

## **Wycombe District Local Plan**

# **High Wycombe Highway Assignment Model Traffic Forecasting and Assumptions Report**


**January 2014**


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## Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Purpose of Report	1
1.2	High Wycombe Study Area	1
1.3	Structure of Report	2
<b>2</b>	<b>Land Use Assumptions</b>	<b>3</b>
2.1	Policy Background	3
2.2	Do Minimum Development	3
<b>3</b>	<b>Transport Infrastructure Provision</b>	<b>5</b>
<b>4</b>	<b>Traffic Forecasting</b>	<b>7</b>
4.1	Introduction	7
4.2	Overview of Modelling Methodology	7
4.3	Do Minimum Development Trip Generation	7
4.4	TEMPRO and NRTF growth factors	8
4.5	Network Assumptions and Final Forecast Matrices	9
<b>5</b>	<b>Summary</b>	<b>10</b>
Table 3-A	Major transport provisions associated with Do Minimum scenario	6
Table 4-A	Peak hour traffic generation from developments	8
Table 4-B	Applied TEMPRO growth factors - car trips	8
Table 4-C	Applied NRTF growth factor	9
Table 4-D	Total trips for forecast scenario	9
Figure 1-A	High Wycombe highway assignment model study area	2
Figure 2-A	Locations of Do Minimum development by land use	4
Figure 4-A	Overview of forecasting methodology	7
Appendix A	Glossary	
Appendix B	Do Minimum Development Assumptions	
Appendix C	AM and PM Peak Hour Traffic Volumes (Rounded)	

# 1 Introduction

## 1.1 Purpose of Report

Jacobs are framework consultants to the Transport for Buckinghamshire Alliance between Ringway Jacobs and Buckinghamshire County Council (BCC). Under the terms of this contract, Jacobs are commissioned to undertake transport planning, modelling and assessment studies on behalf of BCC, working in partnership with District Councils.

Jacobs was commissioned by BCC and Wycombe District Council (WDC) in November 2012 to undertake a transport and land use assessment to support and inform the development of the new Wycombe District Local Plan.

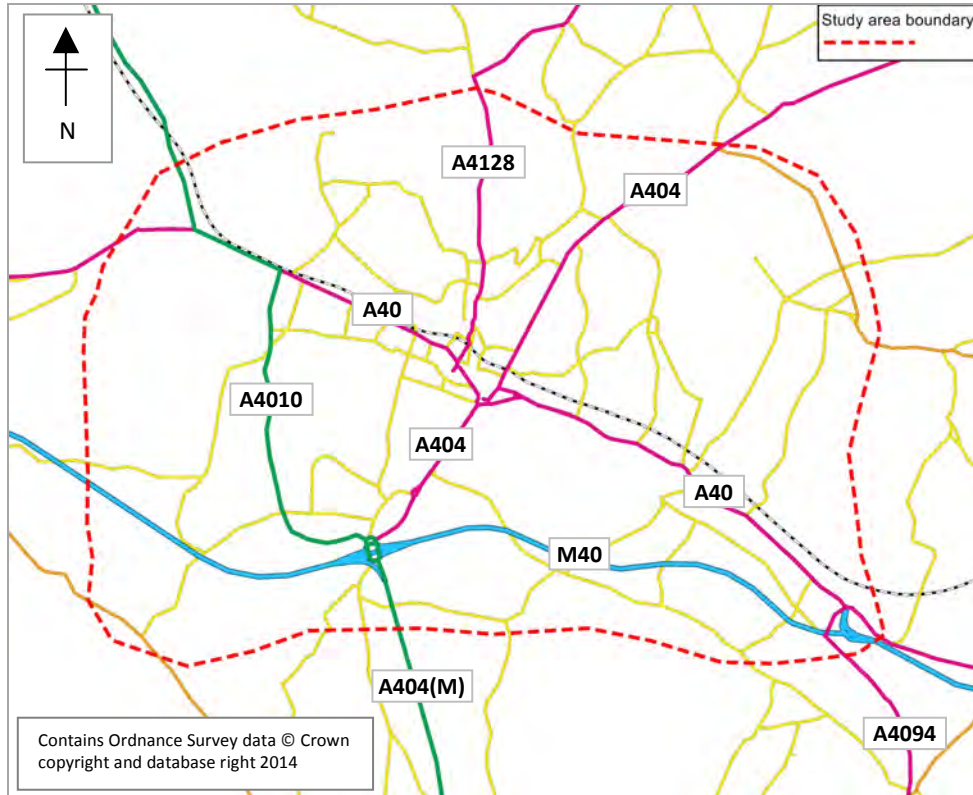
To inform the assessment, year 2013 AM and PM peak hour base models have been developed for the High Wycombe urban area. The base models are described in the document 'High Wycombe Highway Assignment Model - Local Model Validation Report – January 2014'.

This report describes the traffic forecasting work that was undertaken to establish a future year land use scenario for 2031. This scenario is considered to be the Do Minimum scenario, and provides the means to assess the future performance of the High Wycombe highway network and the impact of potential changes in land use or transport infrastructure.

## 1.2 High Wycombe Study Area

High Wycombe is located in the Wycombe District of Buckinghamshire, with a population of 100,316 (and a district wide population of 171,644) based on Census 2011 data. The town is situated north of the M40 motorway, at the hub of five radial highway corridors which include the A40 (east and west), A404 (north and south) and the A4128 Hughenden Road. The A4010, situated in the west of the town, provides a route for north – south movements towards Aylesbury.

The study area for this Do Minimum model is consistent with that defined for the base model in that it comprises the urban area of High Wycombe, and its approaches, as shown in Figure 1-A.



**Figure 1-A High Wycombe highway assignment model study area**

### 1.3 Structure of Report

This report outlines the methodology and assumptions used to forecast future traffic conditions in High Wycombe, using the 2013 High Wycombe highway assignment model as a base. The contents of the report are outlined below:

- *Section 1 – overview of the report purpose and background information*
- *Section 2 – description of assumptions regarding housing and employment land use*
- *Section 3 – description of assumed changes to transport infrastructure provision*
- *Section 4 – description of traffic forecasting methodology including traffic growth factors*
- *Section 5 – summary of the report*

A glossary of terms is presented in Appendix A.

## 2 Land Use Assumptions

### 2.1 Policy Background

WDC is currently working on the new Wycombe District Local Plan (WDLP) which will replace the adopted Wycombe Development Framework Core Strategy (2008) and saved policies of the existing Local Plan (January 2004). The WDLP will sit alongside the Delivery and Site Allocation (DSA) Plans for Town Centres and Managing Development document. The new Local Plan will:

- *set housing targets for the district and address strategic housing issues including housing and mixed use allocations*
- *include policies and proposals for the protection and provision of employment land*
- *include site specific proposals for local communities*
- *set detailed policies to manage development*

The development strategy in the current Core Strategy sets a requirement for 8,050 dwellings to be provided in the District in the period 2006-26, amounting to just over 400 dwellings per year on average. Around 90% of this is to be provided in the south-eastern part of the District including High Wycombe itself, Marlow and Bourne End.

The Core Strategy identifies High Wycombe in particular as the principal focus for new development, with the emphasis being on the re-use of previously developed land ('brownfield' sites) before the release of greenfield sites. In the first five years of the plan period, (i.e. 2006-11), a total of 2,722 dwellings were provided, well above the annualised target with the vast majority of this provided on previously developed land within the main urban areas.

The 2031 population estimate for Wycombe District assumed for the Do Minimum modelling is 180,400 persons in 75,450 households. This represents a 5.1% growth in population and an 11.2% growth in households over Census 2011 data. These figures are used in the TEMPRO traffic growth forecasts described in section 4.

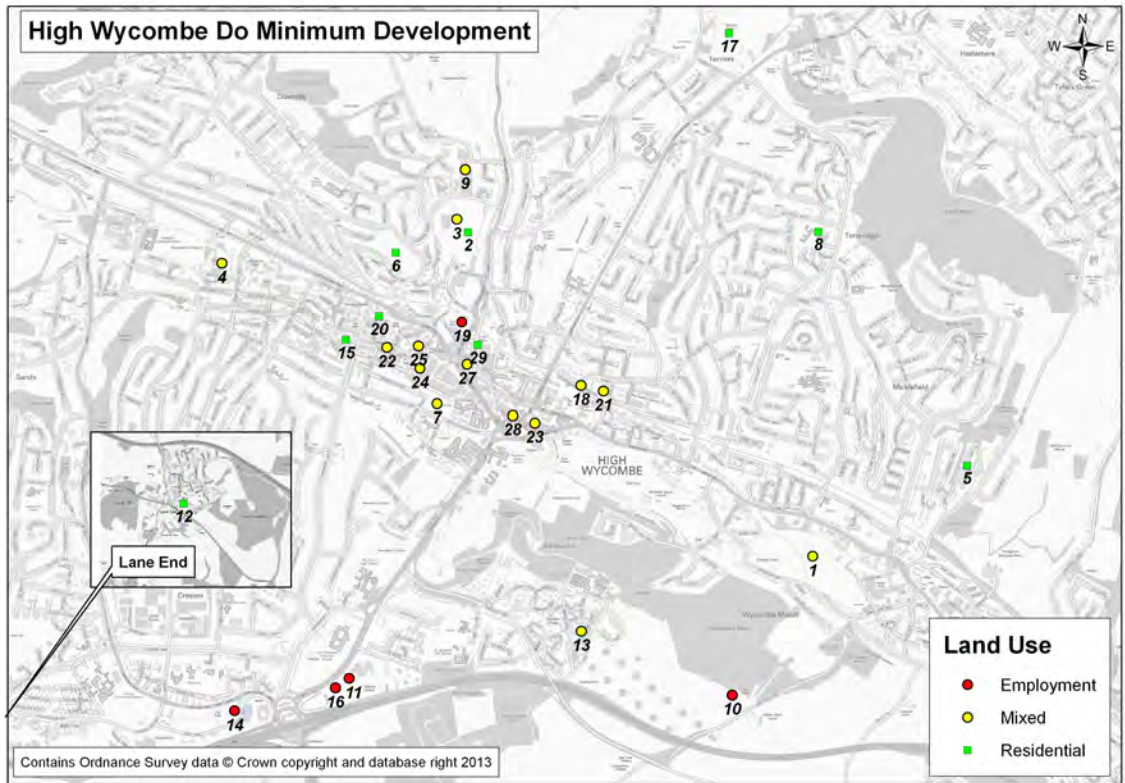
### 2.2 Do Minimum Development

This section establishes the Do Minimum land use development in High Wycombe consisting of 'committed' sites. The information on sites that will deliver housing, employment and other uses was provided by and agreed with the planning authority, WDC. The current supply of land consists of:

- *sites with planning permission*
- *sites that do not yet have planning permission, but have been approved in principle, subject to the completion of a Section 106 or planning obligation agreement*
- *sites consistent with the Core Strategy or DSA expected to come forward within the period defined within the current plans (to 2026)*

A plan of the housing, mixed-use and employment developments is shown in Figure 2-A, with a full list presented in Appendix B. For the purposes of forming the Do Minimum model, it was assumed that all of these developments will be completed by 2031.

In addition to the developments presented in Appendix B, there are also a number of smaller development sites and additional sites outside of the immediate study area for the model. In order to include the effect of traffic from these sites, traffic growth resulting from these particular sites was applied as a blanket growth to the whole town area and is consistent with TEMPRO growth trends.



**Figure 2-A** Locations of Do Minimum development by land use

### 3 Transport Infrastructure Provision

Table 3-A provides details of significant new highway infrastructure which is assumed to have been implemented by 2031 as a result of several Do Minimum developments (described in section 2), policies related to WDC’s DSA, and Department for Transport (DfT) funding bids. These highway schemes are included in the network assumptions in the forecast modelling. Any provision associated with Do Minimum development that is already constructed forms part of the ‘baseline’ infrastructure, and hence is excluded from this table.

Some of the schemes are part of the wider High Wycombe Town Centre Masterplan (HW TCMP) which is part of the DSA policy framework for the future development of the town centre.

Further information about these infrastructure schemes can be found in the technical studies and policy documents listed below Table 3-A.

Infrastructure		Provision associated with Do Minimum
1	Swan Frontage Improvements (HW TCMP)	<ul style="list-style-type: none"> <li>Major amendments to Abbey Way Gyratory with no general vehicular access between Abbey Way and A40/St Mary’s Street</li> <li>Removal of roundabout at the south-eastern end of the A40 Abbey Way flyover</li> </ul>
2	A40 Oxford Road Roundabout amendment (HW TCMP)	<ul style="list-style-type: none"> <li>Alteration of the current A40 Oxford Road/Archway/ Abbey Way Roundabout to a raised block paved junction for shared pedestrian and vehicle access.</li> <li>Capacity reductions on A40 Abbey Way Flyover in the form of a reduction in the number of lanes.</li> </ul>
3	Parker Knoll Way Gyratory (HW TCMP)	<ul style="list-style-type: none"> <li>Implementation of a clockwise gyratory system at Bellfield Road/Parker Knoll Way/Archway and Premier Way.</li> </ul>
4	Handy Cross Hub	<ul style="list-style-type: none"> <li>Three access junctions consisting of an upgrade to the current signalised access junction, a second ‘access only’ to the Coachway / relocated Park &amp; Ride that also permits general traffic use and a third ‘egress only’</li> <li>Internal road layout including a roundabout to the east of Fair Ridge</li> <li>Relocation of school drop off points for St Augustine’s and St Bernard’s schools to the Handy Cross Hub site.</li> <li>Upgrade of A4010 John Hall Way / Crest Road junction as per concept plan presented in the Southern Quadrant Transport Strategy</li> </ul>
5	RAF Daws Hill Development	<ul style="list-style-type: none"> <li>Lozenge gyratory form of junction providing access to the new development</li> </ul>



		<ul style="list-style-type: none"> <li>• Widened left turn at the Daws Hill Lane / Marlow Hill junction</li> </ul>
6	Compair and De La Rue Spine Roads	<ul style="list-style-type: none"> <li>• New road through the Compair and De La Rue sites from Morrisons to Coates Lane</li> <li>• New 4-arm signalised junction with Hughenden Avenue</li> </ul>
7	A4010 Chapel Lane / A40 West Wycombe Road	<ul style="list-style-type: none"> <li>• Upgraded junction configuration as per Local Pinch Point Fund Bid incorporating improving Chapel Lane approach and pre-signal arrangement</li> </ul>
8	Gas Works Link and Westbourne Street Link (HWTCMP)	<ul style="list-style-type: none"> <li>• An extension of Westbourne Street to the north to connect with A40 West Wycombe Road</li> <li>• Gasworks Link providing a connection between Queen Alexandra Road / Suffield Road and Desborough Road / Lily's Walk</li> </ul>
9	A404 Queen Victoria Road/ Easton Street Junction (HWTCMP)	<ul style="list-style-type: none"> <li>• Improvements in junction configuration to allow additional movements within the area including southbound movement on Queen Victoria Road</li> </ul>

**Table 3-A Major transport provisions associated with Do Minimum scenario**

Delivery and Site Allocations Plan

<http://www.wycombe.gov.uk/council-services/planning-and-buildings/planning-policy/delivery-and-site-allocations-plan-examination.aspx>

High Wycombe Town Centre Masterplan

<http://www.wycombe.gov.uk/council-services/planning-and-buildings/planning-policy/wycombe-development-framework/high-wycombe-town-centre-technical-studies.aspx>

Chapel Lane Pinch Point Scheme

<http://www.transportforbucks.net/Roadworks-Centre/Schemes-and-projects/Our-schemes-and-projects/Bucks-Connectivity.aspx>

Southern Quadrant Transport Strategy

<http://www.transportforbucks.net/Strategy/LTP3/Local-Area-Strategies.aspx>

# 4 Traffic Forecasting

## 4.1 Introduction

This section describes the traffic forecasting methodology for the development of the 2031 Do Minimum scenario. The forecasting process utilises the land use and transport infrastructure assumptions described in sections 2 and 3.

## 4.2 Overview of Modelling Methodology

The High Wycombe 2013 base model provides an accurate baseline in terms of traffic volumes, journey times, and general congestion and is an appropriate base upon which to apply traffic growth forecasts. The High Wycombe Transport Model is validated to a 2013 base year and reflects typical morning (08:00 – 09:00) and evening (17:00 – 18:00) peak traffic conditions. Further detail on the 2013 base year model may be viewed in the ‘High Wycombe Highway Assignment Model - Local Model Validation Report’, dated October 2013.

The approach to establishing forecast scenarios translates the trend, land use, and transport infrastructure assumptions into a set of traffic growth assumptions and applies these to the 2013 Car, LGV and HGV matrices. Figure 4-A presents an overview of the forecasting methodology.

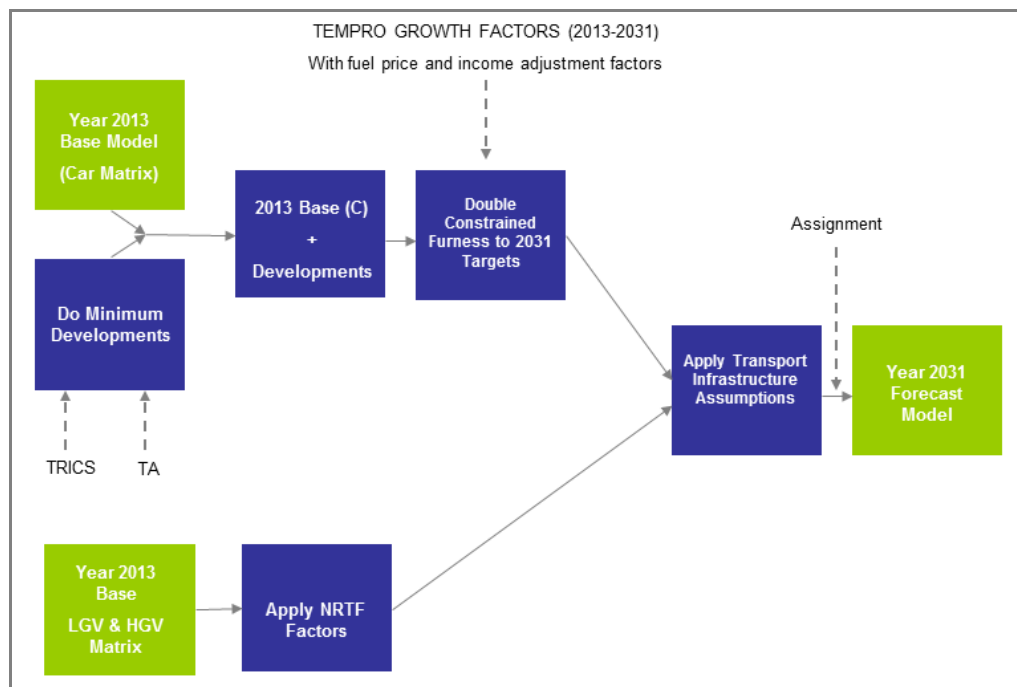


Figure 4-A Overview of forecasting methodology

## 4.3 Do Minimum Development Trip Generation

The assumptions for the future developments were translated into estimates of trip generation utilising the evidence presented in the relevant Transport Assessment or from the TRICS database. Appendix B lists individual sites with the associated trip demands. Table 4-A summarises the total peak hour traffic generation for the 2031 Do Minimum land use developments.

Development	AM Peak Trips		PM Peak Trips	
	Origins	Destinations	Origins	Destinations
2031 Do Minimum Developments	863	1466	1533	1099

**Table 4-A Peak hour traffic generation from developments**

The trip estimates for the list of development sites in Appendix B were applied to specific zones in the 2013 base matrices.

#### 4.4 TEMPRO and NRTF growth factors

A set of traffic growth factors covering the period 2013 and 2031 were derived from the TEMPRO database. TEMPRO is an industry-standard software package created by the DfT which provides access to the National Trip End Model (NTEM) trip forecast data for transport planning purposes. The version of the software used in this assessment (version 6.2 with dataset version 6.2) provides multi-modal trip data for the years 1991 to 2041. Outputs are given in terms of growth factors between the selected base and forecast years or as raw trip-end data.

Origin and destination TEMPRO growth factors for the following areas were extracted:

- High Wycombe Town
- Wycombe District
- Buckinghamshire County
- Rest of Great Britain

The household and jobs assumptions contained within TEMPRO were reviewed by WDC with the conclusion that the Wycombe (11UF1) assumptions are reasonably aligned with current local forecasts but the wider Wycombe District (Authority) TEMPRO assumptions are greater than local estimates suggest. The growth factors applied in the model may therefore over-estimate the level of growth for the District. The assessment for High Wycombe is therefore based on traffic growth levels that could be considered as a ‘high growth’ scenario.

Each of these growth factors is further adjusted by the application of a fuel price and income adjustment factor which is appropriate for transport models with fixed trip matrices. These adjustment factors are presented in WebTAG Guidance document unit 3.15 section 5.4.4. These factors are applied to the 2013 base matrices to forecast the 2031 trip end targets for the respective areas. The growth factors for the 2031 target trip ends are presented in Table 4-B and include adjustments to reflect changes in fuel price and income.

Factor (2013-2031)	AM		PM	
	Origins	Destinations	Origins	Destinations
Wycombe (11UF1)	1.160	1.257	1.241	1.178
Wycombe District (Authority)	1.152	1.254	1.236	1.171
Buckinghamshire County	1.235	1.247	1.255	1.249
Rest of GB	1.206	1.206	1.213	1.213

**Table 4-B Applied TEMPRO growth factors - car trips**

An alternative set of factors are applied to M40 through trips. These factors are derived from NRTF (National Road Traffic Forecast) growth rates which are produced from NTEM. NRTF factors are also applied to HGV and LGV trips throughout the model.

The growth factors for M40 through trips, LGV and HGV trips are derived using data in the Table 2: Forecast traffic by vehicle type, road type, and area type in the report entitled 'Road Transport Forecasts 2009 Results from the Department for Transport's National Transport Model'.

2013-2031	Growth Factor
Car (M40 only)	13.5%
LGV	37.8%
HGV	8.8%

**Table 4-C Applied NRTF growth factor**

#### 4.5 Network Assumptions and Final Forecast Matrices

Having established the future year prior matrices, these are controlled to the 2031 TEMPRO target trip ends using a Furness procedure. This process ensures that the growth in both trip origins and destinations in the resulting matrices are a good fit with the origin and destination target trip ends.

Table 4-D presents the total vehicular trips generated by the modelling process for the 2031 Do Minimum scenario.

Scenario	AM (08:00 – 09:00)		PM (17:00 – 18:00)	
	Total Highway Trips	% Growth	Total Highway Trips	% Growth
Base 2013 – Cars	33594		32626	
Do Minimum 2031 – Cars	40177	19.6%	39078	19.8%
Base 2013 – LGVs	1727		1571	
Do Minimum 2031 – LGVs	2383	37.8%	2165	37.8%
Base 2013 – HGVs	531		284	
Do Minimum 2031 – HGVs	578	8.8%	309	8.8%
<b>Base 2013 – Combined</b>	<b>35852</b>		<b>34481</b>	
<b>Do Minimum 2031 – Combined</b>	<b>43138</b>	<b>20.3%</b>	<b>41552</b>	<b>20.5%</b>

**Table 4-D Total trips for forecast scenario**

The resultant traffic flows for the AM and PM peak hours (rounded to the nearest 10) are presented in Appendix C.

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Jacobs was commissioned by BCC and WDC in November 2012 to undertake a transport and land use assessment to support and inform the development of the new Wycombe District Local Plan

This report describes the traffic forecasting work that was undertaken to establish a future year Do Minimum land use scenario (2031). This scenario provides a means to assess the performance of the High Wycombe highway network.

This process has established a set of assumptions related to the location of housing and employment developments which have been agreed with WDC. This data is used to establish the 2031 Do Minimum traffic scenario which provides a suitable forecast for the assessment of potential changes in land use and transportation infrastructure for Local Plan development purposes.

## Appendix A Glossary

Term	Description
BCC	Buckinghamshire County Council
Capacity	The ability of a highway link or junction to carry or accommodate traffic flow
Furness	A trip distribution model which derives a forecast year trip matrix based on a set of row (origin) and column (destination) trip totals
DfT	Department for Transport
DSA	Delivery and Site Allocations Development Plan Document
GFA	Gross Floor Area
HW TCMP	High Wycombe Town Centre Master Plan
NRTF	National Road Traffic Forecasts (published by DfT)
NTEM	National Trip End Model – provides a set of predictions of growth in car ownership and car traffic, with associated planning data projections, at any geographical level down to local authority districts. It forms part of the same forecasting system as the 1997 National Road Traffic Forecasts (NRTF97)
TEMPRO	Trip End Model Presentation Program – is a modelling tool designed to allow users to look at the growth in trip ends, using actual and forecast data supplied by the Department for Transport
TRICS	Trip Rate Information Computer System – An interactive computer program (and website) designed to calculate the likely rate of arrivals at and departures from a development
WebTAG	The Department for Transport guidance document on the conduct of transport studies
WDC	Wycombe District Council
WDLP	Wycombe District Local Plan

## Appendix B Do Minimum Development Assumptions

ID	Description <sup>1</sup>	Type	No. of dwellings	GFA (m2)	Trip rate source	AM Origins	AM Destinations	PM Origins	PM Destinations
1	Wycombe Marsh (80% already complete)	Mixed	465	2800	TA	44	27	31	38
2	Former Compair Site - Student Accommodation (200 units already complete)	Residential	672		TRICS	10	12	18	13
3	Compair Site Office, Campus and Care Home	Mixed	240	2500	TRICS	20	52	45	19
4	William Bartlett And Son Grafton Street	Mixed	105	2220	TRICS	28	22	23	26
5	Land off Lance Way	Residential	22		TRICS	9	3	5	9
6	Bellfield First & Middle Schools	Residential	90		TRICS	20	7	11	19
7	Lilys Walk Gas Works	Mixed	130	3447	TRICS	55	23	37	56
8	Kingswood County First School	Residential	41		TRICS	16	6	10	16
9	PS7 Former De La Rue Site Coates Lane	Mixed	97	2400	TRICS	46	47	49	43
10	Wycombe Ski Slope	Employment		6143	TRICS	27	34	72	96
11	Wycombe Sports Centre	Employment		43857	TA	214	837	795	404
12	Springbank House, High St Lane End	Residential	42	1091	TRICS	13	4	7	12
13	RAF Daws Hill Site (Total dwellings =433 accounting for extant land use) <sup>2</sup>	Mixed	366	3824	TA	243	105	104	186
14	Proposed "Next Home & Garden" retail site at Cressex Island	Employment		7261	TA	2	11	49	49
15	Needham Bowl, Desborough Road	Residential	74		TRICS	31	11	18	29
16	HXH Coachway/Park and Ride <sup>3</sup>	Employment			TA	0	102	96	0
17	Wellesbourne Campus, Kingshill Road	Residential	238		TRICS	9	3	5	9

18	Railway Station Mixed Schemes	Mixed		928	No change	0	0	0	0
19	Dovecot Remainder	Retail		486	No change	0	0	0	0
20	HWTC18 Baker Street	Residential	125		TRICS	48	19	27	43
21	HWTC9 Land off Duke Street	Mixed	40		No change	0	0	0	0
22	HWTC15 Collins House	Mixed	25	1000	TRICS	8	3	5	8
23	HWTC8 Council Office and Royal Mail Sorting Office	Mixed		15000	No change	0	0	0	0
24	HWTC14 Buckingham House & Castle House	Mixed	115	7400	No change	0	0	0	0
25	HWTC17 Bridge St	Mixed	100	6945	No change	0	0	0	0
27	HWTC16 Oxford Rd Roundabout Site 2	Mixed		6001	No change	0	0	0	0
28	HWTC10 Swan Frontage	Mixed		13300	TRICS	20	138	126	24
29	Formerly Chiterns Hotel (currently Student Accom)	Residential			No change	0	0	0	0
	<b>Total<sup>4</sup></b>					<b>863</b>	<b>1466</b>	<b>1533</b>	<b>1099</b>

<sup>1</sup> Dwellings to be constructed from 2013

<sup>2</sup> Trips from the existing RAF Daws Hill removed.

<sup>3</sup> As per the original planning application 25 trip destinations in the AM Peak and 23 trips origins in the PM Peak were removed from the old P&R in Cressex Road

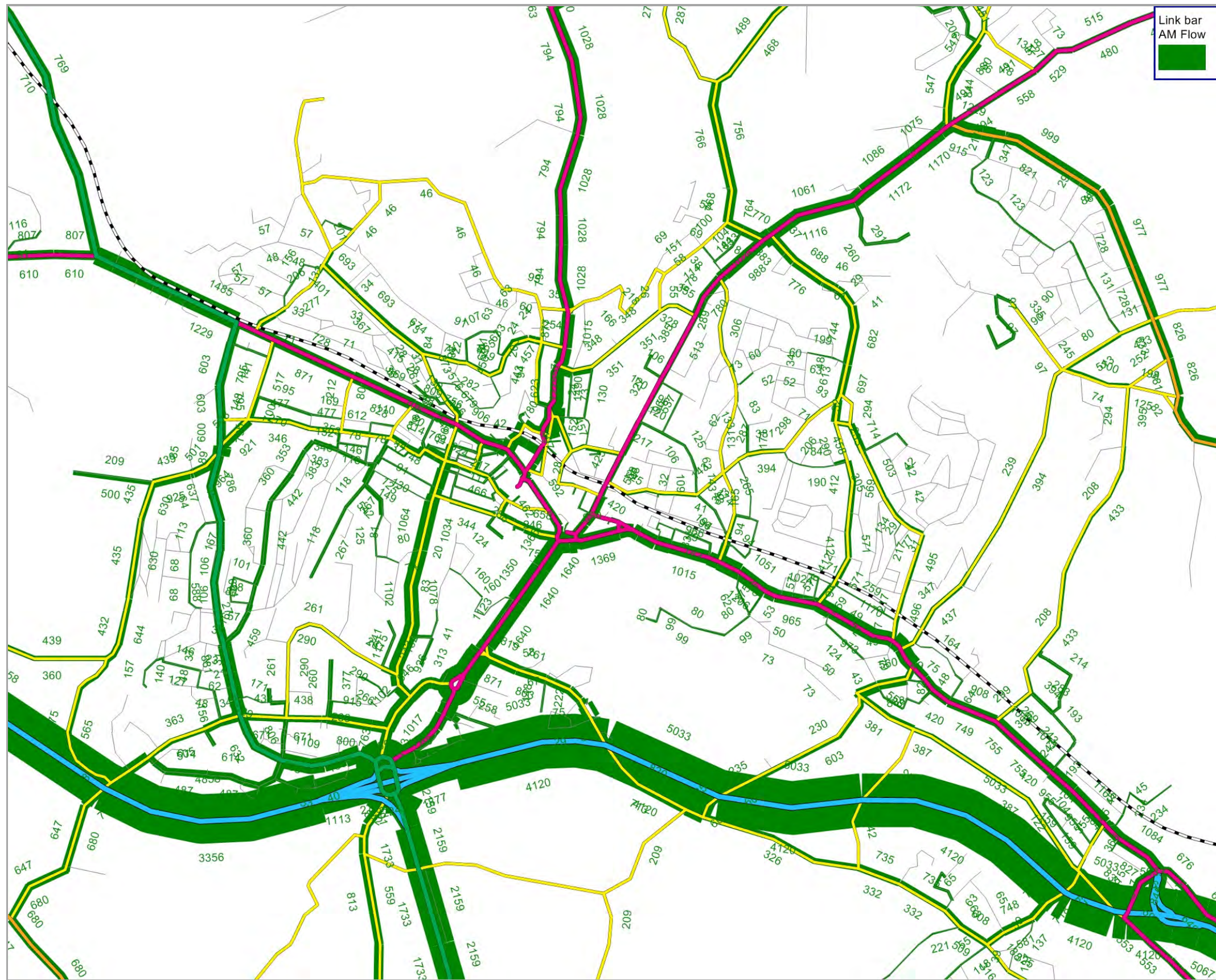
<sup>4</sup> Major Do Min Developments Trips Only



**Appendix C AM and PM Peak Hour Traffic Volumes (Rounded)**



AM Peak Hour 2031 Modelled Traffic Volumes



PM Peak Hour 2031 Modelled Traffic Volumes

