

TECHNICAL NOTE



MANSFIELD LOCAL PLAN

LAND AT BERRY HILL (LINDHURST) STRATEGIC TRANSPORT IMPACT ASSESSMENT SENSITIVITY TEST

IDENTIFICATION TABLE

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1. INTRODUCTION

1.1 Background

- 1.1.1 Mansfield District Council (MDC) is preparing a Local Plan Review for implementation across the District up to 2043. It will identify a preferred strategy in terms of housing and employment growth within the District and set out policies to deliver sustainable growth.
- 1.1.2 SYSTRA completed an assessment of the strategic transport impacts of the Local Plan Review¹. This indicated the transport impact of the development proposals and an assessment of associated strategic mitigation which could be implemented.
- 1.1.3 That assessment was undertaken using the East Midlands Gateway Model (EMGM). The EMGM is a multimodal transport model built following the guidance in the Department for Transport's (DfT) Transport Analysis Guidance (TAG). The model was fully calibrated and validated in line with TAG guidance in 2018 and has a base year of 2016. It has since been used for a variety of studies, including Local Plan assessments, development assessments, DfT-compliant business cases and regional growth strategy studies.
- 1.1.4 To ensure that the EMGM is fit for purpose for the Mansfield Local Plan assessment, the model was expanded and revalidated within the Mansfield District area.
- 1.1.5 The assessment year of that study was 2043, which allowed for the Local Plan's proposed developments to be fully occupied and operational and therefore the strategic transport impacts of the Mansfield Local Plan to be assessed.

1.2 Next Steps

- 1.2.1 Following the completion of the above study, SYSTRA has now been commissioned by MDC to assess the impact of a revised masterplan and strategic access strategy to the existing Local Plan allocation for the Land at Berry Hill (Lindhurst) development in Mansfield using the EMGM. Details on the associated land use quantum changes are provided in Chapter 3.
- 1.2.2 This sensitivity test aims to identify whether any additional mitigation measures may be required to help alleviate the strategic transport impacts of the proposed increase in the number of dwellings and the associated change in the employment land use quantum.
- 1.2.3 The purpose of this Technical Note is to detail:
 - The assumptions and outputs from the Sensitivity Test Scenario compared against the 2043 Local Plan With Mitigation Scenario, and
 - The overall conclusions on the revised masterplan's impact on the strategic public transport and highway networks in Mansfield District and surrounds.

¹ Mansfield Local Plan - Local Plan Testing v4.pdf, August 2026

2. THE EAST MIDLANDS GATEWAY MODEL

2.1 Model Overview

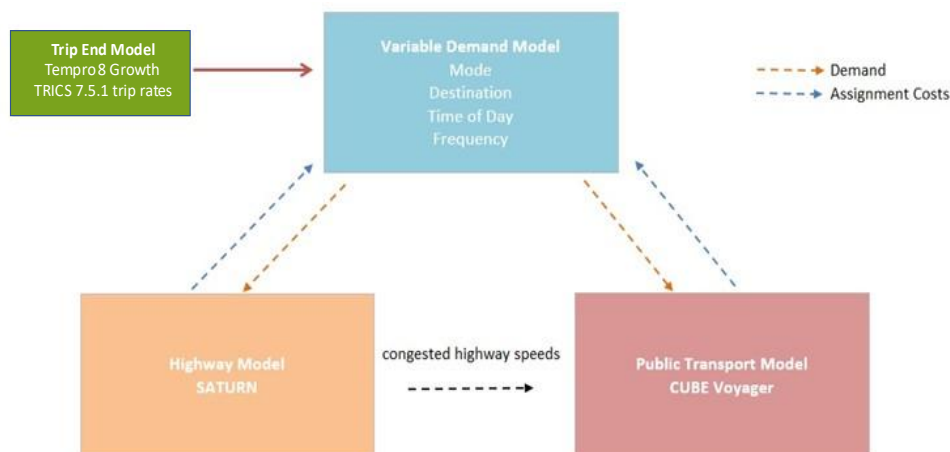
2.1.1 This assessment is undertaken using the East Midlands Gateway Model (EMGM). The EMGM was developed as a multimodal transport model following guidance in the DfT's Transport Analysis Guidance (TAG). It is fully simulated in an area covering Nottinghamshire, Derbyshire and North Leicestershire.

2.1.2 It was previously recalibrated and validated in line with TAG. To ensure that the EMGM is fit for purpose for this assessment, a review of the model was undertaken as part of this study in and around Mansfield District, and no issues were identified.

2.1.3 An overview of the structure of the EMGM is shown in Figure 1. In summary, the modelling suite is comprised of the following elements:

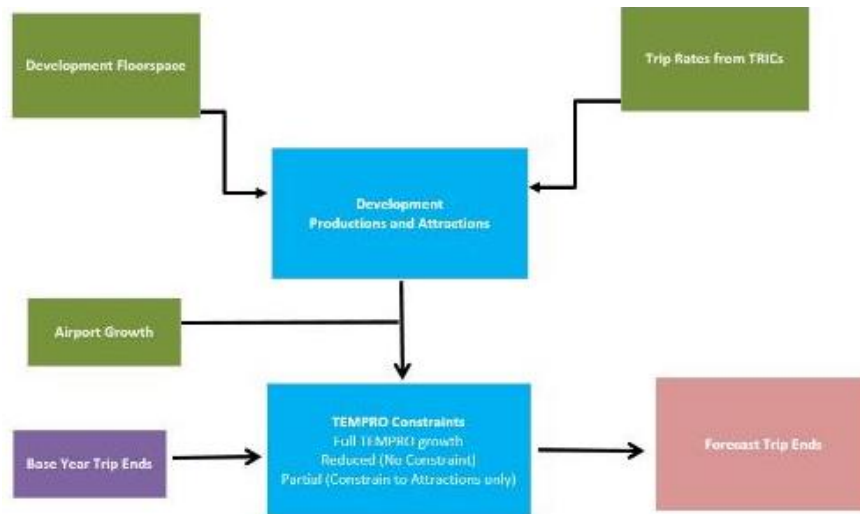
- SATURN Highway Model.
- Cube Voyager Public Transport Model.
- Cube Variable Demand Model including destination, mode choice, trip frequency and time of day responses.
- Park and Ride model.
- TRICS-based Trip End Model.

Figure 1. EMGM Technical Structure



2.1.4 Forecast demand is calculated in the Trip End Model, as in Figure 2.

Figure 2. Trip End Model Structure



- 2.1.5 The number of development trips is calculated from trip rates contained within TRICS. These are applied to floorspace, or the number of dwellings, proposed at each development. The development trips are added to the base year model's matrices, and then background growth is applied to the matrices in a way that ensures that the outturn growth matches the DfT's Trip End Model Presentation Program's (TEMPro 8.1) growth forecasts. Note, the EMGM is constrained to TEMPro growth.
- 2.1.6 Outturn generations for developments which have been entered specifically, closely align with the expected level of trip generation. Residual TEMPro growth is applied to surrounding wards within each MSOA and constrained at a District level.
- 2.1.7 Trip rates have been extracted from TRICS 7.5.1 for distinct types of land use and segmented by mode and time-period. The final person trip rates applied in the trip end model are shown in Table 1. These are provided in the accompanying Forecasting Report and, as per the development of all EMGM models, were agreed with the Local Authorities and National Highways for use in this assessment.

Table 1. EMGM Person Trip Rates

LAND USE	AM PEAK (08:00 – 09:00)			PM PEAK (17:00 – 18:00)		
	ARRIVAL	DEPARTURE	TOTAL	ARRIVAL	DEPARTURE	TOTAL
Residential house (per dwelling)	0.183	0.729	0.912	0.570	0.257	0.827
Residential flat (per flat)	0.074	0.295	0.369	0.231	0.104	0.335
B1 Employment (per 100sqm)	1.631	0.115	1.746	0.102	1.479	1.581
B2 Employment (per 100sqm)	0.388	0.145	0.533	0.081	0.375	0.456
B8 Employment (per 100sqm)	0.087	0.023	0.110	0.011	0.042	0.090
Primary Education (per 100sqm)	7.193	1.613	8.806	0.311	0.658	0.969
Secondary Education (per 100sqm)	2.341	0.256	2.597	0.066	0.634	0.700
College (Nottingham Skills Hub, per pupil)	0.359	0.017	0.376	0.031	0.069	0.100
Food Retail (per 100sqm)	3.518	2.624	6.142	6.558	6.887	13.445
Non-Food Retail (per 100sqm)	0.287	0.069	0.356	0.253	0.206	0.459
Café/Restaurant/Bar (per 100sqm)	0.000	0.000	0.000	6.256	2.874	9.130
Health Centre (Clinic) (per 100sqm)	1.952	0.355	2.307	0.124	0.805	0.929

3. SENSITIVITY TEST: INPUT ASSUMPTIONS

3.1 Introduction

3.1.1 The 2043 Local Plan With Mitigation Scenario includes all committed sites to 2043 levels of build-out, proposed site allocations associated with the new Mansfield Local Plan Review and any demand, active mode, public transport or highway mitigation measures included in that scenario to help assess the extent to which the strategic transport impacts of the Local Plan may be able to be alleviated.

3.1.2 It includes a windfall allowance of 720 dwellings, with 90% (648 dwellings) spread evenly across the Mansfield urban area and 10% (72 dwellings) spread evenly across Warsop Parish.

3.1.3 In total, the 2043 Local Plan With Mitigation Scenario, relative to the 2043 No Local Plan Scenario, includes an additional:

- **10,459** dwellings
- **53,400sqm** B1 employment space
- **128,700sqm** B2 employment space
- **134,100sqm** B8 employment space

3.2 Land at Berry Hill (Lindhurst) Land Use Assumptions

3.2.1 As shown in Table 2, in the 2043 Local Plan With Mitigation Scenario, Land at Berry Hill (Lindhurst) was modelled to include 1,700 homes, 36,000sqm of B1 employment space, 72,000sqm of B2 employment space and 72,000sqm of B8 employment space.

3.2.2 In this Sensitivity Test Scenario, the development has been modelled to include 2,200 homes, 36,000sqm of B1 employment space, 83,000sqm of B2 employment space and 48,000sqm of B8 employment space.

3.2.3 Relative to the 2043 Local Plan With Mitigation Scenario, the Sensitivity Test includes:

- **500** additional dwellings
- An Increase of **11,000sqm** in **B2** employment space
- A reduction of **24,000sqm** in **B8** employment space

3.2.4 The quantum of B1 employment space remains unchanged.

Table 2. Land at Berry Hill (Lindhurst) Development Assumptions by Scenario

SCENARIO	HOMES	B1 (SQM)	B2 (SQM)	B8 (SQM)
2043 Local Plan With Mitigation	1,700	36,000	72,000	72,000
Sensitivity Test	2,200	36,000	83,000	48,000
Difference	+500	0	+11,000	-24,000
Difference (%)	+29%	0%	+15%	-33%

- 3.2.5 The land use assumptions shown in Table 2 for the Sensitivity Test were derived by reviewing the differences between the land use assumptions assessed in the Lindhurst Group developer test scenarios and applying proportionate adjustments to the 2043 Local Plan With Mitigation Scenario. In the developer test, the masterplan change to accommodate an additional 500 homes was associated with an approximate **33-34% reduction in B8 floorspace** (from 150,700sqm to 100,00sqm) and a **24,000sqm increase in B2 floorspace** (from nil) between that study's "Do Minimum" and "Do Something" scenarios.
- 3.2.6 Accordingly, in the Sensitivity Test for this study, B1 floorspace has been held constant, consistent with the developer test. B8 floorspace has been **reduced by 24,000sqm, equivalent to an approximate 33% reduction** (rounded to the nearest 1,000sqm) from the 2043 Local Plan With Mitigation Scenario baseline of 72,000sqm to 48,000sqm. B2 floorspace has correspondingly been **increased by 11,000sqm** (rounded to the nearest 1,000sqm), from 72,000sqm to 83,000sqm.
- 3.2.7 This reflects the same direction and ratio of change as the developer test (in terms of the land use and therefore the trip generation change), namely a reduction in B8 floorspace alongside a consistently proportionate increase in B2 floorspace to accommodate the additional 500 dwellings. All other land use assumptions in the Sensitivity Test Scenario remain as in the 2043 Local Plan With Mitigation Scenario.

3.3 Land at Berry Hill (Lindhurst) Access Assumptions

- 3.3.1 In the developer test scenarios for Lindhurst Group, an additional 500 dwellings are assumed south of the A617 Sherwood Way East, accessed from the east of A60 Nottingham Road via a new signalised junction between Thieves Wood Lane and A617 Sherwood Way, as shown in Figure 3.

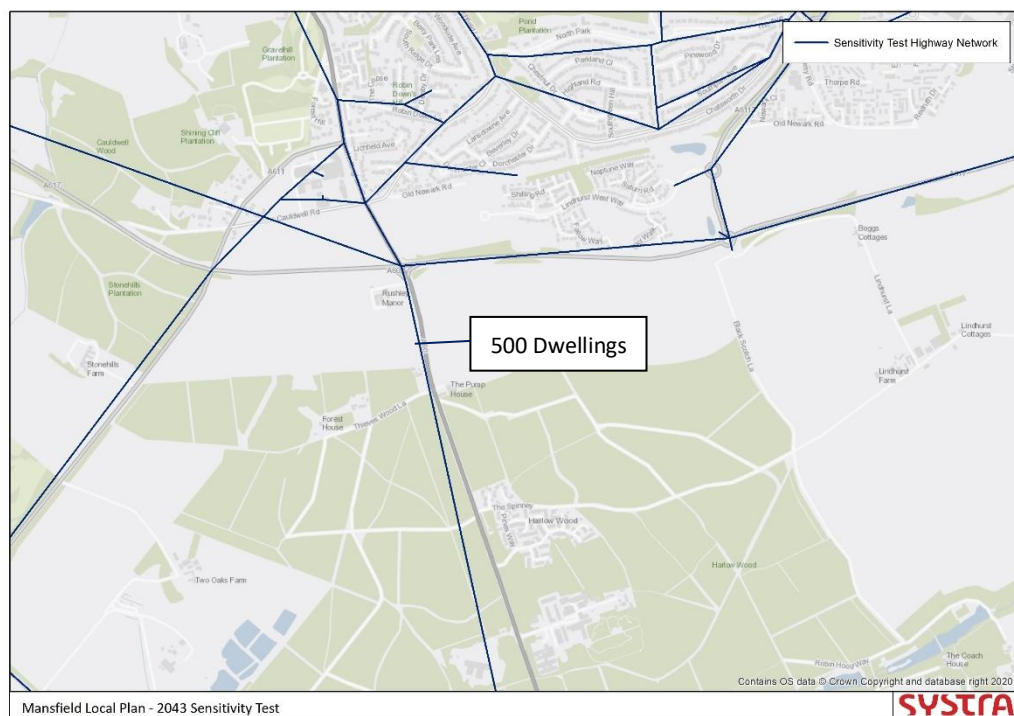


Figure 3. Land at Berry Hill (Lindhurst) Access Assumptions for the Additional 500 Dwellings in the EMGM

- 3.3.2 No through-route for vehicles has been assumed to be possible between this additional 500-home land parcel and the land parcels associated with the 1,700 dwellings. Vehicular movement between them (in the strategic model) is only possible using the external highway network, namely A60 Nottingham Road and A617 Sherwood Way.
- 3.3.3 The 500-home land parcel has been connected to the public transport network in the 2043 Local Plan With Mitigation scenario, allowing residents the opportunity to use buses that run along A60 Nottingham Road.
- 3.3.4 All other network assumptions in the Sensitivity Test Scenario remain as per the 2043 Local Plan With Mitigation Scenario.



4. SENSITIVITY TEST: OUTPUT ANALYSIS

4.1 Introduction

- 4.1.1 This chapter examines the strategic transport impacts of the Sensitivity Test, looking at the number of generated person trips, highway traffic flows and junction congestion. Comparisons are made against the 2043 Local Plan With Mitigation Scenario.

4.2 Generated Person Trips and Mode Shares

- 4.2.1 Table 3 details the number of person trips being made to and from the Land at Berry Hill (Lindhurst) development and the mode share between highway, public transport and active modes (walking and cycling) in the Sensitivity Test Scenario compared to the 2043 Local Plan With Mitigation Scenario.
- 4.2.2 Active modes are not modelled but have been estimated post Variable Demand Model (VDM) run by analysing the same TRICS surveys upon which the EMGM's person trip rates are based to derive the percentage of trips likely to be made additionally by active modes.

Table 3. Land at Berry Hill (Lindhurst) Development Person Trips and Mode Shares

SCENARIO	AM PEAK TRIPS	PM PEAK TRIPS	HIGHWAY	PUBLIC TRANSPORT	ACTIVE
2043 Local Plan With Mitigation	2,708	2,529	85%	3%	12%
2043 Sensitivity Test	3,210	3,018	85%	3%	12%
Difference	502	489	0%	0%	0%
Difference (%)	19%	19%			

- 4.2.3 Table 3 shows that the number of person trips generated by the Land at Berry Hill (Lindhurst) development has increased by approximately 500 person trips in both peaks, which represents a **19%** increase in person trips associated with the site compared to the 2043 Local Plan With Mitigation Scenario. The mode share impact is immaterial, with there being no change in the percentage of person trips being made by each mode of transport.
- 4.2.4 Table 4 shows the change in the number of person trips generated by each land use in the 2043 Sensitivity Test Scenario compared to the 2043 Local Plan With Mitigation Scenario.



Table 4. Land at Berry Hill (Lindhurst) Development Person Trips by Land Use

SCENARIO	AM PEAK TRIPS		PM PEAK TRIPS	
	RESIDENTIAL LAND USE	EMPLOYMENT LAND USE	RESIDENTIAL LAND USE	EMPLOYMENT LAND USE
2043 Local Plan With Mitigation	1,596	1,112	1,462	1,067
2043 Sensitivity Test	2,064	1,145	1,894	1,124
Difference	468	34	432	57
Difference (%)	29%	3%	30%	5%

4.2.5 Table 4 indicates that, in both peaks, changes in person trips from the revised masterplan are driven far more by the residential quantum than by the employment quantum.

4.3 Increase in Generated Highway Trips

4.3.1 In the AM peak, the number of vehicle trips on the highway network in the 2043 Sensitivity Test Scenario compared to the 2043 Local Plan With Mitigation Scenario increases by **179** Passenger Car Units (PCU) and in the PM peak, the number of vehicle trips increases by **168** PCU.

4.4 Highway Flow Change

4.4.1 Figure 4 and Figure 5 present the change in traffic flow between the Sensitivity Test Scenario and the 2043 Local Plan With Mitigation Scenario. Red lines represent roads with flow increases, and green lines represent roads with flow decreases. The impact of the Sensitivity Test is apparent.

4.4.2 In both peaks, there is an insignificant change in highway flow on the majority of the highway network, both on the local network and on the Strategic Road Network (SRN).

4.4.3 Increases in highway flow of up to 100 PCU are only discernible on the A617, adjacent to its junction with A60 Nottingham Road, and on A60 Nottingham Road itself.



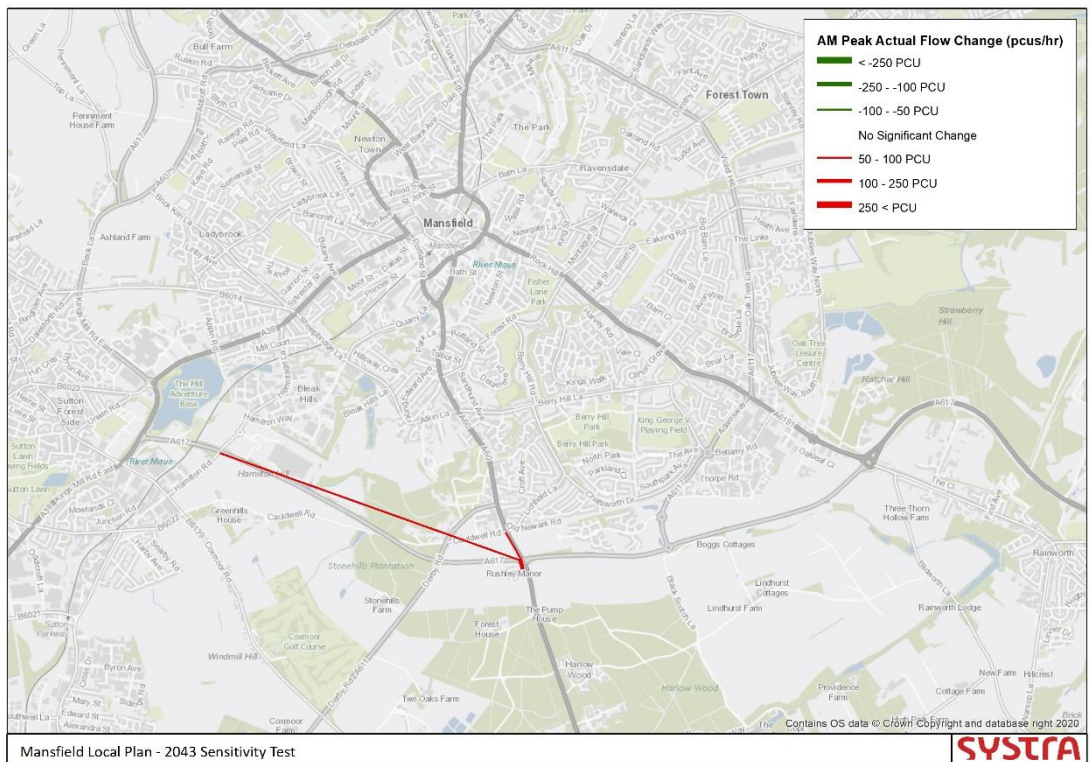


Figure 4. Highway Flow Change Sensitivity Test vs 2043 Local Plan With Mitigation Scenario – AM

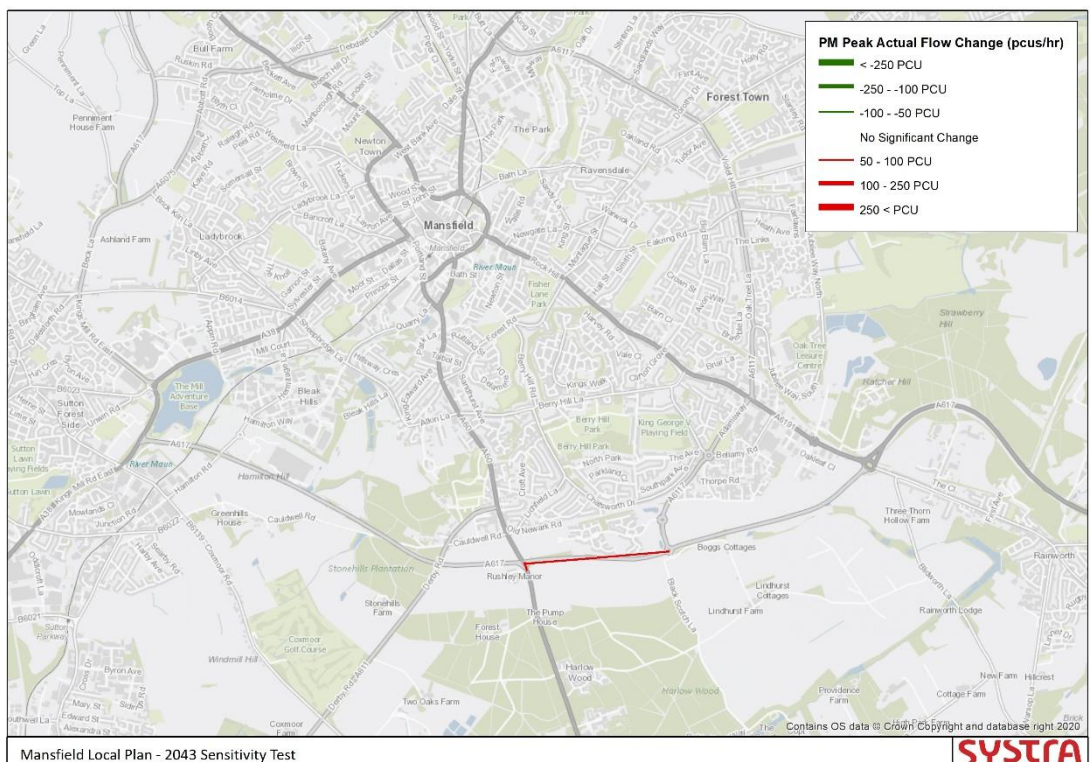


Figure 5. Highway Flow Change Sensitivity Test vs 2043 Local Plan With Mitigation Scenario – PM

4.5 Highway Congestion Change

4.5.1 Figure 6 and Figure 7 show the change in congestion between the Sensitivity Test Scenario and the 2043 Local Plan With Mitigation Scenario. The impact of the Sensitivity Test is apparent. The figures show the locations of all:

- Junctions which were congested in the 2043 Local Plan With Mitigation Scenario and are forecast to experience a change in congestion in the Sensitivity Test Scenario.
- Junctions where the Volume/Capacity (V/C) ratio climbs above 85% in the Sensitivity Test Scenario.

4.5.2 Within Mansfield District, the following junction experiences a congestion increase in the Sensitivity Test Scenario compared to the 2043 Local Plan With Mitigation Scenario in the AM peak only:

- A617 / A60 Nottingham Road

4.5.3 At the A617 / Nottingham Road junction in the AM peak, overall junction congestion increases by between 5% and 10% as a result of additional highway flow on the A60 Nottingham Road northbound approach to the junction.

4.5.4 Therefore, additional highway mitigation may be warranted at this junction, which could be confirmed through detailed junction modelling by the site promoter as part of the planning process for the Land at Berry Hill (Lindhurst) development.

4.5.5 There are no significant changes in junction congestion anywhere in the PM peak.



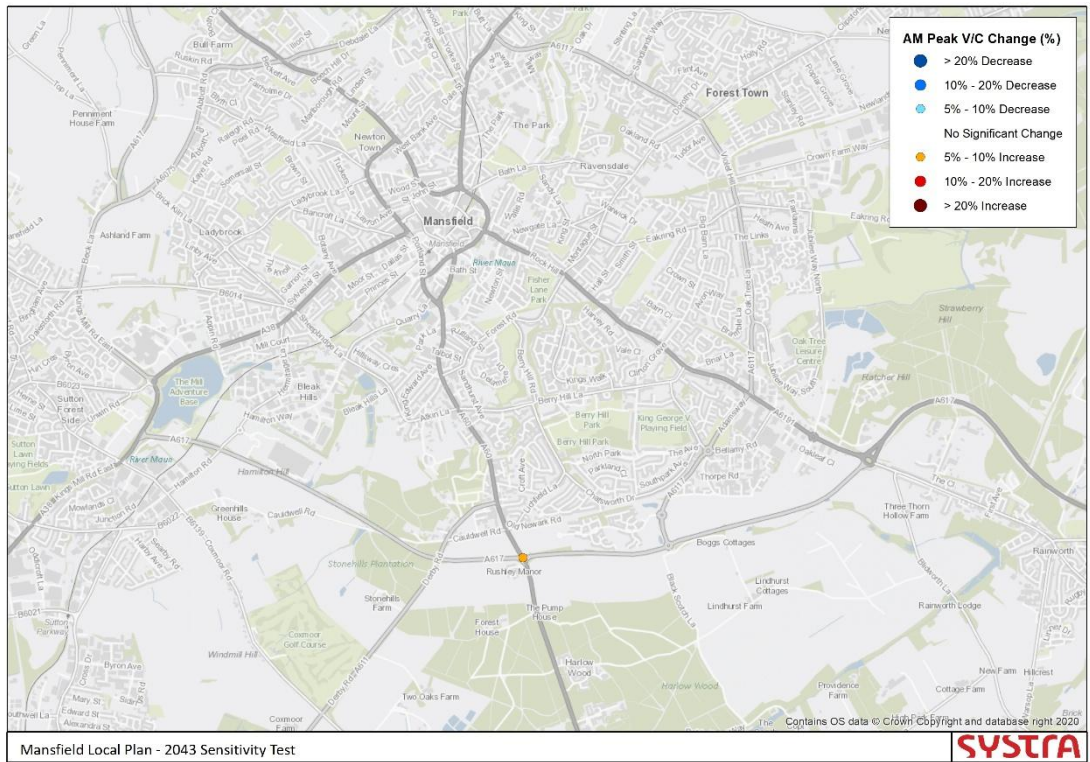


Figure 6. Junction Congestion Change Sensitivity Test vs 2043 Local Plan With Mitigation Scenario – AM

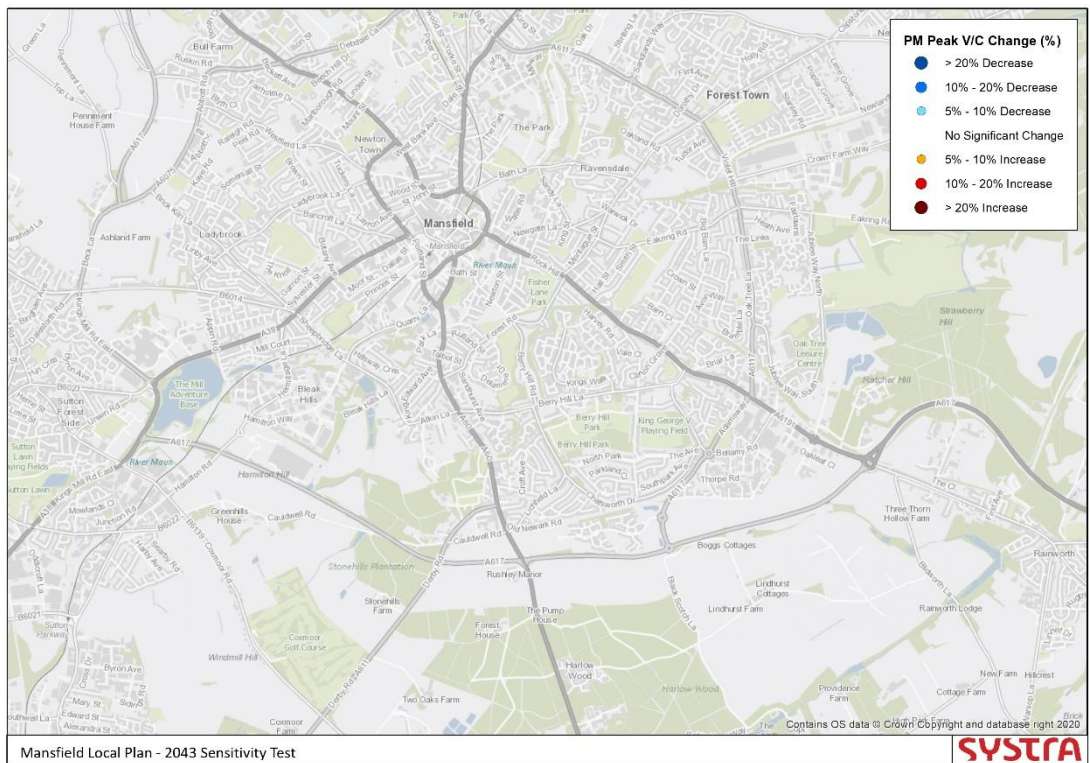


Figure 7. Junction Congestion Change Sensitivity Test vs 2043 Local Plan With Mitigation Scenario – PM



5. CONCLUSION

- 5.1.1 The Sensitivity Test has assessed the strategic transport implications of a revised masterplan and access strategy for the Land at Berry Hill (Lindhurst) development, compared against the 2043 Local Plan With Mitigation Scenario. The revised assumptions increase the residential quantum from 1,700 to 2,200 dwellings, retain B1 floorspace at 36,000sqm, increase B2 floorspace from 72,000sqm to 83,000sqm, and reduce B8 floorspace from 72,000sqm to 48,000sqm.
- 5.1.2 The modelling indicates that the revised masterplan would result in an increase in person trip generation of approximately **500 trips** in both the AM and PM peak hours, equivalent to a **19%** increase in person trips associated with the site relative to the 2043 Local Plan With Mitigation Scenario. The mode share is forecast to remain unchanged, with trips continuing to be distributed across highway, public transport and active modes in the same proportions as the 2043 Local Plan With Mitigation Scenario.
- 5.1.3 The strategic impacts of the Sensitivity Test are generally limited. Across most of the local and strategic highway network, changes in traffic flow are forecast to be insignificant in both peak periods. The principal discernible change is concentrated on the A617 in the vicinity of the A60 Nottingham Road junction, and on the A60 Nottingham Road corridor itself, where increases in flow of up to **100 PCU** are identified.
- 5.1.4 In congestion terms, the assessment indicates that the only notable impact within Mansfield District occurs in the **AM peak** at the **A617 / A60 Nottingham Road** junction, where overall junction congestion is forecast to increase by between **5%** and **10%** as a result of additional traffic on the A60 Nottingham Road northbound approach. No significant changes in junction congestion are forecast elsewhere on the network, and there are no significant congestion effects in the PM peak.
- 5.1.5 Overall, the Sensitivity Test suggests that the revised Berry Hill (Lindhurst) masterplan does not give rise to widespread additional strategic transport impacts when compared with the 2043 Local Plan With Mitigation Scenario. On this basis, the revised masterplan appears to remain broadly acceptable in strategic transport terms when set against the 2043 Local Plan With Mitigation context, subject to further consideration of mitigation at the **A617 / A60 Nottingham Road** junction.
- 5.1.6 It should be recognised that this is a strategic modelling study. The impacts at this junction could be tested through more detailed junction modelling and, if necessary, accompanied by appropriate scheme-specific mitigation as part of the planning application process for the Land at Berry Hill (Lindhurst) development.



APPROVAL

Version	Name		Position	Date	Modifications
1	Author	Jonathan Pagett & Owen Brown	Associate & Assistant Consultant	26/08/2026	First Issue for MDC Comment
	Checked	Rhian Collier & Jonathan Pagett	Associate Director & Associate	26/08/2026	
	Approved	Rhian Collier	Associate Director	26/08/2026	
2	Author	Jonathan Pagett & Owen Brown	Associate & Assistant Consultant	28/08/2026	Minor Updates Following MDC Comments
	Checked	Jonathan Pagett	Associate Director & Associate	28/08/2026	
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