Greater Nottingham Strategic Plan




Transport Modelling Background Paper September 2024

The content of this document is unchanged from the previous consultation except for the disclaimer on the next page.

Greater Nottingham Planning Partnership

Broxtowe Borough Council

Gedling Borough Council

Nottingham City Council

Rushcliffe Borough Council

Greater Nottingham Strategic Plan

March 2025 Update

Please note that Gedling Borough Council has made the decision to withdraw from the Greater Nottingham Strategic Plan. While the Strategic Plan no longer contains any policies applicable to Gedling Borough, they may incorporate elements of policy within their own plan making. References to Gedling Borough in this document should be considered in this light.

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Acronyms

EMCCA	East Midlands Combined County Authority
EMDC	East Midlands Development Company
EMGM	East Midlands Gateway Model
GNSP	Greater Nottingham Strategic Plan
LTP	Local Transport Plan
PCU	Passenger car unit, a metric used in to assess traffic flow rate on a highway
SRN	Strategic Road Network (roads managed by National Highways)
TEMPRO	Trip End Model Presentation Program (national trip end model – long term transport forecasts)
V/C	Ratio of volume / capacity as a measure of congestion of a junction

1 Introduction

1.1 The purpose of transport modelling is firstly to measure the transport impacts of the Greater Nottingham Strategic Plan (GNSP), and secondly to assess the impact of mitigation measures in reducing those impacts.

1.2 Greater Nottingham is covered by one transport model, the East Midlands Gateway Model (EMGM). Following model review and revalidation (which had already been undertaken prior to this GNSP modelling), there are 4 stages to the modelling:

Stage 1: 2041 Reference Case development

Stage 2: Strategic Plan testing - no mitigation

Stage 3: Development of mitigation measures

Stage 4: Mitigation Testing, with strategic highway/public transport mitigation

1.3 The process and outcome of the modelling is set out in this background paper. The modelling has concluded that:

- Under Stage 1, the Reference Case, there are significant levels of congestion, with several junctions operating very close to or over capacity. This demonstrates that the starting point for the GNSP is one where background traffic growth is driving congestion, and in some places causing significant delay, even without the GNSP proposals.
- Not surprisingly, the position is worsened when the GNSP proposals are included under Stage 2.
- A mitigation package, using the principles set out in Policy 14 of the GNSP Managing Travel Demand, was developed (Stage 3) and then modelled (Stage 4) to determine the extent to which mitigation results in reduced congestion.
- Due to the significant congestion already evident in the Reference Case, and the constrained nature of many corridors and junctions, the GNSP authorities accept that it will be difficult to significantly mitigate the transport impacts identified. Nonetheless, further investigation and modelling of mitigation measures is ongoing, with the aim of further reducing the impacts of new development and transport growth.
- Due to much of the congestion reported by the model being due to background growth rather than new sites promoted by the GNSP (the majority of strategic sites proposed in the GNSP already have planning permission and therefore mitigation for these is already addressed in existing S106 agreements) it is not possible to attribute particular mitigation measures to particular sites. A corridor approach will therefore be required to the implementation of mitigation, in which the investment programme of the East Midlands Combined County Authority (EMCCA), set out in its Local Transport Plan (LTP), will be key.

1.4 The summary of EMGM outputs is drawn from Greater Nottingham Strategic Plan Transport Assessment Report v2.1 and Greater Nottingham Strategic Plan - Transport Assessment - Stage 4 prepared by Arup Group Ltd and Systra UK. A consolidated report of all stages of modelling, including the work post publication of the GNSP, is in preparation and will be published when complete.

1.5 When considering the results of a transport model, it is important that the limitations of modelling are understood and taken into account. These limitations are described in section 3 of this background paper.

2 Transport Modelling for Greater Nottingham

East Midlands Gateway Model

2.1 The EMGM was developed to measure the transport impacts of HS2 and associated growth on the region. It is a highway and public transport model which covers the whole of Greater Nottingham, so includes the whole GNSP area. Although HS2 to the north of Birmingham has now been cancelled (and is not included in the EMGM), the EMGM is being used by several regional organisations, including other local authorities in Greater Nottingham (Ashfield District and Erewash Borough Councils), the East Midlands Development Company (EMDC) and EMCCA. Thus, its results are internally consistent with other plans in the area, and it can be considered the authoritative model for the area. As it is a highway and public transport model, walking and cycling measures must be deducted from the demand inputs. The EMGM forecasts the levels of modal shift from private car to public transport and the residual impacts on highway operation. A map showing the geographic extent of the model is at appendix 1.

2.2 The Model is managed by Systra UK, and the modelling commission was managed by Arup Group Limited.

Stage 1 2041 Reference Case

2.3 The reference case is set at 2041, to match the end date of the GNSP. It includes all committed infrastructure and development proposals (of over 250 homes or equivalent for trip generation purposes) between 2016 and 2041.

2.4 Within the GNSP area, only developments/parts of developments that will be constructed between 2016 and the commencement of the GNSP (assumed to be 2026) or do not form part of the proposed GNSP were included in the Reference Case model.

Stage 2 Strategic Plan testing - no mitigation

2.5 A single development scenario was modelled including the residential, employment and other ancillary land use proposals proposed in the GNSP. As the model inputs were based on housing supply, rather than the Preferred Approach housing targets, they are higher than housing targets set out in the regulation 19 Publication Draft GNSP. This scenario was modelled using additional development zones with links to the highway and public transport networks representing the likely access of proposals.

2.6 Where possible, sites that are under 180 houses (or equivalent traffic generations for non-residential uses) were clustered together where proximity allowed. The growth in trips associated with the remaining smaller

developments was included in the application of TEMPRO growth to the 2041 end date year within the GNSP area.

Stage 3: Development of mitigation measures

2.7 Using the results of Stage 2, it is possible to identify areas where mitigation could be applied to reduce transport impacts. A mitigation strategy was then developed, with the principles of "Avoid-Shift-Manage and Mitigate".

2.8 Avoid - The first pillar in the strategy seeks to reduce the need to travel by car influencing the character of the developments (e.g. by applying the 'compact and connected' principles for development included in the GNSP, ensuring daily needs can be met with a short walk, active travel or public transport journey away), improving the efficiency of freight operations and managing demand in hot-spot locations.

2.9 Shift - The second pillar in the strategy seeks to shift travel demand onto more efficient, sustainable modes of transport. This includes improving the attractiveness of public transport and active travel.

2.10 Manage and Mitigate - The third and final pillar in the strategy considers targeted investment in the highway network to manage and mitigate the impacts of development. This is only considered once all efforts to avoid and shift demand have been exhausted.

2.11 The highway mitigation strategy needs to focus on good quality modal alternatives and intelligent traffic management rather than junction capacity improvements, which are difficult to achieve given the constrained nature of most of the junctions, and in any event any capacity released would be filled with induced demand. Appendix C includes a full list of mitigation measures used in the modelling.

Stage 4: Mitigation Testing, with strategic highway/public transport mitigation

2.12 The identified mitigation measures are then input into the EMGM, and the outputs give an indication of the extent to which the transport impacts of the GNSP are capable of mitigation.

<u>Modelling results</u>

2.13 Arup confirmed several challenges associated with the growth proposals:

- In common with all major urban areas, increased congestion occurs even without further development.
- There are widespread impacts across the network caused by the aggregate of development growth.
- Problem locations are not necessarily local to development sites.

- The GNSP area has a large number of junctions operating at or close to capacity, so junction operation is significantly worsened by a relatively small increase in trips.
- Significant impacts are forecast on the Strategic Road Network, key radial routes and within the city centre.
- Addressing problems will involve reducing car use for existing trips as well as new trips.

2.14 An additional factor is that the majority of the strategic sites in the GNSP are not new, most are existing allocations and many benefit from planning permission. Sites not previously included in Local Plans and/or which do not benefit from planning permission are limited to the Former Bennerley Coal Disposal Point, the part of Toton and Chetwynd Barracks Strategic Allocations not accounted for in the Broxtowe Local Plan, the extension to Top Wighay Farm Strategic Allocation in Gedling, and the Broad Marsh Strategic Allocation in Nottingham City. Thus, much of the growth in traffic over the GNSP period which the modelling seeks to address is already planned for, and, where planning permission exists, mitigation will already have been agreed through S106 agreements. Appendix 2 gives the planning status of all the strategic allocations included in the GNSP.

Reference Case (stage 1)

2.15 As noted above, the reference case includes all development currently committed (i.e. with planning permission) that is expected to be delivered by 2041. Within the Greater Nottingham Strategic Plan strategy area, only developments/part of developments that will be constructed between 2016 and the commencement of the new Strategic Plan (assumed to be 2026) or do not form part of the proposed Greater Nottingham Strategic Plan will be included in the Reference Case model. Growth in this area will be constrained to represent the situation at the commencement of the new Strategic Plan. This allows for the full impact of the GNSP to be tested in stage 2. It does include any transport schemes committed and expected to be delivered by 2041.

2.16 Modelling the reference case concludes that there is 19% growth in highway trips between 2016 and 2041 in the AM peak and 18% growth in the PM peak.

2.17 Figure 1 shows AM peak traffic flow change for the 2041 Reference Case compared to the 2016 Base model. Figure 2 shows the same for the PM peak. Red represents links which experience an increase in traffic, whilst green represents links which see a reduction.

2.18 Traffic growth between 2016 and 2041, as well as various infrastructure schemes, impact on traffic flows on the local and Strategic Road Network (SRN). In the GNSP area, on the SRN, the M1, A46, A52 and A453 in particular are forecast to experience increases in traffic. This is the result of a combination of the following:

- Development growth using these corridors
- Mitigation of Erewash and Ashfield Local Plan development impacts and schemes
- Strategic schemes on the A52 at Nottingham Knight and Wheatcroft
- Improvements to M1 J26 and J27 which releases additional capacity
- Improvements to M1 J24a/J24, built as part of the East Midlands Gateway Rail Freight Interchange and the Kegworth Bypass, which releases capacity at M1 J24a/J24 and improves connections between the A42, A50, A453 and the M1

2.19 On the local highway network, a number of routes are also forecast to experience increases in traffic flow. Much of the flow change in the GNSP area is a result of general traffic growth but also can be attributed to local schemes such as the Boots Link Road, the Turning Point South scheme and new development accesses, e.g. Colliery Way in Gedling, which redistribute traffic and release highway capacity.

Figure 1 Flow difference: Base Case vs Reference Case AM Peak

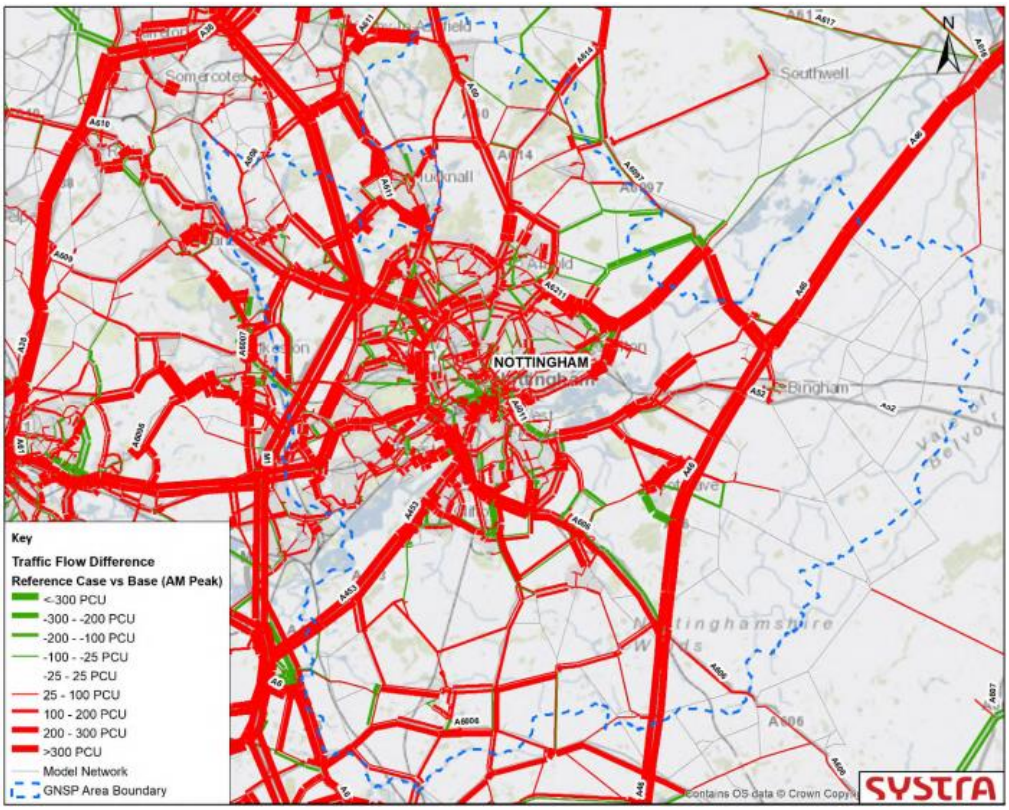
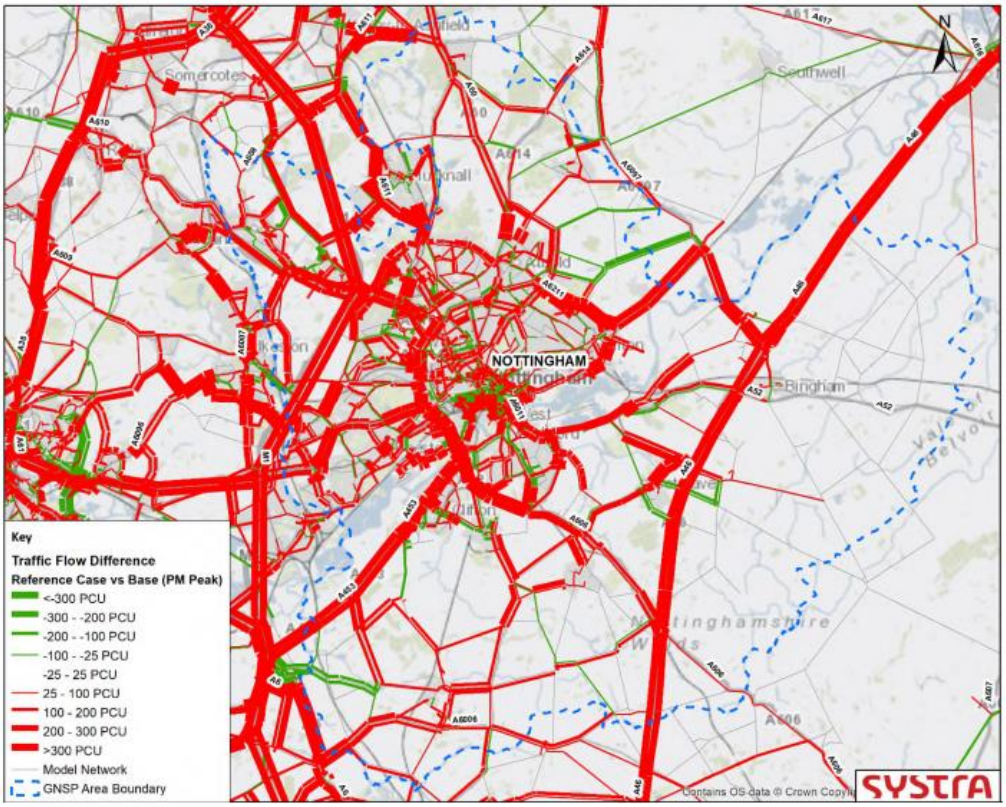


Figure 2 Flow difference: Base Case vs Reference Case PM Peak



2.20 Junction congestion is measured by determining the ratio of the volume of traffic to the capacity that can be accommodated by a junction. A Volume to Capacity (V/C) of 85% is considered to be the threshold at which a junction is approaching its operational capacity, therefore increasing the likelihood of operational problems, including congestion, with associated delays and queues. A V/C of ≥100% indicates that a junction is operating above its theoretical maximum capacity, with associated congestion, queuing and delays.

2.21 Figure 3 and Figure 4 show the junctions which are forecast to have a V/C of 85% or higher in the Reference Case. Orange represents junctions with a V/C over 85% but under 100%. Red marks junctions severely congested with a V/C of 100% or more.

2.22 In 2041, the Reference Case shows severe congestion, particularly within and around Nottingham City, but also across the GNSP area, in particular around Broxtowe given the proximity to the M1.

2.23 The M1 and A52 include several junctions with a V/C ≥100% in the 2041 Reference Case. For example, M1 J24/J24a, J25 and J26, as well as the A52 towards Derby and through Nottingham City, are significantly congested in both peaks, with V/C of ≥100% at multiple points along these strategic routes.

2.24 On the local network, there is significant congestion within Greater Nottingham and the City itself generally, particularly on strategic roads such as the A60, A610 and A6514.

Figure 3 Reference Case Congestion AM Peak

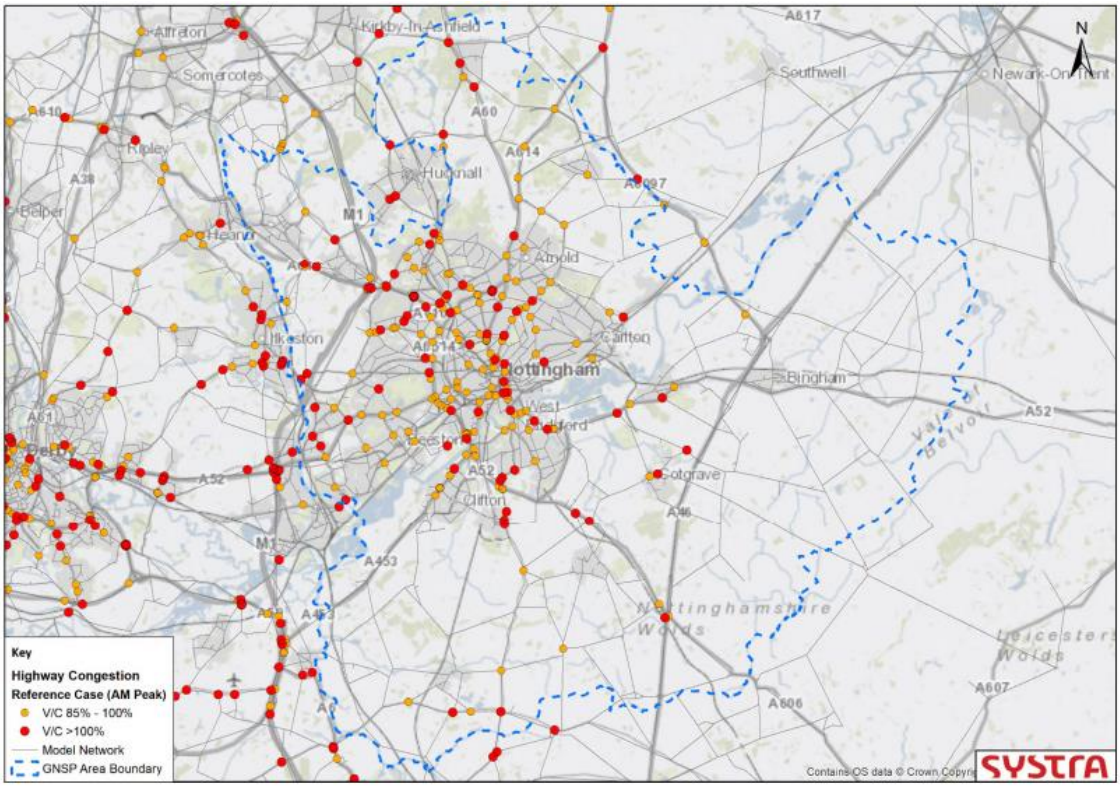
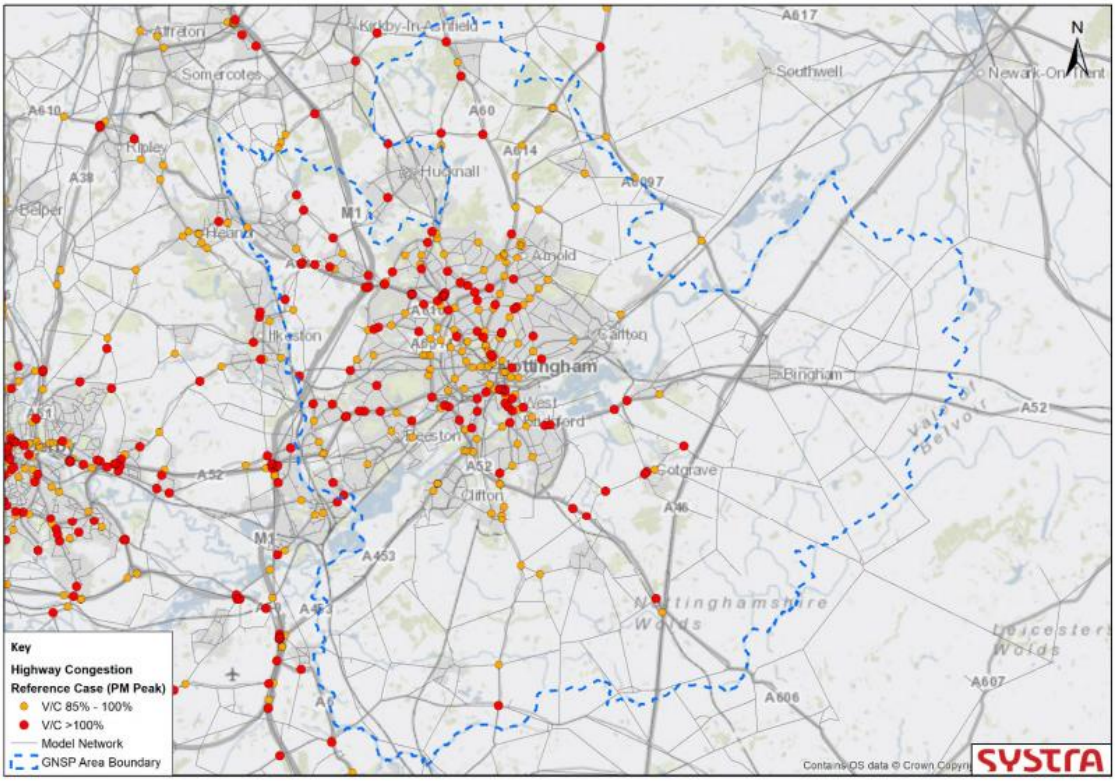


Figure 4 Reference Case Congestion PM Peak



2.25 Modelling of the reference case shows there are high levels of congestion throughout the Greater Nottingham road network even without the GNSP.

GNSP No Mitigation Scenario

2.26 Highway flow change on the network is a function of traffic directly generated by the GNSP developments and traffic which is reassigned as a consequence of the additional development traffic being present in the network in the GNSP No Mitigation scenario. In summary, an additional **60,351** person trips are made in the AM peak and an additional **57,200** person trips are made in the PM peak between the Reference Case and GNSP No Mitigation scenario, split 55% on highway modes, 12% on public transport modes and 33% on active modes. Accounting for vehicle occupancy and mode share, there are an additional **16,113** vehicle trips modelled in the AM peak and an additional **15,434** vehicle trips modelled in the PM peak.

2.27 Figure 5 and Figure 6 show highway flow change compared to the Reference Case. Red links represent roads which experience a net increase in traffic, whilst green links represent roads which experience a reduction in traffic.

2.28 Highway flow change is broadly similar in both peaks, with there being increases in highway flows as a result of the additional GNSP development. There is some reassignment of existing traffic, particularly in the west of

Nottingham around Toton, which is due to the addition of the development and infrastructure in this area, such as the Toton Link Road. There is also localised reassignment in Rushcliffe on the A453, partly as a result of an increase in congestion and highway flow at A453 junctions near the Clifton South and Ratcliffe on Soar Power Station sites which causes a flow decrease on the A453 due to reassignment from congestion (in the PM peak predominantly).

2.29 There are decreases in highway flow on the M1 around Junction 24 in the AM peak. This is due to increased volumes of traffic in the Strategic Plan scenario utilising the M1 to access the A453 at Junction 24, which increases congestion and the volume of queued flow in the model on the M1 around Junction 24. This reduces the volume of traffic that is able to pass freely along the M1 south of Junction 24, since queued flow and congestion increases, whilst demand flow does not change.

Figure 5 Flow difference: Reference Case vs GNSP No Mitigation AM Peak

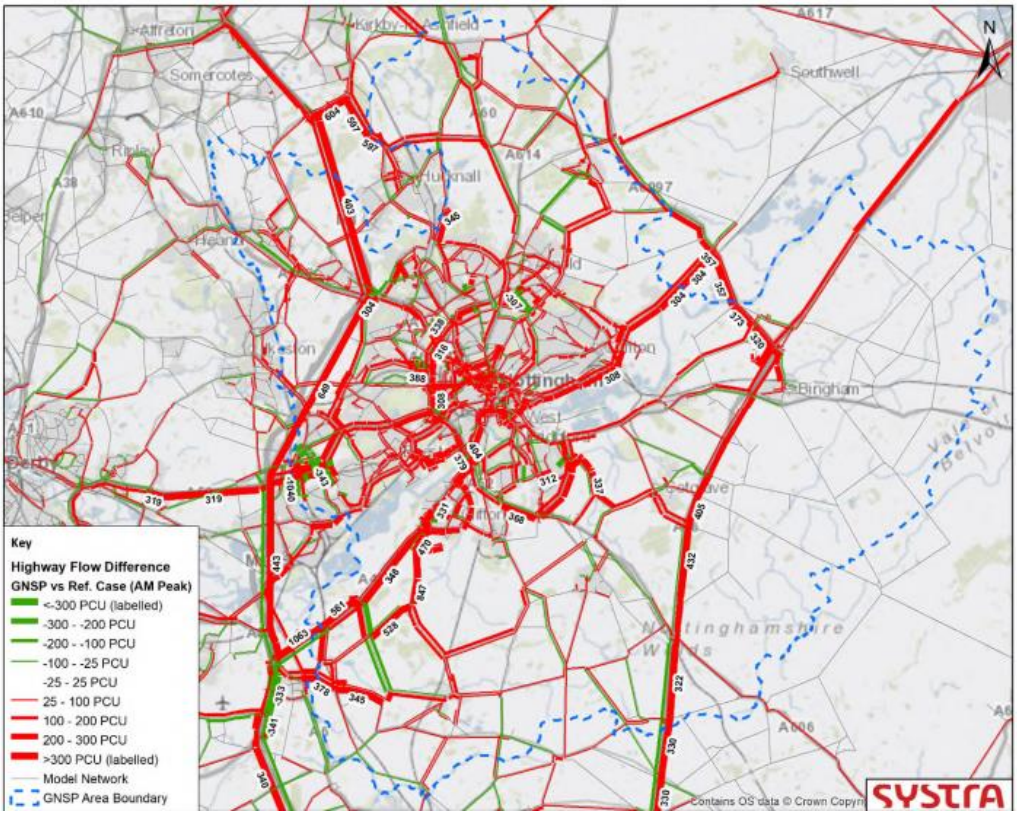
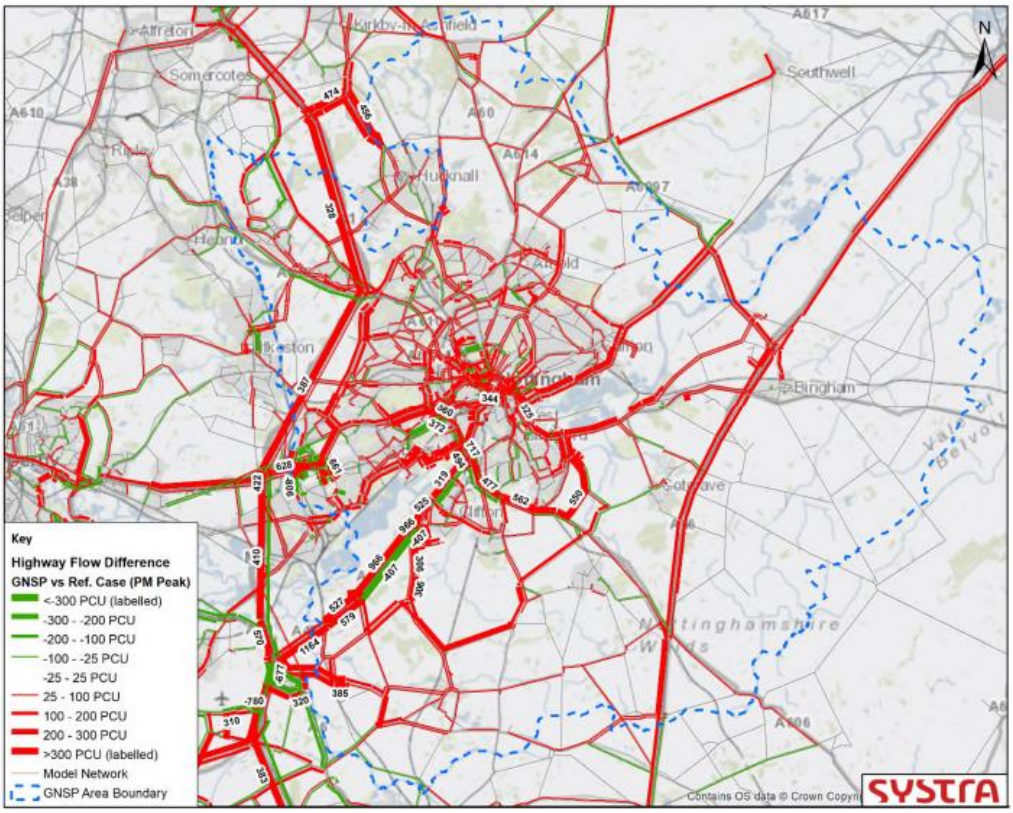


Figure 6 Flow difference: Reference Case vs GNSP No Mitigation PM Peak



2.30 Junction congestion in the GNSP No Mitigation scenario is shown in Figure 7 (AM Peak) and Figure 8 (PM Peak).

Figure 7 GNSP No Mitigation Scenario Congestion AM Peak

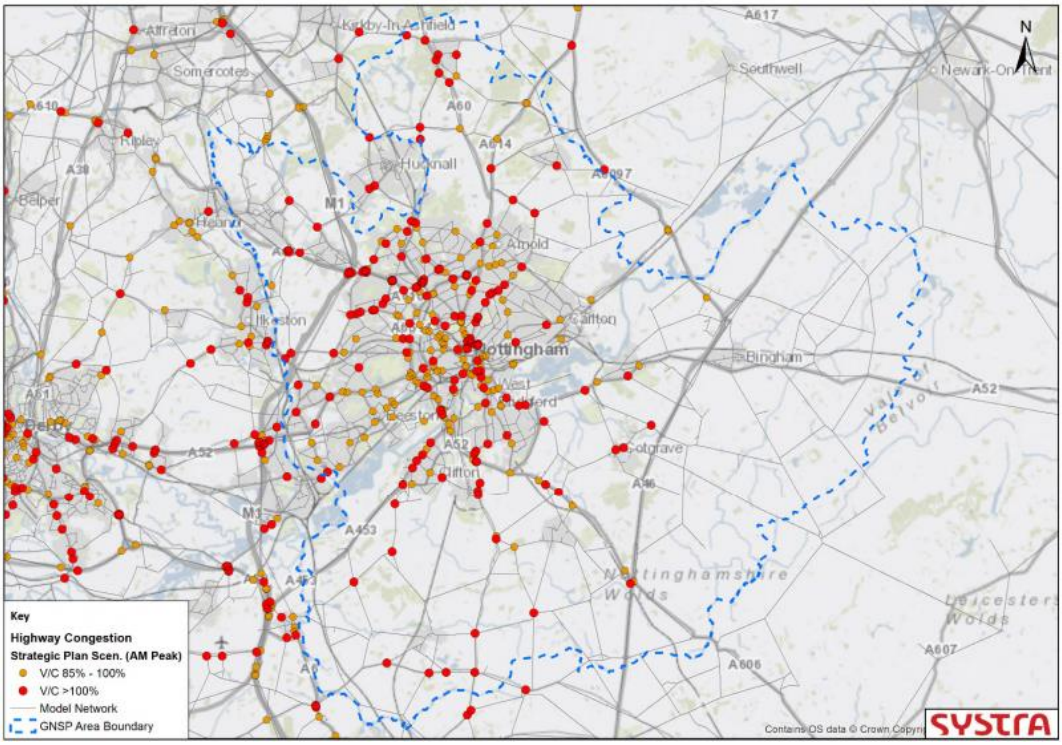
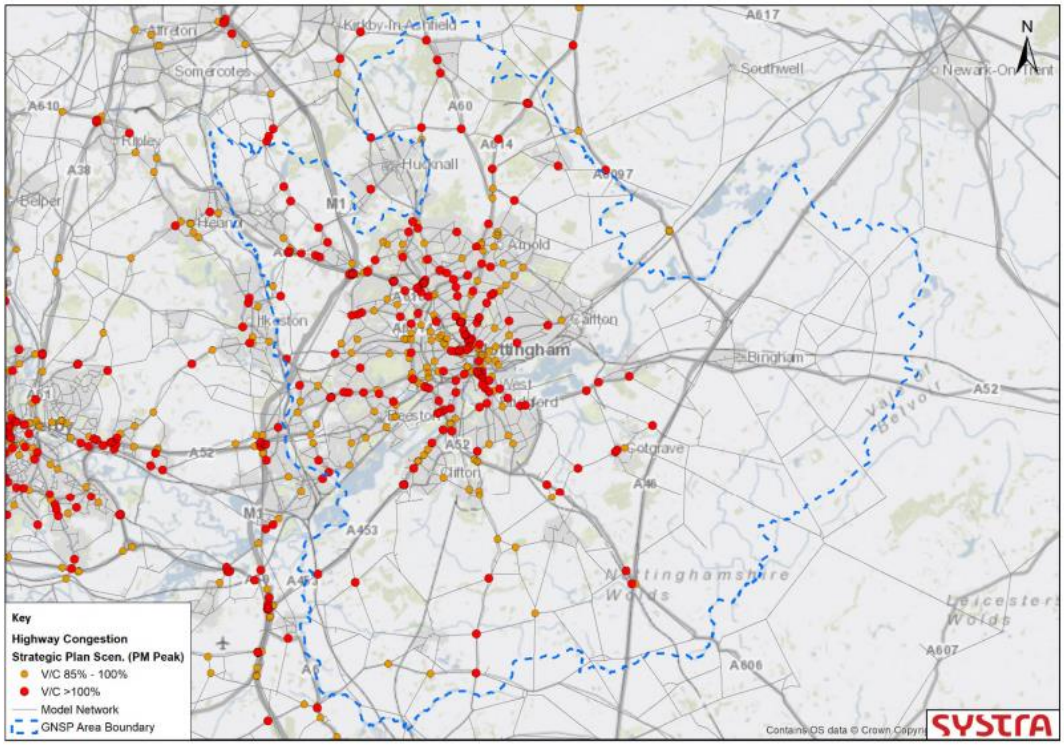


Figure 8 GNSP No Mitigation Scenario Congestion PM Peak



2.31 Figure 9 and Figure 10 show the change in congestion as a result of additional development traffic at junctions which are forecast to have a V/C ratio of >85% in either the Reference Case or the Strategic Plan scenario. The change in congestion is shown relative to congestion in the Reference Case.

Figure 9 Junction Congestion Change Reference Case vs GNSP No Mitigation Scenario, AM Peak

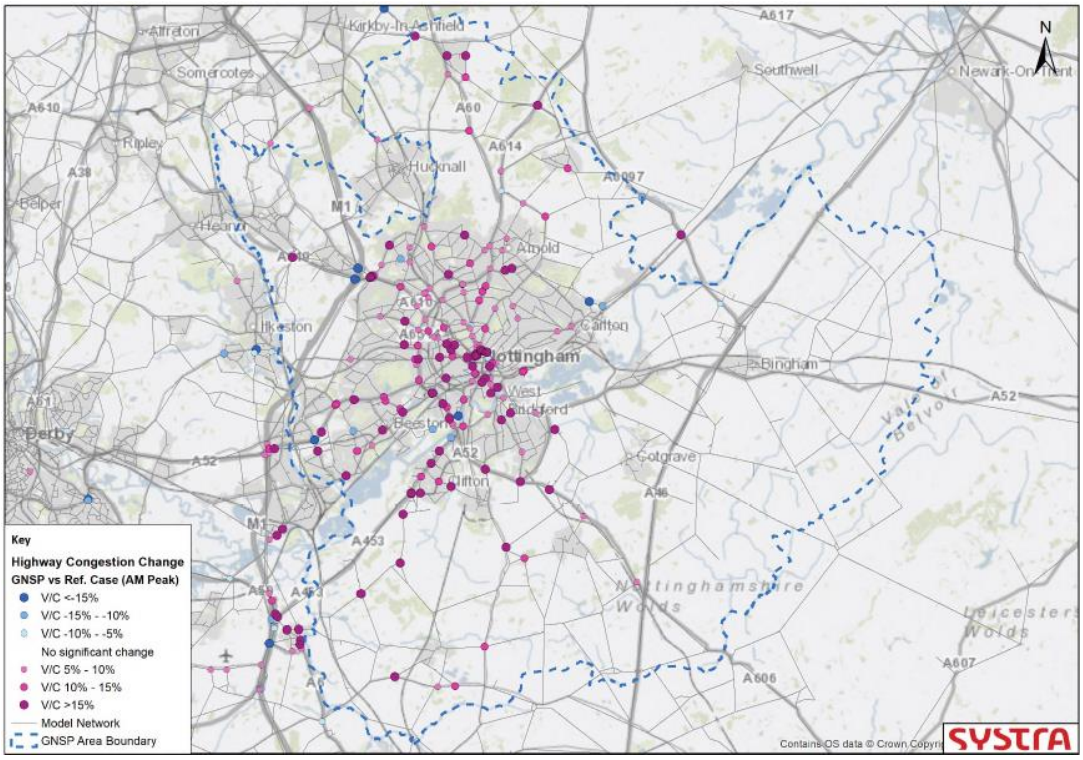
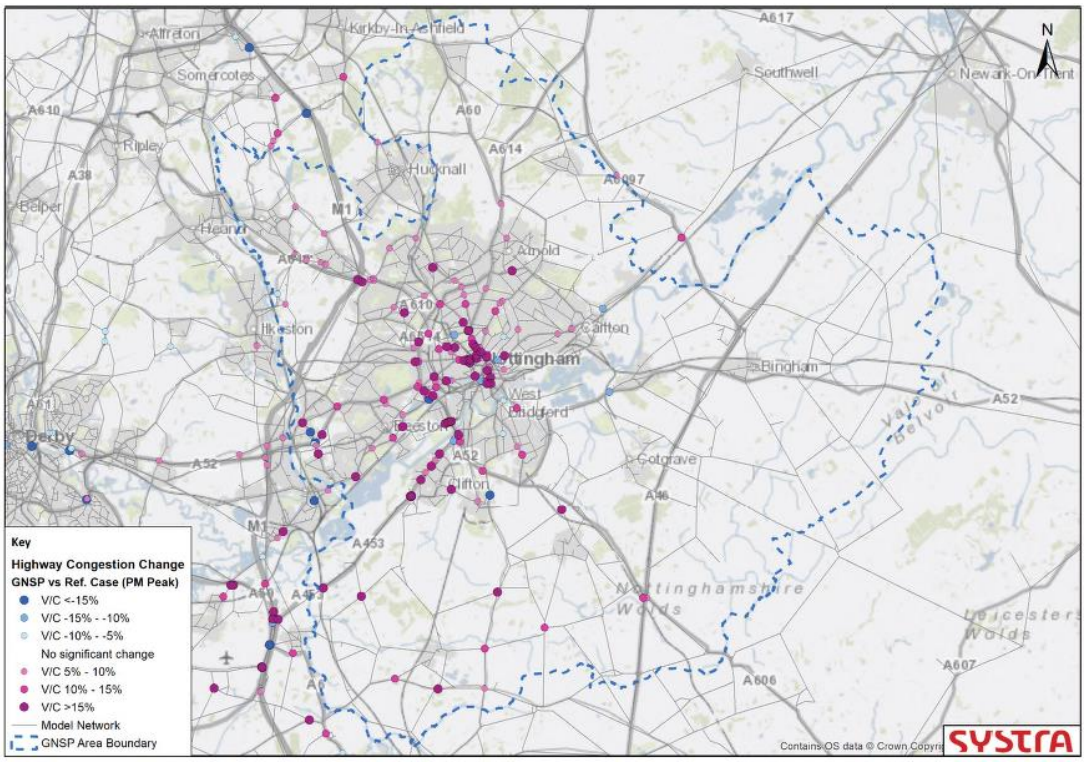


Figure 10 Junction Congestion Change Reference Case vs GNSP No Mitigation Scenario, PM Peak



2.32 These figures show a concentration of impacted junctions within the city's ring road. The plots also show a sequence of impacted junctions along the A453 in the morning and evening peak hours. Addressing capacity at these junctions in isolation would not resolve these issues and would likely move the congestion along the link which evidences the need for a corridor or network level intelligent traffic management solution in this location.

2.33 The figures also show impacts at junctions on and around M1 J24 which is attributable to the complex nature of this part of the network and its lack of resilience to traffic growth.

2.34 In summary, the GNSP No Mitigation scenario results in a significant increase in vehicle trips when compared to the Reference Case. An additional 60,351 person trips are made in the AM peak and an additional 57,200 person trips are made in the PM peak between the Reference Case and GNSP scenario.

2.35 More than 122,000 Passenger Car Unit (PCU) kms are added in the morning peak and more than 116,000 PCU kms are added in the evening peak. The 6% increase in distance travelled exponentially impacts on congestion and queuing which increases by 96% in the morning peak and 59% in the evening peak.

2.36 The distribution outputs show trips are reasonably dispersed from the source of new development but are drawn towards key routes and the strategic road network which accommodates a sizeable increase in demand. The aggregate

of development growth causes widespread impacts across the network including locations which are not local to development sites.

2.37 At junctions operating at or close to capacity (as is already the case in Greater Nottingham), junction operation can be significantly worsened by a relatively small increase in trips. Consequently, a large number of junctions are impacted by the growth proposals including significant impacts which are forecast on the Strategic Road Network (SRN) which would be expensive and challenging to address. The modelling consultants conclude that the highway mitigation strategy therefore needs to focus on intelligent traffic management rather than junction capacity interventions to avoid taking ownership of major junction solutions within the GNSP which would be disproportionate and contrary to the soundness test set out in the NPPF.

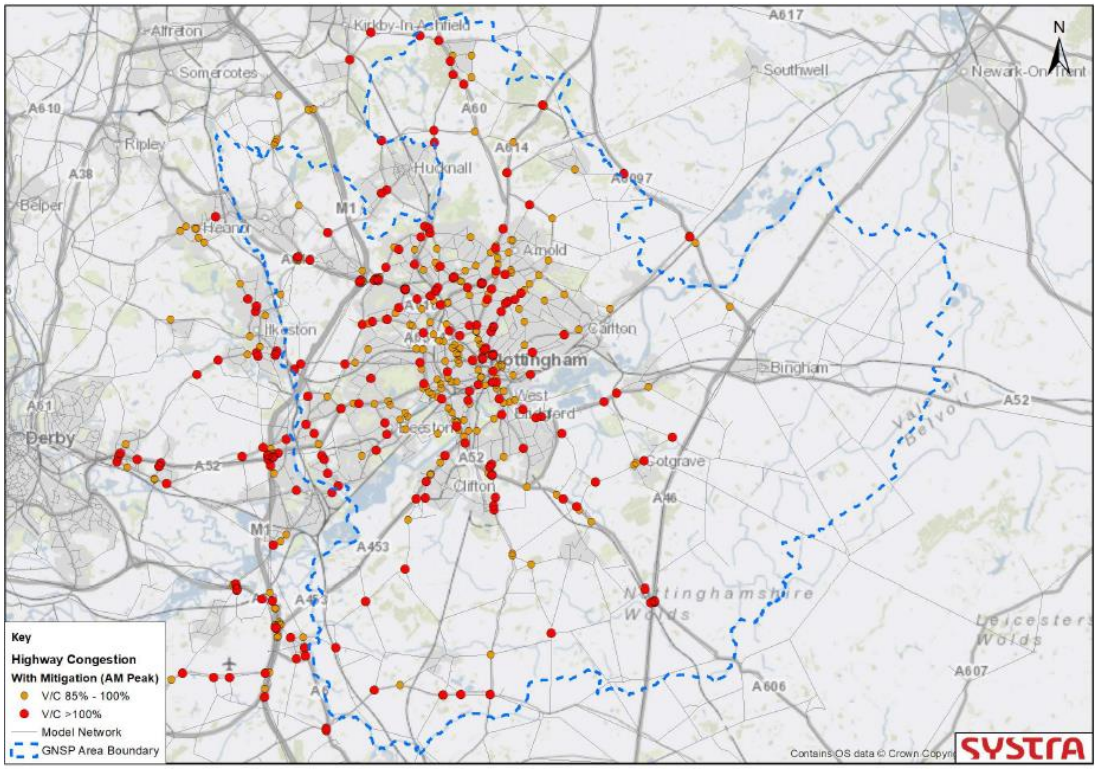
GNSP With Mitigation

2.38 The proposed mitigation measures range from designing developments to be compact and connected, with daily needs within short journey times, active travel hubs within new development and at key locations, and new cycling routes. In terms of public transport, bus frequency improvements are proposed, route extensions and priority measures, park and ride, NET extensions, and improvements to National Rail services. Limited highway/signalling improvements are also included, Toton Link Road, A453 corridor, Bramcote Island (A52) and Junction 24 improvements in line with those included in the Local Development Order. More detail on the mitigation measures is included at appendix C.

2.39 The mitigation strategy thus delivers reductions in demand as a result of policies such as walkable neighbourhoods; reductions in demand as a consequence of active travel measures; and increased public transport use where services are improved. However, a key finding is that overall, a substantial amount of congestion remains.

2.40 Figure 11 shows those junctions that are modelled to be close to, or over, capacity in the morning peak under the GNSP With Mitigation scenario.

Figure 11: Congestion GNSP With Mitigation Scenario AM peak



2.41 Figures 12 and 13 below show the change in congestion between the different scenarios.

2.42 Figure 12 shows the change in congestion between the Reference Case and GNSP With Mitigation scenario. As would be expected, the growth associated with the GNSP leads to many junctions experiencing worsening congestion, although a few experience less congestion due to the mitigation package. Average vehicle speeds reduce from 40km/hr to 37km/hr.

2.43 It would be unrealistic for mitigation measures to result in no increase in congestion between the Reference case and the GNSP With Mitigation scenario, given existing congestion, the fact that many junctions are already at or close to capacity, and the constrained nature of many junctions preventing further capacity improvement. The focus of mitigation is therefore between the GNSP No Mitigation scenario, and the GNSP With Mitigation scenario, shown in figure 13.

Figure 12 Congestion Change: Reference Case vs GNSP With Mitigation

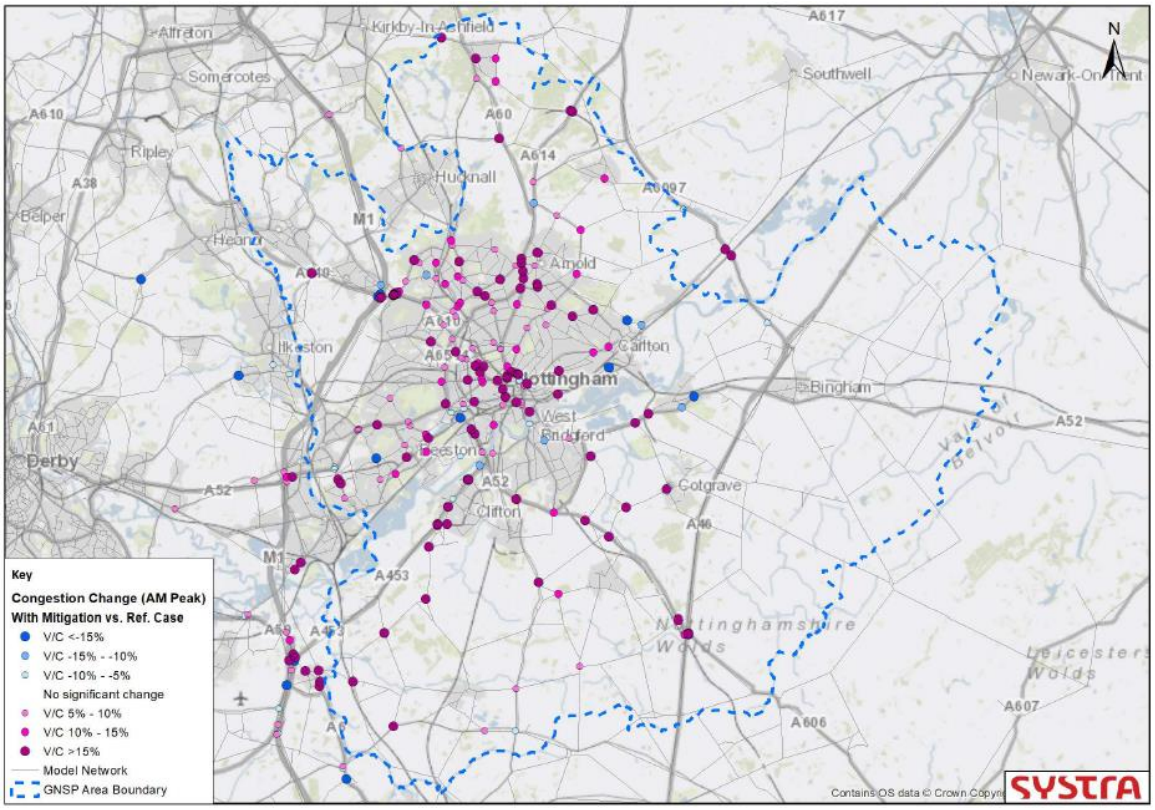
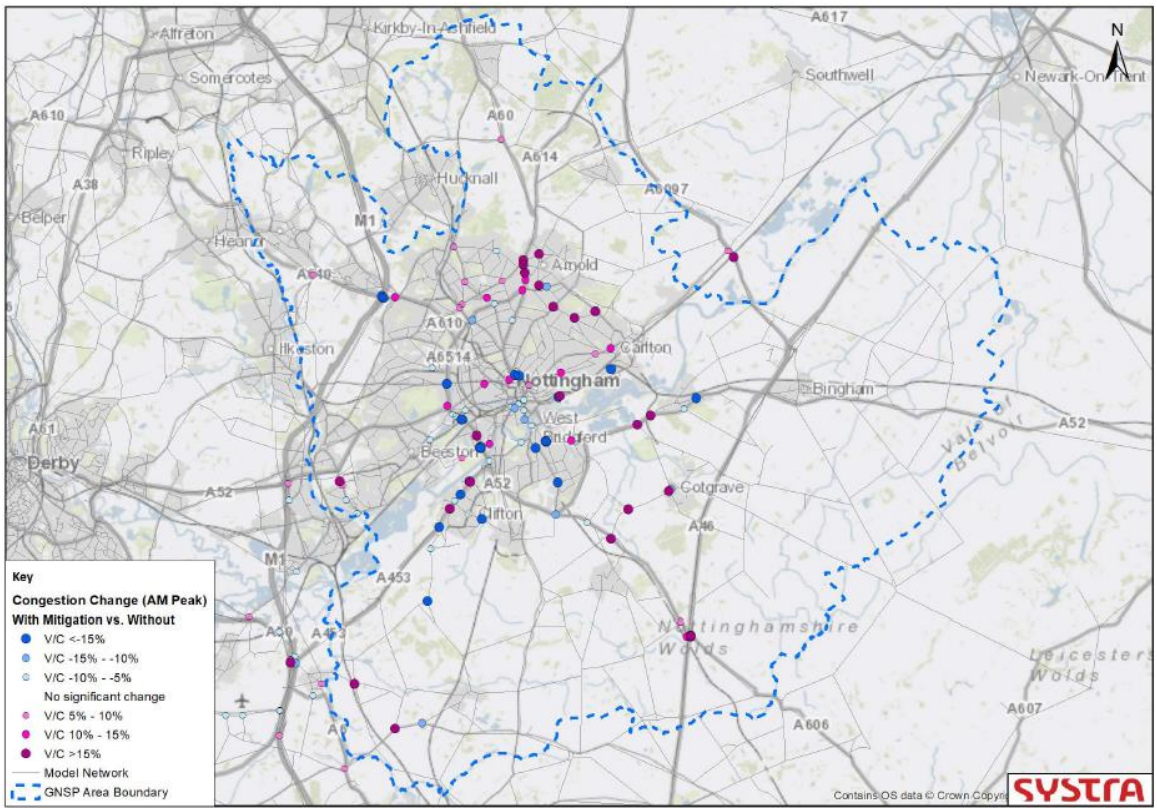


Figure 13 Congestion change: GNSP With Mitigation vs Without Mitigation



2.44 Figure 13 shows that whilst some junctions have improved capacity, many experience increased congestion, despite mitigation measures, with clusters of junctions with increased congestion occurring on the A60 around Arnold, the ring road and the A453.

2.45 Overall, initial modelling of the mitigation package results in a 4% improvement in congestion over the GNSP No Mitigation scenario in the AM peak, and a 10% deterioration in congestion in the PM peak, this is due to public transport measures which remove road capacity for private vehicles, notably at the A52 Bramcote Island roundabout. Removing the bus priority (A52 bus lanes) from the modelling of the mitigation package results in a 28% improvement in congestion over the GNSP No Mitigation scenario in both the AM and the PM peak. Average speeds in the GNSP No Mitigation and the GNSP With Mitigation scenarios are 37km/hr, a 7.5% reduction against the 40km/hr average reported for the Reference Case AM Peak, and a 5.1% reduction against 39km/hr average reported for the Reference Case PM peak.

2.46 Whilst growth without increased congestion is not possible, further refinement of the model and more targeted mitigation measures are expected to improve the position somewhat. However, given the already congested nature of the network, and the constrained nature of most junctions restricting their improvement, the scope for significant further mitigation is likely to be limited. This further modelling is ongoing and will be ready for examination of the Plan.

2.47 Notwithstanding this, the benefits of growth set out in the GNSP in terms of new house building and employment are considered to outweigh the

disbenefits of congestion. The consultants also note that the model cannot accurately measure behavioural changes, such as increased cycling and walking or peak spreading. The weaknesses of transport modelling are considered further below.

3 Limitations of Transport Modelling

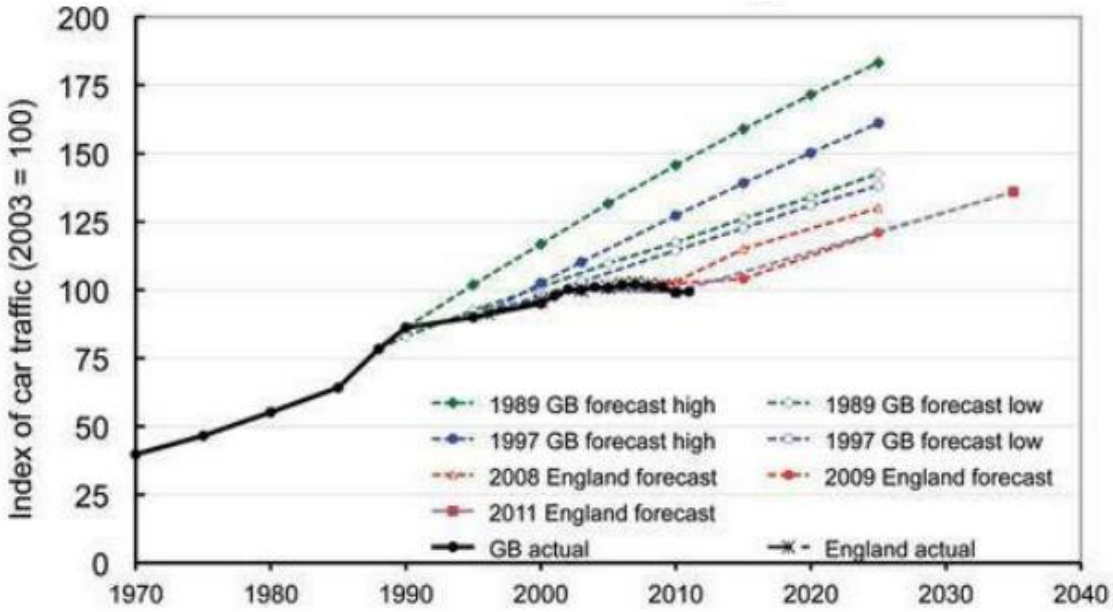
3.1 As noted above, the EMGM is a highway and public transport model. In common with most transport models, it adopts a 'predict and provide' approach, which perpetuates existing patterns and behaviours.

3.2 The EMGM does not take account of peak spreading or potential modal shift to active modes associated with worsening congestion. It does not take into account other behavioural change, such as increased car sharing or more working from home. Neither does it recognise that some congestion in select locations may be beneficial in influencing route choice and mode choice.

3.3 A critique of transport modelling is set out in a paper by David Milner of Create Streets, 'Computer Says Road' Computer-says-road-1.pdf (createstreets.com) (February 2022). The paper notes that multiple studies have found that building new road capacity does not achieve the goal of reducing congestion and is, instead, generating more journeys and more traffic. New capacity has a tendency to shift journeys from other types of (more sustainable) transport or replace virtual engagement, by making it easier to drive.

3.4 The paper argues that models rely on compound assumptions such as predictions of how people move around for decades into the future. They assume growth in car use, growth in car ownership and poor network conditions. They compound many assumptions over multiple decades and have repeatedly proved inaccurate, as can be seen by comparing the Department for Transport's own forecasts with actual results.

Figure 14 DFT Forecasts vs actual traffic growth



3.5 In addition, transport models focus on travel in the morning and evening peak period. However, commuting accounts for just 15 per cent of trips, with leisure (26 per cent) and shopping (19 per cent) being greater drivers of everyday travel. There is a danger that designing roads around peak travel will result in roads designed inefficiently for only short parts of the day, leaving large amounts of road capacity idle at other times. The convenience of commuting car drivers must be balanced against other factors, such as the benefits to the housing market and new jobs which growth can bring.

3.6 National comparators of congestion tend to give variable results depending on the methodology used. However, the National Infrastructure Commission undertook a relatively comprehensive piece of work to identify infrastructure requirements that included congestion data from Department for Transport published sources. (https://nic.org.uk/news/manchester-tops-traffic-congestion-league/). Outside of London, Nottingham is placed in 5th place, behind Manchester, Liverpool, Birmingham and Portsmouth& Southampton. Although this was published in 2018, it is probably the most reliable source, because since then traffic patterns have been impacted by covid, and the Councils are not aware of any post covid data.

3.7 The draft NPPF (2024) at Paragraph 112 and 113 recognises some of the weaknesses inherent in the current approach to planning for transport by advocating a vision led approach to promoting sustainable transport modes. It states that where assessing allocated sites, it should be ensured that "any significant impacts from development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree through a vision led approach." This is a significant departure from a predict and provide approach, towards what has been called 'decide and provide' or 'vision and validate'.

4 Conclusions

4.1 The housing and employment proposals of the GNSP will inevitably have transport impacts, including increasing congestion on the road network. Given the high levels of junctions operating at or close to capacity even without the GNSP, junction operation is significantly worsened by a relatively small increase in trips. Consequently, a large number of junctions are impacted by the GNSP proposals.

4.2 The transport modelling undertaken to support the GNSP gives an understanding of those impacts, and the proposed mitigation measures would provide a degree of improvement when comparing the position without the mitigation measures. However, the level of mitigation, at 28%, means there is significant unresolved congestion.

4.3 In order to explore whether the impacts can be mitigated further, the councils have commissioned additional modelling work. This will interrogate the model to determine the locations of greatest intervention need and the additional transport mitigation measures which are likely to have the greatest impact. The mitigation will then be refined, with specific consideration given to the assumptions underpinning mode choice in the model, opportunities to further enhance the already identified strategy and the need for additional interventions. This work is ongoing and is expected to report prior to the Plan being submitted for examination.

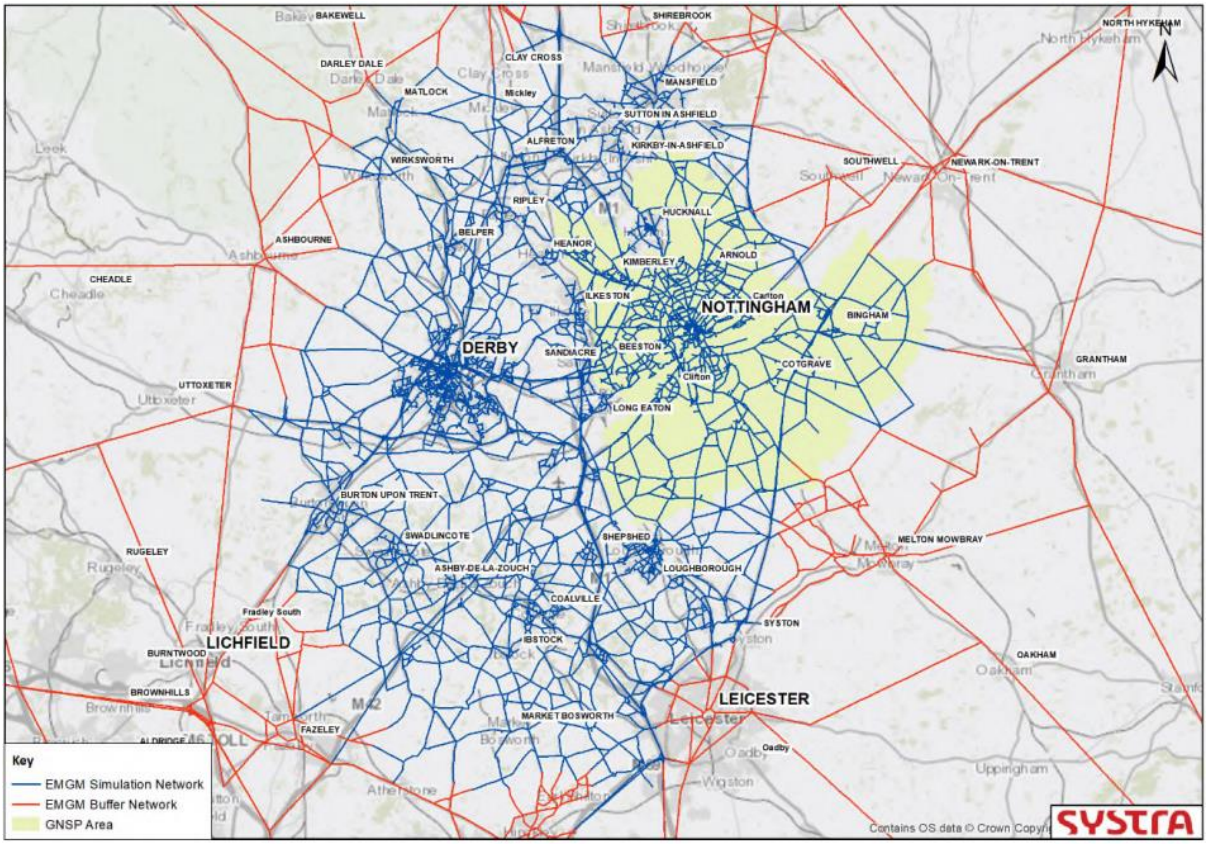
4.4 Notwithstanding the results of the further modelling, it is important to recognise that cities, by their very nature, experience congestion, and this is in part due to their success and growth, and so it will not be possible to fully mitigate congestion caused by the GNSP proposals. Department for Transport data shows that Nottingham's levels of congestion are measured as middle ranking in terms of the 10 main urban areas.

4.5 The fact that most of the development proposed in the GNSP is already committed through either planning permission or Local Plan allocation means that much of the growth associated with the GNSP is already 'baked in', and would likely be implemented without the GNSP, and therefore without any further strategic mitigation.

4.6 Equally, whilst models are useful tools in understanding potential transport impacts, they have significant limitations. They predict and provide based on current travel patterns and behaviours, when in reality predicted congestion will give rise to behavioural change, such as modal shift, changed travel times, avoided journeys etc which in themselves will reduce transport impacts.

4.7 A further conclusion of the modelling is that given existing congestion levels, the dispersed nature of the traffic impacts, and the level of background growth, apportioning mitigation measures to individual developments is problematic, particularly as many already have S106 agreements in place.

Appendix 1 Extent of East Midlands Gateway Model coverage



Appendix 2 Planning Status of GNSP Strategic Allocations

Strategic Allocations	Planning Status
Policy 19: Boots Site	Planning Permission
Policy 20: Field Farm	Planning Permission
Policy 21: Toton Strategic Location for Growth and Chetwynd Barracks	Existing Local Plan allocations (part)
Policy 22: Former Bennerley Coal Disposal Point	New allocation
Policy 23: Top Wighay Farm	Planning Permission (except for extension which is a new allocation)
Policy 24: Former Stanton Tip	Existing Local Plan allocation
Policy 25: Broad Marsh	New allocation
Policy 26: Melton Road	Planning Permission
Policy 27: Land North of Bingham	Planning Permission
Policy 28: Former RAF Newton	Planning Permission
Policy 29: Former Cotgrave Colliery	Planning Permission
Policy 30: South of Clifton	Planning Permission
Policy 31: East of Gamston	Existing Local Plan allocation
Policy 32: Ratcliffe on Soar Power Station	Planning Permission (Local Development Order)

Appendix 3 Transport Mitigation Measures

GNSP – Greater Nottingham Strategic Plan

LCWIP - Local Cycling and Walking Infrastructure Plan

SVD – Selective Vehicle Detection

BSIP – Bus Service Improvement Plan

NET – Nottingham Express Transit (tram)

EMCCA – East Midlands Combined County Authority

LTP – Local Transport Plan

Mitigation Measure	Status	Cost £million	Comment
Policy measure - Compact and Connected Neighbourhoods	Included in GNSP.	N/A	
South-West Orbital Cycling Corridor	Included in LCWIP. Not currently funded	£0.45 to £1.75 per km	Benchmarked against other schemes and DfT document “Typical Costs of Cycling Interventions” (2017) - cycle superhighway costs uplifted to 2023. Long sections of the A52 are currently unsuitable for cycle infrastructure. Creating a cycle route along the A52 would require retaining structures and additional infrastructure interventions to bypass links which are unsuitable for crossing movements.
East-West Cycle Corridor	Included in LCWIP. Largely complete.	£0.65 to £1.75 per km	Benchmarked against other schemes and DfT document “Typical Costs of Cycling

Mitigation Measure	Status	Cost £million	Comment
			Interventions" (2017) - cycle superhighway costs uplifted to 2023. Retaining and / or bridging structures will be required to widen the A52 corridor.
Policy measure - Active Travel Connections	Policy based intervention, delivered through site development.	N/A	Up to 10% cycle mode share at developments achieved by connecting sites to existing and proposed D2N2 walking and cycling routes.
Micro-mobility trials	Policy based intervention, delivered through site development.	£0.05 to £0.1	Costs highly dependent on a range of factors such as the number of units and type of micro-mobility chosen.
'Wheel and ride' facilities	Not currently programmed.	£3.00 to £9.00	12 anticipated at £25k to £75k per scheme NET locations: Clifton Centre, Wilford Lane, Beeston Centre, Bramcote Lane, Highbury Vale and Moor Bridge. National rail stations: Netherfield, Beeston, Attenborough, Ilkeston, Bulwell and Hucknall.
Increased bus service frequencies: Rushcliffe Villager, Nos 9,26,27,33, 141	Not currently programmed.	£1.88 to £2.58	New vehicle: • Euro VI diesel - £180,000 •Operating and fixed costs: • £800,000 - £1,500,000 per annum
Bus extensions and diversions East of Gamston, Gedling Colliery, Ravenshead, Waterside, RAF Newton Site, Teal Close, Toton Chetwynd Barracks and Ratcliffe on Soar Power Station.	Not currently programmed.	£2.24 to £2.94	New vehicle: • Euro VI diesel - £180,000 •Operating and fixed costs: • £800,000 - £1,500,000 per annum

Mitigation Measure	Status	Cost £million	Comment
Bus Priority Measures Clifton Boulevard and Middleton Boulevard (A52) to improve the route of buses 53 and 54.	Not currently programmed.	£0.425 to £0.85	SVD detects specific vehicle types and amends the signal staging / timings. Potential to include at 3 signalised junctions along 3.5km route. £300,000 to £600,000 Carriageway reallocation removes general traffic capacity in favour of public transport. Potential inbound only bus lane between Wollaton Road and A6200 Derby Road (1km). £125,000 to £250,000
Bus Priority Measures Bingham and Nottingham City Centre (Selective Vehicle Detection)	Completed for all junctions on Key corridors excl National Highways.	£1.4 to £2.8	Assumes SVD is implemented at all 14 major signalised junctions along 16km route between A52 Bingham Bypass / Grantham Road and A60 / Canal Street (Nottingham).
Bus Priority Measures (A60 Leapool to Sherwood Express Busway)	Included in City Region Sustainable Transport Settlement considerations in conjunction with Leapool Park and Ride site	£1.3 to £2.6	Assumes SVD is implemented at all 13 existing signalised junctions along the 6.5km route between A60 / Sherwood Rise and A60 / Ollerton Road junctions. Limited scope to create new bus lanes beyond existing lengths due to third party land constraints.
Bus Priority Measures A612 Daleside Road and Colwick Road Bus Priority.	Not currently programmed.	£0.725 to £1.7	Assumes SVD is implemented at all six signalised junctions along the 3.5km route between A612 / Pennyfoot Street (Nottingham) and A612 / Mile End Road (Colwick). SVD £600,000 to £1,200,000 Bus lane already provided between Colwick and A612 / Trent Lane roundabout.

Mitigation Measure	Status	Cost £million	Comment
			Potential for additional lengths of bus lane to west of Trent Lane on approach to Nottingham (reallocation of road space) over approx. 1km length. Potential for one-way (inbound) or two-way (inbound and outbound) bus lanes. One way £125,000 to £250,000 Two way £250,000 to £500,000
Bus Priority Measures A6011 Radcliffe Road, Gamston to A6520 Trent Bridge - Bus Priority.	Completed for all junctions on Key corridors excl National Highways.	£0.4 to £0.8	Assumes SVD is implemented at all four signalised junctions along the 2.5km route between the A52 Gamston Roundabout and Trent Bridge, via the A6011 Radcliffe Road. Limited scope to create new bus lanes beyond existing lengths due to third party land constraints.
Bus priority measures At developments in Clifton, including turning circles and bus gates. This could also include bus priority at A453 Crusader Roundabout.	Delivered by development.	N/A	Bus infrastructure within developments assumed to be delivered by third parties. Bus priority at Crusader Roundabout picked up by highway mitigation proposals at the junction.
Bus priority measures In Edwalton, dedicated bus-only access onto Musters Road (to north of site) and onwards to West Bridgford and Nottingham City Centre.	Delivered by development.	N/A	Bus infrastructure within developments assumed to be delivered by third parties.
Bus Priority Measures	Completed for all junctions on Key corridors excl National Highways.	£0.9 to £1.8	Assumes SVD is implemented at all nine signalised junctions along the 5.5km route between the A60 / A611 Hucknall Road in

Mitigation Measure	Status	Cost £million	Comment
A611 Hucknall Road bus priority measures between Nottingham and Mansfield.			the east and the A611 Hucknall Road / Bestwood Road in the west. Limited scope to create new bus lanes beyond existing lengths due to third party land constraints.
Bus Priority Measures A60 Nottingham Rail Station to West Bridgford bus priority measures.	Bus Service Improvement Plan.	£2	Cost estimate from BSIP
Bus Priority Measures Bus Rapid Transit corridor towards Eastwood along the A610 via Kimberley.	SVD completed for all junctions on Key corridors excl National Highways. Road space re-allocation not programmed.	£1.65 to £3.3	Assumes SVD is implemented at all four signalised junctions along the 10km route between the A610 / A608 Derby Road roundabout (Eastwood) and the A610 / Cinderhill Road roundabout. £400,00 to £800,000. Potential to reallocate nearside lane(s) of dual carriageway to bus lane in both directions with associated loss of general traffic capacity along the majority of the route. £1,250,000 to £2,500,000
Bus Priority Measures Further enhancement and bus priority for NCT service 50 to Teal Close and Waterside areas together with potential rerouting and bus priority along London Road and through the Cattle Market.	SVD completed for all junctions on Key corridors excl National Highways. Road space re-allocation not programmed.	£2.125 to £4.75	Assumes SVD is implemented at all 20 signalised junctions along the 10km route between A612 Manvers Street / Newark Street and Teal Close. £2,000,000 to £4,000,000. Potential for 1km of A612 bus lane to the west of Trent Lane on approach to Nottingham (reallocation of road space). Potential for one-way (inbound) or two-way (inbound and outbound) bus lanes. One way £125,000 to £250,000 Two way £250,000 to £500,000

Mitigation Measure	Status	Cost £million	Comment
Bus Priority Measures Further enhancement and bus priority for NCT service 45 which serves Gedling Colliery, with priority along Westdale Lane and Mapperley Top / Plains.	SVD completed for all junctions on Key corridors excl National Highways. Road space re-allocation not programmed	£1.025 to £2.3	Assumes SVD is implemented at all 20 signalised junctions along the 10km route between A612 Manvers Street / Newark Street and Teal Close. £900,000 to £1,800,000 Potential for 1km of A612 bus lane to the west of Trent Lane on approach to Nottingham (reallocation of road space). Potential for one-way (inbound) or two-way (inbound and outbound) bus lanes. One way £125,000 to £250,000 Two way £250,000 to £500,000
Public Transport Measures New Park and Ride sites East of West Bridgford (Gamston) accessed from the A52 / Radcliffe Road. Leapool, west of the A60, roundabout junction with A614 Ollerton Road.	EMCCA LTP	£11 to £17	Costs based on provision of a 1,000 space P&R site, approx. total area 35,000m2. Costs include allowance for surfacing, kerbs, passenger facilities and landscaping / drainage. Allowance made for junction amendments to create new site access. £5,500,000 to £8,500,000 per site
NET Extensions and improvements Eastern extension towards Gedling Extension through Fairham Pastures Extension north of Hucknall	EMCCA LTP	£180 to £420 £30 to £70 £75 to £150	Arup benchmarking against existing tram systems in Birmingham, Nottingham and Edinburgh. Eastern extension to Gedling approx. 6km, with assumed alignment travelling east from Trent Street (Nottingham Station) via Canal Street / A612 Lower Parliament Street / B686 Carlton Road / B686 Burton Road / Gedling Road / Main Road. Extension through Fairham Pastures approx. 1.0km to serve new development.

Mitigation Measure	Status	Cost £million	Comment
			Assumed length of extension to north of Hucknall approx. 2.5km from existing NET station to A611 / Annesley Road junction. Proposed alignment assumed to run on-road via Station Road, Torkard Way and Annesley Road.
Improvement to access to national rail Better transport interchanges at existing stations including active travel routes, bus interchange and parking facilities (including wheel and ride) at Attenborough, Netherfield and Carlton.	EMCCA LTP	£0.75 to £2.25	Interchange costs recognise constrained nature of sites, with limited opportunities for off-carriageway improvements without third party land. Costs allow for upgraded bus stops, cycle parking facilities and localised road reconfiguration. £250,000 to £750,000 per interchange.
Improvement to access to National Rail Upgrade of the Maid Marian Line to facilitate passenger services. Extension of the Robin Hood Line to Ollerton. Line speed improvements on the Castle Line to Newark. Additional services provision on the Poacher Line to Grantham.	All subject to Restoring your Railway funding bid	£12 to £19 £60 to £90 £18 £0.5 to £1	Maid Marian unpgrade: costs taken form 'Maid Marian Rail Extension Economic Impact Analysis' Ashfield District Council and Mansfield District Council (Feb 2020) and Ashfield District Council Strategic OutlineBusiness Case (2021). Robin Hood: Nottinghamshire County Council report to Transport and Highways Committee (2016) sense checked against estimates based on Camp Hill Line stations in Birmingham. Castle Line Speed Improvements: As reported in Midland Connect business case (2023). Poacher Line: Professional judgement. Assumes OpEx only.

Mitigation Measure	Status	Cost £million	Comment
Highway Measures Toton Link road	Outline Business Case. Not currently programmed.	£40	Two-lane single carriageway link road including bus priority or infrastructure for other sustainable modes, to join the A52 approx. 450m to the east of Bardills via a signalised junction to Stapleford Lane. As per Balfour Beatty costed scheme (July 2022).
Highway Measures Widening of approaches to Crusader roundabout to provide a third entry lane on both arms (as per the Clifton South SUE scheme) Realignment of both A453 approaches to the A453 / Green Lane junction to provide three through-lanes in both directions. Highway Measures Widening and realignment of the north-eastbound A453 approach to Farnborough Road roundabout to provide an additional through lane.	Not currently programmed.	£0.85 to £1.7	Assumes reconfiguration of highway would remain within 75m distance of respective junctions in both directions along A453. • Widening limited to areas of land within current highway boundary, i.e. no 3rd party land costs. SVD £100,000 to £200,000 Junction reconfiguration £750,000 to £1,500,000
Highway Measures Bramcote Island (A52) Signalisation of the remaining unsignalised arms of the junction.	Not currently programmed.	£0.5 to £1	Low cost based on signalisation of current priority arms, with minor amendments to existing junction layout to accommodate new signals. Higher cost assumes local widening / realignment on unsignalised approaches where possible or necessary, together with wider scale amendments to existing

Mitigation Measure	Status	Cost £million	Comment
			junction design to accommodate new signals.
Highway Measures A52 Corridor Widening of the A52 off-slips at the A52 Clifton Boulevard / Queens Drive junction, to provide additional capacity and / or bus priority lanes. Signalisation of the A52 Clifton Boulevard / Abbey Street roundabout to help provide bus priority on key approaches.	Not currently programmed.	£0.75 to £2.25	Variations in cost dependent on scale of off-slip widening and retaining structure / impact on existing culverts. Signalisation of the A52 Clifton Boulevard / Abbey Street roundabout dependent on requirement for realignment of circulatory carriageway and need for signals maintenance bay. Widening of slips £500,000 to £1,500,000 Signalisation £350,000 to £750,000
Highway Measures M1 Junction 24/24a	Local Development Order requirement and Transport for the East Midlands/Midlands Connect “Our Shared Vision for the East Midlands” priority, no current funding	N/A	Widening of the J24 bridge decks to enable the provision of additional circulatory lanes (helping to facilitate bus priority measures for the east-west links in particular). Scheme has been reflected in the modelling to represent additional capacity on the assumption that a scheme will be delivered in this location. Further work is required to develop a solution and therefore a cost estimate has not been provided.