Anstey Ln/Great Meadow Rd	City (NW)	81	-	-	-	-	-	-	-	-	84	88	83	87	83	87
9876	Anstey Ln/ODDR	City (NW)	92	-	-	-	-	-	-	-	-	100	84	99	83	100	84
9953	A50/Heathley Park Dr	City (NW)	82	-	-	-	-	-	-	-	-	-	-	86	87	-	-
60098	The Coneries/Sparrow Hill	Loughborough	95	100	95	100	94	100	95	101	98	100	100	101	100	101	101
60100	Meadow Ln/Toothill Rd	Loughborough	100	90	93	-	-	-	-	-	-	94	90	93	89	-	-
60108	Woodgate/Pinfold Gate	Loughborough	95	-	-	-	-	-	-	-	-	-	-	-	-	100	92
60123	A6004/Allendale Rd	Loughborough	84	100	101	-	-	93	96	90	91	101	101	101	102	99	101
60126	A6/Shelthorpe Rd	Loughborough	101	97	94	101	87	100	87	101	87	101	96	101	96	101	92
60358	A512/Snell's Nook Ln	Loughborough	101	-	-	-	-	-	-	-	-	101	96	101	96	-	-
60538	A6/Beeches Rd	Loughborough	80	91	89	83	85	85	88	87	87	94	96	94	95	92	94
61020	A6/Baxter Gate	Loughborough	87	89	72	91	80	90	74	92	81	91	80	91	76	95	83
65066	A6004/University Rd	Loughborough	80	87	95	83	90	84	92	85	92	89	98	88	97	87	96
65067	A6004 (Epinal Way)	Loughborough	92	100	85	96	81	97	83	98	83	102	87	102	87	100	86
65070	A6004/Radmoor Rd	Loughborough	81	88	97	85	91	86	94	87	94	88	114	88	108	88	101
69015	Belton Rd/Jubilee Dr	Loughborough	74	-	-	-	-	-	-	70	85	-	-	-	-	69	85
69936	Bishop Meadow Rd/Weldon Rd	Loughborough	81	86	76	-	-	-	-	86	77	-	-	85	76	87	78
73778	A6 (Bridge St)	Loughborough	99	101	77	100	79	100	79	102	79	103	98	103	98	103	78
74101	A6004 (Epinal Way)	Loughborough	73	79	86	-	-	-	-	-	-	79	88	79	88	79	87
78902	Belton Rd	Loughborough	75	97	50	100	50	100	50	100	51	101	51	101	51	102	52
78903	Meadow Ln/Station Boulevard	Loughborough	79	85	70	85	69	86	70	89	72	96	75	93	75	98	77
78905	A6004/Squirrel Way	Loughborough	70	-	-	-	-	-	-	-	-	69	86	70	86	71	87
99996	A6004/Forest Rd	Loughborough	90	-	-	93	83	-	-	-	-	-	-	-	-	-	-
9292	M1 Junction 21a Diverge (NB)	M1	82	-	-	-	-	-	-	-	-	83	89	83	88	83	89
50487	M1 Junction 24/A6	M1	86	-	-	-	-	-	-	-	-	81	82	81	82	80	82
50523	M1 Junction 23a/A42	M1	100	100	92	100	92	100	92	100	93	100	91	100	91	100	92
99999	M1 Junction 23	M1	87	-	-	-	-	-	-	-	-	101	100	101	100	100	100
79972	A606	Outside Leics	82	90	88	90	88	88	89	92	90	91	91	92	89	91	88
79974	A606	Outside Leics	82	93	90	95	91	94	92	99	97	92	94	94	91	94	87
60195	Loughborough Rd/Farley Way	Quorn	96	101	101	-	-	101	100	101	100	101	99	101	99	101	99
60362	A6/A6004 (Quorn)	Quorn	101	103	96	103	96	103	96	103	97	-	-	-	-	-	-
74116	A6004 (Terry Yardley Way)	Quorn	84	95	95	85	94	89	92	88	93	91	91	92	92	92	93
60254	A60 Nottm Rd/Barrow Rd	Rest Charnwood (East)	69	-	-	-	-	-	-	-	-	-	-	-	-	82	88
73890	A6/Broadnook	Rest Charnwood (West)	78	-	-	-	-	-	-	-	-	100	100	100	100	100	100
73891	A6/Broadnook	Rest Charnwood (West)	21	-	-	-	-	-	-	-	-	108	281	100	189	89	256
7306	A512 (Ashby Rd E)	Shepshed	77	86	82	88	84	90	85	87	83	95	90	95	89	94	89
60095	A512/Ingleberry Rd	Shepshed	82	88	78	98	93	98	93	90	85	99	96	99	95	99	95
76036	A512/Leicester Rd	Shepshed	81	-	-	87	80	87	80	85	75	87	80	87	80	87	80
76150	A512 (Ashby Rd E)	Shepshed	77	86	82	88	84	90	85	87	83	95	90	95	89	94	89
2227	Melton Rd/Fosse Way	Syston	78	82	91	82	91	90	89	84	90	84	94	80	96	84	94
2280	Fosse Way/High St	Syston	83	95	83	96	83	85	76	94	79	96	81	100	82	97	82
7041	Melton Rd/Goode's Ln	Syston	77	102	88	103	88	94	73	102	84	102	90	102	96	102	90
99994	Hobby Horse	Syston	100	99	93	100	93	100	94	100	93	-	-	-	-	-	-
76033	A607	Thurmaston	82	-	-	-	-	-	-	-	-	83	88	82	88	84	88

Table 11-3: Volume/Capacity Change Junctions, VoC (%), PM Peak

11.3. APPENDIX C: Flagged Junctions – Heavily Congested Delays per PCU

Node	Junction	Area	36_core_del_am	36_opt1_del_am	36_opt1_mit_del_am	36_opt2_del_am	36_opt2_mit_del_am	36_opt3_del_am	36_opt3_mit_del_am	36_opt4_del_am	36_opt4_mit_del_am	36_opt5_del_am	36_opt5_mit_del_am	36_opt6_del_am	36_opt6_mit_del_am	36_opt7_del_am	36_opt7_mit_del_am
1607	A46/A6 (Slip on WB)	A46	49	65	78	63	77	61	72	61	74	82	47	88	48	81	44
99992	A46/A50	A46	72	76	73	77	75	77	75	76	74	81	78	81	77	82	77
99995	A46/A6	A46	85	88	85	93	85	90	80	90	82	100	86	100	87	103	89
60044	Barrow Rd/Bridge St	Barrow	72	-	-	87	65	83	65	97	72	98	77	93	72	127	97
7020	A47/Kings Drive	Blaby	21	20	21	20	20	20	20	21	20	19	19	18	19	19	20
9291	A47/Kirby Ln	Blaby	62	60	61	60	59	60	59	61	59	59	58	58	57	57	57
9332	Ratby Ln/Wembley Rd	Blaby	148	149	152	150	150	148	149	150	149	149	159	150	161	150	166
9401	A47/Braunstone Ln	Blaby	78	79	78	80	79	79	79	79	79	79	80	79	81	80	81
73335	A47/Warren Ln	Blaby	26	32	29	31	28	28	29	31	32	33	51	22	51	48	51
1468	Newarke St/Oxford St	City (Centre)	46	48	48	48	48	47	48	48	47	51	50	50	50	50	50
1493	Oxford St (DMU)	City (Centre)	28	27	28	28	28	28	28	28	28	27	28	27	28	27	28
1551	Newarke St/Welford Rd	City (Centre)	13	13	12	13	13	13	13	12	13	13	12	13	12	13	12
1565	Infirmary Rd (LRI)	City (Centre)	118	115	117	114	116	116	117	117	117	114	115	113	113	115	113
1576	Welford Rd/Infirmary Rd	City (Centre)	21	21	21	21	22	21	21	21	21	22	22	22	22	21	22
1662	Burleys Way/Belgrave Gate	City (Centre)	31	31	31	31	31	32	31	31	32	32	32	31	32	31	32
1794	St Georges Way/Charles St	City (Centre)	33	34	34	34	34	34	34	34	34	34	34	34	34	34	34
3820	Waterloo Way/Regent Rd	City (Centre)	82	82	81	82	82	82	77	82	82	77	81	83	81	82	81
5550	St Nicholas' Circle	City (Centre)	73	75	74	74	75	74	75	74	75	75	74	75	73	75	72
1420	A6/Blackbird Rd	City (NE)	72	81	79	82	78	81	79	80	80	83	61	85	62	85	62
1513	A6/Beaumont Leys Ln	City (NE)	25	25	24	25	26	25	24	24	24	24	27	26	28	26	28
1519	Vaughan Way/A6	City (NE)	30	-	-	-	-	-	-	-	-	32	37	31	36	32	37
1892	Melton Rd/Doncaster Rd	City (NE)	24	26	25	26	26	25	25	26	25	26	23	26	23	26	24
1932	Catherine St/Ulverscroft Rd	City (NE)	43	37	38	39	38	42	41	39	39	40	43	39	43	39	43
2011	ODDR/Melton Rd	City (NE)	79	84	86	85	86	83	84	84	86	88	81	89	82	89	82
2060	Catherine St/Gipsy Ln	City (NE)	23	23	23	23	23	23	23	23	23	23	23	24	23	24	23
2085	Troon Way (ODDR)/Gleneagles Av	City (NE)	42	42	42	42	42	42	43	42	43	42	43	42	43	42	43
2137	Victoria Park Rd East/Talby Av	City (NE)	74	78	78	79	78	78	78	78	79	80	78	81	79	81	78
2751	Loughborough Rd/Checketts Rd	City (NE)	56	70	69	71	69	73	68	69	69	73	78	74	77	76	77
2770	Loughborough Rd/Thurmaston Rd	City (NE)	29	-	-	-	-	-	-	-	-	28	30	28	30	28	32
9734	A563 (Watermead Way)	City (NE)	28	34	31	34	31	32	28	33	30	39	16	41	16	40	16
9820	Melton Rd/Lanesborough Rd	City (NE)	23	-	-	-	-	-	-	-	-	34	30	35	31	34	30
99988	Red Hill Circle	City (NE)	109	122	123	122	123	118	118	120	122	135	93	141	94	138	94
1255	A50/Blackbird Rd	City (NW)	35	39	39	39	39	39	38	38	39	41	40	42	40	41	40
1285	Anstey Ln/Blackbird Rd	City (NW)	62	67	68	67	67	66	67	66	67	71	73	71	74	71	73
1371	Highcross St/Sanvey Gate	City (NW)	61	65	66	67	65	68	67	66	66	69	73	69	73	72	74
1505	Vaughan Way/A6	City (NW)	94	95	94	94	96	95	95	95	95	95	99	95	98	95	97
2785	ODDR (Glenfrith Way)	City (NW)	27	27	27	27	27	27	27	27	27	27	27	-	-	27	28
9007	A50/Fosse Rd North	City (NW)	56	47	43	43	54	43	54	54	43	51	39	40	48	41	51
9728	ODDR/Aikman Avenue	City (NW)	15	15	15	15	16	15	15	15	15	15	15	15	15	15	15
9768	ODDR/Dillon Way	City (NW)	30	-	-	-	-	-	-	-	-	35	39	33	38	33	39
9814	ODDR (Glenfrith Way)	City (NW)	6	9	12	9	13	9	14	10	13	10	10	12	10	11	10
9876	Anstey Ln/ODDR	City (NW)	31	31	32	32	32	31	31	31	32	32	21	32	21	32	21
1612	Welford Rd/Almond Rd	City (SE)	43	42	42	42	42	44	42	42	42	42	42	41	42	42	40
1927	London Rd/Evington Rd	City (SE)	29	29	29	29	29	29	29	29	29	29	29	30	29	29	29
1935	Victoria Park Rd/Queens Rd	City (SE)	43	64	56	39	58	64	44	38	57	35	44	40	47	35	50
1994	East Park Rd/Evington Rd	City (SE)	45	45	44	44	45	45	45	45	45	44	44	44	44	44	46
2235	Stoughton Dr/Evington Ln	City (SE)	40	41	40	41	40	40	41	40	40	41	40	41	40	40	40
2268	Wakerley Rd/Ethel Rd	City (SE)	68	69	74	70	70	70	85	70	71	70	70	70	70	83	72
2380	Goodwood Rd/Coleman Rd	City (SE)	38	41	40	41	42	38	41	41	39	41	41	41	41	42	37
2391	A47/Colchester Rd	City (SE)	19	19	20	20	20	20	19	19	19	20	20	20	20	20	20
1105	Narborough Rd/Evesham Rd	City (SW)	49	49	49	50	49	50	49	49	49	50	50	50	50	48	51
1221	Narborough Rd/Upperton Rd	City (SW)	53	-	-	-	-	-	-	-	-	-	-	-	-	54	54
1315	Braunstone Gate	City (SW)	137	142	141	141	142	142	142	142	140	145	142	143	141	144	144
1318	Upperton Rd/Watkin Rd	City (SW)	132	141	132	142	143	154	142	145	146	138	144	151	141	122	148
1329	Upperton Rd/Western Boulevard	City (SW)	159	159	159	159	159	160	159	160	160	158	154	156	154	158	154
1458	A6 (St Margaret's Way)	City (SW)	48	48	47	48	47	48	48	48	48	47	45	47	45	47	46
1577	Ayelstone Rd (LRI)	City (SW)	37	34	33	37	33	37	33	35	33	32	28	31	29	30	31
1588	Welford Rd/Infirmary Rd	City (SW)	30	30	29	30	30	30	30	30	30	29	29	29	29	30	30
5100	A47/Narborough Rd (N)	City (SW)	61	59	65	66	60	63	61	67	66	67	63	67	64	69	64
9553	A47/ODDR	City (SW)	89	90	90	90	90	90	90	90	90	91	92	91	92	91	92
2546	A47/Station Rd	Harborough	64	68	69	68	69	67	66	68	68	71	70	72	71	71	71
60253	A6/Zouch Rd	Hathern	63	-	-	-	-	-	-	71	64	-	-	-	-	82	66
40178	A511/Copt Oak Rd	Hinckley & Bosworth	82	79	78	82	81	83	82	81	81	79	77	79	77	80	79
60057	A6/Southfield Rd	Loughborough	93	96	93	97	97	99	95	101	97	101	83	100	85	106	95
60099	Meadow Ln/Ratcliffe Rd/Belton Rd	Loughborough	79	113	67	90	61	106	64	105	66	122	80	123	79	120	80
60100	Meadow Ln/Toothill Rd	Loughborough	65	58	45	50	52	59	52	-	-	63	50	64	76	65	51
60108	Woodgate/Pinfold Gate	Loughborough	153	245	162	192	117	224	138	220	134	250	202	246	188	245	176
60126	A6/Shelthorpe Rd	Loughborough	54	99	50	62	35	79	42	76	40	121	64	115	61	102	56
60135	A60 (Nottm Rd/Queens Rd)	Loughborough	77	88	82	87	78	86	81	89	83	85	78	90	79	93	85
60186	A6004/Beacon Rd	Loughborough	28	38	48	34	49	35	50	35	49	46	28	42	25	42	24
60193	A512/WoLSUE South	Loughborough	85	57	51	91	77	80	70	82	72	-	-	-	-	-	-
60198	Nanpantan Rd/Snell's Nook Ln	Loughborough	207	362	196	244	163	279	173	275	175	461	245	428	225	362	191
60366	A512/WoLSUE North	Loughborough	67	37	37	67	66	61	62	61	65	-	-	44	33	44	32
61020	A6/Baxter Gate	Loughborough	61	93	65	75	48	87	55	86	55	94	78	94	74	94	67
65097	A6 Bridge St/Fennel St	Loughborough	72	78	73	71	63	78	67	77	66	78	74	79	73	76	73
65113	Royland Rd/Park Rd	Loughborough	30	32	33	35	30	36	31	39	30	28	38	29	37	31	30
69941	A60/Station Boulevard	Loughborough	140	135	77	152	96	157	92	176	106	146	75	152	81	191	115
73778	A6 (Bridge St)	Loughborough	39	78	36	-	-	-	-	-	-	78	56	81	48	78	40
78903	Meadow Ln/Station Boulevard	Loughborough	89	-	-	-	-	-	-	110	65	-	-	-	-	129	66
99997	A6004/A512	Loughborough	146	200	135	-	-	-	-	172	119	227	143	220	142	208	140
9293	M1 Junction 21a Merge (SB)	M1	12	-	-	-	-	-	-	-	-	34	54	32	52	31	49
50523	M1 Junction 23a/A42	M1	54	71	26	73	25	72	26	75	26	86	28	87	27	88	27
50543	M1 Junction 24	M1	49	71	57	71	35	51	55	59	50	70	55	78	53	78	53
50544	M1 Junction 24	M1	152	139	153	143	168	168	165	158	164	167	161	157	174	158	173
50545	M1 Junction 24	M1	96	97	97	98	96	98	97	98	96	100	97	99	97	98	97
59987	M1 Junction 24 Merge (SB)	M1	18	13	15	15	16	15	15	16	16	12	12	11	12	13	14
76098	M1 Junction 24	M1	23	25	26	25	29	27	26	26	27	29	29	29	28	28	28
99987	M1 Junction 22	M1	140	144	140	143	139	144	140	143	140	154	152	152	150	153	151
50054	A511/Swannington Rd	NW Leics	24	23	23	23	23	23	23	23	23	22	21	22	21	22	21
50304	Copt Oak Rd/Warren Hills Rd	NW Leics	48	44	53	44	51	46	51	46	50	40	44	44	44	41	59
50312	A453/EMA	NW Leics	44	57	39	60	43	55	44	55	42	48	45	52	45	53	66
50492	A42/A453 (EMA)	NW Leics	129	141	115	143	119	141	115	138	116	147	124	149	121	149	123
76085	A453/A6 (Kegworth Bypass)	NW Leics	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
76088	A453/Ashby Rd	NW Leics	132	137	136	141	145	148	138	142	138	158	148	157	155	154	148
2228	Gartree Rd/Stoughton Dr (S)	Oadby & Wigston	56	57	55	57	57	56	54	56	54	54	53	57	55	54	56
2426	Gartree Rd/Stoughton Rd	Oadby & Wigston	32	30	30	30	30	31	31	30	31	30	28	30	28	29	29
76923	Rempstone Crossroads	Outside Leics	163	142	140	151	142	164	162	168	165	160	157	159	155	169	169
60195	Loughborough Rd/Farley Way	Quorn	42	44	41	45	44	47	44	46	43	60	42	59	40	46	48
60362	A6/A6004 (Quorn)	Quorn	56	120	51	71	28	92	39	86	36	152	76	143	69	125	57
2315	A607/Fosse Way	Rest Charnwood (East)	22	33	28	34	28	31	25	31	27	36	30	41	33	36	31
1669	A6/Hallfields Ln/Cossington Ln	Rothley	93	98	95	104	101	103	100	99	97	114	98	116	99	120	102

Table 11-4: Heavily Congested Junctions, Delay per PCU (seconds), AM Peak

Node	Junction	Area	36_core_del_pm	36_opt1_del_pm	36_opt1_mit_del_pm	36_opt2_del_pm	36_opt2_mit_del_pm	36_opt3_del_pm	36_opt3_mit_del_pm	36_opt4_del_pm	36_opt4_mit_del_pm	36_opt5_del_pm	36_opt5_mit_del_pm	36_opt6_del_pm	36_opt6_mit_del_pm	36_opt7_del_pm	36_opt7_mit_del_pm
2047	A46/Wanlip Rd (Slip on WB)	A46	32	45	21	46	20	44	20	45	20	60	17	57	16	60	16
3449	A46 NB (Hobby Horse)	A46	-	-	-	-	-	29	10	-	-	-	-	-	-	24	20
9715	A46 (Anstey Ln Slip On EB)	A46	63	116	119	107	109	104	109	107	109	137	79	140	104	135	77
99992	A46/A50	A46	67	65	64	65	65	66	65	66	65	64	70	64	68	65	70
60044	Barrow Rd/Bridge St	Barrow	-	-	-	-	-	68	65	-	-	-	-	-	-	106	91
9291	A47/Kirby Ln	Blaby	42	43	43	43	43	43	43	43	43	43	46	43	47	43	46
9332	Ratby Ln/Wembley Rd	Blaby	121	118	117	119	118	118	118	118	118	116	130	116	129	117	130
1429	St Nicholas' Circle	City (Centre)	43	43	43	44	43	44	44	44	43	45	41	45	40	45	41
1493	Oxford St (DMU)	City (Centre)	27	28	28	28	28	28	27	28	28	27	27	27	27	27	27
1565	Infirmary Rd (LRI)	City (Centre)	51	54	53	54	53	54	53	54	53	57	55	57	56	57	55
1662	Burleys Way/Belgrave Gate	City (Centre)	40	38	39	38	38	40	40	39	39	37	39	37	37	37	38
1677	Charles St/Rutland St	City (Centre)	187	185	185	185	184	185	185	186	185	184	185	184	184	184	185
1767	Humberstone Rd/Rutland St	City (Centre)	245	242	241	241	240	242	241	242	241	237	238	237	238	238	238
1780	St Georges Way/East St	City (Centre)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
3820	Waterloo Way/Regent Rd	City (Centre)	70	70	69	70	68	69	69	69	70	70	68	70	67	69	67
75007	Belvoir St	City (Centre)	440	439	445	447	438	441	437	450	446	441	419	437	419	440	425
1420	A6/Blackbird Rd	City (NE)	60	63	63	63	63	63	63	63	63	65	55	65	55	65	55
1513	A6/Beaumont Leys Ln	City (NE)	-	-	-	-	-	26	26	-	-	-	-	-	-	27	27
1648	Burleys Way/Belgrave Gate	City (NE)	55	60	58	60	60	57	57	57	57	61	59	62	62	62	62
1932	Catherine St/Ulverscroft Rd	City (NE)	26	24	25	25	25	25	25	25	25	23	21	24	22	24	22
1938	Melton Rd/Checketts Rd	City (NE)	51	57	58	57	57	55	55	56	56	61	57	62	57	62	57
2011	ODDR/Melton Rd	City (NE)	67	70	69	71	69	70	68	70	68	74	64	74	64	74	64
2060	Catherine St/Gipsy Ln	City (NE)	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
2137	Victoria Park Rd East/Talby Av	City (NE)	71	72	73	73	73	72	72	72	72	73	68	73	68	71	68
2751	Loughborough Rd/Checketts Rd	City (NE)	73	76	77	76	72	72	74	74	72	78	77	77	80	81	79
2770	Loughborough Rd/Thurmaston Rd	City (NE)	96	101	102	102	102	102	102	102	102	102	105	102	105	102	106
99988	Red Hill Circle	City (NE)	94	97	95	96	94	95	92	96	94	99	83	100	83	99	83
1174	Beaumont Leys Ln/Leycroft Rd	City (NW)	24	25	25	25	25	25	25	25	25	28	28	27	27	29	28
1255	A50/Blackbird Rd	City (NW)	-	-	-	-	-	32	33	-	-	-	-	-	-	33	33
1285	Anstey Ln/Blackbird Rd	City (NW)	46	48	47	48	47	48	48	48	47	49	48	49	47	49	48
1371	Highcross St/Sanvey Gate	City (NW)	47	47	47	-	-	48	48	-	-	-	-	-	-	48	47
1473	A6/Sanvey Gate	City (NW)	28	33	33	-	-	34	32	-	-	-	-	-	-	37	33
1505	Vaughan Way/A6	City (NW)	75	75	75	76	75	75	75	76	75	76	75	76	75	76	76
9007	A50/Fosse Rd North	City (NW)	37	44	43	44	43	43	43	43	43	44	40	50	41	44	40
9728	ODDR/Aikman Avenue	City (NW)	-	-	-	-	-	13	13	-	-	-	-	-	-	13	13
1612	Welford Rd/Almond Rd	City (SE)	33	33	33	33	33	33	33	33	33	33	32	33	32	33	33
1782	Welford Rd/Victoria Park Rd	City (SE)	69	67	67	67	67	67	67	67	67	65	66	65	66	65	66
1927	London Rd/Evington Rd	City (SE)	42	41	41	41	41	41	41	41	41	40	41	41	41	40	41
2268	Wakerley Rd/Ethel Rd	City (SE)	66	71	66	66	66	66	66	66	66	66	65	66	65	66	65
2391	A47/Colchester Rd	City (SE)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
1105	Narborough Rd/Evesham Rd	City (SW)	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
1221	Narborough Rd/Upperton Rd	City (SW)	68	68	68	68	68	68	68	68	68	68	67	68	67	68	67
1423	St Nicholas' Circle	City (SW)	70	70	70	70	70	70	70	70	70	70	68	69	68	70	69
1482	Ayelstone Rd/Freemans Common	City (SW)	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
1490	Walnut St/Havelock St	City (SW)	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
1529	Infirmary Rd/Jarrom St	City (SW)	67	69	69	69	69	69	69	69	69	69	71	70	71	69	71
3233	Welford Rd/Oakland Rd	City (SW)	32	31	31	31	31	31	31	31	31	30	30	30	30	30	30
3333	Saffron Lane	City (SW)	69	70	69	69	70	70	69	70	70	68	68	69	68	69	68
5100	A47/Narborough Rd (N)	City (SW)	50	51	51	51	51	51	51	51	51	52	50	51	50	52	50
9553	A47/ODDR	City (SW)	77	77	78	77	78	77	78	77	78	79	80	79	80	79	79
2546	A47/Station Rd	Harborough	49	50	51	50	51	50	50	50	51	49	49	50	49	50	49
60253	A6/Zouch Rd	Hathern	-	-	-	-	-	55	49	-	-	-	-	-	-	59	51
60402	A6/Whatton Rd	Hathern	61	62	55	62	57	61	55	65	59	61	53	61	52	66	57
40235	Copt Oak Rd/Whitwick Rd	Hinckley & Bosworth	51	51	52	-	-	54	53	-	-	-	-	-	-	56	59
49975	A511/Copt Oak Rd	Hinckley & Bosworth	46	56	54	53	50	53	52	53	51	60	60	58	60	61	60
60057	A6/Southfield Rd	Loughborough	52	65	62	-	-	59	54	-	-	-	-	-	-	67	61
60062	A6/The Rushes	Loughborough	-	-	-	-	-	43	44	-	-	-	-	-	-	57	43
60085	A6/A60 (New King St)	Loughborough	36	52	48	-	-	42	45	-	-	-	-	-	-	55	51
60099	Meadow Ln/Ratcliffe Rd/Belton Rd	Loughborough	108	104	69	108	73	107	73	116	80	120	74	121	74	144	90
60100	Meadow Ln/Toothill Rd	Loughborough	-	-	-	38	39	38	37	40	39	-	-	-	-	40	38
60148	A6/Alan Moss Rd/Belton Rd	Loughborough	67	76	51	71	50	74	50	76	51	79	52	79	52	79	52
60198	Nanpantan Rd/Snell's Nook Ln	Loughborough	171	278	184	202	136	222	150	229	150	328	210	313	199	271	164
60358	A512/Snell's Nook Ln	Loughborough	44	42	32	51	38	48	37	51	38	-	-	-	-	55	32
61000	Forest Rd/Browns Ln	Loughborough	47	67	54	54	44	58	47	60	48	79	63	74	62	68	57
65097	A6 Bridge St/Fennel St	Loughborough	74	85	73	81	59	81	65	77	66	90	77	85	76	83	74
69941	A60/Station Boulevard	Loughborough	59	60	41	61	43	63	43	72	44	65	50	66	48	85	51
99997	A6004/A512	Loughborough	104	115	90	107	87	110	88	111	89	118	90	117	90	115	90
99998	A6/Bishop Meadow Roundabout	Loughborough	142	132	99	161	112	165	111	171	115	-	-	-	-	170	105
50540	M1 Junction 24	M1	45	48	50	47	49	48	49	48	49	50	54	50	54	49	54
50545	M1 Junction 24	M1	56	52	54	52	53	52	53	51	53	49	48	48	48	47	49
76098	M1 Junction 24	M1	29	27	25	27	25	26	25	27	25	24	22	25	22	24	23
99987	M1 Junction 22	M1	144	152	146	150	143	151	145	151	144	159	159	159	158	158	156
50225	A6/Side Ley	NW Leics	74	75	75	75	75	75	75	76	75	76	76	76	76	77	76
50304	Copt Oak Rd/Warren Hills Rd	NW Leics	58	65	66	65	67	66	68	64	67	68	69	68	69	68	70
50312	A453/EMA	NW Leics	23	23	20	23	22	23	22	23	23	23	19	23	19	23	19
50492	A42/A453 (EMA)	NW Leics	60	62	59	61	57	62	57	62	59	60	54	61	54	62	57
55053	A511 (Bardon Quarry)	NW Leics	23	31	34	35	40	35	40	32	38	35	37	36	37	32	38
76085	A453/A6 (Kegworth Bypass)	NW Leics	31	30	32	30	32	30	32	29	31	30	31	29	31	29	31
2228	Gartree Rd/Stoughton Dr (S)	Oadby & Wigston	33	33	34	33	34	33	33	33	33	34	33	34	33	34	33
76923	Rempstone Crossroads	Outside Leics	117	120	118	122	118	123	119	124	120	129	125	129	124	132	127
60362	A6/A6004 (Quorn)	Quorn	-	-	-	-	-	-	-	-	-	55	26	52	25	58	25
1669	A6/Hallfields Ln/Cossington Ln	Rothley	85	91	90	101	100	100	98	93	93	111	111	108	111	114	113
2508	Queniborough Rd/Barkby Rd	Syston	87	149	93	150	93	-	-	142	88	156	99	167	121	156	99
78892	Melton Rd/Wanlip Rd	Syston	-	-	-	-	-	23	16	-	-	-	-	-	-	23	22
99994	Hobby Horse	Syston	-	-	-	-	-	86	65	-	-	-	-	-	-	84	74

Table 11-5: Heavily Congested Junctions, Delay per PCU (seconds), PM Peak

11.4. APPENDIX D: Residential Development Included in LLITM

Details originally supplied in project proposal (24/09/18)

REF	zone id	Easting	Northing	Planning application	Parish	Address/ Location	Details	2011/ 12	2012/ 13	2013/ 14	2014/15	Plot Numbers Outstanding 31st March 2015	2015/ 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	2021/ 22	2022/ 23	2023/ 24	2024/ 25	2025/ 26	2026/ 27	2027/ 28	2028/ 29	2029/ 30	2030/ 31
1	1119	454426	309018	P/07/2671/2	Anstey	H/2a Land off Bradgate Road Phase 2	Erection of 47 dwellings and formation of access on site of 327 Link Road.	22	1			0																
2	1111	455331	308060	P/10/1123/2	Anstey	159-161 Gynsill Close Anstey Leicester Leicestershire LE7 7AN	Demolish 2 dwellings and erect of 14 dwellings.	12				0																
3	1119	454418	308304	P/12/1688/2 & P/13/0865/2	Anstey	Land North and South of Groby Road	Erection of 165 dwellings			15	55	91	40	40	11													
4	1171	457456	318328	P/05/2778/2	Barrow Upon Soar	Cotes Road	Erection of 360 dwellings and construction of associated access roads and parking areas and landscaping. (Reserved matters - outline planning permission P/04/0999/2).	40	10			0																
5	1122	458610	310311	P/13/0441/2	Birstall	North of Harrowgate Drive	Final Phases 3& 4					185	15	30	40	40	40	20										
5	1122	458610	310311	P/10/2187/2	Birstall	JELSONS PHASE 2	Erection of 111 dwellings and associated landscaping, highway and open spaces. Phase 2, Hallam Fields. (Reserved matters)		6	42	34	29	29															
5	1122	458610	310311	P/12/2096/2	Birstall	PERSIMMON HOMES AREA 2 Phase 2	Erection of 45 dwellings and associated works (Reserved Matters - Outline application P/00/2507/2 refers)			13	32	0																
6	1120	458962	310106	P/09/1571/2	Birstall	North of Harrowgate Drive Phase 1a WEST	Erection of 91 dwellings (83 houses and 8 flats)	47	23			0																
7	1120	459032	310253	P/03/2592/2	Birstall	North of Harrowgate Drive Phase 1b	Erection of 127 dwellings, internal site access roads, foot/cyclepaths, associated infrastructure, landscaping/amenity areas and play areas. (Reserved Matters P/00/2507/2 - Phase 1B).	10				0																
8	1122	458610	310311	P/10/1791/2	Birstall	Land North of Harrowgate Drive - Area 2 Phase 1 Persimmon Homes	Erection of 80 dwellings and associated parking with details of layout, siting, design and landscaping. (Reserved matters - outline P/00/2507/2 refers).	21	42	5	12	0																
9	1122	459070	310443	P/05/0184/2	Birstall	North of Harrowgate Drive Phase 1c Taylor Wimpey Phase B	Residual 43 of the 182 dwelling houses for Phase 1c, (now in Taylor Wimpey ownership)	1	26	17	5	0																
10	1120	459021	310395	P/09/2470/2	Birstall	North of Harrowgate Drive Phase 1c Taylor Wimpey Phase A	Erection of 39 dwellings, 6 maisonettes, 5 flats over garages and 9 apartments. (Reserved Matters - outline application P/00/2507/2 refers).	32	11	5	1	0																
11	1088	450570	321832	P/10/0415/2	Hathern	Loughborough Road	Erection of 58 dwellings with associated access, vehicle parking, public open space and surface water balancing ponds.	45	13			0																
12	1194	449821	321997	P/10/1580/2	Hathern	Shepshed Road	Site for the erection of residential development.		23	36	3	0																
13	1042	454033	319772	P/13/1800/2	L'borough	Cherry Tree Inn (PH) 2 Hume Street	Erection of 13 flats (5 x 1 bedroom and 8 x 2 bedroom).				13	0																
14	1012	454630	319441	Loughborough	LAND AT EMPRESS ROAD	LOCAL PLAN ALLOCATION						30													30			
15	1087	450776	320749	P/07/0991/2	Loughborough	Maxwell Drive	Erection of 38 dwellings. (Substitution of house types and 11 additional dwellings. Revised scheme P/07/0991/2 refers)	37	1			0																
16	1003	453527	316825	P/09/0868/2	Loughborough	Grange Park (Jelsons PHASE)	Erection of 133 dwellings		29	25	41	38	30	8														
17	1025	454274	319347	P/09/0425/2	Loughborough	Wharncliffe Rd/Great Central Road	Erection of 74 apartments and 27 dwellings with associated roads and open space.					50	25	25														

Project Reference: 3851.087

18	1026	454391	319570	P/12/2613/2	Loughborough	British Telecom Depot, Little Moor Lane, Loughborough, Leicestershire, LE11 1SF	Erection of 43 dwellings and associated works (Reserved matters - outline P/08/1325/2 refers).			10	33	0																		
19	1012	454586	319253	P/12/2130/2	Loughborough	Land adjacent to Windmill Road, Great Central Road, Empress Road and Moor Lane,	Erection of 38 dwellings to phase 1 and outline application for residential development and community building					100		25	50	25														
20	1015	453303	318928	P/11/1676/2	Loughborough	Beacon Road Playing Field	Erection of 41 dwellings with associated parking and landscaping, garage and driveway to no. 53 following demolition of 55 Beacon Road and Pavillion building. (Revised scheme - P/10/2362/2 refers)					40	12	28																
21	1003	453689	316886	P/09/0234/2	Loughborough	Grange Park (PHASE 5-10)	Site for residential development with recreational open space, local centre, linear park and road link to proposed Epinal Way extension. (48ha)		3	33	32	262	48	48	35	24	24	24	24	24	11								
22	1003	453871	316866	P/07/1524/2	Loughborough	Grange Park (Phase 4)	Erection of 102 dwellings and associated works (plots 401-502), including internal spine road. (Reserved matters - outline P/00/2078/2 refers).	32	26	5	15	2	2																
23	1071	454141	320540	P/09/0134/2 & P/14/1791/2	Loughborough	Land adj Gordon Road and Meadow Lane Loughborough Leicestershire	Erection of 21 dwellings. (Revised scheme P/13/1909/2 refers)	91				21	21																
24	1053	453748	319978	P/03/2984/2	Loughborough	The Rectory, Steeple Row	Demolition of dwelling and site for erection of 11 dwellings.					10	10																
25	1043	453630	319520	P/13/2402/2	Loughborough	Sital House 3 to 6 Cattlemarket Loughborough Leicestershire LE11 3DL	Conversion of office space into 10 flats (Prior Approval Notification)					10						10											
26	1156	458600	314160	P/09/1506/2	Mountsorrel	Former Factory, Linkfield Road,	Site for the erection of 46 dwellings	27	19			0																	
27	1169	456480	317180	P/11/0836/2	Quorn	Fenny Copse Farm, Meynell Road, LE12 8BG	Residential development for 125 dwellings, open space provision, car parking and vehicular access.		10	52	36	27	27																
28	1165	464827	314446	P/07/2604/2	Rearsby	Mill Road, Rearsby, Leicestershire, LE7 4YN	Erection of 29 dwellings, and conversion of farm buildings to form 6 dwellings, accommodation works to No's.25,27,31 & 33 Mill Road and upgrading of access (Revised scheme P/06/2928/2 refers)	13	19	3		0																	
29	1165	465004	314117	P/09/1434/2	Rearsby	Land off New Avenue	Site for the erection of 12 dwellings following demolition of workshop buildings.			2	10	0																	
30	1130	458882	312322	P/08/3152/2	Rothley	Temple Grange	Erection of 149 dwellings	58	41	15	1	0																	
31	1187	447756	319315	P/10/0994/2	Shepshed	Forresters Arms, Charnwood Road	Erection of 11 dwellings and associated works.	11				0																	
32	1167	460784	316621	P/10/1660/2	Sileby	Seagrave Road	Site for residential and mixed use development, including sports facilities and access. (Revised scheme - refusal P/10/0655/2 refers)			45	44	91	40	40	11														
33	1143	463493	311240	P/06/2180/2	Syston	Barkby Road Phase 1	Erection of 222 dwellings and associated open space. (Revised scheme - P/01/2462/2 refers).	36	17	28	26	11	11																
34	1137	462433	311591	P/08/2123/2	Syston	Land at Broad Street and St Peters Street, Syston, Leicestershire, LE7 1GJ	Erection of 14 dwellings with associated parking and access.					14		14															
35	1143	463493	311240	P/01/2462/2	Syston	Barkby Road Phase 1 North (w.davis)	Erection of 39 dwellings and associated works.		39			0																	
36	1135	463335	310867	P/01/2462/2	Syston	Barkby Road Phase 2 South	Erection of 69 dwellings.			10		0																	
37	1143	463549	311165	P/10/1155/2	Syston	Barkby Road (Ridgemere Centre site)	Erection of 41 dwellings		24	11	5	1																	
38	1107	461147	309475	P/04/3649/2	Thurmaston	10 Hadrian Road	Demolition of industrial building and site for erection of 24 flats in two blocks (2/3 storeys high) with access and car parking.					12						12											
39	1107	461150	309509	P/06/3772/2	Thurmaston	Garden Street	Erection of 18 (2xbedroom) apartments and associated parking and bin stores. (Reserved Matters P/05/3537/2 refers).					9						9											
40	1114	461671	308732	P/12/1768/2	Thurmaston	Auster Industrial Estate, Silverdale Drive	Erection of 44 dwellings and associated works.			44		0																	

41	1117	462257	309199	P/07/2182/2	Thurmaston	Rear 169-177 Colby Drive	Erection of 7 dwellings (P/12/2572/2).plus erection of 6 dwellings (P/13/2043/2).			2	7	4	4																		
42	1166	457894	317008		Barrow Upon Soar	Steelcraft and Always		28				0																			
42	1171	457963	317943	P/09/0928/2	Loughborough	42 Ashby Square, Loughborough, LE11 5AA	Erection of 5-storey student accommodation comprising of 1 x 4-bedroom, 1 x 3-bedroom, 8 x 1-bedroom, 7 x 5-bedroom, 3 x 6-bedroom, 1 x 2-bedroom cluster flats with commercial uses on the ground floor. (Revised scheme - refusal P/08/2878/2 refers)	21				0																	
43	1043	453442	319725	P/11/1213/2	Barrow Upon Soar	Land off Nursery Grove	Erection of 14 dwellings with associated works, public open space and extension of road		4			0																		
43	1056	452699	319895	P/08/1945/2	Loughborough	Rosebery County Junior School, Rosebery Street, Loughborough, Leicestershire, LE11 5DX	Change of use from school to 14 residential units. (1 x five-bed, 2 x one-bed, 3 x four-bed and 8 x three-bed) and provision of car parking, recreation space and bin and cycle stores. (Revised scheme - refusal P/07/3124 refers)		7			5		5															
44	1163	455414	316241	P/09/1095/2	Quorn	55 Chaveney Road	Demolition of dwelling and erection of 13 dwellings with access. (Revised scheme - refusal P/08/3100/2 refers)		6			0																		
45	1169	455346	316713	P/09/1340/2	Quorn	Land at 34 Woodhouse Road	Demolition of dwelling and erection of 12 dwellings with altered vehicular access (Revised scheme - withdrawn P/08/2507/2 refers).	2				0																		
46	1119	454259	308221	P/13/1519/2	Anstey	Land north of Groby Road	Erection of 30 dwellings - (Reserved matters - Outline application P/13/1519/2 refers)					30		10	20															
47	1111	455334	308844	P/13/1770/2	Anstey	2 - 10 Gladstone Street Anstey Leicestershire LE7 7BT	Erection of 10 flats (2.5 storey) following demolition of factory				10	0																		
48	1171	457314	318152	P/11/2540/2	Barrow Upon Soar	Strancliffe Hall, Cotes Road	Erection of 87 dwellings and associated access					87	30	30	27															
49	1171	457833	318297	P/13/1023/2	Barrow Upon Soar	Land at 95 Nottingham Road	Erection of 71 dwellings					71		10	50	11														
50	1170	458346	317242	P/10/1518/2	Barrow Upon Soar	Land at Melton Road	Site for residential development with associated access.					300		15	30	50	50	30	25	25	25	25	25							
51	1118	464082	306994	P/13/0209/2	Barkby	Land at Hamilton Lane, Hamilton, Leicester.	Site for the erection of up to 320 dwellings.					320		50	50	50	50	50	50	20										
52	1193	450006	322672	P/14/0256/2	Hathern	Land off Derby Road	Erection of 68 dwellings and associated works (Reserved matters - outline applications P/13/1343/2 refers).					68	28	40																
53	1004	454104	317604	P/12/2640/2	Loughborough	Land West of Allendale Road	Site for the erection of up to 130 dwellings with associated infrastructure to be accessed off Allendale Road.					80		40	40															
54	1174	454458	317854	P/12/2641/2	Loughborough	Land North of Ling Road	Site for the erection of up to 200 dwellings.					200	10	30	50	50	50	10												
55	1003	453105	316617	P/12/2301/2	Loughborough	Park Grange Farm Newstead Way Loughborough Leicestershire LE11 2FB	Creation/erection of 15 dwellings with associated works including various extensions to existing building.					15		15																
56	1002	452602	316928	P/11/2842/2	Loughborough	Land to south of Bramcote Road	Erection of 50 dwellings and associated garaging, parking and infrastructure, construction of access. Formation of open space and landscaping.				39	11	11																	
57	1155	457835	314194	P/10/2845/2	Mountsorrel	117 Boundary Road, Mountsorrel, Leicestershire, LE12 7EP	Erection of 5 dwellings and 6 self-contained apartments				5	6	6																	
58	1155	457415	314489	P/13/1008/2	Mountsorrel	Land at Halstead Road	ProposalSite for residential development of up to 200 houses with associated roads, landscaping, sports pitch and landscaped bund.					200		25	30	35	45	45	20											

Project Reference: 3851.087

59	1156	458499	314303	P/13/2164/2	Mount sorrel	Mountsorrel Day Centre Marsh Road	Site for demolition of day centre and erection of up to 14 dwellings.				14	7	7																
60	1169	455854	317395	P/13/2242/2	Quorn	Land at Beacon View Industrial Estate, Farley Way, Quorn, Leicestershire LE12 8RB	Site for the erection of up to 44 dwellings with access and associated works.			9	35	35																	
61	1163	455743	316623	P/11/1576/2	Quorn	8 Loughborough Road	Demolition of no.10 Loughborough Road and the construction of access road to serve 13 dwellings.			10	2	2																	
62	1153	458843	313893	P/11/1431/2	Rothley	Manor Holt, 1082 Loughborough Road	Erection of 14 dwellings with associated parking, garages, landscaping, and demolition of dwelling.			14	0																		
63	1130	458648	312259	P/12/1741/2	Rothley	Land at Brookfield Farm Hallfields Lane, Rothley Leicestershire LE7 7NF	Erection of 180 dwellings and erection of school with creation of associated sports pitches, changing facilities and access roads from Loughborough Road and Hallfields Lane.			51	132	40	30	30	20	12													
64	1153	458895	314158	P/11/2150/2	Rothley	Land at Linkfield Farm	Site for residential development of land for up to 45 dwellings with associated open space, access, infrastructure and landscape..				45				15	30													
65	1145	458512	313003	P/12/1740/2	Rothley	Rothley Church of England Primary School Mountsorrel Lane Rothley Leicestershire LE7 7PS	Demolition of school and erection of 16 dwellings with formation of new access.				16			16														
66	1141	459112	312656	P/11/1812/2	Rothley	Land off Cossington Lane Rothley Leicestershire LE7 7NA	Erection of 13 dwellings with associated access and landscaping.			13	0																		
67	1151	458618	313570	*P/12/2005/2	Rothley	Land off Mountsorrel Lane	Site for residential development for a maximum of 250 dwellings and construction of relief road (and public open space under ref no P/12/2456				250		25	30	40	50	50	30	25										
68	1187	446852	319328	P/13/0767/2	Shepshed	Land South of Tickow Lane Shepshed Leicestershire	Erection of 85 dwellings and associated works. (Reserved matters - Outline P/11/2697/2 refers).			24	61	35	26																
69	1182	447199	317743	P/13/0621/2	Shepshed	Land of Iveshead Road	Site for the erection of 66 dwellings with associated garages,				66		33	33															
70	1195	447705	320283	P/11/2724/2	Shepshed	Land adj to Oakley Road playing field	Residential development for up to 133 dwellings.				133		25	30	30	30	18												
71	1187	447522	318960	P/12/1997/2	Shepshed	Manheim Auctions Charnwood Road Shepshed Loughborough LE12 9NN	Site for the erection of up to 79 dwellings, 7 business units and formation of new vehicular access off Charnwood road and Anson Road.				79		30	30	19														
72	1158	460098	315076	P/12/1041/2	Sileby	4a The Maltings	Erection of 2x three storey extensions, change of use to create 21 dwellings and various other alterations.				21	16	5																
73	1158	460727	315171	P/14/0506/2	Sileby	Factory Site, Ratcliffe Road/Cemetary Road	Erection of 24 dwellings.				24	24																	
74	1167	460976	315971	P/12/2235/2	Sileby	Land off Seagrave Road	Site for the erection of up to 135 dwellings.				135	25	35	35	40														
75	1158	461283	315467	P/10/1772/2	Sileby	Land adj to 6 Stanage Road,	Erection of 76 dwellings with associated roads and landscaping.			25 33	18	18																	
76	1143	463550	310830	P/13/0925/2	Syston	220 Barkby Road	Site for the erection of up to 149 dwellings with associated landscaping, public open space, infrastructure and access.				148	40	40	50	18														
77	1117	462111	308649	P/11/2357/2	Thurmaston	Plots 1 to 11 Land of Colby Drive (Rear of 53-55) Thurmaston Leicestershire LE4 8LD	Erection of 11 dwellings with associated garages. (Revised scheme - P/11/1083/2 refers) plus P/13/2345/2 Erection of three dwellings			8 3	3	3																	
78	1112	461251	308875	P/12/0558/2	Thurmaston	Lonsdale Road, Thurmaston	Demolition of public house and erection of 11 houses, 2 bungalows and 4 flats with two access routes off Lonsdale Road.			16	0																		
79	1183	459923	323699	P/12/2117/2	Wymeswold	Land north of Rempstone Road	Site for the erection of up to 32 dwellings.				32	5	27																

Project Reference: 3851.087

80	1161	453139	314212	P/11/0764/2	Wood house Eaves	Forest Rock Garage 7A Church Hill LE12 8RT	Demolition of garage and other commercial buildings and erection of 11 dwellings, access road and car parking		7	4	0																			
81	1157	464659	313640	P/13/1369/2	East Goscote	Former Rearsby Roses Limited Melton Road East Goscote Leicestershire LE7 4YP	Erection of 60 dwellings. (Reserved Matters - Outline application P/12/1709/2 refers)			27	33	33																		
82	1144	463089	312360	P/13/1696/2 & P/13/1613/2	Queniborough	Land at Queniborough Lodge 1446 Melton Road Queniborough LE7 3FN	Site for the erection of 125 dwellings following demolition of industrial buildings and P/13/1613/2 conversion of outbuildings to form seven dwellings.				132			25	40	40	27												
83	1171	458084	317943		Barrow Upon Soar	Residual of Allocation LAND OFF NOTTINGHAM ROAD	LOCAL PLAN ALLOCATION.				10													10					
84	1111	455035	308567	P/05/3778/2	Anstey	Between 1 & 3 Latimer Street and 10a and 16 Bradgate Road	Conversion of factory buildings and erection of new buildings to form 17 2-bedroom apartments. - Construction stalled				12													12					
85	1109	454761	307515	P/13/2510/2	Anstey	Land adj to Gynsill Court	Detail				57			7	25	25													
93	1109	454630	307436	P/13/2263/2	Anstey	Gynsill Court Mews Gynsill Lane	Site for residential development for up to 40 dwellings.				40				10	30													
94	1111	455410	309704	P/14/0428/2	Anstey	Fairhaven Farm, Land off Cropston Road	Site for residential development of up to 160 dwellings, public open space and various other associated works.				160					40	40	30	25	25								
95	1111	455759	309612	P/13/2340/2	Anstey	Land off Cropston Road	Land off Cropston Road				70				10	30	30												
96	1103	463543	308206	P/13/2498/2	Thurmaston	North East of Thurmaston SUE	- Outline permission for Sustainable Urban Extension (SUE) of up to 4500 dwellings, up to 13ha of employment land, two local centres, one district centre, one food store, reserved land for traveller site, school and healthcare facilities, allotments, ope				4,500		25	175	250	300	300	325	325	325	325	300	300	300	420	415	415
97	1169	454638	317987	P/14/0242/2	Loughborough	Land off Lodge End	Site for residential development (1.61ha) and creation of access.				35		10	25														
98	1077	453910	320778	P/14/0229/2	Loughborough	Land at junction of North Road and Meadow Lane Loughborough Leicestershire LE11 1LE	Erection of 22 dwellings and 4 flats.			13	13	13																
99	1004	453853	318012	P/14/0712/2	Loughborough	Former Shelthorpe House Farnham Road	Erection of 20 dwellings, access and associated infrastructure.				20			20														
100	1006	453964	318203	P/14/0693/2	Loughborough	Land at Charnwood Club Shelthorpe Avenue Loughborough Leicestershire LE11 2ND	Demolition of existing buildings, erection of 11 dwellings, 8 self contained apartments and associated works.				19	19																
101	1144	464386	312070	P/14/0708/2	Queniborough	Land off Barkby Road	Site for the erection of up to 165 dwellings including access and associated works.				165		30	40	40	40	15											
102	1144	463520	311961	P/14/0393/2	Queniborough	Land off Millstone Lane Queniborough Leicestershire	David Wilson Erection of 101 dwellings with associated works and creation of cemetery.				101	25	40	36														
103	1145	457690	313409	P/14/0058/2	Rothley	Land off West Cross Lane	Site for residential development of up to 130 dwellings.				130		30	30	30	30	10											
104	1189	448507	320307	P/14/1687/2	Shepshed	Land off Hathern Road	Site for the erection of up to 270 dwellings. (Revised scheme P/13/1641/2 refers				270		30	40	40	40	40	40	40									
105	1191	446612	318947	P/13/1826/2	Shepshed	Land off Tickow Lane	Site for the erection of 380 dwellings with associated landscaping, public open space and access from Tickow Lane.				380		30	40	40	40	40	40	40	40	40	30						
106	1195	447563	320062	P/13/1838/2	Shepshed	Land at Oakley Road & Hallamford Road	Site for the erection of approximately 33 dwellings with associated				33		15	18														
107	1191	447373	319879	P/14/1604/2	Shepshed	Land off Tickow Lane	Outline application for up to 180 dwellings with associated access.				180		30	40	40	40	30											

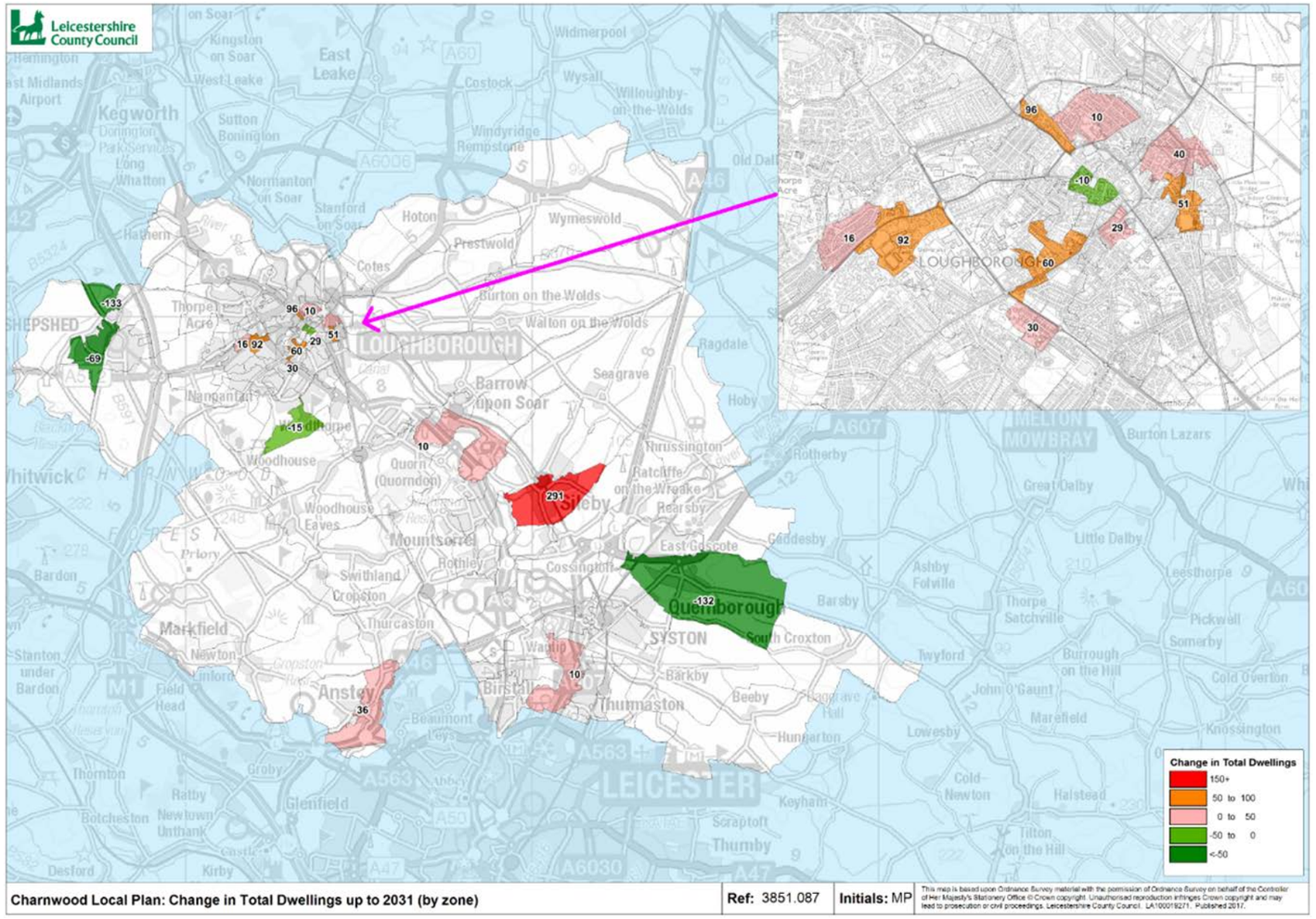
Project Reference: 3851.087

108	1158	460034	315047	P/14/1590/2	Sileby	Rear of the The Maltings site High Street	Site for residential development and associated access.					10			10														
109	1190	449699	321277	P/14/1833/2 pending	Loughborough	West of Loughborough SUE	Outline planning permission for residential development up to 3,200 dwellings; up to 16 ha of employment land of B1/B2 and B8 uses; a mixed-use Community Hub of up to 4 ha comprising a local convenience retail unit (2,000 sqm); up to 1,000 sqm of other A1 retail, A2 financial and professional services, A3 food and drink, B1 business and D1 uses, sites for Gypsy, Travellers and Travelling Show people provision totalling 1 ha; 2 primary schools up to 2 ha each; strategic open space including allotments; access roads and new Strategic Link Road; open space/landscaping and associated works; principal means of access; restoration of Garendon Park and assets; all other matters to be reserved.					3,200		40	120	120	240	240	240	240	240	240	240	240	240	255	255	250
110	1125	458639	310936		Birstall	Direction of Growth North of Birstall	Core Strategy Allocation					1500			75	110	120	130	130	130	130	130	130	130	80	75	
						LARGE TOTAL		**586**	**407**	**498**	**629**	**14714**	**739**	**1091**	**1391**	**1222**	**1396**	**1180**	**954**	**894**	**796**	**760**	**725**	**670**	**722**	**755**	**745**	**665**

Project Reference: 3851.087

Amendments to Core made post-proposal, detailed in Option Testing report (13/11/18)

Changes in Total Dwellings by Zone to Account for Minor Residential Development



Amendment of SUE Planning Trajectories for 2036 Amended Core

SUE	Modelled	Projected	Difference
Broadnook	1,500	1,650	150
North-East of Leicester	4,500	3,720	-780
West of Loughborough	3,200	2,510	-690
Total	**9,200**	**7,880**	**-1,320**

Uplift of SUE Trip Rates for 2036 Amended Core to match Transport Assessment Trip Ends – Additional Trips

SUE	Trips			
	AM In	AM Out	PM In	PM Out
Broadnook	446	512	575	214
North-East of Leicester	349	207	306	300
West of Loughborough	311	98	116	238
Total	***1,106***	***817***	***997***	***752***

11.5. APPENDIX E: Employment Development Included in LLITM

Ref	Easting	Northing	Planning application	Parish	Address/ Location	Details	Site area	Available	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	Total TO 31ST March 2028	Post 2028	Notes / Assumptions
1	**453810**	**319678**	**P/13/2157/2**	**Loughborough**	53 - 55 Baxter Gate including Former General Hospital Loughborough Leicestershire LE11 1TH	**Erection of buildings for D2 (cinema - 8 Screen 1118 seats) and A3/A4 (Restaurant/Bar) use. Change of use of 53/54 Baxter Gate to A3/A4 and B1 use (Restaurant/Bar/Office) with associate works. 7 Restaurants**	0.78ha	0.78ha	0.78ha													**0.78ha**	**0.00**	Under construction due to finish before Easter 2016. 8 Class A3/A4 units ranging in size of between 131 sq m and 463 sq m (GIA).
2	**449458**	**320522**	**P/14/1833/2**	**Loughborough**	West Loughborough SUE	**Outline planning permission a mixed-use Community Hub of up to 4 ha comprising a local convenience retail unit (2,000 sqm); up to 1,000 sqm of other A1**	3000sqm	3000sqm														**3000.00**	**0.00**	
3	**451903**	**320074**	**P/15/0200/2**	**Loughborough**	The Maltings, Knightthorpe Road, Loughborough, Leicestershire, LE11 4JX	**Erection of buildings for class B1, B2 and B8 use and associated estate works. (Reserved Matters P/03/2529/2, revised scheme P/04/2113/2 refers).**	259sq.m	259sq.m	259sq.m													**259sq.m**	**0.00**	
4	**458671**	**311088**		**BIRSTALL/ROTHLEY**	Broad Nook Garden Suburb, Rothley	**Core Strategy Allocation**	1,000 to 2,000sq.m							1000sq.m	1000sq.m							**2,000sq.m**	**0.00**	
5	**462626**	**308665**	**P/13/2498/2**	**Thurmaston**	North East of Leicester SUE	**Outline permission for Sustainable Urban Extension (SUE)two local centres and one district centre (Use Classes A1 - A5, B1, C1, D1 and D2 and including a food-stores (one, up to 4,500sqm gross) with associated car parking);**	20,000sq.m	20,000sq.m			500	1,500	2,000	4,500	2,000	2,000	1,500	1,500	1,500	1,500	1,500	**20,000sq.m**	**0.00**	
6	**453618**	**316862**	**P/09/0233/2**	**Loughborough**	Land off Haddon Way, Grange Park, Loughborough	**Local centre comprising flats over shops, place of worship, health centre, community hall and associated parking.**	0.5ha	0.5ha					0.25	0.25								**0.50**	**0.00**	1.0ha set aside for a local centre of which 0.5ha to be for shopping and other commercial use.
7	**458853**	**310304**	**P/13/0499/2**	**Birstall**	Local Centre Site Hallam Fields Road Birstall Leicestershire	**Erection of 60 bed care home, day nursery, 4 retail units(541sqm), 5 residential units. (Outline application - P/00/2507/2 refers)**	541sqm	541sqm				541										**541sq.m**	**0**	

11.6. APPENDIX F: Highway Infrastructure Included in LLITM

Details originally supplied in project proposal (24/09/18)

Location	Scheme Name	Timescale	First Forecast Year
Loughborough	Loughborough Integrated Transport Scheme – does not include LIRR as this was in place by April 2014 but includes remaining parts of the scheme, i.e. old A6 closure and junction improvements	2013	2016
Cotes	A60 Nottingham Road/Loughborough reduction of speed limit traffic calming features	2016	2016
Loughborough	A512 widening B591 to M1 J23, improvements to J23 and completion of dualling thereafter to either Snell's Nook Lane or Epinal Way junction	2016 - 2021	2021
Loughborough	West of Loughborough Development Link	2021 - 2026	2026
Charnwood	Mountsorrel Lane, Rothley Link Road	2021	2021
Charnwood	A512 junction improvements	2016 - 2019	2021
North East of Leicester	North East of Leicester Development Network	2023	2026
Charnwood	A6 Loughborough Road bus lane and parking controls	2016	2016
Leicester City	East of Hamilton development improvements	2016	2021
North West Leicestershire	M1 J22	March 2016	2016

Amendments to Core made post-Option Testing report, detailed in Mitigation Testing report (26/04/19)

Location	Scheme Name	Timescale	First Forecast Year
Leicester City	A46/Anstey Lane Growth and Housing Fund	2019-2021	2021

12. ADDENDUM (May 2019)

12.1. Background

12.1.1. After the issue of the Draft Report (v0.2), Highways England requested a number of further modelling runs to be undertaken to assist with analysis. These additional runs are detailed in Table 12-1 below:

ID	Demand	Network
1(a)	Core	Low Growth Mitigation
1(b)	Core	High Growth Mitigation
2	Core	Core + A46 Link Capacity Mitigation
3(a)	Option 5	High Growth Mitigation without A46 Link Capacity
3(b)	Option 6	High Growth Mitigation without A46 Link Capacity
3(c)	Option 7	High Growth Mitigation without A46 Link Capacity

Table 12-1: Details of Additional Model Runs

12.1.2. Since these modelling runs were completed, a meeting between the client and relevant stakeholders indicated that further reporting on run 1(a) (AM and PM Peak) would be useful to be included in this report.

12.2. Additional Run: ID 1(a) – Low Growth Mitigation Network with Core Demand

12.2.1. The purpose of this additional run, which consists of the Core demand loaded onto the Low Growth mitigation highway network, is to develop a better understanding of whether mitigation at the identified junctions (see Table 2-1 and Figure 2-1) would be sufficient to resolve Core scenario (background growth) issues at locations where the network is already at/over-capacity.

12.2.2. The following performance metrics have been assessed with regards to this additional modelling:

- Link flow difference (Figure 12-1, Figure 12-2)
- Link delay difference (Figure 12-3, Figure 12-4)
- Junction volume/capacity category changes (Figure 12-5, Figure 12-6)
- Node delay difference (Figure 12-7, Figure 12-8)
- Key junction analysis (Loughborough, Shepshed, Syston, A46, ODDR) (Figure 12-9, Figure 12-10, Table 12-2)
- AoI summary statistics (Table 12-3)

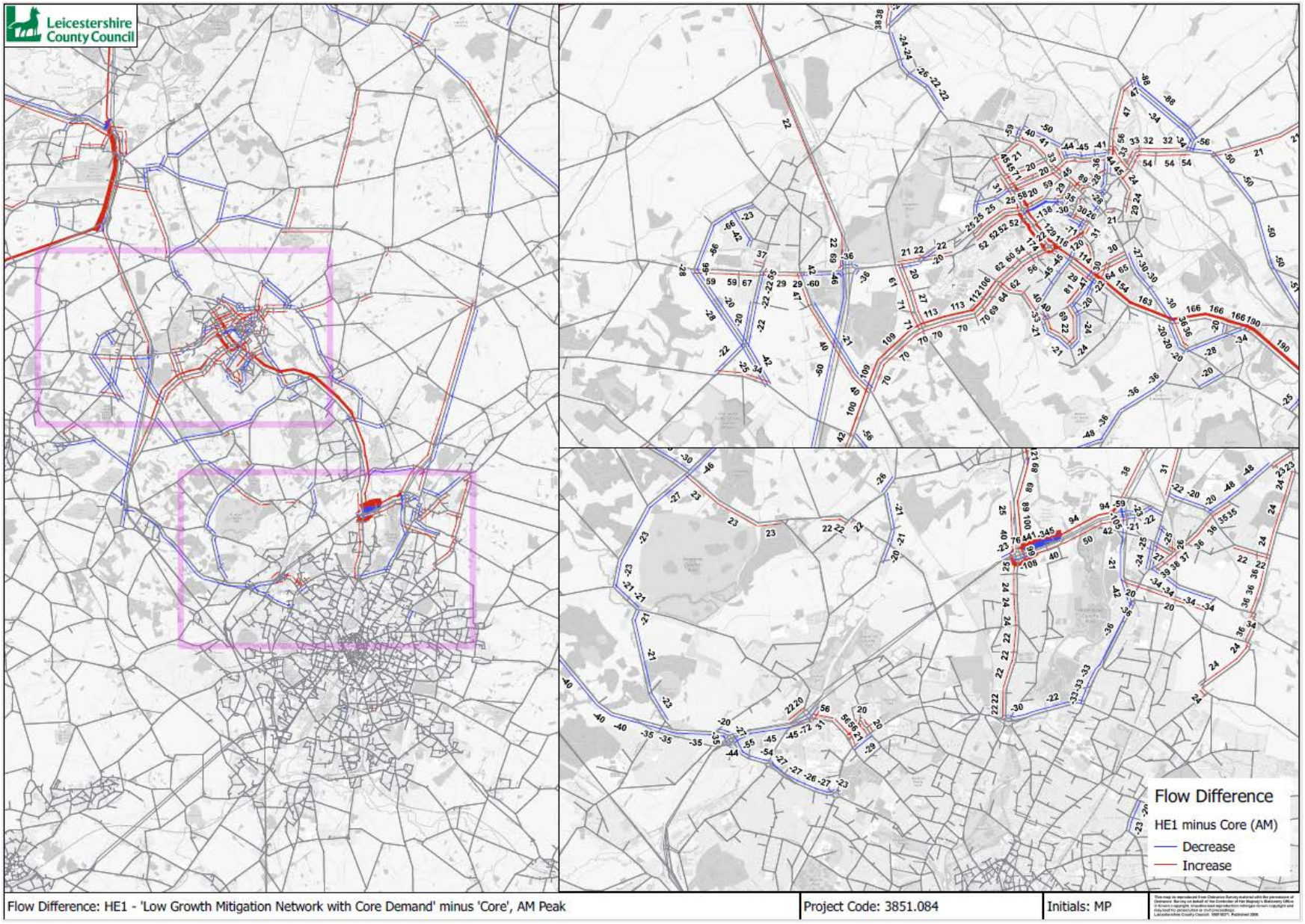


Figure 12-1: Flow Difference Plot, HE1(a) minus Core (AM Peak)

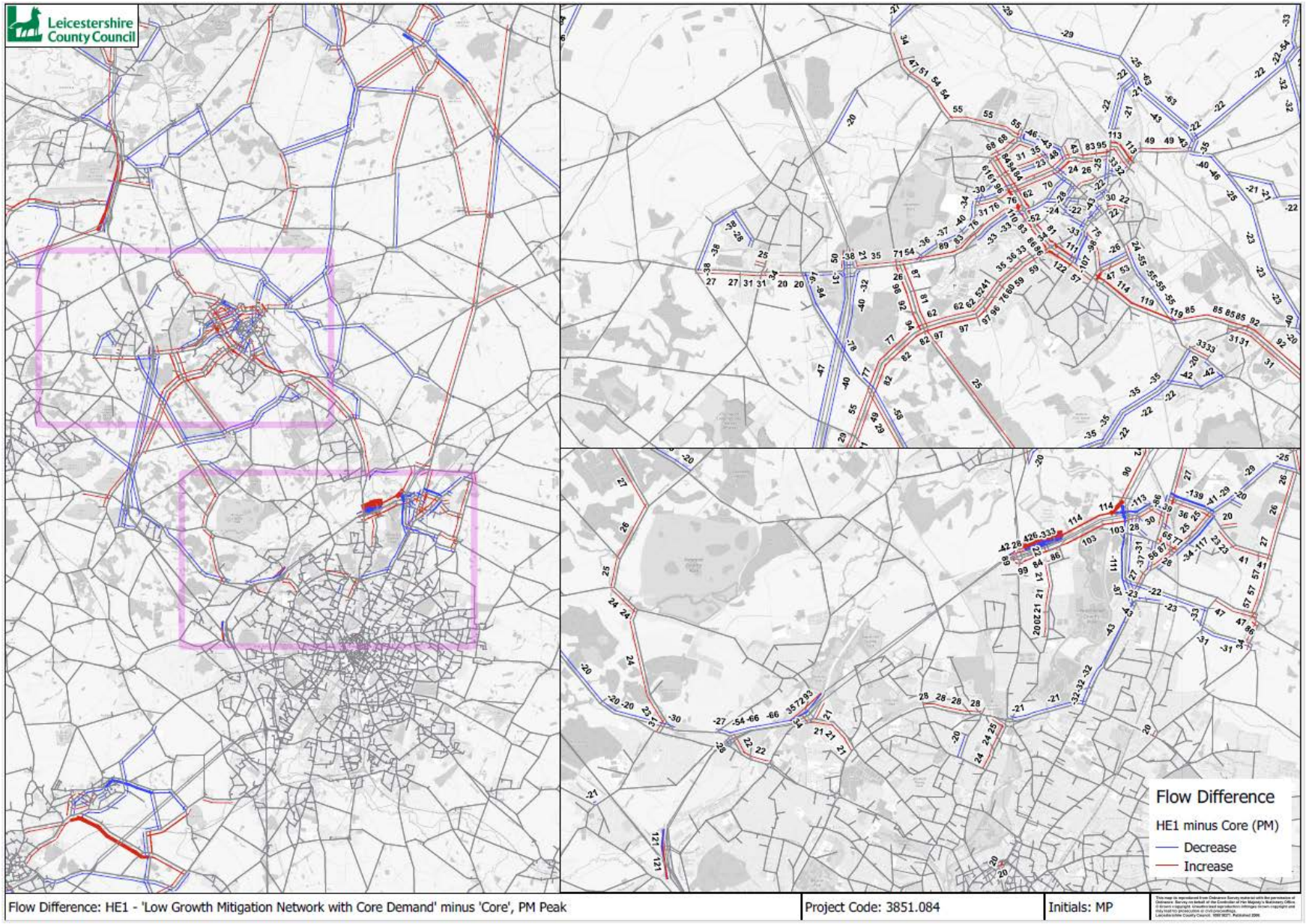


Figure 12-2: Flow Difference Plot, HE1(a) minus Core (PM Peak)

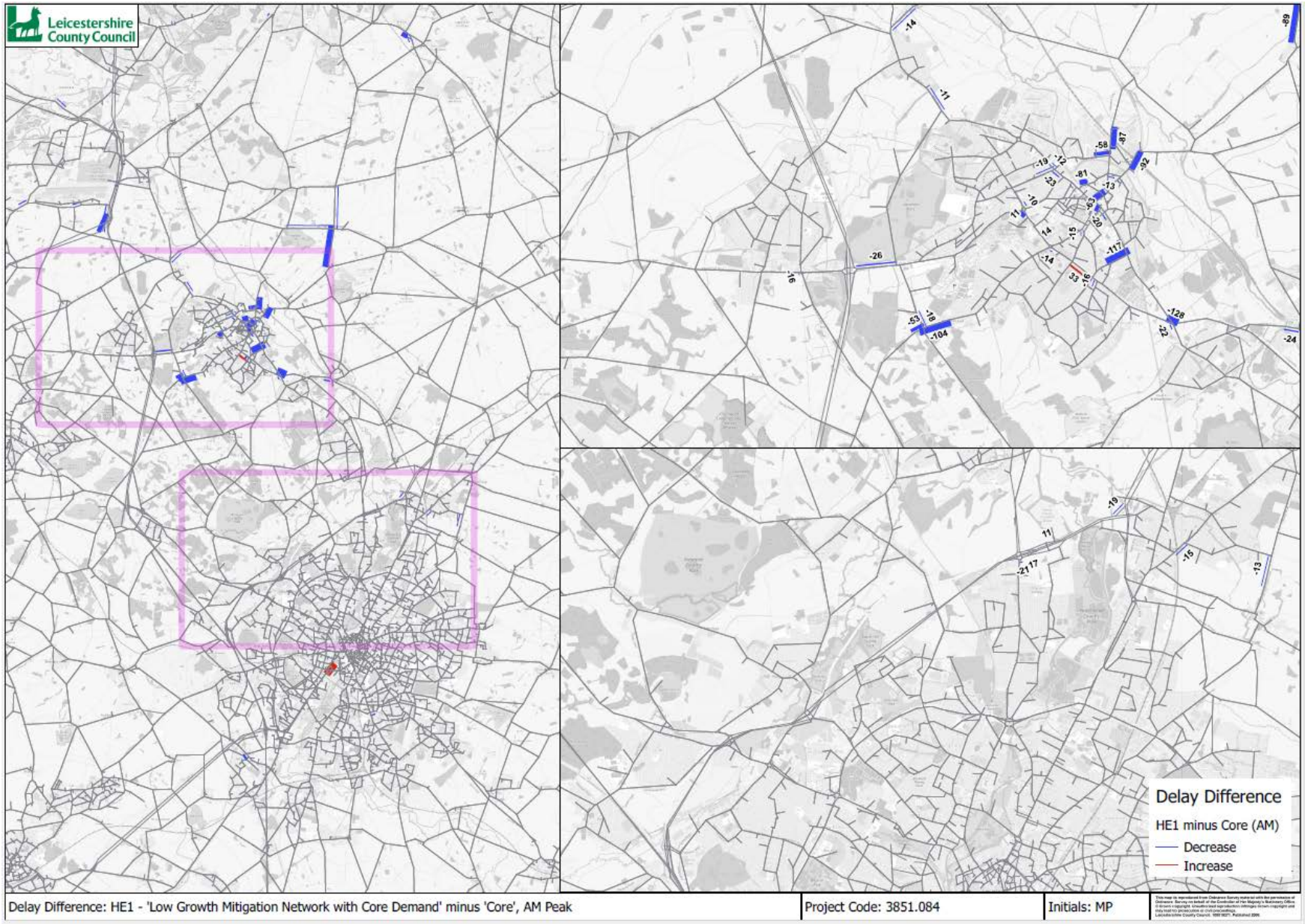


Figure 12-3: Link Delay Difference Plot, HE1(a) minus Core (AM Peak)

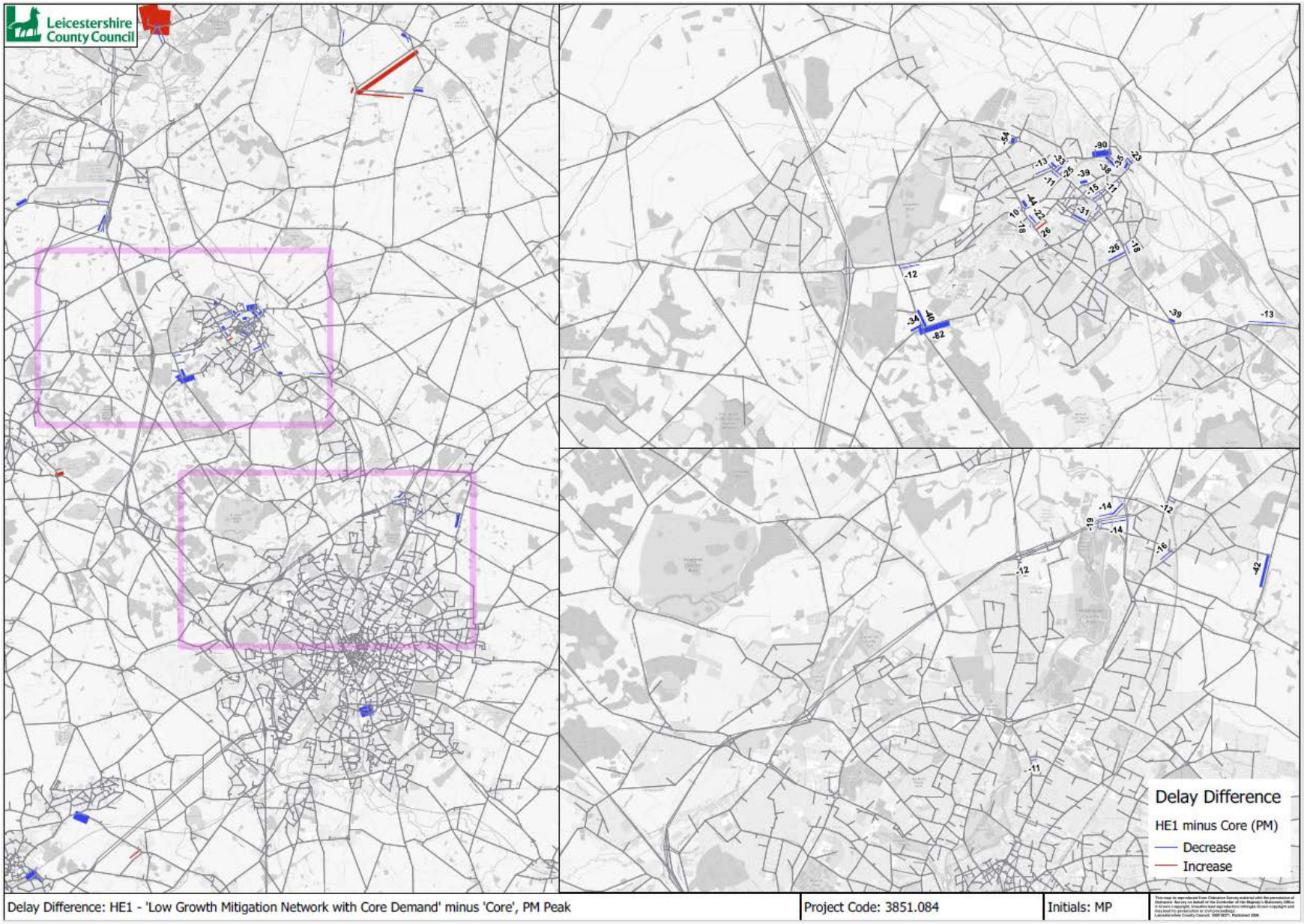


Figure 12-4: Link Delay Difference Plot, HE1(a) minus Core (PM Peak)

Figure 12-5: Volume/Capacity Category Change, Core vs HE1(a) (AM Peak)

Figure 12-6: Volume/Capacity Category Change, Core vs HE1(a) (PM Peak)

Figure 12-7: Node Delay Difference Plot, HE1(a) minus Core (AM Peak)

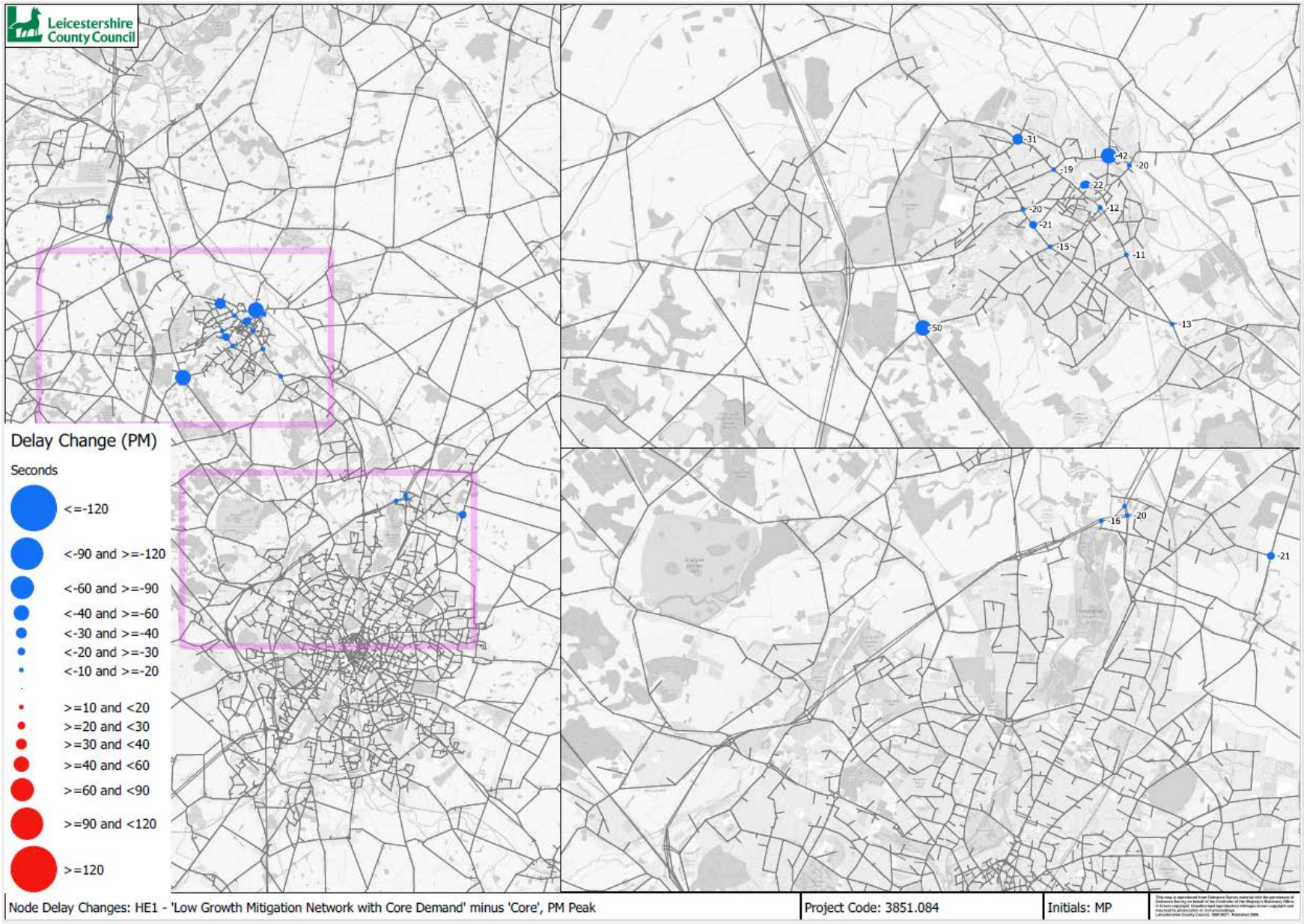


Figure 12-8: Node Delay Difference Plot, HE1(a) minus Core (PM Peak)

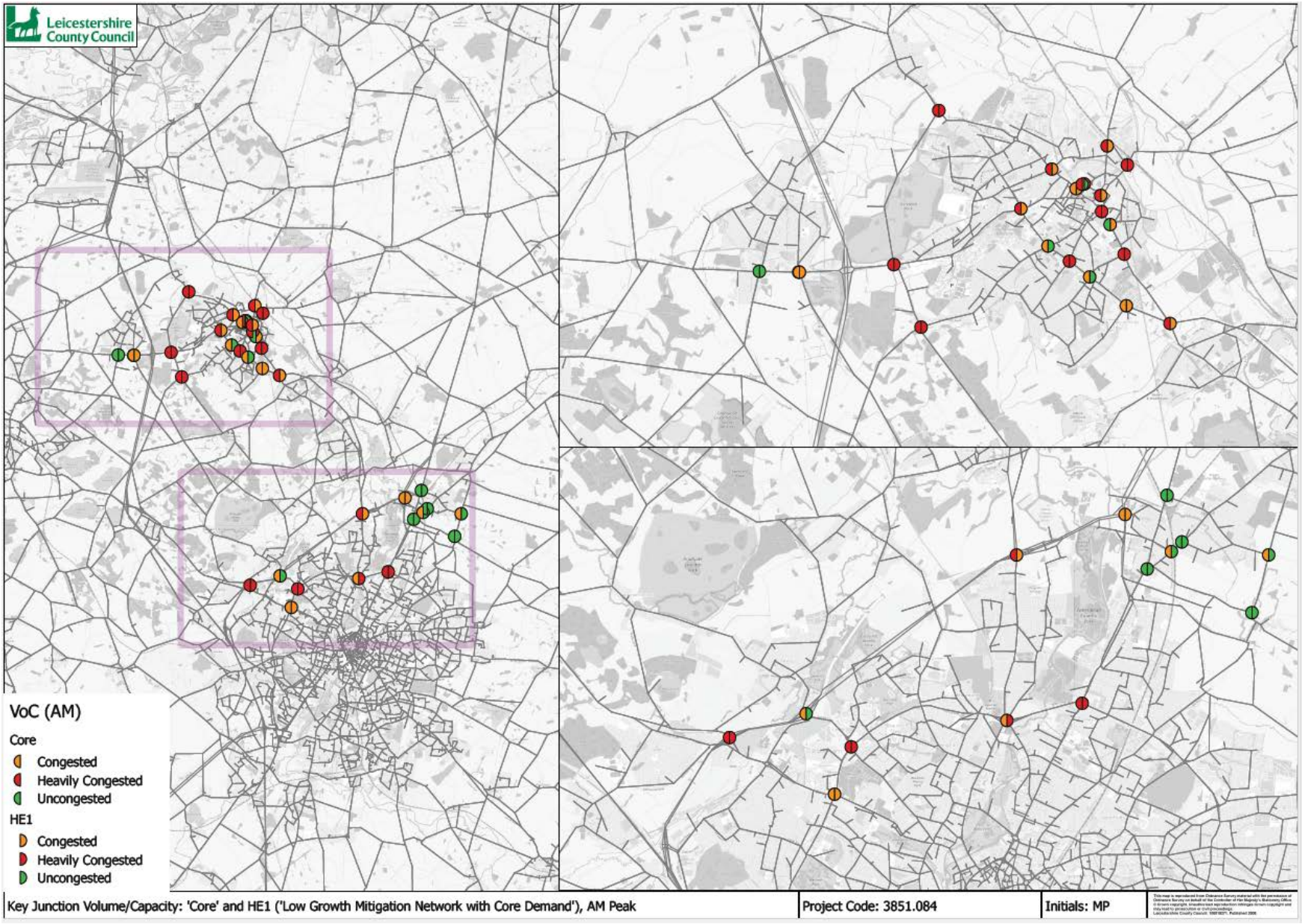


Figure 12-9: Key Junction Volume/Capacity, Core vs HE1(a) (AM Peak)

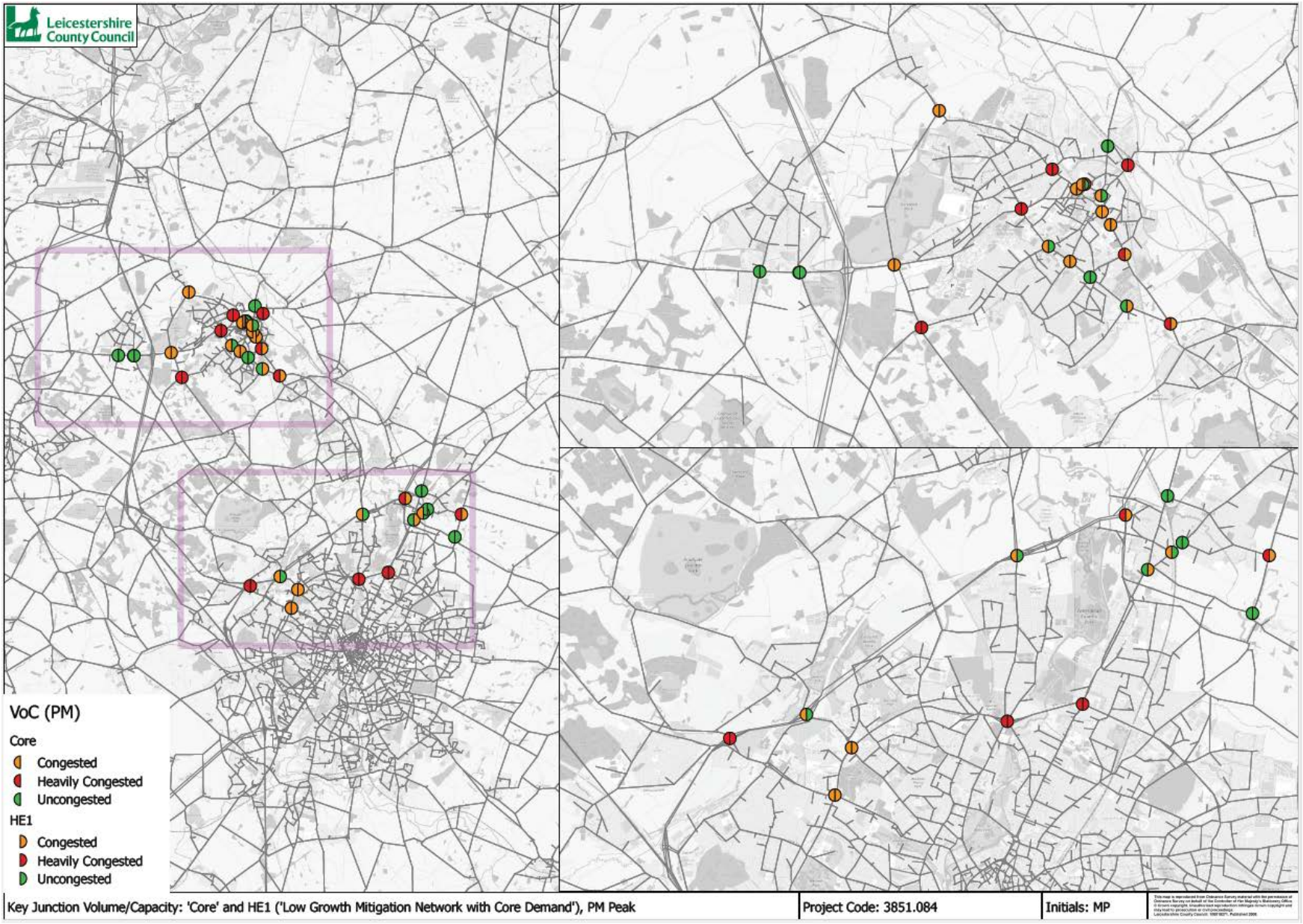


Figure 12-10: Key Junction Volume/Capacity, Core vs HE1(a) (PM Peak)

Leicestershire County Council

Junction	Area	Core_AM	HE1(a)_AM	Core_PM	HE1(a)_PM
A6/WoLSUE North	Loughborough	102	102	96	96
A512/WoLSUE South	Loughborough	105	103	90	94
Nanpantan Rd/Snell's Nook Ln	Loughborough	106	104	103	102
A6/A6004 (Quorn)	Loughborough	107	99	101	90
A60/Station Boulevard	Loughborough	107	103	100	100
Meadow Ln/Station Boulevard	Loughborough	103	98	79	67
A6004/Allendale Rd	Loughborough	86	86	84	85
A6004/Park Rd/Shelthorpe Rd	Loughborough	89	67	79	64
A6004/Beacon Rd	Loughborough	100	102	85	90
A6004/Forest Rd	Loughborough	94	80	90	81
A6004/A512	Loughborough	102	97	101	100
A6/Alan Moss Rd/Belton Rd	Loughborough	100	87	101	100
A6/Shelthorpe Rd	Loughborough	102	100	101	86
A6/A60 (New King St)	Loughborough	84	85	98	99
A6/Southfield Rd	Loughborough	104	102	99	98
A6/Baxter Gate	Loughborough	103	88	87	76
A6 Bridge St/Fennel St	Loughborough	103	101	101	100
A6 (Bridge St)	Loughborough	101	60	99	79
A6/The Rushes	Loughborough	90	92	98	99
A512/Iveshead Rd/Charnwood I	Shepshed	78	66	73	70
A512/Leicester Rd	Shepshed	73	62	81	69
A512/Ingleberry Rd	Shepshed	95	91	82	71
Fosse Way/High St	Syston	64	46	83	75
Queniborough Rd/Barkby Rd	Syston	86	75	100	93
Melton Rd/Goode's Ln	Syston	49	41	77	59
Melton Rd/Wanlip Rd	Syston	99	81	98	84
Melton Rd/Fosse Way	Syston	77	78	78	85
Queniborough Rd/Main St	Syston	49	49	43	50
Hobby Horse	A46	98	90	100	95
A46/A6	A46	100	98	94	84
A46/Anstey Ln	A46	93	81	94	81
A46/A50	A46	102	102	101	101
A50/ODDR	ODDR	94	94	94	95
Anstey Ln/ODDR	ODDR	101	101	92	93
Red Hill Circle	ODDR	99	100	100	100
ODDR/Melton Rd	ODDR	101	101	100	100

Table 12-2: Core and HE1(a) Volume/Capacity Values for Key Junctions

Scenario	AM PEAK				PM PEAK				COMBINED			
	Over-Capacity Queues (pcu.hrs)	Total Travel Time (pcu.hrs)	Total Travel Distance (pcu.kms)	Avg Speed (kph)	Over-Capacity Queues (pcu.hrs)	Total Travel Time (pcu.hrs)	Total Travel Distance (pcu.kms)	Avg Speed (kph)	Over-Capacity Queues (pcu.hrs)	Total Travel Time (pcu.hrs)	Total Travel Distance (pcu.kms)	
Core	987.9	34,250.3	1,472,955.0	43.0	507.9	32,550.2	1,448,974.3	44.5	1,495.8	66,800.5	2,921,929.3	
HE1(a)	803.7	33,948.6	1,476,859.1	43.5	433.5	32,285.0	1,449,314.7	44.9	1,237.2	66,233.6	2,926,173.8	
%Diff	*-19%*	*-1%*	*0%*	*1%*	*-15%*	*-1%*	*0%*	*1%*	*-17%*	*-1%*	*0%*	
Abs Diff	*-184.2*	*-301.7*	*3,904.1*	*0.5*	*-74.4*	*-265.2*	*340.4*	*0.4*	*-258.6*	*-566.9*	*4,244.5*	

Table 12-3: Core vs HE1(a) – Summary Statistics

13.Contact Details

We trust that our report meets your expectations and look forward to working with you again soon.

If you have any questions please do not hesitate to contact:

Tom Baker
Framework Manager
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