

9 Conclusions

9.1 Introduction

- 9.1.1 The Charnwood 2026 Local Development Framework is a statutory plan establishing the spatial strategy for the Borough. The LDF needs to conform to the East Midlands Regional Plan and other up to date guidance. Good transport provision is essential to Charnwood's continuing prosperity but improvements need to be implemented in ways that are sustainable and minimise adverse environmental and social impacts. Car dependency needs to be reduced and the number of people walking, cycling and using public transport increased significantly.
- 9.1.2 As part of the LDF, MVA Consultancy were asked to undertake a detailed assessment of the transport implications of potential growth options in the Loughborough vicinity, which could help meet known needs for housing and employment related development in the period to 2026. The assessment forms part of the evidence base for the Core Strategy Preferred Options.
- 9.1.3 The methodology adopted for each Transport Assessment is based upon a four-stage process:
- Determine the '**worst case**' impact of the development. This is defined in terms of assessing each of the development options with the development in place with no potential mitigation options;
 - Derive the potential mitigation options to be appraised across all modes for each of the scenarios;
 - Using an evidential basis from best practice, stakeholder consultation and the transport assessment mode choice models, assess each of the potential mitigation options in terms of their impact in reducing levels of development induced congestion; and,
 - Refine the options into packages by placing them within an overall multi-criteria framework, which includes indicative costs, in order to ensure that the packages deliver real transport benefits, as well as locally defined objectives and requirements.
- 9.1.4 The options have been tested utilising the full multi-modal capabilities of the Loughborough Transport Model (LTM), which has utilised a 2026 Reference Case. A public transport model has been developed and validated against the 2005 base year counts and patronage data. The highway model has also been revalidated against the roadside counts.
- 9.1.5 This study is the first time that the broad transport implications of potential growth options around Loughborough have been assessed on a consistent basis using an up to date modelling framework.

9.2 Study Results

Available Capacity Analysis

- 9.2.1 The 2026 Reference Case shows that each development option under consideration has a number of key junctions at or close to saturation within its vicinity and likely 'sphere of influence', prior to implementation. No discernible differences were noted in the size or magnitude or available capacity for any of the options within the 2026 Reference Case.
- 9.2.2 Indeed, this Reference Case forecasts that without significant and further infrastructure enhancements, most of the key radial and orbital routes into Loughborough are likely to be at, or approaching operational capacity by this time. This worst case scenario could be avoided if further transport measures were implemented to reduce the background traffic growth forecast over the period to 2026.
- 9.2.3 Nevertheless, it is important that each development option assessed is capable of being mitigated with nationally forecast levels of background traffic growth. This is not only because it is not certain that traffic growth in surrounding districts and boroughs would be similarly reduced if additional traffic management schemes implemented in Loughborough, but also because future transport schemes will not necessarily be in areas primarily impacted upon by each of the potential development options, and their impacts will therefore still require full mitigation.

No Mitigation Results

- 9.2.4 At an aggregate scale, each development induces a significant reassignment impact through the town centre in a no-mitigation scenario. This impact also results with relatively small 2,000 dwelling options, although the impact is proportionately greater with the larger developments tested.
- 9.2.5 This indicates that substantial parts of Loughborough, and in particular Epinal Way, are forecast to be at or exceeding operational capacity by 2026, and that without mitigation, existing traffic is forced to re-route in order to accommodate additional flows, creating comparatively large travel time disbenefits for the town.
- 9.2.6 In terms of development induced congestion, the results show that the West Loughborough Option induces the lowest level of congestion in the AM peak, and third lowest in the PM peak, without mitigation. The Cotes Large Option performs worst in each peak, although it is also the largest development option. For reverse reasons, the South and South-west Options have low levels of development induced congestion, by comparison.
- 9.2.7 The standardised results, which are more representative and are directly comparable, show that the West Loughborough option induces the lowest level of congestion across both the AM and PM peaks. It therefore has the lowest level of congestion that requires mitigation, and in the AM peak in particular, the difference between the other options is significant. The Cotes Large and South-west Options perform the least well on a congestion basis, without mitigation, with both promoting approximately twice the level of congestion per dwelling compared to the West Option in each peak.
- 9.2.8 Although the Cotes and South & South-west options were similar in aggregate congestion terms, when standardised, the South & South-west option performs slightly better than the

Cotes Option across both peaks as it is a slightly larger development.

- 9.2.9 However, as the Cotes development gets larger, so the impact per dwelling increases, with the impact of the larger development being to induce 10-15% more congestion per house than the smaller Cotes option.
- 9.2.10 The same pattern also holds in terms of the total level of travel time predicted by the model across the Loughborough area.

Non- Highway Mitigation Conclusions

- 9.2.11 Values of induced congestion for each development option are reduced with the non-highway mitigation in place. In comparative terms, the West Loughborough Option has the lowest levels of induced congestion in the AM peak and PM peaks, both in aggregate terms and on a per dwelling basis. The Cotes Large Option performs least well in both aggregate and per dwelling terms. The SSW Option produces slightly lower levels of congestion than the Cotes Option, when standardised but the difference is not significant.
- 9.2.12 The non-highway mitigation leads to a 20% reduction in congestion levels for the Cotes Option when compared to the no-mitigation scenario, a 29% reduction for the Western Option, and 13% for the SSW Option. The SSW percentage mitigated is relatively small compared to the other options as the option is already well served by existing bus routes and corridor along the A6. Equally, although a higher level of percentage mitigation is achieved for the western site, the mitigation package is more expensive than other options.
- 9.2.13 A very similar pattern and magnitude of mitigation also holds in terms of total levels of travel times forecast by the model at the Loughborough scale. Each scenario results in level of percentage mitigation of 20-30% in terms of total forecast highway travel time, with the lowest value associated with the SSW option. This is because the southern element of it in particular is already well provisioned for in public transport terms.
- 9.2.14 Whilst P&R is an important part of the overall non-highway mitigation package, care is required in terms of the cost-effectiveness of its implementation. Overall the model forecasts that, in comparison to other urban locations such as Leicester, there is likely to be a limited patronage levels for the majority of the park and ride sites tested. As a result, many of these sites are also unlikely to be sustainable from a commercial point of view given that the patronage figures are reported hourly on the basis of a ten minute frequency.
- 9.2.15 The only site that is likely to provide an adequate level of patronage on its own is the southern A6 park and ride site. The site is also enhanced by existing bus-priority along the A6, as well as the fact that is already along the route of a number of major bus routes-particularly the 127- and this service could form the basis of the P&R service at limited expense when compared to dedicated services.
- 9.2.16 However, linking across town from the development option park and ride with the southern park and ride site is likely to enhance commercial viability, not only because of the additional patronage, but also because these bus services are required as part of the development option mitigation package anyway. Whilst the net increase in passengers is relatively small, this may further increase the attractiveness of services already provided in order to serve each development option.
- 9.2.17 However, a full set of dedicated P&R services for the town, covering each main corridor is

therefore unlikely to be financially sustainable or realistically viable.

9.2.18 Each element of this analysis has been based on the premise that each of the SUE's is required to planned so that the sustainable transport measures are in place from the outset of development, including bus and park and ride routes, so that travel and mode habits are formed with the full complement of non-highway alternative in place from the starting date of the development.

9.2.19 With lagged responses to the introduction of new public transport and park and ride schemes, it is unlikely that the same levels of non-highway mitigation would otherwise be achieved.

Highway Mitigation Conclusions

Cotes Options

9.2.20 With Cotes at 4,200 dwellings, the full outer, partially dualled EDR is shown to fully mitigate the development, and provide a wider net benefit to the town (130% mitigation). This is not the case were only a single lane to be provided on the A6-A60 section of the road by 2026.

9.2.21 Travel time mitigation for the scenario, which is more basic indicator in development terms, but which also helps highlight wider benefits to the town as part of the scheme is 130%. This implies a wider benefit brought to the town, i.e. with travel times significantly lower than within the Reference Case **without** the development.

9.2.22 However, the Cotes 4,200 Option is not fully mitigated by a partial EDR based on either an inner or outer route, even when including Epinal Way enhancements and further capacity enhancements along both Meadow Lane and the A60. As presently configured, and without further improvements to a number of surrounding junctions and routes, the scheme delivers no net benefit to the town compared to the Reference Case, in either travel time or congestion terms.

9.2.23 With the partial inner EDR, improvements to Epinal Way, the A60 and Meadow Lane are all required in order to bring the level of percentage mitigation closer to the target of 100%. A full inner route also requires further substantial junction improvements and dualling of the section between the A6 and A60 in order to achieve full mitigation (and provide a realistic net benefit to the town through the scheme). These are indicated on Figures 6.12 and 6.13, and include in particular:

| Route | Capacity Enhancement Required |
|---|-------------------------------|
| A60 | 22% |
| Stanford Lane | 200% |
| Meadow Lane | 85% |
| Belton Road W | 60% |
| Belton Road | 40% |
| A6 Derby Road (near Warwick Way Roundabout) | 47% |
| Bishop Meadow Road | 200% |
| Warwick Way | 60% |
| A6 Derby Road (near Hathern) | 25% |

- 9.2.24 These schemes and improvements are therefore proposed as additional elements to the mitigation package for a partial EDR with Cotes at 4,200, in order to make it a viable proposition in development mitigation terms.
- 9.2.25 However, a larger Cotes Option of 8,000 dwellings is not fully mitigated in congestion terms by either a full or a partial inner or outer EDR, even partially dualled between the case of the inner route, or dualled between the A6 South and the Dishley Industrial Estate in the case of the full outer EDR. The percentage mitigation achieved is 87% in terms of both congestion and travel times for the full outer EDR, and 40% for the partial inner EDR.
- 9.2.26 Although a dual link beyond Meadow Lane to Dishley is incorporated as part of the Outer EDR package, mitigation falls for the Cotes Option to below 100%, as access to and from the EDR only by the A60 and Meadow Lane creates significant localised congestion and limited opportunities for traffic dispersion.
- 9.2.27 At this scale of development therefore, any net benefit to the town of the full outer EDR is more than taken up by development induced congestion and traffic. The analysis tends to suggest a limit in terms of the effectiveness of the full outer EDR package of approximately 6,000- 7,000 dwellings plus employment at the Cotes site, prior to substantial elements of the links becoming congested, and wider benefits to the town being eroded.
- 9.2.28 The requirements for a dual link on the section of the EDR between the A6 and the A60 for the smaller Cotes Option, and to the present Dishley Industrial Estate for a larger Cotes Option represent an important conclusion; one not previously established from modelling work. This is considered to result from the facts that:
- The previous highway model was not validated to relevant DMRB and DfT criteria in the vicinity of the Cotes development and EDR area of impact;

- The eastern side of the model was outside the RSI cordon when the model was built and therefore a number of trips between Hoton and Barrow were not modelled. As a result, previous transfer of background traffic onto the EDR was underestimated;
- Analysis at an AADT level fails to highlight key pressures and usage of the link in AM and PM peaks specifically; and,
- Previous models have not included background traffic growth to 2026, which again underestimates background traffic transfer to the EDR.

SSW Option

- 9.2.29 The SSW Option is 59% mitigated by a partial WDR link between Woodthorpe and Snell's Nook Lane, bypassing Nanpantan, when tested in conjunction with a number of supporting schemes. However, the percentage mitigation increases to 80% if directly connected to the A6 junction, including a bridge over the railway and junction upgrade.
- 9.2.30 A continuous and full Western distributor road for the SSW option creates both aggregate travel time and development congestion mitigation of 111%, which therefore creates wider benefits for the town. All traffic may be accommodated by a single lane link (although the southern part and section along the current Snell's Nook Lane) would be close to capacity. Significant junction enhancements would be required at the A6 (north and south) as well as at the A512 and, most likely, at the M1 junction 23. A bridge over the railway would also be required, as well as a route which avoided environmental sensitivities associated with the Outwoods area.
- 9.2.31 However, the mitigation package for the SSW Option has more limited impacts in terms of reducing congestion issues on the eastern side of the town, when compared to the EDDR results presented previously. Of particular importance are the A60/ Station Approach and Ratcliffe Road/ Belton Road junctions, and whilst these do not substantially deteriorate with the development options and mitigation package in place, localised capacity enhancements would assist in terms of delivering wider benefits to the town.
- 9.2.32 However, it is not only the level of percentage mitigation achieved which matters, but also the cost-effectiveness of achieving mitigation of the developments. As a result, it is the cost-benefit ratios which are likely to be more important in terms of comparing the development options. This is particularly the case where additional and outside funding sources are likely to be required in order to deliver the mitigation schemes which cannot be afforded by developer contributions alone.
- 9.2.33 Schemes with low value for money (in DfT or other terms) are therefore likely to be difficult to proceed with in terms of funding at a later point in time. As a result, highly cost-effective mitigation packages also have less inherent risk in terms of overall deliverability, as detailed in section 8.
- 9.2.34 Moreover, any cost-savings may also provide a number of complementary schemes in other parts of the town in order to ensure a high degree of equity in terms of the transport benefits provided by the mitigation package for the town as a whole.

West Option

- 9.2.35 The West Loughborough Option at 3,500 dwellings is fully mitigated in congestion terms (126%) by a link between Nanpantan Road and the A6, directly connecting at a single, major junction on the A512. This also includes dualling of the A6 to/ from Bishop Meadow, and the stretch of road on the A512 to the M1, as well as a bypass avoiding Nanpantan cross-roads. As with the EDR schemes, small improvements of 5-10% at junctions along Epinal Way have also been included, as well as at the A6 Dishley roundabout.
- 9.2.36 Wider benefits in terms of reduced rat-running through Thorpe Acre are particularly noted, as well as improvements in congestion along parts of Epinal Way and Ashby Road. Aggregate travel time benefits to the town however are only 93% due to deterioration along Nanpantan Road/ Forest Road in particular.
- 9.2.37 Given the fact that the SSW development is fully mitigated and provides an overall net benefit with its mitigation package when the full WDR mitigation package is included, and that the West Option is fully mitigated, but without significant wider benefits to the town by its mitigation package, a combined scenario of both options has been tested, which would provide a total of 8,500 dwellings and 40ha of employment.

SSWW Option

- 9.2.38 The combined SSW and West options (SSWW option) achieve an overall level of mitigation of 114% with the full WDR highway and non-highway mitigation package. This larger development option has also been tested with a number of route variants, each of which also achieves full mitigation between 105-114%.
- 9.2.39 The level of mitigation achieved is greater than that for Cotes Large option with full EDR package and supporting measures, albeit with a larger development size, although both developments would require sections of their respective distributor roads to be dualled. A slightly enlarged Cotes Large Option based on 8,500 dwellings and 40ha of employment (as tested for the SSWW option) results in 80% mitigation for the full outer EDR package as a direct comparison against the level of mitigation achieved for the SSWW option.
- 9.2.40 However, the mitigation package for the SSWW Option has more limited impacts in terms of reducing congestion issues on the eastern side of the town, and therefore a number of localised capacity enhancements are recommended as part of the scheme in order to provide a further enhancement to the wider benefits for the town as a whole.

9.3 Overall Mitigation and Cost Effectiveness Conclusions

- 9.3.1 The model analysis and option testing analysed within this report does in many ways support the findings from previous studies. Importantly, each study shows that Loughborough, in the absence of further transport measures to tackle background traffic growth, especially by 2026 is highly congested on most of its key radial and orbital routes, and that any development in the town is only realistically accommodated by diverting existing traffic onto other routes, creating relatively high levels of disbenefit.
- 9.3.2 However, the mitigation results of the individual developments do suggest a change in the relative ranking of the development options when compared to previous analysis undertaken

between 2006- 2007.

9.3.3 The main reasons for the differences between the modelling results obtained here from those previously undertaken by Leicestershire County Council include:

- Enhanced validation of the model in the vicinity of the development options (including greater traffic levels on the eastern side in the base model as a result of previously being outside the RSI boundaries);
- Future year traffic growth to 2026 is incorporated into the models, which results in greater utilisation of all distributor road options as both congestion to the east increases (around Belton Road/ Radcliffe Road/A60), as well as increasing congestion to the west, (which is seen in terms of increased rat-running and congestion through Thorpe Acre and Shelthorpe in particular);
- AM and PM peak results are explicitly analysed and reported. Analysis is not aggregated at an AADT level, which is compromised because of large levels of spare capacity in the off-peak periods;
- Whilst flows and travel times are utilised as background indicators of benefit to the town, the development induced congestion indicators are a more powerful assessment tool in determining the benefit of schemes because the *capacity* of new and existing roads is also taken into consideration;
- The western distributor road scheme is coded as a continuous link, without 'dog-legs' and only one major junction crossing with the A512;
- All schemes are coded with improvements to Epinal Way, including capacity enhancements of 5-10% rather than being scheme dependent, but also wider schemes have not formed part of previous testing as the direct impacts of the development have not been graphically analysed and interpreted. This has led to scheme recommendations to dualling parts of the A6, A512 and Dishley A6 and Station Approach/ Radcliffe Road and Belton Road junction upgrades also being included as part of the scheme;
- The full multi-modal impact of the highway schemes and combined packages are taken into account for each forecast run; and,
- Full economic cost-benefit analysis of all schemes (and their components) has been undertaken comparatively between the options, rather than only for selected developments or schemes that comprise its mitigation.

9.3.4 In terms of the magnitude of benefits to Loughborough, the results do show that the full EDR with the Cotes Large 8,000 dwelling option produces, in aggregate terms, the largest level of benefit. The Cotes Option at 4,200 dwellings with a full EDR also performs highly, but *only* with a full EDR.

9.3.5 The 4,200 dwelling Cotes Option with a partial EDR, even with improvements along the A60 and Meadow Lane, produces the lowest level of user benefits. This is due to the high number of over-capacity junctions which result from the scheme placing additional traffic through already congested junctions around the Eastern Gateway and Belton Road. Without further, and substantial, increases in capacity along Belton Road, Meadow Lane, Stanford, Belton Road West and the A6, the scheme is unlikely to approach 100% mitigation, or achieve high levels of cost-effectiveness.

9 Conclusions

- 9.3.6 The SSWW Option has a very similar level of benefits compared to the Cotes Large and full EDR mitigation package at a Loughborough scale. However, the capital costs associated with the EDR package for the Cotes development are high in comparison to other options.
- 9.3.7 The overall cost per dwelling of mitigation package is therefore lowest for the combined SSW option, which has a per dwelling mitigation cost of £6,600. The SSWW and Western Options also perform similarly in terms of cost-effectiveness when compared with £26,261 for a Cotes Option which achieves a similar level of mitigation.

| Option | Total Cost (£m) | Total Cost per Household £ (exc. developer funding) | % Mitigation Achieved |
|-----------------------------|-----------------|---|-----------------------|
| Cotes- Full Outer EDR | 110.3 | 26,261 | 130% |
| Cotes- Partial Inner EDR | 59.3 | 14,119 | 41% |
| Cotes- Full Inner EDR | 88.3 | 21,023 | 56% |
| Cotes Large- Full Outer EDR | 134.4 | 16,800 | 87% |
| SSW- Partial WDR | 33.0 | 6,600 | 80% |
| West- Partial WDR | 33.7 | 9,628 | 126% |
| SSWW- Full WDR | 65.2 | 7,670 | 114% |

- 9.3.8 The size of the cost difference in terms of mitigating the development options is highly significant, with costs required to be over two and a half times as much than forecast within this report, for the eastern side to become as cost effective in transport mitigation terms.
- 9.3.9 As a result, even if developer contributions towards the Western Distributor Roads were not forthcoming, the Western, the South Western and the combined options thereof, are still forecast to provide a greater benefit-cost ratio than the best-performing eastern mitigation packages for the town, as well as providing full mitigation in transport terms to the developments themselves.
- 9.3.10 It is important to note that this does not guarantee any level of future funding over and above a level of developer contribution. However, the more cost-effective development and mitigation scenarios do provide a more likely route towards obtaining future transport improvements for Loughborough as a whole.