South Leicestershire Joint Transport Evidence

Stage 2: Final Draft v3.2

Leicestershire County Council

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Delivering a better world

Quality information

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1. Introduction

Context

1.1. AECOM has been commissioned to support the development of a Joint Transport Evidence (JTE) base for the forthcoming Local Plan reviews for Blaby District Council (BDC), Harborough District Council (HDC), Hinckley and Bosworth Borough Council (HBBC) and Oadby and Wigston Borough Council (OWBC). The development of the evidence base is being supported by Leicestershire County Council (LCC).

1.2. Work to date has been undertaken in two stages:

- Stage 1 completed in September 2024, involved an assessment of three growth options, reflecting the combined emerging Local Plans being prepared by each of the four districts/boroughs. The assessment looked at the scale, nature and distribution of forecast impacts, including cross-boundary issues external to South Leicestershire. Findings from Stage 1 informed the selection of a Preferred Spatial Growth Option, compiled by the four partner districts and boroughs (with technical support and coordination from LCC). The findings from Stage 1 are set out in report 'South Leicestershire Joint Transport Evidence Stage 1 Report v4' (January 2025).
- Stage 2 involved an assessment of the Preferred Spatial Growth Option, determined by the partner districts/boroughs. This included an assessment of forecast issues similar to that undertaken in Stage 1 but with further work to develop a view on the potential strategic mitigation needs arising from growth, plus testing of the success of mitigation packages to address forecast impacts using transport modelling. The Stage 2 outputs provide an evidence base for the Local Plan submissions and a longer-term perspective on the impact of growth on large sites, which have the capacity to deliver homes and jobs beyond the Local Plan horizon of 2041.

1.3. This report presents the Stage 2 findings.

Stage 2 Report Objectives

1.4. Stage 2 has the following objectives:

- To provide a robust assessment of the potential cumulative impacts arising from the Preferred Spatial Growth Strategy in South Leicestershire, including cross-border impacts, to inform Local Plan evidence bases.
- At a high-level, to identify a range of potential strategic transport interventions, with a focus on sustainable measures, which could address issues seen across South Leicestershire.

- To consider the potential phasing for mitigation (to 2036, to 2041, and to full build out) and to propose packages of proportionate mitigation measures to address the impacts identified.
- To determine the effectiveness of the mitigation packages to inform thinking on the phasing of mitigation and give pointers on the deliverability of proposed longer-term strategic development sites.

1.5. The Stage 2 report will inform the ongoing development and delivery of the County's Local Transport Plan 4 and support discussions with key transport stakeholder such as Midlands Connect (Sub-National Transport Body) and National Highways.

Scope

1.6. The scope of work is shaped by the following points:

- **Latest and emerging guidance and policy:** The study has been informed by national transport policy guidance such as Department for Transport's (DfT) Circular 01/2022, which emphasises investment in sustainable forms of travel before highway capacity; the updated the National Planning Policy Framework (NPPF); and LCC's now adopted Local Transport Plan 4 (LTP4) Core Document which highlights amongst other things the importance of sustainable modes and mode choice. Key to the updated NPPF is the shift away from a 'predict and provide' approach to transport strategy and delivery, whereby investment in transport seeks to increase capacity of the network to accommodate the forecast growth in trips; to a 'vision-led' one, whereby investment in transport provision is made to deliver agreed beneficial outcomes for communities and the economy.
- **PRTM used to forecast transport impacts:** In terms of modelling, LCC's Pan Regional Transport Model (PRTM) v1.2 was used. There were three forecast years for the Preferred Spatial Growth Option scenario: 2041, as the Local Plan horizon year; 2051, as a representative year for when large sites will be fully built out; and 2036 as a shorter term forecast part way through the Local Plan period.
- **Assessment of cumulative impacts and sub-area impacts:** Stage 2 applies much of the same approach as Stage 1 in that it identifies strategic interventions required to mitigate the cumulative impacts of the combined Preferred Development Scenario. Whereas Stage 1 looked at the wider South Leicestershire area, Stage 2 places a stronger focus on sub-areas - where there are significant combined issues across a related geographical area. Similar to Stage 1 there is no reporting on site-specific mitigation needs. Cross border issues are a focus of this assessment, recognising that the proposed growth has the potential to generate significant impacts on the highway network beyond the boundary of South Leicestershire, for example in the City of Leicester (the administrative district governed by Leicester City Council).
- **Identify strategic mitigation proportionate to local plan growth needs:** The mitigation schemes put forward to address the key issues arising from growth are to be strategic, rather than site-specific or smaller scale measures. They are developed at a high-level and therefore do not

include detailed proposals. Previous work was drawn upon to inform the analysis and mitigation proposals including the Strategic Growth Plan – Strategic Transport Assessment, Stage 1 undertaken by LCC on behalf of the Leicester and Leicestershire Strategic Planning Partnership.

- **Mitigation measures on the Strategic Road Network (SRN) are included** in the scope of Stage 2 but only for the post-2041 package. There is limited funding to deliver capital works for SRN improvements over the next circa ten years, as confirmed by National Highways during Stage 1 consultation. The Stage 2 work will be part of the local plan evidence base and therefore the focus of mitigation should be on providing solutions to address impacts arising from new growth not existing issues and be proportionate in scale. However, the work also the considers the need for strategic scale interventions at points on the SRN to address pre-existing problems and support further growth on large sites, which have capacity to grow beyond post 2041 and form part of the longer term spatial plans for housing delivery.
- The scope involves modelling the mitigation packages and assessing their effectiveness by changes in model metrics. The testing of the mitigation packages will give some indication of how the mitigation could be refined. However, **the scope of work does not allow for revision to the mitigation package nor retesting once changes to the mitigation packages have been made**.
- The work **does not report on mitigation needs at a district /borough level nor provide a view on site-specific mitigation needs,** which is required for the Local Plan evidence bases and set out in the Infrastructure Delivery Plan. Further work would need to be undertaken to identify additional complementary local / site specific interventions required to support growth. As such the transport mitigation packages proposed in this report does not provide a full list of interventions required to support the cumulative growth across South Leicestershire.
- This report does not include an assessment of the costing of mitigation packages.

Approach

1.7. The approach to this work involved the following steps:

- Forecast modelling of the Preferred Spatial Growth Option scenario using LCC's PRTM.
- Analysis and interpretation of model outputs, the comparing of the forecast Local Plan Preferred Spatial Growth Option scenario to the Core scenario. The analysis identified where impacts are forecast to arise, and the scale of these impacts and reasons.
- Assessment of the need for mitigation and identification of potential multi-modal strategic mitigation.
- Two workshops to share and discuss analysis and potential mitigation with key stakeholders.

- Development of mitigation packages for years 2036, 2041, 2051 (with 2036 mitigation packages – 2036a: sustainable mitigation only and 2036b: sustainable mitigation plus local road network improvements).
- Testing of the shortlisted mitigation packages using PRTM.
- Developing conceptual designs (where possible/applicable) and cost estimates for the recommended mitigation strategy.

1.8. Throughout the project there was ongoing contact with LCC and the partner districts/boroughs. The workshops, which provided a more formal opportunity to share information and seek views, involved LCC, the South Leicestershire partner districts/boroughs, neighbouring county councils, and National Highways. The workshops covered:

- **Workshop 1**: Analysis of modelling outputs and initial discussion on mitigation took place on 23rd September 2024. In the first workshop the initial findings from the transport modelling were shared, any potential deliverability issues from a transport perspective were discussed and an initial view on potential mitigation was raised.
- **Workshop 2**: Review of proposed multi-modal strategic mitigation took place on 14th November 2024. In this workshop there was a more detailed discussion about the strategic mitigation needed to support growth and what could be expected in terms of impact reduction.

1.9. The workshops involved presentations with presentation slides shared with stakeholders in advance. The workshops sought to give as much time as possible to discussions with stakeholders to gathering views and feedback. Notes of key points and actions raised were noted and shared post workshop. The process ensured that stakeholders were able to share their views and actively shape the analysis and reporting of the JTE.

Report Structure

1.10. The report includes the following sections:

- Section 2: an overview of the **Preferred Spatial Growth Option** comprising the combined picture of growth as proposed, individually, by each of the four district and borough councils;
- Section 3: **Analysis of Forecast Modelling Outputs** with reporting on key metrics drawn from the strategic model to illustrate the impacts of new housing and jobs growth;
- Section 4: **Identification and Packaging of Mitigation** for each of the forecast years;
- Section 5: **Assessing the Performance of the Mitigation Packages**;
- Appendix A: **Modelling Background** covering a high-level overview of the process to gather inputs and agree assumptions;
- Appendix B: **Additional Analysis to Support the Identification of Mitigation Measures and Packages** provides more detail on the findings from modelling supporting analysis presented in Section 3;

- Appendix C: **Approach to Modelling Mitigation Measures**;
- Appendix D: **Mitigation List and Packages,** which provides more detail on the schemes proposed;
- Appendix E: **Flow Difference Plots, Zoomed in**; and
- Appendix F: **Mitigation Packages, geography of impacts**, provides more detailed maps on the forecast impacts with the modelled mitigation schemes.

2. Preferred Spatial Growth Option

Introduction

2.1. This section provides an overview of the Preferred Spatial Growth Option in terms of the scale and geography of growth proposed across South Leicestershire.

Quantum of Development

2.2. Table 2-1 and Table 2-2 present the number of new homes and jobs proposed in the Preferred Spatial Growth Option for the three modelled years 2036, 2041, and 2051. This is also illustrated in Figure 2-1.

2.3. Growth across the districts and boroughs varies in terms of the number and proportion of housing and employment development by 2036, 2041, and 2051. Nearly 18,000 new homes are proposed by 2036 and nearly 28,000 by 2041, with sites having further capacity for growth and a proposed additional 15,000 homes post-2041. Employment growth able to support around 15,000 new jobs are proposed by 2041, with capacity for an additional 10,000 jobs post 2041.

2.4. Over the Local Plan horizon, to 2041, c.64% of new homes will be delivered by 2036. Comparatively, the majority of jobs are planned for post 2036.

2.5. There are c.160,000 dwellings in South Leicestershire (ONS data 2021, table RM204) and 172,000 employees (BRES data 2023), so by 2041 the Local Plan growth proposals broadly amount to an 17% increase in dwellings and 9% in jobs.

Table 2-1: Cumulative Housing Growth by District/Borough

District/Borough	Homes by Year (Cumulative)		
	2036	2041	2051
BDC	5,961 (36%)	9,491 (57%)	16,516 (100%)
OWBC	2,557 (54%)	3,999 (85%)	4,726 (100%)
HBBC	4,572 (35%)	7,468 (58%)	12,974 (100%)
HDC	4,827 (51%)	6,875 (73%)	9,375 (100%)
Total	**17,917 (41%)**	**27,833 (64%)**	**43,591 (100%)**

Table 2-2: Cumulative Employment Growth by District/Borough

District/Borough	Jobs by Year (Cumulative)		
	2036	2041	2051
BDC	3,860 (43%)	5,329 (59%)	8,981 (100%)
OWBC	No jobs	No jobs	No jobs
HBBC	158 (1%)	4,998 (46%)	10,975 (100%)
HDC	3,963 (79%)	5,006 (100%)	5,006 (100%)
Total	**7,981 (32%)**	**15,333 (61%)**	**24,962 (100%)**

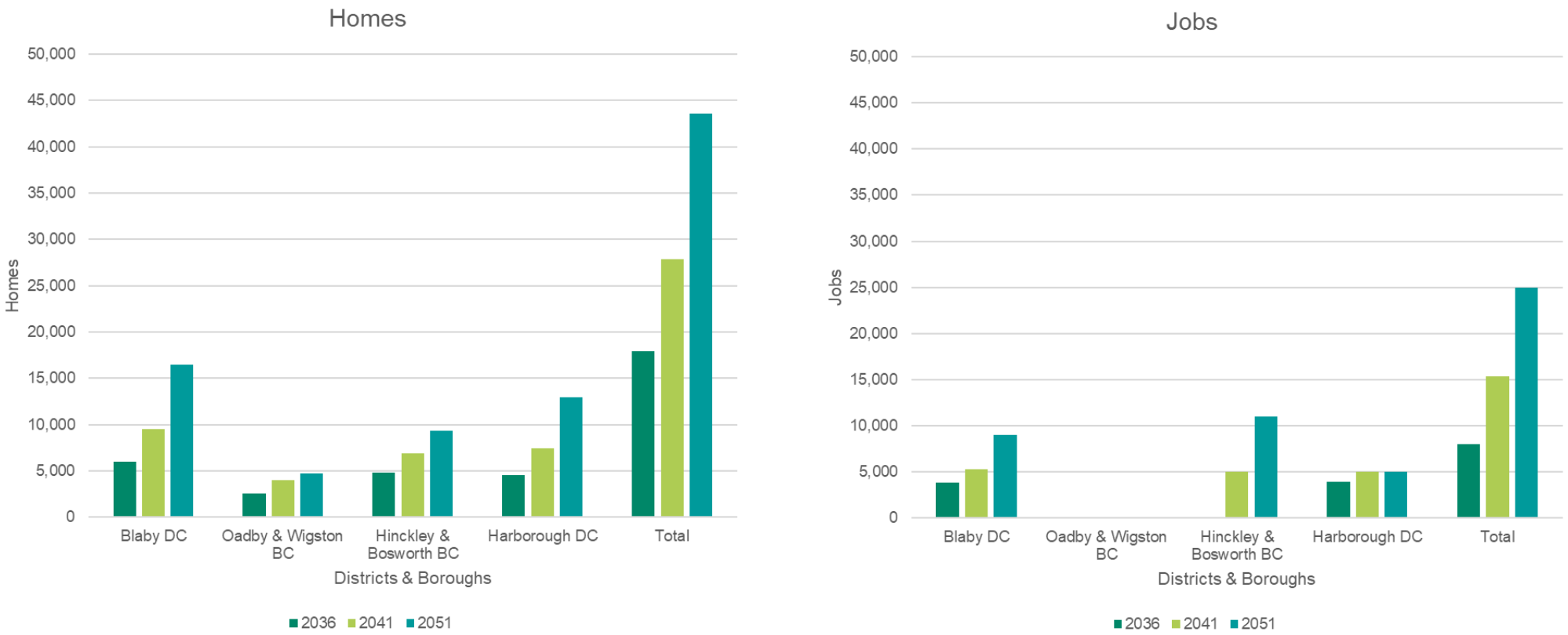

Figure 2-1: Cumulative Housing and Employment Growth by Year, District/Borough and for South Leicestershire

Spatial Distribution of Growth

2.6. The spatial distribution of the proposed growth up to 2041 is shown in Figure 2-2, Figure 2-3 and Figure 2-4. In Figure 2-3 and Figure 2-4, the relative scale of housing and employment growth is shown for each of the three forecast years.

2.7. In the Preferred Spatial Growth Option, growth is area-wide, but the scale and type of growth differs by location across the Local Plan period:

- By 2036, housing will come forward across a range of sites in the South Leicestershire area. Growth will concentrate around Leicester Urban Area, north and east of Hinckley, and the A5 Corridor. Employment growth is also area wide but less dispersed than housing growth as there are fewer sites. A major expansion at Magna Park on the A5 near Lutterworth is proposed.
- Between 2036 and 2041, large sites to the south of the Leicester Urban Area in Oadby & Wigston continue to be developed. There is further expansion of large sites near the M69 corridor, north of Hinckley, and west along the A5. Large employment sites are proposed along the A5 Corridor and smaller sites scattered across rural areas.
- Post-2041, housing growth will continue to be delivered on the largest sites. The largest sites lie south of the Leicester urban area, as well as west - north-east from the A5 Corridor around Hinckley to the Oadby and Wigston/Harborough border. Employment growth will primarily be centred around the Hinckley area and along the A5 between M69 J1 and M42 J10.

2.8. Comparatively, reflecting back to JTE Stage 1, the spatial distribution of growth in the Preferred Spatial Growth Option is most similar to the Stage 1 Spatial Growth Option 1.

2.9. Note that the spatial distribution of growth in Blaby has been excluded from all of the figures in the report. At the time of writing, the sites are yet to be confirmed. As such Blaby District Council requested that the sites were not shown in this report. The modelling and subsequent analysis however includes growth proposed in Blaby.

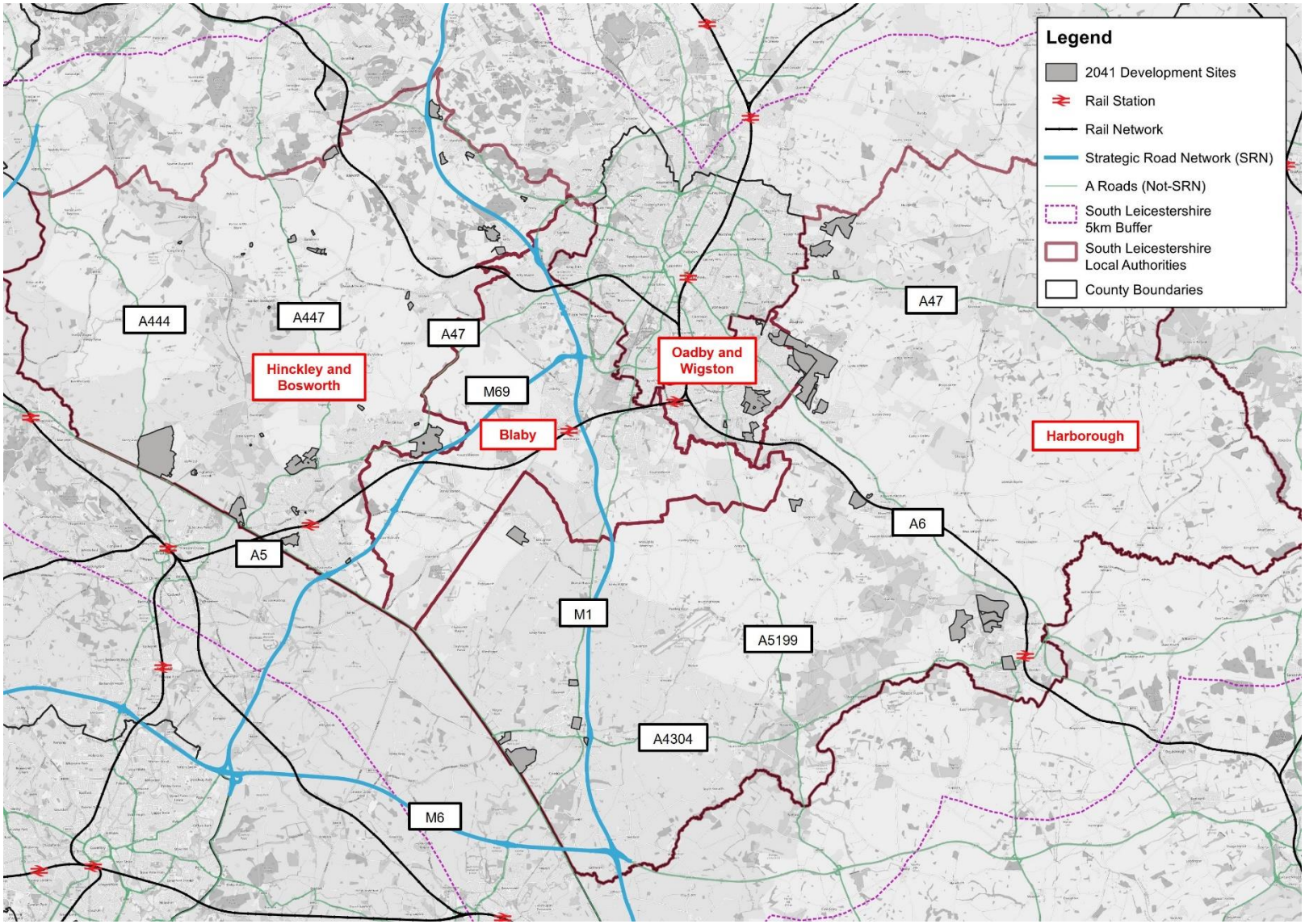

Figure 2-2: Spatial Distribution of Growth in the Preferred Spatial Growth Option

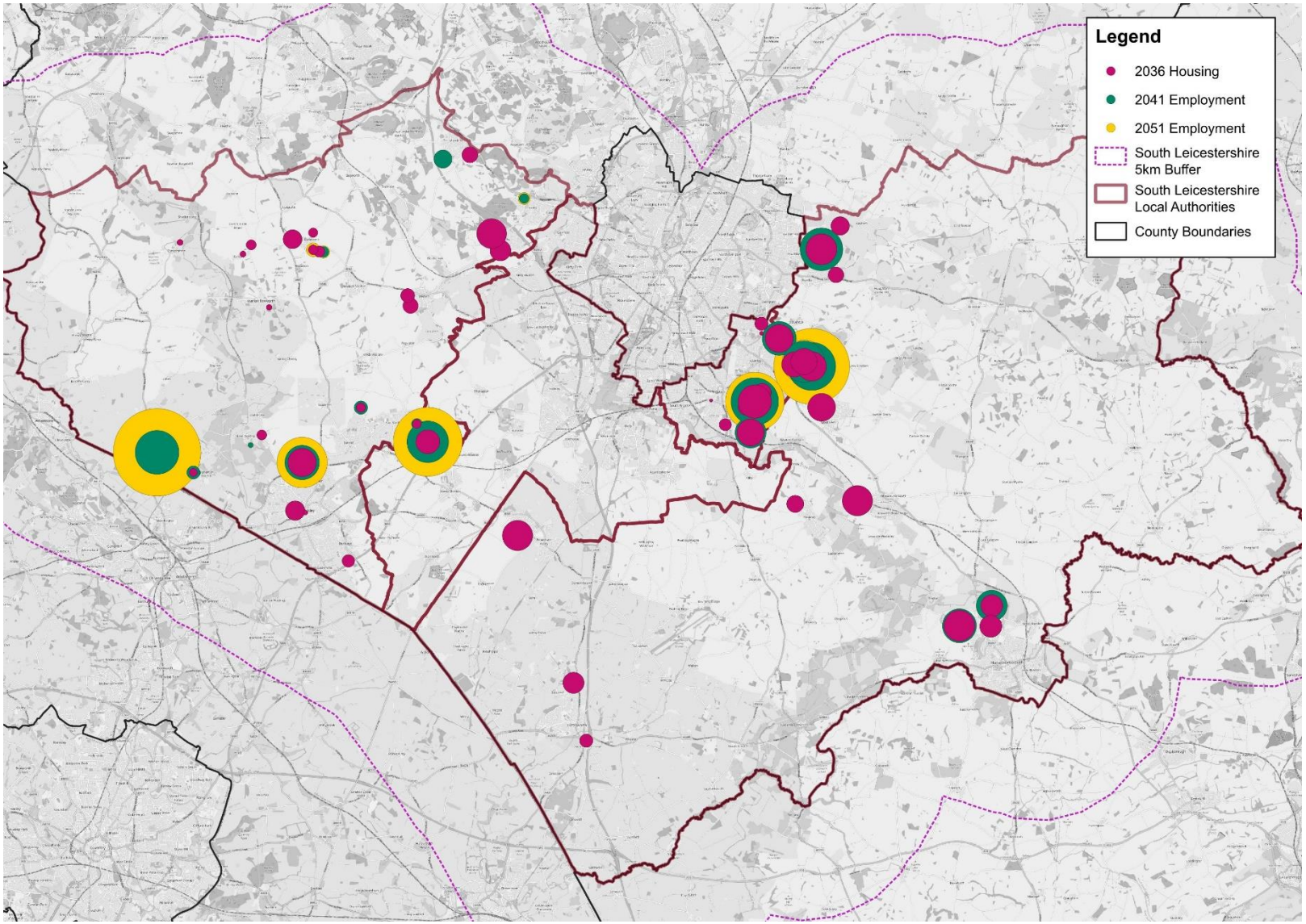

Figure 2-3: Comparative Scale of Housing Growth by 2036, 2041 and 2051

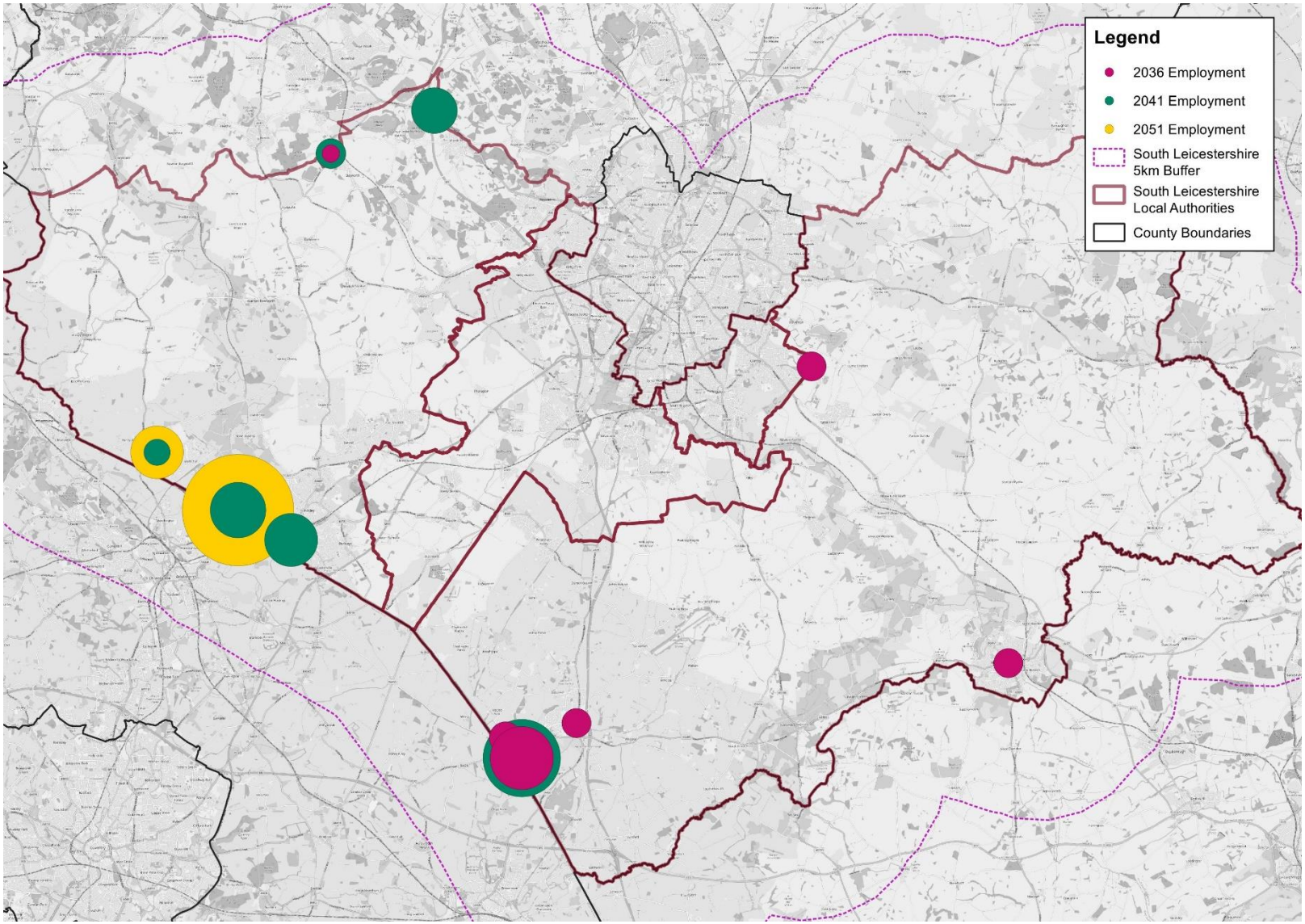

Figure 2-4: Comparative Scale of Employment Growth by 2036, 2041 and 2051

3. Analysis of Forecast Modelling Outputs

Introduction

3.1. This section sets out the analysis of forecast modelling outputs. The objective is to identify the nature and location of impacts, providing a basis for stakeholder discussions and the development of mitigation measures.

3.2. The modelling presented and analysed in this section does not include the impact of any policy measures or schemes that may be introduced through the local transport plan, any improvements on the SRN, or any mitigation associated with the individual development sites.

3.3. The forecasting modelling initially focussed on understanding the location and scale of growth-related issues in terms of the following metrics: volume over capacity (VoC), traffic flow difference, delay change, average speed, and distance travelled.

3.4. Following a review of the location and scale of impacts, further forecast modelling outputs were produced and analysed to develop thinking about strategic mitigation needed to mitigate the identified impacts. Metrics used for this analysis included trip lengths, origin-destination (OD) analysis, and further flow difference plots.

3.5. The forecast modelling outputs illustrated in this section show the 2041 AM Peak impacts. The 2041 AM Peak impacts are representative of the broad pattern of impacts in 2036 and 2051, albeit different in scale.

3.6. The assessment is made on the impact arising from new growth, so the analysis is concerned first and foremost with the impact difference of the Preferred Spatial Growth Option scenario minus the Core scenario; however, existing issues on the transport network and how they may need to be factored into mitigation, have also been considered.

Forecasting Outputs: Impact of Growth

Volume over Capacity

3.7. A VoC of 85% or more indicates that the level of traffic using the junction is approaching the threshold capacity for which it was designed and beyond which it may not operate optimally. Increases in the volume of traffic beyond a VoC of 85% lead to additional congestion and delay. A VoC of 100% or above indicates a junction at or exceeding theoretical capacity, meaning that the highway is saturated and will result in more significant levels of congestion and delay.

Existing Issues

3.8. Existing capacity issues and those arising from background growth (i.e. the Core scenario) have been identified. Locations with junctions exceeding capacity (VoC over 100%) in the Core scenario are marked as grey/black dots

on VoC maps in Figure 3-1. The figure reveals that many existing VoC issues occur on key roads, including the SRN, such as M1 Junctions 21 and J21a, A5, A46, and A426. The scale and spatial distribution of Core issues expands to 2051 as future background growth adds more trips to a network which is already over-capacity in many locations.

Preferred Spatial Growth Option Issues and Progression of Impacts

3.9. Junctions with significant performance deterioration from the Core to the Preferred Spatial Growth Option are identified in Figure 3-1. A significant deterioration has been defined by a change in VoC from the Core scenario of at least 10% and a VoC level of at least 85% in the Preferred Spatial Growth Option.

3.10. Figure 3-1 shows the forecast year for when the junction capacity issues are observed. The size of the coloured dot does not represent the severity or scale of the capacity problems, but rather allows for the information to be overlaid. For example, those junctions with both black and yellow dots indicate that the junction is over 100% capacity in the Core, and that the junction capacity then worsens further by more than 10% when 2051 growth is added.

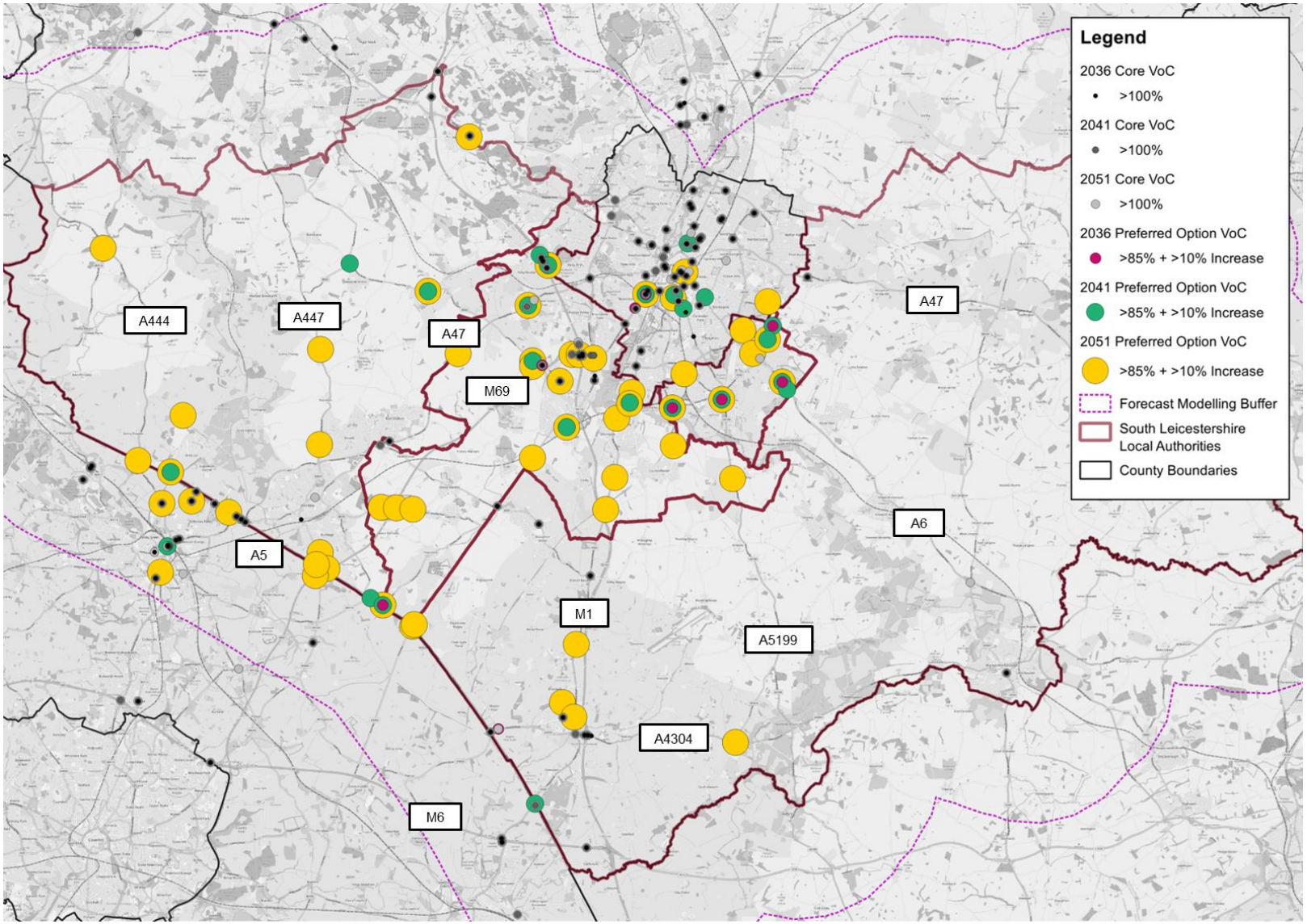

Figure 3-1: Volume over Capacity 2036, 2041, 2051 Spatial Distribution

3.11. The progression and spatial distribution of VoC issues between the three forecast years, shown in Figure 3-1 above, can be summarised as follows:

- **2036**: Impacts in year 2036 are concentrated immediately to the south and east of the City of Leicester on key radial routes with some impacts cross-border in the City and an isolated junction on the A5.
- **2041**: In 2041, there are a greater number of impacts which are more geographically distributed than in 2036, with more over-capacity junctions on radial and orbital routes further west on the periphery of the City of Leicester in Blaby and in Hinckley and Bosworth, most notably the B582. More substantial issues begin to emerge along the length of the A5 Corridor and cross-border in Nuneaton.
- **2051**: By year 2051, VoC issues are widespread, worsening in areas where issues had already arisen and extending further across South Leicestershire. In Hinckley and Bosworth issues are seen on the A444 and A447, whilst in Harborough additional issues can be found on the A426 and A4304. There is also a prevalence of over-capacity junctions on or around the SRN, including significant concentrations at M1 J21, M1 J21a, M69 J1 and M69 J2.

3.12. These VoC issues by year are summarised in Table 3-1. The bottom row of the table shows total VoC issues by forecast year. In 2036 the impact of growth on junctions is relatively limited with nine crossing the threshold, suggesting impacts could be addressed through a smaller package of measures; by 2041, the number of junctions with issues increases to 24 which are more geographically spread, suggesting need for a more spatially integrated approach of multi-modal measures to mitigate impacts; and by 2051, there are 55 junctions with VoC issues pointing to the need for a more comprehensive package of strategic mitigation.

Key Finding(s): Volume over Capacity

- The geography of VoC issues expands from localised impacts in 2036 to widespread congestion across South Leicestershire by 2051, affecting key routes and strategic junctions.
- The number of affected junctions increases over five-fold from 2036 to 2051, highlighting the need for progressively more comprehensive policy and mitigation measures.

Table 3-1: Cumulative Number of VoC Impacts at Forecast Years 2036, 2041, 2051

Impact Location	Number of Over Capacity Junctions (>85% + 10% Increase)			Roads Impacted
	2036	2041	2051	
Orbital/Radial routes close to the border with Leicester City	5	7	13	A563, B582, A6, A426, A5199
Radial routes in Leicester City	2	5	6	A5460, A426, A5199, A607, A6, A594, B667, B5418
A5 corridor	2	4	4	A5, A4303, B4114, A426
Impact of growth on the A5 spreads into Nuneaton	0	1	4	A5, A444
M69/A5 (Stretton Baskerville Interchange)	0	0	3	M69, A5, B4109
West of the study area (significant rerouting from the A5)	0	0	5	A5, A444, A447, B4116
Around M1 J21 and M1 21a	0	2	4	M1, A46, M69, A5460, Ratby Lane

Impact Location	Number of Over Capacity Junctions (>85% + 10% Increase)			Roads Impacted
	2036	2041	2051	
North of study area (A50, M1 J22 and A511)	0	0	1	A50
Rerouting of development traffic from Earl Shilton & Stoney Stanton onto minor roads	0	1	4	B4669, Leicester Road, Coventry Road
A47	0	1	2	A47
Isolated issues in the west of the study area	0	3	5	B582, Forest Road
Around Lutterworth and the A426	0	0	3	A426, Bitteswell Road, Brookfield Way
Isolated issues in the south of the study area	0	0	1	A4304, B5414
Total VoC issues	9	24	55	

Delay

3.13. The locations of significant delay change were identified, and the specific areas of concern were listed. Note that the change in delay is based on the difference between the Preferred Spatial Growth Option scenario and the Core scenario.

3.14. Links which experience a delay increase of at least 30 seconds per passenger car unit (PCU) were mapped. These locations for the 2041 AM Peak are shown in Figure 3-2. Note that in the figure below, the length of the highlighted link shown in red does not indicate the scale of delay but rather the length of the link with delay. As such, comparisons cannot be made regarding the scale of the additional delay (over 30 seconds) on the identified links.

3.15. The delay plots highlight stress points, such as at M1 Junction 21, along the M69 and the A5, and reinforce the findings from the VoC analysis. Notably, a number of roads used to access the SRN are shown to have delay issues. This affects use of the SRN and reroutes traffic away and along less desirable routes.

3.16. The increase in the number and distribution of delayed links also follows a similar pattern and trajectory to VoC issues between 2036, 2041 and 2051. There are relatively few instances of links with delay change greater than 30 seconds in 2036. Those which do appear are generally located on short local road network links in close proximity to the M1 and A5. In 2041, these delay trends continue with additional concentrations of delayed links emerging on the orbital and radial connections on the edge of the Leicester Urban Area including the A6, A5199 and B582. In the 2051 scenario, the aforementioned issues are exacerbated and there are many new links which reach changes in delay of greater than 30 seconds, with notable concentrations close to development sites to the north of Hinckley (including Earl Shilton) and Whetstone Pastures in Blaby.

Key Finding(s): Delay

- Significant delay increases are concentrated around critical points on the network, including M1 J21, and corridors such as the M69 and the A5. These issues have a knock-on effect on local roads accessing the SRN and leads to rerouting of traffic.
- As with VoC, delay issues expand over time, with isolated instances in 2036, increasing in 2041 along key orbital and radial routes, and becoming widespread by 2051, particularly near large fully built out development sites.

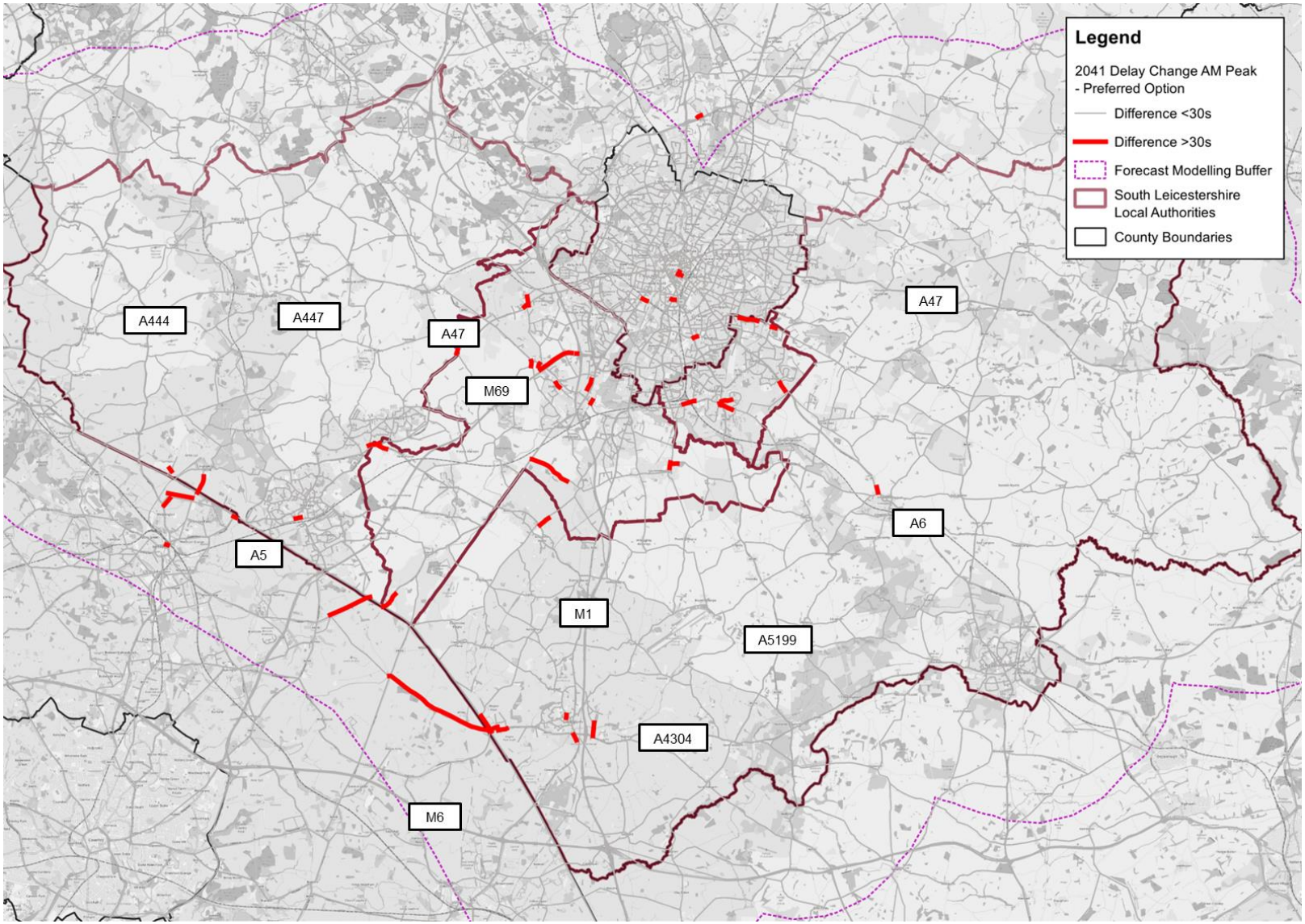

Figure 3-2: Delay Change, Preferred Minus Core (2041, AM Peak)

Flow Difference

3.17. The change in flow is represented simply by the change in the number of vehicles along a section of road. This measure does not include information on the capacity of the road network nor the level of utilisation, and therefore a large change in flow does not necessarily indicate the need for mitigation. It is helpful in providing a view on how routeing of traffic changes.

3.18. Figure 3-2 shows flow differences between the Preferred Spatial Growth Option scenario and the Core scenario in the 2041 AM Peak. In these plots, red indicates an increase in vehicles, while green indicates a reduction. Only differences of greater than 100 vehicles are illustrated. More zoomed in extents of Figure 3-2 can be found in Appendix E.

3.19. Changes in flow between scenarios may be limited in some areas due to capacity constraints within the network. In such cases, even where demand increases, flow may remain stable or increase only marginally because the infrastructure cannot accommodate additional volume. This should be considered when interpreting flow difference diagrams.

3.20. The following observations have been identified, with the locations shown in blue on the flow difference plot:

1. **No flow difference at M1 J21 due to existing capacity constraints:** There is no flow difference on M1 northbound north of M1 J21 due to M1 J21 main carriageway and on-slips already being at capacity in the Core scenario. There is no notable flow difference on M1 southbound north of M1 J21 due to M1 J21a on-slips from A46 already being at capacity in the Core scenario.
2. **M1 J21 capacity issues have knock on impacts for the M69:** There is no significant flow difference on the M69 in either direction as traffic is deterred from using the M69 as the northbound approach to M1 J21 and southern underbridge at M1 J21 are already at capacity in the Core scenario.
3. **Local rerouting south of Leicester:** The B4114 is heavily congested in the Core scenario so traffic uses alternative routes on the local road network through Burbage / Stoney Stanton / Huncote / Narborough.
4. **Development issues interact with existing issues on the A5:** Increases in flow through Hinckley and Bosworth are occurring as a result of development to west of A5 and issues on the A5 corridor (including the Longshoot and Dodwells junctions as well as the Higham and MIRA roundabouts which are at capacity in the Core scenario).
5. **Development traffic impacts flow south and east of Leicester:** Flow increases around the Oadby and Wigston / Harborough border are due to the volume of development to the south and east of the City of Leicester. This has a knock-on effect along the A6 where there is no change in traffic on A6 northbound between Market Harborough and Leicester as trips are rerouted to avoid issues further north.

3.21. The general flow difference patterns across the modelled years reflect the observations from the other metrics; impacts in 2036 are comparatively low, are concentrated on radial routes into the City of Leicester, near to large developments coming forward earlier in the plan periods, or on links close to junctions on the SRN with existing capacity constraints. The 2041 picture has a similar geography but with greater flow difference. By 2051, there is significant

flow difference on local links across South Leicestershire as widespread rerouting occurs to avoid congestion on high-order roads.

Key Finding(s): Flow Difference

- Existing capacity constraints limit flow changes in affected areas, as congestion prevents additional traffic from joining the network. This is particularly evident on the M1 and M69 which show limited flow difference.
- There are significant rerouting impacts on local roads to the immediate south and east of the City of Leicester as well as between Hinckley and Blaby.

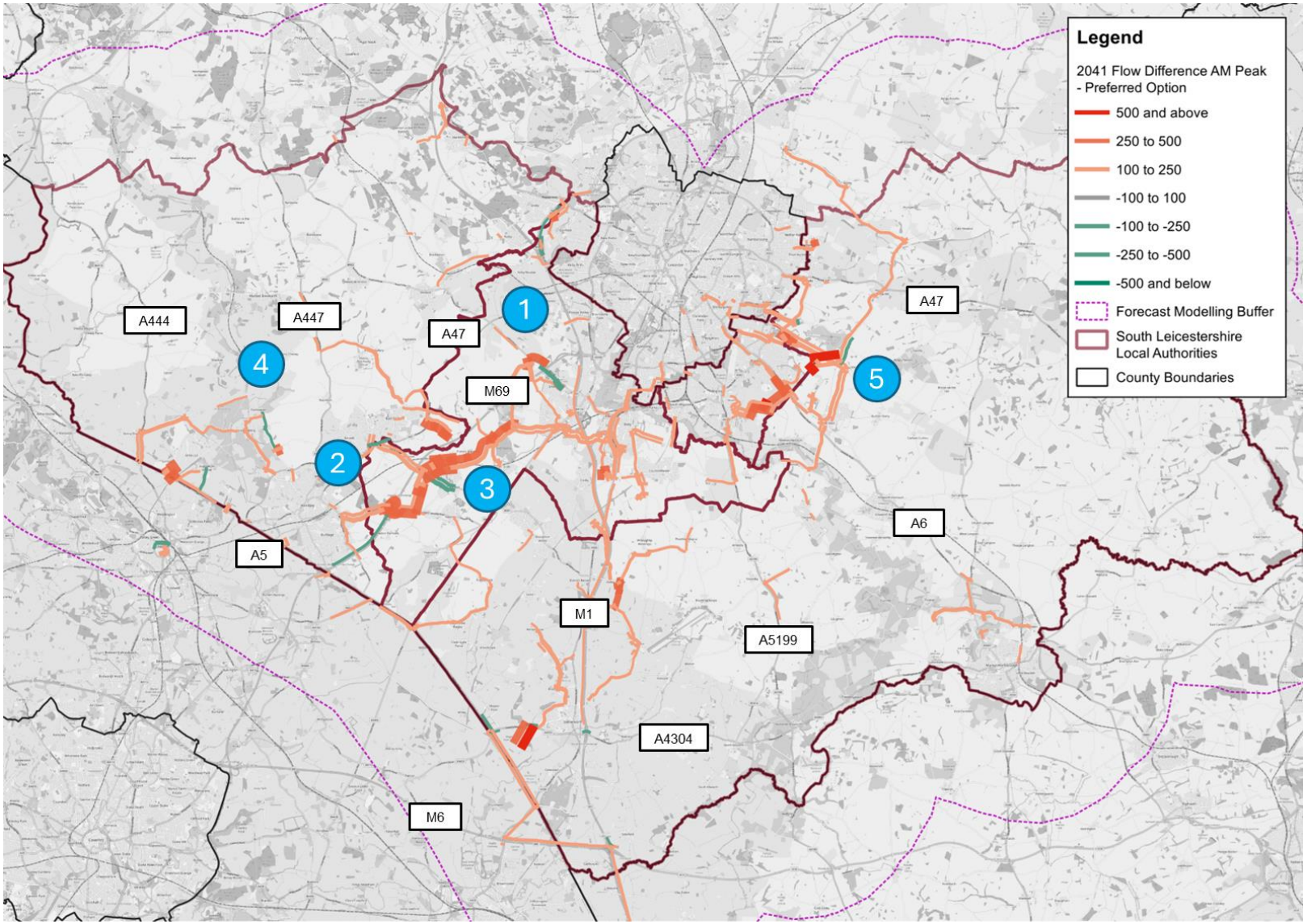

Figure 3-3: Flow Difference, Preferred Scenario Minus Core Scenario (2041, AM Peak)

Speed Change and Distance Travelled

3.22. Change in average speed and distance travelled were calculated. These metrics were split by road type to show the sections of the network which would bear the most significant impact of growth. Table 3-2 shows the outputs of this analysis.

Table 3-2: Average Speed and Distance Travelled Change, Core Scenario vs Preferred Scenario (2041)

Road Type	Average Speed		Distance Travelled			
	AM Peak (%)	PM Peak (%)	AM Peak (PCU KM)	AM Peak (%)	PM Peak (PCU KM)	PM Peak (%)
Motorway	-3.3%	-3.3%	10,931	1.6%	5,570	0.8%
A-Road	-4.3%	-3.9%	14,517	3.6%	13,291	3.3%
Other Road	-2.8%	-3.1%	76,570	13.1%	74,246	12.4%

3.23. As can be seen in Table 3-2, the Preferred Spatial Growth Option growth for 2041 results in a more significant increase in distance travelled on minor roads compared to motorways and A roads. Across South Leicestershire, the cumulative distance travelled increases by 13% in the AM Peak and 12% in the PM Peak, compared to increases of 2% and 1% on motorways, and 4% and 3% on A-roads. This suggests that congestion on the motorway and A road network is causing new traffic to reroute onto minor roads. In terms of average speed, there is relatively little difference between the road types. This is because there are relatively low levels of congestion on local roads in the Core scenario (as can be seen in the VoC plot - Figure 3-1), so despite a large increase in distance travelled, the impact on average speed is similar to the higher-order road types.

Key Finding: Speed Change and Distance Travelled

- Congestion on motorways and A roads leads to a greater relative increase in traffic on minor roads, with distance travelled rising by 13% in the AM Peak compared to just 2% on motorways.

Identifying Areas Impacted by Growth

3.24. From the analysis of forecast outputs set out above we have identified locations of significant cumulative impacts, which are a pointer to where mitigation may be needed. Note, that the impacts forecast within Key Impact Areas are not solely attributed to developments within these Key Impact Areas, as developments outside these areas may contribute to wider impacts. Other locations or routes requiring mitigation may not fall within a Key Impact Area. The boundaries are not definitive and may include sites with existing permissions and agreed contributions, such as the site south of Narborough.

3.25. Seven ‘Key Impact Areas’ (A–G) and two ‘Cross-Border Impact Areas’ (H & I) have been identified based on the key findings and the preceding analysis. These are shown in Figure 3-4 and include:

- A: South and East of Leicester;
- B: M1 J21 and J21a;
- C: Blaby and Whetstone Pastures;
- D: Earl Shilton and Stoney Stanton Area;
- E: Market Harborough;
- F: A5 South and Lutterworth Area;
- G: A5 Corridor;
- H: City of Leicester; and
- I: Nuneaton.

3.26. The term Key Impact Areas is used for illustrative purposes only. They help to inform thinking of where transport strategies and investment could be focused. Key Impact Areas were identified at the request of LCC to support their consideration of Multi-Modal Area Investment Plans being developed as part of the county’s Local Transport Plan refresh.

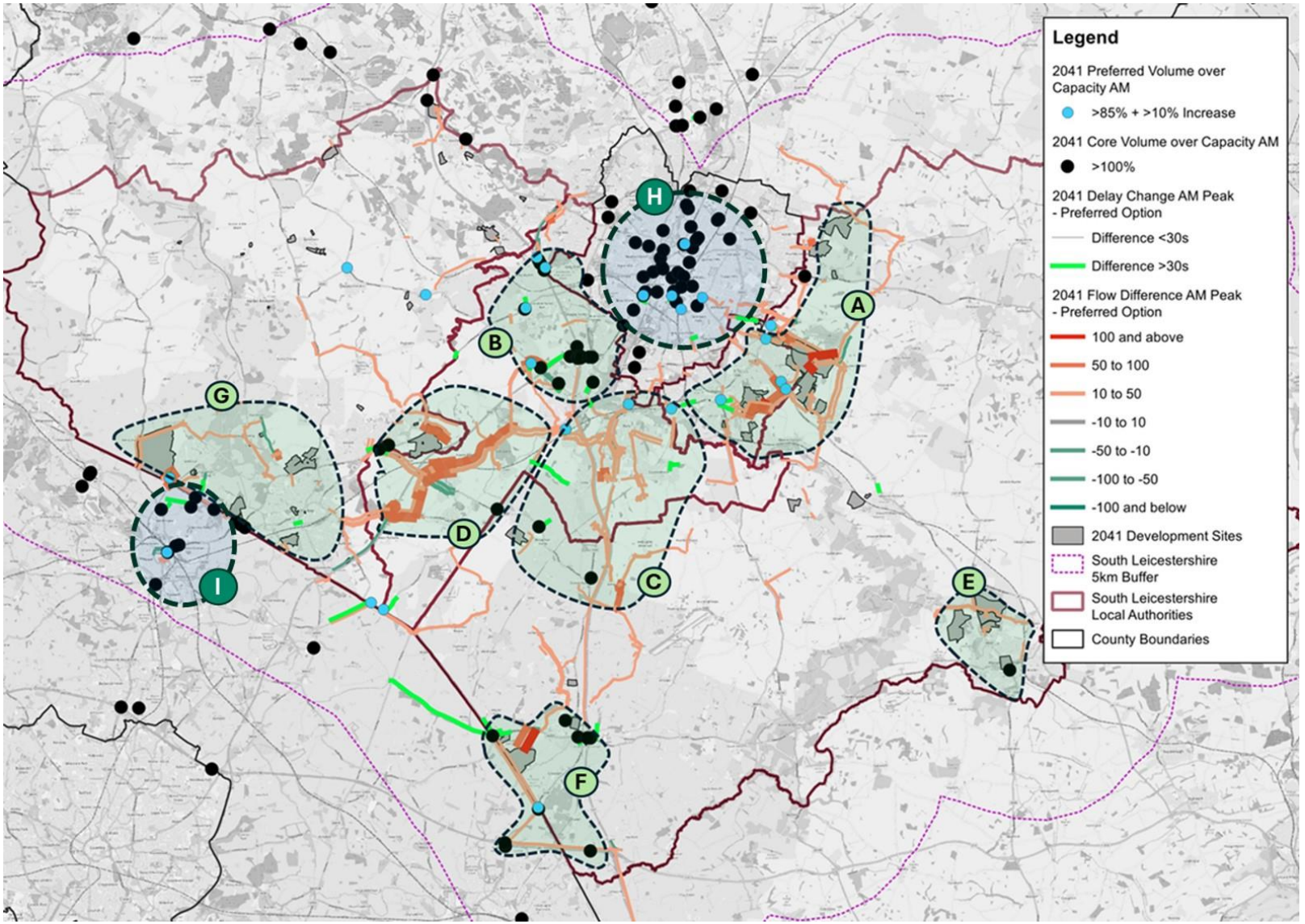

Figure 3-4: Key Impact Areas

4. Identification and Packaging of Mitigation Measures

Introduction

4.1. The objectives of this section are to set out the principles which have guided the approach to thinking about mitigation, identifying potential mitigation measures and to develop packages of measures to address the forecast issues arising from the forecast levels of growth.

4.2. The technical approach to modelling the mitigation measures is shown in Appendix C, while the full list and packaging of the measures can be found in Appendix D.

Identify Potential Mitigation Measures

4.3. The potential mitigation measures were developed based on the following inputs:

- policy guidance and identification of guiding principles;
- forecast modelling outputs;
- the geography of Key Impact Areas;
- feedback from stakeholder workshops; and
- internal workshops within the AECOM team.

Develop Packages of Mitigation Measures

4.4. Packages have been developed for each of the three forecast years to address the sequential nature of growth and the impacts of growth:

- 2036a – active travel and public transport interventions only.
- 2036b – active travel and public transport interventions plus small-scale local road network interventions.
- 2041 – all interventions included in 2036 package plus large-scale local road network interventions.
- 2051 (Full build out) – all interventions included in 2041 package plus additional interventions (as necessary) to accommodate longer-term (post-2041) growth at strategic development sites/clusters.

4.5. The scoping considerations regarding the identification and packaging of potential mitigation measures are outlined in this section.

Mitigation Proposed to include High-Level Strategic Interventions only

4.6. The scope of work is to identify strategic mitigation to address cumulative impacts, and not local or site-specific impacts.

4.7. Some smaller-scale measures have been put forward, but as part of a strategic area-wide package of investments. For example, while individual junction improvements

may be needed to address specific issues on the local road network, multiple measures with similar objectives have been combined to create a more cohesive and strategic package.

4.8. Further strategic work will be undertaken by AECOM to design broad mitigations and to develop broad estimates of costs suitable to inform budget allocations and funding required for delivering the schemes. This will be reported at a later date.

Measure Types Considered

4.9. The mitigation list is multi-modal, incorporating the following modes:

- active travel (cycling, walking and wheeling);
- bus;
- rail;
- interchange;
- Local Road Network (including the Major Road Network); and
- Strategic Road Network (see below).

4.10. Soft measures (e.g. methods of reducing car use through the use of promotion, marketing, personalised travel planning, training etc.) were considered during stakeholder workshops but have not been included as a primary mitigation measure within the potential mitigation packages. It is assumed that active travel and bus measures will be complemented by discrete soft measures to enhance the quality and attractiveness of provision, supporting modal shift. Other soft measures, which impact on travel choice, will need to be carefully considered alongside a range of other matters.

4.11. The development of mitigation measures has not involved a detailed assessment of the measures' viability or deliverability - these factors were only considered through stakeholder feedback.

Strategic Road Network (SRN) Interventions

4.12. Workshop discussions with National Highways and other stakeholders highlighted that the issues related to the SRN are, while significant, pre-existing. SRN interventions are high cost, in the remit of National Highways, and funding for large-scale measures is expected to be limited in the current policy and budgetary position of national government. Our analysis shows that congestion and constrained capacity on the SRN leads to increasing levels of traffic on local roads across the study area.

4.13. It is acknowledged that improvements to the SRN would be required in the future irrespective of the planned level of growth across the area. To enable the impact of the constraints on the SRN to be understood interventions on this network will be modelled as part of the 2051 'full build-out' package.

Additional Forecast Modelling Analysis

4.14. Following the initial analysis of the forecast modelling outputs, which identified the scale, distribution, and underlying explanations of the impacts, additional information

was extracted from the model to inform mitigation proposals. This included the following:

- **Select Link Analysis/Trips by Distance Band:** to understand how trip length and purpose influence the likelihood of modal shift and the feasibility of mitigation measures in specific locations;
- **Geography of Short (<10km) and Longer-Distance (>10km) Trips:** to identify the geography of trips which have the greatest propensity for modal shift to active modes; and
- **Uncongested Routeing**: to evaluate the impact of congestion on routeing patterns and identify how network improvements could enhance efficiency.

4.15. The results of this analysis, along with the rationale behind it, are presented in Appendix B.

Policy Principles to Inform Mitigation

4.16. This section outlines how the policy guidance referred to in Section 1 has informed the approach taken to identification and packaging of proposed mitigation measures.

The Sustainable Modal Hierarchy

4.17. DfT Circular 01/22 highlights the importance of a sustainable hierarchy, prioritising interventions for the most sustainable modes. This points to limiting measures that could increase reliance on car usage.

4.18. Mitigation measures were identified, prioritising potential sustainable transport measures to mitigate impacts for all Key Impact Areas. Road-based measures were considered, recognising that the necessity of specific measures would be considered during the packaging process. At this subsequent stage, their inclusion would be reviewed based on their alignment with the sustainable transport hierarchy.

4.19. The development of mitigation packages was guided by a sustainable hierarchy approach. For each forecast year, the process began by identifying active travel and bus measures to form the foundation of the package. Road-based measures were only considered after sustainable modes had been fully explored, focusing on whether they were necessary to address residual impacts. When evaluating potential road interventions from the longlist, this approach was maintained, with lighter-touch road schemes prioritised over major schemes, particularly in the earlier forecast years.

Providing Travel Choice

4.20. The Leicestershire LTP4 Core Document offers some early insights into the strategic direction of the region's transport network. The Core Document reflects a similar focus on sustainability, acknowledging that South Leicestershire’s rural nature and reliance on freight movement present unique challenges. Enhancing travel choice is critical to addressing these issues sustainably.

4.21. When identifying the longlist of measures, travel choice was a key factor. The suitability of measures for addressing impacts across South Leicestershire’s varied contexts was considered, including whether rural measures provided realistic

solutions for mitigating the impacts of growth and whether the longlist sufficiently mitigated impacts on freight and other economically significant movements.

4.22. As established with the sustainable hierarchy principle, for each forecast year the focus was initially on expanding opportunities for active travel and bus use, recognising their importance in fostering sustainable and inclusive mobility. Road-based interventions were only introduced once these options had been fully considered and where necessary to address outstanding challenges, recognising the rural nature of South Leicestershire and the economic importance of freight traffic on the network. The overarching aim was to create a well-rounded transport system, prioritising measures that promote a shift towards sustainable modes while ensuring the network remains efficient and effective.

Transport as a Means to an End: A Vision-Led Approach

4.23. The National Planning Policy Framework (NPPF) emphasises the need for a vision-led approach to planning. Although a definition of what constitutes a 'good' vision is not detailed, it is a definitive shift away from a 'predict and provide' approach to planning. In the absence of a defined vision, pointers can be taken from the DfT Circular 01/2022 and the LTP4 outlined above. Generally, it is understood as one that articulates a clear and ambitious framework for achieving desired outcomes, such as supporting sustainable development, delivering transport as a means to an end, and enabling significant shifts away from past trends to meet net zero commitments.

Potential Mitigation Measures

4.24. The list of potential mitigation measures by mode is summarised in Table 4-1 below. The full measure by measure mitigation list can be found in Appendix D.

Table 4-1: Mitigation List

Mitigation Measure Mode	Measure Summary
Active Travel	• LCWIP proposals building on the existing LCWIP programmes in South Leicestershire: the delivery of visionary walking and cycling infrastructure to develop a cohesive network. Further details about LCWIP style measures included in the report. Key measures include segregated cycle lanes, cycle-friendly junctions, continuous footways, cycle tracks and protected crossings.
Bus	• Redesign of the bus network, building on: - Relevant service enhancements proposed as part of Leicester City Council's and Leicestershire County Council's respective BSIPs • Network enhancements could include: - Improving existing bus services - New routes - Developing a full BRT network • Additional infrastructure could include: - Bus priority at junctions - Bus-only lanes

Mitigation Measure Mode	Measure Summary
	- Bus-only roads - Bus gates
Rail	• Increase frequency of existing rail services • New rail services • New rail stations
Multi-Modal Interchange	• Multi-modal hubs in towns and villages: - Bus and school bus service (existing) - Community car club - E-bike hire - Liftshare service - Shared micromobility scheme • Multi-modal hubs at rail stations: - Train (existing) - Bus (timetable improvements) - Hub and Ride - Shared micromobility scheme - Car club
Local Road Network	• Minor improvements to junctions • New orbital connections • New links
Strategic Road Network	• New SRN junctions • Capacity improvements to existing junctions

Mitigation Packages

Developing mitigation packages

4.25. The mitigation measures were grouped into packages for each of the three target years: 2036, 2041, and 2051. The initial selection of measures for inclusion in these packages was guided by professional judgement and discussions with partners and stakeholders, considering factors such as the proportionality of the measure to the impacts of Local Plan growth in each of the forecast years, the level of uncertainty regarding stakeholder acceptability, and the feasibility, funding, and deliverability of each measure. For example, discussions with stakeholders indicated that any strategic capacity improvements to M1 J21 would be significantly expensive and the new capacity enabled likely to be disproportionately large compared to the impacts arising from Local Plan growth. Furthermore, the issues forecast at M1 J21 are largely to do with existing or future background congestion. As such, improvements to M1 J21 were excluded from all mitigation packages.

4.26. The assignment of measures to packages considered the type of infrastructure being provided, the specific impacts each measure addresses, and the optimal forecast year to maximise its effectiveness. For example, based on discussions with stakeholders and partners at the workshops, it was judged that active mode mitigation measures should come forward in the earliest package for several reasons: providing

an opportunity for people to shift away from private car use sooner; and supporting greater active mode take up rates for trips associated with new development.

2036a Mitigation Package

4.27. Measures to be delivered by 2036 (package a – sustainable travel only):

- high-quality active travel routes and bus priority infrastructure to support radial trips into Leicester Urban Area and orbital movements;
- existing bus routes to be extended to serve new growth sites on the periphery of the Leicester Urban Area + associated soft measures;
- improvement of connection to and interchange capabilities at rail stations; and
- introduction of new 'Park & Ride' sites with EV charging capabilities.

2036b Mitigation Package

4.28. Measures to be delivered by 2036 (package b – sustainable travel plus limited road improvements):

- high-quality active travel routes and bus priority infrastructure to support radial trips into Leicester Urban Area and orbital movements;
- existing bus routes to be extended to serve new growth sites on the periphery of the Leicester Urban Area + associated soft measures;
- improvement of connection to and interchange capabilities at rail stations;
- introduction of new 'Park & Ride' sites with EV charging capabilities; and
- localised measures on the LRN to reduce flow increases and junction capacity issues.

4.29. To model modal shift away from private car to active travel and buses, a reduction in car trips of 15% was modelled for the 2051 package. The level of modal shift for forecast years 2036 and 2041 interpolated and set at c.6% and c.10%, respectively. See Appendix C for further details. The two 2036 packages enable greater understanding of how growth impacts can be addressed through sustainable measures alone.

2041 Mitigation Package

4.30. Measures to be delivered post 2036 to 2041:

- integration of active travel routes to form cohesive networks around local urban centres (complete LCWIPs);
- bus networks to be redesigned around local 'hub and spokes', complemented by ancillary infrastructure upgrades + associated soft measures;
- mobility hubs at key existing rail stations are upgraded and expanded to include greater provision of modal choice;
- mobility hubs and micromobility schemes are rolled out across the Study Area, including car sharing at large development sites; and
- minor LRN schemes delivered where capacity impacts are severe.

2051 Mitigation Package

4.31. Measures to be delivered post 2041 to 2051:

- LCWIPs connected with longer-distance active travel routes;
- transformational bus network with extensive routes and BRT, supported by soft measures to support modal shift;
- new rail stations opened close to developments in Elmesthorpe, Hinckley and Nuneaton Parkway;
- newly opened rail stations are complemented by an advanced network of mobility hubs to ensure highly effective interchange;
- large LRN / MRN improvements on key local links constructed to enable a reduction in congestion where there are gaps or deficiencies which limit PT provision and economic prosperity; and
- access and capacity enhancements on the SRN to support the full build out of large sites, relieve pressure on lower-order roads, and tackle longstanding efficiency issues on the SRN.

4.32. The packages of the mitigation measures are shown in Appendix D.

5. Assessing the Performance of the Mitigation Packages

Introduction

5.1. This section reports on the performance of the four mitigation packages modelled to support the growth proposed in the Preferred Option. As a reminder the four packages are:

- 2036a – active travel and public transport measures only;
- 2036b – active travel and public transport measures, and localised Local Road Network (LRN) improvements;
- 2041 – active travel and public transport measures, and LRN improvements; and
- 2051 – active travel and public transport measures, and LRN and Strategic Road Network (SRN) improvements.

5.2. For each mitigation package the assessment includes:

- Information on the change in cumulative travel time (PCU hours), distance travelled (PCU km), and average speeds (kph) across South Leicestershire between Preferred Option with mitigation and without mitigation.
- Information on the geography of impacts and any residual or new impacts arising. Each map records the following metrics for the AM and PM peak:
    - Flow difference: change in flow by link (Vehicles >±100) from the Preferred Option without mitigation to the Preferred Option with mitigation;
    - Delay change: change in delay by link (>±30s) from the Preferred Option without mitigation to the Preferred Option with mitigation; and
    - Volume over capacity: junctions at 85% capacity in the Preferred Option (and Preferred Option with Mitigation) with a 10% increase from the Core Scenario.
    - The maps are for illustrative purposes for what improvements are made and what issues remain unresolved.
- A summary list of the observed performance of the mitigation package. Some adverse and unresolved issues were identified relating to specific junctions or links. This is a high-level strategic assessment. As part of future detailed design work, additional modelling, or further consideration of mitigation measures these outstanding issues will need to be reviewed.

2036a Mitigation Package: Active travel and public transport measures only, no LRN

Network Summary Statistics

5.3. Figure 5-1 presents network summary statistics that compare the impact of the Preferred Growth Option with and without the 2036a mitigation package against the Core scenario. The comparison focuses on different road types (motorways, A-roads, and other roads) and considers three key metrics: average speed, distance travelled, and travel time. The outputs presented are for the AM peak which, in the case of network summary statistics, is largely reflective of both peaks.

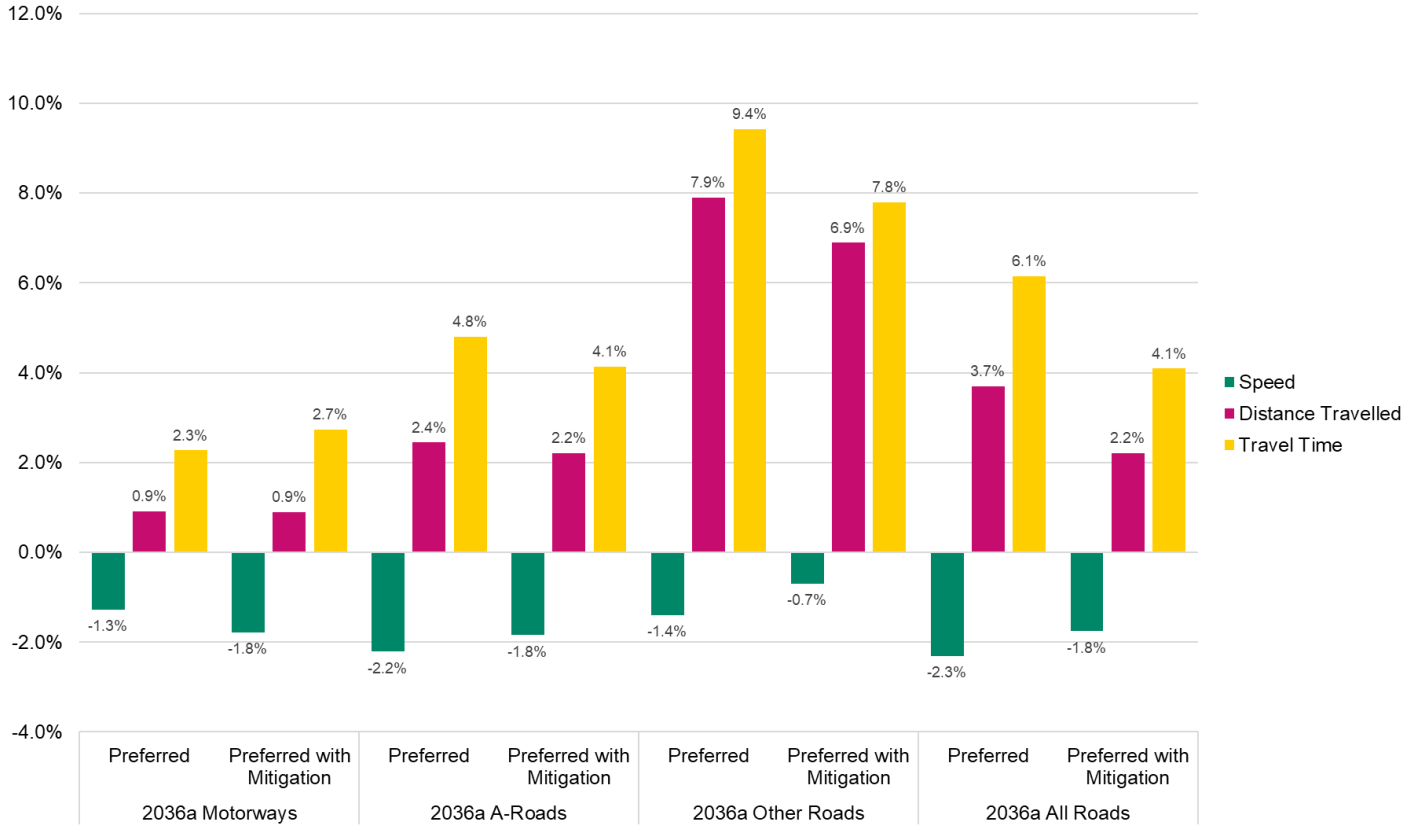

Figure 5-1: 2036a Mitigation Package – Change in Summary Statistics Across South Leicestershire vs Core Scenario

5.4. Table 5-1 shows the absolute figures for difference in journey time savings across each of the road types between the Preferred and the Preferred with Mitigation.

5.5. The 'All-Roads' category consists of all of the model links in the South Leicestershire cordon. This includes zone connectors. As such the journey time savings for 'All-Roads' is not a sum of the other road types.

Table 5-1: 2036a Mitigation Package – Change in Journey Time Savings Across South Leicestershire vs Core Scenario

Scenario versus Core	Motorways (PCU Hrs)	A-Roads (PCU Hrs)	Other Roads (PCU Hrs)	All Roads (PCU Hrs)
Preferred	192	342	1,219	1,753
Preferred with Mitigation	231	295	1,008	1,167

5.6. The following points summarise the performance of the 2036a mitigation package:

- **Across the network, mitigation reduces distance travelled and travel time, and increases average speed** (see right data in right bars for '2036a All Roads')**.**
    - With the 2036a mitigation package, travel time increases by 4.1% from the Core scenario, compared to by 6.1% without mitigation – an impact reduction of approximately a third.
    - Distance travelled increases by 2.2% from the Core scenario with mitigation. Without mitigation, distance travelled increases 3.7% from the Core scenario. In other words, with mitigation there is a reduction of the increase in distance travelled by 1.5 percentage points.
    - Average speed improves from negative 2.3% compared to the Core scenario without mitigation to negative 1.8% with mitigation in place.
- **The benefits of the 2036a mitigation package are more concentrated on local roads** (Local roads are labelled as 'Other roads' in the bar chart; that is roads which are not Motorways or A-roads).
    - Local roads see greater improvements in network summary statistics compared to Motorway and A-roads. Local roads carry a greater proportion of shorter-distance trips (trips under 20km) which are the target of the mitigation measures proposed at 2036a and seek to shift trips from car to public transport and active travel.
    - On local roads, average speed improves from negative 1.4% in the Preferred Option without mitigation to negative 0.7% with mitigation.
    - The increase in distance travelled compared to the Core scenario reduces from a 7.9% to a 6.9% increase on local roads with mitigation, while travel time reduces from a 9.4% increase against the Core scenario without mitigation to a 7.8% increase against the Core scenario with mitigation. On A-roads, the changes with mitigation are proportionally smaller when compared with the Preferred Option without mitigation.

2036a Geography of Mitigation Impacts

5.7. The geography of the impacts of the 2036a mitigation package on the network performance, and how the package affects flow difference, VoC, and delay, is shown in Figure 5-2. The points set out below are the key observed changes following the modelling of mitigation measures. The numbering of points corresponds to the numbered areas in Figure 5-2.

5.8. Modal shift measures are effective at reducing capacity issues in the City of Leicester.

5.9. Modal shift measures improve capacity to the south of the City of Leicester, but some issues remain unresolved.

5.10. Impact reduction is most prominent in the areas targeted by modal shift measures.

5.11. There is some minor re-routeing in Blaby.

5.12. The maps in the following three figures present a lot of information together and it may be difficult to visually discern specific issues or findings. For this reason individual plots showing flow difference, VoC and delay change with the mitigation package applied are presented in Appendix F.

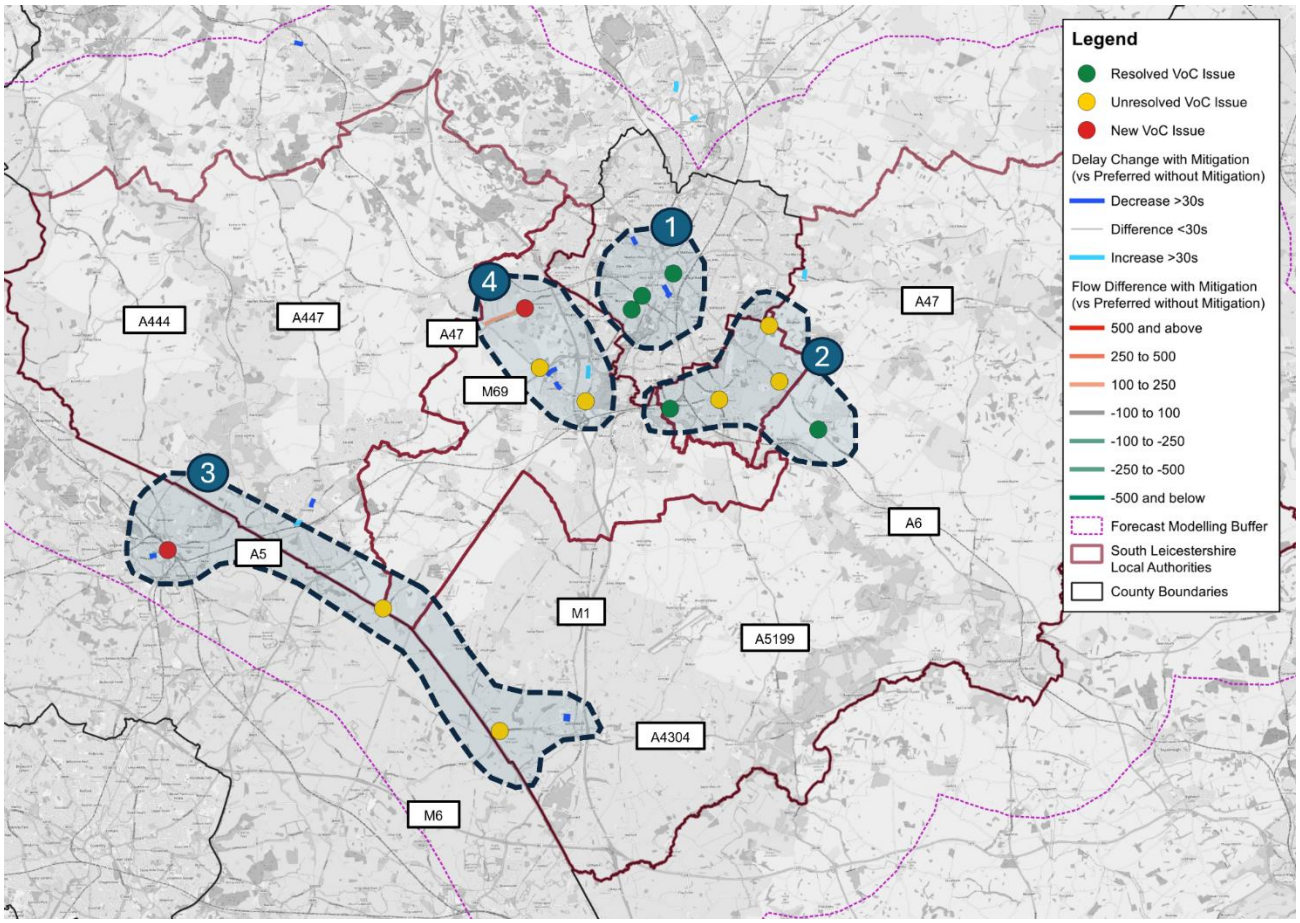

Figure 5-2: Geography of Impacts - 2036a Mitigation Package Performance, AM and PM Peak

5.13. The points set out below are the key observed changes following the modelling of mitigation measures. The numbering of points corresponds to the numbered areas in Figure 5-2.

1. Modal shift measures are effective at reducing capacity issues in the City of Leicester.
2. Modal shift measures improve capacity to the south of the City of Leicester, but some issues remain unresolved.
3. Impact reduction is most prominent in the areas targeted by modal shift measures.
4. There is some minor re-routeing in Blaby.

2036a Mitigation Package Summary

- Modal shift measures improve the capacity of the transport network and the relatively capacity of the highway network as short distance trips can shift from car to bus, rail and cycling.
- Compared to the without mitigation, the with mitigation package reduces travel distance, improves average speed, and shortens travel time.
- The greatest impacts are seen on local roads and in / in proximity to urban areas e.g. around the City of Leicester, where more short distance trips are made.
- Whilst network-wide improvements are observed, area-wide modal shift measures have only a moderate effect on alleviating congestion at specific junctions.

2036b Mitigation Package: Active travel and public transport measures, and selective LRN measures

Network Summary Statistics

5.14. Figure 5-3 presents network summary statistics that compare the impact of the Preferred Growth Option with and without the 2036b mitigation package against the Core scenario.

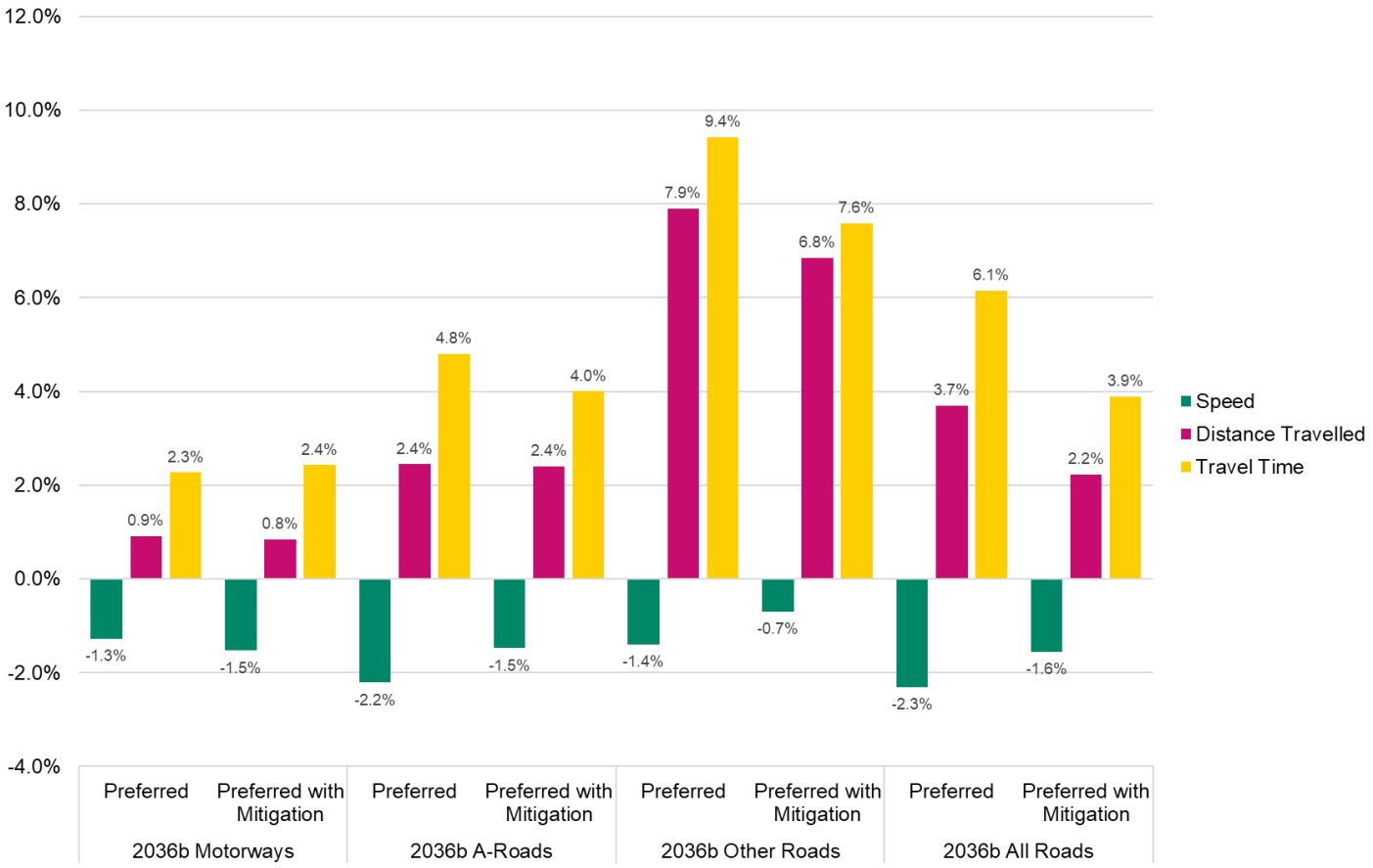

Figure 5-3: 2036b Mitigation Package – Change in Summary Statistics Across South Leicestershire vs Core Scenario

5.15. Table 5-2 shows the absolute figures for difference in journey time savings across each of the road types between the Preferred and the Preferred with Mitigation.

Table 5-2: 2036b Mitigation Package – Change in Journey Time Savings Across South Leicestershire vs Core Scenario

	Motorways (PCU Hrs)	A-Roads (PCU Hrs)	Other Roads (PCU Hrs)	All Roads (PCU Hrs)
Preferred	192	342	1,219	1,753
Preferred with Mitigation	205	286	982	1,111

5.16. The key points:

- **The 2036b package addresses further the impacts of growth compared to the 2036a package.** With the addition of LRN measures in the 2036b package, average speed and travel time improves 0.2 percentage points compared to the 2036a package. For distance travelled there is no difference. Though these improvements are marginal there are significant improvements at those junctions targeted (explained in the next section).

2036b Geography of Mitigation Impacts

5.17. The geography of the mitigation package impacts in term of flow difference, VoC, and delay, is shown in Figure 5-4. Individual plots showing flow difference, VoC and delay change with mitigation package applied can be found in Appendix F.

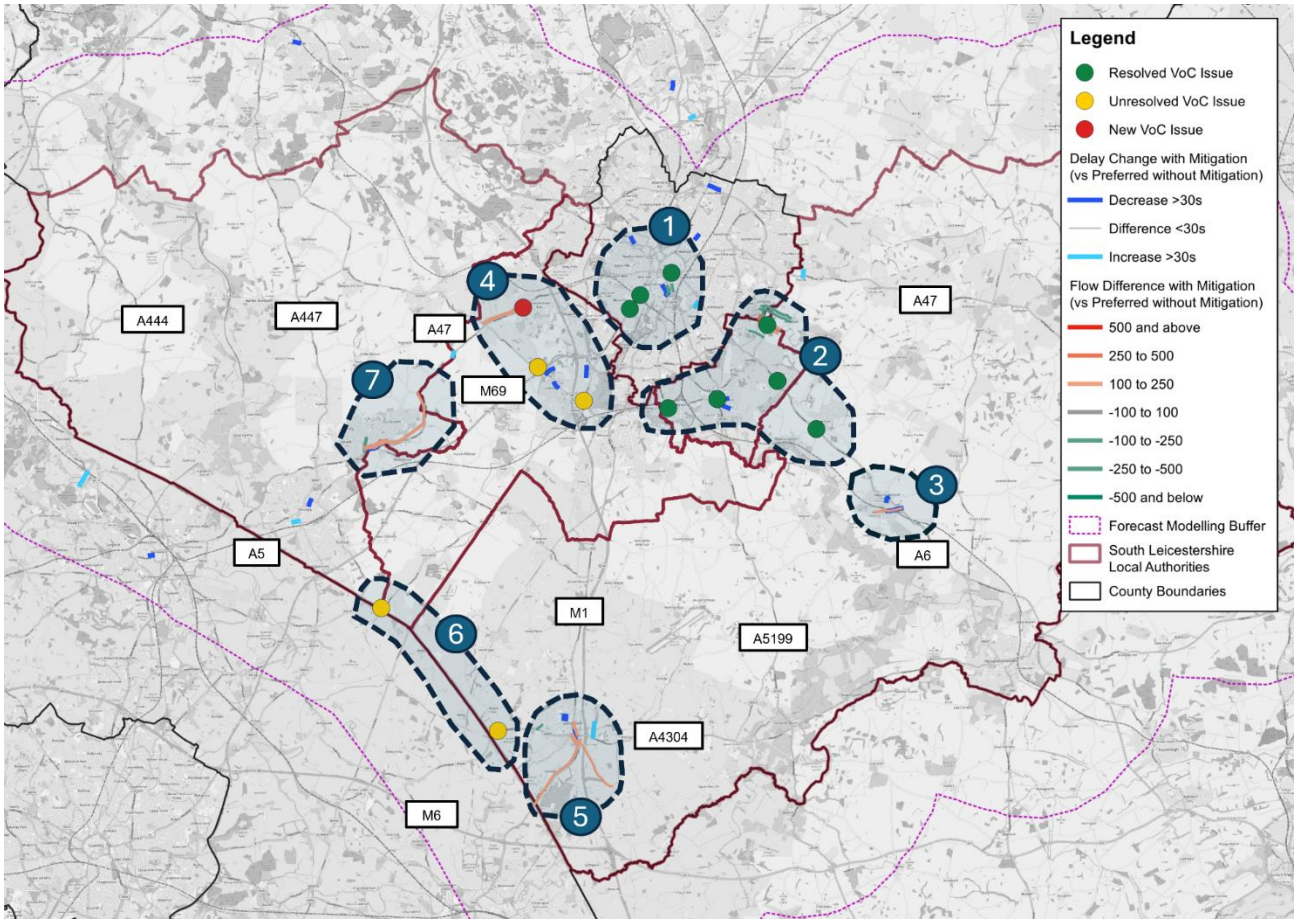

Figure 5-4: Geography of Impacts - 2036b AM and PM Peak Mitigation Package Performance

5.18. The points set out below are the key observed changes following the modelling of mitigation measures. The numbering of points corresponds to the numbered areas in Figure 5-4.

1. Modal shift measures are effective at reducing capacity issues in the City of Leicester.
2. The combined intervention of modal shift and LRN measures resolves the capacity issues to the south of the City of Leicester.
3. LRN measure at A6/New Road in Kibworth has a positive impact on delay.
4. There is some minor rerouteing in Blaby.
5. A426/A4303 measures increase the attractiveness of the A426.
6. Impact reduction is most prominent in the areas targeted by modal shift measures.
7. Rerouteing from Earl Shilton local roads onto the A47.

2036b Mitigation Package Summary

- Many of the localised junction issues which are not resolved by the 2036a package are resolved by the LRN measures in the 2036b package.
- In terms of wider network performance, the benefits of the additional measures in the 2036b package are relatively minimal. Both packages reduce the impact on network speed, distance travelled, and travel time by approximately a third.
- Where some junctions experience congestion due to Core issues, which are then worsened by the Preferred Scenario growth, the LRN measures in the 2036b package effectively resolve these Core-related problems.
- While the overall difference in network-wide performance appears limited, there is value in addressing specific junction issues to help tackle congestion and rerouteing issues, particularly on key corridors into the City of Leicester, which may affect public transport (bus).

2041 Mitigation Package: Active travel and public transport measures, and LRN improvements

Network Summary Statistics

5.19. Figure 5-5 presents network summary statistics that compare the impact of the Preferred Growth Option with and without the 2041 mitigation package against the Core scenario.

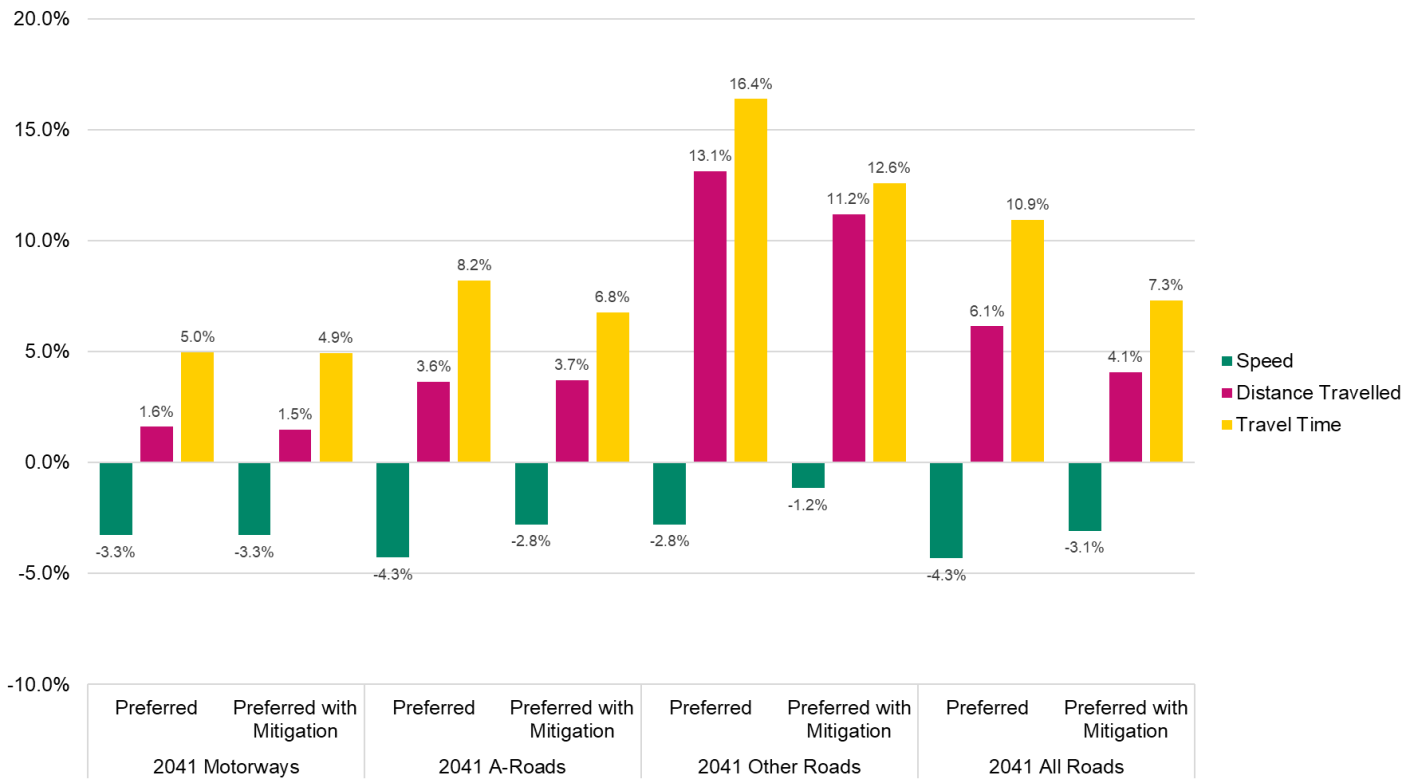

Figure 5-5: 2041 Mitigation Package – Change in Summary Statistics Across South Leicestershire vs Core Scenario

5.20. Table 5-3 shows the absolute figures for difference in journey time savings across each of the road types between the Preferred and the Preferred with Mitigation.

Table 5-3: 2041 Mitigation Package – Change in Journey Time Savings Across South Leicestershire vs Core Scenario

Scenario versus Core	Motorways (PCU Hrs)	A-Roads (PCU Hrs)	Other Roads (PCU Hrs)	All Roads (PCU Hrs)
Preferred	445	610	2,227	3,282
Preferred with Mitigation	442	501	1,712	2,192

5.21. Key points:

- **Across the network, mitigation reduces distance travelled and travel time, and increases speed.**
    - While network performance remains worse than the Core scenario mitigation reduces the impact of growth across all of the metrics assessed.
    - With the 2041 mitigation package, travel time increases 7.3% from the Core, compared to 10.9% without mitigation – an improvement of approximately a third.
    - With mitigation, distance travelled falls to an increase of 4.1%, down from 6.1% without it, a reduction of 2.0 percentage points.

  - Average speed improves from a 4.3% decline to a 3.1% decline with mitigation.

- **Lower-order roads see the greatest impact reduction from the 2041 package, reflecting the active mode, public transport and LRN measures.**
  - The most significant differences between the Preferred Option and the Preferred Option with mitigation for 2041 are on 'Other-Roads' (lower-order roads which are not Motorways or A-Roads). This reflects the mitigation put forward as part of the 2041 package, with no SRN interventions or A-Road measures included in the package. It points to these measures performing well, reducing congestion on lower-order roads.
  - While there is some reduction in issues on Motorways and A-Roads, the lower proportional reduction compared to other roads reflects the fewer short-distance (<20km) trips on motorways and A-roads. This also reflects the increase in modal shift which has been modelled in 2041, increasing the scale of benefits of modal shift from 2036 to 2041 (see C.32 in Appendix C for further details about the modelling of modal shift).
- **The minor increase in distance travelled on A-roads is a result of additional measures to encourage traffic onto higher-order roads.**
  - With the 2041 mitigation package there is an increase in distance travelled on A-roads from 3.6% worsening to 3.7%. This minor difference may reflect the addition of mitigation measures in the 2041 package to encourage traffic onto higher-order orbital and radial roads to the south and east of the City of Leicester. This increase should also be seen in the context of a decrease in travel time and increase in average speed on A-roads, as network efficiency on these roads improves compared to the Preferred Option without mitigation.
- **The 2041 mitigation package reduces but does not entirely mitigate the impact of growth.**
  - Approximately a third of the impacts of growth have been mitigated with the 2041 package. Despite reducing the impact of growth in the 2041 forecast year, the Preferred Option with mitigation results in a worsening of network performance compared to the Core Scenario. As such, it should be assessed whether further mitigation is required, or if the level of impact is acceptable.

2041 Geography of Mitigation Impacts

5.22. The geography of the performance of the 2041 mitigation package, and how it affects flow difference, VoC, and delay, is shown in Figure 5-6. Individual plots showing flow difference, VoC and delay change post-mitigation can be found in Appendix F

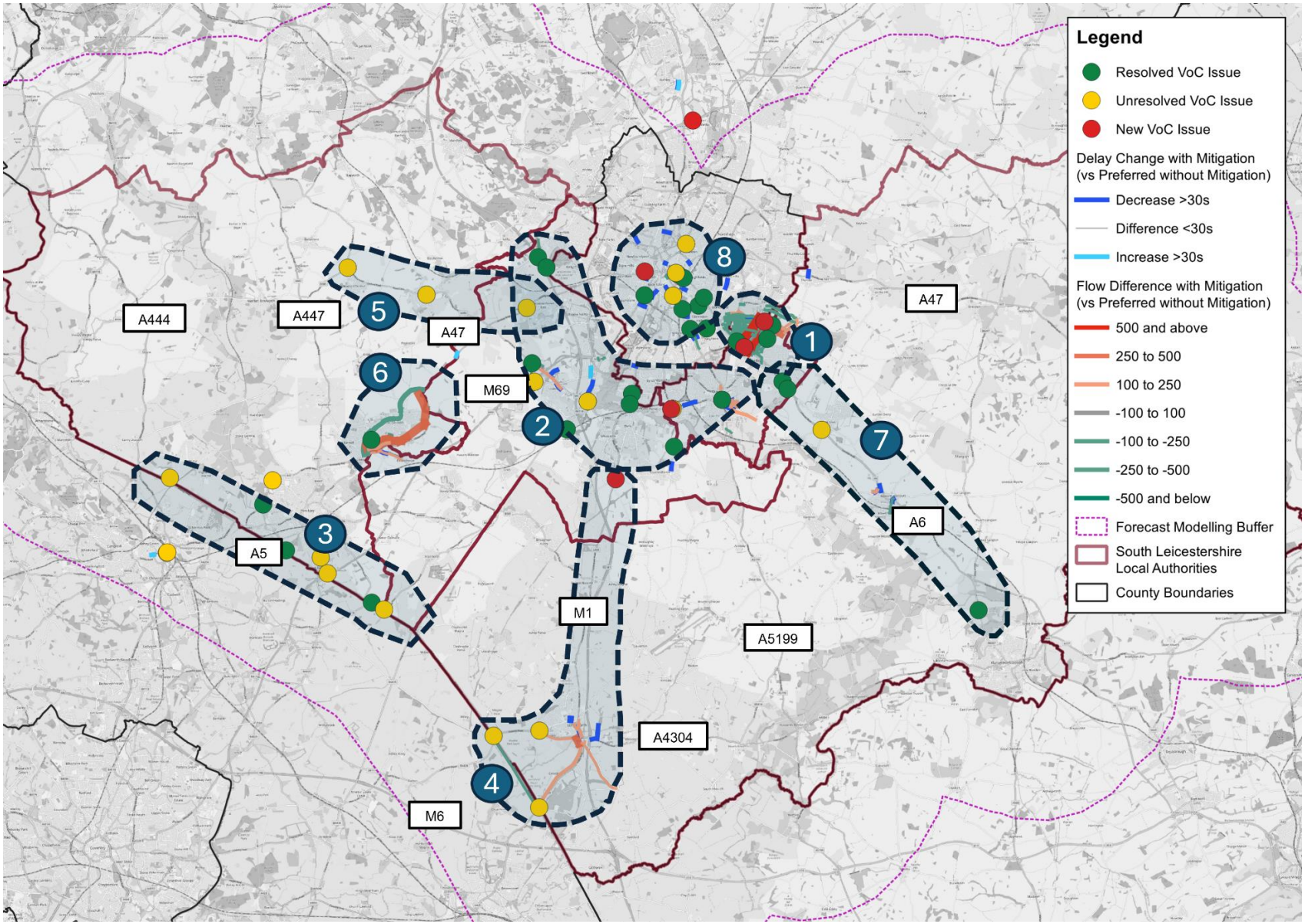

Figure 5-6: Geography of Impacts - 2041 Mitigation Package – AM and PM Peak Mitigation Package Performance

5.23. The points set out below are the key observed changes following the modelling of mitigation measures. The numbering of points corresponds to the numbered areas in Figure 5-6.

1. The link between the A6 north (before A6-Palmerston Way roundabout) and Gartree Road (referred to as the 'distributor road') attracts large flows from local roads.
2. Localised junction measures resolve issues which would otherwise emerge in 2041.
3. No significant changes in performance are seen on the A5 Corridor with the 2041 Mitigation Package.
4. A426/A4303 measures increase the attractiveness of the A426.
5. Localised issues in the west of the study area have not been resolved.
6. Rerouteing from Earl Shilton local roads onto the A47.
7. Capacity issues on the A6 (south of Oadby) resolved.
8. The geography of increased modal shift impact is difficult to discern beyond the City of Leicester.

2041 Mitigation Package Summary

- Mitigation supports modal shift to sustainable forms of transport and so reduces cumulative distance travelled, increases speed across the road network and therefore reduces travel time.
- The package eases pressure on radial and orbital movements into and around the City of Leicester, encouraging traffic onto higher-order roads and reducing congestion on the local road network.
- The measures put forward as part of the 2036 package on the LRN continue to mitigate growth in 2041.
- Increased modal shift reduces impacts in the locations where measures were put forward. To deliver this level of shift, continued roll out and integration of infrastructure is required 2036-2041.
- Further consideration needs to be given as to whether additional mitigation is required to address unresolved and new impacts in 2041, and what this would look like.

2051 Mitigation Package: Active travel and public transport measures, and LRN and SRN improvements

Network Summary Statistics

5.24. Figure 5-7 presents network summary statistics that compare the impact of the Preferred Growth Option with and without the 2051 mitigation package against the Core scenario.

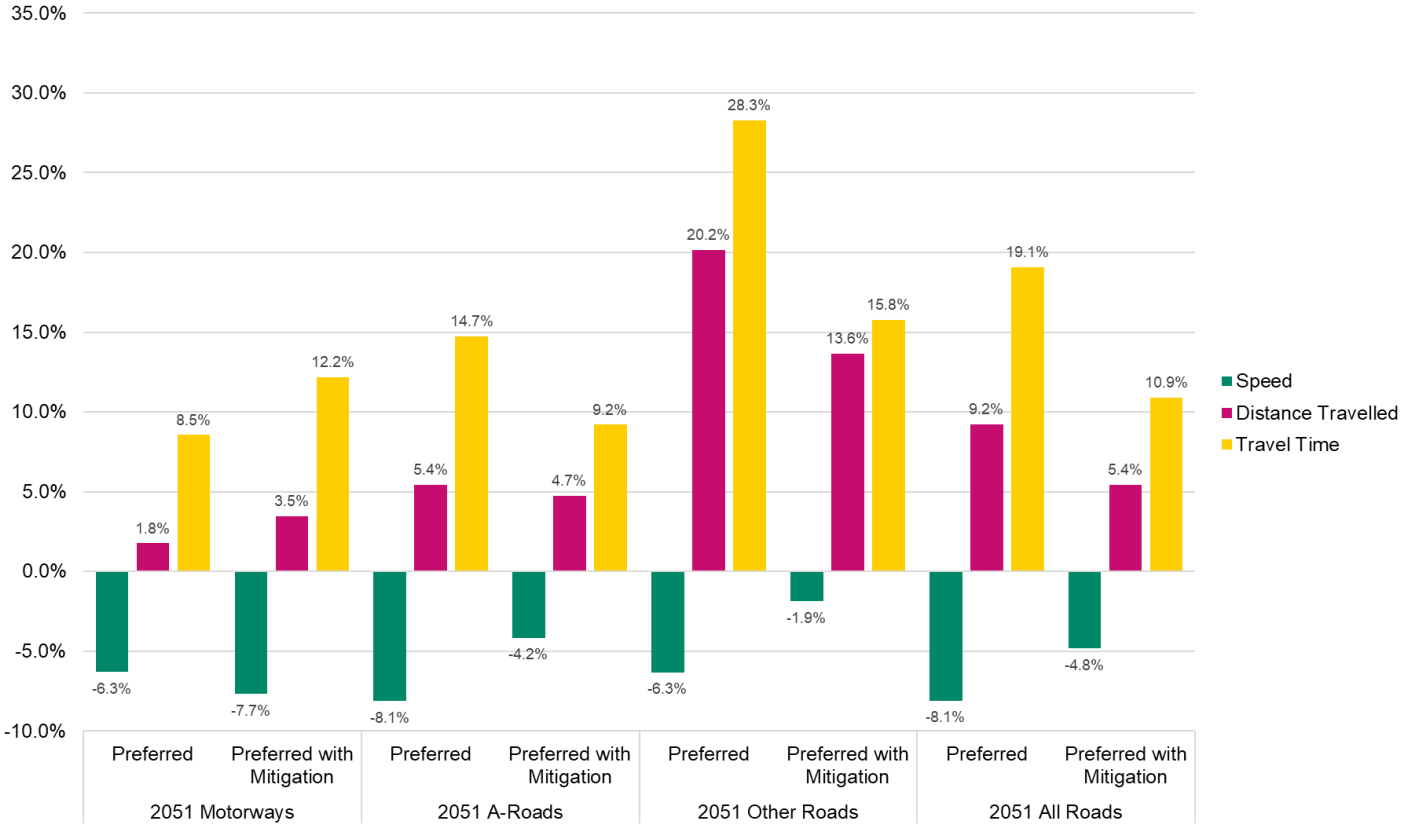

Figure 5-7: 2051 Mitigation Package – Change in Summary Statistics Across South Leicestershire vs Core Scenario

5.25. Table 5-4 shows the absolute figures for difference in journey time savings across each of the road types between the Preferred and the Preferred with Mitigation.

Table 5-4: 2051 Mitigation Package – Change in Journey Time Savings Across South Leicestershire vs Core Scenario

Scenario versus Core	Motorways (PCU Hrs)	A-Roads (PCU Hrs)	Other Roads (PCU Hrs)	All Roads (PCU Hrs)
Preferred	824	1,148	4,140	6,112
Preferred with Mitigation	1,173	716	2,310	3,492

5.26. Key points:

- **There is a decrease in average speed and increases in both distance travelled and travel time on motorways with the 2051 mitigation package.**
    - As the 2051 mitigation package was focussed on improving the capacity of the SRN and improving access to it, these figures reflect the package working as expected, attracting flows to the SRN. The secondary impact of this is that the higher volumes of flow on the SRN lead to a worsening of conditions based on the metrics assessed.
    - With the 2051 mitigation package distance travelled on motorways increases by 1.8% from the Core scenario. Without mitigation this increase is 3.5% compared to the Core scenario.
    - Similarly, with mitigation, travel time on motorways increases by 8.5% compared to the Core scenario. Without mitigation, the increase in travel time is 12.2% compared to the Core scenario. With mitigation, average speed on motorways decreases by 7.7% compared to the Core scenario.
    - Without mitigation, the decrease in average speed is 6.3% compared to the Core scenario.
- **Across A-roads and other roads there are improvements to network performance, which are reflected in the net-positive performance across the network with the mitigation package.**
    - As flows on motorways increase, they are drawn away from A-roads and especially local roads. This is reflected in the improvements to the network summary statistics for A-roads and other roads.
    - Across the network with the 2051 mitigation package, travel time increases 10.9% from the Core, compared to 19.1% without mitigation – an improvement of approximately 50%.
    - Distance travelled increases by 5.4% with mitigation, down from 9.2% without it, a reduction of 3.8 percentage points Average speed improves from an 8.1% decline to a 4.8% decline with mitigation.

2051 Geography of Mitigation Impacts

5.27. The geography of the performance of the 2051 mitigation package, and how it affects flow difference, VoC, and delay, is shown in Figure 5-8. Individual plots showing flow difference, VoC and delay change post-mitigation can be found in Appendix F.

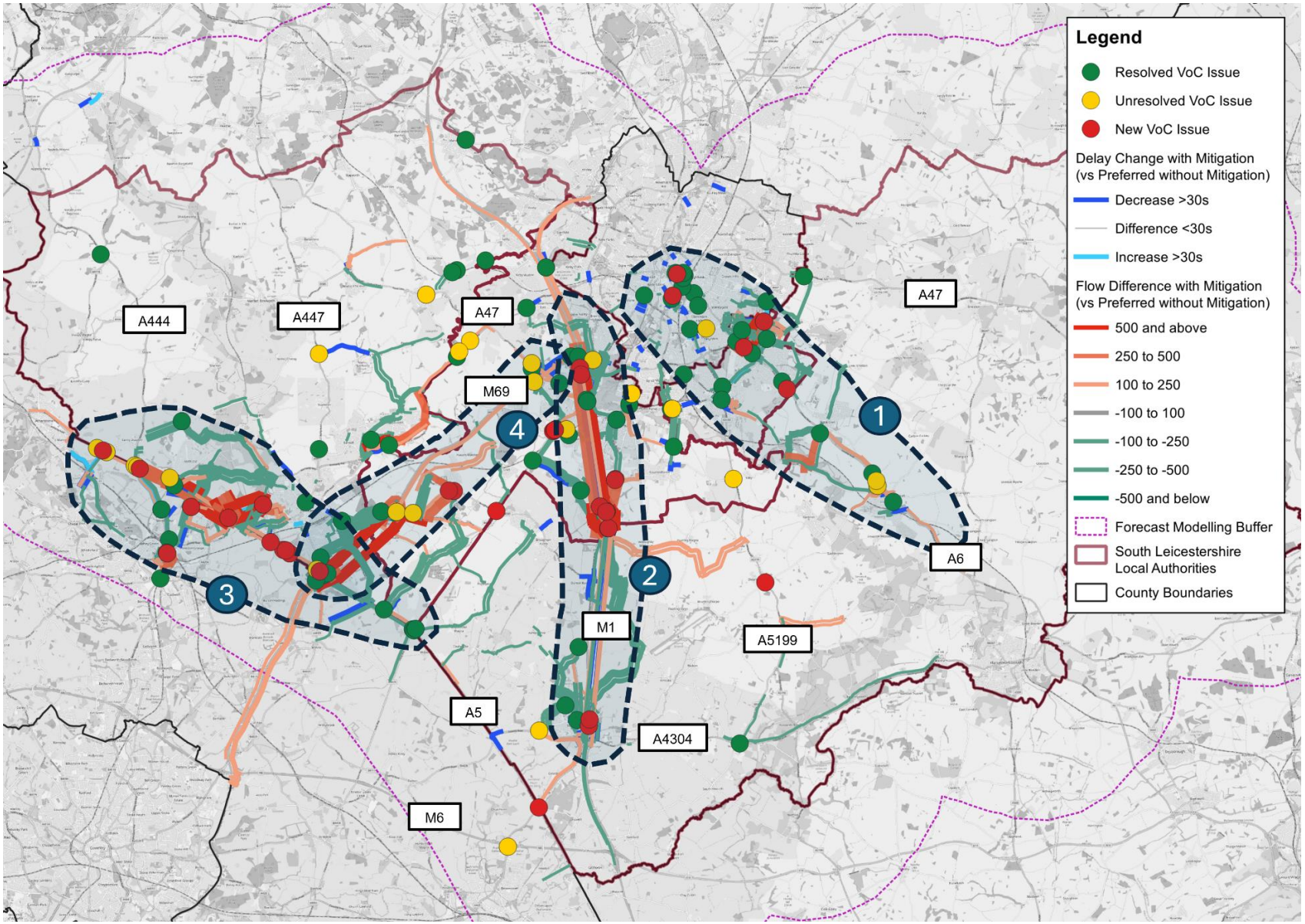

Figure 5-8: Geography of Impacts - 2051 AM and PM Peak Mitigation Package Performance

5.28. The points set out below are the key observed changes following the modelling of mitigation measures. The numbering of points corresponds to the numbered areas in Figure 5-8.

1. The mitigation measures which are proposed as part of the 2036 and 2041 packages continue to mitigate the impacts seen in 2051, but with increasing pressure.
2. The addition of M1 J20a draws significant flows away from local roads and onto the SRN.
3. The improvement to the A5 draws significant flows away from local roads west of Hinckley.
4. The introduction of south-facing slips on the M69 at J2 draws significant flows onto the M69 from the surrounding LRN.

2051 Mitigation Package Summary

- The SRN improvements proposed post 2041 add capacity to the higher-order network and improves its operation. Traffic is drawn back onto the SRN and trips reroute from lower-order roads to higher-order roads.
- Despite there being significant additional housing growth proposed post 2041, the level of impact reduction achieved by the 2051 package is larger than the 2036 and 2041 packages, pointing to the importance of tackling SRN issues and creating new capacity on key / major roads.
- As traffic is drawn off local roads and onto higher-order roads, some further issues emerge which can be considered further as the package is refined.

Overall Performance of the Mitigation Packages

5.29. Each of the four packages mitigate between a quarter and half of the impacts arising from the Preferred Growth Option.

5.30. The impact reduction and residual impact remaining is shown in Figure 5-9. The bars represent 100% of the impact of Preferred growth compared to the Core. The grey area of the bar is the residual impact on speed, distance travelled and travel time following the application of the mitigation measures. Across the packages the impact reduction is broadly similar, though as noted the reduction is larger for the 2051 package.

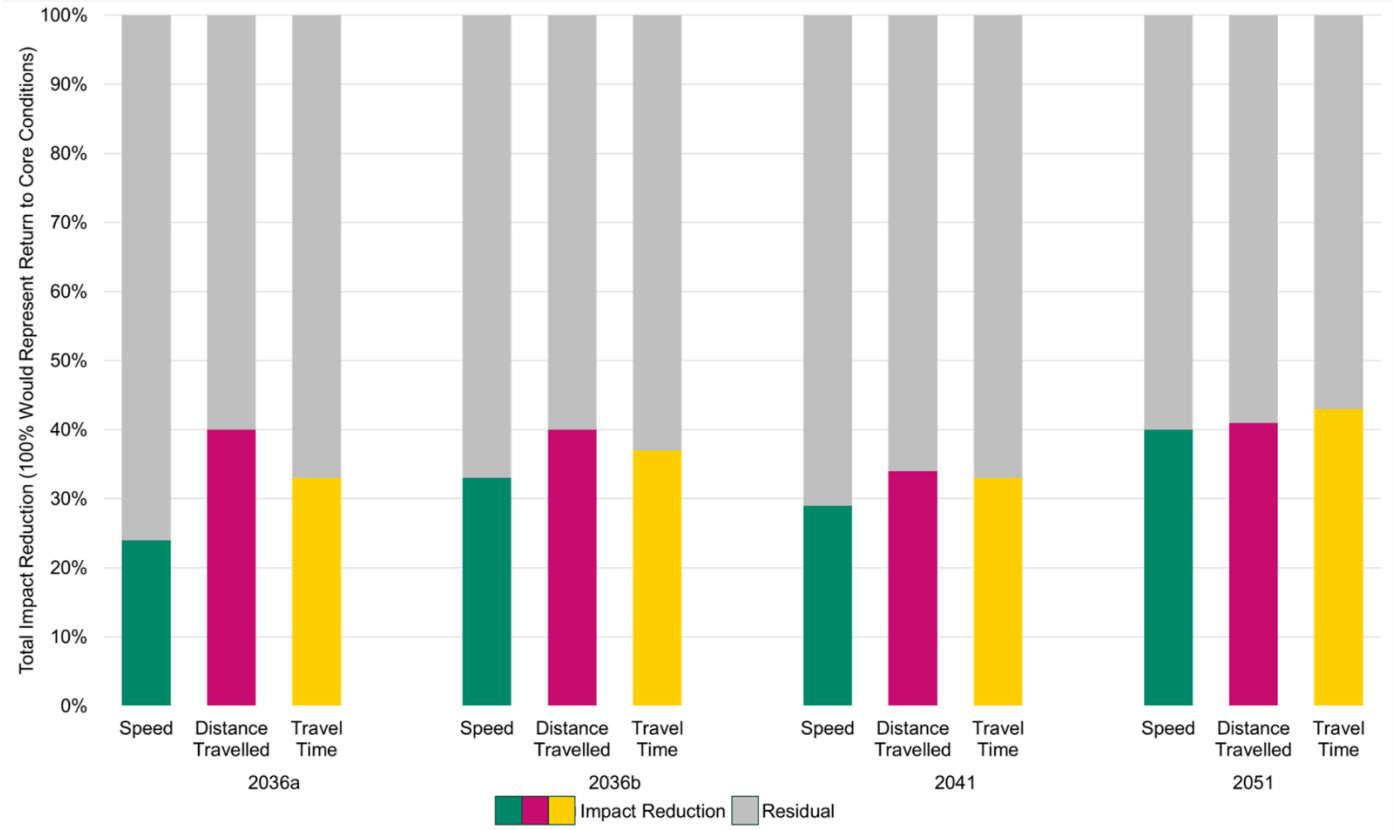

Figure 5-9: Proportion of Growth Mitigated by Package

5.31. Clearly, the mitigation packages address a smaller proportion of total impacts arising. This raises a fundamental question: Is the level of mitigation proposed sufficient and acceptable, or are further interventions required to reduce issues and the residual impacts? How does this differ by forecast year?

- By 2036: The analysis prompts consideration of whether the active travel and public transport package is sufficient or whether the additional interventions proposed in the 2036b package, including LRN measures, are necessary. For instance, can congestion on the highway network help to change travel behaviour positively and support the transition to different mode share levels / uptake of sustainable travel. Can it help with retiming of trips, home working levels, changing destinations, and make the network more efficient?

- By 2041: Investment in active travel and local public transport will continue and the extent and quality of the network for sustainable modes will improve and join up. Provision will continue to focus on areas and corridors where there is more potential for modal shift (improving travel choice and modal share). Additional local road capacity improvements will target significant issues and address serious delays and congestion pinch points. There should be some flexibility around what highway improvements are supported – there may be benefits of bringing forward some SRN improvements such as M69 junction 2 south facing slips and A5 corridor improvements if certain key sites come forward sooner than expected.

- By 2051 / full build-out: The scale of interventions put forward are proportionate to the new growth proposed, but the scale and extent of existing and future background issues means that even with SRN interventions residual impacts and issues remain. The interventions create some secondary

effects on higher-order roads that may need to be addressed by further refinement of the package.

5.32. The outputs of this work and subsequent refinement of the mitigation packages should be used to support the development of focused strategies and implementation plans of the new Local Transport Plan (LTP), including cross-border strategies supported by neighbouring authorities, and site-specific mitigation needs. It is for the South Leicestershire local authorities to work with LCC as highway authority and LTP lead to determine these next steps.

5.33. A final point worth reiterating is that the mitigation packages proposed are designed to address the transport impacts arising from local plan growth only. Many of the key issues identified are already in existence and worsen over time as a result of background growth, as seen in the Core scenario. This point highlights the need for strategies and investment plans that are long-term looking, offer multi-modal transport solutions and target to all users – the existing population as well as the new population who will come to live and work in South Leicestershire as the area grows.

Appendix A – Modelling Background

Introduction

A.1. A modelling exercise was undertaken in order to understand the high-level strategic impacts of the proposed growth options. The model used was the PRTM 2019 base v1.2. The modelling exercise comprised:

- a base year model review (part of JTE Stage 1);
- 2036, 2041 and 2051 Core forecast scenario production;
- 2036, 2041 and 2051 Preferred Option forecast scenario production; and
- analysis of the impact of the proposed growth in each forecast year, compared to the Core scenario.

Base Year Model

A.2. The findings of the base year model review are detailed in the base year model review report[1]. This concluded that the PRTM highway model is considered a suitable tool for informing Stage 1 and Stage 2 of the South Leicestershire Local Plan transport needs evidence base. However, some minor network changes were identified for inclusion as part of the base year model review and subsequent discussions with LCC and the four Districts and Boroughs:

- correction of coding at Wakes Road Roundabout in Wigston;
- network changes identified as part of the A511 Major Roads Network Outline Business Case modelling work; and
- expansion of the coding of two roundabouts on the A6 to the north and east of Market Harborough.

Core Forecast Model Assumptions

A.3. Forecast model networks were based on the latest PRTM network (v1.4) with the inclusion of schemes agreed according to the uncertainty log[2]. This was circulated to key stakeholders for agreement and no changes were made.

A.4. Up to date forecast planning data (households and employment) for the four Districts and Boroughs was provided by LCC. This was processed into the format necessary for inclusion in the model. Planning data for areas outside the four Districts and Boroughs was taken from v1.5 of the standard PRTM planning data spreadsheets.

A.5. The models were run with unconstrained growth, so that in the event that the growth derived from the local planning data results in levels below NTEM[3]/TEMPro[4] growth, the model reverts to NTEM/TEMPro as minimum.

[1] South Leics JTE - Base Year Model Review v1.1.pdf, January 2024
[2] South Leics JTE Uncertainty Log v1.0.xlsx, November 2023
[3] National Trip End Model
[4] Trip End Model Presentation Programme

Development Forecast Model Methodology

A.6. Assumptions relating to the households and employment to be assumed in each of the forecast years, along with locations and associated access points and spine roads, were provided by LCC.

A.7. In most cases, households and employment were added to the appropriate *geographical* zone according to location. However, for larger developments, 36 *development* zones[5] were used to represent access points in more detail as well as apply specific trip rates agreed with LCC and the Districts and Boroughs and based on similar local plan studies undertaken recently within Leicestershire. For household sites, the household trip rates presented in Table A-1 were applied. For sites which contained both household and employment growth, the employment trip rates presented in Table A-1 were also applied.

Table A-1: Development Zone Trip Rates

	Residential		B1 use class		B2 use class		B8 use class	
	Origins per household	Destinations per household	Origins per 100sqm	Destinations per 100sqm	Origins per 100sqm	Destinations per 100sqm	Origins per 100sqm	Destinations per 100sqm
AM Peak Hour	0.41	0.142	0.26	1.51	0.07	0.19	0.05	0.07
PM Peak Hour	0.142	0.41	1.05	0.32	0.19	0.06	0.07	0.03

A.8. In the case of growth included in geographical zones, the distribution of the associated trips was governed by the existing (base year) trip distributions. For growth in development zones, the PRTM gravity model was used to distribute trips to and from these sites.

A.9. Spine roads were included for some of the larger developments to facilitate access to and from the highway network and provide an indicative representation of additional highway capacity that might be required to support such developments. These will to some degree affect the routeing of traffic to and from sites but are, being within the sites themselves, likely to be part of on-site access proposals led by developers. Spine roads were coded with 32kph (20mph) speeds in order to minimise their use by non-development traffic.

[5] Additional model zones used to provide flexibility and greater detail in representing large developments, separate from the geographical zone system

Appendix B – Additional Analysis to Support the Identification of Mitigation Measures and Packages

B.1 This section presents additional modelling analysis that was carried out to support the identification of mitigation measures and approach to modelling modal shift. The following outputs were analysed:

- select link analysis/trips by distance band;
- geography of short (<10km) and longer-distance (>10km) trips; and
- uncongested routeing.

Select Link Analysis/Trips by Distance Band

B.2 Selected links from the model were reviewed to analyse trip distances and purposes across different locations in South Leicestershire. This assessment aimed to understand how trip length and purpose influence the likelihood of modal shift and the feasibility of mitigation measures in specific locations. The chosen links and their selection rationale are outlined below.

Key **Trip** Attractors:

- Fosse Park;
- Grove Park;
- Magna Park; and
- Leicester Rail Station Car Park.

Key Radial and Orbital Routes near Leicester City:

- A6 (Radial); and
- A563 (Orbital).

B.3 Trips along the selected links were categorised into distance bands (<2km, 2km–5km, 5km–10km, 10km–20km and >20km) to assess the potential for modal shift:

- Trips under 20km: Higher propensity for public transport modal shift; and
- Trips under 10km: Higher propensity for active travel modes, with potential increasing for shorter distances.

B.4 Trips were further disaggregated by user class (e.g., car trips versus HGV/LGV trips). HGV/LGV trips have lower modal shift potential compared to car trips. While car trip purposes were not differentiated at this stage, the distinction between trip types provides further insights into mitigation opportunities.

B.5 Figure B-1 shows the outputs of this analysis.

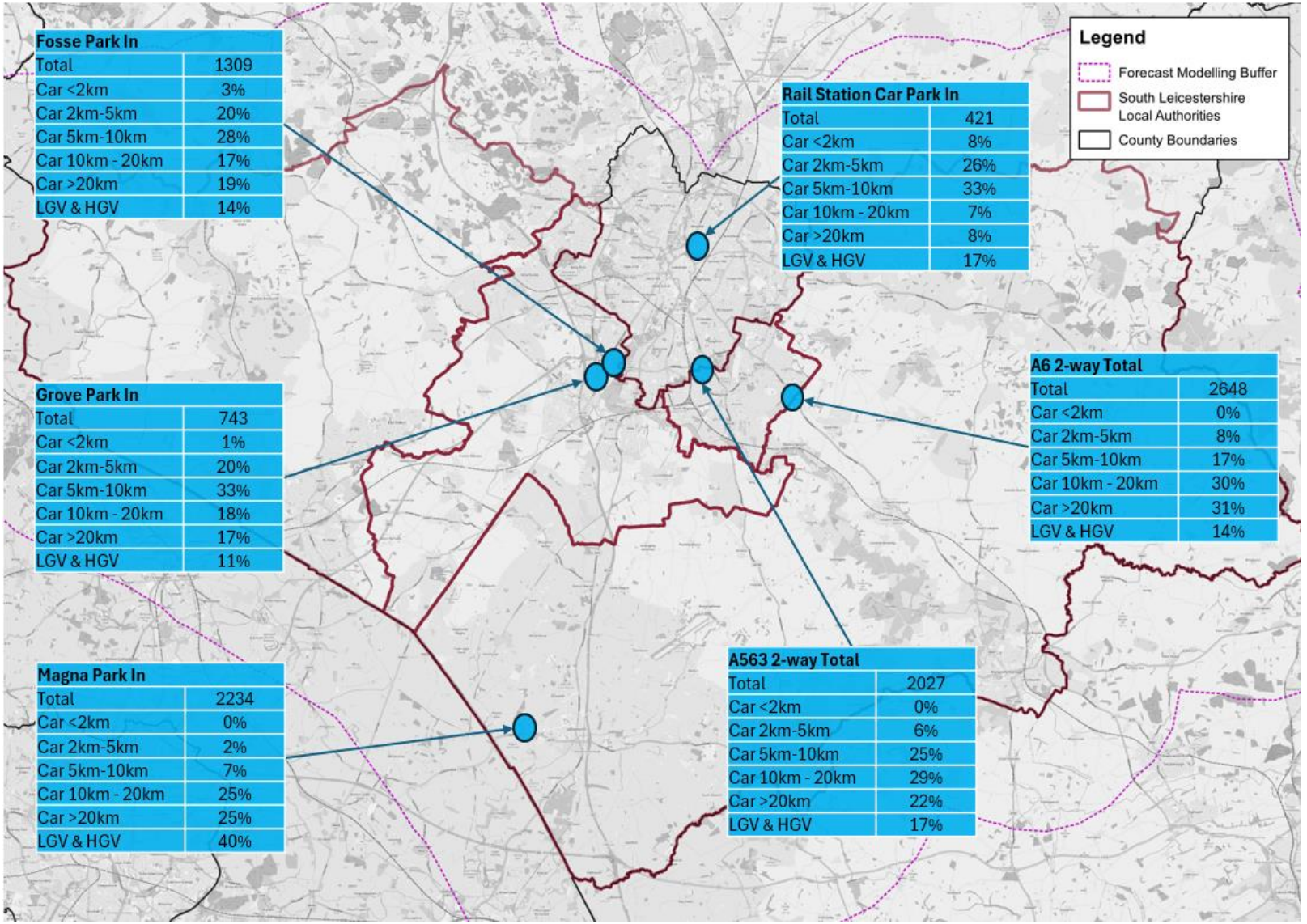

Figure B-1: Select Link Analysis – Trips by Distance Band by Selected Location

B.6 The following findings have been drawn from Figure B-1:

- Fosse Park and Grove Park: A significant proportion of trips are under 10km (51% and 54%, respectively). This indicates strong potential for modal shift to active travel or public transport on short-distance trips to trip attractors in Key Impact Areas A, B, C and H (Leicester City and the areas bordering the south of the City).
- Magna Park: Only 9% of trips are under 10km, reflecting the isolated, industrial nature of this location. The high proportion of LGV/HGV trips (40%) further reduces the potential for modal shift. More rural areas, such as Magna Park, have a greater reliance on car usage and as such a lower propensity to modal shift.
- Leicester Rail Station: Almost two-thirds of trips fall within 2km–10km, highlighting the importance of active travel and public transport links between the City of Leicester and South Leicestershire to accommodate short-distance trips.
- Both the A6 and A563 are characterised by longer trips, with only 25% and 31% of trips, respectively, under 10km. These longer trips are less likely to shift to active modes.

Key Finding(s): Select Link Analysis/Trips by Distance Band

- This analysis highlights the need for targeted mitigation strategies to address the differing trip characteristics across South Leicestershire. For locations with high proportions of short-distance trips, especially to/from the City of Leicester, active travel and public transport improvements should be prioritised.

Geography of Short (<10km) and Longer-Distance (>10km) Trips

B.7 In addition to the more link-specific analysis conducted, plots showing the geography of flows short (<10km) and longer-distance (>10km) trips across South Leicestershire were also extracted. Significant longer-distance flows can be seen across the Study Area, with the exception of the largest urban areas. Greater insight can be drawn from the analysis of short-distance flows, as set out in Figure B-2 which shows car trips shorter than 10km (volume flow) by direction. These are the trips which have the greatest propensity for modal shift to active modes.

B.8 As can be seen in Figure B-2, the largest flows of car trips shorter than 10km are being made in the City of Leicester (Key Impact Areas H), and cross-border between the City of Leicester and the surrounding areas. There are also notable flows of short-distance trips in Hinckley, and cross-border between Hinckley (Key Impact Area G) and Warwickshire. Within South Leicestershire there are also concentrations of these trips in other larger settlements, Market Harborough (Key Impact Area E) and Lutterworth (Key Impact Area F). There are some inter-urban flows, but these are predominantly to the City of Leicester from Market Harborough, Hinckley and Lutterworth.

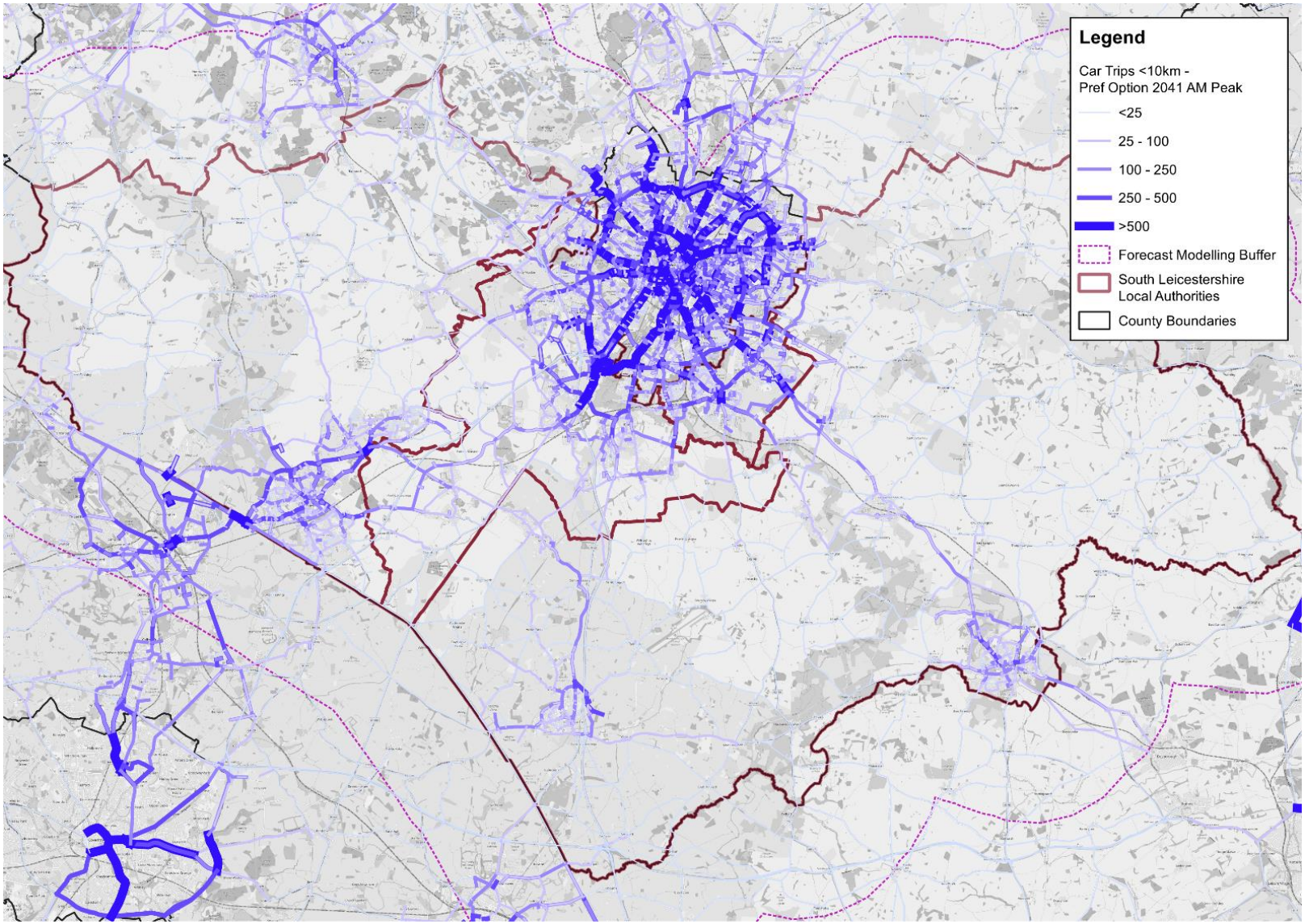

Figure B-2: Car Trips under 10km, Preferred Option 2041 AM Peak

Key Finding(s): South Leicestershire-Wide Review of Trip Lengths.

- Mitigation measures need to address the differing trip characteristics across South Leicestershire. For locations with high proportions of short-distance trips, especially to/from the City of Leicester, active travel and public transport improvements should be prioritised.
- The most effective focus of sustainable mode mitigation measures in terms of achieving a high-degree of modal shift is likely to be on short-distance trips internal to market towns and cross-border between the Key Impact Areas immediately south of the City of Leicester.

Uncongested Routeing Analysis

B.9 Uncongested routeing analysis was undertaken to evaluate the impact of congestion on routeing patterns and identify how network improvements could enhance efficiency. This analysis examines traffic movements under conditions of minimal congestion. The outputs for the Preferred Growth Option are shown in Figure B-3.

B.10 Figure B-3 shows changes in vehicle flows during the AM Peak in 2041, with red indicating increased flows and green indicating reduced flows.

B.11 Significant differences in routeing patterns are observed under the uncongested scenario, particularly on key routes such as the SRN and radial corridors into Leicester City. Increases in vehicle flows are also noted on local roads near major developments due to limited access to higher-order routes.

B.12 Specific issues are evident towards Hinckley, where traffic avoids the A47 and M69 due to access constraints, and in areas south and east of Leicester, where development traffic is routed onto local roads to reach key radial routes. These findings highlight the need to enhance connectivity to the SRN and higher-order roads to support future growth and improve network efficiency.

Key Finding(s): Uncongested Routeing Analysis

- Access to the SRN is a key driver of the routeing of traffic. Access issues are both a result of congestion at major junctions on the SRN, for example M1 J21, but also a lack of suitable access points, for example there are no southbound slips at M69 J2. The latter point is a particular problem for the area between Hinckley and the City of Leicester, an area of significant proposed development.

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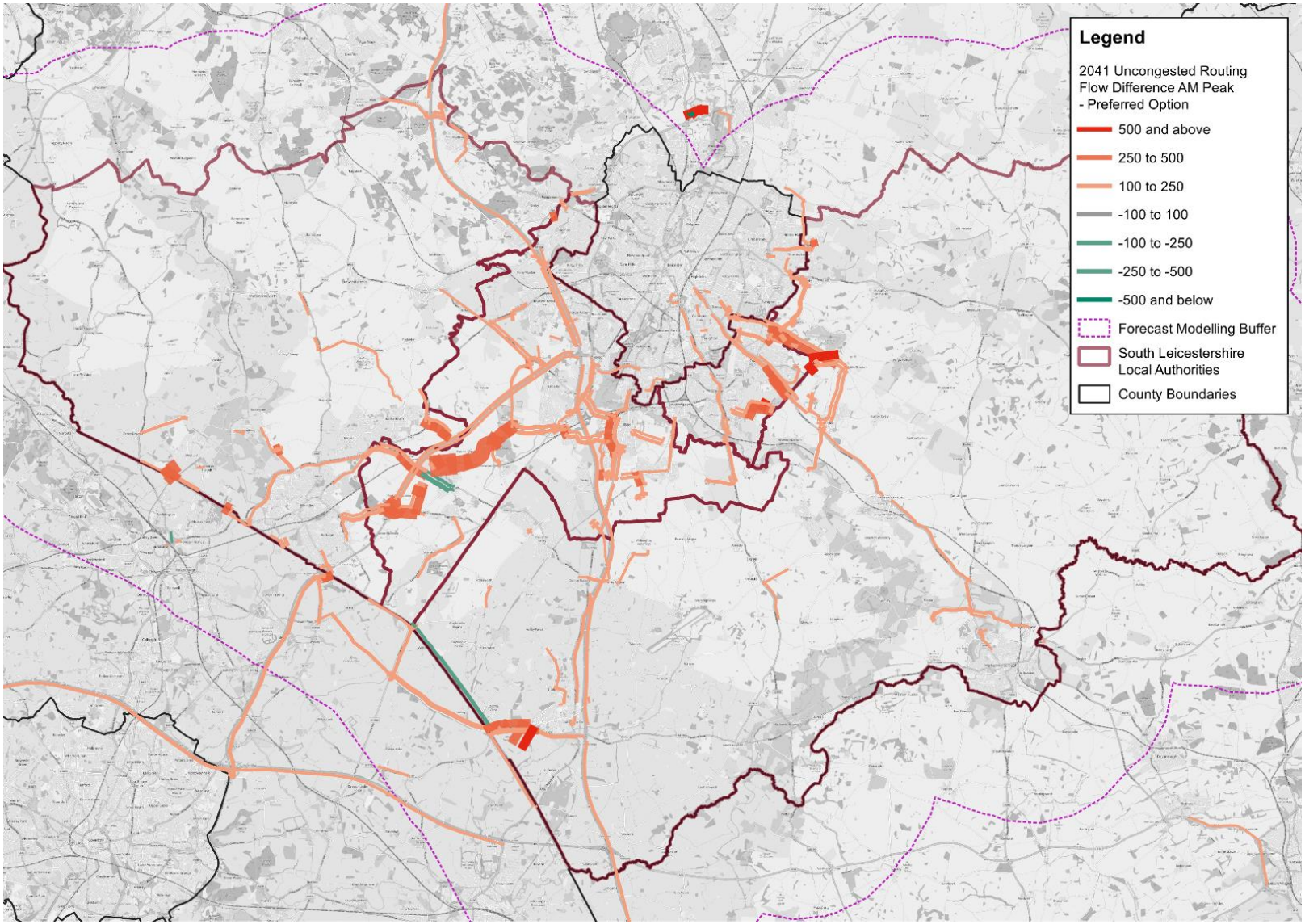

Figure B-3: Uncongested Routeing Analysis, Preferred Option (2041, AM)

Appendix C – Approach to Modelling Mitigation Measures

Introduction

C.1 This Appendix outlines how the mitigation measures identified in Section 4 are considered in the PRTM SATURN modelling inputs. It covers the general approach taken by mode to modelling measures and does not detail the specific coding of road schemes.

C.2 LCC provided details regarding the access requirements for sites in each of the spatial growth options. Spine roads were included in the modelling for larger strategic development sites or clusters where they might serve a strategic purpose.

Which Measures Have Been Modelled?

C.3 Active travel, bus, LRN, and SRN mitigation measures have been modelled as they are expected to have the most significant impact on the issues identified earlier in this report.

C.4 Rail measures have not been modelled, as they are expected to have a limited impact on car reduction due to the limited existing rail patronage in Leicestershire. There are also uncertainties around the relationship between the implementation of rail measures and a potential car trip reduction.

C.5 Interchange measures have not been modelled to avoid double counting the benefits of other modes. While interchange measures are expected to encourage modal shift from cars, their exclusion reflects a conservative approach to ensure the robustness of the outputs.

C.6 As noted in Section 4.10, soft measures have not been modelled as they are not explicitly included in the packages. However, it is assumed that sustainable measures will be accompanied by some soft measures to support their take up.

What are the Approaches Taken to Modelling Different Modes?

Local Road Network

C.7 The mitigation measures were coded and modelled in the PRTM highway-based SATURN model. However, due to the lack of detailed proposals for most LRN junctions requiring mitigation, assumptions were made about the potential scale of the measures.

C.8 Typically, LRN measures involved adding lanes to junction approaches or introducing signalisation. For larger-scale schemes, such as the A563 orbital missing link, further assumptions were made based on professional judgement and previous modelling exercises. The exact details of all LRN schemes will need to be determined as they progress through their individual project pipelines.

Strategic Road Network

C.9 SRN mitigation measures were coded into the SATURN model based on previously established assumptions. For the "M69 Junction 2 South-facing slip roads" measure, assumptions were drawn from previous Hinckley National Rail Freight Interchange (HNRFI) modelling. Coding for other SRN schemes was guided by assumptions previously agreed upon by LCC, predominantly those agreed as part of the Leicester and Leicestershire Strategic Transport Assessment (STA).

Sustainable Measures: Active Travel and Bus

C.10 It was agreed to model the mitigation measures through a highway assignment-only approach which means that modelling the impact of non-highway mode interventions required additional consideration.

C.11 The benefits of the mitigation packages are assessed in terms of their ability to reduce impacts on the road network. This necessitated finding a method to reflect the benefits of sustainable measures in limiting the effects of growth on the highway network.

C.12 Bus and active travel measures reduce road network impacts by encouraging modal shift. Greater uptake of these modes results in fewer car trips, reducing congestion. The modelling approach therefore involved estimating the potential for sustainable measures to increase their modal share in each modelled year (2036, 2041, and 2051) and determining the corresponding reduction in car trips. This reduction was then incorporated into the demand inputs for the model.

C.13 As the proposed mitigation measures will benefit a broader area and not just trips related to new growth (see Section 4.6), modal shift modelling assumptions will be applied to the Preferred Spatial Growth Option. This means it will account for all trips, including core trips, background growth, and development-related growth.

C.14 The modal shifts referenced in the following sections will apply to a significantly larger number of trips compared to current levels, reflecting a changed transport landscape. This vision of the future system carries many uncertainties, including public willingness to shift modes, the availability of future funding, and potential changes in political and policy directions. These factors are some of the implicit assumptions underlying the modelling inputs.

Determining the Level of Modal Shift

C.15 Notwithstanding the wider uncertainties referenced above, there is some uncertainty about the level of modal shift achievable through the proposed sustainable mitigation measures as:

- the strategic nature of the proposed measures means their specific details remain unclear. For example, the exact locations of cycling routes will depend on the completion of the LCWIP process in the identified areas; and
- there is limited context-specific evidence for the outcomes of large-scale investment in similar initiatives.

C.16 To estimate the level of modal shift for modelling purposes, further analysis was conducted, reviewing data on existing usage, identifying research and benchmarks on potential future usage, and through undertaking stakeholder engagement. Further details on this approach are provided below.

C.17 Data on existing modal shares for cycling and buses was reviewed, including sources such as the DfT Annual Bus Statistics[6], Census data (2011 and 2021)[7], and key statistics from the Leicester City BSIP[8]. The review highlighted low existing modal shares for buses and cycling in South Leicestershire, with even lower levels in rural areas. This indicates significant potential for change but also substantial barriers to achieving such an uplift.

C.18 To estimate potential future increases in cycling and bus use, case studies and scenarios were reviewed to establish benchmarks for modelling the JTE mitigation measures. Case studies offered insights into modal shifts achieved through previous active travel investments, though these are often limited by their context and the smaller scale of investment compared to the proposed JTE measures. Notably, the DfT's evaluation of the Cycle City Ambition programme[9] provided valuable insights. Additionally, scenarios such as the UK Government's Climate Change Committee's net-zero pathways[10] and the Propensity to Cycle Tool (PCT) scenarios[11] provided estimates of potential modal shares under specific conditions.

C.19 Existing modal share data, along with details of relevant case studies and scenarios, was presented to stakeholders during the workshop. Stakeholders were invited to provide feedback on whether the figures represented realistic uplifts in cycling and bus patronage. Their input, combined with professional judgement and the case studies and scenarios, informed the final view on the level of modal shift. Stakeholders were then asked for additional feedback on these figures. The resulting estimates and the rationale behind them are outlined in Figure D-1 below.

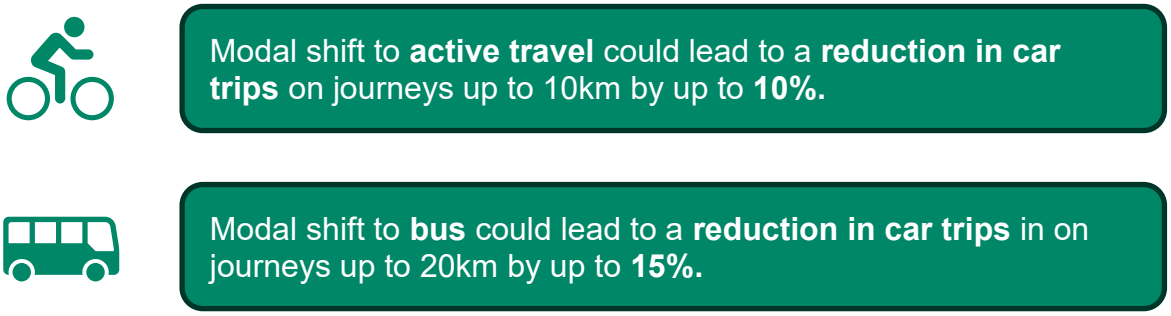

Figure D-1: Proposed Reduction in Car Trips for the Modelling of Active Travel and Public Transport Measures

C.20 The sources referenced between C.17 and C.19 informed the shifts shown in Figure D-1. While the shifts in Figure D-1 should be considered collectively, there is an inevitable overlap between potential new users of active modes and public transport infrastructure. As such, the combined impact cannot be interpreted as a 25% reduction in car trips. The calculations outlined in this section account for this 'substitution effect'.

C.21 These headline figures indicate the potential modal shift achievable in South Leicestershire. However, further considerations were required, such as the timeline for achieving these shifts, expected changes in preceding or following years, and the

[6]https://www.gov.uk/government/statistics/annual-bus-statistics-year-ending-march-2023/annual-bus-statistics-year-ending-march-2023
[7] https://www.ons.gov.uk/census
[8] https://www.leicestershire.gov.uk/roads-and-travel/buses-and-public-transport/bus-service-improvement-plan-bsip
[9] https://www.gov.uk/government/publications/cycle-city-ambition-programme-2013-to-2018-review
[10] https://www.theccc.org.uk/publications/
[11] https://www.pct.bike/

types of car trips to which these reductions could realistically apply. These questions are addressed in the following sections.

To Which Trips Does Modal Shift Apply?

C.22 It was recognised that applying modal shift assumptions uniformly across all trips would lack robustness. Key subsets of trips were defined to guide how modal shift could be applied within the model. These subsets, informed by evidence and professional judgement, were as follows:

Distance

C.23 The potential for modal shift varies by trip length. Shorter trips have a higher propensity to shift to active modes, with e-bikes extending the feasible distance for cycling. Trips under 10km were considered to have the greatest potential for shifting to walking or cycling, while trips under 20km were identified as having a higher propensity to shift to public transport. Although trips over these distances could shift in some cases, their likelihood was deemed too limited to be meaningfully represented in the modelling.

Geography

C.24 The potential for modal shift is also influenced by the geography of South Leicestershire. Urban areas and large developments were identified as having a 'higher propensity for modal shift' to active modes and public transport, due to the concentration of trip attractors in densely populated locations and improved access to sustainable travel options. Considering these factors, zones in the model with a higher potential for modal shift were selected based on their urban or rural characteristics, and the presence of significant new developments.

C.25 ‘Significant’ developments were defined as housing sites with over 500 dwellings and employment sites with a B1 land use (office space). Although some potential for commuting modal shift exists, other employment site land uses were deemed to have a lower likelihood of such shifts due to a higher prevalence of LGV/HGV trips. These sites were therefore excluded, consistent with the conservative approach adopted.

C.26 Due to the nature of bus routes—where passengers board and alight at various points along a route—it was also considered appropriate to identify zones along key radial road corridors between urban areas and large new developments as having a 'higher propensity for modal shift'. Zones along the A6, A426, and A47 were selected based on a review of existing key bus corridors.

C.27 It was then determined that only trips with an origin and destination within zones identified as having a ‘higher propensity for modal shift’ to active travel and/or public transport in South Leicestershire could be assumed to shift modes. This also applied to trips between South Leicestershire and Leicester City, but excluding trips entirely within Leicester City. This approach reflects the greater certainty regarding the implementation of mitigation measures in these areas. The geography of the identified zones is shown in Figure D-2.

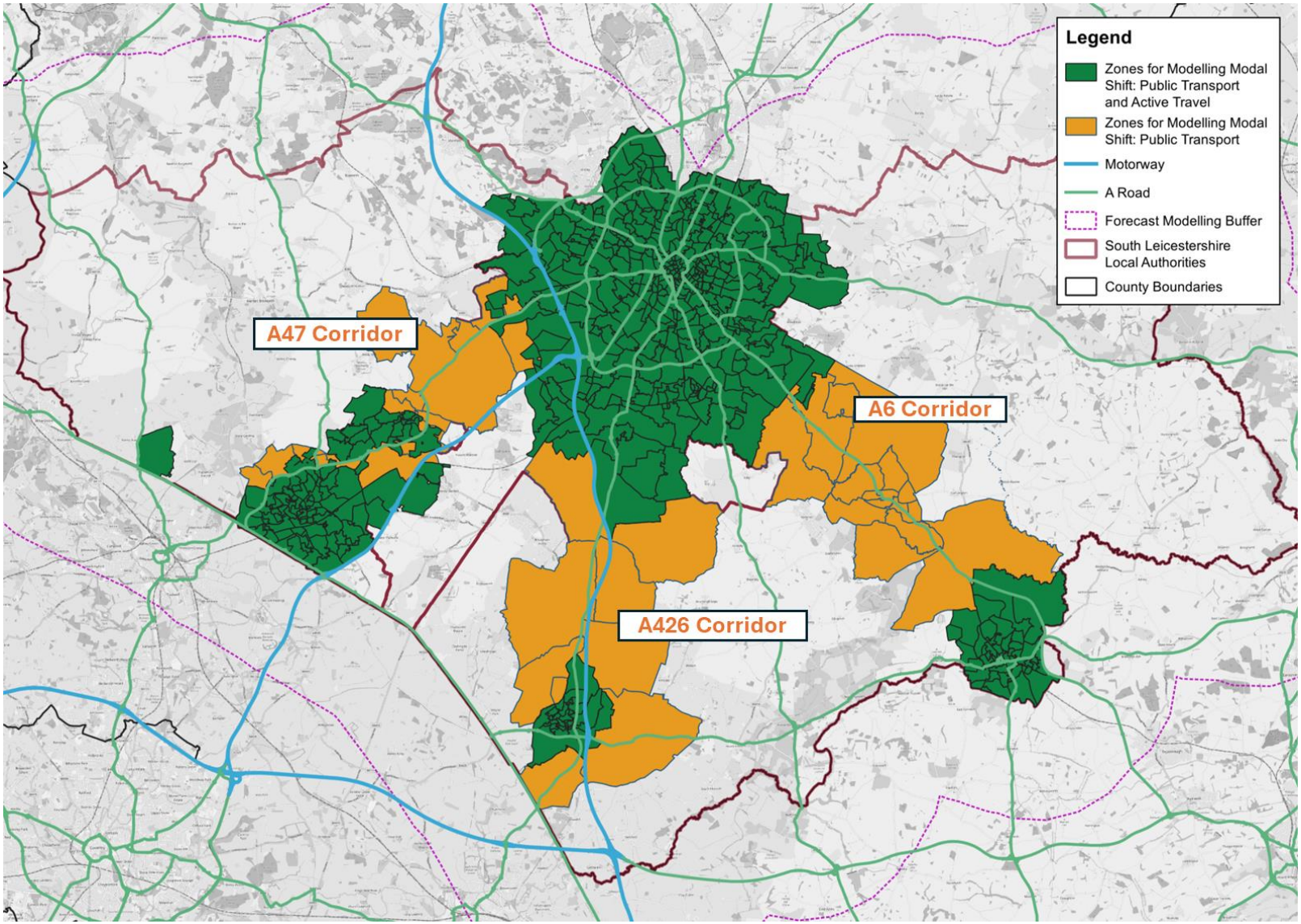

Figure D-2: PRTM Model Zones with Higher Propensity for Modal Shift

C.28 Figure D-2 shows the geography of the identified zones for modelling modal shift. Green zones are those where a modal shift to both active travel and public transport are modelled. Orange zones are the key bus corridors where a shift to public transport only is modelled. The location of these zones in relation to the proposed growth sites can be seen in Figure D-3 to Figure D-5.

C.29 While cross-border connections, such as those to Nuneaton, are also expected to improve, no direct mitigation is proposed in these areas. To maintain the robustness of the modelling, the analysis focuses on the areas where interventions are planned, while acknowledging the potential for a greater modal shift than currently modelled.

Trip Purpose

C.30 The purpose of a trip also affects its likelihood of shifting modes. For this analysis, it was assumed that LGVs and HGVs would not shift modes, whereas all car-based trips were considered to have a degree of modal shift potential (Business, Commuting and Other).

Forecast Modelling Year

C.31 The 10% and 15% modal shift targets referenced in Figure D-1 represent an ambitious vision for change. Based on a review of relevant source material, stakeholder discussions, and professional judgement, it was determined that these figures should reflect the 2051 scenario for modelling modal shift. Given the scale of ambition, a decision was needed on what level of modal shift could be realistically achieved by 2036 and 2041.

C.32 Due to the flexibility and scalability of the proposed active travel and public transport measures (discussed in Section 4), the most appropriate approach was to scale the modal shift targets according to housing growth. As noted in Section 2, 41% of housing growth is expected to be completed by 2036, and 64% by 2041. These proportions were applied to the 2051 modal shift targets, assuming that 41% and 64% of the total shift would be achieved by 2036 and 2041, respectively. For comparison, these figures were cross-checked against metrics such as over-capacity junctions, average speed, cumulative kilometres, and travel time, using the forecast modelling outputs. These metrics showed a similar scale of change to the housing growth figures.

Substituting between Active Travel and Public Transport

C.33 As highlighted in Section C.20, a 'substitution effect' is observed with multi-modal interventions. Car users who might be open to switching modes may choose to use either public transport or active travel interventions. The modal shift from car to both active modes and public transport is assumed to be 25% lower where both active mode and public transport interventions are proposed.

C.34 For uni-modal appraisal, the TAG databook[12] recommends using a diversion factor of 0.04 (4%) from cycling to bus, and 0.14 (14%) from bus to cycling. This means that for every 100 new users of a bus scheme, on average 4% of these would likely have previously cycled. For car to bus and cycling, this figure is 0.24 (24%). Although there are significant differences between uni-modal and multi-modal appraisal, and therefore limited direct comparisons can be drawn, the substitution rate used here can be considered a cautious assumption.

[12] https://www.gov.uk/government/publications/tag-data-book

Summary

C.35 Considering the factors above provides a structured approach for refining the modelling assumptions. While there are recognised caveats and exceptions, these parameters were judged to be appropriate based on the evidence reviewed and the need for practical modelling thresholds.

C.36 The proportion of trips to which modal shift is applied is lower than the total number of trips with an origin or destination in South Leicestershire and Leicester City. This represents a much smaller subset compared to all trips in the model. It is noted that some trips without an origin or destination in these areas may still use South Leicestershire's road network, contributing to and being affected by its impacts and mitigation measures. The implications of this will be reviewed when the mitigation measures have been modelled.

Stakeholder Review

C.37 Once it was confirmed that the proposed car reductions were proportionate, the modal shift modelling assumptions were shared with stakeholders. This included the modelling assumptions for LRN and SRN schemes, to ensure consensus on the inputs before they were incorporated into the model.

Sensitivity Testing

C.38 The modal shift scenario and rate of change outlined above represent a single, evidence-based vision for the future transport system. While ambitious and supported by stakeholders, achieving this scenario would require substantial infrastructure and investment to align with its scale. The analysis relies on numerous assumptions, some of which are explicitly stated, while others, such as uncertainties around people’s willingness to shift modes, remain implicit and subject to significant uncertainty.

C.39 Further work could be undertaken such as sensitivity testing to assess the potential range of different model outcomes which may arise with different rates of change and different modal shifts.

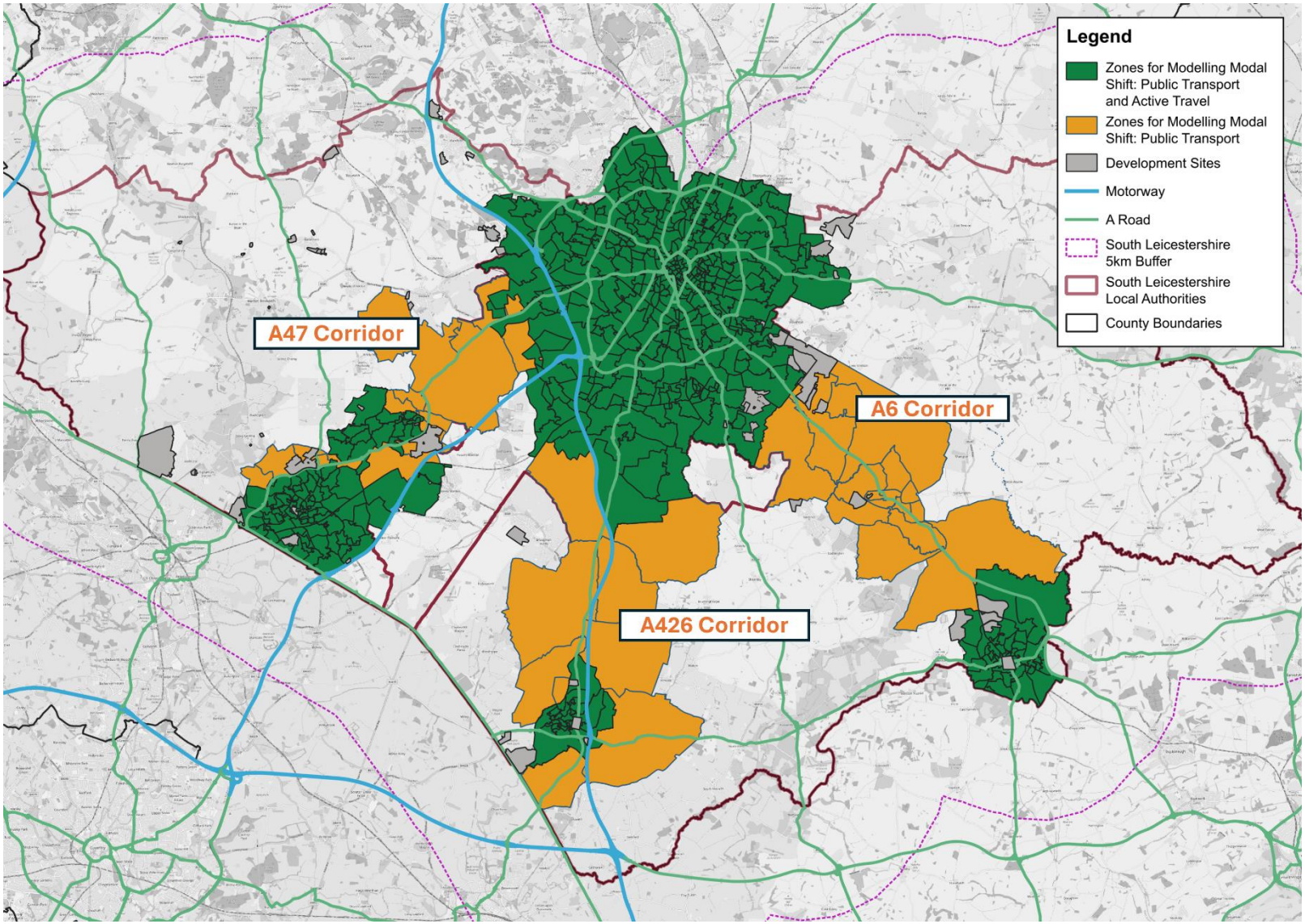

Figure D-3: PRTM Model Zones with Higher Propensity for Modal Shift and Proposed Growth Sites 2036 - 2051

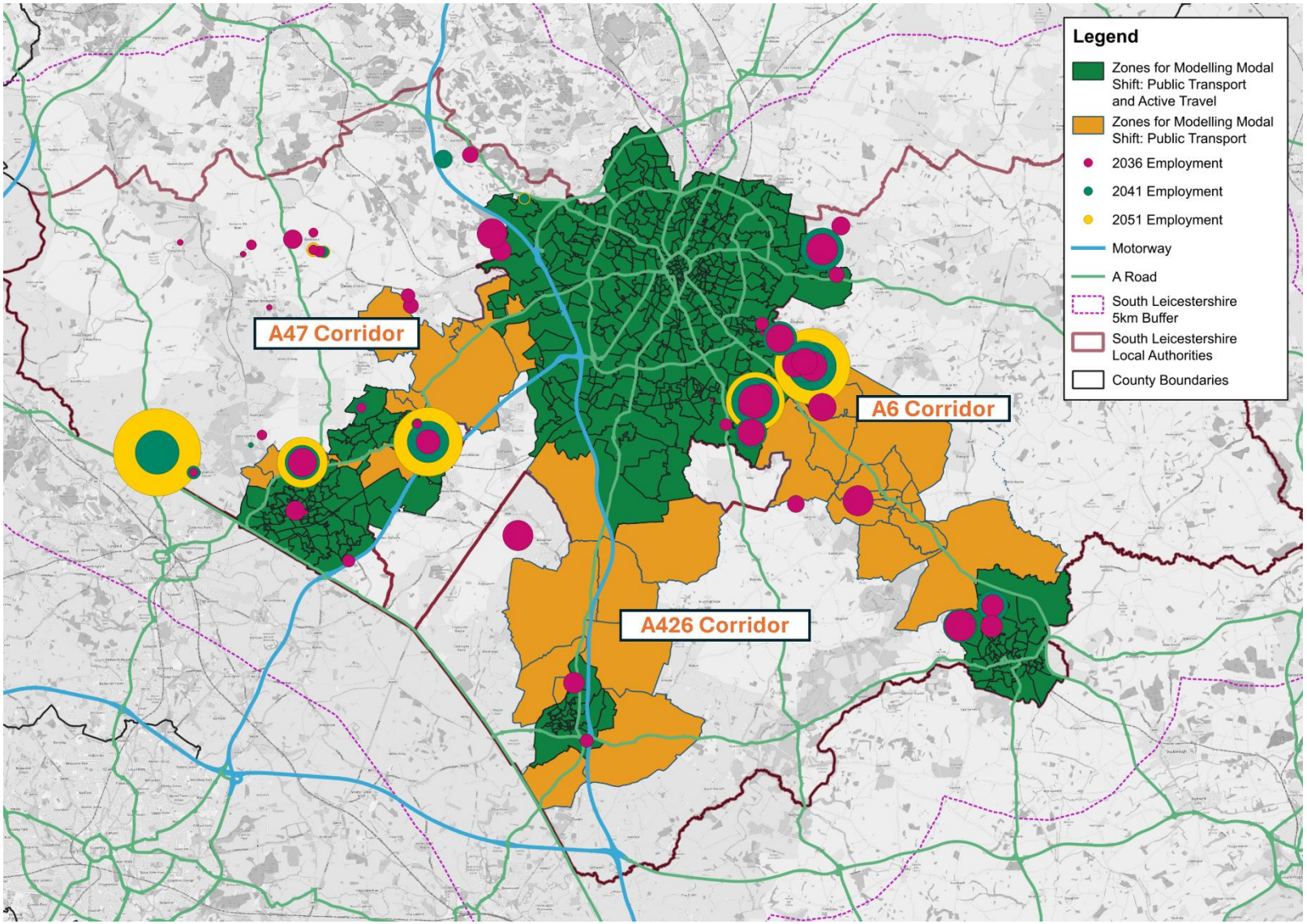

Figure D-4: PRTM Model Zones with Higher Propensity for Modal Shift and Proposed Housing Growth Sites 2036 - 2051

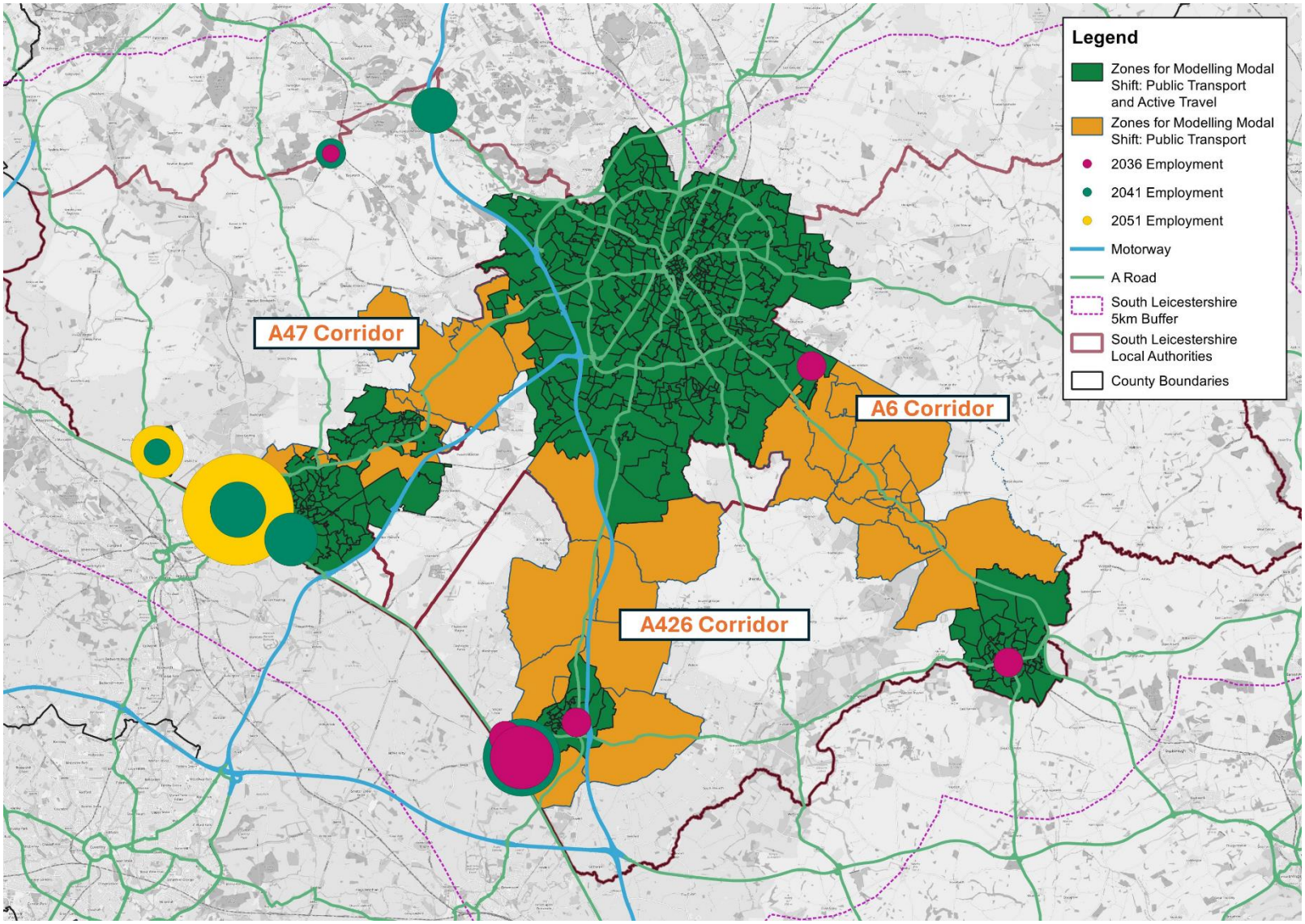

Figure D-5: PRTM Model Zones with Higher Propensity for Modal Shift and Proposed Employment Growth Sites 2036 - 2051

Appendix D – Mitigation List and Packages

Table D-1: Mitigation List and Packages

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
Active Travel	**LCWIP proposals building on LCC's 'North of Leicester LCWIP'.** This area is West of Leicester City and includes the towns of Desford, Ratby, Kirby Muxloe and Groby. The delivery of visionary walking and cycling infrastructure to develop a cohesive network. Further details about LCWIP style measures included in the report. Key measures include segregated cycle lanes, cycle-friendly junctions, continuous footways, cycle tracks and protected crossings. Measures may include: - Routes which support safe crossing of the M1 to reduce severance including radial connections which link towns of Desford, Ratby, Kirby Muxloe and Groby to the City of Leicester	Encourage active and sustainable travel behaviour choices for both existing and new journeys arising from planned growth to/from the West of Leicester area. Remove and relieve the impact of local, short-distance trips to/from the West of Leicester area and from the highway network in and around this area.	B	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.
Active Travel	**LCWIP proposals building on LCC's 'South of Leicester LCWIP'.** This area is immediately south of the City. The delivery of visionary walking and cycling infrastructure to develop a cohesive network. Further details about LCWIP style measures included in the report. Key measures include segregated cycle lanes, cycle-friendly junctions, continuous footways, cycle tracks and protected crossings. Measures may include: - LTN 1/20 compliant infrastructure from Sites to South Wigston Station and Fosse Park. - Segregated cycle routes for radial routes into City of Leicester e.g. segregated routes on the B5336 (Saffron Lane), A5199, A6 - Improved cycling infrastructure on the A47, A426, B667	Encourage active and sustainable travel behaviour choices for both existing and new journeys arising from planned growth to/from the Fosse Park area. Remove and relieve the impact of local, short-distance trips to/from the Fosse Park area from the highway network in and around this area.	B/C	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
Active Travel	**Hinckley LCWIP Style Measures (Hinckley LCWIP):** the delivery of visionary walking and cycling infrastructure to develop a cohesive network. Further details about LCWIP style measures included in the report. Key measures include segregated cycle lanes, cycle-friendly junctions, continuous footways, cycle tracks and protected crossings. Measures may include: - Routes linking large development sites at Earl Shilton to key trip attractors in Hinckley. - Routes connecting new and existing employment sites on the A5 with towns, including Hinckley.	Encourage active and sustainable travel behaviour choices for both existing and new journeys arising from planned growth to/from Hinckley Remove and relieve the impact of local, short-distance trips to/from the Hinckley from the highway network in and around this area.	G	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.
Active Travel	**Lutterworth Area LCWIP Style Measures (Lutterworth LCWIP)**: the delivery of visionary walking and cycling infrastructure to develop a cohesive network. Further details about LCWIP style measures included in the report. Key measures include segregated cycle lanes, cycle-friendly junctions, continuous footways, cycle tracks and protected crossings. Measures may include: - High-quality routes linking key trip origins and destinations in Lutterworth. - Safe routes linking Magna Park with Lutterworth and limiting conflict with freight traffic.	Encourage active and sustainable travel behaviour choices for both existing and new journeys arising from planned growth to/from Lutterworth and Magna Park Remove and relieve the impact of local, short-distance trips to/from the Lutterworth/Magna Park from the highway network in and around this area.	F	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.
Active Travel	**Market Harborough LCWIP Style Measures (Market Harborough LCWIP)**: the delivery of visionary walking and cycling infrastructure to develop a cohesive network. Further details about LCWIP style measures included in the report. Key measures include segregated cycle lanes, cycle-friendly junctions, continuous footways, cycle tracks and protected crossings. Measures may include: - High-quality routes linking key trip origins and destinations in Market Harborough.	Encourage active and sustainable travel behaviour choices for both existing and new journeys arising from planned growth to/from Market Harborough Remove and relieve the impact of local, short-distance trips	E	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
	- Routes linking new developments on the northern edge of the urban area to trip attractors in the centre.	to/from the Market Harborough from the highway network in and around this area.							
Active Travel	**Blaby LCWIP Style Measures (Blaby LCWIP)**: the delivery of visionary walking and cycling infrastructure to develop a cohesive network Further details about LCWIP style measures included in the report. Key measures include segregated cycle lanes, cycle-friendly junctions, continuous footways, cycle tracks and protected crossings. Measures may include: - Routes linking large development sites at Whetstone Pastures, Stoney Stanton, to key trip attractors further north in Blaby and edge of PUA. - High-quality segregated routes linking to Narborough Station. - Routes in the vicinity of Sapcote, Glenfield, Kirby Muxloe, New Lubbesthorpe.	Encourage active and sustainable travel behaviour choices for both existing and new journeys arising from planned growth to/from Blaby (including Whetstone Pastures) Remove and relieve the impact of local, short-distance trips to/from the Blaby (including Whetstone Pastures) from the highway network in and around this area.	B, C, D	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.
Active Travel	**South Leicestershire Wide Cycling and Walking Infrastructure Plan**: the delivery of visionary walking and cycling infrastructure to develop a cohesive network. Further details about LCWIP style measures included in the report. Key measures include segregated cycle lanes, cycle-friendly junctions, continuous footways, cycle tracks and protected crossings. Measures may include: - Strategic longer-distance (e.g. superhighway) and rural connections linking LCWIP areas together. - Develop existing NCN routes to improve the Study Area wide and cross-border network.	A joined up South Leicestershire-wide active travel network will support longer-distance and rural-to-urban trips. A cohesive network will help to embed a change in behaviour towards active modes.	A/B/C/D/E/F/G	N	No	No	No	No	On further discussion with LCC and partners it was decided to not include this intervention as modal shift may be hard to achieve in this more rural area of South Leicestershire. This is not included in the package therefore.

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
Bus	**Redesign of the bus network serving the South and East of Leicester area**, building on: - Relevant service enhancements proposed as part of Leicester City Council's and Leicestershire County Council's respective Bus Service Enhancement Plans (BSIPs) - Any new, high-quality passenger transport services to be provided to connect nearby strategic developments to key services and facilities in the South and East of Leicester area. Network enhancements could include: - Improving existing bus services (increasing frequency, optimising timetables) - Expanding on the existing bus network with new routes - Developing a full BRT network to connect South Leicestershire towns and developments together and to Leicester, with a new BRT service designed to support the growth proposed Additional infrastructure could include: - Bus priority at junctions - Bus-only lanes - Bus-only roads - Bus gates Potential measure locations: - Bus service improvements and bus priority measures (potentially a BRT line) from Leicester City out along the A47 (east), the A5199 Welford Road, the A6 London Road, and the B667 Evington Lane, reducing bus pinch points, providing access to bus and BRT services. - DRT zone to the east of Leicester, targeting new growth areas in Scraptoft and to the east of Leicester near Oadby, as well as existing villages and suburban area of Leicester.	Encourage sustainable travel behaviour choices for both existing and new journeys arising from planned growth to/from the South and East of Leicester area. Remove and relieve the impact of local, short and medium-distance trips to/from the South and East of Leicester area from the highway network in and around this area.	A	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
Bus	**Redesign of the bus network serving the M1 J21 and J21a area (including Fosse Park)**, building on: - Relevant service enhancements proposed as part of Leicester City Council's and Leicestershire County Council's respective Bus Service Enhancement Plans (BSIPs) - Any new, high-quality passenger transport services to be provided to connect nearby strategic developments to key services and facilities in the M1 J21 and J21a area. Network enhancements could include: - Improving existing bus services (increasing frequency, optimising timetables) - Expanding on the existing bus network with new routes - Developing a full BRT network to connect South Leicestershire towns and developments together and to Leicester, with a new BRT service designed to support the growth proposed Additional infrastructure could include: - Bus priority at junctions - Bus-only lanes - Bus-only roads - Bus gates Potential measure locations: - Bus service improvements and bus priority measures (potentially a BRT line) from Leicester City out along the A5460 Narborough Road and the B4114, as well as at junctions in the Fosse Park area, reducing bus pinch points, providing access to bus and BRT services to existing and new developments, including those around Whetstone. - DRT zone to the south of Leicester, targeting new growth areas around Whetstone and Blaby, as well as existing villages and suburban area of Leicester, and providing access to bus and BRT services and South Wigston station.	Encourage active and sustainable travel behaviour choices for both existing and new journeys arising from planned growth to/from the M1 J21 and J21a area (including Fosse Park). Remove and relieve the impact of local, short and medium-distance trips to/from the M1 J21 and J21a area from the highway network in and around this area.	B	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
Bus	**Redesign of the bus network serving Blaby (including Whetstone Pastures)**, building on: - Relevant service enhancements proposed as part of Leicester City Council's and Leicestershire County Council's respective Bus Service Enhancement Plans (BSIPs) - Any new, high-quality passenger transport services to be provided to connect nearby strategic developments to key services and facilities in Blaby and Whetstone Pastures. Network enhancements could include: - Improving existing bus services (increasing frequency, optimising timetables) - Expanding on the existing bus network with new routes - Developing a full BRT network to connect South Leicestershire towns and developments together and to Leicester, with a new BRT service designed to support the growth proposed Additional infrastructure could include: - Bus priority at junctions - Bus-only lanes - Bus-only roads - Bus gates Potential measure locations: - Bus service improvements and bus priority measures (potentially a BRT line) from Leicester City out along the A426 and the A5199, reducing bus pinch points, providing access to bus and BRT services to existing and new developments, including those around Whetstone. - DRT zone to the south of Leicester, targeting new growth areas around Whetstone and Blaby, as well as existing villages and suburban area of Leicester, and providing access to bus and BRT services and South Wigston station.	Encourage active and sustainable travel behaviour choices for both existing and new journeys arising from planned growth to/from the Blaby area (including Whetstone Pastures). Remove and relieve the impact of local, short and medium-distance trips to/from the Blaby area from the highway network in and around this area.	C	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
Bus	**Redesign of the bus network serving the Earl Shilton and Stoney Stanton area**, building on: - Relevant service enhancements proposed as part of Leicester City Council's and Leicestershire County Council's respective Bus Service Improvement Plans (BSIPs) - Any new, high-quality passenger transport services to be provided to connect nearby strategic developments to key services and facilities in Earl Shilton and Stoney Stanton. Network enhancements could include: - Improving existing bus services (increasing frequency, optimising timetables) - Expanding on the existing bus network with new routes - Developing a full BRT network to connect South Leicestershire towns and developments together and to Leicester, with a new BRT service designed to support the growth proposed Additional infrastructure could include: - Bus priority at junctions - Bus-only lanes - Bus-only roads - Bus gates Potential measure locations: - Bus service improvements and bus priority measures (potentially a BRT line) from Leicester City out along the A47 (west) towards Earl Shilton, Barwell, and potentially as far as Hinckley, reducing bus pinch points. - DRT zone in and to the north of Hinckley, targeting new growth areas in and around Earl Shilton and Stoney Stanton, providing access to bus and BRT services and Hinckley railway station. - Expand on existing DRT services in Earl Shilton and Hinckley, and the NovusFlex & NovusDirect network.	Encourage sustainable travel behaviour choices for both existing and new journeys arising from planned growth to/from the Key Impact Area. Remove and relieve the impact of local, short and medium-distance trips to/from the Key Impact Area from the highway network in and around this area. Reduce pressure on key over-burdened orbital and radial routes.	D	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
Bus	**Redesign of the bus network serving the A5 Corridor**, building on: - Relevant service enhancements proposed as part of Leicester City Council's and Leicestershire County Council's respective Bus Service Improvement Plans (BSIPs) - Any new, high-quality passenger transport services to be provided to connect nearby strategic developments to key services and facilities on the A5 Corridor Network enhancements could include: - Improving existing bus services (increasing frequency, optimising timetables) - Expanding on the existing bus network with new routes - Developing a full BRT network to connect South Leicestershire towns and developments together and to Leicester, with a new BRT service designed to support the growth proposed Additional infrastructure could include: - Bus priority at junctions - Bus-only lanes - Bus-only roads - Bus gates Potential measure locations: - Bus service improvements and bus priority measures along the A5 corridor, connecting Hinckley and Nuneaton to Lutterworth and potentially Market Harborough, as well as new sites around Magna Park and Longshoot Dodwells, reducing bus pinch points.	Encourage active and sustainable travel behaviour choices for both existing and new journeys arising from planned growth to/from the Key Impact Area. Remove and relieve the impact of local, short and medium-distance trips to/from the Key Impact Area from the highway network in and around this area. Reduce pressure on key over-burdened orbital and radial routes.	G	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
Bus	**Redesign of the bus network serving Market Harborough**, building on: - Relevant service enhancements proposed as part of Leicester City Council's and Leicestershire County Council's respective Bus Service Improvement Plans (BSIPs) - Any new, high-quality passenger transport services to be provided to connect nearby strategic developments to key services and facilities in Market Harborough. Network enhancements could include: - Improving existing bus services (increasing frequency, optimising timetables) - Expanding on the existing bus network with new routes - Developing a full BRT network to connect South Leicestershire towns and developments together and to Leicester, with a new BRT service designed to support the growth proposed Additional infrastructure could include: - Bus priority at junctions - Bus-only lanes - Bus-only roads - Bus gates Potential measures locations: - Bus service improvements and bus priority measures along the A5 corridor, connecting Hinckley and Nuneaton to Lutterworth and potentially Market Harborough, as well as new sites around Magna Park and Longshoot Dodwells, reducing bus pinch points. - DRT around Market Harborough, targeting nearby existing rural and new growth areas, providing access to bus and BRT services and Market Harborough railway station.	Encourage sustainable travel behaviour choices for both existing and new journeys arising from planned growth to/from the Key Impact Area. Remove and relieve the impact of local, short and medium-distance trips to/from the Key Impact Area from the highway network in and around this area.	E	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
Bus	**Redesign of the bus network serving the A5 South and Lutterworth area**, building on: - Relevant service enhancements proposed as part of Leicester City Council's and Leicestershire County Council's respective Bus Service Improvement Plans (BSIPs) - Any new, high-quality passenger transport services to be provided to connect nearby strategic developments to key services and facilities in the Lutterworth/Magna Park Network enhancements could include: - Improving existing bus services (increasing frequency, optimising timetables) - Expanding on the existing bus network with new routes - Developing a full BRT network to connect South Leicestershire towns and developments together and to Leicester, with a new BRT service designed to support the growth proposed Additional infrastructure could include: - Bus priority at junctions - Bus-only lanes - Bus-only roads - Bus gates Potential measure locations: - Bus service improvements and bus priority measures along the A5 corridor, connecting Hinckley and Nuneaton to Lutterworth and potentially Market Harborough, as well as new sites around Magna Park and Longshoot Dodwells, reducing bus pinch points. - DRT around Lutterworth, targeting nearby existing rural and new growth areas, providing access to bus and BRT services.	Encourage sustainable travel behaviour choices for both existing and new journeys arising from planned growth to/from the Key Impact Area. Remove and relieve the impact of local, short and medium-distance trips to/from the Key Impact Area from the highway network in and around this area.	F	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.
Rail	**Increase frequency of Birmingham-Leicester-Stansted rail services**, potentially increasing Birmingham to Leicester frequency	To alleviate overall pressure on the road network by enhancing connectivity and promoting modal shift.	A/B/C/D/G	Y	No	No	Yes	Yes	This intervention is included in the mitigation package.

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
Rail	**Introduce a new 2 tph service between Coventry, Nuneaton, Hinckley, Narborough, South Wigston, Leicester, Loughborough, and Nottingham** in addition to any existing or new Birmingham to Leicester services (Possibly 1tph stopping with other non-stopping tph)	To alleviate overall pressure on the road network by enhancing connectivity and promoting modal shift.	A/B/C/D/G	Y	No	No	Yes	Yes	This intervention is included in the mitigation package.
Rail	**Investment in new infrastructure to deliver and enable frequency enhancements**, for example additional freight loops between Birmingham and Leicester.	To alleviate overall pressure on the road network by enhancing connectivity and promoting modal shift.	A/B/C/D/G	Y	No	No	Yes	Yes	This intervention is included in the mitigation package.
Rail	**Major improvements to rail services on the Nuneaton to Leicester line** in accordance with Midlands Connect's 'Midlands Rail Hub' proposals, comprising: - Higher frequency services between Birmingham and Leicester. - New direct service between Coventry, Nuneaton, Hinckley, Narborough, South Wigston, Leicester, Loughborough, and Nottingham	Encourage longer-distance car trips to shift to rail for such journeys and remove and relieve the impact of such trips from the highway network	A/B/C/D/G	Y	No	No	Yes	Yes	This intervention is included in the mitigation package.
Rail	Possible opportunities for a **new rail station on the existing Birmingham to Stansted Line** (e.g. a 'Hinckley and Nuneaton Parkway' station to the south of the A5).	Encourage longer-distance car trips passing through the Key Impact Area to access the SRN to shift to rail for such journeys. Remove and relieve the impact of such trips from the highway network in and around Hinckley and Nuneaton	D/G	N	No	No	No	No	Major infrastructure beyond the scale of impacts in the Local Plan. Significant uncertainty regarding available stakeholder acceptance, funding, feasibility and deliverability.
Rail	Possible opportunities for a **new rail station on the Birmingham to Peterborough Line** between Hinckley and Narborough stations (e.g. reopening of Elmesthorpe).	Encourage longer-distance car trips passing through the Key Impact Area to access the SRN to shift to rail for such journeys. Remove and relieve the impact of such trips from the highway	D/G	N	No	No	No	No	Major infrastructure beyond the scale of impacts in the Local Plan. Significant uncertainty regarding available stakeholder acceptance, funding, feasibility and deliverability.

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
		network in and around the Earl Shilton, Stoney Stanton and Hinckley.							
Rail	Should the Leicester to Burton railway line be reopened to passenger services at some point in the future, it may present opportunities for **new stations at Meynell's Gorse and/or Bagworth**	To support radial trips into the City of Leicester and remove and relieve the impact of local, short and medium-distance trips to/from the M1 J21a area from the highway network in and around this area.	B	N	No	No	No	No	The Government has cancelled Phase 1 of the Ivanhoe Line between Coalville and Derby so further work towards Leicester is not going to be delivered
Multi-modal/Interchange	**Multi-Modal Transport Hub at Key Existing Rail Stations** Near Major Developments: - Hinckley - Narborough - South Wigston - Market Harborough	Encourage sustainable behaviour choices for both existing and new journeys arising from planned growth. Remove and relieve the impact of local, short and medium-distance car trips.	A/B/C/D/E/F/G	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.
Multi-modal/Interchange	**Multi-Modal Transport Hub at Potential New Rail Stations** (see Rail Measures): - Hinckley and Nuneaton Parkway - Meynell's Gorse - Elmesthorpe	Encourage sustainable behaviour choices for both existing and new journeys arising from planned growth. Remove and relieve the impact of local, short and medium-distance car trips.	B/D/G	N	No	No	No	No	Associated with new stations which are major infrastructure beyond the scale of impacts in the Local Plan. Lack of clarify regarding available stakeholder acceptance, funding, feasibility and deliverability.
Multi-modal/Interchange	**P&R hubs** on the edge of the Leicester Urban Area e.g. Leicester Racecourse	Encourage sustainable travel behaviour choices for both existing and new journeys arising from planned growth to/from the Key Impact	A/B/C	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
		Area. Remove and relieve the impact of trips to/from the Key Impact Area from the highway network. Reduce pressure on key over-burdened orbital and radial routes.							
Multi-modal/Interchange	**Multi-Modal Transport Hub at Key Trip Attractors**. For example: - Fosse Park - Grove Park -Enderby Park and Ride	Encourage active travel behaviour choices for both existing and new journeys arising from planned growth. Remove and relieve the impact of local, short and medium-distance car trips	A/B/C/D/E/F/G	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.
Multi-modal/Interchange	**Mobility Hubs in Rural Areas and Large Developments:** - Whetstone Pastures - Earl Shilton - Stoney Stanton	Encourage active travel behaviour choices for both existing and new journeys arising from planned growth. Remove and relieve the impact of local, short and medium-distance car trips	A/B/C/D/E/F/G	Y	Yes	Yes	Yes	Yes	This intervention is included in the mitigation package.
LRN	**Junction capacity improvements to the Ratby Lane/ Kirby Lane junction**	Support nearby growth proposals and create additional capacity for trips crossing the M1.	B	Y	No	Yes	Yes	Yes	This intervention is included in the mitigation package.
LRN	**Localised measures to reduce delay at A47/Station Road**	Reduce residual traffic flow and capacity issues in and around the Stoney Stanton & Earl Shilton.	A	Y	No	Yes	Yes	Yes	This intervention is included in the mitigation package.
LRN	**Localised measures to reduce delay on junctions with the A6 in Kibworth: A6/New Road**	Reduce residual traffic flow, delay and capacity issues in and	D	Y	No	Yes	Yes	Yes	This intervention is included in the mitigation package.

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
		around Kibworth and the A6							
LRN	**Localised measures to reduce delay on junctions with the A6 in Kibworth: A6/Wistow Road**	Reduce residual traffic flow, delay and capacity issues in and around Kibworth and the A6	D	Y	No	No	Yes	Yes	This intervention is included in the mitigation package.
LRN	**Localised measures to reduce delay at A426/A4303 junction in Lutterworth**	Reduce residual traffic flow, delay and capacity issues in and around Lutterworth and key links including the A426 and A4303	D	Y	No	Yes	Yes	Yes	This intervention is included in the mitigation package.
LRN	**Localised measures to reduce flow increases and junction capacity issues in the area south and east of the City of Leicester in Oadby and Wigston.** The junctions have issues emerging in 2036 which could be relieved by a package of potential measures: A6/Florence Wragg Way A5199/Kelmarsh Avenue B582/Gartree Road	Reduce residual traffic flow and capacity issues in and around the area south and east of the City of Leicester (Oadby and Wigston)	D	Y	No	Yes	Yes	Yes	This intervention is included in the mitigation package.
LRN	**Localised measures to reduce flow increases and junction capacity issues in Blaby and the area north of Whetstone Pastures including Countesthorpe, Narborough and South Wigston.** The junctions have issues which could be relieved by a package of potential measures: A426/Little Glen Road B582/B5366	Reduce residual traffic flow and capacity issues in and around Blaby and the local road network north of Whetstone Pastures	C	Y	No	Yes	Yes	Yes	This intervention is included in the mitigation package.
LRN	**Local Highway Improvements around Stoughton Road and Stoughton Drive** Link between the A6 north (before A6-Palmerston Way roundabout) and Gartree Road. LCC has explored the land ownership issue and has established that some land is likely to be outside the control of the LTA. As such there would be a potential need for a CPO to deliver this measure. Scale of intervention to reflect function of the link as a distributor. 30mph speed limit to be modelled.	Local distributor road between A6 Leicester Road and B582 Gartree Road, to enable local movements.	A/B/C	Y	No	No	Yes	Yes	This intervention is included in the mitigation package.

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
LRN	**New link road from the A47 (south west of Leicester City) to a potential new M1 Junction 20a**. Road would also link to M69 Junction 2, and then M1 J20a. Approx. 12.5km. Note, this could then connect to south and east of Leicester Urban Area orbital route see # 43	Provide better access to the SRN for trips from large number of new developments located in proximity. Relieve congestion further north and south on the M69, M1 and A47. Links to A47 scheme #45. Requires south facing slips on M69 #44.	C/D	N	No	No	No	No	This intervention is not included in mitigation packages
LRN	**New orbital road link around the south and east of the Leicester Urban Area**. Large scheme approximately 30km. Dual carriageway from M1 jn20a running east to A46. At grade, signalised, junctions at: new M1 J20a, A5199, A6, A47.	Would provide high quality connections between any new junctions on the M1 and M69 (as described above) and strategic development zones avoiding the M1 J21/Fosse Park area altogether. This scheme, along with #42, would provide a significant increase in capacity to the south of Leicester Urban Area and have the potential to support large scale growth longer term.	C/D and A	N	No	No	No	No	This intervention is not included in mitigation packages
SRN	**M69 Junction 2 South-facing slip roads** (as proposed as part of the Hinckley National Rail Freight Interchange scheme).	Allow traffic to join the M69 from the B4669. Provide better access to the SRN for trips from large number of new developments located in proximity.	D	Y	No	No	No	Yes	This intervention is included in the mitigation package.

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
SRN	**Strategic capacity improvements to the A5 from A444 to A47.** Measure to include improvements to the flow of traffic: Additional lane added from where the A5 is not dualled; plus an A5-to-A47 link road, which could double as access for proposed site/s in area to directly relieve traffic at the A5/A47 (The Long Shoot) and A5/A47/B466 (Dodwells Roundabout). This would begin within 1km west of where A47/A5 meet and run in a NE direction to join A47 potentially to existing roundabout north of Triumph Factory. No capacity improvement south east of A47/A5 junction.	Relieve existing issues and potential additional traffic from the MIRA development along the A5. Additional capacity to support local plan sites, including MIRA and other site with traffic using the A5. Recognises the difficulties bringing forward a solution at Longshoot-Dodwells and proposes and alternative.	G	Y	No	No	No	Yes	This intervention is included in the mitigation package.
SRN	**Strategic capacity improvements from A5 from A47/A5 to M69 Junction 1.** Measures to directly relieve traffic at the A5/A47 (The Long Shoot) to A5/A47/B466 (Dodwells Roundabout); plus, additional lane added where the A5 is not dualled; and capacity enhancements at M69 junction 1 to improve circulating movements (underbridges).	Additional capacity to support local plan sites, including MIRA along the A5. Not necessarily required alongside #45 as the new A5-A47 link (#45) may largely resolve issues.	G	N	No	No	No	No	Potentially not needed if #45 comes forward. (this to be determined). Additionally, large scale improvements needed to A5-M69 junction which would be complex and take time. Questions over whether this would be acceptable and feasible.
SRN	**New M1 Junction 20a.**	Improve access to the SRN, providing an alternative access point to J20/J21. In turn reduce pressure on J20/J21 and the impacts on the local road network. Facilitate the capacity required to deliver the Whetstone Pastures site New J20a could support additional orbital links around the City of Leicester	C	Y	No	No	No	Yes	This intervention is included in the mitigation package. Note M1 jn20a will be part of the 2051 plus orbital mitigation test but a larger M1 jn20a scheme will be modelled to cater for more east - west movements.

Mode	Proposed Intervention / Measure	Potential Impact Reduction of the Intervention / Measure	Key Impact Area (See 'Key Impact Areas' Sheet	2036, 2041 and 2051 packages (Y/N)	2036a Package (Active Travel, Public Transport and Interchange)	2036b Package (Active Travel, Public Transport and Interchange, plus LRN)	2041 Package (Active Travel, Public Transport and Interchange, plus LRN)	2051 Package (Active Travel, Public Transport and Interchange, plus 2041 LRN and SRN)	Key Reason for Exclusion
		should there be sufficient need and investment to deliver.							
SRN	**Strategic capacity improvements to the M1 between Junction 21 and Junction 21a** of a broadly equivalent scale to those under consideration as part of National Highways' Road Investment Strategy (RIS) pipeline process (M1 'Leicester Western Access' scheme)	Improved capacity/ performance on M1 mainline and at J21a, resulting in reduced knock-on traffic issues on the surrounding local road network.	B	N	No	No	No	No	Significant scale of intervention which does not reflect the scale of impacts arising from Local Plan growth.
SRN	**Strategic capacity improvements to the M1 between Junction 21a and Junction 23a** of a broadly equivalent scale to those previously under consideration as part of National Highways' Road Investment Strategy (RIS) pipeline process.	Improved capacity/ performance on M1 mainline and at J21a, resulting in reduced knock-on traffic issues on the surrounding local road network.	B	N	No	No	No	No	Significant scale of intervention which does not reflect the scale of impacts arising from Local Plan growth.
SRN	**Strategic capacity improvements to M1 J21**	Improved capacity/ performance on M1 J21, resulting in reduced knock-on traffic issues on the surrounding network. Issues at M1 J21 central to wider congestion across South Leicestershire	A/B/C/D	N	No	No	No	No	Significant scale of intervention which does not reflect the scale of impacts arising from Local Plan growth.

Appendix E Flow Difference Plots – Zoomed In Extents

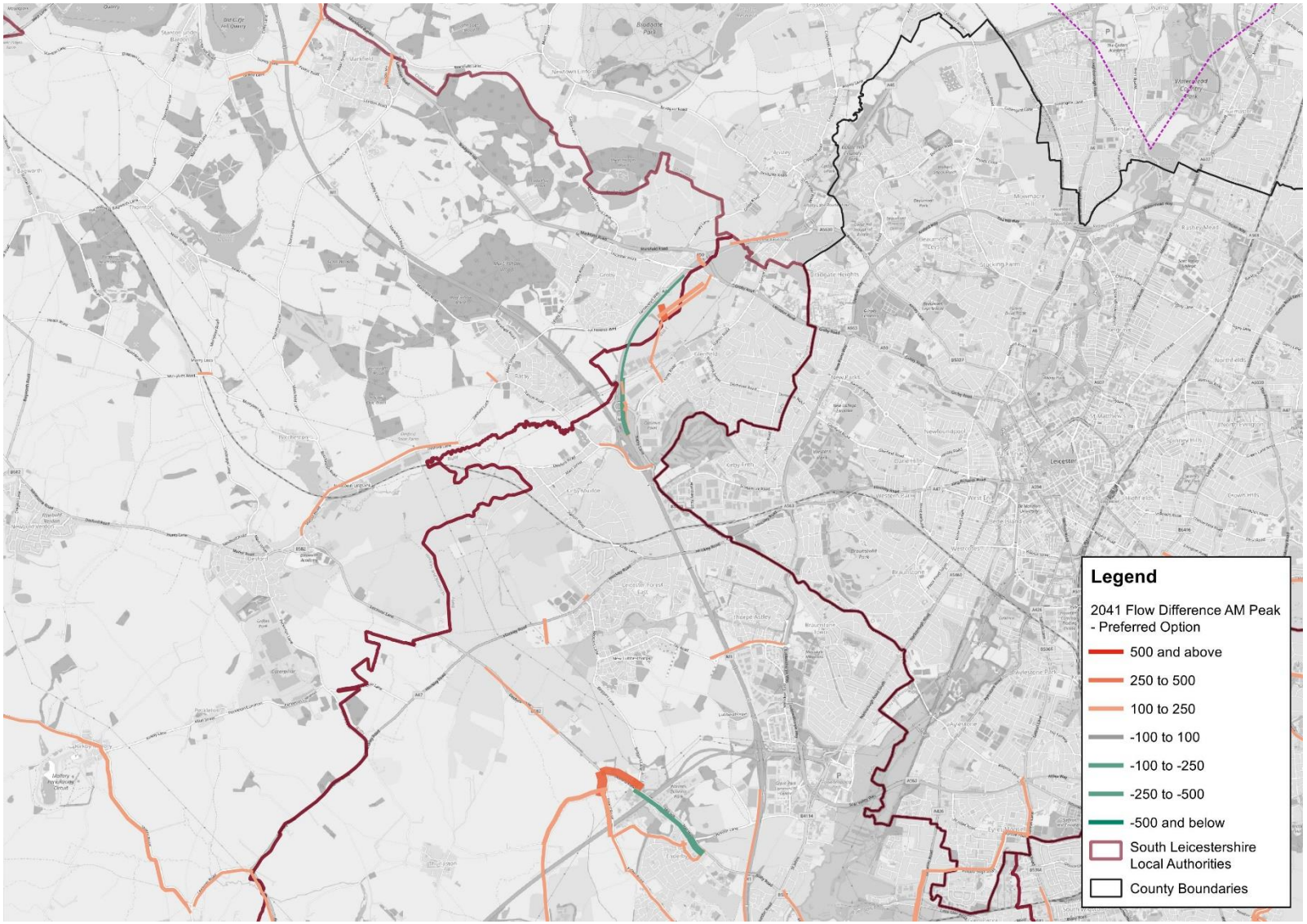

Figure E-5-10: Flow Difference, M1 Junction 21 and Junction 21a Preferred Scenario Minus Core Scenario (2041, AM Peak)

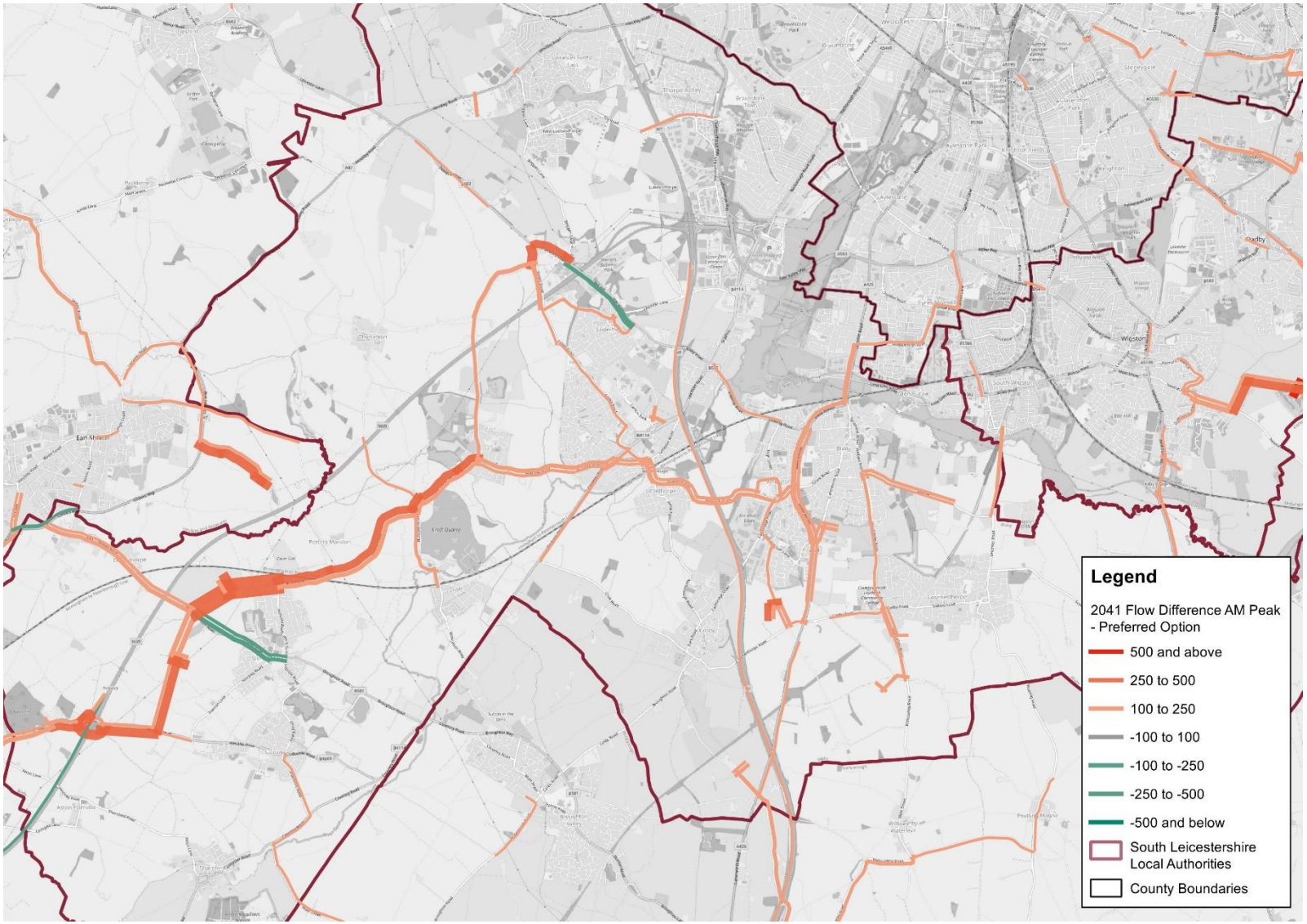

Figure E-5-11: Flow Difference, Blaby, Preferred Scenario Minus Core Scenario (2041, AM Peak)

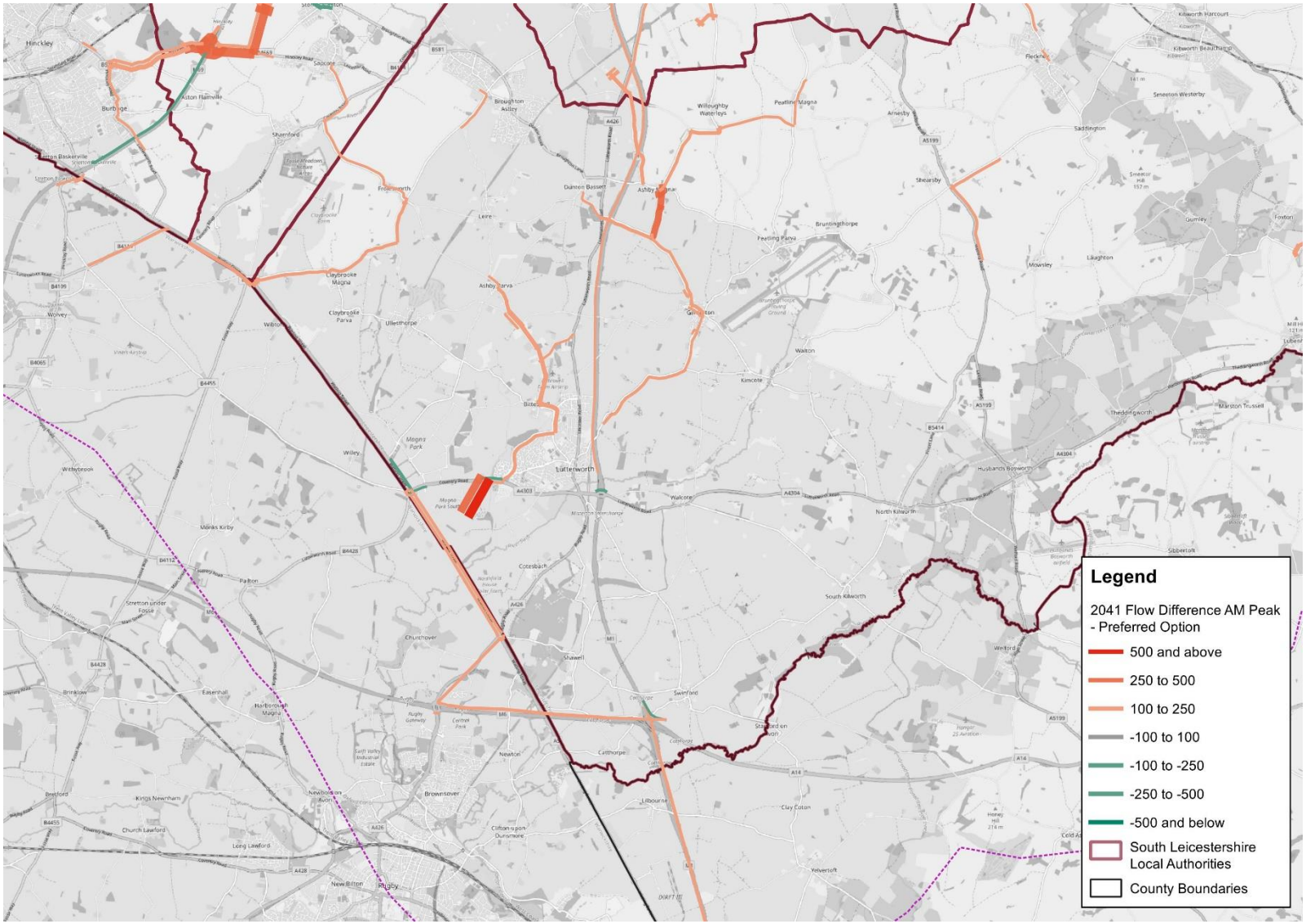

Figure E-5-12: Flow Difference, Lutterworth, Preferred Scenario Minus Core Scenario (2041, AM Peak)

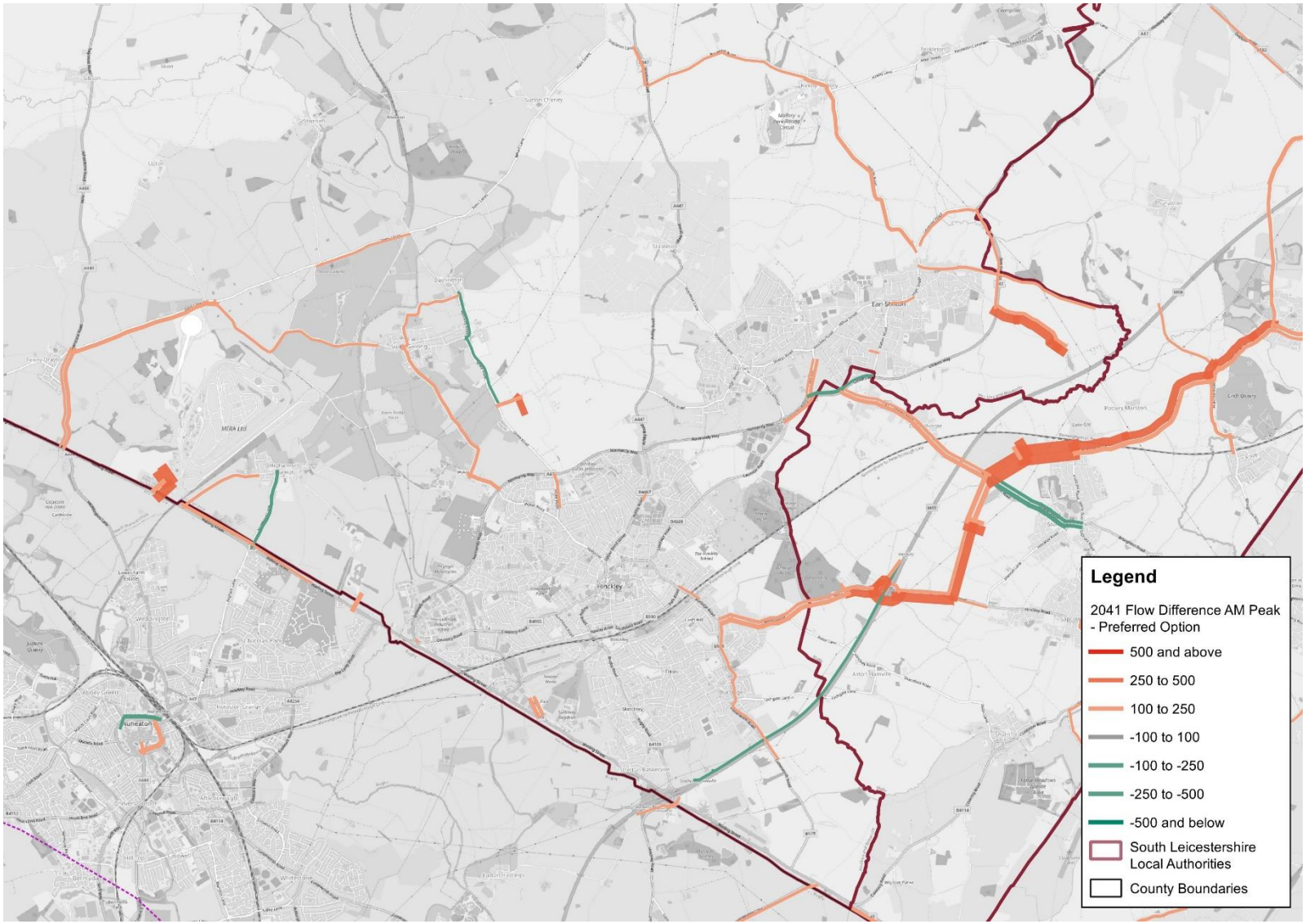

Figure E-5-13: Flow Difference, Hinckley Nuneaton & the A5, Preferred Scenario Minus Core Scenario (2041, AM Peak)

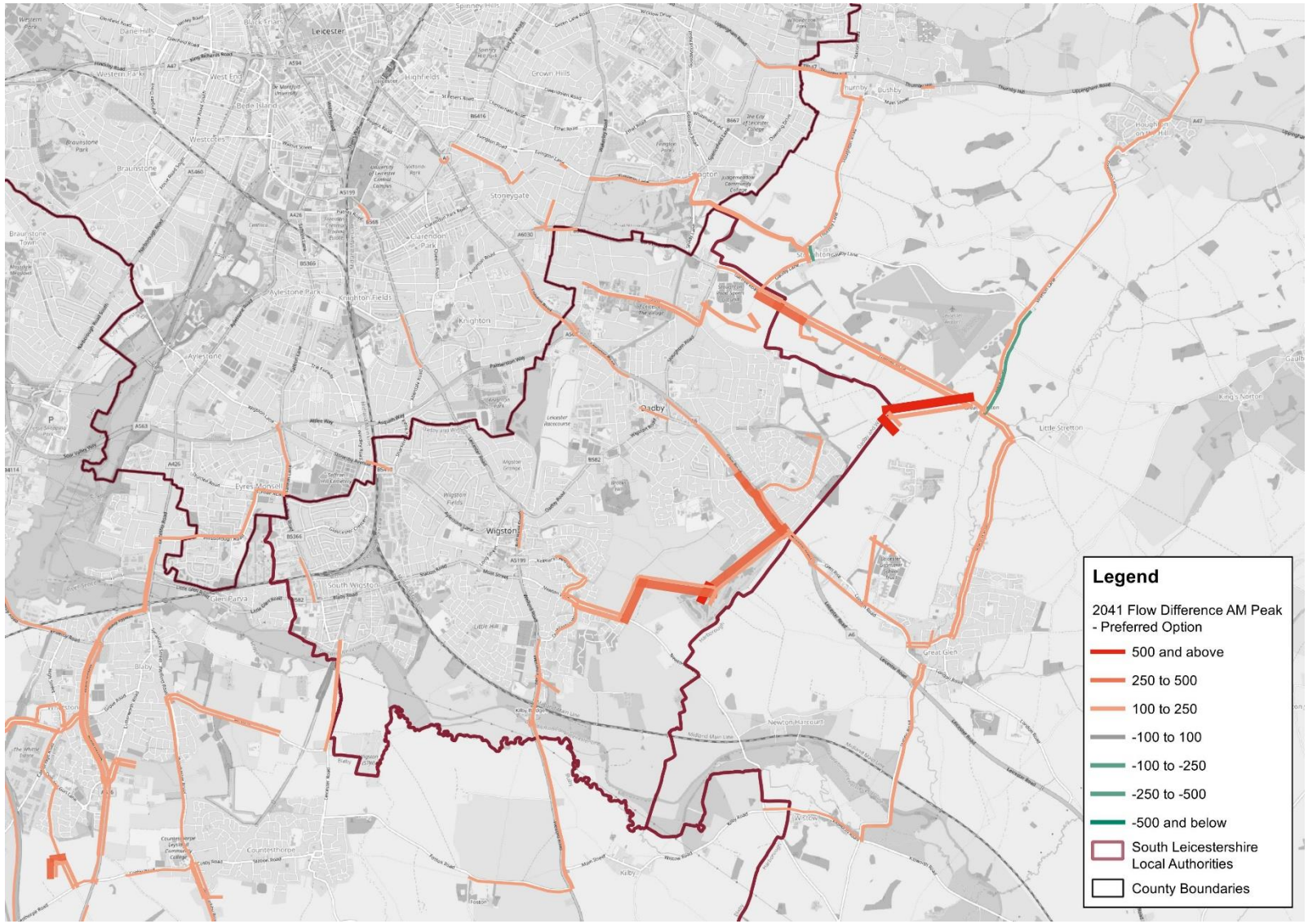

Figure E-5-14: Flow Difference, South and East of Leicester Urban Area Preferred Scenario Minus Core Scenario (2041, AM Peak)

Appendix F Mitigation Packages - Geography of Impacts

2036a Package

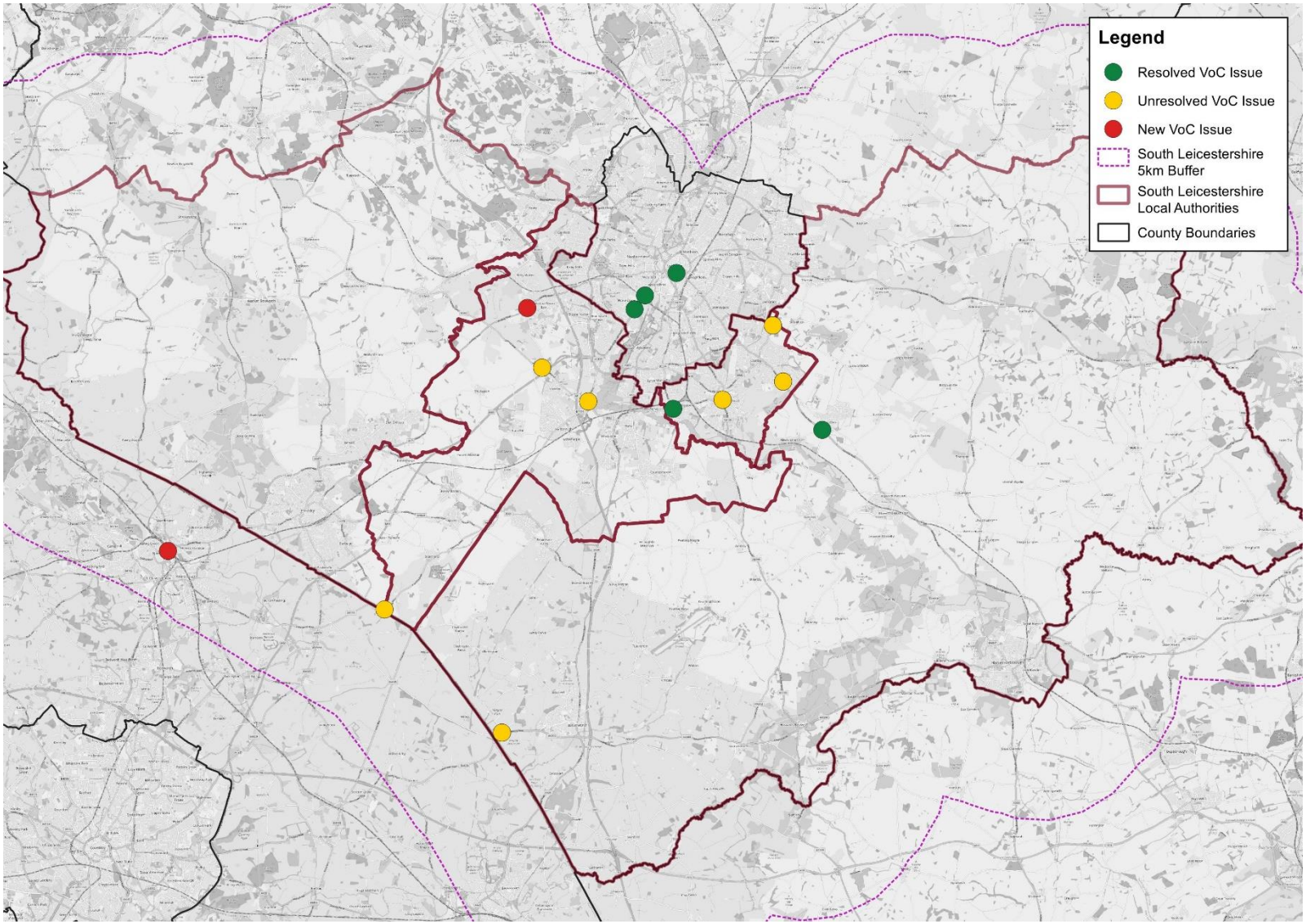

Figure 5-15: Geography of Impacts - 2036a Mitigation Package Performance, Volume over Capacity, AM and PM Peak

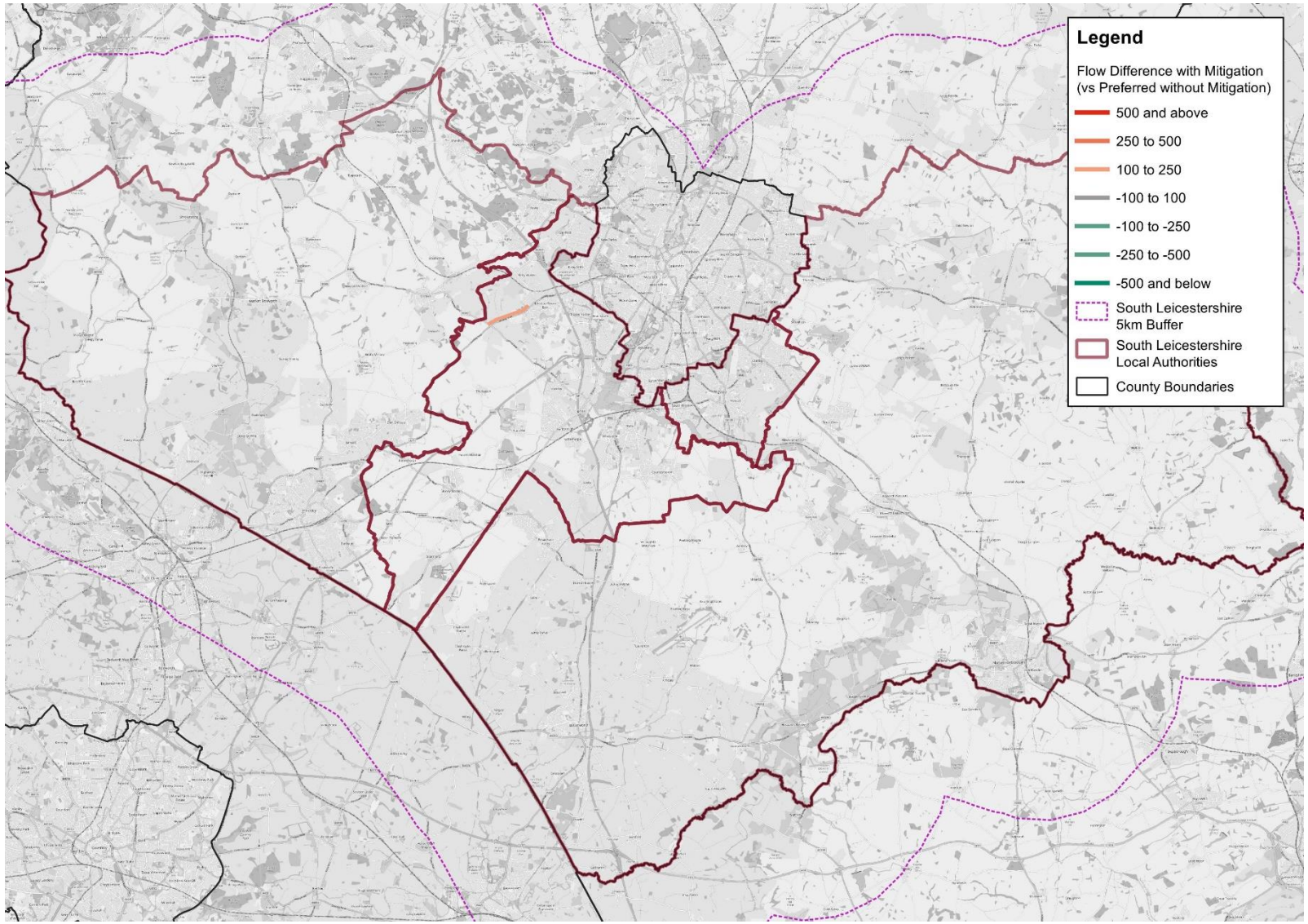

Figure 5-16: Geography of Impacts - 2036a Mitigation Package Performance, Flow Difference, AM and PM Peak

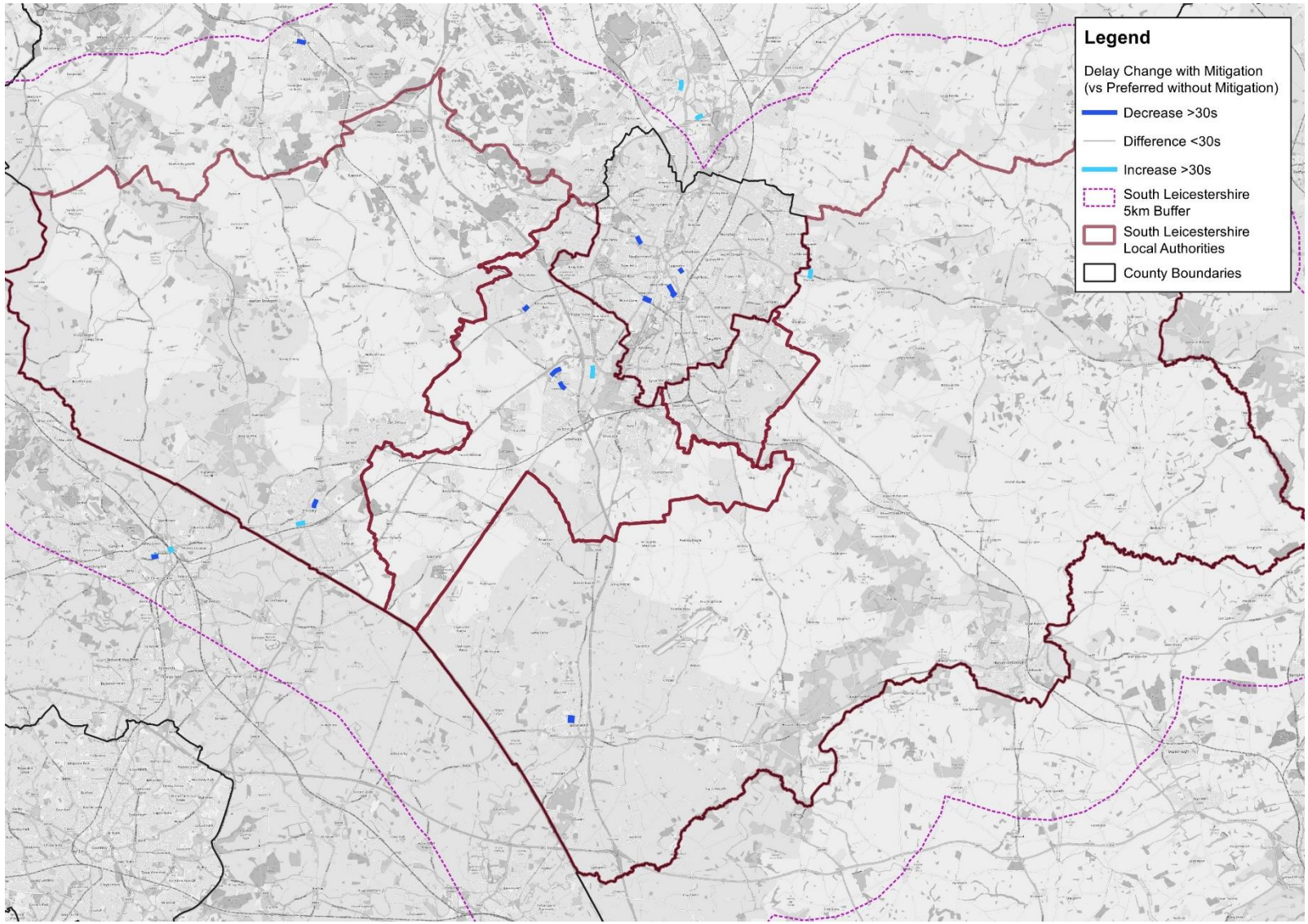

Figure 5-17: Geography of Impacts - 2036a Mitigation Package Performance, Delay Change, AM and PM Peak

2036b Package

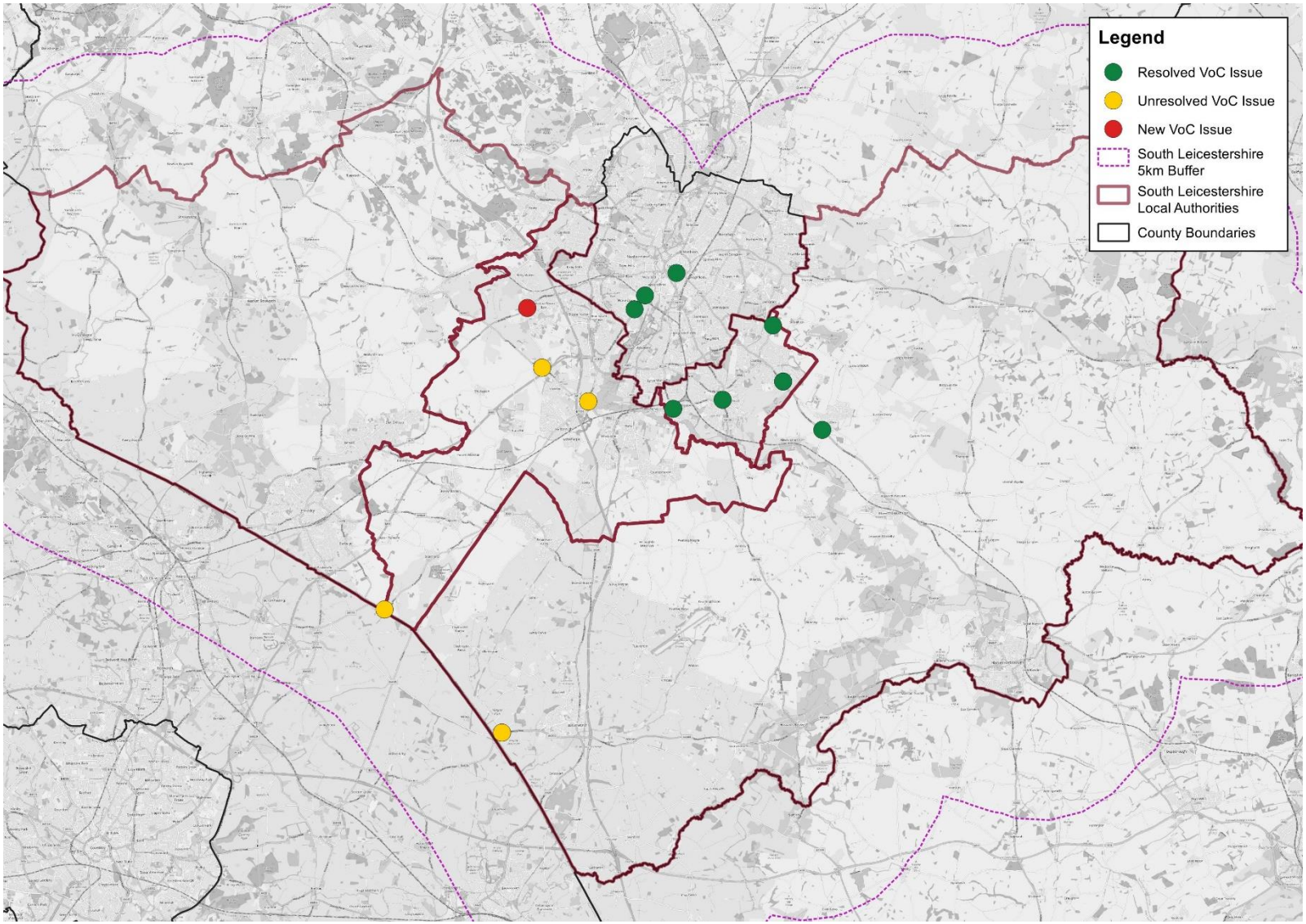

Figure 5-18: Geography of Impacts - 2036b Mitigation Package Performance, Volume over Capacity, AM and PM Peak

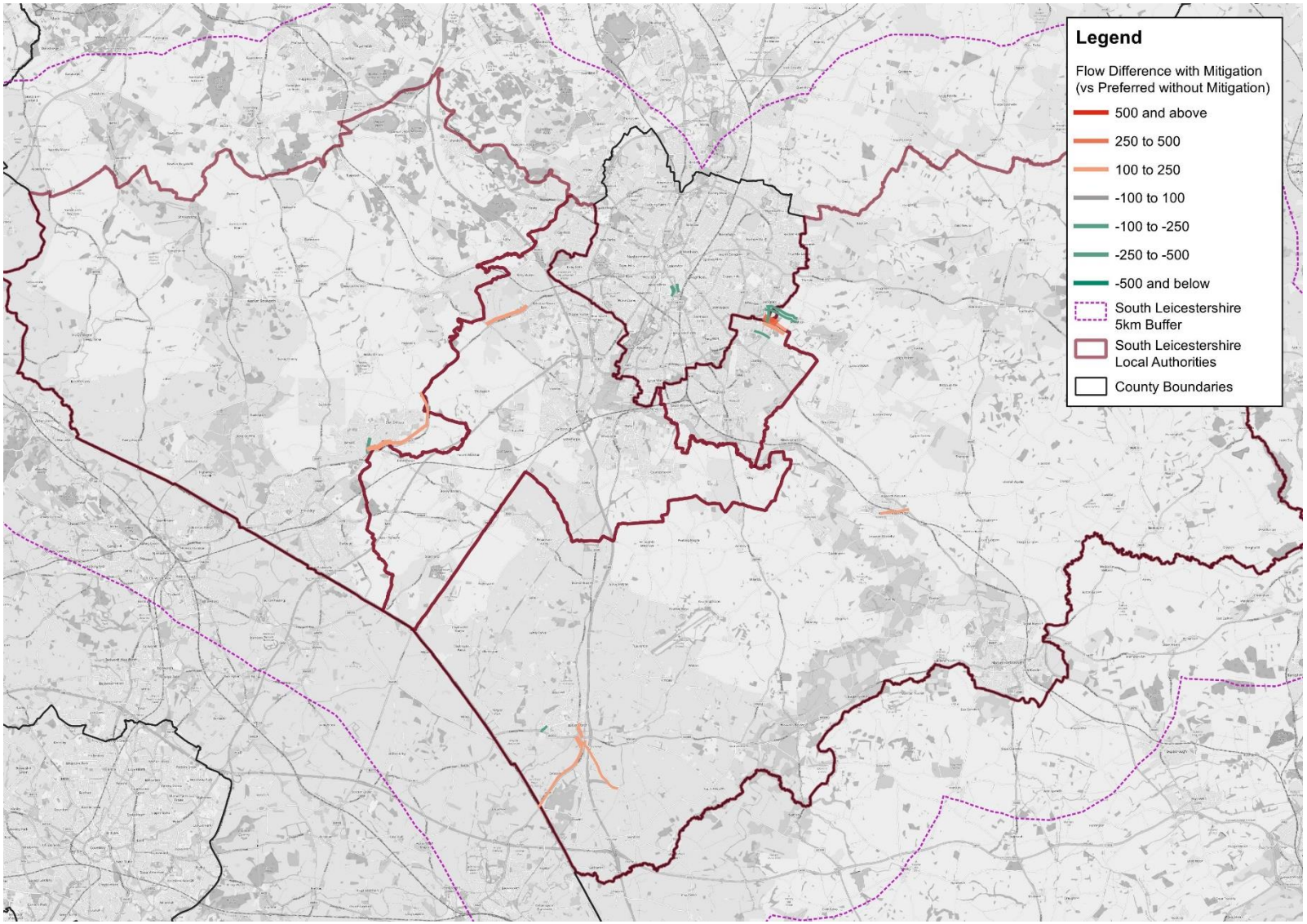

Figure 5-19: Geography of Impacts - 2036b Mitigation Package Performance, Flow Difference, AM and PM Peak

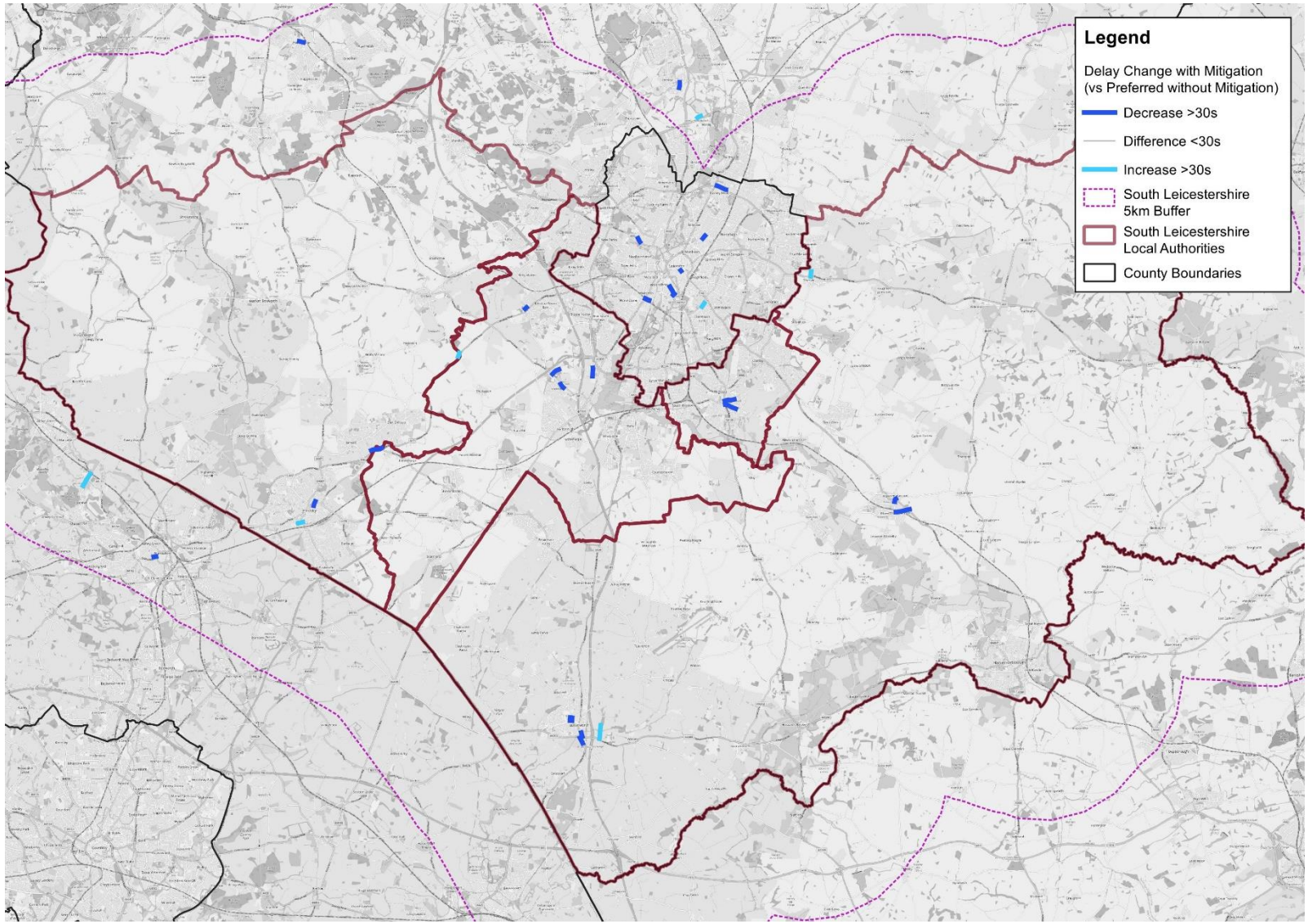

Figure 5-20: Geography of Impacts - 2036b Mitigation Package Performance, Delay Change, AM and PM Peak

2041 Package

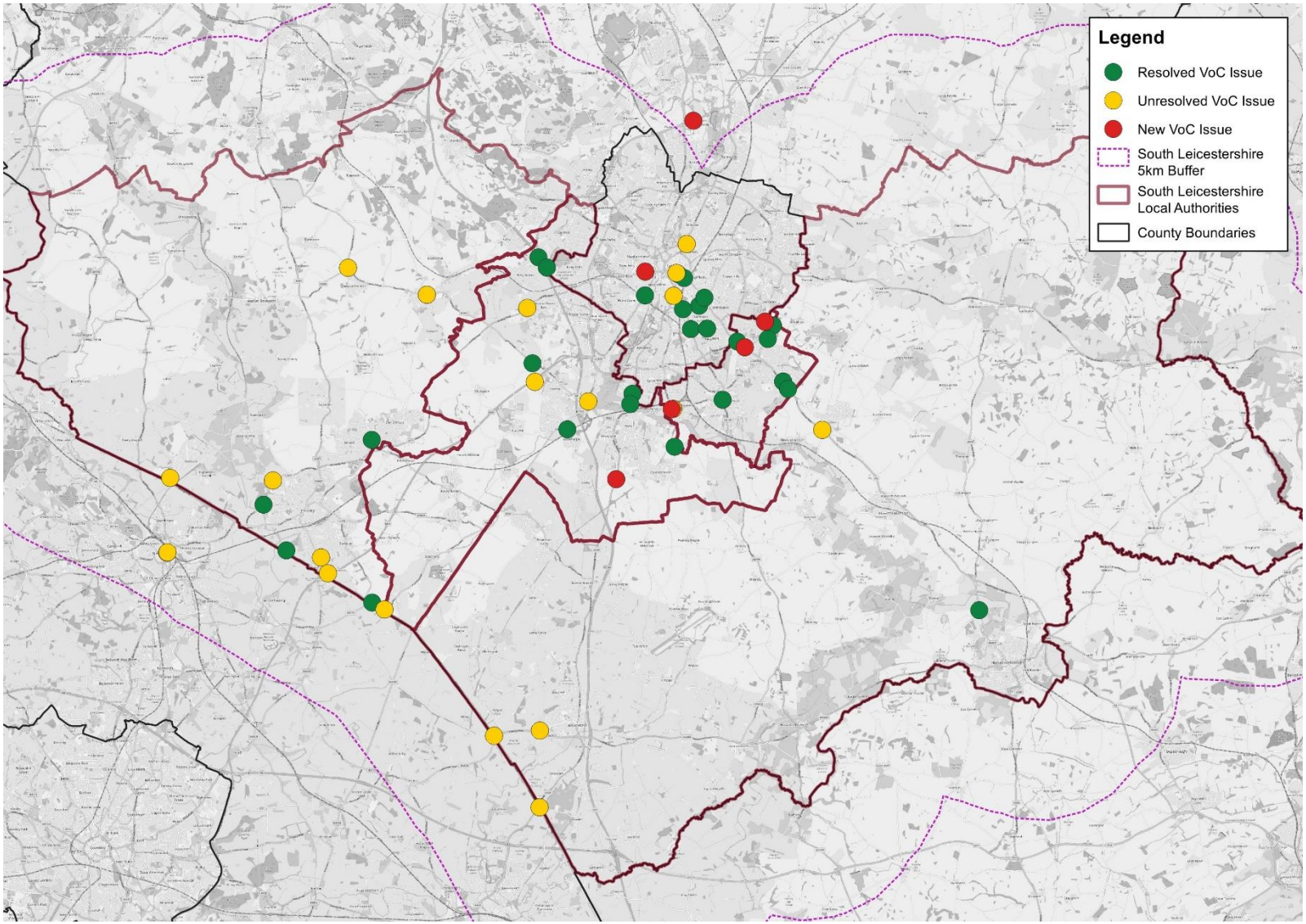

Figure 5-21: Geography of Impacts - 2041 Mitigation Package Performance, Volume over Capacity, AM and PM Peak

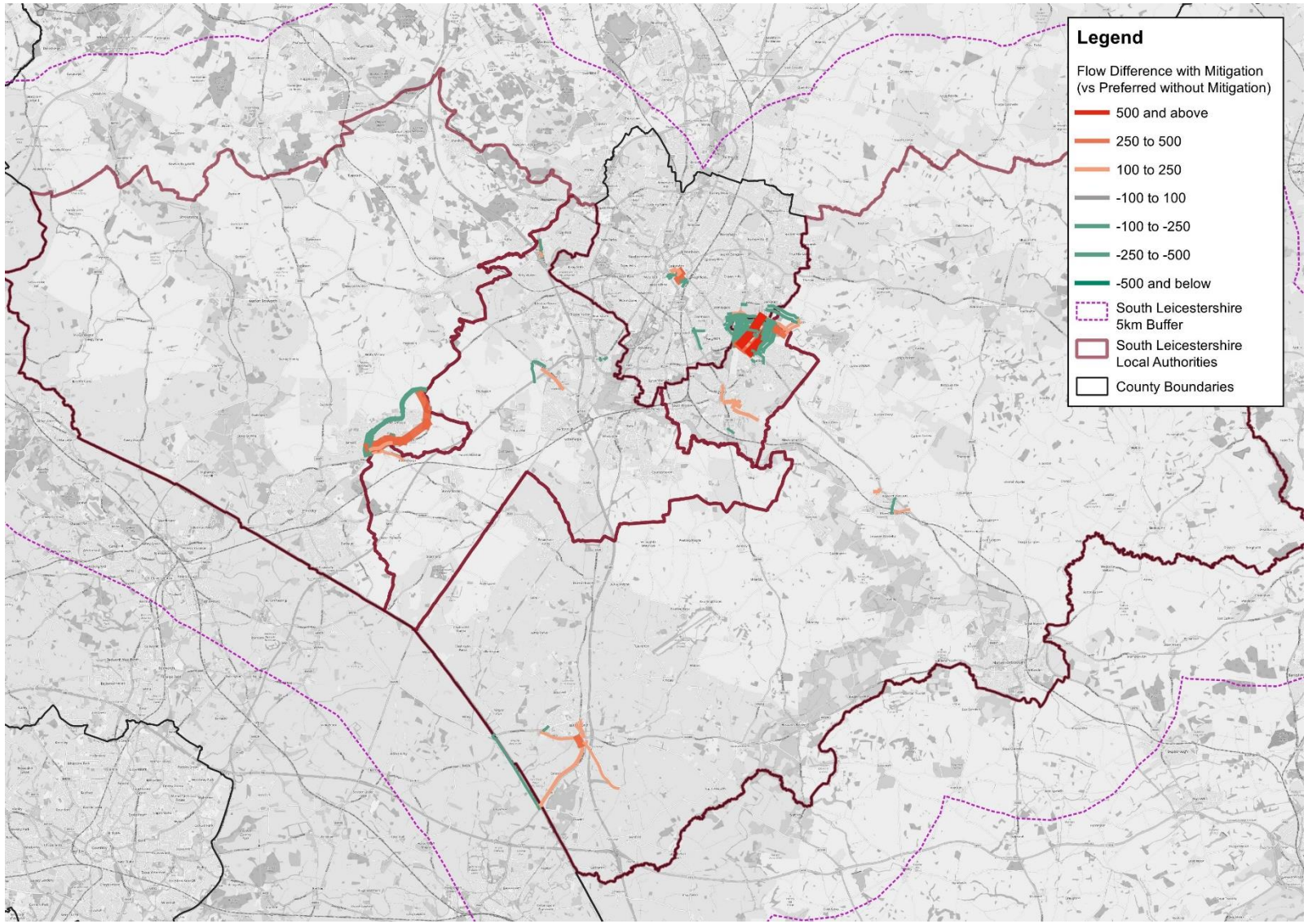

Figure 5-22: Geography of Impacts - 2041 Mitigation Package Performance, Flow Difference, AM and PM Peak

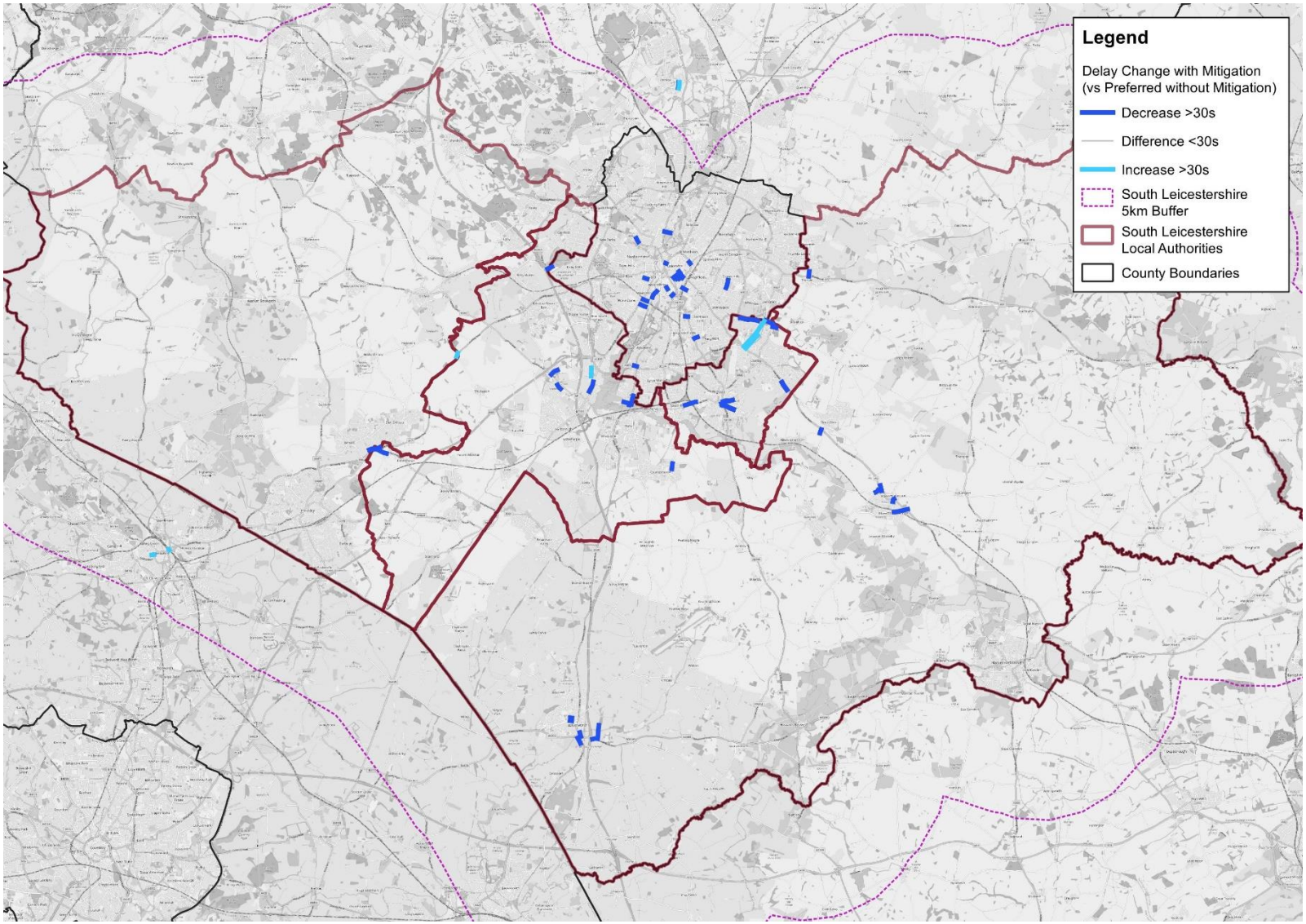

Figure 5-23: Geography of Impacts - 2041 Mitigation Package Performance, Delay Change, AM and PM Peak

2051 Package

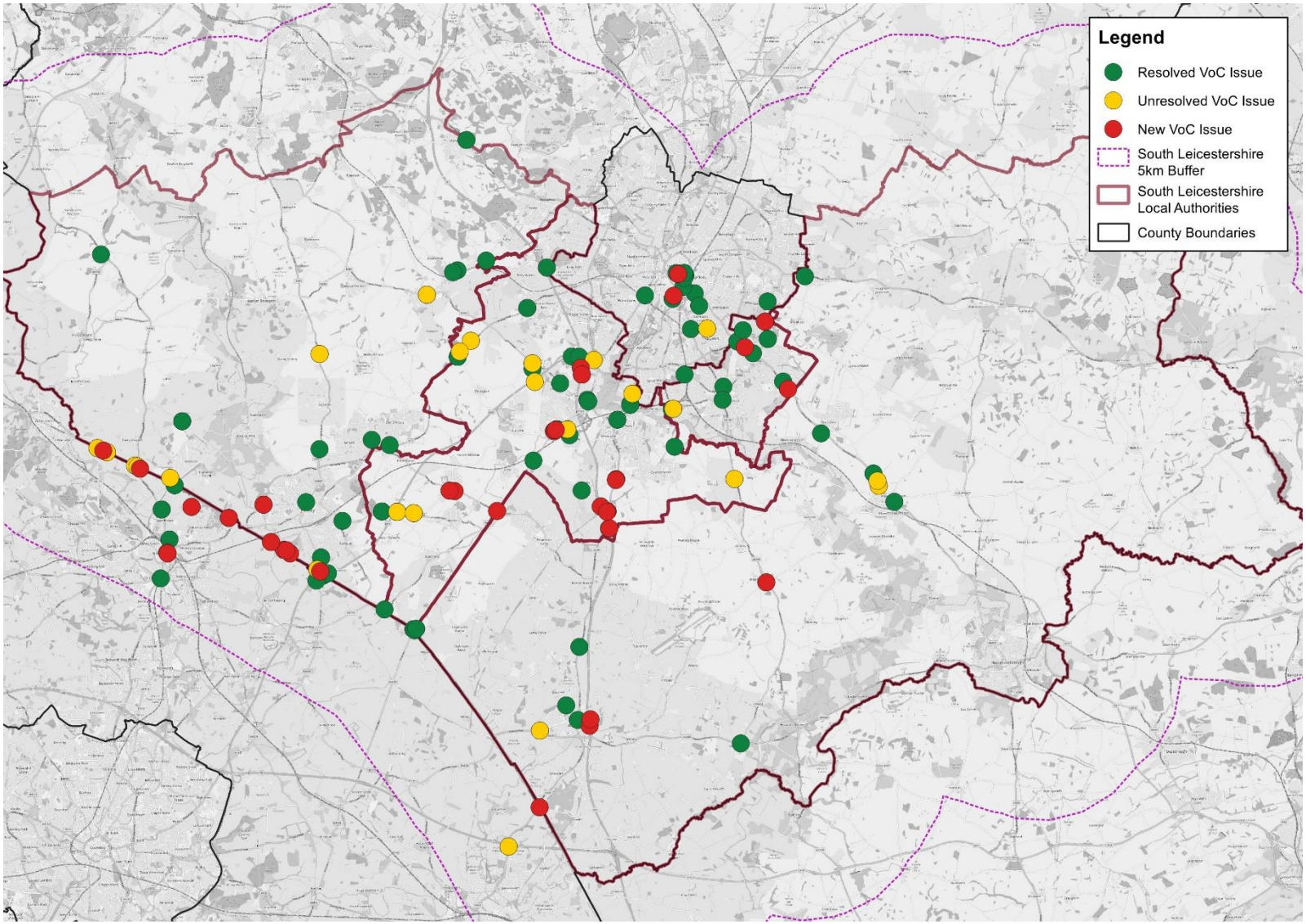

Figure 5-24: Geography of Impacts - 2051 Mitigation Package Performance, Volume over Capacity, AM and PM Peak

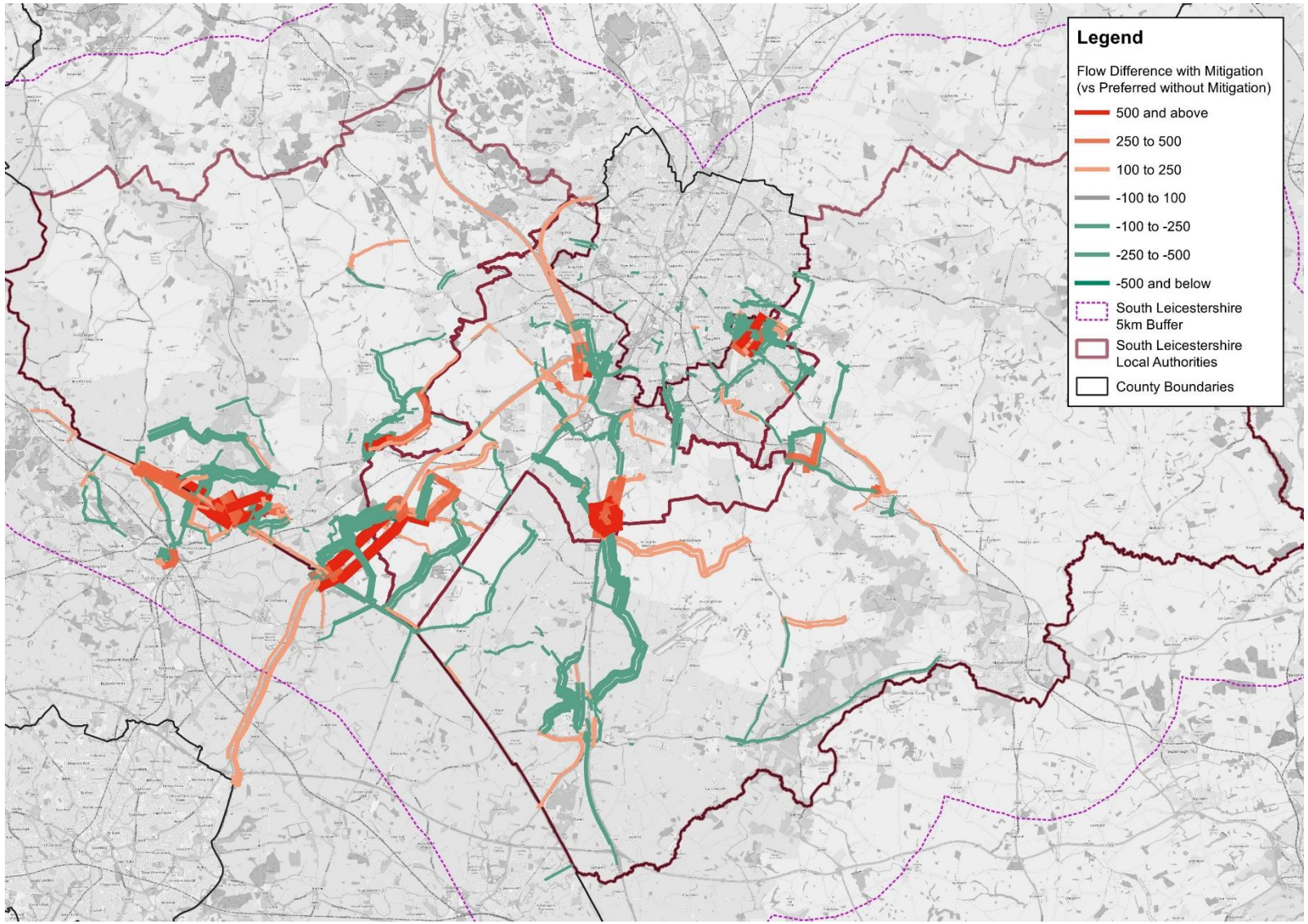

Figure 5-25: Geography of Impacts - 2051 Mitigation Package Performance, Flow Difference, AM and PM Peak

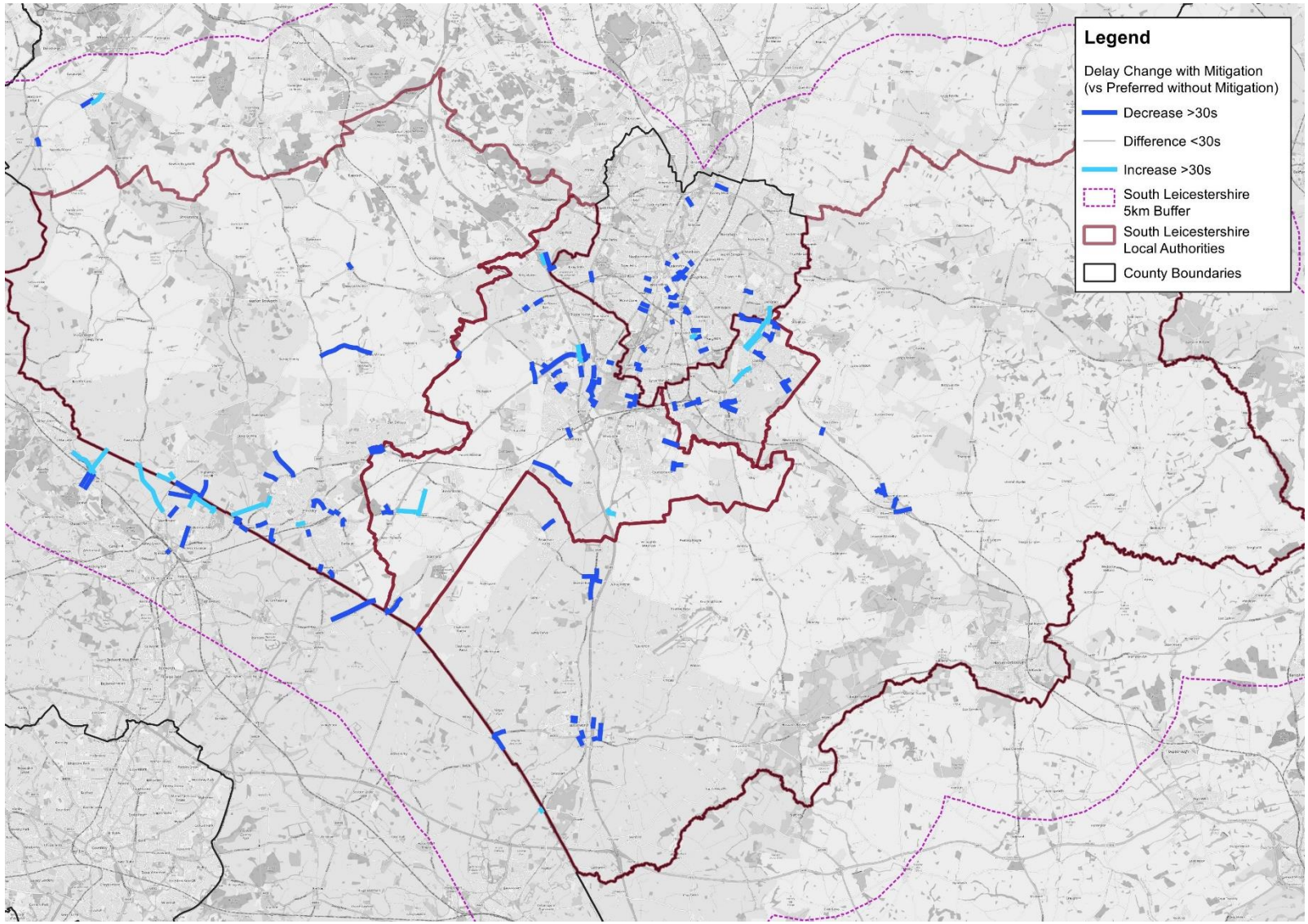

Figure 5-26: Geography of Impacts - 2051 Mitigation Package Performance, Delay Change, AM and PM Peak

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