Mansfield Transport Study

Stage 2: Local Plan Growth

Project Number: 60627945

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Quality information

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Executive Summary

Overview

Mansfield District Council is currently preparing a new local development plan to be known as the Mansfield District Local Plan. The Local Plan will provide the overall planning strategy for the area through strategic policies dealing with the overall scale, broad distribution and timing of new development. It will also take forward the strategy with policies that allocate land for development and designate specific areas for protection.

All development plan documents will be subject to 'Examination in Public'. As such, a wide-ranging evidence base is being prepared to support the new Mansfield District Local Plan. This report considers how the transport network is likely to operate in the future (2033) with the potential development plan-related proposals. The operation of the transport network in 2016 and without the potential development plan proposals were presented in the Stage 1 assessment and report.

This report presents Stage 2. It considers the transport network conditions in the future with the identified development sites identified in the Local Plan. A future year of 2033 has been considered as this represents the end of the development plan period.

Although the focus of the assessment work relates to the operation of roads and junctions, this report does consider all modes of transport within the district of Mansfield.

Having examined the Base Year conditions and the forecast traffic conditions in the Stage 1 Report, this part of the study examines the likely future conditions within Mansfield and Market Warsop, given the most likely projections of growth and committed developments (both transport infrastructure and land-use developments) along with Local Plan growth scenario that has identified possible development opportunities to 2033.

Table 1 below details the hourly trip total represented in the Base Year (2016) SATURN model, the DfT's national trip-end model's growth forecasts (NTEM) to 2033, the 2033 trip totals calculated for the Reference Case (based on committed developments in Mansfield District) and those additionally associated with the identified Local Plan developments (also 2033). The Local Plan growth represents an increase of trips equal to 51% in the AM Peak and 52% in the PM Peak compared to the Base Year (2016).

Table 1: Matrix Totals

Trip demand scenario	Total Trips	
	AM	PM
Base 2016	29,595	31,678
NTEM 2033	33,376	35,571
Reference Case 2033	39,452	40,890
Local Plan 2033	44,783	48,010

The Stage 1 Report identified the following thirteen junctions within the Mansfield urban area that were close to or approaching capacity:

1. Chesterfield Road / Debdale Lane
2. A60 Nottingham Road / Berry Hill Lane
3. Carter Lane / Southwell Road / Windsor Road
4. A617 MARR / A6191 Southwell Road
5. A60 Leeming Lane / Peafield Lane
6. A60 Leeming Lane / A6075 Warsop Road
7. Kings Mill Road / Beck Lane / B6014 Skegby Lane / Mansfield Road
8. A6191 Ratcliffe Gate / A60 St. Peters Way

9. A6117 Old Mill Lane / B6030 Clipstone Road West
10. A38 Sutton Road / B6014 Skegby Lane / Sheepbridge Lane
11. A60 / Old Mill Lane / Butt Lane
12. A6191 Adams Way / Oak Tree Lane
13. A60 / New Mill Lane

Within Market Warsop the following junction was identified:

14. A60 Church Street / Wood Street.

The Stage 2 analysis of the Local Plan scenario highlights a further five junctions:

15. A6117 Oak Tree Lane/ Eakring Road – Mansfield
16. Southwell Road/Berry Hill Lane
17. Southwell Road/Bellamy Road
18. A38/Rosemary Street
19. Coxmoor Road/Hamilton Road

In addition to the junctions highlighted by the Stage 2 analysis, the following four junctions have been assessed in detail as there is a local perception that these junctions are operating close to capacity:

20. A6075 Debdale Lane/ Priory Road – Mansfield Woodhouse
21. A60 Nottingham Road/ A611 Derby Road – Mansfield
22. A6191 Chesterfield Road/ A617 MARR – Pleasley
23. A60/Baums Lane/Sainsburys

The detailed junction modelling of these junctions confirm that all of the identified junctions would operate either near to or at capacity (Degree of Saturation >90%) or over capacity (Degree of Saturation >100%) with traffic demand forecasts that include sites in 2033 Local Plan.

Some form of capacity improvement would be required at each of the identified junctions, in order to accommodate trips from Local Plan development sites. This report makes comment on the feasibility of providing mitigation at the identified affected junctions. Suggested mitigation packages include:

- junction widening where appropriate to improve capacity;
- linking traffic signals to the urban traffic control centre using CCTV;
- optimising the layout and operation of traffic signal junctions so as to maximise capacity;
- the installation of bus priority measures to promote model shift
- maximise sustainable travel take-up; and
- technology upgrades.

An assessment and review of the sustainable travel potential of each Local Plan site has been undertaken to identify sites that may require additional interventions to maximise sustainable travel take up. Sites that can maximise the levels of sustainable travel options, where these are both available and attractive, have the most potential to result in decreased car dependency and result in fewer single occupier car trips being generated. The development of sites with sustainable travel options would reduce the generation of private car trips and assist with the mitigation of a site's traffic impacts.

It is expected that any subsequent planning application for a site would be required to include a transport assessment and travel plan that would identify that site's traffic impacts and detail a package of mitigation measures.

1. Introduction

1.1 Overview

1.1.1 Mansfield District Council is currently preparing a new local development plan to be known as the Mansfield District Local Plan. It will comprise two main parts. The Local Plan will provide the overall planning strategy for the area through strategic policies dealing with the overall scale, broad distribution and timing of new development. It will also take forward the strategy with policies that allocate land for development and designate specific areas for protection.

1.1.2 The new Local Plan will be subject to 'Examination in Public'. As such, a wide-ranging evidence base is being prepared to support the new Mansfield District Local Plan. This report has been prepared as part of this evidence base, and considers the transport context within which the potential development plan-related development would be brought forward. Although written as a stand-alone report, it should be read alongside the other documents comprising the evidence base as transport is only one consideration informing the new Local Plan and associated development allocations.

1.2 Reporting Structure

1.2.1 The transport assessment work has been undertaken via a 'stepped' approach. Broadly, these steps are:

Step 1:	How does the current transport network operate now?	Stage 1
Step 2:	How is the transport network likely to operate in future, with committed infrastructure schemes and land-use developments, but without the development identified in the Local Plan?	
Step 3:	How is the transport network likely to operate in future, with committed infrastructure schemes and land-use developments, and with development identified in the Local Plan?	Stage 2

1.2.2 From the above, comparison of the outputs from Stage 1 and Stage 2 will allow the impact of the proposed development identified in the Local Plan to be judged and the appropriate level of mitigation identified.

1.2.3 Step 1 and Step 2 are detailed in the Stage 1 report (Mansfield District Transport Study: Stage 1 Baseline and Reference Case, May 2017).

1.3 Purpose of this Report

1.3.1 This report comprises of Step 3. It considers the transport network conditions in the future with the identified development sites in the development plan. A future year of 2033 has been considered as this represents the end of the Local Plan period.

1.3.2 Although the focus of the assessment work relates to the operation of roads and junctions, this report does consider all modes of transport within the district of Mansfield.

1.3.3 The outputs from this Stage 2 assessment have been compared against those presented in the Stage 1 assessment.

1.4 Study Area

1.4.1 The Study Area is shown in Figure 1.1 (at the end of this section) and covers Mansfield, Market Warsop and the surrounding area. This is the same study area as previously identified, assessed and reported at Stage 1.

1.5 Methodology

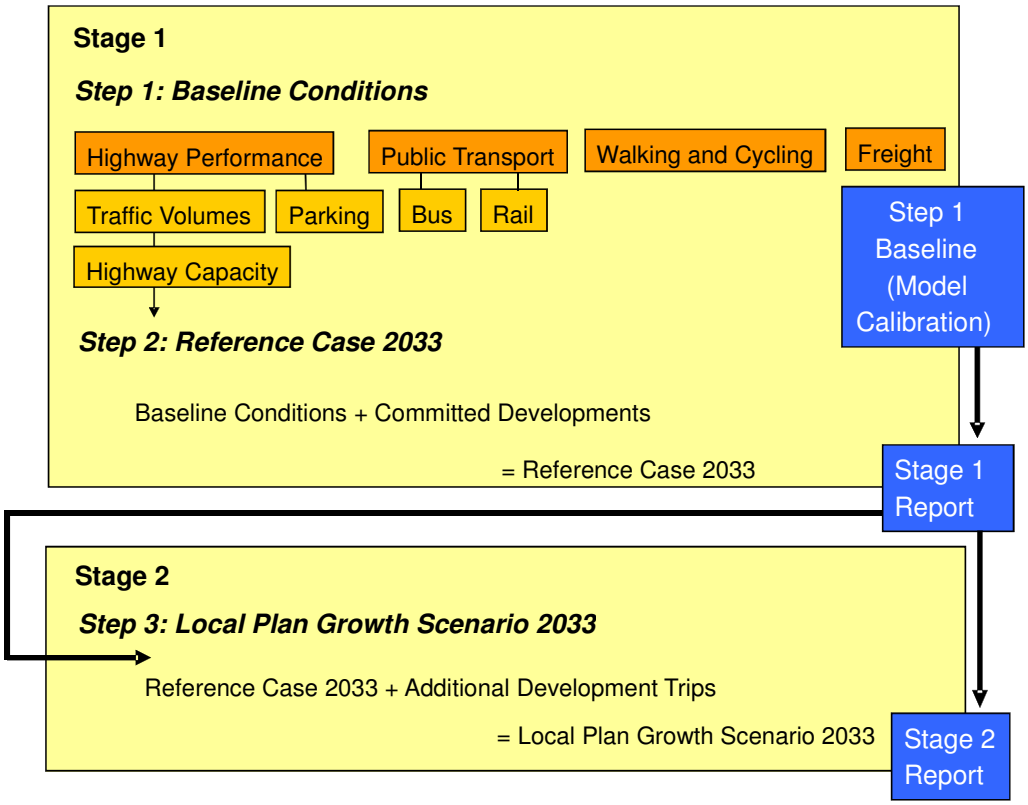
1.5.1 Figure 1.2 summarises the methodology employed for this study. Essentially there are three steps:

Step 1 collates data about the existing transport conditions and identifies a 'Baseline' For the purposes of the transport modelling tasks, the baseline is 2016. The Local Plan period is between 2013 and 2033.

Step 2 examines future conditions given the most likely projections of growth and committed developments (both transport infrastructure and land-use developments) that are likely to be implemented to 2033. This is a 'Reference Case' against which potential additional development can be judged.

Step 3 then examines the likely future conditions given the introduction of potential development plan-related proposals, and reviews this against the 'Reference Case'.

Figure 1.2: Study Methodology (Steps 1 – 3)



1.5.2 Data to inform the above steps have been obtained from both Mansfield District Council's planning department, and Nottinghamshire County Council (the local highway authority). In particular, the following information and data has been collated:

- Details of committed land-use developments to 2033;
- Details of committed transport-infrastructure improvements to 2033;
- Details of land use developments identified by the draft Local Plan;
- Historic traffic count data from Nottinghamshire County Council including, 47 count locations in total, comprising:
  - Manual Classified Counts at junctions;
  - Permanent Automatic Traffic counts;
  - Temporary Automatic Traffic Counts.
- New traffic count data was commissioned for the following junctions during October 2016;
  - A60 / Baums Lane / Park Lane;
  - New Mill Lane / Sandlands Way;
  - Sandlands Way / A6117 / Heatherley Drive;
  - A60 Church Street / Wood Street;
  - A60 / Askew Lane / Vale Avenue;
- Cycle count data from Nottinghamshire County Council;
- Road Safety statistics from Nottinghamshire County Council;
- Census data from National Statistics; and
- Mansfield SATURN traffic model.

1.5.3 As noted in the last bullet point, Mansfield benefits from a SATURN model of its highway network which has been developed over a number of years by Nottinghamshire County Council. Although made available to Mansfield District Council for this work, it is noted that this model does not cover the full Study Area, as Market Warsop is not included in the SATURN model. As such, the Step 1 and 2 assessments of the highway network have been undertaken via a composite of baseline data from the SATURN traffic model and traffic count data in Market Warsop.

1.5.4 The SATURN model development is described in the Stage 1 assessment report.

1.5.5 Chapters containing details on 'Policy Background' and 'Base Conditions' have not been presented in this Stage 2 report. These details are documented in the Stage 1 report, the base traffic conditions and policy information has not changed since the Stage 1 document was finalised and published.

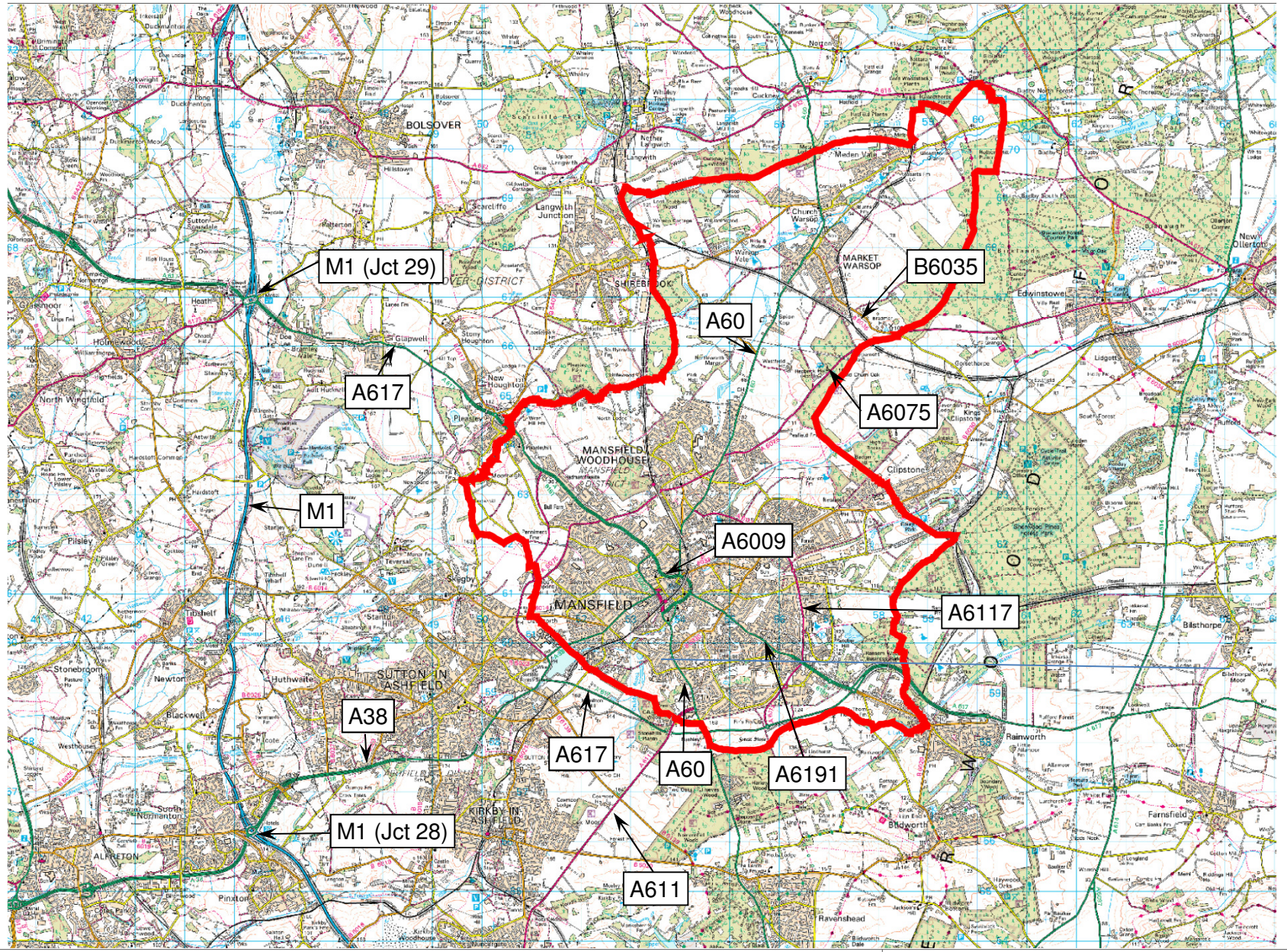


Figure 1.1: Study Area

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2. Local Plan Conditions – Highway Network

2.1 Overview

2.1.1 Having examined the Base Year conditions as part of Step 1 and the Reference Case as Step 2, this part of the study examines the likely future conditions within Mansfield urban area and Market Warsop, given the most likely projections of growth and committed developments (both transport infrastructure and land-use developments) along with Local Plan 'Urban Concentration' growth sites that have been identified as possible development sites to 2033. This process forms Step 3, which is Stage 2 of the Mansfield Transport Study.

2.1.2 Step 3 forms the Local Plan growth assessment which will allow the additional Local Plan development sites to be compared against the 'Reference Case' assessments highlighting impacts upon the transport networks.

2.1.3 This section of the report documents the developments above and beyond those used in the 'Reference Case' and describes the method used to develop a 2033 Local Plan 'Urban Concentration' forecast, in the Mansfield urban area using the SATURN model. It will also identify any links or junctions that would be likely to be approaching or exceeding capacity by 2033.

2.2 Developments included in the Local Plan to 2033

2.2.1 Committed developments identified (in Step 2), as part of the 'Reference Case', were carried forward into this assessment. For the purposes of the study, committed developments are defined as major housing, commercial and retail sites with planning permission but not fully developed in the Base Year, sites with Council resolutions to grant planning permission for housing subject to signing Section 106 agreements, and other housing sites deemed suitable for development through the Housing and Employment Land Availability Assessment (HELAA) process.

2.2.2 To this Reference Case scenario, the Local Plan developments were added in this Stage 2 assessment. Strategic employment, retail and housing sites were identified by Mansfield District Council along with the relevant site size or dwelling capacity. The Local Plan contains provision for 4,869 dwellings and 44.84 hectares of employment and retail land.

2.2.3 For the purpose of the transport modelling tasks it is assumed that all the Local Plan site allocations will be delivered within the plan period (some of the larger sites may be fully delivered outside of this period). This approach represents a robust traffic forecasting approach.

2.2.4 The included Local Plan developments are identified by land-use type, on a map base in Figure 2.1 and Figure 2.2 below. They include residential, economic and mixed-use developments. The Mansfield District Council site reference numbers for these Local Plan developments are also included.

2.2.5 Each Local Plan site was considered as to whether the development would replace existing development which would either require demolition or site clearance. The implication for the traffic model would be to represent an unrealistically high level of trips if both existing and new Local Plan development were to occupy the same land. No Local Plan sites were considered to be in locations of existing trip generation and therefore no adjustment was made to the Reference Case matrices.

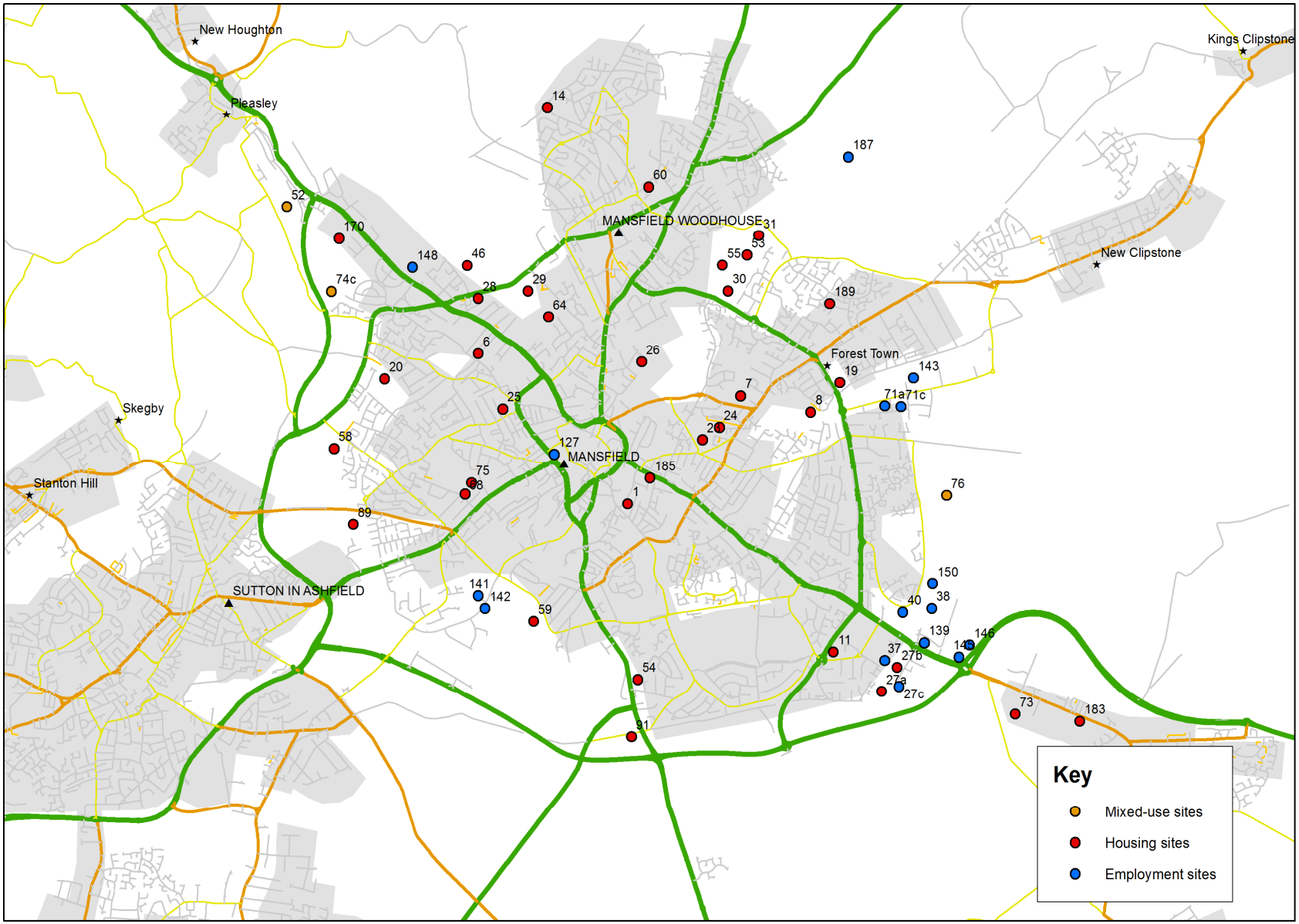

Figure 2.1: Local Plan development for Mansfield to 2033

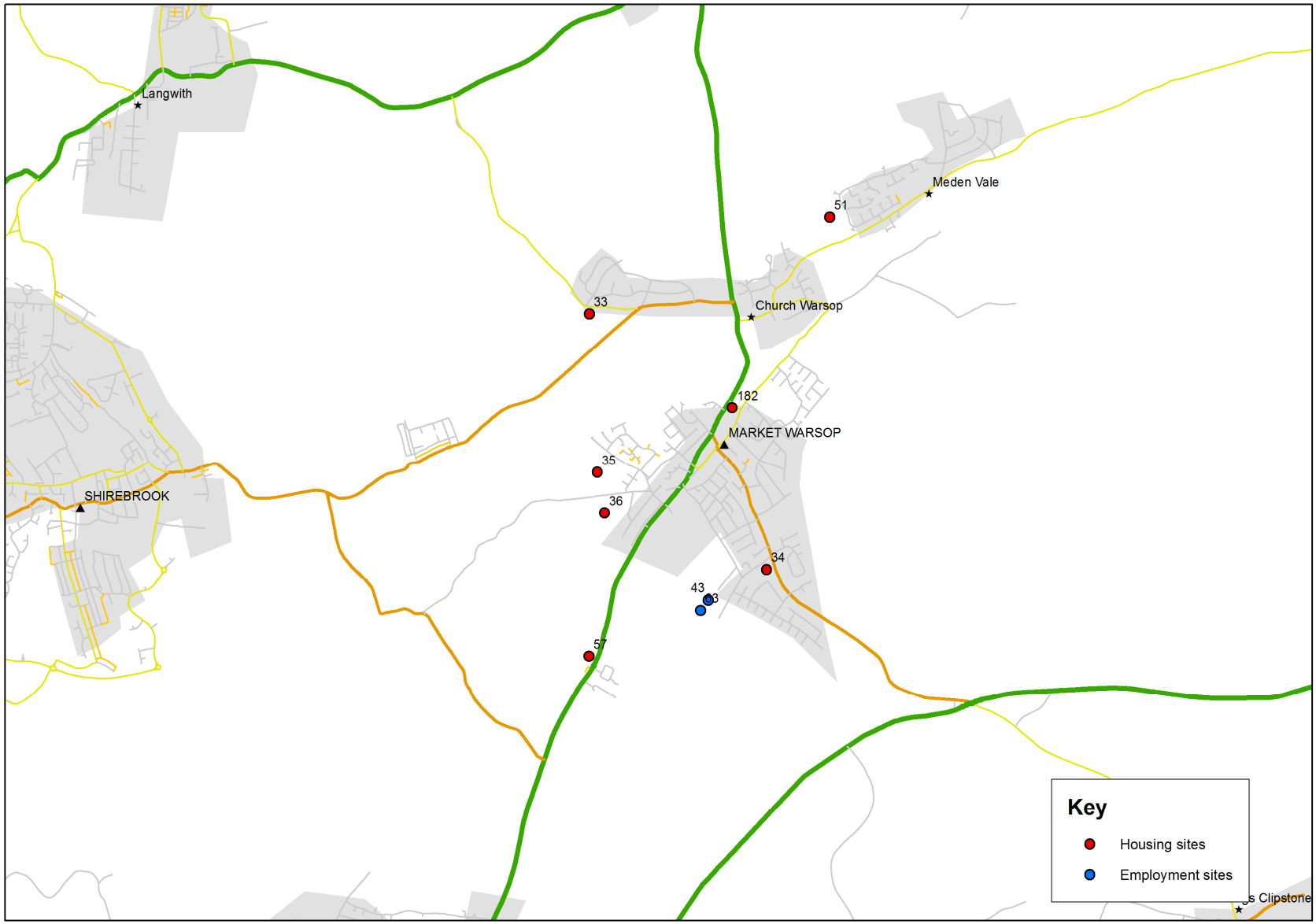

Figure 2.2: Local Plan development for Warsop to 2033

2.2.6 The levels of development entered into the matrices of the 2033 Local Plan SATURN model are detailed in Appendix A. Table 2.1 below details the hourly trip total represented in the Base Year (2016) SATURN model, forecasts trip levels using growth factors from the Department for Transport's (DfT) National Trip End Model (NTEM) 2033, the 2033 trip totals calculated for the Reference Case (based on committed developments in Mansfield District) and those additionally associated with the identified Local Plan developments (also 2033).

Table 2.1: Matrix Totals

Trip demand scenario	Total Trips (per hour)	
	AM	PM
Base 2016	29,595	31,678
NTEM 2033	33,376	35,571
Reference Case 2033	39,452	40,890
Local Plan 2033	44,783	48,010

2.2.7 Table 2.1 shows that the 2033 Reference Case forecasts represent an increase compared to the 2016 Baseline traffic conditions of 9,857 trips per hour (33%) in the AM peak and 9,212 trips per hour (29%) in the PM peak. The Local Plan growth represents an increase of trips equal to 15,188 trips per hour (51%) in the AM peak and 16,332 trips (52%) in the PM Peak compared to the Baseline.

2.2.8 The 2033 Local Plan represents an increase over the 2033 Reference Case of 5,331 trips (14%) in the AM peak and 7,120 trips (17%) in the PM peak hour.

2.2.9 It is noted that the growth in trip demand in both the Reference Case and Local Plan cases exceed that forecast from NTEM. This shows that the overall level of growth contained in Mansfield District Council's list of committed development and Local Plan is greater than the forecasts derived from local and regional planning projections of jobs, employment, population and household numbers in combination with travel growth factors from the National Transport Model.

2.2.10 As the 2033 model's demand matrix trip-end totals for the Local Plan forecasts scenario (calculated using the development assumptions detailed in Appendix A) exceed those trip-end forecasts produced by the DfT's NTEM in both AM and PM Peak periods, it was not necessary, therefore, to 'top-up' the Local Plan growth to match the traffic growth benchmarks set by NTEM.

2.2.11 The extra trips associated with the Local Plan development sites were added to the Reference Case demand matrices. This method assumes that all Local Plan development trips are new to the network and will not suppress or replace the existing Reference Case (or Base) trips. This produced a robust approach to the traffic impact assessments.

2.3 Transport Infrastructure

2.3.1 No future year highway schemes were identified which would impact upon the existing network capacity. Some of the committed development sites in the Reference Case forecasts had associated highway infrastructure as part of the development. These included:

- Lindhurst (internal link roads and access points);
- Penniment Farm (access points); and
- Prologis Park (access points).

2.3.2 These highway improvements, which were included within the 2033 Reference Case highway networks, were also included in the 2033 Local Plan highway networks.

2.3.3 For modelling purposes, it has been assumed that all Local Plan development will be able to access the local highway network without the need for internal highway construction adding to or changing the highway network and providing new routes for existing trips.

2.3.4 As the development site at 'Land off Jubilee Way' (combined employment and housing) is accessed via Jubilee Way, an existing highway link which was at the edge of the local traffic model and not represented in the Baseline or Reference Case model networks, was added to the Local Plan networks to allow trips generated by the development site to enter Mansfield via either the northern or southern end of Jubilee Way.

2.4 Operating Conditions

2.4.1 Using the methodology and presentation format previously exhibited for the Stage 1 analysis, the following indicators for the Local Plan (2033) highway network have been extracted from the SATURN model:

- Total flow in Passenger Car Units (PCU) per hour (Figure 2.3 & 2.4 – pages 10 and 11);
- Delay (Figure 2.7 & 2.8 – pages 20 and 21); and
- Volume / Capacity Ratios (Figure 2.11 & 2.12 – pages 28 and 29).

2.4.2 Additionally the total flow in PCU per hour has been presented as a percentage difference between the 2033 Reference Case and 2033 Local Plan. This analysis is presented in Figure 2.5 and 2.6 for the AM and PM Peak respectively.

2.4.3 Delay differences between the 2033 Reference Case and 2033 Local Plan scenario are presented in Figure 2.9 & 2.10 for the AM and PM Peak respectively.

2.5 Total Flow

2.5.1 The aggregate traffic flow impacts of all Local Plan developments compared with the Reference Case can be seen in Figure 2.5 and 2.6. The comparison is shown as percentage change from the 2033 Reference Case scenario outlined in Stage 1, Step 2 of the Mansfield Transport Study.

2.5.2 Traffic flow changes of no more than 10% (between -10% and +10%) from the Reference Case scenario to the Local Plan scenario are considered to be within the traffic model forecasting tolerances, and to have no overall or discernible traffic impact upon the highway network.

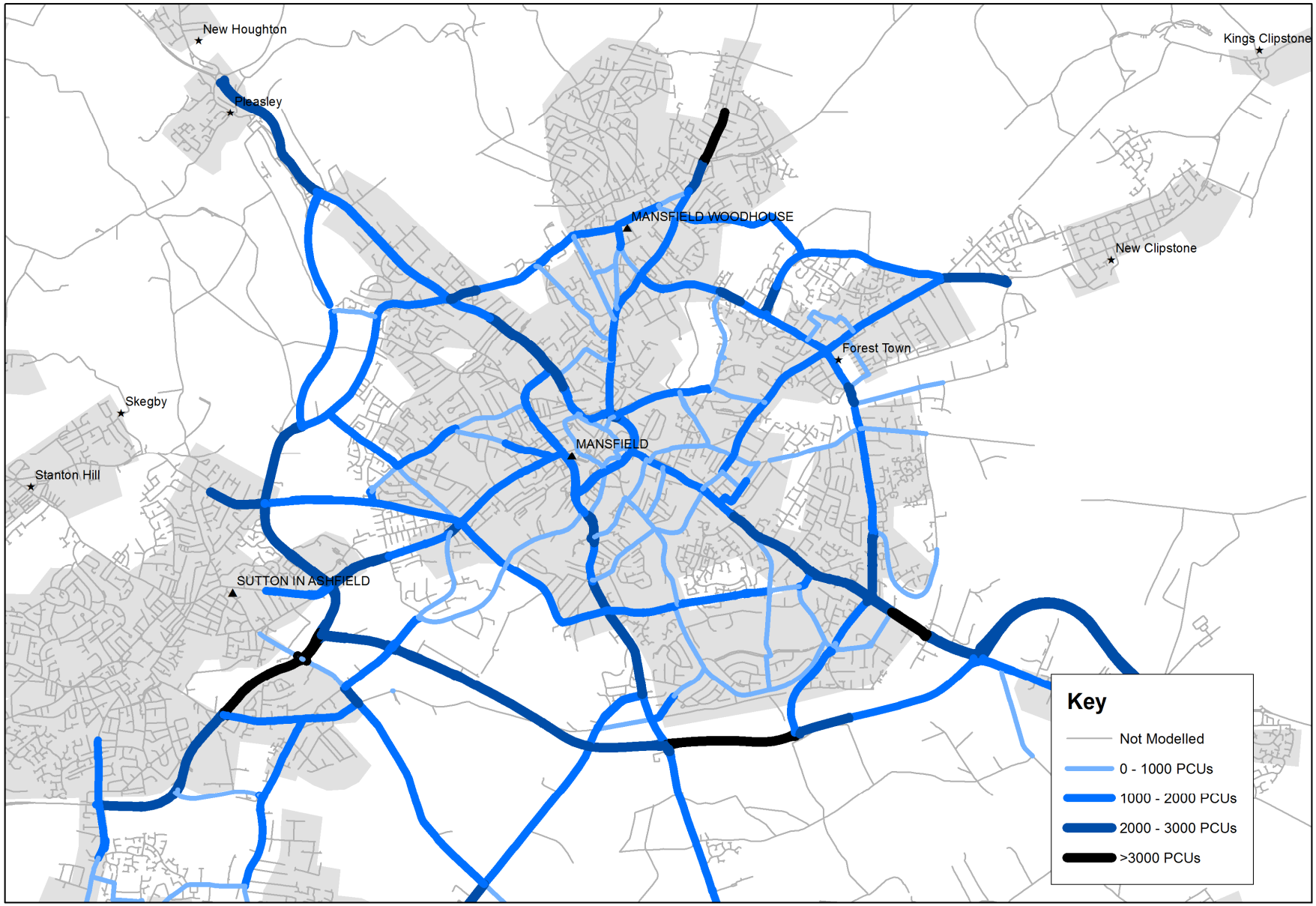

Figure 2.3: Local Plan (2033) AM Peak Hour Traffic Flows

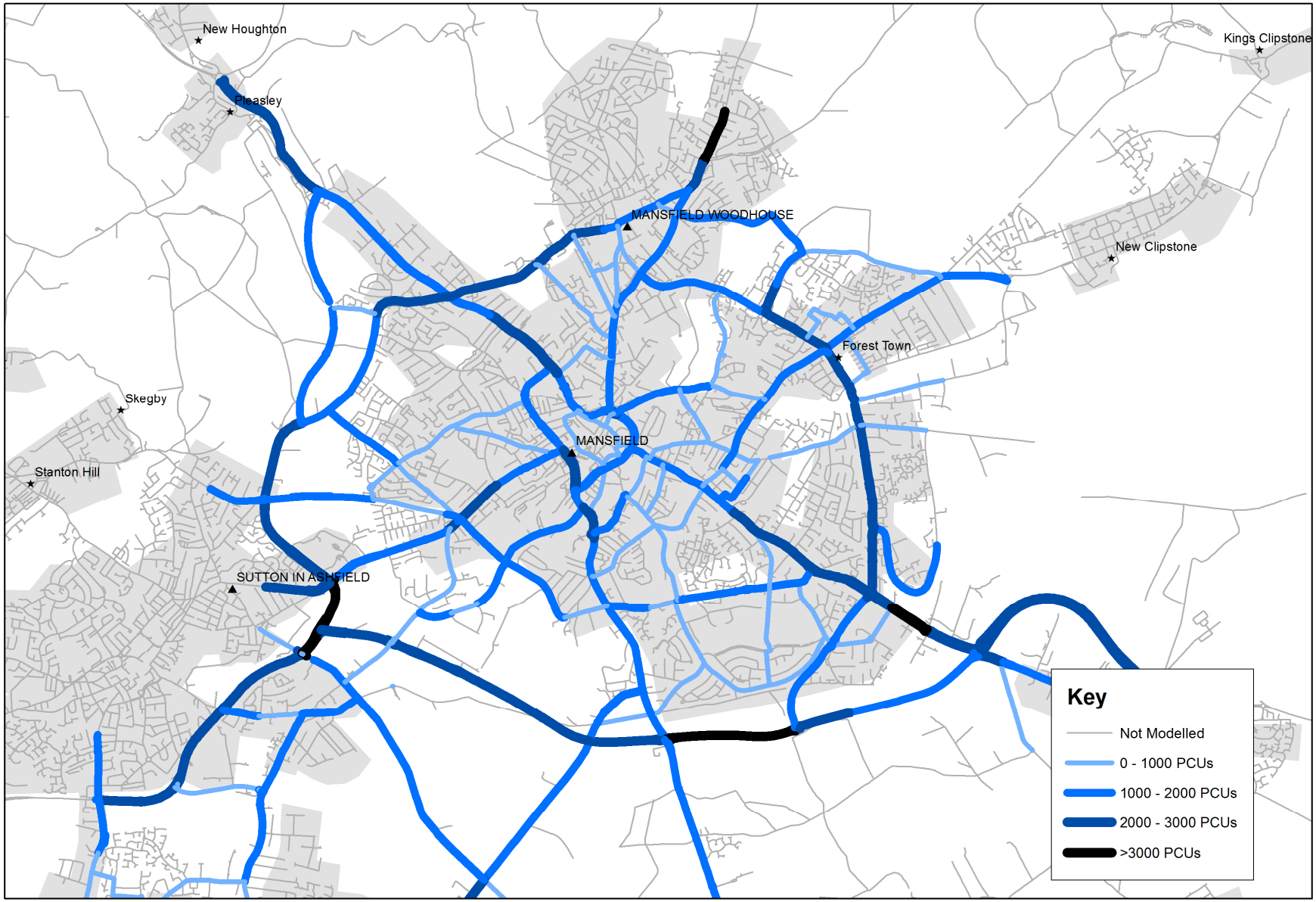

Figure 2.4: Local Plan (2033) PM Peak Hour Traffic Flows

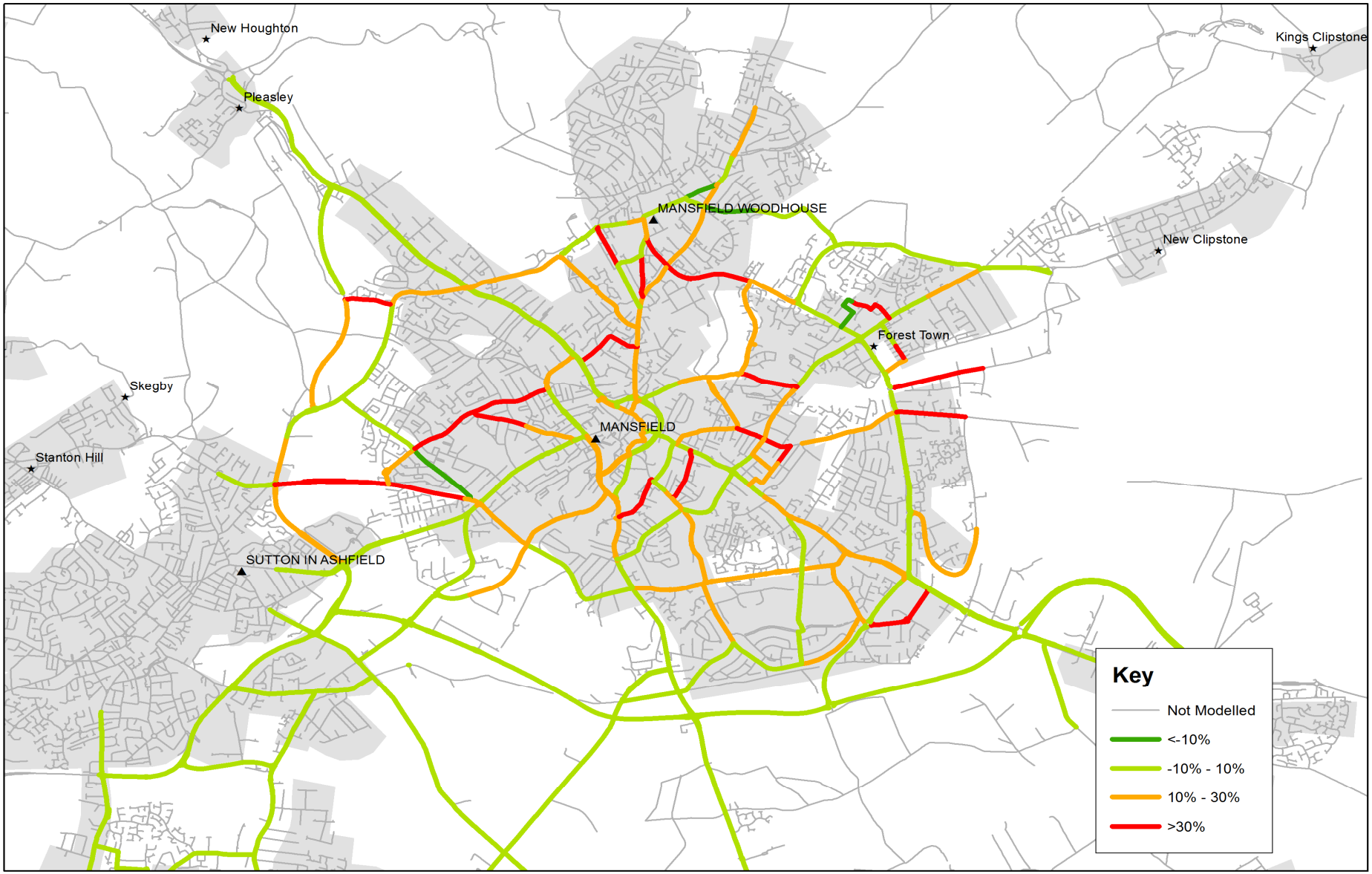

Figure 2.5: Local Plan – Reference Case % Difference (2033) AM

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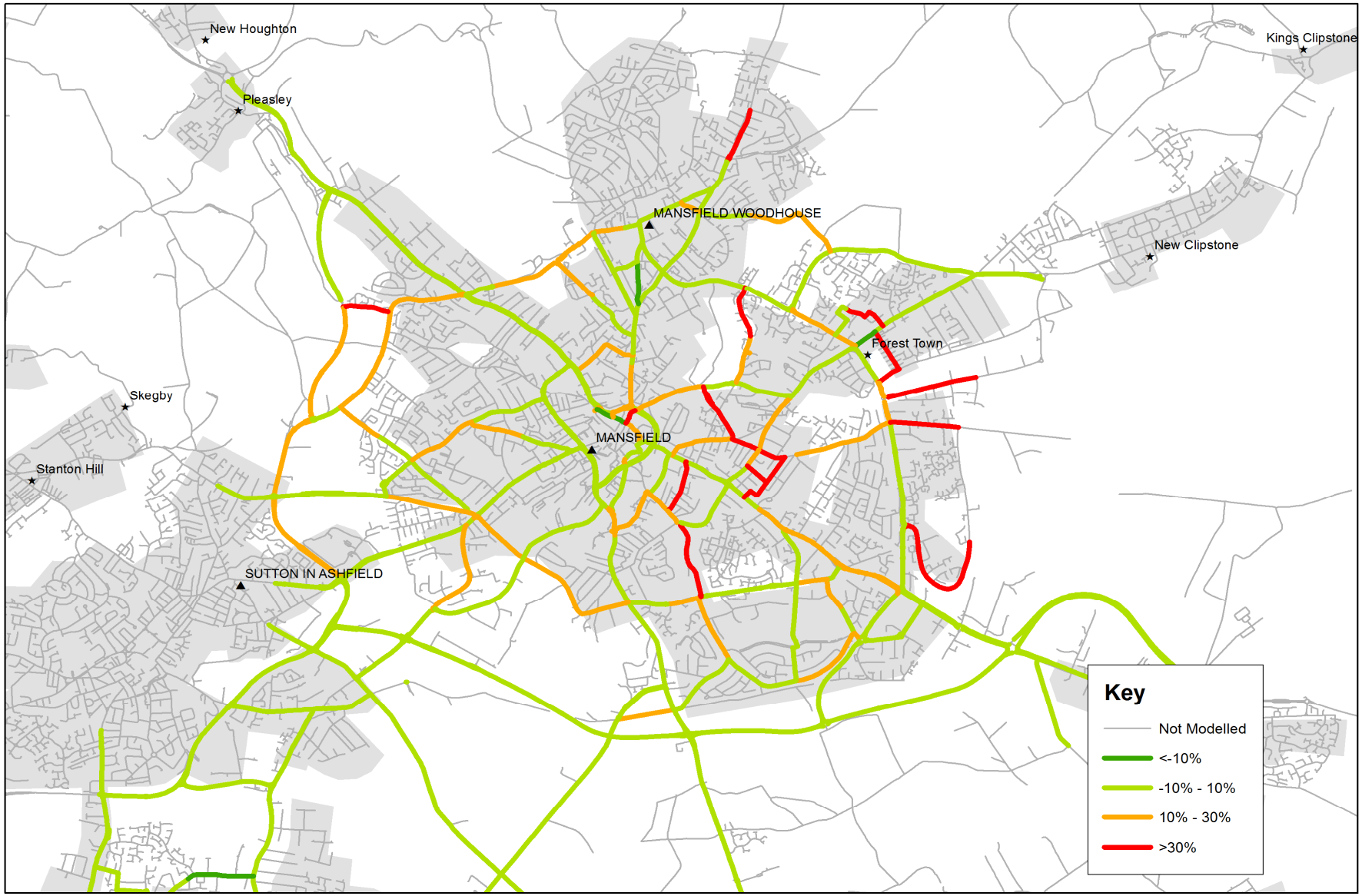


Figure 2.6: Local Plan – Reference Case % Difference (2033) PM

2.5.3 In the AM Peak (Figure 2.5), the largest traffic flow increases (30% or more) are on the following highway links:

- A6117 Old Mill Lane, and Butt Lane;
- Skerry Hill;
- B6033 Ravensdale Road;
- Ladybrook Lane;
- Bancroft Lane;
- B6032 Mansfield Road;
- Sherwood Street, Mansfield Woodhouse;
- West Bank Avenue and Haddon Road;
- Water Lane;
- Skegby Lane;
- Baums Lane;
- Cavendish Street and Broxtowe Drive;
- Eakring Road;
- Hall Street;
- Bellamy Road;
- Crown Farm Way;
- Main Avenue;
- George Street.

2.5.4 As a result of Local Plan development, in the AM Peak, two-way traffic flows on A6117 Old Mill Lane are predicted to increase from 1,390 PCUs per hour to 1,820 PCUs per hour along the western section and from 1,550 PCUs per hour to 1,900 PCUs per hour along the eastern section, relative to the Reference Case. Whilst on street parking is not prohibited, especially at the two ends of this link, on-street parking does not appear to be restricting traffic flow and therefore any capacity issues would be likely to occur as junction delays.

2.5.5 Two-way traffic flows on Butt Lane are forecast to increase from 620 PCUs per hour to 810 PCUs per hour in the AM Peak: although this is a large increase in percentage terms, the flow remains less than the mid-link capacity of Butt Lane and any increases in delay are likely to occur at the junction with the A60 and Old Mill Lane.

2.5.6 Two-way forecast flows along Skerry Hill in the AM Peak are forecast to increase from approximately 530 PCUs per hour in the Reference Case to 750 PCUs per hour in the Local Plan growth scenario. It may be necessary to rationalise on-street parking, for example only allow parking on one side of the road in order to maintain two-way traffic movements. Otherwise the overall capacity along the link and at the two end junctions would be sufficient to accommodate the forecast flow demands.

2.5.7 Along the B6033 Bath Lane, AM Peak two-way traffic flows are predicted to increase from 1,250 PCUs per hour in the Reference Case to 1,400 PCUs per hour in the Local Plan scenario. While larger flow increases would occur on the B6033 Ravensdale Road, the

resulting flow in the Local Plan scenario would be less (increase from 680 PCUs per hour to 960 PCUs per hour). These links are capable of accommodating these two-way flows as on-street parking does not restrict the traffic movements. Capacity constraint would be likely to occur as junction delays, which are discussed later in reference to Figure 2.11 and Figure 2.12.

2.5.8 Two-way traffic flow increases along Ladybrook Lane in the AM Peak would be from approximately 800 PCUs per hour in the Reference Case to 1,230 PCUs per hour in the Local Plan scenario. Ladybrook Lane is generally wide and parking is provided either on road (both sides) or off road, two lanes are maintained. It is expected that this increase, due to the Local Plan traffic, would not be a material impact.

2.5.9 Bancroft Lane, to the north-west of Goldsmith Street, is wide with parking provided either on-street (on both sides) or off-road with two lanes maintained for through movements. Two-way traffic flows are predicted to increase from approximately 480 PCUs per hour in the Reference Case to 740 PCUs per hour in the Local Plan scenario. It is expected that the traffic impacts of the Local Plan scenario can be accommodated by the existing highway network. The south-eastern section of Bancroft Lane narrows as it approaches the A38 and there are fewer marked parking bays. Along this section of Bancroft Lane the two-way traffic flows are predicted to increase from approximately 830 PCUs per hour in the Reference Case to 1,060 PCUs per hour in the Local Plan. Given that on-street parking is already restricted in order to maintain two-way traffic flows, it is expected that the Local Plan traffic could be accommodated within the existing highway design. Any issues with the capacities at the junctions at either end of the link are considered separately in subsequent paragraphs.

2.5.10 Two-way traffic flows on the B6032 Mansfield Road in the AM Peak would increase from 200 PCUs per hour in the Reference Case to 310 PCUs per hour in the Local Plan scenario. This would remain within the capacity of the existing highway.

2.5.11 Sherwood Street at Mansfield Woodhouse is forecast to carry two-way flows in the AM Peak of 210 PCUs per hour in the Reference Case, rising to 320 PCUs per hour in the Local Plan scenario: while a large percentage increase, this would remain within the capacity of the existing highway.

2.5.12 West Bank Avenue and Haddon Road are forecast to carry two-way flows in the AM Peak of 180 PCUs per hour in the Reference Case, rising to 310 PCUs per hour in the Local Plan scenario: while a large percentage increase, this would remain within the capacity of the existing highway.

2.5.13 Traffic flows on Water Lane between the MARR and Abbott Road are forecast to increase substantially in the Local Plan scenario due to nearby developments. 2-way flows in the AM Peak would increase from 350 PCUs per hour in the Reference Case to 890 PCUs per hour in the Local Plan scenario. Although the hourly flow would more than double, Water Lane has a straight alignment, without on-street parking, and the flow is not expected to cause link capacity issues. The eastern end of Water Lane, at its junction with Abbott Road, is currently signed ‘Unsuitable for heavy goods vehicles’: no corresponding indication is given in the opposite direction. This might need to be reviewed in the light of development in the area.

2.5.14 Two-way AM Peak flows on the western part of Skegby Lane, between the MARR and Ladybrook Lane, are forecast to increase from 1,000 PCUs per hour in the Reference Case to 1,320 PCUs per hour in the Local Plan scenario. This link is straight, with few junctions or

direct accesses (housing to the north is accessed via a service road), and the junction with the MARR is signalised. The section of Skegby Lane between Ladybrook Lane and the A38 Sutton Road has more on-street parking, but is wider: two-way AM Peak flows on this section would increase from 650 PCUs per hour to 1,000 PCUs per hour. As such, the increases in flow on both parts of Skegby Lane should be accommodated within the existing highway capacity.

2.5.15 Two-way AM Peak flows on Baums Lane are forecast to increase from 460 PCUs per hour in the Reference Case to 710 PCUs per hour in the Local Plan scenario. Although this is a large relative increase, the absolute change is small and is not expected to cause capacity issues.

2.5.16 Two-way AM Peak flows on Cavendish Street and Broxtowe Drive are forecast to increase from 270 PCUs per hour in the Reference Case to 380 PCUs per hour in the Local Plan scenario. Although this is a large relative increase, the absolute change is small and is not expected to cause capacity issues.

2.5.17 Two-way AM Peak flows on the western section of Eakring Road, adjacent to its junction with the B6030 Carter Lane, would increase from 140 PCUs per hour in the Reference Case to 280 PCUs per hour in the Local Plan scenario. On-street parking on this section of Eakring Road is in marked bays, and it is anticipated that the increase in flow would be accommodated within the existing highway capacity. Two-way AM Peak flows on the section of Eakring Road to the east of the A6117 Oak Tree Lane would increase from 150 PCUs per hour in the Reference Case to 640 PCUs per hour in the Local Plan scenario, in part due to the Local Plan development on land off Jubilee Way. It is expected that this increase in flow would be within the link capacity, and that any increase in delay would occur at the signalised junction with the A6117.

2.5.18 Flows on the section of Hall Street between Newmarket Street and Eakring Road are forecast to increase from 150 PCUs per hour to 290 PCUs per hour two-way in the AM Peak. This part of Hall Street is narrow, with on-street parking on both sides, but the forecast flow in the Local Plan scenario is still low (less than 5 PCUs per minute two-way flow), and there are additional links which would provide alternative routes in this area (e.g. Smith Street and Maltby Road/Epsom Street) but which are not directly represented in the traffic model.

2.5.19 Two-way AM Peak flows on Bellamy Road would increase from 270 PCUs per hour in the Reference Case to 360 PCUs per hour in the Local Plan scenario. The road is wide (although there is some on-street parking) and would accommodate the forecast flows.

2.5.20 Flows on Crown Farm Way would increase in the Local Plan scenario because of employment development nearby (Crown Farm Industrial Estate and Long Stoop Way). Two-way flows in the AM Peak would increase from 570 PCUs per hour to 740 PCUs per hour. The link is of a high standard and would accommodate these flows satisfactorily.

2.5.21 Two-way AM Peak flows on the southern part of Main Avenue are shown increasing from 120 PCUs per hour in the Reference Case to 170 PCUs per hour in the Local Plan scenario because of Local Plan housing development on the allotment site to the north of the junction of Pump Hollow Road and Newlands Road. The actual routing of trips to and from this site would be dependent on the access arrangements for this development, and is not expected to be via Main Avenue.

2.5.22 Increased AM Peak flows on George Street and reductions in flow on Dorothy Drive shown in Figure 2.5 are a result of localised rerouting of trips to and from existing housing in this area: no Local Plan development is present at this location.

2.5.23 In the PM Peak (Figure 2.6), the largest traffic flow increases (30% or more) are on the following highway links:

- A60 Leeming Lane North;
- Sandy Lane;
- Berry Hill Road;
- Skerry Hill
- Eakring Road
- Hall Street
- Gordon Avenue
- Barringer Road
- George Street
- Main Avenue
- Crown Farm Way
- Jubilee Way South
- Cavendish Street and Broxtowe Drive
- Water Lane

2.5.24 Traffic increases along Leeming Lane, between the Reference Case and Local Plan scenario, are a result of a proportion of trips from the identified development sites in Market Warsop, to the north of the District, travelling to/from Mansfield. Along Leeming Lane North the two-way traffic flow increases in the PM Peak from 2,610 to 3,700 PCUs, and the flow on Leeming Lane South increases from 1,870 PCUs to 1,910 PCUs. In terms of highway link capacity, Leeming Lane North may experience queuing and delays as it begins to approach capacity and free-flow traffic operation may become limited. In comparison, Leeming Lane South would be able to accommodate the predicted flows and capacity shortfalls would be likely to occur as junction delays. These are discussed later in reference to Figure 2.11 and Figure 2.12.

2.5.25 Two-way forecast flows along Sandy Lane in the PM Peak are expected to increase from approximately 610 PCUs per hour in the Reference Case to 870 PCUs per hour in the Local Plan scenario. Whilst there is on-street parking along this road, the predicted traffic flow increases are unlikely to cause material traffic impacts.

2.5.26 Traffic volumes in the PM Peak are predicted to increase by 40% along Berry Hill Road as a result of the Local Plan developments. The increase is approximately 250 PCUs per hour. On-street parking can occur on both sides of Berry Hill Road, but given that overall two-way flow volumes are predicted to remain below 900 PCUs per hour, the Local Plan growth is unlikely to cause material traffic impacts.

2.5.27 Two-way forecast flows along Skerry Hill in the PM Peak are forecast to increase from approximately 660 PCUs per hour in the Reference Case to 910 PCUs in the Local Plan growth scenario. It may be necessary to rationalise on-street parking, for example only

allow parking on one side of the road in order to maintain two-way traffic movements. Otherwise the overall capacity along the link and at the two end junctions would be sufficient to accommodate the forecast flow demands.

2.5.28 Two-way PM Peak flows on the western section of Eakring Road, adjacent to its junction with the B6030 Carter Lane, would increase from 280 PCUs per hour in the Reference Case to 450 PCUs per hour in the Local Plan scenario. On-street parking on this section of Eakring Road is in marked bays, and it is anticipated that the increase in flow would be accommodated within the existing highway capacity. Two-way PM Peak flows on the section of Eakring Road to the east of the A6117 Oak Tree Lane would increase from 190 PCUs per hour in the Reference Case to 420 PCUs per hour in the Local Plan scenario, in part due to the Local Plan development on land off Jubilee Way. It is expected that this increase in flow would be within the link capacity, and that any increase in delay would occur at the signalised junction with the A6117.

2.5.29 Flows on the section of Hall Street between Newmarket Street and Eakring Road are forecast to increase from 340 PCUs per hour to 540 PCUs per hour two-way in the PM Peak. This part of Hall Street is narrow, with on-street parking on both sides, but there are additional links which would provide alternative routes in this area (e.g. Smith Street and Maltby Road/Epsom Street) but which are not directly represented in the traffic model.

2.5.30 Flows on Gordon Avenue are forecast to increase from 490 PCUs per hour to 650 PCUs per hour two-way in the PM Peak. There is some on-street parking on Gordon Avenue, but it is wide enough that the forecast flow in the Local Plan scenario would be within the existing capacity of the link.

2.5.31 Two-way PM Peak flows on the northern part of Barringer Road (between Breckbank and Old Mill Lane) are forecast to increase from 690 PCUs per hour in the Reference Case to 890 PCUs per hour in the Local Plan scenario. This link is of the standard that would be expected for a housing estate main distributor road, and would accommodate the forecast flow in the Local Plan scenario.

2.5.32 Increased AM Peak flows on George Street and reductions in flow on Dorothy Drive shown in Figure 2.6 are a result of localised rerouting of trips to and from existing housing in this area: no Local Plan development is present at this location.

2.5.33 Two-way PM Peak flows on the southern part of Main Avenue are shown increasing from 63 PCUs per hour in the Reference Case to 397 PCUs per hour in the Local Plan scenario because of Local Plan housing development on the allotment site to the north of the junction of Pump Hollow Road and Newlands Road. The actual routing of trips to and from this site would be dependent on the access arrangements for this development, and is not expected to be via Main Avenue.

2.5.34 Flows on Crown Farm Way would increase in the Local Plan scenario because of employment development nearby (Crown Farm Industrial Estate and Long Stoop Way). Two-way flows in the PM Peak would increase from 640 PCUs per hour to 880 PCUs per hour. The link is of a high standard and would accommodate these flows satisfactorily, although some increase in delay would be expected at the Oak Tree Lane roundabout.

2.5.35 Flows on Jubilee Way South would increase in the Local Plan scenario because of the development of land off Jubilee Way. Two-way flows in the PM Peak would increase from 820 PCUs per hour to 1,330 PCUs per hour.

2.5.36 Two-way PM Peak flows on Cavendish Street and Broxtowe Drive are forecast to increase from 390 PCUs per hour in the Reference Case to 520 PCUs per hour in the Local Plan scenario. Although this is a large relative increase, the absolute change is small and is not expected to cause capacity issues.

2.5.37 Traffic flows on Water Lane between the MARR and Abbott Road are forecast to increase substantially in the Local Plan scenario due to nearby developments. 2-way flows in the PM Peak would increase from 230 PCUs per hour in the Reference Case to 890 PCUs per hour in the Local Plan scenario. Although the hourly flow would more than double, Water Lane has a straight alignment, without on-street parking, and the flow is not expected to cause link capacity issues. The eastern end of Water Lane, at its junction with Abbott Road, is currently signed 'Unsuitable for heavy goods vehicles': no corresponding indication is given in the opposite direction. This might need to be reviewed in the light of development in the area.

2.5.38 Flows on Leeming Street in the PM Peak are forecast to increase from 120 PCUs per hour in the Reference Case to 160 PCUs per hour in the Local Plan scenario. Although this is a large relative increase, the absolute change is small and is not expected to cause capacity issues.

2.6 Travel Delays

2.6.1 Figure 2.7 and Figure 2.8 (pages 20 &21) show the traffic modelled delays, in the AM and PM peak hours respectively, for the 2033 Local Plan scenario compared with the 2016 Baseline case.

2.6.2 Figure 2.9 and Figure 2.10 (pages 22 & 23) show the traffic modelled delays, in the AM and PM peak hours respectively, for the 2033 Local Plan scenario compared with the 2033 Reference Case forecasts.

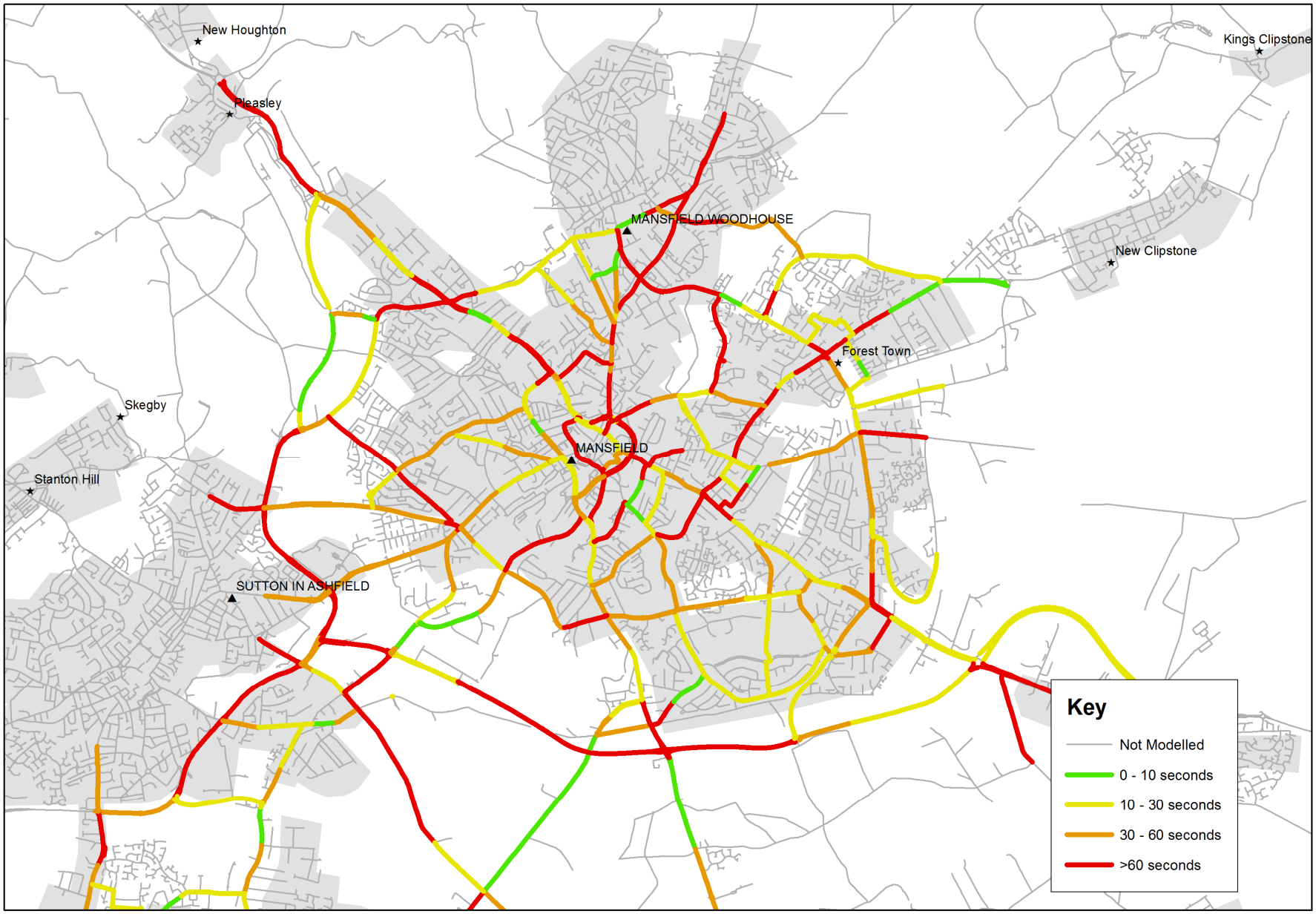


Figure 2.7: Local Plan (2033) AM Peak Hour Delays

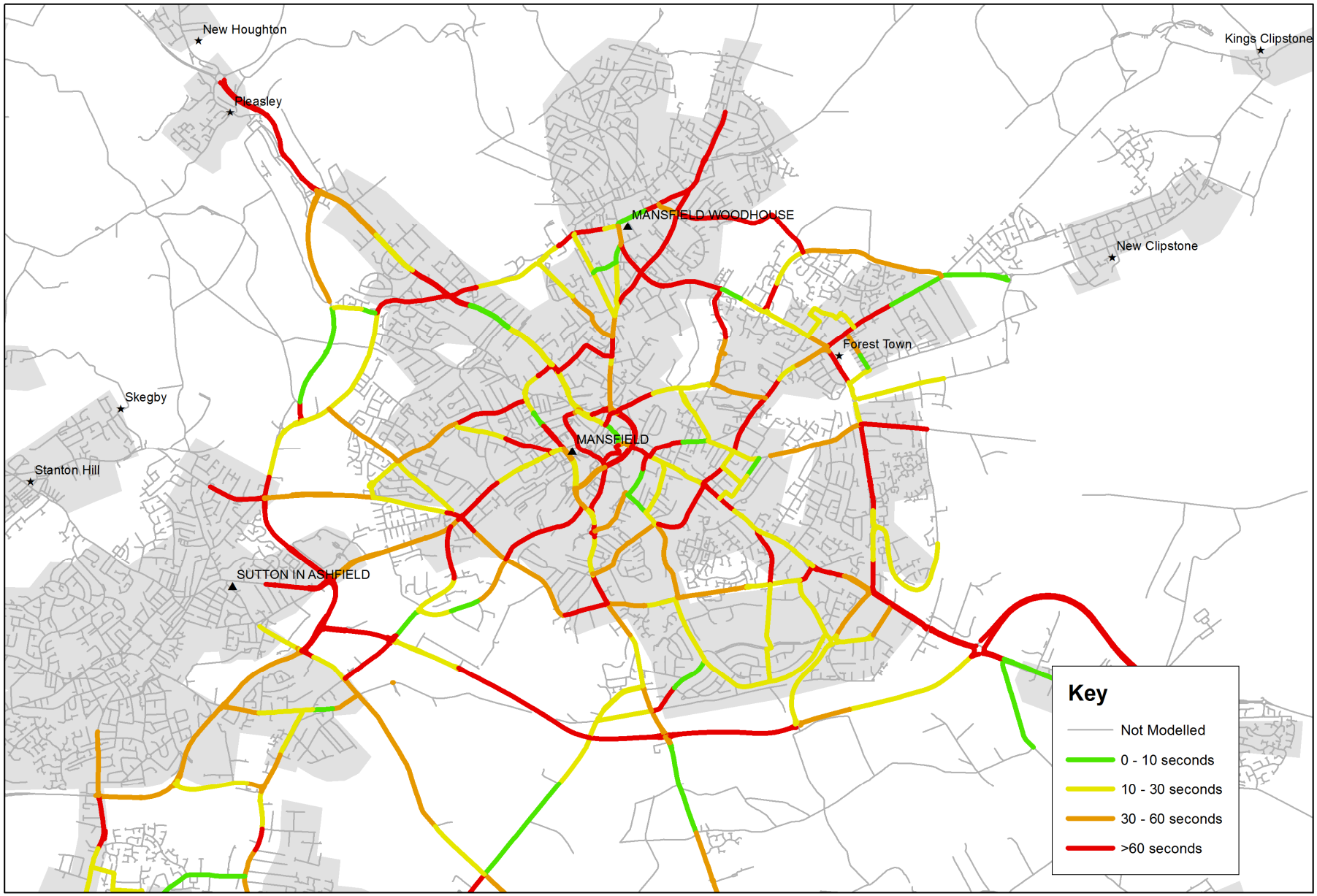


Figure 2.8: Local Plan (2033) PM Peak Hour Delays

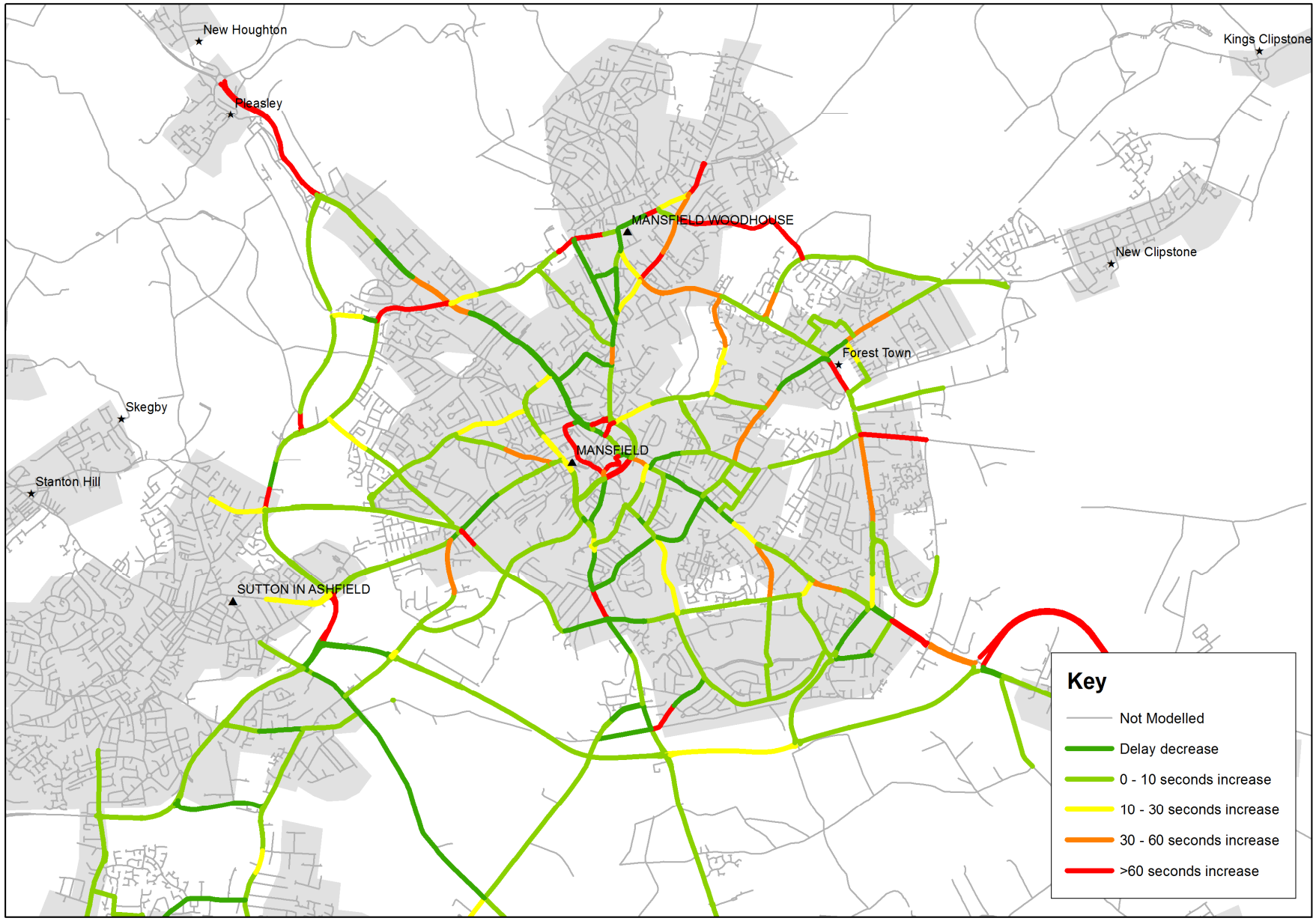


Figure 2.9: Local Plan – Reference Case Delay Differences (2033) AM Peak Hour

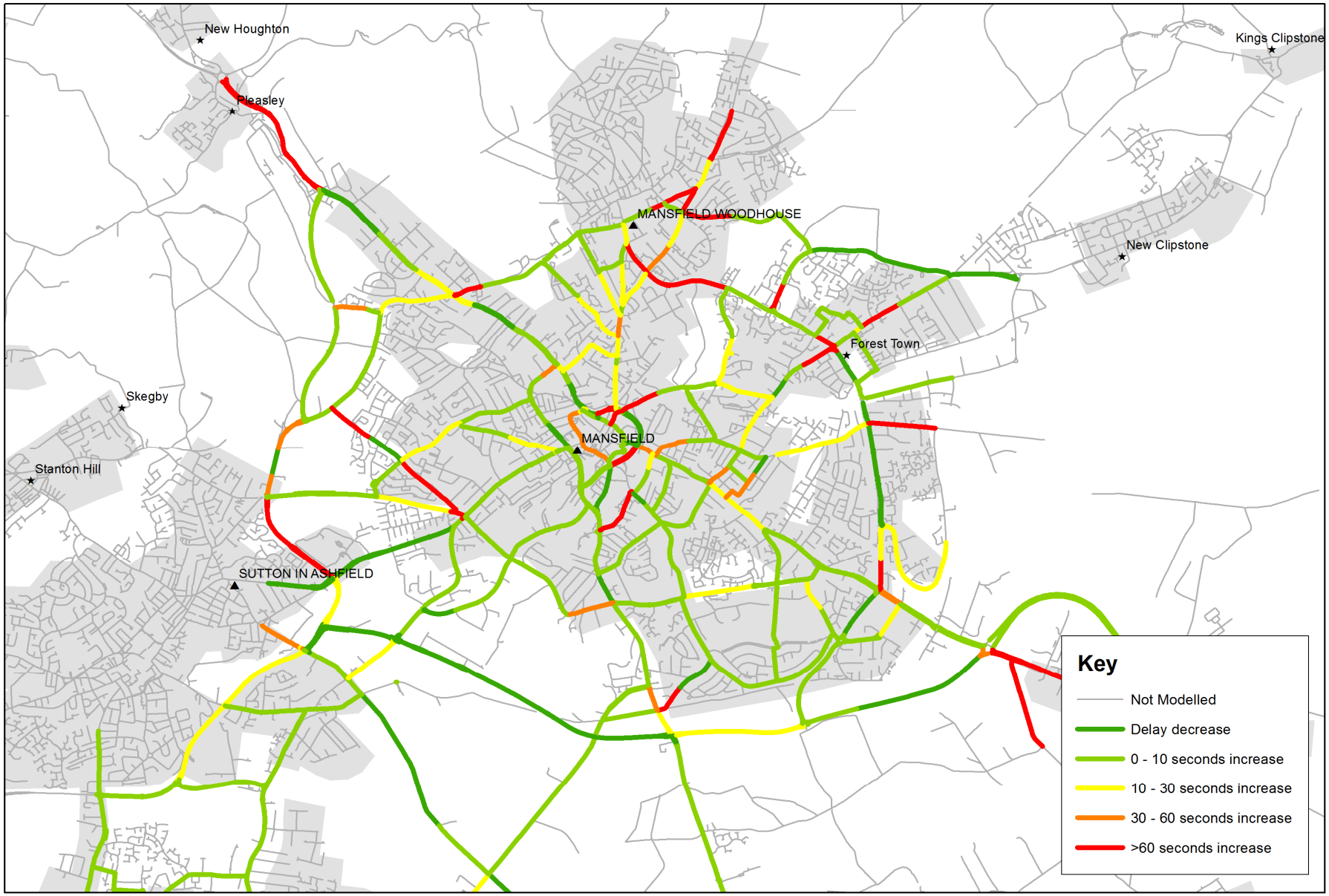


Figure 2.10: Local Plan – Reference Case Delay Difference (2033) PM Peak Hour

2.6.3 Travel time changes on links within the -10 to +10 seconds time range are considered to represent no change overall, as this change along a single link is unlikely to be discernible in the context of a journey made along several links and which would typically be at least several minutes.

2.6.4 In the AM Peak (Figure 2.9), delay differences between the Local Plan and Reference Case growth scenarios highlight that additional delays of more than 30 seconds would be expected to occur at:

- A60 Leeming Lane North – between Peafield Lane and Warsop Road;
- A60 Leeming Lane South – between Warsop Road and Old Mill Lane;
- New Mill Lane – between Leeming Lane South and Sandlands Way;
- Welbeck Road – between Poplar Street and Portland Street;
- A6075 Debdale Lane and Priory Road – between The Sidings and Castle Street;
- A6117 Old Mill Lane – between Leeming Lane South and Barringer Road;
- Barringer Road – between Old Mill Lane and Breckbank
- Sandlands Way – between The Bridleway and Old Mill Lane
- B6030 Clipstone Road West – between Stanley Road and Main Avenue;
- B6030 Sherwood Hall Road and Little Carter Lane – between Woodhall Gardens and Skerry Hill;
- A6117 Pump Hollow Road – between Newlands Road and Clipstone Road West;
- A6117 Oak Tree Lane – between Longshaw Road and Eakring Road;
- A617 Rainworth Bypass;
- A6191 Southwell Road West – between A617 and Bellamy Road;
- Lichfield Lane and Old Newark Road – between Dorchester Drive and Nottingham Road;
- A6191 Southwell Road West – between Southwell Gardens and Berry Hill Lane;
- Jenny Becketts Lane – between Berry Hill Lane and Southwell Road West;
- A60 Nottingham Road – between Berry Hill Lane and Forest Road;
- Sheepbridge Lane – between Intake Avenue and A38 Sutton Road;
- Hermitage Lane – between Maunside and A38 Sutton Road;
- A38 Kings Mill Road East – between A38 Sutton Road and A617 Sherwood Way South;
- Beck Lane – north of B6014 Skegby Lane;
- A617 MARR – north of A6075 Abbott Road;
- A617 Chesterfield Road North – between Pleasley Roundabout and MARR;
- A6191 Chesterfield Road North and South – between Booth Crescent and Thorn Avenue;
- A6075 Abbott Road – between Water Lane and A6191 Chesterfield Road;
- Bancroft Lane – between Castle Street and A38 Sutton Road;
- Albert Street, Quaker Way and St John Street;

- St Peter's Way – between Albert Street and Ratcliffe Gate, and between St John Street and Woodhouse Road;
- Leeming Street;
- Ratcliffe Gate – between Great Central Road and St Peter's Way.

2.6.5 Smaller delay increases (10-30 seconds) in the AM Peak occur on the following road lengths:

- A6117 Oak Tree Lane – north of Southwell Road;
- A60 Leeming Lane South – between Old Mill Lane and Morven Avenue;
- A6075 Warsop Road – between Leeming Lane and New Mill Lane;
- Butt Lane – between B6032 Church Hill and A60 Leeming Lane;
- Debdale Lane – northeast of A6191 Chesterfield Road;
- Water Lane – east of MARR;
- Barringer Road – between Breckbank and Ravensdale Road;
- B6033 Bath Lane;
- A6191 Southwell Road West – between Jenny Becketts Lane and Maltby Road;
- Berry Hill Road – between Berry Hill Lane and B6030 Windsor Road;
- A617 Sherwood Way East – between A6117 and A60 Nottingham Road;
- Ladybrook Lane – between Bancroft Lane and Rosemary Street;
- A6009 Rosemary Street – southwest of Chesterfield Road South;
- Brick Kiln Lane – southeast of A6075 Abbott Road.

2.6.6 In the PM Peak (Figure 2.10), the delay differences between the Local Plan and Reference Case highlight increases of more than 30 seconds on the following road lengths:

- A60 Leeming Lane North – north of Peafield Lane;
- A60 Leeming Lane South – between Warsop Road and New Mill Lane, and between Arun Dale and Old Mill Lane;
- A6075 Welbeck Road and Warsop Road – between Poplar Street and Leeming Lane;
- New Mill Lane – east of A60 Leeming Lane South;
- Butt Lane – between B6032 Church Hill and A60 Leeming Lane;
- A6117 Old Mill Lane – between Leeming Lane South and Barringer Road, nad north of Clipstone Road West;
- Sandlands Way – between The Bridleway and Old Mill Lane;
- B6030 Clipstone Road West – between Stuart Avenue and Old Mill Lane, and between George Street and Stanley Road;
- Eakring Road – east of Oak Tree Lane;
- B6020 Southwell Road East and Blidworth Lane, Rainworth;
- A6191 Southwell Road West – between Oak Tree Lane and Bellamy Road;
- Oak Tree Lane – north of A6191 Southwell Road West;

- A617 Chesterfield Road North – between Pleasley Roundabout and MARR;
- Water Lane – east of MARR;
- Debdale Lane – northeast of A6191 Chesterfield Road;
- Beck Lane – north of B6014 Skegby Lane, and southwest of Abbott Road;
- Kings Mill Road East – between B6014 Skegby Lane and A38 Sutton Road;
- Lichfield Lane and Old Newark Road – between Dorchester Drive and Nottingham Road;
- A60 Nottingham Road – between A611 Derby Road and Old Newark Road;
- Atkin Lane;
- B6014 Skegby Lane and Brick Kiln Lane between A38 Sutton Road and Ladybrook Lane;
- Brick Kiln Lane – between Birks Road and Abbott Road;
- Baums Lane;
- B6030 Carter Lane – between A6191 Rock Hill and Gordon Avenue;
- Hall Street, Argyle Street and Hamilton Street – between Newmarket Street and A6191 Southwell Road West
- St Peter's Way – between Albert Street and Ratcliffe Gate, and between St John Street and Woodhouse Road;
- Leeming Street;
- Bath Lane – between St Peter's Way and Carr Bank;
- Albert Street, Quaker Way and St John Street;
- A6009 Rosemary Street – southwest of Chesterfield Road South;
- A60 Woodhouse Road – between Birding Street and Yorke Street;
- A6191 Ratcliffe Gate – between St Peter's Way and Newgate Lane;
- Newgate Lane – between Ratcliffe Gate and Redcliffe Road.

2.6.7 Smaller delay increases (10-30 seconds) in the PM Peak occur on the following road lengths:

- A60 Leeming Lane North – between Warsop Lane and Peafield Road;
- A60 Leeming Lane South – between New Mill Lane and Arun Dale;
- B6032 Church Hill and Mansfield Road – between A6075 Priory Road and Butt Lane, and between Crow Hill Lane and Morven Avenue;
- Yorke Street – between Crow Hill Lane and A60 Woodhouse Road;
- A6191 Chesterfield Road North and South – between Booth Crescent and Thorn Avenue;
- A6075 Abbott Road – between Water Lane and A6191 Chesterfield Road;
- Dunsil Road, Muskham Court and Birding Street – between Sherwood Rise and A60 Woodhouse Road;
- A60 Woodhouse Road – between Birding Street and St Peter's Way;
- West Bank Avenue and Haddon Road ;

- Barringer Road – between Breckbank and Ravensdale Road;
- Ravensdale Road – between Barringer Road and Sherwood Hall Road;
- B6030 Sherwood Hall Road and Little Carter Lane – between Ravensdale Road and Skerry Hill;
- Eakring Road – west of Oak Tree Lane;
- Jubilee Way South;
- Oak Tree Lane – south of Jubilee Way South;
- Bellamy Road – south of Southwell Road West;
- A6191 Southwell Road West – between Carter Lane and Jenny Becketts Lane;
- Berry Hill Lane – between Kings Walk and Berry Hill Road;
- A617 Sherwood Way East – between A6117 and A60 Nottingham Road;
- Bancroft Lane – between Castle Street and A38 Stockwell Gate;
- Ladybrook Lane – between Bancroft Lane and Brick Kiln Lane;
- Lindhurst Lane – south of Berry Hill Lane;
- A38 Kings Mill Road East – between A38 Sutton Road and A617 Sherwood Way South;
- Hamilton Road – between B6139 Coxmoor Road and A617 Sherwood Way South;
- Skegby Lane – between Brick Kiln Lane and Ladybrook Lane.

2.6.8 The increases in delay in the Local Plan scenario relative to the Reference Case reflect the locations of Local Plan developments and the routing of trips to and from these developments.

2.6.9 The Local Plan sites at Pleasley and Water Lane contribute to increases in delay on the A617 Chesterfield Road North, around the A6191 Chesterfield Road/Abbott Road/Debdale Lane junction and on Water Lane.

2.6.10 The Local Plan sites at Warsop, Old Mill Lane and New Mill Lane contribute to increases in delay on Leeming Lane, Old Mill Lane, New Mill Lane, Sandlands Way and Barringer Road.

2.6.11 The Local Plan development on land off Jubilee Way contributes to increases in delay on Eakring Road, Jubilee Way South and Oak Tree Lane.

2.7 Volume Over Capacity

2.7.1 Figure 2.11 and Figure 2.12 show the ratio of forecast flow volume (V) to the highway capacity (C), for the AM and PM peak hours respectively, with the 2033 Local Plan scenario traffic demand forecasts assigned to the Mansfield highway network. These are referred to as Volume/Capacity (V/C) ratio diagrams.

2.7.2 These diagrams support the conclusions derived from the traffic flow and delay plots presented in Sections 2.5 and 2.6, but also highlight which junctions are approaching, or are above their operational capacity. These junctions are discussed further in Section 2.8

2.8 Traffic Impact on Junctions in Mansfield

2.8.1 The SATURN traffic model was used to identify those junctions that would be operating at, or over capacity in the forecast year of 2033 with Local Plan developments. It is noted that the traffic modelling method makes a number of assumptions about the operation of the highway network and therefore, at the appropriate time, a separate Transport Assessment is likely to be required for each individual development and the highway authority may require mitigation measures at junctions other than those identified in this strategic study. The traffic model identifies where traffic flows are likely to increase and traffic delays might worsen as a result of the cumulative impact of the proposed Local Plan development sites.

2.8.2 Given that traffic growth is expected from the Baseline year of 2016 to the forecast 2033, then it is expected that junctions across the highway network will be more heavily loaded in future years.

2.8.3 The 2033 Local Plan traffic forecast model was interrogated to determine those junctions with a traffic V/C ratio of more than 0.85. A V/C value above 0.85 (or 85%) is likely to produce queues on some occasions during the peak hours. Above a V/C value of 1.0 (or 100%), a junction is more than likely to be at capacity (with resulting larger increases in queue length) during the peak hours.

2.8.4 Detailed junction modelling has been undertaken on the thirteen junctions identified from the Base Year analysis and the Reference Case 2033 analysis (as reported at Stage 1) plus eight additional junctions highlighted by the 2033 Local Plan analysis.

2.8.5 The Stage 1 Base Year and Reference Case analysis highlighted the following thirteen junctions within the Mansfield urban area:

1. Chesterfield Road / Debdale Lane
2. A60 Nottingham Road / Berry Hill Lane
3. Carter Lane / Southwell Road / Windsor Road
4. A617 MARR / A6191 Southwell Road
5. A60 Leeming Lane / Peafield Lane
6. A60 Leeming Lane / A6075 Warsop Road
7. Kings Mill Road / Beck Lane / B6014 Skegby Lane / Mansfield Road
8. A6191 Ratcliffe Gate / A60 St. Peters Way
9. A6117 Old Mill Lane / B6030 Clipstone Road West
10. A38 Sutton Road / B6014 Skegby Lane / Sheepbridge Lane
11. A60 / Old Mill Lane / Butt Lane
12. A6191 Adams Way / Oak Tree Lane
13. A60 / New Mill Lane

2.8.6 Within Market Warsop the following junction was identified:

14. A60 Church Street / Wood Street.

2.8.7 The Stage 2 analysis of the Local Plan scenario highlighted a further five junctions:

15. A6117 Oak Tree Lane/ Eakring Road – Mansfield
16. Southwell Road/Berry Hill Lane
17. Southwell Road/Bellamy Road
18. A38/Rosemary Street
19. Coxmoor Road/Hamilton Road

2.8.8 It is noted that the Coxmoor Road / Hamilton Road junction is within the Ashfield District. As part of a planning application for an Ashfield Local Plan development site, a junction improvement scheme has been developed for this junction which will provide additional capacity. In agreement with the highway authority, this report has not undertaken any further analysis at this junction.

2.8.9 In addition to the four junctions highlighted by the Stage 2 analysis, the following four junctions have been assessed in detail as there is a perception that these junctions would be operating close to capacity:

20. A6075 Debdale Lane/ Priory Road – Mansfield Woodhouse
21. A60 Nottingham Road/ A611 Derby Road – Mansfield
22. A6191 Chesterfield Road/ A617 MARR – Pleasley
23. A60/Baums Lane/Sainsburys

2.8.10 Outside of the area of the traffic model, the traffic growth is likely to follow the Nottinghamshire rural growth forecasts. The 2016 Baseline assessments identified one junction in Market Warsop that was approaching capacity, which was the A60 Church Street / Wood Street traffic signalled junction. This junction was included within the detailed junction analysis.

2.8.11 The detailed junction assessment results for all of these junctions are summarised in Table 2.2, the Reference Case results are reproduced from the Stage 1 report for comparison purposes.

2.8.12 In the AM Peak hour, the junction of A617 MARR / A6191 Southwell Road changes from ‘within capacity’ in the Reference Case to being ‘Near to or at capacity’ as a result of the Local Plan growth. In the PM Peak, it will remain within the ‘near to or at capacity’ level of service.

2.8.13 The following five junctions that were under capacity or ‘near to or at capacity’ in the Reference Case, are predicted to exceed the normal acceptable degree of saturation (over capacity) in one or more time periods in the Local Plan scenario;

- Carter Lane / Southwell Road / Windsor Road
- A60 / Old Mill Lane / Butt Lane
- A60 Church Street / Wood Street
- A6191 Southwell Road / Berry Hill Lane
- A6009 Rosemary St / A38 Stockwell Gate

2.8.14 Sixteen of the 22 junctions that are predicted to operate over capacity in the Reference Case, remain over capacity in the Local Plan scenario. At each of these junctions, the level of performance worsens in the Local Plan case.

2.8.15 Appendix B provides further detail with regard to these junction assessments.

2.8.16 The detailed junction modelling results, presented in Table 2.2, confirm that all of the 22 identified junctions would operate 'Near to or at Capacity' (Degree of Saturation >90%) or 'Over Capacity' in the 2033 Local Plan scenario forecast.

Table 2.2: Junction Capacity Assessments – Base Year, Reference Case and Local Plan

Junction	Base Year (2016)		Reference Case (2033)		Local Plan (2033)	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Chesterfield Road / Debdale Lane	Over Capacity	Over Capacity	Over Capacity	Over Capacity	Over Capacity	Over Capacity
A60 Nottingham Road / Berry Hill Lane	Near to or At Capacity	✓	Over Capacity	Over Capacity	Over Capacity	Over Capacity
Carter Lane / Southwell Road / Windsor Road	✓	✓	✓	Near to or At Capacity	Over Capacity	Over Capacity
A617 MARR / A6191 Southwell Road	✓	✓	✓	Near to or At Capacity	Near to or At Capacity	Near to or At Capacity
A60 Leeming Lane / Peafield Lane	✓	✓	Over Capacity	Near to or At Capacity	Over Capacity	Over Capacity
A60 Leeming Lane / A6075 Warsop Road	Over Capacity	Over Capacity	Over Capacity	Over Capacity	Over Capacity	Over Capacity
Kings Mill Road / Beck Lane / B6014 Skegby Lane / Mansfield Road	Over Capacity	Over Capacity	Over Capacity	Over Capacity	Over Capacity	Over Capacity
A6191 Ratcliffe Gate / A60 St. Peters Way	Near to or At Capacity	Near to or At Capacity	Over Capacity	Over Capacity	Over Capacity	Over Capacity
A6117 Old Mill Lane / B6030 Clipstone Road West	Near to or At Capacity	Over Capacity	Over Capacity	Over Capacity	Over Capacity	Over Capacity
A38 Sutton Road / B6014 Skegby Lane / Sheepbridge Lane	Near to or At Capacity	Over Capacity	Over Capacity	Over Capacity	Over Capacity	Over Capacity
A60 / Old Mill Lane / Butt Lane	Not Assessed	Not Assessed	✓	✓	Over Capacity	Over Capacity
A6191 Adams Way / Oak Tree Lane	Not Assessed	Not Assessed	Over Capacity	Over Capacity	Over Capacity	Over Capacity
A60 / New Mill Lane	Not Assessed	Not Assessed	Over Capacity	Over Capacity	Over Capacity	Over Capacity
A60 Church Street / Wood Street	Not Assessed	Not Assessed	✓	Near to or At Capacity	Over Capacity	Over Capacity

A6117 Oak Tree Lane/Eakring Road	Not Assessed	Not Assessed	Over Capacity	Over Capacity	Over Capacity	Over Capacity
A6191 Southwell Road / Berry Hill Lane	Not Assessed	Not Assessed	✓	✓	Near to or At Capacity	Over Capacity
A6191 Southwell Road / Bellamy Road	Not Assessed	Not Assessed	Over Capacity	Over Capacity	Over Capacity	Over Capacity
A6009 Rosemary St / A38 Stockwell Gate	Not Assessed	Not Assessed	✓	✓	Near to or At Capacity	Near to or At Capacity
A6075 Debdale Lane / Priory Rd	Not Assessed	Not Assessed	Over Capacity	Near to or At Capacity	Over Capacity	Over Capacity
Coxmoor Road / Hamilton Road	Not Assessed	Not Assessed	Not Assessed	Not Assessed	Not Assessed	Not Assessed
A60 Nottingham Road / A611 Derby Road	Not Assessed	Not Assessed	Over Capacity	Over Capacity	Over Capacity	Over Capacity
A6191 Chesterfield Road / A617 MARR Pleasley	Not Assessed	Not Assessed	Over Capacity	Over Capacity	Over Capacity	Over Capacity
A60 Nottingham Road / Baums Lane / Park Lane	Not Assessed	Not Assessed	Near to or At Capacity	Over Capacity	Over Capacity	Over Capacity
✓Indicates that the operational performance of the junction would be acceptable; i.e. RFC less than 0.85 for a roundabout or priority junction or Degree of Saturation less than 0.9 for a traffic signal junction.						

2.8.17 Following the network operational performance assessment, given above, there may be a benefit to installing CCTV at certain junctions and along key corridors, the following locations have been identified;

- A6191 Chesterfield Road / MARR;
- A6191 Chesterfield Road / Rosemary Street;
- A6191 Chesterfield Road / Debdale Lane;
- A60 Leeming Lane / Warsop Road;
- A60 Leeming Lane / New Mill Lane;
- A60 Leeming Lane / Old Mill Lane;
- A60 Woodhouse Road / A6009 St Peters Way / B6033 Bath Lane;
- B6030 Clipstone Road / A6117 Old Mill Lane / Pump Hollow Road;
- A6117 Oak Tree Lane / Eakring Road;
- A617 Southwell Road / Oak Tree Lane;
- A60 Nottingham Road / Park Lane / Baums Lane;
- A60 Nottingham Road / A611 Derby Road;
- A60 Nottingham Road / Berry Hill Lane / Atkin Lane;
- A60 Portland Street / A6009 Portland Street / A6009 St Peters Way;
- A38 Sutton Road / Sheepbridge Lane / Skegby Lane;
- A6009 Rosemary Street / Ladybrook Lane;
- A6009 St Peters Way / Nottingham Road / Albert Street;
- A6009 St Peters Way / A6191 Ratcliffe Gate;
- A6009 Chesterfield Road / St John Street;
- A6191 Rock Hill / Southwell Road West / B6030 Windsor Road / Carter Lane.

2.8.18 CCTV will allow the urban traffic control centre to monitor the relevant routes covered by the system to identify any day to day variability and one off events as they occur on the highway network. In response to incidents, it would be possible to alter signal settings to adapt to changed flow patterns and intervene to speed up the clearing of queues after such events.

2.8.19 Given the level of development, modal change should be promoted to reduce the number of additional vehicles on the highway network. The potential for sustainable travel modes at each Local Plan site is presented in Section 3. In addition, bus corridors, which prioritise bus movements over other traffic may encourage modal shift. This would require the introduction of selective bus detection at key junctions along a route.

2.8.20 The following routes have been identified as potential strategic bus corridors:

- A6191 Chesterfield Road between MARR and Mansfield town centre;
- A60 Leeming Lane between Peafield Lane and Mansfield town centre;
- A617 Southwell Road between Rainworth bypass and Mansfield town centre;
- A60 Nottingham Road between MARR and Mansfield town centre; and
- A38 Sutton Road between Kings Mill Road East and Mansfield town centre.

2.9 Other Junctions Outside Of Mansfield District

2.9.1 An assessment of the Local Plan (2033) development traffic entering the Strategic Road Network (SRN) was required as part of the Mansfield Transport Study Brief. "The Strategic Road Network (SRN) in England consists of the motorways and the most significant A-roads. It is managed by Highways England, which is an executive agency of the Department for Transport (DfT)." (House of Commons Transport Committee, 2014).

2.9.2 There are no Strategic Roads within the Mansfield District and the nearest one is the M1 motorway to the west. As the M1 is not included in the Mansfield traffic model, flow changes on the A38 approaching Junction 28 and on the A617 approaching M1 Junction 29 are presented in Table 2.3 below as the closest possible links included in the SATURN traffic model. The A611 leaves the traffic modelled area on the south side of Mansfield and the A608 branches-off this A611 route to access the M1 at Junction 27, this is also included in Table 2.3.

2.9.3 Table 2.3 presents the percentage change in traffic flows comparing the 2033 forecast Reference Case to the 2016 Base Year model flows (Reference Case) and the 2033 forecast Local Plan to the 2016 Base Year model flows (Local Plan). These comparisons are provided for both AM and PM Peak periods and for both traffic flow directions independently.

Table 2.3: Changes in Traffic On Roads Approaching the M1 between the Baseline and Reference Case / Local Plan

		Change in traffic flows – compared to Baseline (%)			
		AM		PM	
		Reference Case	Local Plan	Reference Case	Local Plan
A38	Westbound	20.5%	22.4%	24.7%	30.2%
	Eastbound	33.8%	39.0%	30.4%	32.3%
A617	Westbound	8.5%	14.6%	29.2%	35.0%
	Eastbound	78.0%	85.1%	14.0%	18.2%
A611	Southbound	25.8%	29.1%	44.6%	55.7%
	Northbound	41.9%	47.1%	22.5%	24.7%

2.9.4 Table 2.4 presents the absolute change in flows between the 2033 Reference Case and 2033 Local Plan growth scenario, the changes are measured in PCUs per hour.

Table 2.4: Changes in Traffic Volumes between the Reference Case and Local Plan

		Change in traffic flows (PCU per hour-Demand)	
		AM	PM
A38	Westbound	+17	+38
	Eastbound	+46	+13
A617	Westbound	+29	+28
	Eastbound	+29	+22
A611	Southbound	+23	+109
	Northbound	+54	+25

2.9.5 Table 2.4 compares the Local Plan scenario with the Reference Case and indicates minimal changes in the flows on the A617 and A38 corridors in the AM and PM peaks. Any flow restrictions along these routes, due to the capacity limitations of junctions along these routes, would limit the volume of traffic reaching the M1 motorway.

2.9.6 As Table 2.4 indicates, any changes in flow between the Reference Case and Local Plan forecasts are less than 60 PCU per hour with the exception of A611 southbound in the PM peak. In AECOM's view, the predicted flows changes are likely to have no material impact on the operation of the M1 motorway and it's junctions.

2.9.7 Along with the routes approaching the SRN detailed above, there are also other major routes that cross the district boundary, mainly: A617 Rainworth Bypass and A60 Nottingham Road. Additionally the A60 Leeming Lane is a major route entering Mansfield, but not crossing the district boundary.

Table 2.5: Changes in Traffic On Primary Roads At the edge of Mansfield District between the Baseline and Reference Case / Local Plan

		Change in traffic flows – compared to Baseline (%)			
		AM		PM	
		Reference Case	Local Plan	Reference Case	Local Plan
A60 Leeming Ln	Northbound	+24%	+48%	+21%	+46%
	Southbound	+27%	+44%	+22%	+58%
A617 Rainworth	Eastbound	+20%	+26%	+19%	+27%
	Westbound	+19%	+26%	+19%	+25%
A60 Nott'ham Rd	Northbound	+31%	+35%	+25%	+28%
	Southbound	+27%	+30%	+28%	+31%

Table 2.6: Changes in Traffic Volumes between the Reference Case and Local Plan

		Change in traffic flows (PCU per hour-Demand)	
		AM	PM
A60 Leeming Lane	Northbound	+595	+947
	Southbound	+457	+1070
A617 Rainworth Bypass	Eastbound	+80	+152
	Westbound	+124	+98
A60 Nottingham Rd	Northbound	+77	+39
	Southbound	+40	+45

2.9.8 Along A60 Leeming Lane, in the northbound direction, there are predicted to be an additional 595 trips in the AM Peak as a result of the Local Plan growth when compared with the Reference Case. This represents a 48% increase over the Base Year scenario. In the PM Peak an additional 947 Local Plan trips in the northbound direction result in a 46% increase over the Base Year.

2.9.9 In the southbound direction along Leeming Lane there would be an additional 457 Local Plan trips in the AM Peak when compared to the Reference Case, which is an overall increase of 44% over the Base Year. In the PM Peak in the southbound direction there would be an additional 1070 Local Plan trips compared to the Reference Case which is a 58% increase over the Base Year.

2.9.10 This increase in trips along the A60 is expected due to the Local Plan development sites located close to the A60, which include the Old Mill Lane Strategic sites and multiple developments in Warsop.

2.9.11 On the A617 Rainworth bypass in the eastbound direction, there is an additional 198 in trips between the Base Year and Reference Case. Between the Reference Case and Local Plan scenario there is a increase of 80 trip in the AM Peak eastbound direction, which represents an overall increase of 26% when compared to the Base Year. In the eastbound direction in the PM Peak there is predicted to be 152 additional trips between the Reference Case and Local Plan, overall there is a 27% increase in traffic flow compared to the Base Year.

2.9.12 On the A617 Rainworth bypass in the westbound direction, there is an additional 124 in trips between the between the Reference Case and Local Plan scenario. In the westbound direction in the PM Peak there is predicted to be 98 additional trips between the Reference Case and Local Plan, overall there is a 25% increase in traffic flow compared to the Base Year.

2.9.13 On A60 Nottingham Road in the AM Peak there is predicted to be an additional 77 and 40 trips for the southbound and northbound directions respectively. This represents a 35% northbound trips and 30% southbound trips in the AM Peak, when comparing the base year to the Local Plan forecast. In the PM Peak, there would be an increase of 39 and 45 trips for the southbound and northbound directions respectively. When compared to the Base Year, there is a predicted to be a 28% increase in trips in the northbound direction in the PM Peak and 31% increase in the southbound direction.

2.9.14 Further to the above, there are other junctions identified by the SATURN modelling which may experience capacity issues in the 2033 Local Plan forecast (but which are located outside of the Mansfield District's Transport Study Area). These junctions fall within the A38 and the A617 corridors. Table 2.7 provides a qualitative assessment of these junctions:

Table 2.7: Changes in Traffic Outside the Study Area

Junction	Qualitative Assessment
A617 MARR / Prologis Park development junction	This junction provides an access to a committed development. Reference should be made to the transport assessment for this site. The Local Plan developments would add some additional trips to this junction, but the increase and subsequent impact is not material to this junction.
A617 MARR / Hamilton Road	The traffic model indicates that the V/C indicator would increase from 75% in 2016 to 84% in the 2033 Reference Case and 83% in the Local Plan. The route would continue to operate within acceptable V/C stress levels under the 2033 Local Plan forecast.
A38 / Kings Mill Road East / Mansfield Road	The traffic model indicates that the V/C indicator would increase from 58% in 2016 to 65% in the 2033 Reference Case. This changes to a V/C of 71% in the Local Plan forecast.
B6139 Coxmoor Road / Hamilton Road	The V/C indicator shows 60% in 2016 . This was 83% in the Reference Case and 86% in 2033 Local Plan forecast. Improvements at this junction are proposed as part of a Transport Assessment for one of Ashfield District Council's Local Plan development sites.
A38 Kings Mill Road East / B6022 Station Road	The traffic model indicates that the V/C indicator would increase from 73% in 2016 to 84% in the Reference Case and 85% in the Local Plan. This indicates that the traffic impact of the Local Plan is minimal.
A38 Kings Mill Road East / B6018 Sutton Road / Kirkby Road	The traffic model indicates that the V/C indicator is 70% in 2016 and would increase at 82% in the 2033 Reference case and 83% in the Local Plan forecast. The traffic impact of the Local Plan is not material.

2.10 Impact on Public Transport Services

2.10.1 Any change in journey times may impact on public transport services. Table 2.8, below summarises the modelled journey times (excluding stops) extracted from the SATURN model for vehicles travelling along six key routes (as identified in Figure 2.13). Times are compared for the Baseline (2016), Reference Case (2033 RC) and Local Plan (2033 LP) forecasting models.

Table 2.8: Changes in Journey Time (seconds) on Key Routes (shown on Figure 2.13)

AM Peak		2016	2033RC	2033 LP	RC Time Increase	RC % change	LP - RC Increase	LP - RC % change
Route 1	Inbound	579	845	920	266	45.9	75	8.9
	Outbound	353	419	703	66	18.7	284	67.8
Route 2	Inbound	542	798	956	256	47.2	158	19.8
	Outbound	361	363	437	2	0.6	74	20.4
Route 3	Inbound	443	469	564	26	5.9	95	20.3
	Outbound	335	411	465	76	22.7	54	13.1
Route 4	Inbound	261	271	280	10	3.8	9	3.3
	Outbound	259	295	293	36	13.9	-2	-0.7
Route 5	Inbound	404	461	492	57	14.1	31	6.7
	Outbound	415	432	458	17	4.1	26	6.0
Route 6	Inbound	365	508	548	143	39.2	40	7.9
	Outbound	356	462	461	106	29.8	-1	-0.2
Journey times are in seconds (s) Reference Case increases are from 2012 Base conditions, Local Plan increases are from Reference Case.								

PM Peak		2016	2033 RC	2033 LP	RC Time Increase	RC % change	LP - RC Increase	LP - RC % change
Route 1	Inbound	382	551	618	169	44.2	67	12.2
	Outbound	533	736	1053	203	38.1	317	43.1
Route 2	Inbound	411	464	476	53	12.9	12	2.6
	Outbound	414	530	669	116	28.0	139	26.2
Route 3	Inbound	446	519	611	73	16.4	92	17.7
	Outbound	336	356	361	20	6.0	5	1.4
Route 4	Inbound	275	325	301	50	18.2	-24	-7.4
	Outbound	277	305	280	28	10.1	-25	-8.2
Route 5	Inbound	421	421	462	0	0.0	41	9.7
	Outbound	435	499	491	64	14.7	-8	-1.6
Route 6	Inbound	391	469	513	78	19.9	44	9.4
	Outbound	399	475	482	76	19.0	7	1.5
Journey times are in seconds (s) Reference Case increases are from 2012 Base conditions, Local Plan increases are from Reference Case.								

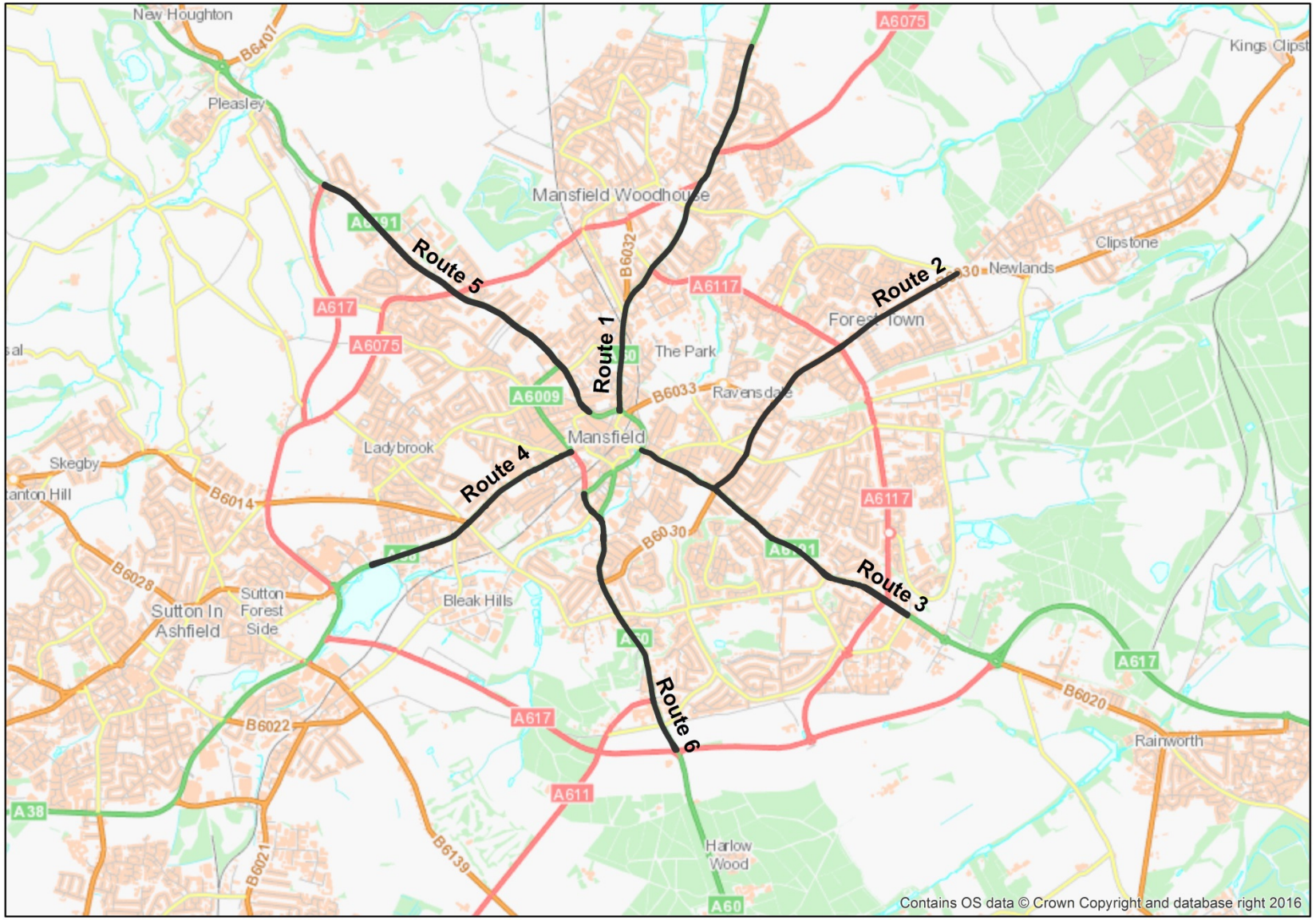


Figure 2.13: Public Transport Journey Times (relating to Table 2.8)

2.10.2 Detailed journey time–distance charts for the key routes are provided in Appendix C.

2.10.3 In response to longer travel times, bus operators may need to adjust their timetables or add extra buses to the service in order to compensate for the extra time that buses spend in travelling.

2.10.4 The travelling journey time for bus services, excluding waiting time at stops, would increase for all routes between the 2016 Base Year and the 2033 Local Plan forecast,.

2.10.5 **Route 1:** The largest travel time changes are predicted to occur along Route 1 (A60 North of Mansfield), particularly in the outbound direction. In the AM Peak a 266 second increase is recorded between the Base Year and Reference Case, implementing the Local Plan developments would result in an additional 75 second delay along this route. Overall the journey time would increase from just under 10 minutes in the Base Year to just under 16 minutes in the Local Plan scenario. In the PM Peak the inbound journey time would increase by 169 seconds between the Base Year and Reference Case and a further 44 seconds between the Local Plan scenario and the Reference Case. In the outbound direction there would be a total travel time increase of 350 seconds between the Local Plan and Base Year in the AM Peak and 520 seconds in the PM Peak. Nottinghamshire County Council currently has plans for public transport improvements along this corridor.

2.10.6 In the AM Peak delays are predicted to occur at the junctions of A60 Woodhouse Road / A6009 St Peters Way (Additional 12 seconds), A60 Leeming Lane / Old Mill Lane / Butt Lane (+28 seconds) and the most additional junction delay would occur at A60 Leeming Lane / A6075 Warsop Road (95 seconds). In the PM Peak, an additional 32 seconds delay is predicted at this junction when compared to the Reference Case.

2.10.7 Bus services 10, 11 and 12 operate along this route, the shortest two-way journey times of these services is timetabled to take 65 minutes (service 11; Meden Vale - Mansfield). The additional 384 seconds (PM peak – 67s inbound + 317s outbound) delay, compared with the Reference Case represents a 9.8% increase in the overall two-way travel time. Public service operators will need to respond to increased journey times due to natural forecast traffic growth. The extra impact of development trips is modest by comparison.

2.10.8 **Route 2:** Route 2 represents the B6030 Sherwood Hall Road, the largest impact of Local Plan traffic growth on Route 2 is predicted to occur in the AM Peak in the inbound direction. An additional 158 seconds delay is predicted to occur which represents a 19.8% increase in travel times compared to the Reference Case. In the PM Peak, there is a predicted increase of 139 seconds delay in the outbound direction.

2.10.9 Key points of delay along the route in the AM Peak would occur at A6117 / Pump Hollow Road / B6030 Clipstone Road West / A6117 Old Mill Lane (39 seconds). At A6191 Rock Hill / Southwell Road West / B6030 Carter Lane there is an additional 18 seconds of delay that would occur in the Local Plan scenario.

2.10.10 Bus services 14 (Kirton – Mansfield) and 15 (Walesby - Mansfield) operate along the assessed section of B6030. Typical two-way journey times for these services – over the whole route would be 106 minutes in the AM Peak. The additional delay of 232 seconds (AM peak – 158s Inbound + 74s outbound) represents 3.65% of the total journey time.

2.10.11 **Route 3:** Increases in journey times along Route 3 (A6191 Southwell Road West) as a result of the Local Plan growth scenario are limited to a maximum increase of 95 seconds

and 92 seconds in the inbound direction in the AM Peak and PM peak respectively. This represents a journey time increase of 20.3%.

2.10.12 **Route 4:** There is no material increase in journey time along the A38 Sutton Road / Stockwell Gate route, as a result of the Local Plan, when compared to the Reference Case. The PM peak suggests there may be a small beneficial change in journey times as the impact of the additional Local Plan trips changes how trips route through the network.

2.10.13 **Route 5:** As a result of Local Plan developments, Route 5 (A6191 Chesterfield Road North / South), is predicted to experience the greatest increase in travel time delay in the PM peak in the inbound direction. The change in journey times between the Reference Case and Local Plan is predicted to be less than 1 minute in both time periods, in both directions.

2.10.14 On Route 5 inbound in the AM Peak, 35 seconds of additional delay would occur at A6191 Chesterfield Road North / Chesterfield Road South / Abbott Road / Debdale Lane when compared to the Reference Case scenario. In the PM Peak at the same junction, there is an additional 46 seconds of delay, when compared to the reference case.

2.10.15 Bus services 9, 10, 17, 23, 53, N23 and Pronto operate along this route, the shortest two-way operation is Service 23 (Langwith – Mansfield), this is currently timetabled to take 83 minutes in the PM Peak. The 57 second (AM peak – 31s inbound + 26s outbound) two-way journey time increase would represent a 1.1% increase in the total bus two-way journey time for this route.

2.10.16 **Route 6:** Increases in journey time along A60 Nottingham Road would be greatest in the PM Peak in the inbound direction. A predicted 44 second increase between the Local Plan and Reference Case would represent a journey time increase of 9.4%.

2.10.17 Bus services 3c, 19 and Pronto operate partially over this section of the A60. Service 19 (Berry Hill – Mansfield) has the shortest operating route taking 18 minutes for a complete two-way journey. A total two-way travel time increase of 39 seconds (AM peak – 40s Inbound + -1s Outbound) would represent a 3.6% increase in operating time for this service. It should be noted though, that this service does not currently operate in the PM Peak.

2.10.18 Nottinghamshire County Council also has plans in place for public transport improvements to the A60 Nottingham Road which should mitigate against the Reference Case growth.

2.11 Local Plan Mitigation

2.11.1 Two further options exist for mitigation measures to improve the expected journey times predicted by the Local Plan growth scenario. INIT has developed a bus priority system, called LISA, which can transmit a message to the traffic signal controller to either request a green signal or extend the green time further. A message is transmitted again once the vehicle has passed the signals. This is beneficial over more typical traffic signal bus priority measures as it is not impacted by weather variables, it does not need a line of sight between the vehicle and controller and it can determine when to switch back to 'normal' operations.

2.11.2 A second option that can be installed, most beneficially as a corridor scheme, would be a system of CCTV cameras, which can monitor the progress of vehicles and identify where issues are occurring. This would allow, in the case of traffic signal junctions, an operator to react to day to day variability and manually intervene. Where other traffic incidents occur, a coordinated response can be determined at the earliest possible opportunity. The

possibility, and best locations, for this type of intervention have been identified in 2.8.17 above.

2.11.3 Appendix B makes mitigation recommendations at each of the junctions flagged as operating over capacity. These recommendations are summarised in Table 2.9 below.

2.11.4 It is noted that several of the junctions that have been highlighted as likely to operate over capacity in the Local Plan case have limited scope for physical improvements without third party land. Without effective mitigation it is likely there will be increased queuing delay in the peak periods if the Local Plan allocation is delivered.

2.11.5 Appendix B also makes an assessment of which Local Plan sites could be required to provide developer funding contributions to any junction improvements. This is summarised in Appendix D.

2.11.6 Appendices B and D present scheme cost estimates for the mitigation packages identified. Cost estimates have been provided in advance of any detailed design and therefore have a high level of uncertainty attached to them. These outline estimates have been produced for the sole purpose of the Local Plan site viability assessments.

Table 2.9: Junction Mitigation Strategies

Key	✓			Operates within capacity
	x			Operates over–capacity
	x x			The requirement for mitigation at this junction increases in the Local Plan scenario compared with the Reference Case
	N/A			Not assessed
Junction	Within Capacity in…			Mitigation Measures
	Base	RC	LP	
Chesterfield Road / Debdale Lane	x	x	x x	- Nearside crossing detection. - Likely to require MDC land, funding could be sourced from identified developments. - A GPS based system for additional improvements for public service vehicles. - CCTV links to Urban Traffic Control Centre
A60 Nottingham Road / Berry Hill Lane	x	x	x x	- A GPS based system for additional improvements for public service vehicles. - CCTV links to Urban Traffic Control Centre - Larger scale widening not feasible without third party land take.
Carter Lane / Southwell Road / Windsor Road	✓	x	x x	- A GPS based system for additional improvements for public service vehicles. - CCTV links to Urban Traffic Control Centre - PUFFIN crossings. - Larger scale widening not feasible due to topography and third party land take.

A617 MARR / A6191 Southwell Road	✓	✓	x	- Reference case development site includes plans to upgrade junction.
A60 Leeming Lane / Peafield Lane	✓	x	x x	- A GPS based system for additional improvements for public service vehicles - Localised widening of the A60 northbound approach; funding would be required from identified development sites.
A60 Leeming Lane / A6075 Warsop Road	x	x	x x	- Nottinghamshire County Council have developed a traffic signal junction design with provision for the wider A60 bus priority scheme. Will require developer funding/contributions.
Kings Mill Road / Beck Lane / B6014 Skegby Lane / Mansfield Road	x	x	x x	- Reference case development site includes plans to upgrade junction.
A6191 Ratcliffe Gate / A60 St Peters Way	x	x	x x	- A GPS based system for additional improvements for public service vehicles. - Larger scale widening not feasible without third party land take.
A6117 Old Mill Lane / B6030 Clipstone Road West	x	x	x x	- CCTV links to Urban Traffic Control Centre - A GPS based system for additional improvements for public service vehicles. - Nearside crossing detection. - Larger scale widening not feasible without third party land take.
Sutton Road / Skegby Lane / Sheepbridge Lane	x	x	x x	- No mitigation measures at this junction have been identified. - Larger scale widening not feasible without third party land take.
A60 Leeming Lane / Old Mill Lane / Butt Lane	N/A	✓	x	- A GPS based system for additional improvements for public service vehicles. - CCTV links to Urban Traffic Control Centre - High cost/long term options include further widening with significant third party land take or the provision of a bypass.
A6191 Southwell Road / Oak Tree Lane / Adamsway	N/A	x	x x	- A GPS based system for additional improvements for public service vehicles. - CCTV links to Urban Traffic Control Centre - PUFFIN crossings - Larger scale widening not feasible without significant third party land take.
A60 Leeming Lane / New Mill Lane	N/A	x	x x	- A GPS based system for additional improvements for public service vehicles . - CCTV links to Urban Traffic Control Centre - Widen New Mill Lane to provide additional flares and widen Leeming Lane (N) to provide additional capacity, significant funding would be required from identified development sites.
A6075 Debdale Lane / Priory Road	N/A	x	x x	- No mitigation measures at this junction have been identified. - Larger scale widening not feasible without third party land take.

A6117 Oak Tree Lane / Eakring Road	N/A	x	x x	- Localised widening of Oak Tree Lane South - CCTV links to Urban Traffic Control Centre - A GPS based system for additional improvements for public service vehicles . - Nearside crossing detection.
A60 Nottingham Road / A611 Derby Road	N/A	x	x x	- Reference case development site includes plans to upgrade junction.
A6191 Chesterfield Road / A617 MARR Pleasley	N/A	x	x x	- Localised widening of A6117 – A6191 - A GPS based system for additional improvements for public service vehicles. - CCTV links to Urban Traffic Control Centre - PUFFIN crossings
A60 Nottingham Road / Baums Lane / Park Lane	N/A	x	x x	- Junction improvements options currently being assessed by NCC. Junction widening would require 3rd Party land. - A GPS based system for additional improvements for public service vehicles. - CCTV links to Urban Traffic Control Centre
A6191 Southwell Road / Berry Hill Lane	N/A	✓	x	- A GPS based system for additional improvements for public service vehicles.
A6191 / Bellamy Road	N/A	x	x x	- Larger scale widening not feasible due to topography and third party land take. - A GPS based system for additional improvements for public service vehicles. - CCTV links to Urban Traffic Control Centre
A6009 Rosemary Street / A38 Stockwell Gate	N/A	✓	x	- No mitigation measures at this junction have been identified. - Larger scale widening not feasible without third party land take.
A60 Church Street / Wood Street, Warsop	N/A	x	x x	- To improve overall efficiency MOVA control can be installed (£40k-100k). - Larger scale widening not feasible due to topography and third party land take.

3. Securing Sustainable Transport

3.1 Overview

3.1.1 This section sets out an approach to securing sustainable transport in relation to development plans.

3.1.2 In the last ten years, there has been a much greater focus on securing transport sustainability. This has now been fully articulated in both the DfT's Guidance on Transport Assessment and the Delivering a Sustainable Transport System strategy.

3.1.3 The most widely quoted definition of sustainability and sustainable development was developed by the Brundtland Commission of the United Nations which stated that;

"sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

3.1.4 In transport terms, sustainability is often taken as being the ability to access development without the use of a private car - with a particular focus on reducing single-occupancy car trips1. As such, it is focused on providing opportunities to make cycling, walking and public transport the modes of choice. In order for this to be successful, these modes must be made more convenient than the private car for the majority of trips.

3.1.5 The more trips that can be accommodated by sustainable means, the less private car traffic a development would generate. This section identifies how sustainable transport choices could be secured and locked-in to the developments via the planning process (i.e. how sites could enhance their sustainable transport-mode shares).

3.1.6 This approach is consistent with the Guidance on Transport Assessment, which seeks to maximise transport sustainability prior to the identification of measures to accommodate residual trips.

3.2 Development Location and Mix

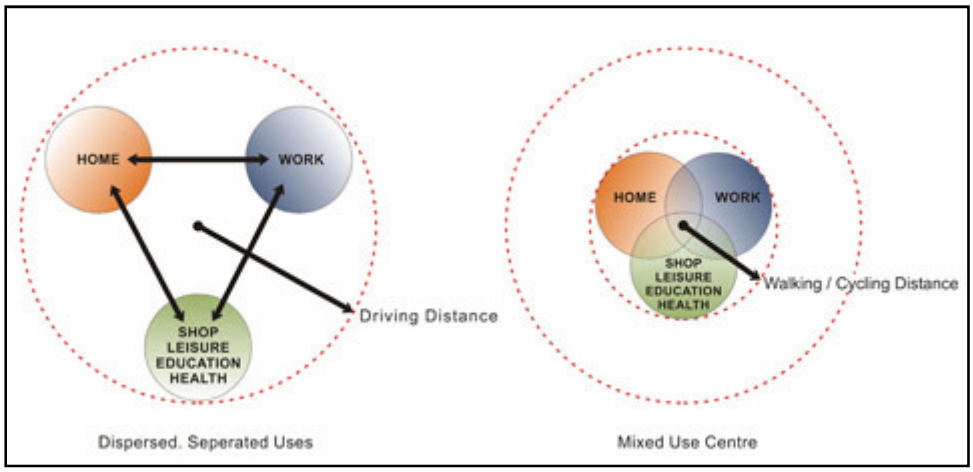
3.2.1 It is recognised that the requirement to interchange during a particular trip is an important dissuasive factor when selecting overall mode choice. Following from this, it is important to note that the most "door-to-door" trips over medium to long distances are provided only by the private car.

3.2.2 Walking and cycling modes are "door-to-door" over short distances (normally taken to be up to 2km and 5km respectively) and public transport has traditionally been effective at moving people within defined corridors of movement.

3.2.3 As such, ensuring that different land-uses (including key services and facilities) are contained within a geographic area (either the development itself or the proximate neighbourhood) is often taken as being a key enabler of sustainable-mode trips such that real mode choice is available to those wishing to travel. This is illustrated within Figure 3.1, below.

[1] Transport Sustainability is often mistaken for "anti-car" policies; though Travel Planning often encourages car sharing schemes that seek to minimise single-occupancy trips by replacing these with multi-occupant car journeys.

Figure 3.1: Mixed Use Development (taken from www.plan4sustainabletravel.org)



3.2.4 From the above figure, it can be seen that having several land uses within a defined area is to allow multiple activities to occur from one trip, to shorten trip lengths and to encourage non-motorised trips by making common destinations available within walking / cycling distance.

3.2.5 Table 3.1 indicates how various land-use design features are estimated to reduce per capita vehicle trip generation compared with conventional development that lacks these features;

Table 3.1: Travel Impacts of Land Use Design Features (Source: Victoria Transport Policy Institute, 2001, from DISTILLATE - Design and Implementation Support Tools for Integrated Local Land use, Transport and the Environment, April 2006)

Design Feature	Reduced Vehicle Travel
Residential development around public transport nodes	10%
Commercial development around public transport nodes	15%
Residential development along public transport corridor	5%
Commercial development along public transport corridor	7%
Residential mixed-use development around public transport nodes	15%
Commercial mixed-use development around public transport nodes	20%
Residential mixed-use development around public transport corridor	7%
Commercial mixed-use development around public transport corridor	10%
Residential mixed-use development	5%
Commercial mixed-use development	7%

Notes (1) In this table, “residential mixed-use development” would indicate a residential development with our land-use integrated into the development form, whereas residential development indicates a wholly residential development

(2) public transport node = bus or train station

3.2.6 Table 3.1 shows the relative importance of mixed-use development, public transport corridors and public transport nodes; with the latter (i.e. bus and train stations) having the greatest impact.

3.2.7 Research into the impacts of providing a mix of land-use types within a neighbourhood has found that;

- The presence of local facilities has a positive effect on mode choice (i.e. more non-car trips) but more so on car ownership, particularly multiple car ownership (Dargay and Hanly, 2004).
- Diversity of services and facilities in close proximity to households reduces distance travelled (Banister, 1996; Farthing et al, 1995, 1997; Hickman and Banister, 2007a)
- Work trip distances and times are shorter in areas of higher population density, higher employment density and greater land use mix (Frank and Pivo, 1994).
- Trip lengths are shorter in 'traditional urban settings'. Walking and, to a lesser degree, public transport mode share is also higher in 'traditional urban settings' (Ewing and Cervero, 2001).
- The use of public transport and walk / bike modes is more likely where commercial and non-residential uses are nearby (within 300 feet of residence). Also, walking, cycling and public transport mode shares are greater in locations where shops are located close to office buildings (Cervero, 1989).

(taken from www.plan4sustainabletravel.org)

3.2.8 Given the above, according to the Commission for Integrated Transport (CFIT), an initial basis for securing sustainable development in transport terms is the selection of a good site location where:

- Good accessibility is available, or can be developed, by sustainable modes to:
  - employment and other main facilities in the main towns or immediate vicinities;
  - a rail station or other public transport interchange where good services are available to other (larger) centres within the sub-region; and
  - community facilities within the development or the surrounding neighbourhood.
- Opportunities exist to:
  - promote the use of walking, cycling and public transport;
  - provide an attractive level of public transport service which does not depend on (additional) subsidy over the longer term; and
  - utilise and support existing public transport services and community facilities in the locality.

3.2.9 According to Inclusive Mobility (DfT, 2002) bus services should be within 400m of a development in order to be considered accessible - though without specific development sites, this level of analysis is not available at this stage. However, this section does give indication of public transport density and therefore potential for servicing.

3.3 On-Site Development Infrastructure

3.3.1 According to the Government publication, Building Sustainable Transport into New Developments (DfT, April 2008), *"the layout of a development has a significant impact on how people choose to travel."*

3.3.2 Indeed, a year before this document was issued, the benefits of good design on mode choice was recognised in the DfT publication Manual for Streets which sought to directly influence the layout of new residential development.

3.3.3 The Manual for Streets replaced the previous guidance (DB32 and the accompanying Places, Streets and Movement) that was focused on providing for the car. By comparison, Manual for Streets provided a new hierarchy for the provision of infrastructure within the development envelope (as summarised in Figure 3.2 below) which placed the needs of pedestrians and cyclists at the forefront of design.

Figure 3.2: Development-Envelope Design Hierarchy (Source; Manual for Streets)

Consider first	Pedestrians
	Cyclists
↓	Public transport use
	Specialist service vehicles (e.g. emergency service vehicles, waste etc)
Consider last	Other motor traffic

3.3.4 In the above, it is acknowledged that the attractiveness of walking and cycling is not only influenced by distance but also the quality of the walking and cycling environment.

3.4 Assessment of the Sustainability of New Development

3.4.1 Sections 3.3 to 3.5 in the Stage 1 Report have identified that opportunities to serve new development by sustainable modes vary across the district of Mansfield. Table 3.2, below, lists the Local Plan developments and makes an assessment of the opportunities for sustainable-transport based upon the context identified. The opportunities for travel by walking, cycling and public transport, using existing facilities, have been assessed at each Local Plan site using the three point scale:

Walking	**Criteria**
✓	Within 2km of site, good route
+−	Within 2km of site but a poor route
✗	Above 2km

Cycling	Criteria
	Within 5km of site, good route
	Within 5km of site but a poor route
	Above 5km

Public Transport	Criteria
	Within 400m of a bus stop and a good level of service
	~400m of a bus stop and a poor level of service
	Above 400m and a poor service

3.4.2 Where developments coincide with opportunities for sustainable travel, it is likely that the proportion of those travelling to / from employment (and other services and facilities) by car will be naturally lower than where such opportunities do not exist. However, this is not meant to imply that developments in other areas should not proceed. Rather it identifies which developments would need additional support through development specific measures such as bus services, cycle routes and / or the wider Travel Planning process. Site descriptions and locations can be referenced from Figures 2.1 and 2.2 and Appendix A.

Table 3.2: Opportunities for Sustainable Travel at each Local Plan site

The sites below are located 2km or less from Mansfield Town Centre. They are therefore considered to be within a reasonable walking and cycling distance for most people.				
MDC Site Ref	**Comment**	**Walking**	**Cycling**	**Public Transport**
1	**Former Mansfield Brewery Site (Part B) -**The site is within 700m of the town centre. A signed on road cycle route, the Timberland Trail exists along Littleworth and there is good pedestrian infrastructure towards the town centre and suitable crossings are provided across St. Peters Way. Bus service 218 provides an hourly service along Littleworth and Baum's Lane during the week. Service 219 provides 3 services a day during the week along Baum's Lane. This site is within reasonable walking and cycling distance from the town centre and bus/rail station and therefore should enable and encourage travel by active modes.	✓	✓	+ −
6	**Centenary Lane (Part 3) -** From this site, it is 1.5km to Mansfield Town centre. There are two options to cycle to Mansfield, either along Chesterfield Road which has dedicated cycle lanes or the traffic calmed route along Broomhill Lane which has also been highlighted as a proposed signed cycle route. Bus services are provided along Chesterfield Road including services 23, 53, 53A, N12, 204, 217 and 'Pronto' bus routes; these provide frequencies of at least every 25 minutes during the day to and from Mansfield. This site can therefore provide sustainable travel options.	✓	✓	✓
7	**Former Ravensdale Middle School -** The site is located approximately 2km from Mansfield town centre. This site is within reasonable cycling distance and there are sections of Ravensdale Road which have dedicated cycle lanes and provide a direct route into Mansfield town centre. The closest bus stop is directly outside the site entrance on Ravensdale Road, the no. 16 provides 4 services per hour for most of the day during the week. This site should enable and encourage sustainable travel, particularly by active modes.	✓	✓	✓
23	**Sandy Lane -** It is 1.2km from this site to Mansfield Town centre. Newgate Lane is traffic calmed and has been identified as a proposed new signed cycle route. Bus services 14 and 15 operate along Sandy Lane at 30 minute intervals during the day. Bus service 7 alternatively operates along Newgate lane and provides 4 services per hour during the day. As such, this site is served by suitable sustainable travel options.	✓	✓	✓
24	**Sherwood Close -** It is 1.3km from this site to Mansfield Town centre. Newgate Lane is traffic calmed and has been identified as a proposed new signed cycle route. The nearest bus stops are on Sherwood Hall Road, services 14 and 15 along this route however there are only 2 services per hour during the day. The site is about 400 metres from the bus stops on Eakring Road, for which bus 7 provides a much more frequent service of 4 per hour during the day. This site provides suitable sustainable travel alternatives.	✓	✓	✓
25	**Ladybrook Lane/Tuckers Lane -** The site is less than 1km from the Town centre. There are no cycle lanes provided from this site, however Ladybrook Lane, directly south of the site, is planned as a new proposed signed cycle route which should encourage more cycling trips from this site. Bus services are provided on Westfield Lane (6), within 400 metres	✓	+ −	✓

	walk from the site, which provide 4 services an hour throughout most of the day during the week. This site provides good sustainable travel options and should enable and encourage travel by active modes.			
26	**Land at Windmill Lane -** This site is less than 1km from Mansfield Town centre. The nearest bus services operate from Woodhouse Road at frequencies of 10 minutes (including services; 1, 10, 11, 12). This site provides good sustainable travel opportunities and should enable and encourage travel by active modes.			
28	**Debdale Lane/Emerald Close -** The site is located 2km from Mansfield town centre. Chesterfield Road, 300 metres to the west of the site contains a dedicated cycle lane and good pedestrian infrastructure leading directly into Mansfield town centre. Mansfield Woodhouse train station is just over 1km walk east from the site, with 2 services an hour into Mansfield with journey times of 4 minutes. The closest bus stops are located on Debdale lane just west of the site however the service is very limited. Chesterfield Road however is served by 23, 53 and 'Pronto' bus routes; these provide frequencies of at least every 30 minutes for most of the day during the week. Some bus stops along Chesterfield Road benefit from Real Time Information and are covered; this should encourage more people to use these services. There are therefore suitable sustainable travel options for this site, although greater frequency of bus services may encourage greater use of sustainable travel modes.			
29	**Sherwood Rise -** This site is located 1.9km from Mansfield town centre. Although there is no dedicated cycling infrastructure within the vicinity of the site, Dunsil Road/Birding Street to the south east of the site is planned as a new signed route which leads onto Woodhouse Road, providing a direct link into the centre of Mansfield. Mansfield Woodhouse train station is within 700 metres walk of the site, providing 2 services an hour into Mansfield with journey times of 4 minutes. The closest bus stops are on Debdale Lane, 200 metres from the site and service 204 stops here; however there are only 6 services throughout the day. There are therefore suitable and varied sustainable travel options for this site, although a greater frequency of bus services nearby would likely encourage greater use of sustainable travel modes.			
46	**Land off Debdale Lane (Burlington Drive) -** The site is located 2km from Mansfield town centre. Chesterfield Road, 300 metres to the west of the site contains a dedicated cycle lane and good pedestrian infrastructure leading directly into Mansfield town centre. Mansfield Woodhouse train station is just over 1km walk east from the site, with 2 services an hour into Mansfield with journey times of 4 minutes. The closest bus stops are located on Debdale lane just west of the site however the service is very limited. Chesterfield Road however is served by 23, 53 and 'Pronto' bus routes; these provide frequencies of at least every 30 minutes for most of the day during the week. Some bus stops along Chesterfield Road benefit from Real Time Information and are covered; this should encourage more people to use these services. There are therefore suitable sustainable travel options for this site, although greater frequency of bus services may encourage greater use of sustainable travel modes.			
59	**Land to the rear of High Oakham Hill -** This site is within 2km from Mansfield town centre. Sheepbridge Lane/High Oakham Hill immediately east of the site provide good pedestrian infrastructure and the Timberland Trail passes the north of the site along Bleak Hills Lane, this provides a mixed on/off road cycle/walking route which can be used to access Mansfield town centre. The nearest bus stop is on Sheepbridge			

	lane 200 metres north of the site. Service 219 operates through here however there are only 3 services a day. The Pronto bus service runs along Nottingham Road, within 10 minutes' walk east of the site, and this provides services every 10 minutes for most of the day during the week. The sites proximity to the large business park located to the west of the site may also reduce the need to travel for local employees. This site therefore provides good sustainable travel options.			
64	**Pheasant Hill -** This site is located 1.8km from Mansfield town centre. Although there is no dedicated cycling infrastructure within the vicinity of the site, Dunsil Road/Birding Street to the east of the site is planned as a new signed route which leads onto Woodhouse Road, providing a direct link into the centre of Mansfield. Mansfield Woodhouse train station is within a 1km walk of the site, providing 2 services an hour into Mansfield with journey times of 4 minutes. The closest bus stops are on Dunsil Road, 300 metres from the site and service 205 stops here; however there are only 3 services throughout the day. There are therefore suitable and varied sustainable travel options for this site, although a greater frequency of bus services nearby would likely encourage greater use of sustainable travel modes.			
68	**Kirkland Avenue Industrial Park -** This site is located 1.3km from Mansfield town centre. Sutton Road, just south of the site provides good pedestrian and cycling infrastructure (including a dedicated off road cycle lane) all the way through to Mansfield town centre. The nearest bus stops are located on Sutton Road and there are services every few minutes throughout the day (including services 1, 141, Black Cat, The Nines and The Threes). These bus stops are covered and contain real time information boards. There are numerous and realistic sustainable travel options from this site.			
75	**Former Mansfield Hosiery Mills car park** - This site is located 1.3km from Mansfield town centre. Sutton Road, just south of the site provides good pedestrian and cycling infrastructure (including a dedicated off road cycle lane) all the way through to Mansfield town centre. The nearest bus stops are located on Sutton Road and there are services every few minutes throughout the day (including services 1, 141, Black Cat, The Nines and The Threes). These bus stops are covered and contain real time information boards. There are numerous and realistic sustainable travel options from this site.			
127	**Former Bus Station Site -** Stockwell Gate is located within the A6009 and is therefore accessible from and forms part of the town centre. Access to this site is determined by access to Mansfield in general. The bus station and train station are located close by (within 250 metres), therefore this site can be determined to be very accessible by sustainable travel modes for all services terminating or calling at Mansfield.			
141	**Oakham Business Park (Site A) -** This employment site is located 2km from Mansfield town centre. There is good pedestrian infrastructure along Hamilton Way and the Timberland Trail is located just south of the site, this provides a mixed on/off road cycle/walking route which can be used to access Mansfield town centre. There are no bus stops within the immediate vicinity of the site, the closest is on Sheepbridge lane however there is only one bus that provides 3 services a day. As an employment site, some of the housing in south and south west Mansfield is accessible by sustainable modes however this could be improved by providing a bus service that runs through the business park or by increasing frequency of existing nearby services.			

142	**Oakham Business Park (Site B) -** This employment site is within 2km from Mansfield town centre. There is good pedestrian infrastructure along Hamilton Way and the Timberland Trail is located just south of the site, this provides a mixed on/off road cycle/walking route which can be used to access Mansfield town centre. There are no bus stops within the immediate vicinity of the site, the closest is on Sheepbridge lane however there is only one bus that provides 3 services a day. As an employment site, some of the housing in south and south west Mansfield is accessible by sustainable modes however this could be improved by providing a bus service that runs through the business park or by increasing frequency of existing nearby services.	✓	✓	✗
185	**52, Ratcliffe Gate –** This site is located within 900m of the town centre. A signed on road cycle route, the Timberland Trail exists along Littleworth, within 500m of the site and there is a new signed cycle route planned for Newgate Lane, to the north of the site. There is good pedestrian infrastructure towards the town centre and suitable crossings are provided across St. Peters Way. The closest bus stop is on Rock Hill, 150 metres east of the site and services 27, 28 and 141 pass here and have service frequencies of 4 per hour for most of the day during the week. This site is within reasonable walking and cycling distance from the town centre and bus/rail station and therefore should enable and encourage travel by active modes. There is also good public transport accessibility to the site.	✓	✓	✓

The sites below are located between 2km and 5km from Mansfield Town Centre. They are therefore considered to be within a reasonable cycling distance but above a reasonable walking distance for most people.

Site Number	Comment	Walking	Cycling	Public Transport
8	**Former Sherwood Hall School -** The site is 2.3km from Mansfield Town centre. Directly east of the site there is a dedicated off road cycle and pedestrian route towards Mansfield, the Timberland Trail which may provide a safer option than the most direct on-road routes to Mansfield which do not have specific cycle provision. Bus service 17 operates along Stuart Avenue, past the site, with a frequency of one bus an hour. More frequent services operate on Sherwood Hall Road with a typical time of 15 minutes between services. The site should provide sustainable travel options for its users.	✗	✓	✓
11	**Bellamy Road recreation ground -** The site is located 3.1km from Mansfield Town centre. Cycle routes are available with some being off-road, namely north of the site along the Mansfield Way. New planned cycle signage routes on Lindhurst Lane and around King George V recreation ground will provide more incentive to cycle. There are employment and retail opportunities also available around Oak Tree Lane. Bus services are provided on Bellamy Road (218 and 28) with 30 minute frequencies. This site is suitable for sustainable travel options, particularly due to its proximity to mixed use developments.	✗	✓	✓
143	**Crown Farm Industrial Estate (Site A) -** This site is located approximately 4km from Mansfield town centre. The site is directly south of the Timberland trail, a dedicated cycling and pedestrian route which leads directly into Mansfield town centre. The nearest	✗	✓	✓

	bus stops are located outside the site entrance to the north on Clipstone Road East; buses 14, 15 and 16 offer 6 services an hour into Mansfield for most of the day during the week. This site provides suitable sustainable travel options.			
14	**Land at Cox's Lane -** The site is approximately 3.5km from Mansfield town centre. There are no designated on or off road cycle routes near the site. However the new proposed signed cycle route along Beech Tree Avenue/Slant Lane (460 metres east of the site) may encourage cycle trips from the site. Mansfield Woodhouse train station is a 1.4km walk from the site, with 2 services an hour allowing the potential for multi modal trips into Mansfield town centre. The nearest bus stop to the site (service 204) is on Hazel Grove however services are once an hour. Alternatively, services on Brown Avenue (1) are much more frequent, every 10 minutes during the day and this is a 480 metre walk south from the site. There are therefore opportunities for sustainable travel from this site.	✗	±	✓
19	**Allotment Site at Pump Hollow Lane -** The site is 2.7km from Mansfield Town centre. There are opportunities to cycle along Eakring Road or along the Timberland Trail leading directly towards Mansfield town centre. The junction of the A6117 and Newlands Road, directly south west of the site has good cycle signage. Bus services are provided on Coronation Drive (218) however these are only once hourly. Alternatively, bus services on Clipstone Road West (about 360 metres north of the site) such as 14, 15, 16 and 218 are much more frequent with services of at least every 15 minutes. There are opportunities for sustainable travel from this site.	✗	✓	✓
20	**Land at Rosebrook Primary School -** This site is 2.3km from Mansfield Town centre. There are several routes which have been traffic calmed and suitable for cyclists. Brick Kiln Lane to the south, Westfield Lane to the north and Somersall Street/Jenkins Avenue directly east of the site have all been highlighted as new proposed signed cycling routes which would encourage more people to cycle. The site also lies close to several schools and the Kings Mill Hospital. The nearest bus service (no. 217) is provided along Abbott Road; however this only operates 2 services per day. Slightly further away (500m), along Armstrong Road is bus service 6, operating at 15 minute intervals, additional services are available along either Brick Kiln Lane (no. 17) or Westfield Lane, within 500m (no. 23). This site is therefore suitable for providing sustainable travel options. Signed cycle routes are also planned in close proximity to the site.	✗	✓	✓
27A	**Land at Redruth Drive -** The site is just less than 4km from Mansfield Town centre. A dedicated off-road cycle route is provided parallel along Southwell Road West, 460 metres north of the site. After about 400 metres this becomes the Mansfield Way, a recognised local cycleway which provides a direct link into Mansfield town centre. The site will also benefit from a proposed new signed cycle route along Old Newark Road to the south west of the site. Bus services 27, 28 and 141 pass the site on Southwell Road West (about 450 metres from the site) and have service frequencies of 15 - 20 minutes. Most of the housing in the south east of Mansfield is easily accessible by sustainable travel modes.	✗	✓	✓
27B	**Land off Sherwood Oaks Close -** The site is just less than 4km from Mansfield Town centre. A dedicated off-road cycle route is	✗	✓	✓

	provided parallel along Southwell Road West, 460 metres north of the site. After about 400 metres this becomes the Mansfield Way, a recognised local cycleway which provides a direct link into Mansfield town centre. The site will also benefit from a proposed new signed cycle route along Old Newark Road to the south west of the site. Bus services 27, 28 and 141 pass the site on Southwell Road West (about 450 metres from the site) and have service frequencies of 15 - 20 minutes. Most of the housing in the south east of Mansfield is easily accessible by sustainable travel modes.			
27C	**Land South of Sherwood Avenue -** The site is just less than 4km from Mansfield Town centre. A dedicated off-road cycle route is provided parallel along Southwell Road West, 460 metres north of the site. After about 400 metres this becomes the Mansfield Way, a recognised local cycleway which provides a direct link into Mansfield town centre. Bus services 27, 28 and 141 pass the site on Southwell Road West (about 450 metres from the site) and have service frequencies of 15 - 20 minutes. Most of the housing in the south east of Mansfield is easily accessible by sustainable travel modes.			
30	**Land at Old Mill Lane/Stinting Lane -** This site is approximately 2.5km from Mansfield town centre. Although there are no dedicated cycle routes around the site, New Mill Lane, just north of the site, is planned as a new signed cycle route which should encourage more active travel. The nearest bus stops to the site are on Old Mill Lane (210) and Sandlands Way (210 and 218); however they all only offer hourly services. Bus facilities, whilst provided, may require greater frequencies to encourage a greater proportion of sustainable travel from this site.			
31	**Land at New Mill Lane -** This site is approximately 3km from Mansfield town centre. Although there are no dedicated cycle routes around the site, New Mill Lane, where the site is located, is planned as a new signed cycle route which should encourage more active travel. The nearest bus stops to the site are on Holly Road (218) and Sandlands Way (210 and 218); however they both only offer hourly services. Bus facilities, whilst provided, may require greater frequencies to encourage a greater proportion of sustainable travel from this site.			
37	**Land at Bellamy Road Industrial Estate -** The site is less than 4km from Mansfield Town centre. A dedicated off-road cycle route is provided parallel along Southwell Road West north east of the site. After about 400 metres this becomes the Mansfield Way, a recognised local cycleway which provides a direct link into Mansfield town centre. Bus services 27, 28 and 141 pass the site on Southwell Road West (about 260 metres from the site) and have service frequencies of 15 - 20 minutes. Most of the housing in the south east of Mansfield is easily accessible by sustainable travel modes.			
38	**Ransom Wood Business Park -** The site is less than 4km from Mansfield Town centre. A dedicated off-road cycle route is provided parallel along Southwell Road West, directly south of the site, after about 400 metres this becomes the Mansfield Way, a recognised local cycleway which provides a direct link into Mansfield town centre. Bus services 27, 28 and 141 pass the site on Southwell Road West and have service frequencies of 15 - 20 minutes. As an employment site, most of the housing in the south east of Mansfield is easily accessible by sustainable travel modes.			

139	**Frontage to Ransom Wood Business Park -** The site is less than 4km from Mansfield Town centre. A dedicated off-road cycle route is provided parallel along Southwell Road West, directly south of the site, after about 400 metres this becomes the Mansfield Way, a recognised local cycleway which provides a direct link into Mansfield town centre. Bus services 27, 28 and 141 pass the site on Southwell Road West and have service frequencies of 15 - 20 minutes. As an employment site, most of the housing in the south east of Mansfield is easily accessible by sustainable travel modes.			
52	**Pleasley Hill Farm -** This mixed use development site is over 3.5km from Mansfield Town centre. Along Chesterfield Road, to the north of the site and extending towards Mansfield Town centre, there is a combination of on-road and off-road cycle facilities, with a dedicated cycle lane along parts of Chesterfield Road. The route is served by 23, 53 and 'Pronto' bus services; these provide frequencies of at least every 30 minutes during the day to and from Mansfield. Other destinations include; Chesterfield, Sheffield and Shirebrook. Some bus stops along Chesterfield Road benefit from Real Time Information. Bus facilities, whilst provided, may require greater frequencies to encourage a greater proportion of sustainable travel.			
53	**Land between Old Mill Lane and New Mill Lane -** This site is approximately 2.7km from Mansfield town centre. Although there are no dedicated cycle routes around the site, New Mill Lane, just north of the site, is planned as a new signed cycle route which should encourage more active travel. The nearest bus stops to the site are on Holly Road (218), Old Mill Lane (210) and Sandlands Way (210 and 218); however they all only offer hourly services. Bus facilities, whilst provided, may require greater frequencies to encourage a greater proportion of sustainable travel from this site.			
54	**Former Evans Halshaw Site -** The site is located 2.4km from Mansfield town centre. Traffic calming measures in place along Nottingham Road which may encourage people to cycle on road. The Pronto bus service, run by Trentbarton stops on Nottingham Road to the west of the site entrance, providing services every 10 minutes into Mansfield town centre for most of the day during the week. The sites proximity to West Notts College and a local day nursery would also reduce the need to travel for young people and families. This site therefore provides suitable sustainable travel options.			
55	**Tall Trees Mobile Home Park -** This site is approximately 2.5km from Mansfield town centre. Although there are no dedicated cycle routes around the site, New Mill Lane, just north of the site, is planned as a new signed cycle route which should encourage more active travel. The nearest bus stops to the site are on Old Mill Lane (210) and Sandlands Way (210 and 218); however they all only offer hourly services. Bus facilities, whilst provided, may require greater frequencies to encourage a greater proportion of sustainable travel from this site.			
58	**Fields Farm, Abbot Road -** The site is located 2.7km from Mansfield town centre. Brick Kiln Lane, which runs parallel to the site, is part of a proposed signed cycle route which would provide a direct link into Mansfield town centre, this should encourage more people to cycle into Mansfield. Bus 217 stops directly outside the site on Brick Kiln Lane however this only provides 2 services throughout the day; a more realistic option is the no. 6 bus on Birks			

	Road, a 300 metre walk from the site which provides 4 services an hour throughout most of the day during the week. This site therefore provides good sustainable travel options.			
60	**Land off Ley Lane -** The site is approximately 2.9km from Mansfield town centre. Although there are no designated cycle route near the site, Ley Lane, where the site is located, is planned as a new signed cycle route which should encourage more active travel from the site. Mansfield Woodhouse train station is a 1.9km walk from the site, with 2 services an hour allowing the potential for multi modal trips into Mansfield town centre The nearest bus stops to the site are on Albert Street (1) and Portland Street (210), with services every 10 minutes and hourly respectively. Both stops are 160 metres walk west of the site. There are therefore opportunities for sustainable travel from this site.			
71A	**Long Stoop Way, Site A -** This employment site is approximately 3km from Mansfield town centre. The Timberland Trail is located directly north of the site entrance, a dedicated cycling and pedestrian route leading directly into the centre of Mansfield. The closest bus stop is on Eakring Road (7 and 218) with 5 services per hour for most of the day during the week, located 600 metres south of the site. As an employment site, most of the housing in east Mansfield is accessible by sustainable travel modes and this site provides suitable sustainable travel options for getting to/from the centre of Mansfield.			
71C	**Long Stoop Way, Site C -** This employment site is approximately 3km from Mansfield town centre. The Timberland Trail is located directly north of the site entrance, a dedicated cycling and pedestrian route leading directly into the centre of Mansfield. The closest bus stop is on Eakring Road (7 and 218) with 5 services per hour for most of the day during the week, located 1km walk south of the site. As an employment site, most of the housing in east Mansfield is accessible by sustainable travel modes and this site provides suitable sustainable travel options for getting to/from the centre of Mansfield.			
73	**Three Thorn Hollow Farm -** The site is within 4.7km from Mansfield town centre. A dedicated off road cycle lane is provided along Southwell Road East, directly north of the site. The Mansfield Way runs parallel to the north of this road, a recognised local cycleway which provides access into Mansfield. Bus services 27, 28 and 141 pass to the north of the site along Southwell Road East and have service frequencies of 4 per hour for most of the day during the week. This site therefore provides suitable sustainable travel options.			
74C	**Water Lane -** This mixed use development is located 3.2km from Mansfield town centre. The A617 runs alongside the site and contains a dedicated cycle lane. The closest bus stop is on Water Lane, within 700 metres walk of the site, buses 6 and 217 run through here and there are at least 4 services an hour throughout most of the day during the week. For residents, there is some opportunity for sustainable travel from this site and in terms of employment uses; some housing to the north west of Mansfield is accessible by sustainable travel modes.			
76	**Land off Jubilee Way -** This mixed use site is approximately 3.3km from Mansfield town centre. The Timberland Trail is located on the very northern edge of the site, this is a dedicated cycling			

	and pedestrian route leading directly into the centre of Mansfield. Bus stops are located along Jubilee Way North (7 and 218), on the western side of the site which provide 5 services per hour. For its employment purposes, most of the housing in east Mansfield is accessible by sustainable travel modes. In terms of accessing Mansfield town centre, there is suitable sustainable travel options available from the site, particularly by public transport, however for a development of this size, opportunity for active travel could be improved to encourage more sustainable travel.			
89	**Land off Skegby Lane -** This site is located 2.6km from Mansfield town centre. Although there are no dedicated cycling routes within immediate vicinity of the site, there are some traffic calming measures in place along Skegby Lane which may encourage cycling from the site. The Skegby Trail/Timberland Trail is located to the south of the site on Sutton Road, although this doesn't provide the most direct route into Mansfield. The closest bus stop is located on Ladybrook Lane, 0.3km walk from the site, bus 6 runs through here and provides 4 services an hour throughout most of the day during the week. The site's immediate proximity to King's Mill Hospital and a large supermarket will also reduce the need to travel. This site therefore provides suitable sustainable travel options.			
91	**Strip of land off Caudwell Road -** The site is located just less than 3km from Mansfield town centre. Although there are no dedicated cycle routes nearby, a proposed new signed route is planned to be implemented along Cauldwell Road, immediately north of the site. This should encourage more local cycling trips from the south into Mansfield town centre. The nearest bus stops are located on Nottingham Road which runs parallel to the site; the Pronto bus service run by Trentbarton stops here and offers services every 10 minutes into Mansfield town centre for most of the day during the week. The sites proximity to West Notts College and a local day nursery would also reduce the need to travel for young people and families. This site therefore provides suitable sustainable travel options.			
145	**Sherwood Business Park (Site A) -** The site is less than 4.5km from Mansfield Town centre. A dedicated off-road cycle route is provided parallel along Southwell Road West, directly south of the site. This is the Mansfield Way, a recognised local cycleway which provides access into Mansfield. Bus services 27, 28 and 141 pass the south of the site on Southwell Road West and have service frequencies of 4 per hour for most of the day during the week. As an employment site, most of the housing in the south east of Mansfield and Rainworth is easily accessible by sustainable travel modes.			
146	**Sherwood Business Park (Site B) -** The site is less than 4.5km from Mansfield Town centre. A dedicated off-road cycle route is provided parallel along Southwell Road West, directly south of the site. This is the Mansfield Way, a recognised local cycleway which provides access into Mansfield. Bus services 27, 28 and 141 pass the south of the site on Southwell Road West and have service frequencies of 4 per hour for most of the day during the week. As an employment site, most of the housing in the south east of Mansfield and Rainworth is easily accessible by sustainable travel modes.			
148	**Millennium Business Park (Site A) -** This employment site is			

	located 2.5km from Mansfield town centre. Along Chesterfield Road, to the west of the site, towards Mansfield Town centre there is a combination of on-road and off-road cycle facilities, with a dedicated cycle lane along parts of Chesterfield Road. The route is served by 23, 53 and 'Pronto' bus routes; these provide frequencies of at least every 30 minutes for most of the day during the week. Some bus stops along Chesterfield Road benefit from Real Time Information and are covered; this should encourage more people to use these services. There are therefore suitable sustainable travel options for this site, although greater frequency of bus services may encourage greater use of sustainable travel modes.			
150	**Ratcher Hill Quarry -** The site is less than 4km from Mansfield Town centre. A dedicated off-road cycle route is provided parallel along Southwell Road West, directly south of the site, after about 400 metres this becomes the Mansfield Way, a recognised local cycleway which provides a direct link into Mansfield town centre. Bus services 7 and 218 pass the site on Jubilee Way South and have service frequencies of 5 per hour for most of the day during the week. As an employment site, most of the housing in the south east of Mansfield and Rainworth is easily accessible by sustainable travel modes.			
40	**Ratcher Hill Quarry (south west) -** The site is less than 4km from Mansfield Town centre. A dedicated off-road cycle route is provided parallel along Southwell Road West, directly south of the site, after about 400 metres this becomes the Mansfield Way, a recognised local cycleway which provides a direct link into Mansfield town centre. Bus services 7 and 218 pass the site on Jubilee Way South and have service frequencies of 5 per hour for most of the day during the week. As an employment site, most of the housing in the south east of Mansfield and Rainworth is easily accessible by sustainable travel modes.			
170	**Land off Wharmby Avenue -** The site is 3.2km from Mansfield town centre. Along Chesterfield Road, to the east of the site, towards Mansfield Town centre there is a combination of on-road and off-road cycle facilities, with a dedicated cycle lane along parts of Chesterfield Road. The route is served by 23, 53 and 'Pronto' bus routes; these provide frequencies of at least every 30 minutes for most of the day during the week. Some bus stops along Chesterfield Road benefit from Real Time Information and are covered; this should encourage more people to use these services. There are therefore suitable sustainable travel options for this site, although greater frequency of bus services may encourage greater use of sustainable travel modes.			
187	**Land forming part of Peafield Farm –** The site is located 3.8km from Mansfield town centre. There is adequate pedestrian infrastructure that runs parallel to Peafield Lane, which provides direct access to the residential areas in Mansfield Woodhouse, within 1km of the site. There is no adequate cycling infrastructure within close proximity to the site, the closest being located in Mansfield Woodhouse. The closest bus stop is located on Litton Road, 800m from the site and bus 210 provides frequencies of one service an hour for most of the day during the week. As an employment site, housing in the east of Mansfield Woodhouse is relatively accessible by active modes. Wider accessibility could be improved by increasing the frequency of existing nearby bus			

	services that would serve more of the residential areas in Mansfield Woodhouse.			
189	**Land at Holly Road -** This site is 3km from Mansfield Town centre. No specific cycle routes are provided over the majority of the journey, however Holly Road immediately north of the site has been considered as a potential route for a proposed new signage cycle route. The nearest bus route operates along Holly Road, with bus stops within 100 metres of the site; no. 218 runs through here however there is only an hourly service during the day. Sandlands Way and particularly Clipstone Road West provide more frequent services; 14, 15, 16, 218 and 210, some of these services operate at 15 minute intervals. This site has the potential to provide some sustainable travel opportunities.			
The sites below are located more than 5km from Mansfield Town Centre. They are therefore considered to be outside of a reasonable walking and cycling distance for most people.				
Site	**Comment**	**Walking**	**Cycling**	**Public Transport**
33	**Wood Lane (miners Welfare) -** This site is just less than 9km from Mansfield travelling via the A60. Bus services 12 and 209 pass the site entrance on Wood Lane and operate 2 services per hour, every 30 minutes. The bus stop is also sheltered. However, not all journeys to/from this site would be to Mansfield, a significant proportion would also travel to/from Market Warsop. This would allow a certain amount of sustainable travel from this site where Market Warsop could provide the required facilities. Therefore, bus facilities, whilst provided, may require greater frequencies to encourage a greater proportion of sustainable travel into Mansfield.			
34	**Land at Sheerwood Street/Oakwood Lane -** This site is approximately 8.5km from Mansfield travelling via the A60. Bus service 209 passes by this site entrance, with services every 2 hours. Other services are available in Market Warsop, approximately a 1km walk away. Utilising facilities in Market Warsop instead would allow a certain amount of sustainable travel from this site where possible however in relation to Mansfield, this site lacks opportunities for sustainable travel.			
35	**Stonebridge Lane/Sookholme Lane -** The site is approximately 7km from Mansfield travelling south via the A60. There is no bus service immediately serving the site. The closest bus stop is on Mansfield Road, 500 metres walk south east of the site, and buses 11 and 12 stop here with up to 4 services per hour during the day. Utilising facilities in Market Warsop instead would allow a significant amount of sustainable travel from this site where possible, however in relation to Mansfield, this site lacks opportunities for sustainable travel.			
36	**Stonebridge Lane/Sookholme Drive -** The site is approximately 7km from Mansfield travelling via the A60. There is no bus service immediately serving the site. The closest bus stop is on Mansfield Road, 500 metres walk south east of the site, and buses 11 and 12 stop here with up to 4 services per hour during the day. Utilising facilities in Market Warsop instead would allow a significant amount of sustainable travel from this site where possible, however in			

	relation to Mansfield, this site lacks opportunities for sustainable travel.			
43	**Oakfield Lane (Land Adj recycling depot)** - This site is approximately 8.5km from Mansfield travelling via the A60. Bus service 209 passes near the site, on Robin Hood Avenue with services every 2 hours. Other services are available in Market Warsop, approximately a 1km walk. On this basis this site currently provides little scope for sustainable travel. As an employment site it is possible to attract journeys from within Warsop where the possibility of sustainable travel would be greater than for those travelling further. Some of the housing provided at Mansfield Woodhouse is approximately 4km away which may also allow the potential for some sustainable travel.			
51	**Land off Netherfield Lane -** The site is approximately 9.3km from Mansfield travelling via the A60. This is too far to undertake walking and most cycle trips. Bus service 11 passes by the site entrance, stopping 240 metres east of the site with services every half an hour. Other services are available in Market Warsop, approximately 1.8km walk away, which is within a reasonable walking distance. Utilising facilities in Market Warsop instead would allow a certain amount of sustainable travel from this site where possible however in relation to Mansfield, this site lacks opportunities for sustainable travel.			
57	**Land off Mansfield Road, Spion Kop -** This site is approximately 5.8km from Mansfield travelling south via the A60. Bus services 11 and 12 pass the site with up to 4 services per hour during the day, providing direct access into both Mansfield and Market Warsop. Utilising facilities in Market Warsop instead would allow a certain amount of sustainable travel from this site where possible and there is some, albeit small opportunity for sustainable travel modes from this site to Mansfield town centre.			
43	**Oakfield Lane -** This site is approximately 8.5km from Mansfield travelling via the A60. Bus service 209 passes near the site, along Robin Hood Avenue with services every 2 hours. Other services are available in Market Warsop, approximately a 1km walk. On this basis this site currently provides little scope for sustainable travel. As an employment site it is possible to attract journeys from within Warsop where the possibility of sustainable travel would be greater than for those travelling further. Some of the housing provided at Mansfield Woodhouse is approximately 4km away which may also allow the potential for some sustainable travel.			
63	**Land at Oakfield Lane -** This site is approximately 8.5km from Mansfield travelling via the A60. Bus service 209 passes near the site, along Robin Hood Avenue with services every 2 hours. Other services are available in Market Warsop, approximately a 1km walk. On this basis this site currently provides little scope for sustainable travel. As an employment site it is possible to attract journeys from within Warsop where the possibility of sustainable travel would be greater than for those travelling further. Some of the housing provided at Mansfield Woodhouse is approximately 4km away which may also allow the potential for some sustainable travel.			
175	**Former Warsop Vale School -** The site is approximately 7.2km from Mansfield travelling via the A60. Bus service 12 passes the site, stopping directly outside with services every half an hour for			

	most of the day during the week. Other services are available in Market Warsop; around 3km away which is just over the reasonable walking distance, although is within a reasonable cycling distance. Utilising facilities in Market Warsop instead would allow a certain amount of sustainable travel from this site where possible however in relation to Mansfield, this site lacks opportunities for sustainable travel.			
183	**Adj 188, Southwell Road East –** This site is approximately 5.5km from Mansfield town centre. A dedicated off road cycle lane is provided along Southwell Road East, directly north of the site. The Mansfield Way runs parallel to the north of this road, a recognised local cycleway which provides access into Mansfield. Bus services 27, 28 and 141 pass immediately outside the site along Southwell Road East and have service frequencies of 4 per hour for most of the day during the week. This site therefore provides suitable sustainable travel options.			

4. Summary

4.1.1 This Stage 2 report has considered the highway related impacts of implementing the Local Plan development scenario for Mansfield District. The highway network, using the Mansfield SATURN traffic model has considered traffic volumes and capacities, delays on links and at junctions and travel times through the network.

4.1.2 The 2033 Local Plan represents an increase over the 2033 Reference Case of 5,331 trips in the AM peak and 7,120 trips in the PM peak hour.

4.1.3 Highway traffic volumes have been considered in Section 2.5. Several links were identified to have traffic volume flow increases in the ranges of 10-30% increase and greater than 30% increase compared with the Reference Case. Assessing the current highway conditions on these links, i.e. parking obstructions, capacity restraints or access arrangements, in light of overall expected two-way traffic volumes in the Local Plan scenario, most of the highlighted links would operate within their assessed capacity

4.1.4 Section 2.6 considered link delay, as calculated using the SATURN traffic model and which included the queuing-delay on the approach to the junctions at the end of each link.

4.1.5 Over capacity was considered both in terms of links and junctions and detailed in Section 2.7. The junctions highlighted by the SATURN model were assessed in more detail using junction-specific analysis software; the results of which are reported in Appendix B at the back of this report. The possible junction operational performances and mitigation measures were identified in Appendix B and summarised in Table 2.9.

4.1.6 Suggested mitigation packages include:

- junction widening where appropriate to improve capacity;
- linking traffic signals to the urban traffic control centre using CCTV;
- optimising the layout and operation of traffic signal junctions so as to maximise capacity;
- the installation of bus priority measures to promote model shift
- maximise sustainable travel take-up; and
- technology upgrades.

4.1.7 Journey time on defined routes were assessed with the SATURN model, and section 2.10 reports the impact of the Local Plan traffic growth on the network upon bus service operating times. The increases in journey times for bus operators can be mitigated against with the provision of bus priority corridors, such as that proposed for the A60. Additionally, GPS-based systems can be used to track bus positions and used by traffic signal controllers to optimise green signals in favour of the bus demands on the approaches to signalled junctions.

4.1.8 Section 3.0 has assessed the suitability of each Local Plan development site regarding the opportunities for sustainable transport. Many Local Plan sites are in favourable locations which are either close to Mansfield centre and therefore also the bus and train station for further destinations, or are located near to Market Warsop District Centre, or are located near to good quality / high frequency public transport corridors. Some sites are located

further from these provisions where additional provision may be required to maximise the sustainability of the site.

5. Conclusions

5.1.1 Mansfield District Council is currently preparing a new Local Plan. This report has been prepared to support the traffic analysis and impacts of the developments in the Local Plan and considers the transport context within which the development sites identified within the Local Plan would be brought forward.

5.1.2 Baseline (2016) and future year Reference Case conditions have been assessed and reported in the Stage 1 report (Mansfield District Transport Study: Stage 1 Baseline and Reference Case, May 2017).

5.1.3 There is an existing traffic model of Mansfield, based upon the SATURN software package, which has been utilised in this study. The model has been updated to 2016 flow levels using existing and new traffic count data in order to represent a baseline of trip patterns and traffic volumes in Mansfield.

5.1.4 The 2016 Baseline and 2033 Reference Case traffic forecast models were used to examine the performance of the highway network and identify any junctions that were approaching capacity and thus causing delays and congestion. This process identified the following thirteen junctions within the Mansfield urban area:

1. Chesterfield Road / Debdale Lane
2. A60 Nottingham Road / Berry Hill Lane
3. Carter Lane / Southwell Road / Windsor Road
4. A617 MARR / A6191 Southwell Road
5. A60 Leeming Lane / Peafield Lane
6. A60 Leeming Lane / A6075 Warsop Road
7. Kings Mill Road / Beck Lane / B6014 Skegby Lane / Mansfield Road
8. A6191 Ratcliffe Gate / A60 St. Peters Way
9. A6117 Old Mill Lane / B6030 Clipstone Road West
10. A38 Sutton Road / B6014 Skegby Lane / Sheepbridge Lane
11. A60 / Old Mill Lane / Butt Lane
12. A6191 Adams Way / Oak Tree Lane
13. A60 / New Mill Lane

5.1.5 Within Market Warsop the following junction was identified:

14. A60 Church Street / Wood Street.

5.1.6 A list of Local Plan development sites was compiled by Mansfield District Council. These were used to generate additional trip demand matrices that were added to the 2033 Reference Case forecasts. The resulting 2033 Local Plan forecasts were assigned to the highway network, with improvements associated with committed developments.

5.1.7 The Stage 2 analysis of the Local Plan scenario highlighted a further five junctions:

15. A6117 Oak Tree Lane/ Eakring Road – Mansfield

16. Southwell Road/Berry Hill Lane
17. Southwell Road/Bellamy Road
18. A38/Rosemary Street
19. Coxmoor Road/Hamilton Road

5.1.8 In addition to the junctions highlighted by the Stage 2 analysis, the following four junctions have been assessed in detail as there is a perception that these junctions would be operating close to capacity:

20. A6075 Debdale Lane/ Priory Road – Mansfield Woodhouse
21. A60 Nottingham Road/ A611 Derby Road – Mansfield
22. A6191 Chesterfield Road/ A617 MARR – Pleasley
23. A60/Baums Lane/Sainsburys

5.1.9 Detailed models of the above junctions were built to examine their performance in the Base Year, Reference Case and Local Plan.

5.1.10 Mitigation strategies have been identified in Sections 2.11 and Section 3. Opportunities for Sustainable travel are set out in Table 3.2 and potential junction improvement strategies are provided in Table 2.9. An assessment of which Local Plan sites could be required to provide developer funding contributions to any junction improvements is made in Appendix B and summarised in Appendix D.

5.1.11 It is noted that several of the junctions that were highlighted as likely to operate over capacity in the Local Plan case have limited scope for physical improvements without third party land. Without effective mitigation it is likely there will be increased queuing delay in the peak periods if the Local Plan allocation is delivered.

5.1.12 An assessment and review of the sustainable travel potential of each Local Plan site has been undertaken to identify sites that may require additional interventions to maximise the take up of sustainable travel options.

5.1.13 It is expected that any subsequent planning application for a site identified in the Local Plan would be required to include a transport assessment and travel plan that would identify that site's traffic impacts and detail a package of mitigation measures.

Glossary

ARCADY	*Assessment of Roundabout Capacity and DelaY*. A software tool used to assess the capacity of roundabouts under differing traffic scenarios.
Design Manual for Roads and Bridges	The UK highway design guide, commonly used for analysis and design of the trunk road network but also used for local roads, where appropriate.
Degree of Saturation (DoS)	A measure of the operational performance of a signalled junction, with measures 100% or above indicating that a junction is operating above capacity.
Guidance on Transport Assessment (GTA)	A guidance document prepared by the DfT setting out how a Transport Assessment should be prepared.
Junction Capacity	The number of vehicles which can be accommodated by a junction within a given period. Normally calculated using software such as ARCADY, PICADY or LINSIG. Where a junction is operating “at capacity”, queues are likely to form since the number of vehicles approaching the junction is more than that which can pass through it.
LINSIG	A computer programme used for modelling traffic at traffic signal junctions. LINSIG allows engineers to model junctions in a way which closely follows the behaviour of on-site signal control equipment.
Local Highway Authority	The body responsible for the local road network in a particular area, in particular with regards network improvements and the control of development that could affect the local highway.
Local Plan	A document produced by Local Authorities containing the development plans and policy documents for the local area.
Local Transport Plan	The Transport Act 2000 required Local Highway Authorities to produce and maintain an LTP. The LTP sets out transport strategies and policies for a given area and how these will be implemented. The plans cover a defined period and are used by the DfT to make decisions on capital funding, and for Local Authorities to monitor the delivery of key objectives and targets. The current LTP document covers the period 2011-2026.
Manual Classified Count (MCC)	A count of traffic on a particular road, or at a junction, which is usually undertaken by a team of enumerators, usually over a 12-hour period. Traffic is classified by vehicle type.

MOVA	*Microprocessor Optimised Vehicle Actuation* is an adaptive signal control system. It uses advanced traffic control algorithms to increase capacity and minimise delay at traffic signals. It is used at a range of junctions from high speed to smaller suburban and urban sites.
NTEM	The *National Trip End Model* is a transport planning tool that was developed by the DfT, which produces projections of trip numbers across England and Wales. The forecasts are derived from local and regional planning projections of jobs, employment, population and household numbers in combination with travel growth factors from the national transport model.
PCU	Passenger Car Units are used to measure the capacity of roads and junctions whereby vehicle flows are converted to a standard unit using factors, e.g. car = 1 PCU, bus = 2 PCUs.
PICADY	*Priority Intersection Capacity and Delay.* A software tool that predicts capacities, queue lengths and delays at non-signalised major/minor priority junctions.
Ratio of Flow to Capacity (RFC)	A measure of the performance of a junction, with a measure of 1.0 or above indicating that a junction is operating above capacity.
SATURN	A software tool used to model traffic flows on a highway network that is responsive to congestion and reassignment issues.
SCOOT	Urban Traffic Control (UTC) with the additional option of Split Cycle Offset Optimisation Technique module (SCOOT). UTC SCOOT is a centralised computer based traffic control system that monitors vehicular flows throughout a region or several regions (closely associated clusters of traffic signals). The system applies adjustments to the timings at traffic signal controlled junctions to accommodate changes in traffic flows via complex algorithms contained within the SCOOT logic.
TEMPRO	Is the software used to calculate and present NTEM trip growth factors for defined local areas.
Transport Analysis Guidance (TAG)	A set of documents (or Units) published by the Department for Transport which sets out how a particular transport scheme should be assessed, principally in terms of economic analysis and calculating a Benefit:Cost ratio. Guidance on the assessment of environmental impacts of

	highway schemes are also contained in the guidance. Sometimes referred to as WebTAG.
Transport Assessment (TA)	A document submitted in support of a planning application which sets out the likely impact of a proposed development on the transport network. Guidance on the content of a Transport Assessment is provided in the GTA.
Travel Plan	A document submitted in support of a planning application which sets out how trips to / from a development would be managed on opening. Its objective is usually to reduce single occupancy car trips by promoting sustainable travel options.
Trip Rate Information Computer System (TRICS)	A software tool which contains traffic survey data classified by land-use type and size. It is used to estimate the number of trips that could be generated by a proposed development based on experience elsewhere in the UK, and is recommended for this purpose in the GTA.
Trip Assignment	A stage in the estimation of future traffic conditions. The process of "assigning" traffic flows to particular links and junctions to and from a particular destination. It is preceded by Trip Distribution.
Trip Distribution	A stage in the estimation of future traffic conditions. The process of determining the likely origins and destinations of traffic to and from a proposed development. This stage does not make any assumptions about routeing, and is followed by Trip Assignment.
Trip End Model Program (TEMPRO)	The TEMPRO database contains information relating to land-use developments across the United Kingdom. It is used to forecast traffic growth in / from specific areas.
Trip Generation	A stage in the estimation of future traffic conditions. Trip Generation is an estimate of the total arrivals and departures that could be generated by a development within a specific time period. The software tool TRICS is commonly used to inform this stage. This stage is followed by Trip Distribution and Trip Assignment.
WebTAG	See TAG.

APPENDIX A Local Plan Development Sites

Locations of Local Plan development sites are shown in Figure 2.1 (for Mansfield) and Figure 2.2 (for Warsop). Site references in those Figures correspond to the following Tables.

Table A.1: Local Plan Housing Sites

MDC Site Reference	Easting	Northing	Site Description	Number of houses
27b	456833	359054	Land off Sherwood Oaks Close	46
54	454333	358941	Former Evans Halshaw site	66
183	458596	358545	Adj 188, Southwell Road East.	8
185	454452	360842	52, Ratcliffe Gate	9
59	453330	359486	Land to the rear of High Oakham Hill	39
1	454236	360597	Former Mansfield Brewery (part B)	23
6	452797	362012	Centenary Lane (phase 3)	93
8	456001	361463	Former Sherwood Hall School	94
11	456218	359201	Bellamy Road Recreation Ground	64
14	453462	364335	Land at Cox's Lane	14
19	456279	361737	Allotment site at Pump Hollow Road	64
20	451893	361774	Land at Rosebrook Primary School	134
23	454955	361203	Sandy Lane	63
24	455120	361320	Sherwood Close	32
25	453033	361493	Ladybrook Lane / Tuckers Lane	33
26	454370	361934	Land at Windmill Lane (former nursery)	23
27a	456685	358827	Land at Redruth Drive	99
28	452796	362535	Debdale Lane / Emerald Close	32
29	453274	362604	Sherwood Rise (adjacent Queen Elizabeth Academy)	87
30	455205	362605	Land at Old Mill Lane / Stinting Lane	86
31	455497	363128	Land at New Mill Lane	100
46	452689	362845	Land at Debdale Lane, Burlington Drive.	157
52	450952	363400	Pleasley Hill Farm	660
53	455384	362945	Land between Old Mill Lane & New Mill Lane	153
55	455151	362847	Tall Trees mobile homes Old Mill Lane	100
58	451407	361121	Fields Farm, Abbott Road	200
60	454441	363587	Land off Ley Lane	14
64	453472	362360	Pheasant Hill and Highfield Close	98
68	452669	360690	Kirkland Avenue Industrial Park	20
73	457972	358612	Three Thorn Hollow Farm	188
74c	451380	362601	Water Lane	139
75	452730	360797	Former Mansfield Hosiery Mill Car Park	29
76	457310	360676	Land off Jubilee Way	800
89	451590	360403	Land off Skegby Lane	215
91	454272	358398	Strip of land off Cauldwell Road (opposite the College)	42
170	451453	363104	Land off Wharmby Avenue	125
189	456184	362485	Land at Holly Road	16
7	455325	361615	Former Ravensdale Middle School	100
182	456803	368170	Oak Garage	9
33	455852	368790	Wood Lane (Miners Welfare)	31

34	457032	367107	Land at Sherwood Street / Oakfield Lane	36
35	455906	367746	Stonebridge Lane / Sookholme Lane	200
36	455954	367476	Sookholme Lane / Sookholme Drive	200
51	457451	369427	Land off Netherfield Lane	120
57	455851	366537	Land off Mansfield Road, Spion Kop (adj The Gables)	8

Table A.2: Local Plan Employment Sites

MDC Site Reference	Easting	Northing	Site Description	Development area (ha)
40	456890	359573	Land at Ratcher Hill Quarry (south west)	0.75
71a	456713	361519	Site A, Long Stoop Way	1.596
71c	456869	361513	Site C, Long Stoop Way	0.42
127	453526	361067	Former bus station site	1.5775
139	457094	359287	Frontage to Ransom Wood Business Park	0.175
150	457177	359841	Ratcher Hill Quarry	3.416
38	457169	359608	Ransom Woods Business Park (north of NHS Offices)	2.07
52	450952	363400	Pleasley Hill Farm	5.61
74c	451380	362601	Water Lane	0.8176
76	457310	360676	Land off Jubilee Way	6.762
27c	456853	358877	Land South of Sherwood Avenue	2.82
37	456713	359120	Land at Bellamy Road Industrial Estate	1.87
141	452795	359725	Oakham Business Park (Site A)	0.17
142	452862	359606	Oakham Business Park (Site B)	0.22
143	456991	361782	Crown Farm Industrial Estate (Site A)	2.77
145	457431	359153	Sherwood Business Park (Site A)	0.51
146	457532	359264	Sherwood Business Park (Site B)	0.27
148	452161	362830	Millennium Business Park (Site A)	0.32
187	456364	363868	Land forming part of Peafield Farm	10.064
43	456643	366903	Oakfield Lane (land adjacent recycling depot)	1.2
63	456591	366835	Land at Oakfield Lane	1.09

APPENDIX B Junction Operational Capacity Assessments Reference Case (2033) and Local Plan (2033)

Appendix B Junction Operational Capacity Assessments

Introduction

This Appendix summarises the detailed Reference Case (2033), previously presented in the Stage 1 Report, and Local Plan (2033) junction assessments described in the main body of the report.

In order to determine the viability of the development sites, an assessment of which sites are likely to impact the affected junctions has been made.

Whilst an assessment of which sites are likely to impact the affected junctions has been made, it is expected that all proposed Local Plan development sites which impact on the traffic network should contribute to strategic infrastructure improvements.

Each junction mitigation measure identified below has had a cost estimate attributed to it. Cost estimates have been provided in advance of any detailed design and therefore have a high level of uncertainty attached to them. Scheme costs have been developed based on the following assumptions:

- A 'Top Down' costing methodology, based on the cost ranges of comparable schemes has been used;
- All costs provided are 2018 Q1 prices;
- The prices provided do not include additional land purchase cost;
- The prices do not include any costs associated with the diversion or protection of existing utilities;
- An allowance is made for contingencies, optimism bias, and design and supervision costs based upon a typical percentage for the size and type of improvement; and

The following software packages have been used:

LINSIG3 has been used to assess signalised junctions. LINSIG3 (3.2.28) software provides outputs for both individual approaches and for the junction as a whole. For the individual approaches, the outputs are Degree of Saturation (DoS) and Mean Maximum Queue Length (MMQ). A total-junction statistic known as the Practical Reserve Capacity (PRC) is also reported, which shows the percentage of "spare" capacity left at the junction.

LINSIG works on the basis that a junction is considered to be near to or at capacity when the DoS value on an individual junction approach exceeds 90%. Below this threshold, queues begin to increase slowly as the DoS increases. Above this threshold, queues begin to elongate rapidly. As the DoS on any approach increases, the PRC remaining at the junction decreases.

All signal phasing and timings used in the LINSIG assessments have been derived from traffic signal controller data.

ARCADY has been used to assess roundabout junctions. The ARCADY software has been run using a synthesised profile and provides outputs in the form of *Ratio of Flow to Capacity* (RFC) and *queue length* (Q). A synthesised profile includes a 12.5% mid-peak increase in traffic demand to robustly test the performance of the junction. For a new roundabout, a target RFC value of 0.85 on the worst-approach during a single time segment is preferred as this minimises the chance that queuing will occur at a new junction on opening. For existing junctions, RFC values above 0.85 are likely to produce queues which increase slowly. Above an RFC value of 1.0, a junction is more than likely to be at capacity (with resulting larger increases in queue length).

PICADY has been used to assess priority junctions. PICADY software has been run using a synthesised profile and provides outputs in the form of Ratios of Flow to Capacity (RFC) and queue length (Q). A synthesised profile includes a 12.5% mid-peak 'surge' to robustly test the performance of the junction. For a junction, a worst-arm target RFC value of 0.85 (or 0.75 in a rural location) during a single time segment is preferred as this minimises the chance that queuing will occur at a new junction on opening. For existing junctions, RFC values above 0.85 are likely to produce queues which increase slowly. Above an RFC value of 1.0, a junction is more than likely to be at capacity (with resulting larger increases in queue length).

Chesterfield Road / Debdale Lane

This is a MOVA controlled signalised junction and, as such, has been assessed using LINSIG3. Chesterfield Road is a key route between the M1 and Mansfield town centre. Abbott Road leads to local housing estates and links into MARR providing routes to Sutton in Ashfield and the A38. Debdale Lane provides routes to Mansfield Woodhouse.

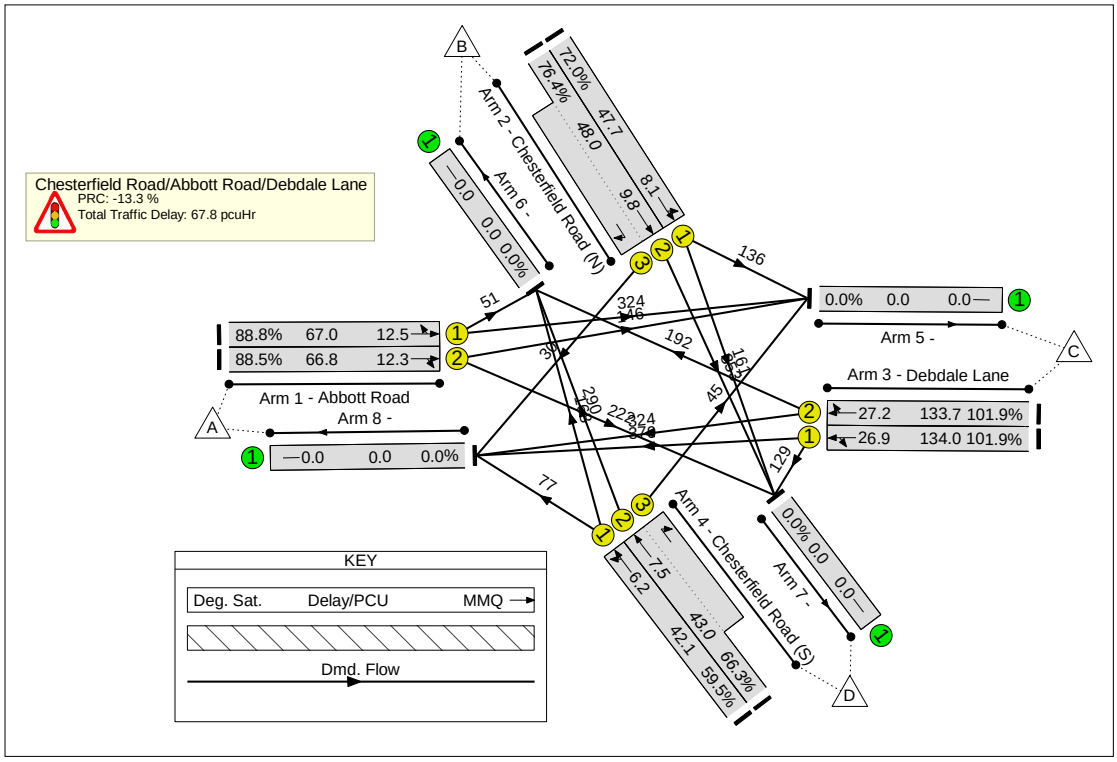


Table 1A: Performance of Chesterfield Road / Debdale Lane (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Abbott Road Left Ahead	123.0%	69.0	126.8%	85.7
Abbott Road Ahead Right	123.1%	67.9	126.7%	84.2
Chesterfield Road (N) Left Ahead	117.7%	59.2	124.8%	70.1
Chesterfield Road (N) Ahead Right	118.0%	69.8	124.9%	84.9
Debdale Lane Left Ahead	122.4%	69.5	122.8%	67.8
Debdale Lane Ahead Right	122.3%	70.9	122.8%	69.1
Chesterfield Road (S) Left Ahead	79.3%	10.2	102.2%	24.4
Chesterfield Road (S) Ahead Right	82.8%	11.7	105.4%	35.5
Junction Summary	PRC	-36.8	PRC	-40.9
	Veh Delay (PCU Hrs)	372.13	Veh Delay (PCU Hrs)	464.16

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 1A indicates that the signal controlled junction at Chesterfield Road / Debdale Lane operates over capacity in both the AM Peak and PM Peak in the Reference Case, the measure of DoS are worse (higher) for all arms than in the Base year. The arm with least queueing would be expected to be Chesterfield Road (S) in both the AM and PM Peak.

Table 1B: Performance of Chesterfield Road / Debdale Lane (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Abbott Road Left Ahead	135.2%	110.2	144.7%	159.2
Abbott Road Ahead Right	130.8%	98.5	136.2%	132.7
Chesterfield Road (N) Left Ahead	123.5%	81.9	126.5%	86.8
Chesterfield Road (N) Ahead Right	134.8%	119.3	145.3%	143.4
Debdale Lane Left Ahead	132.7%	110.0	145.0%	125.9
Debdale Lane Ahead Right	133.5%	112.2	146.2%	128.8
Chesterfield Road (S) Left Ahead	90.3%	17.4	111.0%	48.2
Chesterfield Road (S) Ahead Right	102.4%	32.5	130.6%	106.4
Junction Summary	PRC	-50.2	PRC	-62.4
	Veh Delay (PCU Hrs)	614.90	Veh Delay (PCU Hrs)	864.98

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

The cycle time used in the Local Plan LINSIG has been extended so as to maximise the capacity of the junction. Notwithstanding, Table 1B indicates that the signal controlled junction at Chesterfield Road / Debdale Lane operates over capacity in both the AM Peak and PM Peak in the Local Plan Scenario, the measure of DoS are worse (higher) for all arms than in the Base year. The arm with least queueing would be expected to be Chesterfield Road (S) in both the AM and PM Peak.

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

This junction already operates on MOVA which adjusts phase timings depending upon demand, under MOVA control it is also possible to increase the overall cycle time to improve overall efficiency. Localised widening could be undertaken, although any expansion is restrained by the petrol filling station, the public house and local businesses on three corners of the junction. Additional space for queuing on A6075 to provide for two ahead movements and two ahead exits along with a lengthened facility for left turn flares would allow signal times to be re-optimised. This would require the use of Mansfield District Council owned land. Further capacity improvement will be difficult and/or expensive as it would require 3rd party land take. A detailed design of junction options would need to be developed in order to assess the feasibility of any potential junction improvements and the impact upon adjacent land owners. Given that a substantial improvement is likely to be required by the forecast year, a localised widening scheme may need to be considered at this junction.

It would be possible to implement near side detection for the pedestrian crossings which would reduce intergreen times currently lost to the pedestrian phase. The installation of a nearside crossing detection system would require the refurbishment of the existing traffic signal equipment at a cost of approximately £250,000.

Modal change could be encouraged by the introduction of selective bus detection along the Chesterfield Road Corridor.

A CCTV based system could also be implemented to enable the urban traffic control centre to intervene with signal settings to respond to incidents and events as they occur.

The total package of possible mitigation measures and associated costs can be summarised as:

Mitigation Measures	Cost Estimate
- Nearside crossing detection.	£250,000
- Likely to require MDC land, funding could be sourced from identified developments.	£1,600,000
- A GPS based system for additional improvements for public service vehicles.	£5,000
- CCTV links to Urban Traffic Control Centre	£5,000
Total	**£1.86m**
*See Appendix B Introduction for cost assumptions	

Local Plan sites that could require developer funding contributions to any major junction improvements are (but not limited to); Millennium Business Park, Land off Wharmby Avenue, Pleasley Hill Farm, Land at Rosebrook Primary School, Land at Debdale Lane (Burlington Drive), Debdale Lane/Emerald Close, Sherwood Rise and Pheasant Hill and Highfield Close. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

A60 Nottingham Road / Berry Hill Lane

This is a MOVA controlled signalised junction and, as such, has been assessed using LINSIG3. The A60 Nottingham Road is a key arterial route between Mansfield and Nottingham. Berry Hill Lane leads to local housing and provides a route for east-west movements across Mansfield. Atkin Lane links to local housing and business parks. There is a school located on the corner of Atkin Lane which leads to localised parking/capacity issues at peak times.

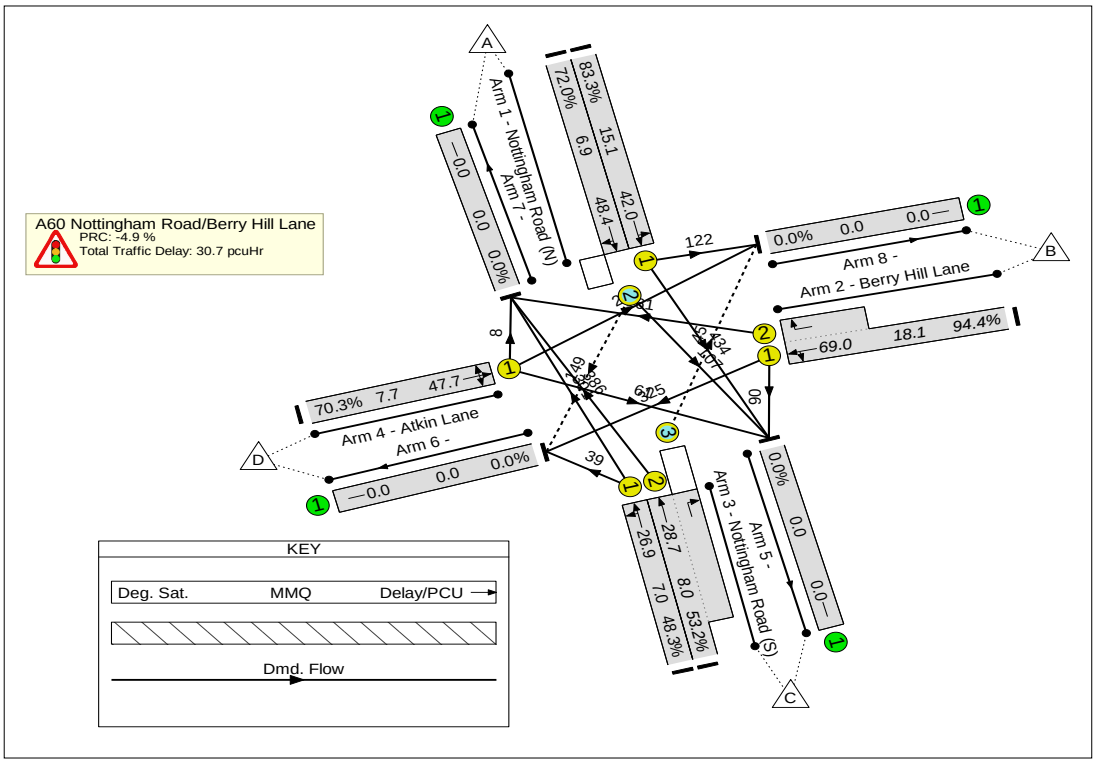


Table 2A: Performance of A60 Nottingham Road / Berry Hill Lane (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Nottingham Road (N) Left Ahead	128.3%	143.8	100.5%	25.8
Nottingham Road (N) Ahead Right	132.5%	28.2	100.8%	28.2
Berry Hill Lane Left Ahead Right	132.1%	109.4	104.1%	32.3
Nottingham Road (S) Left Ahead	67.5%	11.9	76.2%	11.7
Nottingham Road (S) Ahead Right	74.1%	11.0	81.3%	11.6
Atkin Lane Left Ahead Right	128.3%	72.1	102.7%	31.1
Junction Summary	PRC	-47.2	PRC	-15.6
	Veh Delay (PCU Hrs)	334.92	Veh Delay (PCU Hrs)	97.00

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 2A, in the AM Peak this junction is expected to operate over capacity in the Reference Case. All arms except for Nottingham Road (S) approach are over capacity. In the PM peak, the junction would operate over the normal maximum acceptable degree of saturation (90%) on three of the four approaches.

Compact approaches to the junction (narrow lanes) and lack of adjacent land to use for widening of the carriageway would restrict the amount of physical mitigation that could be undertaken, for example in terms of further lane widening. It may be possible to examine the closure of some shared lane right turn movements to increase capacity for the ahead-movements, but liaison with Mansfield District Council and Nottinghamshire County Council determined that this solution would not be acceptable in terms of the routing of the displaced vehicles and is therefore discounted.

Larger scale widening would require the purchase of third party land (residential) and the costs of this may exceed any journey time benefits.

To encourage modal shift in the A60 corridor, the current level of bus priority on Nottingham Road could be upgraded to a GPS System (pending agreement with the bus companies) and extended to the north approach.

Table 2B: Performance of A60 Nottingham Road / Berry Hill Lane (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Nottingham Road (N) Left Ahead	118.4%	111.3	126.6%	90.2
Nottingham Road (N) Ahead Right	205.3%	89.3	126.7%	88.1
Berry Hill Lane Left Ahead Right	205.4%	273.8	126.6%	95.5
Nottingham Road (S) Left Ahead	74.7%	17.9	100.6%	27.9
Nottingham Road (S) Ahead Right	91.2%	22.5	120.9%	77.1
Atkin Lane Left Ahead Right	195.7%	158.7	127.8%	96.1
Junction Summary	PRC	-128.3	PRC	-42.1
	Veh Delay (PCU Hrs)	623.41	Veh Delay (PCU Hrs)	424.02

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 2B, in the 2033 Local Plan, indicates that the performance of this junction worsens from that of the Reference Case. In both AM Peak and PM Peak, this junction is expected to operate over capacity. In the AM Peak all approaches are over capacity (Degree of Saturation > 90%).

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

Given the junction land constraints outlined for the Reference Case, the opportunities for further mitigation may be restricted. One potential strategy might be to adjust the traffic signal settings to allocate priority to the A60 Nottingham Road, which is the main bus route. The green time allocated to Berry Hill Lane and Atkin Lane would thus be restricted and the vehicles on these routes would have to find an alternative route in order to minimise their journey times. This was considered to be a not appropriate mitigation strategy by Nottinghamshire County Council on grounds of potential rerouting on less appropriate routes.

An alternative approach to improving bus journey times through this junction is to implement inbound bus lanes and a GPS based system to enable approaching busses to pass through the junction with minimal delay. The cost of a GPS system is typically £4000-£5000 per junction.

A CCTV based system could be implemented to enable the urban traffic control centre to intervene with signal settings to respond to incidents and events as they occur.

Given the limited scope for cost effective physical improvements at this junction, some further queuing delay is likely to occur in the peak periods if the Local Plan allocation is delivered without effective mitigation.

The total package of possible mitigation measures and associated costs can be summarised as:

Mitigation Measures	Cost Estimate
- A GPS based system for additional improvements for public service vehicles.	£5,000
- CCTV links to Urban Traffic Control Centre	£5,000
- Larger scale widening not feasible without third party land take.	Not Included
Total	**£10,000**
*See Appendix B Introduction for cost assumptions	

Local Plan sites that could require developer funding contributions to any major junction improvements are (but not limited to); Caudwell Road site and the land to rear of High Oakham School. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

Carter Lane / Southwell Road / Windsor Road

This is a MOVA controlled signalised junction and, as such, has been assessed using LINSIG3. Southwell Road is an arterial route to/from Mansfield town centre. Carter Lane accesses local housing but also provides routes to Forest Town and Clipstone to the east of Mansfield.

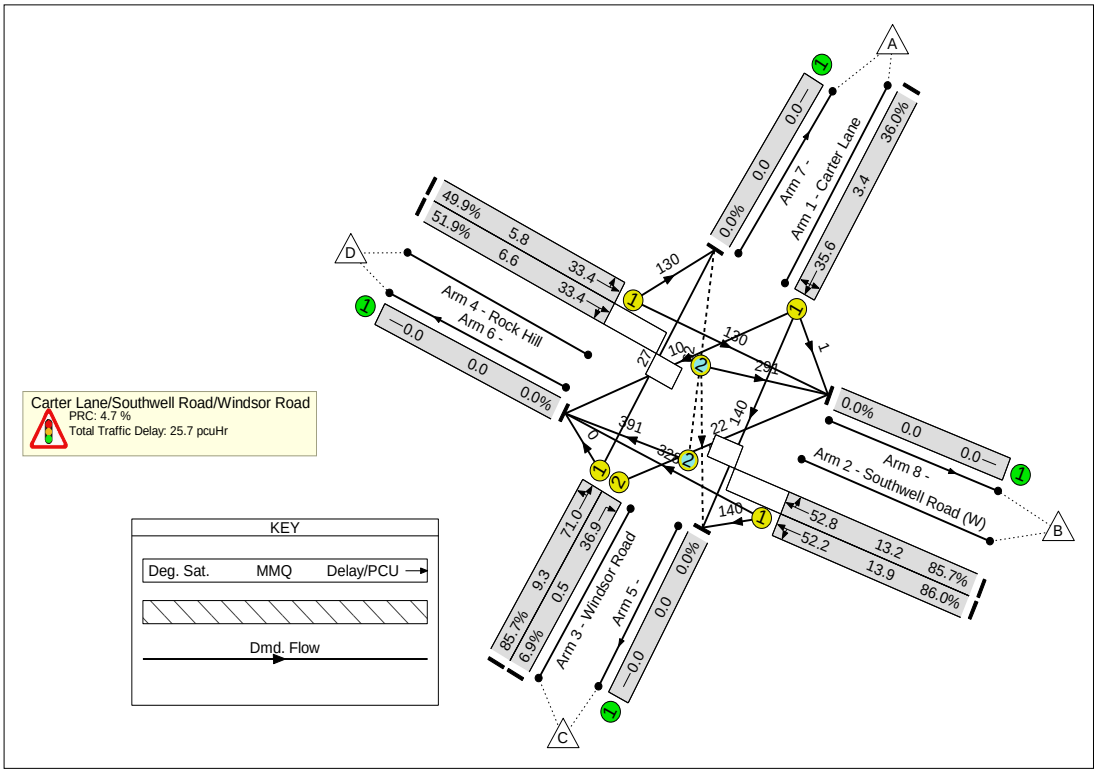


Table 3A: Performance of Carter Lane / Southwell Road / Windsor Road (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Carter Lane Left Ahead Right	75.3%	6.1	51.9%	2.4
Southwell Road (W) Left Ahead	81.0%	13.9	38.5%	5.8
Southwell Road (W) Ahead Right	78.9%	13.7	93.6%	10.6
Windsor Road Left Ahead	78.5%	8.8	94.7%	12.4
Windsor Road Right	13.6%	1.1	45.2%	3.5
Rock Hill Left Ahead	70.9%	11.0	61.5%	10.3
Rock Hill Ahead Right	67.5%	10.5	58.3%	10.1
Junction Summary	PRC	11.1	PRC	-5.3
	Veh Delay (PCU Hrs)	28.82	Veh Delay (PCU Hrs)	27.46

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 3A indicates that the junction would operate within capacity in the 2033 Reference Case in the AM peak hour, although Carter Lane, Southwell Road and Windsor Road would be heavily loaded approaches. The PM peak hour results indicate that Southwell Road and Windsor Road would have degrees of saturation of greater than the target value of 90%.

The issue for this junction appears to be the level of demand flow making the ahead movement from Windsor Road to Carter Lane. It would be difficult to implement widening for this movement as there is not sufficient room available on either the approach or exit to improve the operation.

An approach to allow queuing on the non-strategic routes (Carter Lane and Windsor Road) in order to give additional capacity to the strategic traffic to/from Mansfield (Southwell Road) was discounted by the highway authority. A detailed review at this traffic signal junction might show that fine tuning of the signal timings would resolve some of the capacity issues associated with the Reference Case traffic without physical works at the junction.

A CCTV based system could also be implemented to enable the urban traffic control centre to intervene with signal settings to respond to incidents and events as they occur.

Modal change corridor may be encouraged in the Southwell Road by the introduction of selective bus detection at this junction (and other junctions).

Table 3B: Performance of Carter Lane / Southwell Road / Windsor Road (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Carter Lane Left Ahead Right	119.3%	79.6	119.1%	44.8
Southwell Road (W) Left Ahead	117.0%	67.1	85.3%	10.6
Southwell Road (W) Ahead Right	113.9%	60.5	126.8%	51.9
Windsor Road Left Ahead	118.5%	40.7	125.5%	40.9
Windsor Road Right	21.4%	1.7	68.1%	4.2
Rock Hill Left Ahead	106.8%	41.3	126.5%	75.6
Rock Hill Ahead Right	106.8%	41.3	126.5%	75.6
Junction Summary	PRC	-32.5	PRC	-40.9
	Veh Delay (PCU Hrs)	273.61	Veh Delay (PCU Hrs)	274.86

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 3B shows that in both the AM and PM Peaks in the local plan scenario, the junction will be operating overcapacity.

Fine tuning of the signal timings and lane markings may resolve some of the capacity issues however a target of lower than 90% in the PM Peak may be unachievable using low-cost adjustments.

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

One solution might be to ban the turning movement from Southwell Road (W) to Carter Lane; however consideration would need to be given as to the potential diversion routes used by the displaced vehicles. This approach has been discounted by the highway authority.

The opportunity for widening the junction is limited by the locations of the petrol filling station and retail store on the south east and north east quadrants of the junction. There is sufficient width to widen the A617 Rock Hill exit and approach however, the steep banking on both sides of Rock Hill would require extensive engineering works that is likely to outweigh the benefits of the additional capacity.

Given the limited scope for cost effective physical improvements at this junction, some further queuing delay is likely to occur in the peak periods if the Local Plan allocation is delivered without effective mitigation.

The junction would benefit from the installation of PUFFIN crossing which would improve the efficiency of the junction. Without an identified funding source, it is unlikely that a low cost mitigation strategy will fully address queues at this junction in the Local Plan scenario.

The total package of possible mitigation measures and associated costs can be summarised as:

Mitigation Measures	Cost Estimate
- A GPS based system for additional improvements for public service vehicles.	£5,000
- CCTV links to Urban Traffic Control Centre	£5,000
- PUFFIN crossings.	£30,000
- Larger scale widening not feasible due to topography and third party land take.	Not Included
Total	**£40,000**
*See Appendix B Introduction for cost assumptions	

Local Plan sites that could require developer funding contributions to any major junction improvements are (but not limited to); Ratcliffe Gate and the former Brewery Site. Other sites to the north east and south east of Mansfield may also have an incremental impact at this junction. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

A617 MARR / A6191 Southwell Road

The A617 MARR route provides links to Mansfield, the M1 and Nottingham to the west and Newark to the east. The A6191 provides links to Mansfield to the north and Rainworth to the south. This is a roundabout junction and, as such, has been assessed using ARCADY.

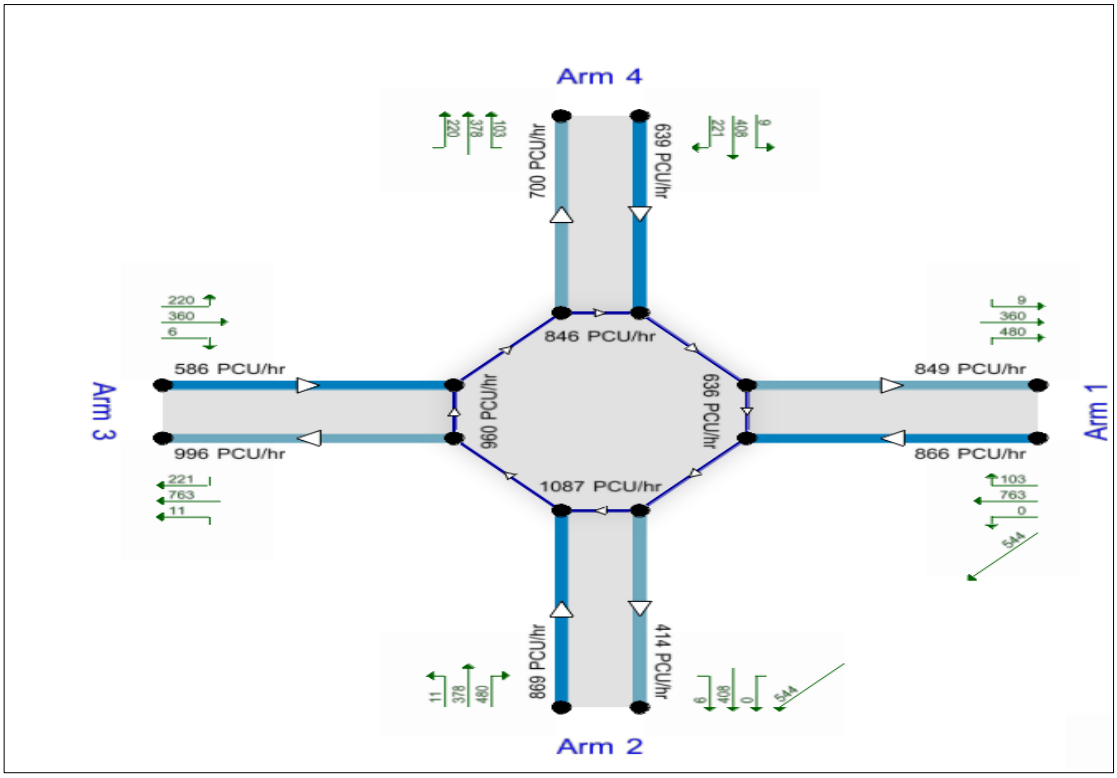


Table 4A: A617 MARR / A6191 Southwell Road (2033 Reference Case)

Approach	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	RFC	Q	RFC	Q
A6191 Southwell Road	0.40	0.67	0.76	3.04
A617 Rainworth Bypass	0.84	5.13	0.85	5.36
B6020	0.81	4.04	0.50	0.98
A617 MARR	0.69	2.22	0.58	1.38

Notes: RFC = Ratio of Flow to Capacity. A measure of the trafficking at the junction in relation to its ability to accommodate such flow, reported on a worst-arm basis. Q = Mean Maximum Vehicle Queue, reported on a worst arm basis. It is measured in PCUs.
PCU = Passenger Car Unit. 1 car = 1 PCU; 1 bus = 2 PCU etc.

In the AM peak the junction operates within capacity, in the PM peak the junction operates just within the band of 'near to or at capacity'. In the both the AM and PM peak hours the A617 Rainworth Bypass operates with the highest RFC values. All remaining approaches are less than the target RFC value of 0.85. The operational performance of the junction is considered to be acceptable in both peak hour periods, the small amount of queueing suggests that mitigation may not be required in the Reference Case scenario.

Table 4B: A617 MARR / A6191 Southwell Road (2033 Local Plan)

Approach	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	RFC	Q	RFC	Q
A6191 Southwell Road	0.46	0.8	0.92	10.3
A617 Rainworth Bypass	0.95	14.5	1.03	37.9
B6020	0.96	14.4	0.55	1.2
A617 MARR	0.77	3.2	0.64	1.7

Notes: RFC = Ratio of Flow to Capacity. A measure of the trafficking at the junction in relation to its ability to accommodate such flow, reported on a worst-arm basis. Q = Mean Maximum Vehicle Queue, reported on a worst arm basis. It is measured in PCUs.
PCU = Passenger Car Unit. 1 car = 1 PCU; 1 bus = 2 PCU etc.

With the traffic growth from the Local Plan developments added, this junction would be expected to continue to operate close to capacity in the AM peak hour, and be over capacity in the PM Peak. In the AM peak the B6020 operates with the highest RFC, closely followed by the A617 Rainworth Bypass. In the PM peak hour A617 Rainworth operates with the highest RFC values, with the largest queue forming on this approach.

As two arms in each time period are greater than the target RFC value of 0.85, mitigation at this junction is considered to be necessary to fully implement the Local Plan development.

It is noted that the Lindhurst development, as a pipeline scheme identified in the Reference Case list of developments, is expected provide a significant improvement to this junction as part of the Section 106 agreement with the Local Authority. The junction improvement would comprise of signalisation and localised widening to improve capacity. These improvements could be enough to militate against the deterioration in operational efficiency between the current layout between the Reference Case and Local Plan.

Given the described improvement scheme is associated with a committed development, no cost estimate has been provided. The assumption being that the improvement would be provided by another developer in advance of the Local Plan sites.

Should the infrastructure improvement be delayed or not delivered by the Lindhurst developer (e.g. if the Section 106 trigger points for improvements are not met) the junction improvements may need to be adopted by the Local Plan developers. The cost of providing traffic signals and localised widening is estimated to cost £3.5m.

A60 Leeming Lane / Peafield Lane

This is a MOVA controlled signalised junction and, as such, has been assessed using LINSIG3. The A60 provides a link between Mansfield and Market Warsop. Peafield Lane provides a route to Edwinstowe.

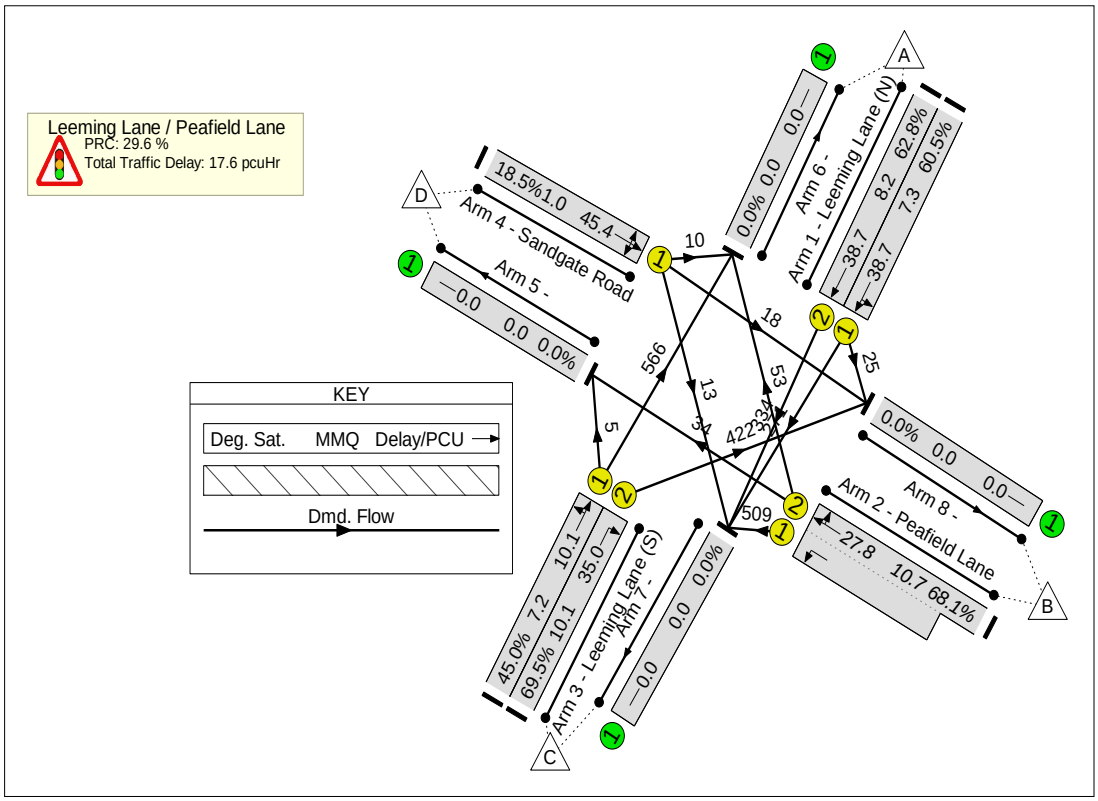


Table 5A: Performance of A60 Leeming Lane / Peafield Lane (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Leeming Lane (N) Left Ahead	88.0%	17.0	53.7%	10.1
Leeming Lane (N) Ahead	86.1%	16.7	52.5%	10.1
Peafield Lane Left Ahead Right	105.0%	55.9	102.7%	37.2
Leeming Lane (S) Left Ahead	105.9%	54.1	118.5%	126.9
Leeming Lane (S) Right	84.6%	19.4	117.6%	68.1
Sandgate Road Left Ahead Right	7.9%	1.2	10.8%	1.4
Junction Summary	PRC	-17.7	PRC	-31.7
	Veh Delay (PCU Hrs)	99.89	Veh Delay (PCU Hrs)	194.61

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 4A indicates that the junction of A60 Leeming Lane / Peafield Lane operates over capacity in the Reference Case in the AM Peak and PM Peak time period. The worst performing arm in both time periods is the Leeming Lane (S) approach.

The heavy right turn movement from Leeming Lane (S) to Peafield Lane and the conflicting Leeming Lane (N) to Leeming Lane (S) movement appear to be causing the restriction in operating capacity at this junction in the Reference Case.

Upgrading the junction to include Puffin-style pedestrian crossing facilities may release some time to vehicles which could provide capacity benefits.

Modal change may be encouraged by the introduction of selective bus detection at this junction (and other along the A60).

Table 5B: Performance of A60 Leeming Lane / Peafield Lane (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Leeming Lane (N) Left Ahead	88.5%	19.5	79.7%	17.0
Leeming Lane (N) Ahead	87.2%	19.2	78.4%	16.9
Peafield Lane Left Ahead Right	105.8%	53.8	90.2%	20.7
Leeming Lane (S) Left Ahead	105.6%	58.1	150.4%	271.8
Leeming Lane (S) Right	91.7%	21.7	130.9%	114.5
Sandgate Road Left Ahead Right	8.1%	1.2	10.3%	1.4
Junction Summary	PRC	-17.5	PRC	-67.1
	Veh Delay (PCU Hrs)	105.93	Veh Delay (PCU Hrs)	376.79

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

The modelled cycle times at this junction in the Local Plan scenario have been extended to maximise the capacity. Table 5B shows the results of the LINSIG analysis and identifies that the junction operation would worsen with the Local Plan growth, in both the AM and PM Peak periods.

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

If further improvements to the operational performance of the traffic signals are needed, then other alternatives would need to be considered. The alternative options might include:

- prohibit eastbound exits from Sandgate Road in order to eliminate a signal phase;
- rearrange the pedestrian crossing layout to reduce inter-green times and improve traffic green phases; or
- provision of additional lanes/width for northbound ahead movements.

The first two of these options have been rejected by Nottinghamshire County Council as they will encourage traffic flow increases onto less suitable routes.

Localised widening of the A60 northbound approach to provide a second ahead lane may be achievable utilising some of the wide footway/verge to the west of the current carriageway. This would allow a reallocation of green times to the over-capacity arms.

The total package of possible mitigation measures and associated costs can be summarised as:

Mitigation Measures	Cost Estimate
- A GPS based system for additional improvements for public service vehicles	£5,000
- Localised widening of the A60 northbound approach; funding would be required from identified development sites.	£3,300,000
Total	**£3.31m**
*See Appendix B Introduction for cost assumptions	

Local Plan sites that could require developer funding contributions to any junction improvements are (but not limited to); land at New Mill Lane, Land at Old Mill Lane, land between Old Mill Lane and New Mill Lane, Sookholme Lane/Sookholme Drive and Stonebridge Lane/Sookholme Lane and Land forming part of Peafield Farm. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

A60 Leeming Lane / A6075 Warsop Road

This is a priority junction and, as such, has been assessed using PICADY. The A60 Leeming Lane forms a major north east route between Mansfield town centre and Market Warsop. The A6075 Warsop Road provides access to Mansfield Woodhouse.

Nottinghamshire County Council is aware of queues forming at this junction and have developed a preliminary traffic signal design for this junction to address some of the issues. Currently, no funding source has been identified for this scheme and therefore it is likely that contributions from nearby developments would be required. As such, this junction cannot be considered as having 'Do-Minimum' improvements as there is no commitment. It is therefore assessed as a priority junction in these capacity assessments.

The potential to widen the carriageway is limited by the existing adjacent land use; however there are likely to be benefits to providing signalised junction at this location. Changes at this junction may also require a review of the bus stop provision on Leeming Lane.

Nottinghamshire County Council has developed a preliminary traffic signal design for this junction to address some of the queuing issues. Currently, no funding source has been identified for this scheme and therefore it is likely that contributions from nearby developments would be required.

This junction could also be incorporated into a wider A60 bus priority scheme which would limit delays encountered by public transport.

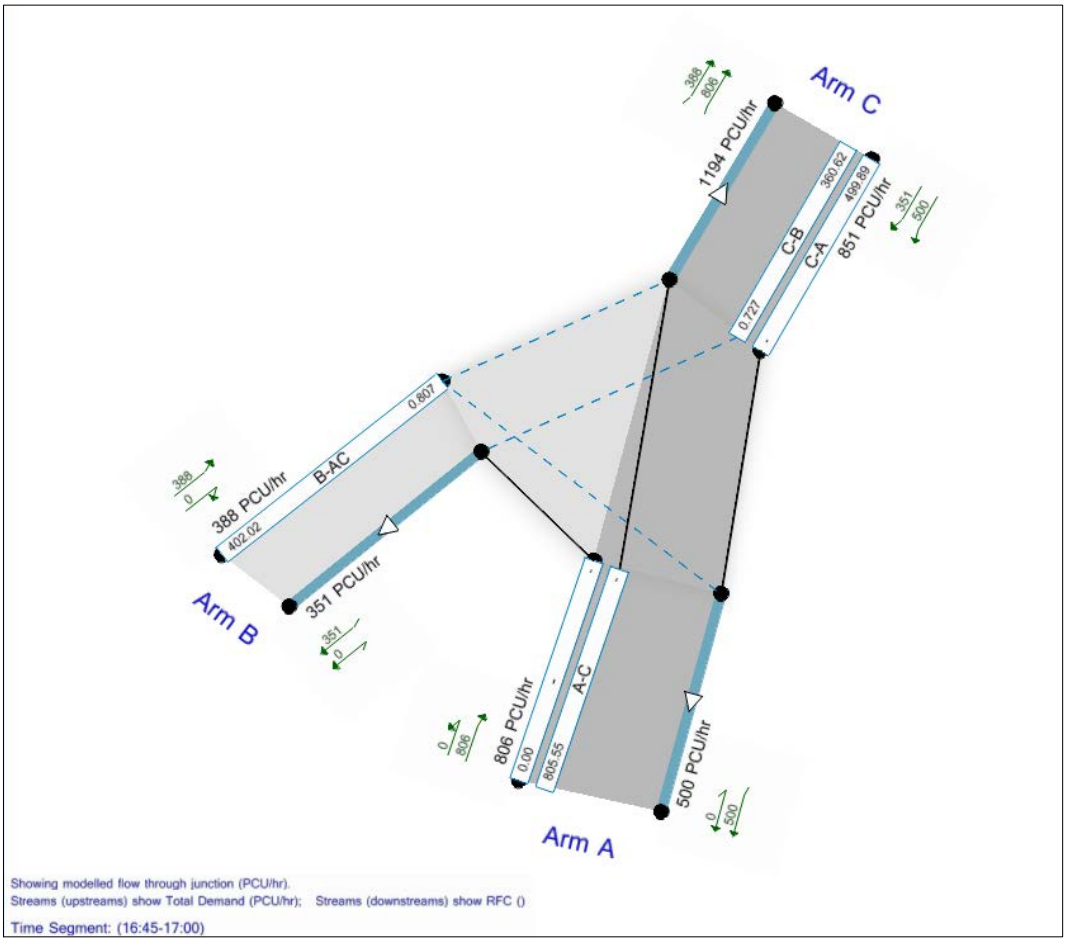


Table 6A: Performance of A60 Leeming Lane / A6075 Warsop Road (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	RFC	Q	RFC	Q
A60 Leeming Lane (S) Left Ahead	-	-	-	-
A6075 Warsop Road Left Right	0.98	12.62	1.98	301.84
A60 Leeming Lane (N) Ahead Right	1.45	139.38	1.56	140.17
Junction Summary	Junction Delay (Seconds)	554.14	Junction Delay (Seconds)	1614.48

Notes: RFC = Ratio of Flow to Capacity. A measure of the trafficking at the junction in relation to its ability to accommodate such flow, reported on a worst-arm basis. Q = Mean Maximum Vehicle Queue, reported on a worst arm basis. It is measured in PCUs.
PCU = Passenger Car Unit. 1 car = 1 PCU; 1 bus = 2 PCU etc.
Junction Delay= Demand weighted averages

Table 6A shows the results from the PICADY analysis and identifies that the junction would not operate within capacity in the 2033 Reference Case in either the AM or PM peak hours.

Table 6B: Performance of A60 Leeming Lane / A6075 Warsop Road (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	RFC	Q	RFC	Q
A60 Leeming Lane (S) Left Ahead	-	-	-	-
A6075 Warsop Road Left Right	1.62	123.4	5.31	964.6
A60 Leeming Lane (N) Ahead Right	2.60	476.0	5.12	910.0
Junction Summary	Junction Delay (Seconds)	776.23	Junction Delay (Seconds)	2991.85

Notes: RFC = Ratio of Flow to Capacity. A measure of the trafficking at the junction in relation to its ability to accommodate such flow, reported on a worst-arm basis. Q = Mean Maximum Vehicle Queue, reported on a worst arm basis. It is measured in PCUs.
PCU = Passenger Car Unit. 1 car = 1 PCU; 1 bus = 2 PCU etc.
Junction Delay= Demand weighted averages

Table 6B shows the results from the PICADY analysis and identifies that the junction would significantly exceed the operation capacity in the 2033 Local Plan Case in both the AM or PM peak hours. The worst performing arm in the AM peak is the A60 Leeming Lane (N) with queues of up to 476 PCUs. In the PM peak the worst performing arm is A6075 Warsop Road with queues of up to 964 PCUs.

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

Queues are predicted to increase in the Local Plan scenarios as drivers turning right from Leeming Lane into Warsop Road would block the vehicles behind attempting to go ahead (57% & 65% of A60 southbound traffic in the AM and PM peak hours respectively are predicted to turn right into Warsop Road). In addition, the increased flow on Leeming Lane is likely to cause delays on Warsop Road in the PM peak because vehicles at the stop line would be unable to find suitable gaps in traffic into which to pull-out. The visibility to the right, from vehicles exiting Warsop Road, is limited by the presence of the bus shelter on Leeming Lane.

In order to facilitate the Local Plan growth, improvement at this junction is required. The NCC traffic signalled junction would reduce Local Plan delays at this junction.

The NCC cost estimate for a traffic signalised improvement scheme is £500,000.

Given no funding source has been identified for this scheme and therefore it is likely that contributions from nearby developments would be required.

Local Plan sites that could require developer funding contributions to any junction improvements are (but not limited to); land at New Mill Lane, Land at Old Mill Lane, land between Old Mill Lane and New Mill Lane, Sookholme Lane/Sookholme Drive and Stonebridge Lane/Sookholme Lane and Land forming part of Peafield Farm . Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

Kings Mill Road / Beck Lane / B6014 Skegby Lane / Mansfield Road

This is a MOVA controlled signalised junction and, as such, has been assessed using LINSIG3. Kings Mill Road facilitates north-south movements and accommodates flows circulating around the town centre using the MARR. Mansfield Road leads to the residential areas around Skegby and Stanton Hill whilst Skegby Lane leads towards Mansfield via the A38.

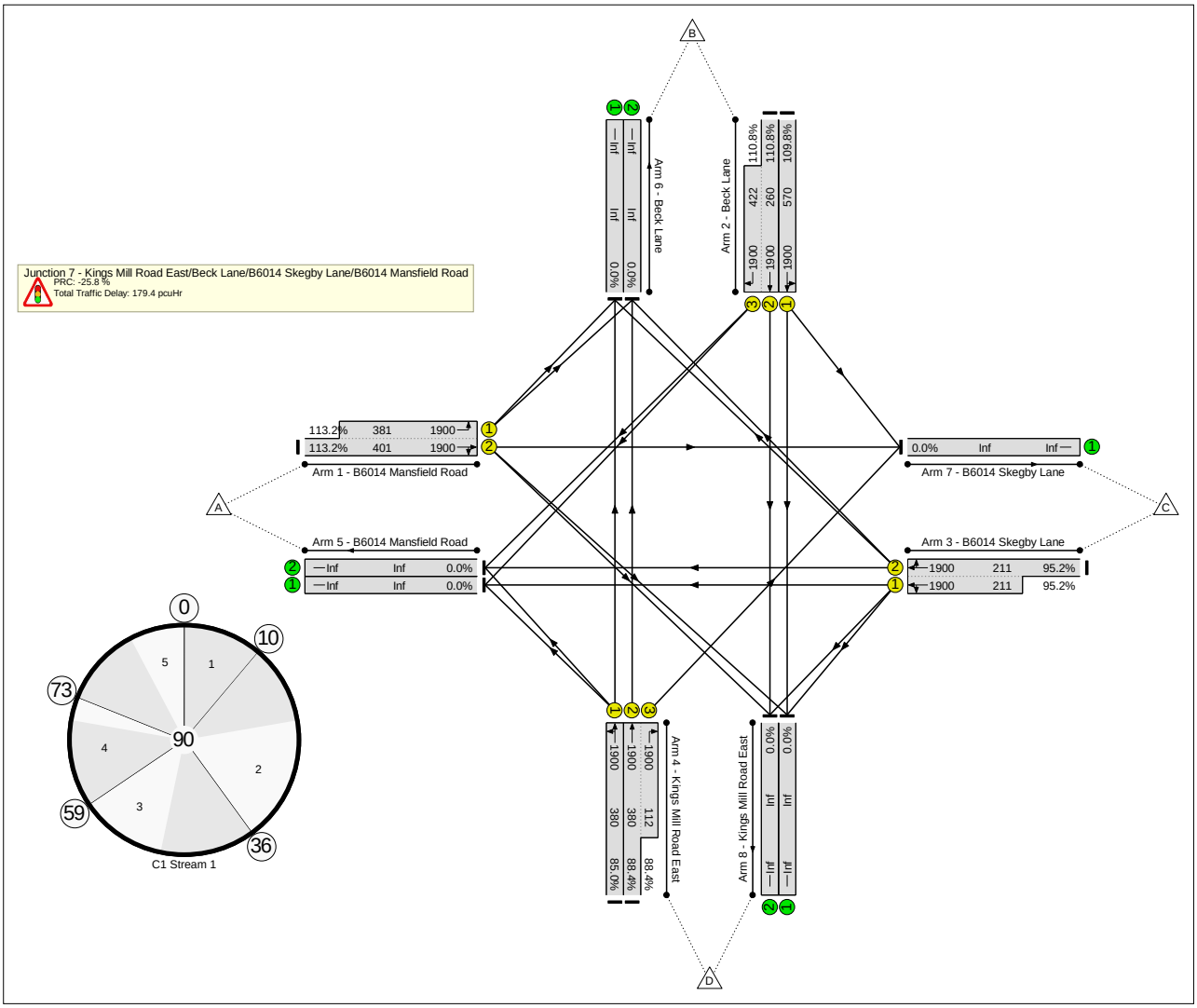


Table 7A: Performance of Kings Mill Road / Beck Lane / B6014 Skegby Lane / Mansfield Road (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Mansfield Road Left Ahead Right	112.9%	58.6	130.9%	116.0
Beck Lane Left Ahead	108.7%	37.3	113.0%	58.9
Beck Lane Ahead Right	106.1%	51.7	127.9%	43.6
Skegby Lane Left Ahead Right	115.1%	73.1	124.1%	94.3
Kings Mill Road East Left Ahead	110.8%	36.3	132.1%	116.9
Kings Mill Road East Ahead Right	111.3%	45.9	130.5%	135.2
Junction Summary	PRC	-27.9	PRC	-46.8
	Veh Delay (PCU Hrs)	267.78	Veh Delay (PCU Hrs)	532.58

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 7A indicates that the Kings Mill Road /Beck Lane / B6014 Skegby Lane / Mansfield Road junction operates over capacity in the Reference Case in both the AM Peak and PM Peak. In the AM Peak the worst performing arm is Skegby Lane with queues of upto 73 PCUs. In the PM Peak the worst performing arm is Kings Mill Road with queues upto 135 PCUs.

Table 7B: Performance of Kings Mill Road / Beck Lane / B6014 Skegby Lane / Mansfield Road (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Mansfield Road Left Ahead Right	128.5%	171.9	140.7%	163.9
Beck Lane Left Ahead	129.3%	105.8	124.7%	106.2
Beck Lane Ahead Right	126.9%	104.4	139.9%	64.5
Skegby Lane Left Ahead Right	129.9%	130.2	139.5%	159.7
Kings Mill Road East Left Ahead	125.3%	68.3	139.8%	154.0
Kings Mill Road East Ahead Right	123.4%	78.6	138.6%	176.8
Junction Summary	PRC	-44.3	PRC	-56.3
	Veh Delay (PCU Hrs)	608.17	Veh Delay (PCU Hrs)	773.01

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 6B indicates that the Kings Mill Road /Beck Lane / B6014 Skegby Lane / Mansfield Road junction operates over capacity in the Local Plan scenario in both the AM Peak and PM Peak. In the AM Peak the worst performing arm is Mansfield Road with queues of 172 PCUs. In the PM Peak the worst performing arm is Kings Mill Road with queues of 177 PCUs.

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

A potential junction improvement scheme was identified as part of the Penniment Farm planning application. There may be some potential to provide some localised widening at this junction, particularly to the south.

Given the improvement scheme is associated with a committed development, no cost estimate has been provided. The assumption is that another developer would fund this development in advance of the Local Plan sites.

Should the infrastructure improvement be delayed or not delivered by the developer (e.g. if the Section 106 trigger points for improvements are not met) the junction improvements may need to be adopted by the Local Plan developers. The upgrading the traffic signals and localised widening is estimated to cost £3m.

Local Plan sites that could require developer funding contributions to any junction improvements are (but not limited to); Water Lane, Pleasley Hill Farm, Fields Farm (Abbott Road) and Land of Skegby Lane. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

A6191 Ratcliffe Gate / A60 St Peters Way

This is a SCOOT controlled signalised junction and, as such, has been assessed using LINSIG3. The A60 St Peters Way forms part of a ring road around Mansfield's' commercial centre. Bridge Street allows access towards the town centre but only Public Service Vehicles are allowed out at the junction. A6191 Ratcliffe Gate is the main arterial route towards the south east of the town centre and joins with the A617 Rainworth bypass and MARR.

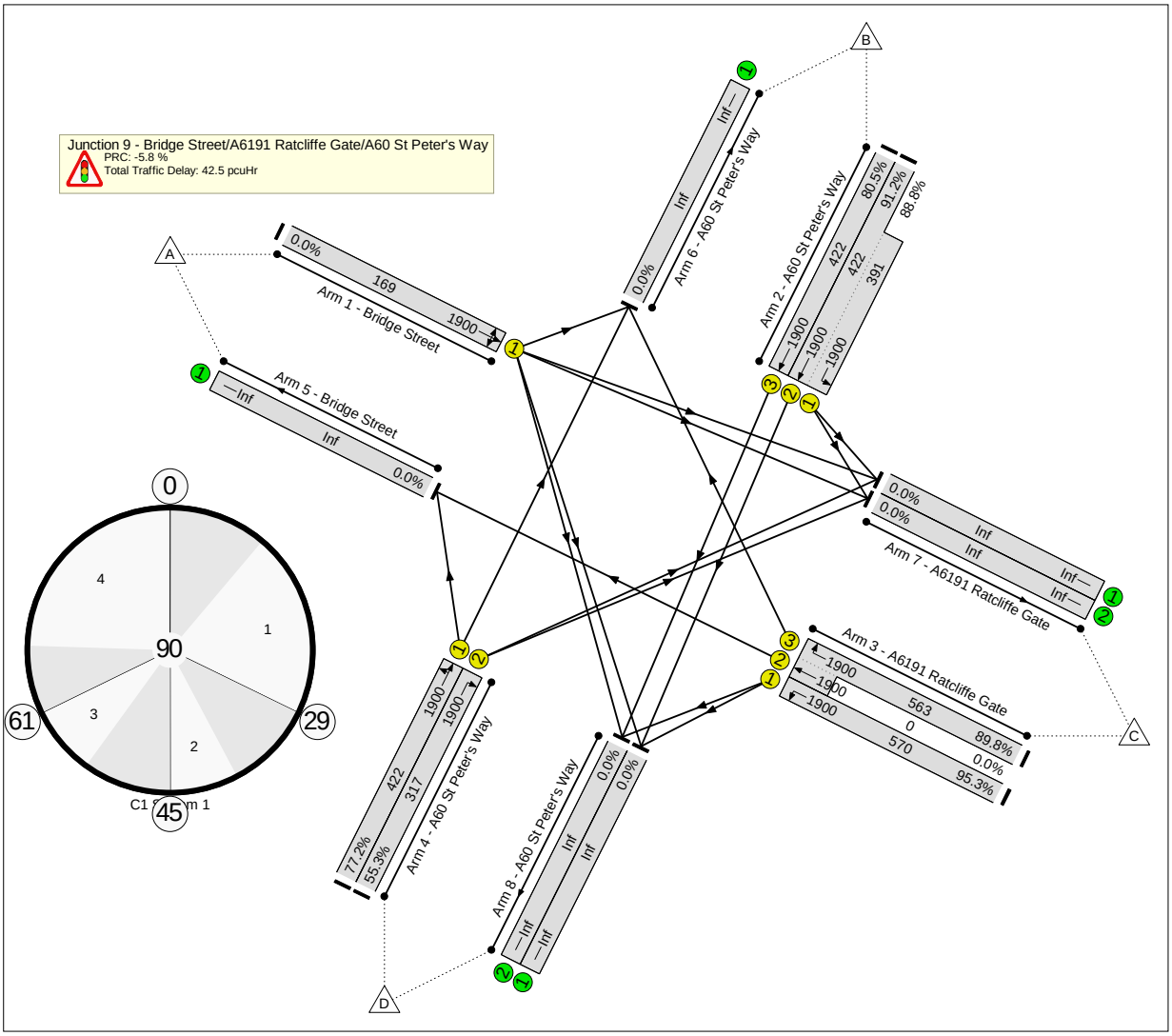


Table 8A: Performance of A6191 Ratcliffe Gate / A60 St Peters Way (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Bridge Street Left Ahead Right	0.0%	0.0	0.0%	0.0
A60 St Peters Way Left Ahead	113.2%	71.2	101.8%	29.4
A60 St Peters Way Ahead	108.0%	34.3	100.3%	24.3
A6191 Ratcliffe Gate Left	115.4%	67.0	76.9%	9.6
A6191 Ratcliffe Gate Ahead Right	109.5%	49.0	100.3%	21.8
A60 St Peters Way Left Ahead	99.2%	19.8	103.8%	30.9
A60 St Peters Way Right	74.5%	7.0	101.7%	20.5
Junction Summary	PRC	-28.3	PRC	-15.4
	Veh Delay (PCU Hrs)	210.13	Veh Delay (PCU Hrs)	96.31

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 8A indicates that the A6191 Ratcliffe Gate / A60 St Peters Way junction operates over capacity in the Reference Case in both the AM Peak and PM Peak. In the AM Peak the worst performing arm is A60 St Peters Way with queues of 71 PCUs. In the PM Peak the worst performing arm is A60 St Peters Way with queues of 31 PCUs.

Table 8B: Performance of A6191 Ratcliffe Gate / A60 St Peters Way (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Bridge Street Left Ahead Right	0.0%	0.0	0.0%	0.0
A60 St Peters Way Left Ahead	117.6%	102.4	118.0%	93.7
A60 St Peters Way Ahead	117.8%	77.6	118.9%	85.3
A6191 Ratcliffe Gate Left	111.7%	66.6	90.8%	16.4
A6191 Ratcliffe Gate Ahead Right	116.9%	86.7	115.0	56.8
A60 St Peters Way Left Ahead	84.8%	17.3	105.1%	43.1
A60 St Peters Way Right	111.9%	27.2	118.9%	51.3
Junction Summary	PRC	-30.9	PRC	-32.1
	Veh Delay (PCU Hrs)	312.26	Veh Delay (PCU Hrs)	284.83

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 8B indicates that the A6191 Ratcliffe Gate / A60 St Peters Way junction operates over capacity in the Local Plan in both the AM Peak and PM Peak. In the AM Peak the worst performing arm is A60 St Peters Way with queues of 102 PCUs. In the PM Peak the worst performing arm is A60 St Peters Way with queues of 93 PCUs.

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

Modal change may be encouraged by the introduction of selective bus detection at this junction (and other along the A60).

This junction is constrained along Ratcliffe Gate by several properties, so widening along this arm would be unlikely or high cost. The Bridge Street arm provides a bus lane into the junction and is also constrained. Potentially both the A60 St Peters Way arms could be widened locally to provide additional capacity at the junction. However this is likely to be a high cost solution, particularly given it is likely that major engineering work would be required, and the benefits delivered by any widening may be outweighed by the scheme costs. Any potential scheme would need detailed junction design to understand the feasibility of this type of layout.

Given the limited scope for cost effective physical improvements at this junction, some further queuing delay is likely to occur in the peak periods if the Local Plan allocation is delivered without effective mitigation.

The total package of possible mitigation measures and associated costs can be summarised as:

Mitigation Measures	Cost Estimate
- A GPS based system for additional improvements for public service vehicles . - Larger scale widening not feasible without third party land take.	£5,000 Not Included
Total	**£5,000**
*See Appendix B Introduction for cost assumptions	

Given the sites location on the ring road, the impact from local plan developments are likely to be incremental changes from multiple sites. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

A6117 Old Mill Lane / B6030 Clipstone Road West

This is a MOVA controlled signalised junction and, as such, has been assessed using LINSIG3. The junction is to the east of Mansfield town centre. Clipstone Road is aligned NE-SW and provides access to the residential areas of Forest Town and Clipstone. A6117 Old Mill Lane is in a NW-SE alignment and provides a route around the town centre on the eastern side of Mansfield.

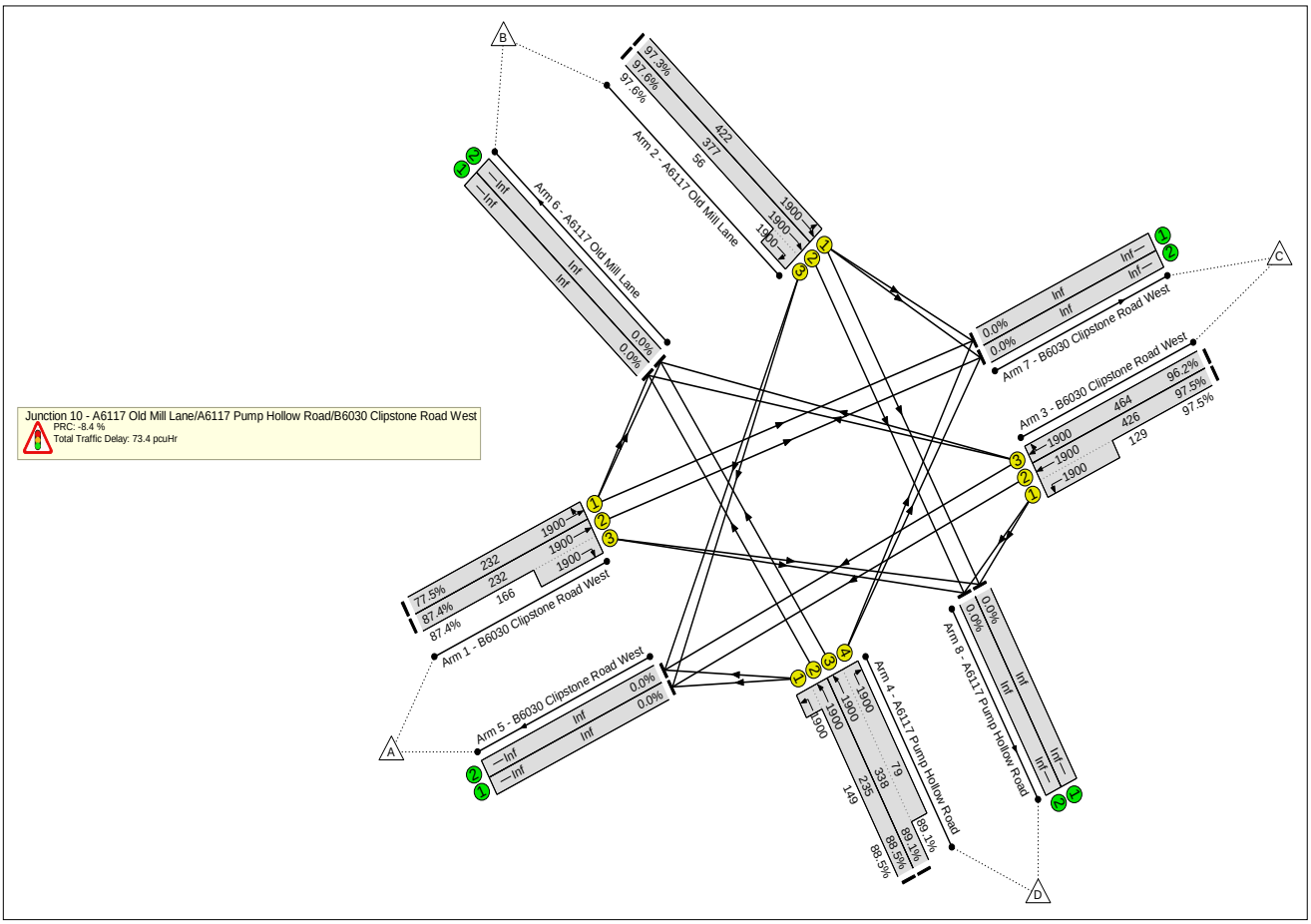


Table 9A: Performance of A6117 Old Mill Lane / B6030 Clipstone Road West (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Clipstone Road West Left Ahead	96.0%	11.0	136.8%	83.4
Clipstone Road West Ahead Right	98.2%	13.0	135.6%	103.2
Old Mill Lane Left Ahead	122.7%	72.2	70.5%	9.4
Old Mill Lane Ahead Right	122.6%	74.3	72.3%	9.4
Clipstone Road West Left Ahead	120.8%	71.8	132.6%	67.4
Clipstone Road West Ahead Right	119.1%	58.0	131.8%	49.0
Pump Hollow Road Left Ahead	101.0%	20.9	136.3%	102.5
Pump Hollow Road Ahead Right	102.4%	24.2	136.7%	139.0
Junction Summary	PRC	-36.4	PRC	-52.0
	Veh Delay (PCU Hrs)	302.95	Veh Delay (PCU Hrs)	520.56

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 9A indicates that the A6117 Old Mill Lane / B6030 Clipstone Road West junction operates over capacity in the Reference Case in both the AM peak and the PM peak. The worst performing arm in the AM peak is Old Mill Lane with queues of 74 PCUs. The worst performing arm in the PM peak is Pump Hollow Road with queues of 139 PCUs.

Table 9B: Performance of A6117 Old Mill Lane / B6030 Clipstone Road West (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Clipstone Road West Left Ahead	126.3%	45.9	139.8%	114.3
Clipstone Road West Ahead Right	127.6%	72.5	140.1%	136.1
Old Mill Lane Left Ahead	125.3%	103.0	92.8%	22.2
Old Mill Lane Ahead Right	125.2%	108.8	93.0%	19.5
Clipstone Road West Left Ahead	127.4%	106.5	137.5%	86.3
Clipstone Road West Ahead Right	126.4%	85.8	136.2%	62.3
Pump Hollow Road Left Ahead	75.6%	12.9	140.1%	142.0
Pump Hollow Road Ahead Right	75.1%	13.0	140.2%	143.6
Junction Summary	PRC	-41.7	PRC	-55.7
	Veh Delay (PCU Hrs)	480.87	Veh Delay (PCU Hrs)	649.92

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 9B indicates that the A6117 Old Mill Lane / B6030 Clipstone Road West junction operates over capacity in the Local Plan scenario in both peak periods. The total vehicle delay at the junction would be higher in the Local Plan scenario than in the Reference Case. In the AM peak, Clipstone Road West (both arms) and old Mill Lane operate at a similar Degree of Saturation suggestion that optimisation of the traffic signal will not resolve the issues.

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

The junction is mostly constrained to all sides with localised widening having already been undertaken. Relatively high flows of movements across the junction between Clipstone Road and Clipstone Road and between Old Mill Lane and Pump Hollow Road prevent the signals from being optimised to any particular one or two arms.

To improve this junction to operate with a reasonable level of service would require land take and widening of the approaches which would involve the purchase of third party land.

Given the limited scope for cost effective physical improvements at this junction, some further queuing delay is likely to occur in the peak periods if the Local Plan allocation is delivered without effective mitigation.

It would be possible to implement near side detection for the pedestrian crossings which would reduce intergreen times currently lost to the pedestrian phase. The installation of a nearside crossing detection system would require the refurbishment of the existing traffic signal equipment at a cost of approximately £250,000.

An approach to improve bus journey times through this junction GPS based system to enable approaching busses to pass through the junction with minimal delay. The cost of a GPS system is typically £5000 per junction.

A CCTV based system could also be implemented to enable the urban traffic control centre to intervene with signal settings to respond to incidents and events as they occur.

The total package of possible mitigation measures and associated costs can be summarised as:

Mitigation Measures	Cost Estimate
- CCTV links to Urban Traffic Control Centre	£5,000
- A GPS based system for additional improvements for public service vehicles .	£5,000
- Nearside crossing detection.	£250,000
- Larger scale widening not feasible without third party land take.	N/A
Total	**£260,000**
*See Appendix B Introduction for cost assumptions	

Local Plan sites that could require developer funding contributions to any junction improvements are (but not limited to); Allotment site at Pump Hollow Lane, the former Sherwood Hall School, the former Ravensdale Middle School, Jubilee Way and the multiple sites between Old Mill Lane and New Mill Lane. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

Sutton Road / Skegby Lane / Sheepbridge Lane

This is a SCOOT controlled signalised junction and, as such, has been assessed using LINSIG3. The A38 forms the south west radial route into Mansfield town centre. Skegby Lane on the west side of the junction provides a link to the northern part of Sutton in Ashfield. Sheepbridge Lane to the south east of the junction provides a route to the Berry Hill area of Mansfield. The results of the operational analysis are presented in Table 10A and 10B.

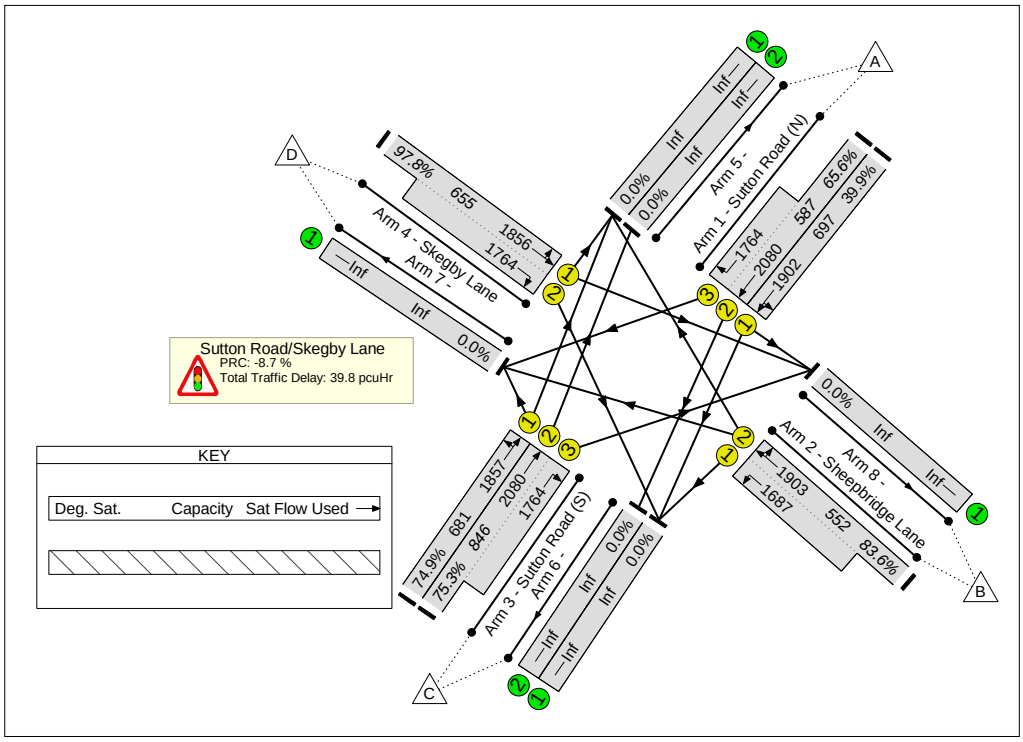


Table 10A: Performance of Sutton Road / Skegby Lane / Sheepbridge Lane (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Sutton Road (N) Left Ahead	72.7%	10.5	79.3%	11.9
Sutton Road (N) Ahead Right	78.2%	12.2	82.1%	13.3
Sheepbridge Lane Left Ahead Right	106.5%	32.4	114.5%	52.6
Sutton Road (S) Left Ahead	107.8%	42.7	111.3%	55.3
Sutton Road (S) Ahead Right	106.6%	50.2	112.5%	78.2
Skegby Lane Left Ahead Right	105.4%	48.8	113.6%	58.3
Junction Summary	PRC	-19.7	PRC	-27.2
	Veh Delay (PCU Hrs)	157.17	Veh Delay (PCU Hrs)	223.05

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 10A indicates that the operation of the Sutton Road / Skegby Lane / Sheepbridge Lane worsens in the Reference Case when compared to the Base Year. The junction operates over capacity in both the AM and PM peak periods.

Table 10B: Performance of Sutton Road / Skegby Lane / Sheepbridge Lane (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Sutton Road (N) Left Ahead	73.1%	11.6	80.0%	12.5
Sutton Road (N) Ahead Right	99.3%	28.0	102.2%	31.9
Sheepbridge Lane Left Ahead Right	122.6%	73.6	146.1%	135.6
Sutton Road (S) Left Ahead	111.0%	57.0	121.2%	81.1
Sutton Road (S) Ahead Right	122.1%	107.4	145.4%	188.6
Skegby Lane Left Ahead Right	122.2%	130.1	146.9%	181.5
Junction Summary	PRC	-36.2	PRC	-63.2
	Veh Delay (PCU Hrs)	355.82	Veh Delay (PCU Hrs)	557.88

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 10B indicates that the operation of the Sutton Road / Skegby Lane / Sheepbridge Lane worsens in the Local Plan scenario when compared to the Reference Case, in both peak periods.

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

The junction benefits selective GPS bus detection at this junction.

The junction also benefits from a CCTV based system to enable the urban traffic control centre to intervene with signal settings to respond to incidents and events as they occur.

The junction has residential, business and public house premises on the four corners so localised widening of the approaches would be likely to require the acquisition of property. Cycle times at the junction could be extended to increase vehicle capacity but this would come with a disbenefit to pedestrian wait times.

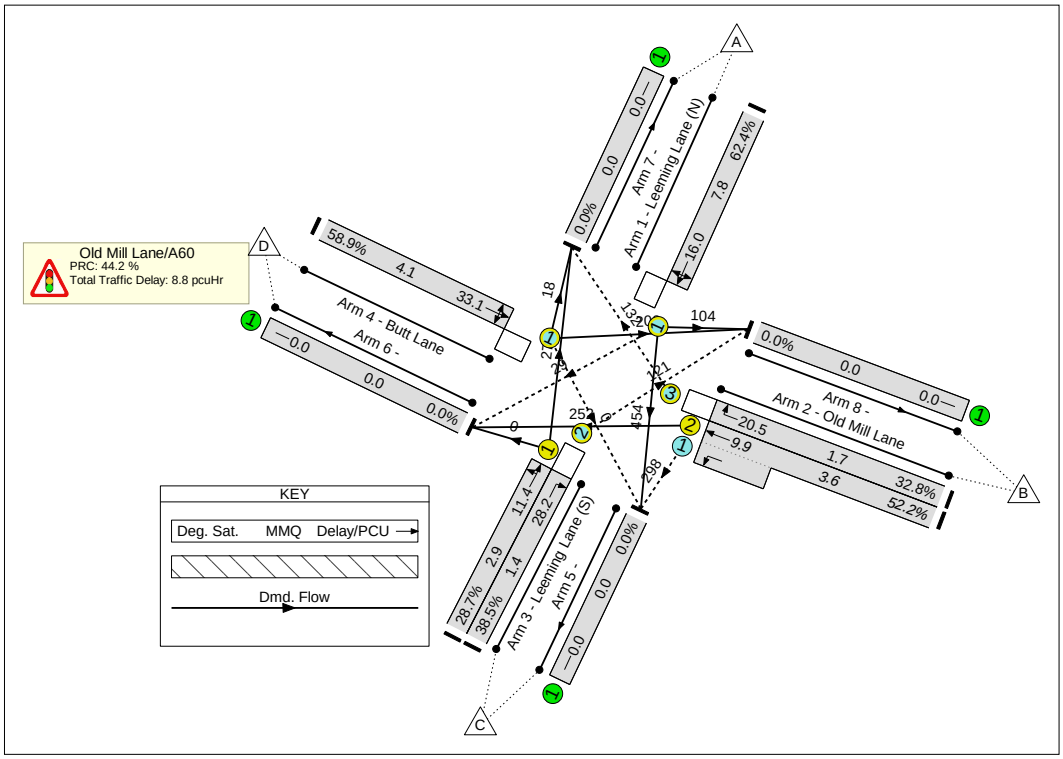
Given the limited scope for cost effective physical improvements at this junction, some further queuing delay is likely to occur in the peak periods if the Local Plan allocation is delivered without effective mitigation.

Given the junction already benefits from GPS bus priority and CCTV links to the urban control centre, no mitigation measures at this junction have been identified.

Local Plan sites that are likely to impact the junction are (but not limited to); Land off Skegby Lane, Former Hosiery Mills Site, and Fields Farm (Abbott Road). Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

A60 Leeming Lane / Old Mill Lane / Butt Lane

This is a MOVA controlled signalised junction and, as such, has been assessed using LINSIG3. A60 Leeming Lane provides access between Mansfield and Warsop with Worksop beyond. Old Mill Lane provides access towards Forest Town and Butt Lane provides access towards Mansfield Woodhouse.



This junction was not highlighted as approaching capacity in the Base Year and has therefore not been assessed with 2016 traffic flows and turning movements.

Table 11A: Performance of A60 Leeming Lane / Old Mill Lane / Butt Lane (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Leeming Lane (N) Left Ahead Right	87.4%	14.1	89.4%	17.5
Od Mill Lane Left Ahead	81.6%	10.7	84.8%	15.1
Old Mill Lane Right	81.3%	7.4	88.7%	10.1
Leeming Lane (S) Left Ahead	33.9%	4.2	69.6%	14.1
Leeming Lane (S) Right	72.6%	5.7	89.4%	10.9
Butt Lane Left Ahead Right	86.1%	9.9	80.5%	11.6
Junction Summary	PRC	3.0	PRC	0.6
	Veh Delay (PCU Hrs)	26.69	Veh Delay (PCU Hrs)	38.20

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 11A indicates that the A60 Leeming Lane / Old Mill Lane / Butt Lane junction operates within capacity in the Reference Case in the AM Peak and PM Peak. The worst performing arm is Leeming Lane (N) with queues of up to 14 PCUs in the AM Peak and 17 PCUs in the PM Peak.

In the Reference Case, no mitigation measures are required with the predicted levels of traffic flows.

Table 11B: Performance of A60 Leeming Lane / Old Mill Lane / Butt Lane (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Leeming Lane (N) Left Ahead Right	120.8%	101.7	119.4%	89.7
Od Mill Lane Left Ahead	120.0%	112.0	107.6%	60.3
Old Mill Lane Right	115.3%	41.5	120.2%	49.0
Leeming Lane (S) Left Ahead	57.1%	12.9	106.7%	68.2
Leeming Lane (S) Right	120.4%	41.6	119.2%	36.1
Butt Lane Left Ahead Right	110.7%	41.9	120.2%	64.5
Junction Summary	PRC	-34.3	PRC	-33.6
	Veh Delay (PCU Hrs)	292.53	Veh Delay (PCU Hrs)	304.42

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 11B indicates that in the Local Plan scenario, the degree of saturation would exceed 100% on most approaches in both peak periods.

The forecast increase in traffic flows at this junction results from the development of housing at nearby sites, including four to the north of Old Mill Lane, as part of the Local Plan. As noted above, this junction already operates under MOVA, and the forecast degrees of saturation are high across approaches from all arms, so there appears to be little scope for improvement of this junction through changes to traffic signal settings. The proximity of buildings in the eastern and western quadrants of the junction would make widening of the approaches difficult.

Modal change may be encouraged by the introduction of selective bus detection at this junction (and others along the A38 corridor).

A CCTV based system could also be implemented to enable the urban traffic control centre to intervene with signal settings to respond to incidents and events as they occur.

As part of a longer term strategy, there may be scope for flows on the A60 to be reduced by larger highway schemes bypassing Mansfield Woodhouse and the northern parts of Mansfield. Possible routes, for example, might include:

- A link from the A60 north of Mansfield Woodhouse, around the north and west sides of Mansfield Woodhouse, connecting to the A617 and/or Debdale Lane, and/or
- A link from the A60 north of Mansfield Woodhouse, eastwards to Peafield Lane and south to join the A6117 Old Mill Lane in the vicinity of the Maun Valley.

These would be substantial highway schemes requiring large-scale traffic modelling and appraisal to identify their effect on the existing network and interaction with planned land-use developments. A major scheme of this nature is not within Nottinghamshire County Council's Local transport Plan.

Given the limited scope for cost effective physical improvements at this junction, some further queuing delay is likely to occur in the peak periods if the Local Plan allocation is delivered without effective mitigation.

The total package of possible mitigation measures and associated costs can be summarised as:

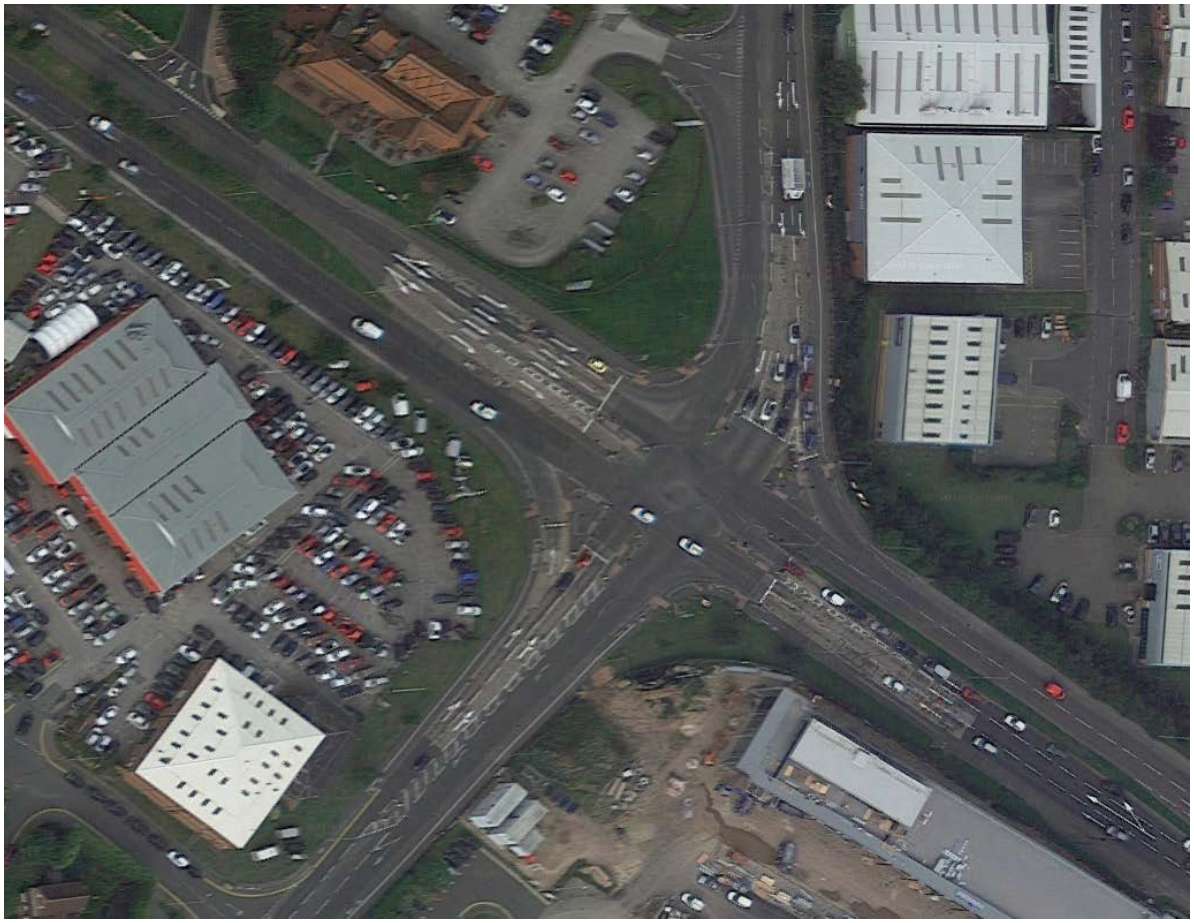
Mitigation Measures	Cost Estimate
- A GPS based system for additional improvements for public service vehicles .	£5,000
- CCTV links to Urban Traffic Control Centre	£5,000
- High cost/long term options include further widening with significant third party land take or the provision of a bypass.	Not Included
Total	**£10,000**
*See Appendix B Introduction for cost assumptions	

Local Plan sites that could require developer funding contributions to any junction improvements are (but limited to); land at New Mill Lane, Land at Old Mill Lane, land between Old Mill Lane and New Mill Lane, Sookholme Lane/Sookholme Drive and Stonebridge Lane/Sookholme Lane and Land forming part of Peafield Farm. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

A6191 Southwell Road / Oak Tree Lane / Adamsway

This is a SCOOT controlled signalised junction and, as such, has been assessed using LINSIG3. The A6191 Southwell Road West provides a link between Mansfield and the A617 to the south east: the two arms of the junction are referred to here as Southwell Road (East) and Southwell Road (West) with reference to their position relative to the junction. Oak Tree Lane and Adamsway provide a north-south route.

The junction benefits from near side detection for the pedestrian crossings which aim to reduce intergreen times lost to the pedestrian phase.



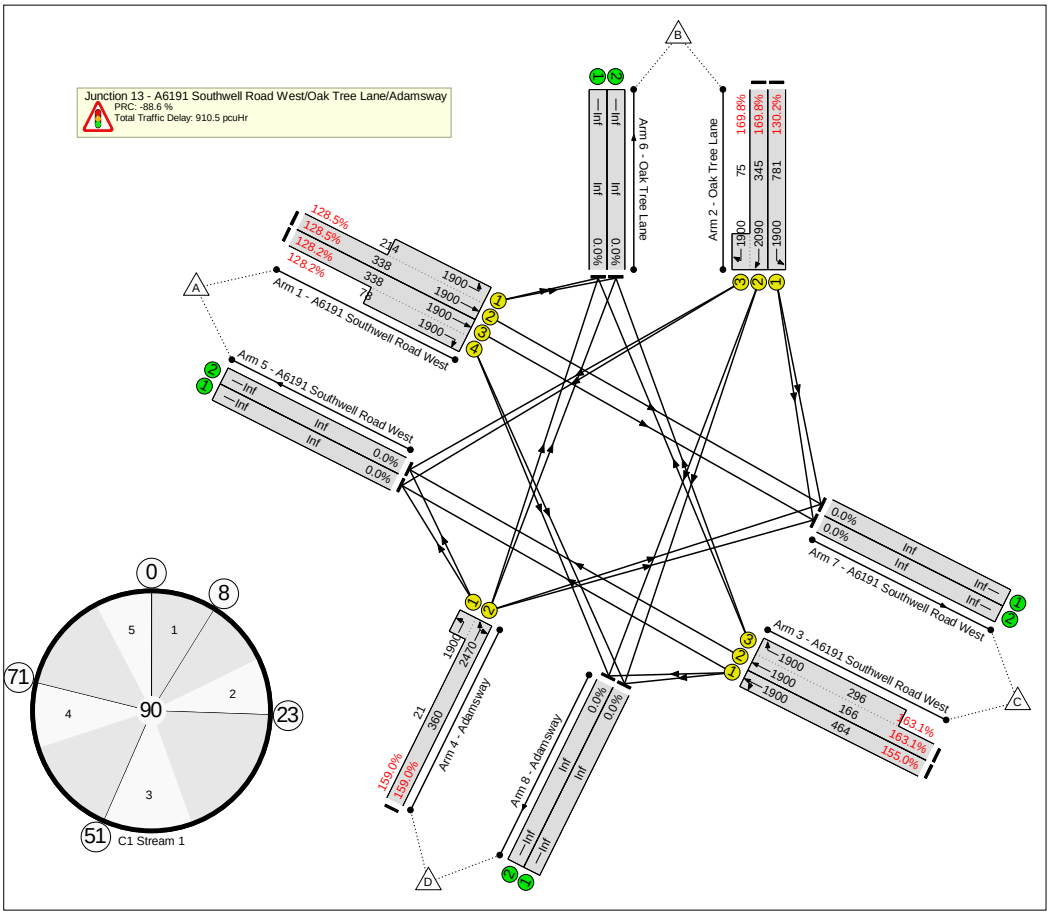


Table 12A: Performance of A6191 Southwell Road / Oak Tree Lane / Adamsway (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
A6191 Southwell Road (East) Left Ahead	128.5%	98.5	103.7%	30.7
A6191 Southwell Road (East) Ahead Right	128.2%	76.3	102.8%	23.5
Oak Tree Lane Left	126.8%	140.5	73.5%	13.3
Oak Tree Lane Right Ahead	40.3%	1.9	69.7%	3.9
A6191 Southwell Road (West) Ahead Left	97.3%	24.6	137.1%	151.6
A6191 Southwell Road (West) Ahead Right	99.3%	24.9	132.4%	129.3
Adamsway Left Ahead	34.9%	1.0	57.0%	1.8
Adamsway Ahead Right	9.5%	0.8	5.0	0.4
Junction Summary	PRC	-42.8	PRC	-52.3
	Veh Delay (PCU Hrs)	328.70	Veh Delay (PCU Hrs)	315.70

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 12A indicates that the A6191 Southwell Road / Oak Tree Lane / Adamsway junction operates over capacity in the Reference Case in both the AM peak and the PM peak. Large queues are predicted to form on approaches from A6191 Southwell Road (E) and Oak Tree Lane in the AM Peak, and A6191 Southwell Road (W) in the PM peak.

Table 12B: Performance of A6191 Southwell Road / Oak Tree Lane / Adamsway (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
A6191 Southwell Road (East) Left Ahead	130.9%	113.9	116.6%	75.8
A6191 Southwell Road (East) Ahead Right	124.5%	88.2	107.3%	37.5
Oak Tree Lane Left	130.5%	180.3	82.2%	19.3
Oak Tree Lane Right Ahead	77.3%	4.4	113.1%	27.1
A6191 Southwell Road (West) Ahead Left	68.1%	16.6	110.3%	73.2
A6191 Southwell Road (West) Ahead Right	84.4%	20.4	118.8%	133.2
Adamsway Left Ahead	54.9%	2.2	86.6%	10.2
Adamsway Ahead Right	22.5%	1.5	8.3%	0.5

Junction Summary				
	PRC	-45.4	PRC	-32.0
	Veh Delay (PCU Hrs)	365.49	Veh Delay (PCU Hrs)	314.73

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

The modelled cycle time has been extended in the 2033 Local Plan scenario, to maximise the capacity of the junction and Table 12B indicates that the A6191 Southwell Road / Oak Tree Lane / Adamsway junction operates over capacity in the Local Plan scenario in both peak periods. Forecast delays would be higher than the Reference Case in the AM Peak, and similar to the Reference Case in the PM peak.

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

The junction already provides the capacity of two lanes for each arm's straight ahead movement: further junction improvements would require additional widening at the stop lines.

Options for capacity improvements at this junction include:

- Given a high forecast left turning movement from Oak Tree Lane in both peak periods, provision of two left turn lanes from Oak Tree Lane to A6191 Southwell Road (East) could allow more traffic to make this move. An associated extension of the flare northwards along Oak Tree Lane would allow better utilisation of the left turn lanes. An extra left turn lane could be achieved by utilising land take (third party) from the western side of the arm and moving the remaining existing lanes slightly westwards.
- Left turn dedicated lane from A6191 Southwell Road (East) to A6117 Adamsway. There may be land available to the south of the highway to develop a flare along this arm. Whilst this is a fairly small movement, this improvement would allow an incremental increase to the capacity for the heavier ahead movement.
- Provision of three ahead lanes from A6191 Southwell Road (East) to A6191 Southwell Road (West). This would require land take from both A6191 arms which could be gained from the

southern side of the arm and subsequently developed using the central grassed divider on the western arm. A three lane exit length could be provided for approximately 230m before providing a merge back down to two lanes. The west bound movement along the A6191 is greater than the east bound movement in both peak periods.

- The three improvements above would allow the signals to be retimed and would allow more capacity at each of the stop lines.

Each of the options will require land take, in some cases third party land outside the existing highway boundary. Given the major works required and the potential land costs of any scheme, the costs might outweigh any potential benefits accruing to decreased journey times. Any potential scheme would need detailed junction design to understand the feasibility of this type of layout.

Given the limited scope for cost effective physical improvements at this junction, some further queuing delay is likely to occur in the peak periods if the Local Plan allocation is delivered without effective mitigation.

A CCTV based system could also be implemented to enable the urban traffic control centre to intervene with signal settings to respond to incidents and events as they occur.

Modal change may be encouraged by the introduction of selective bus detection at this junction (and others along the A6191 Southwell Road corridor).

The junction would benefit from the installation of PUFFIN crossing which would improve the efficiency of the junction.

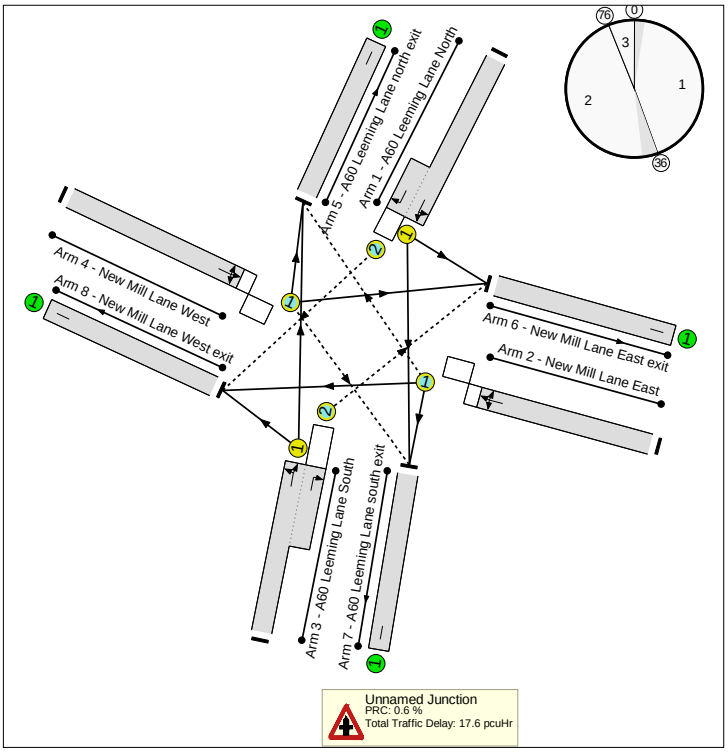
The total package of possible mitigation measures and associated costs can be summarised as:

Mitigation Measures	Cost Estimate
- A GPS based system for additional improvements for public service vehicles.	£5,000
- CCTV links to Urban Traffic Control Centre	£5,000
- Larger scale widening not feasible without significant third party land take.	Not Included
- PUFFIN crossings	£30,000
Total	**£40,000**
*See Appendix B Introduction for cost assumptions	

Local Plan sites that could require developer funding contributions to any junction improvements are (but not limited to); Jubilee Way, Ratcher Hill Quarry, Ransom Wood, Land at Bellamy Road Industrial Estate, Land at Redruth Drive and Bellamy Road Recreation Ground. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

A60 Leeming Lane / New Mill Lane

This is a MOVA controlled signalised junction and, as such, has been assessed using LINSIG3. The A60 Leeming Lane is an arterial route linking Mansfield and Market Warsop. New Mill Lane links Mansfield Woodhouse to the west and Forest Town to the east.



This junction was not highlighted as approaching capacity in the Base Year and has therefore not been assessed with 2016 traffic flows and turning movements.

Table 13A: Performance of A60 Leeming Lane / New Mill Lane (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
A60 Leeming Lane (N) Left Ahead Right	126.5%	130.2	120.5%	94.5
New Mill Lane (E) Left Ahead Right	195.6%	189.4	161.9%	174.7
A60 Leeming Lane (S) Left Ahead Right	72.8%	9.0	110.7%	65.2
New Mill Lane (W) Left Ahead Right	56.5%	4.6	41.8%	3.4
Junction Summary	PRC	-117.3	PRC	-79.9
	Veh Delay (PCU Hrs)	309.96	Veh Delay (PCU Hrs)	311.17

Notes: DoS = Degree of Saturation. A measure of the trafficking of an approach to the junction in relation to its ability to accommodate such flow.
MMQ = Mean Maximum Queue reported on a per arm basis and measured in PCUs.
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity. A measure of the overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour

Table 13A indicates that the A60 Leeming Lane / New Mill Lane junction operates over capacity in the Reference Case in the AM Peak and PM Peak. Large queues are predicted to form on A60 Leeming Lane (N) and New Mill Lane (E) in the AM Peak and PM Peak.

Table 13B: Performance of A60 Leeming Lane / New Mill Lane (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
A60 Leeming Lane (N) Left Ahead Right	179.9%	359.2	225.3%	513.2
New Mill Lane (E) Left Ahead Right	180.0%	185.8	224.7%	343.6
A60 Leeming Lane (S) Left Ahead Right	124.8%	127.3	200.2%	420.1
New Mill Lane (W) Left Ahead Right	58.3%	8.9	59.8%	13.4
Junction Summary	PRC	-100.0	PRC	-150.3
	Veh Delay (PCU Hrs)	635.77	Veh Delay (PCU Hrs)	1226.59

Notes: DoS = Degree of Saturation. A measure of the trafficking of an approach to the junction in relation to its ability to accommodate such flow.
MMQ = Mean Maximum Queue reported on a per arm basis and measured in PCUs.
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity. A measure of the overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour

In the 2033 Local Plan scenario, the modelled cycle time has been extended to maximise the capacity of the junction and Table 13B indicates that the A60 Leeming Lane / New Mill Lane junction operates substantially over capacity in the Local Plan scenario in both peak periods. Large queues are predicted to form on A60 Leeming Lane (N), New Mill Lane (E) and Leeming Lane (S) in both peak periods.

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

To improve the operational performance of this junction, it may be possible to widen from the existing two lanes to three lanes at the stop line from the A60 Leeming Lane (N) arm. To the east there is a very wide footpath area extending back to a length of approximately 30m which is currently used as informal parking. If a third lane was developed back from this point extra capacity could be achieved

on this arm. Given that the left and ahead turning movements are heaviest from this arm, the ahead move should develop the left turn flare from a suitable distance with the right turn flare developing towards the stop line. It is noted that as there is limited space to build a flare lane, the potential increase in capacity may not address all the issues at this junction.

From the New Mill Lane (E) arm the major movements are ahead to New Mill Lane (W) and right to A60 Leeming Lane (N). It may be possible to develop two lanes towards the stop line along this arm. Potentially a flare could begin from approximately 20m back utilising land to the south of the arm. There is an area of widened access to three properties which could still be maintained if a flare was to used, however a 'Keep Clear' marking would need to be extended to the 2nd lane to maintain access which may negate some of the capacity improvements. There may need to be a small amount of land take on the corner to maintain a footpath. Given the turning movements, the lanes should be marked left and ahead in the left lane and right turn in the right lane. Nottinghamshire County Council have aspirations to deliver an A60 bus priority scheme so any improvements should make allowance for future schemes.

Any potential scheme would need detailed junction design to understand the feasibility of this type of layout.

A CCTV based system could also be implemented to enable the urban traffic control centre to intervene with signal settings to respond to incidents and events as they occur.

Modal change may be encouraged by the introduction of selective bus detection at this junction (and others along the A60 Woodhouse Road corridor).

The total package of possible mitigation measures and associated costs can be summarised as:

Mitigation Measures	Cost Estimate
- A GPS based system for additional improvements for public service vehicles .	£5,000
- CCTV links to Urban Traffic Control Centre	£5,000
- Widen New Mill Lane to provide additional flares and widen Leeming Lane (N) to provide additional capacity, significant funding would be required from identified development sites.	£1,750,000
Total	**£1.76m**
*See Appendix B Introduction for cost assumptions	

Local Plan sites that could require developer funding contributions to any junction improvements are (but not limited to); land at New Mill Lane, Land at Old Mill Lane, land between Old Mill Lane and New Mill Lane, Sookholme Lane/Sookholme Drive and Stonebridge Lane/Sookholme Lane and Land forming part of Peafield Farm. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

A6075 Debdale Lane / Priory Road

This is a traffic-signalled junction and, as such, has been assessed using LINSIG. The A6075 Priory Road – Debdale Lane provides a main east-west route around the north side of Mansfield. Station Street, to the north, leads to Mansfield Woodhouse High Street, while Sherwood Street, to the south, connects to the A60 Woodhouse Road into Mansfield.

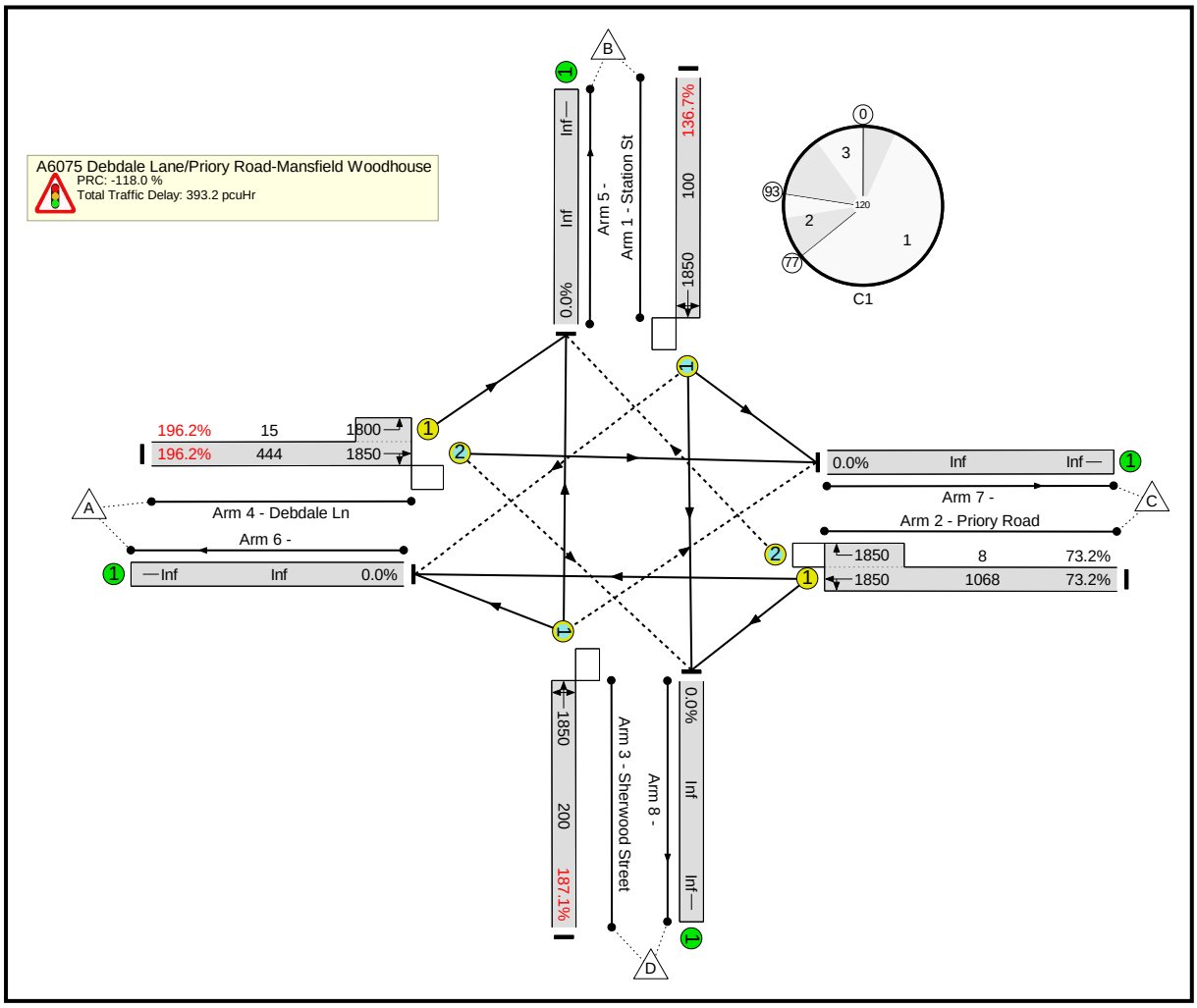


Table 14A: Performance of A6075 Debdale Lane / Priory Road (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Station St Right Left Ahead	118.3%	17.7	31.1%	0.0
Priory Road Right Ahead Left	66.3%	16.5	57.4%	0.0
Sherwood Street Ahead Left Right	116.1%	40.9	92.8%	0.0
Debdale Ln Left Ahead Right	114.3%	76.7	97.1%	0.0
Junction Summary	PRC	-31.5	PRC	-7.9
	Veh Delay (PCU Hrs)	116.40	Veh Delay (PCU Hrs)	29.06

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

In the 2033 Reference Case, the junction would operate above the practical reserve capacity in both the AM and PM peaks. In the AM peak, the degree of saturation would exceed 100% on all arms except Priory Road, to the east. The longest mean maximum queue would occur on Debdale Lane, to

the west. In the PM peak, the degree of saturation would remain below 100% on all arms, and so queuing would not become a problem, although Sherwood Street and Debdale Lane would exceed the normal maximum acceptable degree of saturation of 90%.

Table 14B: Performance of A6075 Debdale Lane / Priory Road (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Station St Right Left Ahead	136.7%	27.0	42.3%	2.0
Priory Road Right Ahead Left	73.2%	20.4	197.9%	274.3
Sherwood Street Ahead Left Right	187.1%	112.2	141.6%	56.1
Debdale Ln Left Ahead Right	196.2%	270.9	220.6%	316.9
Junction Summary	PRC	-118.0	PRC	-145.1
	Veh Delay (PCU Hrs)	393.20	Veh Delay (PCU Hrs)	633.33

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

In the Local Plan scenario, the junction would operate with a degree of saturation of over 100% on three of the four arms in both the AM and PM peaks. Substantial queues would form on Sherwood Street and Debdale Lane in the AM peak, and on Priory Road and Debdale Lane in the PM peak.

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

Given the limited scope for cost effective physical improvements at this junction, some further queuing delay is likely to occur in the peak periods if the Local Plan allocation is delivered without effective mitigation.

Given the junction already benefits from MOVA control with nearside crossing detection and Puffin crossings, no mitigation measures at this junction have been identified.

Local Plan sites that could impact the junction are (not limited to); Land at Debdale Lane (Burlington Drive), Debdale Lane/Emerald Close, Sherwood Rise and Pheasant Hill and Highfield Close. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

A6117 Oak Tree Lane / Eakring Road

This is a MOVA controlled traffic-signalled junction and, as such, has been assessed using LINSIG. The A6117 Oak Tree Lane, running north-south, forms part of an outer ring road of the eastern side of Mansfield. To the east of the junction, Eakring Road links to the northern end of Jubilee Way, and to the west of the junction, it forms a radial route into Mansfield.

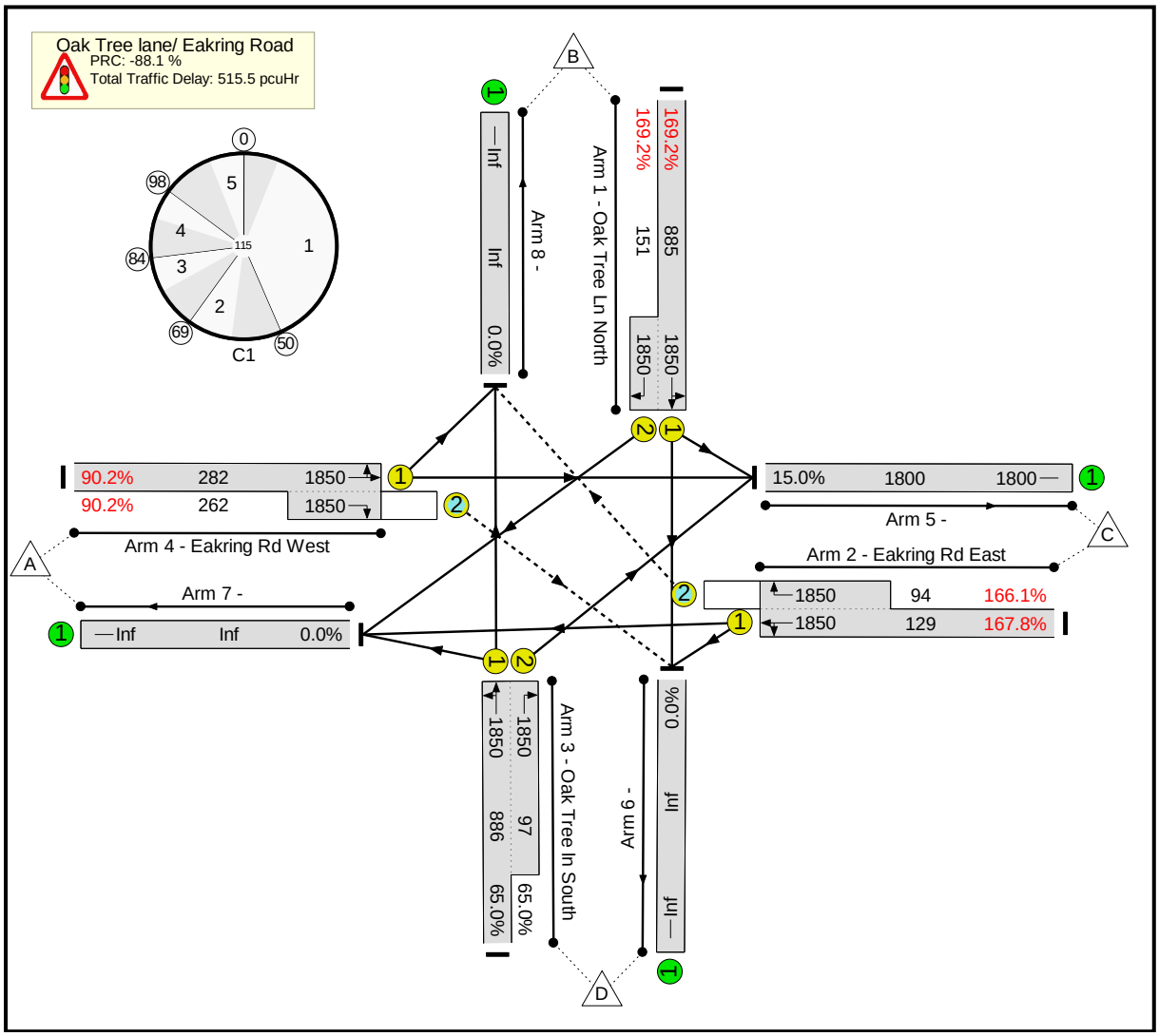


Table 15A: Performance of A6117 Oak Tree Lane / Eakring Road (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Oak Tree Ln North Left Ahead Right	113.7%	123.3	97.3%	36.8
Eakring Rd East Left Ahead Right	61.6%	3.2	54.4%	2.3
Oak Tree Ln South Right Left Ahead	88.7%	29.6	124.5%	183.9
Eakring Rd West Ahead Right Left	85.8%	12.5	99.1%	22.4
Junction Summary	PRC	-26.3	PRC	-38.4
	Veh Delay (PCU Hrs)	115.15	Veh Delay (PCU Hrs)	190.17

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

In the Reference Case, the degree of saturation on the Oak Tree Lane North arm would exceed 100% in the AM peak, with mean maximum queues of 121 PCU occurring. In the PM peak, the degree of saturation on the Oak Tree Lane North, Oak Tree Lane South and Eakring Road West arms would exceed the normally acceptable maximum of 90%, but only on Oak Tree Lane South would the degree of saturation exceed 100% and a substantial queue form (mean maximum queue length 184 PCU).

Table 15B: Performance of A6117 Oak Tree Lane (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Oak Tree Ln North Left Ahead Right	169.2%	440.3	114.5%	121.9
Eakring Rd East Left Ahead Right	167.8%	89.5	149.1%	33.8
Oak Tree Ln South Right Left Ahead	65.0%	14.3	150.7%	317.4
Eakring Rd West Ahead Right Left	90.2%	14.3	124.8%	84.3
Junction Summary	PRC	-88.1	PRC	-67.5
	Veh Delay (PCU Hrs)	515.51	Veh Delay (PCU Hrs)	493.59

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Flows at the junction in the Local Plan scenario would be higher because of Local Plan development, especially sites accessed via Eakring Road (such as land off Jubilee Way) or Oak Tree Lane (such as the allotment site at Pump Hollow Road). As in the Reference Case, the longest queues would occur on Oak Tree Lane North in the AM peak and on Oak Tree Lane South in the PM peak, although queuing would also occur on other arms, especially where the degree of saturation exceeded 100%: on Eakring Road East in the AM peak, and on Oak Tree Lane North and Eakring Road West in the PM peak.

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

It would be possible to implement near side detection for the pedestrian crossings which would reduce intergreen times currently lost to the pedestrian phase. The installation of a nearside crossing detection system would require the refurbishment of the existing traffic signal equipment at a cost of approximately £200,000.

An approach to improve bus journey times through this junction GPS based system to enable approaching busses to pass through the junction with minimal delay. The cost of a GPS system is typically £5000 per junction.

Localised widening might be possible on the Oak Tree Lane North approach to the junction, as properties to the east of this approach are set back and accessed via a service road (Fairfield Drive) which is separated from Oak Tree Lane by a footway and planted verge. As the width of Oak Tree Lane South is only sufficient to allow one lane exiting the junction (as at present) it would probably be necessary to separate the left turn and ahead movements from Oak Tree Lane North if this was widened from the present two lanes (Lane 1 left and ahead, Lane 2 right) to three lanes (Lane 1 left, Lane 2 ahead, Lane 3 right).

There may be opportunity to develop the internal layouts and access arrangements at the Local Plan sites to minimise the impact at this junction.

A CCTV based system could also be implemented to enable the urban traffic control centre to intervene with signal settings to respond to incidents and events as they occur.

The total package of possible mitigation measures and associated costs can be summarised as:

Mitigation Measures	Cost Estimate
- Localised widening of Oak Tree Lane South	£2,950,000
- CCTV links to Urban Traffic Control Centre	£5,000
- A GPS based system for additional improvements for public service vehicles .	£5,000
- Nearside crossing detection.	£250,000
Total	**£3.21m**
*See Appendix B Introduction for cost assumptions	

Local Plan sites that could require developer funding contributions to any junction improvements are (but not limited to); Land off Jubilee Way, Allotment site at Pump Hollow Road, the former Sherwood Hall School, Long Stoop Road, and Crown Farm Industrial Estate. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

A60 Nottingham Road / A611 Derby Road

A60 Nottingham Road / A611 Derby Road is a MOVA controlled traffic-signalled junction and, as such, has been assessed using LINSIG. The A60 Nottingham Road is a main north-south radial of Mansfield. The A611 Derby Road links via the A608 to M1 Junction 27.

The junction benefits from near side detection for the pedestrian crossings which aim to reduce intergreen times lost to the pedestrian phase.

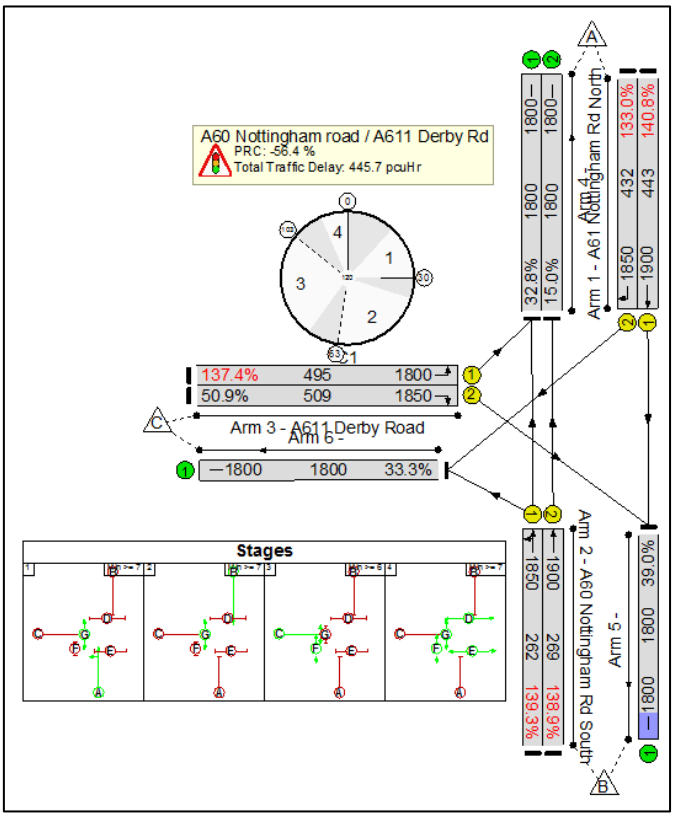


Table 16A: Performance of A60 Nottingham Road / A611 Derby Road (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
A61 Nottingham Rd North Ahead	140.7%	139.5	130.6%	93.7
A61 Nottingham Rd North Right	98.7%	26.2	115.4%	55.4
A60 Nottingham Rd South Ahead Left	135.2%	48.7	124.6%	53.0
A60 Nottingham Rd South Ahead	131.7%	45.8	121.7%	49.6
A611 Derby Road Left	137.1%	122.1	129.2%	96.9
A611 Derby Road Right	57.0%	8.7	48.8%	7.0
Junction Summary	PRC	-56.3	PRC	-45.1
	Veh Delay (PCU Hrs)	346.06	Veh Delay (PCU Hrs)	312.11

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

In the Reference Case, all approach lanes except the right turn from Derby Road to Nottingham Road South would exceed the normal maximum acceptable degree of saturation of 90% in both the AM and PM peaks. The longest queues would occur on the ahead movement from Nottingham Road North to Nottingham Road South and the left turn from Derby Road to Nottingham Road North.

Table 16B: Performance of A60 Nottingham Road / A611 Derby Road (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
A61 Nottingham Rd North Ahead	148.6%	158.0	140.8%	118.9
A61 Nottingham Rd North Right	104.8%	36.8	133.0%	97.0
A60 Nottingham Rd South Ahead Left	146.2%	59.1	139.3%	68.9
A60 Nottingham Rd South Ahead	144.8%	61.3	138.9%	70.2
A611 Derby Road Left	145.5%	150.3	137.4%	126.7
A611 Derby Road Right	66.2%	10.9	50.9%	7.8
Junction Summary	PRC	-65.1	PRC	-56.4
	Veh Delay (PCU Hrs)	429.04	Veh Delay (PCU Hrs)	445.69

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

In the Local Plan scenario, queues on all approach lanes would be longer than in the Reference Case. As in the Reference Case, all approach lanes except the right turn from Derby Road to Nottingham Road South would exceed the normal maximum acceptable degree of saturation of 90% in both the AM and PM peaks. The longest queues would occur on the ahead movement from Nottingham Road North to Nottingham Road South and the left turn from Derby Road to Nottingham Road North.

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

It is noted that the Lindhurst development, as a pipeline scheme identified in the Reference Case list of developments, is expected provide a significant improvement to this junction as part of the Section 106 agreement with the Local Authority. The junction improvement would comprise of signalisation and localised widening to improve capacity. These improvements could be enough to mitigate against the deterioration in operational efficiency between the current layout between the Reference Case and Local Plan.

Given the described improvement scheme is associated with a committed development, no cost estimate has been provided. The assumption being that the improvement would be provided by another developer in advance of the Local Plan sites.

Should the infrastructure improvement be delayed or not delivered by the Lindhurst developer (e.g. if the Section 106 trigger points for improvements are not met) the junction improvements may need to be adopted by the Local Plan developers. The cost of providing traffic signals and localised widening is estimated to cost £2.3m.

Local Plan sites that are likely to impact this junction are (but not limited to); Caudwell Road. Other Local plans sites may have incremental increases at this junction given that it forms a key route to the M1 J27. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

A6191 Chesterfield Road / A617 MARR Pleasley

A6191 Chesterfield Road / A617 MARR is a traffic-signalled junction and, as such, has been assessed using LINSIG. The A6191 Chesterfield Road to the south-east of the junction is a main east-west radial of Mansfield, and the A617 Chesterfield Road to the north-west of the junction connects Mansfield to M1 Junction 29. The junction is at the northern end of the MARR: Woburn Road, to the north of the junction, provides access to a residential area.

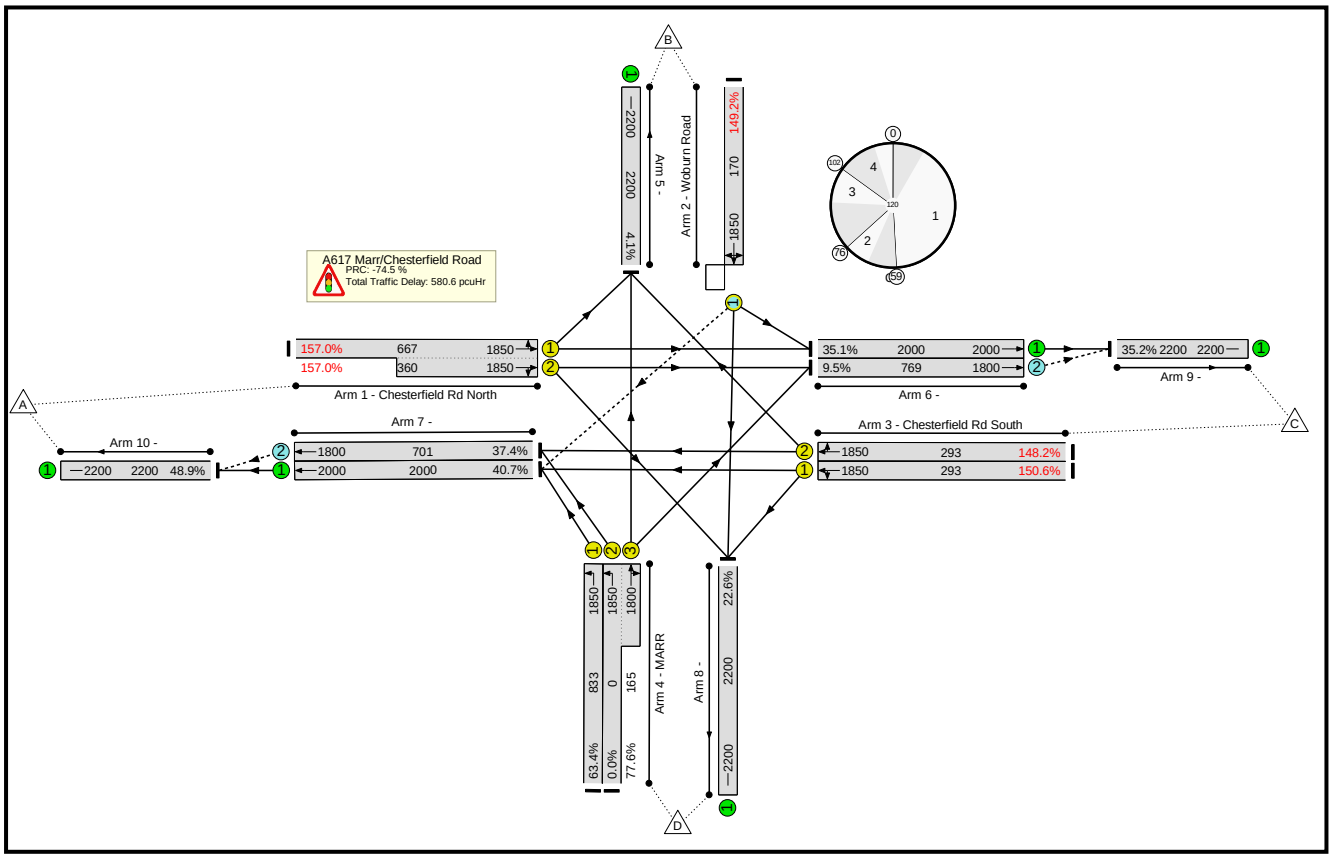


Table 17A: Performance of A6191 Chesterfield Road / A617 MARR Pleasley (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Chesterfield Rd North Left Ahead Right	145.4%	301.8	125.9%	161.0
Woburn Road Left Right Ahead	137.4%	43.3	53.2%	3.2
Chesterfield Rd South Ahead Left	140.9%	77.4	125.1%	98.8
Chesterfield Rd South Right Ahead	139.1%	74.5	114.5%	66.1
MARR Left	58.5%	12.8	104.0%	41.4
MARR Ahead Right Left	60.6%	3.9	65.3%	4.1
Junction Summary	PRC	-61.5		-39.8
	Veh Delay (PCU Hrs)	464.08		348.18

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

In both the AM and PM peaks, the highest degree of saturation and the longest queues would occur on the A617 Chesterfield Road approach from the north-west. The degree of saturation of the two approach lanes from A6191 Chesterfield Road south-east would also exceed 100% in both the AM

and PM peaks, as would that of Woburn Road in the AM peak and the left turn from the MARR to the A617 Chesterfield Road in the PM peak.

Table 17B: Performance of A6191 Chesterfield Road / A617 MARR Pleasley (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Chesterfield Rd North Left Ahead Right	157.0%	366.0	141.0%	236.6
Woburn Road Left Right Ahead	149.2%	54.4	70.2%	5.0
Chesterfield Rd South Ahead Left	150.6%	98.2	137.2%	129.4
Chesterfield Rd South Right Ahead	148.2%	94.1	128.7%	104.2
MARR Left	63.4%	14.4	117.6%	85.1
MARR Ahead Right Left	77.6%	5.8	133.9%	39.5
Junction Summary	PRC	-74.5	PRC	-56.7
	Veh Delay (PCU Hrs)	580.63	Veh Delay (PCU Hrs)	557.05

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

In the Local Plan scenario, the degree of saturation would be higher and the mean maximum queues longer on all approach lanes. The approach from the A617 Chesterfield Road north west shows the highest degree of saturation and mean maximum queue.

There may be scope to increase the capacity of the junction by widening the approach from the A617 Chesterfield Road northwest, to provide separate ahead and right turn lanes (Lane 1 Left and Ahead, Lane 2 Ahead, Lane 3 Right): as noted above, this is the arm of the junction which is forecast to show the longest queues. Widening would require third party land located to the north of the junction either side of Woburn Road.

Nottinghamshire County Council has considered a similar design for this junction to address some of the queuing issues. Currently, no funding source has been identified for this scheme, and scheme was not considered feasible within the Local Transport Plan budget and therefore it is likely that contributions from nearby developments would be required.

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

Modal change may be encouraged by the introduction of selective bus detection at this junction (and others along the A617 Chesterfield Road corridor).

A CCTV based system could also be implemented to enable the urban traffic control centre to intervene with signal settings to respond to incidents and events as they occur.

The junction would benefit from the installation of PUFFIN crossing which would improve the efficiency of the junction.

The total package of possible mitigation measures and associated costs can be summarised as:

Mitigation Measures	Cost Estimate
- Localised widening of A6117 – A6191	£3,300,000
- A GPS based system for additional improvements for public service vehicles .	£5,000
- CCTV links to Urban Traffic Control Centre	£5,000
- PUFFIN crossings	£30,000
Total	**£3.34m**
*See Appendix B Introduction for cost assumptions	

Local Plan sites that could require developer funding contributions to any junction improvements are (but not limited to); Water Lane, Pleasley Hill, land of Wharmby Avenue, and Millennium Business Park. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

A60 Nottingham Road / Baums Lane / Park Lane

This is a MOVA controlled traffic-signalled junction and, as such, has been assessed using LINSIG. The A60 Nottingham Road forms a north-south radial of Mansfield, while Park Lane to the west and Baums Lane to the east provide access to adjacent retail parks.

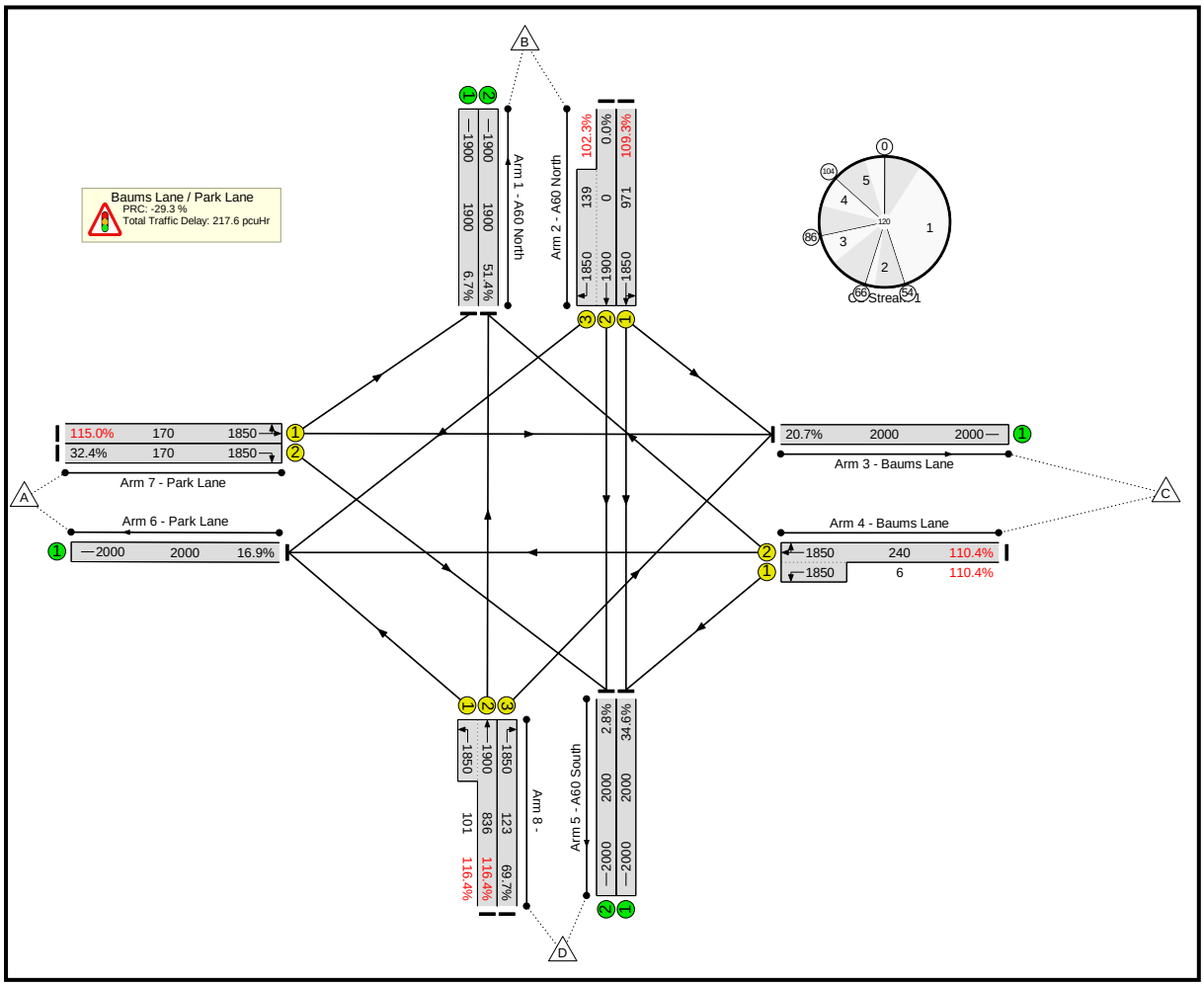

Baums Lane / Park Lane
PRC: -29.3 %
Total Traffic Delay: 217.6 pcuHr
Arm 1 - A60 North
Arm 2 - A60 North
Arm 3 - Baums Lane
Arm 4 - Baums Lane
Arm 5 - A60 South
Arm 6 - Park Lane
Arm 7 - Park Lane
Arm 8 -
A
B
C
D
Stream 1

Table 18A: Performance of A60 Nottingham Road / Baums Lane / Park Lane (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
A60 North Left Ahead	90.5%	31.2	111.7%	68.7
A60 North Ahead Right	96.0%	9.6	110.8%	33.1
Baums Lane Right Left Ahead	79.9%	6.7	114.2%	49.7
A60 South Left Ahead	98.2%	40.9	115.7%	75.9
A60 South Right	60.8%	3.2	49.5%	2.4
Park Lane Left Ahead	97.3%	12.2	117.1%	47.3
Park Lane Right	21.5%	1.4	69.6%	8.5
Junction Summary	PRC	-9.2		-30.1
	Veh Delay (PCU Hrs)	53.45		327.79

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

The degree of saturation in the AM peak would exceed 90% on approaches from all arms except Baums Lane. In the PM peak, the degree of saturation on approaches from all arms would exceed 100%. This junction is also likely to exceed operational capacity in the peak shopping/leisure periods eg. early evening, weekends.

Table 18B: Performance of A60 Nottingham Road / Baums Lane / Park Lane (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
A60 North Left Ahead	109.3%	89.0	112.6%	62.2
A60 North Ahead Right	102.3%	11.6	126.5%	78.8
Baums Lane Right Left Ahead	110.4%	26.8	123.1%	90.7
A60 South Left Ahead	116.4%	122.2	125.9%	90.7
A60 South Right	69.7%	3.9	45.4%	2.2
Park Lane Left Ahead	115.0%	23.3	125.7%	61.2
Park Lane Right	32.4%	2.0	74.7%	9.0
Junction Summary	PRC	-29.3	PRC	-40.5
	Veh Delay (PCU Hrs)	217.64	Veh Delay (PCU Hrs)	341.81

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

In the Local Plan case, queue lengths would be longer than in the Reference Case on all approach lanes except the right turn from A60 South to Baums Lane in the PM peak, and the degree of

saturation would exceed 100% on approaches from each of the four arms in both the AM and PM peaks. The total vehicle delay at the junction would increase by more in the AM peak than in the PM peak.

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

The degree of saturation is relatively consistent across the approach lanes accommodating the main turning movements from all arms, and so there is likely to be little scope for improvement of capacity through the optimisation of signal timings, and any scheme to widen the approaches to the junction would be likely to require the purchase of land outside the highway boundary. Park Lane currently provides the only access to adjoining retail and leisure sites, limiting opportunities to reduce flows at this junction by encouraging use of alternative routes. The scope for additional accesses to the retail park is limited.

Notwithstanding, Nottinghamshire County Council are currently looking at the feasibility of junction improvement options. One option is a junction widening option that would require land owned by Sainsbury's and financial support of external parties. This option is estimated to cost £2m.

Given the limited scope for cost effective physical improvements at this junction, some further queuing delay is likely to occur in the peak periods if the Local Plan allocation is delivered without effective mitigation.

Modal change may be encouraged by the introduction of selective bus detection at this junction (and others along the A60 Nottingham Road corridor).

A CCTV based system could also be implemented to enable the urban traffic control centre to intervene with signal settings to respond to incidents and events as they occur.

The total package of possible mitigation measures and associated costs can be summarised as:

Mitigation Measures	Cost Estimate
- Junction improvements options currently being assessed by NCC. Junction widening would require 3rd Party land.	£2,000,000
- A GPS based system for additional improvements for public service vehicles.	£5,000
- CCTV links to Urban Traffic Control Centre	£5,000
Total	**£2.01m**
*See Appendix B Introduction for cost assumptions	

There are no Local Plan sites that directly impact the site although there is likely to be an incremental increase as sites are developed. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show if they impact this junction and where applicable, proposed mitigation measures.

A6191 Southwell Road / Berry Hill Lane

This is a MOVA controlled traffic-signalled junction and, as such, has been assessed using LINSIG. The A6191 Southwell Road is a northwest-southeast radial of Mansfield, while Berry Hill Lane to the southeast provides an east-west route around the southern side of the town.

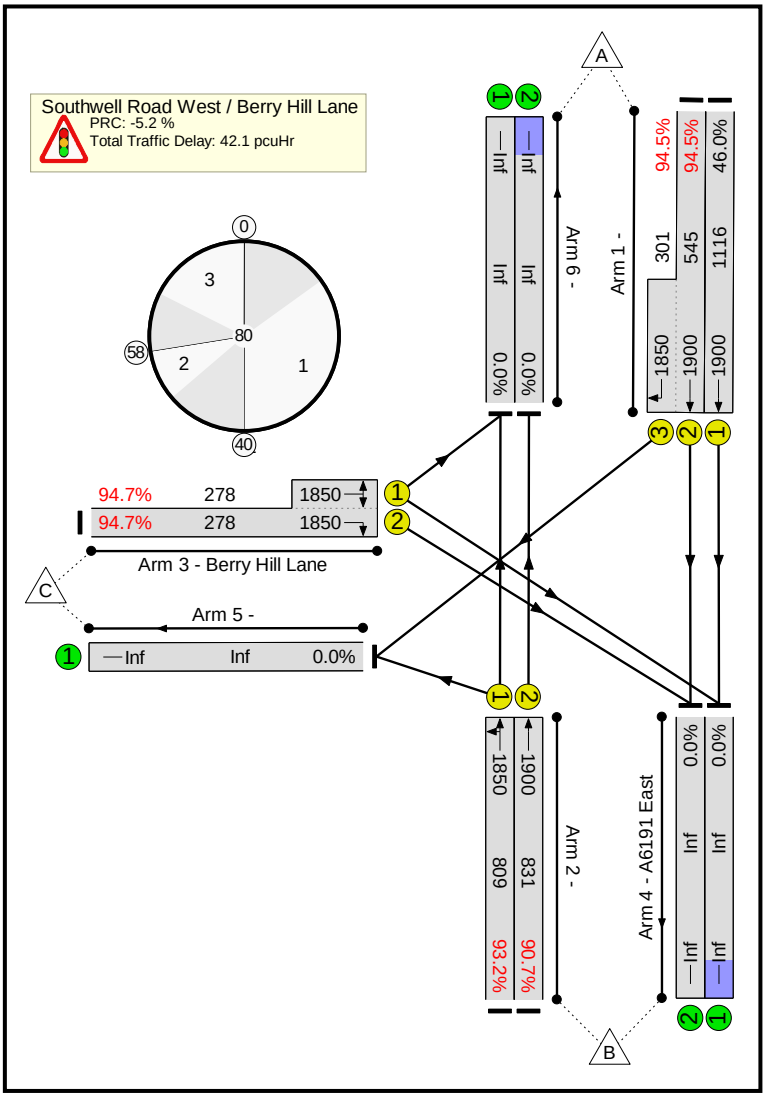


Table 19A: Performance of A6191 Southwell Road / Berry Hill Lane (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
A6191 Southwell Road (N) Ahead	44.1%	5.8	44.1%	9.4
A6191 Southwell Road (N) Ahead Right	79.6%	7.3	80.8%	12.0
A6191 Southwell Road (S) Left Ahead	79.5%	11.9	86.0%	23.0
A6191 Southwell Road (S) Ahead	77.3%	11.5	83.7%	22.2
Berry Hill Lane Right Left	77.5%	5.9	86.2%	18.2
Junction Summary	PRC	13	PRC	4.4
	Veh Delay (PCU Hrs)	21.60	Veh Delay (PCU Hrs)	35.37

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

In the 2033 Reference Case forecasts, the junction would operate below the normal maximum acceptable degree of saturation (90%) on all approach lanes in both peak periods. The longest queues would occur on the approaches from Southwell Road South in the PM peak but would dissipate within one cycle of the traffic signals.

Table 19B: Performance of A6191 Southwell Road / Berry Hill Lane (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
A6191 Southwell Road (N) Ahead	46.0%	6.9	46.8%	10.2
A6191 Southwell Road (N) Ahead Right	94.5%	13.1	87.0%	14.4
A6191 Southwell Road (S) Left Ahead	93.2%	21.4	102.6%	51.9
A6191 Southwell Road (S) Ahead	90.7%	19.9	99.8%	43.7
Berry Hill Lane Right Left	94.7%	13.2	101.3%	34.2
Junction Summary	PRC	-5.2	PRC	-14.0
	Veh Delay (PCU Hrs)	42.07	Veh Delay (PCU Hrs)	86.96

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

In the 2033 Local Plan forecasts, the junction would exceed the normal maximum acceptable degree of saturation (90%) on all approach lanes but one in the AM peak, but mean maximum queues would remain short (less than 22 PCU). In the PM peak, mean maximum queues of more than 30 PCU would form on approaches from Southwell Road South and Berry Hill Lane.

The over-capacity issues shown at this junction only occur with the increased flows present in the Local Plan scenario, and as the Southwell Road North approaches still have a maximum degree of saturation of 87% in the PM peak under this scenario. Properties to the north of Berry Hill Lane are accessed via a service road, separated from Berry Hill Lane by a wide verge: there may be opportunity to increase the capacity of the junction by widening this approach. A widening scheme is estimated to cost £1.6m, but given the level of performance reported in the Local Plan case, this scale of junction improvement is unlikely to be justified.

Modal change may be encouraged by the introduction of selective bus detection at this junction (and others along the A617 Southwell Road corridor).

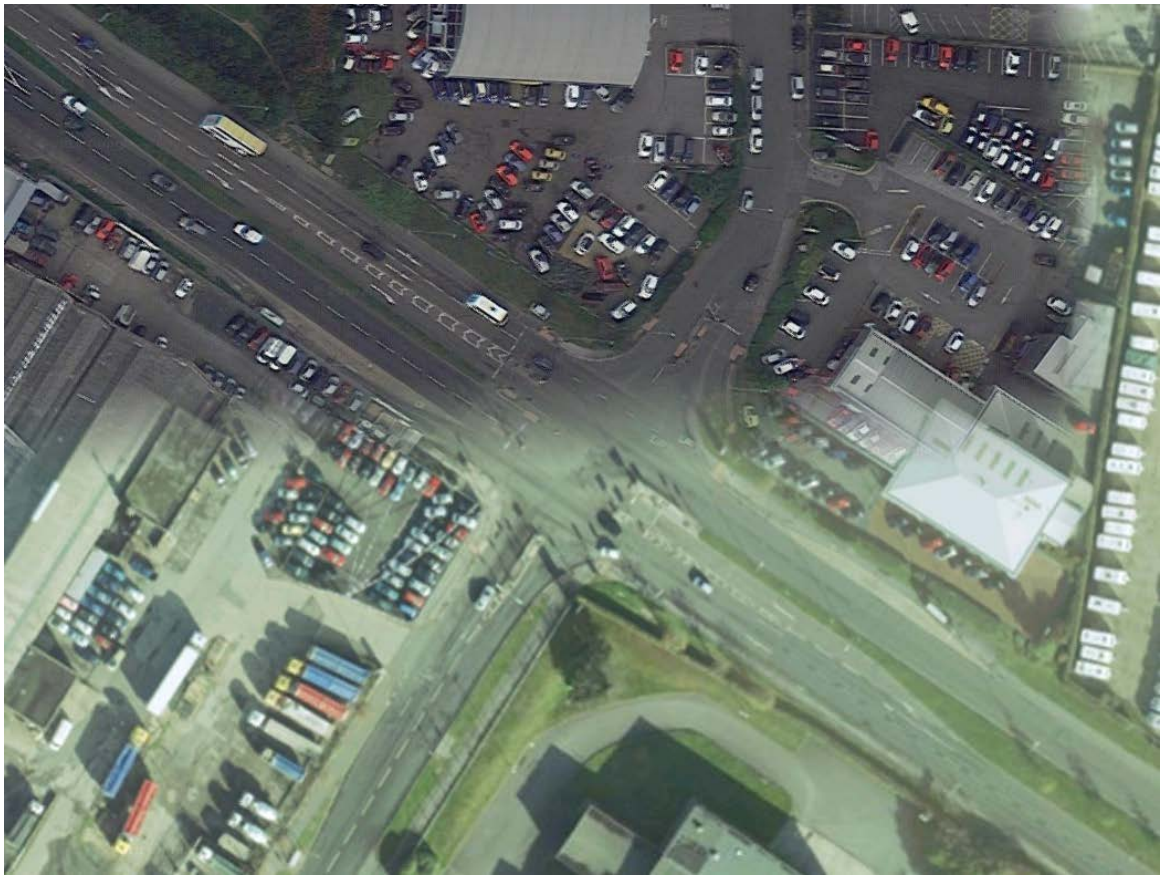
The total package of possible mitigation measures and associated costs can be summarised as:

Mitigation Measures	Cost Estimate
- A GPS based system for additional improvements for public service vehicles.	£5,000
Total	**£5,000**
*See Appendix B Introduction for cost assumptions	

Local Plan sites that could require developer funding contributions to any junction improvements are (but not limited to); Land off Sherwood Oaks Avenue, land off Jubilee Way and multiple employment sites on Southwell Road. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

A6191 / Bellamy Road

This is a SCOOT controlled traffic-signalled junction and, as such, has been assessed using LINSIG. The A6191 Southwell Road is a northwest-southeast radial of Mansfield. Sovereign Way, to the northeast, is a cul-de-sac providing access to car dealerships and other business units, while Bellamy Road, to the southwest, connects through industrial and residential areas to the A6117 (Adamsway).



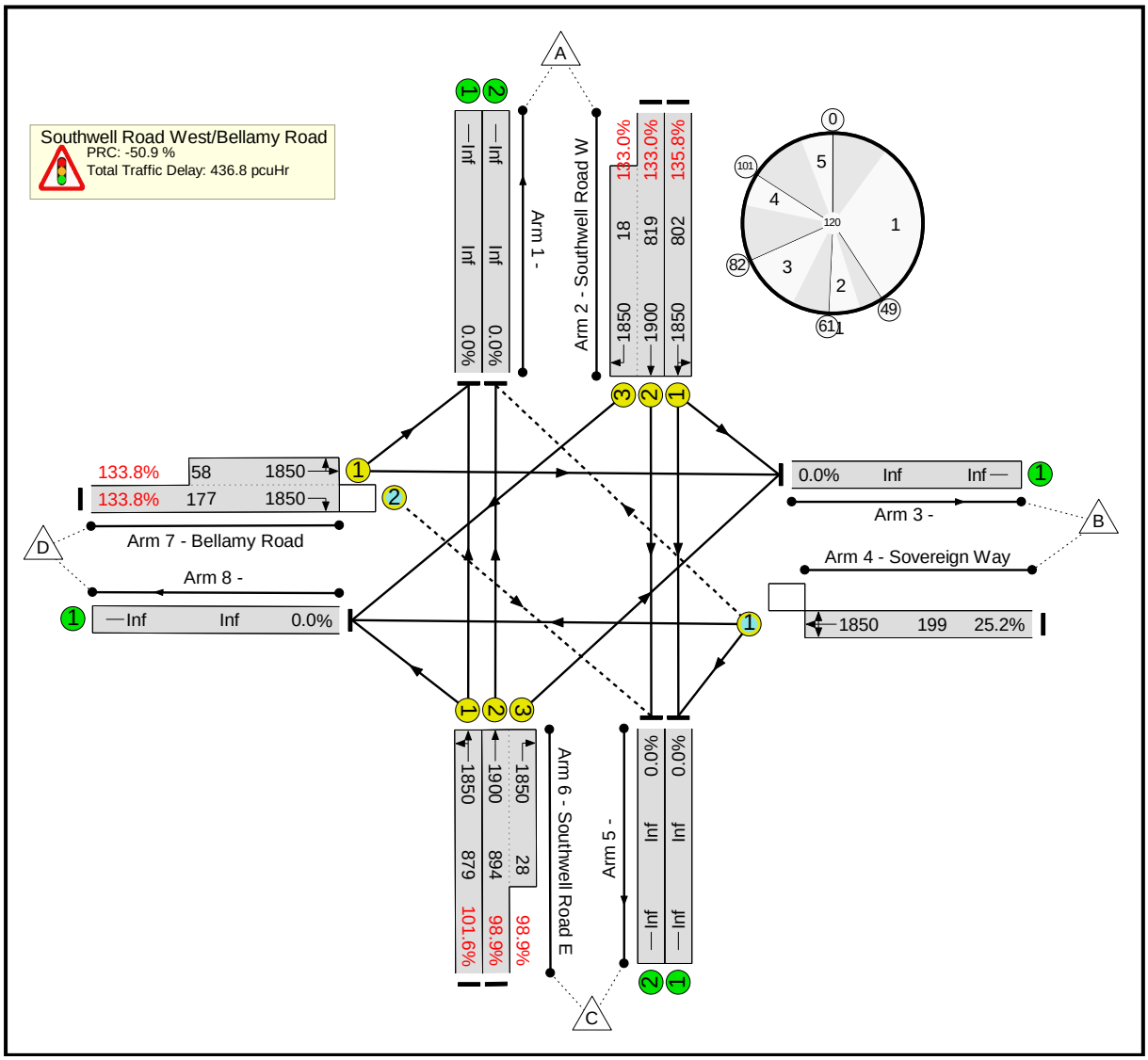


Table 20A: Performance of A6191 / Bellamy Road (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Southwell Road W Left Ahead	110.3%	82.4	79.1%	20.2
Southwell Road W Ahead Right	108.6%	82.4	78.8%	20.3
Sovereign Way Right Left Ahead	15.3%	0.9	21.0%	1.4
Southwell Road E Ahead Left	85.5%	25.7	100.8%	47.1
Southwell Road E Ahead Right	83.2%	25.0	98.2%	41.1
Bellamy Road Left Ahead Right	111.0%	20.7	96.0%	11.0
Junction Summary	PRC	-23.4	PRC	-12.0
	Veh Delay (PCU Hrs)	155.46	Veh Delay (PCU Hrs)	63.37

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

In the Reference Case, the degree of saturation exceeds the normal acceptable maximum of 90% on the approach from Southwell Road West in the AM Peak, on the approach from Southwell Road East in the PM peak, and on Bellamy Road in both peak periods.

Table 20B: Performance of A6191 / Bellamy Road (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Southwell Road W Left Ahead	135.8%	191.4	93.9%	30.0
Southwell Road W Ahead Right	133.0%	190.1	92.8%	29.5
Sovereign Way Right Left Ahead	25.2%	1.7	55.5%	4.0
Southwell Road E Ahead Left	101.6%	49.2	116.8%	116.1
Southwell Road E Ahead Right	98.9%	42.5	113.7%	106.7
Bellamy Road Left Ahead Right	133.8%	52.7	116.7%	28.6
Junction Summary	PRC	-50.9	PRC	-29.7
	Veh Delay (PCU Hrs)	436.76	Veh Delay (PCU Hrs)	231.02

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

In the Local Plan scenario, the degree of saturation exceeds the normal acceptable maximum of 90% on the approaches from Southwell Road West, Southwell Road East, and Bellamy Road in both peak periods.

The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

The high degrees of saturation on approaches from all arms except Sovereign Way indicate that there may not be benefits to be obtained from further traffic signal optimisation. The widening of the approaches to the junction to improve capacity would require the purchase of third part land as each quadrant of the junction is occupied by business premises.

Given the limited scope for cost effective physical improvements at this junction, some further queuing delay is likely to occur in the peak periods if the Local Plan allocation is delivered without effective mitigation.

Modal change may be encouraged by the introduction of selective bus detection at this junction (and others along the A617 Southwell Road corridor).

A CCTV based system could also be implemented to enable the urban traffic control centre to intervene with signal settings to respond to incidents and events as they occur.

The total package of possible mitigation measures and associated costs can be summarised as:

Mitigation Measures	Cost Estimate
- Larger scale widening not feasible due to topography and third party land take.	Not Included
- A GPS based system for additional improvements for public service vehicles.	£5,000
- CCTV links to Urban Traffic Control Centre	£5,000
Total	**£10,000**
*See Appendix B Introduction for cost assumptions	

Local Plan sites that could require developer funding contributions to any junction improvements are (but not limited to); Land off Sherwood Oaks Avenue, land off Jubilee Way and multiple employment sites on Southwell Road, Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

A6009 Rosemary Street / A38 Stockwell Gate

This is a traffic-signalled junction linked to the SCOOT network and, as such, has been assessed using LINSIG. The A6009 Rosemary Street forms part of the Mansfield Inner Ring Road, and the A38 Stockwell Gate is a radial route linking to Sutton in Ashfield and M1 Junction 28.

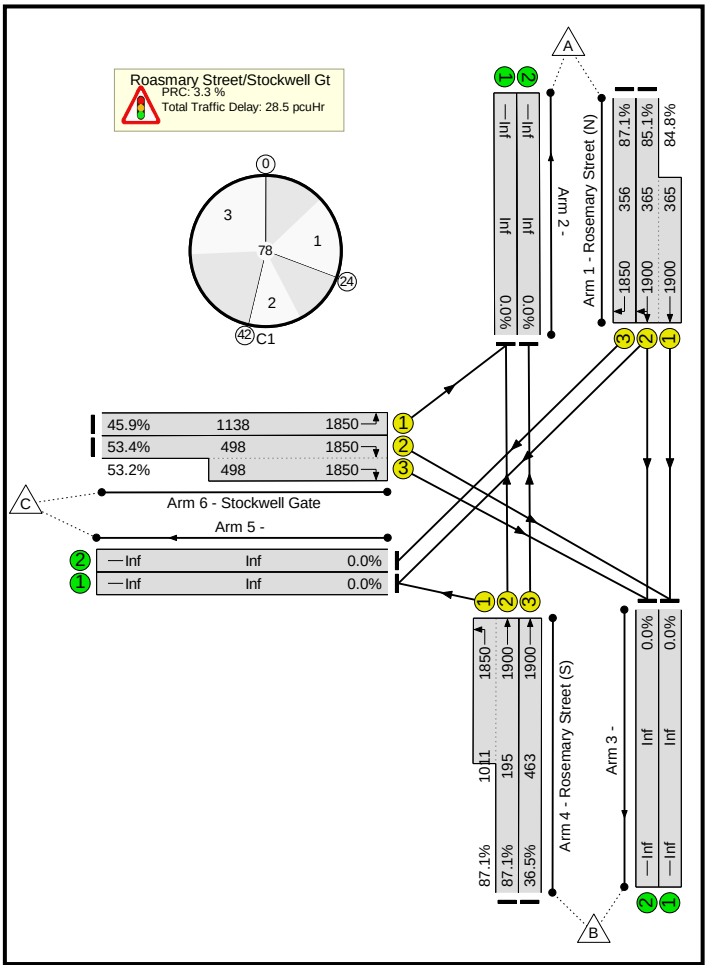


Table 21A: Performance of A6009 Rosemary Street / A38 Stockwell Gate (2033 Reference Case)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Rosemary Street (N) Ahead Right	73.4%	6.0	85.6%	7.2
Rosemary Street (N) Right	75.4%	6.2	87.9%	7.4
Rosemary Street (S) Ahead Left	74.5%	10.5	88.0%	20.7
Rosemary Street (S) Ahead	24.1%	2.0	30.7%	2.7
Stockwell Gate Left	43.3%	5.0	62.4%	10.1
Stockwell Gate Right	75.2%	5.2	48.6%	5.3
Junction Summary	PRC	-5.6	PRC	19.1
	Veh Delay (PCU Hrs)	43.70	Veh Delay (PCU Hrs)	19.61

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

In the 2033 Reference Case forecast, the junction would operate below the normal maximum acceptable degree of saturation (90%) on all approach lanes.

Table 21B: Performance of A6009 Rosemary Street / A38 Stockwell Gate (2033 Local Plan)

Approach Lane (and flare)	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Rosemary Street (N) Ahead Right	84.8%	9.2	92.5%	13.0
Rosemary Street (N) Right	87.1%	9.5	95.0%	13.5
Rosemary Street (S) Ahead Left	87.1%	19.5	94.1%	42.5
Rosemary Street (S) Ahead	36.5%	3.3	56.5%	5.8
Stockwell Gate Left	45.9%	6.4	60.8%	13.7
Stockwell Gate Right	53.2%	5.4	48.5%	6.7
Junction Summary	PRC	3.3	PRC	-5.6
	Veh Delay (PCU Hrs)	28.47	Veh Delay (PCU Hrs)	43.70

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

In the 2033 Local Plan scenario, the modelled cycle time has been extended to maximise the capacity of the junction and the junction would continue to operate within an acceptable degree of saturation on all approach lanes in the AM peak. In the PM peak, the two approach lanes from Rosemary Street North and Lane 1 (with flare) from Rosemary Street South would operate with a degree of saturation of between 90% and 95%.

The junction would operate within capacity in the forecast 2033 Reference Case and in the Local Plan scenario in the AM Peak, with issues arising in the Local Plan scenario in the PM peak only (resulting in mean maximum queues of up to 43 PCU).

Given the land use constraints surrounding the junction capacity improvements cannot be made without significant engineering works and third party land purchases which would results in works costs that exceed the journey time benefits.

Given the limited scope for cost effective physical improvements at this junction, some further queuing delay is likely to occur in the peak periods if the Local Plan allocation is delivered without effective mitigation.

Given the junction is already linked to the SCOOT network and benefits from CCTV and GPS based bus priority, no further mitigation measures at this junction have been identified.

Local Plan sites that could impact the junction are (but not limited to); the former bus station. Other Local Plan sites may have an incremental impact at the junction. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures.

A60 Church Street / Wood Street, Warsop

This is a signalised junction and, as such, has been assessed using LINSIG3. The A60 Church Street provides links to Mansfield to the south and Worksop to the north. B6035 Church Street to the east provides local access to Market Warsop town centre and car parking. Wood Street, to the west, is one-way (inbound only), from a residential area to the north-west of the A60 which can also be accessed via Carr Lane and York Terrace.

The junction benefits from near side detection for the PUFFIN pedestrian crossings which aim to reduce intergreen times lost to the pedestrian phase.

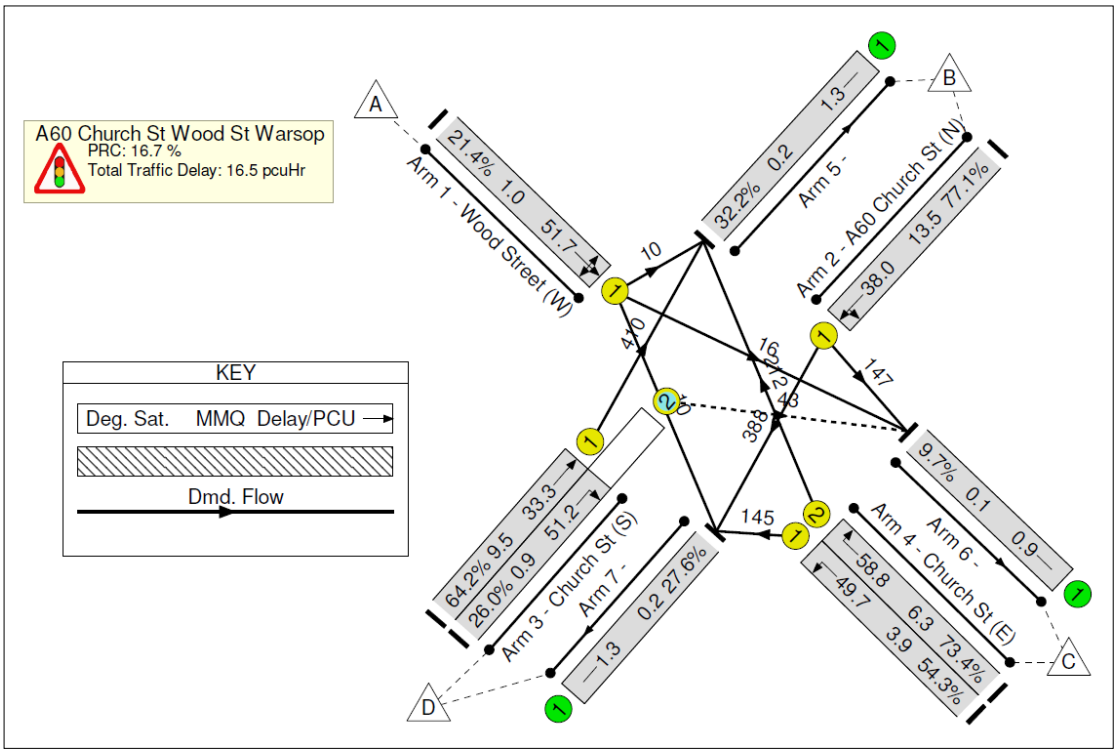


Table 22A: Performance of A60 Church Street / Wood Street (2033 Reference Case)

Approach Lane	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Wood Street (W) Left Ahead Right	64.5%	3.4	23.8%	1.1
A60 Church St (N) Left Ahead	101.2%	34.2	112.9%	73.0
Church St (E) Left	85.9%	7.8	93.9%	10.5
Church St (E) Right	98.0%	13.4	106.6%	21.5
Church St (S) Ahead	97.2%	24.5	72.0%	11.6
Church St (S) Right	65.0%	1.7	76.3%	2.4
Junction Summary	PRC	-12.4	PRC	-25.5
	Veh Delay (PCU Hrs)	54.23	Veh Delay (PCU Hrs)	93.29

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 22A indicates that the A60 Church Street / Wood Street junction operates over capacity in the Reference Case in the AM Peak and PM Peak. The worst performing arm is the A60 Church Street (N) with queues of up to 34 PCUs in the AM Peak and 73 PCUs in the PM Peak.

Table 22B: Performance of A60 Church Street / Wood Street (2033 Local Plan)

Approach Lane	AM (0800 – 0900hrs)		PM (1700 – 1800hrs)	
	DoS	MMQ	DoS	MMQ
Wood Street (W) Left Ahead Right	118.4%	20.2	52.7%	2.6
A60 Church St (N) Left Ahead	119.4%	122.2	163.5%	316.6
Church St (E) Left	97.0%	16.2	113.9%	41.2
Church St (E) Right	116.8%	43.5	136.5%	86.3
Church St (S) Ahead	102.7%	51.7	93.4%	30.2
Church St (S) Right	118.3%	9.1	165.0%	23.0
Junction Summary	PRC	-32.7	PRC	-83.3
	Veh Delay (PCU Hrs)	207.7	Veh Delay (PCU Hrs)	448.13

Notes: DoS = Degree of Saturation, is the percentage of the traffic demand on a traffic lane compared to the capacity of that traffic lane with the allocated green time.
MMQ = Mean Maximum Queue is the estimated mean of the back of the predicted traffic queue (which is exceeded for 50% of the time).
PCU = Passenger Car Unit. 1 car = 1 PCU / 1 bus = 2 PCU etc.
PRC = Practical Reserve Capacity is the percentage difference between the estimated Degree of Saturation (DoS) and the normal maximum acceptable degree of saturation of 90%.
Delay = Vehicle Delay in PCU-hours per hour.overall percentage "spare" capacity at a junction.
Delay = Vehicle Delay in PCU-hours per hour.

Table 22B indicates that the A60 Church Street / Wood Street junction operates over capacity in the Reference Case in the AM Peak and PM Peak. The worst performing arm is the A60 Church Street (N) with queues of up to 122 PCUs in the AM Peak and 317 PCUs in the PM Peak.
The requirement for mitigation at this junction increases in the Local Plan scenario compared to the Reference Case scenario.

There is very little room to provide localised widening around the junction, the junction has residential and retail properties on all four corners.

The option of biasing green times to the A60 strategic corridor has been discounted by the highway authority.

This junction currently does not operate under MOVA control. MOVA may provide some benefits in managing the incoming traffic demands. The installation of MOVA typically costs in the range of £40,000 to £100,000 dependent upon existing conditions and equipment.

The total package of possible mitigation measures and associated costs can be summarised as:

Mitigation Measures	Cost Estimate
- To improve overall efficiency MOVA control can be installed. - Larger scale widening not feasible due to topography and third party land take.	£100,000 Not Included
Total	**£100,000**
*See Appendix B Introduction for cost assumptions	

Local Plan sites that could require developer funding contributions to any junction improvements are (but not limited to);.Stonebridge Lane/Sookholme Lane, Sookholme Lane/Sookholme Drive, Oakfield Lane and Land off Netherfield Avenue. Prior to planning approval, each Local Plan site would be expected to submit a Transport Assessment to show their impact at this junction and where applicable, mitigation measures

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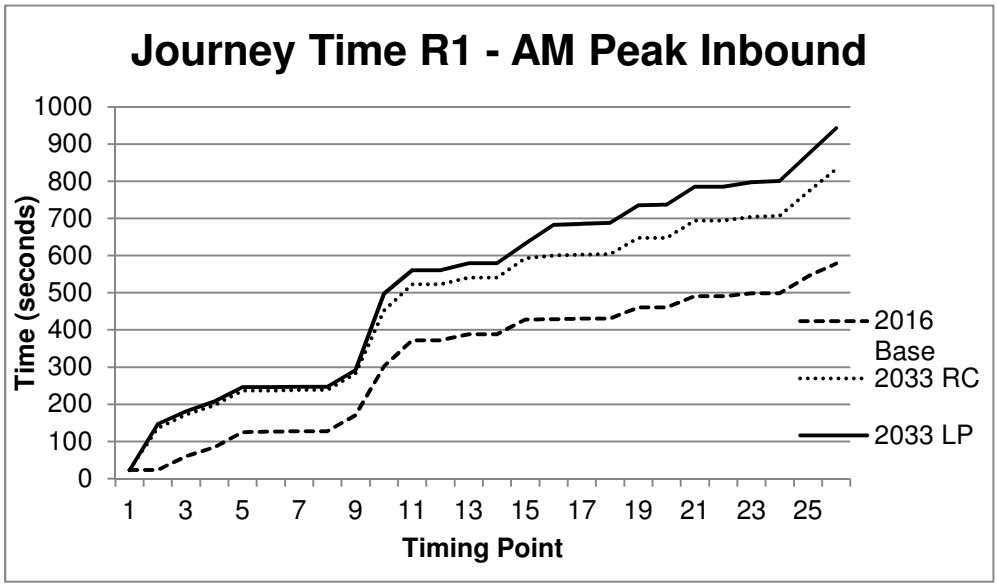
APPENDIX C Route Time-Distance Plots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Time (seconds)
1000
900
800
700
600
500
400
300
200
100
0
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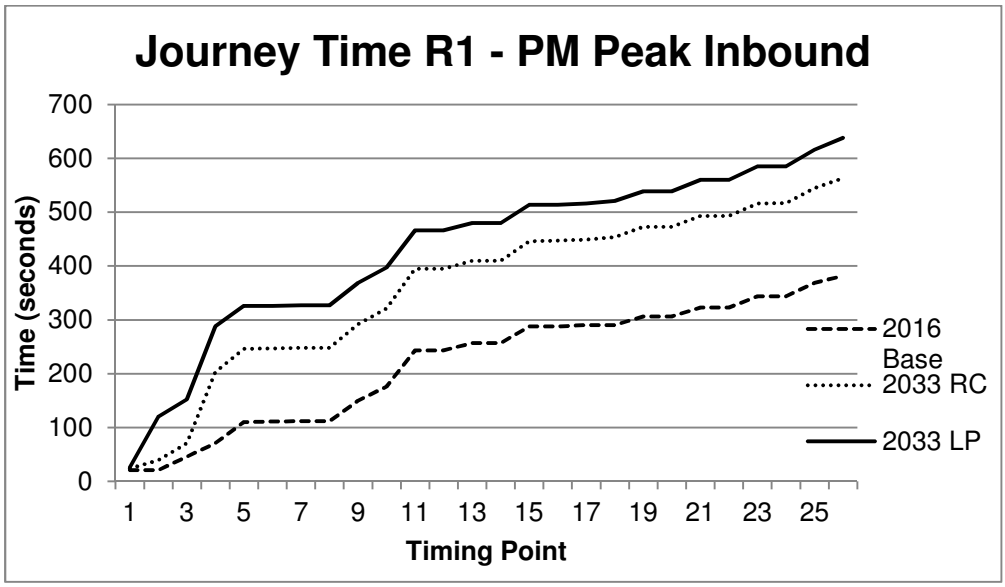
Timing Point
2016 Base
2033 RC
2033 LP


Journey Time R1 - PM Peak Inbound
Time (seconds)
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400
300
200
100
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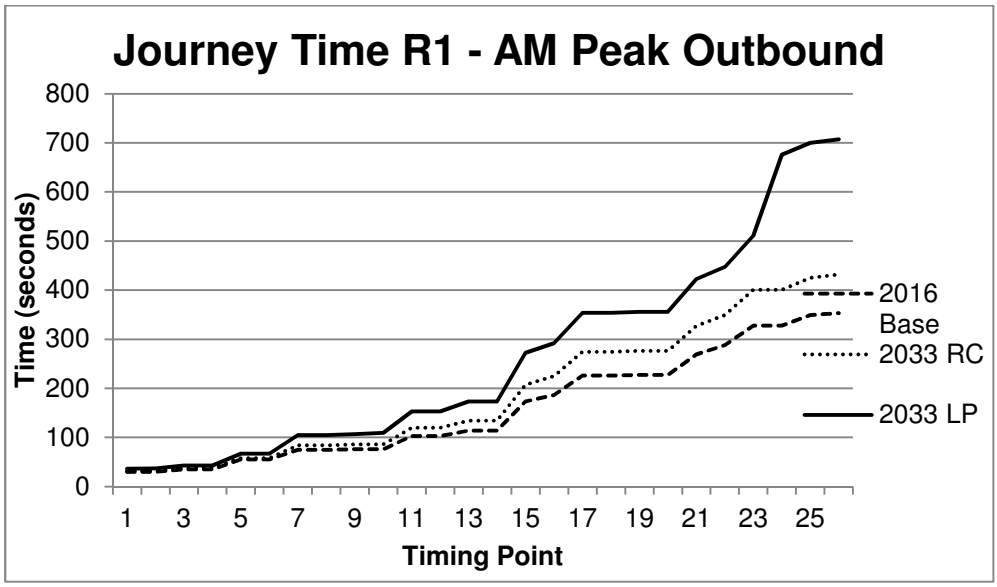
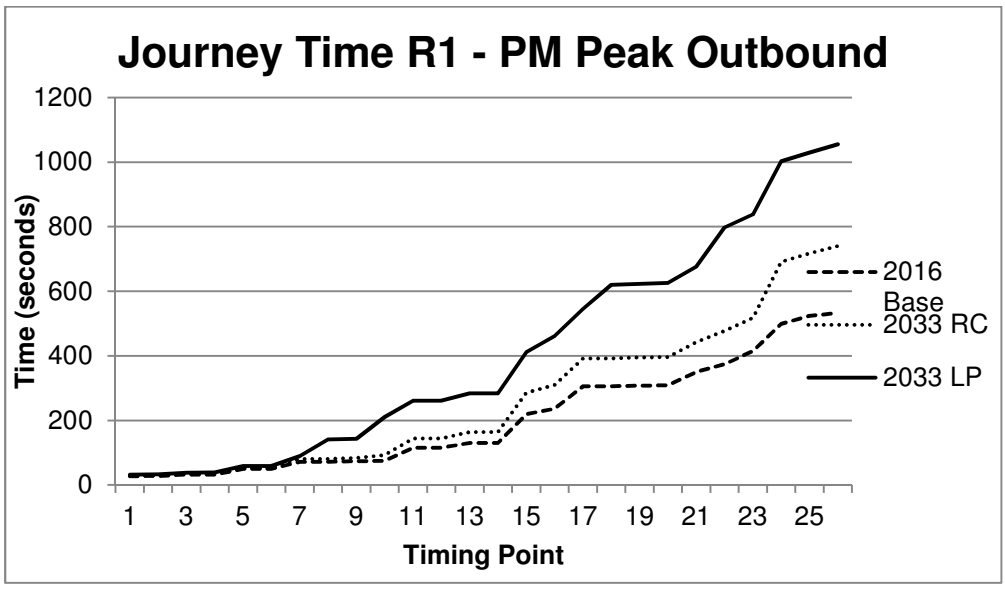
Timing Point
2016 Base
2033 RC
2033 LP


Journey Time R1 - AM Peak Outbound
Time (seconds)
800
700
600
500
400
300
200
100
0
1 3 5 7 9 11 13 15 17 19 21 23 25
Timing Point
2016 Base
2033 RC
2033 LP


Journey Time R1 - PM Peak Outbound
Time (seconds)
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1000
800
600
400
200
0
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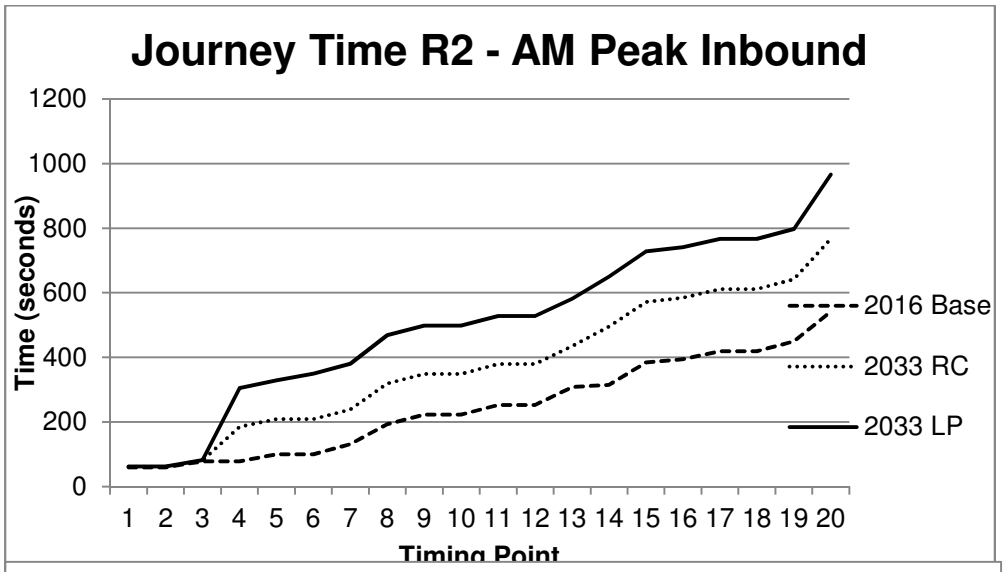
Timing Point
2016 Base
2033 RC
2033 LP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Time (seconds)
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600
400
200
0
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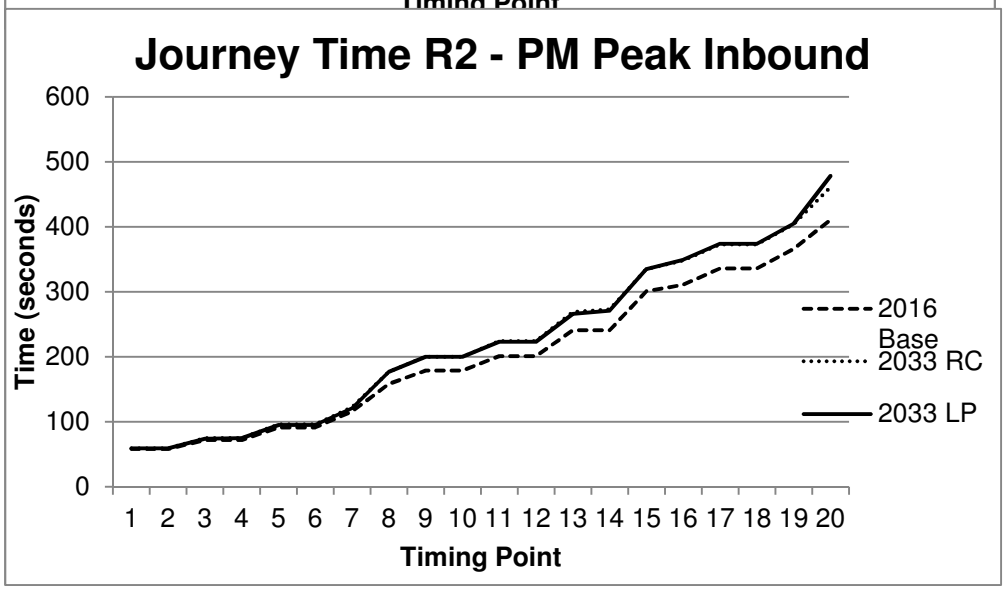
Timing Point
2016 Base
2033 RC
2033 LP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Time (seconds)
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500
400
300
200
100
0
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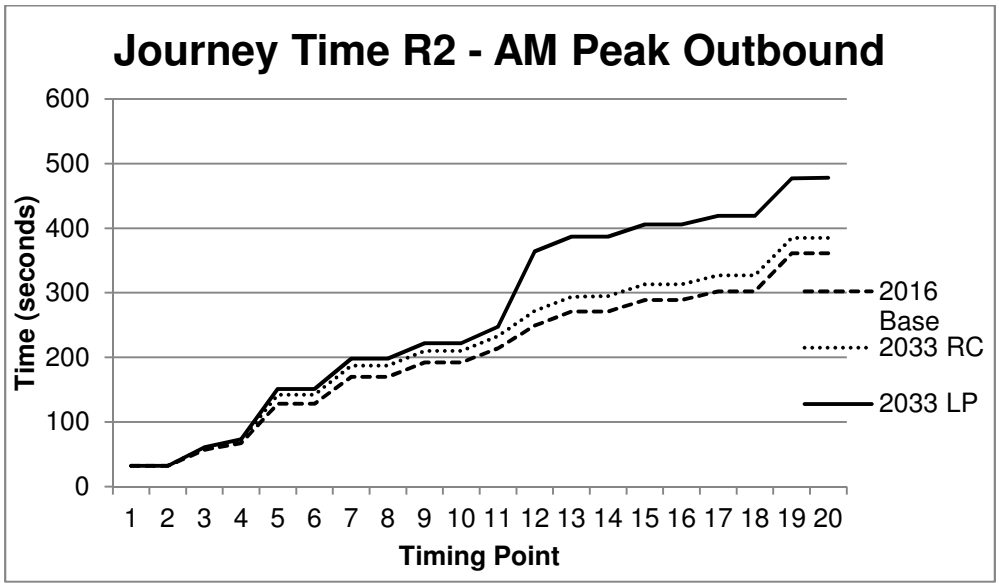
Timing Point
2016 Base
2033 RC
2033 LP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Time (seconds)
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300
200
100
0
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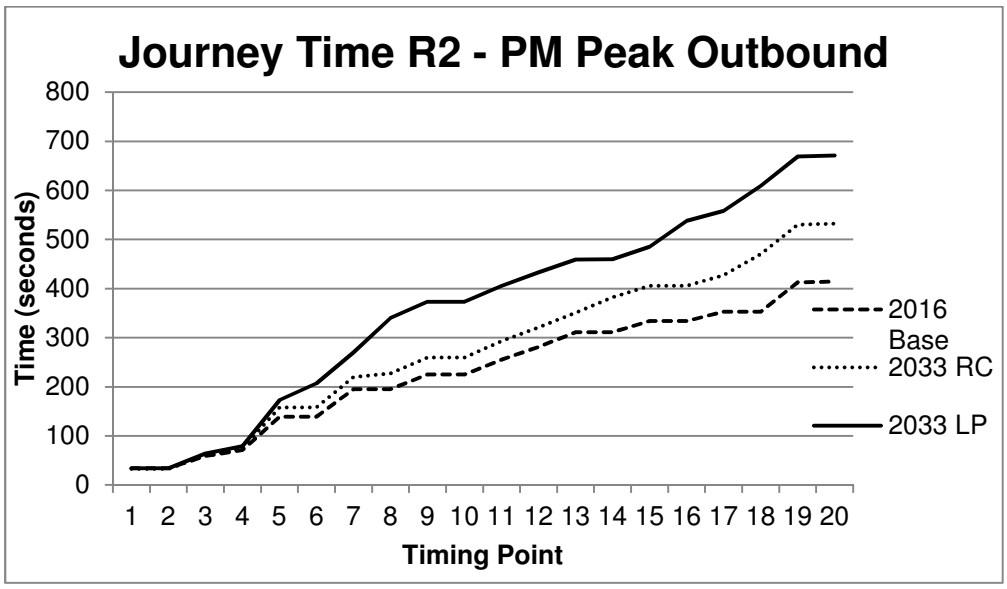
Timing Point
2016 Base
2033 RC
2033 LP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Time (seconds)
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700
600
500
400
300
200
100
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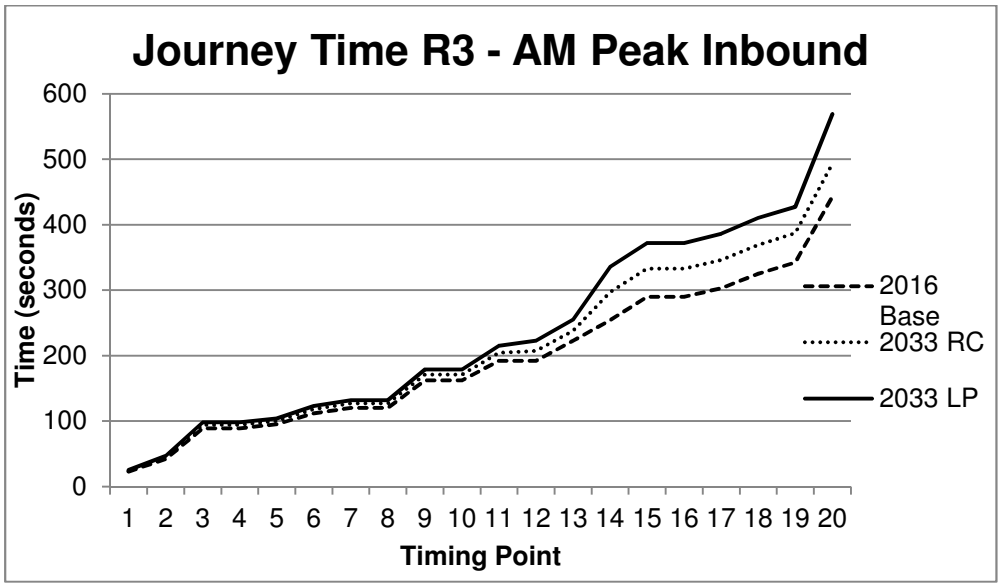
Timing Point
2016 Base
2033 RC
2033 LP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Time (seconds)
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200
100
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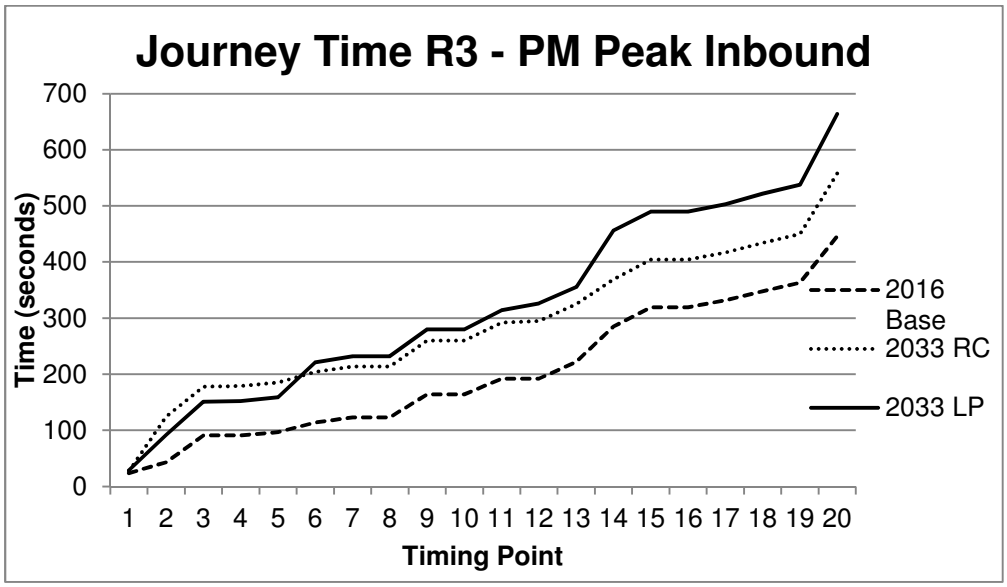
Timing Point
2016 Base
2033 RC
2033 LP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Time (seconds)
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600
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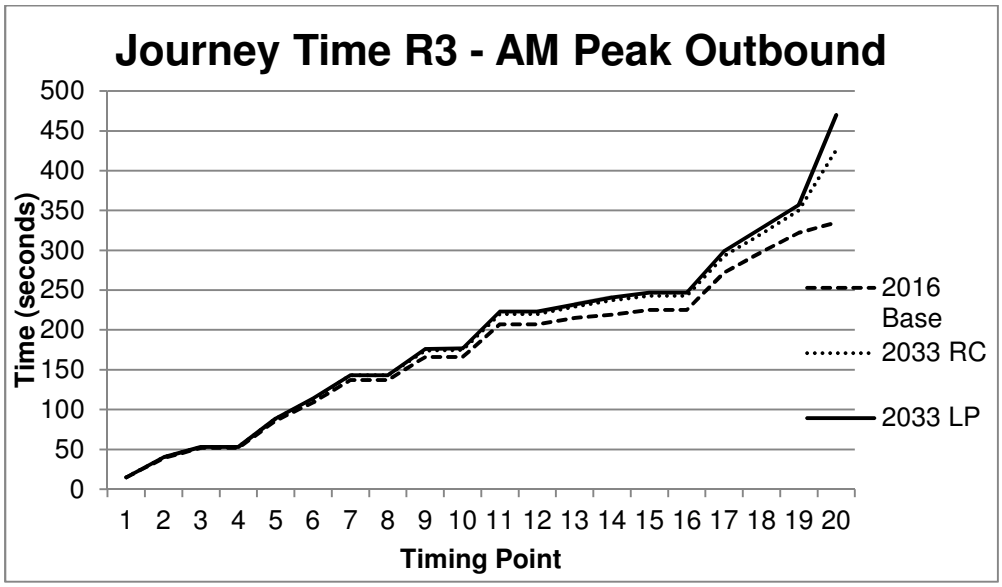
Timing Point
2016 Base
2033 RC
2033 LP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Time (seconds)
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150
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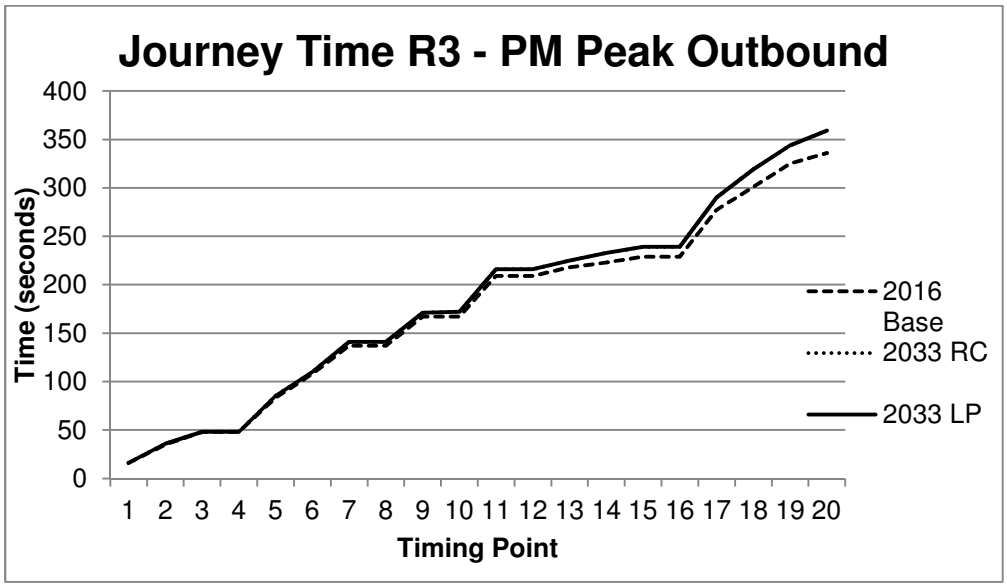
Timing Point
2016 Base
2033 RC
2033 LP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Time (seconds)
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300
350
400
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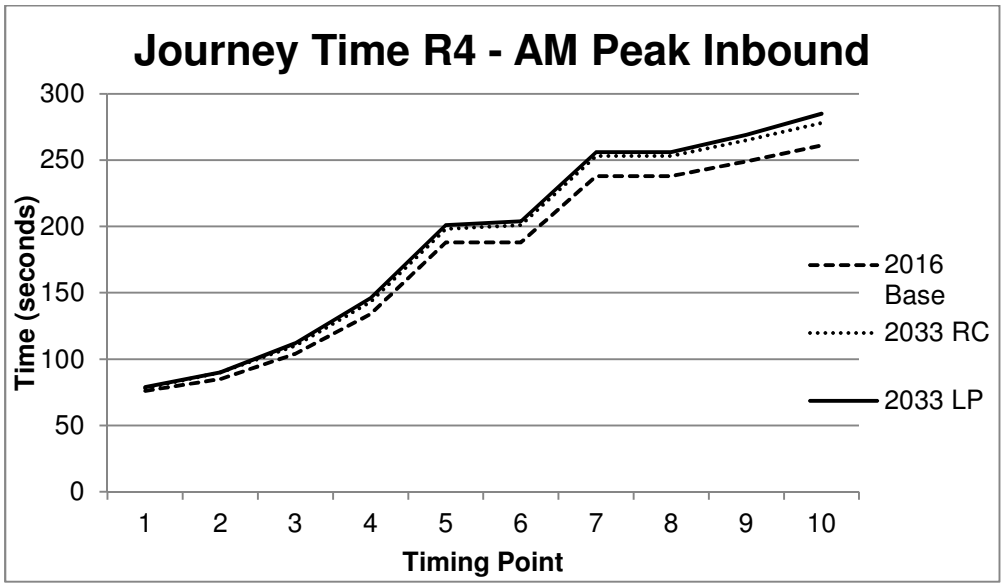
Timing Point
2016 Base
2033 RC
2033 LP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Time (seconds)
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250
200
150
100
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2
3
4
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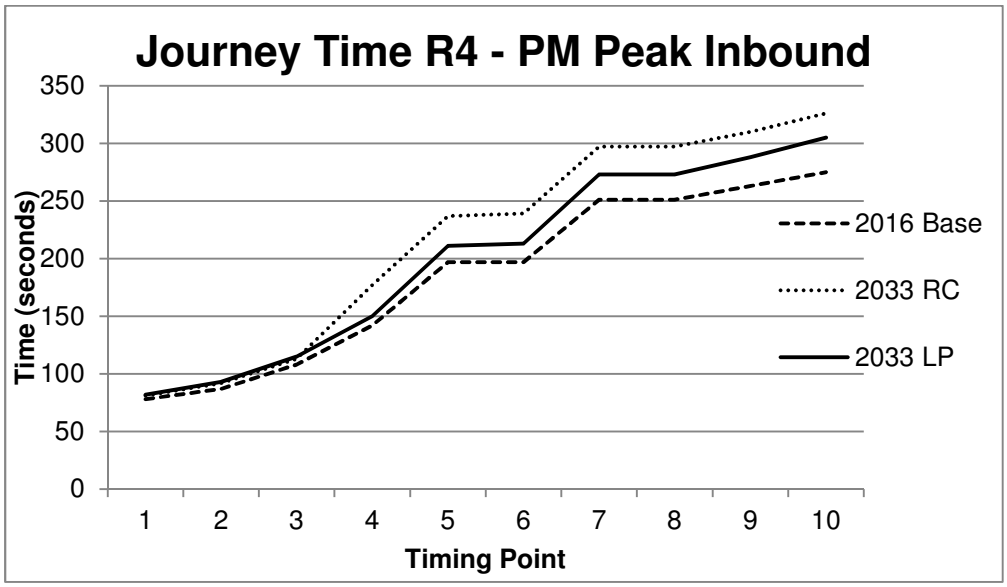
6
7
8
9
10
Timing Point
2016 Base
2033 RC
2033 LP


Journey Time R4 - PM Peak Inbound
Time (seconds)
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300
250
200
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100
50
0
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2
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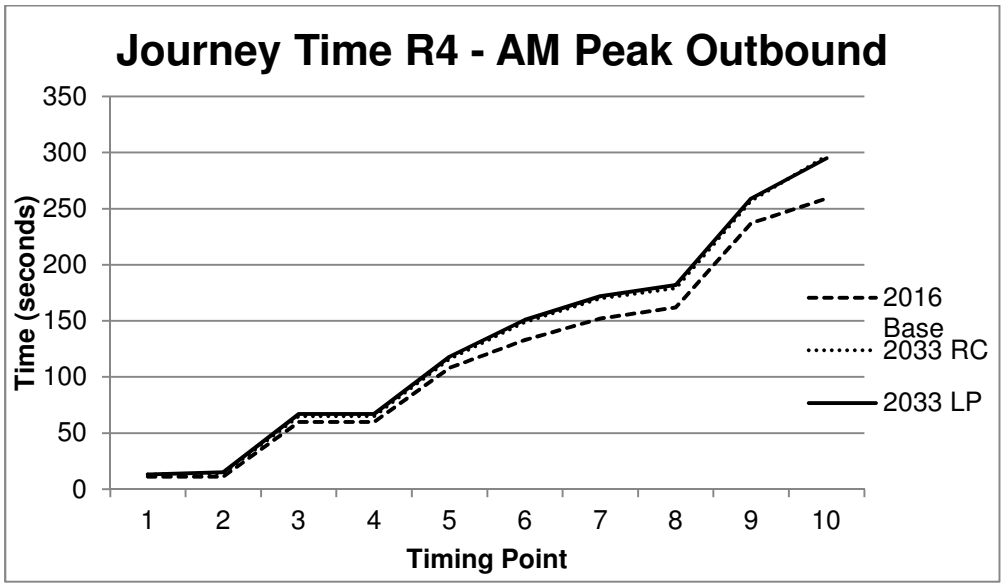
4
5
6
7
8
9
10
Timing Point
2016 Base
2033 RC
2033 LP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Time (seconds)
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300
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200
150
100
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2
3
4
5
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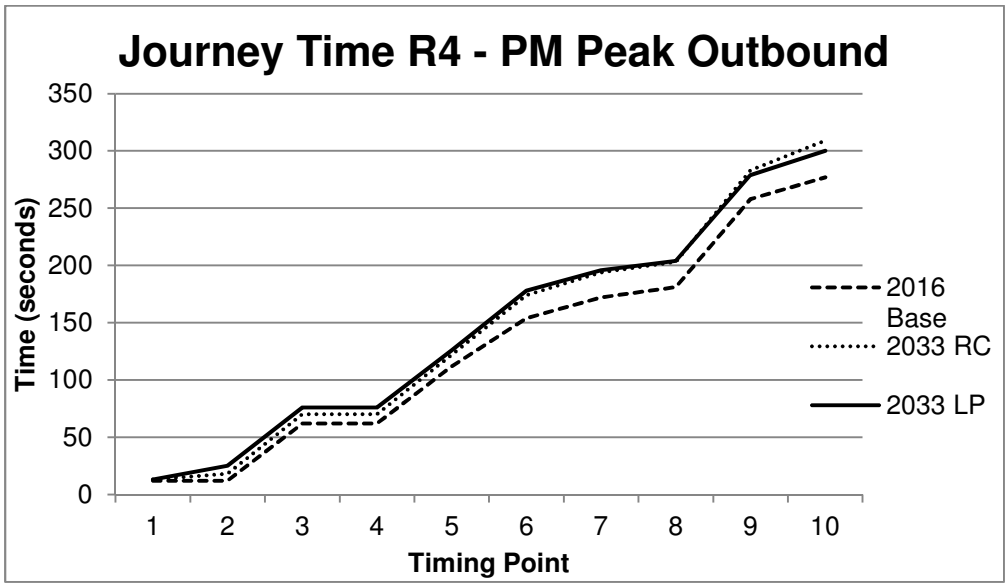
9
10
Timing Point
2016 Base
2033 RC
2033 LP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Time (seconds)
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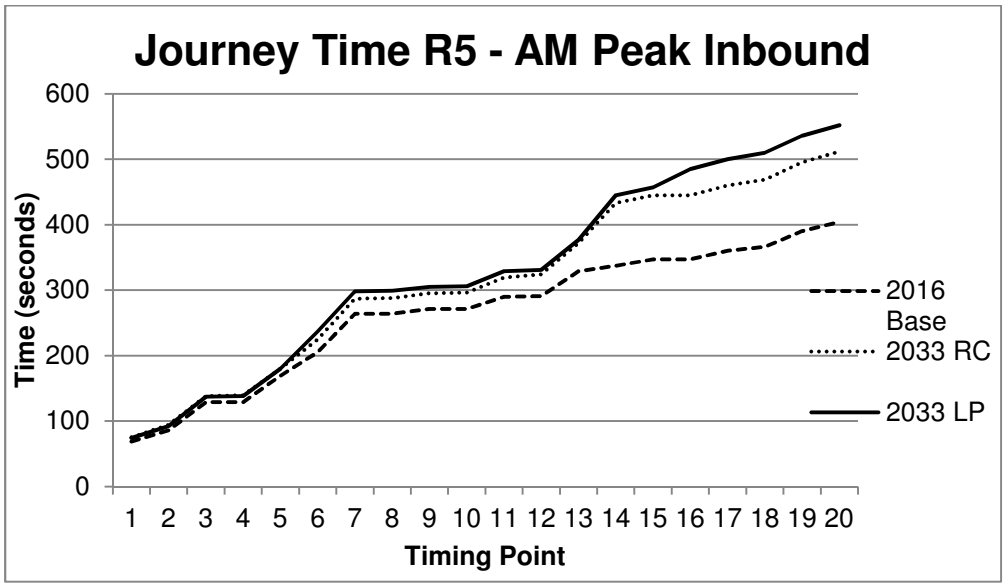
7
8
9
10
Timing Point
2016 Base
2033 RC
2033 LP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Time (seconds)
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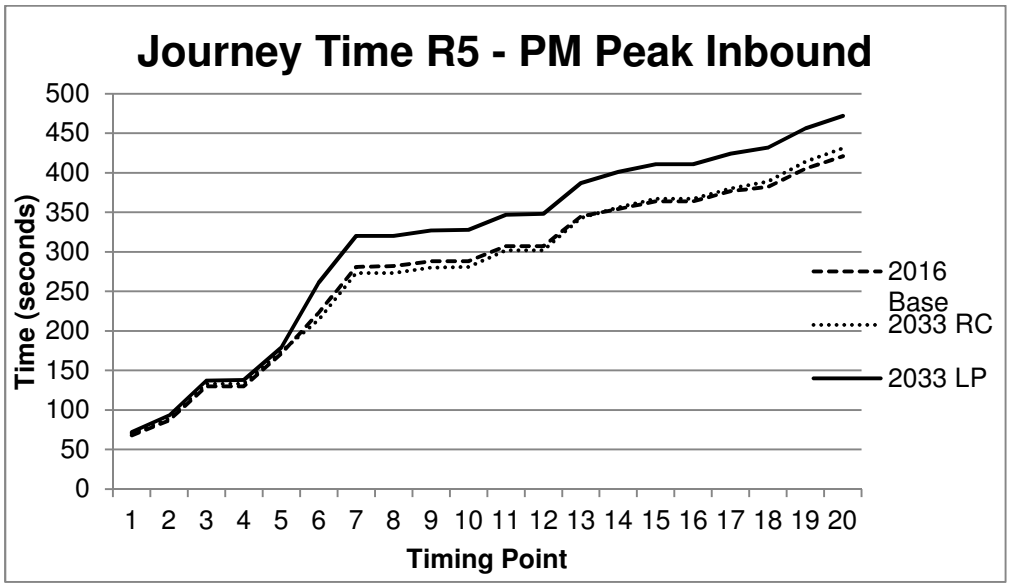
Timing Point
2016 Base
2033 RC
2033 LP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Time (seconds)
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400
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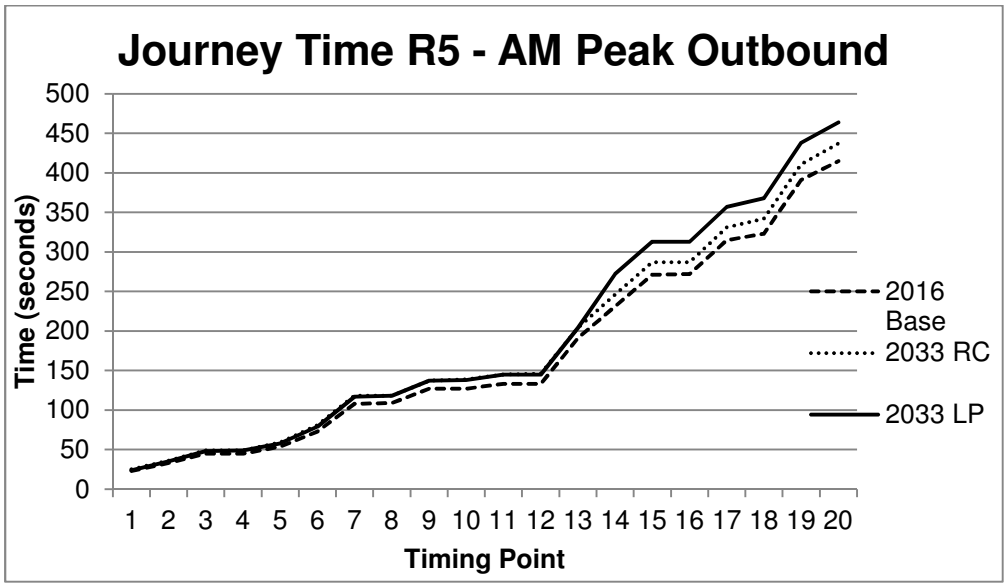
300
250
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Timing Point
2016 Base
2033 RC
2033 LP


Journey Time R5 - AM Peak Outbound
Time (seconds)
0
50
100
150
200
250
300
350
400
450
500
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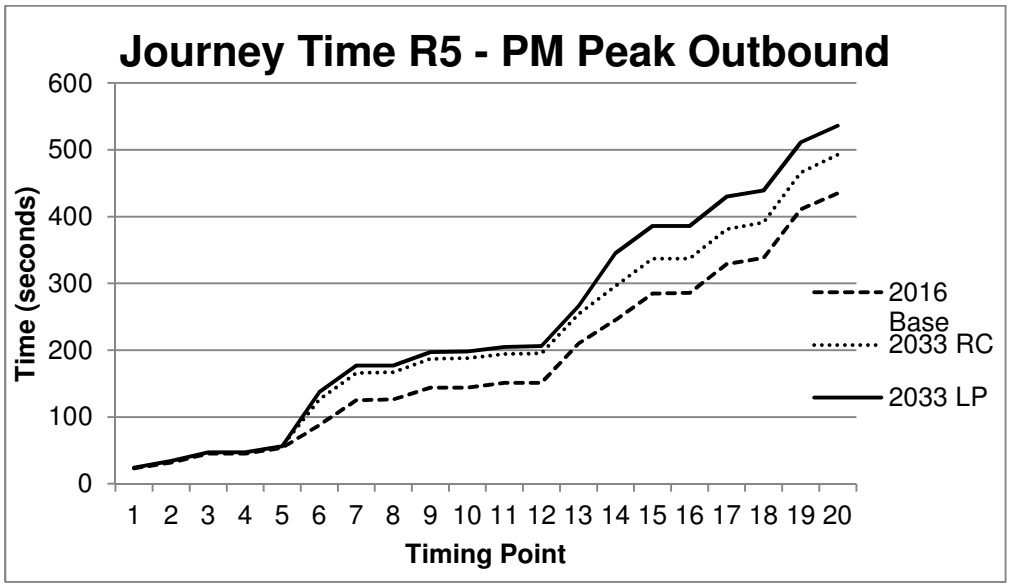
Timing Point
2016 Base
2033 RC
2033 LP


Journey Time R5 - PM Peak Outbound
Time (seconds)
0
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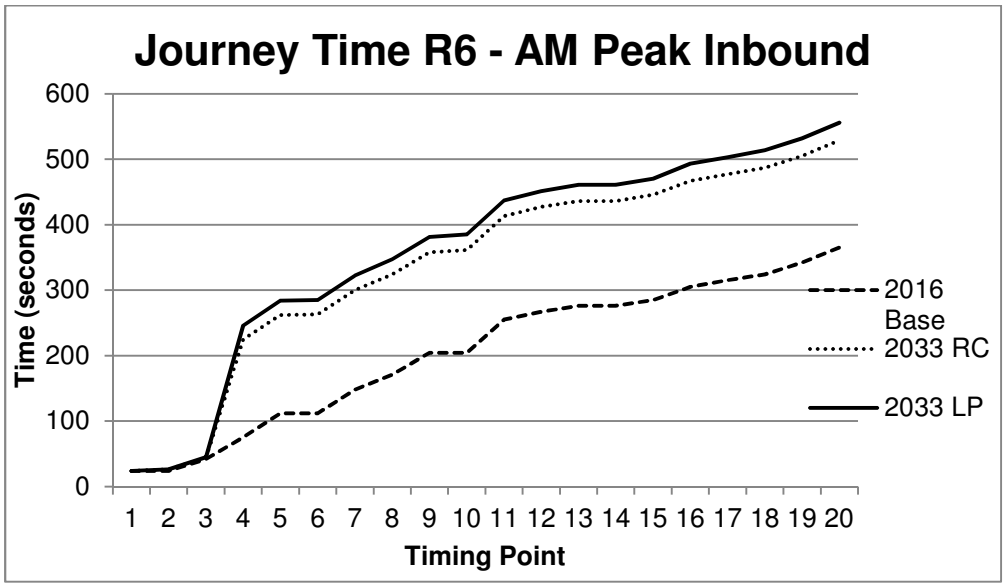
200
300
400
500
600
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Timing Point
2016 Base
2033 RC
2033 LP


Journey Time R6 - AM Peak Inbound
Time (seconds)
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500
400
300
200
100
0
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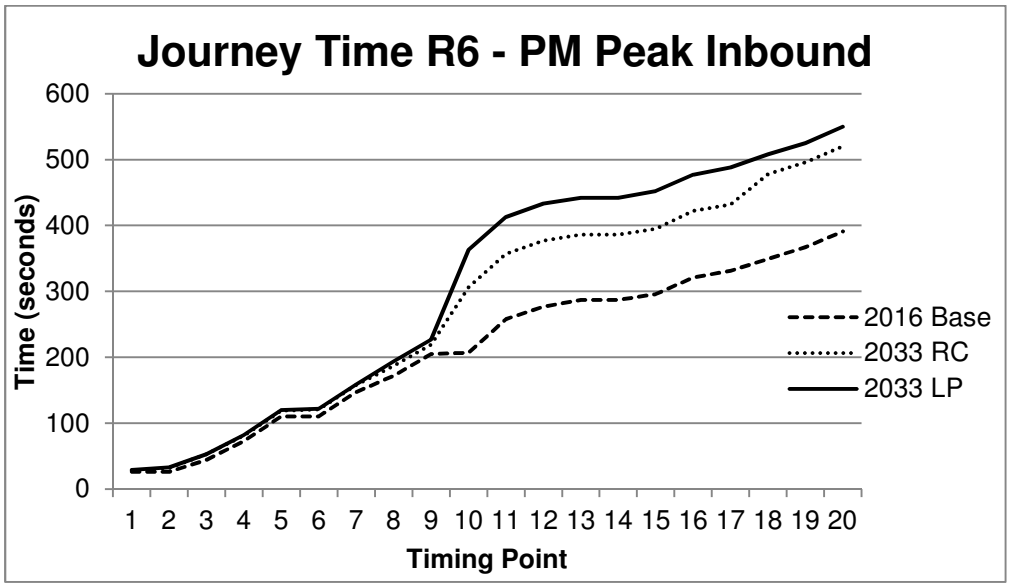
Timing Point
2016 Base
2033 RC
2033 LP


Journey Time R6 - PM Peak Inbound
Time (seconds)
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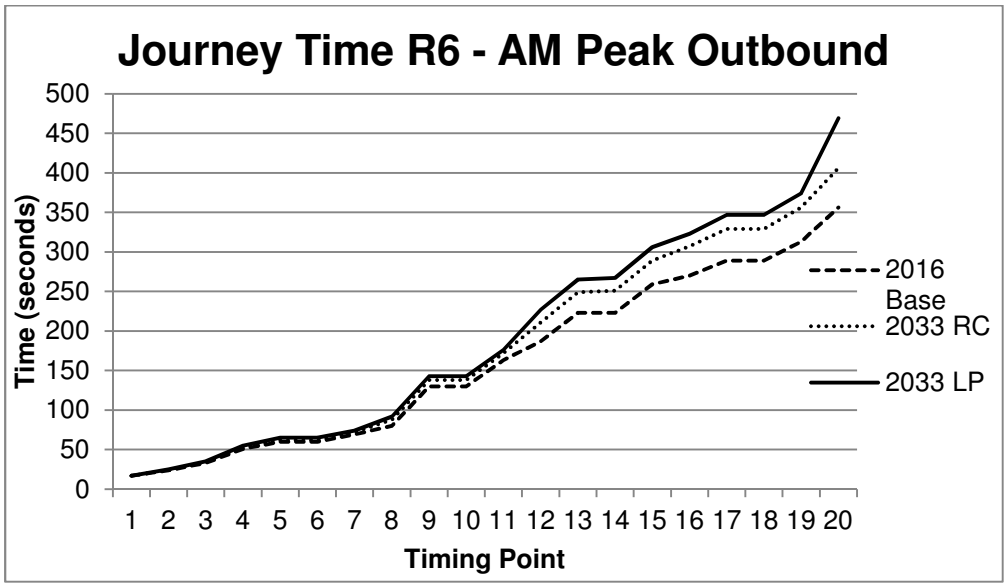
500
400
300
200
100
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Timing Point
2016 Base
2033 RC
2033 LP


Journey Time R6 - AM Peak Outbound
Time (seconds)
0
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100
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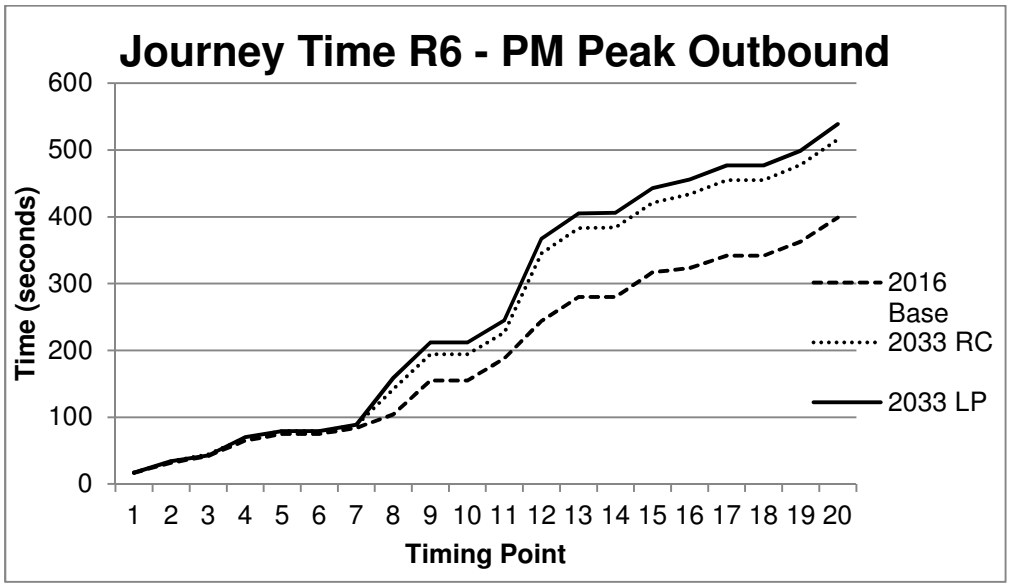
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Timing Point
2016 Base
2033 RC
2033 LP


Journey Time R6 - PM Peak Outbound
Time (seconds)
0
100
200
300
400
500
600
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Timing Point
2016 Base
2033 RC
2033 LP

APPENDIX D Local Plan Development Impacts

Residential (R) or Employment (E) Site?	MDC Site Reference	Site Description	Number of Houses / Development Area (ha)	Chesterfield Road / Debdale Lane	A60 Nottingham Road / Berry Hill Lane*	Carter Lane / Southwell Road / Windsor Road	A617 MARR / A6191 Southwell Road	A60 Leeming Lane / Peafield Lane	A60 Leeming Lane / A6075 Warsop Road	Kings Mill Road / Beck Lane / B6014 Skegby Lane / Mansfield Road	A6191 Ratcliffe Gate / A60 St Peters Way*	A6117 Old Mill Lane / B6030 Clipstone Road West	Sutton Road / Skegby Lane / Sheepbridge Lane*	A60 Leeming Lane / Old Mill Lane / Butt Lane*	A6191 Southwell Road / Oak Tree Lane / Adamsway	A60 Leeming Lane / New Mill Lane	A6075 Debdale Lane / Priory Road*	A6117 Oak Tree Lane / Eakring Road	A60 Nottingham Road / A611 Derby Road	A6191 Chesterfield Road / A617 MARR Pleasley	A60 Nottingham Road / Baums Lane / Park Lane	A6191 Southwell Road / Berry Hill Lane	A6191 / Bellamy Road*	A6009 Rosemary Street / A38 Stockwell Gate*	A60 Church Street / Wood Street, Warsop
		Scheme Cost Estimate (see Appendix B for Assumptions)		**£1,860,000**	**£10,000***	**£40,000**	**Developer Scheme**	**£3,310,000**	**£500,000**	**Developer Scheme**	**£5,000***	**£260,000**	**No Mitigation identified***	**£10,000***	**£40,000**	**£1,760,000**	**No Mitigation identified***	**£3,210,000**	**Developer Scheme**	**£3,340,000**	**£2,010,000**	**£5,000**	**£5,000***	**No Mitigation identified***	**£100,000**
		*** Limited mitigation measures identified. Further mitigation would require third party land.**																							
R	30	Land at Old Mill Lane / Stinting Lane	86					X	X			X		X		X									
R	31	Land at New Mill Lane	100					X	X			X		X		X									
R	53	Land between Old Mill Lane & New Mill Lane	153					X	X			X		X		X									
R	55	Tall Trees mobile homes Old Mill Lane	100					X	X			X		X		X									
R	52	Pleasley Hill Farm	660	X						X										X					
E	52	Pleasley Hill Farm	5.61	X						X										X					
R	76	Land off Jubilee Way	800									X			X			X							
E	76	Land off Jubilee Way	6.762									X			X			X							
R	1	Former Mansfield Brewery (part B)	23			X																			
R	6	Centenary Lane (phase 3)	93																						
R	7	Former Ravensdale Middle School	100									X													
R	8	Former Sherwood Hall School	94									X						X							
R	11	Bellamy Road Recreation Ground	64												X							X	X		
R	14	Land at Cox's Lane	14																						
R	19	Allotment site at Pump Hollow Road	64									X						X							
R	20	Land at Rosebrook Primary School	134	X																					

	Scheme Cost Estimate (see Appendix B for Assumptions) *** Limited mitigation measures identified. Further mitigation would require third party land.**		**£1,860,000**	**£10,000***	**£40,000**	**Developer Scheme**	**£3,310,000**	**£500,000**	**Developer Scheme**	**£5,000***	**£260,000**	**No Mitigation identified***	**£10,000***	**£40,000**	**£1,760,000**	**No Mitigation identified***	**£3,210,000**	**Developer Scheme**	**£3,340,000**	**£2,010,000**	**£5,000**	**£5,000***	**No Mitigation identified***	**£100,000**
Residential (R) or Employment (E) Site?	**MDC Site Reference**	**Site Description**	**Number of Houses / Development Area (ha)**	Chesterfield Road / Debdale Lane	A60 Nottingham Road / Berry Hill Lane*	Carter Lane / Southwell Road / Windsor Road	A617 MARR / A6191 Southwell Road	A60 Leeming Lane / Peafield Lane	A60 Leeming Lane / A6075 Warsop Road	Kings Mill Road / Beck Lane / B6014 Skegby Lane / Mansfield Road	A6191 Ratcliffe Gate / A60 St Peters Way*	A6117 Old Mill Lane / B6030 Clipstone Road West	Sutton Road / Skegby Lane / Sheepbridge Lane*	A60 Leeming Lane / Old Mill Lane / Butt Lane*	A6191 Southwell Road / Oak Tree Lane / Adamsway	A60 Leeming Lane / New Mill Lane	A6075 Debdale Lane / Priory Road*	A6117 Oak Tree Lane / Eakring Road	A60 Nottingham Road / A611 Derby Road	A6191 Chesterfield Road / A617 MARR Pleasley	A60 Nottingham Road / Baums Lane / Park Lane	A6191 Southwell Road / Berry Hill Lane	A6191 / Bellamy Road*	A6009 Rosemary Street / A38 Stockwell Gate*	A60 Church Street / Wood Street, Warsop
R	23	Sandy Lane	63																					
R	24	Sherwood Close	32																					
R	25	Ladybrook Lane / Tuckers Lane	33																					
R	26	Land at Windmill Lane (former nursery)	23																					
R	28	Debdale Lane / Emerald Close	32	X												X								
R	29	Sherwood Rise (adjacent Queen Elizabeth Academy)	87	X												X								
R	33	Wood Lane (Miners Welfare)	31																					X
R	34	Land at Sherwood Street / Oakfield Lane	36																					X
R	35	Stonebridge Lane / Sookholme Lane	200					X	X				X		X									
R	36	Sookholme Lane / Sookholme Drive	200					X	X				X		X									
E	37	Land at Bellamy Road Industrial Estate	1.87											X								X	X	
E	38	Ransom Woods Business Park (north of NHS Offices)	2.07											X								X	X	
E	40	Land at Ratcher Hill Quarry (south west)	0.75											X								X	X	
E	43	Oakfield Lane (land adjacent recycling depot)	1.2																					X
R	46	Land at Debdale Lane, Burlington Drive.	157													X								
R	51	Land off Netherfield Lane	120																					X

Residential (R) or Employment (E) Site?	MDC Site Reference	Site Description	Number of Houses / Development Area (ha)	Chesterfield Road / Debdale Lane	A60 Nottingham Road / Berry Hill Lane*	Carter Lane / Southwell Road / Windsor Road	A617 MARR / A6191 Southwell Road	A60 Leeming Lane / Peafield Lane	A60 Leeming Lane / A6075 Warsop Road	Kings Mill Road / Beck Lane / B6014 Skegby Lane / Mansfield Road	A6191 Ratcliffe Gate / A60 St Peters Way*	A6117 Old Mill Lane / B6030 Clipstone Road West	Sutton Road / Skegby Lane / Sheepbridge Lane*	A60 Leeming Lane / Old Mill Lane / Butt Lane*	A6191 Southwell Road / Oak Tree Lane / Adamsway	A60 Leeming Lane / New Mill Lane	A6075 Debdale Lane / Priory Road*	A6117 Oak Tree Lane / Eakring Road	A60 Nottingham Road / A611 Derby Road	A6191 Chesterfield Road / A617 MARR Pleasley	A60 Nottingham Road / Baums Lane / Park Lane	A6191 Southwell Road / Berry Hill Lane	A6191 / Bellamy Road*	A6009 Rosemary Street / A38 Stockwell Gate*	A60 Church Street / Wood Street, Warsop
Scheme Cost Estimate (see Appendix B for Assumptions)				**£1,860,000**	**£10,000***	**£40,000**	**Developer Scheme**	**£3,310,000**	**£500,000**	**Developer Scheme**	**£5,000***	**£260,000**	**No Mitigation identified***	**£10,000***	**£40,000**	**£1,760,000**	**No Mitigation identified***	**£3,210,000**	**Developer Scheme**	**£3,340,000**	**£2,010,000**	**£5,000**	**£5,000***	**No Mitigation identified***	**£100,000**
*** Limited mitigation measures identified. Further mitigation would require third party land.**																									
R	54	Former Evans Halshaw site	66																						
R	57	Land off Mansfield Road, Spion Kop (adj The Gables)	8																						X
R	58	Fields Farm, Abbott Road	200							X			X												
R	59	Land to the rear of High Oakham Hill	39		X																				
R	60	Land off Ley Lane	14																						
E	63	Land at Oakfield Lane	1.09																						X
R	64	Pheasant Hill and Highfield Close	98	X													X								
R	68	Kirkland Avenue Industrial Park	20									X													
R	73	Three Thorn Hollow Farm	188				X																		
R	75	Former Mansfield Hosiery Mill Car Park	29									X													
R	89	Land off Skegby Lane	215							X			X												
R	91	Strip of land off Cauldwell Road (opposite the College)	42		X														X						
E	127	Former bus station site	1.5775																					X	
E	139	Frontage to Ransom Wood Business Park	0.175												X							X	X		
E	141	Oakham Business Park (Site A)	0.17										X												
E	142	Oakham Business Park (Site B)	0.22										X												
E	143	Crown Farm Industrial Estate (Site A)	2.77															X							

	Scheme Cost Estimate (see Appendix B for Assumptions) *** Limited mitigation measures identified. Further mitigation would require third party land.**		**£1,860,000**	**£10,000***	**£40,000**	**Developer Scheme**	**£3,310,000**	**£500,000**	**Developer Scheme**	**£5,000***	**£260,000**	**No Mitigation identified***	**£10,000***	**£40,000**	**£1,760,000**	**No Mitigation identified***	**£3,210,000**	**Developer Scheme**	**£3,340,000**	**£2,010,000**	**£5,000**	**£5,000***	**No Mitigation identified***	**£100,000**
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E	145	Sherwood Business Park (Site A)	0.51												X							X	X		
E	146	Sherwood Business Park (Site B)	0.27												X							X	X		
E	148	Millennium Business Park (Site A)	0.32	X																X					
E	150	Ratcher Hill Quarry	3.416												X							X	X		
R	170	Land off Wharmby Avenue	125	X																X					
R	182	Oak Garage	9																						X
R	183	Adj 188, Southwell Road East.	8				X																		
R	185	52, Ratcliffe Gate	9			X																			
E	187	Land forming part of Peafield Farm	10.064					X	X					X		X									
R	189	Land at Holly Road	16																						
R	27a	Land at Redruth Drive	99												X							X	X		
R	27b	Land off Sherwood Oaks Close	46												X							X	X		
E	27c	Land South of Sherwood Avenue	2.82												X							X	X		
E	71a	Site A, Long Stoop Way	1.596															X							
E	71c	Site C, Long Stoop Way	0.42															X							
R	74c	Water Lane	139							X										X					
E	74c	Water Lane	0.8176	X						X										X					

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