Nuneaton and Bedworth Borough Council
Local Development Framework Borough Plan

Warwickshire County Council
Highways Agency

Strategic Transport Assessment – Addendum

August 2012

Warwickshire County Council

HIGHWAYS AGENCY

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1 Introduction

1.1 Background

1.1.1 This document forms the County Council's response on transport matters to the additional LDF scenarios requested to be undertaken by NBBC. This response is an Addendum to the submissions on transport which the County Council made as part of the February 2011 Strategic Transport Assessment for Nuneaton and Bedworth Borough Local Development Framework Borough Plan.

1.1.2 The County Council has prepared this document to form a key input to the decision making process regarding the levels of future housing and employment growth within the Borough over the next 16 years. It is recognised however that transport is only one of many important considerations in the planning process.

1.2 The Process

1.2.1 An iterative, staged approach is being adopted by the County Council in providing its advice to the Borough Council on the transport implications of the Borough Plan. It is envisaged that further timely input to the process will be made at the post preferred option and submission stages.

1.2.2 In parallel with this process, the County Council, Highways Agency and Borough Council are working closely with promoters of a number of potential development sites within the area. It is likely that this work will help:

(i) Identify the key transport infrastructure and services which will be needed to support the Borough Plan proposals, in advance of the Independent Examination; and

(ii) Inform the position of the County Council and the Highways Agency when planning applications and supporting Transport Assessments (TAs) come forward for these sites in due course.

2 Option Assessment

2.1 Future Growth in Nuneaton and Bedworth Borough

Introduction

2.1.1 As described below, the Borough Council has provided details of the required levels of housing and employment growth that could take place over the next 15 years. In order for the County Council to inform this process, it has been necessary to make some assumptions regarding what broad geographical areas across the Borough could come forward to deliver this growth. In conjunction with officers from the Borough Council, a number of sites which were identified in the Strategic Housing Land Availability Assessment (SHLAA) have been used as the basis of a number of option tests. By inclusion in this piece of work, no implication should be taken that these are the preferred sites for future development within the Borough. Without making some assumptions about the location of development, it is extremely difficult to come to any meaningful conclusions regarding the likely impact on the transport network of one growth scenario compared to another.

Development Scenarios and Assumptions

Levels of Growth and Location of Sites

2.1.2 NBBC requested a specific level of growth to be assessed in terms of high level highway impact and accessibility to sites. Three additional scenarios (with various combinations of potential housing sites) were tested and analysed and the results are discussed in this addendum report of, a further 2 tests were undertaken to investigate the effectiveness of major mitigation options. NBBC provided potential broad locations for residential development and gave specific locations to be used in all scenarios for commercial development and advised on the capacity of these sites. Suitable access points onto the highway network were identified by the Project Board. Further details on the scenarios tested are shown in Table 3.1 below (page 15).

2.1.3 All scenarios assume a quantum of growth equating to 7,900 housing units (dependent on selected sites) and 100 Ha of employment land with a 40% build out assumption, this equated to 40 Ha of employment. The employment land use class split was defined as;

- B1 13%
- B2 28%
- B8 59%

2.1.4 As a second stage, a sensitivity test was undertaken to understand the impacts of developments that already have planning permission and are committed developments but are not included in the base line traffic flows. This can be found in the original STA report

Trip Rates

2.1.5 The trip rates adopted for each housing and employment land use are shown in Appendix C of the original STA. The trip rates which have been adopted are for strategic modelling use only. Once the actual characteristics of each site are more certain more detailed analysis and identification of suitable trip rates will be required for microsimulation modelling purposes. These trip rates remain the same as used in the original STA report.

Prerequisites for site delivery

2.1.6 Where it is considered that an internal link road through the site would be required as a distributor road for development site trips and as a route to take external traffic, these have been included as a prerequisite and are taken into account in the CITEware modelling.

	Parcel			Scenario 1	Scenario 2	Scenario 3
Housing Sites	PDA 1			1749	1749	1749
	PDA 2			1571	1571	1571
	WCC Site			*1974*	*1974*	*1974*
	Weddington Appeal Site			*326*	*326*	*326*
	Other Urban Sites			*2280*	*2280*	*2280*
	Total			***7900***	***7900***	***7900***
	Emp Site	Has available*	Has(40% build out) available			
Employment Sites	WB/01/08	2.02	0.81	0.81	0.81	0.81
	AR/13/08h	6.55	2.62	2.62	2.62	2.62
	AR/13/08i	9.41	3.77	3.77	3.77	3.77
	AR/13/08j	16.73	6.69	6.69	6.69	6.69
	AR/13/08k	27.24	10.9	10.9	10.9	
	HE/01/08	20.87	8.35	8.35		
	EX/19/08	21.07	8.43	8.43	8.43	8.43
	P11	3.47	1.39	1.39	1.39	1.39
	P04	4.19	1.68	1.68	1.68	1.68
	P27	0.88	0.35	0.35	0.35	0.35
	P03	1.71	0.68	0.68	0.68	0.68
	PDA2	20.87-48.11	8.35-19.25		8.35	19.25
	Total	***135.02-162.26***	***54.01-64.90***	***45.67***	***45.67***	***45.67***

Table 2.1: Development Scenarios and Site
(*note that 114.15 Has required equating to 45.67 Has buildout)

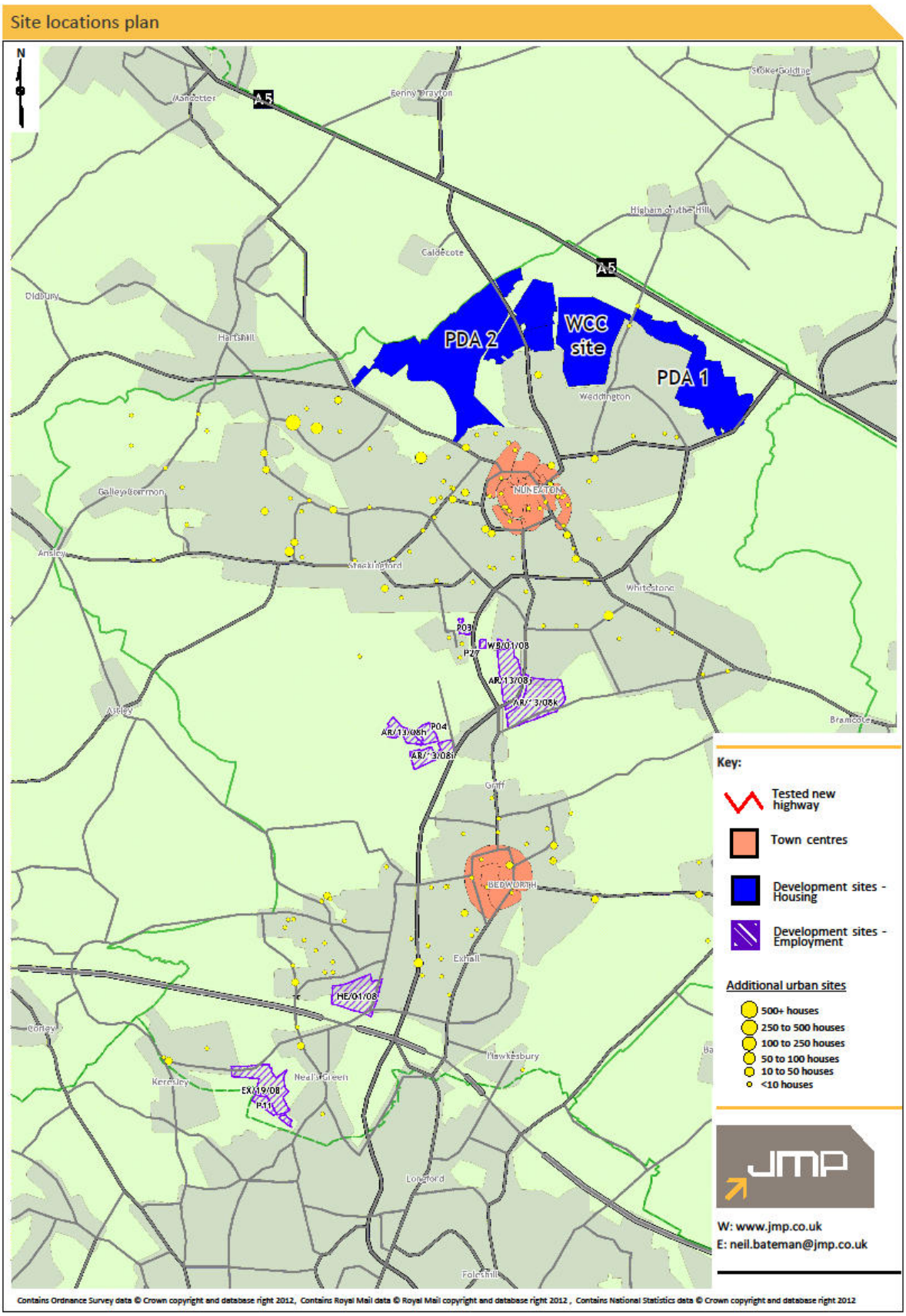


Figure 2.1: Potential Development Areas in Additional Test Scenarios (Housing & Employment)

Strategic Modelling Methodology with CITEware

2.1.7 The test year for all assessments was 2028. AM morning peak (0800-0900) and PM evening peak (1700-1800) have been adopted as the most suitable time periods to test as they represent the worst case in terms of traffic congestion issues on the road network with Nuneaton and Bedworth Borough.

2.1.8 The highway impact relating to each scenario was assessed using JMP's CITEware strategic modelling software. This software was developed with input from WCC and has been tailored for our use through the inclusion of surveyed traffic flows across the entire strategic network and observed vehicle speeds derived from DfT NI167 data. The software also utilises census journey to work data, OS mapping and DfTs NTM for the calculation of growth factors. The model has been used by a number of other local authorities and the Highways Agency. WCC are satisfied that this model is the most suitable tool for the kind of high level strategic modelling required at this stage. Further details on how CITEware works can be found in Appendix B of the original STA.

2.1.9 It should be noted that this is a strategic modelling exercise. The CITEware model calculates the routes chosen by vehicles based on a time and distance calculation. The time taken to travel along any given link is informed by DfT NI167 data and is therefore based on the delays/speed of travel experienced during 2008/9. Route choice during the 2028 test year may differ as speed of travel along various links may alter as a result of increased congestion and delay. The model cannot take account of the delay caused by the additional traffic on the network nor can it take account of infrastructure changes improving junction capacity (ne links can be modelled) that may be associated with each scenario tested. The CITEware model runs an "All or Nothing" assignment which means that the model will work out the least cost route from the origin of the trip to the development site (or vice versa), there is no rerouting of traffic due to increased levels of congestion for either the baseline traffic flows or the development related traffic flows. Therefore a logic check is required in the interpretation of the CITEware output plots. This involved identifying areas where it is known that capacity is restricted (i.e a town centre) and where there are few options to improve the capacity. It can be expected that a proportion of the development site vehicles would in reality reroute onto more appropriate routes, for example the M69/M6 corridor.

2.1.10 It should also be noted that the outputs from CITEware are considered to be a worst case scenario. The profile of development related trips is based on current mode share and time period choice. Current trends suggest that by 2028 it is inevitable that there will be a higher degree of modal shift onto more sustainable means of transport and commuters are likely retime their journeys in response to the higher levels of congestion on the network (e.g. commuting between 0700-0800 rather than the current peak period). There is evidence that this behaviour is already happening however it is difficult to protract this evidence to provide reliable 15+ year forecasts. Therefore the most suitable approach is to use current patterns of travel and except that the model is providing a robust worst case scenario.

2.1.11 The original STA considers the impact of developments that have already achieved a committed development planning status. The impact of these developments will be in addition to that of the strategic sites for housing and employment. This should in theory become the new base situation from which to measure the impact of developments. However, to do this would mask the true impact of the SHLAA and strategic employment development sites and would not recognise the changes to the road network associated with committed development mitigation. Therefore the fairest way to deal with this issue is to apply NTM growth factors(see 3.3.13) to the base flows and then measure the differences between factored flows and factored flows + strategic developments, whilst also keeping in mind the area specific network issues associated with committed developments. This issue is raised in Chapter 4 of the original STA.

2.1.12 This type of modelling provides evidence to be used in a strategic sift of scenarios and sites, and highlights where possible highway infrastructure improvements are required. Once this has been achieved a more detailed modelling exercise should be undertaken using microsimulation modelling to ascertain with more confidence the actual impact on the highway network, thoroughly testing mitigation options and attributing cost to developments. This issue is discussed further in Chapter 6.

2.1.13 Three methodologies have been adopted in the analysis of the CITEware outputs and should be used in conjunction when formulating an opinion on the impact of a scenario on the highway network.

2.1.14 The first methodology involved a simple assessment of the overall increase in 2-way traffic flow on all links within the model relating to each development scenario. The outputs for this method are provided in development traffic plots using the following banding;

- 0-50 additional vehicles
- 50-100 additional vehicles
- 100-250 additional vehicles
- 250-500 additional vehicles

- 500-1000 additional vehicles
- 1000+ additional vehicles

2.1.15 In addition to the analysis described above further analysis was undertaken to assess;

- the increase in traffic movements along key routes between towns and the HA Strategic Road Network (SRN);
- the additional numbers of vehicles travelling through, to or within town centres; and
- the additional numbers of vehicles travelling through Air Quality Management Areas (AQMAs).

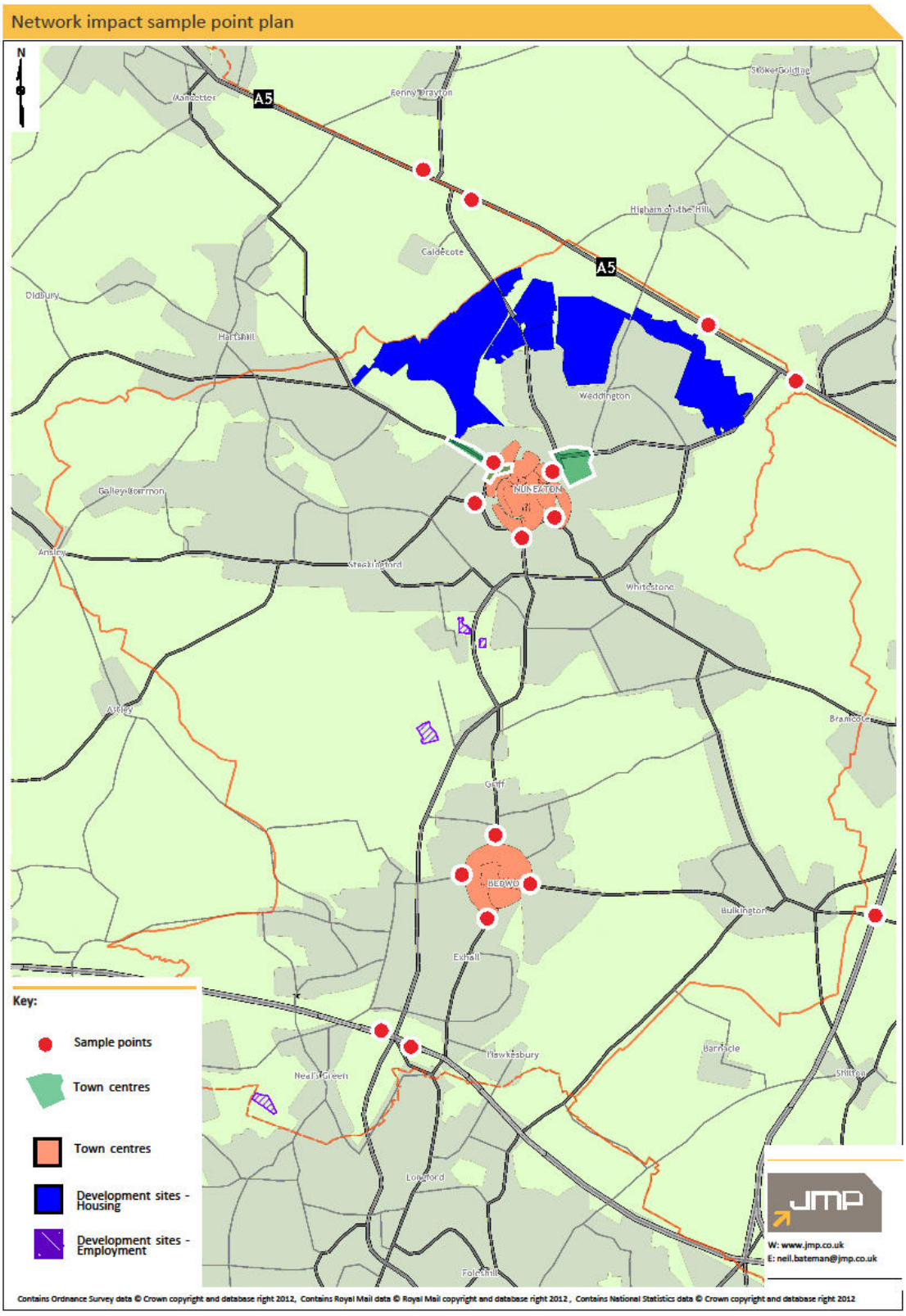


Figure 2.2: Network Impact Sample Points

2.1.16 This methodology provides an easily understood output in a tabular form. Additional development traffic in 2028 has been provided in absolute generation of additional vehicle trips on the network and percentage increase. Base traffic flows were factored according to DfTs NTM forecasting software, standard modelling practice. The growth rates used for this process are in Appendix D of the original STA.

2.1.17 It should be noted that all analysis has been undertaken using 2-way flow as is typical for a strategic modelling exercise of this nature. Trips originating from the development zones will have tidal flows where in the AM a housing development will be producing many more trips than it will be attracting and vice versa for the PM period. The opposite of this will be true for an employment development site. It should be recognised that any mitigation solutions identified should be able to accommodate the tidal nature of the trips associated with the developments and the baseline traffic conditions.

2.1.18 An analysis of outputs is provided in Chapter 3. CITEware outputs are provided in the Appendices

2.2 Identification and Costing of Transport Interventions

2.2.1 Identification of key transport interventions was based on expert analysis of the modelling outputs through the project board,. Transport interventions were identified in terms of provision of sustainable transport to encourage modal shift and key road network schemes to improve capacity.

2.2.2 Broad approximations of costs have been provided based on suitable mitigation schemes discussed with the project board. These can only be considered as indicative costs. The most suitable mitigation measures will be derived though mitigation option testing using microsimulation modelling. This can only be undertaken once a suitable set of sites and growth level have been decided.

3 Results of Option Assessment

3.1 Introduction to Strategic Modelling

3.1.1 As discussed in the methodology in Chapter 3, all assessments provide a comparison between NTM 2028 factored base flows and NTM 2028 factored base flows + strategic development site traffic flows. Committed developments are considered separately and should be considered when looking at area specific traffic impact. This exercise was to determine the impact of traffic relating to the identified broad location of sites and a comparative difference combinations of sites. As such, inclusion of committed developments would mask the full impact of the strategic development sites. NTM growth factors will take into account the growth related to the committed developments but it will not be area specific. As discussed, Stage 2 of the assessment included analysis of committed development sites.

3.1.2 On the whole AM and PM plots are very similar as the distribution for PM trips is a reversal of the AM journey to work data taken from the National Census. There will be slight difference in trip rates and more significant difference in delays on certain road links (informing route choice) and for this reason PM plots are provided in the Appendices. The following comments relate to AM and PM period traffic impacts, where there is any significant difference between AM and PM outputs this will be noted.

3.1.3 Analysis of results covers the following;

Stage 1

a) Development Traffic Plots – interpretation of the 2 way additional development traffic flow plots over the network.
b) Comparative Indicators - interpretation of Table 3.1 and 3.2 which highlight additional development traffic on key routes, within town centres and within AQMAs in terms of absolute and percentage increase.
c) Impact on SRN – interpretation of all outputs relevant to the impact on the Highways Agency Strategic Road Network.

	Base Year 2011		Base Year 2028		Scenario 1		Scenario 2		Scenario 2 RR		Scenario 3		Scenario 3 RR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Town centres														
Nuneaton	9711	10171	10881	11573	1648	1824	1380	1542	1457	1618	1359	1516	1431	1587
Bedworth	3690	3869	4399	4692	234	173	161	136	199	155	145	111	180	130
Trunk														
HA links - A5	3400	3390	3929	3951	944	957	775	758	784	766	843	804	861	819
HA links - M6	12748	12141	13020	12455	365	347	347	334	348	335	328	322	330	323
HA links - M69	5537	5320	5606	5397	69	69	35	33	42	40	41	37	47	43
AQMA areas														
AQMA 1 - Leicester Rd Gyratory, Nuneaton	1799	1854	2302	2450	870	936	878	899	749	781	978	965	835	840
AQMA 2 - Midland Road to Corporation Street, Nuneaton	1353	1307	1473	1448	162	176	137	150	137	150	135	147	135	148

Table 3.1: Absolute increase in 2028 development related traffic on selected routes and areas

	Base Year 2028		Scenario 1		Scenario 2		Scenario 2 RR		Scenario 3		Scenario 3 RR	
	AM	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Town centres												
Nuneaton	12%	14%	17%	18%	14%	15%	15%	16%	14%	15%	15%	16%
Bedworth	19%	21%	6%	4%	4%	4%	5%	4%	4%	3%	5%	3%
Trunk												
HA links - A5	16%	17%	28%	28%	23%	22%	23%	23%	25%	24%	25%	24%
HA links - M6	2%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
HA links - M69	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Total												
AQMA areas	28%	32%	48%	50%	49%	48%	42%	42%	54%	52%	46%	45%
AQMA 1 - Leicester Rd Gyratory, Nuneaton	28%	32%	48%	50%	49%	48%	42%	42%	54%	52%	46%	45%
AQMA 2 - Midland Road to Corporation Street, Nuneaton	9%	11%	12%	13%	10%	11%	10%	11%	10%	11%	10%	11%

Table 3.2: Percentage increase in 2028 development related traffic on selected routes and areas

3.2 Stage 1 Strategic Modelling – Growth Scenarios

Scenario 1

3.2.1 This development option allocates developments at PDA 1 & 2 plus the WCC site and Wedding appeal site with a total of 7,900 housing units plus 114 Ha of employment land (46Ha at 40% build out) around Bermuda and M6. Employment site locations remain the same as in the original STA option testing

- PDA 1 – 1749 houses
- PDA 2 – 1571 houses
- WCC site – 1974 houses
- Weddington Appeal Site – 326 houses
- Remaining housing allocated to urban sites – 2280

Development Traffic Plots

3.2.2 As with all additional options to be tested, this scenario places the majority of housing north of Nuneaton whilst the majority of employment sites are dispersed centrally between Nuneaton and Bedworth around Bermuda area. Therefore in addition to the significant pressure experienced throughout the network local to the development there is also a strong north-south draw to the new proposed employment and existing employment in Coventry. This can be clearly seen in the flow plots where the greatest impact of all scenarios is experienced in the Nuneaton town centre and radial routes across Nuneaton urban area destined for the A444 to Coventry. As the majority of proposed employment developments are located in close proximity to each other, appropriate mitigation can be focussed. However, with housing developments concentrated to the north of Nuneaton and a strong north-south draw for employment it will be more difficult to focus suitable mitigation.

3.2.3 With PDA2 and the larger urban sites situated to the north of Nuneaton, there is a significant demand to and from Coventry and the new employment in the south. Tunnel Rd/Astley Lane/Dark Lane is being used as an alternative route to get to these areas as an alternative to travelling through the town centre which is already nearing capacity. This route is not of a sufficient standard to accommodate these levels of traffic. Capacity constraints mean that it is likely a significant proportion of this traffic will actually use the A444 putting further pressure on routes closer to Nuneaton town centre.

3.2.4 Manor Court Road/ Croft Rd/Greenmoor Rd/College St route is being heavily used by traffic associated with PDA 2 and trying to access the A444 and employment in the south. This area is already experiences congestion issues under current traffic conditions

3.2.5 Similarly, with PDA 1 and the WCC site situated to the north east there is a strong draw for traffic along the A4254 to the A444 and taking the alternative route through the town centre. Donnithorne Ave also comes under increasing pressure as an alternative route to the A4254. There is also further rerouting of traffic via Crown Hill Road and Bulkington Lane in order to to access employment in Bedworth and Coventry.

3.2.6 The A4254 is under significant pressure, as traffic from the northern sites travels towards the employment in Coventry. 500-1000 additional vehicles will put additional demands on this route and further pressure on Coton Arches junction as they make their way to the A444. College St roundabout and George Eliot Hospital roundabout also come under significant pressure. There will be a requirement to provide significant mitigation packages in these areas.

3.2.7 A new road link providing a Northern Relief Road which joins the B4114 Tuttle Hill with the A47 Longshoot is a feature of all tests. The Northern Relief Road will be a prerequisite for the delivery of these northern sites especially when the whole focus of housing developments is to the north of Nuneaton. This Strategic modelling exercise that 1000+ vehicles would use this route. This figure accounts for development traffic only, this type of modelling only provides route choice to development traffic, all non-development traffic is assumed to use the existing network. Therefore in reality there will be additional demand for east-west and west east movements that currently travel through the town centre and AQMAs. It is also of note that the inclusion of a specific Northern Relief Road has halved the impact when compared to Scenario 2 in the original STA which also located similar volumes of housing to the north of Nuneaton. However the impact still equates to additional 50% rise in flow on top of 2028 growthed traffic.

3.2.8 The largest impact on the SRN is experienced on the A5 link between Higham roundabout and Dodwells roundabout. Although mitigation associated with committed developments at MIRA do provide additional capacity, this will be in no way sufficient to accommodate an additional 500-1000 two-way vehicle trips during the peak hour.

Comparative Indicators

3.2.9 Nuneaton town centre experiences an additional 17-18% growth in traffic flow in the AM and PM peak. This equates to approximately 1640-1820 additional vehicles on the route during the peak hours. Bedworth town centre experiences 4-6%% extra vehicles in the AM and PM peak. This equates to approximately 173-234 additional vehicles on the route during the peak hours.

3.2.10 AQMA1 (Leicester Rd Gyratory) experiences an additional 48-50% vehicles in the AM and PM peak. This equates to approximately 870-940 additional vehicles on the route during the peak hours. This would be considered a very significant impact and would certainly be detrimental to the AQMA. Reductions in impact over previous STA tests is due to the introduction of the Northern Relief Road. IIt should be notedr, capacity constraints are likely to cause rerouting and therefore impact may in reality be less (however may actually be greater in AQMA2). AQMA2 (Midland Rd Area) experiences an additional 12-13% extra vehicles in the AM and PM peak. This equates to approximately 160-180 additional vehicles on the route during the peak hours.

Impact on SRN

3.2.11 The A5 sample points experience approximately 28% increase in flow, approximately 944-957 vehicle additional 2 way flow. This option consider similar quantum of development and locations as the previous Scenario 2 from the original STA. However with the introduction of the Northern Relief road through the sites the impact on the A5 decreases (previously 31-33%)

3.2.12 The M6 experiences 3% increase in flow, approximately 335-370 vehicle additional 2 way flow.

3.2.13 The M69 experiences 1% increase in flow, approximately 70 vehicle additional 2 way flow.

Scenario 2

3.2.14 This development option allocates development Sites in the same locations as scenario 1 with the exception of a slight change to the location of employment sites which involves the removal of site HE/01/08 and allocation of 8.35 Ha of employment within PDA 2.

Development Traffic Plots

3.2.15 The results of the option are similar to scenario 1. As with all assessments, the greatest impacts are in close proximity to the sites. As most sites are dispersed centrally between Nuneaton and Bedworth around Bermuda area, significant pressure is experienced throughout the local network especially along the A444 to Coventry. However it appears that Nuneaton town centre experiences far less impact due to the location of housing and the employment draw of Coventry and the new employment around Bermuda.

3.2.16 The main differences are slightly less impact on routes heading to employment in the south. With the A4254 experiencing less impact than scenario 1 as do the alternative routes. Similarly rural routes through Astley and Ansley experience less impact. However the impacts in these areas should still be considered to be significant

Comparative Indicators

3.2.17 Nuneaton town centre experiences an additional 14-15% growth in traffic flow in the AM and PM peak. This equates to approximately 1380-1540 additional vehicles in the area during the peak hours. Bedworth town centre also experiences a 4% extra vehicles in the AM and PM peak. This equates to approximately 140-160 additional vehicles in the area during the peak hours.

3.2.18 AQMA1 (Leicester Rd Gyratory) experiences an additional 48-49% vehicles in the AM and PM peak. This equates to approximately 880-900 additional vehicles in the area during the peak hours. This would be considered a very significant impact and would certainly be detrimental to the AQMA. However, it is clear that this demand on the network far exceeds the capacity of the network. Capacity constraints are likely to cause rerouting and therefore impact will in reality be less (however may actually be greater in AQMA2). AQMA2 (Midland Rd Area) experiences an additional 10-11% extra vehicles in the AM and PM peak. This equates to approximately 130-140 additional vehicles on the route during the peak hours.

Impact on SRN

3.2.19 The A5 experience 22-23%% increase in flow, approximately 760-770 vehicle additional 2 way flow. As mentioned previously, the reduction in impact over previous similar tests is attributable to the Northern Relief Rd and in this case, the relocation of some employment to within the northern sites.

3.2.20 The M6 experiences 3% increase in flow, approximately 330-350 vehicle additional 2 way flow.

3.2.21 The M69 experiences 1% increase in flow, approximately 30-40 vehicle additional 2 way flow.

Scenario 3

3.2.22 This development option allocates development Sites in the same locations as scenario 1 with the exception of a slight change to the location of employment sites which involves the removal of sites HE/01/08 and AR/13/08k andallocation of 19.25 Ha of employment within PDA 2.

Development Traffic Plots

3.2.23 Again, the results of Scenario 3 are similar to Scenario 1 and 2. main differences are slightly less impact on routes heading to employment in the south due to the allocation of 19.25 Ha of employment . With the A4254 experiencing less impact than Scenario 1 & 2 as do the alternative routes. Similarly rural routes through Astley and Ansley experience less impact. However the impacts in these areas should still be considered to be significant.

Comparative Indicators

3.2.24 Nuneaton town centre experiences 14-15% additional vehicles in the AM and PM peak. This equates to approximately 1359-1516 additional vehicles on the route during the peak hours. Bedworth town centre experiences an additional 3-4% extra vehicles in the AM and PM peak. This equates to approximately 110-150 additional vehicles on the route during the peak hours.

3.2.25 AQMA1 (Leicester Rd Gyratory) experiences an additional 52-54% vehicles in the AM and PM peak. This equates to approximately 970additional vehicles on the route during the peak hours. AQMA2 (Midland Rd Area) experiences an additional 10-11% extra vehicles in the AM and PM peak. This equates to approximately 50 additional vehicles on the route during the peak hours.

Impact on SRN

3.2.26 The A5 experiences 24-25% increase in flow, approximately 800-840 vehicle additional 2 way flow.

3.2.27 The M6 experiences 3% increase in flow, approximately 320-330 vehicle additional 2 way flow.

3.2.28 The M69 experiences 1% increase in flow, approximately 40 vehicle additional 2 way flow.

Scenarios 2 and 3 with Eastern Relief Road (RR)

3.2.29 Due to the very significant pressure experienced on routes travelling from the housing sites in the north to the proposed employment sites and employment attractors in Coventry, an option which considers an eastern relief road was processed through CITEware in order to look at the congestion relief.

3.2.30 The alignment of this option is indicative (feasibility studies have not been undertaken) and further detailed modelling is required to fully understand the congestion relief possibilities as CITEware will not account for the redistribution of traffic already on the network. Only development associated trips will use the route in this analysis.

3.2.31 The provision of this route provides significant congestion relief in the following areas;

- the western rural routes (which may in relity also use congested town centre routes);
- Manor Court Rd/Greenmoor Rd (a very congested route already);
- The A4254 corridor (under significant pressure without mitigation);and
- reduces traffic though AQMA1 by up to 8% (this only considers development traffic a sigbnificant proportion of background traffic would also reassign therefore accruing much greater benefits).

Stage 1 General Comments

3.2.32 It is worth noting that certain routes do not highlight significant pressure where one might expect to see an impact, this is due to the congestion that already exists on the network. A good example of this is the Roanne Ringway. As a result, pressure is put on alternative routes as drivers attempt to find the least cost route to their destination. Therefore knowledge of congested routes needs to be used in conjunction to these plots to ascertain the most appropriate location and nature of mitigation. Appendix A of the original STA shows outputs from the DfT Congestion Indicator data and provides a good guide to the most congested routes in the district – CITEware also utilises this data, hence the congestion avoiding travel behaviour.

3.2.33 It should also be noted that CITEware is a strategic model and does not understand when a road reaches capacity and therefore routing is not based on capacity of a route. Routing is based on time and distance, time of travel is informed by observed DfT Congested Indicator Data and the model does not recalculate based on the additional traffic as a result of the developments. Therefore the model may sometimes show too much traffic on certain routes. In reality a number of these routes will reach capacity and trips would divert to alternative routes, re-time or change mode of travel.

3.2.34 The general routing and distribution assumptions are robust but these comments should be kept in mind when interpreting the impact of the results.

3.2.35 More detailed modelling should be undertaken once there is more certainty over the actual location of sites.

3.3 Committed Developments

3.3.1 The impact on the road network relating to committed development and background growth up to 2028 should be considered to fully understand the combined impact of SHLAA and committed development sites on the road network. Appendix F within the original STA highlights the impact of these developments in terms of additional development traffic flow on the road network.

3.3.2 The impact of the committed developments and general background growth up to 2028 is very significant. This is not unexpected as substantial committed developments including MIRA are accounted for.

3.3.3 However, it should be recognised that these outputs are absolute worst case. Strategic trip rates used in throughout this study are based on current trip rates. As road networks become more congested it is highly likely that these trip rates will alter to account for trip re-timing, modal shift and other sustainable measures such as home working.

3.3.4 Modal shift when encouraged by comprehensive sustainable infrastructure and supporting policies can achieve a 15%-20% reduction in travel.

3.3.5 Nuneaton and Bedworth automatic traffic monitors shows clear evidence of peak spreading over the last 10 years. This is likely to be a result of existing capacity constraints on the network. There is no reason to believe that this trend will cease, thus further reducing the future impact of development through time period choice.

3.3.6 Routing of traffic is based on current congestion observations. Therefore drivers may attempt to take alternative routes to avoid existing congestion. However, the model run will not take account of the additional pressure put on this alternative route and then revert trips to the original congested route. This type of behaviour will be modelled in greater detail at a later stage, using a dynamic assignment microsimulation model which will take into account junction delay and driver behaviour to inform route choice more accurately.

3.3.7 Another consideration is that these impacts assume that economic conditions are good and costs of motoring do not escalate. In recent years there has been 3-4% negative traffic growth. With uncertainty about the future of economies, the supply of fuel and rising insurance premiums the level of background traffic and demands for use of the highway by car based trips may not be as large as expected.

3.3.8 When identifying mitigation strategies, only those impacts related specifically to proposed developments can reasonably be expected to be mitigated. Therefore, it is worth remembering the locations where the background growth is having an impact, but not to expect current or future congestion issues to be solved through development. However certain mitigation strategies can actually benefit the network as a whole. Some committed developments and the future LDF proposals will be providing their own network mitigation which may have positive externalities for other road users. A good example of this is MIRA. A substantial mitigation strategy is proposed which provides additional capacity which exceeds the development's mitigation requirements. This may make the A5 a more desirable route. The mitigation package has not been accounted for in these model runs as congestion on the network is based on current observations. These mitigation strategies will be accounted for in the more detailed microsimulation modelling.

3.4 Further Work

3.4.1 It should be noted that this is a strategic assessment of the impact on the road network. Detailed operation of junctions has not been considered. Comparisons have been made against existing peak hour traffic flows and no assessment of latent capacity on routes which may be utilised has been made. The effects of modal choice, time period choice and other measure that influence travel behaviour have not been considered. To make a more informed assessment which considers all these issues it will be necessary to carry out additional modelling work using WCC microsimulation S-Paramics models which cover the Nuneaton and Bedworth areas. This type of detailed modelling can be undertaken when there is more certainty over the level of growth and the options for locations of sites have been limited.

4 Transport Interventions

4.1 Introduction

4.1.1 Identification of key transport interventions to mitigate the traffic impact relating to sites/scenarios within the original STA was based on expert analysis of the modelling outputs. A project board which included senior transport planning and development control officers from WCC and senior planners from NBBC, HA and JMP (HA consultants) was set up to interpret the modelling outputs and identify potential mitigation solutions. These interventions have been review and amended in order to mitigate the impact of the latest set of sites tested. Transport interventions were identified in terms of provision of sustainable transport to encourage modal shift and key road network schemes to improve capacity.

4.1.2 Key transport interventions were identified to mitigate development scenario traffic impact only. Committed and background growth mitigation have not been considered to the same level. Mitigation requirements for committed developments should have already been identified as part of the planning process.

4.1.3 A Community Infrastructure Levy (CIL) type charging scheme may be required to ensure that cumulative impacts of future development can be mitigated (i.e. no single development may trigger the requirement for a mitigation scheme, however, combined impact may trigger this need and therefore a charging structure may be required). This issue is covered in more detail in Chapter 5.

4.1.4 The mitigation described in this chapter does not include the requirements for site accesses. Position of site accesses is important and can influence the mitigation required.

4.1.5 It should be noted that mitigation requirements are based on professional opinion following interrogation of the output from the strategic modelling exercises. To fully understand the impact of the developments and the mitigation requirements, an in depth microsimulation modelling study would be required which would include all committed developments and schemes, would take account of time period choice and modal shift and would test a series of mitigation options for a development scenario. This kind of study is not possible until there is more certainty over the location and size of sites for growth.

4.1.6 The costs identified for each scheme are indicative and are based solely on professional opinion and experience of similar types of infrastructure delivery. Once a more detailed microsimulation modelling exercise has been undertaken, the nature and costs associated with mitigation strategies can be more accurately assessed. Although efforts have been made to provide some contingency within the cost estimates, it should be noted that the location of utilities and acquisition of non-highway or non-developer owned land could significantly alter some of the estimated costs.

4.1.7 The mitigation schemes listed include both site specific and area wide interventions. There will be derived benefits for public transport through the delivery of network interventions that aid the free flow of traffic on the network. In addition to this a number of sustainable transport schemes are listed which should complement the Travel Plans for each development. The mitigation schemes described are for major capital schemes and do not include minor schemes such as bus shelter provision, footpaths and pedestrian crossing facilities, nor do they include revenue based schemes secured through S106 such as provision of additional bus services.

4.1.8 Where a new bus service is required to serve a site or cluster of sites approximately £800,000 contribution over 5 years would be required to deliver a 15 minute bus service. At certain sites there may be opportunity to make minor diversions to existing routes subject to the agreement of bus service providers and will also incur costs. Further work would be required to ascertain the actual bus service provision for each individual site. This work can be undertaken once there is more certainty over the exact location of sites and the level of growth adopted.

4.1.9 Where development sites are clustered it would be possible to achieve a critical mass that enables greater mitigation possibilities. This is especially true in the provision of sustainable travel infrastructure. Although the usual approach is to ensure that the highway network experiences nil detriment, some of the more major mitigation solutions may actually accrue benefits for the wider network. However, it is inevitable that some areas of the network will experience additional congestion issues as a result of all growth levels.

4.1.10 A number of the mitigation proposals should be considered as a prerequisite for certain sites. For example, the northern sites would require a link road through the sites linking A47 to the B4114. This link would be necessary as a distributor road but will also give alternative routes for those travelling from west Nuneaton to the new and existing employment in the Bermuda area.

4.2 The Transport Strategy

4.2.1 The following rationale underpins the transport strategy which the County Council believes is necessary to support the objectives of the LDF Core Strategy and the delivery of development through the various scenarios for development locations provided by NBBC:

- Maximise the use of public transport to meet new travel demand for both short and medium/longer distance journeys;
- Maximise the overall number of trips which can be made on foot and by bike;
- Ensure that development does not generate significant numbers of car trips through town centres and in surrounding communities; and
- Minimise the need for significant new highway infrastructure, unless it is essential.

4.3 Interventions required to deliver the Transport Strategy

4.3.1 Mitigation schemes for all additional scenarios tested within this addendum have been identified within the table below and an indicative cost is provided. A full list of all mitigation options is provided in section 4.4 which includes further details on the likely requirements. Due to the similarity between options and the strategic nature of the modelling it is only possible to identify a single overarching mitigation package that would be suitable to mitigate all proposed additional scenarios.

4.3.2 The mitigation strategy is based on professional opinion and not on modelled outputs. There is a general consensus that due to the location of the housing in these options and the significant north/south draw, it may not be possible to mitigate traffic impact to the same extent as in previous proposed scenarios. It is more likely that very significant and politically sensitive network infrastructure will be required. All mitigation packages will have to be tested using more detailed microsimulation modelling to ascertain their ability to accommodate the proposed northern focussed growth in these scenarios.

Scheme Code	**Key transport interventions that are very likely to be required**	**Costs**	**Sites responsible for majority of impact at location**
1	Nuneaton Northern Relief Road	Prerequisite and part of site. To be included in site development costs. Circa £25m	Prerequisite for delivery of sites in the north of Nuneaton
2	Longshoot-Dodwells Dualling/Capacity Enhancements	Costs still being identified approx. £2m+	All northern sites
3	Longshoot/Higham Roundabout link and junction improvements	£2m	All northern sites
4	Coton Arches roundabout signalisation/junction improvement	£1,500,000	All northern sites and Bermuda Employment Areas
5	College St roundabout junction improvement	£1,000,000	All northern sites and Bermuda Employment Areas
6	A444/Eliot Way Roundabout junction improvement	£1,000,000	All northern sites and Bermuda Employment Areas
7	Walking/Cycle Links to Town Centre/Nuneaton Station	£250,000	All northern sites and Bermuda Employment Areas
8	Croft Rd/Greenmoor Rd and	£750,000	PDA2

	Greenmoor/Heathend Rd junction improvements		
9	Coventry Rd link Rd	To be included in site development costs. £2.5m-5m	Bermuda Employment Areas
10	Walking/Cycle Links to Bermuda Station	£250,000	Bermuda Employment Areas
11	Virtual P&R and Bermuda	£1,750,000	All Sites
12	Bermuda Sustainable Transport Bridge	£250,000	All Sites
13	Town Centre Improvements	£2,000,000	All Sites
14	Sustainable Transport Contributions	£2,000,000	All Sites
15	Higham Lane Roundabouts Improvements	£1,000,000	PDA 1 ,WCC site and PDA2
16	A4254 Eastern Corridor Improvements	£1,500,000	PDA1 + contribution from others
	Total	**£45,000,000**	Includes prerequisite infrastructure costs not included in original STA
Possible Additional Schemes	Link from Greenmoor Rd to Walsingham Dr & junction upgrades	£2,000,000	Possibly PDA 2 + contributions from others.
Possible Additional Schemes	A4254/A47 –Gypsy lane/Bulkington Lane Link Rd	£10,000,000	All northern sites
	M6 J3 Potential Improvements	Unknown	Contributions from all sites
	Possible Additional Mitigation Total	£12,000,000	

Table 4.1 Mitigation Requirements

4.3.3 Further details on the broad specifications of these schemes are provided in section 4.4.

4.4 Mitigation Scheme Definitions

4.4.1 The following table provides more detailed of the key transport interventions required to mitigate the impact of the development proposals.

4.4.2 Schemes marked “possible” with no scheme code are classed as more aspirational proposals, however given the location of the proposed sites they are more likely to be required. Further detailed modelling would be required to identify the requirement for such proposals.

Scheme Code	Key transport interventions	Approximate Cost	Explanation
1	Nuneaton Northern Relief Road	Prerequisite and part of site. To be included in site development costs. Circa £25m	This scheme would be a prerequisite for the delivery of all northern sites. It is likely that it would be required as a high quality distributor road, but should be built to a standard that has capacity to accommodate traffic from north Nuneaton proposed sites. This route would form a northern relief road. The link would most likely be aligned between B4114/B4111 junction and would enter the A444 just north of the current urban extent. The A444 would then be linked to Higham Lane through the Weddington Rd and WCC sites. From Higham Lane there would be a link through PDA 1 which would tie in at the A47. Further analysis using microsimulation modelling should be undertaken to determine the most appropriate locations for connections onto the existing network.
2	Longshoot-Dodwells Dualling/Capacity Enhancements	Costs still being identified approx. £2m+	Longshoot and Dodwells are key junctions on the A5 accommodating all traffic travelling between Nuneaton and Hinckley on the A47. Proposals for MIRA include extensive mitigation for these junctions, it is likely there will be spare junction capacity. However the section of A5 between Longshoot and Dodwells would require dualling. Some capacity improvements at the two junctions may be required for certain scenarios.

Scheme Code	Key transport interventions	Approximate Cost	Explanation
3	Longshoot/Higham Roundabout link and junction improvements	£2m	Pressure from additional northern sites will require significant capacity improvements at Higham Lane roundabout on the A5 as well as possibly requiring partial dualling
4	Coton Arches roundabout signalisation/junction improvement	1,500,000	Significant pressure is experienced on A444 in most scenarios. This junction already experiences significant congestion. Signalisation of this large roundabout at which A444, A4254 and B4114 intersect will be required. Road space should be sufficient to do this but further work would be required to determine whether the scheme is deliverable.
5	College St roundabout junction improvement	1,000,000	Significant pressure is experienced on A444 in most scenarios. This junction also already experiences significant congestion . Signalisation of this large roundabout at which A444 and B4112 intersect will be required. Further work would be required to determine whether the scheme is deliverable.
6	A444/Eliot Way Roundabout junction improvement	1,000,0000	Another junction on the A444 which provides access to significant employment at GEH, EPIC and other major employers on the western side and a well utilised filling station to the east. Additional pressure on the A444 may require this junction to be improved by increasing its size, adding additional longer approach lanes and circulatory lanes or signalisation.
7	Walking/Cycle Links to Town Centre/Nuneaton Station	250,000	PDA1 is close to the town centre, rail and bus stations. However there is no existing route that links this site directly and efficiently. Dedicated cycle and walking links should be investigated
8	Croft Rd/Greenmoor Rd and Greenmoor/Heathend Rd junction improvements	750,000	PDA1, 4 and 5 and to some extent other sites, put considerable pressure on routes in this area which already experience significant congestion issues. Min roundabouts and priority junctions may require improvements such as signalisation. Feasibility of such schemes should be investigated

Scheme Code	Key transport interventions	Approximate Cost	Explanation
9	Coventry Rd link Rd	To be included in site development costs. £2.5m-£5m	A link road through the employment sites from Gypsy Lane to Coventry Rd would help to alleviate pressure on Gypsy Lane. This would also be used by the proposed employment area east of Coventry Rd
10	Walking/Cycle Links to Bermuda Station	250,000	Improvements to walking and cycling links to Bermuda station will be required from the proposed employment sites.
11	Virtual P&R and Bermuda	1,750,000	Virtual Park and Rides accrue the benefits of standard park and ride facilities without incurring the costs of providing expensive infrastructure. Developers would be encouraged to provide additional parking at edge of town sites which could then be utilised for P&R facilities. Existing developments where parking capacity is available could also be used. Instead of providing a bespoke bus services to the P&R facilities, a two stage bus journey would be made where the first stage would provide a direct service to the town centres or employment sites with perhaps one or two stop on route thus avoiding. The second stage would distribute local trips around housing areas or employment areas This would maximise potential of new bus routes provided by developers which are necessary to ensure sustainable access to their developments and to meet model share targets. Such facilities would be easier to deliver where there is a critical mass of development proposed in one area. A suitable site may be in the vicinity of the proposed Bermuda Station with parking in the proposed employment areas at this location. Such a scheme would be complimented by Bermuda Sustainable Transport Bridge.
12	Bermuda Sustainable Transport Bridge	£250,000	WCC is currently investigating the formalising the existing Bermuda bridge over the A444 for use by cyclists. WCC has longer term aspirations to open this route up for bus use to serve Bermuda Station and open up alternative routes to and from existing and proposed housing and employment.

Scheme Code	Key transport interventions	Approximate Cost	Explanation
13	Town Centre Improvements	£2,000,000	A contribution towards other capacity improvements around both Nuneaton and Bedworth will be required
14	Sustainable Transport Contributions	£2,000,000	Extensive sustainable travel infrastructure should be constructed to encourage modal shift and thus alleviate pressure on the road network. It is likely that this contribution would be best spent on provision of key cycle routes between housing and employment in Nuneaton and Bedworth, completion of the existing cycle networks - this has been termed "Missing Links" and provision of new cycle infrastructure linking proposed developments to the existing cycle network. Provision of "Missing Links" may involve working closely with NBBC and other land owners in order to provide the shortest routes to key destinations. Provision should include toucan/pedestrian crossings to avoid severance. Provision of minor schemes has not been included in these costs but provision of bus shelters should also be included. Bedworth currently has limited provision of cycle network and funding from developers could be used to improve this situation. Sustainable travel infrastructure could also encompass bus priority schemes.
15	Higham Lane Roundabouts Improvements	£1,000,000	The impact relating to PDA1, WCC site and 2 on Higham Lane roundabout will have to be investigated. Additional/longer approach lanes may be required as capacity improvements to mitigate the impact on the junction.

Scheme Code	Key transport interventions	Approximate Cost	Explanation
16	A4254 Eastern Corridor Improvements	£1,500,000	The A4254 is an important link for most scenarios providing access to A5 and Hinckley from south Nuneaton avoiding town centre routes. The A4254 also has a substantial amount of employment located along the corridor. Therefore capacity improvements may be required at junctions along this corridor.
Possible Additional Schemes			
	Link from Greenmoor Rd to Walsingham Dr & junction upgrades	Part of site. To be included in site development costs.	This scheme would provide another alternative route to access west Nuneaton rather than using A444 and rural roads identified as coming under pressure in this assessment.
	A4254/A47 –Gypsy lane/Bulkington Lane link Rd (Eastern Relief Rd)	£10,000,000	This may be required if such a significant quantum of focussed growth is allocated to the north of Nuneaton, it would take pressure off the A4254. However viability may be a serious issue with this mitigation proposal and the impact on communities and political acceptability is also of concern. This proposal may also be dependent on provision of a route through the employment sites at Bermuda.
	M6 J3 Potential Improvements	Unknown	The impact in terms of operation at this major HA motorway junction cannot be determined until further microsimulation modelling is undertaken. As such it is difficult to determine the approximate costs.

Table 4.2: Mitigation Schemes – Definitions

4.5 Other mitigation considerations

4.5.1 When combined with the background growth and committed developments, all scenarios put significant pressure on a number of critical links in the Borough. Therefore WCC would recommend to undertake further studies to consider the Congestion Reference Flow (CRF) for link capacity. It is recognised that sections of the network are already nearing capacity, as such, mitigation options including public transport priority schemes and additional link and junction capacity improvement schemes have been suggested. However, further investigation is required, most notably southbound on the A5, A4254 and A444 to determine if link capacity would become a problem. The HA would like further investigation into the mitigation requirements necessary at M6 J3. This could be undertaken once there is more certainty regarding the likely locations and level of growth as part of the suggested microsimulation modelling exercises.

4.6 Other Modal Shift Mitigation Strategies (not included in transport interventions)

4.6.1 Encouraging modal shift is a key strategy aimed at reducing the impact of the proposed growth within the Borough on the road network. An approach combining "sticks and carrots" to influence modal shift is recommended. Options to complement Travel Plans could include:

Sticks

- Preferential business rates for those employers that can demonstrate significant shifts in employee travel behaviour.
- Parking tariffs for employee parking.

Carrots

- Subsidised employee bus shuttles from all rail stations to build on the success of the National Grid shuttle bus.
- Subsidised commuter bus shuttles to all rail stations.
- Long distance virtual P&Rs and staff bus schemes.
- Area wide car share databases.
- Further investment in Smarter Choices.

4.6.2 Smarter Choices are 'soft' measures that seek to influence people's travel behaviour away from car use towards more sustainable modes of transport. They are aimed at helping people to choose to reduce their car use while enhancing the attractiveness of more sustainable alternatives, such as walking, cycling and public transport. Examples of such measures include:

- Workplace and School Travel Plans
- Personalised travel planning
- Travel awareness campaigns
- Public transport information and marketing

- Car clubs
- Car sharing schemes
- Teleworking, teleconferencing and home shopping

4.6.3 ‘Smarter Choices’ measures have an integral role in complementing ‘hard’ infrastructure improvements, which alone are unlikely to generate significant behaviour change. Information, promotion, marketing and other supporting measures are key to successful schemes aimed at increasing use of sustainable transport and reducing single-occupancy car journeys through improving knowledge, perceptions and choice of alternative modes of transport. Research by Sustrans shows that lack of information about alternative modes such as cycling and public transport and motivation to try them, are key barriers to change.

4.6.4 The DfT commissioned a major study in 2004 to examine whether large-scale programmes could potentially deliver substantial cuts in car use. In summary the results suggested that, within approximately 10 years, smarter choices measures have the potential to reduce national traffic levels by about 11% with reductions of up to 21% of peak period urban traffic.

4.6.5 Each measure should work on the three principles of (i) 'inform'; (ii) 'enable'; and (iii) 'promote' with resources and interventions tailored to the individual needs of the target audience and proximity to the development (s).

4.6.6 Example activities for each of the three principles include, but are not limited to:

(i) Inform - provide route maps, timetable information, travel advice;
(ii) Enable - 'taster' public transport tickets, travel training services, marketing offers
(iii) Promote - destination advertising, discount (e.g. 2 for 1 via rail) promotions, public transport launch events.

4.7 Initial Assessment of Deliverability

4.7.1 As clearly highlighted in the original STA, WCC hold serious concerns over the impact such significant focussed growth to the north of Nuneaton. These latest scenarios focus even more growth in this area. Without detailed modelling it is unclear whether any deliverable mitigation package will have the ability to accommodate such growth levels in these locations. A number of schemes presented have potential to accrue benefits for the wider network. However, there will be implications resulting from any level of growth. Overall the network should be able to accommodate the level of growth proposed, however, it is the location of this growth that will determine the ability of the mitigated network to accommodate these additional demands. In any proposed option, there will be areas of the network that will suffer from increased congestion issues with no or few potential mitigation options (e. the town centre and AQMAs are constrained by the available highway). Implications of development (in particular congestion issues) will be closely related to the growth scenario adopted.

4.8 Managing Risk

4.8.1 Throughout the work undertaken to date on the LDF Borough Plan, the County Council has attempted to identify and manage risk and will continue to do so as the Borough Plan evolves. Examples of this include the following:

- Early discussions with the Borough Council regarding its LDF, and timely submissions on transport throughout the development of the strategy;
- Joint working with the Highways Agency to ensure that a complete assessment of the impact of development on the local and strategic highway network is undertaken with agreements on the most suitable way forward in terms assessing these impacts once there is more certainty on the levels of growth and locations of sites;
- Consulting HBBC on Northern sites that may impact on Leicestershire's network;
- Establishment of joint working arrangements with the developers of the preferred sites;
- To seek agreement with the respective developers and the Highways Agency regarding the combined use of the Nuneaton and Bedworth Area Wide S-Paramics model and the Nuneaton and Hinckley Area Wide S-Paramics Model to include agreement trip rates/distribution and public transport assumptions;
- Carrying out timely discussions with other organisations regarding potential transport interventions and measures;
- Working in partnership with NBBC to deliver a comprehensive cycle network which may involve linking through district land;
- Commenting and advising on the technical work in support of the
- proposals for major infrastructure delivery;

- Possibility of undertaking work on key measures to help support the transport network of the towns and the LDF housing and employment growth. This may include the assessment of public transport improvements, town centre proposals and the design of key mitigation infrastructure.
- Advising developers on measures to encourage modal shift.

4.8.2 It is envisaged that further detailed work will be undertaken in conjunction with developers, public transport providers and authorities to develop a comprehensive Transport Infrastructure Delivery Plan prior to the LDF Core Strategy Examination in Public to further reduce any remaining elements of risk.

4.9 Funding

4.9.1 WCC indicative costings suggest that contributions towards mitigation schemes would be at least £45m at 2012 prices, this figure differs significantly from previously stated figures due to provision of an estimate for the Northern Relief Road, this would actually be partly delivered within the site development costs. Effectiveness of mitigation is dependent on scenario, it is likely that the impact from some sites cannot be fully mitigated. A contingency of 30% should be allowed to account for utilities and other variable costs. There are a number of possible additional schemes highlighted in the mitigation tables that may be necessary (and are more likely to be required compared to the original proposals) which would add additional costs to the overall package. Due to these escalated costs the viability of delivering a mitigation package(that WCC consider may not be able to cope with the demands on the network) is brought into question.

4.9.2 These mitigation schemes do not include revenue based contributions towards bus services which could be significant. Further studies would be required to understand the requirements.

4.9.3 Further modelling work would be required to identify the definitive requirements for new infrastructure, and there is the possibility that costs could escalate if major schemes are discovered to be necessary. This is however thought to be unlikely at this stage.

4.9.4 Based on approximately 5600 houses (as proposed by NBBC, not including *"Other urban sites"*), a contribution (including 30% contingency) approximately £8,000 per housing unit would be required towards transport improvements. Please note this figure assumes the Northern Relief Rd is in part funded in development site costs and does not include contributions from employment developments which at this stage would be difficult to calculate. Therefore, costs per household could vary.

4.9.5 It should be noted that costs are based on current prices. They are derived from the professional opinion of the project board. No detailed cost estimates have been undertaken. Although contingency has been provided in the cost estimates, the existence of utility services and purchasing of land can substantially increase costs.

4.9.6 Funding could be secured through the traditional S106 and S278 agreement approach or a Community Infrastructure Levy(CIL).

4.9.7 The benefits of using the CIL type approach would be that an average cost per household/cost per trip could be collected and placed in a funding pool which could be used for mitigation purposes. However, given that a number of development sites are pushing forward with their applications and the CIL approach is not formalised it is likely a combination of funding streams is more likely, there is a risk that suitable funding to secure all the necessary funding for the required mitigation needs is not met. Under the S106 approach it may be that an uneven distribution of costs and responsibility is placed on the different development sites. For instance, it may be considered the eastern relief road is required for site PDA1 at Calendar Farm and the developers would be expected to pay for it. In reality development traffic from all sites may use the route and diverted background traffic may alleviate routes surrounding alternative developments, thus reducing the need for mitigation in these areas. Therefore all developments accrue benefits from the mitigation packages as a whole and should provide contributions in relation to the numbers of housing unit/size of employment development/numbers of vehicle trips.

5 Conclusions and Further Work

5.1 Conclusions

5.1.1 This document is provided as an Addendum to the original STA undertaken for NBBC. The modelling and report considers the implications of focussing the majority of growth in the north of Nuneaton

5.1.2 Strategic modelling has been undertaken using industry recognised tools. The interpretation and identification of mitigation schemes was carried out by senior transport professional working for WCC and the HA.

5.1.3 With previous proposals within the original STA, WCC believed that with a combination of innovative engineering solutions in parallel with significant, effective, sustainable transport provision, that all scenarios that the Borough put forward could be accommodated. However, with the latest set of proposals allocating all housing developments to the north of Nuneaton, WCC believe there will be severe impacts on network performance which cannot all be mitigated. As clearly stated in the original STA, Options with housing sites located north of Nuneaton have the most significant effect on the highway network as a whole. WCC would therefore not recommend the allocation of all housing development north of Nuneaton as tested within this addendum report.

5.1.4 From previous accessibility work, it has been demonstrated that no scenario has particularly poor accessibility based on existing provision of infrastructure and services. However all scenarios/sites should improve accessibility through comprehensive sustainable travel packages. It should also be noted that the capacity of existing bus services are unlikely to be sufficient to accommodate some or all of the levels of growth proposed.

5.1.5 All combinations of sites will have implications on the road network. There may be some areas of the network that accrue significant benefits from well targeted mitigation measures especially where a critical mass of development exists. However, with any proposed growth level there will be areas of the network that suffer especially when all housing development is focussed to the north of Nuneaton. The extent to which gains and losses are experienced on the network can only really be assessed once there is more certainty over the level of growth and locations of sites, and when appropriate mitigation is more accurately defined through Microsimulation modelling option testing.

5.1.6 It is likely that existing capacity constrained areas such as town centres and AQMAs will continue to be placed under increased pressure. Although some outputs indicate significant increase in flow in these areas, it is known that the existing capacity would constrain this demand. It is more likely that in this type of situation, pressure would be sustained for a longer periods i.e. peak spreading. These areas are capacity constrained because of the topography and existing land uses, unfortunately there are few engineering solutions to mitigate these impacts given the existing land constraints. Even through provision of upgraded/alternative routes to allow traffic to avoid these areas would still experience a significant impact as there will always be a residual demand for town centre retail and services from both existing users and new trips associated with the development sites. It is evident from the analysis provided within this report that the northern sites have the most significant impact in these areas, even with the inclusion of the northern relief road and eastern relief road.

5.1.7 With reference specifically to the SRN and the location of sites, the Highways Agency provided the following comments.

"Placing all housing sites to the north of Nuneaton will place the A5 under considerable pressure. However if it can be demonstrated that any development impacts can be accommodated on the SRN and appropriate mitigation delivered (preferably from developer's contributions) the proposals may be acceptable to the Agency. Clearly there is a need for a detailed modelling exercise to confirm what can be accommodated on the SRN and what mitigation achieved, in particular at the Higham Lane roundabout junction, Longshoot junction, Dodwells junction and the M6 J3."

5.1.8 The impact on the modelling outputs may appear severe in places however a number of points must be considered in their interpretation;

- The strategic modelling does not account of the propensity for modal shift through infrastructure, public transport provision, policy changes, congestion avoidance, escalating costs of motoring and targeted soft measures such as “Smarter Choices”. Approximately 15-20% modal shift was in fact the recommended targets for use in Rugby Borough Council’s LDF Core Strategy which was subsequently approved following the Examination in Public.

- Time period choice becomes a reality. Evidence already exists of peak spreading elsewhere within Warwickshire across the Nuneaton and Bedworth cordon monitors. This is likely to continue as more pressure is applied to the network.

- This is a strategic modelling exercise. Some of the numerous more minor routes will not have been utilised, and as such, some impacts have probably been over estimated.

- The model does not recognise congestion caused by background, committed and proposed sites. Routing is based on current congestion conditions. The model does not recognise that certain links and junction will have capacity. As such there is no dynamic feedback where the model will reroute traffic based on congestion experienced.

- The assumption is that economic conditions are good. Recently we have experienced negative traffic growth as a result of economic recession, thus creating capacity on the network.

- Mitigation proposals to improve a number of corridors to improve access to the SRN will alleviate routes around the town centres.

- Significant committed employment and housing land development has been modelled in Stage 2 modelling. Mitigation assumptions for these sites have not been included in the strategic modelling exercises.

- DfT NTM traffic growth forecasts have recently (post CITEware modelling exercise) been adjusted down to take account of recent economic growth forecasts.

5.1.9 Further recommended work through detailed microsimulation modelling will take account of all the issues raised above. See 5.2.4 – 5.2.11.

5.1.10 A comprehensive and viable set of mitigation infrastructure proposals has been identified for each scenario. Dependent on scenario, these costs range up to at least £60m (including some mitigation that may be delivered as part of the site requirements but not including contingency). This does not include any contribution from the substantial proposed employment land. These figures are based on the assumption that microsimulation modelling does not highlight a requirement for the possible additional schemes mentioned in tables 4.1-4.2.

5.1.11 Effectiveness of mitigation is dependent on scenario. The impact of traffic from some sites, especially those located north of Nuneaton is more difficult to mitigate. There are some areas of the network that are already at capacity and there is little scope to provide further capacity through junction improvements, especially around Nuneaton town centre. Therefore mitigation should concentrate on alternative routes to and from the developments.

5.1.12 Consideration has been given to managing risk throughout the LDF Core Strategy planning process.

5.1.13 WCC has expressed a view that a Community Infrastructure Levy type scheme is our preferred route to manage developer contributions for mitigation proposals.

5.1.14 A series of further studies is recommended in the following section.

5.2 Further Work

Congestion Reference Flow (CRF) analysis to determine link capacity constraints

5.2.1 It is apparent that when the impacts of the scenarios are combined with the trips associated with the committed developments and background growth link capacity may become an issue.

5.2.2 The analysis of CRF to determine with link capacity will become an issue is recommended along with S-Paramics microsimulation modelling to determine the requirement for elements of the proposed mitigation.

5.2.3 It should be recognised however that the result of the modelling exercise demonstrate a worst case scenario, as no account has been taken for modal shift influenced by sustainable travel infrastructure and provision and use of smarter choices for influencing travel behaviour. As mentioned previously, it is estimated that up to 15%-20% reduction in demand on the road network could be achieved through such measures. In addition to this, no account has been taken of time period choice as commuters choose to re-time their journeys in order to avoid congestion.

Detailed modelling of Preferred Option using S-Paramics

5.2.4 To fully understand the real impact of proposed developments an in depth study using microsimulation modelling tools will be required.

5.2.5 This type of modelling should be undertaken once there is more certainty over the levels of growth and location of development sites.

5.2.6 Microsimulation modelling should be used to determine the effectiveness of the proposed mitigation options.

5.2.7 WCC has a preferred microsimulation modelling package called S-Paramics.

5.2.8 WCC has two up to date models covering Nuneaton and Bedworth Borough;

- Nuneaton and Bedworth 2009, 2018 and 2028 Area Wide Models
- Nuneaton and Hinckley 2009, 2018 and 2028 Area Wide Models

5.2.9 WCC has established a licence agreement and modelling protocol for use of the models by developers. WCC will work either in isolation or with promoters of the preferred sites to test mitigation proposals. This will also cover phasing of development and mitigation.

5.2.10 Microsimulation modelling will take account of the modal shift and time period choice elements missing from this strategic assessment thus giving a true picture of the impact on the local road network.

5.2.11 An explanation of S-Paramics is provided below:

"S-Paramics is the latest version of the widely applicable Paramics microsimulation traffic flow modelling system, software for the analysis and design of urban and highway networks. Only S-Paramics offers wide area vehicle routeing with dynamic feedback for accurate traffic flow modelling within a context of active ITS and UTC.

S-Paramics simulates the individual components of traffic flow and congestion, and presents its output as a real-time visual display for traffic management and road network design. S-Paramics represents the actions and inter-actions of individual vehicles as they travel through a road network. It models the detailed physical road layout, and includes features such as bus operations, traffic signal settings, driver behavioural characteristics and vehicle kinematics. As a consequence, S-Paramics

can accurately portray the variable circumstances which lead to congestion in all types and sizes of road network……

…..S-Paramics enables non traffic experts, such as the public and their elected representatives, to interactively test " What If " scenarios and immediately see the results in terms of real-time traffic flows and congestion. The most widely used microsimulation system in the UK for applications at all scales, S-Paramics brings new standards of integrity and veracity to traffic flow modelling.

S-Paramics is being applied to trunk, urban, suburban and rural schemes for a very wide range of purposes and situations. It is being used routinely to examine signalised roundabouts, bus priority, emissions control, ramp metering, toll plaza design, urban traffic control, traffic calming, wide area traffic management, road works design, car park location and control, multi-level inter-changes, pedestrian and cyclist interaction, traffic impact, unusual/non-standard layouts and complex junctions, incident management, slow moving traffic on rural roads ... indeed every conceivable combination of circumstances which other modelling systems have difficulty simulating and analysing."

Source: SIAS S-Paramics Website
http://www.sias.com/ng/spoverview/spintroduction.htm

Public Transport Studies

5.2.12 Further work on the requirements and viability of public transport provision will be required and will involve close working relationships with site promoters, bus and rail service providers and WCC.

Costing and Feasibility Assessment of Transport Interventions

5.2.13 Initial estimates covering the mitigation requirements at various growth levels and alternative site locations have been provided within this document.

5.2.14 Once there is more certainty over the locations of sites and levels of growth more detailed testing of mitigation requirements can be undertaken. This will inform the actual mitigation requirements.

5.2.15 When the actual mitigation requirements are defined, further work on the costing and feasibility of the transport interventions can be undertaken.

5.2.16 Where substantial mitigation requirements are proposed with significant construction of infrastructure, it may be appropriate to undertake preliminary feasibility studies on individual schemes.

Preparation of Draft IDP/Input to Wider Viability Assessment

5.2.17 It is recognised that the LDF Borough Plan needs to be supported by a comprehensive Transport Infrastructure Delivery Plan, which covers the measures which are required to mitigate the impact of the proposed development sites.

5.2.18 An Infrastructure Delivery Plan will be prepared to support the development proposals set out in the LDF. WCC has identified a number of the transport mitigation measures as described in Chapter 5. These proposals will form the basis for mitigation testing through more detailed modelling exercises. Once the broad specification of the mitigation requirements is defined, the preparation of the Infrastructure Delivery Plan can be undertaken. It is suggested that officers from both the Borough and County Council meet at an appropriate point in the near future to discuss the current mitigation proposals. It is also suggested to convene again, once the mitigation proposals have further defined through the modelling process in order to discuss which measures need to be included in the Plan, who the lead delivery organisation will be, the likely timescale for the improvements to come forward, and their anticipated cost.

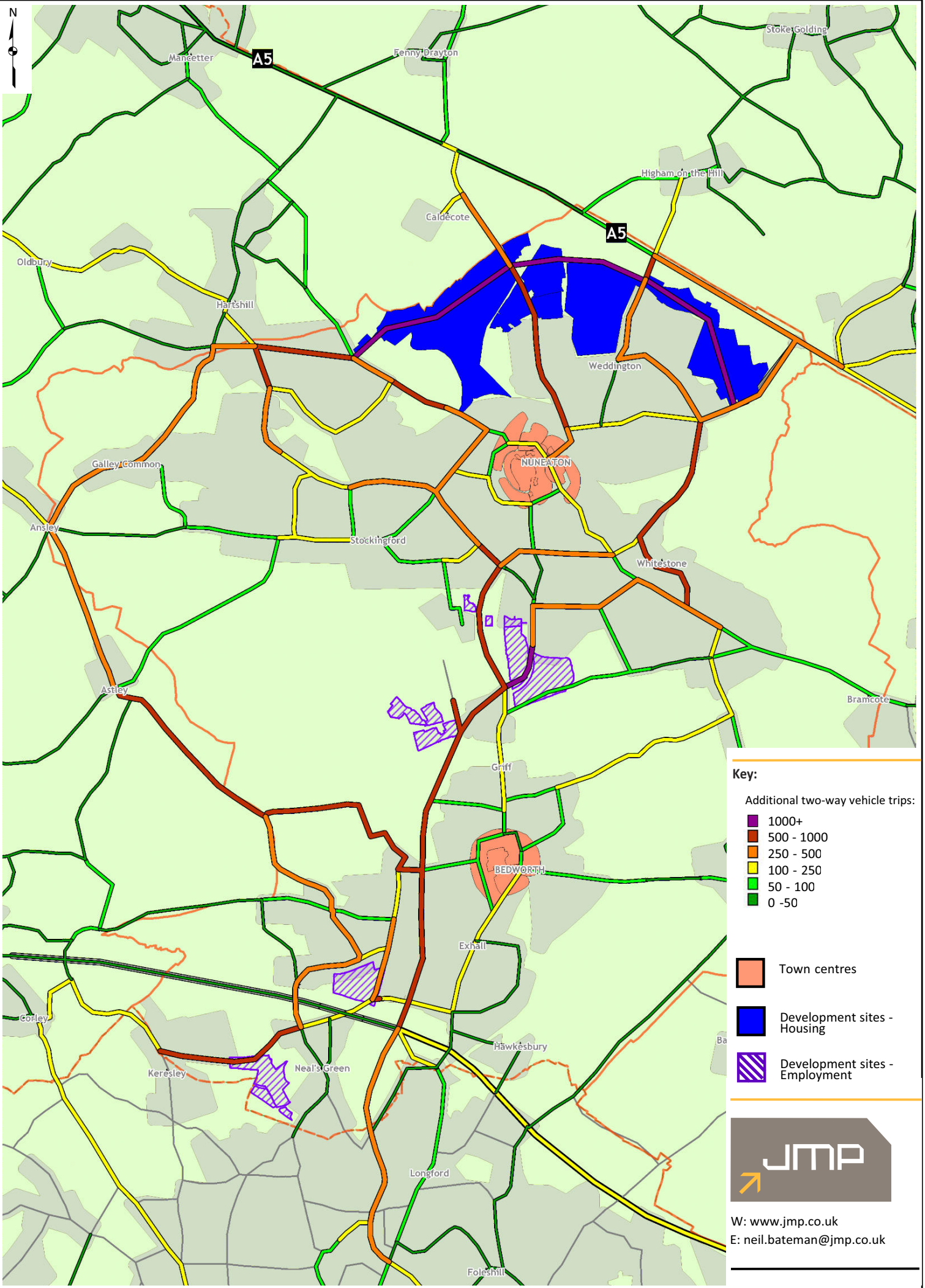
5.2.19 It is envisaged that further detailed work will be undertaken prior to the LDF Core Strategy Examination in Public to further reduce any remaining elements of risk within the Transport Infrastructure Delivery Plan.

Preparation of Developer Contributions SPD/draft CIL Charging Schedule

5.2.20 It is anticipated that contributions from developers will be secured through either the conventional S106 route, or via an approach based on the principles of a Community Infrastructure Levy (CIL). This document highlights, the County Council view that the latter, a CIL type developer contribution model, as its preferred approach. It is understood that this would need to be produced as a separate Supplementary Planning Document (SPD) to the LDF Core Strategy.

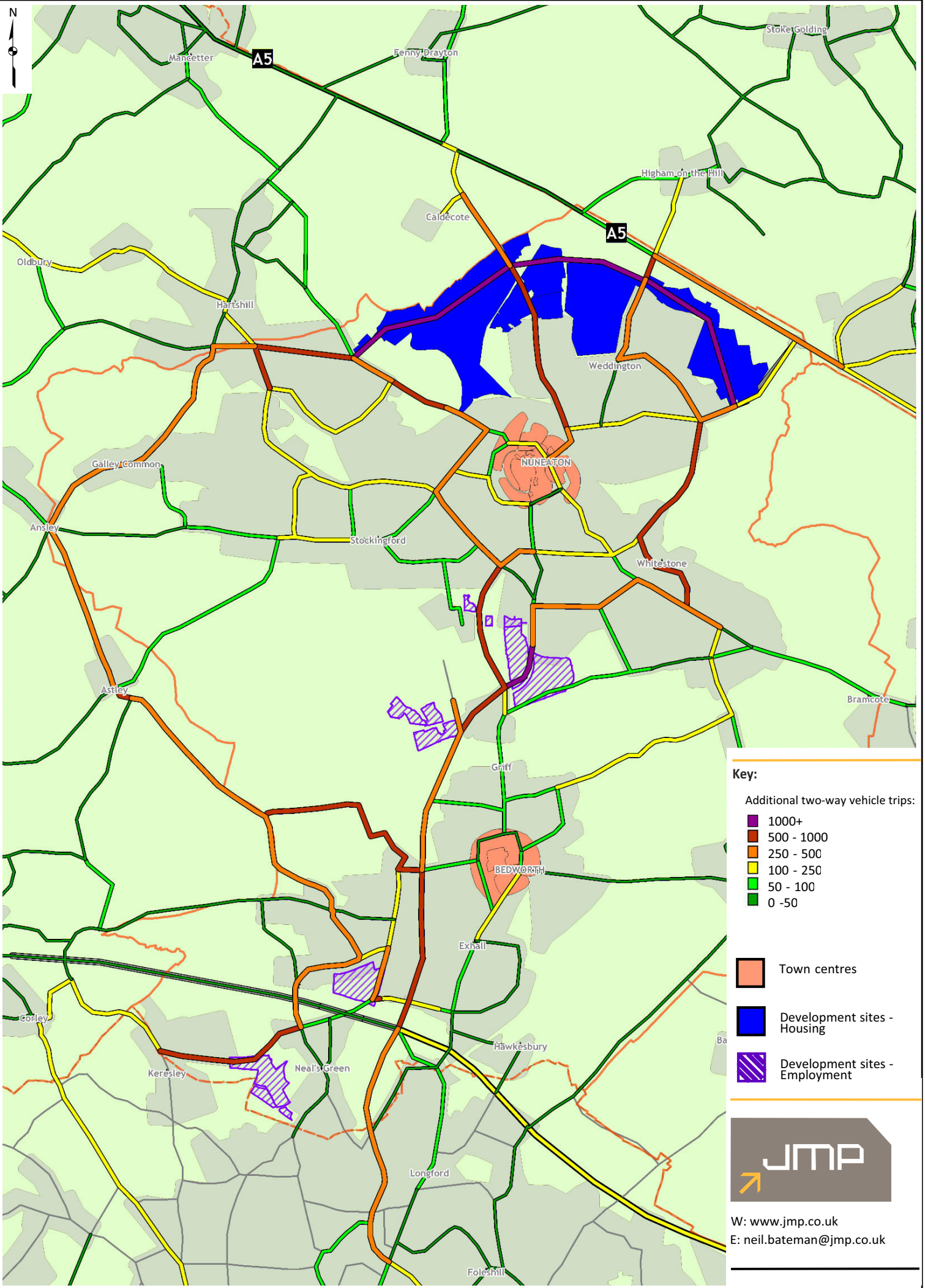
Appendices

Scenario 1- AM peak 0800-0900 Flow



W: www.jmp.co.uk
E: neil.bateman@jmp.co.uk

Scenario 1 - PM peak 1700-1800 Flow



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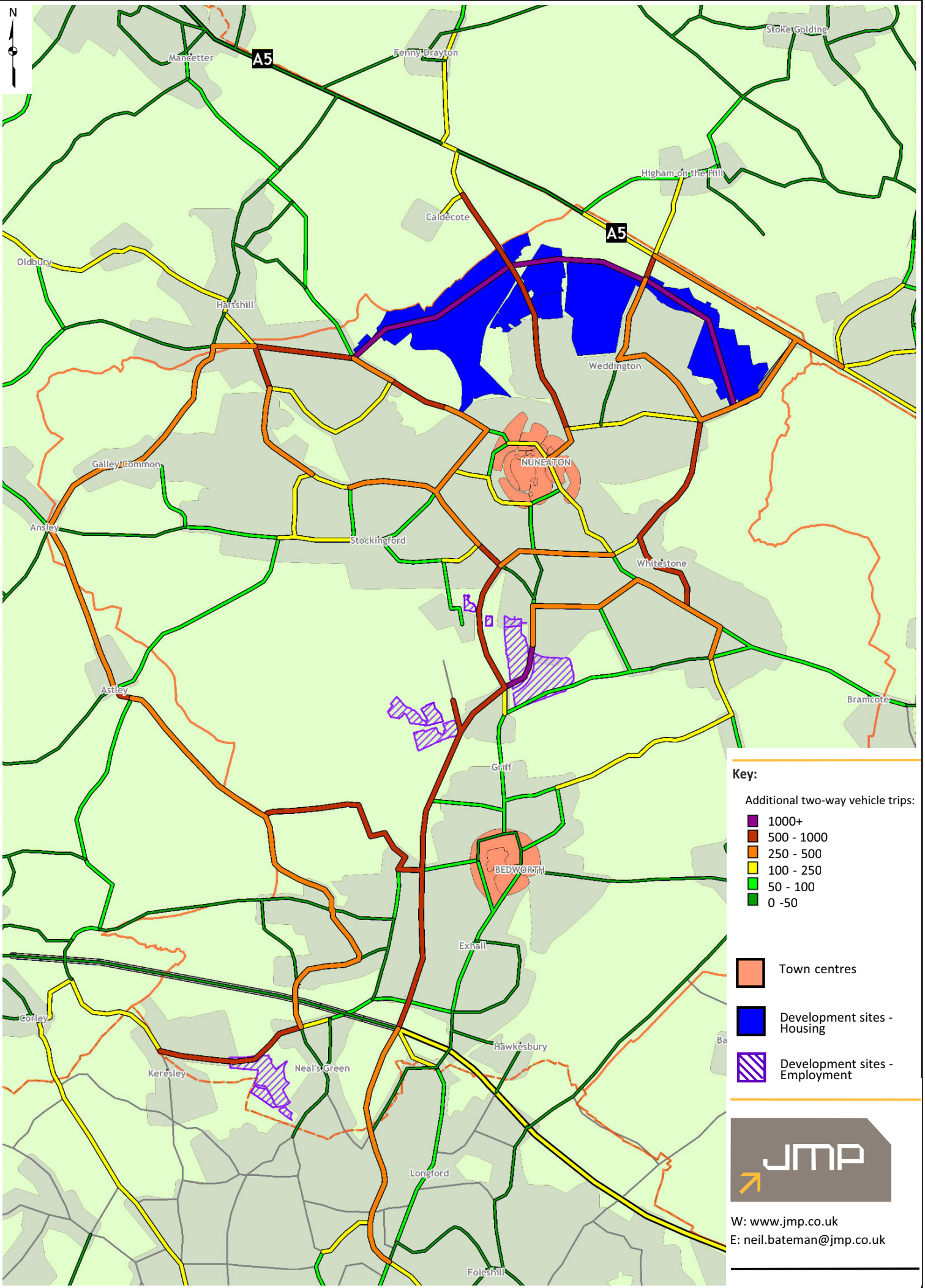
E: neil.bateman@jmp.co.uk

Scenario 2- AM peak 0800-0900 Flow



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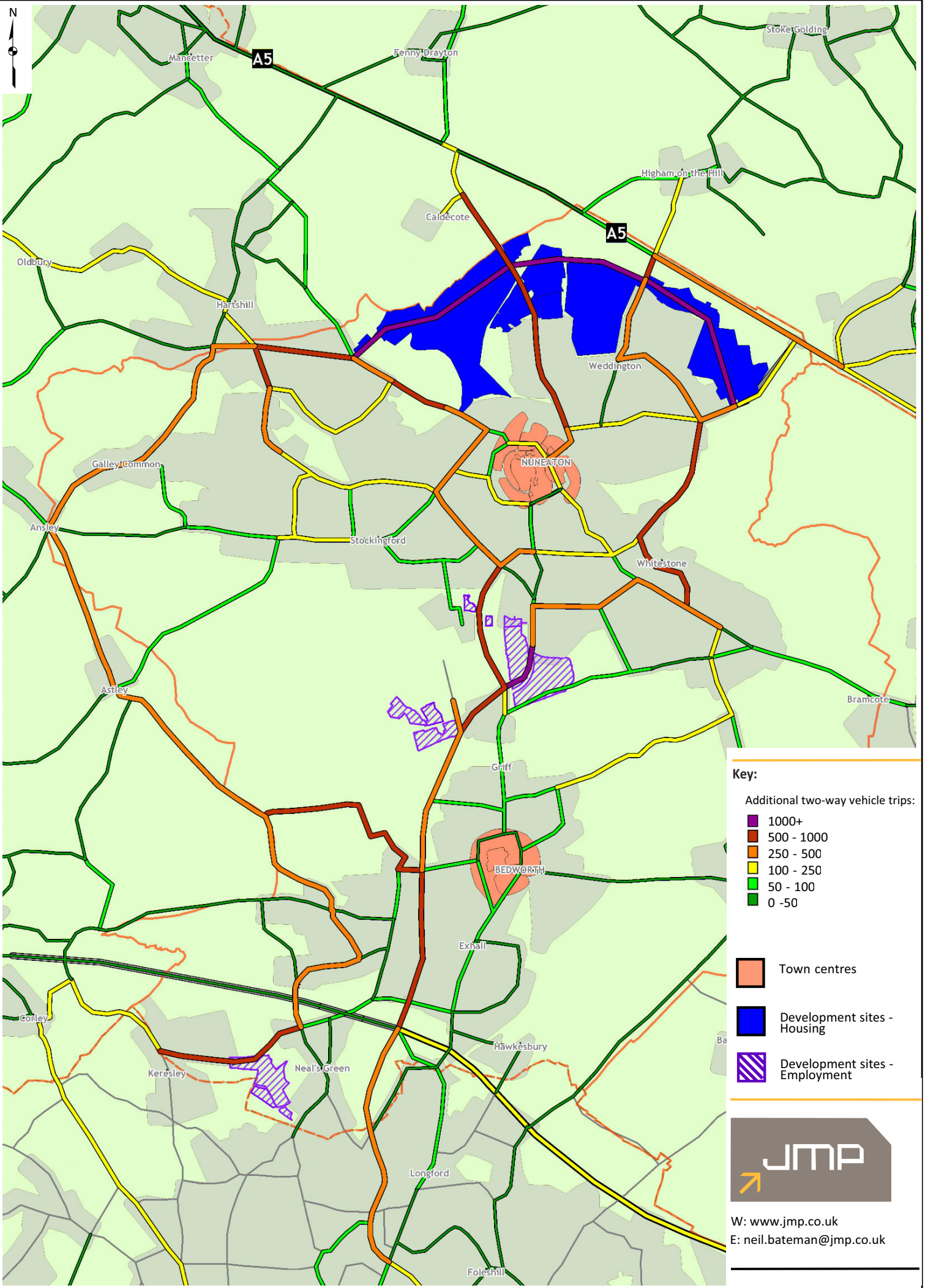

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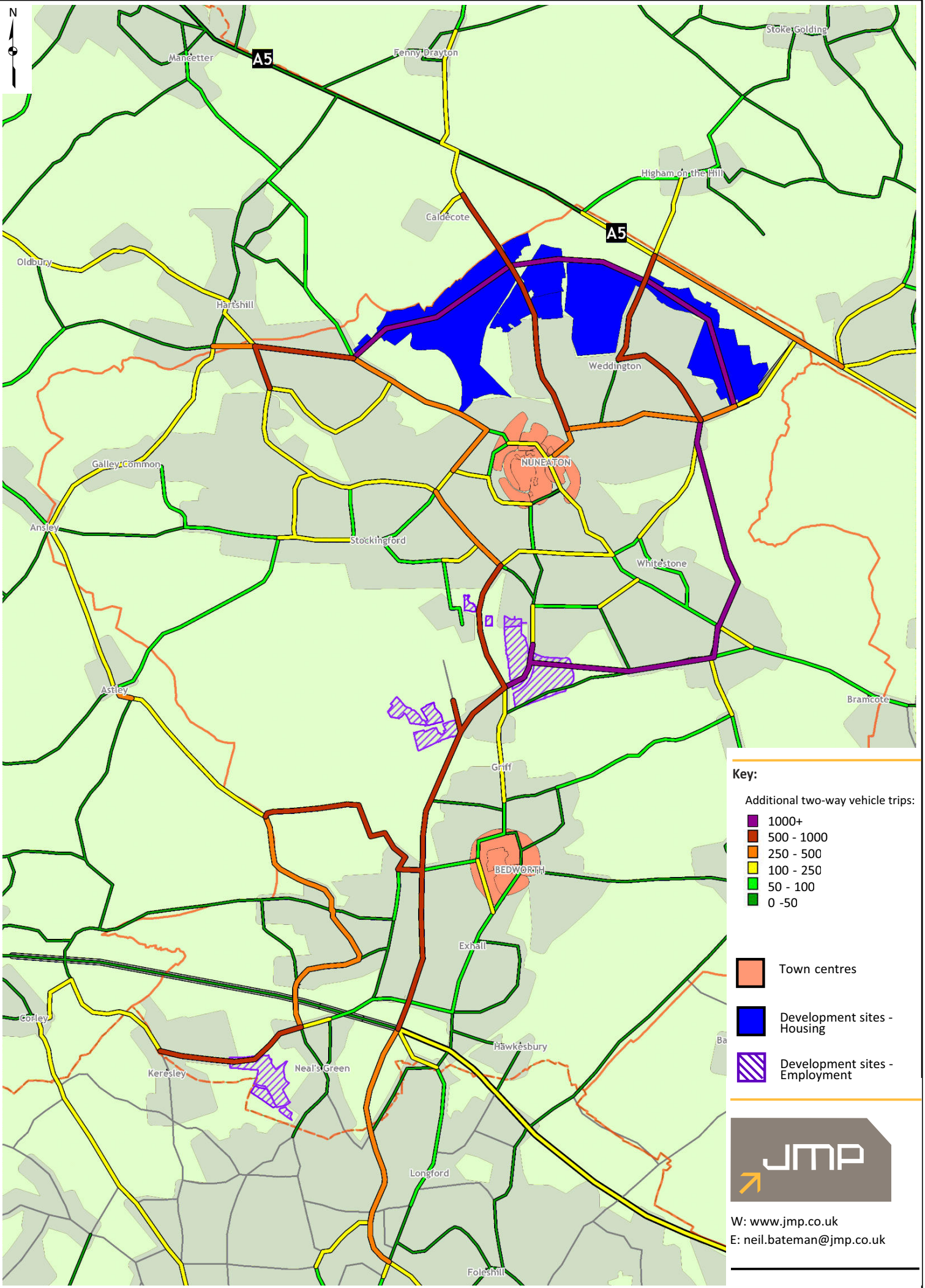
Scenario 2 with eastern relief road - AM peak 0800-0900 Flow



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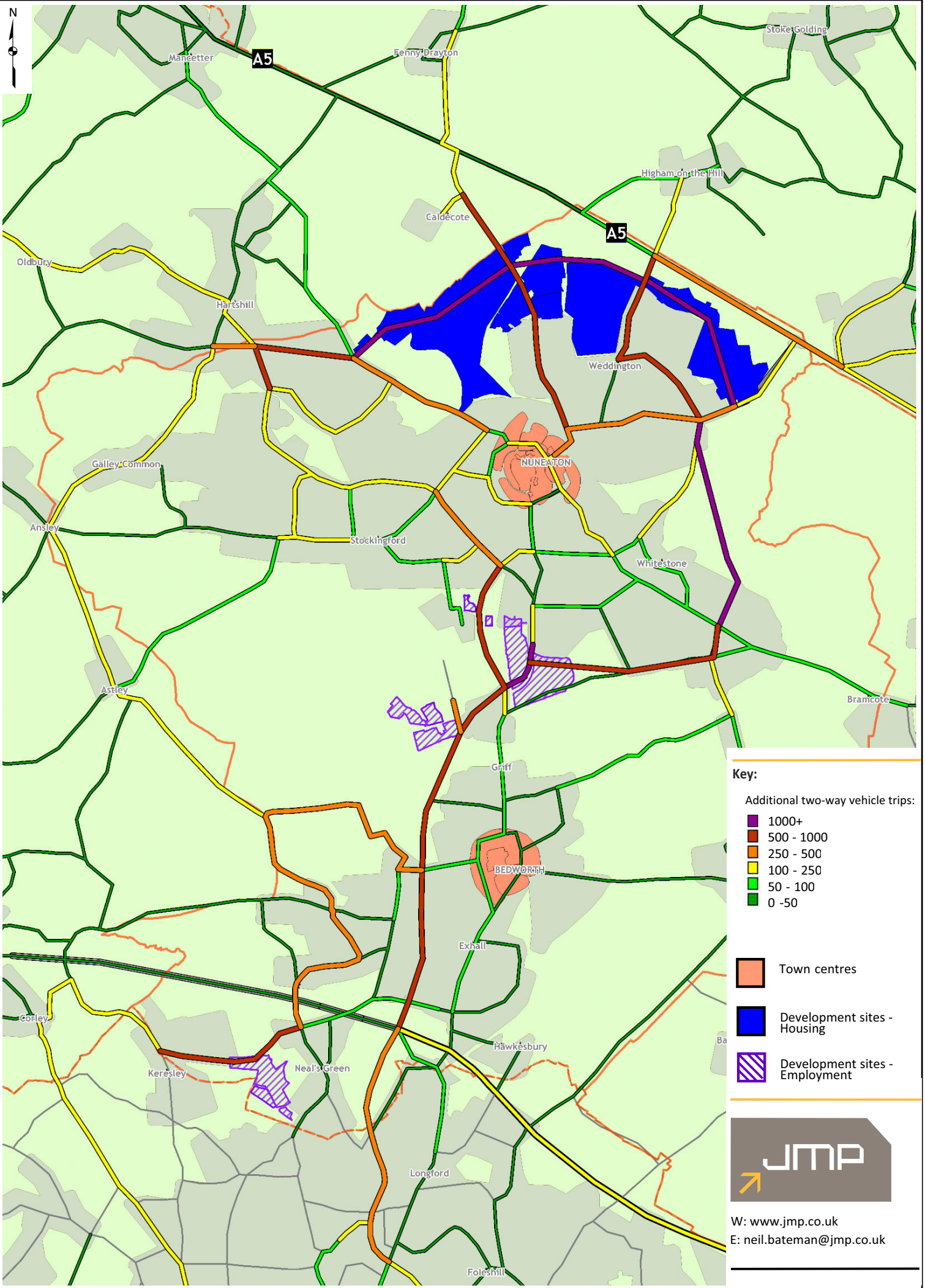
Scenario 2 with eastern relief road - PM peak 1700-1800 Flow



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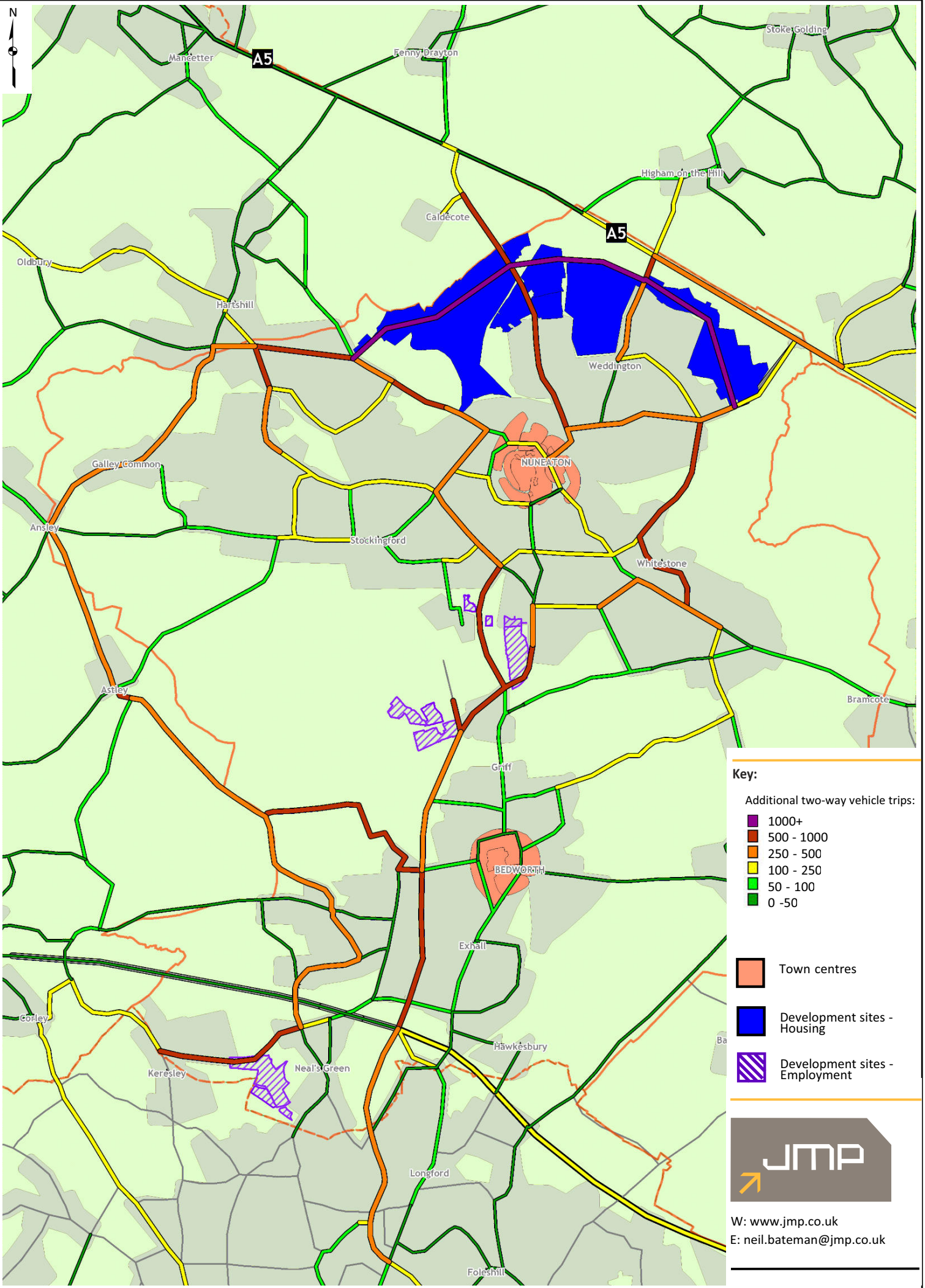
Scenario 3 - AM peak 0800-0900 Flow



W: www.jmp.co.uk
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