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To: All Members and Substitute Members of the Joint Overview and Scrutiny Committee
(Other Members for Information)

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Date: 24 June 2016

Membership of the Joint Overview and Scrutiny Committee

Cllr Mike Band
Cllr Maurice Byham
Cllr Carole Cockburn
Cllr Brian Ellis
Cllr Patricia Ellis
Cllr Mary Foryszewski
Cllr John Fraser
Cllr Pat Frost
Cllr Michael Goodridge
Cllr Val Henry
Cllr Christiaan Hesse
Cllr Stephen Hill
Cllr Nicholas Holder
Cllr David Hunter
Cllr Peter Isherwood
Cllr Denise Le Gal
Cllr Denis Leigh
Cllr Peter Martin
Cllr Kika Mirylees
Cllr Sam Pritchard
Cllr Wyatt Ramsdale
Cllr David Round
Cllr Richard Seaborne
Cllr Simon Thornton
Cllr Bob Upton
Cllr Ross Welland
Cllr Liz Wheatley
Cllr Nick Williams
Cllr John Williamson

This meeting commenced on 27 June 2016 and was adjourned. This is the agenda for the reconvened meeting.

Dear Councillor

A RECONVENED meeting of the JOINT OVERVIEW AND SCRUTINY COMMITTEE will be held as follows:

DATE: MONDAY, 4 JULY 2016

TIME: 4.30 PM

PLACE: COUNCIL CHAMBER, COUNCIL OFFICES, THE BURYS, GODALMING

The Agenda for the Meeting is set out below.

Yours sincerely

ROBIN TAYLOR
Head of Policy and Governance

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NOTES FOR MEMBERS

Members are reminded that contact officers are shown at the end of each report and members are welcome to raise questions etc in advance of the meeting with the appropriate officer.

AGENDA

1. APOLOGIES FOR ABSENCE

   To receive any apologies for absence.

2. DECLARATIONS OF INTEREST

   To receive from members, declarations of interests in relation to any items included on the agenda for this meeting, in accordance with the Waverley Code of Local Government Conduct.

3. WAVERLEY BOROUGH LOCAL PLAN PART I: STRATEGIC POLICIES AND SITES - PRE-SUBMISSION DRAFT (Pages 5 - 116)

   The new Waverley Borough Local Plan Part 1 has reached a key stage in its development. The purpose of this report is to seek comments on the proposed submission version of Local Plan Part 1. The report summarises the evolution of the Plan and its key contents as well as explaining the process going forward. It also includes details of the most recent consultation on the emerging Plan and how this has informed the development of the pre-submission Plan.

   The report and its Annexes were circulated with the agenda for the meeting held on 27 June 2016, and the meeting was subsequently adjourned. Please refer back to this agenda for the full details. The observations raised at the first part of the meeting held on 27 June 2016, are now attached.

   Also attached is the Strategic Transport Assessment that was circulated, and the Stage 3 and Stage 4 documents from Mott MacDonald.

   Recommendation

   That the Joint Overview and Scrutiny Committee considers the draft Local Plan Part 1 and forwards any comments to the Executive.

4. EXCLUSION OF PRESS AND PUBLIC

   To consider the following recommendation of the motion of the Chairman:-

   Recommendation

   That pursuant to Procedure Rule 20 and in accordance with Section 100A(4) of the Local government Act 1972, the press and public be excluded from the meeting during consideration of the following item(s) on the grounds that it is likely, in view of the nature of the business to be transacted or the nature of the

proceedings, that if members of the public were present during the item(s), there would be disclosure to them of exempt information (as defined by Section 100I of the Act) of the description specified in the appropriate paragraph(s) of the revised Part 1 of Schedule 12A to the Act (to be identified, as necessary, at the meeting).

5. ANY ISSUES TO BE CONSIDERED IN EXEMPT SESSION

To consider matters (if any) relating to aspects of any report on this agenda which is it felt may need to be considered in Exempt session.

For further information or assistance, please telephone Emma McQuillan, Democratic Services Manager, on 01483 523351 or by email at emma.mcquillan@waverley.gov.uk

OBSERVATIONS FROM THE JOINT OVERVIEW AND SCRUTINY COMMITTEE – 27 JUNE 2016

There were a number of specific requests made by the Committee for parts of the Draft Plan to be amended or the wording of paragraphs to be reviewed, and these relate to the following areas:-

1. Policy AHN3: Housing Types and Size - to include a definition of older people;
2. Policy TD1: Townscape and Design - to check the phrasing of paragraph 3 relating to town and village design statements and neighbourhood plans to ensure that it clearly demonstrates the Council's support for both the preparation of the plans and their delivery;
3. Ensure that the comments on page 9 relating to the Dunsfold Aerodrome site and the need for appropriate transport mitigation are consistent within Section 18;
4. Section 18: Strategic Sites – officers to check the calculation of numbers of homes that would be forthcoming from the sites in this section.

5. Paragraph 6.15: Check the reference to the amount of housing that can potentially be delivered between 2016 and 2021.

6. Review the Housing Trajectory (Appendix C), particularly in terms of the development likely to come forward early in the Plan period.

More generally, the Committee raised the following points which it was agreed would merit consideration by the Executive:-

1. to include a paragraph in the Spatial Strategy relating to the Housing Market Assessment that explains why it is not possible to match the distribution of homes across the Borough with the housing need, especially in terms of affordable housing;

2. concern about the air quality in certain traffic hot spots in the Borough and members requested that the Plan is consistent with the most up to date evidence, including the 2014 report produced by Public Health England;

3. the request for an up-to-date Infrastructure Delivery Plan to be provided because most of the concerns raised at the meeting related to infrastructure and mitigation measures. Officers were in the process of pulling together an updated schedule of responses from Infrastructure Providers which would be shared with members. Members also requested that specific contact be made with those providers who are not currently able to meet their targets, or where there are concerns about capacity, such as Thames Water and the South East Ambulance Services; Members also asked for a review of the information on broadband provision and the comments from the rail operators about their infrastructure requirements;

4. the need to find infill sites in rural areas to provide a limited number of affordable homes, especially when it is only possible to deliver smaller developments in these areas which would be below the threshold where affordable housing is normally required;

5. the plan to expand on some of the more strategic infrastructure measures that are outside of the Borough/cross-boundary but which are likely to impact on the feasibility of our mitigation measures and ability to deliver developments;

6. inclusion of a reference to highway safety implications in the Plan especially with regard to the cumulative impact of safety issues to be addressed, in addition to those considered individually in the planning application process. Officers undertook to discuss this further with colleagues at Surrey County Council;

7. ensure that the Plan makes appropriate references to the NPPF requirement to deliver good design;

8. add a reference to the need for development proposals at Dunsfold Aerodrome to take account of the potential impact on Cranleigh; and

9. the need for a more specific reference to the outstanding issues regarding the A3 and the implications of improvements not coming forward.

Transport Assessment

Scenarios for Distribution of Housing Growth-
Stage 3 Report

June 2016

Waverley Borough Council

Transport Assessment

Scenarios for Distribution of Housing Growth-
Stage 3 Report

June 2016

Waverley Borough Council

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Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
A	October 2015	S Finney	R Khakh	N Richardson	1st issue
B	November 2015	S Finney	R Khakh	N Richardson	2nd issue
C	June 2016	S Finney	R Khakh	N Richardson	3rd issue

Contents

1 Introduction

Mott MacDonald has been commissioned by Waverley Borough Council (WBC) to provide advice in relation to planning for new development as part of their Local Plan. This report covers Stage 3 of the work, following on from the Stage 1 and Stage 2 Reports (February 2016).

1.1 Background

WBC consulted on a new Local Plan from 3 September - 17 October 2014, through the 'Consultation on Potential Housing Scenarios and Other Issues for the Waverley Local Plan' document. Four scenarios to meet the predicted demand for new housing were presented:

"Each would deliver 8,450 homes over the period from 2013 to 2031, equivalent to just over 469 homes per year on average. This includes the 3,400 on sites within settlements. The distribution of the remaining 5,050 homes differs between the scenarios as follows:

- Scenario 1 – Around 4,450 on greenfield sites at the four larger settlements, some growth at villages (600) but no development at Dunsfold Aerodrome
- Scenario 2 – Around 2,650 on greenfield sites at the four larger settlements, some growth at the villages (600) plus 1,800 at Dunsfold Aerodrome
- Scenario 3 – Around 1,900 on greenfield sites at the four larger settlements, some growth at the villages (550) plus 2,600 at Dunsfold Aerodrome
- Scenario 4 – Around 1,200 on greenfield sites at the four larger settlements, some growth at the villages (450) plus 3,400 at Dunsfold Aerodrome."

Supporting evidence for this consultation included a Strategic Transport Assessment of scenarios undertaken by Surrey County Council (SCC) on behalf of WBC, as well as a 'Planning Position Statement from Promoters of Dunsfold Aerodrome: August 2014'. Within this report the scenarios modelled are referred to as the STA Scenarios, which are different to those consulted on by WBC.

1.2 Scope of Work

Stages 1 and 2 of the assessment have focused on the A281 corridor (Alfold to Guildford town centre gyratory).

Stage 3 of the work considers the potential impact of housing developments in and around Farnham and uses the Farnham Traffic Model that was developed by SCC. This report includes a review of the traffic model and details existing levels of congestion in and around Farnham. The impact of additional housing for Farnham is then considered for two development scenarios, based on predicted increases in traffic demand provided by SCC from their strategic traffic model that covers the whole county. Potential mitigation measures to address the predicted future congestion issues are also considered and their impact assessed.

2 Farnham Traffic Model

2.1 Details of Model

SCC has developed a micro-simulation traffic model covering Farnham and the roads immediately around the town, including the Wrecclesham, Rowledge, Hale and Badshot Lea areas, as shown in **Figure 2.1.**

The model uses S-Paramics software, which is an internationally recognised microsimulation traffic flow modelling program. It simulates the individual components of traffic flow and congestion, and presents its output as a real-time visual display for traffic management and road network design.

The model was originally built in 2004 to cover the PM peak period. In 2011, the model was reviewed and updated to a 2010 base year for both AM and PM peak periods, for the assessment of highway schemes within Farnham town centre. The model was further improved in 2012 but retained a 2010 base year, covering the following periods for an average weekday:

- AM peak hour 08:00-09:00; and
- PM peak hour 17:00-18:00.

Traffic is assigned to the road network through 83 zones which represent the origin/destination of vehicle trips, such as car parks, residential and employment areas and the radial routes at the edge of the model.

Modelled vehicles on the road network mimic real-life behaviour, such as giving way to each other at priority and roundabout junctions, using a range of 'desired' speeds and faster vehicles overtaking slower ones. At signalised junctions and pedestrian crossings, appropriate 'green times' are assigned to the different movements, including at the railway level crossing south of Hickley's Corner. Four of the junctions are controlled on site with MOVA to optimise signal timings to match the variation in traffic demand over the day and within the peak hours. This is replicated within the model at the following junctions:

- A287 Folly Hill junction with A3016 Upper Hale Road (J702);
- A31 Farnham Bypass junction with Shepherd & Flock Roundabout (J705);
- A31 Farnham Bypass junction with South Street and Station Hill (Hickley's Corner) (J721); and
- A31 Farnham Bypass junction with D5317 Weydon Lane (J748).

Different vehicle classes (and their different characteristics such as acceleration rates, vehicle length etc) are modelled as follows:

- car - petrol;
- car - diesel (to give air quality data);
- Light Goods Vehicle (LGV);
- Oversized Goods Vehicle 1 (OGV1);
- Oversized Goods Vehicle 2 (OGV2); and
- coach.

Scheduled bus services are included based on timetabled routes and frequencies.

Figure 2.1: Extent of Traffic Model

Source: Farnham Microsimulation Model, Local Model Validation Report, July 2013

2.2 Observed Traffic Demand

Although the model has a base year of 2010, traffic demand has been derived from traffic counts undertaken between 2004 and 2012 from a number of sources:

- Classified counts (traffic volumes on a single weekday, split into vehicle classes);
- Automatic traffic counts (giving average weekday volumes over one or more weeks); and
- Automatic Number Plate Recognition surveys (used to determine origin and destination of trips but also provide traffic volumes).

There is no apparent factoring applied to counts from earlier years to bring them in-line with later years and take into account possible growth. However, data from long term ATC sites (detailed in Section 3) show that there has generally been no traffic growth between 2009 and 2014. Counts are also available from 2009-2012 on the A31 and most of the main radial routes to/from Farnham town centre and within the centre itself. The modelled flows generally match these more recent counts adequately, therefore the validation is acceptable as representing 2010. The lack of traffic growth over recent years also means that the model can be taken as a proxy for 2014/15 traffic conditions.

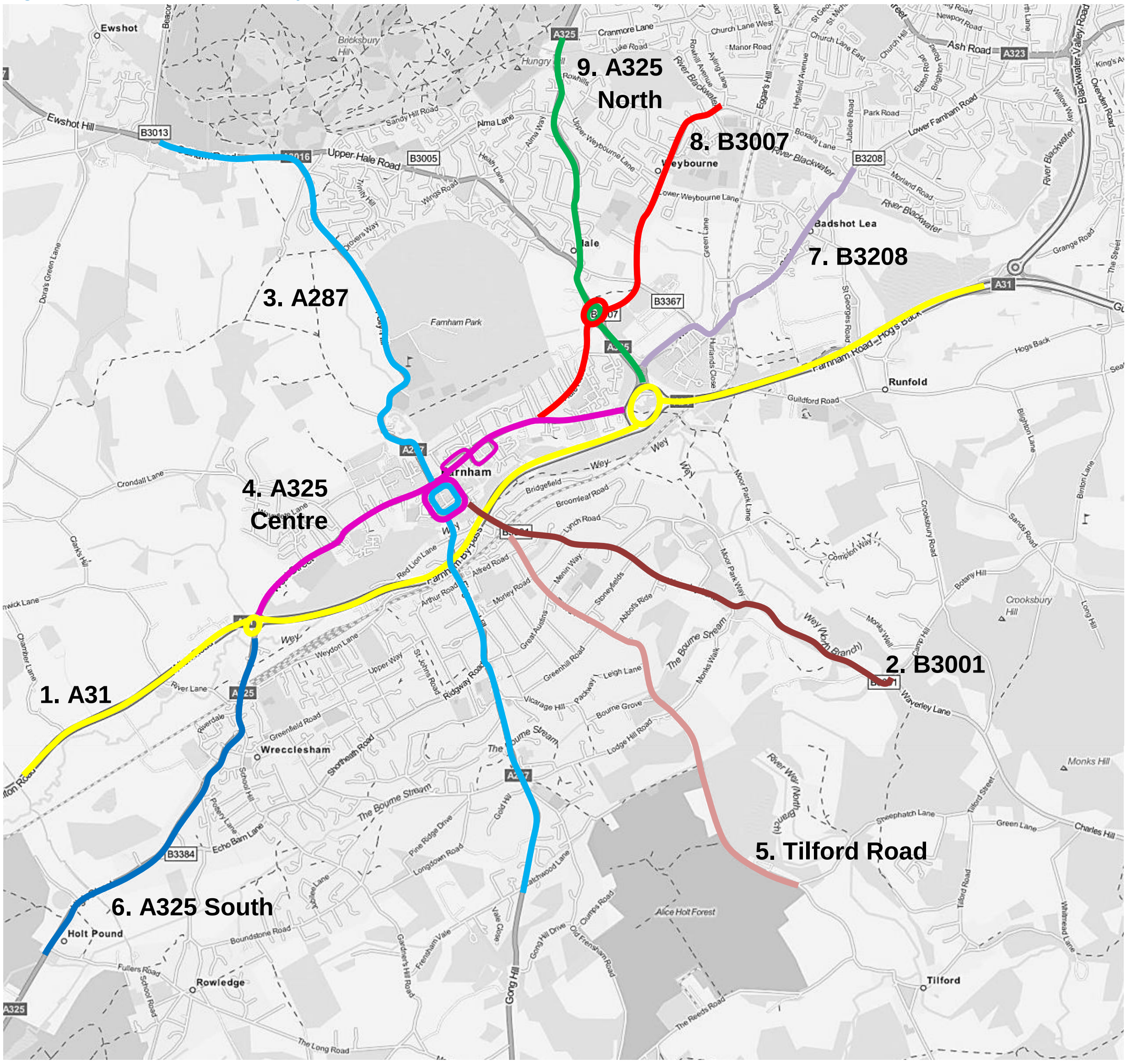
2.3 Observed Journey Times

Observed journey times were obtained from the Congestion and Journey-time Acquisition and Monitoring System (CJAMS). CJAMS is developed by Mott MacDonald and holds observed journey time information from in-vehicle global positioning systems. Tuesday to Thursday weekday data (excluding school holidays) was extracted for the school year 2010/11 (01/09/10 – 01/08/11). This was the most recent data available at the time of the 2012 model update, and was used to calibrate and verify model values of delay, speed and journey times. As such, the model is validated to congestion levels for an average schoolday over the whole year, rather than for a particular month (it is usual practice to build traffic models that represent a 'neutral' month i.e. in March, April, May, June, September, October or November[1]).

The main journey time routes that have been evaluated are shown in **Figure 2.2.**

1 Transport Analysis Guidance Unit M1.2, Data Sources and Surveys, Department for Transport, January 2014

Figure 2.2: Farnham Journey Time Routes



Source: Routes as in Local Model Validation Report, © OpenStreetMap contributors

Table 2.1 shows the observed average journey times on each of these routes for the AM hour, with the PM results in **Table 2.2.** Note that the length of route is different in each direction as the start and end points are not necessarily in exactly the same location and some routes involve one-way loops in the town centre.

Table 2.1: Journey Times – AM Peak Hour

			Length (m)	Modelled Time (mins)	Observed Time (mins)	Observed Delay (mins)	Ave Speed (kph)
1	A31	Westbound	6934	6.8	7.6	2.5	55
	A31	Eastbound	6613	11.7	10.9	5.7	36
2	B3001	Southbound	3187	5.0	5.6	1.3	34
	B3001	Northbound	3204	7.4	7.1	2.3	27
3	A287	Southbound	6881	14.0	14.0	5.6	29
	A287	Northbound	5728	13.8	12.1	4.9	28
4	A325 Centre	Eastbound	3118	8.2	6.8	2.4	27
	A325 Centre	Westbound	3645	7.8	8.2	2.8	27
5	Tilford Rd	Northbound	3355	4.8	6.0	1.8	33
	Tilford Rd	Southbound	3355	3.7	4.8	1.0	42
6	A325 South	Northbound	2808	8.3	7.3	4.2	23
	A325 South	Southbound	2816	3.1	3.8	0.9	45
7	B3208	Southbound	2124	4.2	4.0	1.1	32
	B3208	Northbound	2084	3.3	3.5	0.7	35
8	B3007	Southbound	2526	5.2	6.0	3.1	25
	B3007	Northbound	2683	6.4	6.4	3.2	25
9	A325 North	Southbound	2662	5.5	5.9	2.7	27
	A325 North	Northbound	2383	4.8	5.7	2.8	25

Table 2.2: Journey Times – PM Peak Hour

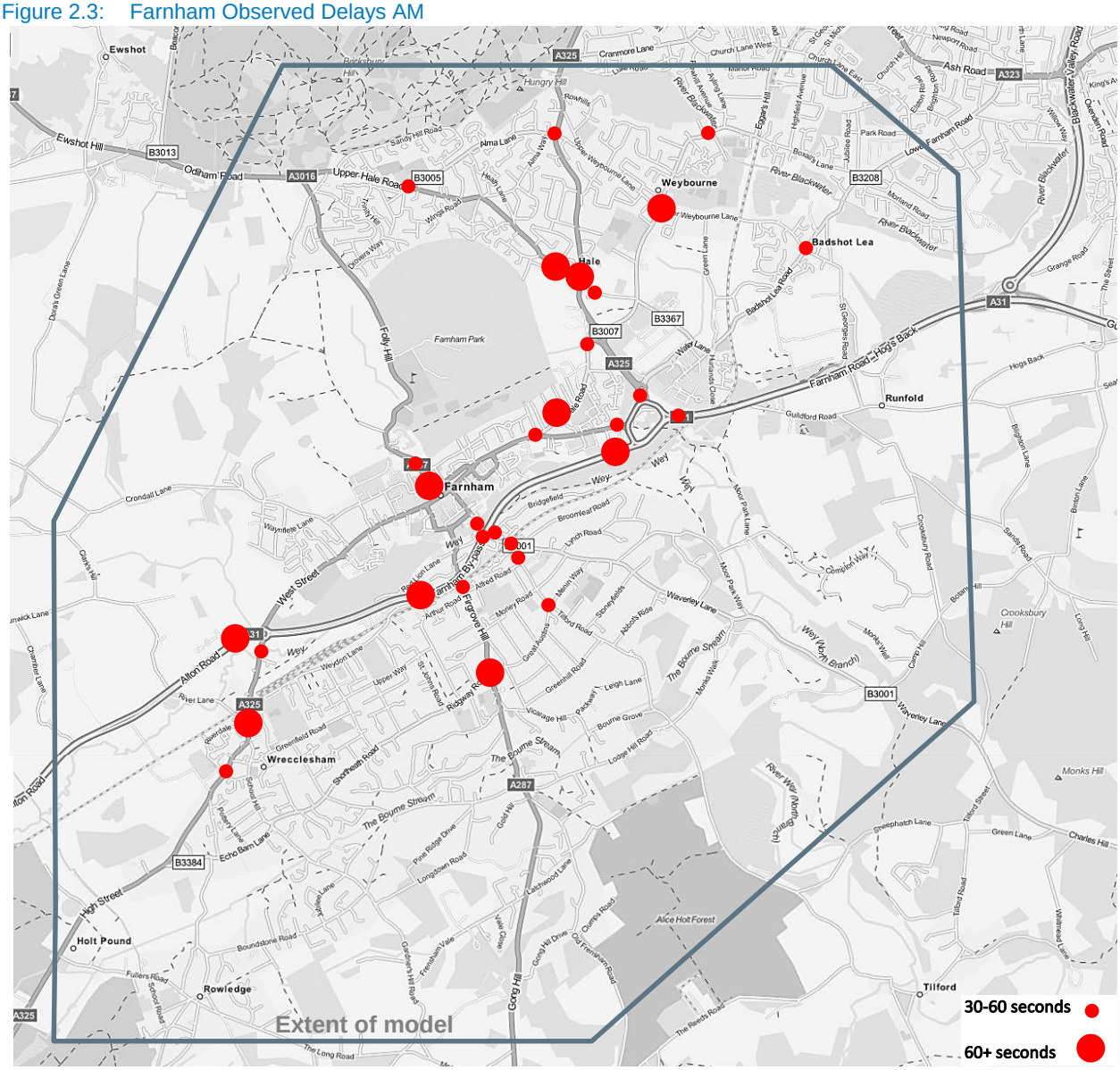
			Length (m)	Modelled Time (mins)	Observed Time (mins)	Observed Delay (mins)	Ave Speed (kph)
1	A31	Westbound	6934	13.0	12.5	7.4	33
	A31	Eastbound	6613	6.5	7.6	2.3	52
2	B3001	Southbound	3187	5.2	6.0	1.6	32
	B3001	Northbound	3204	7.0	7.3	2.6	26
3	A287	Southbound	6881	9.8	13.7	5.3	30
	A287	Northbound	5728	9.1	10.1	2.9	34
4	A325 Centre	Eastbound	3118	7.2	7.4	3.0	25
	A325 Centre	Westbound	3645	8.8	10.4	5.0	21
5	Tilford Rd	Northbound	3355	4.3	5.3	1.1	38
	Tilford Rd	Southbound	3355	3.5	4.1	0.4	49
6	A325 South	Northbound	2808	3.6	4.3	1.3	39
	A325 South	Southbound	2816	3.3	4.2	1.3	40
7	B3208	Southbound	2124	4.2	4.4	1.6	29
	B3208	Northbound	2084	3.5	4.2	1.4	30
8	B3007	Southbound	2526	4.8	4.3	1.4	35
	B3007	Northbound	2683	5.5	5.7	2.4	28
9	A325 North	Southbound	2662	6.0	5.4	2.2	30
	A325 North	Northbound	2383	4.5	4.9	2.0	29

Within CJAMS, delays at junctions for busier hours are estimated based on the observed journey times during off-peak periods and these are included in the table above. **Figure 2.3** shows the locations where delays of over 30 seconds were experienced on links in the AM peak hour on an average schoolday in 2010/11 (at the end of each link where it meets the junction).

Figure 2.4 shows a 'snapshot' from the AM traffic model in which yellow circles show the areas where there is queuing, with the size of the circle proportional to the number of queuing vehicles. It should be noted that this diagram only represents one instant within the peak hour, rather than average levels of queuing. Nevertheless, the diagram shows that queues generally occur in the model at the same locations where there were observed delays.

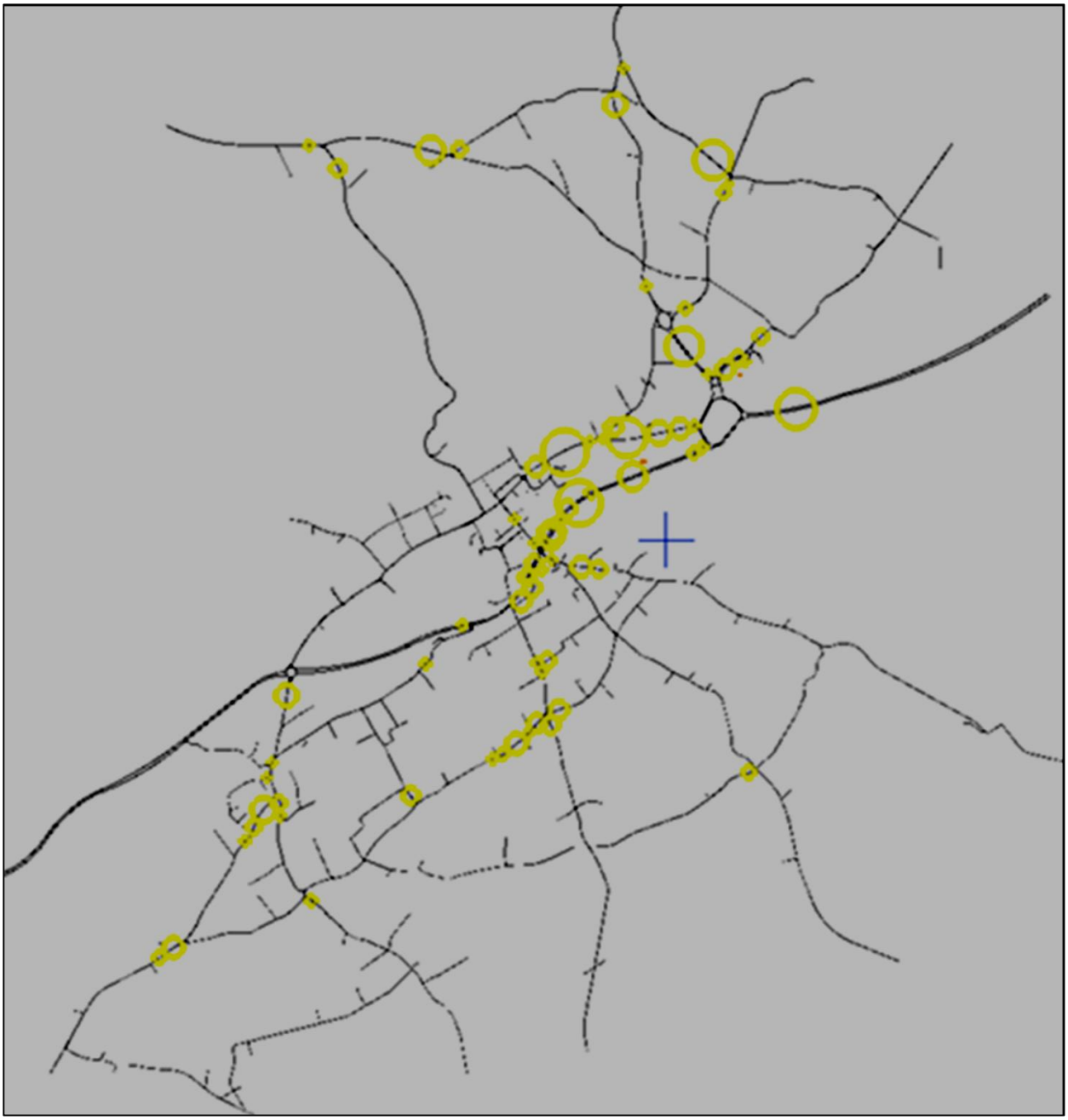
Similarly, the locations of delays/congestion in the PM peak hour are shown in **Figure 2.5** and **Figure 2.6**.

Figure 2.3: Farnham Observed Delays AM



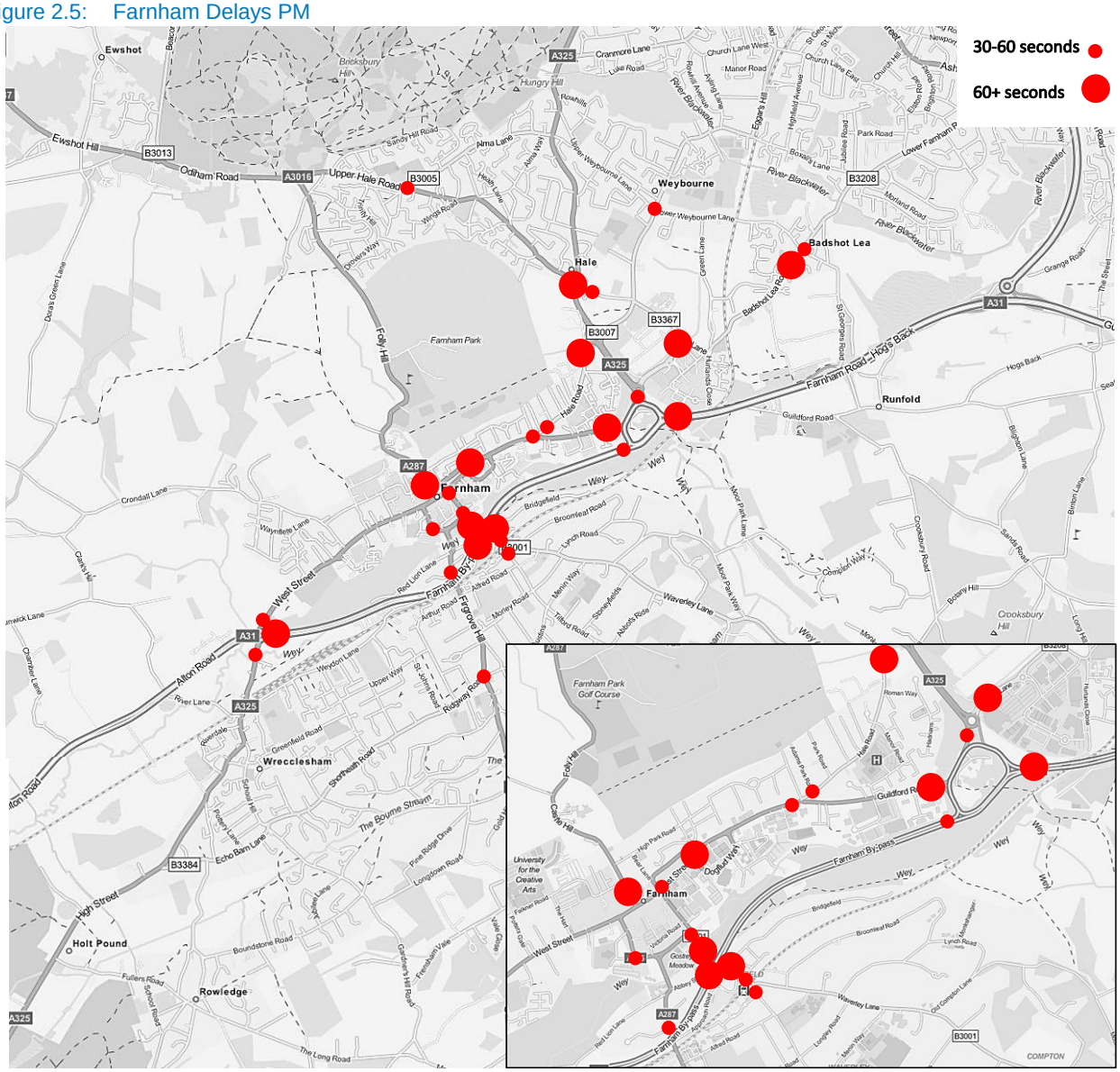
Source: CJAMS data, © OpenStreetMap contributors

Figure 2.4: Snapshot of Modelled Congestion Points AM



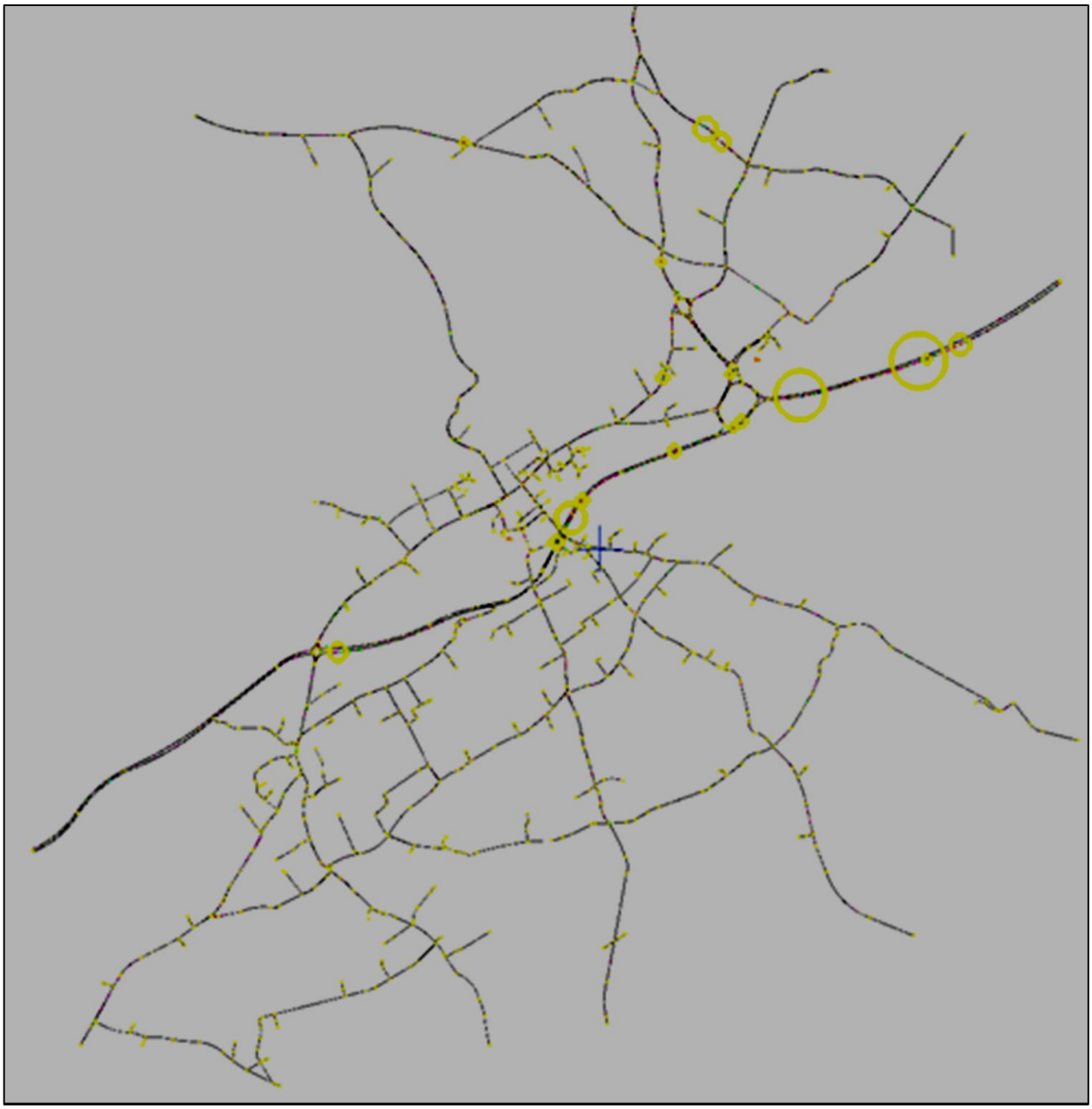
Source: Paramics Base Model

Figure 2.5: Farnham Delays PM



Source: CJAMS data, © OpenStreetMap contributors

Figure 2.6: Snapshot of Modelled Congestion Points PM



Source: Paramics Base Model

The main locations that experience delays are outlined below:

A31 Shepherd and Flock Roundabout

The capacity of the junction is constrained by the signals at the roundabout, with excess traffic demand leading to the eastbound delays in the AM peak. This leads to queuing back through Hickley's Corner, with delays shown on the links at this junction. In the PM peak there are westbound queues back from the roundabout signals towards the A331 junction.

Long queuing also forms on the A325 eastbound approach in the AM peak, blocking back into the town centre.

Queuing on the southbound approach blocks through the B3208 roundabout in the AM peak and reaches the Six Bells roundabout, in turn, causing queuing on approaches to this junction. Similarly, the constraint causes queuing on the westbound B3208 Water Lane.

A31 Hickley's Corner

In the PM peak this junction is the main constraint to throughput, with westbound queues extending back to the Shepherd and Flock Roundabout, but the junction also contributes to eastbound delays in the AM peak. In both peaks, queuing on northbound Station Hill extends past the rail station and level crossing and southbound queues can extend back into the town centre.

A31 / A325 Coxbridge Roundabout

The roundabout causes some congestion in both peak hours.

A325 Farnborough Road / A3016 Upper Hale Road Signals

The signal junction causes some delays in both peak hours.

A325 Wrecclesham Road

Some queuing and delays, mainly in the AM peak, due to the roundabout and numerous priority junctions as the A325 passes through Wrecclesham.

A287 Firgrove Hill / Ridgway Road Signals

The signalised crossroads cause some queuing, mainly in the AM peak.

A287 Folly Hill / A3106 Upper Hale Road Signals

The signals cause some queuing in the AM peak for A287 eastbound traffic due to right turning traffic blocking the ahead movement.

2.4 Model Validation

The adequacy of a traffic model is judged on how well it matches observed data or 'validates'. For traffic volumes, 85% of links should meet the validation criteria set out in the Department for Transport's guidelines (WebTAG). This is achieved for both peak hours in the Farnham model as detailed in **Table 2.3.** However, there is a slight concern with the model in that around two-thirds of the modelled flows are lower than the observed, even for counts from 2004-2009, whereas it may be expected that around half would be lower and half higher.

Table 2.3: Link Count Validation

		AM			PM		
Year	No. of counts	Validates	% Validate	Model flow less than observed	Validates	% Validate	Model flow less than observed
2004	67	63	94%	44	65	97%	44
2005	2	2	100%	2	2	100%	2
2006	18	16	89%	9	15	83%	7
2007	14	12	86%	10	11	79%	11
2008							
2009	9	8	89%	4	7	78%	2
2010	54	44	81%	32	48	89%	31
2011	6	6	100%	3	6	100%	2
2012	63	59	94%	37	60	95%	34
Total	233	210	90%	141	214	92%	133

In terms of journey times, the model also validates according to the WebTAG requirement that 85% of measurements should be within 15% of the observed value or within one minute if this is lower. 19 out of the 22 routes meet the validation criteria in both peaks equating to 86%. However, in both the AM and PM peaks, many modelled journey times are less than that observed, with the overall modelled journey time being 2% lower in the AM peak and 11% lower in the PM peak. Given that the modelled flows are generally lower than observed, it follows that the journey times are likely to be lower.

The conclusion of the model review is that the modelled flows and journey times are generally understated to some degree, compared to the observed data, but that the model validates successfully in terms of the published guidelines.

3 Historic Traffic Growth

3.1 Automatic Traffic Count Locations

Figure 3.1 shows the locations of long term automatic traffic counters (ATC), from which average weekday traffic volumes have been extracted for each year between 2009 and 2014 where available. Flows shown are generally for a neutral month (April, May, June or September) and, where possible, the month is the same for each year.

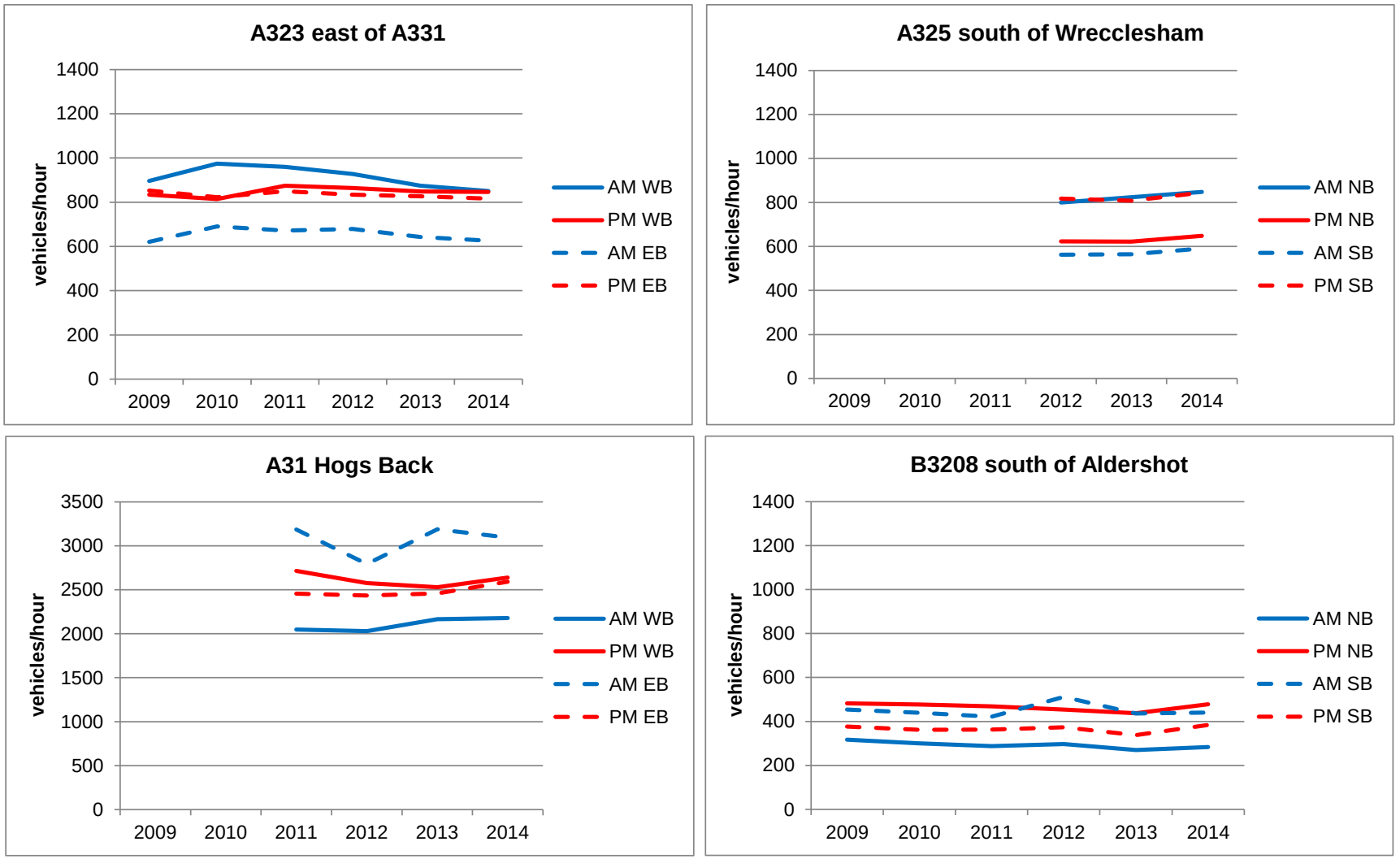
Figure 3.2 and **Figure 3.3** show the AM and PM peak hour volumes at each of the ATC sites, with daily volumes shown in **Figure 3.4** and **Figure 3.5**. The graphs show that there has generally been no growth in peak hour or daily flows over the past 5 years, although there has been some increase on the B3007 in the AM peak since 2012. On the A31, west of the A325 Coxbridge roundabout, the data shows a trend of reduced volumes year on year.

The conclusion from the ATC data is that the base model year of 2010/11 should still be representative of traffic demand in 2014.

Figure 3.1: ATC Location Plan

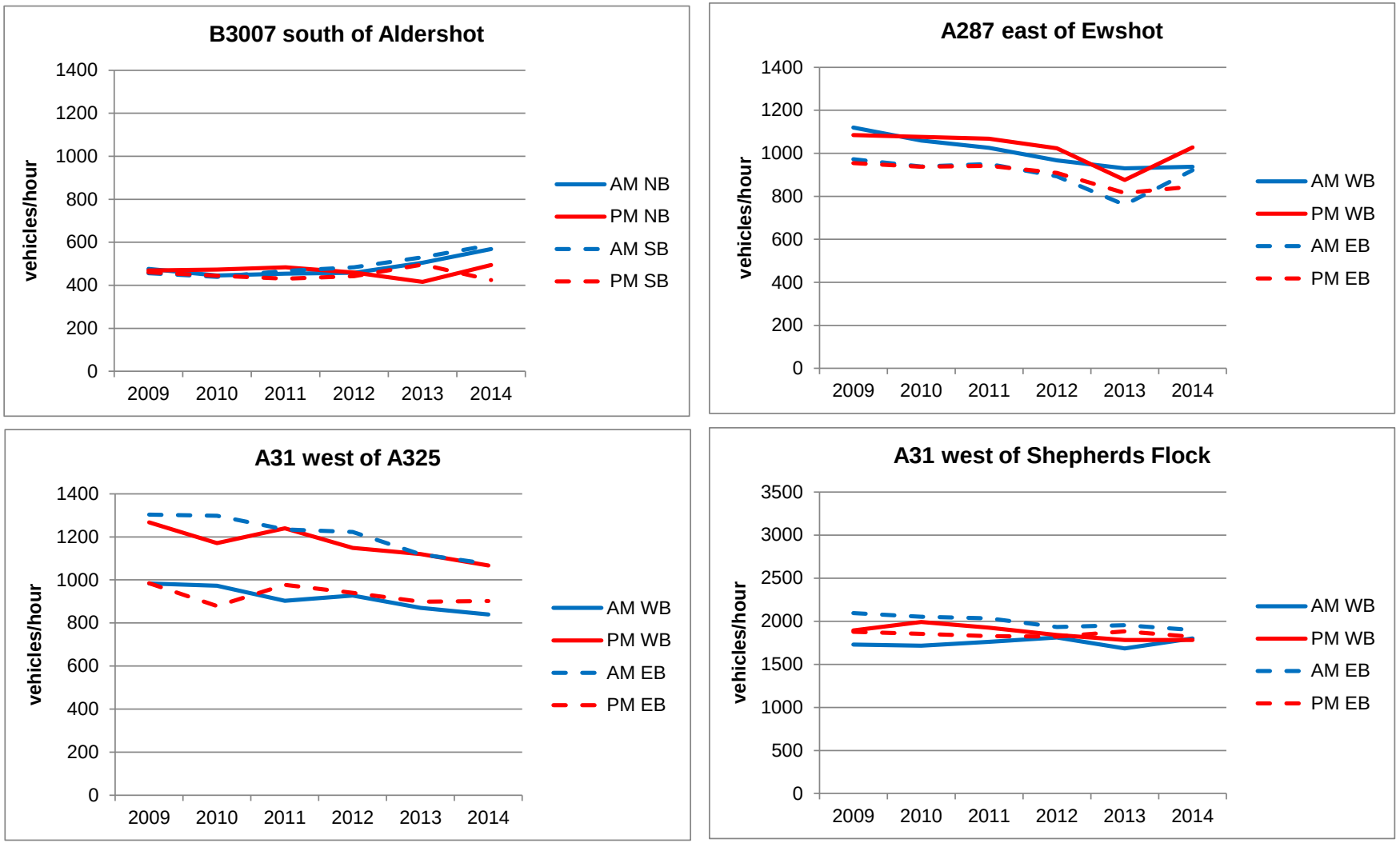
Source: © OpenStreetMap contributors

Figure 3.2: Peak Hour Volumes 1 of 2



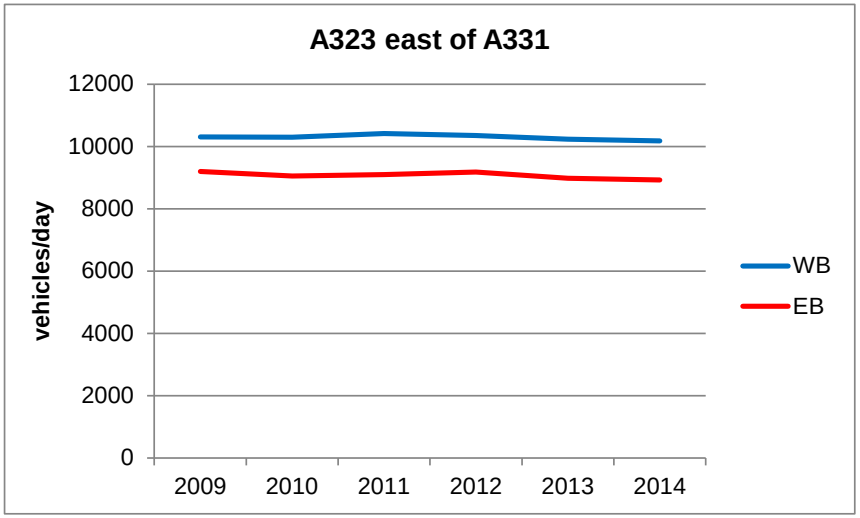
Source: SCC traffic counts

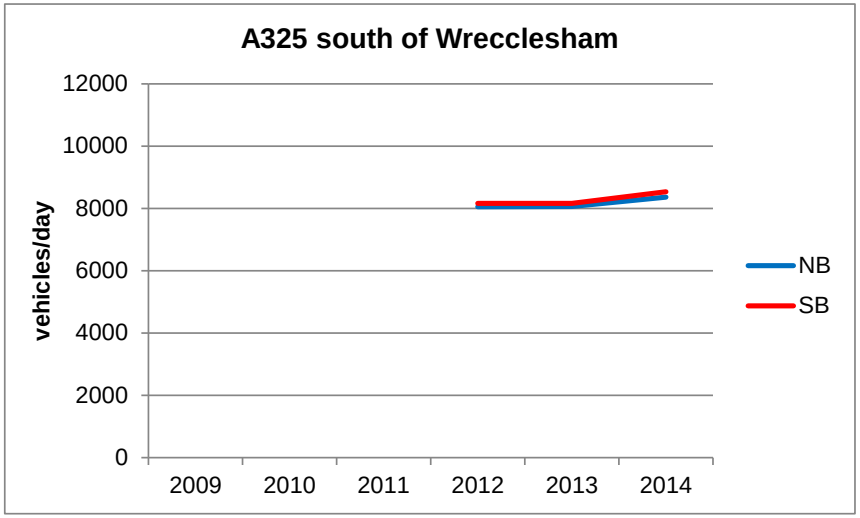
Figure 3.3: Peak Hour Volumes 2 of 2

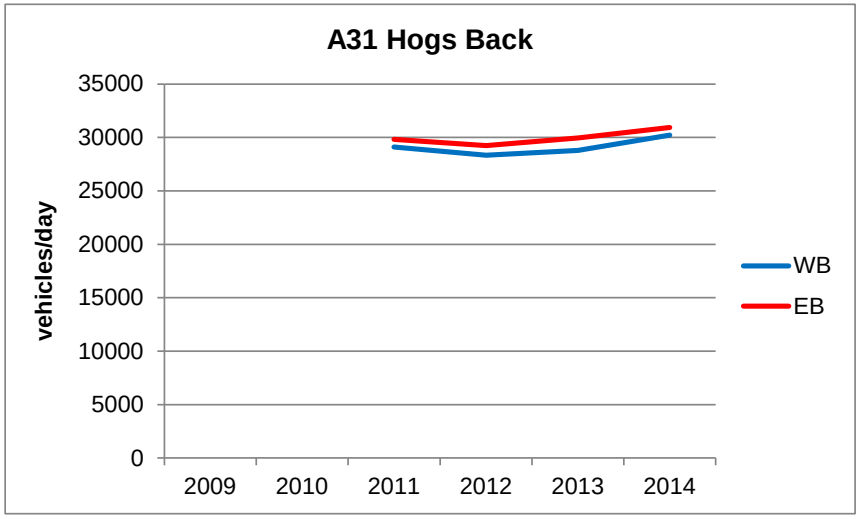


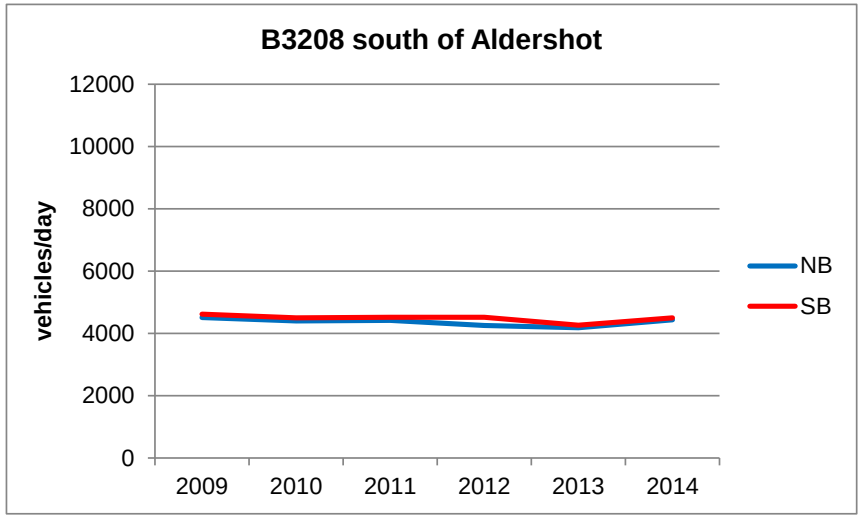
Source: SCC traffic counts

Figure 3.4: Daily Volumes 1 of 2



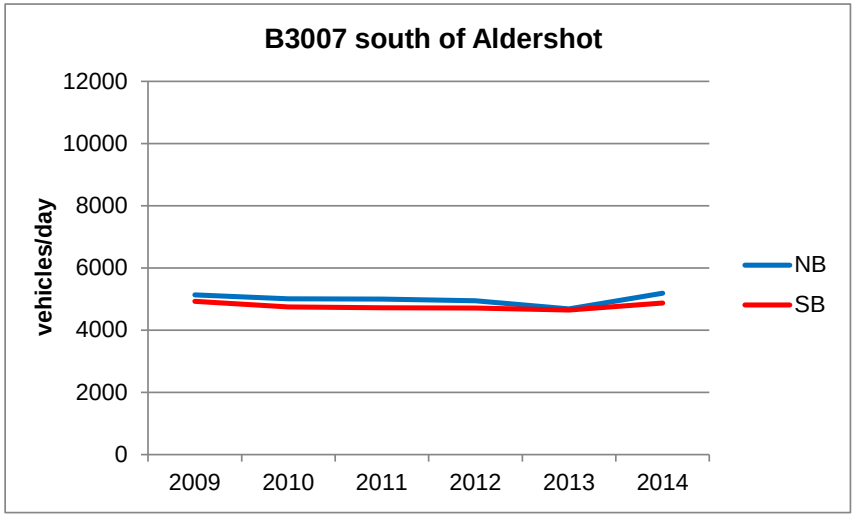


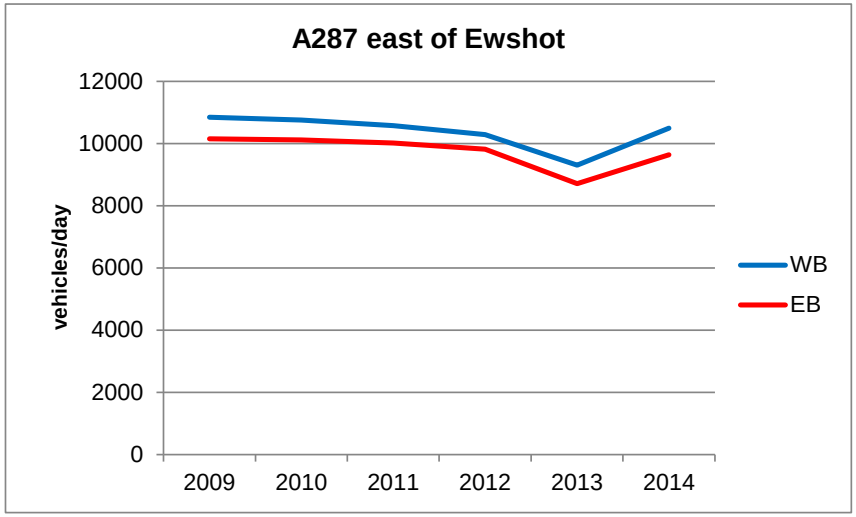


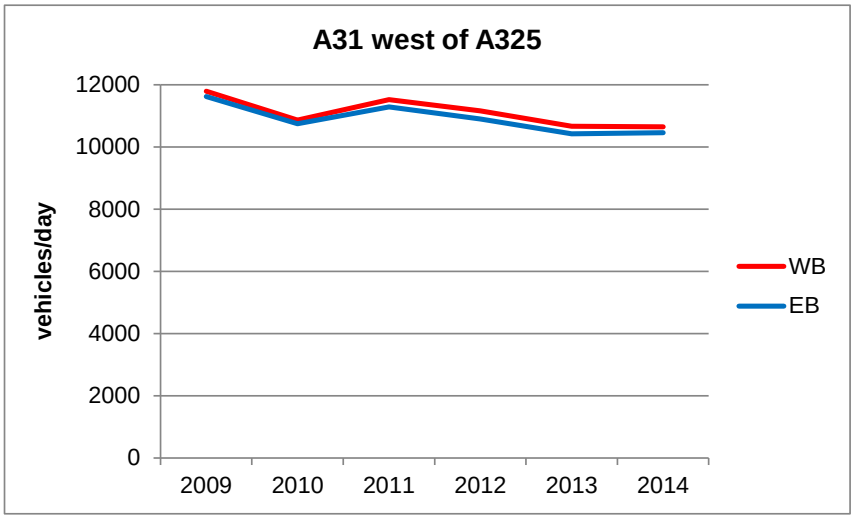


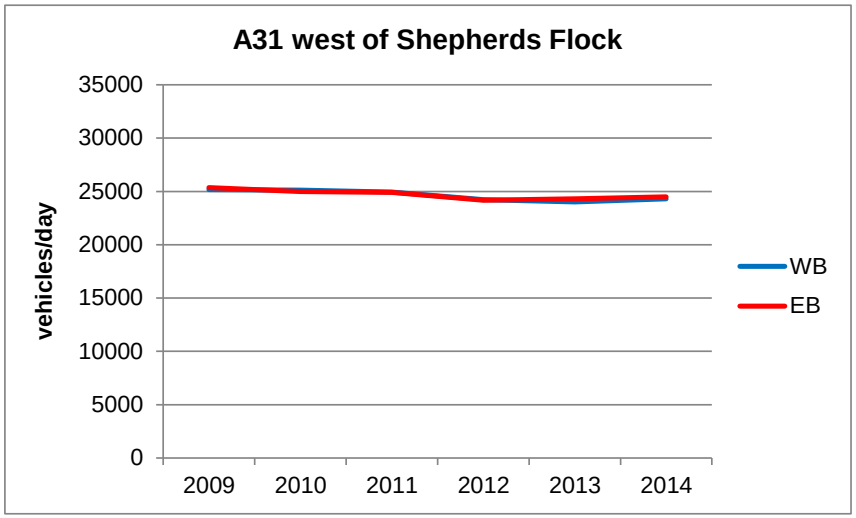
Source: SCC traffic counts

Figure 3.5: Daily Volumes 2 of 2









Source: SCC traffic counts

4 Future Year Congestion

4.1 Traffic Growth

Predicted traffic growth for the Farnham area has been estimated based on SCC's strategic traffic model (SINTRAM). For their Strategic Transport Assessment (reported in September 2014), SCC modelled four different development scenarios for Waverley in 2031, which were then compared to the 2009 base model. For this work, the increase in traffic demand for trips to, from, within and passing through the Farnham area has been extracted for two of the scenarios. Note that the STA scenarios are not the same as the development scenarios that were consulted on by WBC.

The numbers of additional homes in each of the main settlement areas with the two STA scenarios under consideration are detailed in **Table 4.1**:

Table 4.1: STA Modelled Scenarios for 2031

Scenario	Type	Farnham	Godalming	Cranleigh	Dunsfold	Total
STA Scenario 2	Brownfield	1140	882	383	1800	4205
	Greenfield	1139	210	774	0	2123
	Total	2279	1092	1157	1800	6328
STA Scenario 3	Brownfield	1140	882	383	0	2405
	Greenfield	2660	994	1649	0	5303
	Total	3800	1876	2032	0	7708

Source: Extracted from SCC Strategic Transport Assessment Appendix A

STA Scenario 3 had around 1,500 more homes in Farnham, compared to STA Scenario 2 which was focused on 1,800 new homes at Dunsfold Park. STA Scenario 3 also had significantly more homes in Godalming and Cranleigh but trips from these areas will have less of an impact in Farnham. A 'Do Minimum' scenario has also been considered which has no additional housing in Farnham and the rest of Waverley, other than completed schemes and those with planning permission between 2009-2013.

The total trips were extracted for the AM peak period of 07:00-10:00 only, as this period was used for the Strategic Transport Assessment, giving the levels of traffic growth in **Table 4.2**:

Table 4.2: Traffic Growth Levels 2009-2031

Development Scenario	Car	LGV	HGV
Do Minimum	18.0%	13.5%	3.0%
STA Scenario 2	30.3%	18.2%	3.7%
STA Scenario 3	35.2%	25.3%	9.6%

Source: SCC from SINTRAM

The above factors take into account trips from the new homes in Farnham, but also other developments away from Farnham which would result in some trips to or through the Farnham area, including longer

distance trips using the A31. General traffic growth, such as from increased car ownership and reduction in relative fuel costs, is also allowed for in SINTRAM.

The factors were applied to all of the trips in the relevant vehicle classes in both the AM and PM peak hour models for Farnham. The impact of the traffic growth on journey times and congestion in and around Farnham is detailed in the following sections.

4.2 Future Journey Times

Error! Reference source not found. details the predicted journey times on the 9 routes analysed in the AM peak, together with the increases compared to the base model and Do Minimum. **Figure 4.1 - Figure 4.18** show how the journey times increase over the length of each route with STA Scenarios 2 and 3, with steeper parts of the graph highlighting areas where delays are greatest. The process of extracting results from the runs follows the method used by Surrey CC and uses their spreadsheet as a template for the new results.

With STA Scenario 2, the largest increases in journey times are for northbound movements towards the town centre on the A325 northbound (18.3 minutes) and A287 northbound (13.6 minutes). Other routes that experience an increase of 6 minutes or more are the A31 in both directions and the radial routes towards the centre on the B3001 northbound, A287 southbound and B3007 southbound. In all cases it is clear that the increased delays are as a result of worsening of the existing congestion problems, with queues extending back and affecting a wider area.

With the higher levels of growth under STA Scenario 3 the journey times are higher, as would be expected, and similar routes to Scenario 2 experience increases in delays but the delays are around 3-5 minutes greater.

Results for the Do Minimum show that even with no additional housing in Farnham, some routes will experience significant increases in journey time, particularly the northbound A325 and A287 routes into the centre. However, the increased delay on these and other routes is a lot less than under STA Scenario 2 or 3.

The journey times in the PM peak (**Table 4.4)** show highest increases from the base year on the A325 passing through the town centre (both directions) and B3001 northbound for STA Scenario 2. Increases of 6 minutes or more also occur on the A287 (both directions), B3208 southbound, B3007 northbound and A325 southbound towards the centre.

With STA Scenario 3, the A325 routes through the town centre are around 3 minutes longer than STA Scenario 2; on other routes the difference is generally only around one minute or so. Again the increase in delay is generally due to existing problems getting worse but it is apparent that the town centre one-way system will also constrain north-south and south-north movements in the future, e.g. on the A287.

For the Do Minimum, there is a similar pattern to the STA Scenarios, with some routes experiencing increased delay but at a lower level, with increases of generally around 4 minutes at most.

The A31 Westbound route shows a slightly lower journey time in the PM peak with STA Scenario 3, compared to STA Scenario 2, which is not expected. The issue here is that there is a high level of congestion in both scenarios, which leads to queues extending back to the edge of the model and start of the journey time measurement route on the A31 Westbound, east of Farnham. Therefore, the journey time from the edge of the model is shown to be roughly the same as with STA Scenario 2, when in reality the queues and delays would be longer.

The reason that the STA Scenario 3 journey time is slightly lower is because there is variation in each model run that is carried out. All of the Paramics model runs have been run with a random seed. The random seed affects two variables – the vehicle release rate with their characteristics and the randomisation of vehicle interaction within the network. These together are used to represent normal day-to-day variability within the road network.

It is normal practice to run micro-simulation models numerous times and to take an average across the runs; this reduces the impact of any 'outliers' and creates more robust results. The number of runs required will vary depending on the network performance. The Farnham base model was initially run 40 times by Surrey County Council. Both STA Scenario 2 and 3 have been run 20 times for this analysis.

A number of junctions within the Farnham model are linked to PC MOVA software which takes adaptive control of the signal timings within Paramics to optimise junction capacity. The use of PC MOVA means that the signal timings for these junctions will vary between runs and, therefore, the demand assigned to each approach could vary between runs. This leads to a greater amount of reassignment, compared to fixed time signal operation, and adds to the level of variability between runs. It is this variability (which is an inherent part of the model to reflect normal day-to-day variations) that results in the journey time on the A31 being lower for Scenario 3; this difference is therefore not considered to be significant.

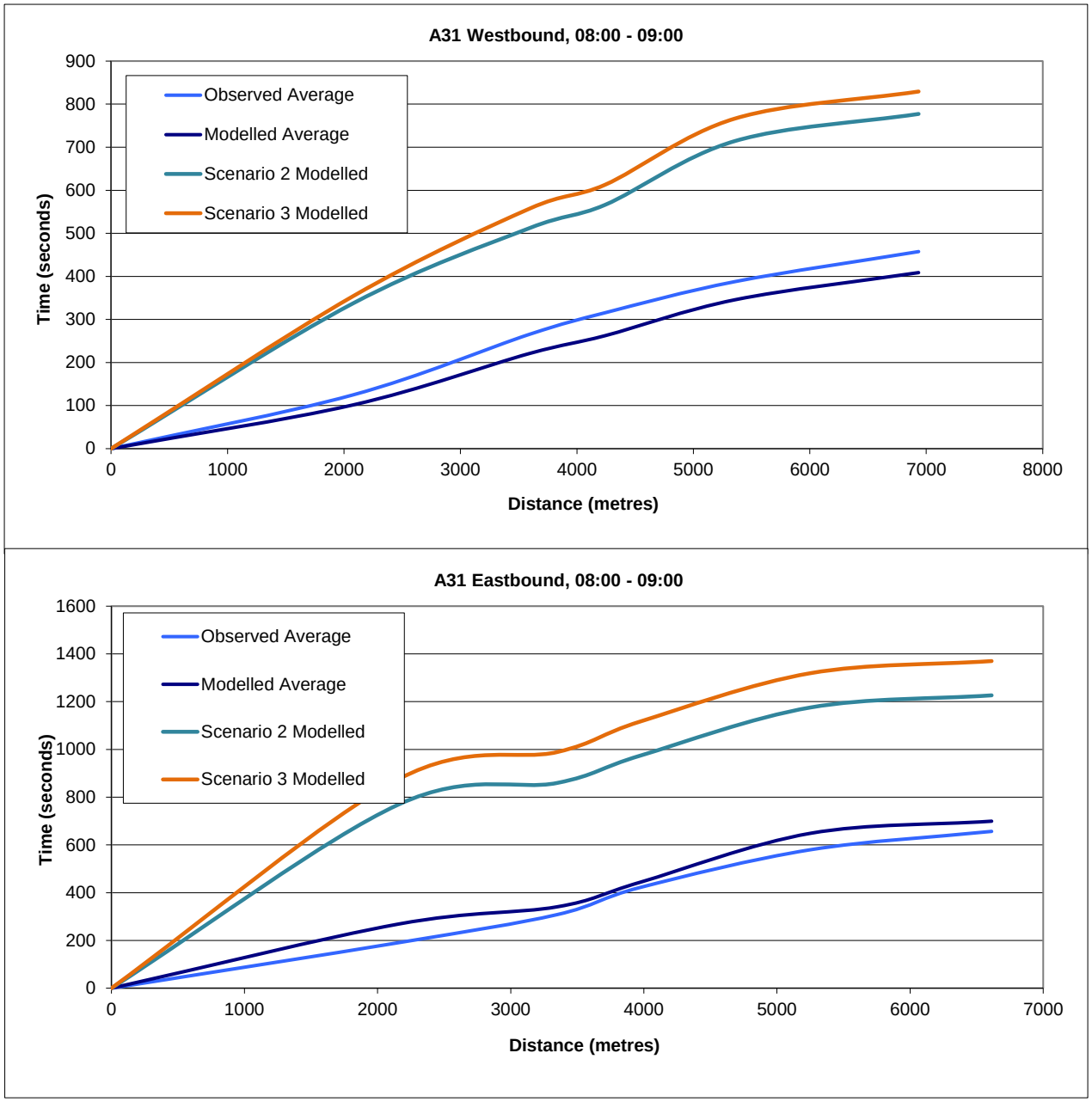
Table 4.3: Journey Times – AM Peak Hour

				Base Year	Future Do Minimum		STA Scenario 2			STA Scenario 3		
Ref	Route	Direction	Length (m)	Time (mins)	Time (mins)	Diff to Base (mins)	Time (mins)	Diff to Base (mins)	Diff to Do Min (mins)	Time (mins)	Diff to Base (mins)	Diff to Do Min (mins)
1	A31	Westbound	6934	6.8	11.5	4.7	13.0	6.1	1.5	13.8	7.0	2.4
	A31	Eastbound	6613	11.7	17.6	5.9	20.4	8.8	2.9	22.8	11.2	5.3
2	B3001	Southbound	3187	5.0	5.5	0.5	6.0	1.0	0.5	6.5	1.5	1.0
	B3001	Northbound	3204	7.4	12.4	5.0	16.8	9.4	4.4	21.0	13.6	8.6
3	A287	Southbound	6881	14.0	17.5	3.5	20.6	6.5	3.1	21.7	7.7	4.2
	A287	Northbound	5728	13.8	22.2	8.4	27.5	13.6	5.2	29.9	16.1	7.7
4	A325 Centre	Eastbound	3118	6.8	8.2	1.4	10.0	3.2	1.8	11.5	4.7	3.3
	A325 Centre	Westbound	3645	7.8	11.0	3.2	11.8	4.0	0.8	14.2	6.5	3.2
5	Tilford Rd	Northbound	3355	4.8	6.5	1.7	7.9	3.1	1.4	8.2	3.4	1.7
	Tilford Rd	Southbound	3355	3.7	3.8	0.1	4.0	0.4	0.3	4.3	0.6	0.5
6	A325 South	Northbound	2808	8.3	16.8	8.5	26.6	18.3	9.8	27.3	19.0	10.5
	A325 South	Southbound	2816	3.1	3.3	0.2	3.4	0.3	0.1	3.4	0.3	0.1
7	B3208	Southbound	2124	4.2	6.4	2.2	9.2	4.9	2.7	10.0	5.7	3.5
	B3208	Northbound	2084	3.3	3.9	0.6	4.5	1.2	0.6	4.1	0.9	0.3
8	B3007	Southbound	2526	5.2	7.5	2.3	11.9	6.7	4.4	14.4	9.2	6.9
	B3007	Northbound	2683	6.4	8.7	2.3	10.4	3.9	1.6	10.5	4.1	1.8
9	A325 North	Southbound	2662	5.5	8.1	2.6	11.0	5.5	2.9	12.7	7.2	4.6
	A325 North	Northbound	2383	4.8	6.8	2.0	8.5	3.7	1.7	9.1	4.3	2.3

Table 4.4: Journey Times – PM Peak Hour

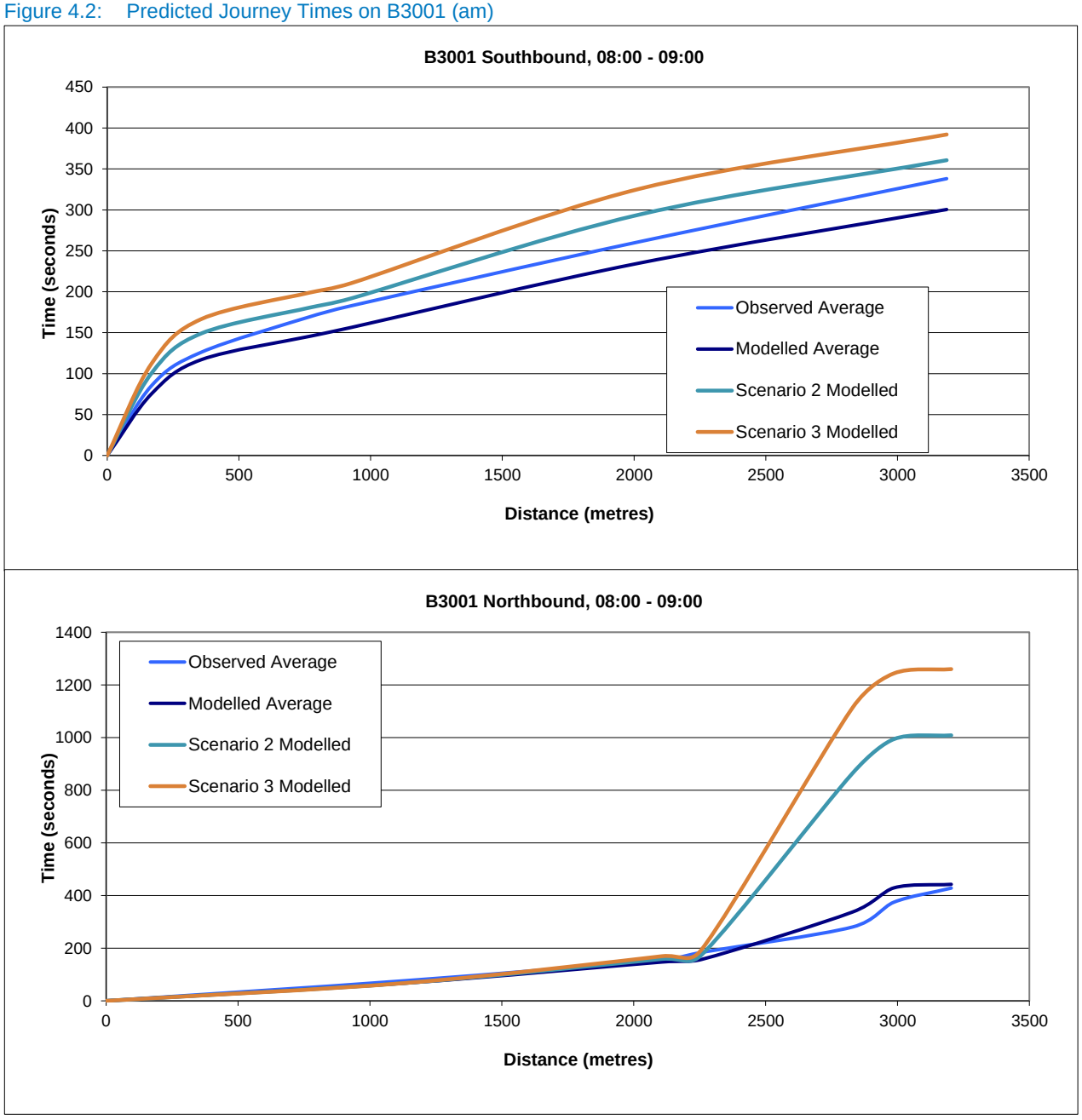
				Base Year	Future Do Minimum		STA Scenario 2			STA Scenario 3		
Ref	Route	Direction	Length (m)	Time (mins)	Time (mins)	Diff to Base (mins)	Time (mins)	Diff to Base (mins)	Diff to Do Min (mins)	Time (mins)	Diff to Base (mins)	Diff to Do Min (mins)
1	A31	Westbound	6934	13.0	15.5	2.5	16.4	3.3	0.9	15.4	2.3	-0.1
	A31	Eastbound	6613	6.5	8.8	2.3	11.2	4.7	2.4	12.0	5.5	3.2
2	B3001	Southbound	3187	5.2	5.5	0.3	5.7	0.5	0.2	5.8	0.6	0.2
	B3001	Northbound	3204	7.0	11.3	4.3	20.5	13.5	9.2	21.5	14.5	10.2
3	A287	Southbound	6881	9.8	13.8	4.0	18.1	8.3	4.3	18.3	8.5	4.5
	A287	Northbound	5728	9.1	12.0	2.9	15.5	6.4	3.6	16.4	7.3	4.4
4	A325 Centre	Eastbound	3118	6.3	12.3	6.0	20.8	14.5	8.5	24.3	18.0	12.0
	A325 Centre	Westbound	3645	8.8	15.7	6.9	25.9	17.1	10.2	29.4	20.6	13.7
5	Tilford Rd	Northbound	3355	4.3	5.1	0.9	7.3	3.0	2.2	7.8	3.5	2.6
	Tilford Rd	Southbound	3355	3.5	3.6	0.0	3.6	0.0	0.0	3.6	0.0	0.0
6	A325 South	Northbound	2808	3.6	4.7	1.0	5.6	2.0	1.0	6.4	2.7	1.7
	A325 South	Southbound	2816	3.3	3.5	0.2	3.6	0.2	0.1	3.7	0.4	0.2
7	B3208	Southbound	2124	4.2	7.1	2.8	10.0	5.7	2.9	11.3	7.1	4.2
	B3208	Northbound	2084	3.5	4.0	0.5	4.2	0.7	0.3	4.1	0.5	0.1
8	B3007	Southbound	2526	4.8	5.5	0.8	8.2	3.4	2.7	8.5	3.7	3.0
	B3007	Northbound	2683	5.5	10.2	4.6	14.5	9.0	4.3	14.8	9.3	4.6
9	A325 North	Southbound	2662	6.0	8.4	2.4	11.8	5.8	3.4	12.3	6.3	3.9
	A325 North	Northbound	2383	4.5	5.4	0.9	6.0	1.5	0.6	6.4	1.9	1.0

Figure 4.1: Predicted Journey Times on A31 (am)



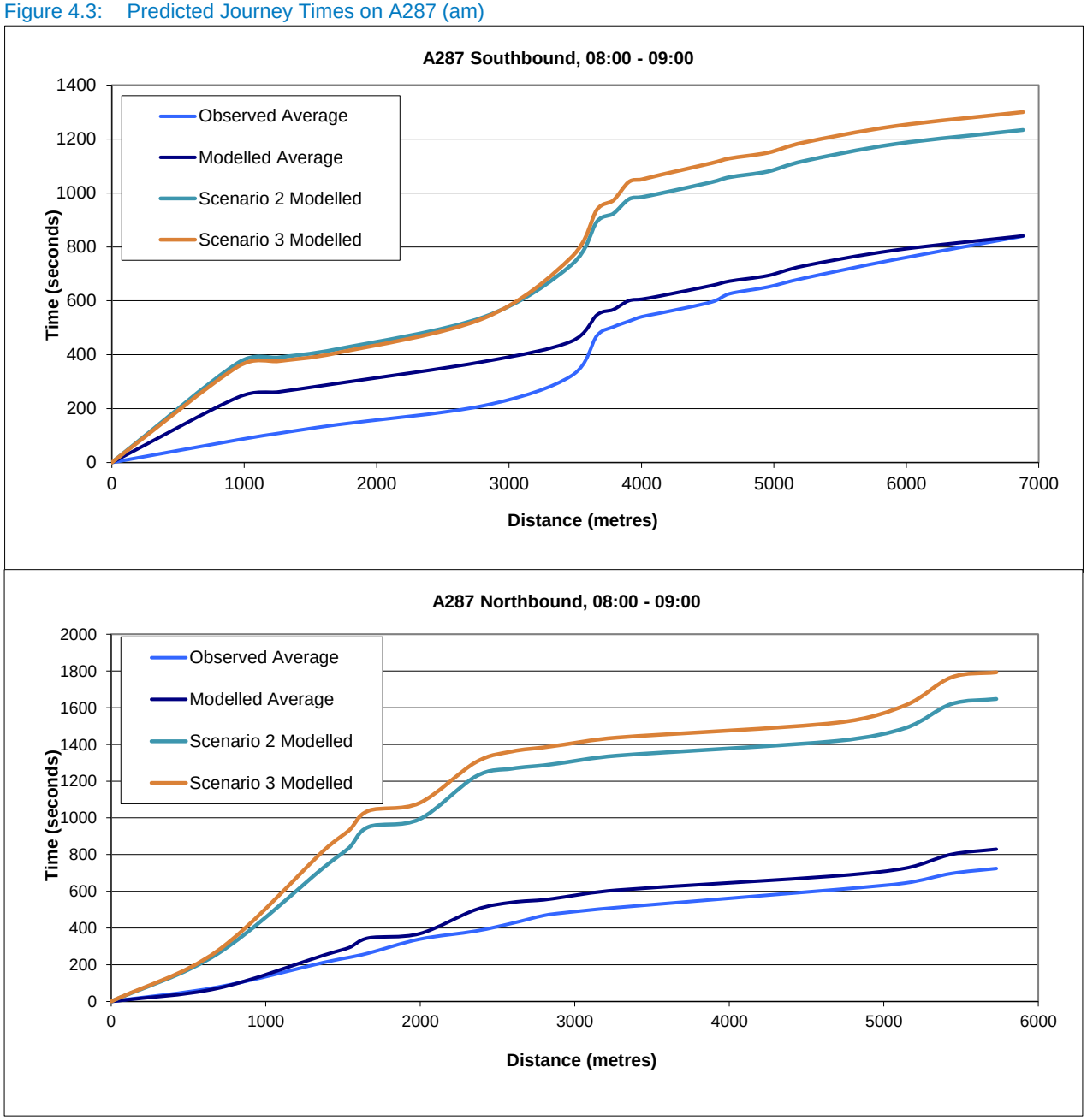
Source: Farnham Traffic Model

Figure 4.2: Predicted Journey Times on B3001 (am)



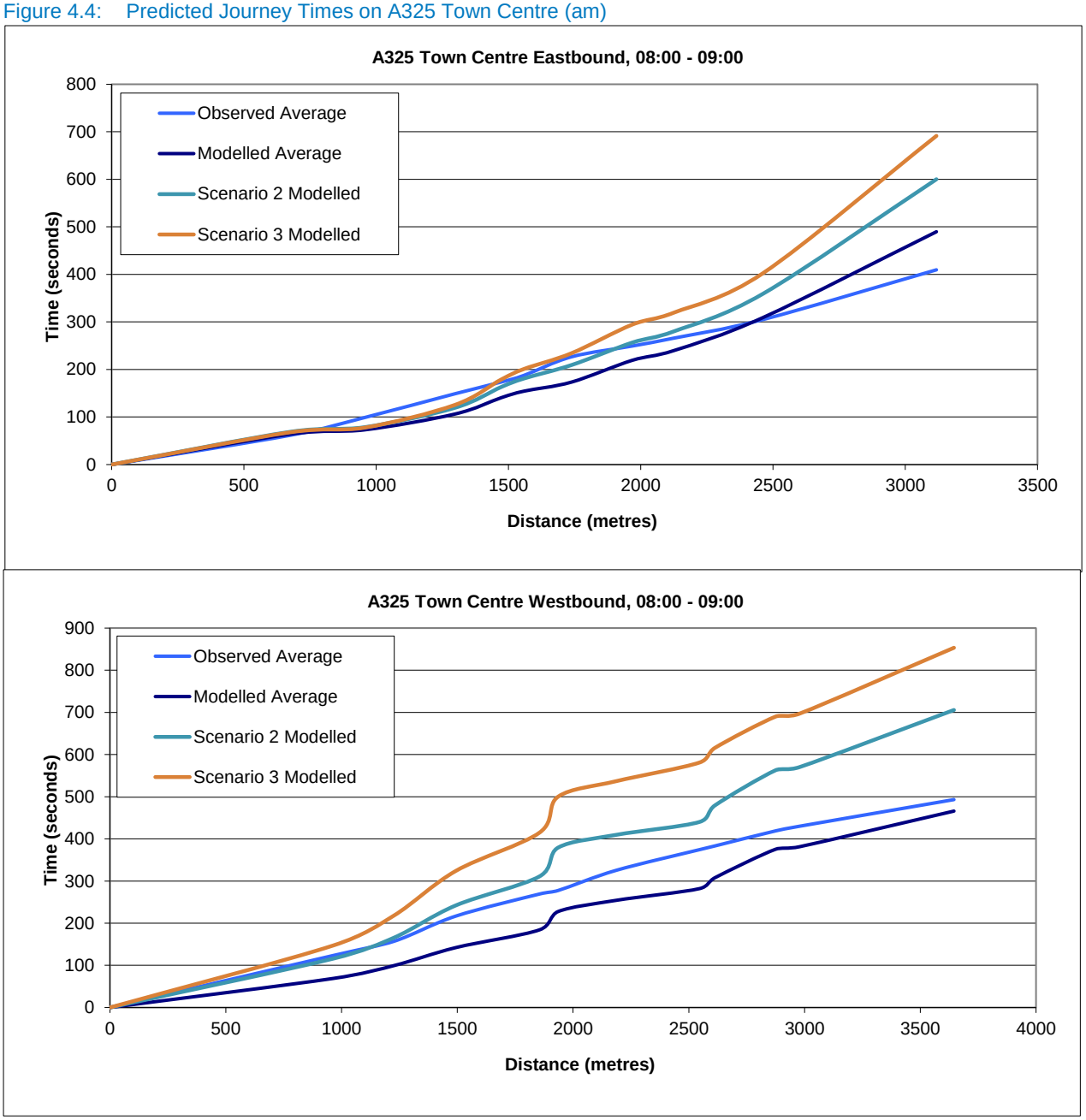
Source: Farnham Traffic Model

Figure 4.3: Predicted Journey Times on A287 (am)



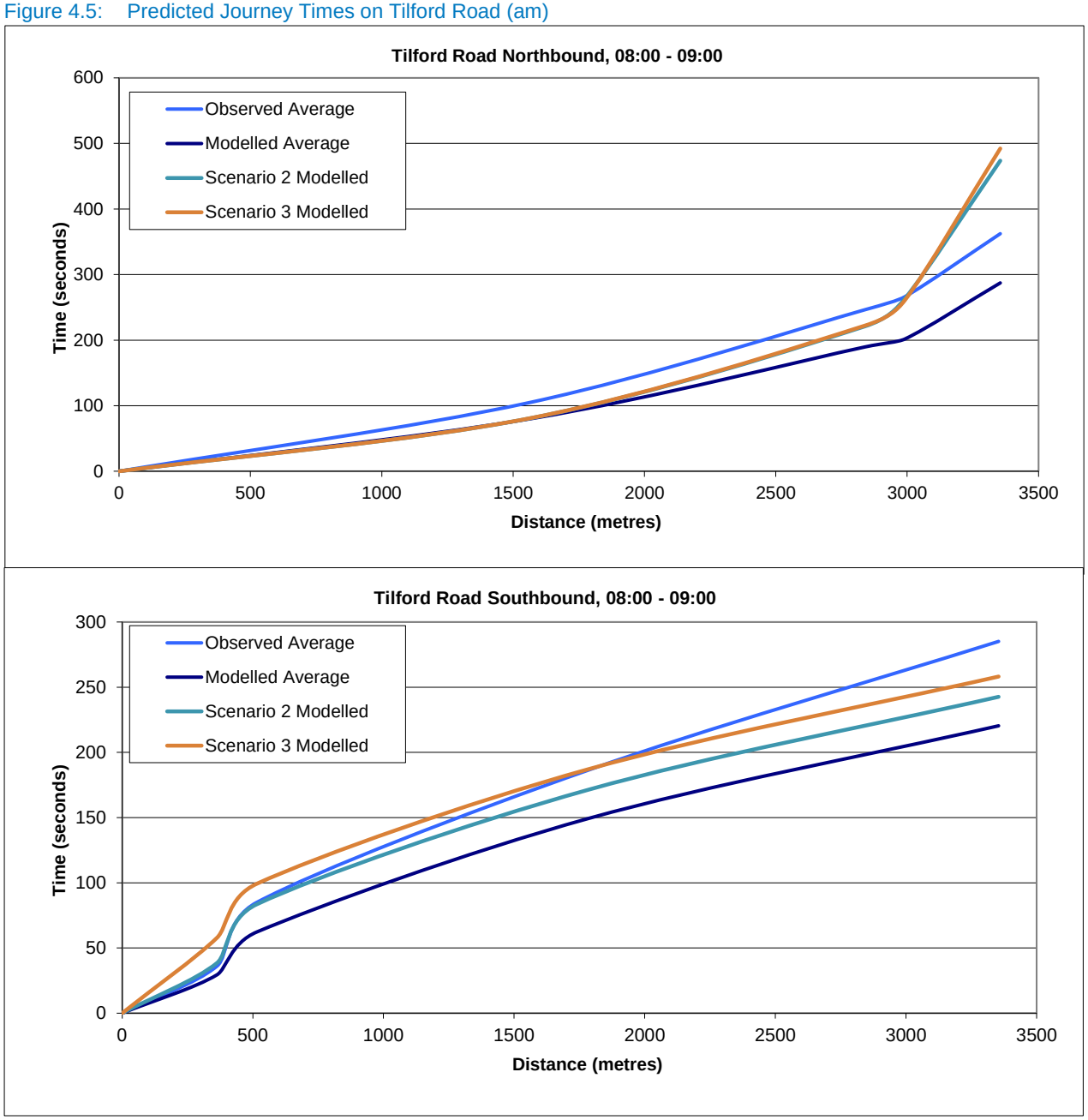
Source: Farnham Traffic Model

Figure 4.4: Predicted Journey Times on A325 Town Centre (am)



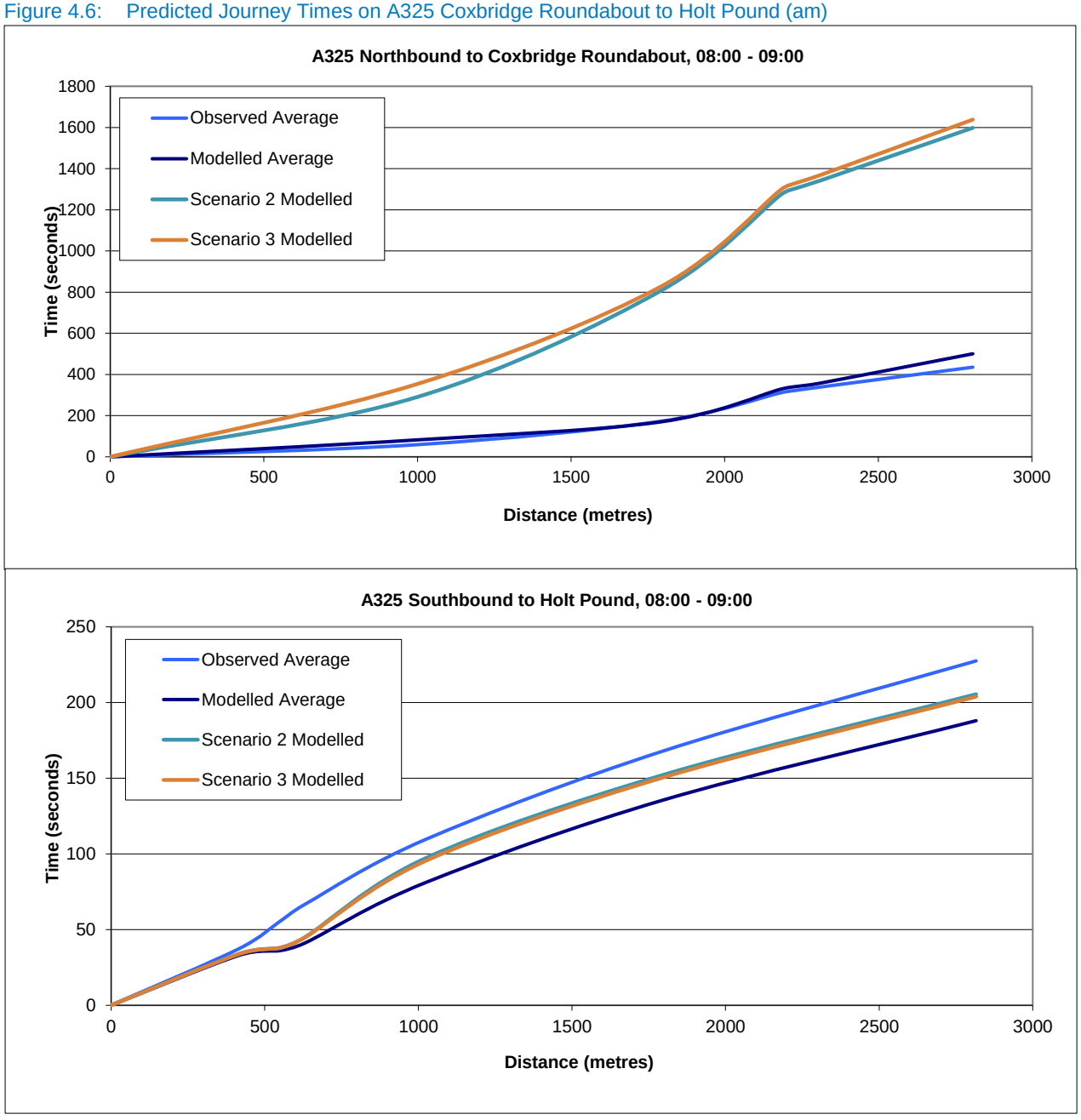
Source: Farnham Traffic Model

Figure 4.5: Predicted Journey Times on Tilford Road (am)



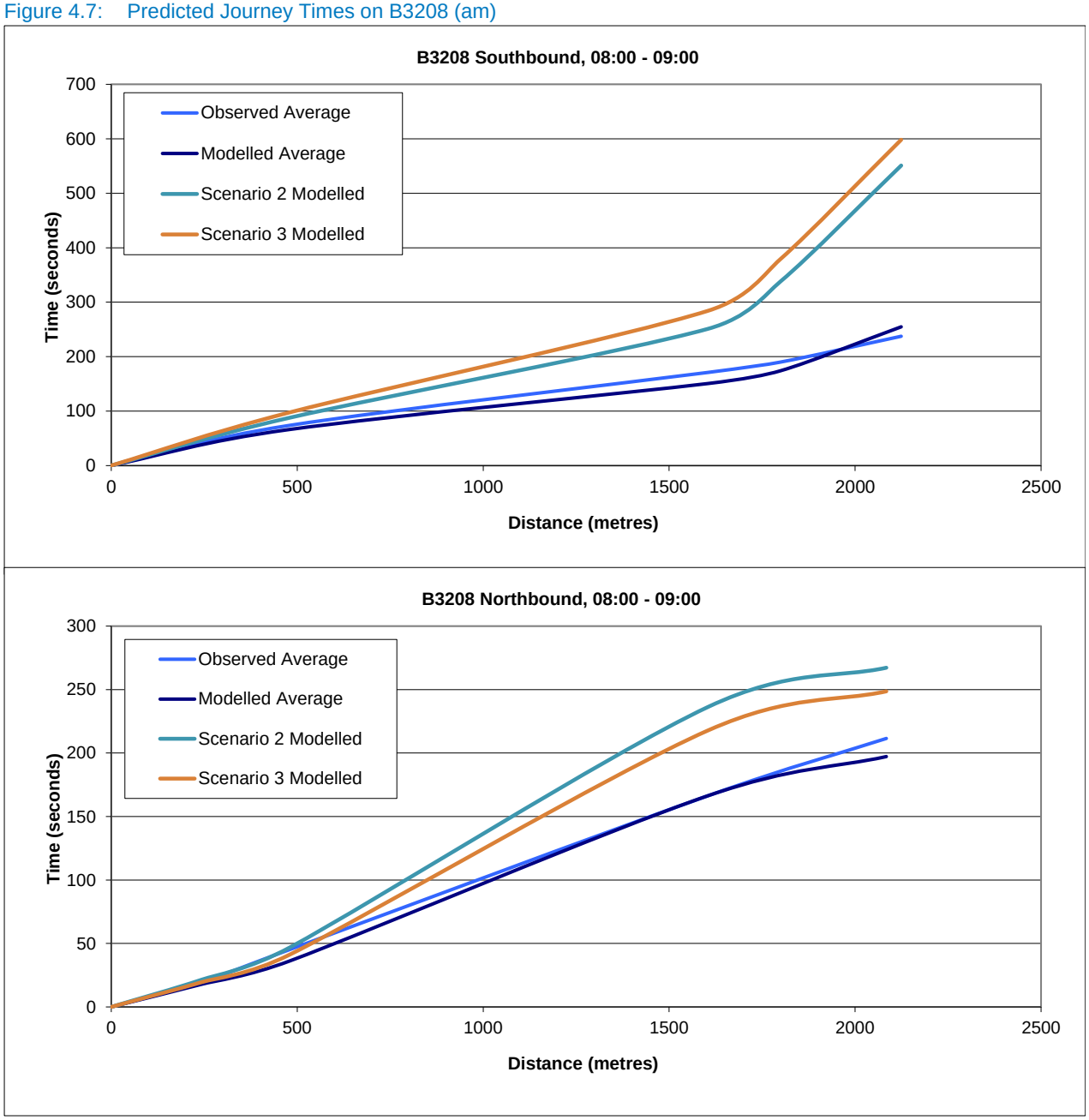
Source: Farnham Traffic Model

Figure 4.6: Predicted Journey Times on A325 Coxbridge Roundabout to Holt Pound (am)



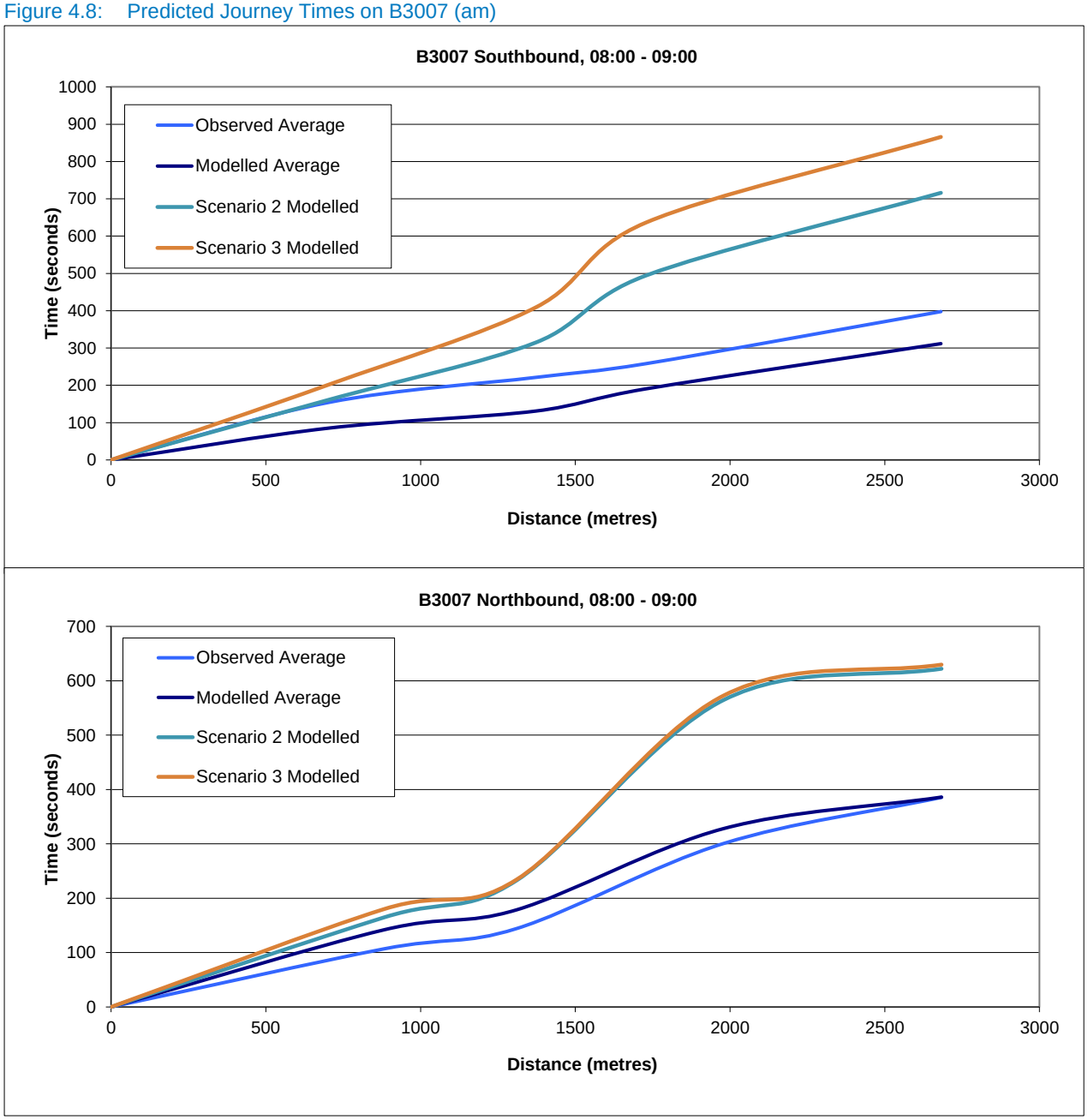
Source: Farnham Traffic Model

Figure 4.7: Predicted Journey Times on B3208 (am)



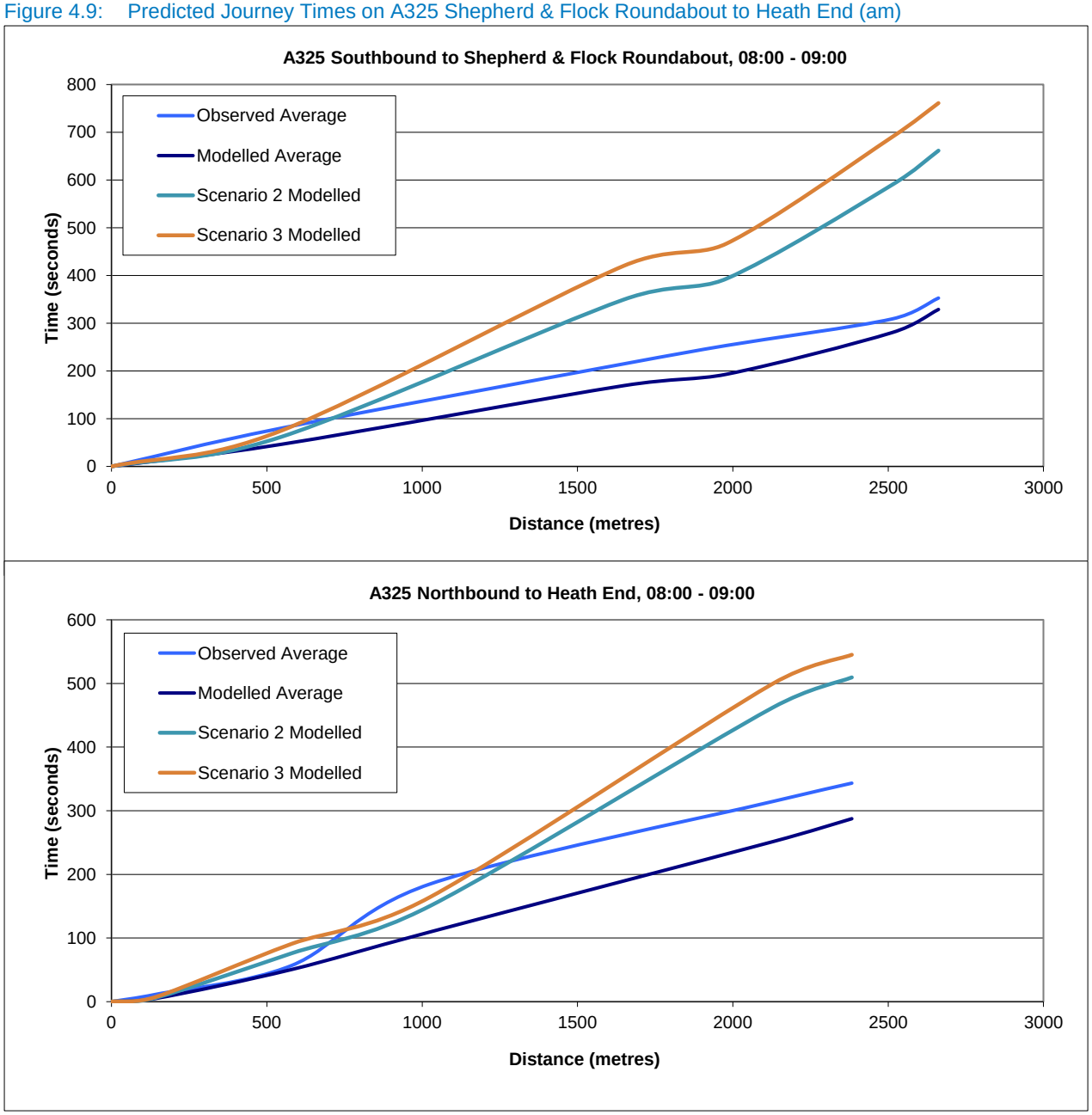
Source: Farnham Traffic Model

Figure 4.8: Predicted Journey Times on B3007 (am)



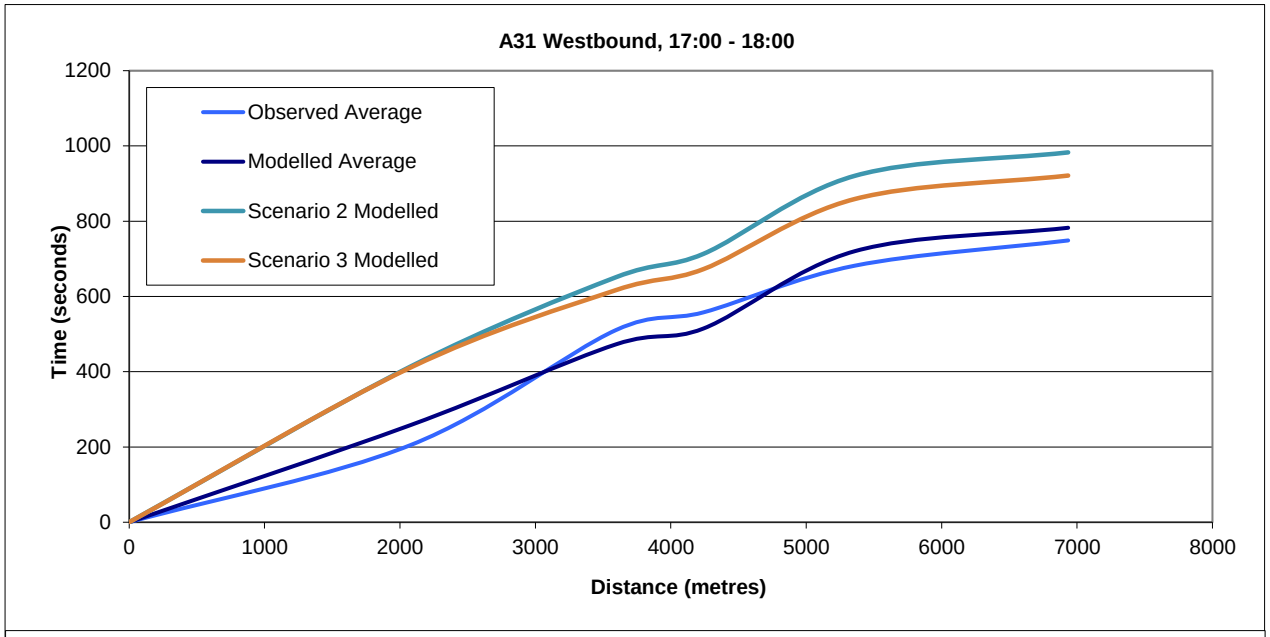
Source: Farnham Traffic Model

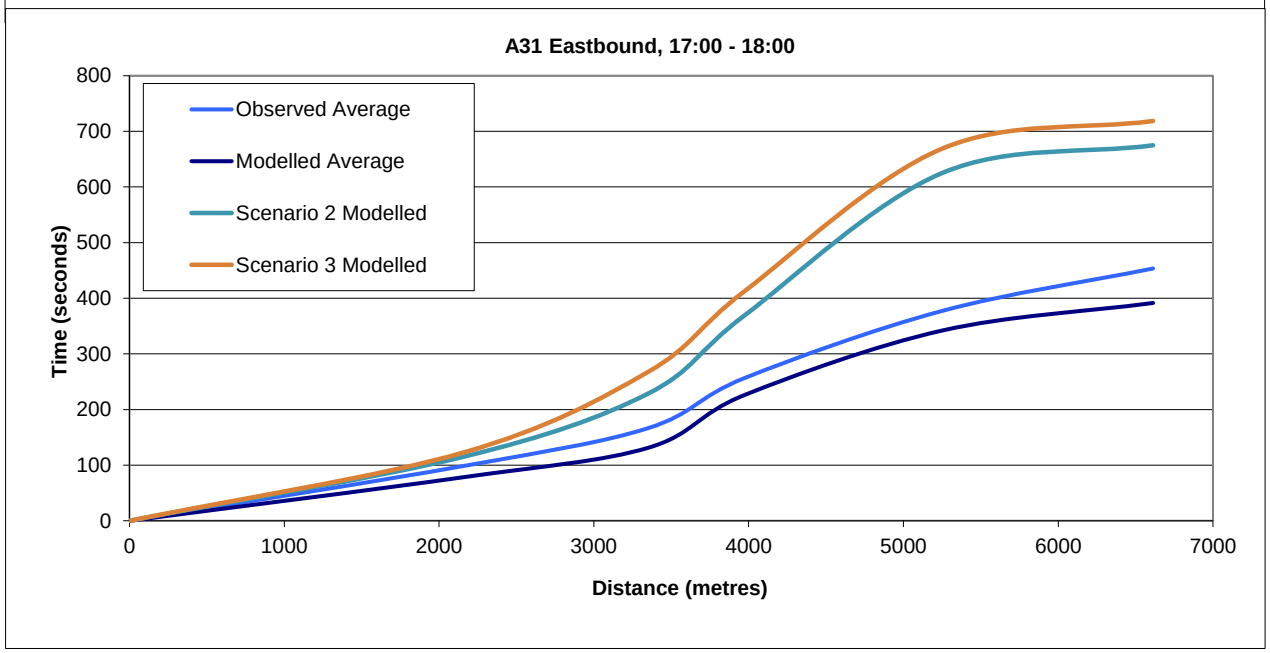
Figure 4.9: Predicted Journey Times on A325 Shepherd & Flock Roundabout to Heath End (am)



Source: Farnham Traffic Model

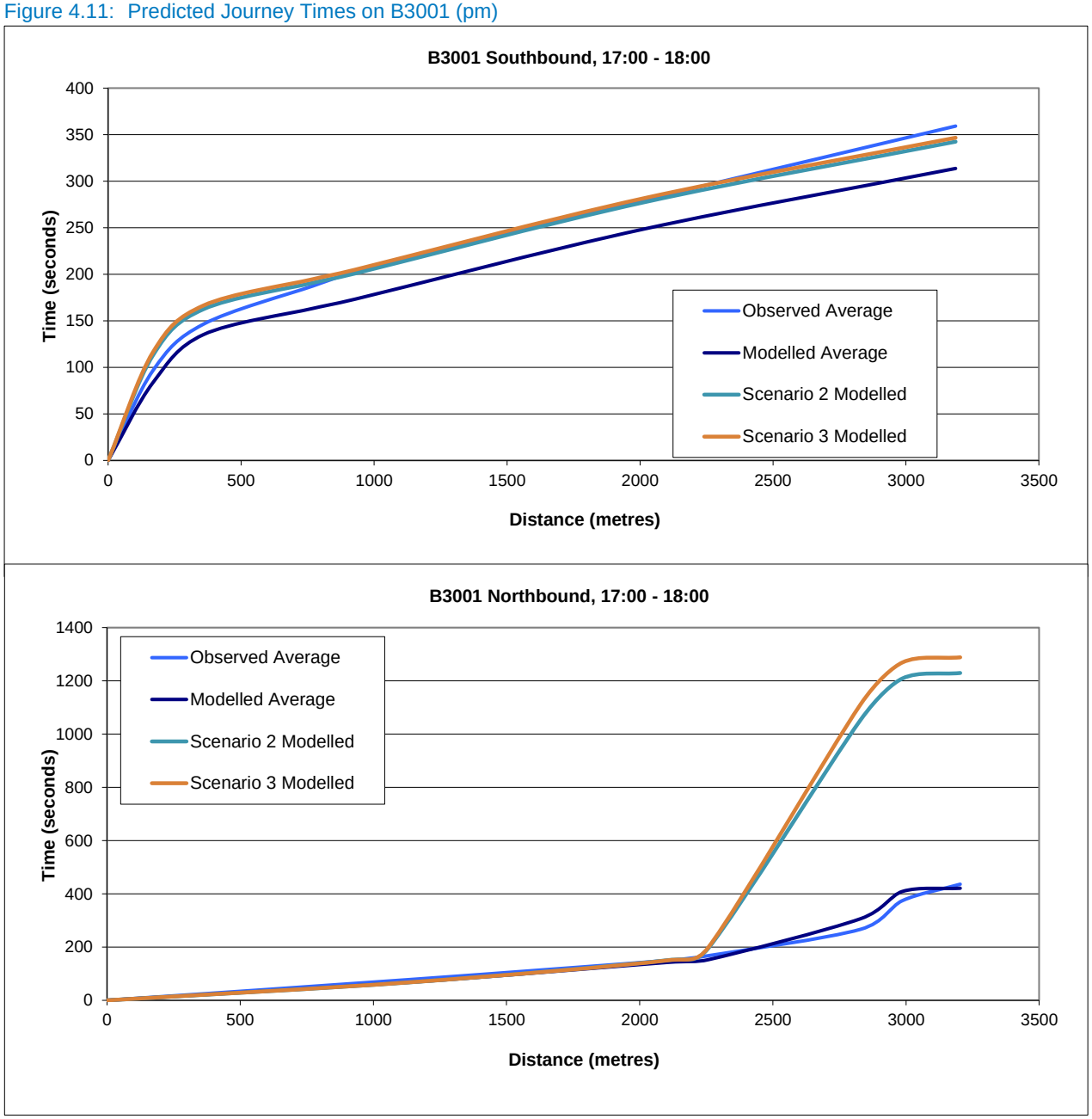
Figure 4.10: Predicted Journey Times on A31 (pm)





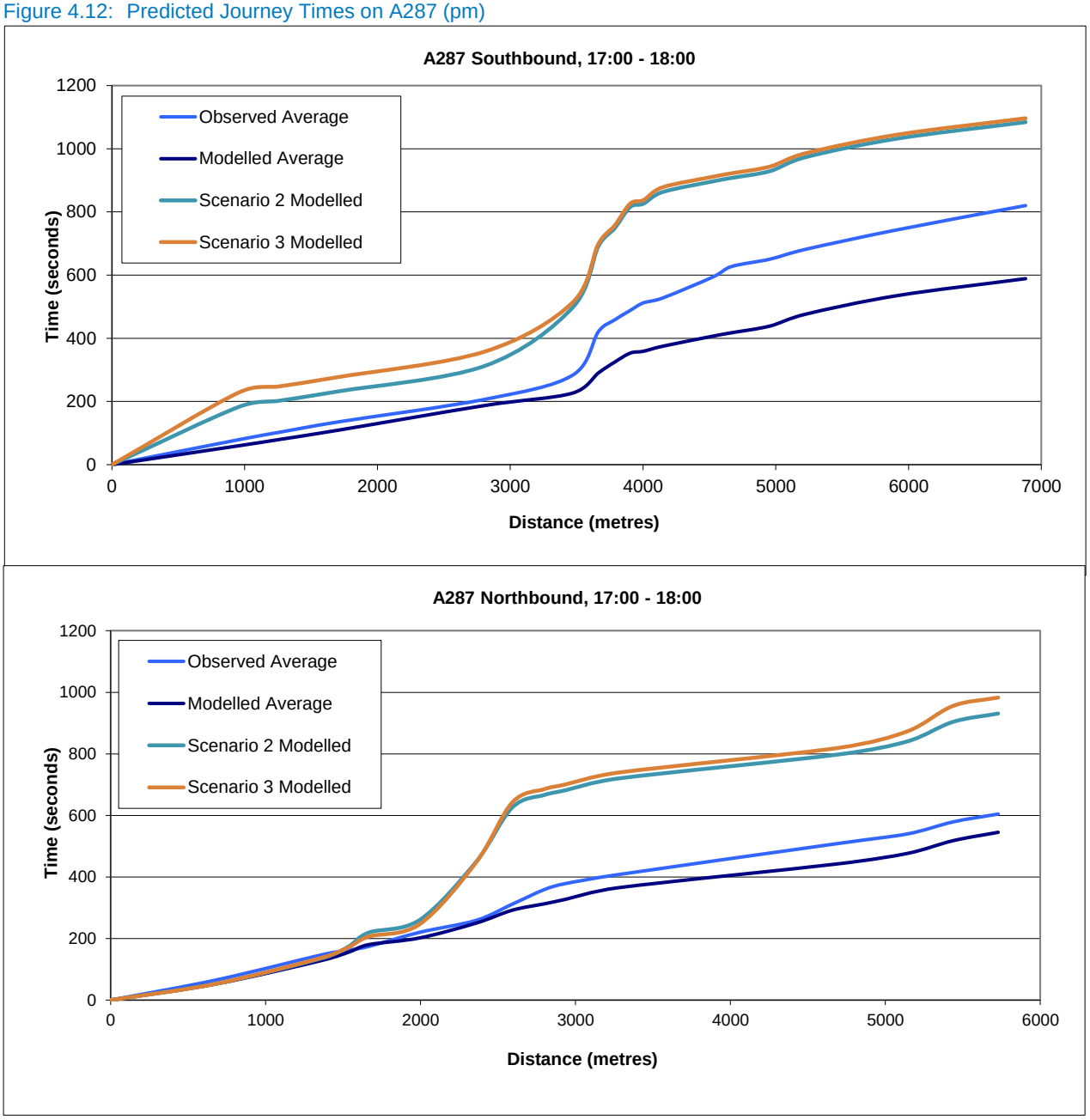
Source: Farnham Traffic Model

Figure 4.11: Predicted Journey Times on B3001 (pm)



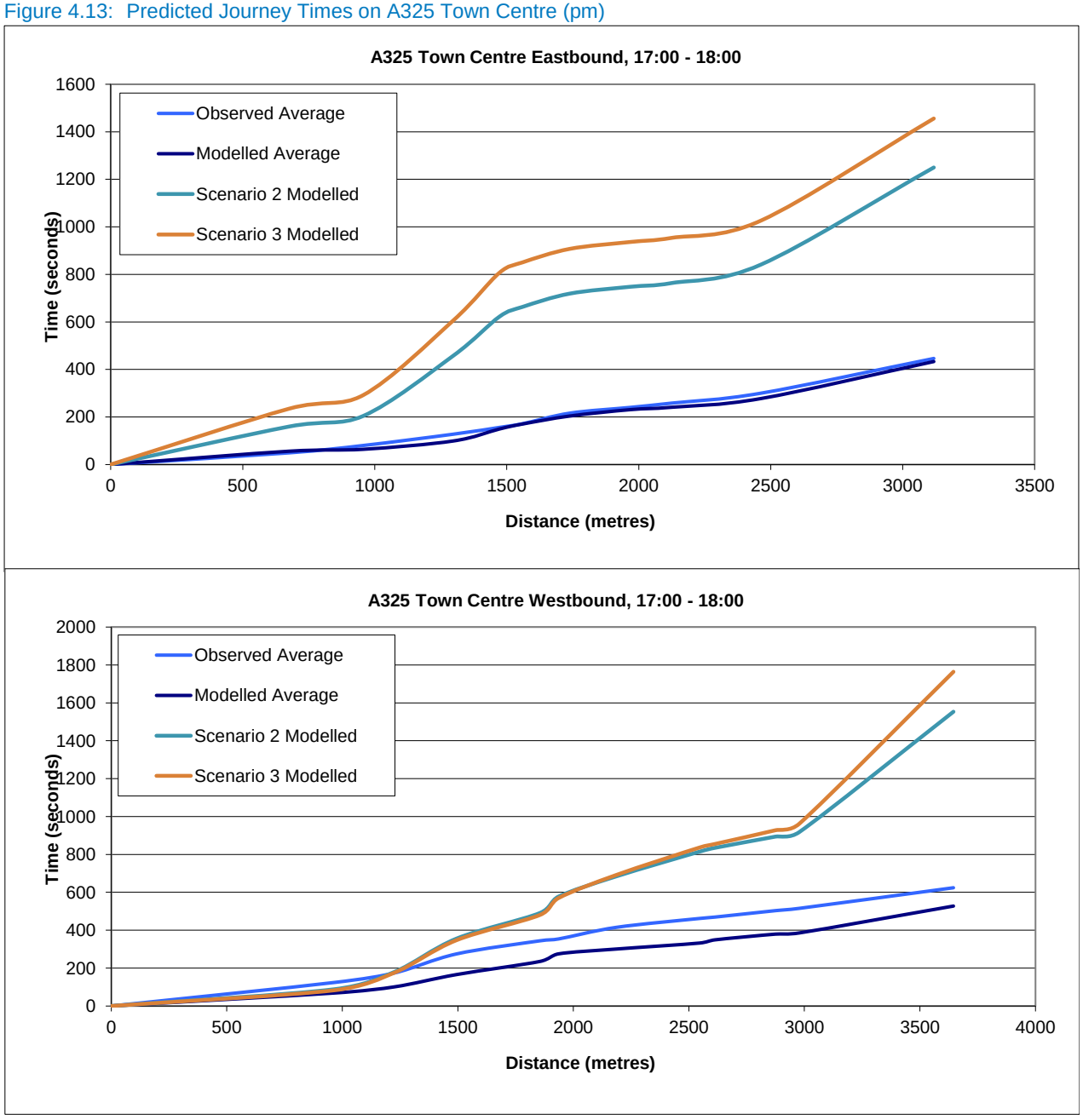
Source: Farnham Traffic Model

Figure 4.12: Predicted Journey Times on A287 (pm)



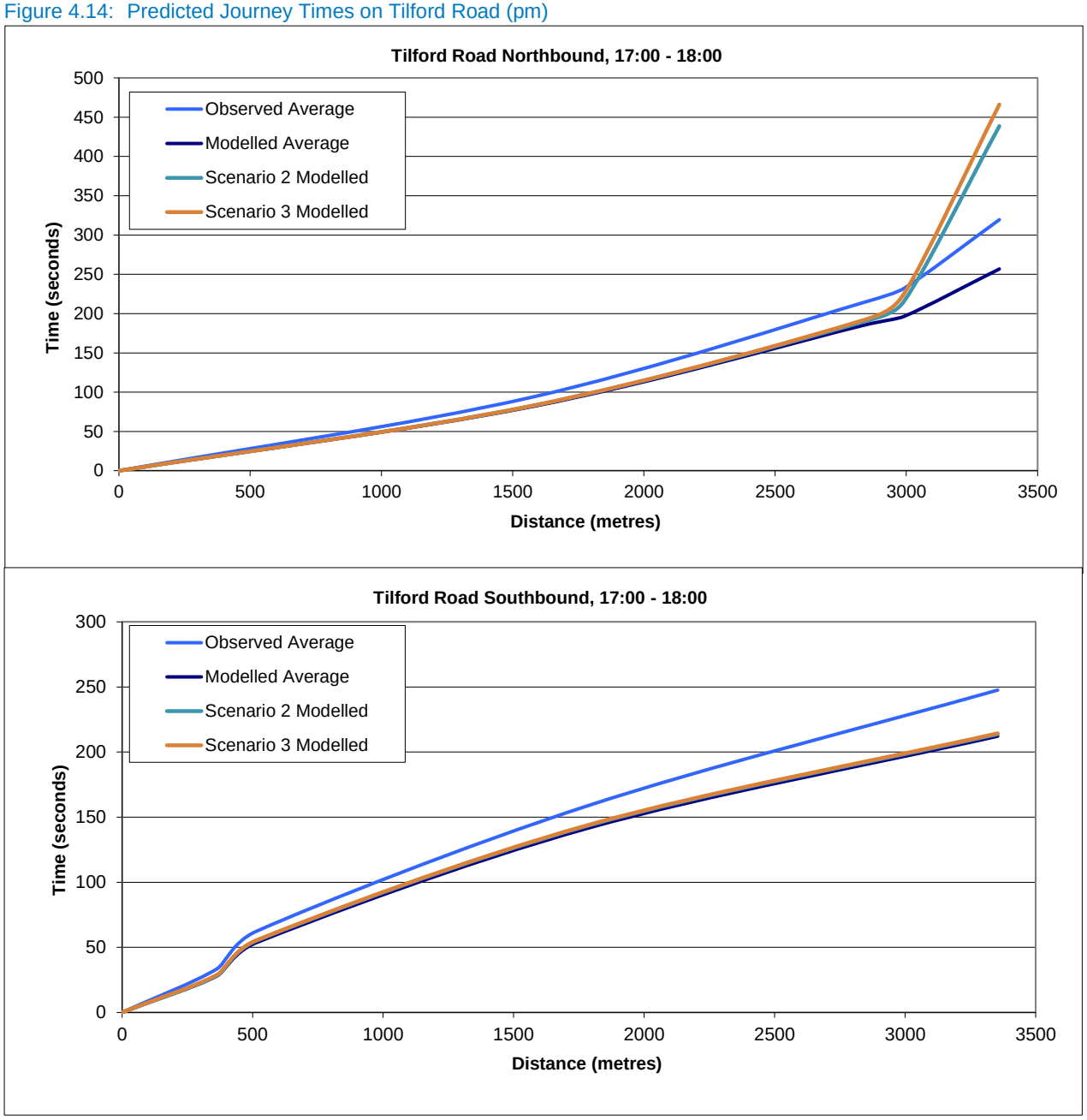
Source: Farnham Traffic Model

Figure 4.13: Predicted Journey Times on A325 Town Centre (pm)



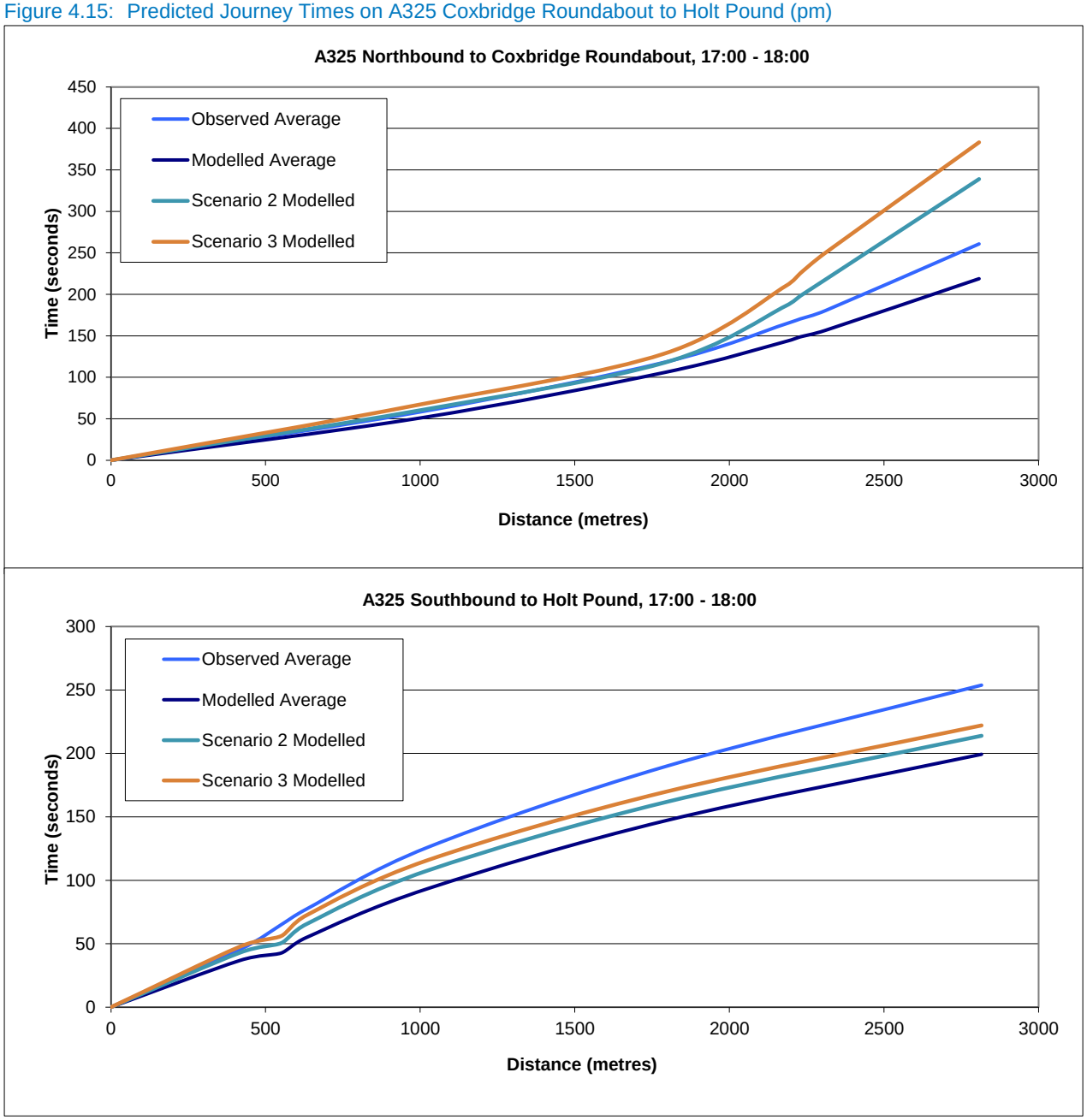
Source: Farnham Traffic Model

Figure 4.14: Predicted Journey Times on Tilford Road (pm)



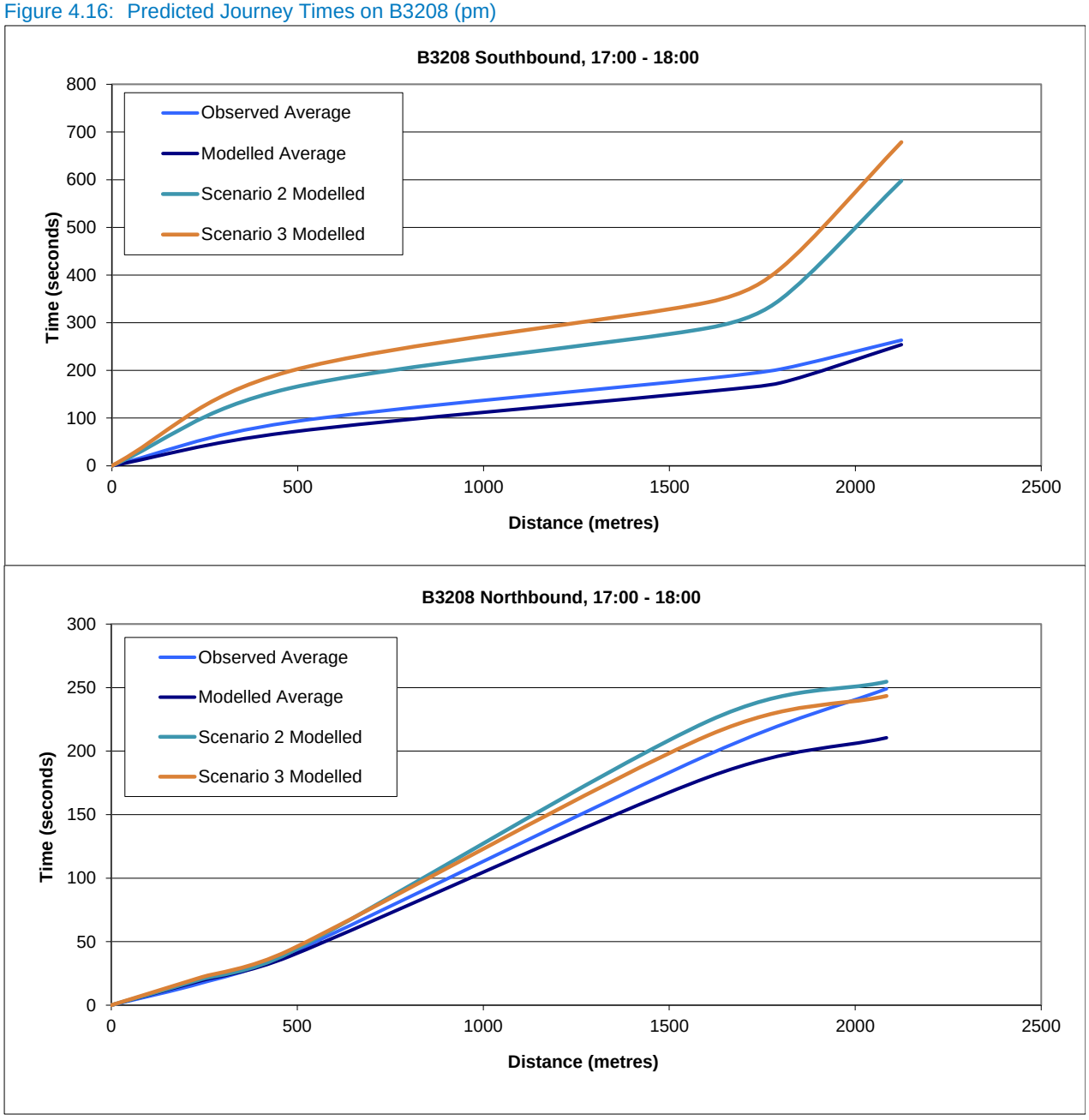
Source: Farnham Traffic Model

Figure 4.15: Predicted Journey Times on A325 Coxbridge Roundabout to Holt Pound (pm)



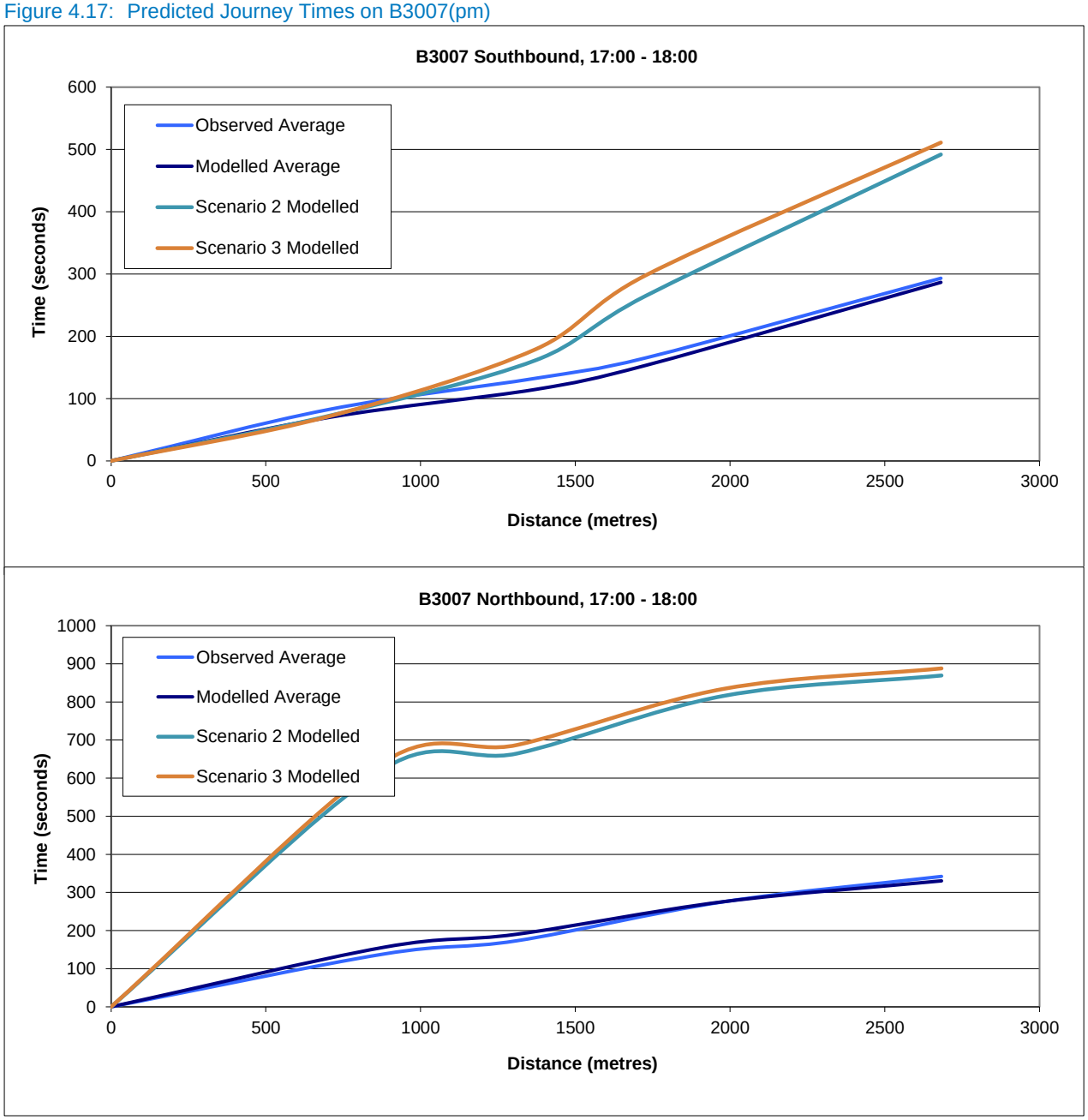
Source: Farnham Traffic Model

Figure 4.16: Predicted Journey Times on B3208 (pm)



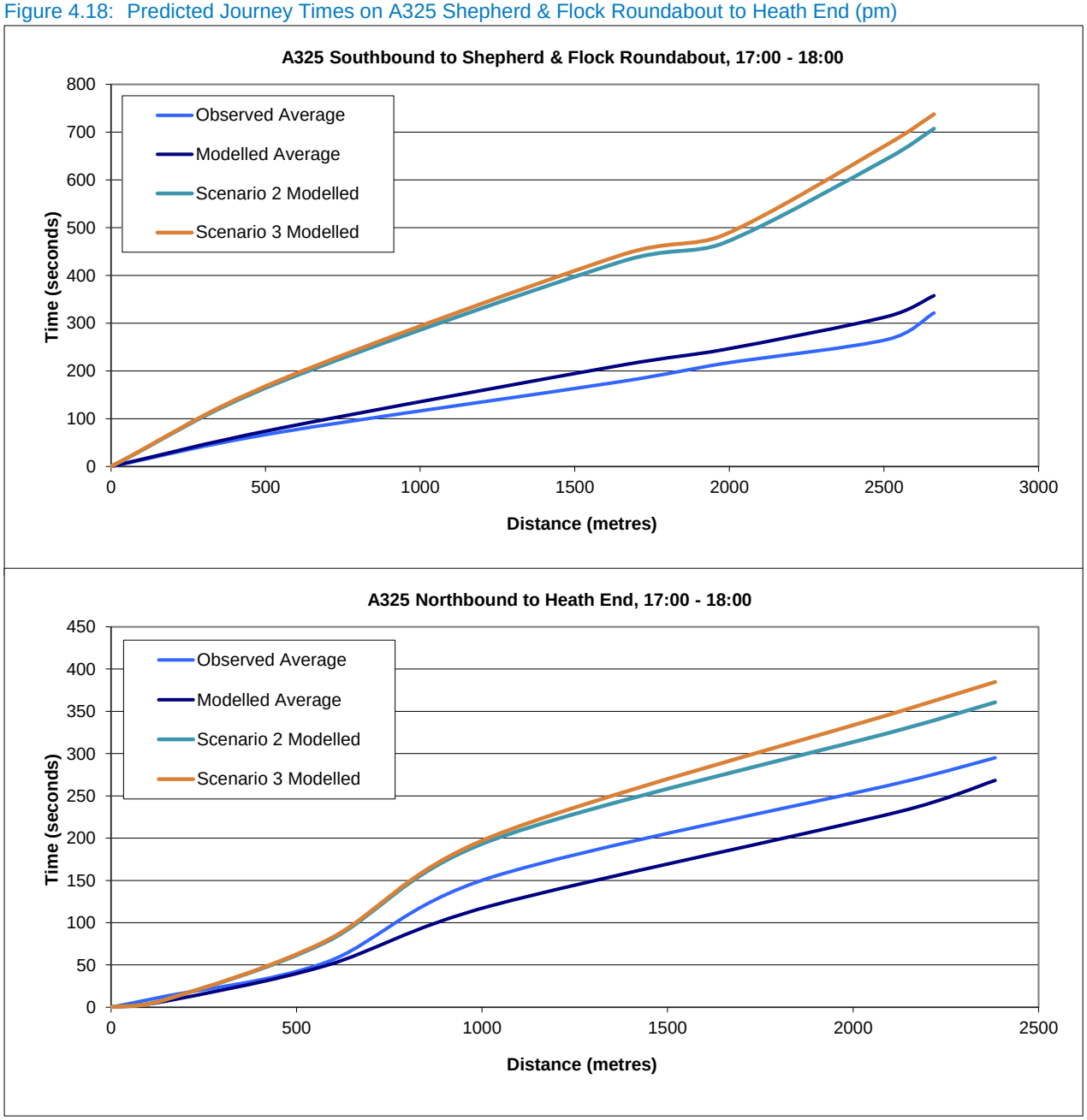
Source: Farnham Traffic Model

Figure 4.17: Predicted Journey Times on B3007(pm)



Source: Farnham Traffic Model

Figure 4.18: Predicted Journey Times on A325 Shepherd & Flock Roundabout to Heath End (pm)



Source: Farnham Traffic Model

5 Potential Mitigation Measures

5.1 Previous Core Strategy Supporting Documents

Potential mitigation measures have previously been considered in relation to the Core Strategy. SCC produced a report entitled "Transport Measures to Support Growth Identified in the Waverley Borough Core Strategy" (August 2012). This was an assessment of the highways and transport infrastructure which would be required to support the growth set out in the emerging Local Development Framework (LDF) Core Strategy at the time, for the period to 2028. This previous Core Strategy had a housing target of 3,614 new homes in total for 2012-2028, including 1,295 in Farnham.

The information presented on future highway conditions was based on the Waverley Borough-Wide Traffic Modelling 2009-2026: Core Strategy Transport Assessment Report (SCC, May 2012). The overall conclusion was that "major highway infrastructure is not required to support the planned development proposed within the emerging LDF Core Strategy. However, it is likely that some schemes in urban areas, such as Farnham, and at key junctions, will be required."

Schedules of improvement measures were produced to "show outline highways and transport schemes or packages of schemes. These generally do not provide additional network capacity but seek to manage the existing network and provide more sustainable transport choices." For Farnham the following schemes were proposed and included in the Infrastructure Delivery Plan produced by WBC in August 2012:

- Farnham town centre improvement scheme including revised traffic system (following review), pedestrian priority, streetscene enhancements and reallocation of street space; Measures to reduce emissions e.g. VMS to discourage idling; Upgrade bus stops and improve services; Improved cycle routes providing town centre access;
- A287 Firgrove Hill traffic management route improvement including a pedestrian crossing near Red Lion Lane;
- Farnham rail station forecourt improvement scheme including new bus shelter;
- A31 Hickley's Corner online junction improvement - following a study to identify an appropriate scheme to balance objectives to improve access for pedestrians and cyclists between the town centre and the station and residential areas to the south, improve air quality, and tackle traffic congestion, both in the town centre and at Hickley's Corner itself;
- Urban traffic control linking level crossing with Hickley's Corner signals;
- A31 Shepherd & Flock roundabout improvement scheme – including further signalisation of the junction and modification of traffic lights to allow crossing of A31 by cyclists;
- A325 Corridor, Wrecclesham - Traffic management and route improvements including A325 School Hill mini-roundabout replacement with traffic signals; and
- A31 Coxbridge Roundabout – pedestrian crossing to the east, make safer for cyclists and increase vehicle throughput.

5.2 Strategic Transport Assessment

The Strategic Transport Assessment (STA) Report produced by SCC in September 2014 re-visited the modelling of Core Strategy development scenarios. This showed that the A325 Coxbridge roundabout and A325 West Street / Crondall Lane priority junction would be among the junctions experiencing the highest increase in junction delay compared to the Do minimum, under all scenarios considered. However, the increase in delay was only between 8-19 seconds on average over the peak period of 07:00-10:00.

With STA Scenario 3, the links with the highest increase in flow from the Do Minimum included the A325 north of Shepherd and Flock (26%), the A287 through the town centre (42%) and B3208 Water Lane (97%).

Potential mitigation measures to address increased congestion in the future were not considered in the STA.

STA Scenarios 2 and 3 were based on 2,279 and 3,800 new homes in Farnham respectively: substantially more than the 1,295 considered for the previous Core Strategy work. From the previous reports only modest traffic capacity enhancement schemes were proposed at the A31 Shepherd and Flock roundabout, A31 Hickley's Corner signals and on the A325 at Wrecclesham. It is clear that with many more new houses being considered in Farnham, schemes to increase traffic capacity will be required if congestion and delays are not to increase greatly.

5.3 Schemes Associated with Whitehill/ Bordon

Potential schemes related to increased traffic as a result of the proposed White Hill/ Bordon development in Hampshire have been identified:

- A31 Hickley's Corner – local widening through removal of footways adjacent to the A31 to allow traffic on the A31 to pass through the junction in three lanes;
- A31 / A325 Coxbridge Roundabout - local widening to provide a separate left turn lane on each of the A31 approaches;
- A325 / School Hill mini-roundabout in Wrecclesham – conversion to signalised junction
- A325 / B3384 priority junction replaced with mini-roundabout.

All of the above schemes would be part funded by development at Whitehill/ Bordon, but would only be delivered if gap funding could be found.

5.4 Key Schemes

If the largest increases in journey times predicted for STA Scenarios 2 and 3 are to be addressed, significant increases in capacity will be required at Shepherd and Flock and Hickley's Corner. These junctions cause delays for A31 traffic but also generate queuing that blocks back to other junctions. This

causes delays on the A287, B3001, B3208, B3007 and A325 North radial routes towards Farnham, as well as the A325 through the town centre.

It is noted that the Waverley Borough Local Plan 2002 contains Policy M19: A31 Farnham By-Pass Improvements. These improvements comprised a grade-separated junction at Hickley's Corner and associated works including improvements to the station forecourt. The scheme was subsequently identified in the Draft South East Plan Implementation Plan (SEERA, March 2006) with an estimated cost of £87m but has since been considered 'unlikely to proceed'.

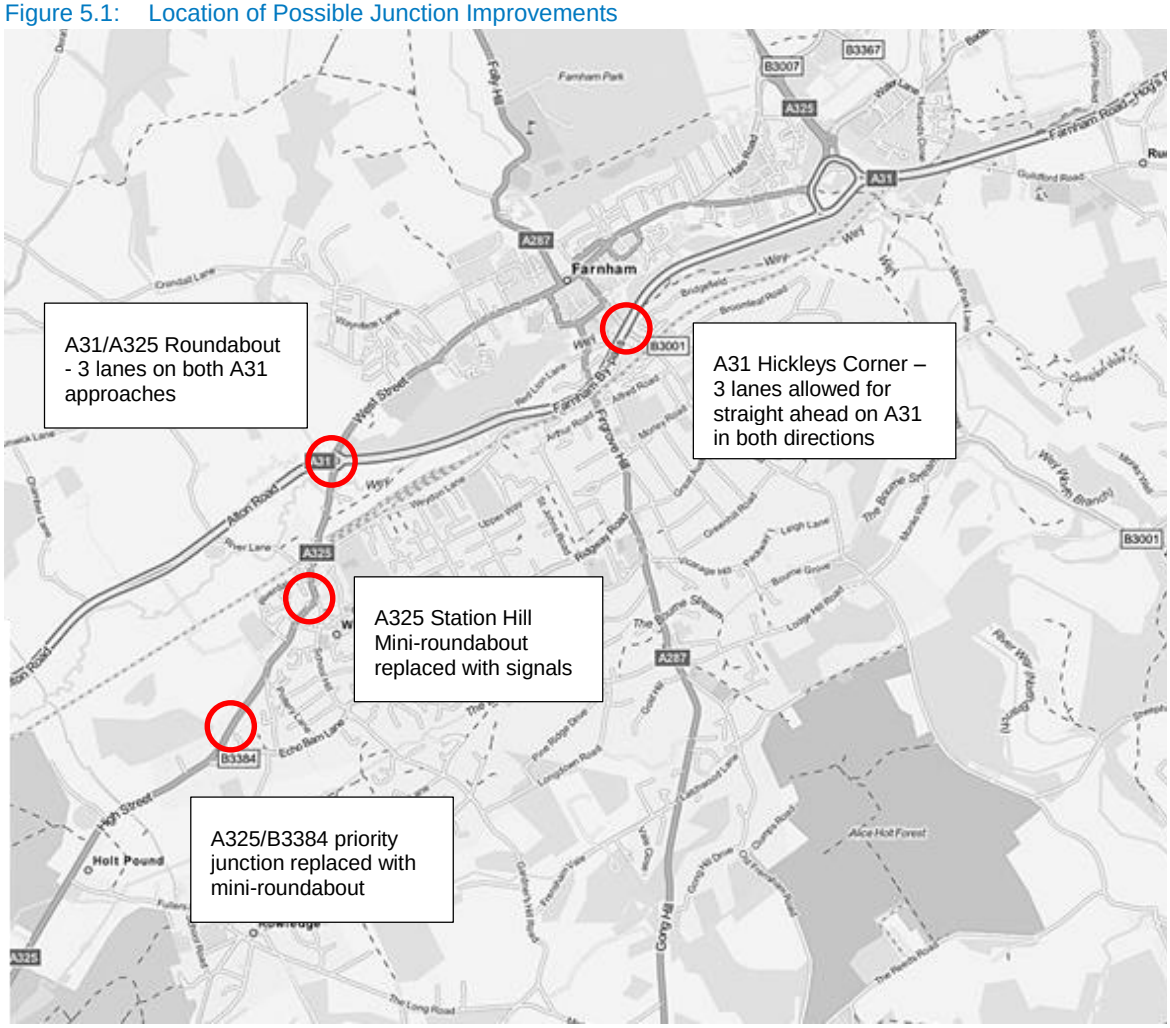
It is also noted that improving the A31 through Farnham is not currently seen as priority by the Enterprise M3 Local Enterprise Partnership (based on their report Working for a Smarter Future, the Enterprise M3 Strategic Economic Plan 2014-2020, March 2014), therefore they have not been seeking funding for schemes. Farnham was not identified as a Growth Town or Step-Up Town so is not considered a priority.

At Shepherd and Flock, some increases in capacity should be possible through further signalisation of the roundabout and localised widening to provide more lanes at the signal stop lines i.e. without the need for a major scheme.

5.5 Results of Modelling Improvements

Potential junction improvement schemes have been modelled with the STA Scenario 2 and 3 demands, at four locations as shown in **Figure 5.1**. These are the schemes that were developed as part of work to assess the potential impact of the proposed Whitehill Bordon development, as detailed above.

Figure 5.1: Location of Possible Junction Improvements



Source: © OpenStreetMap contributors

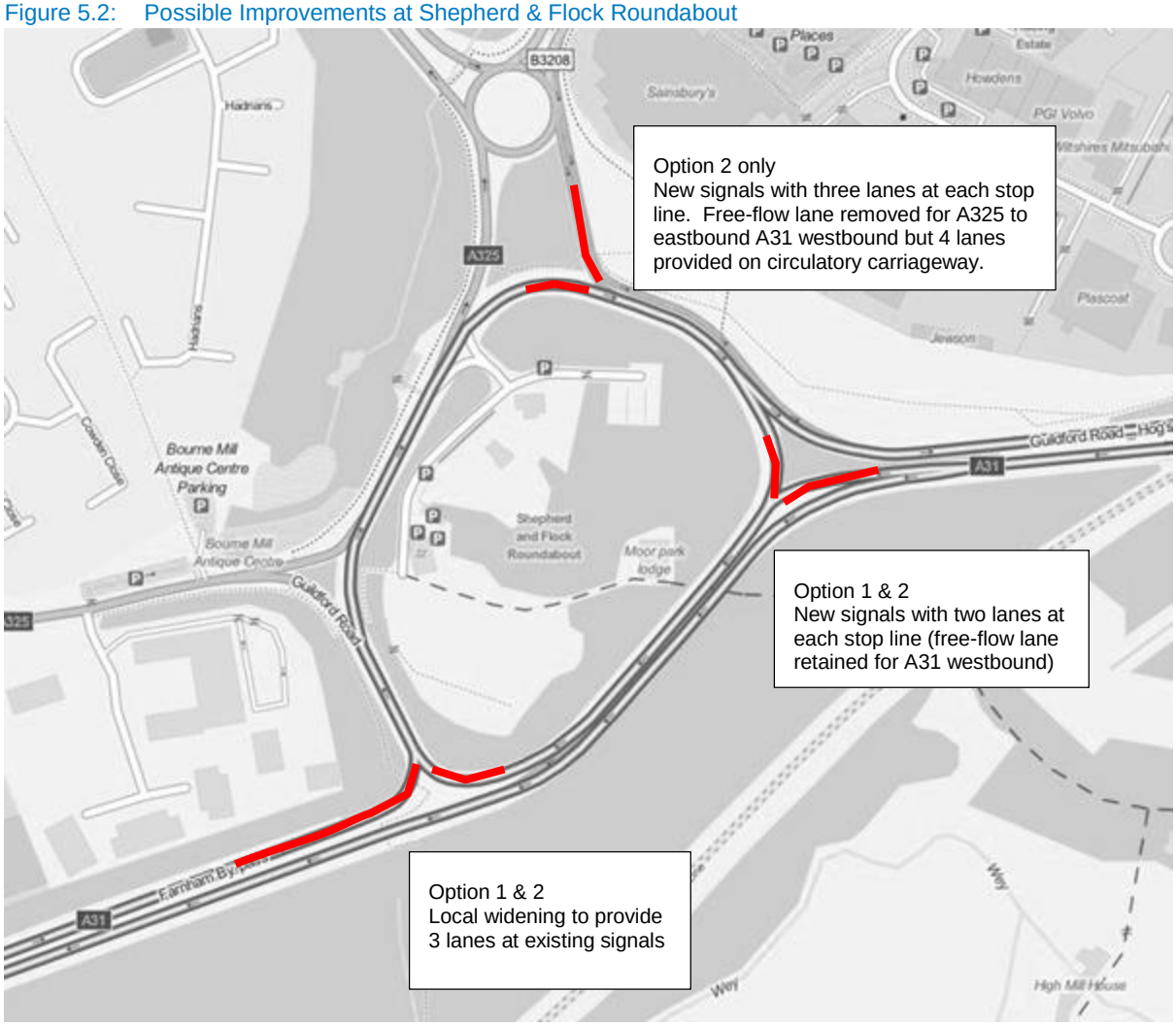
Modelling of the possible improvements to Hickley's Corner highlighted a problem in the PM peak. There is currently a separate lane on the westbound A31 for left-turning traffic onto the B3001 Station Hill. This movement receives more green time than the A31 straight ahead movement at the signals because it can run at the same time as the Station Hill arm. With the improvement, the current left turn lane would also be used for straight-ahead movements so could not run at the same time as the side road i.e. the capacity for left turners would reduce. In the PM peak, there is a high volume of left-turners so the scheme was shown to make congestion worse on the A31. Therefore, this part of the scheme was excluded and only changes to the eastbound layout were modelled.

No schemes have previously been proposed for the A31/A325 Shepherd and Flock roundabout, so potential improvements here have been developed, primarily to address the constraint to A31 movements.

Schemes were considered that stayed within the highway boundary and did not require major construction, such as a new flyover. **Figure 5.2** illustrates potential improvements. Option 1 has local widening on the approaches to the existing signalised part of the roundabout (south west corner), with new signals introduced where the westbound A31 joins the roundabout. The existing free-flow lane for westbound traffic staying on the A31 is retained.

Option 2 is the same as Option 1 but with the addition of new signals where the southbound A325 joins the roundabout, to try to address the problem of queuing on the A325 blocking back to upstream junctions. The free-flow lane from the A325 to the eastbound A31 is removed but replaced with 4 lanes between the two new sets of signals.

Figure 5.2: Possible Improvements at Shepherd & Flock Roundabout



Source: © OpenStreetMap contributors

Table 5.1 and **Table 5.2** show how the journey times change with the Option 1 improvements at Shepherd & Flock and all of the other schemes in place, for the AM and PM peak respectively.

In the future AM peak, the schemes are successful in reducing delays on the A31, particularly in the eastbound direction (which is busier in the AM peak) where journey times are actually less than in the Base Year. The schemes also reduce delays on some of the other routes, compared to Scenario 2 & 3 without improvements, particularly on the A325 northbound (south section) although long delays remain on the B3001 northbound and A287 northbound.

In the future PM peak, A31 westbound journey times are shown to be only slightly higher than the Base Year. However, the Option 1 scheme still has long queues (due to blocking back from Hickley's corner), but it provides more capacity and queuing past the edge of the model is greatly reduced. As a result more traffic is released onto the A325 northbound and through the town centre.

This extra traffic has the knock-on impact of increasing journey times on other routes, so that some routes are higher than the Scenario 2 & 3 base cases, particularly the B3007 northbound, B3001 northbound and A325 through the centre. With higher flows around the Shepherd & Flock roundabout, there are less gaps for traffic on the A325 from the town centre so queuing is much worse. This also results in traffic changing route, with more demand on the B3007 causing longer delays on this route.

Therefore, the Option 1 improvements on their own are not sufficient to have a significant impact on journey times with Scenarios 2 & 3, due to interaction of traffic at other junctions through and near to the town centre.

Table 5.3 and **Table 5.4** show how the Option 2 improvements change the journey time results.

In the AM peak, the new signals on the northern part of the Shepherd & Flock roundabout lead to increased delays to eastbound traffic, compared to Option 1. This is shown by the journey times for the eastbound A31 but the impact is much greater on the A325 through the town centre. The B3007 southbound is also worse due to congestion where it joins the A325 in the centre.

In the PM peak, there is a similar situation with more delays to A31 and A325 town centre eastbound traffic, compared to Option 1. However, the increase in delays in the centre is much greater, with knock-on effects on the westbound traffic and A287 in both directions.

5.6 Summary of Modelling of Possible Improvements

Modelling of possible improvements has shown:

1. Improvements on the A325 at the A31 junction and to the south are shown to reduce the northbound delays in the AM peak with STA Scenario 2 and 3 back to around Do Minimum levels;
2. Improvements on the A31 at Hickley's Corner and at Shepherd & Flock (Option 1) are shown to reduce eastbound delays in the AM peak to below existing levels;
3. In the AM peak, long delays remain on the B3001 northbound and A287 northbound;

4. Signalisation of the northern part of Shepherd & Flock (Option 2) does not provide sufficient capacity for eastbound traffic in both AM and PM peaks;
5. In the PM peak, Option 1 increases the capacity for A31 westbound traffic where it joins Shepherd & Flock. However, the westbound capacity at Hickley's Corner cannot easily be increased, resulting in similar delays to those currently experienced;
6. Option 1 in the PM peak does allow more A31 westbound traffic to reach the A325 to the north and A325 into the town centre. This causes longer delays on other routes due to the interaction of traffic at other junctions through and near to the town centre.

Based on the above results, it is clear that the capacity at the Shepherd & Flock roundabout can be increased but further work is required to assess improvements on other routes that would be needed to address the knock-on impacts. The overall conclusion is that it should be possible to largely mitigate for the impacts of additional traffic demand resulting from new housing allocations in Farnham, compared to the Do Minimum, but there will be additional delay due to background growth. This will be easier to achieve under STA Scenario 2 which has much less new housing compared to STA Scenario 3.

Table 5.1: AM Peak Hour, With Option 1 Junction Improvements

				Base Year	Future Do Minimum		STA Scenario 2			STA Scenario 3		
Ref	Route	Direction	Length (m)	Time (mins)	Time (mins)	Diff to Base (mins)	Time (mins)	Diff to Base (mins)	Diff to Do Min (mins)	Time (mins)	Diff to Base (mins)	Diff to Do Min (mins)
1	A31	Westbound	6934	6.8	11.5	4.7	10.1	3.3	-1.4	11.2	4.3	-0.3
	A31	Eastbound	6613	11.7	17.6	5.9	8.4	-3.3	-9.2	9.0	-2.7	-8.6
2	B3001	Southbound	3187	5.0	5.5	0.5	6.2	1.2	0.7	6.5	1.5	1.0
	B3001	Northbound	3204	7.4	12.4	5.0	18.1	10.7	5.7	23.4	16.1	11.1
3	A287	Southbound	6881	14.0	17.5	3.5	20.4	6.4	2.9	22.0	8.0	4.5
	A287	Northbound	5728	13.8	22.2	8.4	23.9	10.1	1.7	27.0	13.2	4.8
4	A325 Centre	Eastbound	3118	6.8	8.2	1.4	9.8	3.0	1.6	11.3	4.5	3.1
	A325 Centre	Westbound	3645	7.8	11.0	3.2	12.8	5.0	1.8	15.8	8.0	4.8
5	Tilford Rd	Northbound	3355	4.8	6.5	1.7	7.7	3.0	1.2	8.3	3.5	1.8
	Tilford Rd	Southbound	3355	3.7	3.8	0.1	3.9	0.2	0.1	4.1	0.5	0.4
6	A325 South	Northbound	2808	8.3	16.8	8.5	15.2	6.9	-1.6	16.8	8.4	-0.1
	A325 South	Southbound	2816	3.1	3.3	0.2	4.4	1.2	1.0	4.5	1.4	1.2
7	B3208	Southbound	2124	4.2	6.4	2.2	10.1	5.8	3.6	12.7	8.5	6.3
	B3208	Northbound	2084	3.3	3.9	0.6	4.2	1.0	0.4	4.1	0.8	0.2
8	B3007	Southbound	2526	5.2	7.5	2.3	11.2	6.0	3.7	14.7	9.5	7.2
	B3007	Northbound	2683	6.4	8.7	2.3	11.7	5.3	3.0	13.9	7.5	5.2
9	A325 North	Southbound	2662	5.5	8.1	2.6	12.9	7.4	4.8	15.4	9.9	7.3
	A325 North	Northbound	2383	4.8	6.8	2.0	9.4	4.7	2.7	10.6	5.8	3.8

Table 5.2: PM Peak Hour, With Option 1 Junction Improvements

				Base Year	Future Do Minimum		STA Scenario 2			STA Scenario 3		
Ref	Route	Direction	Length (m)	Time (mins)	Time (mins)	Diff to Base (mins)	Time (mins)	Diff to Base (mins)	Diff to Do Min (mins)	Time (mins)	Diff to Base (mins)	Diff to Do Min (mins)
1	A31	Westbound	6934	13.0	15.5	2.5	13.5	0.5	-2.0	14.4	1.3	-1.1
	A31	Eastbound	6613	6.5	8.8	2.3	10.0	3.5	1.2	11.1	4.6	2.3
2	B3001	Southbound	3187	5.2	5.5	0.3	6.0	0.8	0.5	5.9	0.7	0.4
	B3001	Northbound	3204	7.0	11.3	4.3	19.8	12.7	8.5	27.6	20.6	16.3
3	A287	Southbound	6881	9.8	13.8	4.0	22.0	12.2	8.2	21.1	11.3	7.3
	A287	Northbound	5728	9.1	12.0	2.9	16.2	7.2	4.3	17.8	8.7	5.8
4	A325 Centre	Eastbound	3118	6.3	12.3	6.0	27.3	21.0	15.0	31.9	25.6	19.6
	A325 Centre	Westbound	3645	8.8	15.7	6.9	29.9	21.1	14.2	31.7	22.9	16.0
5	Tilford Rd	Northbound	3355	4.3	5.1	0.9	7.0	2.7	1.8	7.7	3.4	2.6
	Tilford Rd	Southbound	3355	3.5	3.6	0.0	3.6	0.0	0.0	3.6	0.0	0.0
6	A325 South	Northbound	2808	3.6	4.7	1.0	4.5	0.9	-0.1	5.1	1.4	0.4
	A325 South	Southbound	2816	3.3	3.5	0.2	6.8	3.4	3.3	7.1	3.8	3.7
7	B3208	Southbound	2124	4.2	7.1	2.8	11.0	6.8	3.9	13.1	8.9	6.1
	B3208	Northbound	2084	3.5	4.0	0.5	4.2	0.7	0.2	4.1	0.6	0.1
8	B3007	Southbound	2526	4.8	5.5	0.8	12.0	7.3	6.5	10.9	6.2	5.4
	B3007	Northbound	2683	5.5	10.2	4.6	28.8	23.3	18.6	29.0	23.5	18.9
9	A325 North	Southbound	2662	6.0	8.4	2.4	13.7	7.8	5.3	14.8	8.9	6.5
	A325 North	Northbound	2383	4.5	5.4	0.9	6.9	2.4	1.5	6.7	2.2	1.3

Table 5.3: AM Peak Hour, With Option 2 Junction Improvements

				Base Year	Future Do Minimum		STA Scenario 2			STA Scenario 3		
Ref	Route	Direction	Length (m)	Time (mins)	Time (mins)	Diff to Base (mins)	Time (mins)	Diff to Base (mins)	Diff to Do Min (mins)	Time (mins)	Diff to Base (mins)	Diff to Do Min (mins)
1	A31	Westbound	6934	6.8	11.5	4.7	10.4	3.6	-1.1	10.6	3.8	-0.9
	A31	Eastbound	6613	11.7	17.6	5.9	13.8	2.1	-3.8	14.6	3.0	-2.9
2	B3001	Southbound	3187	5.0	5.5	0.5	6.1	1.1	0.6	6.8	1.8	1.3
	B3001	Northbound	3204	7.4	12.4	5.0	20.0	12.6	7.6	21.8	14.4	9.4
3	A287	Southbound	6881	14.0	17.5	3.5	22.7	8.7	5.2	24.5	10.5	7.0
	A287	Northbound	5728	13.8	22.2	8.4	25.9	12.1	3.7	28.7	14.9	6.5
4	A325 Centre	Eastbound	3118	6.8	8.2	1.4	23.8	17.0	15.6	23.9	17.1	15.7
	A325 Centre	Westbound	3645	7.8	11.0	3.2	14.5	6.7	3.5	14.1	6.3	3.1
5	Tilford Rd	Northbound	3355	4.8	6.5	1.7	7.9	3.1	1.3	8.5	3.7	2.0
	Tilford Rd	Southbound	3355	3.7	3.8	0.1	3.9	0.2	0.1	4.0	0.3	0.2
6	A325 South	Northbound	2808	8.3	16.8	8.5	14.9	6.5	-2.0	16.2	7.8	-0.6
	A325 South	Southbound	2816	3.1	3.3	0.2	4.2	1.1	0.9	4.3	1.2	1.0
7	B3208	Southbound	2124	4.2	6.4	2.2	11.0	6.8	4.6	12.2	8.0	5.8
	B3208	Northbound	2084	3.3	3.9	0.6	3.9	0.6	0.0	3.7	0.4	-0.2
8	B3007	Southbound	2526	5.2	7.5	2.3	16.6	11.4	9.1	19.5	14.3	12.0
	B3007	Northbound	2683	6.4	8.7	2.3	12.5	6.0	3.8	12.7	6.2	3.9
9	A325 North	Southbound	2662	5.5	8.1	2.6	15.3	9.8	7.2	16.0	10.5	7.9
	A325 North	Northbound	2383	4.8	6.8	2.0	8.6	3.9	1.9	8.9	4.1	2.1

Table 5.4: PM Peak Hour, With Option 2 Junction Improvements

				Base Year	Future Do Minimum		STA Scenario 2			STA Scenario 3		
Ref	Route	Direction	Length (m)	Time (mins)	Time (mins)	Diff to Base (mins)	Time (mins)	Diff to Base (mins)	Diff to Do Min (mins)	Time (mins)	Diff to Base (mins)	Diff to Do Min (mins)
1	A31	Westbound	6934	13.0	15.5	2.5	13.8	0.8	-1.6	14.6	1.5	-0.9
	A31	Eastbound	6613	6.5	8.8	2.3	18.4	11.8	9.6	19.2	12.7	10.4
2	B3001	Southbound	3187	5.2	5.5	0.3	6.8	1.5	1.2	7.5	2.2	1.9
	B3001	Northbound	3204	7.0	11.3	4.3	18.0	11.0	6.7	24.4	17.3	13.1
3	A287	Southbound	6881	9.8	13.8	4.0	25.2	15.4	11.4	27.8	18.0	14.0
	A287	Northbound	5728	9.1	12.0	2.9	22.6	13.5	10.6	25.3	16.2	13.4
4	A325 Centre	Eastbound	3118	7.2	12.3	5.1	50.5	43.3	38.2	43.8	36.6	32.6
	A325 Centre	Westbound	3645	8.8	15.7	6.9	28.0	19.2	12.3	35.8	27.0	20.1
5	Tilford Rd	Northbound	3355	4.3	5.1	0.9	8.7	4.4	3.5	10.9	6.6	5.8
	Tilford Rd	Southbound	3355	3.5	3.6	0.0	3.6	0.0	0.0	3.6	0.0	0.0
6	A325 South	Northbound	2808	3.6	4.7	1.0	5.0	1.3	0.3	5.2	1.6	0.5
	A325 South	Southbound	2816	3.3	3.5	0.2	6.3	3.0	2.8	6.4	3.1	2.9
7	B3208	Southbound	2124	4.2	7.1	2.8	10.5	6.3	3.4	11.3	7.1	4.2
	B3208	Northbound	2084	3.5	4.0	0.5	3.6	0.1	-0.4	3.7	0.2	-0.3
8	B3007	Southbound	2526	4.8	5.5	0.8	10.6	5.8	5.1	14.1	9.3	8.5
	B3007	Northbound	2683	5.5	10.2	4.6	14.6	9.1	4.5	17.3	11.8	7.2
9	A325 North	Southbound	2662	6.0	8.4	2.4	17.6	11.7	9.3	18.0	12.0	9.6
	A325 North	Northbound	2383	4.5	5.4	0.9	6.3	1.8	0.9	5.8	1.3	0.4

6 Conclusions

- Congestion currently occurs on some of the roads in and around Farnham. The largest delays are due to the capacity of the A31 Shepherd and Flock and Hickley's Corner junctions that constrain throughput and lead to delays on the other routes feeding into these junctions.
- Other junctions on the A287 and A325 cause some delays due to capacity constraint but the impacts are localised.
- A micro-simulation model of Farnham has been developed by Surrey County Council representing a base year of 2010/11, covering the AM and PM peak hours. Although the model seems to underestimate traffic demand and journey times to some degree, it was successfully validated in line with Department for Transport guidelines. Therefore, the model is considered suitable for testing the impact of additional traffic in the future due to new housing and other developments in Farnham.
- Traffic growth between 2009 and 2031 has been estimated based on Surrey County Council's strategic traffic model which was used to test different development scenarios. STA Scenarios 2 and 3 include 2,279 and 3,800 new houses in Farnham respectively and are predicted to increase car traffic demand by 30% and 35%. This is compared to 18% with the 'Do Minimum' of no new housing in Farnham, other than that which currently has planning permission.
- This growth has been applied uniformly to the Farnham base year traffic model to represent conditions in 2031 with the two development scenarios and Do Minimum.
- Under both development scenarios, increases in journey time from the base year of over ten minutes are predicted on:
  - AM peak hour - the A325 and A287 northbound routes towards the town centre
  - PM peak hour - B3001 northbound and A325 through the town centre in both directions.
- Under Scenario 3, the following routes also experience increases in journey time of over ten minutes:
  - AM peak hour - the A31 eastbound, B3001 northbound and B3007 southbound
  - PM peak hour – no additional routes.
- The A31 junctions at Shepherd and Flock and Hickley's Corner cause delays for A31 traffic but also generate queuing that blocks back to other junctions. This causes delays on the A287, B3001, B3208, B3007 and A325 North radial routes towards Farnham, as well as the A325 through the town centre.
- Modelling has shown that it should be possible to increase the capacity of the A31 Shepherd and Flock junction through further signalisation of the roundabout and localised widening to provide more lanes at the signal stop lines. However, improving this junction to increase the A31 throughput has implications for other routes due to a combination of more queuing on some arms and increased traffic volumes reaching downstream junctions.
- Improvements at the A31 Hickley's Corner junction should be able to increase the capacity for eastbound traffic but westbound throughput would still be constrained.
- The overall conclusion is that it should be possible to largely mitigate for the impacts of additional traffic demand resulting from new housing allocations in Farnham, compared to the Do Minimum, but there will be additional delay due to background growth.
- This will be easier to achieve under STA Scenario 2 which has much less new housing compared to STA Scenario 3.

Transport Assessment

Scenarios for the Distribution of Housing Growth - Stage 4 Report

June 2016

Waverley Borough Council

Transport Assessment

Scenarios for the Distribution of Housing Growth - Stage 4 Report

June 2016

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A	November 2015	S Finney	P Rapa	N Richardson	1st Issue
B	June 2016	S Finney	P Rapa	N Richardson	2nd Issue

Information class: Standard

Contents

1 Introduction

Mott MacDonald has been commissioned by Waverley Borough Council (WBC) to provide advice in relation to planning for new development as part of their Local Plan. This report covers Stage 4 of the work.

1.1 Background

WBC consulted on a new Local Plan from 3 September - 17 October 2014, through the 'Consultation on Potential Housing Scenarios and Other Issues for the Waverley Local Plan' document. Four scenarios to meet the predicted demand for new housing were presented:

"Each would deliver 8,450 homes over the period from 2013 to 2031, equivalent to just over 469 homes per year on average. This includes the 3,400 on sites within settlements. The distribution of the remaining 5,050 homes differs between the scenarios as follows:

- Scenario 1 – Around 4,450 on greenfield sites at the four larger settlements, some growth at villages (600) but no development at Dunsfold Aerodrome
- Scenario 2 – Around 2,650 on greenfield sites at the four larger settlements, some growth at the villages (600) plus 1,800 at Dunsfold Aerodrome
- Scenario 3 – Around 1,900 on greenfield sites at the four larger settlements, some growth at the villages (550) plus 2,600 at Dunsfold Aerodrome
- Scenario 4 – Around 1,200 on greenfield sites at the four larger settlements, some growth at the villages (450) plus 3,400 at Dunsfold Aerodrome."

Supporting evidence for this consultation included a Strategic Transport Assessment (STA) of scenarios undertaken by Surrey County Council (SCC) on behalf of WBC, as well as a 'Planning Position Statement from Promoters of Dunsfold Aerodrome: August 2014'.

The main difference between the scenarios is in the number of homes provided in 3 main areas as below:

Table 1.1: Number of New Homes in Each Scenario

Scenario	Farnham	Cranleigh	Dunsfold Aerodrome
1	3,800	1,800	0
2	2,600	1,200	1,800
3	2,100	1,050	2,600
4	1,800	650	3,400

1.2 Scope of Stage 4 Report

Stage 4 of the work is to contribute to the evidence base that covers wider transport sustainability issues, as set out in the Government's Planning Practice Guidance: "Transport evidence bases in plan making and decision taking".

The main requirements of Stage 4 are to:

- Determine existing modal split for each area;
- Determine existing destinations of work trips by mode;
- Identify existing transport services;
- Identify existing levels of employment;
- Identify existing access to other local facilities; and
- Investigate transport capacity and the potential to improve sustainable modes.

Stage 4 follows on, and refers to, previous stages of work:

Stage 1 - review of previous work and associated data inputs and modelling outputs, with development of an approach to assess the impact of increased traffic on the A281 as a result of 1,800 new homes at Dunsfold;

Stage 2 – detailed analysis of the impacts on the A281. Expanded to include the impact of more than 1,800 new homes at Dunsfold and an alternative scenario with more new homes in Cranleigh;

Stage 3 – use of the Farnham traffic model to assess the impact of predicted traffic growth in and around the town, as a result of new homes in Farnham, and consideration of potential mitigation measures.

2 Mode of Travel to Work

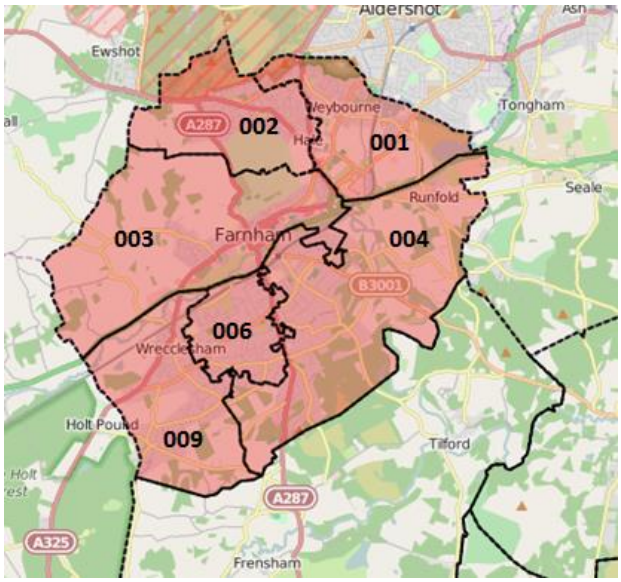
2.1 2011 Census Data on Travel Modes

The 2011 Census Database contains information on travel modes used by existing residents for their usual journey to work. Data on the usual workplace of residents is also available, with the greatest level of detail in terms of home locations being 'middle layer super output areas' which are somewhat larger than Census wards.

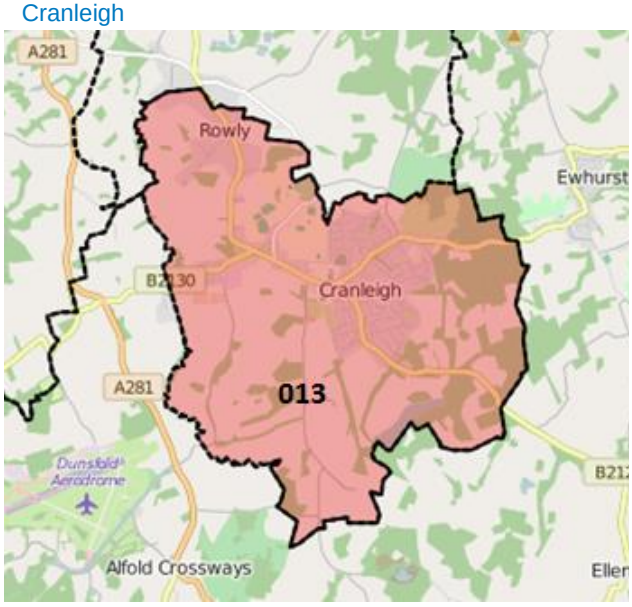
Farnham is split into six middle layer super output areas, as shown below, whereas all of Cranleigh is covered by one area:

Figure 2.1: Census Middle Layer Super Output Areas

Farnham



Cranleigh



Source: © OpenStreetMap contributors

The modes of travel to work used by residents of each of these areas is detailed in **Table 2.1** overleaf. For Farnham, the average for the whole town is also shown, weighted based on the number of residents in each area.

Estimates of the travel modes that would be used by new Dunsfold residents for trips to work are also shown, based on the data for Cranleigh but adjusted to take into account the likely lower level of 'internalisation' of trips. 31% of existing Cranleigh residents also work in the town; it is unlikely that a similar figure would be achieved for the Dunsfold development, with 20% internalisation being the highest realistic level. For comparison, there is 28% internalisation for Farnham as a whole.

The modal split is also shown for a sensitivity test with a lower internalisation rate of 10%. Both of these mode distributions are calculated by factoring down the 'internal' trips, which reduces the walk and cycle modes, and factoring up 'external' trips, giving increases in car driver, rail and bus modes.

Table 2.1: Existing Modes of Travel to Work by Farnham, Cranleigh and New Dunsfold Residents

Area		Car Driver	Car Pass	Rail	Bus	Walk	Cycle	Motor cycle	Other	Total
Badshot Lea	1	77.4%	5.2%	5.4%	2.0%	6.8%	1.2%	1.2%	0.8%	100.0%
Hale	2	76.5%	4.9%	5.7%	4.3%	5.7%	1.4%	0.9%	0.5%	100.0%
Centre and west Farnham	3	58.6%	3.8%	12.2%	2.0%	20.4%	1.5%	0.5%	1.0%	100.0%
South Farnham	4	67.3%	2.7%	17.2%	0.7%	9.4%	1.2%	0.6%	0.8%	100.0%
Central urban area	6	69.5%	4.3%	11.8%	1.6%	9.6%	1.6%	0.7%	0.8%	100.0%
Wrecclesham / Rowledge	9	74.6%	4.5%	9.2%	1.4%	7.1%	1.5%	0.7%	0.9%	100.0%
Farnham Average		70.5%	4.3%	9.9%	2.2%	10.1%	1.4%	0.8%	0.8%	100.0%
Cranleigh	13	70.2%	5.2%	5.3%	2.4%	12.6%	3.0%	0.5%	0.8%	100.0%
Dunsfold Park – 20% Internalisation		74.2%	4.7%	6.2%	2.7%	8.6%	2.4%	0.6%	0.7%	100.0%
Dunsfold Park – 10% Internalisation		77.5%	4.3%	6.9%	2.9%	5.3%	1.9%	0.6%	0.7%	100.0%

2.2 Employees Working in Each Area

The 2011 Census Database gives numbers of full and part time employees who live in each area, as well as the total number of employees who work in each area, as detailed in **Table 2.2**. Comparing these two figures shows that the ratio of total employed in the area to working residents is higher in Farnham than Cranleigh.

Table 2.2: Numbers of Residents and Employees in Each Area

Area	Residents in Area	Employed Residents in Area (FTE)	Total Employed in Area (FTE)	Ratio of Employees to Residents
Farnham Total	39,488	16,253	26,732	1.64
Cranleigh	10,692	4,344	6,052	1.39

2.3 Average Mode Split for Development Scenarios

Data on the number of new homes assumed in each of the Census areas for the four different development scenarios was provided by WBC and is detailed in **Table 2.3**. By applying the journey to work mode splits for each Census area to the number of homes contained it, the average mode split for each scenario was determined. The results assuming 20% internalisation at Dunsfold are shown in **Table 2.4**, demonstrating a consistent mode split across all scenarios. The biggest difference is 1.2% more car drivers in Scenario 4 compared to Scenario 1, with a similar reduction in walking in Scenario 4.

Table 2.5 shows the corresponding figures with 10% internalisation which increases the difference between Scenario 4 and Scenario 1 to 3.2% for car drivers. Scenarios 2 and 3 are shown to have mode splits that are very similar to each other with 10% internalisation.

Table 2.3: Distribution of New Homes to Census Areas

Area	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Badshot Lea	1634	969	594	459
Hale	162	122	72	72
Centre and west Farnham	1187	902	1107	942
South Farnham	313	233	123	123
Central urban area	95	95	95	95
Wrecclesham/ Rowledge	409	279	109	109
Farnham total	3800	2600	2100	1800
Cranleigh	1450	850	700	300
Dunsfold Park	0	1800	2600	3400
Total	5250	5250	5400	5500

Table 2.4: Average Modes of Travel for Each Scenario – 20% Internalisation at Dunsfold

Scenario	Car Driver	Car Pass	Rail	Bus	Walk	Cycle	Motor cycle	Other	Total
1	70.2%	4.6%	8.0%	2.1%	11.7%	1.8%	0.8%	0.8%	100.0%
2	71.1%	4.6%	7.7%	2.3%	10.8%	2.0%	0.7%	0.8%	100.0%
3	70.6%	4.6%	7.6%	2.4%	11.3%	2.1%	0.6%	0.8%	100.0%
4	71.4%	4.5%	7.5%	2.4%	10.6%	2.1%	0.6%	0.8%	100.0%

Table 2.5: Average Modes of Travel for Each Scenario – 10% Internalisation at Dunsfold

Scenario	Car Driver	Car Pass	Rail	Bus	Walk	Cycle	Motor cycle	Other	Total
1	70.2%	4.6%	8.0%	2.1%	11.7%	1.8%	0.8%	0.8%	100.0%
2	72.3%	4.5%	7.9%	2.3%	9.7%	1.8%	0.7%	0.8%	100.0%
3	72.2%	4.4%	8.0%	2.5%	9.7%	1.9%	0.6%	0.8%	100.0%
4	73.4%	4.3%	8.0%	2.6%	8.6%	1.8%	0.6%	0.7%	100.0%

3 Destinations of Work Trips by Mode

3.1 2011 Census Data

As mentioned earlier, data on the mode of travel to work from specified areas of residence to areas of workplace is available from the 2011 Census. The distribution of trips to work from the residents of Farnham and Cranleigh for each of the main modes of car driver, rail and bus are illustrated in plans contained in **Appendix A.**

For trips to work in Waverley Borough, the distribution is shown at the middle layer super output area level. For the rest of Surrey and its neighbouring counties, the district boundaries have been used, with Boroughs used in London. For trips further afield, the county/unitary authority boundaries have been used.

For car drivers, the plans show that Farnham residents travel in all directions from the town. Significant numbers are shown to the districts of Winchester, Basingstoke & Deane, West Berkshire, Wokingham, Bracknell Forest, Runnymede, Woking, Elmbridge and Mole Valley, as well as more local towns.

In contrast, the distribution for Cranleigh residents who drive to work shows a greater concentration nearer to the town, including 29% to Guildford and 21% in total to the nearby rural areas such as Ewhurst, Dunsfold, Chiddingfold, Bramley and Shamley Green. There are also over 5% of trips to Mole Valley and Horsham.

For travel to work by rail, Cranleigh has large proportions with a destination in the City of London (50%) and the rest of central London (34%). For the remainder of rail trips, Reading is the only destination that accounts for more than 2%. For Farnham, there are also high proportions to City of London (42%) and central London (34%), with the other main destinations being Guildford, Woking, Farnham, Reading and Aldershot.

The distance between each of the combinations of home and workplace locations recorded in the Census was calculated based on the ‘crow fly’ distance between the centroids of the zones. This allowed the average distance travelled from each residential area to be estimated for each travel mode, as shown in **Table 3.1.**

It should be noted that any trips contained within an area are assumed to be zero in length, so the average length of walk trips for Cranleigh is shown to be much lower than areas in Farnham (where most walk trips move from one area to another).

Table 3.1: Existing Distance Travelled to Work by Farnham and Cranleigh Residents (km)

Area		Car Driver	Car Pass	Rail	Bus	Walk	Cycle	Motor cycle	Other	Average
Badshot Lea	1	14.2	10.9	44.0	8.0	3.9	6.6	16.4	5.5	14.7
Hale	2	14.7	9.5	45.9	7.1	3.4	8.5	16.5	8.2	15.1
Centre and west Farnham	3	17.1	11.3	46.1	14.2	2.3	8.2	12.7	16.1	17.2
South Farnham	4	17.7	11.4	51.1	18.2	3.3	14.9	15.1	12.5	21.9
Central urban area	6	16.1	11.1	49.4	8.9	4.5	5.2	12.4	25.3	18.4
Wrecclesham / Rowledge	9	17.0	11.8	53.5	12.0	5.5	5.8	19.4	28.9	19.2
Farnham Average		16.0	10.9	48.7	9.8	3.4	7.8	15.8	16.4	17.5
Cranleigh	13	13.5	7.3	45.4	10.8	1.5	4.2	17.4	19.3	13.1

For car driver trips, the weighted average trip length for the whole of Farnham is shown to be around 18% higher than for Cranleigh (16.0km compared to 13.5km).

Using the above data for Cranleigh, the likely travel distances by new Dunsfold residents has been estimated assuming lower proportions of internalisation as before. With 20% internalisation, the average car driver trip length is lower than that for Farnham at 15.0km but this increases to 16.2km with 10% internalisation (as there are fewer short car trips).

Table 3.2: Estimated Distance Travelled to Work by New Dunsfold Residents (km)

Area	Car Driver	Car Pass	Rail	Bus	Walk	Cycle	Motor cycle	Other	Average
Dunsfold Park – 20% Internalisation	15.0	9.5	45.7	11.5	2.2	5.7	19.8	23.2	15.3
Dunsfold Park – 10% Internalisation	16.2	11.7	45.9	11.9	3.8	7.9	21.6	27.8	17.2

3.2 Total Travel Distances for Development Scenarios

The total distance travelled by residents in the new development areas has been estimated for each the four development scenarios, using the mode shares and average trip lengths for the relevant Census areas. The results are shown in **Table 3.3-Table 3.6** for 20% internalisation at Dunsfold, for the one-way trip to work each day.

Each household currently has an average of 1.01 employed residents (full time equivalent), based on existing Census data for Farnham and Cranleigh, assuming part-time employees work 3 days/week. Therefore, the number of homes can be used directly to estimate employee trips.

Similar results with 10% internalisation are contained in **Table 3.7 - Table 3.10**.

Table 3.3: Scenario 1 – Estimated Total Distance Travelled Each Day – 20% Internalisation at Dunsfold

		Total Distance Travelled (km)		
Area	No. of homes	Car driver	Rail	Bus
Badshot Lea	1634	18010	3894	265
Hale	162	1816	424	50
Centre and west Farnham	1187	11877	6680	341
South Farnham	313	3734	2756	39
Central urban area	95	1063	554	14
Wrecclesham/ Rowledge	409	5199	2016	70
Farnham total	3800	41698	16324	779
Cranleigh	1450	13733	3493	375
Dunsfold Park	0	0	0	0
Total	5250	55431	19816	1154
Average Distance per home (km)		10.6	3.8	0.2

Table 3.4: Scenario 2 – Estimated Total Distance Travelled Each Day – 20% Internalisation at Dunsfold

		Total Distance Travelled (km)		
Area	No. of homes	Car driver	Rail	Bus
Badshot Lea	969	10680	2309	157
Hale	122	1368	319	37
Centre and west Farnham	902	9025	5076	259
South Farnham	233	2780	2052	29
Central urban area	95	1063	554	14
Wrecclesham/ Rowledge	279	3546	1375	48
Farnham total	2600	28462	11685	545
Cranleigh	850	8050	2047	220
Dunsfold Park	1800	20087	5140	554
Total	5250	56600	18872	1318
Average Distance per home (km)		10.8	3.6	0.3

Table 3.5: Scenario 3 – Estimated Total Distance Travelled Each Day – 20% Internalisation at Dunsfold

		Total Distance Travelled (km)		
Area	No. of homes	Car driver	Rail	Bus
Badshot Lea	594	6547	1415	96
Hale	72	807	188	22
Centre and west Farnham	1107	11076	6230	318
South Farnham	123	1467	1083	15
Central urban area	95	1063	554	14
Wrecclesham/ Rowledge	109	1385	537	19
Farnham total	2100	22346	10008	485
Cranleigh	700	6629	1686	181
Dunsfold Park	2600	29015	7424	800
Total	5400	57991	19118	1465
Average Distance per home (km)		10.7	3.5	0.3

Table 3.6: Scenario 4 – Estimated Total Distance Travelled Each Day – 20% Internalisation at Dunsfold

		Total Distance Travelled (km)		
Area	No. of homes	Car driver	Rail	Bus
Badshot Lea	459	5059	1094	74
Hale	72	807	188	22
Centre and west Farnham	942	9425	5302	271
South Farnham	123	1467	1083	15
Central urban area	95	1063	554	14
Wrecclesham/ Rowledge	109	1385	537	19
Farnham total	1800	19207	8758	415
Cranleigh	300	2841	723	78
Dunsfold Park	3400	37943	9708	1046
Total	5500	59992	19188	1539
Average Distance per home (km)		10.9	3.5	0.3

Table 3.7: Scenario 1 – Estimated Total Distance Travelled Each Day – 10% Internalisation at Dunsfold

		Total Distance Travelled (km)		
Area	No. of homes	Car driver	Rail	Bus
Badshot Lea	1634	18010	3894	265
Hale	162	1816	424	50
Centre and west Farnham	1187	11877	6680	341
South Farnham	313	3734	2756	39
Central urban area	95	1063	554	14
Wrecclesham/ Rowledge	409	5199	2016	70
Farnham total	3800	41698	16324	779
Cranleigh	1450	13733	3493	375
Dunsfold Park	0	0	0	0
Total	5250	55431	19816	1154
Average Distance per home (km)		10.6	3.8	0.2

Table 3.8: Scenario 2 – Estimated Total Distance Travelled Each Day – 10% Internalisation at Dunsfold

		Total Distance Travelled (km)		
Area	No. of homes	Car driver	Rail	Bus
Badshot Lea	969	10680	2309	157
Hale	122	1368	319	37
Centre and west Farnham	902	9025	5076	259
South Farnham	233	2780	2052	29
Central urban area	95	1063	554	14
Wrecclesham/ Rowledge	279	3546	1375	48
Farnham total	2600	28462	11685	545
Cranleigh	850	8050	2047	220
Dunsfold Park	1800	22557	5797	625
Total	5250	59069	19529	1390
Average Distance per home (km)		11.3	3.7	0.3

Table 3.9: Scenario 3 – Estimated Total Distance Travelled Each Day – 10% Internalisation at Dunsfold

		Total Distance Travelled (km)		
Area	No. of homes	Car driver	Rail	Bus
Badshot Lea	594	6547	1415	96
Hale	72	807	188	22
Centre and west Farnham	1107	11076	6230	318
South Farnham	123	1467	1083	15
Central urban area	95	1063	554	14
Wrecclesham/ Rowledge	109	1385	537	19
Farnham total	2100	22346	10008	485
Cranleigh	700	6629	1686	181
Dunsfold Park	2600	32582	8373	903
Total	5400	61557	20067	1569
Average Distance per home (km)		11.4	3.7	0.3

Table 3.10: Scenario 4 – Estimated Total Distance Travelled Each Day – 10% Internalisation at Dunsfold

		Total Distance Travelled (km)		
Area	No. of homes	Car driver	Rail	Bus
Badshot Lea	459	5059	1094	74
Hale	72	807	188	22
Centre and west Farnham	942	9425	5302	271
South Farnham	123	1467	1083	15
Central urban area	95	1063	554	14
Wrecclesham/ Rowledge	109	1385	537	19
Farnham total	1800	19207	8758	415
Cranleigh	300	2841	723	78
Dunsfold Park	3400	42607	10949	1181
Total	5500	64655	20429	1674
Average Distance per home (km)		11.8	3.7	0.3

As each development scenario does not contain exactly the same number of homes, the average trip length by mode is also shown in the tables as a fairer comparison. The differences in average lengths between scenarios are shown graphically in **Figure 3.1** and **Figure 3.2.**

Scenario 1 has the lowest car trip length. This is partly due to the other scenarios having fewer homes in Cranleigh which has the lowest car mode share and lowest average car trip length of the three main home locations (Farnham, Cranleigh and Dunsfold).

There is a much more marked increase assuming 10% internalisation at Dunsfold as this results in a higher car mode share and higher average car trip length for Dunsfold residents.

Table 3.11 and **Table 3.12** gives an estimate of the total vehicle-kilometres travelled to work by car for each scenario over a whole year, based on the following assumptions:

- A total of 5,250 homes in each scenario to allow direct comparison;
- On average each employee would travel to work on 225 days of the year.

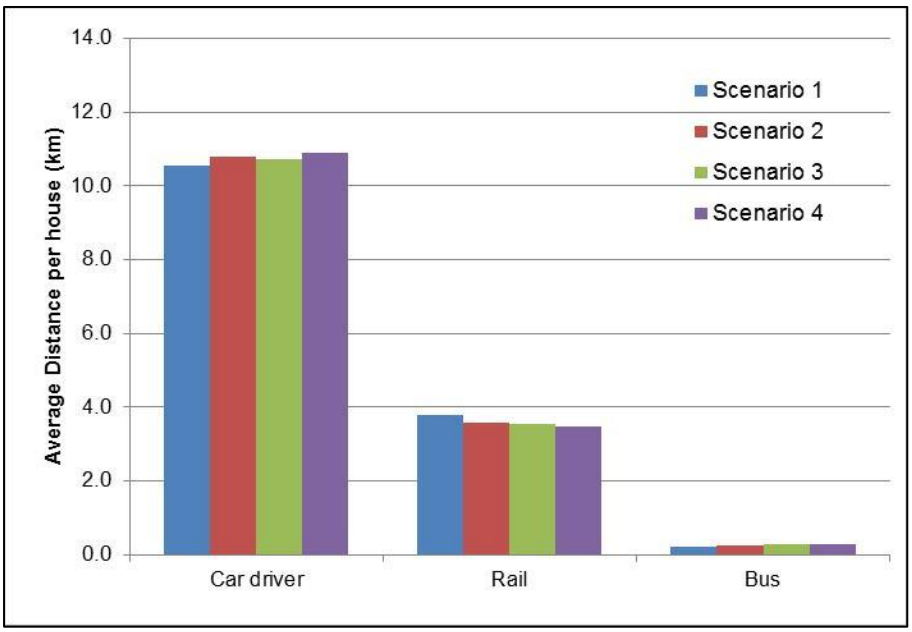
Table 3.11: Annual Distance Travelled to Work by Car - 20% Internalisation at Dunsfold

Car distance travelled	Scenario 1	Scenario 2	Scenario 3	Scenario 4
One-way to work on one day (veh-kms)	55,431	56,600	56,380	57,265
Two-way total over one year (veh-kms)	24,944,000	25,470,000	25,371,000	25,769,000
Difference to Scenario 1 (veh-kms)		526,000	427,000	825,000
Difference to Scenario 1 (%)		2.1%	1.7%	3.3%

Table 3.12: Annual Distance Travelled to Work by Car - 10% Internalisation at Dunsfold

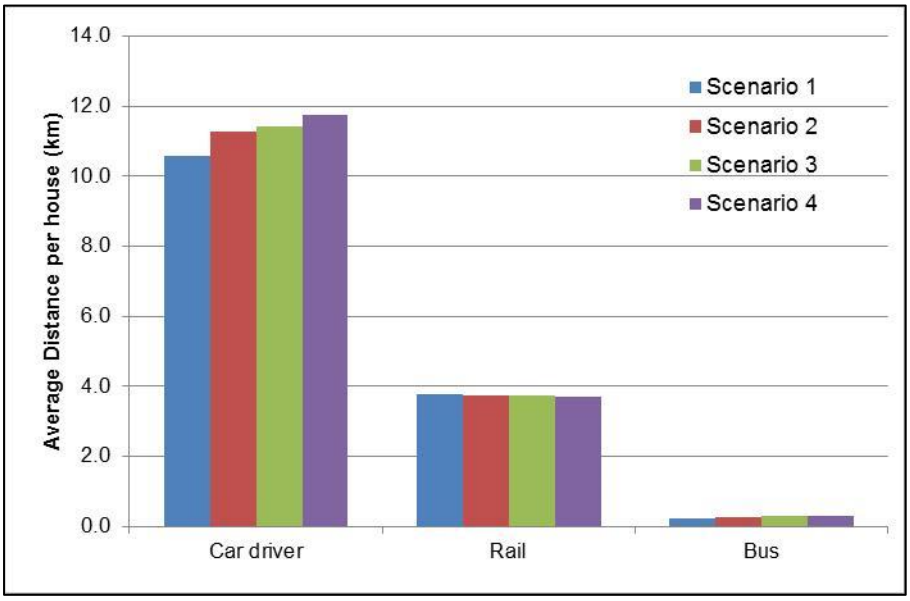
Car distance travelled	Scenario 1	Scenario 2	Scenario 3	Scenario 4
One-way to work on one day (veh-kms)	55,431	59,069	59,848	61,717
Two-way total over one year (veh-kms)	24,944,000	26,581,000	26,931,000	27,772,000
Difference to Scenario 1 (veh-kms)		1,637,000	1,987,000	2,828,000
Difference to Scenario 1 (%)		6.6%	8.0%	11.3%

Figure 3.1: Average Distance Travelled per Home – 20% Internalisation at Dunsfold (km)



Source: MM analysis

Figure 3.2: Average Distance Travelled per Home – 10% Internalisation at Dunsfold (km)



Source: MM analysis

4 Existing Transport Services

A review of the existing bus and rail services was undertaken for the Farnham and Cranleigh/Dunsfold areas, using up to date online resources through passenger travel information websites.

4.1 Existing Bus Provision

Table 4.1 below presents the existing bus services in Farnham, detailing routes, operators, frequencies and the main locations that each route travels through, based on 2015 timetables.

Table 4.1: Existing Bus Services in Farnham

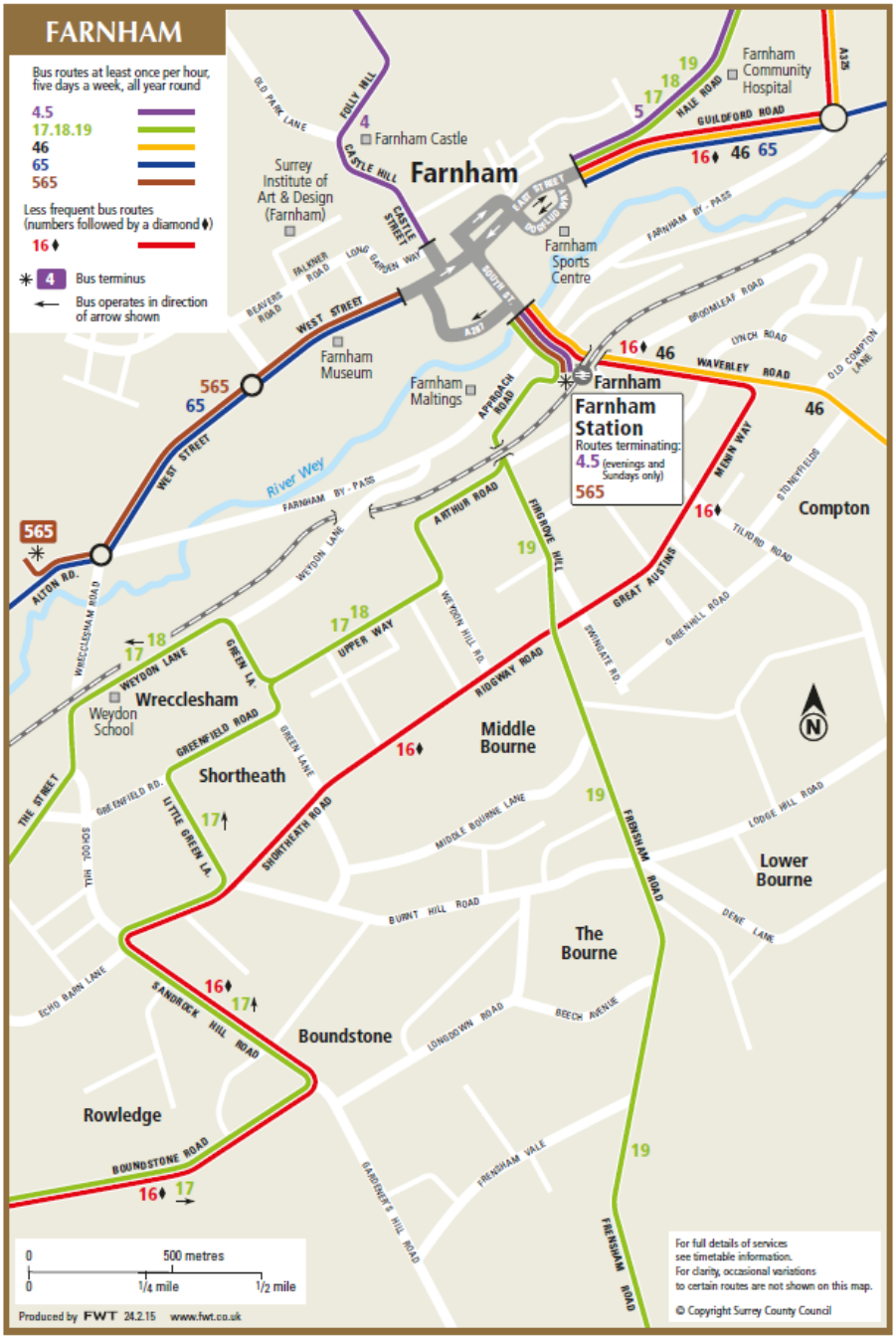
Route	Service Area	Operator	Weekday	Saturday	Sunday
4 - 5	North Town - Aldershot-Hale/Folly Hill - Farnham (4 via Folly Hill and 5 via Hale)	Stagecoach	2 per hour until 20:00 1 per hour until 24:00	2 per hour until 20:00	1 per 2 hours
17	Aldershot - Farnham - Wrecclesham - Rowledge	Stagecoach	1 per hour	1 per hour	No service
18	Aldershot - Farnham - Wrecclesham - Bordon-Lindford - Headley Down - Hindhead - Haslemere	Stagecoach	1 per hour	1 per hour	1 per 2 hours
19	Aldershot - Farnham - Beacon Hill - Hindhead - Haslemere - Guildford	Stagecoach	1 per hour	1 per hour	No service
46	Guildford - Compton - Godalming - Hurtmore - Shackelford - Elstead - Farnham - Aldershot	Stagecoach	1 per hour	1 per hour	No service
65	Guildford - Puttenham - Runfold - Farnahm - Bentley - Alton	Stagecoach	1 per hour	1 per hour	No service
565	Woking - Sheerwater - New Haw - Addlestone - Chertsey	Waverley Hoppa	Farnham Station to Coxbridge Business Park route has been withdrawn		
16	Dockenfield/Rowledge - Shortheath - Farnham - Weybourne	Stagecoach	1 per hour between 10:00 - 13:00	No service	No service

Source: http://www.surreycc.gov.uk/roads-and-transport/buses-and-trains

There are a total of seven existing bus routes that service Farnham town centre, all of which are operated by Stagecoach. The services generally run hourly Monday-Saturday, but only two services run on Sundays. The 4-5 routes combine to give a 30-minute service Monday-Saturday. It should be noted that the 565 service has been withdrawn as the funding provided by the developer of the business park ended after the agreed period (August 2015).

Figure 4.1 shows the distribution of the bus routes through Farnham. All routes serve the town centre and all but the 65 service also connect to the rail station. The majority of Farnham residential areas are within walking distance of a bus stop giving an hourly service to the rail station and town centre.

Figure 4.1: Existing Bus Routes in Farnham



Source: http://www.surreycc.gov.uk/roads-and-transport/buses-and-trains

Table 4.2 below presents the existing bus services in Cranleigh and Dunsfold areas, detailing routes, operators, frequencies and the main locations that each route travels through.

There are nine bus routes that service the Cranleigh area, operated by five different bus operators. The 24, 25, 42, 53 and 63 services run on an hourly or every other hour basis, with most of the other services only running one trip on one or two weekdays. Only the 53 service runs on Sunday.

There is a good service between Cranleigh and Guildford, with a combined frequency of 4 buses/hour from the 24, 53 and 63 services.

There are only two bus routes that service the Dunsfold area, both of which are operated by Compass Travel. One route offers a fairly frequent service of one to two buses per hour, whilst the other only consists of one return journey per week, Monday-Saturday. There is no service on Sunday.

There are no bus services that currently provide a direct connection to the Dunsfold Aerodrome site

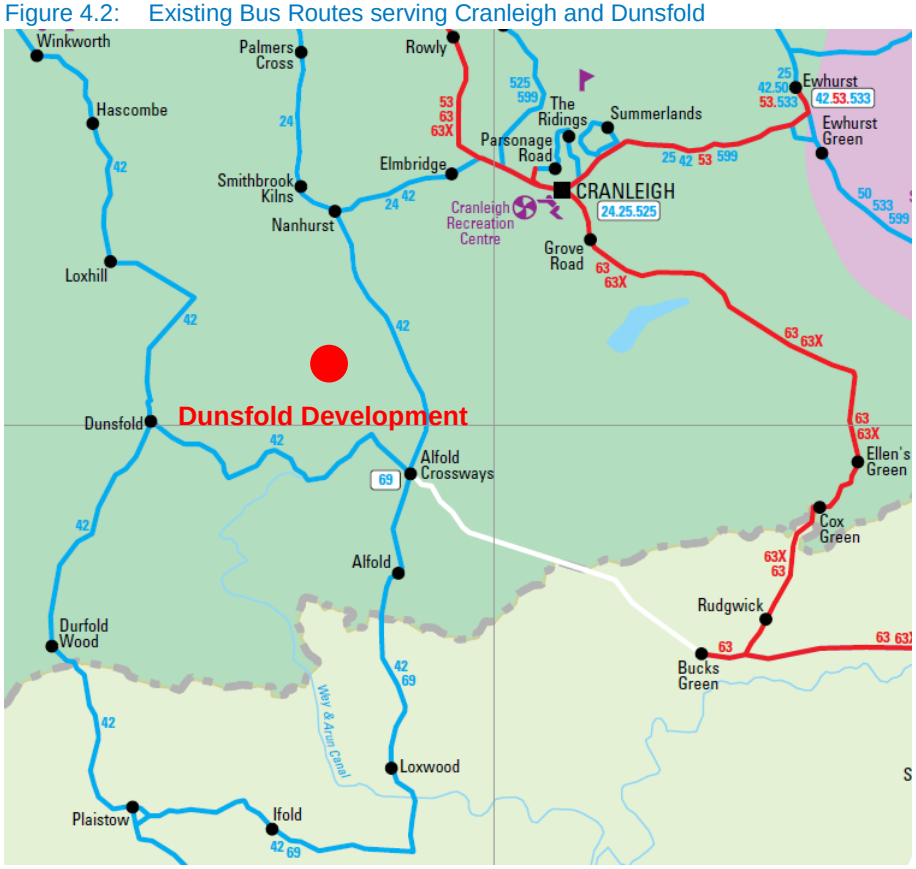
Figure 4.2 shows the distribution of the bus routes through the Cranleigh/Dunsfold area.

Table 4.2: Existing Bus Services in Cranleigh/Dunsfold

Route	Service Area	Operator	Weekday	Saturday	Sunday
Cranleigh					
24	Guildford - Shalford - Bramley - Elmbridge - Cranleigh	Buses Excetera	1 per hour	1 per hour	No service
42	Guildford - Farncombe-Catteshall - Godalming - Hascombe - Dunsfold - Alfold - Elmbridge -Cranleigh – Ewhurst (1 service per day via Plaistow - Ifold – Loxwood)	Compass Travel	Alternating: 1 per hour to 1 per 2 hours	Alternating: 1 per hour to 1 per 2 hours	No service
53	Ewhurst - Cranleigh - Wonersh - Bramley - Shalford - Guildford	Arriva	2 per hour until 10:00 1 per hour until 23:00	2 per hour until 10:00 1 per hour until 23:00	1 per hour
63 - 63X	Horsham - Slinfold - Bucks Green - Rudgwick -Cranleigh - Wonersh -Bramley - Shalford - Guildford	Arriva	1 per hour until 10:00 2 per hour until 16:00 1 per hour until 19:00	2 per hour until 18:00	No service
525	Albury - Chilworth - Wonersh - Smithwood Common - Cranleigh	Carlone Buses	1 return journey every Thursday	No service	No service
599	Holmbury St Mary - Forest Green - Ewhurst - Cranleigh - Smithwood Common - Wonersh -Chilworth - Guildford	Carlone Buses	1 return journey Thursdays and Fridays only	No service	No service
25	Guildford - Boxgrove -Merrow - Gomshall -Peaselake - Ewhurst -Cranleigh	Buses Excetera	1 per 2 hours between 10:30 - 16:30	1 per 2 hours between 10:30 - 16:30	No service
533	Ewhurst - Walliswood -Forest Green - Ockley -Dorking - Ranmore	Carlone Buses	1 return journey every Tuesday	No service	No service
50	Horsham - Walliswood - Ewhurst - Forest Green -Ockley - Coldharbour -Dorking	Buses4u	1 service every Tuesday	No service	No service
Dunsfold					
42	Guildford - Farncombe-Catteshall - Godalming - Hascombe - Dunsfold - Plaistow - Ifold - Loxwood - Alfold - Elmbridge -Cranleigh - Ewhurst	Compass Travel	Alternating: 1 per hour to 1 per 2 hours	Alternating: 1 per hour to 1 per 2 hours	No service
69	Alfold - Loxwood - Ifold - Plaistow - Kirdford - Wisborough - Green - Billingshurst - Pulborough Arundel - Worthing	Compass Travel	1 return journey every Tuesday	No service	No service

Source: http://www.surreycc.gov.uk/roads-and-transport/buses-and-trains

Figure 4.2: Existing Bus Routes serving Cranleigh and Dunsfold



Source: http://www.surreycc.gov.uk/roads-and-transport/buses-and-trains

4.2 Existing Rail Provision

Table 4.3 below presents the existing rail services for Farnham, detailing key destinations, frequencies and number of journey legs.

Table 4.3: Existing Rail Services for Farnham

Area	Time	Weekday	Saturday	Sunday
Woking	23 minutes (direct)	Every 30 minutes	Every 30 minutes	Every hour until 14:00 then every 30 minutes
Clapham Junction	50 minutes (direct) 1 hour (1 change) alternating services	Every 30 minutes	Every 30 minutes	Every hour until 13:30 then every 30 minutes
London Waterloo	1 hour direct /1 change alternating services	1 to 2 trains every 30 minutes (1 direct, 1 change)	1 to 2 trains every 30 minutes (1 direct 1 change)	Every hour until 13:30 then every 30 minutes
Reading	1 hour 20 min (2 changes)	Every 30 minutes	Every 30 minutes	Every hour until 15:30 then every 30 minutes
Portsmouth	1 hour 35 minutes (2 changes) 2 hours (1 change) alternating services	1 to 2 trains every 30 minutes	1 to 2 trains every 30 minutes	Every hour until 13:30 then every 30 minutes
Southampton	1 hour 20 minutes (1 change) 1 hour 40 minutes (2 changes)	Every 30 minutes	Every 30 minutes	Every hour until 13:30 then every 30 minutes
Basingstoke	1 hour (1 change)	Every 30 minutes	Every 30 minutes	Every hour until 13:30 then every 30 minutes
Guildford	27 - 40 minutes (1 change)	Every 30 minutes	Every 30 minutes	1 to 2 trains every hour until 13:30 then every 30 minutes
Dorking	1 hour 10 minutes (2 changes)	Every 30 minutes	Every 30 minutes	2 trains every hour until 13:30 then every 30 minutes
Aldershot	6 minutes (direct)	Every 30 minutes	Every 30 minutes	Every 30 minutes
Farnborough (main)	34 minutes (1 change)	Every 30 minutes	Every 30 minutes	Every 30 minutes to 1 every hour

Source: http://www.nationalrail.co.uk/

The majority of Farnham residents who travel by rail to work do so to London. Farnham is on the Alton-London Waterloo line, giving a 30-minute direct service at commuting times.

Cranleigh and Dunsfold do not have rail stations, so residents in these areas have to travel to Witley, Milford, Ockley or Chilworth station. **Table 4.4** below presents the existing direct rail services available from these stations to a range of major destinations.

Table 4.4: Existing Rail Services from Witley/Milford, Ockley and Chilworth (direct services only)

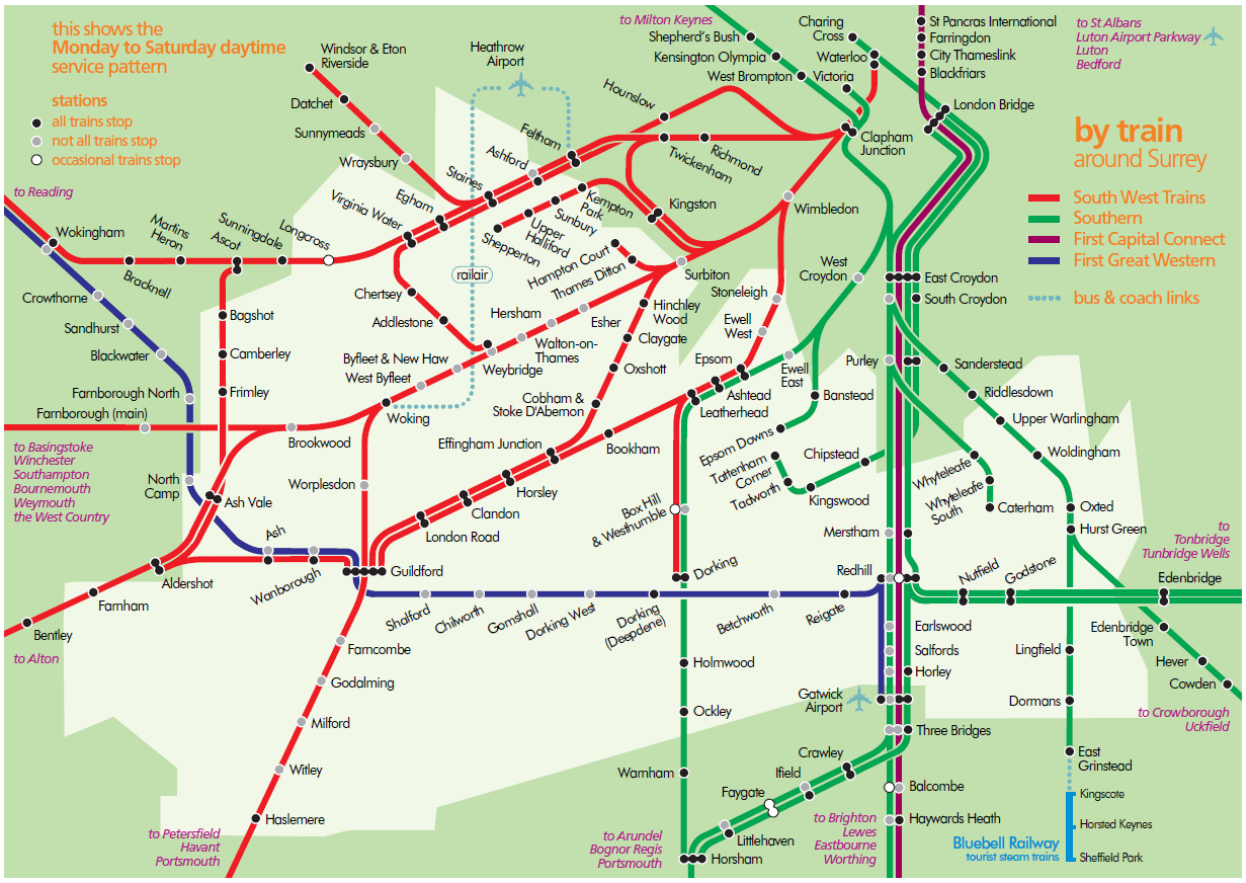
Destination	Origin	Weekday	Saturday	Sunday
Woking	Witley/Milford (26/21 minutes)	1 every hour	1 every hour	1 every hour
Clapham Junction	Witley/Milford (50/45 minutes)	1 every hour	1 every hour	1 every hour
	Ockley (56 minutes)	1 every hour	1 every hour	No service
London Waterloo	Witley/Milford (58/53 minutes)	1 every hour	1 every hour	1 every hour
Reading	Chilworth (45 minutes)	1 every hour/1 every 2 hours (alternating)	1 every 2 hours	1 every 2 hours
Redhill	Chilworth (25 minutes)	1 every 2 hours	1 every 2 hours	1 every 2 hours
Farnborough North	Chilworth (27 minutes)	1 every hour/1 every 2 hours (alternating)	1 every 2 hours	No service
Wokingham	Chilworth (36-44 minutes)	1 every hour	1 every 2 hours	1 every 2 hours
Guildford	Witley/Milford (16/12 minutes)	1 every hour	1 every hour	1 every hour (43/38 minutes)
	Chilworth (8 minutes)	1 every hour/1 every 2 hours (alternating)	1 every 2 hours	1 every 2 hours
Dorking Dorking (Deepdene)	Ockley (10 minutes)	1 every hour	1 every hour	No service
	Chilworth (14 minutes)	1 every 2 hours	1 every 2 hours	1 every 2 hours
Leatherhead	Ockley (20 minutes)	1 every hour	1 every hour	No service
Victoria	Ockley (1 hour 6 minutes)	1 every hour	1 every hour	No service

Source: http://www.nationalrail.co.uk/

Figure 4.3 shows the distribution of the rail routes from Farnham, Witley, Milford, Ockley and Chilworth, showing a range of connecting destinations from the local areas.

As for Farnham, the majority of rail commuters from the Cranleigh area travel into central London. Guildford station provides an attractive alternative to the local stations as there are more direct services to London (around 4 per hour at peak times), with a travel time of 37-43 minutes.

Figure 4.3: Existing Rail Routes in Surrey



Source: https://www.surreycc.gov.uk/__data/assets/pdf_file/0020/7922/Surrey_Rail_Map_WEB.pdf

5 Existing Access to Other Local Facilities

5.1 Background

The levels of access to local facilities for all of the settlement areas in the Borough was assessed by WBC in the Waverley Settlement Hierarchy report (2010) and Factual Update (2012). These documents state:

"One of the primary aims of establishing a settlement hierarchy is to promote sustainable communities by bringing housing, employment opportunities and services closer together in an attempt to reduce the need for travel, particularly by private vehicle."

Farnham, Godalming, Haslemere and Cranleigh are considered to be the most sustainable settlements within Waverley (in that order), as they provide the greatest number and range of community services and facilities to meet the needs of the local community. 'Heat maps' have been produced by WBC to illustrate the accessibility of all areas of the Borough to key services. These maps are contained in **Appendix B**, with a summary of the results detailed in **Table 5.1**. In relation to the development scenarios under consideration, new homes in Farnham would have best access to a range of local facilities, followed by Cranleigh and then Dunsfold, which will have very limited local facilities.

Table 5.1: Accessibility to Local Services

	Farnham	Cranleigh	Dunsfold Aerodrome
Primary Schools by walking	Majority of area within 20 minutes Large areas within 10 minutes	Majority of area within 20 minutes Large areas within 10 minutes	None within walking distance
Secondary Schools by Public Transport	Majority of area within 30 minutes Large areas within 20 minutes	All of area within 30 minutes Large areas within 20 minutes	No existing bus services
Colleges by Public Transport	Majority of area within 30 minutes Some areas within 20 minutes	All of area within 60 minutes Large areas within 50 minutes	No existing bus services
GP Surgeries by walking	Large areas within 20 minutes Some areas within 10 minutes	Majority of area within 20 minutes Some areas within 10 minutes	None within walking distance
Hospitals by Public Transport	Majority of area within 30 minutes Large areas within 20 minutes	All of area within 30 minutes Majority of area within 20 minutes	No existing bus services
Town Centres by walking	Some areas within 20 minutes	All of area within 30 minutes	None within walking distance
Town Centres by Public Transport	Majority of area within 30 minutes Large areas within 20 minutes	All of area within 30 minutes Majority of area within 20 minutes	No existing bus services
Local shops by walking	Majority of area within 20 minutes Large areas within 10 minutes	Majority of area within 20 minutes Large areas within 10 minutes	None within walking distance
Railway stations by walking	Some areas within 10 minutes	No station within walking distance	None within walking distance
Bus stops by walking	Majority of area within 5 minutes	Some areas within 5 minutes	None within walking distance but potential for new bus services to be introduced

6 Transport Capacity and the Potential to Improve Sustainable Modes

6.1 Road Network and Potential Increase in Traffic

Stages 2 and 3 of the Transport Assessment work for WBC have considered the impact on the local road network of additional homes in Dunsfold (and Cranleigh) and Farnham respectively. Stage 2 demonstrated that the A281 / Kings Road roundabout in Shalford and A281 / Station Road mini-roundabout in Bramley are likely to represent the largest constraint to traffic on the A281. However, possible improvement schemes were shown to be able to accommodate the predicted increased traffic demand in the future.

The other main concern on the A281 is its junctions with the A248 at Broadford Road and Kings Road in Shalford. Improvement schemes should be able to provide sufficient capacity to accommodate 1,800-3,400 homes at Dunsfold but they would require road widening into existing common land. Such schemes would require complicated and lengthy approval procedures, with replacement of lost common land at a suitable nearby location. However, these problems are not insurmountable and do not rule out the potential to implement the schemes.

Stage 2 also considered the scenario with additional new homes being provided at Cranleigh, with no new homes at Dunsfold. Similar improvement schemes to those proposed at the A281 Shalford junctions and Nanhurst crossroads with the Dunsfold development would be able to accommodate additional traffic from Cranleigh with no significant delays.

The Strategic Transport Assessment undertaken by SCC identified key links/junctions with increased traffic congestion with a number of different development scenarios. STA Scenarios 2 and 4 contained 1,800 and 3,400 new homes at Dunsfold respectively and neither of these showed significant congestion on the A281. However, as noted in the Stage 1 Report, using average ***peak period*** traffic demand does not consider the flows during the morning ***peak hour*** which will be significantly higher. Therefore, the strategic traffic model is not the best tool for assessing impacts on congestion at the busiest times.

Stage 3 modelled the impact of additional traffic in and around Farnham associated with around 2,300 and 3,800 new homes in the town. Based on SCC's strategic model, total growth in car traffic between 2009-2031 was predicted to be 30% and 35% for these two scenarios respectively, compared to a 'Do Minimum' level of 18% with no additional housing. The Farnham micro-simulation traffic model showed that such growth would lead to long delays on some of the main routes into and through Farnham. Key junctions on the A31 at Hickleys Corner and Shepherd and Flock roundabout were shown to be constraints to traffic growth, as well as other junctions on the radial routes into Farnham.

Improvements at the two key A31 junctions and on the A325 were modelled and were shown to increase capacity and reduce journey times on these two routes. However, increasing the A31 throughput has implications for other routes due to a combination of more queuing on some arms and increased traffic volumes reaching downstream junctions. The overall conclusion of the modelling was that it should be possible to largely mitigate for the impacts of additional traffic demand resulting from new housing allocations in Farnham, through junction improvements on the A31 and A325.

In Farnham, the STA predicted that a number of links would be over capacity even with the 'base' level of development (STA Scenario 1) and for the average peak period demand:

- A325 at Heath End;
- B3001 Station Hill;
- B3007 Hale Road;
- A287 Firgrove Hill; and
- A31 Westbound Off-slip to A331.

In terms of impact on the A3, all STA scenarios showed an increase of around 150 vehicles/hour, averaged over the peak period 07:00-10:00, between the Hindhead Tunnel and Milford. This was not predicted to cause significant additional congestion.

6.2 Rail Network and Potential Increase in Trips

It has been estimated that the rail mode share for trips to work under each of the development scenarios considered would be roughly the same at around 8%. With a total of around 5,000 new homes, this is likely to result in a demand for around 400 new rail trips, the majority of which would be to London.

For the commuting trip into London in the morning, there is likely to be spare capacity to accommodate this demand as the trains passing through Farnham and Witley/Milford/Guildford gain passengers along their route so should not be full as they reach these stations (although this would be at the expense of other users further towards London, notably at Guildford and Woking).

In contrast, for the trip out of London Waterloo in the evening, the services are already running at capacity. Therefore, new Waverley residents would be competing with all other passengers that use the Farnham-Alton and Guildford-Haslemere lines. This would add to congestion on the concourse at London Waterloo and result in more standing passengers on departing trains.

6.3 Potential Transport Measures to Increase Sustainable Travel

In Farnham, there is a desire to reduce traffic volumes to or passing through the town centre. Demand management measures would help in this regard by encouraging sustainable modes for relatively short trips in the town i.e. increased walking, cycling and bus use. An overall transport strategy for the town could be developed, balancing the need for traffic management measures in the town centre and capacity enhancements on other routes.

Currently, 55% of those that live and work in Farnham drive to work, with only 3.0% using bus and 2.9% cycling (31.6% walking). As working in Farnham accounts for 28% of all trips to work by Farnham residents, there is high potential to reduce traffic volumes in the town by encouraging a switch from car to walking, cycling and bus.

In Cranleigh, 46% of those that live and work in the town drive to work but cycling is relatively popular at 7.3%, whereas only 1.1% take the bus (36.4% walking). Given the size of the town, a significant increase in bus use is unlikely for such trips but more walking could be encouraged. However, it is not believed that traffic congestion in the town is a serious problem, so there would be less incentive to reduce traffic volumes, compared to Farnham.

For residents in a new Dunsfold development, internal trips to work are assumed to be made by walking and cycling. Therefore, encouraging sustainable travel modes would have to address external trips away from the site. Given the location, walking to other work locations is unlikely and there is low potential for a frequent bus service to major employment centres to be viable in the long term. Therefore, it is difficult to see how increases in sustainable travel could be encouraged at the Dunsfold site.

7 Conclusions

Table 7.1 below summarises the key issues for sustainability in relation to transport for the three main areas where new homes could be provided in Waverley Borough. A RAG analysis has been used to highlight the relative merits of each location against each key issue, where **Green** is most sustainable and **Red** is least sustainable.

Table 7.1: **Assessment of Transport Sustainability**

Criteria	Farnham	Cranleigh	Dunsfold
Internalisation of trips	28%	31%	10-20%
Modal split – car driver	71%	70%	74-78%
Trip Length – Car Trips to Work	16.0 km	13.5 km	15.0-16.2 km
Bus accessibility	Good access to town centre from most areas in town	Good service to Guildford	No existing services
Rail accessibility - non-car modes	Good access by bus and walking/cycling an option for many	Only via bus to Guildford	Potential new bus link to nearby station(s)
Accessibility to local facilities - non-car modes	Good access by bus and walking/cycling an option for many	Access to some local facilities by walking/cycling	Limited on-site facilities
Potential impact on traffic congestion	Mitigation measures possible but some increased congestion likely	Increased traffic can be mitigated for range of number of homes being considered	Increased traffic can be largely mitigated
Potential to encourage greater use of sustainable modes	Greatest potential to encourage walking, cycling and bus use	Some potential to encourage walking and further cycling	Difficult for new bus services to remain viable. No scope for higher levels of walking trips

Source: MM analysis

Based on the above analysis, Farnham is considered to be the most sustainable location overall for provision of new homes given its current transport options and the potential to address local car trips by transferring them to other modes, followed by Cranleigh and then Dunsfold. It follows that Scenario 1 of the development scenarios that were subject to public consultation by WBC is considered the most sustainable, given the following numbers of new homes in each scenario:

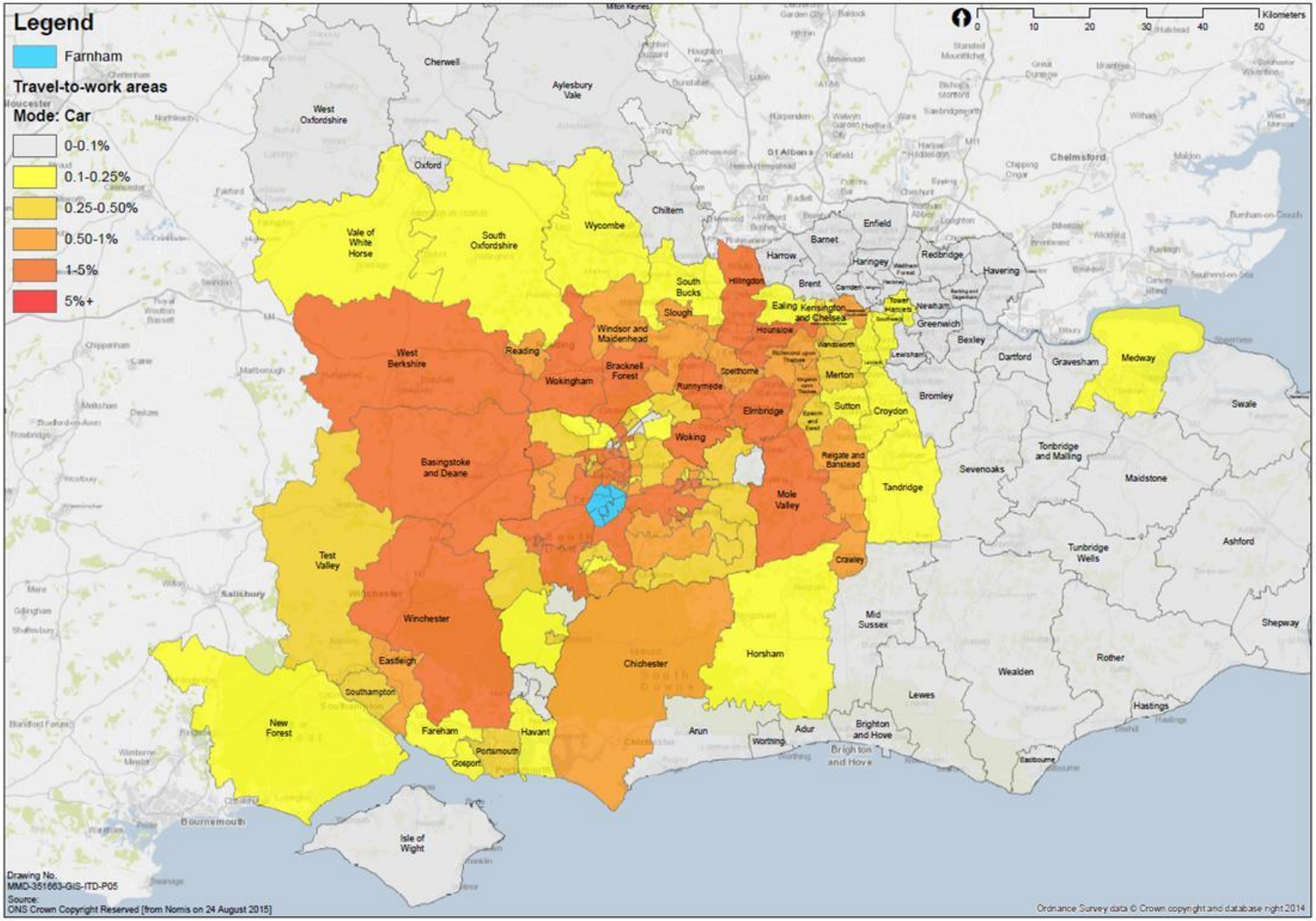
Table 7.2: Number of New Homes in the Development Scenarios

Scenario	Farnham	Cranleigh	Dunsfold Aerodrome
1	3,800	1,800	0
2	2,600	1,200	1,800
3	2,100	1,050	2,600
4	1,800	650	3,400

Scenarios 2, 3 and 4 have increasing numbers of new homes at Dunsfold which are considered to give corresponding reductions in the level of transport sustainability.

Appendices

Appendix A. Distributions of Trips to Work by Mode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0.1-0.25%
0.25-0.50%
0.50-1%
1-5%
5%+
Kilometers
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10
20
30
40
50
Cherwell
Aylesbury Vale
West Oxfordshire
Oxford
Vale of White Horse
South Oxfordshire
Wycombe
Chiltern
South Bucks
Slough
Windsor and Maidenhead
Reading
West Berkshire
Wokingham
Bracknell Forest
Hillingdon
Harrow
Barnet
Enfield
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Redbridge
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Kensington and Chelsea
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Greenwich
Bexley
Dartford
Gravesham
Medway
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Lewisham
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Croydon
Elmbridge
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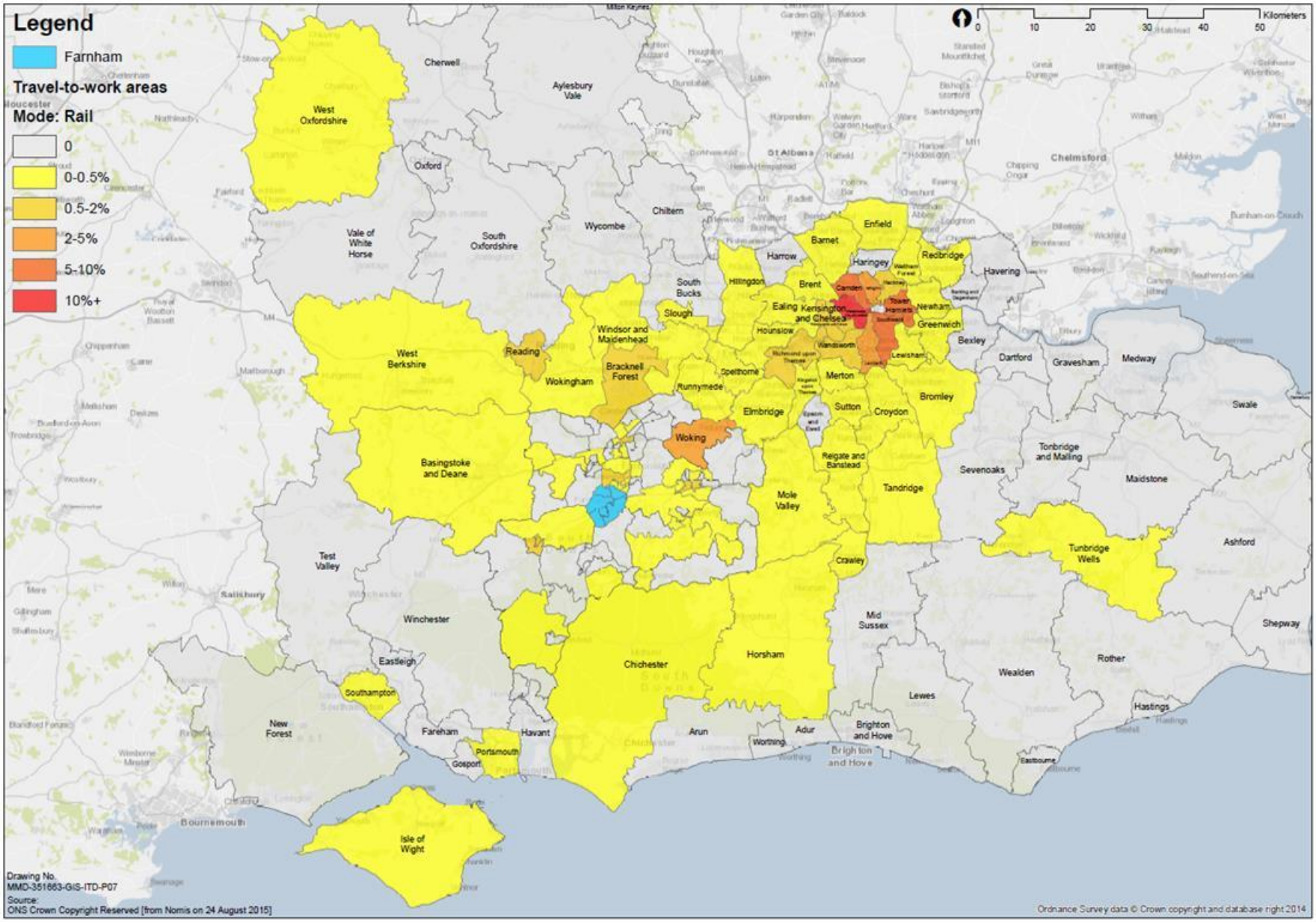
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2-5%
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Oxford
Chiltern
Wycombe
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South Oxfordshire
South Bucks
Slough
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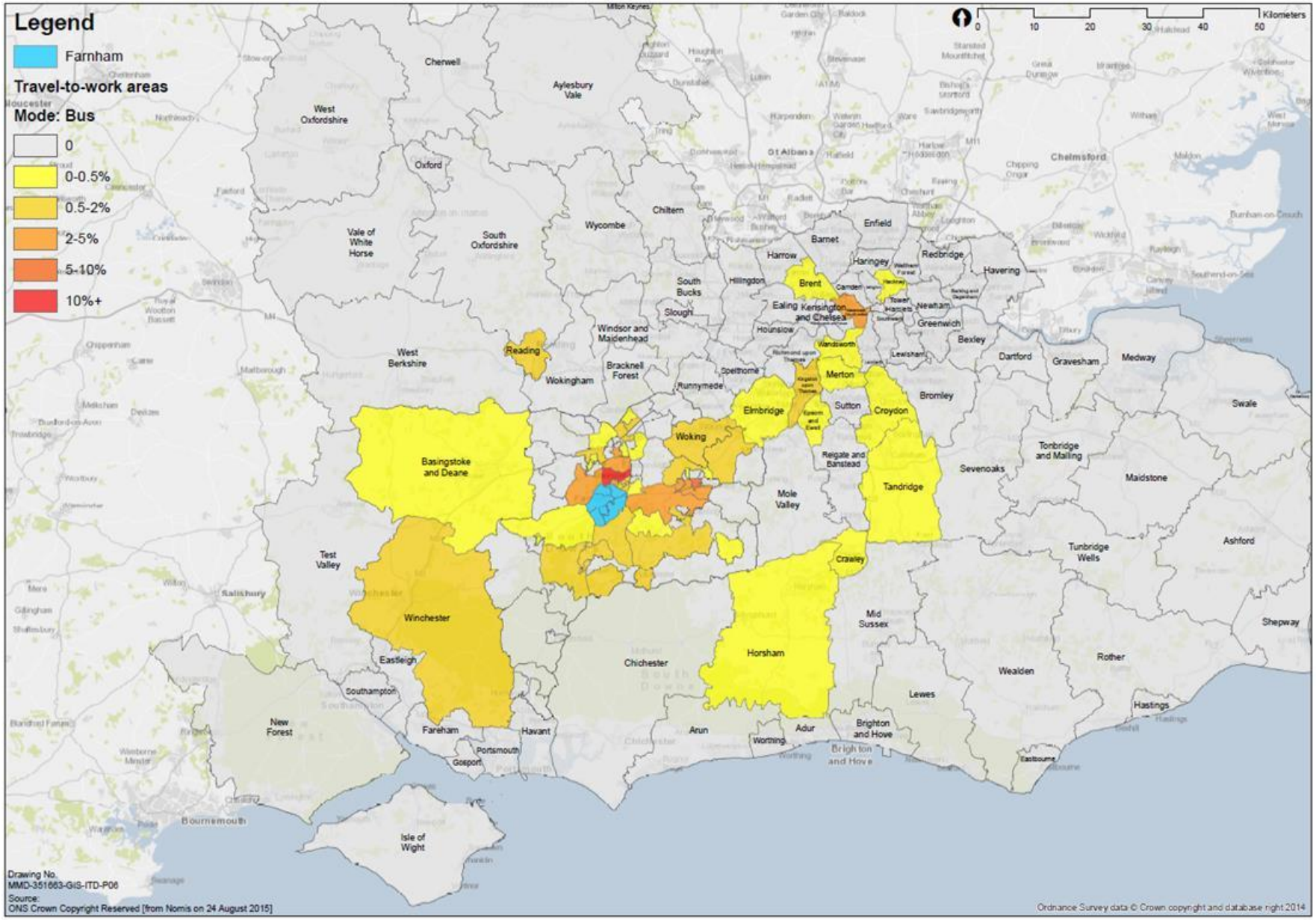
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5-10%
10%+
Kilometers
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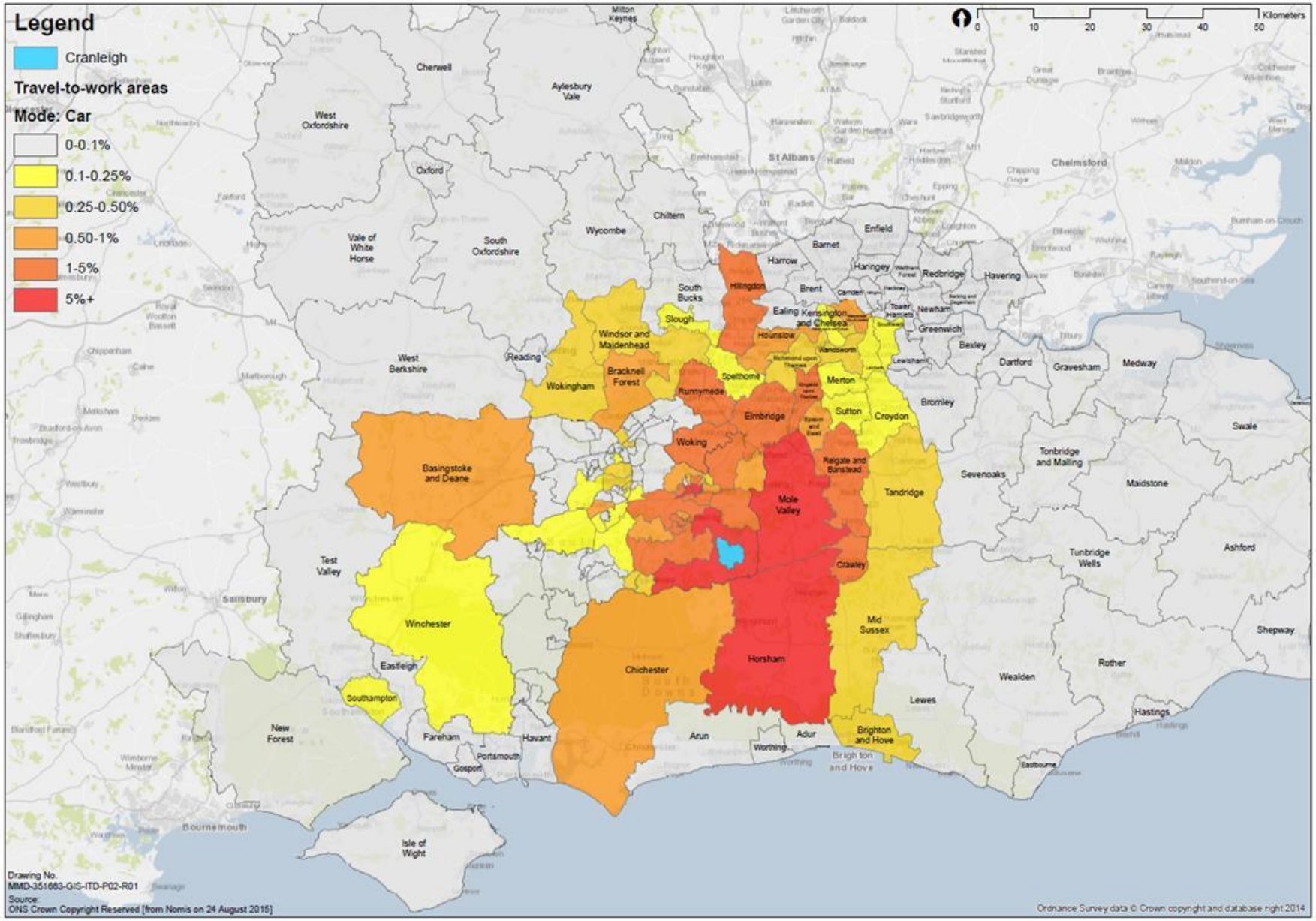
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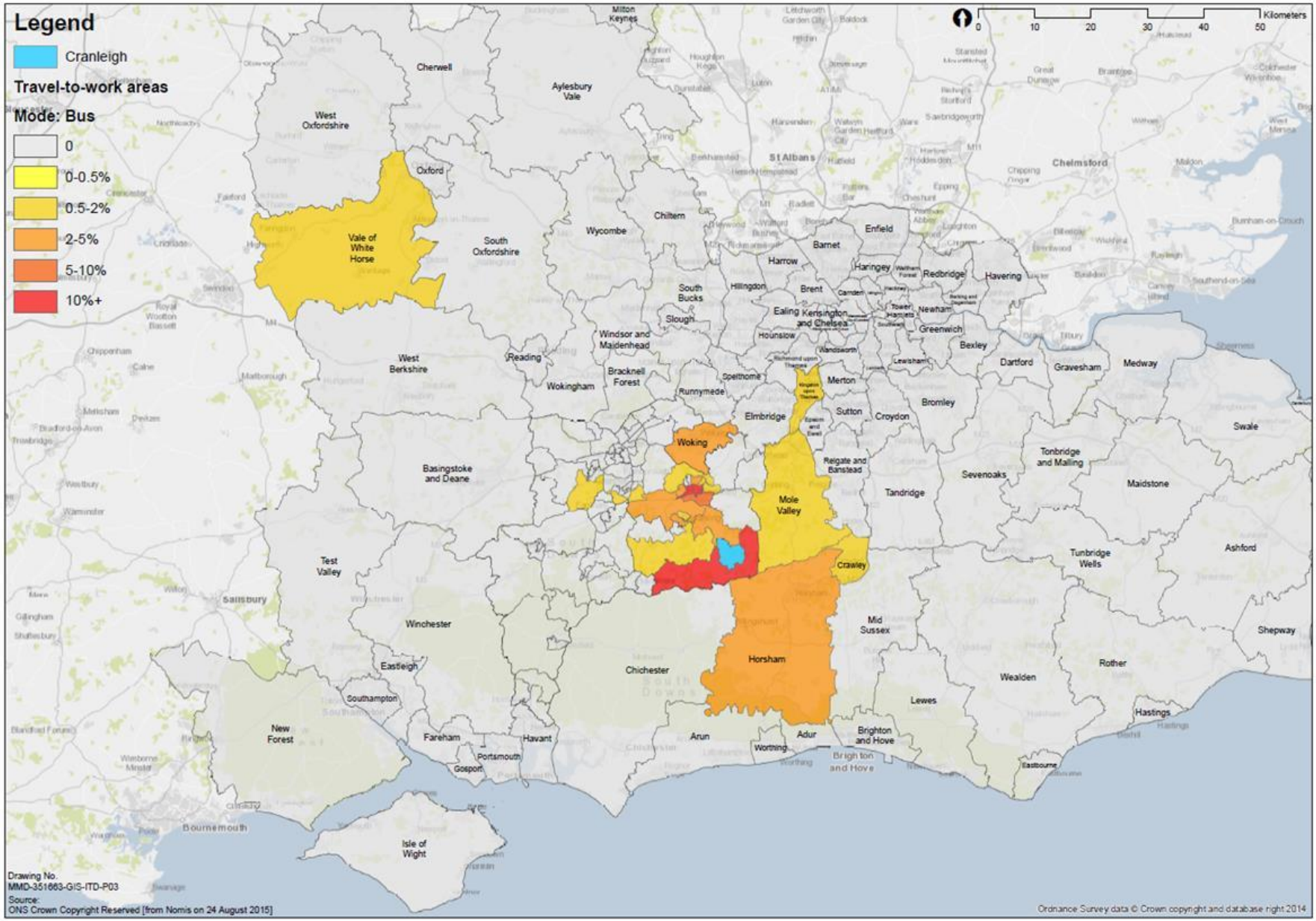
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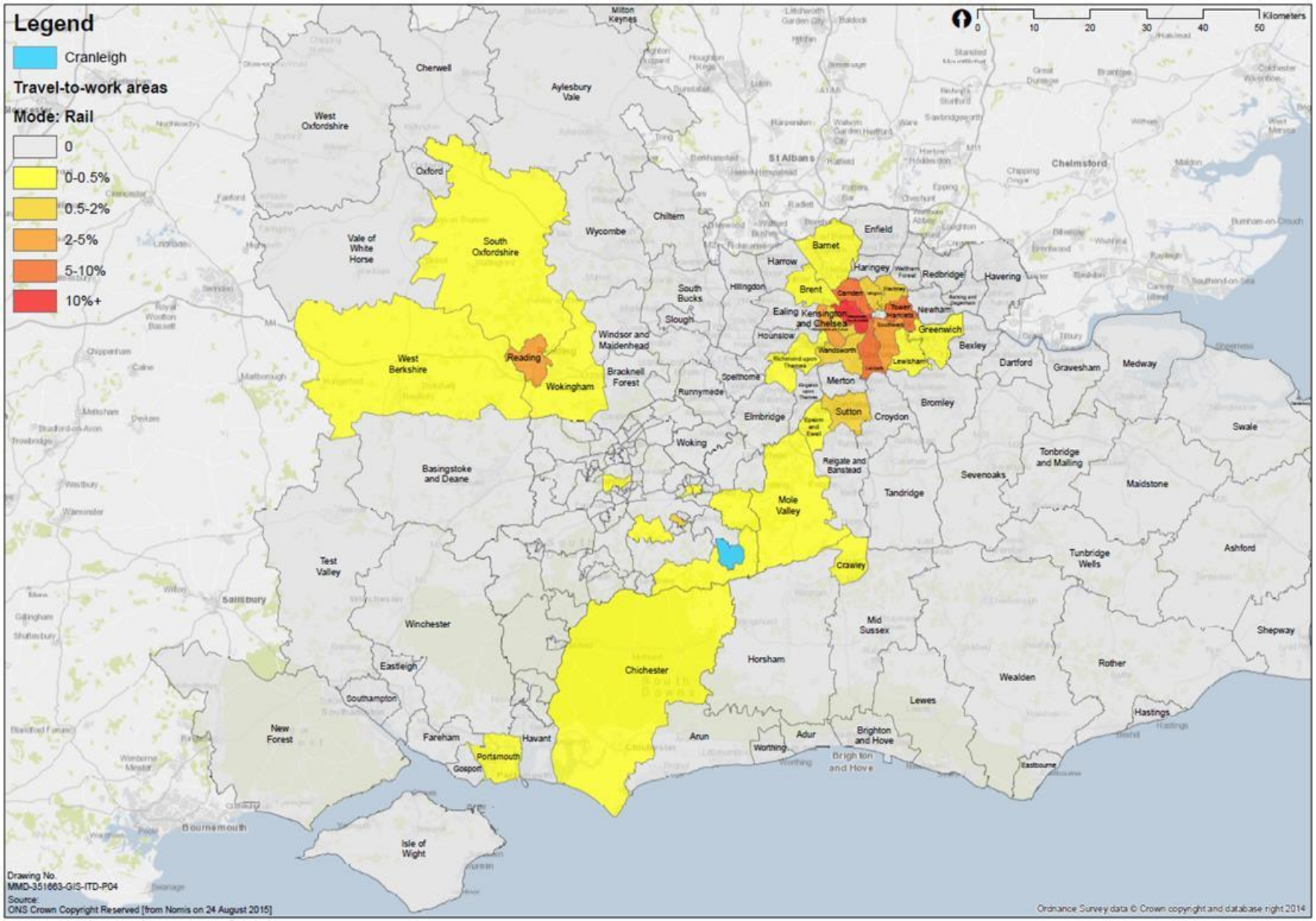
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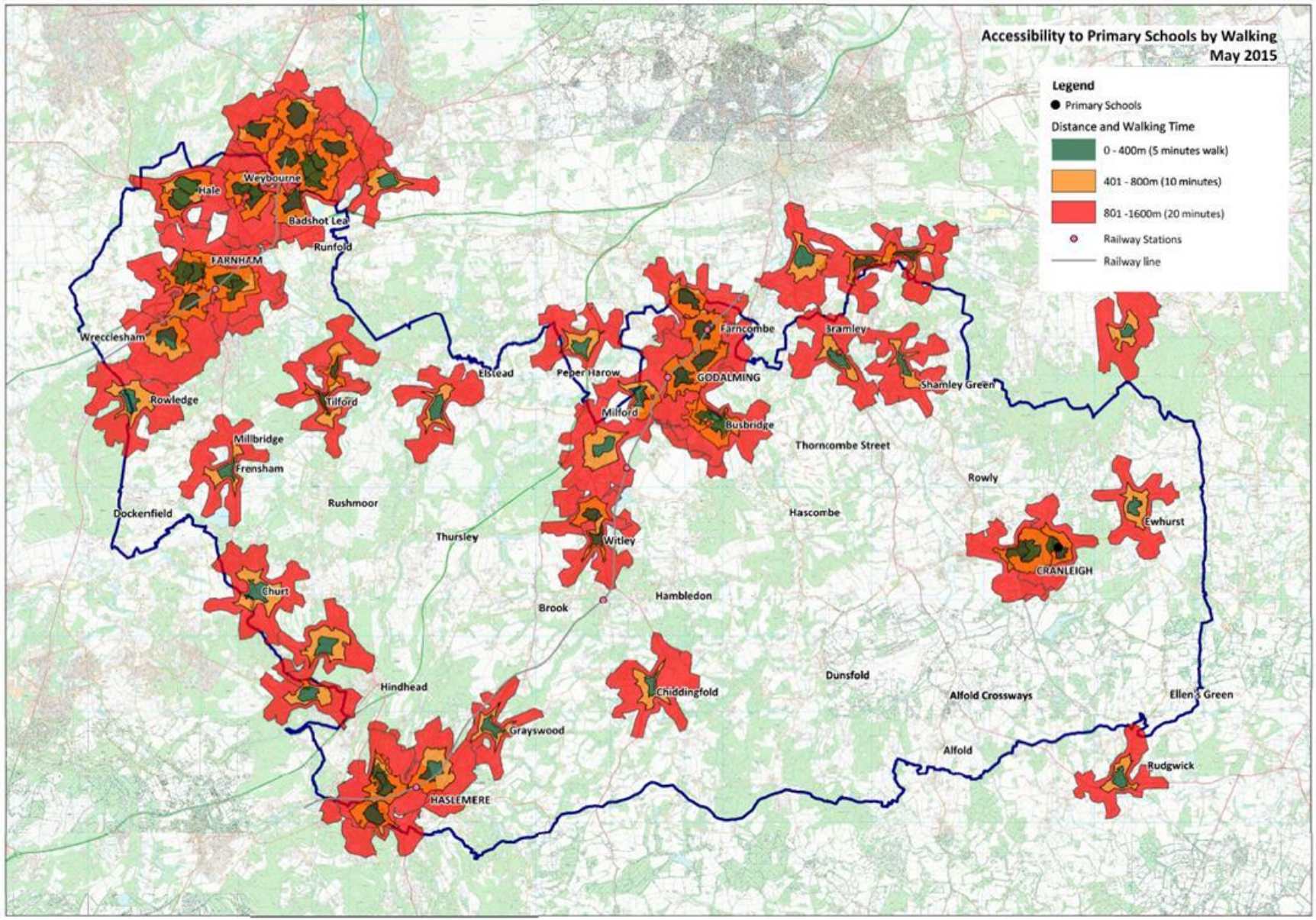
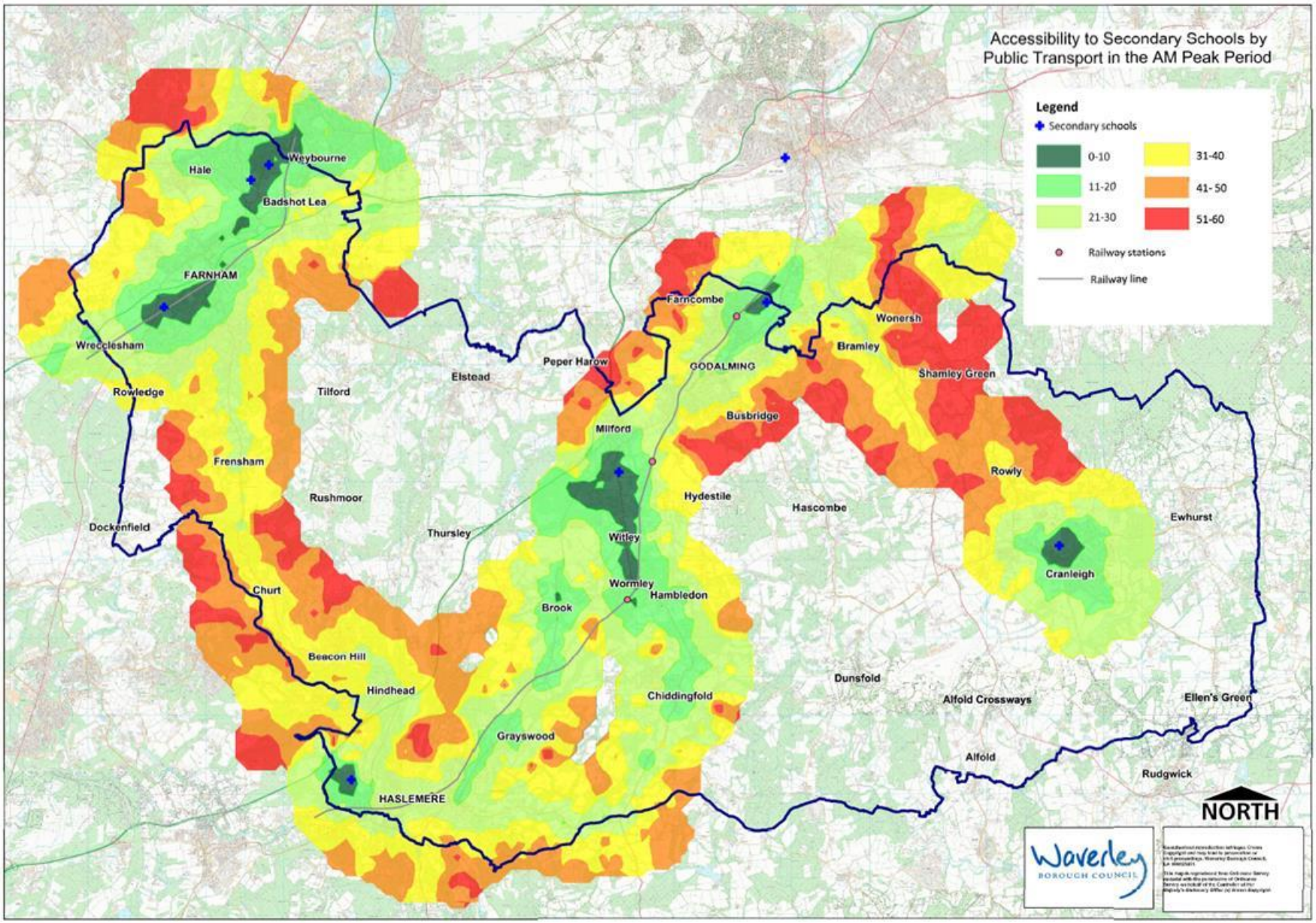
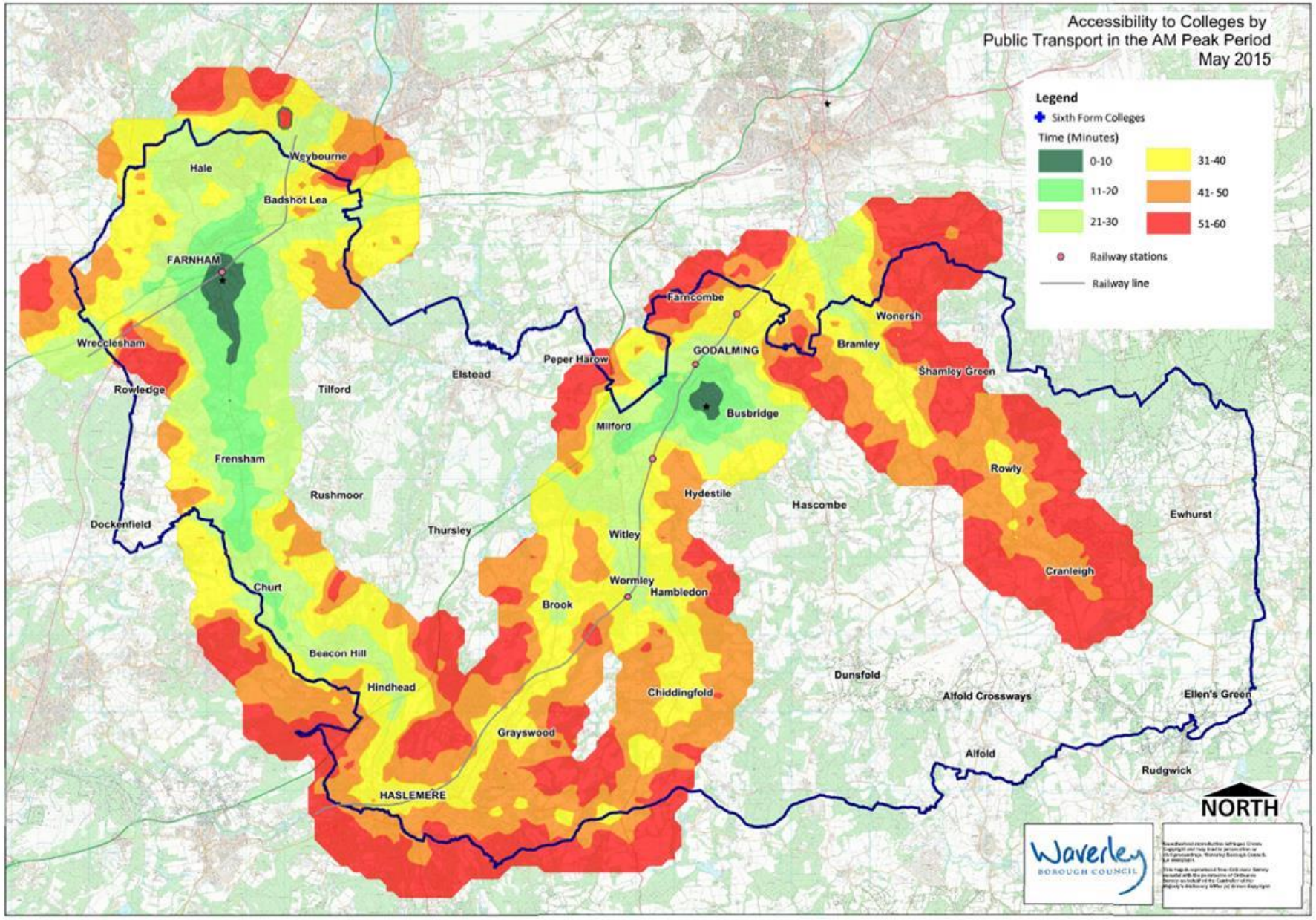
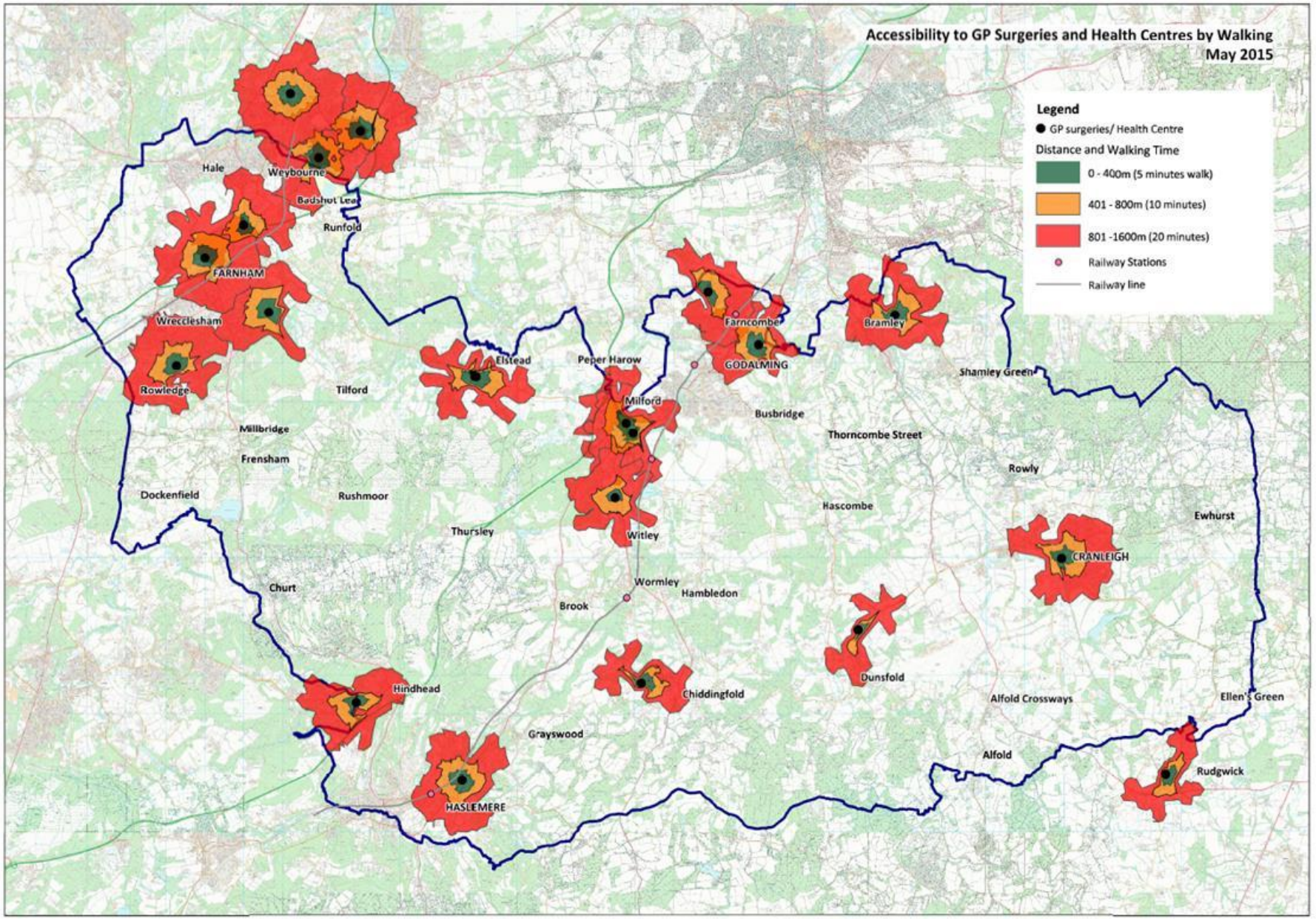
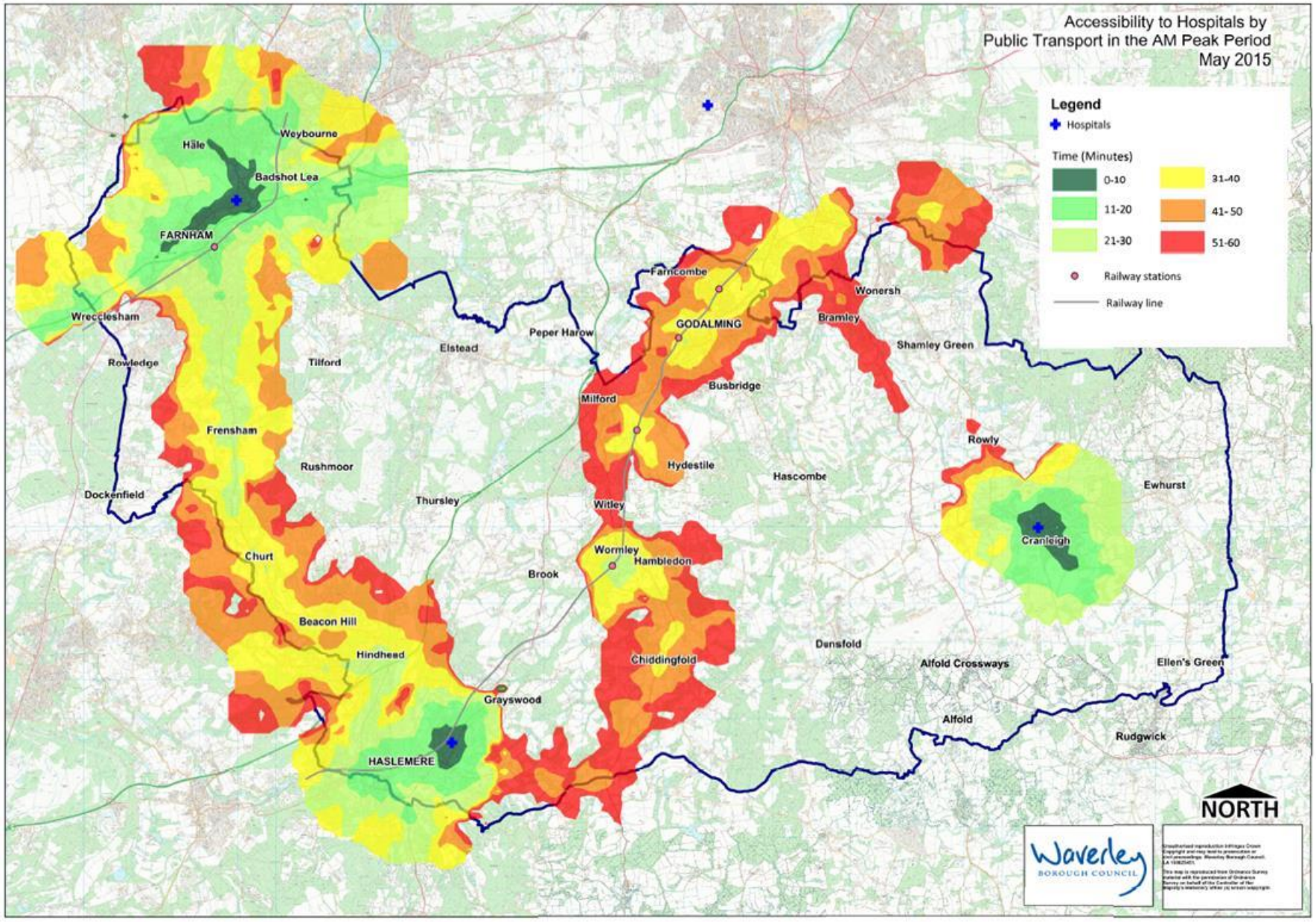
Appendix B. Heat Maps

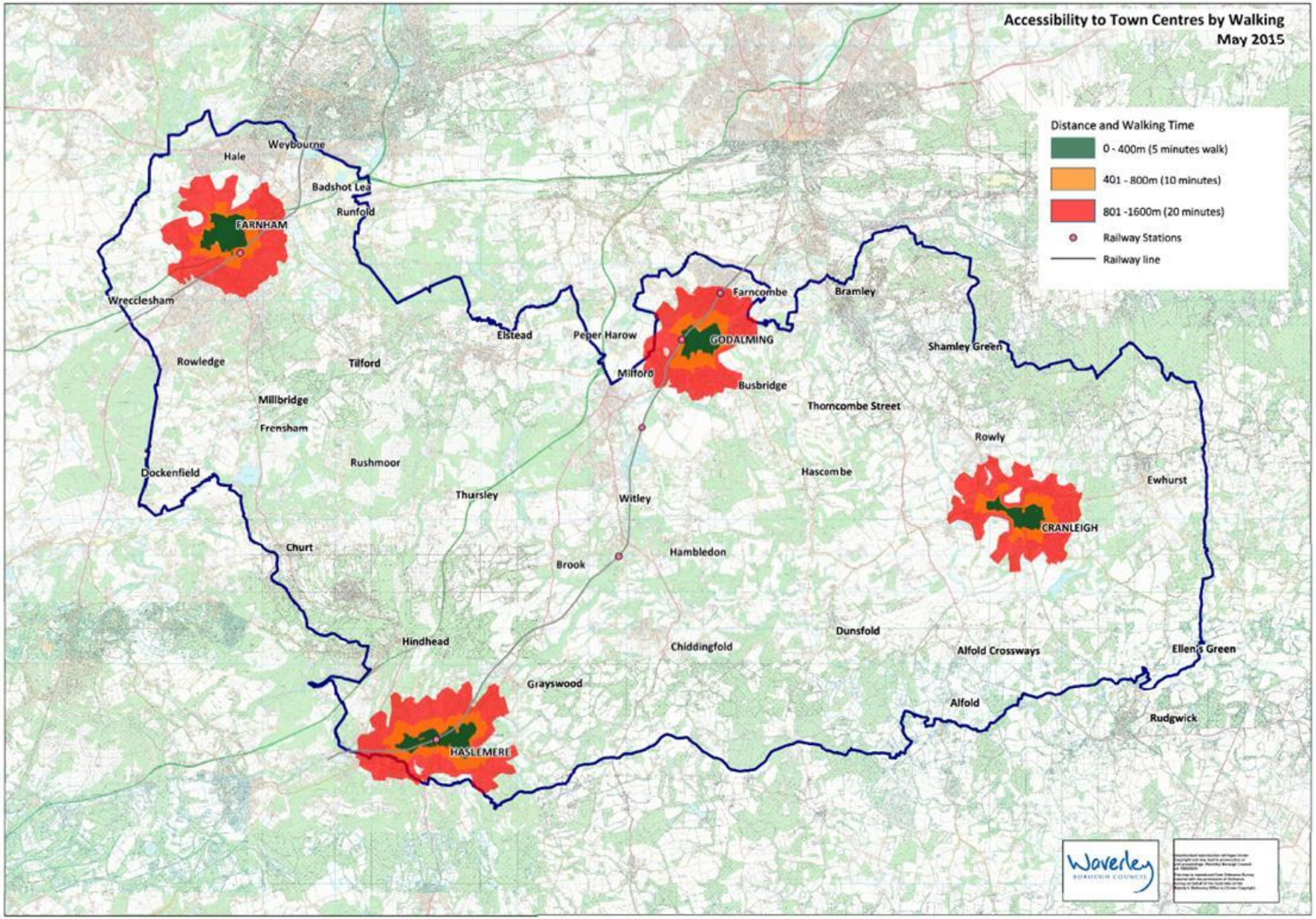

Accessibility to Primary Schools by Walking
May 2015
Legend
Primary Schools
Distance and Walking Time
0 - 400m (5 minutes walk)
401 - 800m (10 minutes)
801 -1600m (20 minutes)
Railway Stations
Railway line
Weybourne
Hale
Badshot Lea
Runfold
FARNHAM
Wrecclesham
Rowledge
Tilford
Elstead
Millbridge
Frensham
Dockenfield
Rushmoor
Thursley
Churt
Hindhead
Grayswood
HASLEMERE
Peper Harow
Farncombe
GODALMING
Milford
Witley
Brook
Hambledon
Chiddingfold
Bramley
Shamley Green
Busbridge
Thorncombe Street
Hascombe
Rowly
Ewhurst
CRANLEIGH
Dunsfold
Alfold Crossways
Alfold
Ellen's Green
Rudgwick

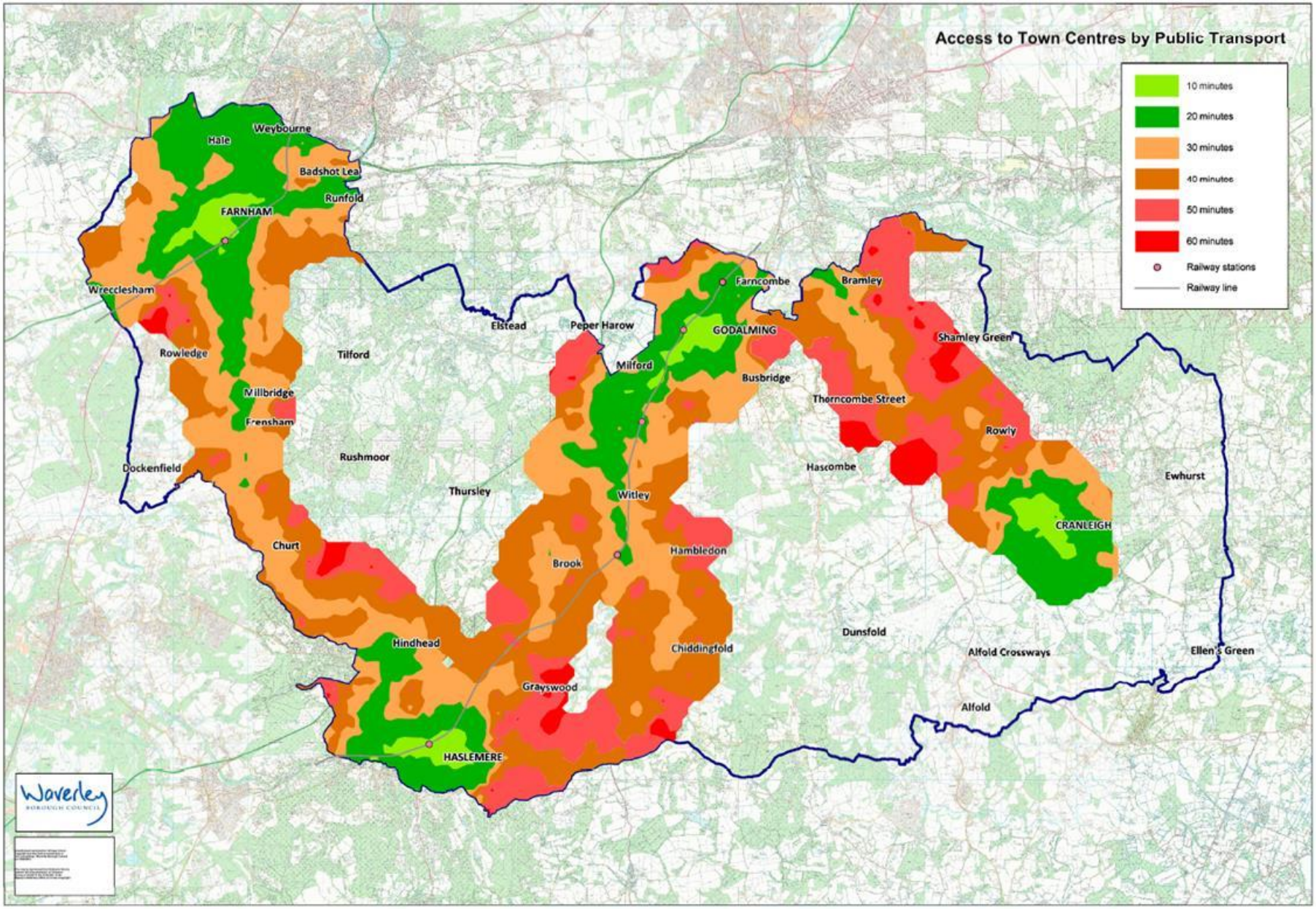

Accessibility to Secondary Schools by Public Transport in the AM Peak Period
Legend
Secondary schools
0-10
11-20
21-30
31-40
41-50
51-60
Railway stations
Railway line
Weybourne
Hale
Badshot Lea
FARNHAM
Wrecclesham
Rowledge
Tilford
Elstead
Peper Harow
Farncombe
GODALMING
Wonersh
Bramley
Shamley Green
Busbridge
Milford
Frensham
Rushmoor
Dockenfield
Thursley
Hydestile
Witley
Hascombe
Rowly
Ewhurst
Cranleigh
Churt
Wormley
Hambledon
Brook
Beacon Hill
Hindhead
Chiddingfold
Dunsfold
Alfold Crossways
Ellen's Green
Grayswood
Alfold
Rudgwick
HASLEMERE
NORTH
Waverley
BOROUGH COUNCIL

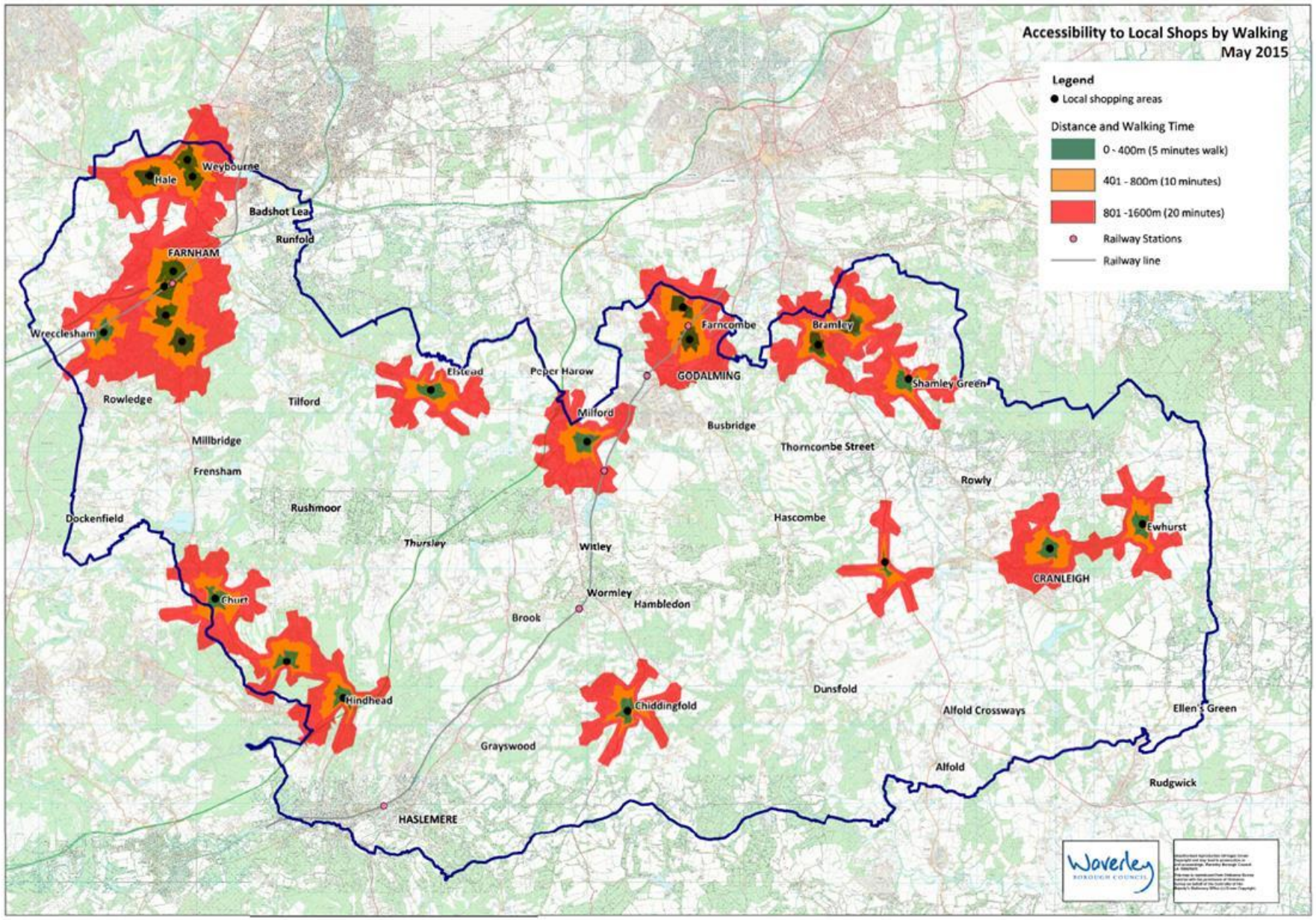

Accessibility to Colleges by
Public Transport in the AM Peak Period
May 2015
Legend
Sixth Form Colleges
Time (Minutes)
0-10
11-20
21-30
31-40
41-50
51-60
Railway stations
Railway line
Hale
Weybourne
Badshot Lea
FARNHAM
Wrecclesham
Rowledge
Tilford
Frensham
Rushmoor
Dockenfield
Churt
Beacon Hill
Hindhead
HASLEMERE
Grayswood
Thursley
Elstead
Peper Harow
Farncombe
GODALMING
Busbridge
Milford
Witley
Wormley
Hambledon
Brook
Hydestile
Hascombe
Chiddingfold
Dunsfold
Alfold Crossways
Alfold
Rudgwick
Wonersh
Bramley
Shamley Green
Rowly
Cranleigh
Ewhurst
Ellen's Green
NORTH
Waverley
BOROUGH COUNCIL

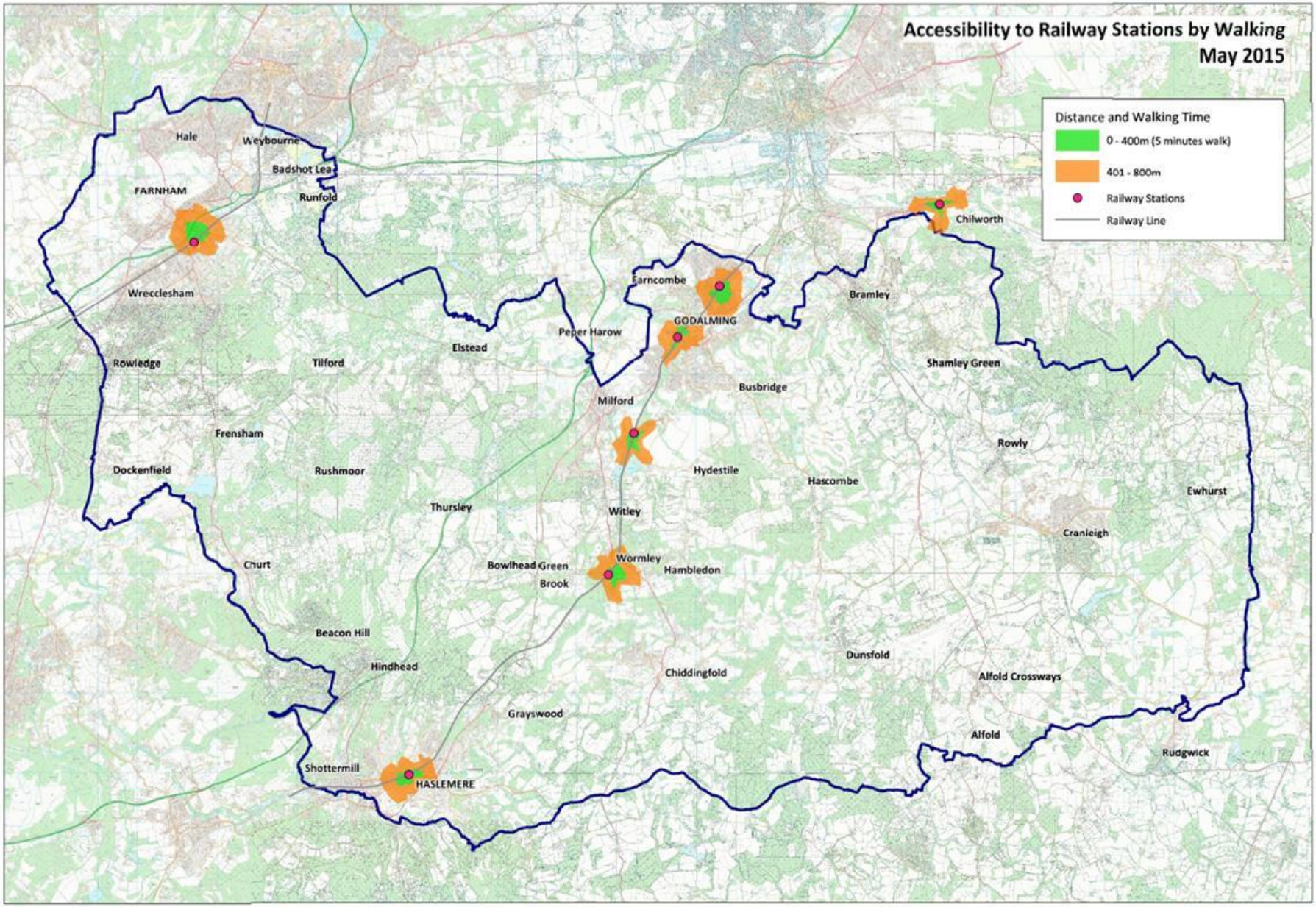

Accessibility to GP Surgeries and Health Centres by Walking
May 2015
Legend
GP surgeries/ Health Centre
Distance and Walking Time
0 - 400m (5 minutes walk)
401 - 800m (10 minutes)
801 -1600m (20 minutes)
Railway Stations
Railway line
Hale
Weybourne
Badshot Lea
Runfold
FARNHAM
Wrecclesham
Rowledge
Tilford
Millbridge
Frensham
Dockenfield
Rushmoor
Churt
Hindhead
HASLEMERE
Grayswood
Thursley
Elstead
Peper Harow
Milford
Witley
Wormley
Brook
Hambledon
Chiddingfold
Farncombe
GODALMING
Busbridge
Bramley
Shamley Green
Thorncombe Street
Rowly
Hascombe
Dunsfold
CRANLEIGH
Ewhurst
Alfold Crossways
Alfold
Ellen's Green
Rudgwick

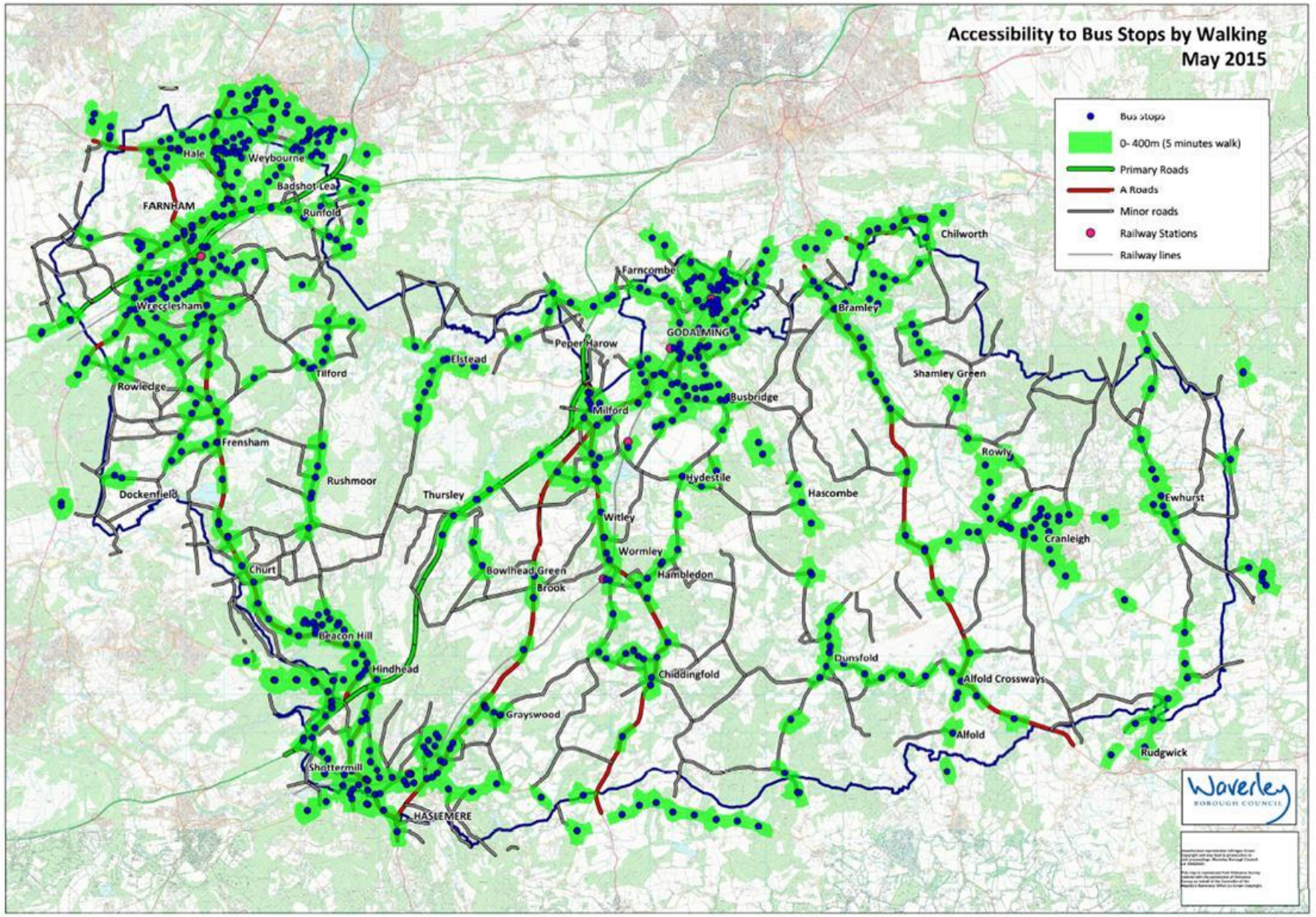

Accessibility to Hospitals by
Public Transport in the AM Peak Period
May 2015
Legend
Hospitals
Time (Minutes)
0-10
11-20
21-30
31-40
41-50
51-60
Railway stations
Railway line
Weybourne
Hale
Badshot Lea
FARNHAM
Wrecclesham
Rowledge
Tilford
Elstead
Peper Harow
Farncombe
GODALMING
Wonersh
Bramley
Shamley Green
Busbridge
Milford
Frensham
Rushmoor
Dockenfield
Thursley
Hydestile
Witley
Hascombe
Rowly
Ewhurst
Cranleigh
Churt
Wormley
Hambledon
Brook
Beacon Hill
Hindhead
Chiddingfold
Dunsfold
Alfold Crossways
Ellen's Green
Grayswood
Alfold
Rudgwick
HASLEMERE
NORTH
Waverley
BOROUGH COUNCIL


Accessibility to Town Centres by Walking
May 2015
Distance and Walking Time
0 - 400m (5 minutes walk)
401 - 800m (10 minutes)
801 -1600m (20 minutes)
Railway Stations
Railway line
Weybourne
Hale
Badshot Lea
Runfold
FARNHAM
Wrecclesham
Rowledge
Tilford
Millbridge
Frensham
Dockenfield
Rushmoor
Churt
Hindhead
Grayswood
HASLEMERE
Elstead
Peper Harow
Farncombe
GODALMING
Milford
Busbridge
Witley
Thursley
Brook
Hambledon
Chiddingfold
Bramley
Shamley Green
Thorncombe Street
Hascombe
Rowly
Ewhurst
CRANLEIGH
Dunsfold
Alfold Crossways
Alfold
Ellen's Green
Rudgwick
Waverley


Access to Town Centres by Public Transport
10 minutes
20 minutes
30 minutes
40 minutes
50 minutes
60 minutes
Railway stations
Railway line
Weybourne
Hale
Badshot Lea
Runfold
FARNHAM
Wrecclesham
Rowledge
Millbridge
Frensham
Dockenfield
Tilford
Rushmoor
Thursley
Churt
Hindhead
Grayswood
HASLEMERE
Elstead
Peper Harow
Milford
Witley
Brook
Farncombe
GODALMING
Busbridge
Hambledon
Chiddingfold
Bramley
Shamley Green
Thorncombe Street
Rowly
Hascombe
CRANLEIGH
Ewhurst
Dunsfold
Alfold Crossways
Alfold
Ellen's Green
Waverley


Accessibility to Local Shops by Walking
May 2015
Legend
Local shopping areas
Distance and Walking Time
0 - 400m (5 minutes walk)
401 - 800m (10 minutes)
801 -1600m (20 minutes)
Railway Stations
Railway line
Weybourne
Hale
Badshot Lea
Runfold
FARNHAM
Wrecclesham
Rowledge
Tilford
Millbridge
Frensham
Dockenfield
Rushmoor
Thursley
Churt
Hindhead
HASLEMERE
Grayswood
Elstead
Peper Harow
Milford
Witley
Wormley
Brook
Hambledon
Farncombe
GODALMING
Busbridge
Bramley
Shamley Green
Thorncombe Street
Hascombe
Rowly
Ewhurst
CRANLEIGH
Chiddingfold
Dunsfold
Alfold Crossways
Ellen's Green
Alfold
Rudgwick
Waverley
BOROUGH COUNCIL


Accessibility to Railway Stations by Walking
May 2015
Distance and Walking Time
0 - 400m (5 minutes walk)
401 - 800m
Railway Stations
Railway Line
Hale
Weybourne
Badshot Lea
FARNHAM
Runfold
Wrecclesham
Farncombe
GODALMING
Peper Harow
Elstead
Chilworth
Bramley
Rowledge
Tilford
Busbridge
Shamley Green
Milford
Frensham
Rowly
Dockenfield
Rushmoor
Hydestile
Hascombe
Ewhurst
Thursley
Witley
Cranleigh
Churt
Bowlhead Green
Wormley
Hambledon
Brook
Beacon Hill
Dunsfold
Hindhead
Chiddingfold
Alfold Crossways
Grayswood
Alfold
Shottermill
HASLEMERE
Rudgwick


Accessibility to Bus Stops by Walking
May 2015
Bus stops
0- 400m (5 minutes walk)
Primary Roads
A Roads
Minor roads
Railway Stations
Railway lines
Hale
Weybourne
Badshot Lea
Runfold
FARNHAM
Wrecclesham
Rowledge
Frensham
Dockenfield
Tilford
Rushmoor
Churt
Beacon Hill
Hindhead
Shottermill
HASLEMERE
Elstead
Thursley
Grayswood
Farncombe
Peper Harow
GODALMING
Milford
Witley
Wormley
Bowlhead Green
Brook
Hambledon
Chiddingfold
Hydestile
Busbridge
Chilworth
Bramley
Shamley Green
Hascombe
Rowly
Cranleigh
Ewhurst
Dunsfold
Alfold Crossways
Alfold
Rudgwick
Waverley
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