PRTM: Charnwood Local Plan

Base Year Model Review

Quality Information

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Revision History

Revision	Revision date	Details	Authorised	Name	Position
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Section 1 – Overview

1.1 Introduction

1.1.1 Charnwood Borough Council (CBC) is currently in the process of producing a new Local Plan that covers a 15-year timescale to 2036. This will build on the existing Core Strategy for the borough which covers the period from 2011 to 2028. The draft Local Plan sets out a need for:

- a total of 18,394 new homes over the period from 2019 to 2036 (including the 13,940 new homes adopted in the existing Core Strategy from 2011 to 2028); and
- no additional commitments for employment land over and above the existing commitments contained in the Core Strategy.

1.1.2 AECOM has been commissioned by Leicestershire County Council (LCC) to undertake a strategic assessment of the new Local Plan using the Pan-Regional Transport Model (PRTM), which is an extension of the Leicester and Leicestershire Integrated Transport Model (LLITM 2014).

1.1.3 This Base Year Model Review will assess the performance of the base year highway model contained within the PRTM and assess the suitability of the model to assess the proposed growth defined in the new Charnwood Local Plan. The base year highway model represents an average weekday during April, May, June 2014 and the following three time periods:

- the AM Peak hour between 08:00 and 09:00;
- an average interpeak hour between 10:00 and 16:00; and
- the PM Peak hour between 17:00 and 18:00.

1.1.4 The review will focus on the following tasks:

- a high-level review within the Study Area seeking to identify outliers in the base year network coding, such as the application of link lengths, speed-flow curves / fixed cruise speeds and junction saturation flows;
- a detailed review of a limited subset of the network coding considered to be central to the assessment and defined through discussion with the client; and
- a review of the base year highway model performance against observed flows and journey times within the Study Area.

1.1.5 For the purposes of this review a Study Area needs to be defined. This has been defined to capture locations likely to be affected by the proposed growth and / or potential mitigation measures in Charnwood, including along the Strategic Road Network. The Study Area has been based on the Charnwood Borough boundary and locations within 10 kilometres of the borough. Figure 1.1 shows the location of the Study Area and the Charnwood Borough boundary.

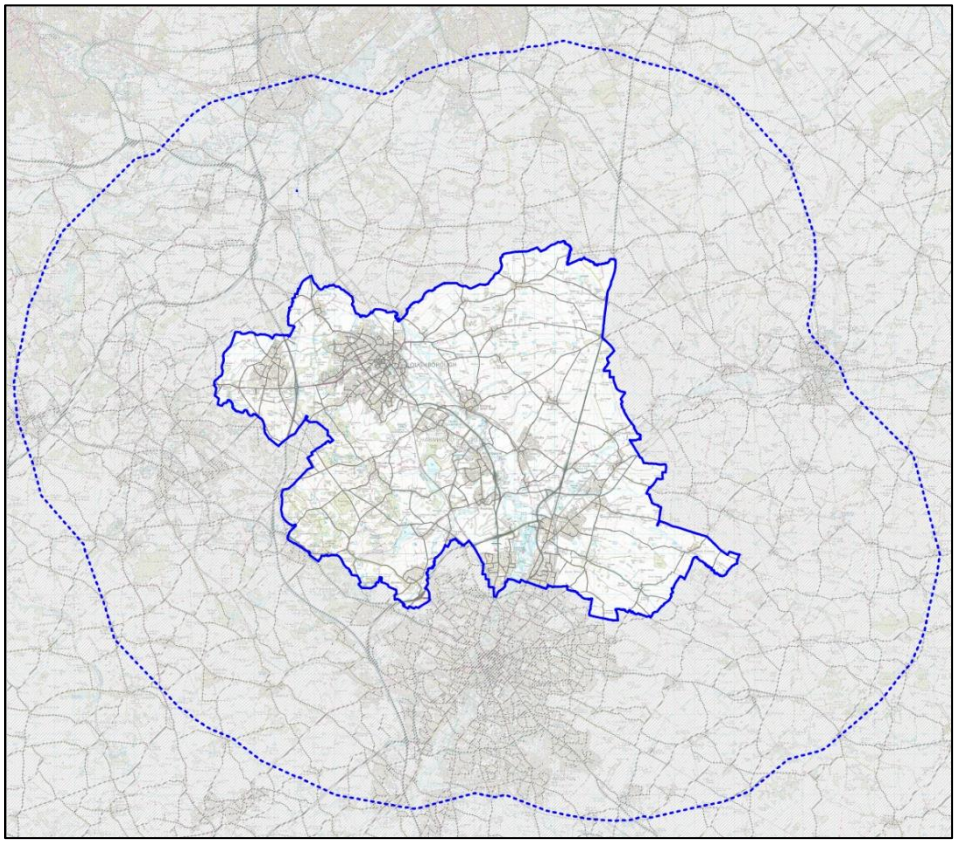

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Figure 1.1: Study Area and Charnwood Borough Boundaries

1.2 Report Structure

1.2.1 In addition to this introduction, this report contains the following sections:

- Section 2 – High-Level Review: this section details the high-level review of a range of network attributes across the defined Study Area in order to identify outliers in the base year network coding.
- Section 3 – Detailed Highway Network Review: this section details the detailed network review for key roads and junctions within the Study Area to verify that the base year coding corresponds with the standards set out in the adopted coding manual.
- Section 4 – Model Performance Review: this section provides a summary of the performance of the base year model against observed data for the screenlines, individual count locations and journey time routes within the Study Area.
- Section 5 – Summary of Findings: this section provides a summary of the base year model review undertaken for the assessment of the new Charnwood Local Plan.

Section 2 – High-Level Review

2.1 Introduction

2.1.1 Given the size of the defined Study Area, it is not practicable to undertake a detailed review of the highway model across the Study Area. Therefore, a proportional approach has been adopted which undertakes a high-level review of the base year highway model within the Study Area and is supplemented by a more detailed review of key routes within the Study Area (discussed in Section 3).

2.2 Overview of Model Zoning

2.2.1 The PRTM zone system is of a level of detail commensurate with the detail of the transport network, with a total of 1,478 geographical zones, and an additional 56 unallocated 'development zones' for use in forecasting. Figure 2.1 shows the adopted zone system within Charnwood. This shows that there is a significant level of zonal detail in the borough and the surrounding areas, with a total of 185 zones within Charnwood and around 830 model zones within the wider Study Area.

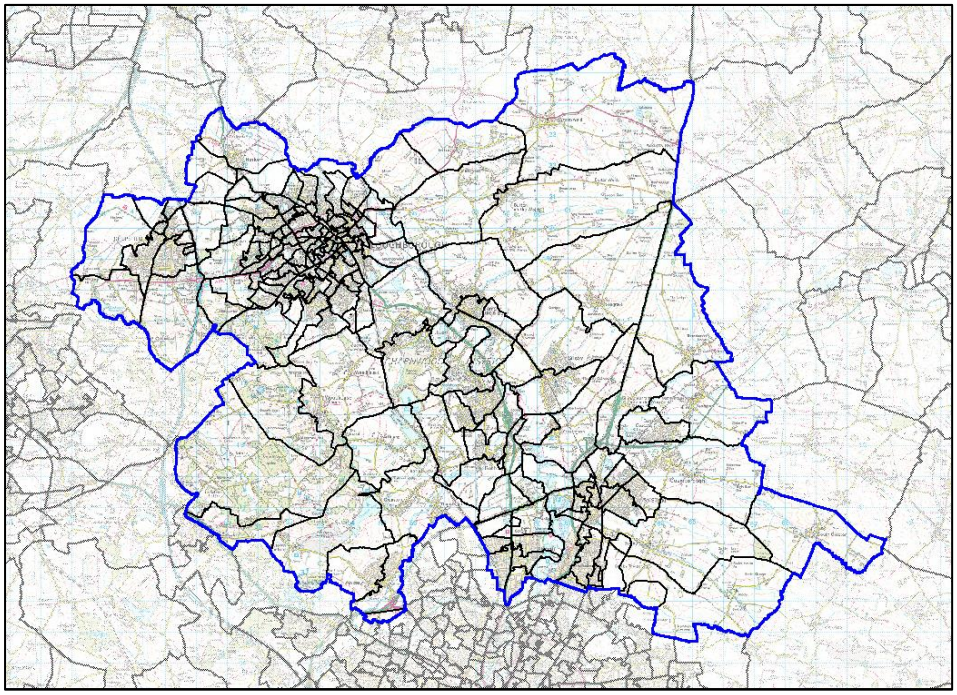

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Figure 2.1: PRTM Zone System, Charnwood

2.2.2 This level of model zoning is appropriate both within Charnwood and in the wider Study Area for the assessment of the new Local Plan. There may be proposed developments within the new Local Plan which represent a step-change in land-use within a given area (such as a greenfield development) and / or where the traffic associated with the proposed development is required to be isolated within the analysis of the model forecasts.

2.2.3 In these circumstances the use of some of the 56 spare development zones will be considered to represent these developments. These development zones include no travel demand in the base year and can be located throughout the model to represent proposed future year developments.

2.3 Review of Network Coding

2.3.1 As part of the base year network coding, multiple attributes have been defined within the PRTM highway network. These include the link length, road type, road classification, the number of lanes, whether a fixed or variable speed is applied, and the standard of each junction represented in the model.

2.3.2 These attributes have been reviewed against online data sources (such as Google Maps) to ensure the base year highway model coding is consistent with highway network within the Study Area. From these high-level checks, any outliers which may suggest an error in the base year network coding have been reviewed.

2.3.3 The first stage of the high-level review of the base year network coding is a review of the coded link lengths within the model. These coded link lengths for links within the Study Area have been compared with the link length calculated from the length of each link within GIS software. The results of this comparison are shown in Figure 2.2. This shows that there is a strong correlation between the coded and recalculated link lengths within the base year highway model.

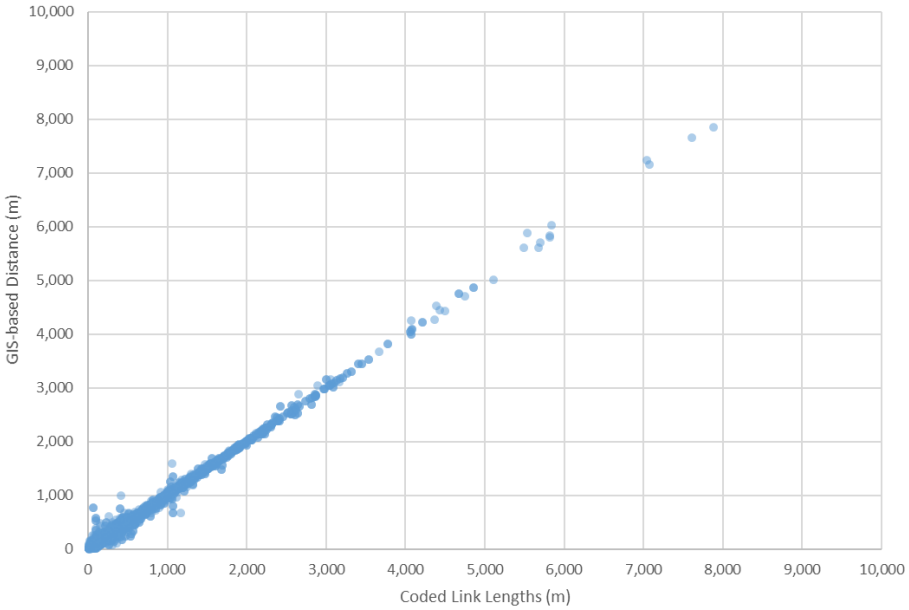

Figure 2.2: Comparison of Coded and GIS-based Link Lengths, Study Area, All Link Lengths

2.3.4 Figure 2.3 provides the same analysis of coded link lengths within the defined Study Area but focusses on links of up to 2 kilometres in length. Some differences between the coded and recalculated link lengths are shown within this analysis, and these differences have been investigated. This analysis relies on the accuracy of both the coded base year coordinates and the shaping of the network links. Where significant discrepancies between the coded and GIS-based link lengths were identified, these were found to be due to the defined node coordinates and / or link shaping, and that the coded base year distances were accurate.

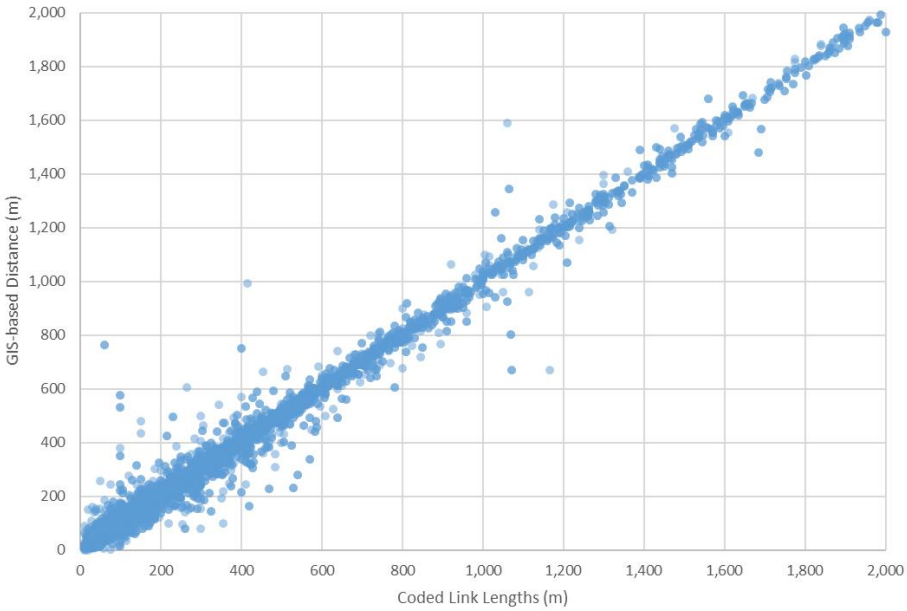

Figure 2.3: Comparison of Coded and GIS-based Link Lengths, Study Area, up to 2kms

2.3.5 Figure 2.4 and Figure 2.5 show the coded road type and location classifications across the Study Area and within Charnwood respectively. Within the PRTM highway network links are classified by their road type (motorway, A-road, or other) and their location (Leicester City, Leicestershire market town, or rural). These figures have been reviewed and no outliers in terms of the application of road type and location within the Study Area have been identified.

2.3.6 In addition to the road type and location classification, the coded base year network includes another measure of link type. This is link type, defined as urban, suburban, interurban and motorway, and figures showing the allocation of this attribute are shown in Figure 2.6 and Figure 2.7 for the Study Area and Charnwood respectively. As with the analysis of road type and location classification, the analysis of link type definitions in the base year model has not identified any outliers in the base year network coding.

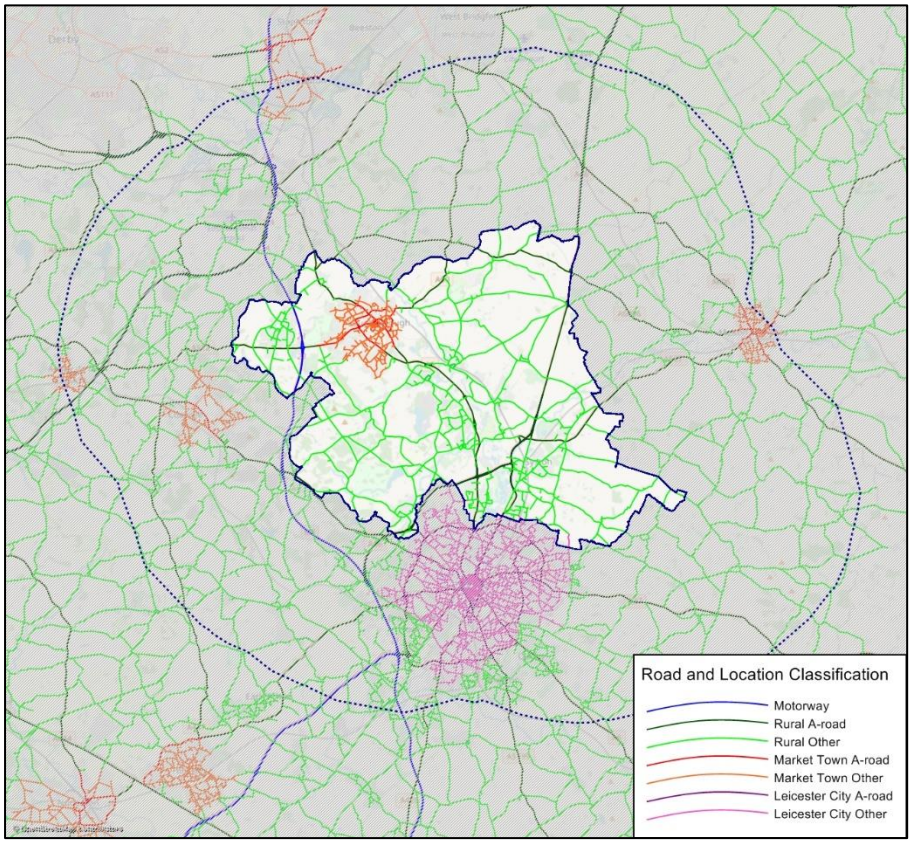

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Figure 2.4: Road Type and Location Classification, Study Area

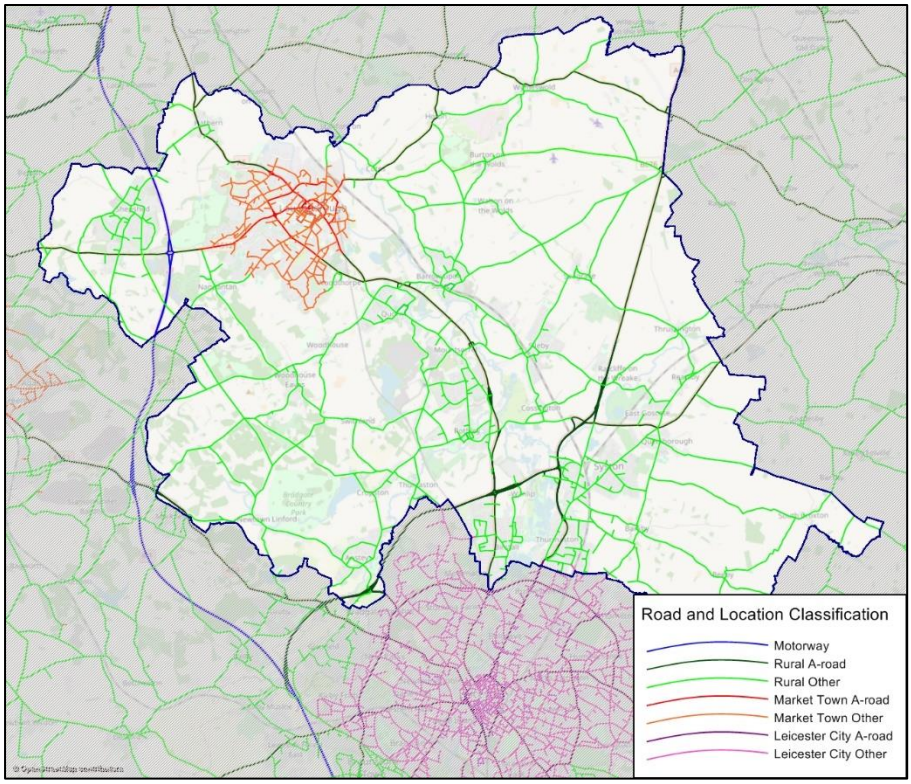

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Figure 2.5: Road Type and Location Classification, Charnwood

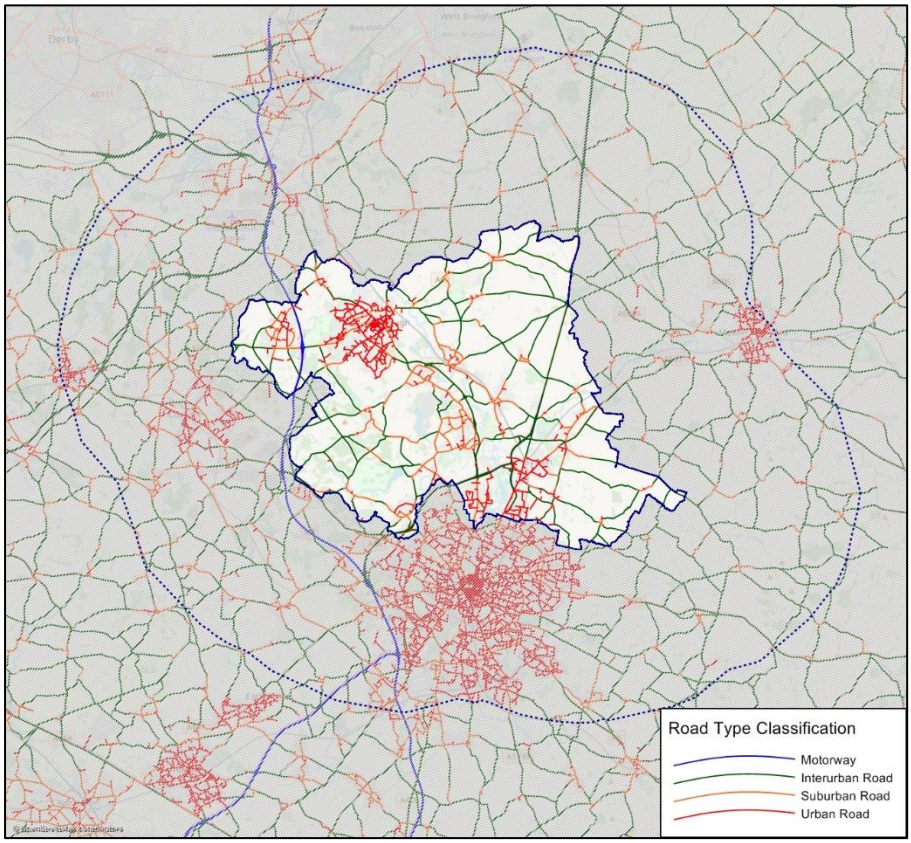

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Figure 2.6: Link Type Classification, Study Area

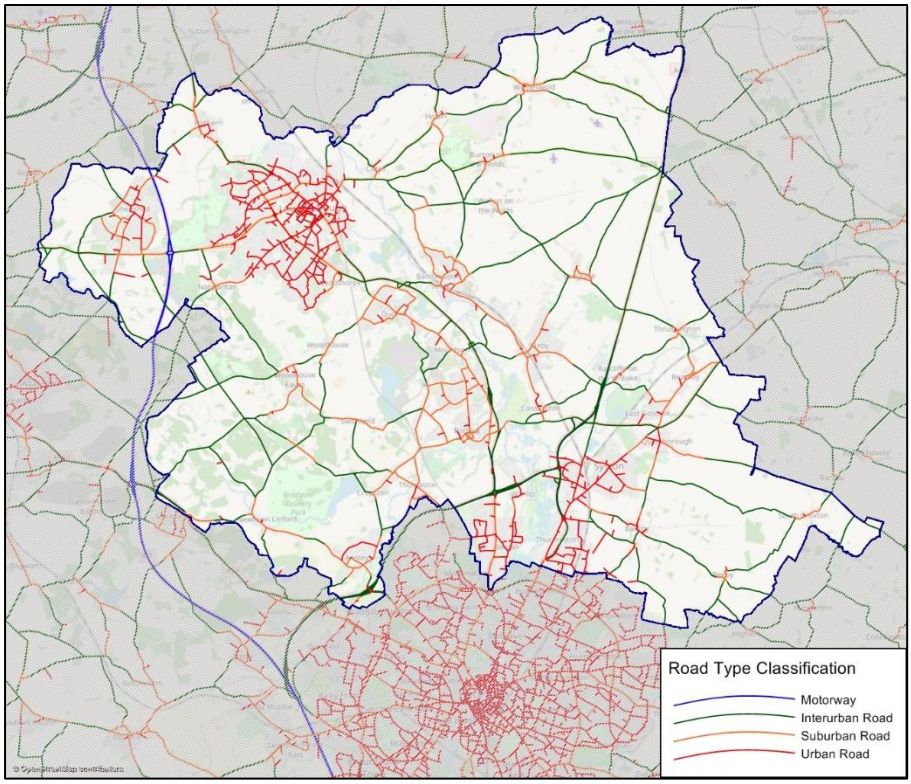

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Figure 2.7: Link Type Classification, Charnwood

2.3.7 Figure 2.8 and Figure 2.9 show the coded number of lanes within the 2014 bae year highway network. This analysis of the coded number of lanes closely aligns with the analysis of road type. Key interurban routes (such as the M1, A46 and A6) are coded with more than one lane, with most urban and minor, rural routes coded with a single lane.

2.3.8 A high-level review of the number of lanes coded within the highway network has highlighted one link where the incorrect number of lanes has been applied. This is located on the gyratory of the A6 / A46 Birstall Interchange junction and is discussed further in Section 3.

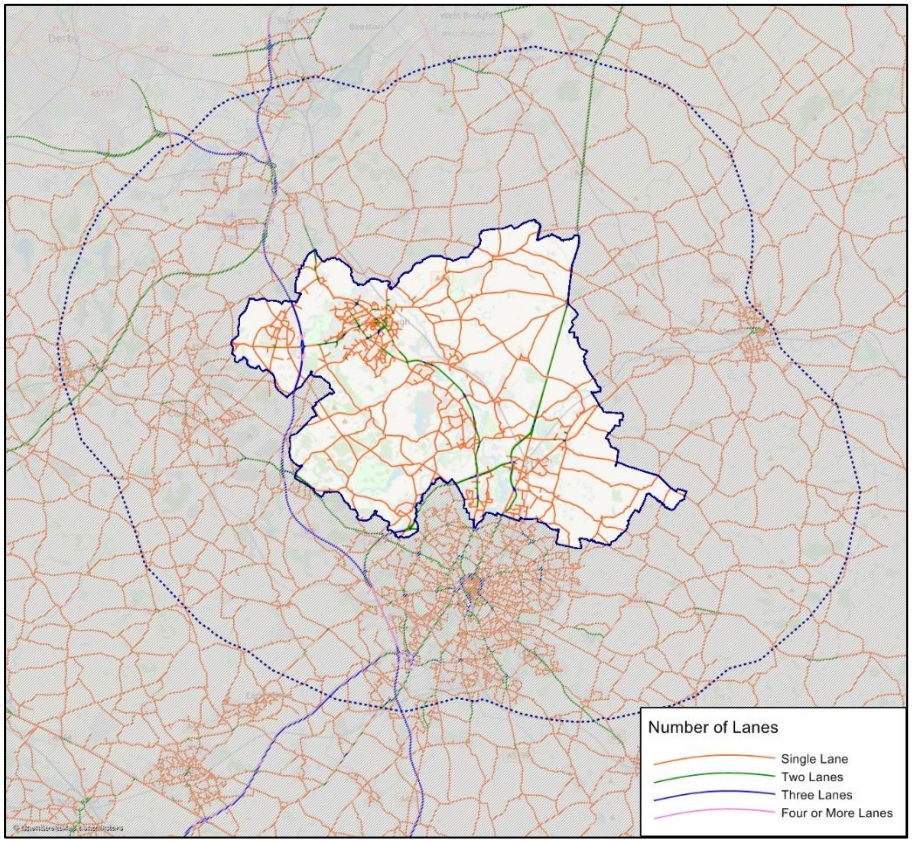

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Figure 2.8: Coded Number of Lanes, Study Area

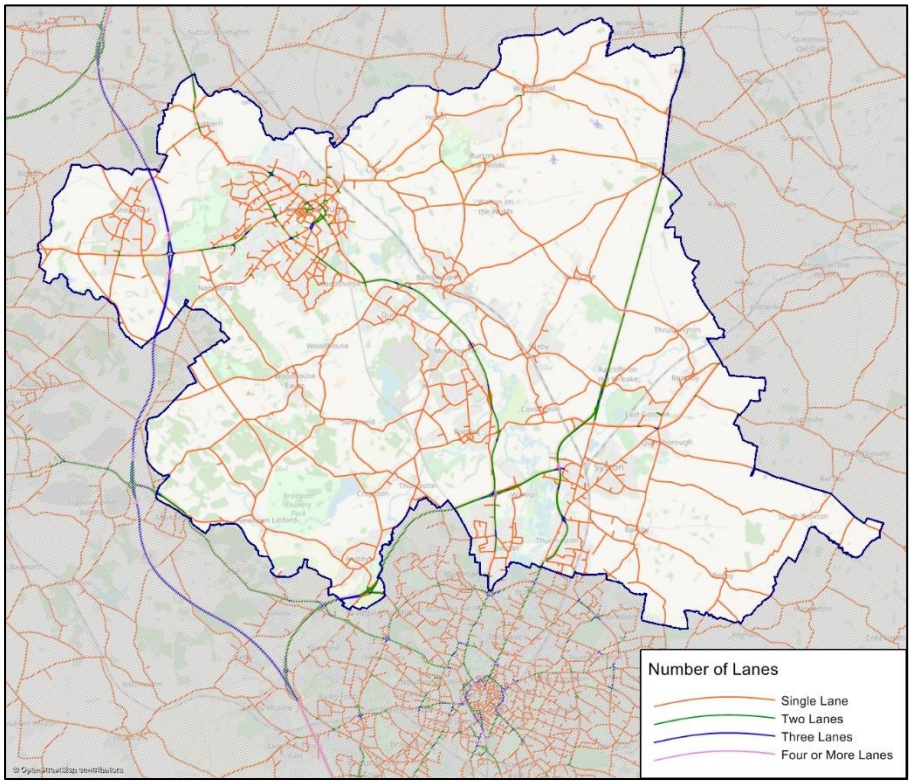

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Figure 2.9: Coded Number of Lanes, Charnwood

2.3.9 When coding the highway network there is a choice of using a fixed cruise speed for a link or a variable speed-flow curve where the speed on the link is a function of the modelled flow on the link. In general, fixed cruise speeds are applied where most delay along a route is attributable to junctions, whereas speed-flow curves are applied along routes where delay is largely due to the weight of traffic. This broadly equates to fixed cruise speeds being applied within urban areas and speed-flow curves applied on interurban routes.

2.3.10 Figure 2.10 and Figure 2.11 show the application of fixed cruise speeds and speed-flow curves within the Study Area and within Charnwood respectively. This shows that fixed cruise speeds are applied within urban areas and on zone connectors within the Study Area. There are a limited number of key routes within both Loughborough and Leicester City urban areas where speed-flow curves have been applied, with interurban routes coded with speed-flow curves.

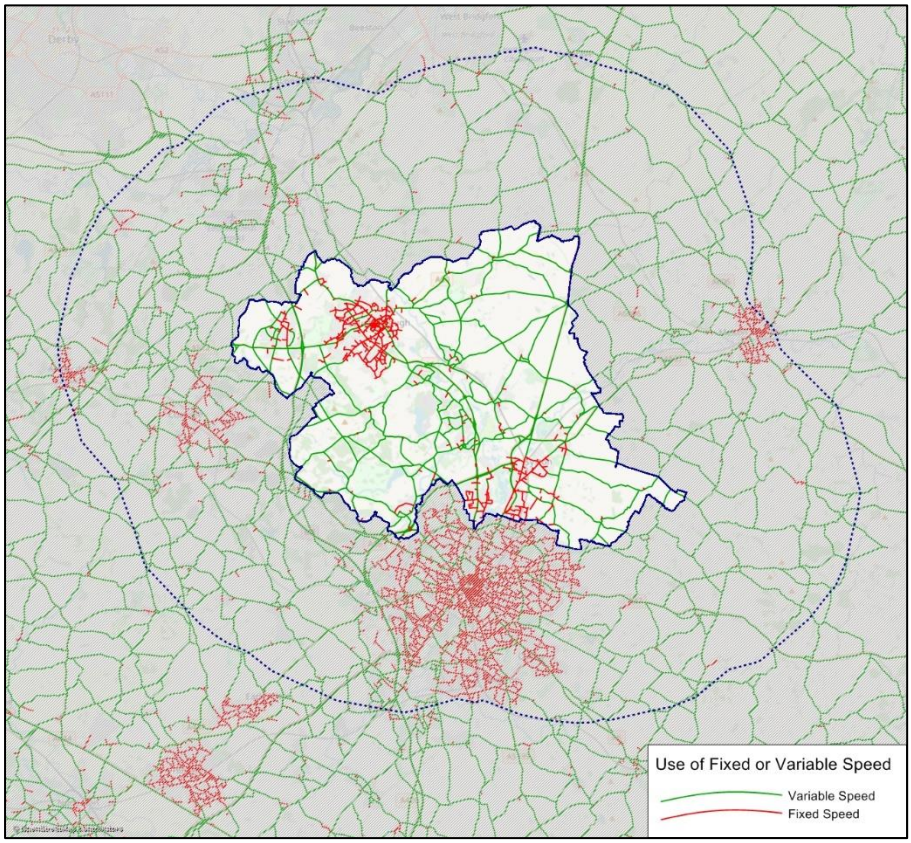

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Figure 2.10: Application of Fixed Cruise Speeds and Speed-flow Curves, Study Area

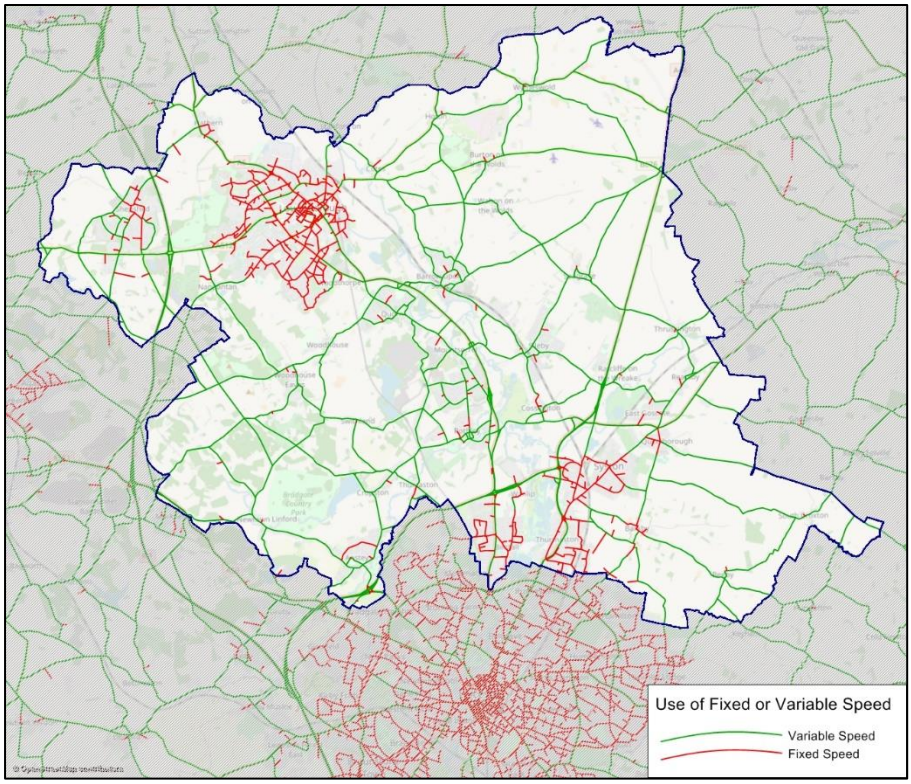

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Figure 2.11: Application of Fixed Cruise Speeds and Speed-flow Curves, Charnwood

2.3.11 As part of the coding of junctions within the base year highway network the standard of priority and signalised junctions is considered. For these two junction types, three standards are defined: 'tight'; 'average'; and 'wide'. These definitions relate to the turning radius of each junction, but in general 'tight' junctions are located within dense urban areas and 'wide' junctions are located in rural areas and / or along key strategic routes. (Roundabouts are modelled using a different set of assumptions, based on the number of lanes and the presence of a flare on each approach.)

2.3.12 Figure 2.12 and Figure 2.13 show the application of these three junction standards for priority and signalised junctions within the Study Area and within Charnwood respectively. These figures show that, in general, 'tight' junctions are located within the urban areas (for example, Loughborough, Syston and Barrow upon Soar) and 'wide' junctions are located along the key strategic routes such as the M1 and A46.

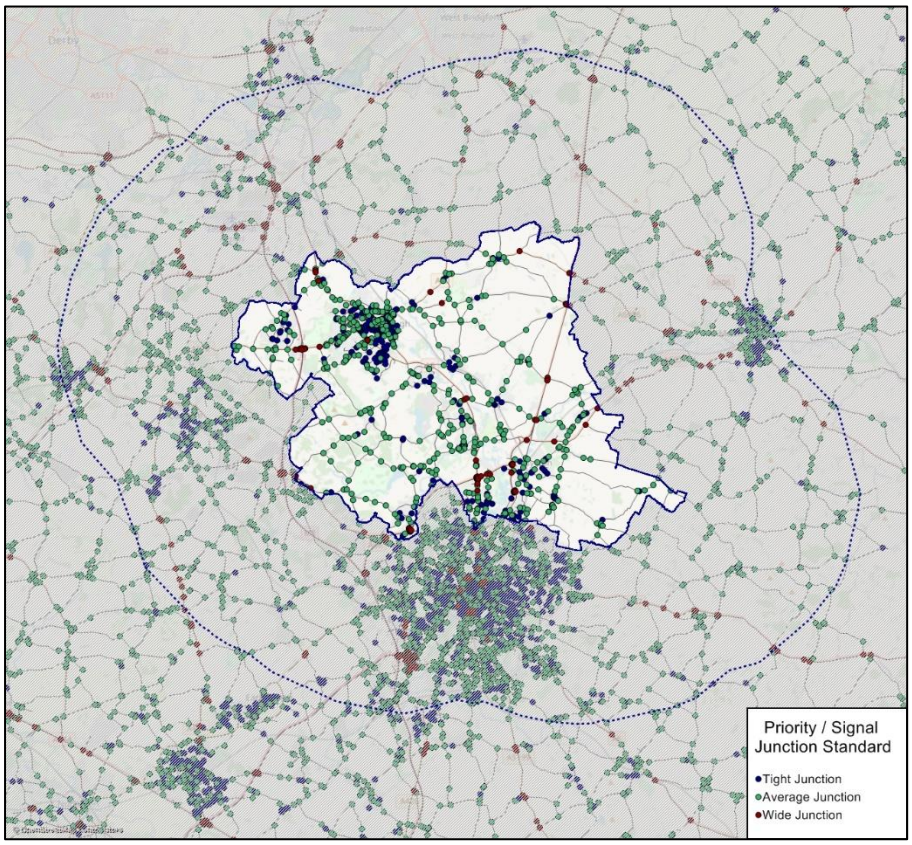

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Figure 2.12: Application of Priority / Signalised Junction Standards, Study Area

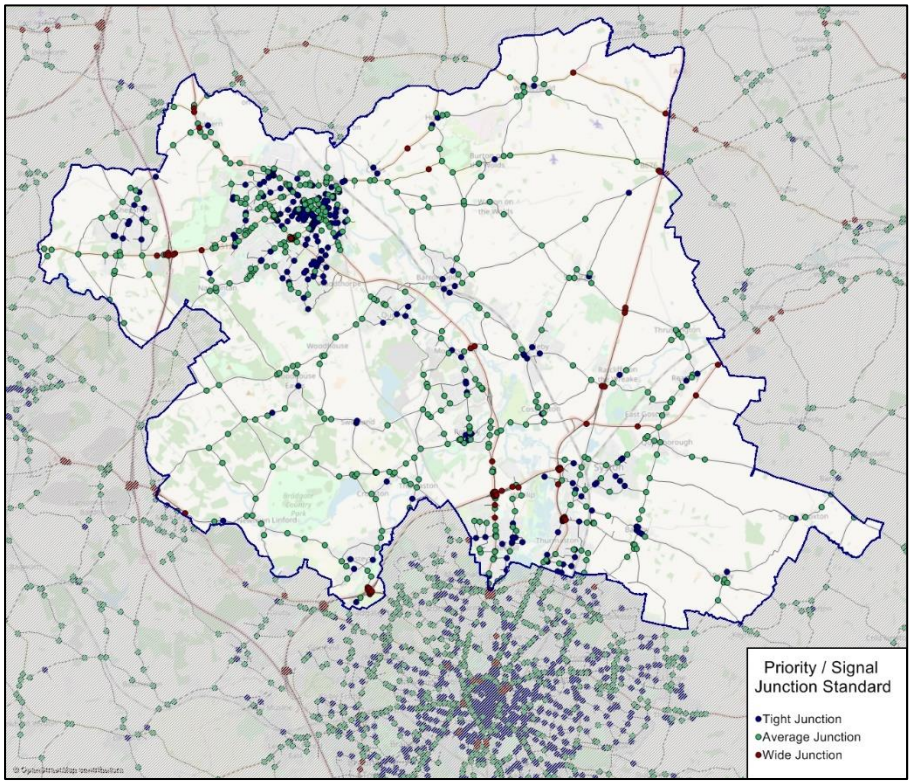

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Figure 2.13: Application of Priority / Signalised Junction Standards, Charnwood

2.4 High-Level Review of Base Year Highway Network Flows and Delays

2.4.1 In addition to the high-level review of the network coding, a high-level review of traffic volumes and delays has been undertaken. A more detailed review of the performance of the base year flows and delays against observed traffic counts and journey times is given in Section 4; however, this section summarises the general pattern of traffic and delays in the base year highway models.

2.4.2 Figure 2.14 shows the assigned traffic volumes in the 2014 base year model in the AM Peak hour, interpeak hour and PM Peak hour for the Study Area as a whole and within Charnwood. These figures show that the largest modelled flows are along the key strategic routes in both the Study Area and within Charnwood, namely the M1 and A46 within or in the vicinity of Charnwood. Below these two key strategic routes, the modelled flows are highest along the A6 between Loughborough and Leicester City, and along key arterial routes within both Loughborough and Leicester City urban areas.

2.4.3 In addition to figures showing the location of modelled traffic flows in the base year, Figure 2.15 shows the location of modelled junction delays within both the Study Area and within Charnwood. In general, the location of larger modelled junction delays aligns with known areas of congestion within urban areas such as within Loughborough town centre, the A512 to the south of Shepshed, and a number of locations within Leicester city centre and along key arterial routes.

2.4.4 One junction delay worth noting is the high modelled delay to the east of Syston at the junction between Queniborough Road and Barkby Road. This junction is a four-arm signalised junction, although only three of the arms are represented within the PRTM highway network. Delays at this junction are modelled for the northbound Queniborough Road approach and Barkby Road, and these modelled delays vary between around one and two minutes depending on the time of day.

2.4.5 A review of the coding at this location has not highlighted any issues with the assumptions adopted at this location, and the signal timings data for this location have been provided by LCC as part of the observed signal timing data for the development of the PRTM. Given the proximity of this signalised junction to proposed developments to the east of Syston, it is recommended that the performance of this junction is reviewed within the model forecasts and adjustments made to the signal timings to minimise any excessive delays at this location.

AM Peak Hour

Interpeak Hour

PM Peak Hour

Study Area

Charnwood

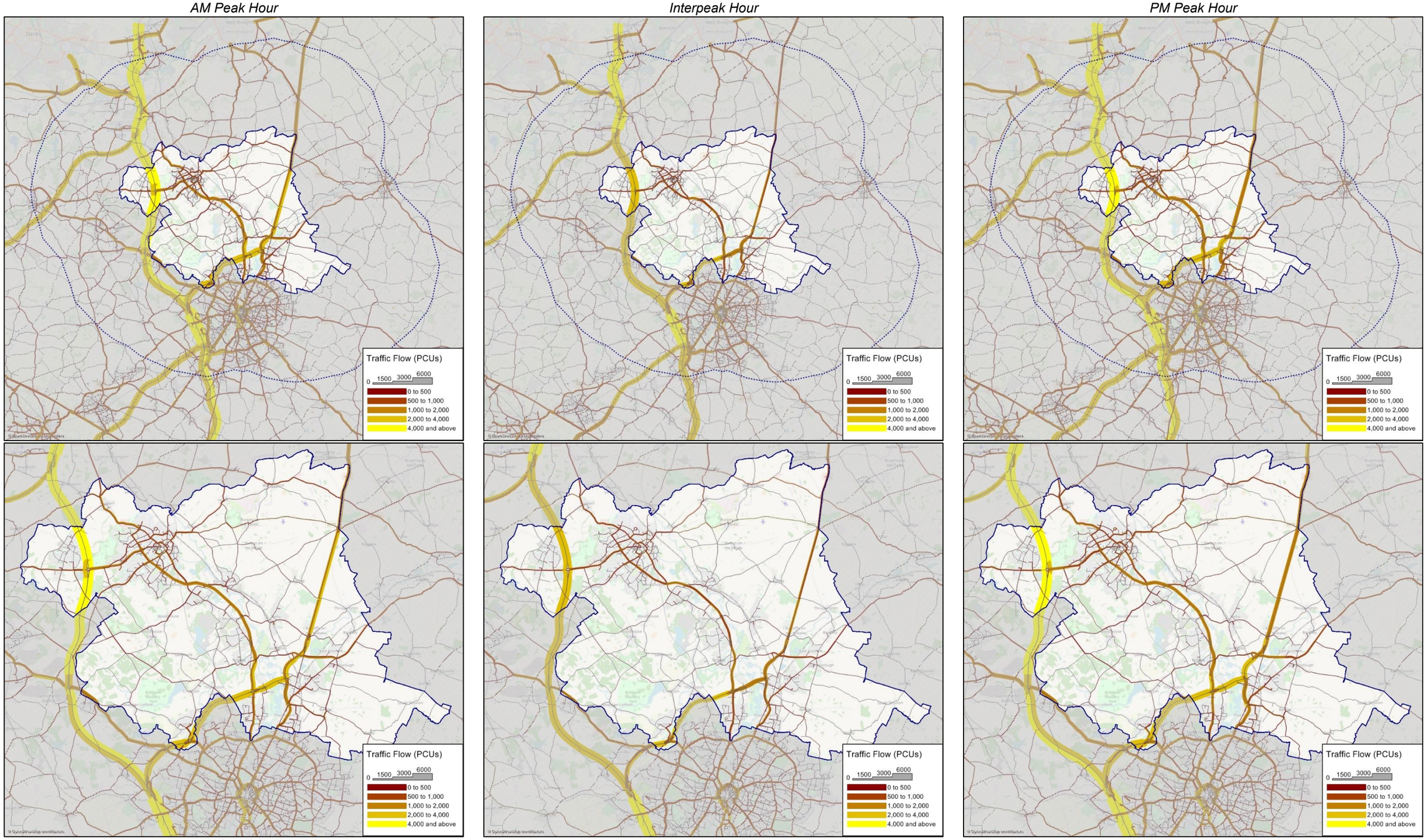

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Figure 2.14: Base Year Assigned Traffic Volumes by Modelled Hour

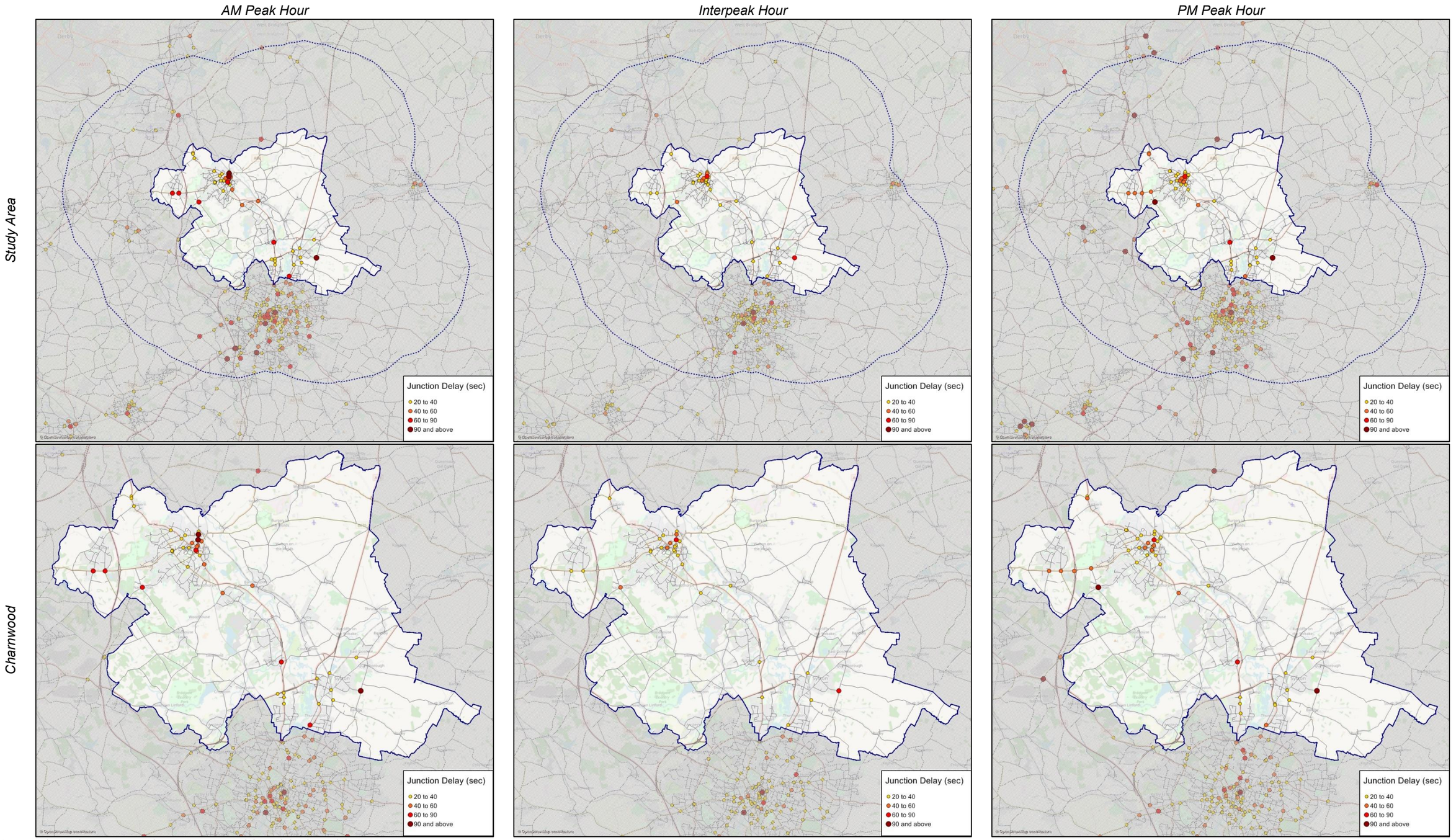

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Figure 2.15: Base Year Modelled Junction Delays by Modelled Hour

Section 3 – Detailed Highway Network Review

3.1 Introduction

3.1.1 In addition to the high-level network checks detailed in Section 2, this section details the outcome of a more detailed review of the highway network coding for a limited number of routes in the network. The routes selected for this detailed coding review were those discussed during the Inception Meeting for this assessment and are:

- the M1 between, and including, Junction 21 and Junction 23a;
- the A46 from M1 Junction 21a to the A606 between Nottingham and Melton Mowbray; and
- the A6 from the A46 to the M1.

3.1.2 The network coding for these routes and junctions has been reviewed against the standards set out in the PRTM coding manual and aerial photography of the routes and junctions available through Google Maps. The link and junction properties considered in this review include the coded link length, junction type, number of lanes, flare coding, saturation flows, speed-flow curves and signal stage timings.

3.2 Detailed Network Review Findings

3.2.1 As part of the detailed network coding review of these three routes, the majority of network coding was found to be in-line with the adopted coding standards and information on the highway network available from Google Maps; however, two minor network coding errors were identified. These are:

- the section of the gyratory at the A46 / A6 Birstall Interchange between the A6 northbound exit and A6 southbound entry is coded as two lanes, whereas this section should be coded with three-lanes (as shown in Figure 3.1); and
- the A6 / Granite Way roundabout (to the east of Quorn) is incorrectly coded with flares on all approaches to the roundabout, whereas a flared approach is only present on the Granite Way approach (see Figure 3.2).

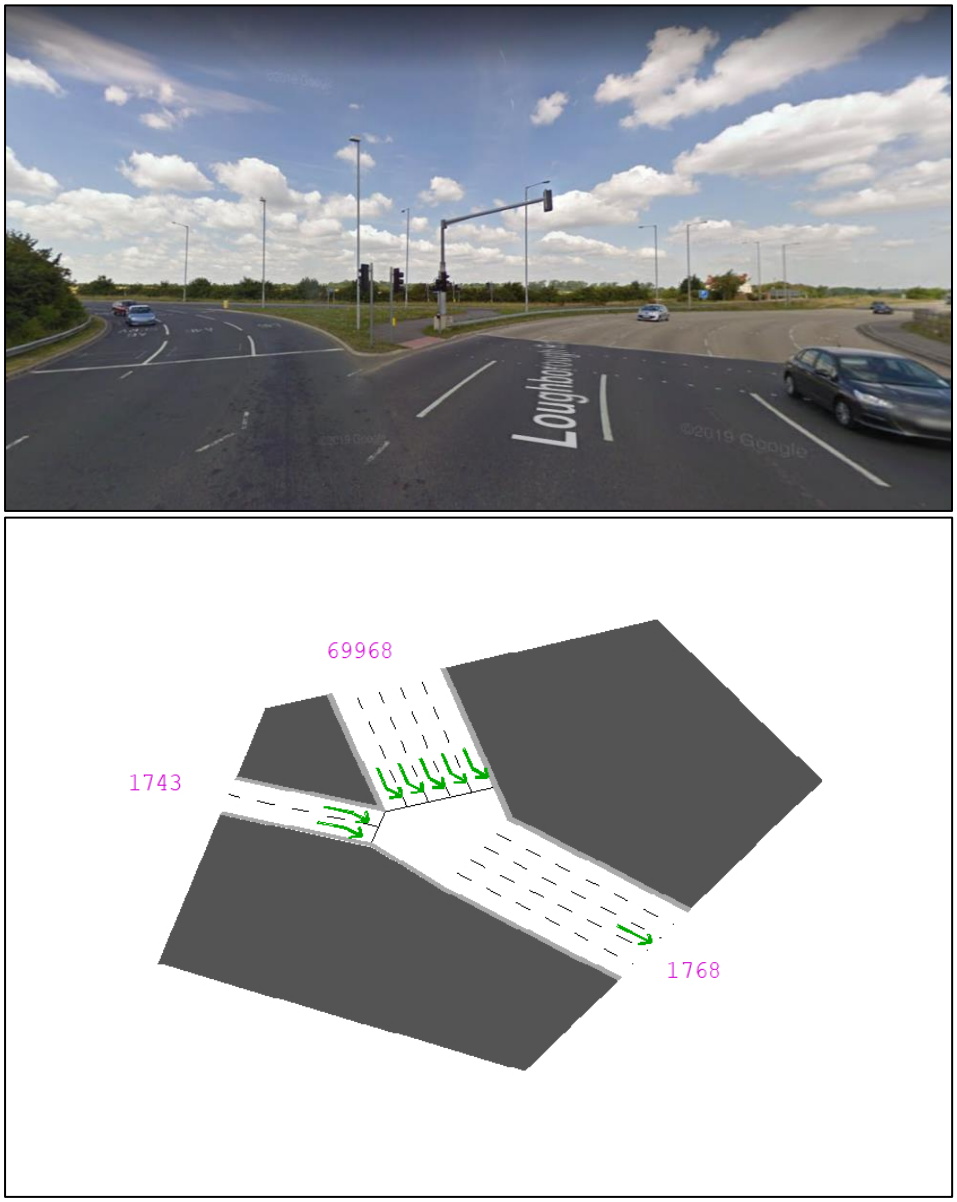

Figure 3.1: A46 / A6 Birstall Interchange Highway Network Coding

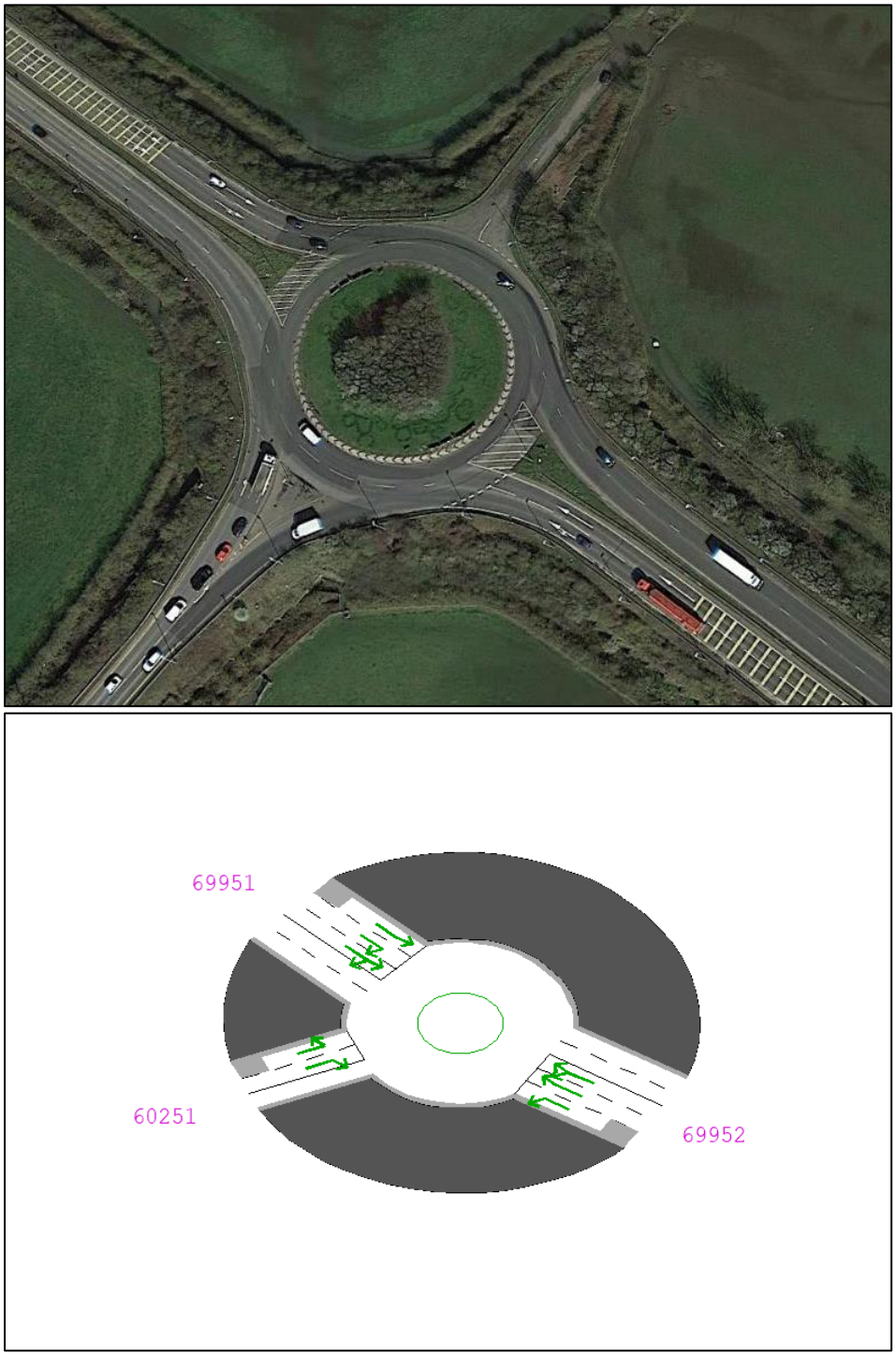

Figure 3.2: A6 / Granite Way Highway Network Coding

3.2.2 To assess the potential impact of these suggested network coding changes within the base year assignments, a test has been undertaken by reassigning the base year demand on a version of the network including these corrections. The changes in assigned traffic volumes and modelled delays within Charnwood are shown in Figure 3.3 for the three modelled time periods. These figures show that the impact of these changes to the base year network coding do not affect the modelled flows and delays within Charnwood significantly and could be incorporated without a recalibration of the model.

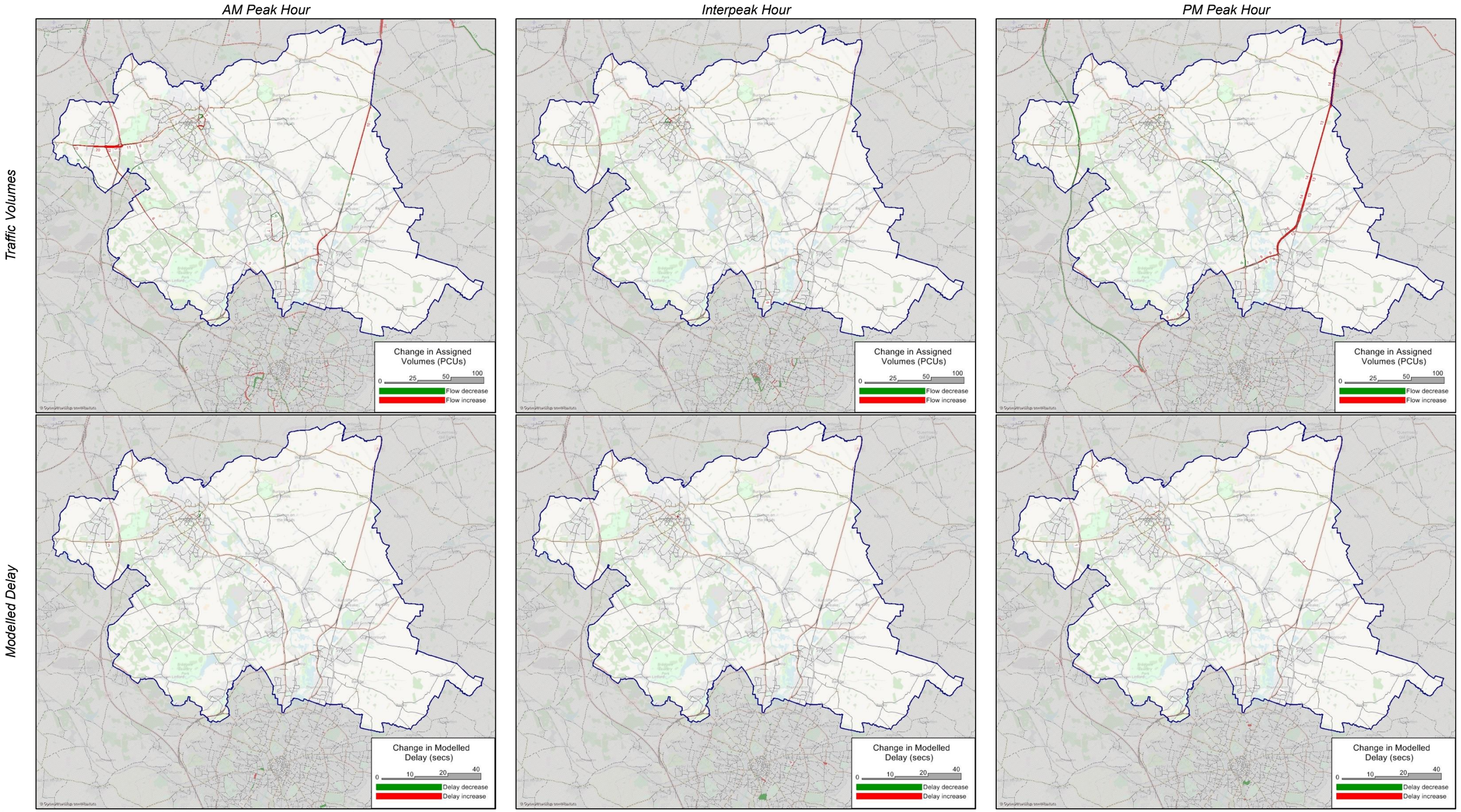

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Figure 3.3: Impact on Assigned Traffic Volumes and Delays by Modelled Hour of Network Corrections

Section 4 – Model Performance Review

4.1 Introduction

4.1.1 As part of the development of the PRTM, a number of screenlines and cordons have been defined using traffic count surveys against which the modelled traffic volumes have been compared. In addition to this, the observed journey times along a number of defined routes have been calculated using Trafficmaster data, and the modelled journey times along these routes have been compared with the observed data.

4.1.2 In assessing the performance of the base year highway model against the collated observed data, guidelines detailed in TAG Unit M3.1 have been adopted. These criteria can be summarised as follows:

- for screenlines the difference between modelled and observed traffic volumes should be less than 5% for 'all or nearly all' screenlines;
- for individual count locations the modelled flows should be within the defined criteria for at least 85% of cases; and
- for journey times the modelled times along routes should be within 15% of surveyed times (or 1 minute, if higher than 15%) on at least 85% of routes.

4.1.3 For individual count locations, the guidelines set out in Table 2 of TAG Unit 3.1 state that a modelled link flow meets TAG criteria if at least one of the two following conditions is met:

- *Flow Criteria*:
  - modelled flow is within 100 vehicles for counts with an observed flow of less than 700 vehicles;
  - modelled flow is within 15% vehicles for counts with an observed flow between 700 and 2,700 vehicles; or
  - modelled flow is within 400 vehicles for counts with an observed flow greater than 2,700 vehicles.
- *GEH criteria:*
  - a GEH value of less than 5, where $GEH = \sqrt{\frac{(M-O)^2}{(M+O)/2}}$, M is the modelled flow and O is the observed flow.

4.2 Screenline Performance

4.2.1 A total of 117 screenlines, cordons and groupings of traffic counts have been defined within the base year PRTM highway model. From this set of screenlines, cordons and count groupings have been selected the locations which are relevant to the assessment of the new Charnwood Local Plan. For screenlines and cordons these have been grouped into those within or largely within Charnwood, those within Leicester City, and other selected screenlines within the Study Area.

4.2.2 Table 4.1 provides a summary of the performance for screenlines which are located within or largely within Charnwood for total vehicle flows (i.e. car, LGV and HGV traffic combined). This includes screenlines within Loughborough, a cordon of Shepshed, and screenlines running parallel to the M1, the River Soar (S-line) and along the Charnwood / Melton Borough border. In addition to this, Table 4.2 provides the same summary for screenlines outside Charnwood but within the Study Area. These include screenlines within Leicester City and cordons of Melton Mowbray and Coalville.

4.2.3 Table 4.1 demonstrates that all the screenlines within Charnwood meet the defined TAG criteria in all three modelled time periods. Considering the screenlines across the wider Study Area, there is a single screenline failure in the AM Peak hour for the Leicester City Inner Cordon in the outbound direction.

4.2.4 Across the 44 screenlines and cordons selected within the Study Area, the single failure in the AM Peak hour demonstrates that the model achieves the TAG guideline for screenline performance of 'all or nearly all' screenlines being within 5% of the observed flows.

Table 4.1: Base Year Highway Model Screenline Performance, Charnwood

Screenline	Counts	AM Peak Hour			Interpeak Hour			PM Peak Hour		
		Observed	Modelled	Pass	Observed	Modelled	Pass	Observed	Modelled	Pass
Loughborough Cordon Inbound	8	6,742	6,717	✓	3,441	3,463	✓	4,529	4,563	✓
Loughborough Cordon Outbound	8	4,123	4,170	✓	3,543	3,548	✓	6,317	6,331	✓
Loughborough North-South Screenline (Epinal Way) Eastbound	8	3,728	3,713	✓	2,419	2,392	✓	2,674	2,656	✓
Loughborough North-South Screenline (Epinal Way) Westbound	8	2,562	2,540	✓	2,492	2,476	✓	3,062	3,098	✓
Loughborough North-South Screenline (A6) Eastbound	7	3,483	3,497	✓	2,342	2,339	✓	2,620	2,625	✓
Loughborough North-South Screenline (A6) Westbound	6	2,769	2,776	✓	2,578	2,575	✓	3,837	3,862	✓
Loughborough East-West Screenline (Ashby Rd) Northbound	6	2,449	2,454	✓	2,135	2,139	✓	2,693	2,672	✓
Loughborough East-West Screenline (Ashby Rd) Southbound	6	2,971	2,960	✓	2,136	2,142	✓	2,792	2,837	✓
Shepshed Cordon Inbound	5	1,075	1,082	✓	933	936	✓	1,451	1,452	✓
Shepshed Cordon Outbound	5	1,298	1,302	✓	909	913	✓	1,220	1,221	✓
M1 Screenline (North) Eastbound	18	8,607	8,566	✓	4,911	4,945	✓	8,411	8,393	✓
M1 Screenline (North) Westbound	18	7,949	7,995	✓	5,082	5,081	✓	8,354	8,555	✓
Leicestershire S-Line (North) Eastbound	4	1,690	1,685	✓	1,234	1,231	✓	2,533	2,523	✓
Leicestershire S-Line (North) Westbound	4	2,642	2,584	✓	1,287	1,280	✓	1,844	1,842	✓
Melton-Charnwood North-South Screenline Eastbound	12	4,335	4,329	✓	2,720	2,721	✓	4,899	4,776	✓
Melton-Charnwood North-South Screenline Westbound	12	4,788	4,821	✓	2,737	2,741	✓	4,351	4,351	✓

Table 4.2: Base Year Highway Model Screenline Performance, Study Area

Screenline	Counts	AM Peak Hour			Interpeak Hour			PM Peak Hour		
		Observed	Modelled	Pass	Observed	Modelled	Pass	Observed	Modelled	Pass
Leicester City Inner Cordon Inbound	14	4,337	4,248	✓	3,132	3,122	✓	3,474	3,384	✓
Leicester City Inner Cordon Outbound	22	3,365	3,112	×	3,585	3,407	✓	4,564	4,523	✓
Leicester City Middle Cordon (A563) Inbound	49	23,354	22,639	✓	16,044	16,125	✓	19,269	19,246	✓
Leicester City Middle Cordon (A563) Outbound	49	19,127	18,918	✓	16,345	16,247	✓	22,759	22,469	✓
Leicester City Outer Cordon Inbound	40	30,400	30,268	✓	19,025	19,057	✓	27,528	27,761	✓
Leicester City Outer Cordon Outbound	41	25,830	26,239	✓	19,191	19,289	✓	30,721	30,829	✓
Leicester City North-South Screenline (Beaumont Leys) Eastbound	8	3,027	2,968	✓	2,869	2,869	✓	3,903	3,893	✓
Leicester City North-South Screenline (Beaumont Leys) Westbound	8	4,456	4,352	✓	2,860	2,863	✓	3,452	3,401	✓
Leicester City North-South Screenline (Railway) Eastbound	4	2,200	2,101	✓	1,838	1,832	✓	2,527	2,482	✓
Leicester City North-South Screenline (Railway) Westbound	4	2,412	2,403	✓	1,826	1,809	✓	2,074	2,029	✓
Western Leicester S-Line Eastbound	4	2,064	1,990	✓	1,199	1,167	✓	1,583	1,543	✓
Western Leicester S-Line Westbound	4	1,594	1,551	✓	1,208	1,166	✓	1,845	1,754	✓
Northern Leicester T-Line Northbound	5	2,111	2,128	✓	2,367	2,364	✓	3,735	3,714	✓
Northern Leicester T-Line Southbound	5	3,883	3,813	✓	2,365	2,357	✓	2,636	2,606	✓
Glen Parva East-West Northbound	3	3,659	3,701	✓	2,315	2,313	✓	2,858	2,784	✓
Glen Parva East-West Southbound	3	2,819	2,810	✓	2,396	2,387	✓	3,393	3,355	✓
Southern Leicester T-line Northbound	9	4,587	4,512	✓	2,939	2,941	✓	2,997	2,980	✓
Southern Leicester T-line Southbound	9	3,207	3,192	✓	3,440	3,388	✓	5,185	5,078	✓
Leicestershire T-Line (Leicester City) Northbound	29	14,078	13,825	✓	10,090	10,176	✓	12,075	12,117	✓
Leicestershire T-Line (Leicester City) Southbound	29	12,433	12,376	✓	9,571	9,613	✓	13,798	13,723	✓
Leicestershire S-Line (Leicester City) Eastbound	11	13,563	13,043	✓	9,542	9,527	✓	12,346	12,233	✓
Leicestershire S-Line (Leicester City) Westbound	11	12,093	12,030	✓	9,683	9,453	✓	13,656	13,484	✓
M1 Screenline (Leicester City) Eastbound	5	8,441	8,770	✓	5,346	5,366	✓	9,104	8,940	✓
M1 Screenline (Leicester City) Westbound	5	8,625	8,411	✓	5,368	5,363	✓	8,690	9,110	✓
Melton Mowbray Cordon Inbound	11	3,235	3,227	✓	2,125	2,137	✓	3,184	3,174	✓
Melton Mowbray Cordon Outbound	11	3,054	3,002	✓	2,200	2,202	✓	2,920	2,917	✓
Coalville-Whitwick Cordon Inbound	19	7,160	7,150	✓	4,096	4,085	✓	6,541	6,557	✓
Coalville-Whitwick Cordon Outbound	19	5,888	5,894	✓	4,153	4,150	✓	7,252	7,272	✓

4.3 Individual Link Flow Performance

4.3.1 In addition to the traffic count surveys along the screenlines and cordons assessed in Section 4.2, the calibration and validation of the base year highway assignment model contains a number of individual count surveys on the Strategic Road Network. This includes counts on the M1 through Leicestershire and on the A46 between the M1 and the county boundary.

4.3.2 Table 4.3 provides a summary of the proportion of individual link counts meeting the defined TAG criteria in the three modelled hours for total vehicle flows. These individual counts have been grouped based on the screenlines which contain each count, with the individual link counts along the Strategic Road Network also included in the analysis.

Table 4.3: Summary of Individual Link Flow Performance

Location	Counts	AM Peak	Interpeak	PM Peak
Charnwood	135	89%	93%	82%
Leicester City	371	84%	93%	86%
Other Study Area	60	98%	100%	90%
Strategic Road Network	33	100%	100%	100%
All	**599**	**87%**	**94%**	**86%**

4.3.3 Table 4.3 shows that across all the counts selected for this analysis, 87% meet the defined TAG criteria in the AM Peak hour, 94% in the interpeak hour, and 86% in the PM Peak hour. These pass rates are above the 85% defined within TAG for individual count sites.

4.3.4 Within the reporting areas there is some variation in the pass rate against TAG criteria. For the Strategic Road Network counts on the M1 and A46 have a pass rate of 100% in all time periods, with the lowest pass rate being 82% within Charnwood in the PM Peak hour. This pass rate within Charnwood in the PM Peak hour and the pass rate within Leicester City in the AM Peak hour (at 84%) are the only two metrics within this analysis which are (marginally) below the defined TAG criteria. These pass rates are relatively minor failures to meet TAG guidelines, with no pass rate within this analysis below 80%.

4.3.5 To provide additional information on the location of the traffic count surveys which meet or fail to meet the defined TAG criteria, Figure 4.1 provides an overview of the performance against individual link counts in the three modelled time periods. These figures show the wider Study Area and Charnwood and show where a given link has met the defined TAG criteria and where a given location has not met the criteria, if the modelled flow is above or below the observed traffic count.

4.3.6 As shown in Table 4.3, the majority of links meet the defined TAG criteria within both the Study Area and within Charnwood, and the locations of the failure are, in general, not clustered in one geographical location or that there are groupings where counts are consistently above or below the observed traffic volumes. A possible exception to this is to the south and east of Syston where there are several locations across the three time periods which fail to achieve the defined TAG criteria. In general, there are a mixture of locations which are above and below the observed traffic volumes in this area, suggesting that this is an issue of local routeing rather than an over- or understatement of travel demand.

4.3.7 Considering these locations to the east of Syston in more detail, a subset of counts from the count data set have been used to form a new screenline. This new screenline contains eight counts from two existing screenlines defined in the model development (namely the Melton-Charnwood screenline running broadly along the boundary of the two districts and the Leicester City Outer cordon) and runs from Main Street in Ratcliffe on the Wreake to Hamilton Lane to the south of Barkby Thorpe.

4.3.8 The performance of the model for total vehicle flows across these eight count locations is detailed in Table 4.4. This shows that for this set of counts the modelled flows are generally within ±2.5% of the observed flows (within the TAG criterion of ±5%) in the majority of cases, with the exception being in the eastbound direction in the PM Peak hour where the modelled flows are around 8.5% lower than observed.

4.3.9 Looking at the performance of this new screenline in detail to the east of Syston, Table 4.5 details a comparison of the model against a subset of counts along this new screenline immediately to the east of Syston. This analysis consists of four count locations from Melton Road to the north of Syston to Barkbythorpe Road. This analysis shows that the model tends to understate traffic volumes on these four routes in both directions and all time periods.

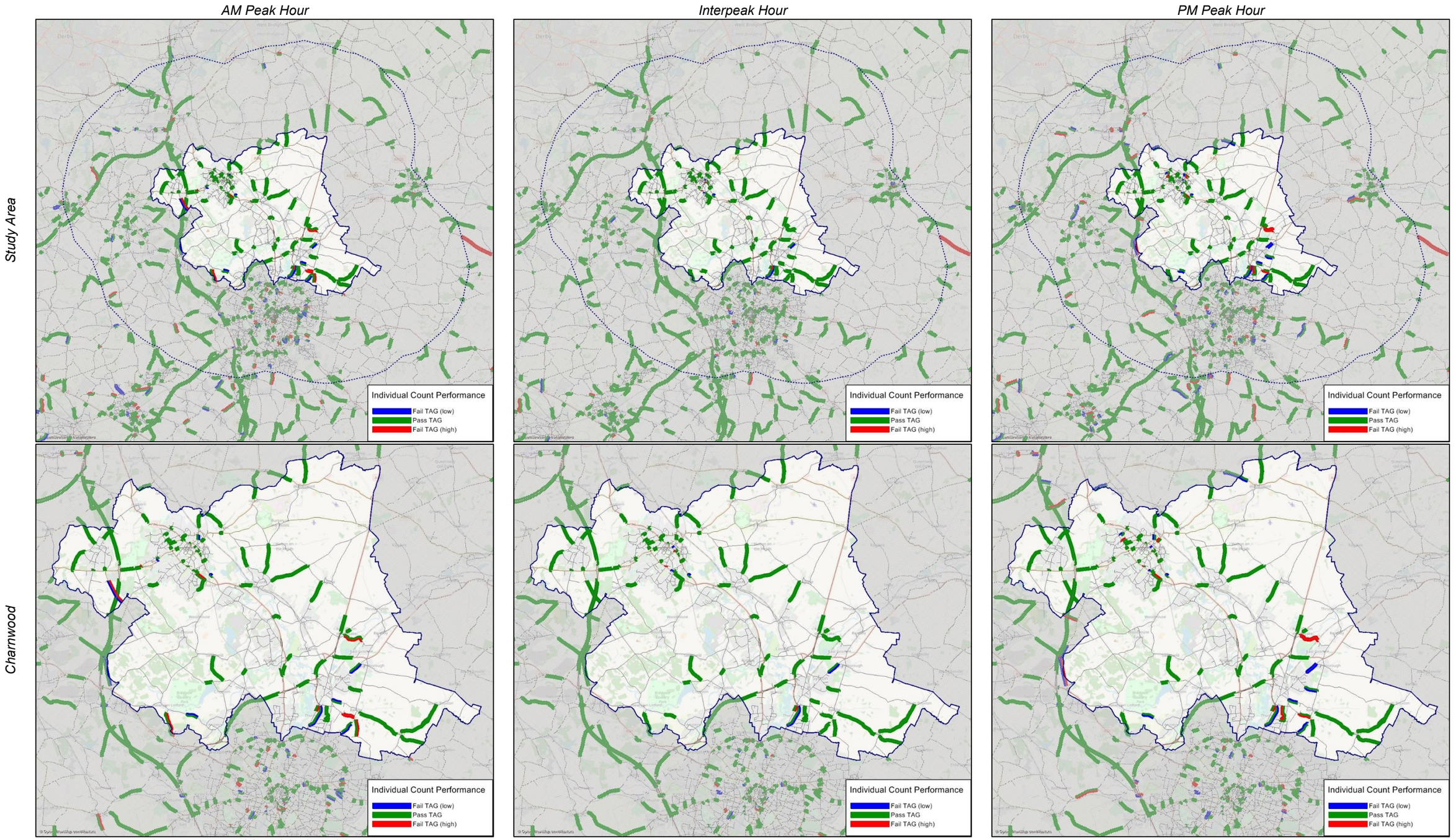
4.3.10 The analysis contained in Table 4.4 combined with the analysis in Table 4.5 suggests that the model contains a good representation of traffic volumes across the wider screenline to the east of Syston (between Ratcliffe on the Wreake and Barkby Thorpe) but that there are local issues with routeing and / or the allocation of travel demand to zones when looking at the four routes immediately to the east of Syston (Melton Road to Barkbythorpe Road).

Table 4.4: Syston East Screenline Performance, Total Vehicle Flows

Time Period	Direction	Obs.	Mod.	%Diff.
AM Peak Hou	Eastbound	2,771	2,767	-0.1%
	Westbound	3,153	3,132	-0.6%
Interpeak Hour	Eastbound	1,795	1,837	2.3%
	Westbound	1,796	1,805	0.5%
PM Peak Hour	Eastbound	3,278	2,997	-8.6%
	Westbound	2,701	2,681	-0.7%

Table 4.5: Syston East Screenline Performance (Subset), Total Vehicle Flows

Time Period	Direction	Obs.	Mod.	%Diff.
AM Peak Hou	Eastbound	1,212	1,193	-1.6%
	Westbound	1,067	866	-18.8%
Interpeak Hour	Eastbound	732	673	-8.1%
	Westbound	731	621	-15.0%
PM Peak Hour	Eastbound	1,282	1,026	-20.0%
	Westbound	1,098	941	-14.3%



Map contains Ordnance Survey data © Crown copyright and database right 2020

Figure 4.1: Individual Link Flow Performance by Modelled Hour

4.4 Journey Time Performance

4.4.1 In total 198 journey time routes have been defined within the PRTM highway model, of which 18 are within Charnwood and 32 are primarily focussed on Leicester City. In addition to this, the journey time validation includes journey time routes covering the M1 (between Junction 16 and Junction 26) and the A46 (between the M1 and A52).

4.4.2 Table 4.6 provides a summary of the journey time performance by time period within Charnwood, Leicestershire and along the M1 and A46 routes. Overall 91% of the selected journey time routes meet the defined TAG criteria in the AM Peak hour, with 89% of routes meeting the criteria in the interpeak and PM Peak hours, all of which are above the 85% criterion recommended within TAG.

Table 4.6: Summary of Journey Time Performance

Location	AM Peak	Interpeak	PM Peak
Charnwood	83%	94%	83%
Leicester City	94%	84%	91%
Strategic Road Network	100%	100%	100%
All	**91%**	**89%**	**89%**

4.4.3 Table 4.7, Table 4.8 and Table 4.9 provide further details on the performance of individual routes within Charnwood, Leicester City and along the Strategic Road Network respectively. Table 4.7 shows that there are three failures to meet the defined TAG criteria in the AM Peak hour and PM Peak hour within Charnwood (out of 18 journey time routes), with a single failure within Charnwood in the interpeak hour.

4.4.4 In terms of the routes in the AM Peak hour which do not achieve the TAG criteria in Charnwood, all three of these routes have modelled journey times below those observed within the Trafficmaster data and the largest difference between modelled and observed journey times is 20.1% (the recommended TAG criterion is +/- 15%).

4.4.5 Figure 4.2, Figure 4.3 and Figure 4.4 show the comparison of modelled and observed journey times for the three routes in the AM Peak hour which do not meet the TAG criteria in Charnwood, namely Forest Road Eastbound, A6 (north of the Inner Relief Road) southbound, and the A6004 Epinal Way northbound.

4.4.6 For theses journey time routes, there is a subsection within the journey time route where the modelled and observed journey times diverge. Considering the Forest Road eastbound journey time route (as shown in Figure 4.2), the modelled and observed journey times are closely aligned before around 2.5km along the route and after around 3km along the route. In the subsection between around 2.5km and 3km there is a divergence of the modelled and observed journey times. A similar result can be seen for the other two journey time routes highlighted in the AM Peak hour within Charnwood.

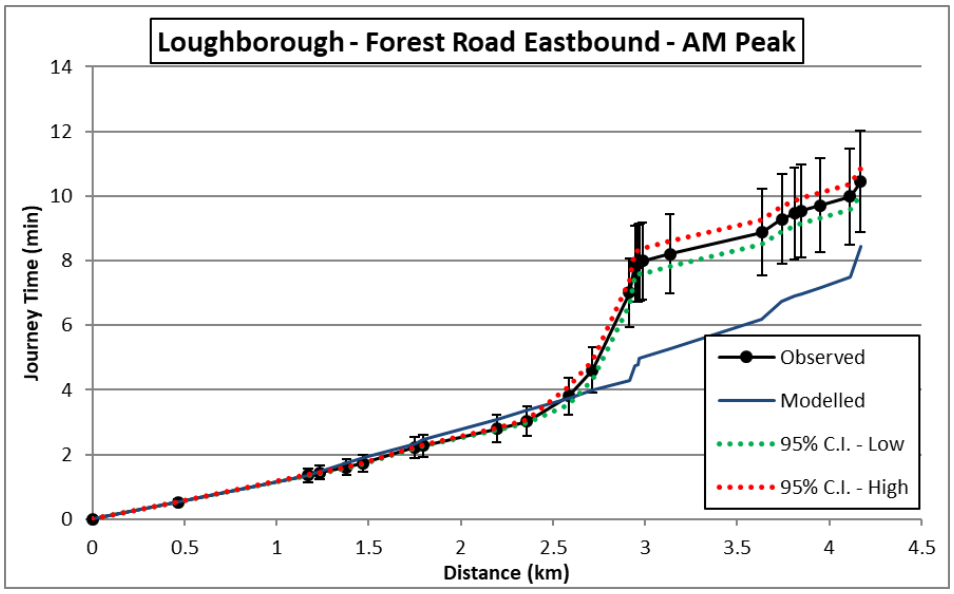


Figure 4.2: Journey Time Validation, Forest Road Eastbound, AM Peak Hour

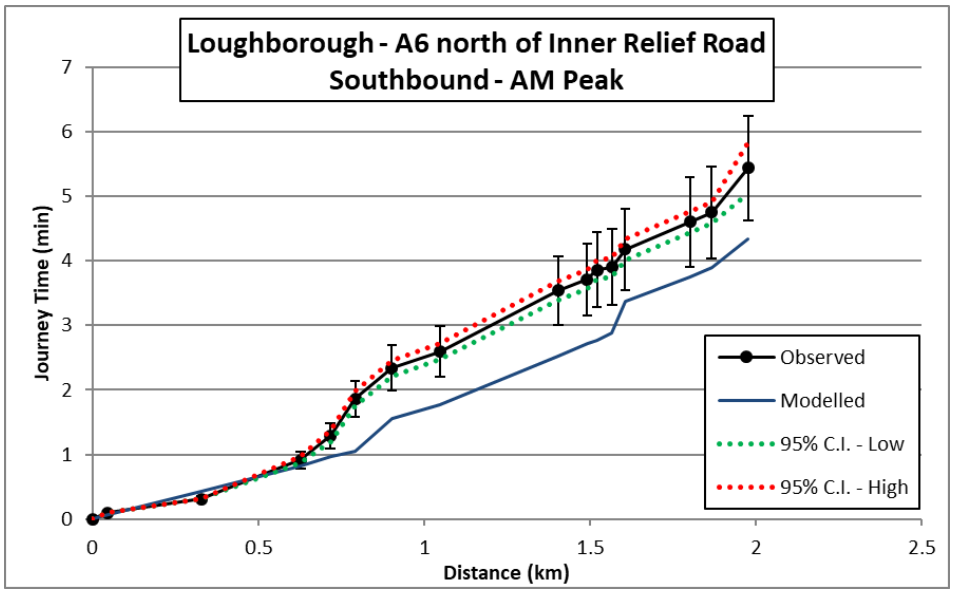


Figure 4.3: Journey Time Validation, A6 north of the Inner Relief Road Southbound, AM Peak Hour

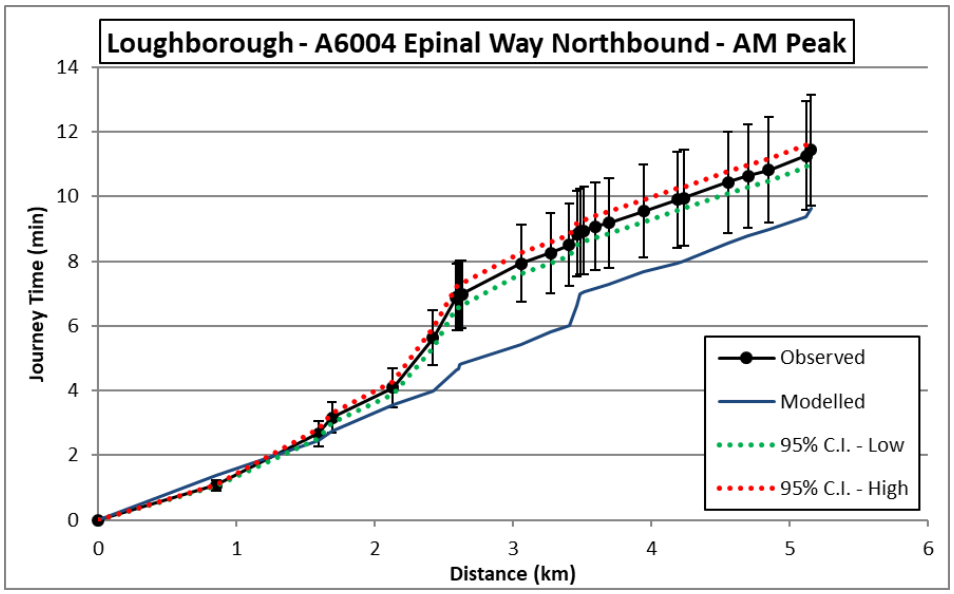


Figure 4.4: Journey Time Validation, A6004 Epinal Way Northbound, AM Peak Hour

4.4.7 Within the interpeak hour in Charnwood there is a single route which does not achieve the TAG criteria, and this is along Forest Road in the westbound direction (as shown in Figure 4.5). For this route in the interpeak hour the modelled journey times are higher than those observed for the route by 18.6% or just over one minute. For this route there is a general divergence of modelled and observed journey times from around 1.25km along the route.

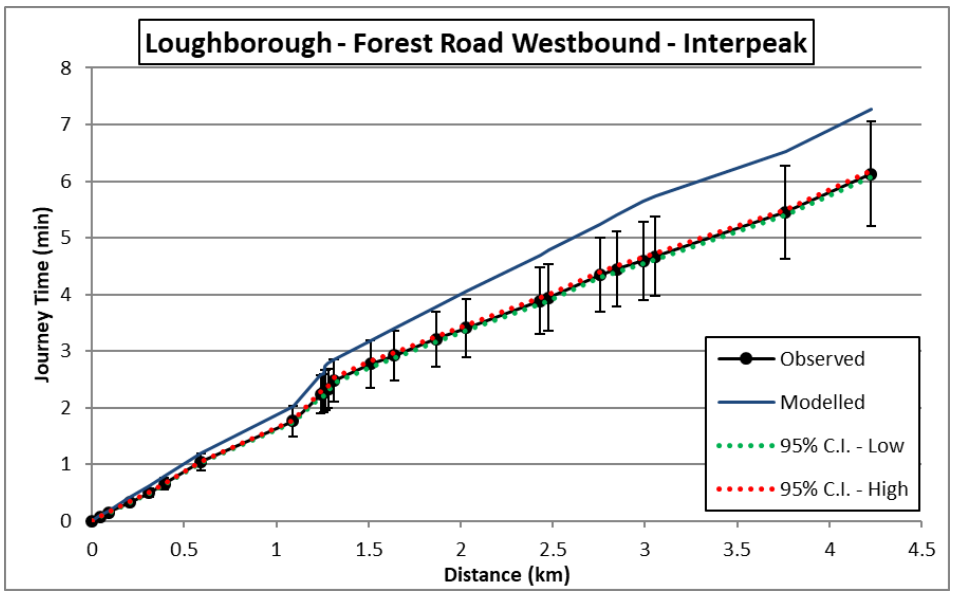


Figure 4.5: Journey Time Validation, A6004 Epinal Way Northbound, Interpeak Hour

4.4.8 Within Charnwood in the PM Peak hour there are three journey time routes which do not achieve the TAG criteria. These are along Old Ashby Road / Alan Moss Road in the eastbound direction, the A6 (north of the Inner Relief Road) in the northbound direction, and along the A6004 Epinal Way in the southbound direction. The magnitude of the differences between the modelled and observed journey times in the PM Peak hour for these three routes are similar to those in the AM Peak hour for routes which do not achieve the TAG criteria. Within Charnwood in the PM Peak hour for these three routes the modelled journey times are lower than those observed, with the largest difference being -23.1%.

4.4.9 Further details on the comparison between the modelled and observed journey times for these three routes in the PM Peak hour are shown in Figure 4.6, Figure 4.7 and Figure 4.8.

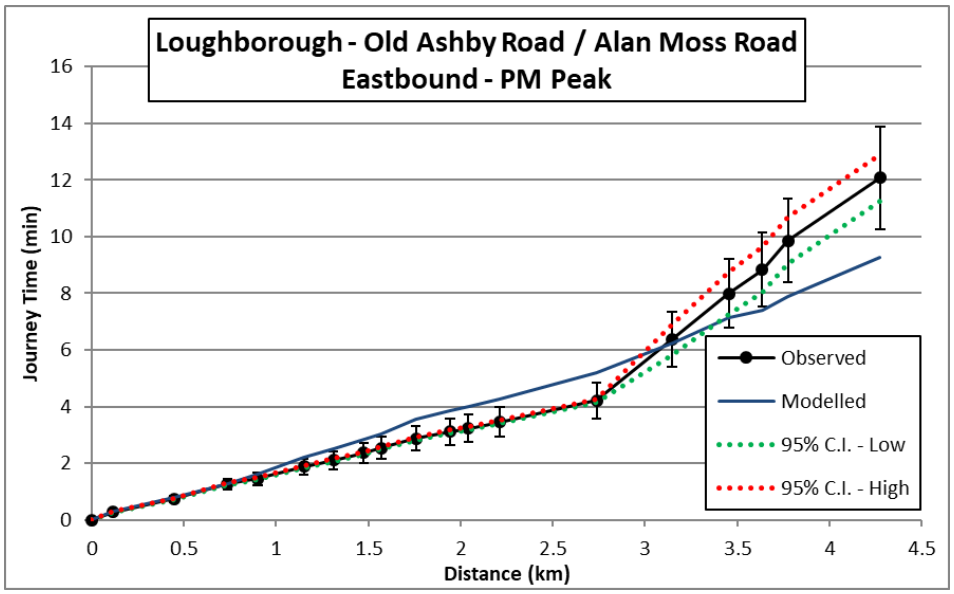


Figure 4.6: Journey Time Validation, Old Ashby Road / Alan Moss Way Eastbound, PM Peak Hour

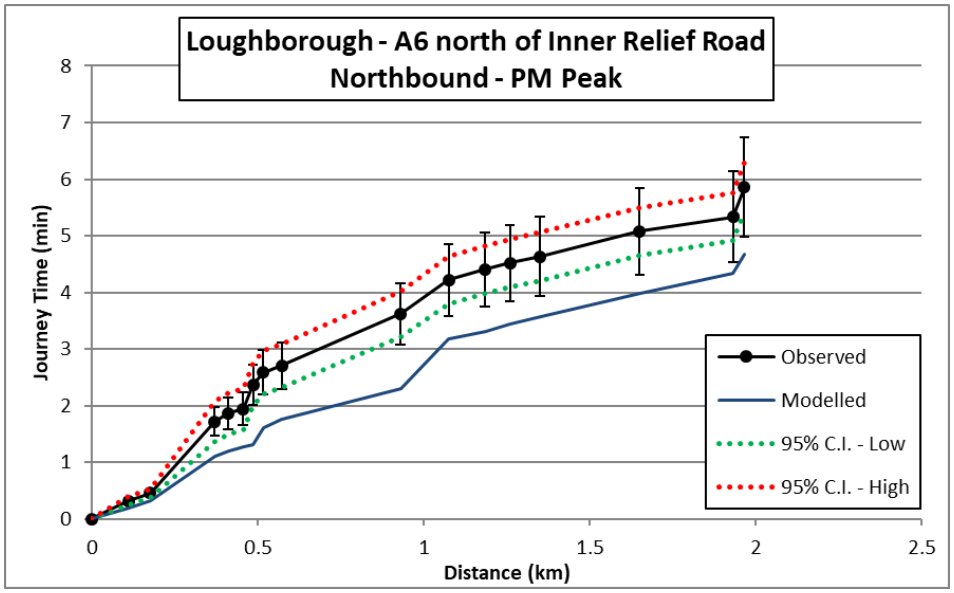


Figure 4.7: Journey Time Validation, A6 north of the Inner Relief Road Northbound, PM Peak Hour

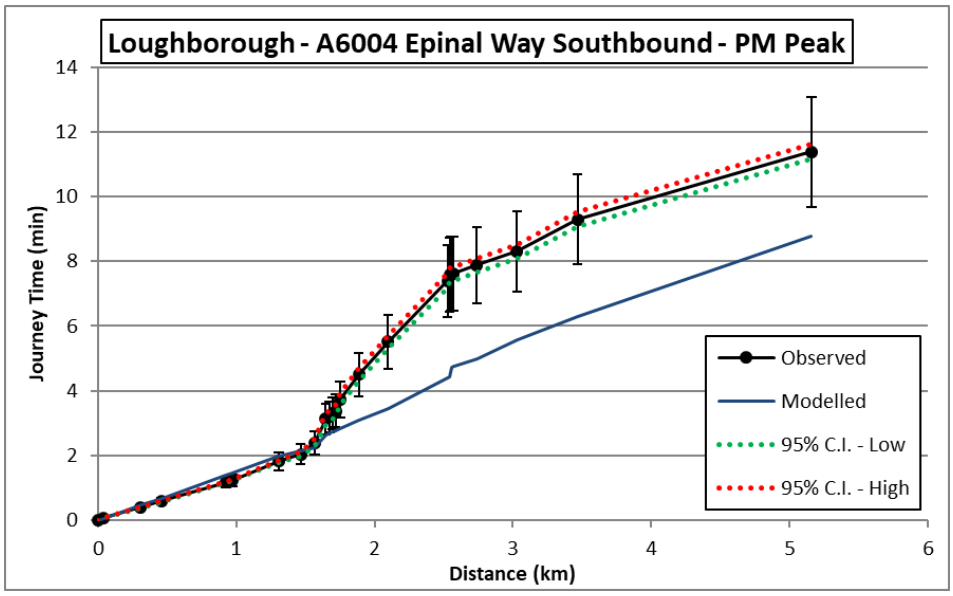


Figure 4.8: Journey Time Validation, A6004 Epinal Way Southbound, PM Peak Hour

4.4.10 Outside Charnwood the results for the journey time routes defined within Leicester City are detailed in Table 4.8. Generally, the pass rates for journey time routes within Leicester City are high, with above 90% of routes meeting the defined TAG criteria in the AM Peak and PM Peak hours. The largest difference between the modelled and observed journey times within Leicester City is along the A50 inbound to the city centre from Groby in the AM Peak hour, where the modelling journey time is around 33% quicker than observed, or around 5 minutes (as shown in Figure 4.9).

4.4.11 In parallel to this assessment of the new Charnwood Local Plan, an assessment of proposed developments within Leicester City is being undertaken. The corresponding review of the base year model also highlighted this journey time route and stated that:

> *Modelled journey times start to diverge from the observed journey time from the outset of the defined route. No individual section along the route exhibits an obvious shortfall in delay (which might otherwise indicate an incorrectly modelled junction). The most marked disparity in delay seems to accumulate gradually along the links between the Station Road / Glynsill Lane / Groby Road roundabout and Holmwood Drive, and also along the links just east of the Fosse Road North / Blackbird Road junction until just north of Vaughan Way (on the approach to central Leicester).*
>
> *It is therefore noted that improving the Groby Road route validation may be difficult, since the delay incurred along the route may be to do with link capacity rather than delay caused by the junctions along the route. Indeed, attempts to improve performance on this route in the past have been largely unsuccessful so it is unlikely that any further effort will be worthwhile in this case.*

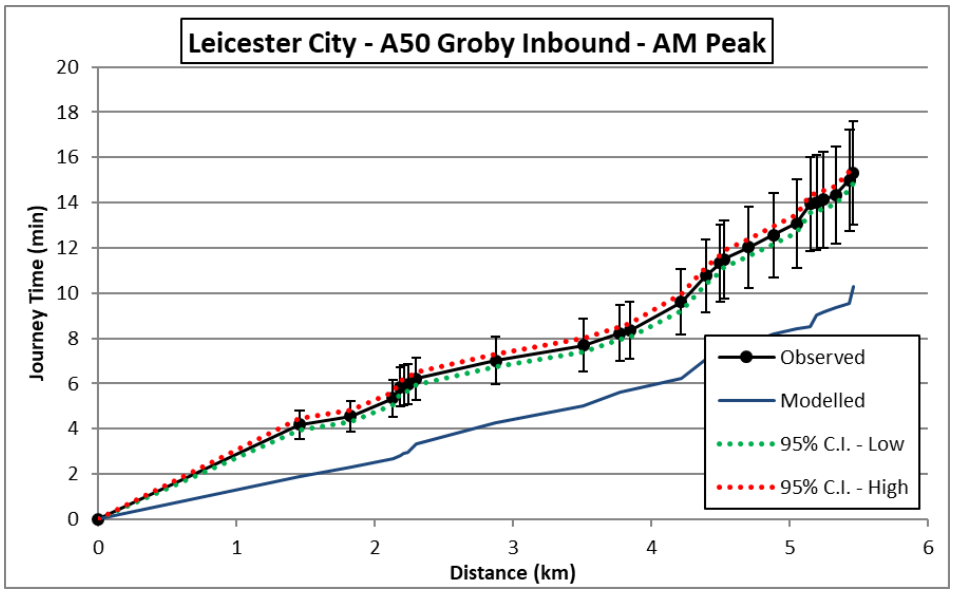


Figure 4.9: Journey Time Validation, A50 Groby Inbound, AM Peak Hour

4.4.12 Table 4.10 provides further details on the performance of the A50 Groby Inbound journey time route in the three modelled time periods, providing a comparison of the modelled and observed journey times for a number of sections defined along the route. Considering the performance in the AM Peak hour, the majority of the shortfall in modelled journey time is present within two sections, namely between the start of the route at the A46 and outside County Hall, and between the junctions with Fosse Road North and Sanvey Gate.

4.4.13 Along the A50 within Leicester City there are two counts which have been used in the calibration and validation of the model. These are located to the east of the junction with the A563, New Parks Way and at the bridge over the Grand Union Canal, north of Sanvey Gate. In the inbound direction across the three modelled time periods, the modelled flows are within ±40 vehicles of the observed flows at these two locations, suggesting that there is not a shortfall of traffic along the route which is leading to an understatement in journey time.

4.4.14 Assuming there is not a significant error in the modelled traffic volumes along the route, the modelled journey times are determined by the coded link speed (either a fixed, cruise speed or a speed-flow curve where speed varies with traffic volume) and the junction coding. Considering the performance of this route in the interpeak hour, where junction delays are likely to be at their lowest, the modelled journey times by section are within ±0.6 minutes of the observed times, suggesting that the coded link speeds are appropriate for the route.

4.4.15 This therefore suggests that the underrepresentation of journey times in the AM Peak hour (and to a lesser extent in the PM Peak hour) are largely due to junction delays. Considering the AM Peak hour, the first section between the A46 and County Hall shows the model understates journey time by around 2.3 minutes for this section, and the section between Fosse Road North and Sanvey Gate also understates travel times by around 1.9 minutes (with a similar 1.4 minute understatement in the PM Peak hour). Within each of these sections there is only one significant junction which is expected to generate significant delay: the junction with Station Road and Gynshill Lane; and the junction with Sanvey Gate.

4.4.16 Considering each of these locations in turn, the junction with Station Road and Gynshill Lane is coded as a priority roundabout in the 2014 base year as this is prior to the recent conversion of this junction to signalised operation. The observed journey time data are from April, May and June 2014, and from reviewing the available imagery on Google Street View there are roadworks present at the junction in August 2015 which reduce the capacity of the approach from the A46 to this junction. It is unclear if these roadworks were also present in April, May and June 2014; if they were present, this may have affected the observed journey time data for this section.

4.4.17 The junction with Sanvey Gate is coded as a signalised junction and the coding of this junction has been reviewed and found to be in-line with available imagery of the junction and the adopted coding manual. The signal timings for this junction are based on data provided by LCC as part of the model development, with some minor changes from the timings provided to improve the model flow and journey time performance against observed data. Significant deviations from either the coding manual

or the provided signal data would be required to generate the additional 1.5 to 2 minutes of delay at this location observed in the AM Peak and PM Peak hours. Adding this level of delay in the peak hours may also have a detrimental impact on the performance of the model against the traffic count located to the north of this junction, and it is likely that during the model calibration a balance between the model flow and journey time performance has been required at this location.

4.4.18 In terms of the four journey time routes along the Strategic Road Network of interest to this study, namely the M1 between Junctions 16 and 26 and the A46 between the M1 and the A52, each of these routes in all three modelled time periods meet the defined TAG acceptability criteria.

Table 4.7: Base Year Highway Model Journey Time Performance, Charnwood

		AM Peak Hour				Interpeak Hour				PM Peak Hour			
Location	**Route**	**Observed**	**Modelled**	**Diff**	**Pass**	**Observed**	**Modelled**	**Diff**	**Pass**	**Observed**	**Modelled**	**Diff**	**Pass**
Loughborough	A512 Ashby Road Eastbound	11:57	10:44	-10.2%	✓	08:58	09:29	5.6%	✓	11:23	10:08	-11.0%	✓
Loughborough	A512 Ashby Road Westbound	09:36	10:01	4.4%	✓	09:02	10:06	11.8%	✓	12:43	12:04	-5.2%	✓
Loughborough	Old Ashby Road / Alan Moss Road Eastbound	08:55	09:13	3.3%	✓	08:13	08:50	7.6%	✓	12:04	09:17	-23.1%	×
Loughborough	Old Ashby Road / Alan Moss Road Westbound	09:18	08:42	-6.4%	✓	07:46	08:29	9.3%	✓	08:25	09:12	9.5%	✓
Loughborough	Forest Road Eastbound	10:27	08:27	-19.0%	×	06:56	07:48	12.5%	✓	07:04	07:58	12.9%	✓
Loughborough	Forest Road Westbound	07:23	08:06	9.7%	✓	06:08	07:16	18.6%	×	09:31	09:37	0.9%	✓
Loughborough	A6 north of Inner Relief Road Northbound	04:37	04:21	-5.7%	✓	04:47	04:32	-5.2%	✓	05:51	04:41	-20.1%	×
Loughborough	A6 north of Inner Relief Road Southbound	05:26	04:20	-20.1%	×	04:36	04:07	-10.3%	✓	04:55	04:24	-10.6%	✓
Loughborough	A6 south of Inner Relief Road Northbound	06:08	05:48	-5.5%	✓	03:39	04:03	11.0%	✓	04:04	04:15	4.5%	✓
Loughborough	A6 south of Inner Relief Road Southbound	03:49	03:42	-3.3%	✓	03:22	03:32	5.0%	✓	04:28	04:10	-6.9%	✓
Loughborough	A6004 Epinal Way Northbound	11:26	09:37	-15.8%	×	08:38	09:12	6.7%	✓	09:56	09:53	-0.5%	✓
Loughborough	A6004 Epinal Way Southbound	09:13	09:11	-0.4%	✓	08:15	08:30	2.9%	✓	11:23	08:48	-22.7%	×
Loughborough	New King Street / Queen's Road Eastbound	04:31	04:55	8.8%	✓	04:08	04:41	13.0%	✓	04:59	05:49	16.8%	✓
Loughborough	New King Street / Queen's Road Westbound	06:16	06:43	7.3%	✓	04:26	05:11	16.8%	✓	05:23	05:42	5.7%	✓
Charnwood	A6 (A46 to Loughborough) Northbound	05:56	05:51	-1.4%	✓	05:40	05:42	0.6%	✓	05:36	05:53	5.0%	✓
Charnwood	A6 (A46 to Loughborough) Southbound	06:05	05:54	-3.0%	✓	05:53	05:41	-3.4%	✓	05:30	05:50	6.1%	✓
Charnwood	A6 (Loughborough to M1) Northbound	12:08	12:42	4.6%	✓	10:27	10:27	0.0%	✓	17:43	15:57	-10.0%	✓
Charnwood	A6 (Loughborough to M1) Southbound	11:28	11:45	2.5%	✓	09:40	10:10	5.2%	✓	10:42	10:54	1.8%	✓

Table 4.8: Base Year Highway Model Journey Time Performance, Leicester City

		AM Peak Hour				Interpeak Hour				PM Peak Hour			
Location	Route	Observed	Modelled	Diff	Pass	Observed	Modelled	Diff	Pass	Observed	Modelled	Diff	Pass
Leicester City	A47 Thurnby Inbound	15:03	13:59	-7.1%	✓	12:03	13:09	9.1%	✓	12:15	13:06	7.0%	✓
Leicester City	A47 Thurnby Outbound	13:03	12:44	-2.4%	✓	12:34	12:39	0.6%	✓	16:00	13:33	-15.3%	×
Leicester City	A607 Thurmaston Inbound	13:27	13:50	2.8%	✓	12:41	11:49	-6.9%	✓	12:57	12:33	-3.1%	✓
Leicester City	A607 Thurmaston Outbound	11:47	12:18	4.4%	✓	12:19	12:15	-0.5%	✓	14:36	15:43	7.7%	✓
Leicester City	A6 Birstall Inbound	15:14	13:45	-9.8%	✓	10:30	10:50	3.1%	✓	11:33	11:41	1.2%	✓
Leicester City	A6 Birstall Outbound	10:47	10:50	0.4%	✓	09:50	10:41	8.7%	✓	12:37	13:07	4.0%	✓
Leicester City	B5327 Anstey Inbound	10:17	08:49	-14.3%	✓	05:50	06:44	15.2%	✓	06:22	07:18	14.8%	✓
Leicester City	B5327 Anstey Outbound	06:15	06:30	3.8%	✓	06:03	06:26	6.3%	✓	07:59	07:42	-3.7%	✓
Leicester City	A50 Groby Inbound	15:18	10:16	-32.9%	×	08:31	08:54	4.5%	✓	11:29	09:59	-13.1%	✓
Leicester City	A50 Groby Outbound	08:24	09:29	12.9%	✓	08:01	08:52	10.6%	✓	12:13	11:54	-2.6%	✓
Leicester City	A47 Leicester Forest East Inbound	17:38	17:25	-1.2%	✓	11:04	12:24	12.1%	✓	13:46	15:10	10.3%	✓
Leicester City	A47 Leicester Forest East Outbound	13:09	14:59	13.9%	✓	11:34	12:08	4.8%	✓	15:37	15:54	1.8%	✓
Leicester City	A5460 Enderby Inbound	18:29	16:08	-12.7%	✓	11:48	12:56	9.5%	✓	13:28	13:16	-1.4%	✓
Leicester City	A5460 Enderby Outbound	15:00	13:56	-7.1%	✓	11:28	12:18	7.3%	✓	15:45	13:50	-12.2%	✓
Leicester City	A426 Blaby Inbound	18:09	16:00	-11.8%	✓	10:01	11:07	11.0%	✓	12:34	11:08	-11.5%	✓
Leicester City	A426 Blaby Outbound	13:04	14:12	8.7%	✓	10:41	12:40	18.6%	×	16:10	15:48	-2.2%	✓
Leicester City	Saffron Lane Inbound	11:43	11:50	1.0%	✓	07:53	08:58	13.8%	✓	08:32	09:19	9.2%	✓
Leicester City	Saffron Lane Outbound	09:52	09:59	1.2%	✓	08:27	09:43	14.9%	✓	12:21	10:46	-12.8%	✓
Leicester City	A5199 Wigston Inbound	12:23	12:40	2.3%	✓	08:44	09:20	6.8%	✓	09:34	09:45	2.0%	✓
Leicester City	A5199 Wigston Outbound	09:48	10:42	9.1%	✓	09:10	09:52	7.7%	✓	11:05	12:28	12.5%	✓
Leicester City	A6 Oadby Inbound	18:29	17:53	-3.2%	✓	12:45	13:55	9.2%	✓	15:10	14:59	-1.2%	✓
Leicester City	A6 Oadby Outbound	12:24	13:42	10.5%	✓	11:52	13:15	11.6%	✓	15:56	16:41	4.7%	✓
Leicester City	A594 IRR Clockwise	15:31	16:54	9.0%	✓	12:44	14:50	16.6%	×	15:59	15:25	-3.5%	✓
Leicester City	A594 IRR Anti-Clockwise	12:29	14:33	16.5%	×	10:20	11:43	13.5%	✓	12:43	12:59	2.1%	✓
Leicester City	A563 ORR1 Clockwise	18:33	17:14	-7.2%	✓	11:25	14:17	25.1%	×	13:42	15:17	11.5%	✓
Leicester City	A563 ORR1 Anti-Clockwise	16:07	14:51	-7.9%	✓	11:12	14:50	32.4%	×	21:30	17:45	-17.4%	×
Leicester City	A563 ORR2 Clockwise	14:45	13:52	-6.0%	✓	11:53	13:14	11.3%	✓	15:24	14:14	-7.6%	✓
Leicester City	A563 ORR2 Anti-Clockwise	14:08	15:00	6.2%	✓	10:52	12:21	13.5%	✓	12:47	13:50	8.1%	✓
Leicester City	A563 ORR3 Clockwise	12:53	13:10	2.1%	✓	11:15	12:19	9.5%	✓	15:46	14:12	-9.9%	✓
Leicester City	A563 ORR3 Anti-Clockwise	13:05	14:53	13.8%	✓	11:07	13:22	20.2%	×	11:28	13:47	20.1%	×
Leicester City	Fullhurst Clockwise	17:16	17:03	-1.3%	✓	13:47	15:46	14.4%	✓	16:01	17:38	10.1%	✓
Leicester City	Fullhurst Anti-Clockwise	15:51	16:50	6.3%	✓	13:52	15:07	9.1%	✓	18:18	18:49	2.8%	✓

Table 4.9: Base Year Highway Model Journey Time Performance, Strategic Road Network

		AM Peak Hour				Interpeak Hour				PM Peak Hour			
Location	Route	Observed	Modelled	Diff	Pass	Observed	Modelled	Diff	Pass	Observed	Modelled	Diff	Pass
SRN	M1 (Jn16 to Jn26) Northbound	51:39	57:45	11.8%	✓	53:29	56:16	5.2%	✓	01:00:08	01:01:05	1.6%	✓
SRN	M1 (Jn16 to Jn26) Southbound	59:46	01:01:54	3.6%	✓	52:48	56:00	6.1%	✓	52:49	59:19	12.3%	✓
SRN	A46 (M1 to A52) Northbound	25:17	26:29	4.7%	✓	24:21	25:22	4.2%	✓	28:33	29:25	3.0%	✓
SRN	A46 (M1 to A52) Southbound	27:25	29:50	8.9%	✓	24:35	25:42	4.5%	✓	24:13	26:53	11.0%	✓

Table 4.10: A50 Groby Inbound Journey Time Route by Section

Location	Distance (km)	AM Peak Hour Observed Time (min)	AM Peak Hour Observed Speed (kph)	AM Peak Hour Modelled Time (min)	AM Peak Hour Modelled Speed (kph)	AM Peak Hour Section Diff	Interpeak Hour Observed Time (min)	Interpeak Hour Observed Speed (kph)	Interpeak Hour Modelled Time (min)	Interpeak Hour Modelled Speed (kph)	Interpeak Hour Section Diff	PM Peak Hour Observed Time (min)	PM Peak Hour Observed Speed (kph)	PM Peak Hour Modelled Time (min)	PM Peak Hour Modelled Speed (kph)	PM Peak Hour Section Diff
A46	0	0		0			0		0			0		0		
Opposite County Hall	1.5	4.2	20.8	1.9	45.9	-2.3	1.5	58.2	1.7	52.1	0.2	1.6	56.0	1.8	49.6	0.2
A563, New Parks Way	2.2	5.8	26.4	2.8	46.7	-0.7	2.3	56.7	2.5	53.1	0.1	2.6	44.2	2.7	49.1	-0.1
Fosse Road North	4.3	9.6	34.5	6.5	35.2	-0.1	5.0	48.1	5.8	38.9	0.6	5.4	46.0	6.4	34.9	0.9
Sanvey Gate	5.2	14.0	11.7	9.0	20.4	-1.9	7.4	20.8	7.8	25.6	-0.5	9.0	14.1	8.6	22.9	-1.4
A594, Vaughan Way	5.5	15.3	12.1	10.3	12.8	-0.1	8.5	14.7	8.9	14.8	0.0	11.5	6.4	10.0	11.5	-1.1

Section 5 – Summary of Findings

5.1 Summary of Base Year Model Review

5.1.1 PRTM represents an average weekday in April, May and June in 2014 for an AM Peak, average interpeak and PM Peak hour. This review focussed on the network within the defined Study Area, and the suitability of the model has been reviewed for use in the strategic assessment of the proposed Charnwood Local Plan.

5.1.2 A high-level review of the network within the Study Area has been completed for a number of key link and junction attributes and has also assessed the overall pattern of traffic flows and delays within Charnwood and the defined Study Area. As a result of this high-level network review, no significant outliers to the base year model coding or assignment results were identified.

5.1.3 Following this high-level review of the highway network, a more detailed network coding review of three key routes within the Study Area was undertaken. This more detailed network review considered the M1 between Junction 21 and 23a, the A46 between the M1 and the junction with the A606, and the A6 between the A46 and the M1. This review identified two coding errors in the network, namely:

- the section of the gyratory at the A46 / A6 Birstall Interchange between the A6 northbound exit and A6 southbound entry is coded as two lanes, whereas this section should be coded with three-lanes; and
- the A6 / Granite Way roundabout (to the east of Quorn) is incorrectly coded with flares on all approaches to the roundabout, whereas a flared approach is only present on the Granite Way approach.

5.1.4 Finally, a review of the base year model performance against observed traffic volumes and journey times within the Study Area has been undertaken. In terms of the screenlines and cordons within Charnwood, all these screenlines and cordons meet the defined TAG acceptability guidelines in all three modelled time periods. Across the wider Study Area, a total of 44 screenlines and cordons have been selected for this assessment, and there is a single failure to meet the TAG criteria in the AM Peak hour (for the Leicester City Inner Cordon in the outbound direction).

5.1.5 For the assessment of modelled and observed traffic volumes at individual count locations, across the Study Area the proportion of count sites which meet the defined TAG criteria area 87% in the AM Peak hour, 94% in the interpeak hour, and 86% in the PM Peak hour. All three time periods are therefore in excess of the TAG acceptability criteria of 85% of count locations. There is variation in this pass rate across the Study Area with the corresponding pass rates within Charnwood being 89% in the AM Peak hour, 93% in the interpeak and 82% in the PM Peak hour.

5.1.6 As detailed in Section 4.3, a shortfall of travel demand to the east of Syston has been identified within this review. Within the scope of this review it has not been possible to determine the underlying cause of this shortfall, such as local routeing or issues with the base year demand matrices. This understatement of base year traffic in this location is likely to persist within the forecasts, potentially overstating the available capacity on the road network in this area. When reviewing the results of the model forecasts, this potential overstatement of available capacity in this area should be considered.

5.1.7 In terms of journey times, the base year model achieves the TAG criteria for 91% of the routes selected within the Study Area in the AM Peak hour, 89% of routes in the interpeak hour, and 89% of routes in the PM Peak hour. As with the assessment of individual count locations, this is in excess of the 85% guideline detailed in TAG. There is variation in the proportion of journey times achieving the TAG criteria within the Study Area, with 83% of routes within Charnwood meeting the defined criteria in the AM Peak and PM Peak hours, and 94% of routes meeting the criteria in Charnwood in the interpeak hour.

5.2 Recommendations

5.2.1 The performance of the base year highway model against observed traffic counts and journey time surveys shows that the model exceeds the defined TAG acceptability guidelines across the Study Area. On this basis, and due to the limited number of coding corrections which have been identified as part of this review, the PRTM highway model is considered a suitable tool for assessing the new Charnwood Local Plan.

5.2.2 The analysis detailed in Figure 3.3 suggests that the two minor coding corrections identified as part of this review can be incorporated within the model without requiring a full recalibration of the model, which comes with significant cost and time impacts on the programme for this assessment. Given this, it is proposed that these two corrections are incorporated into the model for this application.

5.2.3 As discussed previously, a parallel assessment of proposed developments within Leicester City is ongoing. As part of the corresponding Base Year Model Review a limited number of network corrections were also recommended. Given the proposed updates to the highway network due to the findings of this model review, it is recommended that the updates identified as part of this parallel review of the base year model are also incorporated providing that they do not have an adverse effect on the performance of the base year model against observed traffic counts and journey times. These updates to the highway network are:

- corrections to the forecast year access arrangements for zone 5033; and
- updates to link lengths in the vicinity of the Leicester City Strategic Sites locations.

5.2.4 TAG Unit M3.1 states that a model can be defined as “fit for purpose” if robust conclusions can be drawn from the model outputs. It goes on to state that meeting the defined criteria for screenline, individual link flow and journey time performance does not automatically result in a model being “fit for purpose”, and conversely a model which does not meet these guidelines does not mean that it is not “fit for purpose”.

5.2.5 By considering the key findings of this review of the base year model as part of the assessment of the model forecasts, the PRTM highway assignment model is considered a suitable tool to draw robust conclusions on the forecast impacts of growth proposed in the Charnwood Local Plan.

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