

LLITM 2014 Base

Melton Mowbray Distributor Road
Outline Business Case:
Additional Sensitivity Testing Technical Note

Quality Information

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Section 1 – Overview

1.1 Introduction

- 1.1.1 AECOM has been commissioned to undertake traffic modelling using the LLITM 2014 Base suite to assess the proposed Melton Mowbray Distributor Road (MMDR), informing an Outline Business Case (OBC). This OBC was submitted to the DfT in late December 2017, and a conference call to discuss clarifications on the submission with the DfT was expected in mid-March 2018.
- 1.1.2 In advance of this meeting, LCC requested that further analysis of the existing model forecasts was undertaken, and that further sensitivity tests around the forecast scheme benefits were also produced. The aim of these additional sensitivity tests is to provide supporting evidence to the business case as part of any dialogue with the DfT.
- 1.1.3 The additional analysis of existing model forecasts is to undertake accident assessments (using CoBA-LT) and journey time reliability assessments based on the forecasts produced using the WebTAG high / low growth scenarios, and the forecasts produced using the alternative base year model.
- 1.1.4 In terms of the additional sensitivity tests, four have been defined in discussion with LCC and WSP. These are:
- **Test 1:** re-run of the 2021, 2036 and 2041 “without” and “with” scheme scenarios with the input planning data controlled to TEMPro v7.2 growth at a local level.
 - **Test 2:** as above, using TEMPro controlled planning data at a local level, but excluding the northern link (between Nottingham Road and Melton Spinney Road) from the “without” scheme forecasts, and excluding the southern link (between Burton Road and Leicester Road) from both the “with” and “without” scheme scenarios.
 - **Test 3:** using the central forecasts, re-run the 2021, 2036 and 2041 “without” and “with” scheme scenarios excluding the Melton Mowbray northern link from the “without” scheme scenario and the associated SUE from the planning forecasts.
 - **Test 4:** using the central forecasts, re-run the 2021, 2036 and 2041 “without” and “with” scheme scenarios excluding the Melton Mowbray northern link from the “without” scheme scenario, the southern link from both the “without” and “with” scheme scenarios, and the associated SUEs from the planning inputs.

1.2 Report Structure

- 1.2.1 Following this introduction, this technical note contains the following sections:
- Section 2 – Additional Analysis of Existing Model Forecasts: this section details the accident and journey time assessments undertaken using the WebTAG high / low growth scenarios, and the forecasts derived from the alternative base year model.
 - Section 3 – Additional Sensitivity Testing: this section details the methodology and assumptions adopted for the four sensitivity tests detailed above, and provides forecast network performance statistics and TUBA scheme benefits for these sensitivity tests.

Section 2 – Additional Analysis of Existing Model Forecasts

2.1 Introduction

- 2.1.1 Accident analysis (using CoBA-LT) and journey time reliability analysis (following the approach set out in WebTAG Unit A1.3) was undertaken using the Central Case, with the results of these assessments detailed in the Economic Assessment Report.
- 2.1.2 As part of the Economic Assessment Report, TUBA scheme benefits have been forecast for three sensitivity tests in addition to the Central Case. These sensitivity tests are the WebTAG high / low growth scenarios, and using the alternative base year model (developed using roadside interview data for Melton Mowbray).
- 2.1.3 Accident and journey time assessments were not undertaken for the WebTAG high / low growth and alternative base forecasts as part of the work to produce the Economic Assessment Report. This section details the results of the accident and journey time reliability assessments for these sensitivity tests.

2.2 Accident Assessment

- 2.2.1 As discussed in Section 4 of the Economic Assessment Report, CoBA-LT has been used to forecast changes in the numbers of accidents and casualties associated with a change to the highway network, and to monetise these impacts.
- 2.2.2 The same approach and input parameters have been used to assess the accident impact of the high and low growth scenarios, as well as the alternative base year scenario, with the AADT traffic forecasts taken from the high / low sensitivity tests.
- 2.2.3 The assessment of the Central Case resulted in forecast accident disbenefits over 60 years in 2010 prices and values of around £7.68m. Table 2.1 provides the corresponding results for the WebTAG high / low growth scenarios.
- 2.2.4 The accident disbenefits are forecast to be around £8.96m (an increase of 17% from the Central Case) in the WebTAG high growth scenario, and around £6.77m (a decrease of 12% from the Central Case) in the low growth scenario. This is in line with the additional vehicle kilometres forecast in the high growth scenario compared with the Central Case, and the corresponding forecast reductions in vehicle kilometres in the low growth scenario.
- 2.2.5 The forecast accident disbenefits when using the alternative base year are around £7.21m, which is 6% lower than the Central Case, reflecting fewer forecast accidents of all severities. This is in line with the forecast reduction in scheme benefits between the Central Case and the alternative base year, for which there was a forecast reduction of 13%. (See Section 3.8 of the Economic Assessment Report for further details on the forecast scheme benefits with the alternative base year.)

Table 2.1: Summary of Accident Disbenefits

	Central Case	High Growth	Low Growth	Alternative Base
Economic Summary (£000s in 2010 prices and values)				
Total without-scheme accident costs	£341,841.90	£367,394.80	£314,911.50	£339,978.20
Total with-scheme accident costs	£349,547.80	£376,356.90	£321,678.30	£347,184.10
Total accident benefits saved by the scheme	-£7,682.80	-£8,962.10	-£6,766.80	-£7,205.90

Accident Summary

Total without-scheme accidents	6,141.3	6,619.0	5,640.4	6,125.7
Total with-scheme accidents	6,212.1	6,706.7	5,701.3	6,190.7
Total accidents saved by the scheme	-70.7	-87.8	-60.9	-65.0

Casualty Summary

Total without-scheme casualties	Fatal	116.1	124.6	106.9	114.7
	Serious	1030.6	1110.1	946.8	1024.9
	Slight	7613.2	8198.8	6997.1	7585.9
Total with-scheme casualties	Fatal	121.3	130.6	111.6	119.6
	Serious	1053.8	1137.5	967.3	1046.4
	Slight	7728.1	8337.5	7096.9	7692.2
Total casualties saved by the scheme	Fatal	-5.2	-6.0	-4.7	-4.9
	Serious	-23.2	-27.4	-20.5	-21.5
	Slight	-114.9	-138.6	-99.8	-106.3

Note: There are some rounding errors in these CoBA-LT outputs

2.3 Journey Time Reliability Assessment

- 2.3.1 As detailed in Section 6 of the Economic Assessment Report, an assessment of journey time reliability has been undertaken following guidance contained within WebTAG Unit A1.3, Section 6.3. This approach uses a cordon of Melton Mowbray, and considers the ratio of assigned time to free-flow time within the assignment.
- 2.3.2 The assessment of the Central Case resulted in forecast journey time reliability benefits over 60 years in 2010 prices and values of around £7.25m. Table 2.2 provides the corresponding results for the WebTAG high / low growth scenarios, and the forecasts using the alternative base year model.

Table 2.2: Summary of Reliability Benefits by User Class (£s, 2010 prices and values)

User Class	Central Case	High Growth	Low Growth	Alternative Base Year
HGV	£193,443	£275,353	£140,641	£192,628
LGV	£1,263,066	£1,971,384	£915,367	£1,111,333
Emp. Bus.	£1,098,753	£1,490,161	£861,027	£971,241
Other Low Income	£833,561	£1,401,833	£585,659	£764,269
Other Medium Income	£917,362	£1,495,144	£654,359	£852,103
Other High Income	£1,002,633	£1,615,608	£719,881	£930,998
Commute Low Income	£377,177	£731,505	£244,108	£295,767
Commute Medium Income	£709,746	£1,329,725	£466,731	£576,970
Commute High Income	£856,289	£1,505,882	£585,113	£715,960
Total	£7,252,030	£11,816,594	£5,172,887	£6,411,268

- 2.3.3 The journey time reliability benefits are forecast to be around £11.8m (an increase of 63% from the Central Case) in the WebTAG high growth scenario, and around £5.2m (a decrease of 29% from the Central Case) in the low growth scenario. This is in line with the additional congestion forecast in the high growth scenario compared with the Central Case, and the corresponding forecast reductions in congestion in the low growth scenario.
- 2.3.4 The forecast journey time reliability benefits when using the alternative base year are around £6.4m, which is 12% lower than the Central Case. This is in line with the forecast reduction in scheme benefits between the Central Case and the alternative base year, for which there was a forecast reduction of 13%. (See Section 3.8 of the Economic Assessment Report for further details on the forecast scheme benefits with the alternative base year.)

Section 3 – Additional Sensitivity Testing

3.1 Introduction

- 3.1.1 After submission of the Outline Business Base in December 2017, discussions were held between AECOM, WSP and LCC to consider what additional evidence may help support the bid in dialogue with DfT. An outcome of these discussions was four additional sensitivity tests which were to be undertaken to understand the impact on the forecast network performance and scheme benefits of changes to key modelling assumptions.
- 3.1.2 These four sensitivity tests focussed on two areas. The first of these is the application of the constraint to TEMPro planning data applied within the land-use model forecasts, given the higher forecast levels of planning data growth within Melton Borough (driven by the emerging Local Plan) compared with TEMPro forecasts. The second area of interest is the impact on the scheme assessment should either the northern or southern SUEs, including their associated link roads, not be delivered.
- 3.1.3 The four sensitivity tests around the Central Case scheme assessment are:
- **Test 1:** re-run of the 2021, 2036 and 2041 “without” and “with” scheme scenarios with the input planning data controlled to TEMPro v7.2 growth at a local level.
 - **Test 2:** as above, using TEMPro controlled planning data at a local level, but excluding the northern link (between Nottingham Road and Melton Spinney Road) from the “without” scheme forecasts, and excluding the southern link (between Burton Road and Leicester Road) from both the “with” and “without” scheme scenarios.
 - **Test 3:** using the central forecasts, re-run the 2021, 2036 and 2041 “without” and “with” scheme scenarios excluding the Melton Mowbray northern link from the “without” scheme scenario and the associated SUE from the planning forecasts.
 - **Test 4:** using the central forecasts, re-run the 2021, 2036 and 2041 “without” and “with” scheme scenarios excluding the Melton Mowbray northern link from the “without” scheme scenario, the southern link from both the “without” and “with” scheme scenarios, and the associated SUEs from the planning inputs.
- 3.1.4 Table 3.1 provides an overview of the network assumptions adopted within Melton Mowbray in the four sensitivity tests. This table details the inclusion or exclusion of the northern (between Nottingham Road and Melton Spinney Road), eastern (between Melton Spinney Road and Burton Road), and southern (Burton Road and Leicester Road) links in the “without” and “with” scheme forecasts.

Table 3.1: Summary of Sensitivity Test Network Assumptions

		“without scheme”	“with scheme”
Test 1	Northern (Nottingham Road to Melton Spinney Road)	✓	✓
	Eastern (Melton Spinney Road to Burton Road)	✗	✓
	Southern (Burton Road to Leicester Road)	✓	✓
Test 2	Northern (Nottingham Road to Melton Spinney Road)	✗	✓
	Eastern (Melton Spinney Road to Burton Road)	✗	✓
	Southern (Burton Road to Leicester Road)	✗	✗
Test 3	Northern (Nottingham Road to Melton Spinney Road)	✗	✓
	Eastern (Melton Spinney Road to Burton Road)	✗	✓
	Southern (Burton Road to Leicester Road)	✓	✓
Test 4	Northern (Nottingham Road to Melton Spinney Road)	✗	✓
	Eastern (Melton Spinney Road to Burton Road)	✗	✓
	Southern (Burton Road to Leicester Road)	✗	✗

- 3.1.5 The remainder of this section details the methodologies adopted in undertaking these four sensitivity tests, and the forecast model results in terms of highway network performance statistics and scheme benefits.

3.2 Forecast Methodology

Test 1: Local TEMPro Constraint with Existing Forecast Assumptions

- 3.2.1 This sensitivity test makes changes to the forecast planning data (population, households and employment), retaining the same underlying forecasting assumptions, including the highway network infrastructure schemes, as detailed in the Forecasting Report.
- 3.2.2 As detailed within Section 3.2 of the Forecasting Report, the forecast planning data from the land-use model are controlled to TEMPro v7.2 forecasts for the 'fully modelled area'. This 'fully modelled area' is defined by the housing market and travel to work area for Leicestershire, and includes Leicestershire and neighbouring counties.
- 3.2.3 Within this, the forecast reflect the current Local Plans and therefore produces a different allocation of growth within the 'fully modelled area' than represented within TEMPro v7.2. A key difference is within Melton Borough where the expected growth in the borough based on the emerging Local Plan is significantly higher than that contained within TEMPro v7.2 forecasts. This sensitivity test therefore considers the impact of lower growth in Melton Borough, constraining growth for the district to TEMPro v7.2 forecasts.
- 3.2.4 To apply this approach consistently across the 'fully modelled area', growth in population, households and employment from the 2014 base year has been controlled to growth contained within TEMPro v7.2 forecasts. This constraint has been applied at a district level within Leicestershire, and at a county level (or groupings of counties) outside Leicestershire.
- 3.2.5 This constraint has been applied by factoring the forecast planning data produced as part of the Central Forecasts to reproduce the growth from 2014 contained within the TEMPro forecasts for population, households and employment individually. These factors have been applied at a district level within Leicestershire, retaining the distribution of land-use within the district and the demographic forecasts as produced by the Central Forecasts.
- 3.2.6 Table 3.2 provides a summary of the change in planning data growth between the Central Forecasts and the TEMPro controlled sensitivity test from 2014 to 2036. Within Melton Borough this results in a reduction in growth of around 9,675 people, 4,725 households and 1,275 jobs.
- 3.2.7 We note that the growth in both population and employment (but not households) for Leicester/Leicestershire is lower in the TEMPro-controlled planning data than in the Central Forecasts.
- 3.2.8 The revised planning data have been used within the DfT's CTripEnd software to generate revised trip-end estimates. These estimates have been used within the forecasting process, which aside from the changes to the planning inputs uses the same forecasting assumptions as adopted in the Central Forecasts.

Test 2: Local TEMPro Constraint excluding Melton Mowbray Northern and Southern Link Roads

- 3.2.9 Included within the Core Scenario highway network assumptions are two schemes which are assumed to be delivered as part of proposed developments to the north and south of Melton Mowbray. These are a link road between the A606, Nottingham Road and Melton Spinney Road to the north of the town, and between the A606, Burton Road and the A607, Leicester Road to the south of Melton Mowbray.
- 3.2.10 With the lower levels of forecast household growth contained within TEMPro v7.2, it is unlikely that sufficient housing growth would be delivered within Melton Mowbray to deliver these two infrastructure schemes.
- 3.2.11 Based on this, and using the planning inputs derived for Test 1, a further incremental change to the forecast assumptions has been made to remove these two schemes from the forecast highway networks. This means that the proposed scheme is a new link road between Nottingham Road in the north and Burton Road in the south in all forecast years; whereas in the later forecast years within the Central Forecasts the section between Nottingham Road and Melton Spinney Road is assumed to have been delivered, and that the scheme accelerates delivery of this section.

Table 3.2: Summary of Planning Data Growth (2014 to 2036) in Central Case and Local TEMPro Controlled Sensitivity Test

District / County	Central Forecasts			TEMPro v7.2 Controlled			Change		
	Population	Households	Employment	Population	Households	Employment	Population	Households	Employment
Leicester	18,304 (5.5%)	12,533 (10.0%)	-5,182 (-3.2%)	37,474 (11.3%)	22,369 (17.7%)	16,253 (9%)	19,170	9,836	21,435
Charnwood	22,717 (13.1%)	21,857 (31.5%)	6,450 (9.6%)	29,904 (17.8%)	16,536 (24%)	6,430 (8.6%)	7,188	-5,321	-20
Melton	11,936 (23.3%)	6,622 (29.9%)	3,491 (16.1%)	2,261 (4.5%)	1,891 (8.6%)	2,228 (9.1%)	-9,675	-4,732	-1,263
Harborough	9,026 (10.4%)	7,459 (20.5%)	2,175 (5.3%)	12,431 (14.5%)	7,464 (20.7%)	4,214 (9%)	3,405	5	2,040
Oadby and Wigston	-634 (-1.1%)	2,899 (13.3%)	-274 (-1.4%)	1,141 (2.1%)	1,626 (7.5%)	2,092 (9%)	1,775	-1,273	2,366
Blaby	6,282 (6.6%)	8,262 (20.6%)	4,989 (8.5%)	8,792 (9.3%)	6,006 (14.9%)	5,398 (9.4%)	2,510	-2,256	409
Hinckley and Bosworth	8,235 (7.7%)	6,621 (14.1%)	2,151 (5.0%)	13,207 (12.5%)	8,420 (17.9%)	4,205 (9.0%)	4,972	1,798	2,055
North West Leicestershire	11,996 (12.7%)	7,465 (18.6%)	15,101 (26%)	5,357 (5.7%)	4,385 (10.8%)	5,383 (9.1%)	-6,639	-3,079	-9,718
Nottinghamshire	142,888 (14.5%)	74,917 (17.8%)	27,923 (6.3%)	114,919 (10.6%)	73,923 (15.7%)	49,081 (9.0%)	-27,969	-993	21,158
Coventry and Warwickshire	133,060 (15%)	73,460 (19.7%)	29,518 (6.7%)	132,399 (15.2%)	77,503 (20.9%)	34,190 (7.7%)	-661	4,043	4,671
Northamptonshire	110,444 (15.5%)	63,029 (21.1%)	16,634 (5.1%)	124,959 (17.8%)	71,872 (24.1%)	33,520 (9.3%)	14,515	8,843	16,886
Derbyshire	162,388 (14.1%)	87,927 (17.6%)	35,101 (7.1%)	110,935 (10.9%)	72,051 (16.2%)	43,710 (9.0%)	-51,452	-15,876	8,608
Greater Birmingham and Staffordshire	380,107 (10.7%)	277,578 (19.1%)	132,585 (8.5%)	341,377 (9.7%)	227,212 (15.7%)	131,064 (8.2%)	-38,730	-50,366	-1,521
Lincolnshire	75,543 (10.3%)	43,820 (13.8%)	25,541 (8.2%)	86,312 (12.1%)	55,104 (17.5%)	21,897 (6.6%)	10,769	11,285	-3,644
Rutland	2,585 (6.9%)	1,562 (10.0%)	246 (1.4%)	2,216 (5.9%)	1,842 (11.9%)	1,837 (9.3%)	-369	280	1,591
Cambridgeshire and Peterborough	162,535 (19.7%)	87,275 (25.8%)	46,890 (10.8%)	215,662 (26.0%)	123,355 (36.0%)	48,342 (10.7%)	53,127	36,080	1,452

Test 3: Central Forecasts excluding Melton Mowbray Northern Link and SUE

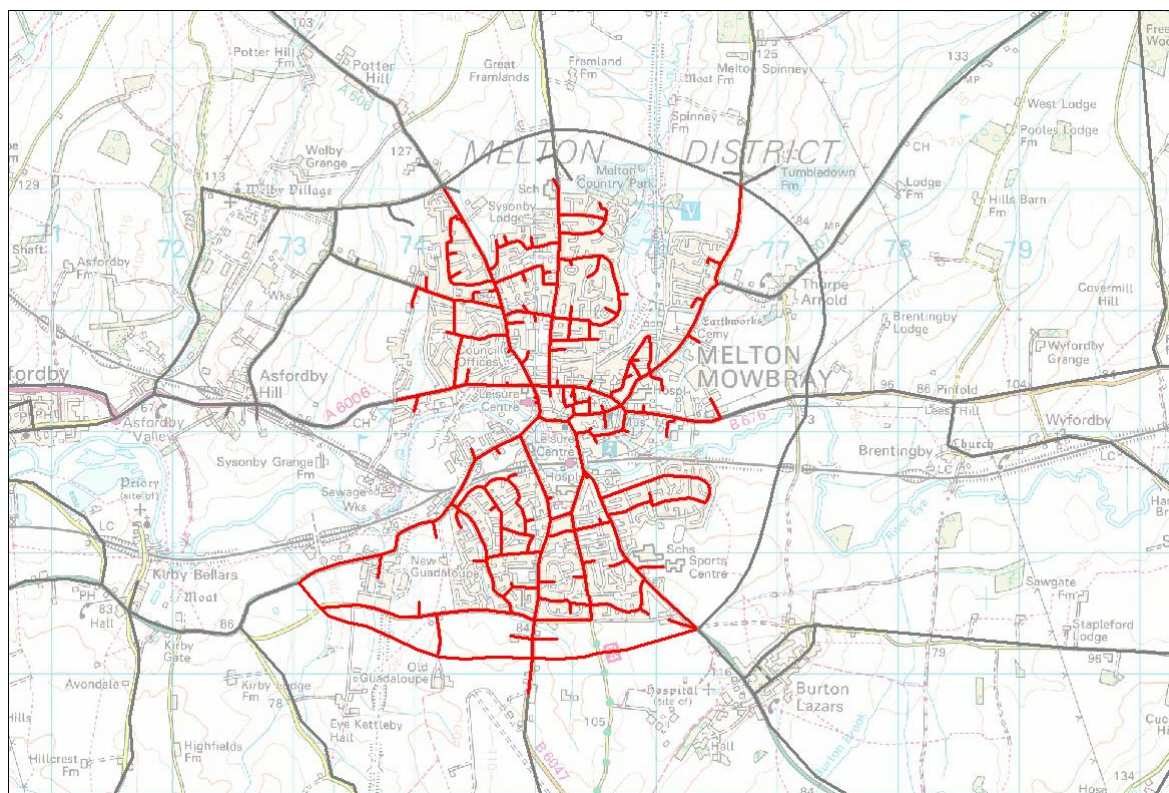
- 3.2.12 The second area of investigation is the impact on the scheme assessment should either the northern or southern SUEs and associated link roads not be delivered. As the planning application process is more advanced for the southern SUE, this sensitivity test considers the impact of the northern SUE and link road being removed from the Core Scenario forecast assumptions.
- 3.2.13 This sensitivity test has used the Central Forecast planning data, and not the planning data controlled to TEMPro growth at a district level as defined for Test 1 and Test 2. Using the Central Forecast assumptions, the planning data growth for the zones representing the proposed northern SUE has been removed from the model, retaining the base year planning data for these zones in all forecast years.
- 3.2.14 In the scenario where the northern SUE is removed from the forecasting assumptions, the associated link road between Nottingham Road and Melton Spinney Road is also removed from the network assumptions. As with Test 2, this changes the definition of the scheme to be a link between Nottingham Road and Burton Road (and not accelerating the delivery of the northern section).

Test 4: Central Forecasts excluding Melton Mowbray Northern and Southern Links and SUEs

- 3.2.15 Based on the forecasting assumptions developed for Test 3, the southern SUE and link road have also been removed model inputs. This has been implemented using the same methodology as adopted for the northern SUE, whereby the planning data for the zones representing the southern SUE has taken the base year planning data estimates in all forecast years.
- 3.2.16 In addition to removing the southern SUE planning data growth, the link road between Leicester Road and Burton Road has also been removed from the forecast network assumptions. This is due to the same rationale as for the northern SUE whereby if the development is not delivered, we assume that the link road is also not delivered.

3.3 Test 1: Local TEMPro Constraint with Existing Forecast Assumptions

- 3.3.1 Using the revised forecasts with planning data growth controlled to TEMPro v7.2 growth for districts within Leicestershire and counties outside Leicestershire, the forecast highway network performance statistics have been calculated. These have been calculated using the same methodology and assumptions as adopted within the Forecasting Report, and provide the model forecasts for:
- the level of traffic on the network (measured in vehicle distance);
 - the delay on the network (measured both in total vehicle delay and in terms of delay per kilometre); and
 - the average speed on the network.
- 3.3.2 These statistics have been calculated for links identified as being within Melton Borough, and also the subset within Melton Mowbray. The links identified as being within Melton Mowbray are shown in Figure 3.1.

Figure 3.1: Links Selected as within Melton Mowbray

Map contains Ordnance Survey data © Crown copyright and database right 2018

- 3.3.3 Table 3.3 and Table 3.4 show the forecast change in network performance statistics between the Central Forecasts and the Test 1 forecasts without the proposed scheme within Melton Borough and Melton Mowbray respectively. Table 3.5 and Table 3.6 provide the same comparison for the forecasts including the proposed scheme.
- 3.3.4 These tables show that the forecast level of traffic across Melton Borough decreases by around 5% in 2021 and around 10% in 2036 and 2041 due to the constraint to TEMPro planning data growth at a local level. This results in a forecast increase in average speed across the borough of up to 5%. Within Melton Mowbray, traffic is forecast to decrease by around 7% in 2021 and around 13% in 2036 and 2041 due to the local constraint to TEMPro planning data growth. Within Melton Mowbray, average speeds are forecast to increase by generally up to 5% (although there is a forecast increase of 11% in 2041 in the PM Peak hour) with the forecast reduction in traffic levels.
- 3.3.5 These forecast reductions in traffic levels are comparable with the reductions in forecast population and employment levels with the application of the constraint to TEMPro growth at a local level. Applying this constraint reduces the forecast population within Melton Borough by 15% in 2036, with a 5% reduction in employment within the borough.

Table 3.3: LLITM 2014 “without scheme” Test 1 Forecast Network Performance within Melton Borough

		Central Forecasts			Test 1 Forecasts			Change		
		2021	2036	2041	2021	2036	2041	2021	2036	2041
AM Peak Hour	Vehicle Distance (veh-km)	127,339	140,152	143,235	121,572	127,956	130,842	-5%	-9%	-9%
	Vehicle Delay-Time (veh-hours)	2,302	2,585	2,667	2,177	2,304	2,370	-5%	-11%	-11%
	Average Speed (kph)	55	54	54	56	56	55	1%	2%	3%
	Vehicle Delay/Vehicle Distance (sec/km)	10	11	12	9	10	10	-4%	-10%	-11%
Interpeak Hour	Vehicle Distance (veh-km)	92,373	106,324	108,990	88,260	97,432	99,960	-4%	-8%	-8%
	Vehicle Delay-Time (veh-hours)	1,670	1,944	2,006	1,580	1,741	1,793	-5%	-10%	-11%
	Average Speed (kph)	55	55	54	56	56	56	1%	2%	3%
	Vehicle Delay/Vehicle Distance (sec/km)	9	10	10	8	9	9	-4%	-9%	-10%
PM Peak Hour	Vehicle Distance (veh-km)	134,543	152,548	156,243	128,334	139,198	142,954	-5%	-9%	-9%
	Vehicle Delay-Time (veh-hours)	2,453	2,877	3,014	2,310	2,532	2,621	-6%	-12%	-13%
	Average Speed (kph)	55	53	52	56	55	55	1%	4%	5%
	Vehicle Delay/Vehicle Distance (sec/km)	10	13	14	10	11	11	-6%	-15%	-21%

Table 3.4: LLITM 2014 “without scheme” Test 1 Forecast Network Performance within Melton Mowbray

		Central Forecasts			Test 1 Forecasts			Change		
		2021	2036	2041	2021	2036	2041	2021	2036	2041
AM Peak Hour	Vehicle Distance (veh-km)	20,012	23,357	24,152	18,818	20,649	21,282	-6%	-12%	-12%
	Vehicle Delay-Time (veh-hours)	701	809	852	650	691	720	-7%	-15%	-16%
	Average Speed (kph)	29	29	28	29	30	30	1%	3%	4%
	Vehicle Delay/Vehicle Distance (sec/km)	40	41	44	38	38	39	-4%	-9%	-11%
Interpeak Hour	Vehicle Distance (veh-km)	16,023	19,535	20,226	14,955	17,021	17,615	-7%	-13%	-13%
	Vehicle Delay-Time (veh-hours)	547	656	687	505	558	582	-8%	-15%	-15%
	Average Speed (kph)	29	30	29	30	31	30	1%	2%	3%
	Vehicle Delay/Vehicle Distance (sec/km)	36	37	39	35	35	36	-3%	-7%	-8%
PM Peak Hour	Vehicle Distance (veh-km)	21,334	25,285	26,073	19,930	22,076	22,828	-7%	-13%	-12%
	Vehicle Delay-Time (veh-hours)	762	929	1,013	698	763	798	-8%	-18%	-21%
	Average Speed (kph)	28	27	26	29	29	29	2%	6%	11%
	Vehicle Delay/Vehicle Distance (sec/km)	42	49	56	40	41	42	-5%	-16%	-25%

Table 3.5: LLITM 2014 “with scheme” Test 1 Forecast Network Performance within Melton Borough

		Central Forecasts			Test 1 Forecasts			Change		
		2021	2036	2041	2021	2036	2041	2021	2036	2041
AM Peak Hour	Vehicle Distance (veh-km)	131,454	145,431	148,918	125,387	132,688	136,069	-5%	-9%	-9%
	Vehicle Delay-Time (veh-hours)	2,289	2,577	2,656	2,162	2,304	2,374	-6%	-11%	-11%
	Average Speed (kph)	57	56	56	58	58	57	1%	2%	2%
	Vehicle Delay/Vehicle Distance (sec/km)	9	10	10	8	9	9	-5%	-9%	-9%
Interpeak Hour	Vehicle Distance (veh-km)	95,658	110,711	113,550	91,305	101,506	104,176	-5%	-8%	-8%
	Vehicle Delay-Time (veh-hours)	1,661	1,943	2,003	1,571	1,747	1,800	-5%	-10%	-10%
	Average Speed (kph)	58	57	57	58	58	58	1%	2%	2%
	Vehicle Delay/Vehicle Distance (sec/km)	8	9	9	7	8	9	-4%	-8%	-9%
PM Peak Hour	Vehicle Distance (veh-km)	138,204	158,160	162,620	131,780	144,368	148,358	-5%	-9%	-9%
	Vehicle Delay-Time (veh-hours)	2,424	2,839	2,946	2,287	2,528	2,615	-6%	-11%	-11%
	Average Speed (kph)	57	56	55	58	57	57	1%	3%	3%
	Vehicle Delay/Vehicle Distance (sec/km)	9	11	11	9	10	10	-4%	-10%	-11%

Table 3.6: LLITM 2014 “with scheme” Test 1 Forecast Network Performance within Melton Mowbray

		Central Forecasts			Test 1 Forecasts			Change		
		2021	2036	2041	2021	2036	2041	2021	2036	2041
AM Peak Hour	Vehicle Distance (veh-km)	17,558	20,954	21,771	16,374	18,342	19,029	-7%	-12%	-13%
	Vehicle Delay-Time (veh-hours)	587	697	730	540	597	623	-8%	-14%	-15%
	Average Speed (kph)	30	30	30	30	31	31	1%	2%	2%
	Vehicle Delay/Vehicle Distance (sec/km)	35	37	38	33	35	35	-4%	-6%	-7%
Interpeak Hour	Vehicle Distance (veh-km)	13,942	17,371	18,026	12,937	15,031	15,593	-7%	-13%	-13%
	Vehicle Delay-Time (veh-hours)	460	569	596	424	485	506	-8%	-15%	-15%
	Average Speed (kph)	30	31	30	31	31	31	1%	2%	2%
	Vehicle Delay/Vehicle Distance (sec/km)	33	35	36	32	34	34	-2%	-5%	-5%
PM Peak Hour	Vehicle Distance (veh-km)	18,910	23,058	23,937	17,575	19,984	20,788	-7%	-13%	-13%
	Vehicle Delay-Time (veh-hours)	639	787	830	588	662	694	-8%	-16%	-16%
	Average Speed (kph)	30	29	29	30	30	30	1%	3%	4%
	Vehicle Delay/Vehicle Distance (sec/km)	36	40	42	34	37	38	-3%	-8%	-10%

- 3.3.6 Using the revised highway model forecasts, a TUBA scheme assessment has been undertaken using the same approach and assumptions as detailed in the Economic Assessment Report. This includes the application of a mask for the TUBA benefits (see Section 3.4 of EAR), and the cleaning of the highway assignment skims (see Section 3.5 of EAR).
- 3.3.7 Other monetised benefits used within the appraisal of the scheme, such as noise and air quality, construction delays and accident analysis, have not been updated using these sensitivity test forecasts. The benefits for these elements of the appraisal are assumed to be unchanged.
- 3.3.8 Table 3.7 reproduces the summary of the forecast TUBA scheme benefits from the Central Case as reported in the Economic Assessment Report. Table 3.8 provides the corresponding analysis of the TUBA assessment of the proposed scheme with Test 1 assumptions (i.e. local level constraint to TEMPro planning data growth).
- 3.3.9 These tables show that by applying the constraint to TEMPro planning data growth at a district level within Leicestershire and at a county level outside Leicestershire, the forecast TUBA benefits of the scheme fall from around £117m in the Central Case to around £83m (i.e. a reduction of around 29%). This reduction is in part due to the lower forecast levels of traffic on the network, reducing the number of users experiencing benefit from the proposed scheme, and partly due to the lower forecast levels of delay and congestion, which reduces the forecast time savings due to the proposed scheme.
- 3.3.10 It is noted that with the WebTAG low growth sensitivity test, the forecast TUBA benefits were around £94m, so this sensitivity test with a local level constraint to TEMPro forecasts lower benefits than the WebTAG low growth scenario.

Table 3.7: Summary of Discounted TUBA Benefits - Central Case, 2010 prices and values

	Travel Time	Vehicle Operating Costs	Total
Non-Business: Commuting	£29,726,000	-£2,832,000	£26,894,000
Non-Business: Other	£42,970,000	-£8,464,000	£34,506,000
Business (Freight)	£25,288,000	£928,000	£26,215,000
Business (Personal)	£19,552,000	£2,157,000	£21,709,000
Total	£117,536,000	-£8,211,000	£109,324,000

Indirect Tax Revenues	£14,688,000
Greenhouse Gases	-£6,839,000
Present Value of Benefits	£117,173,000

Table 3.8: Summary of Discounted TUBA Benefits - Test 1, 2010 prices and values

	Travel Time	Vehicle Operating Costs	Total
Non-Business: Commuting	£20,477,000	-£2,980,000	£17,498,000
Non-Business: Other	£28,389,000	-£8,547,000	£19,841,000
Business (Freight)	£19,863,000	£170,000	£20,033,000
Business (Personal)	£16,558,000	£1,743,000	£18,300,000
Total	£85,287,000	-£9,614,000	£75,672,000

Indirect Tax Revenues	£13,410,000
Greenhouse Gases	-£6,100,000
Present Value of Benefits	£82,982,000

- 3.3.11 Using the forecast TUBA scheme benefits detailed above, the WebTAG Transport Economic Efficiency (TEE), Public Accounts (PA) and Analysis of Monetised Costs and Benefits (AMCB) tables have been updated. This update has assumed that the other monetised benefits, namely construction

delays, noise, air quality, physical activity, journey time reliability and wider impacts, are unchanged within this analysis.

- 3.3.12 Table 3.9 provides a summary of the Central Case benefit-cost ratios (both excluding and including adjusted benefits, namely journey time reliability and wider impacts) along with the updated analysis using the TUBA scheme benefits using planning data growth controlled to TEMPro at a local level.
- 3.3.13 The benefit-cost ratios (BCRs) for this sensitivity test have been presented using the same assumptions as adopted for the Central Case (including around £7.5m of developer contributions, and the scheme costs excluding the cost of the northern section assumed to be in the Core Scenario), and also excluding developer contributions. Given the level of growth assumed for Melton Borough within TEMPro, developer contributions at the same level as assumed in the Central Case would not be forthcoming. It is likely that significantly lower levels of developer contributions would be achieved, and for the purposes of this sensitivity test it has been assumed that are no developer contributions.
- 3.3.14 Including developer contributions, the BCRs are forecast to reduce to 1.67 from 2.45 excluding adjusted benefits, and reduced to 2.33 from 3.12 with adjusted benefits. Excluding developer contributions, the forecast BCR without adjusted benefits is 1.84, with a forecast BCR of 2.50 with adjusted benefits.

Table 3.9: Summary of Value for Money Assessment - Test 1

	BCR (Initial)	BCR (Adjusted)
Central Case (including developer contributions and Core Scenario scheme costs)	2.45	3.12
<i>Test 1 Forecasts</i>		
Including Core Scenario scheme costs and developer contributions	1.67	2.33
Including Core Scenario scheme costs, excluding developer contributions ¹	1.84	2.50

3.4 Test 2: Local TEMPro Constraint excluding Melton Mowbray Northern and Southern Link Roads

- 3.4.1 As discussed, this sensitivity test takes the forecasting assumptions from Test 1, and removes the link roads to the north and south of Melton Mowbray from the Core Scenario network assumptions. This is due to the fact that with the lower household growth assumed within Melton Borough within TEMPro compared with the growth assumed in the emerging Local Plan means that it is unlikely that these development related schemes would be delivered.
- 3.4.2 As with the Test 1 forecasts, Table 3.10 to Table 3.13 provide the forecast highway network performance statistics both without and with the proposed scheme for links within Melton Borough and those within Melton Mowbray. Within these tables, the incremental change due the removal of the northern and southern from Test 1 is presented.

¹ Conventionally it is assumed that the addition of developer contributions to a scheme appraisal increases the BCR, due to the developer contributions being removed from the scheme benefits and scheme costs. However, in the assessment of the proposed Melton Mowbray Distributor Road the calculation of scheme costs is more complex as it includes the scheme costs associated with the Core Scenario.

Within the appraisal detailed in the EAR, the scheme costs are calculated as around £3.2m of local government funding, plus around £47.7m of central government funding, minus around £7.5m of developer costs, resulting in a broad transport budget of £43.5m. The central government funding is calculated as the full scheme costs, minus the costs of the northern section of the scheme assumed to be included in the Core Scenario. The northern section is assumed to cost around £12m; however the same developer contributions are assumed for the northern section, resulting in the incremental costs of the northern section being around £4.5m.

When removing developer contributions from the scheme assessment, the forecast scheme benefits increase by around £7.5m. For the scheme costs, there are two equal and opposite impacts of removing the developer contributions. Firstly the scheme costs increase by around £7.5m with the removal of developer contributions; however the incremental scheme costs of the northern sections also increase by around £7.5m without developer contributions, reducing the scheme costs for the distributor road.

There is therefore no change in the scheme costs, and with the increase in scheme benefits, the BCRs are forecast to increase without developer contributions.

- 3.4.3 Within Melton Borough there are no significant forecast changes in the highway network performance statistics due to the removal of these two links. Forecast traffic levels reduce by up to 2% with the removal of these links, with average speeds across the borough forecast to decrease by up to 1%.
- 3.4.4 Within Melton Borough there are forecast to be more significant changes in the highway network statistics. Traffic levels within the town are forecast to decrease by around 5% with the removal of the northern and southern link roads, with average speeds forecast to decrease by up to 7%. This change is largely due to the removal of the southern link, which is included within the links identified as within Melton Mowbray (see Figure 3.1).
- 3.4.5 Removing the southern link road from the definition of Melton Mowbray links in the Test 1 analysis provides an indication of the impact of the removal of these links on the network performance on the existing Melton Mowbray network. With the southern link removed from the analysis, in 2021 forecast traffic within Melton Mowbray decreases by around 3%, with average speeds forecast to reduce by up to 2%. In 2036 and 2041, traffic within Melton Mowbray is forecast to increase by between 3% and 8%, with average speeds forecast to decrease by between 3% and 5%.

Table 3.10: LLITM 2014 “without scheme” Test 2 Forecast Network Performance within Melton Borough

		Test 1 Forecasts			Test 2 Forecasts			Change		
		2021	2036	2041	2021	2036	2041	2021	2036	2041
AM Peak Hour	Vehicle Distance (veh-km)	121,572	127,956	130,842	120,905	126,289	128,831	-1%	-1%	-2%
	Vehicle Delay-Time (veh-hours)	2,177	2,304	2,370	2,158	2,285	2,344	-1%	-1%	-1%
	Average Speed (kph)	56	56	55	56	55	55	0%	0%	0%
	Vehicle Delay/Vehicle Distance (sec/km)	9	10	10	9	10	10	-2%	-1%	-1%
Interpeak Hour	Vehicle Distance (veh-km)	88,260	97,432	99,960	87,961	95,413	97,753	0%	-2%	-2%
	Vehicle Delay-Time (veh-hours)	1,580	1,741	1,793	1,570	1,721	1,771	-1%	-1%	-1%
	Average Speed (kph)	56	56	56	56	55	55	0%	-1%	-1%
	Vehicle Delay/Vehicle Distance (sec/km)	8	9	9	8	9	9	-1%	1%	1%
PM Peak Hour	Vehicle Distance (veh-km)	128,334	139,198	142,954	127,838	137,427	141,063	0%	-1%	-1%
	Vehicle Delay-Time (veh-hours)	2,310	2,532	2,621	2,297	2,519	2,608	-1%	-1%	0%
	Average Speed (kph)	56	55	55	56	55	54	0%	-1%	-1%
	Vehicle Delay/Vehicle Distance (sec/km)	10	11	11	9	11	11	-1%	1%	1%

Table 3.11: LLITM 2014 “without scheme” Test 2 Forecast Network Performance within Melton Mowbray

		Test 1 Forecasts			Test 2 Forecasts			Change		
		2021	2036	2041	2021	2036	2041	2021	2036	2041
AM Peak Hour	Vehicle Distance (veh-km)	18,818	20,649	21,282	17,937	19,327	19,847	-5%	-6%	-7%
	Vehicle Delay-Time (veh-hours)	650	691	720	628	693	720	-3%	0%	0%
	Average Speed (kph)	29	30	30	29	28	28	-1%	-7%	-7%
	Vehicle Delay/Vehicle Distance (sec/km)	38	38	39	39	42	43	1%	11%	12%
Interpeak Hour	Vehicle Distance (veh-km)	14,955	17,021	17,615	14,382	16,159	16,717	-4%	-5%	-5%
	Vehicle Delay-Time (veh-hours)	505	558	582	492	565	589	-3%	1%	1%
	Average Speed (kph)	30	31	30	29	29	28	-1%	-6%	-6%
	Vehicle Delay/Vehicle Distance (sec/km)	35	35	36	36	39	39	2%	10%	10%
PM Peak Hour	Vehicle Distance (veh-km)	19,930	22,076	22,828	19,125	20,960	21,637	-4%	-5%	-5%
	Vehicle Delay-Time (veh-hours)	698	763	798	681	776	815	-2%	2%	2%
	Average Speed (kph)	29	29	29	28	27	27	-2%	-7%	-7%
	Vehicle Delay/Vehicle Distance (sec/km)	40	41	42	41	46	48	2%	12%	13%

Table 3.12: LLITM 2014 “with scheme” Test 2 Forecast Network Performance within Melton Borough

		Test 1 Forecasts			Test 2 Forecasts			Change		
		2021	2036	2041	2021	2036	2041	2021	2036	2041
AM Peak Hour	Vehicle Distance (veh-km)	125,387	132,688	136,069	124,585	130,415	133,746	-1%	-2%	-2%
	Vehicle Delay-Time (veh-hours)	2,162	2,304	2,374	2,141	2,274	2,345	-1%	-1%	-1%
	Average Speed (kph)	58	58	57	58	57	57	0%	0%	0%
	Vehicle Delay/Vehicle Distance (sec/km)	8	9	9	8	9	9	-1%	-1%	-1%
Interpeak Hour	Vehicle Distance (veh-km)	91,305	101,506	104,176	91,040	99,424	102,122	0%	-2%	-2%
	Vehicle Delay-Time (veh-hours)	1,571	1,747	1,800	1,561	1,721	1,774	-1%	-1%	-1%
	Average Speed (kph)	58	58	58	58	58	58	0%	-1%	-1%
	Vehicle Delay/Vehicle Distance (sec/km)	7	8	9	7	8	8	-2%	-1%	-1%
PM Peak Hour	Vehicle Distance (veh-km)	131,780	144,368	148,358	131,202	141,670	145,694	0%	-2%	-2%
	Vehicle Delay-Time (veh-hours)	2,287	2,528	2,615	2,270	2,498	2,585	-1%	-1%	-1%
	Average Speed (kph)	58	57	57	58	57	56	0%	-1%	-1%
	Vehicle Delay/Vehicle Distance (sec/km)	9	10	10	8	10	10	-1%	0%	-1%

Table 3.13: LLITM 2014 “with scheme” Test 2 Forecast Network Performance within Melton Mowbray

		Test 1 Forecasts			Test 2 Forecasts			Change		
		2021	2036	2041	2021	2036	2041	2021	2036	2041
AM Peak Hour	Vehicle Distance (veh-km)	16,374	18,342	19,029	15,572	17,229	17,885	-5%	-6%	-6%
	Vehicle Delay-Time (veh-hours)	540	597	623	521	587	614	-4%	-2%	-1%
	Average Speed (kph)	30	31	31	30	29	29	-1%	-4%	-5%
	Vehicle Delay/Vehicle Distance (sec/km)	33	35	35	34	36	37	2%	5%	5%
Interpeak Hour	Vehicle Distance (veh-km)	12,937	15,031	15,593	12,408	14,199	14,743	-4%	-6%	-5%
	Vehicle Delay-Time (veh-hours)	424	485	506	410	478	499	-3%	-1%	-1%
	Average Speed (kph)	31	31	31	30	30	30	-1%	-4%	-4%
	Vehicle Delay/Vehicle Distance (sec/km)	32	34	34	33	35	35	1%	4%	4%
PM Peak Hour	Vehicle Distance (veh-km)	17,575	19,984	20,788	16,883	18,922	19,658	-4%	-5%	-5%
	Vehicle Delay-Time (veh-hours)	588	662	694	571	658	690	-3%	-1%	-1%
	Average Speed (kph)	30	30	30	30	29	29	-1%	-5%	-5%
	Vehicle Delay/Vehicle Distance (sec/km)	34	37	38	35	39	40	1%	5%	5%

- 3.4.6 Table 3.14 provides a summary of the TUBA scheme assessment for Test 2. The present value of benefits within this sensitivity test is around £87m over the 60 year appraisal period, compared with around £83m in Test 1 (an increase of around 5%).
- 3.4.7 The network performance statistics provide a mixed picture of the expected impact of the network assumption changes on the forecast scheme benefits. Within Melton Mowbray traffic is expected to reduce, and delays are forecast to increase. This therefore suggests a broadly neutral impact on the forecast scheme benefits.
- 3.4.8 However, with the change in network assumptions, the scope of the scheme increases in the later modelled years. Within Test 1, the section between Nottingham Road and Melton Spinney Road is expected to be completed by 2036, and therefore the scheme is only the eastern section of the distributor road. With the removal of the northern section from the “without scheme” networks, the scheme becomes the entire link road from Nottingham Road to Burton Road, increasing the scale of the network change assessed in the later years.

Table 3.14: Summary of Discounted TUBA Benefits - Test 2, 2010 prices and values

	Travel Time	Vehicle Operating Costs	Total
Non-Business: Commuting	£20,958,000	-£2,116,000	£18,842,000
Non-Business: Other	£30,761,000	-£8,198,000	£22,563,000
Business (Freight)	£22,322,000	-£1,336,000	£20,986,000
Business (Personal)	£16,934,000	£835,000	£17,769,000
Total	£90,975,000	-£10,815,000	£80,160,000

Indirect Tax Revenues	£12,866,000
Greenhouse Gases	-£5,777,000
Present Value of Benefits	£87,249,000

- 3.4.9 As with Test 1, the forecast BCR has been calculated using the forecast TUBA scheme benefits assuming that all other monetised benefits remain unchanged. Table 3.15 provides a summary of the forecast BCRs for this sensitivity test.
- 3.4.10 As with Test 1, the BCR has been calculated excluding developer contributions due to the lower level of household growth assumed for Melton Borough in the TEMPro forecasts compared with the emerging Local Plan. In addition to this, the Central Case removes the costs of the northern link road (between Nottingham Road and Melton Spinney Road) from the overall scheme costs, as this scheme is assumed to be built as part of the Core Scenario. Given that this scheme has been removed within this sensitivity test, BCRs have also been presented using the scheme costs for the entire distributor road.
- 3.4.11 Using the calculations excluding developer contributions and including the full costs of the proposed scheme, the initial BCR is forecast to reduce from 2.45 in the Central Case to 1.51, and the adjusted BCR reduces from 3.12 to 2.03 within this sensitivity test.

Table 3.15: Summary of Value for Money Assessment - Test 2

	BCR (Initial)	BCR (Adjusted)
Central Case (including developer contributions and Core Scenario scheme costs)	2.45	3.12
<i>Test 2 Forecasts</i>		
Including Core Scenario scheme costs and developer contributions	1.77	2.43
Including Core Scenario scheme costs, excluding developer contributions	1.94	2.60
Excluding Core Scenario scheme costs and developer contributions	1.51	2.03

3.5 Test 3: Central Forecasts excluding Melton Mowbray Northern Link and SUE

- 3.5.1 The Test 3 sensitivity test considers the Central Forecasts, and removes the Melton Mowbray northern SUE and associated link road (between Nottingham Road and Melton Spinney Road) from the forecast assumptions. The planning data growth is not controlled to TEMPro growth at a local level within this sensitivity test.
- 3.5.2 Table 3.16 to Table 3.19 show the forecast highway network performance statistics for Melton Borough and Melton Mowbray without and with the proposed scheme. These forecasts have been compared against the corresponding forecasts from the Central Case, as detailed in the Forecasting Report.
- 3.5.3 Due to the removal of the northern SUE and link road from the forecasting assumptions, traffic across Melton Borough is forecast to reduce by up to 2% compared with the Central Forecasts. There is not forecast to be a significant change in average speeds across the borough as a result of this reduction in traffic, with average speeds forecasting to increase by up to 1%.
- 3.5.4 Within Melton Mowbray, traffic is forecast to reduce by up to 3% compared with the Central Forecasts, with average network speeds forecast to generally decrease by up to 1% in the “without” scheme forecasts, and increase by up to 1% in the “with” scheme forecasts.
- 3.5.5 The decrease in forecast average speeds in the “without” scheme forecasts is primarily due to the reduction in highway infrastructure assumed within the Test 3 forecasts, decreasing average speeds within the town. In the “with” scheme forecasts the highway network assumptions are unchanged from the Central Forecasts, and so the reduction in demand with the removal of the northern SUE results in a forecast increase in average network speeds.

Table 3.16: LLITM 2014 “without scheme” Test 3 Forecast Network Performance within Melton Borough

		Central Forecasts			Test 3 Forecasts			Change		
		2021	2036	2041	2021	2036	2041	2021	2036	2041
AM Peak Hour	Vehicle Distance (veh-km)	127,339	140,152	143,235	126,381	136,794	139,725	-1%	-2%	-2%
	Vehicle Delay-Time (veh-hours)	2,302	2,585	2,667	2,280	2,520	2,595	-1%	-3%	-3%
	Average Speed (kph)	55	54	54	55	54	54	0%	0%	0%
	Vehicle Delay/Vehicle Distance (sec/km)	10	11	12	9	11	12	-1%	-1%	-2%
Interpeak Hour	Vehicle Distance (veh-km)	92,373	106,324	108,990	91,713	103,800	106,420	-1%	-2%	-2%
	Vehicle Delay-Time (veh-hours)	1,670	1,944	2,006	1,656	1,898	1,957	-1%	-2%	-2%
	Average Speed (kph)	55	55	54	55	55	54	0%	0%	0%
	Vehicle Delay/Vehicle Distance (sec/km)	9	10	10	9	10	10	-1%	0%	0%
PM Peak Hour	Vehicle Distance (veh-km)	134,543	152,548	156,243	133,668	148,935	152,687	-1%	-2%	-2%
	Vehicle Delay-Time (veh-hours)	2,453	2,877	3,014	2,432	2,804	2,925	-1%	-3%	-3%
	Average Speed (kph)	55	53	52	55	53	52	0%	0%	1%
	Vehicle Delay/Vehicle Distance (sec/km)	10	13	14	10	13	14	-1%	-1%	-3%

Table 3.17: LLITM 2014 “without scheme” Test 3 Forecast Network Performance within Melton Mowbray

		Central Forecasts			Test 3 Forecasts			Change		
		2021	2036	2041	2021	2036	2041	2021	2036	2041
AM Peak Hour	Vehicle Distance (veh-km)	20,012	23,357	24,152	19,870	23,046	23,812	-1%	-1%	-1%
	Vehicle Delay-Time (veh-hours)	701	809	852	692	806	845	-1%	0%	-1%
	Average Speed (kph)	29	29	28	29	29	28	1%	-1%	-1%
	Vehicle Delay/Vehicle Distance (sec/km)	40	41	44	39	42	44	-2%	2%	0%
Interpeak Hour	Vehicle Distance (veh-km)	16,023	19,535	20,226	15,866	19,219	19,911	-1%	-2%	-2%
	Vehicle Delay-Time (veh-hours)	547	656	687	541	651	682	-1%	-1%	-1%
	Average Speed (kph)	29	30	29	29	30	29	0%	-1%	-1%
	Vehicle Delay/Vehicle Distance (sec/km)	36	37	39	36	38	39	-1%	2%	1%
PM Peak Hour	Vehicle Distance (veh-km)	21,334	25,285	26,073	21,147	24,887	25,624	-1%	-2%	-2%
	Vehicle Delay-Time (veh-hours)	762	929	1,013	752	923	992	-1%	-1%	-2%
	Average Speed (kph)	28	27	26	28	27	26	0%	-1%	0%
	Vehicle Delay/Vehicle Distance (sec/km)	42	49	56	41	49	55	-1%	1%	-2%

Table 3.18: LLITM 2014 “with scheme” Test 3 Forecast Network Performance within Melton Borough

		Central Forecasts			Test 3 Forecasts			Change		
		2021	2036	2041	2021	2036	2041	2021	2036	2041
AM Peak Hour	Vehicle Distance (veh-km)	131,454	145,431	148,918	130,683	142,029	145,455	-1%	-2%	-2%
	Vehicle Delay-Time (veh-hours)	2,289	2,577	2,656	2,272	2,506	2,582	-1%	-3%	-3%
	Average Speed (kph)	57	56	56	58	57	56	0%	0%	0%
	Vehicle Delay/Vehicle Distance (sec/km)	9	10	10	9	10	10	-1%	-2%	-2%
Interpeak Hour	Vehicle Distance (veh-km)	95,658	110,711	113,550	95,066	108,368	111,108	-1%	-2%	-2%
	Vehicle Delay-Time (veh-hours)	1,661	1,943	2,003	1,648	1,894	1,951	-1%	-3%	-3%
	Average Speed (kph)	58	57	57	58	57	57	0%	0%	0%
	Vehicle Delay/Vehicle Distance (sec/km)	8	9	9	8	9	9	-1%	-2%	-2%
PM Peak Hour	Vehicle Distance (veh-km)	138,204	158,160	162,620	137,311	154,781	158,867	-1%	-2%	-2%
	Vehicle Delay-Time (veh-hours)	2,424	2,839	2,946	2,404	2,761	2,859	-1%	-3%	-3%
	Average Speed (kph)	57	56	55	57	56	56	0%	1%	1%
	Vehicle Delay/Vehicle Distance (sec/km)	9	11	11	9	11	11	-1%	-3%	-3%

Table 3.19: LLITM 2014 “with scheme” Test 3 Forecast Network Performance within Melton Mowbray

		Central Forecasts			Test 3 Forecasts			Change		
		2021	2036	2041	2021	2036	2041	2021	2036	2041
AM Peak Hour	Vehicle Distance (veh-km)	17,558	20,954	21,771	17,495	20,518	21,287	0%	-2%	-2%
	Vehicle Delay-Time (veh-hours)	587	697	730	582	680	710	-1%	-2%	-3%
	Average Speed (kph)	30	30	30	30	30	30	0%	0%	1%
	Vehicle Delay/Vehicle Distance (sec/km)	35	37	38	34	37	37	-2%	-2%	-2%
Interpeak Hour	Vehicle Distance (veh-km)	13,942	17,371	18,026	13,809	16,824	17,469	-1%	-3%	-3%
	Vehicle Delay-Time (veh-hours)	460	569	596	455	550	576	-1%	-3%	-3%
	Average Speed (kph)	30	31	30	30	31	30	0%	0%	0%
	Vehicle Delay/Vehicle Distance (sec/km)	33	35	36	33	35	36	0%	-1%	-1%
PM Peak Hour	Vehicle Distance (veh-km)	18,910	23,058	23,937	18,757	22,385	23,235	-1%	-3%	-3%
	Vehicle Delay-Time (veh-hours)	639	787	830	633	759	800	-1%	-4%	-4%
	Average Speed (kph)	30	29	29	30	29	29	0%	1%	1%
	Vehicle Delay/Vehicle Distance (sec/km)	36	40	42	35	39	41	-1%	-2%	-3%

- 3.5.6 In terms of the forecast scheme benefits in this sensitivity test, Table 3.20 provides a summary of the TUBA assessment with these forecasts. Compared with the Central Case assessment, scheme benefits are forecast to increase from around £117m to around £123.5m (around a 5% increase) with the removal of the northern SUE and link road.
- 3.5.7 This increase in scheme benefits is primarily due to the change in scheme definition in this sensitivity test. As discussed as part of Test 2, in this sensitivity test the scheme is the full link between Nottingham Road and Burton Road in all forecast years, whereas in the Central Case the scheme is only the eastern section in later years. This change produces larger forecast benefits in this sensitivity test, particularly in 2036, compared with the Central Case assessment.

Table 3.20: Summary of Discounted TUBA Benefits - Test 3, 2010 prices and values

	Travel Time	Vehicle Operating Costs	Total
Non-Business: Commuting	£30,163,000	-£2,624,000	£27,539,000
Non-Business: Other	£44,863,000	-£8,843,000	£36,020,000
Business (Freight)	£27,209,000	£1,972,000	£29,180,000
Business (Personal)	£20,259,000	£2,077,000	£22,336,000
Total	£122,494,000	-£7,418,000	£115,075,000

Indirect Tax Revenues	£15,258,000
Greenhouse Gases	-£6,847,000
Present Value of Benefits	£123,486,000

- 3.5.8 The forecast BCRs have been calculated using the revised TUBA assessments excluding the northern SUE and link road. The results of this analysis are shown in Table 3.21. As discussed within the analysis of Test 1 and Test 2, the removal of the northern SUE also removes the developer contributions from the assessment, and the removal of the northern link road from the “without scheme” network assumptions results in the scheme costs including the section between Nottingham Road to Melton Spinney Road.
- 3.5.9 Excluding both developer contributions and the Core Scenario scheme costs, the initial BCR is forecast to reduce from 2.45 to 2.18 by removing the northern SUE and link road, with the adjusted BCR reducing from 3.12 to 2.70. Whilst the scheme benefits are forecast to increase in this sensitivity test, the increase in scheme costs (through including the northern section scheme costs) results in a forecast reduction in the benefit-cost ratios.

Table 3.21: Summary of Value for Money Assessment - Test 3

	BCR (Initial)	BCR (Adjusted)
Central Case (including developer contributions and Core Scenario scheme costs)	2.45	3.12
<i>Test 3 Forecasts</i>		
Including Core Scenario scheme costs and developer contributions	2.60	3.26
Including Core Scenario scheme costs, excluding developer contributions	2.77	3.43
Excluding Core Scenario scheme costs and developer contributions	2.18	2.70

3.6 Test 4: Central Forecasts excluding Melton Mowbray Northern and Southern Links and SUEs

- 3.6.1 Test 4 builds on Test 3 by also removing the Melton Mowbray south SUE and link road from the planning data and network assumptions, in addition to removing the corresponding northern SUE and

link road. As with Test 3, the planning inputs for this sensitivity test are not controlled to TEMPro growth at a local level.

- 3.6.2 Table 3.22 to Table 3.25 show the forecast highway network performance statistics for the Test 4 model runs compared with the Central Forecasts for Melton Borough and Melton Mowbray, and for the “without” and “with” scheme forecasts. As discussed as part of the analysis of Test 2, the southern link is included within the Melton Mowbray subset of links, and so is included in statistics produced for the Central Forecasts within Melton Mowbray.
- 3.6.3 Within Melton Borough, traffic is forecast to decrease by around 2% in Test 4 compared with the Central Forecasts in 2021. This forecast reduction increases to around 7% in both 2036 and 2041, due to the southern link assumed to be completed in these forecast years in the Central Forecasts. This reduction in traffic across the borough results in forecast increases in average speed of up to 2%.
- 3.6.4 For the links identified as Melton Mowbray, traffic is forecast to reduce compared with the Central Forecasts by around 6% in 2021, rising to around 14% in 2036 and 2041. The larger reduction in traffic in 2036 and 2041 is primarily due to the removal of the southern link from the network assumptions in this sensitivity test.
- 3.6.5 Forecast average network speeds within Melton Mowbray are also forecast to decrease, largely due to the removal of the southern link road from the highway network, which provides some relief for congestion within the town centre. The average network speeds within the town are forecast to reduce by up to 2% in 2021, and by around 5% in 2036 and 2041.

Table 3.22: LLITM 2014 “without scheme” Test 4 Forecast Network Performance within Melton Borough

		Central Forecasts			Test 4 Forecasts			Change		
		2021	2036	2041	2021	2036	2041	2021	2036	2041
AM Peak Hour	Vehicle Distance (veh-km)	127,339	140,152	143,235	124,846	130,635	133,254	-2%	-7%	-7%
	Vehicle Delay-Time (veh-hours)	2,302	2,585	2,667	2,248	2,397	2,460	-2%	-7%	-8%
	Average Speed (kph)	55	54	54	56	54	54	0%	0%	1%
	Vehicle Delay/Vehicle Distance (sec/km)	10	11	12	9	11	11	-2%	-4%	-6%
Interpeak Hour	Vehicle Distance (veh-km)	92,373	106,324	108,990	90,684	98,652	100,970	-2%	-7%	-7%
	Vehicle Delay-Time (veh-hours)	1,670	1,944	2,006	1,631	1,797	1,848	-2%	-8%	-8%
	Average Speed (kph)	55	55	54	56	55	55	0%	0%	1%
	Vehicle Delay/Vehicle Distance (sec/km)	9	10	10	9	10	10	-2%	-5%	-5%
PM Peak Hour	Vehicle Distance (veh-km)	134,543	152,548	156,243	132,098	142,389	145,920	-2%	-7%	-7%
	Vehicle Delay-Time (veh-hours)	2,453	2,877	3,014	2,395	2,652	2,752	-2%	-8%	-9%
	Average Speed (kph)	55	53	52	55	54	53	1%	1%	2%
	Vehicle Delay/Vehicle Distance (sec/km)	10	13	14	10	12	13	-3%	-8%	-12%

Table 3.23: LLITM 2014 “without scheme” Test 4 Forecast Network Performance within Melton Mowbray

		Central Forecasts			Test 4 Forecasts			Change		
		2021	2036	2041	2021	2036	2041	2021	2036	2041
AM Peak Hour	Vehicle Distance (veh-km)	20,012	23,357	24,152	18,736	20,237	20,788	-6%	-13%	-14%
	Vehicle Delay-Time (veh-hours)	701	809	852	667	749	778	-5%	-8%	-9%
	Average Speed (kph)	29	29	28	28	27	27	-2%	-6%	-6%
	Vehicle Delay/Vehicle Distance (sec/km)	40	41	44	41	45	47	2%	10%	7%
Interpeak Hour	Vehicle Distance (veh-km)	16,023	19,535	20,226	15,056	16,807	17,337	-6%	-14%	-14%
	Vehicle Delay-Time (veh-hours)	547	656	687	521	599	624	-5%	-9%	-9%
	Average Speed (kph)	29	30	29	29	28	28	-1%	-6%	-6%
	Vehicle Delay/Vehicle Distance (sec/km)	36	37	39	37	40	42	1%	8%	7%
PM Peak Hour	Vehicle Distance (veh-km)	21,334	25,285	26,073	20,025	21,859	22,465	-6%	-14%	-14%
	Vehicle Delay-Time (veh-hours)	762	929	1,013	724	843	893	-5%	-9%	-12%
	Average Speed (kph)	28	27	26	28	26	25	-1%	-5%	-2%
	Vehicle Delay/Vehicle Distance (sec/km)	42	49	56	42	51	55	1%	4%	-2%

Table 3.24: LLITM 2014 “with scheme” Test 4 Forecast Network Performance within Melton Borough

		Central Forecasts			Test 4 Forecasts			Change		
		2021	2036	2041	2021	2036	2041	2021	2036	2041
AM Peak Hour	Vehicle Distance (veh-km)	131,454	145,431	148,918	128,863	135,384	138,683	-2%	-7%	-7%
	Vehicle Delay-Time (veh-hours)	2,289	2,577	2,656	2,231	2,388	2,462	-3%	-7%	-7%
	Average Speed (kph)	57	56	56	58	57	56	1%	0%	0%
	Vehicle Delay/Vehicle Distance (sec/km)	9	10	10	8	10	10	-2%	-5%	-5%
Interpeak Hour	Vehicle Distance (veh-km)	95,658	110,711	113,550	94,067	102,913	105,408	-2%	-7%	-7%
	Vehicle Delay-Time (veh-hours)	1,661	1,943	2,003	1,623	1,798	1,849	-2%	-7%	-8%
	Average Speed (kph)	58	57	57	58	57	57	1%	0%	1%
	Vehicle Delay/Vehicle Distance (sec/km)	8	9	9	8	9	9	-3%	-6%	-6%
PM Peak Hour	Vehicle Distance (veh-km)	138,204	158,160	162,620	135,744	146,929	150,951	-2%	-7%	-7%
	Vehicle Delay-Time (veh-hours)	2,424	2,839	2,946	2,367	2,619	2,712	-2%	-8%	-8%
	Average Speed (kph)	57	56	55	57	56	56	1%	1%	1%
	Vehicle Delay/Vehicle Distance (sec/km)	9	11	11	9	10	11	-2%	-6%	-7%

Table 3.25: LLITM 2014 “with scheme” Test 4 Forecast Network Performance within Melton Mowbray

		Central Forecasts			Test 4 Forecasts			Change		
		2021	2036	2041	2021	2036	2041	2021	2036	2041
AM Peak Hour	Vehicle Distance (veh-km)	17,558	20,954	21,771	16,397	18,260	18,938	-7%	-13%	-13%
	Vehicle Delay-Time (veh-hours)	587	697	730	555	637	667	-5%	-9%	-9%
	Average Speed (kph)	30	30	30	30	29	28	-1%	-5%	-5%
	Vehicle Delay/Vehicle Distance (sec/km)	35	37	38	35	39	40	1%	4%	5%
Interpeak Hour	Vehicle Distance (veh-km)	13,942	17,371	18,026	13,045	14,861	15,417	-6%	-14%	-14%
	Vehicle Delay-Time (veh-hours)	460	569	596	435	509	532	-5%	-11%	-11%
	Average Speed (kph)	30	31	30	30	29	29	-1%	-4%	-4%
	Vehicle Delay/Vehicle Distance (sec/km)	33	35	36	33	36	37	1%	3%	3%
PM Peak Hour	Vehicle Distance (veh-km)	18,910	23,058	23,937	17,784	19,928	20,679	-6%	-14%	-14%
	Vehicle Delay-Time (veh-hours)	639	787	830	608	711	748	-5%	-10%	-10%
	Average Speed (kph)	30	29	29	29	28	28	-1%	-4%	-4%
	Vehicle Delay/Vehicle Distance (sec/km)	36	40	42	36	41	43	1%	3%	2%

- 3.6.6 The forecast scheme benefits using this sensitivity test are shown in Table 3.26. This table shows that the forecast scheme benefits excluding both the northern and southern SUEs and link roads is around £100m. This is a forecast reduction of around 15% from the Central Case forecast benefits.
- 3.6.7 With the inclusion of the southern link road in the Core Scenario, the introduction of the proposed scheme provides an alternative route for trips between the north-west and south-east of Melton Mowbray (the existing A606 route) via the proposed scheme, and also for trips between the north-east and south-west of Melton Mowbray (the existing A607 route) via the proposed scheme and the southern link road. With the removal of the southern link road from network assumptions, this alternative route for A607 traffic is not introduced.
- 3.6.8 Considering the change in forecast benefits between Test 3 and Test 4, the largest forecast reductions in scheme benefits are between southern and north-eastern Melton Mowbray, between southern Melton Mowbray and north-eastern Melton Borough, and between north-eastern and south-western Melton Mowbray. These are movements which would benefit from the alternative route to the A607 provided by the scheme and the southern link road, which is not present within the Test 4 forecasts.

Table 3.26: Summary of Discounted TUBA Benefits - Test 4, 2010 prices and values

	Travel Time	Vehicle Operating Costs	Total
Non-Business: Commuting	£24,174,000	-£2,285,000	£21,889,000
Non-Business: Other	£35,182,000	-£8,132,000	£27,050,000
Business (Freight)	£24,824,000	-£404,000	£24,420,000
Business (Personal)	£18,099,000	£1,163,000	£19,262,000
Total	£102,279,000	-£9,658,000	£92,621,000

Indirect Tax Revenues	£13,640,000
Greenhouse Gases	-£6,095,000
Present Value of Benefits	£100,166,000

- 3.6.9 As with the other sensitivity tests, forecast BCRs have been calculated using the revised TUBA assessments excluding both the northern and southern SUEs and link roads. The results of this analysis are shown in Table 3.27. As discussed, the removal of the northern SUE also removes the developer contributions from the assessment, and the removal of the northern link road from the “without scheme” network assumptions results in the scheme costs including the Nottingham Road to Melton Spinney Road section.
- 3.6.10 Excluding both developer contributions and the Core Scenario scheme costs, the initial BCR is forecast to reduce from 2.45 to 1.75 by removing the northern SUE and link road, with the adjusted BCR reducing from 3.12 to 2.27.

Table 3.27: Summary of Value for Money Assessment - Test 4

	BCR (Initial)	BCR (Adjusted)
Central Case (including developer contributions and Core Scenario scheme costs)	2.45	3.12
<i>Test 4 Forecasts</i>		
Including Core Scenario scheme costs and developer contributions	2.06	2.73
Including Core Scenario scheme costs, excluding developer contributions	2.23	2.90
Excluding Core Scenario scheme costs and developer contributions	1.75	2.27

3.7 Summary of Sensitivity Test Forecasts

3.7.1 This section of the Technical Note details the results of the four defined sensitivity tests. The four sensitivity tests around the Central Case scheme assessment are:

- **Test 1:** re-run of the 2021, 2036 and 2041 “without” and “with” scheme scenarios with the input planning data controlled to TEMPro v7.2 growth at a local level.
- **Test 2:** as above, using TEMPro controlled planning data at a local level, but excluding the northern link (between Nottingham Road and Melton Spinney Road) from the “without” scheme forecasts, and excluding the southern link (between Burton Road and Leicester Road) from both the “with” and “without” scheme scenarios.
- **Test 3:** using the central forecasts, re-run the 2021, 2036 and 2041 “without” and “with” scheme scenarios excluding the northern link and SUE.
- **Test 4:** using the central forecasts, re-run the 2021, 2036 and 2041 “without” and “with” scheme scenarios excluding both the northern and southern links and SUEs.

3.7.2 In terms of the forecast highway network statistics in the “without scheme” scenarios:

- **Test 1:** compared with the Central Forecasts, controlling the local planning data growth to TEMPro results in forecast reductions in traffic across Melton Borough of between 5% and 9%, with reductions of between 6% and 13% within Melton Mowbray. These forecast reductions in traffic levels result in forecast increases in average network speed of up to 5% across the district, and up to 11% within Melton Mowbray.
- **Test 2:** compared with the Test 1 forecasts, removing the Melton Mowbray northern and southern links from the “without scheme” scenario results in Melton Borough traffic reducing by up to 2%, with reductions of up to 7% within Melton Mowbray. Forecast network speeds across the borough reduce by up to 1% compared with Test 1 forecasts, with average network speeds within Melton Mowbray forecast to reduce by up to 7%.
- **Test 3:** compared with the Central Forecasts, removing the Melton Mowbray northern SUE and link road results in up to 2% less forecast traffic across Melton Borough and Melton Mowbray. In terms of average network speeds, these are not forecast to significantly change across the borough, with reductions of up to 1% within Melton Mowbray.
- **Test 4:** compared with the Central Forecasts, removing both the Melton Mowbray northern and southern SUEs and link roads results in between 2% and 7% less traffic forecast within Melton Borough, and between 6% and 14% less traffic within Melton Mowbray. In terms of average network speeds, across Melton Borough the average speed is forecast to increase by up to 2%, with forecast reductions in average speed within Melton Mowbray of between 1% and 6%.

3.7.3 Using the model forecasts for the four sensitivity tests, TUBA scheme benefits have been estimated. The results of this analysis are shown in Table 3.28.

Table 3.28: Summary of Discounted TUBA Benefits

	Present Value of Benefits	Change from Central Case
Central Case	£117,173,000	
Test 1: Local TEMPro Constraint with Existing Forecast Assumptions	£82,982,000	-29.2%
Test 2: Local TEMPro Constraint excluding Melton Mowbray Northern and Southern Link Roads	£87,249,000	-25.5%
Test 3: Central Forecasts excluding Melton Mowbray Northern Link and SUE	£123,486,000	5.4%
Test 4: Central Forecasts excluding Melton Mowbray Northern and Southern Links and SUEs	£100,166,000	-14.5%

3.7.4 This table shows that by applying the constraint to TEMPro planning data growth at a local level, forecast scheme benefits reduce by between 25% and 30% compared with the Central Case, with higher benefits forecast with the exclusion of the northern and southern link roads from the “without

scheme” scenario. Excluding the northern SUE and link road results in a forecast 5% increase in scheme benefits compared with the Central Case, with a 15% reduction in scheme benefits compared with the Central Case if both the northern and southern SUEs and link roads removed.

- 3.7.5 Table 3.29 provides a summary of the change in benefit-cost ratio with these alternative forecasts, assuming no change in all other monetised benefits. Within all sensitivity tests, developer contributions have been removed from the appraisal, with the scheme costs of the Nottingham Road to Melton Spinney Road section added to the appraisal for Test 2 to Test 4.

Table 3.29: Summary of Value for Money Assessment

	BCR (Initial)	BCR (Adjusted)
Central Case (including developer contributions and Core Scenario scheme costs)	2.45	3.12
Test 1: Local TEMPro Constraint with Existing Forecast Assumptions	1.84	2.50
Test 2: Local TEMPro Constraint excluding Melton Mowbray Northern and Southern Link Roads	1.51	2.03
Test 3: Central Forecasts excluding Melton Mowbray Northern Link and SUE	2.18	2.70
Test 4: Central Forecasts excluding Melton Mowbray Northern and Southern Links and SUEs	1.75	2.27

- 3.7.6 In terms of the initial BCR, the Central Case produces a BCR of 2.45 (high value for money). This high value for money classification is retained in Test 3 (excluding the northern SUE and link road); however, in all other sensitivity test the initial BCR is between 1.5 and 2.0 resulting in a medium value for money classification.
- 3.7.7 In terms of the adjusted BCR, including journey time reliability and wider impacts, in all sensitivity tests the BCR is forecast to remain above 2.0, providing high value for money.

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