AMION Consulting

North Worcestershire Councils

North Worcestershire Housing Need

A Report

April 2014

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Appendix A – Edge Analytics Limited's report

1 Introduction

1.1 This report sets out the results of new work undertaken in late 2013 and early 2014 to assess future housing need for the North Worcestershire area and its three component local authorities (Bromsgrove, Redditch and Wyre Forest).

1.2 The assessment has been undertaken in order to complement the objective assessment of housing need for the South Worcestershire area, which was required in response to the Inspector's Interim Conclusions (28 October 2013) on the housing need matters considered at the Stage 1 hearings of the Examination of the South Worcestershire Development Plan (SWDP). In particular, the Inspector asked that additional work be undertaken to address two specific issues:

(i) use of the latest official population projections in the demographic modelling work; and

(ii) the preparation of more than one employment–based scenario using up-to-date, realistic and representative employment forecasts from more than one source.

1.3 These issues relate to identified weaknesses in the Worcestershire SHMA (2012) which involved all the Worcestershire authorities and therefore it was felt it needed to be considered by the North Worcestershire Councils (NWCs) which are partly reliant on the same evidence. The report has also been informed by comments and questions raised at the SWDP Stage 2 hearings.

1.4 In order to complete this work, the NWCs have appointed AMION Consulting to assess this new evidence and prepare a summary technical report for the North Worcestershire area. In line with the SWDP Inspector's views, the work takes as its starting point trend-based demographic scenarios and then focuses in particular on the implications of forecast jobs growth and likely consequences for the local labour market. When published by the NWCs the North Worcestershire report will become part of the evidence base for the Local Plans to be produced by each of the 3 NWCs.

1.5 The NWCs have obtained employment forecasts produced by Cambridge Econometrics, Experian and Oxford Economics for each local authority area in North Worcestershire. These forecast workplace jobs in each district by year and by sector. They have been reviewed to assess and ensure that they are up-to-date, realistic and representative. They have then been used to model employment-based housing need scenarios and sensitivity tests. The NWCs will publish the spreadsheets with the detailed employment forecasts for Bromsgrove, Redditch and Wyre Forest, and they will become part of the supporting evidence base. Separate briefing notes will also be provided on the methodologies from each of the forecasters.

1.6 The NWCs have commissioned Edge Analytics Limited (Edge) to provide new demographic and employment-based scenarios for each local authority area. Edge has modelled these using the POPGROUP model and produced a draft Demographic Forecasts report. A copy of its report is included at Appendix A[1]. It should be noted that a key issue with any housing forecasts are the assumptions to be used regarding Household Headship Rates (i.e. to translate population forecasts into households). The Inspector at the SWDP Stage 1 hearings indicated that an 'index

[1] Edge forecast using a 2012 base year. However, in order to facilitate comparison with the SHMA, the analysis in this report use 2006 as the base year for the analysis of the forecasts.

approach' should be adopted. It has not been necessary therefore to appoint specialist consultants to explore this issue further.

1.7 Using the employment-based scenarios, population growth is determined by the number of jobs forecast to be available within the area and the associated requirement for in-migration. This requirement is principally determined by unemployment and economic activity rates (that influence the level of 'spare capacity' within the existing population) and commuting patterns. The core employment-based forecasts assume these factors to be constant. However they will vary according to structural and cyclical economic changes. Accordingly further analysis was undertaken to identify the likely consequences of such changes and their impacts upon migration and therefore population and household numbers. This analysis used the labour market projections produced through the Experian model (which had been balanced using the Sub-National Population Projections 2010 (SNPP 2010).

1.8 In compliance with their Duty to Co-operate, and consistent with the extent of the Worcestershire Housing Market Area, the NWCs have worked closely with the three South Worcestershire Districts (Malvern Hills District Council, Worcester City Council, and Wychavon District Council) during the commissioning and production of this new evidence. This has involved:

- gaining agreement by the Worcestershire Planning Officers Group in November 2013 to obtain new evidence to support further assessment of housing need for all six Worcestershire Districts;
- preparation of the project brief to encompass the six Worcestershire Districts;
- participation by officers from each of the six Worcestershire Districts on the evidence project working group;
- obtaining the new employment forecasts for all six Worcestershire Districts from the three forecasting organisations and sharing the results;
- commissioning the suite of demographic-led and employment-led scenarios for all six Worcestershire Districts and sharing the results; and
- commissioning the work to critically assess the new evidence and prepare two summary technical reports - one for South Worcestershire and one for North Worcestershire.

1.9 This summary technical report continues in three sections as follows:

- Section 2 - critically reviews and summarises the economic forecasts.
- Section 3 - summarises the demographic, household and housing need forecasts. A more detailed review of these forecasts is included at Appendix A; and
- Section 4 - sets out the conclusions of the assessment.

2 Economic forecasts

2.1 Introduction

2.1.1 This section provides summary details of the employment growth forecasts for North Worcestershire. It covers the period from 2001 to 2030. The forecasts reviewed have been obtained from:

- Experian (September 2013);
- Oxford Economics (November 2013 – directly commissioned by the NWCs); and
- Cambridge Econometrics (March 2013 – commissioned originally by and provided to the SWCs with the agreement of the Worcestershire Local Enterprise Partnership[2]).

2.1.2 In relation to the latest national medium-term economic forecasts, context for the study is provided by HM Treasury 'Forecasts for the UK Economy – A Comparison of Independent Forecasts' (February 2014). This identifies, using an average across all forecasts, an average UK Gross Domestic Product (GDP) growth of 2.6% in 2014, falling to 2.5% in 2015 and 2.4% in 2016, 2017 and 2018. Over the period 2014 to 2018, claimant count unemployment is forecast to fall from 1.25 million to 1.00 million.

2.2 Forecasting methodologies

2.2.1 The methodologies used by the three different forecasting models are, in brief, as follows:

- **Experian** – the overall forecasting approach is based on a methodology that combines long-term supply and demand influences with short-term demand side factors. Population projections are a key driver in the regional and local forecasts. These help to determine hours worked, which feed into output, compensation, employment in all its forms, income and finally spending. In each case Experian forecast shares of the corresponding UK variable, from their national forecasts, for the region and local area.
- **Oxford Economics** – this is based on the Oxford Economics Local Authority District Forecasting Model and takes into consideration global and national factors (such as developments in the Eurozone and UK Government fiscal policy) and their potential impact at local authority level. It also factors in historical trends in the area. The variables taken into consideration in the model are:
  - employment – both residence-based and workplace-based;
  - population, migration and households;
  - wages – both residence-based and workplace-based;

[2] Note: Cambridge Econometrics also produced a Smart Efficiency and Growth Scenario, which has been informing the Worcestershire Local Enterprise Partnerships' Strategic Economic Plan (SEP) and Local Growth Deal. It is, however, aspirational and dependent upon the allocation of very substantial amounts of additional government funding, which is uncertain. In addition, the draft SEP aims to significantly increase participation rates through a range of proposed training and labour market measures.

- unemployment and inactivity;
- house prices;
- commuting by occupation; and
- Gross Value Added.

- **Cambridge Econometrics** – baseline scenario projections are provided through the Local Economy Forecasting Model (LEFM) and are based on the historical relationship between growth in the local area relative to the region or UK (depending on which area it has the strongest relationship with), on an industry-by-industry basis. The projections assume that these relationships will continue to hold in the future. Thus, if growth in an industry in the local area (district) outperformed the industry in the West Midlands (or UK) as a whole in the past, then it will be assumed to do so in the future. Similarly, if it underperformed the region (or UK) in the past then it will be assumed to underperform the region (or UK) in the future. The projections for some sectors, in which growth is more closely related to changes in population, are based on historical relationships between growth in output per capita in the local area and output per capita in the region or UK as a whole. These industries are: retail, public administration, education, health, and miscellaneous services (which include leisure services).

2.2.2 Briefing notes on the projection methodologies for each of the forecasters can be provided separately.

2.3 Forecasting results

2.3.1 Bromsgrove

2.3.1.1 Table 2.1 sets out the employment forecasts for Bromsgrove for the period 2001 to 2030.

Table 2.1: Overall forecasts for employment change for Bromsgrove, 2001 to 2030

Experian	**2001**	**2011**	**2012**[b]	**2030**
Total employment (thousand)	38.4	37.3	37.8	41.7
Total employment growth to 2030 (thousand)[a]	3.3	4.4	3.9	n/a
Total percentage growth to 2030[a]	8.5	11.9	10.3	n/a
Oxford Economics	**2001**	**2011**	**2012**	**2030**
Total employment (thousand)	41.0	38.2	40.7	46.0
Total employment growth to 2030 (thousand)[a]	5.0	7.8	5.3	n/a
Total percentage growth to 2030[a]	12.2	20.4	13.0	n/a
Cambridge Econometrics	**2001**	**2011**	**2012**	**2030**
Total employment (thousand)	39.2	37.4	38.6	42.4
Total employment growth to 2030 (thousand)[a]	3.3	5.1	3.9	n/a
Total percentage growth to 2030[a]	8.4	13.5	10.0	n/a

Source: Experian, 2013, Oxford Economics 2013, Cambridge Econometrics 2013
[a] Note: Change from column year to 2030
[b] Note: 2012 is the baseline year for the demographic, household and housing need forecasts.

2.3.1.2 Each of the forecasts for Bromsgrove predicts an increase in employment for the 2001 to 2030 period overall. However, the Oxford Economics forecast projects a significantly higher overall employment figure (46,000) in 2030 than the Experian (41,700) and Cambridge Econometrics (42,400) forecasts. All three forecasts show a decrease in employment between 2001 and 2011, with an increase in employment during the 2011-2030 and 2012-2030 periods.

2.3.2 Redditch

2.3.2.1 The employment forecasts for Redditch for the period 2001 to 2030 are set out in Table 2.2.

Table 2.2: Overall forecasts for employment change for Redditch, 2001 to 2030

Experian	**2001**	**2011**	**2012**	**2030**
Total employment (thousand)	46.1	41.7	42.5	43.5
Total employment growth to 2030 (thousand)[a]	-2.6	1.8	1.0	n/a
Total percentage growth to 2030[a]	-5.6	4.4	2.5	n/a
Oxford Economics	**2001**	**2011**	**2012**	**2030**
Total employment (thousand)	47.1	39.1	40.0	41.2
Total employment growth to 2030 (thousand)[a]	-5.9	2.1	1.2	n/a
Total percentage growth to 2030[a]	-12.6	5.4	2.9	n/a
Cambridge Econometrics	**2001**	**2011**	**2012**	**2030**
Total employment (thousand)	47.6	39.3	41.3	44.6
Total employment growth to 2030 (thousand)[a]	-3.1	5.3	3.3	n/a
Total percentage growth to 2030[a]	-6.5	13.5	7.9	n/a

Source: Experian, 2013, Oxford Economics 2013, Cambridge Econometrics 2013
[a] Note: Change from column year to 2030

2.3.2.2 In contrast to the forecasts for Bromsgrove, each forecast for Redditch predicts a decrease in employment for the 2001 to 2030 period overall. While each forecast predicts an increase in employment during the 2011-2030 periods, this is more than offset by significant decreases in employment during the 2001-2011 period. The Oxford Economics employment forecast (41,200) for 2030 is significantly lower than the Cambridge Econometrics (44,600) and Experian (43,500) forecasts. The 13.5% 2011-30 employment growth forecast by Cambridge Econometrics (13.5%) is significantly higher than that forecast by Experian (4.4%) and Oxford Economics (5.4%).

2.3.3 Wyre Forest

2.3.3.1 Table 2.3 shows the employment forecasts for Wyre Forest for the period 2001 to 2030.

Table 2.3: Overall forecasts for employment change for Wyre Forest, 2001 to 2030				
Experian	**2001**	**2011**	**2012**	**2030**
Total employment (thousand)	38.3	35.5	36.2	37.5
Total employment growth to 2030 (thousand)[a]	-0.8	1.9	1.2	n/a
Total percentage growth to 2030[a]	-2.2	5.4	3.4	n/a
Oxford Economics	**2001**	**2011**	**2012**	**2030**
Total employment (thousand)	39.0	37.1	38.1	38.8
Total employment growth to 2030 (thousand)[a]	-0.1	1.7	0.7	n/a
Total percentage growth to 2030[a]	-0.4	4.7	1.9	n/a
Cambridge Econometrics	**2001**	**2011**	**2012**	**2030**
Total employment (thousand)	37.1	37.6	39.8	41.3
Total employment growth to 2030 (thousand)[a]	4.2	3.7	1.6	n/a
Total percentage growth to 2030[a]	11.3	9.9	3.9	n/a

Source: Experian, 2013, Oxford Economics 2013, Cambridge Econometrics 2013
[a] Note: Change from column year to 2030

2.3.3.2 For Wyre Forest the Cambridge Econometrics forecast predicts a significantly higher rate (9.9%) of employment growth during the 2011-2030 period than the Oxford Economics (4.7%) and Experian (5.4%) forecasts. This differential is however largely accounted for by significantly higher estimated growth between 2011 and 2012.

2.3.4 North Worcestershire Total

2.3.4.1 Table 2.4 shows the overall forecasts for employment change for North Worcestershire for the period from 2001 to 2030.

Table 2.4: Overall forecasts for employment change for North Worcestershire, 2001 to 2030				
Experian	**2001**	**2011**	**2012**	**2030**
Total employment (thousand)	122.8	114.5	116.5	122.7
Total employment growth to 2030 (thousand)[a]	-0.2	8.2	6.2	n/a
Total percentage growth to 2030[a]	-0.1	7.1	5.3	n/a
Oxford Economics	**2001**	**2011**	**2012**	**2030**
Total employment (thousand)	127.1	114.4	118.8	126.0
Total employment growth to 2030 (thousand)[a]	-1.1	11.7	7.2	n/a
Total percentage growth to 2030[a]	-0.8	10.2	6.1	n/a
Cambridge Econometrics	**2001**	**2011**	**2012**	**2030**
Total employment (thousand)	123.9	114.2	119.6	128.3
Total employment growth to 2030 (thousand)[a]	4.4	14.1	8.7	n/a
Total percentage growth to 2030[a]	3.5	12.3	7.3	n/a

Source: Experian, 2013, Oxford Economics 2013, Cambridge Econometrics 2013
[a] Note: Change from column year to 2030

2.3.4.2 The projections produced by Cambridge Econometrics show the highest employment increase over the 2011-30 period with employment increasing by 12.3% (14,100) compared with 10.2% or 11,700 (Oxford Economics) and 7.1% or 8,200 (Experian).

2.3.4.3 Table 2.5 below provides summary details of the three forecasts, showing total employment and absolute and percentage change in employment from the column year to 2030.

Table 2.5: Summary of forecasts

Experian	**2001**	**2011**	**2012**	**2030**
Total employment (thousand)				
Bromsgrove	38.4	37.3	37.8	41.7
Redditch	46.1	41.7	42.5	43.5
Wyre Forest	38.3	35.5	36.2	37.5
North Worcestershire	122.8	114.5	116.5	122.7
Total employment growth to 2030 (thousand)[a]				
Bromsgrove	3.3	4.4	3.9	n/a
Redditch	-2.6	1.8	1.0	n/a
Wyre Forest	-0.8	1.9	1.2	n/a
North Worcestershire	-0.2	8.2	6.2	n/a
Total percentage growth to 2030[a]				
Bromsgrove	8.5	11.9	10.3	n/a
Redditch	-5.6	4.4	2.5	n/a
Wyre Forest	-2.2	5.4	3.4	n/a
North Worcestershire	-0.1	7.1	5.3	n/a
Oxford Economics	**2001**	**2011**	**2012**	**2030**
Total employment (thousand)				
Bromsgrove	41.0	38.2	40.7	46.0
Redditch	47.1	39.1	40.0	41.2
Wyre Forest	39.0	37.1	38.1	38.8
North Worcestershire	127.1	114.4	118.8	126.0
Total employment growth to 2030 (thousand)[a]				
Bromsgrove	5.0	7.8	5.3	n/a
Redditch	-5.9	2.1	1.2	n/a
Wyre Forest	-0.1	1.7	0.7	n/a
North Worcestershire	-1.1	11.7	7.2	n/a

Total percentage growth to 2030[a]				
Bromsgrove	12.2	20.4	13.0	n/a
Redditch	-12.6	5.4	2.9	n/a
Wyre Forest	-0.4	4.7	1.9	n/a
North Worcestershire	-0.8	10.2	6.1	n/a
Cambridge Econometrics	**2001**	**2011**	**2012**	**2030**
Total employment (thousand)				
Bromsgrove	39.2	37.4	38.6	42.4
Redditch	47.6	39.3	41.3	44.6
Wyre Forest	37.1	37.6	39.8	41.3
North Worcestershire	123.9	114.2	119.6	128.3
Total employment growth to 2030 (thousand)[a]				
Bromsgrove	3.3	5.1	3.9	n/a
Redditch	-3.1	5.3	3.3	n/a
Wyre Forest	4.2	3.7	1.6	n/a
North Worcestershire	4.4	14.1	8.7	n/a
Total percentage growth to 2030[a]				
Bromsgrove	8.4	13.5	10.0	n/a
Redditch	-6.5	13.5	7.9	n/a
Wyre Forest	11.3	9.9	3.9	n/a
North Worcestershire	3.5	12.3	7.3	n/a

Source: Experian, 2013, Oxford Economics 2013, Cambridge Econometrics 2013
[a] Note: Change from column year to 2030

2.3.4.4 Table 2.6 shows the sectoral changes in employment between 2012 and 2030 projected by the three forecasts. The only sector where a decrease is observed across all three forecasts is manufacturing. This ranges from a decrease of 13% (2,700) projected by Cambridge Econometrics to a decrease of 32% (5,900) projected by Experian. Most service sector activities across all forecasts are predicted to increase employment between 2012 and 2030 while employment in the construction industry is projected to increase by between 15% and 31%.

Table 2.6: Sectoral forecasts (Employment) – North Worcestershire				
Experian	**2012**	**2030**	**Change**	**% change**
Agriculture, forestry and fishing	1.5	1.2	-0.3	-20.0
Mining and quarrying	0.0	0.0	0.0	0
Manufacturing	18.4	12.5	-5.9	-32.1
Utilities	0.8	0.9	0.1	12.5
Construction	7.8	9.0	1.2	15.4
Wholesale and retail trade; repair of motor vehicles and motorcycles	21.2	23.6	2.4	11.3
Transportation and storage	3.9	3.3	-0.5	-12.8
Accommodation and food service activities	7.0	7.9	0.8	11.4
Information and communication	3.2	3.6	0.4	12.5
Financial and insurance activities	2.3	2.7	0.4	17.4
Real estate activities	1.6	2.1	0.4	25.0
Professional, scientific and technical activities	5.5	7.3	1.8	32.7
Administrative and support service activities	8.7	11.0	2.3	26.4
Public administration and defence; compulsory social security	10.7	10.9	0.3	2.8
Education	9.7	10.3	0.6	6.2
Human health and social work activities	7.1	7.8	0.8	11.3
Arts, entertainment and recreation	3.0	3.4	0.4	13.3
Other service activities	3.8	4.8	1.0	26.3
Total	**116.2**	**122.4**	**6.2**	**5.3**
Oxford Economics	**2012**	**2030**	**Change**	**% change**
Agriculture, forestry and fishing	1.1	0.8	-0.3	-27.3
Mining and quarrying	0.0	0.0	0.0	0.0
Manufacturing	16.7	13.9	-2.8	-16.8
Utilities	0.9	0.8	-0.1	-11.1
Construction	7.8	9.6	1.9	24.4
Wholesale and retail trade; repair of motor vehicles and motorcycles	24.1	24.7	0.6	2.5
Transportation and storage	3.8	4.4	0.6	15.8
Accommodation and food service activities	7.4	8.0	0.7	9.5
Information and communication	3.7	4.3	0.6	16.2
Financial and insurance activities	2.4	2.5	0.2	8.3
Real estate activities	1.9	2.5	0.6	31.6
Professional, scientific and technical activities	6.3	8.1	1.8	28.6
Administrative and support service activities	8.9	11.3	2.4	27.0
Public administration and defence; compulsory social security	3.0	2.5	-0.5	-16.7
Education	10.1	9.9	-0.3	-3.0
Human health and social work activities	14.8	15.5	0.7	4.7
Arts, entertainment and recreation	3.0	3.7	0.7	23.3
Other service activities	3.0	3.3	0.4	13.3
Total	**118.8**	**126.0**	**7.2**	**6.1**

Cambridge Econometrics	2012	2030	Change	% change
Agriculture, forestry and fishing	2.3	2.4	0.1	4.3
Mining and quarrying	0.1	0.0	0.0	0.0
Manufacturing	20.1	17.4	-2.7	-13.4
Utilities	0.9	1.2	0.3	33.3
Construction	7.8	10.2	2.4	30.8
Wholesale and retail trade; repair of motor vehicles and motorcycles	21.9	21.3	-0.6	-2.7
Transportation and storage	3.9	4.1	0.2	5.1
Accommodation and food service activities	7.4	9.6	2.2	29.7
Information and communication	3.1	3.3	0.2	6.5
Financial and insurance activities	2.2	2.3	0.1	4.5
Real estate activities	1.5	3.0	1.5	100.0
Professional, scientific and technical activities	6.8	7.8	1.0	14.7
Administrative and support service activities	8.4	9.9	1.5	17.9
Public administration and defence; compulsory social security	9.5	10.4	0.9	9.5
Education	8.9	7.8	-1.1	-12.4
Human health and social work activities	8.0	10.2	2.1	26.3
Arts, entertainment and recreation	3.2	3.6	0.4	12.5
Other service activities	3.7	4.0	0.3	8.1
Total[c]	**119.6**	**128.3**	**8.7**	**7.3**

Source: Experian, 2013, Oxford Economics 2013, Cambridge Econometrics 2013
[c] Note: Total may not sum due to rounding

2.4 Assessment of forecasts

2.4.1 Overview

2.4.1.1 The forecasts have been assessed by addressing the following two questions:

- **are they up-to-date?** – based on the forecast publication date; and
- **are they realistic and representative?** – based on consideration of whether they are a product of an established and recognised forecasting model; comparison with other medium-term economic forecasts; baseline (2001 and 2011) employment data; total employment growth; rate of employment growth (compound annual growth rate); and sectoral variations.

2.4.1.2 Table 2.7 summarises the analysis of whether or not the forecasts are up-to-date. Each of the three forecasts is adjudged as meeting this criterion.

Table 2.7: Up-to-dateness of forecasts			
Criteria for assessment	**Experian**	**Oxford Economics**	**Cambridge Econometrics**
Forecast publication date	September 2013	November 2013	March 2013
Is this the most recent?	Yes – these were the most up to date forecasts available when the analysis was being undertaken in November 2013.	Yes – these were the most up to date forecasts available when the analysis was being undertaken in November 2013.	Yes – these were the most up to date forecasts available when the analysis was being undertaken in November 2013.
If not, why is it not used?	n/a	n/a	n/a

2.4.1.3 A summary of the data used to assess the extent to which the forecasts are considered to be realistic and representative is set out in Table 2.8.

Table 2.8: Realism and representativeness of forecasts			
	Experian	**Oxford Economics**	**Cambridge Econometrics**
Methodology	Experian forecasting model	LAD forecasting model	LEFM model
Comparison of national GDP forecast with other medium-term economic forecasts	Average	High end	Low end
North Worcestershire - Total			
Baseline employment (000s) 2001 2011	 122.8 114.5	 127.1 114.4	 123.9 114.2
Total employment growth (2012 to 2030)	6.2	7.2	8.7
Growth rate (2012 to 2030) CAGR (%)	5.3 0.29	6.1 0.33	7.3 0.39
Bromsgrove			
Baseline employment (000s) 2001 2011	 38.4 37.3	 41.0 38.2	 39.2 37.4
Total employment growth (2012 to 2030)	3.9	5.3	3.9
Growth rate (2012 to 2030) CAGR (%)	10.3 0.55	13.0 0.68	10.0 0.53
Redditch			
Baseline employment (000s) 2001 2011	 46.1 41.7	 47.1 39.1	 47.6 39.3
Total employment growth (2012 to 2030)	1.0	0.7	1.6
Growth rate (2012 to 2030) CAGR (%)	2.5 0.14	2.9 0.16	7.9 0.43

Table 2.8: Realism and representativeness of forecasts			
	Experian	**Oxford Economics**	**Cambridge Econometrics**
Wyre Forest			
Baseline employment (000s)			
2001	38.3	127.1	37.1
2011	35.5	114.4	114.2
Total employment growth (2012 to 2030)	1.2	0.7	1.6
Growth rate (2012 to 2030)	3.4	1.9	3.9
CAGR (%)	0.19	0.11	0.21

2.4.1.4 The compound annual growth rate (CAGR) of total projected employment across North Worcestershire has been calculated for each 18 year period from 1997-2015 to 2012-2030, as shown in Table 2.9. Although a decline in employment has been projected for the majority of 18 year periods between 1997-2015 and 2006-24, the CAGR between 2012 and 2030 is lower than the three preceding 18 year periods within the Oxford Economic and Cambridge Econometrics forecasts, and lower than the two preceding 18 year forecasts within the Experian forecasts.

Table 2.9: CAGR comparisons																
	97-15	**98-16**	**99-17**	**00-18**	**01-19**	**02-20**	**03-21**	**04-22**	**05-23**	**06-24**	**07-25**	**08-26**	**09-27**	**10-28**	**11-29**	**12-30**
Experian																
Bromsgrove	-0.06	-0.05	-0.01	0.08	0.20	0.26	0.27	0.31	0.25	0.16	0.20	0.24	0.45	0.57	0.61	0.55
Redditch	-0.45	-0.46	-0.41	-0.36	-0.31	-0.33	-0.37	-0.36	-0.38	-0.44	-0.33	-0.22	0.12	0.22	0.24	0.14
Wyre Forest	-0.49	-0.47	-0.39	-0.27	-0.15	-0.13	-0.17	-0.16	-0.22	-0.27	-0.16	-0.10	0.15	0.23	0.29	0.19
North Worcs.	-0.34	-0.33	-0.28	-0.19	-0.10	-0.08	-0.10	-0.08	-0.13	-0.19	-0.10	-0.03	0.24	0.34	0.38	**0.29**
Oxford																
Bromsgrove	0.11	0.32	0.26	0.27	0.37	1.59	1.08	0.77	1.07	0.59	0.68	0.67	0.83	0.88	1.01	0.68
Redditch	-0.33	-0.36	-0.36	-0.62	-0.78	-0.26	-0.78	-0.96	-0.96	-0.97	-0.70	-0.19	0.09	0.20	0.29	0.16
Wyre Forest	-0.90	-0.84	-0.80	-0.72	-0.08	-0.04	-0.20	-0.39	-0.35	-0.46	-0.20	-0.05	0.26	0.16	0.25	0.11
North Worcs.	-0.37	-0.29	-0.30	-0.35	-0.17	0.40	0.01	-0.21	-0.11	-0.29	-0.08	0.15	0.40	0.42	0.53	**0.33**
Cambridge																
Bromsgrove	-0.19	-0.04	-0.14	-0.28	0.08	1.12	0.60	0.34	0.51	0.17	0.29	0.19	0.37	0.56	0.67	0.53
Redditch	-0.35	-0.13	-0.05	-0.31	-0.56	0.05	-0.45	-0.63	-0.78	-0.78	-0.45	0.05	0.33	0.65	0.69	0.43
Wyre Forest	-0.21	-0.15	-0.13	-0.18	0.52	0.51	0.26	0.11	0.13	0.09	0.36	0.46	0.72	0.44	0.52	0.21
North Worcs.	-0.25	-0.11	-0.11	-0.26	-0.02	0.53	0.10	-0.09	-0.09	-0.21	0.04	0.23	0.47	0.55	0.63	**0.39**

2.4.2 National forecasts

2.4.2.1 Each of the forecasts has been produced using an established forecasting model. At the national level, the HM Treasury comparison of independent forecasts' (February 2014) indicates that GDP is forecast to grow by 2.6% in 2014, falling to 2.5% in 2015 and 2.4% in 2016, 2017 and 2018. Table 2.10 provides a comparison of the GDP forecasts produced by each provider with the average across all forecast providers.

Table 2.10: GDP national forecasts					
	2014	**2015**	**2016**	**2017**	**2018**
Experian	2.6	2.5	2.6	2.4	2.3
Oxford Economics	2.6	2.4	2.6	2.6	2.5
Cambridge Econometrics	2.4	1.8	1.8	2.1	2.7
Average across all forecasts	**2.6**	**2.5**	**2.4**	**2.4**	**2.4**

Although there is some variation between the three forecasts and the average across all forecasts (particularly in the case of Cambridge Econometrics), the national forecasts of all three forecasts are considered to be credible.

2.4.3 Local historic information

2.4.3.1 Somewhat surprisingly, the forecasts vary significantly in terms of the estimated actual employment levels in 2001 and 2011. Table 2.11 shows how the actual number of jobs, as determined by the Annual Business Inquiry (ABI) for 2001 and the Business Register and Employment Survey (BRES) for 2011, compares with the baseline figures for those years provided in the three forecasts. It sets out the percentage difference between the forecasts and the published statistics and shows that each of the forecasts has higher baseline figures than the ABI and BRES figures.

Table 2.11: Number of jobs in each area (000s)								
	2001				**2011**			
	ABI	**Exp**	**OE**	**CE**	**BRES**	**Exp**	**OE**	**CE**
Bromsgrove	35.6	+8.1%	+15.3%	+10.1%	34.1	+9.4%	+12.2%	+9.7%
Redditch	41.8	+10.4%	+12.8%	+14.1%	36.3	+14.7%	+7.5%	+8.0%
Wyre Forest	33.8	+13.4%	+15.3%	+9.9%	32.7	+8.6%	+13.3%	+14.9%
North Worcestershire	111.1	+10.6%	+14.4%	+11.5%	103.1	+11.0%	+10.9%	+10.8%

2.4.3.2 Table 2.12 shows growth figures for the period 2001 to 2011. In terms of historic jobs growth, the main growth sectors included real estate activities; arts, entertainment and recreation; and professional, scientific and technical activities.

Table 2.12: Historic jobs growth figures, 2001 to 2011				
Experian	**2001**	**2011**	**Change**	**% change**
Bromsgrove	38.4	37.3	-1.1	-3.0%
Redditch	46.1	41.7	-4.4	-9.6%
Wyre Forest	38.3	35.5	-2.8	-7.2%
North Worcestershire total	122.8	114.5	-8.4	-6.8%
Main growth sectors				
Real estate activities	1.1	1.6	0.5	43.2%
Arts, entertainment and recreation	2.1	2.8	0.7	30.5%
Education	8.3	10.2	1.9	23.0%
Oxford Economics	**2001**	**2011**	**Change**	**% change**
Bromsgrove	41.0	38.2	-2.8	-6.8%
Redditch	47.1	39.1	-8.0	-17.1%
Wyre Forest	39.0	37.1	-1.9	-4.9%
North Worcestershire total	127.1	114.4	-12.7	-10.0%
Main growth sectors				
Arts, entertainment and recreation	2.3	3.1	0.8	36.3%
Real estate activities	1.3	1.7	0.4	29.8%
Professional, scientific and technical activities	5.0	6.4	1.5	29.3%
Cambridge Econometrics	**2001**	**2011**	**Change**	**% change**
Bromsgrove	39.2	37.4	-1.8	-4.5%
Redditch	47.6	39.3	-8.4	-17.6%
Wyre Forest	37.1	37.6	0.5	1.3%
North Worcestershire total	123.9	114.2	-9.7	-7.8%
Main growth sectors				
Professional, scientific and technical activities	4.5	7.3	2.8	60.8%
Real estate activities	1.1	1.5	0.4	40.4%
Construction	6.3	7.7	1.4	21.7%

2.4.4 Local forecasts 2012 - 2030

2.4.4.1 The change in the number of jobs forecast each year between 2012 and 2030 is used to drive the POPGROUP model to produce jobs-led scenarios and the related sensitivity Scenarios 2 and 3 produced by Edge.

2.4.4.2 As noted above, in terms of the 2012 to 2030 forecasts, the level and rate of employment change varies significantly, with Cambridge Econometrics forecasting much stronger employment growth than both Experian and Oxford Economics in North Worcestershire as a whole. In addition, there are some sectoral variations in the forecasts. However, varying results are not unexpected given the different forecasting models and methodologies.

2.4.4.3 Table 2.13 summarises the forecast jobs for 2012 and 2030 by each forecaster by District and aggregated for North Worcestershire.

Table 2.13: Forecast jobs growth (000's)

Experian	**2012**	**2030**	**Change**	**% change**
Bromsgrove	37.8	41.7	3.9	10.3%
Redditch	42.5	43.5	1.0	2.5%
Wyre Forest	36.2	37.5	1.2	3.4%
North Worcestershire total	116.5	122.7	6.2	5.3%
Oxford Economics	**2012**	**2030**	**Change**	**% change**
Bromsgrove	40.7	46.0	5.3	13.0%
Redditch	40.0	41.2	1.2	2.9%
Wyre Forest	38.1	38.8	0.7	1.9%
North Worcestershire total	118.8	126.0	7.2	6.1%
Cambridge Econometrics	**2012**	**2030**	**Change**	**% change**
Bromsgrove	38.6	42.4	3.9	10.0%
Redditch	41.3	44.6	3.3	7.9%
Wyre Forest	39.8	41.3	1.6	3.9%
North Worcestershire total	119.6	128.3	8.7	7.3%

2.4.4.4 At a district level, Cambridge Econometrics has the highest growth rate for Redditch and Wyre Forest, while Oxford Economics has the highest growth rate for Bromsgrove.

2.4.5 Employment forecast conclusions

2.4.5.1 Each forecast is considered to be:

- up-to-date because they were the latest available at the local level when the analysis was undertaken in November 2013; and
- realistic and representative because:
  - despite the variations between the three forecasts, each is based on an established and recognised economic forecasting model;
  - at the national level, all three forecasts are credible; and
  - while the Cambridge Econometrics' forecast for the 2012-2030 period (CAGR 0.39%) represents higher employment growth than that forecast by Experian (CAGR 0.29%) and Oxford (CAGR 0.33%), the variation is relatively limited and the pattern of change over the period is broadly similar to the other two forecasts (as evidenced by the CAGR 18-year period comparison in Table 2.9).

2.4.4.6 **Consequently, at the North Worcestershire and district level, all three projections are considered to provide up-to-date, representative and realistic forecast scenarios for planning purposes.**

3 Demographic, household and housing need forecasts

3.1 Introduction

3.1.1 This section reports on the further demographic, household and housing analysis that has been undertaken to support the objective assessment of future housing need in the North Worcestershire area and its three component districts for the period to 2030.

3.1.2 It is based on work that was undertaken by Edge Analytics in March 2014. This work has extended the geographical scope of earlier work undertaken for the South Worcestershire local authorities to inform the South Worcestershire Development Plan (SWDP) and has incorporated the observations of the Inspector at the SWDP examination.

3.1.3 The Edge report, together with a separate sensitivity note, which contain a full description of the methodologies used and the underpinning assumptions.

3.2 The methodology

3.2.1 Housing requirements are intrinsically linked to the size and structure of the population. Projections of future population and households (as set out in the Edge report, attached at Appendix A) were produced using four broad approaches, namely:

- Use of the 2010-based official ONS projections to produce a SNPP-2010 core scenario. These are used primarily to serve as a benchmark for the other scenarios. Age-specific migration rates for internal and international migration are drawn from the ONS 2010-based assumptions.
- A 'Natural Change' scenario in which no in- or out- migration to/from the area is assumed to occur from 2012
- New trend-based demographic 'core' scenarios based on the latest evidence regarding existing population composition and preceding trends. Two 'migration-led' scenario alternatives have been developed, based upon the latest demographic evidence:
  - Migration-led 5 year: Age-specific rates for internal and international migration assumptions for 2012 to 2030 are based on the last five years of historical evidence (2007/08 to 2011/12); and
  - Migration-led 10 year: internal and international migration assumptions for 2012 to 2030 are based on the last 10 years of historical evidence (2002/03 to 2011/12).

  A further analysis has been produced (Sensitivity Scenario 4) whereby the internal in-migration flows for both Bromsgrove and Redditch have been altered (migration flows to Wyre Forest have remained unchanged). It is based on the 'Migration-led 10yr' core scenario and was developed to examine the impact of an increased inflow of internal (UK) migrants - principally 'overspill' from Birmingham - upon the annual dwelling requirement.

In each year of the forecast period (2012–2030), the net internal migration flow from the 'Migration-led 10yr' core scenario has been increased by 20%.

- Employment-led 'core' scenarios using the new economic forecasts for each district produced by Cambridge Econometrics, Oxford Economics and Experian. The demographic implications of each scenario have been examined. Prior to 2012 these scenarios are constrained to the level of population growth according to the ONS Mid-Year Population Estimates to 2012. From 2012 to 2030 they are constrained by the growth in employment forecast for the period by each of the three economic forecasts. While the economic forecasts vary (particularly at a district level), each is considered to be up-to-date and realistic and representative. Accordingly a further calculation has been produced using the mean of the three forecasts.

3.2.2 Three key parameters determine the balance of migration that is required to match the size of the labour force and the anticipated jobs growth[3]:

- economic activity rates;
- unemployment rate; and
- commuting ratio.

3.2.3 The 'core' scenarios produced by Edge have assumed that economic activity rates, unemployment rates and commuting ratio are constant over the forecasting period. In reality they will change and as a consequence so will the relationship between jobs growth and population growth (and therefore housing demand).

3.2.4 Accordingly, two further set of projections were produced using modified assumptions regarding activity and unemployment rates in order to provide more realistic forecasts. These involve:

- variation of the unemployment rate post-recovery and of the economic activity rate in older people (Sensitivity Scenario 2); and
- a more sophisticated modelling of the variation in unemployment rates, in economic activity rates in older people and in economic activity rates across age-bands to reflect tightening labour markets, based on labour market research (Sensitivity Scenario 3). The Experian forecasts were used for this purpose as they were the only ones made available to us that included labour market data. Experian balance the labour market within their model using the Sub National Population Projections 2010 (SNPP 2010) and thereby produce estimates of unemployment. This provided an index that was used to inform a further modelling of the employment-led scenarios. However, Experian also allows commuting and activity rates to vary within its model. In the case of Sensitivity Scenario 3, commuting is held constant and therefore the other variables (unemployment, economic activity rates and migration) are allowed to adjust. These adjustments are based on either the Experian forecasts or actual labour market evidence in the case of unemployment and activity rates.

[3] Further details are set out in the Edge report at Appendix A.

3.2.5 The household and dwelling implications of each population forecast scenario have then been estimated through the application of a communal population adjustment (based on 2011 Census data), household headship rates and a dwelling vacancy rate.

3.2.6 Household headship rates were taken from the CLG 2008-based and 2011-based household projections. For the 'core' scenarios presented here, the CLG 2011-based headship rates were applied for the period to 2021, reverting to the 2008-based rate of change in headship rates thereafter. Additional sensitivity analysis (Sensitivity Scenario 1) was also conducted applying the original 2008-based and 2011-based headship rate assumptions over the full period.

3.2.7 The subsequent conversion of households to dwellings was based on a 'vacancy rate', taking account of both vacant properties and second homes, drawing on latest information from the 2011 Census.

3.2.8 A summary of the various 'core' and 'sensitivity' scenarios is provided in Table 3.1. The Edge Analytics Ltd report (Appendix A) presents further information on the methodology used.

Table 3.1: Summary of forecast scenarios

Scenario Type		Scenario Name
Core Scenarios	'Official' projections	SNPP-2010
	Alternative trend scenarios	Migration-led 5yr Migration-led 10yr Natural Change
	Jobs-led scenarios	Jobs-led (Cambridge Econometrics) Jobs-led (Oxford Economics) Jobs-led (Experian)
Sensitivity Scenarios	Sensitivity Scenario 1 *(Headship Rate Sensitivity)*	All core scenarios
	Sensitivity Scenario 2 *(Employment Sensitivity)*	Jobs-led Cambridge (SENS2) Jobs-led Oxford (SENS2) Jobs-led (SENS2)
	Sensitivity Scenario 3 *(Employment Sensitivity)*	Jobs-led Cambridge (SENS3) Jobs-led Oxford (SENS3) Jobs-led (SENS3)
	Sensitivity Scenario 4 *(Migration Sensitivity)*	Migration-led 10yr (SENS4)

3.3 The forecasts[4]

3.3.1 Core scenarios

3.3.1.1 The trend-based demographic scenarios suggest that the bulk of projected future additional housing demand in North Worcestershire will be driven by migration into the area. The 'Natural Change' scenario, where net migration is set to zero for each year of the forecast period, results in 3.9% population growth for the period 2006 to 2030, driven solely by the excess of births over deaths. The associated growth in households is forecast to be 392 per year. It should be emphasised that a 'Natural Change' scenario is not a realistic forecast of the future and is included only as a simple means to compare the impact of the migration associated with each of the other scenarios relative to a net nil migration position.

3.3.1.2 Under the trend scenarios ('Migration-led 5year', 'Migration-led 10year' and 'SNPP-2010'), population growth over the forecast period (2006–2030) ranges from 6.9% to 11.8%. Using a 10-year period (2002/03 to 2011/12) to derive future migration trends results in higher population growth than when using a 5-year history (2007/08 to 2011/12). Household growth suggested by these three trend scenarios is 563 – 842 households per year.

3.3.1.3 The three jobs-led forecasts result in much higher population growth (20.2% – 22.6%) compared to the demographic 'trend' scenarios, with a correspondingly higher dwelling growth anticipated (1,146 – 1,235 dwellings per year). The population growth is driven by the higher annual net migration, required to sustain the labour force in line with the forecast growth in job numbers (assuming no adjustments in activity rates, unemployment and commuting patterns).

3.3.1.4 The headline results of the core analysis for each scenario are presented in Table 3.2.

Table 3.2: North Worcestershire Forecast Summary 2006-2030 (ranked in order of population change)

Core scenario	Change 2006 - 2030				Average per year	
	Population change	Population change %	Households change	Households change %	Net Migration	Household Growth
Jobs-led Cambridge	61,150	22.6%	29,636	26.5%	2,120	1,235
Jobs-led Oxford	57,972	21.4%	28,247	25.2%	1,996	1,177
Jobs-led Experian	55,654	20.2%	27,503	24.6%	1,915	1,146
Jobs-led Average	*58,259*	*21.4%*	*28,462*	*25.4%*	*2,011*	*1,186*
SNPP-2010	32,683	11.8%	20,197	18.1%	1,159	842
Migration-led 10 year	27,082	9.8%	16,802	15.0%	868	700
Migration-led 5 year	19,011	6.9%	13,518	12.1%	562	563
Natural Change	10,655	3.9%	9,398	8.4%	138[5]	392

Source: Edge Analytics 2014, Experian, 2013, Oxford Economics 2013, Cambridge Econometrics 2013

[4] As noted earlier, the tables in the Edge report attached at Appendix A use 2012 as the forecast base year. The tables in this report use 2006 as the base year to facilitate comparison with the 2012 SHMA.

[5] Averaged over the entire period – assumed to be zero post-2011.

3.3.1.5 The overall household growth forecasts for North Worcestershire conceal variations in the three district areas under each scenario (see Table 3.3). These variations largely reflect differences in the principal drivers of future housing needs within the districts.

3.3.1.6 A significant proportion of the requirement for Redditch is accounted for by natural change (i.e. a surplus of births over deaths reflecting the relatively younger age structure of the area's population). Without migration, both Bromsgrove and Wyre Forest would experience only limited increases in population with a correspondingly low requirement to accommodate new households. There is a more even distribution of household growth under the migration-led trend analyses - particularly when using the SNPP-2010 projections.

3.3.1.7 By way of contrast, however, the 'jobs-led' scenarios (the average of which has an additional annual need to accommodate some 340 to 620 additional households between 2006 and 2030 over the migration-led and SNPP forecasts) result in Bromsgrove and Wyre Forest accommodating the bulk of the additional requirement. Comparing the jobs-led average requirement with the natural change scenario shows that of the additional migration-driven household growth, Redditch will account for just over 100 additional households per annum compared with nearly 300 in Wyre Forest and almost 400 in Bromsgrove.

Table 3.3: North Worcestershire districts - household growth

Scenario	Total (average annual) growth in household numbers 2006 - 2030			
	Bromsgrove	Redditch	Wyre Forest	Total
Jobs-led Cambridge	448	385	401	1,235
Jobs-led Oxford	501	313	363	1,177
Jobs-led Experian	451	308	387	1,146
Jobs-led Average	*467*	*335*	*384*	*1,186*
SNPP-2010	292	293	256	842
Migration-led 10 year	266	275	159	700
Migration-led 5 year	205	251	106	563
Natural Change	71	228	92	392

Source: Edge Analytics 2014, Experian, 2013, Oxford Economics 2013, Cambridge Econometrics 2013
NB Totals subject to rounding

3.4 Sensitivity scenarios

3.4.1 Introduction

3.4.1.1 Sensitivity tests provide the means to assess assumptions that have been made and to explore potential areas of uncertainty. Four sets of sensitivity scenarios have been produced:

- Sensitivity Scenario 1

  The implications of using different household formation rates from the 2011- and 2008-based CLG models are examined.

- Sensitivity Scenarios 2 and 3

  The implications of varying economic activity rates in the older age groups and altering unemployment rates on the jobs-led scenarios are examined.

- Sensitivity Scenario 4

  The implications of altering net internal migration in Bromsgrove and Redditch are examined.

3.4.2 Sensitivity Scenario 1

3.4.2.1 The core scenarios presented in Section 4 have used the 'Option C' combination of headship rates to translate population forecasts into household projections. This 'core' option applies CLG 2011-based headship rates up to 2021, reverting to the 2008-based rate of change in headship rates thereafter. Table 3.4 presents the range of dwelling growth outcomes that would result if alternative headship rate trajectories were applied to each of the population growth scenarios:

- Option A: CLG 2011-based headship rates, with the 2011-21 trend continued after 2021.
- Option B: CLG 2008-based headship rates, scaled to be consistent with the 2011 Census household total, but following the original trend thereafter.

Using the 2011-based household projection assumptions (Option A) results in a lower dwelling requirement than the 2008-based alternative (Option B). For example, in the SNPP-2010 scenario, under 'Option A' the annual average dwelling requirement is 826. Under 'Option B', 964 dwellings per year would be required.

3.4.2.2 The scale of variation between Options A and B illustrates the consequences of using the different projections. Exclusive use of the 2011-based assumptions can be criticised for being overly dependent upon a period where household formation rates have been suppressed whereas exclusive use of the 2008-based rates can be criticised as being influenced by rates of household formation associated with an 'over-heated' housing market.

3.4.2.3 Option C is in line with the approach proposed by the Inspector at the SWDP examination and has been used for the other (following) sensitivity scenarios.

Table 3.4: North Worcestershire - household growth (ranked by preferred 'Option C')

Scenario	Average annual growth in household numbers 2006 - 2030		
	Option A	Option B	Core (Option C)
Jobs-led Cambridge	1,220	1,364	1,235
Jobs-led Oxford	1,162	1,305	1,177
Jobs-led Experian	1,131	1,272	1,146
Jobs-led Average	*1,171*	*1,314*	*1,186*
SNPP-2010	826	964	842
Migration-led 10 year	684	810	700
Migration-led 5 year	544	671	563
Natural Change	369	509	392

Source: Edge Analytics 2014, Experian, 2013, Oxford Economics 2013, Cambridge Econometrics 2013

3.4.3 Sensitivity scenarios 2 and 3

3.4.3.1 With regard specifically to the 'jobs-led' scenarios, the results are also sensitive to a number of other assumptions that are required to translate jobs growth into population and household growth. These factors include:

- economic activity rates;
- unemployment rates; and
- commuting ratios.

In the core scenarios these three assumptions have been fixed throughout the 2011 to 2030 period. In reality they will change thus affecting the numbers of projected new jobs that will be filled by the area's pre-existing population – and therefore the need for new in-migration and thus housing demand.

3.4.3.2 The Edge report provides an assessment (Sensitivity Scenario 2) of the 'sensitivity' of the jobs-led 'core' scenario results to changes in the assumptions underpinning two of these key parameters - economic activity rates (which have been modified to take account of planned changes to State Pension Age) and unemployment rates (modified to account for a period of recovery post-2013 based on previous rates).

3.4.3.3 In addition further detailed research and analysis have been undertaken into how the above labour market variables adjust to economic conditions and, in particular, to increasing (and decreasing) supply of jobs. On the basis of this, a further Sensitivity Scenario (3) has been produced which makes three modifications: economic activity rates are adjusted to reflect planned changes to State Pension Age; unemployment is adjusted in line with the Experian Economic forecast; and activity rates by age cohort are increased in response to the tightening labour market, based on econometric analysis of Annual Population Survey data. This latter scenario is considered to provide the most reasonable and robust set of jobs-led forecasts and to better reflect labour market realities.

3.4.3.4 The results are summarised in Table 3.5. They show a reduction in the dwelling requirement of some 12 to 12.5% under both Sensitivity Scenarios.

Table 3.5: North Worcestershire - household growth sensitivity (Scenarios 2 and 3)

Scenario	Total (average annual) growth in household numbers requirement 2006 - 2030		
	Core scenarios	Sensitivity 2 scenario	Sensitivity 3 scenario
Jobs-led Cambridge	1,235	1,107	1,107
Jobs-led Oxford	1,177	1,049	1,052
Jobs-led Experian	1,146	1,018	1,022
Jobs-led Average	*1,186*	*1,058*	*1,060*

Source: Edge Analytics 2014, Experian, 2013, Oxford Economics 2013, Cambridge Econometrics 2013

3.4.4 Sensitivity scenario 4

3.4.4.1 In Sensitivity Scenario 4, the internal in-migration flows for both Bromsgrove and Redditch have been altered (migration flows to Wyre Forest have remained unchanged). This sensitivity scenario is based on the 'Migration-led 10 year' core scenario and was developed to examine the impact of an increased inflow of internal (UK) migrants upon the annual dwelling requirement. This is considered to be a likely outcome of the high levels of economic growth and population change expected within the West Midlands conurbation. In each year of the forecast period (2006–2030), the net internal migration flow from the 'Migration-led 10yr' core scenario has been increased by 20%.

3.4.4.2 Overall, this results in household growth 10.1% higher than under the core scenario. The increase is concentrated in Bromsgrove (16.9% higher) and Redditch (9.5% higher).

Table 3.6 North Worcestershire - household growth summary for Sensitivity Scenario 4

Scenario	Average annual growth in household numbers 2006 - 2030	
	Migration-led 10yr (Core Scenario)	Migration-led 10yr (SENS4)
Bromsgrove	266	311
Redditch	275	301
Wyre Forest	159	159
North Worcestershire	700	771

4 Conclusions and dwelling requirement implications

4.1 This assessment, based on forecasts prepared by Edge Analytics Ltd, has used the latest official population estimates and three new employment forecasts. It has comprised:

- the preparation of population forecasts for the period up to 2030;
- translation of these forecasts, taking into account headship rates, into forecasts of the numbers of households; and
- interpretation of the household forecasts into projections for future dwelling requirements – taking into account vacancies, second homes and developments already undertaken during the forecasting period.

4.2 A number of core scenarios have been explored including:

- an ONS Sub-National forecast 'benchmark';
- a 'Natural Change' scenario – with zero migration;
- trend-based migration-led scenarios – assuming a continuation of recent migration patterns; and
- 'employment-constrained' scenarios based on projections of the levels of population (and therefore migration if these projections exceed forecast natural change) that will be required to sustain forecast jobs in the area.

4.4 The extent to which future jobs growth will require population growth will be influenced by future economic activity, unemployment rates and commuting rates. The employment-constrained scenarios assume that all of these factors will be constant over the forecasting period. In reality they will change and as a consequence so will the relationship between jobs growth and population growth (and therefore housing demand).

4.5 Two further sets of 'sensitivity scenario' projections were produced using modified assumptions regarding economic activity and unemployment rates in order to provide more realistic forecasts. The second of these projections (Sensitivity Scenario 3) uses new labour market research to derive assumptions about the degree to which overall labour market conditions (i.e. tightening or loosening) will impact upon future activity and employment rates and, therefore, the supply of local labour.

4.6 A further demographic sensitivity scenario (Sensitivity Scenario 4) was also produced which assumes an increased level of in-migration as a result of growth in the rest of the conurbation. This would impact in particular on Bromsgrove and Redditch.

4.7 Sensitivity Scenarios 3 and 4 are considered to provide the most realistic reflection of likely labour market and demographic realities. Table 4.1 translates these, and, for 'benchmark' purposes, the SNPP forecasts (which are used by Experian in its economic forecasts), into draft hypothetical net dwelling requirement figures.

4.8 The relationship between households and dwellings is modelled using a 'vacancy rate' which is applied as an uplift to the household forecasts. The uplift rates have been derived by Edge

Analytics from analysis of Council Tax statistics. There is an average rate of 3.0% for North Worcestershire as a whole but this varies across the districts as below:

- Bromsgrove 2.8%
- Redditch 2.3%
- Wyre Forest 3.6%

4.9 To ensure that there is no under-supply of housing prior to the plan period (2011-2030) a base date of 2006 has been used and completions for period 2006-2011 have been factored in. This results in a forecast net new dwelling requirement for North Worcestershire for the period 2011 – 2030 of between 15,910 and 23,080 - equivalent to between 840 and 1,210 per annum.

Table 4.1: Net Dwelling Requirements 2011 – 2030

Scenario	Forecast Household-Change (2006-2030) (a)	Forecast Dwelling Requirement – factoring in vacancy and second home rates (2006-2030) (b)	Housing Delivered Net 2006 – 2011 (5 years) (c)	Dwelling requirements 2011 - 2030 (19 years)	
				Net Dwelling requirement (Rounded) (d) = (b) – (c)	Net Annual Average Dwelling Requirement (Rounded) (d) / 19
Bromsgrove					
Sensitivity Scenario 3 (average case)	10,292	10,580	823	9,760	510
Sensitivity Scenario 4	7,458	7,667	823	6,840	360
SNPP-2010	7,018	7,215	823	6,390	340
Redditch					
Sensitivity Scenario 3 (average case)	7,252	7,419	1,101	6,320	330
Sensitivity Scenario 4	7,228	7,394	1,101	6,290	330
SNPP-2010	7,027	7,189	1,101	6,090	320
Wyre Forest					
Sensitivity Scenario 3 (average case)	7,897	8,181	1,176	7,000	370
Sensitivity Scenario 4	3,815	3,952	1,176	2,780	150
SNPP-2010	6,153	6,375	1,176	5,200	270
Total North Worcestershire					
Sensitivity Scenario 3 (average case)	25,441	26,180	3,100	23,080	1210
Sensitivity Scenario 4	18,501	19,013	3,100	15,910	840
SNPP-2010	20,198	20,778	3,100	17,680	930

NB Totals subject to rounding

Appendix A: Edge Analytics

North Worcestershire

Demographic Forecasts

March 2014

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Acknowledgements

Demographic statistics used in this report have been derived from data from the Office for National Statistics licensed under the Open Government Licence v.1.0.

The authors of this report do not accept liability for any costs or consequential loss involved following the use of the data and analysis referred to here, which is entirely the responsibility of the users of the information presented in this report.

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1. Introduction

Context

1.1 In 2013, the South Worcestershire Councils (Malvern Hills District Council, Worcester City Council and Wychavon District Council) published their draft South Worcestershire Development Plan (SWDP). The overall housing provision requirement target set out in Policy SWDP 3 reflected the recommendation set out in the evidence in the Worcestershire Strategic Housing Market Assessment (SHMA) February 2012, based on Sensitivity Scenario 2.

1.2 Following the submission and Stage 1 hearings of the SWDP examination, the Inspector concluded in his Interim Conclusions (28 October 2013) that the February 2012 SHMA did not provide "a sound basis for the planning of housing provision in the Plan area". The Inspector requested that further analysis was undertaken to support the derivation of an objective assessment of the housing need.

1.3 In direct response to the Inspector's comments and request for further analysis, the South Worcestershire Councils commissioned additional work to support the derivation of an objective assessment of the housing need. The geographical scope of these additional requirements has been extended to include the three North Worcestershire districts.

Requirements

1.4 In line with the South Worcestershire requirements, the North Worcestershire Councils have requested new trend-based demographic scenarios for each of the three North Worcestershire districts, aggregated for North Worcestershire. It was specified that these new scenarios should be based on the latest demographic evidence to provide a reliable, up-to-date basis for identifying housing requirements in North Worcestershire.

1.5 The analysis presented here also includes up-to-date employment forecasts for each North Worcestershire district, examining the demographic implications of the anticipated jobs growth. Forecasts of employment (workplace based jobs) together with supporting information and explanation have been provided by three organisations: Cambridge Econometrics, Oxford Economics and Experian.

Approach & Methodology

1.6 Housing requirements are intrinsically linked to the size and structure of the population and, in turn, population growth can be constrained by housing availability. Any consideration of future housing development requires robust demographic information and analysis of the possible impact of demographic change on the demand and supply of housing, jobs, services, infrastructure and facilities.

1.7 The National Planning Policy Framework (NPPF) and the emerging National Planning Practice Guidance (NPPG) provide guidance on the development of a robust evidence base to support the objective assessment of housing need. The guidance makes it clear that data inputs, assumptions and methodology should be robust and should consider future growth potential from a number of perspectives.

1.8 A suite of demographic forecasts has been developed for the North Worcestershire districts. Trend-based forecasts have been developed using the latest demographic evidence and are benchmarked against the most recent official population projections from the Office for National Statistics (ONS).

1.9 Using economic forecasts from Cambridge Econometrics, Oxford Economics and Experian, employment-led scenarios have also been developed to test the demographic implications of jobs-growth trajectories.

1.10 Additional analysis has also been conducted to evaluate the sensitivity of the forecasts to:

1. household headship rate variations;
2. economic activity rate and unemployment variations;
3. internal migration assumptions.

1.11 To ensure transparency of the analysis presented here, all data inputs and assumptions are detailed in the Appendix and the output presented in a consistent format that allows comparison between scenarios.

Forecasting Methodology

1.12 Evidence is often challenged on the basis of the 'appropriateness' of the methodology that has been employed to develop growth forecasts. The use of a recognised forecasting product which

incorporates an industry-standard methodology (a cohort component model) removes this obstacle and enables a focus on assumptions and output, rather than methods.

1.13 Demographic forecasts have been developed for the North Worcestershire districts using the POPGROUP suite of products. POPGROUP is a family of demographic models that enables forecasts to be derived for population, households and the labour force, for areas and social groups. The main POPGROUP model (Figure 1) is a cohort component model, which enables the development of population forecasts based on births, deaths and migration inputs and assumptions.

1.14 The Derived Forecast (DF) model (Figure 2) sits alongside the population model, providing a headship rate model for household projections and an economic activity rate model for labour-force projections.

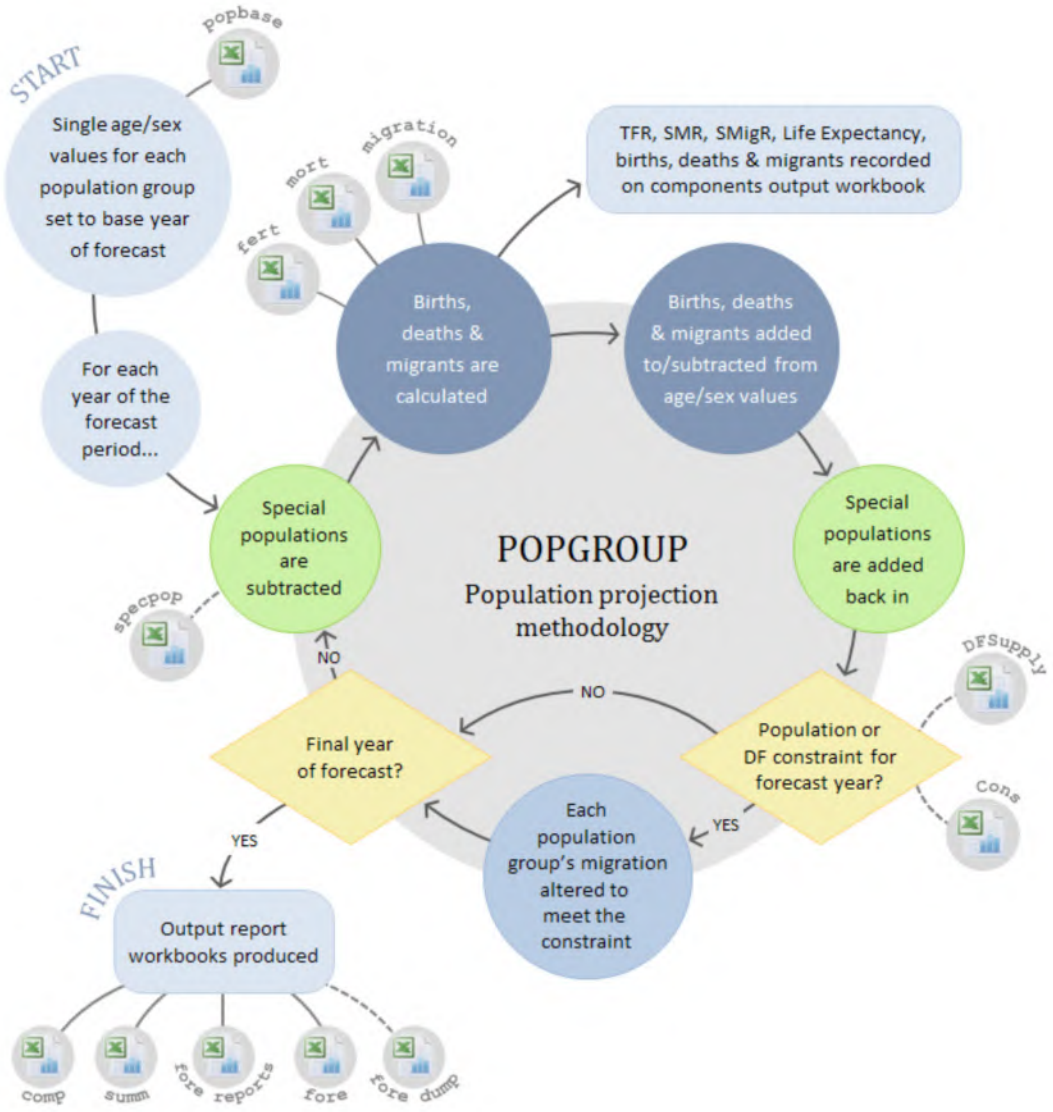
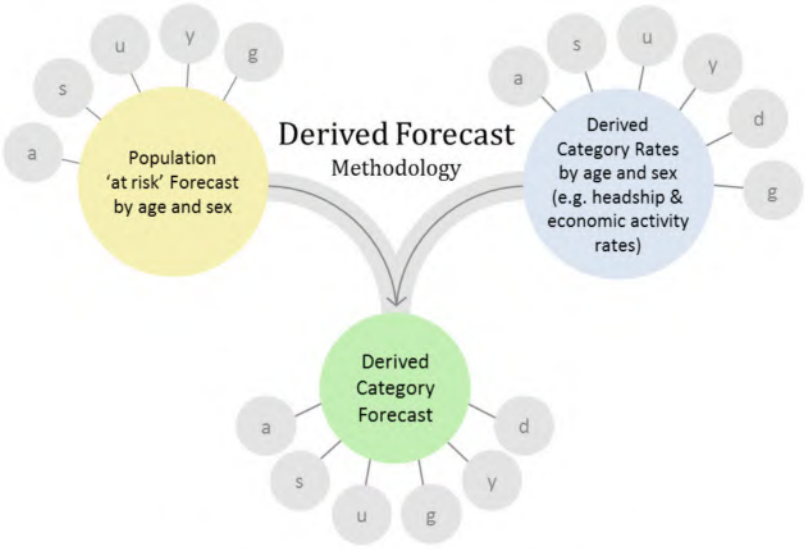


Figure 1: POPGROUP population projection methodology



$$D_{a,s,u,y,d,g} = \frac{P_{a,s,u,y,g} \quad R_{a,s,u,y,d,g}}{100}$$

D Derived Category Forecast
P Population 'at risk' Forecast
R Derived Category Rates
a Age-group
s Sex
u Sub-population
y Year
d Derived category
g Group (usually an area, but can be an ethnic group or social group)

Figure 2: Derived Forecast (DF) methodology

Report Structure

1.15 Section 2 provides a short commentary on demographic change in North Worcestershire since 2001 and presents new demographic evidence available from the Office for National Statistics (ONS) and the Department for Communities and Local Government (CLG).

1.16 Section 3 describes the suite of scenario alternatives, developed to evaluate trend and employment growth trajectories.

1.17 Section 4 summarises the outcomes of each of these scenarios, presenting growth in terms of population, households, dwellings, labour force and jobs impacts. In Section 5, the results of the sensitivity analysis are presented.

1.18 The Appendix (Section 6) to this document contains guidance on the data inputs and assumptions used in the development of the scenarios.

2. The Latest Demographic Evidence

Headlines 2001–2011

2.1 The development of Local Plans is made considerably more challenging by the dynamic nature of key data inputs. Economic and demographic factors, coupled with the continuous release of new statistics, often undermine the robustness of underpinning evidence. This has been a particular issue during 2013, with the release of 2011 Census statistics, revisions to historical population estimates and updated household projections.

Headlines 2001–2011

2.2 The 2011 Census recorded a resident population of 275,826 within North Worcestershire, a 4.5% increase over the 2001–2011 decade (Table 1).

Table 1: North Worcestershire, population change 2001–2011. Source: ONS

District	2001 Pop	2011 Pop	Change	%
Bromsgrove	87,879	93,637	5,758	6.6%
Wyre Forest	97,218	97,975	757	0.8%
Redditch	78,817	84,214	5,397	6.8%
North Worcestershire	263,914	275,826	11,912	4.5%

2.3 Population growth has been most substantial in Bromsgrove and Redditch, with a 6.6% and 6.8% increase respectively since 2011. This has been balanced by very low population growth in Wyre Forest, which saw only 0.8% population growth over the decade.

2.4 Within each North Worcestershire district, population change has been driven by a mixture of natural change (the difference between births and deaths) and net migration (the overall balance of growth resulting from in-migration, out-migration, immigration and emigration). The balance differs substantially between districts (Figure 3).

2.5 With an excess of deaths over births, natural change has had a negative impact upon growth in Bromsgrove since 2001. This has been counter-balanced by a substantial, larger net in-migration component, resulting in population growth.

2.6 In contrast, Redditch's growth has been driven largely by positive natural change with a relatively

small net in-migration component.

2.7 Wyre Forest's population change has been almost exclusively due to net in-migration and a small, positive natural change impact.

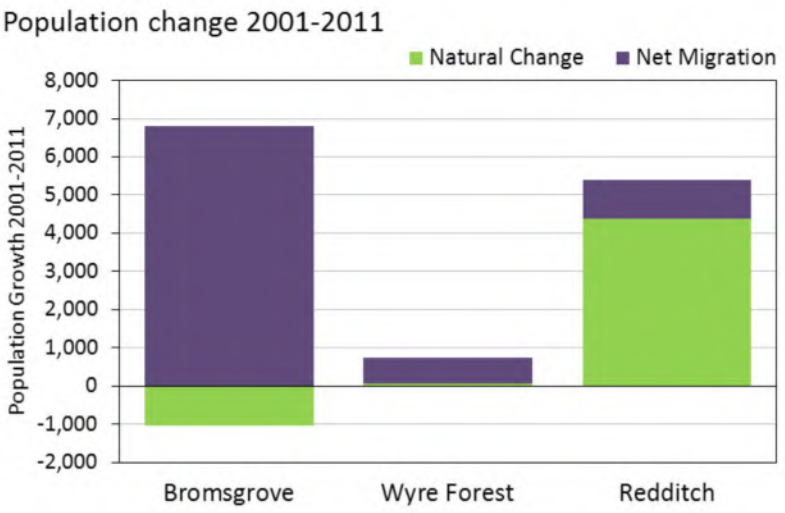


Figure 3: North Worcestershire, components of population change 2001–2011. Source: ONS

Population Estimates

2.8 The 2011 Census has provided a timely and definitive update on local population statistics. However, it has also resulted in the 'recalibration' of previous mid-year population estimates. This has important implications for both the interpretation of historical evidence on demographic change in local authority areas and on the derivation of projections of future growth based upon this evidence.

2.9 For the North Worcestershire districts, the 2011 Census has suggested that previous mid-year populations (interim mid-year estimates) under-estimated the scale of growth in Redditch but over-estimated growth in Wyre Forest (Figure 4). In Bromsgrove, the scale of growth was slightly over-estimated in the first half of the decade.

2.10 Given that births and deaths are robustly recorded through vital statistics registers, the 'error' in the mid-year population totals is due to the difficulty associated with the estimation of migration. Internal migration is adequately measured through the process of GP registration although data robustness may be lower where there is non-registration or delay in registering. It is most likely that the 'error' in the mid-year population totals is due to the difficulty associated with the estimation of international migration impacts (i.e. immigration and emigration) at a local level.

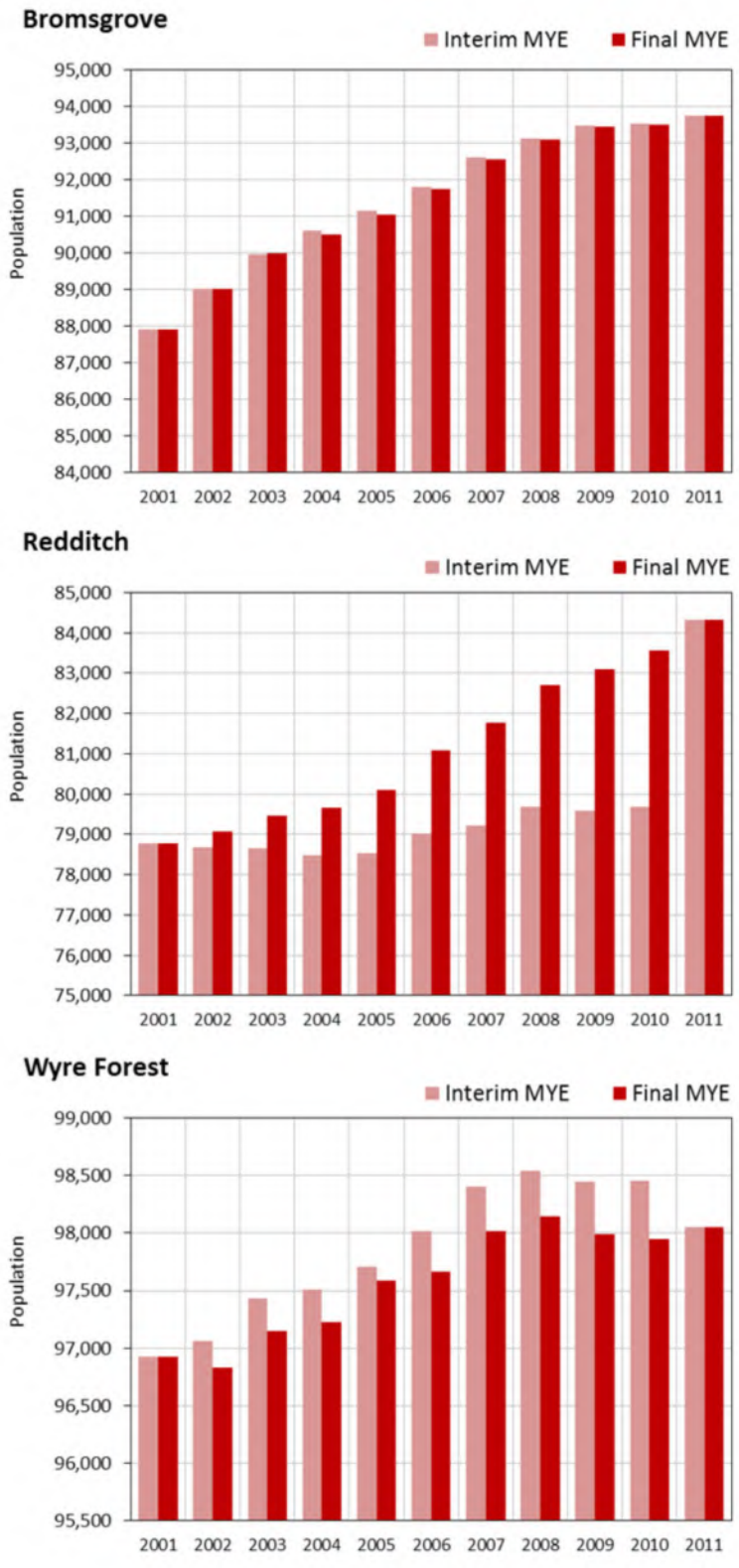


Figure 4: North Worcestershire, population counts 2001–2011. Source: ONS

Components of Change

2.11 On the assumption that births, deaths and internal migration have been robustly measured (and that the 2001 Census provided a robust population count for North Worcestershire districts), the 'adjustment' that resulted from the mid-year population estimate revisions is predominantly associated with the mis-estimation of international migration; the balance between immigration and emigration flows to and from North Worcestershire.

2.12 The result of the mid-year population estimate recalibration for North Worcestershire districts is that birth and death totals (and therefore natural change) remain largely unchanged. Small changes to internal migration may be evident but not substantial. With regard to international migration, ONS has not explicitly assigned the mid-year estimate adjustment to international migration. Instead it has identified an additional 'other unattributable' component, suggesting it has not been able to accurately identify the source of the 2001–2011 over-count (Figure 5).

2.13 For demographic analysis, the classification of this 'other unattributable' is unhelpful, but given the robustness of births, deaths and internal migration statistics compared to international migration estimates, it is assumed that it is most likely to be associated with the latter.

2.14 For the individual districts of North Worcestershire, the effect of the 'other unattributable' adjustment has varied depending upon the scale of population 'recalibration' that has been required following the 2011 Census results (Figure 5). No change has been made to the 2011/12 statistics as these relate to the 2012 mid-year estimate which followed the 2011 Census results.

2.15 In Bromsgrove, a small downward adjustment is evident in most years of the 2001/02–2011/12 decade. A larger downward adjustment is associated with the Wyre Forest mid-year population estimates. In contrast, the population estimates for Redditch have been subject to a consistent annual uplift due to the undercount experienced over the 2001–2011 decade.

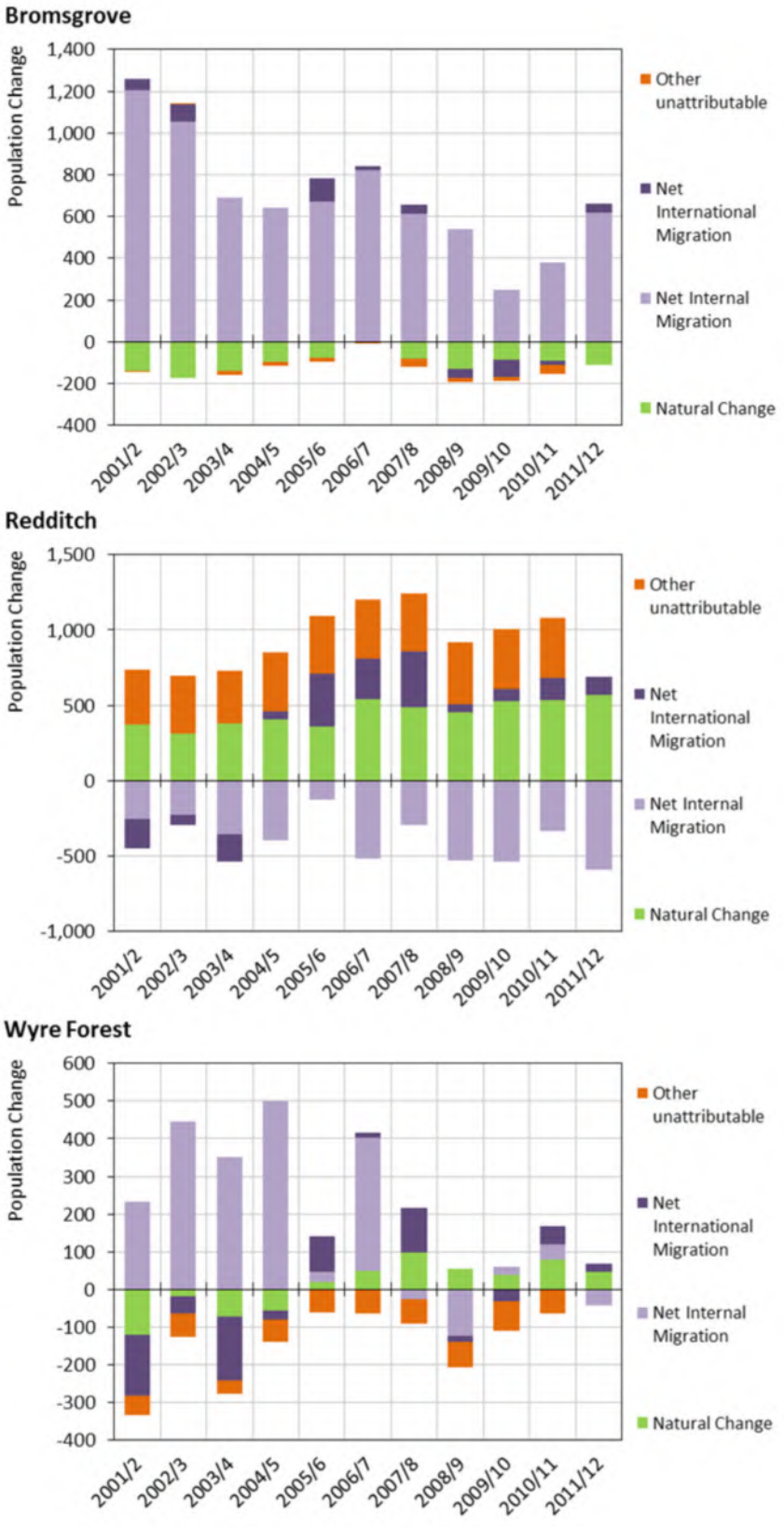


Figure 5: North Worcestershire, components of population change 2001/02–2011/12. Source: ONS

2.16 With an assumption that the 'other unattributable' element is assigned to international migration (for estimates to 2011) and with the inclusion of statistics from the 2012 mid-year estimate from ONS, an eleven-year profile of the 'components of change' for North Worcestershire districts is presented (Figure 6).

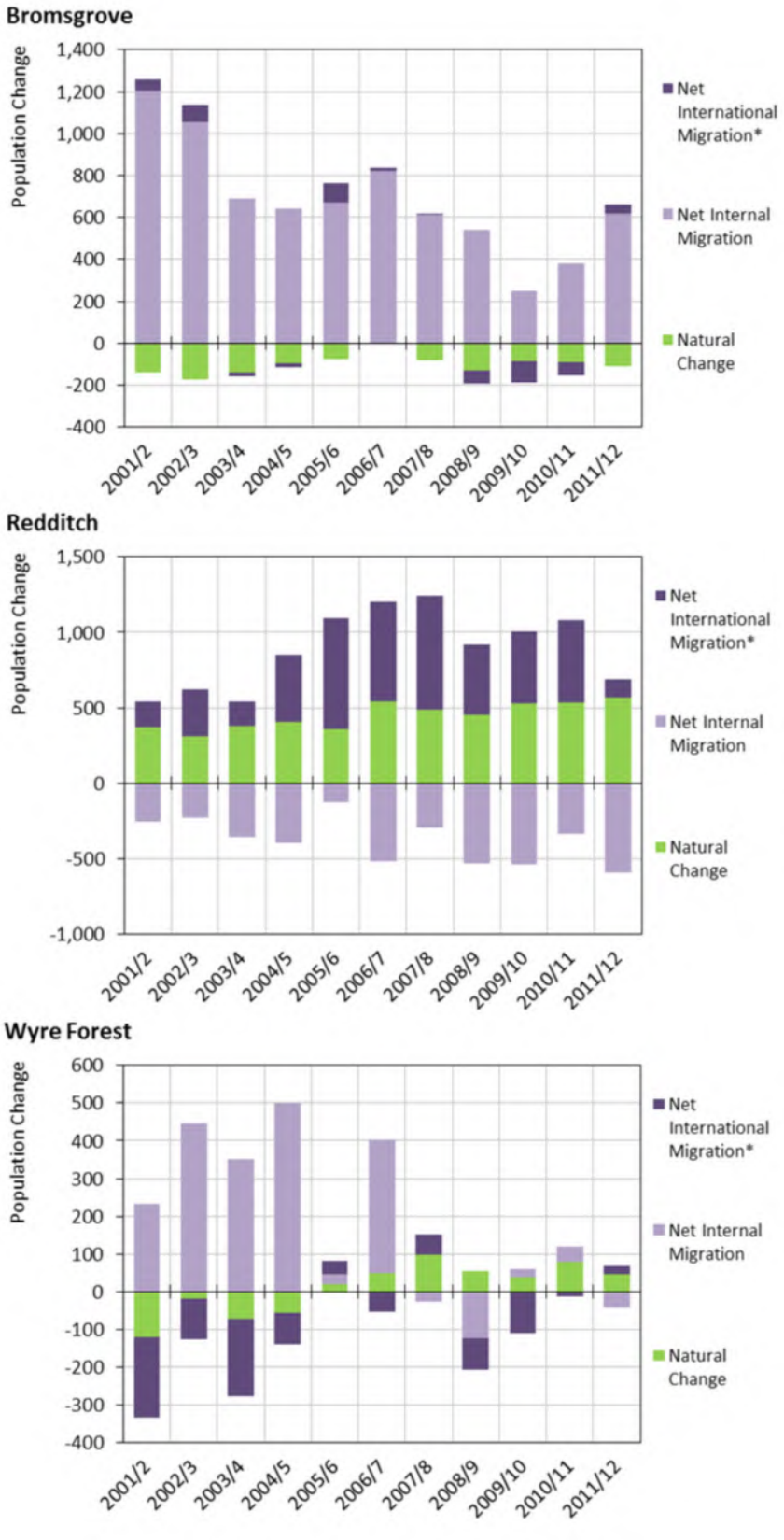
2.17 These components of change illustrations provide an annualised perspective on the profiles presented in Figure 3, with the additional disaggregation of migration into 'net internal' and 'net international' migration components.

2.18 Bromsgrove has experienced a consistent population decline due to natural change, balanced by a high level of net internal migration and a very small impact due to international migration. The impact of net internal migration has decreased over the decade.

2.19 Redditch has experienced a positive contribution from both natural change and net international migration. The impact of net internal migration has been negative in all years of the time-series.

2.20 In Wyre Forest, net internal migration has had a positive impact upon growth in the early part of the decade and a smaller impact in the latter years. Net international migration and natural change have varied between positive and negative contributions to annual population change.

2.21 The profile and trend in these components of change are important in the derivation of trend forecasts, with historical evidence used to derive future assumptions on migration. Scenarios presented in this analysis use both a 5-year (2007/08 to 2011/12) and a 10-year history (2002/03 to 2011/12) to set migration assumptions in the trend forecasts.



*Includes the 'other unattributable' component

Figure 6: North Worcestershire, components of population change 2001/02–2011/12. Source: ONS

Household Projections

2.22 During the 2001–2011 decade the household projection methodology has been subject to substantial review, with a new approach adopted between the 2006-based and 2008-based outputs. In April 2013, CLG released its 2011-based household projections for local authorities in England, replacing the 2008-based projections.

2.23 The 2011-based projections provide an update on likely household growth trajectories (albeit to 2021 only), taking into account the unprecedented economic conditions that have affected local communities since 2008 and the substantial impact of population growth (particularly international migration) upon average household size.

2.24 **The general trend of the 2011-based projections suggests a reduction in the anticipated rate of household growth from 2011 to 2021, compared to the 2008-based projections.**

2.25 Identifying the 'most likely' speed and scale of future household formation presents a challenge to planners.

2.26 In providing its evidence on demographic change, Edge Analytics has typically used 'headship rate' assumptions from both the 2008-based and 2011-based household models. Household headship rates define the likelihood of a particular household type being formed in a particular year, given the age-sex profile of the population in that year. Household-types are modelled within a 17-fold classification (see Appendix, Table 16).

2.27 The use of assumptions from both the 2008-based and 2011-based models is in recognition of the uncertainty associated with future rates of household growth, given economic and demographic conditions. This approach presents a 'range' of household growth outcomes for each population forecast.

2.28 Alternative approaches to estimating household growth have sought to forecast a likely 'recovery' in household formation rates (reverting from 2011-based to 2008-based assumptions). In South Worcestershire, following the SWDP Stage 1 hearings, the Inspector requested that the household growth outcomes of the newly-developed demographic scenarios were assessed using the 2011-based headship rate assumptions to 2021 but, thereafter, applying rates of change in household formation that are consistent with the previous 2008-based household model (the 'index' approach).

2.29 For consistency with the South Worcestershire scenario forecasts, three alternative headship rate assumptions have been applied to the North Worcestershire scenarios in this report:

- Option A: CLG 2011-based headship rates, with the 2011-21 trend continued after 2021.
- Option B: CLG 2008-based headship rates, scaled to be consistent with the 2011 Census household total, but following the original trend thereafter.
- Option C: CLG 2011-based headship rates applied to 2021, reverting to the 2008-based rate of change in headship rates thereafter.

2.30 The Option C alternative is used in the main presentation of the forecast outcomes (i.e. the 'core' scenarios). The Option A and Option B alternatives are used to present the range of dwelling growth outcomes associated with 2011-based and 2008-based household formation rate assumptions as part of a sensitivity analysis (Sensitivity Scenario 1).

3. Scenario Development

Introduction

3.1 There is no single, definitive view on the likely level of growth expected in North Worcestershire; a mix of economic, demographic and national/local policy issues ultimately determines the speed and scale of change. For local planning purposes, it is necessary to evaluate a range of growth alternatives to establish the most 'appropriate' basis for determining future housing provision.

3.2 A range of scenario alternatives has been developed for the North Worcestershire Councils. These include:

- The 2010-based and 2011-based official projections from the ONS;
- Updated 'migration-led' trend forecasts based on the latest demographic evidence;
- Jobs-led scenarios based on employment forecasts from Cambridge Econometrics, Oxford Economics and Experian.

3.3 Scenarios have been produced for each of the three North Worcestershire districts and for North Worcestershire in aggregate. The forecasts have been produced with a base year of 2012 and a forecast horizon of 2030. Historical population data are included from 2001 to 2012[6].

3.4 Seven 'core' scenarios and four sensitivity scenario alternatives have been developed. Information on the assumptions underpinning each of the scenarios can be found in the Appendix to this document.

3.5 Analysis of the core scenarios is presented in Section 4 of this report and the sensitivity scenarios in Section 5. In the following sections, an overview of the scenario alternatives is provided.

[6] Note that in the detailed scenario output (supplied separately to the North Worcestershire Councils), the historical population totals and the components of change (migration, births and deaths) are sourced directly from the ONS revised mid-year estimates. Historical data on households/dwellings and labour force/jobs are derived from the population totals (using the derived forecast assumptions outlined in this document, see page 20).

Core Scenarios

Official Projections

3.6 In the development and analysis of population forecasts, it is important to 'benchmark' any growth alternatives against the latest 'official' population projection.

3.7 The most recent official projection is the ONS 'interim' 2011-based population projection (SNPP-2011), released following the publication of the 2011 Census. Despite being the most recent official projection, it is considered inappropriate as a growth benchmark as the normally robust rules on the calculation of long-term migration, fertility and mortality assumptions were not followed. Instead, ONS applied the assumptions from the previous official forecast, the 2010-based sub-national population projection (SNPP-2010), to a 2011 Census base population. This is unsuitable for two key reasons.

1. The revisions to the historical mid-year populations and the subsequent change in the historical impact of migration have not been taken into account.
2. The 2011 Census population has a different age structure to the previous 2010-based population.

3.8 Both of these issues mean that the 2011-based projection is not sufficiently robust to underpin any analysis of long-term housing requirements. Therefore, the SNPP-2010 is used here to benchmark against the other scenario alternatives. The scenario is rescaled to the 2011 Census population total, thereby enabling comparison with the other scenario alternatives. From 2011, the SNPP-2010 growth trend is continued. This scenario uses historical evidence from the period 2006–2010 and incorporates the long-term assumptions on fertility, mortality and international migration that were defined in the SNPP-2010.

3.9 The SNPP-2011 scenario is included for comparison on the output charts; for the reasons outlined above (and as this projection does not extend beyond 2021) it is not included within the analysis of demographic change from 2012 to 2030.

Alternative Trend Scenarios

3.10 In determining the migration assumptions for a new '2012-based' trend projection, historical data on the components of demographic change during the 2001–2012 time-period are a key consideration.

3.11 A five year historical period is a typical time-frame from which migration 'trend' assumptions are derived (this is consistent with the ONS official methodology). However, given the unprecedented economic change that has occurred since 2008, it is important to give due consideration to an extended historical time period for assumption derivation.

3.12 Three 'migration-led' scenario alternatives have been developed, based upon the latest demographic evidence:

- **Migration-led 5yr:** Internal and international migration assumptions are based on the last five years of historical evidence (2007/08 to 2011/12).
- **Migration-led 10yr:** internal and international migration assumptions are based on the last 10 years of historical evidence (2002/03 to 2011/12).
- **Natural Change:** in-migration, out-migration, immigration and emigration are set to zero.

Jobs-led Scenarios

3.13 In a 'jobs-led' scenario, population growth is determined by the number of jobs available within an area. POPGROUP evaluates the impact of a particular jobs growth trajectory by measuring the relationship between the number of jobs in an area, the size of the labour force and the size of the resident population.

3.14 Migration is used to balance the relationship between the size of the population's labour force and the forecast number of jobs. A higher level of net in-migration will occur if there is insufficient population and resident labour force to meet the forecast number of jobs. A higher level of net out-migration will occur if the population is too high relative to the forecast number of jobs.

3.15 The following jobs-led scenarios have been developed:

- **Jobs-led (Cambridge Econometrics)**
  Population growth is constrained by an annual net change in jobs numbers as defined in the 'Cambridge Econometrics' employment forecast for the North Worcestershire districts.

- **Jobs-led (Oxford Economics)**

  Population growth is constrained by an annual net change in jobs numbers as defined in the 'Oxford Economics' employment forecast for the North Worcestershire districts.

- **Jobs-led (Experian)**

  Population growth is constrained by an annual net change in jobs numbers as defined in the 'Experian' employment forecast for the North Worcestershire districts.

3.16 The jobs growth figures used in each of these scenarios for the forecast period (2012 to 2030) are shown in Figure 7[7]. These graphs show the annual change in the number of jobs as specified in the employment forecasts from Cambridge Econometrics, Oxford Economics and Experian. Further detail on the employment forecasts can be found in the AMION Consulting report, above.

3.17 Three key data items are required to run jobs-led scenarios. Economic activity rates provide the basis for calculating the size of the labour force within the population. A commuting ratio and an unemployment rate control the balance between the size of the labour force and the number of jobs within an area. In the core scenarios, these assumptions are fixed throughout the forecast period (2012-2030). Further detail on these items is provided in the Appendix.

[7] Jobs constraints have not been applied before 2012. Prior to 2012, the mid-year population estimates constrain the POPGROUP model outcomes.

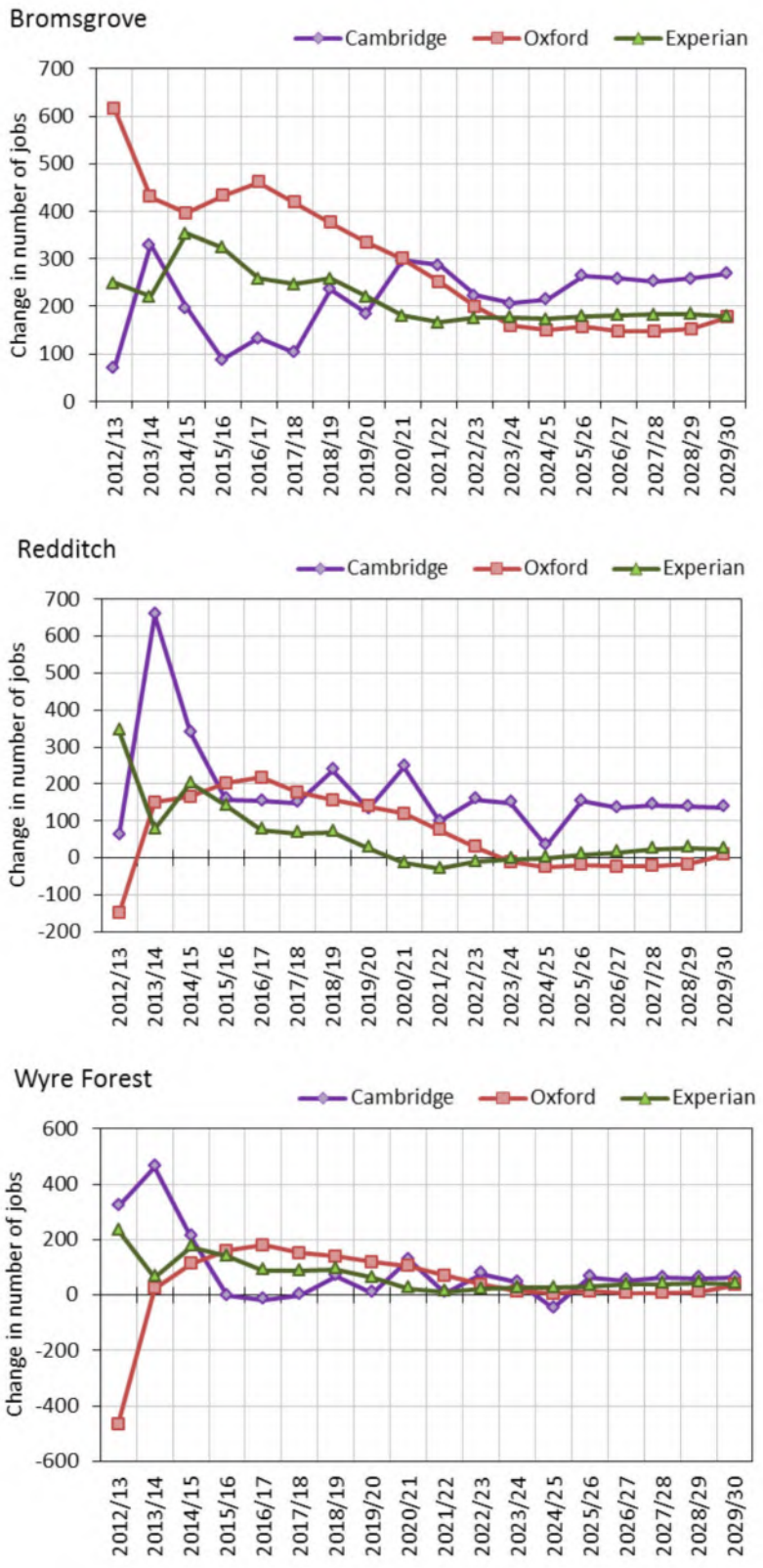


Figure 7: Jobs growth trajectories used in the POPGROUP model for each of the three North Worcestershire districts. Data source: Cambridge Econometrics, Oxford Economics, Experian.

Derived Forecast Implications: Households and Dwellings

3.18 In all of the scenarios presented in this report (core and sensitivity), the household and dwelling implications of each population growth trajectory were evaluated through the application of a communal population adjustment, household headship rates and a dwelling vacancy rate.

3.19 Communal population statistics have been derived from 2011 Census data.

3.20 Household headship rates are taken from the CLG's 2008-based and 2011-based household projections. In the 'core' scenarios, the 'Option C' combination of headship rates has been applied, in which the CLG 2011-based headship rates are applied to 2021. From 2021, the 2008-based rate of change in headship rates was reverted to.

3.21 The conversion of households to dwellings is based on a 'vacancy rate', taking account of both vacant properties and second homes in measuring the relationship between households and dwellings.

3.22 The Appendix to this document presents further information on the household model assumptions and the vacancy rates used.

Derived Forecast Implications: Labour Force and Jobs

3.23 In all scenarios (apart from the jobs-led scenarios) the labour force and jobs implications of each scenario are evaluated through the application of a commuting ratio, an unemployment rate and economic activity rates to the population projection.

3.24 In the 'jobs-led' scenarios, the commuting ratio, an unemployment rate and economic activity rates are used to determine population growth from a specified number of jobs (see page 16).

3.25 In all the 'core' scenarios, the commuting ratio, an unemployment rate and the economic activity rate are fixed throughout the forecast period (2012–2030).

3.26 The Appendix to this document presents further information on the underlying employment assumptions used.

Sensitivity Scenarios

Sensitivity Scenario 1: Headship Rate Sensitivity

3.27 In all of the 'core' scenarios, the 'Option C' headship rates are used (see page 13). Additional sensitivity analysis has been conducted using the original 2008-based and 2011-based headship rate assumptions, as follows:

- 'Option A': CLG 2011-based headship rates, with the 2011–2021 trend continued after 2021.
- 'Option B': CLG 2008-based headship rates, scaled to be consistent with the 2011 Census household total, but following the original trend thereafter.

3.28 Each of the seven 'core' scenarios has been produced using the Option A and the Option B rates, for comparison with the Option C ('index') approach. Further information on these scenarios and the results can be found in the 'Sensitivity Scenario 1' section on page 27.

Sensitivity Scenarios 2 and 3: Employment Sensitivity

3.29 Two employment-sensitivity scenario alternatives ('Sensitivity Scenario 2' and 'Sensitivity Scenario 3') have been produced to evaluate the sensitivity of the jobs-led scenarios to changes in the unemployment rate and the economic activity rates.

3.30 The Appendix to this document details the assumptions underlying these sensitivity scenarios.

3.31 Further information on these scenarios and the results can be found in the 'Sensitivity Scenarios 2 and 3' section on page 30.

Sensitivity Scenario 4: Migration Sensitivity

3.32 To test the possibility of a higher net inflow of 'internal' migrants to North Worcestershire, an additional sensitivity scenario has been developed for both Bromsgrove and Redditch.

3.33 This sensitivity has examined the long-term impact of an internal net migration flow to Bromsgrove and Redditch that is 20% higher than that defined in the 'Migration-led 10yr' scenario.

3.34 No changes have been applied to migration flows to/from Wyre Forest.

Scenario Summary

3.35 Seven 'core' scenarios have been produced and four sensitivity scenario alternatives.

Table 2: Scenario definition summary

Scenario Type		Scenario Name
Core Scenarios	'Official' projections	SNPP-2010 (SNPP-2011 included on charts for comparison)
	Alternative trend scenarios	Migration-led 5yr Migration-led 10yr Natural Change
	Jobs-led scenarios	Jobs-led (Cambridge Econometrics) Jobs-led (Oxford Economics) Jobs-led (Experian)
Sensitivity Scenarios	Sensitivity Scenario 1 *(Headship Rate Sensitivity)*	All core scenarios
	Sensitivity Scenario 2 *(Employment Sensitivity)*	Jobs-led Cambridge (SENS2) Jobs-led Oxford (SENS2) Jobs-led (SENS2)
	Sensitivity Scenario 3 *(Employment Sensitivity)*	Jobs-led Cambridge (SENS3) Jobs-led Oxford (SENS3) Jobs-led (SENS3)
	Sensitivity Scenario 4 *(Migration Sensitivity)*	Migration-led 10yr (SENS4)

4. Scenario Forecasts

Core Scenario Summaries

4.1 A summary of the results for each core scenario is provided in the form of a chart and an accompanying table of statistics. The chart illustrates the trajectory of population change resulting from each scenario. The table summarises the change in population and household numbers from 2012–2030 that results from each scenario.

4.2 The scenarios are 'ranked' (high to low) according to the expected average annual dwelling growth throughout the projection period, based on the assumptions used in each scenario. The table also shows the estimated level of population change throughout the projection period, the average annual net migration associated with the population change and the expected average annual jobs growth.

Scenario Commentary

4.3 Comments are provided here on the North Worcestershire aggregate picture, with additional scenario illustrations provided for the three individual districts.

4.4 Under the trend scenarios ('Migration-led 5yr', 'Migration-led 10yr' and 'SNPP-2010'), population growth over the forecast period (2012–2030) ranges from 4.6 to 9.3% (Table 3). Using a 10-year period (2002/03 to 2011/12) to derive future migration trends results in higher population growth than when using a 5-year history (2007/08 to 2011/12). Dwelling growth suggested by these three trend scenarios is 505–832 dwellings per year.

4.5 The 'Natural Change' scenario, where net migration is set to zero for each year of the forecast period, results in 1.6% population growth, driven solely by the excess of births over deaths. The dwelling growth expectation is 270 per year.

4.6 The three jobs-led forecasts result in much higher population growth (17.8–19.8%) compared to the demographic 'trend' scenarios, with a correspondingly high dwelling growth anticipated (1,308–1,429 dwellings per year). The population growth is driven by higher annual net migration, required to sustain the labour force in line with the forecast growth in job numbers.

North Worcestershire

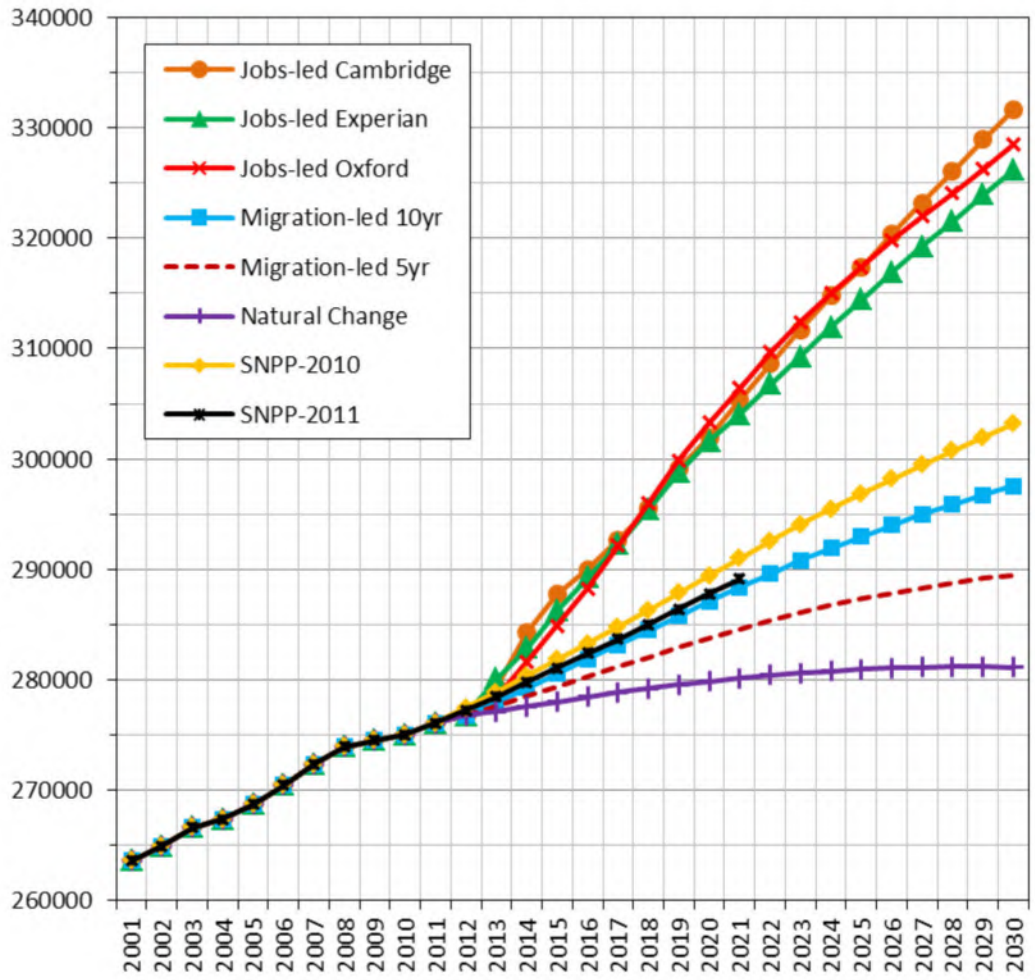


Figure 8: North Worcestershire scenario forecasts population growth 2012-2030

Table 3: North Worcestershire forecast summary 2012-2030 (ranked in order of population change)

Scenario	Change 2012 - 2030				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Jobs
Jobs-led Cambridge	54,849	19.8%	24,974	21.4%	2,642	1,429	484
Jobs-led Oxford	51,671	18.7%	23,584	20.2%	2,477	1,350	400
Jobs-led Experian	49,353	17.8%	22,841	19.6%	2,369	1,308	344
SNPP-2010	25,705	9.3%	14,540	12.4%	1,319	832	-75
Migration-led 10yr	20,782	7.5%	12,140	10.4%	973	694	-281
Migration-led 5yr	12,710	4.6%	8,856	7.6%	564	505	-487
Natural Change	4,354	1.6%	4,736	4.1%	0	270	-556

Bromsgrove

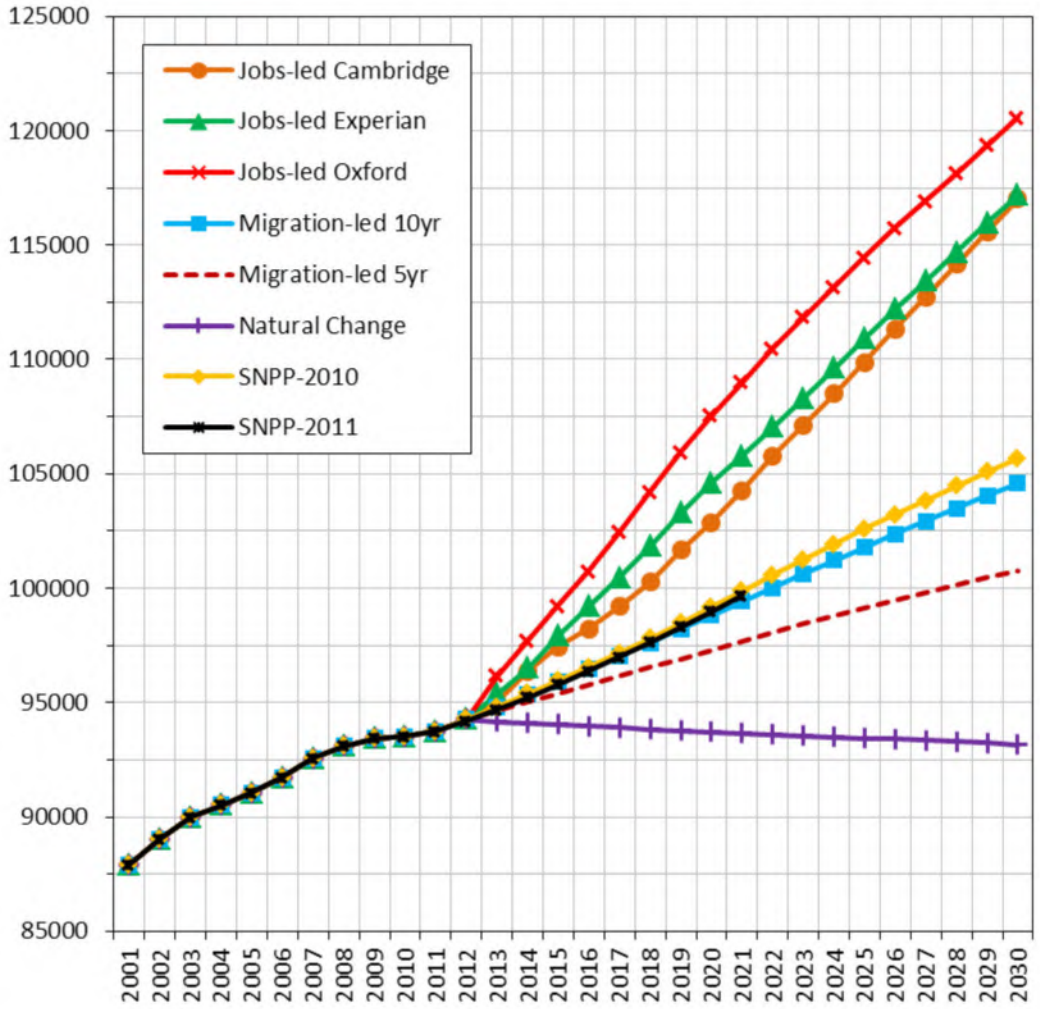


Figure 9: Bromsgrove scenario forecasts population growth 2012-2030

Table 4: Bromsgrove scenario forecast summary 2012-2030 (ranked in order of population change)

Scenario	Change 2012 - 2030				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Jobs
Jobs-led Oxford	26,294	27.9%	10,527	27.3%	1,543	602	294
Jobs-led Experian	22,900	24.3%	9,324	24.2%	1,385	533	217
Jobs-led Cambridge	22,733	24.1%	9,264	24.0%	1,387	530	215
SNPP-2010	11,406	12.1%	5,348	13.8%	857	306	36
Migration-led 10yr	10,302	10.9%	4,893	12.7%	759	280	-67
Migration-led 5yr	6,490	6.9%	3,442	8.9%	564	197	-167
Natural Change	-1,125	-1.2%	215	0.6%	0	12	-243

Redditch

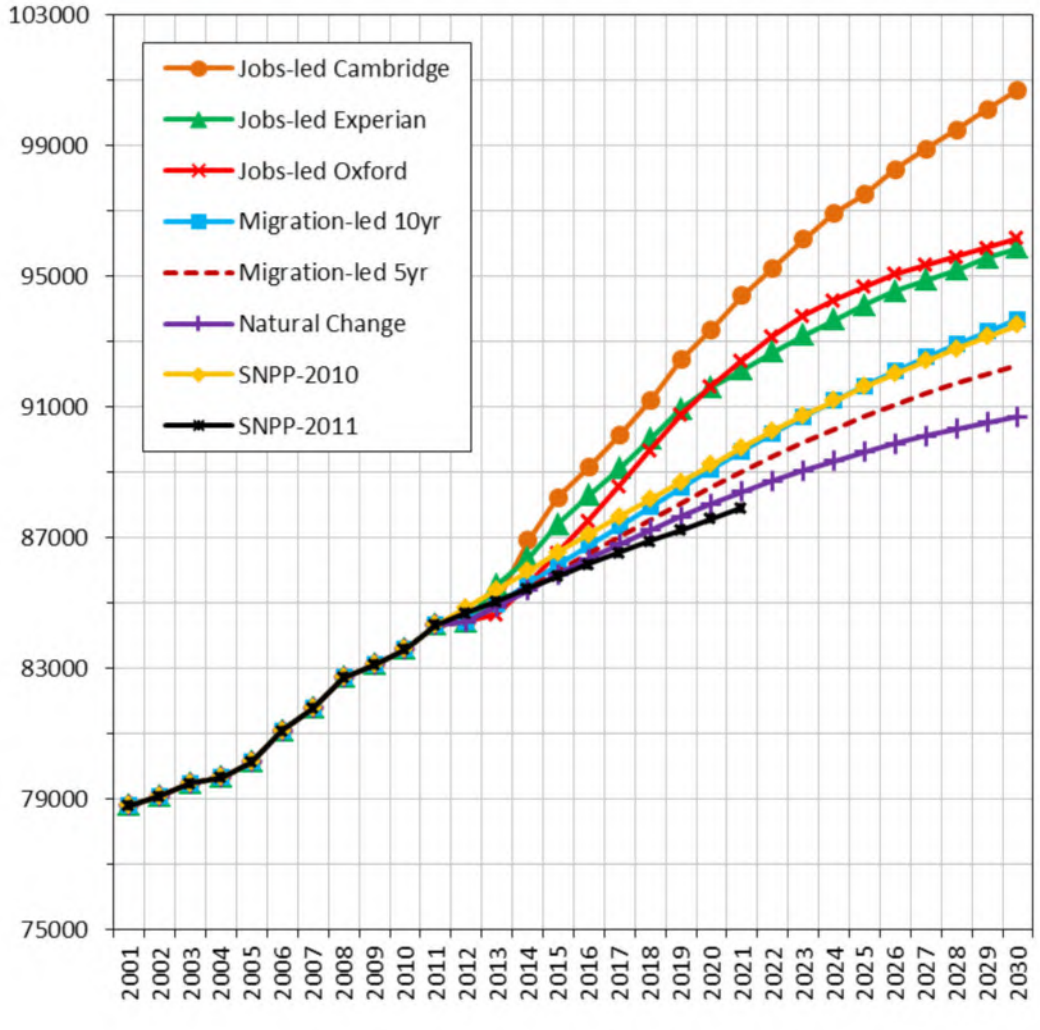


Figure 10: Redditch scenario forecasts population growth 2012-2030

Table 5: Redditch scenario forecast summary 2012-2030 (ranked in order of population change)

Scenario	Change 2012 - 2030				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Jobs
Jobs-led Cambridge	16,259	19.3%	7,468	21.4%	405	425	182
Jobs-led Oxford	11,734	13.9%	5,729	16.4%	188	326	65
Jobs-led Experian	11,425	13.5%	5,616	16.1%	172	319	58
Migration-led 10yr	9,250	11.0%	4,821	13.8%	76	274	19
SNPP-2010	8,638	10.2%	4,695	13.3%	76	267	14
Migration-led 5yr	7,855	9.3%	4,248	12.2%	14	242	-30
Natural Change	6,271	7.4%	3,697	10.6%	0	210	-79

Wyre Forest

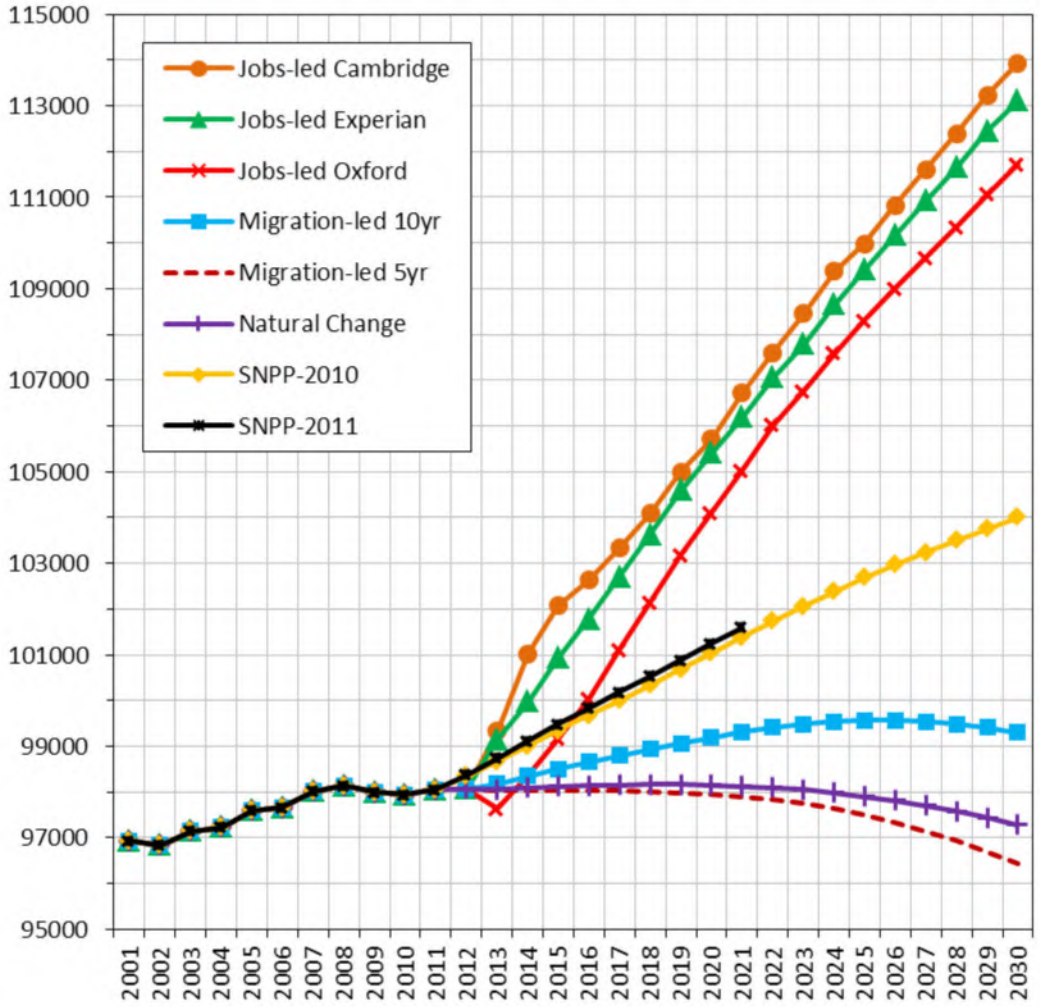


Figure 11: Wyre Forest scenario forecasts population growth 2012-2030

Table 6: Wyre Forest scenario forecast summary 2012-2030 (ranked in order of population change)

Scenario	Change 2012 - 2030				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Jobs
Jobs-led Cambridge	15,857	16.2%	8,241	19.1%	850	475	86
Jobs-led Experian	15,028	15.3%	7,902	18.3%	811	455	69
Jobs-led Oxford	13,643	13.9%	7,328	17.0%	747	422	40
SNPP-2010	5,660	5.8%	4,497	10.4%	385	259	-125
Migration-led 10yr	1,231	1.3%	2,425	5.6%	138	140	-233
Natural Change	-792	-0.8%	824	1.9%	0	48	-233
Migration-led 5yr	-1,634	-1.7%	1,166	2.7%	-14	67	-291

5. Sensitivity Analyses

Sensitivity Scenarios: Introduction

5.1 Sensitivity tests provide the means to objectively assess assumptions that have been made and to explore potential areas of uncertainty. Four sets of sensitivity scenarios have been produced:

- **Sensitivity Scenario 1**
  The implications of using different household formation rates from the 2011- and 2008-based CLG models are examined.
- **Sensitivity Scenarios 2 and 3**
  The implications of varying economic activity rates in the older age groups and altering unemployment rates on the jobs-led scenarios are examined.
- **Sensitivity Scenario 4**
  The implications of altering net internal migration in Bromsgrove and Redditch are examined.

Sensitivity Scenario 1: Headship Rate Sensitivity

5.2 Identifying the 'most likely' speed and scale of future household formation presents a challenge to planners. Edge Analytics has typically used 'headship rate' assumptions from both the 2008-based and 2011-based household models.

5.3 The core scenarios presented in Section 4 have used the 'Option C' combination of headship rates:

- Option C: CLG 2011-based headship rates applied to 2021, reverting to the 2008-based rate of change in headship rates thereafter.

5.4 This sensitivity analysis presents the range of dwelling growth outcomes that would result if the alternative Option A and Option B headship rate trajectories were applied to each of the population growth scenarios:

- Option A: CLG 2011-based headship rates, with the 2011-21 trend continued after 2021.
- Option B: CLG 2008-based headship rates, scaled to be consistent with the 2011 Census household total, but following the original trend thereafter.

5.5 Using both the 'Option A' and 'Option B' headship rates enables an evaluation of the growth outcomes that would results from both the 2008- and 2011-based CLG household projection assumptions. Using the 2011-based household projection assumptions (Option A) results in a lower dwelling requirement than the 2008-based alternative (Option B) (Table 7). For example, in the SNPP-2010 scenario, under 'Option A' the annual average dwelling requirement is 811. Under 'Option B', 1,015 dwellings per year would be required.

5.6 The scale of variation between Options A and B illustrates the consequences of using the different projections. *Exclusive use of the 2011-based assumptions can be criticised for being overly dependent upon a peri*od where household formation rates have been suppressed; whereas exclusive use of the 2008-based rates can be criticised as being influenced by rates of household formation associated with an 'over-heated' housing market.

5.7 The 'index' approach ('Option C') outcomes are generally positioned between the 2011-based (Option A) and 2008-based (Option B) alternatives. Appending the 2008-based headship rate changes to the 2011-based statistics from 2012 onwards results in higher household growth and a corresponding higher annual dwelling requirement than in the 'Option A' outcome, in which the trend in the 2011-based rates is continued after 2021.

Table 7: North Worcestershire dwelling requirements
(ranked in order of 'Option C' dwelling requirement)

Scenario	Average annual dwelling requirement 2012 - 2030		
	Option A	Option B	Option C
Jobs-led Cambridge	1,408	1,620	1,429
Jobs-led Oxford	1,329	1,537	1,350
Jobs-led Experian	1,286	1,493	1,308
SNPP-2010	811	1,015	832
Migration-led 10yr	671	858	694
Migration-led 5yr	480	667	505
Natural Change	238	445	270

5.8 Similar sensitivity outcomes are presented for each of the three North Worcestershire districts (Table 8, Table 9, Table 10).

Table 8: Bromsgrove dwelling growth sensitivity

(ranked in order of 'Option C' dwelling requirement)

Scenario	Average annual dwelling requirement 2012 - 2030		
	Option A	Option B	Option C
Jobs-led Oxford	602	672	602
Jobs-led Experian	532	602	533
Jobs-led Cambridge	528	599	530
SNPP-2010	308	375	306
Migration-led 10yr	278	339	280
Migration-led 5yr	194	255	197
Natural Change	5	83	12

Table 9: Redditch dwelling growth sensitivity

(ranked in order of 'Option C' dwelling requirement)

Scenario	Average annual dwelling requirement 2012 - 2030		
	Option A	Option B	Option C
Jobs-led Cambridge	418	499	425
Jobs-led Oxford	319	396	326
Jobs-led Experian	312	389	319
Migration-led 10yr	266	344	274
SNPP-2010	258	341	267
Migration-led 5yr	233	310	242
Natural Change	200	276	210

Table 10: Wyre Forest dwelling growth sensitivity

(ranked in order of 'Option C' dwelling requirement)

Scenario	Average annual dwelling requirement 2012 - 2030		
	Option A	Option B	Option C
Jobs-led Cambridge	462	521	475
Jobs-led Experian	442	502	455
Jobs-led Oxford	409	468	422
SNPP-2010	245	299	259
Migration-led 10yr	126	175	140
Migration-led 5yr	53	101	67
Natural Change	33	86	48

Sensitivity Scenarios 2 and 3

Aligning Economic and Demographic Forecasts

5.9 Whilst the choice of household headship rate presents an important consideration when selecting assumptions about future demographic change, an equally important consideration is the appropriate alignment of economic forecasts (from Cambridge Econometrics, Oxford Economics and Experian) and demographic forecasts.

5.10 The 'core' scenarios presented above include three 'jobs-led' scenarios which use employment forecasts from each of the three providers to determine likely rates of population, household and dwelling growth. The population growth associated with these 'jobs-led' scenarios is, in all cases, higher than the trend scenarios suggest. This is because the demographic model is seeking to align itself with the underlying assumptions from the respective economic forecasts.

5.11 To achieve this alignment, the demographic model uses migration (either in- or out-migration) to balance the size of the resident labour force to the jobs growth anticipated. If the size of the labour force is too small to accommodate the required jobs growth, in-migration results. If the labour force is too large, out-migration results.

5.12 Three key parameters determine the balance of migration (population change) that is required to match the size of the labour force and the anticipated jobs growth:

- Economic activity rates
- Unemployment rate
- Commuting ratio

5.13 In the 'core' scenarios these three assumptions have been 'fixed' throughout the forecast period (2012–2030). In reality, and in the assumptions that have been applied in the respective economic forecasts from Cambridge Econometrics, Oxford Economics and Experian, these three assumptions change over time and have an important effect upon the relationship between population growth and jobs growth (and therefore upon the derived dwelling requirement).

5.14 To provide an assessment of the 'sensitivity' of the scenarios to changes to these parameters, two sensitivity scenario alternatives have been produced: 'Sensitivity Scenario 2' and 'Sensitivity Scenario 3'. In each of these sensitivities, the three jobs-led scenarios have been reproduced with

modified economic activity rates and unemployment rates. The following sections summarise the changes that have been made in each of these sensitivities.

Modifications made in Sensitivity Scenario 2

5.15 To take account of planned changes to State Pension Age (SPA), the following modifications have been made to the economic activity rates in 'Sensitivity Scenarios 2':

- Women aged 60-64: 40% increase from 2012 to 2020.
- Women aged 65-69: 20% increase from 2012 to 2020.
- Men aged 60-64: 5% increase from 2012 to 2020.
- Men aged 65-69: 10% increase from 2012 to 2020.

5.16 In addition, the unemployment rate has been modified in 'Sensitivity Scenario 2' to account for a period of recovery post-2013. The commuting ratio parameter remains consistent with the 'core' scenario assumptions. Please refer to the Appendix for detail on the modifications to the economic activity rates and the unemployment rate, and for detail on the commuting ratio.

Modifications made in Sensitivity Scenario 3

5.17 In the third sensitivity scenario alternative, the unemployment rate has been reduced over the forecast period (2012–2030). These modifications have been made using an index based on the Experian employment forecast (for information on these changes please refer to the Appendix to this document and the AMION Consulting report above).

5.18 The 2011 Census economic activity rates have been modified in the following way. Firstly, to account for planned changes to the SPA, the same uplift in economic activity rates has been applied as in 'Sensitivity Scenario 2' to the 60–69 age groups (see above, paragraph 5.15 and Appendix for further information). Secondly, additional changes been applied to the economic activity rates of the 25–74 age groups.

5.19 These changes are different for each of the Cambridge, Experian and Oxford forecasts and have been made following recommendations from AMION (for information on these changes please refer to the Appendix to this document and the AMION Consulting report above).

5.20 As in Sensitivity Scenario 2 and the 'core' scenarios, the commuting ratio is kept fixed throughout the forecast period.

Sensitivity Scenarios 2 and 3: Results

5.21 The application of the modified assumptions on economic activity rates and unemployment rates results in changes to dwelling requirement when compared to the 'core' jobs-led scenarios. This is because these jobs-led scenarios are seeking to determine demographic change based upon a definitive trajectory of jobs growth. (Note that changing the economic activity rates and unemployment rates in the trend-based scenarios would have no impact on the resulting dwelling requirement, only on the derived labour force and jobs numbers).

5.22 The dwelling growth outcomes of the jobs-led 'core', the 'Sensitivity 2' and 'Sensitivity 3' scenarios for North Worcestershire are presented below (Table 11 to Table 14). Note that the 'Option C' headship rates are applied to derive the dwelling numbers, as requested by the SWDP Inspector.

Table 11: North Worcestershire – dwelling growth summary for Sensitivity Scenarios 2 and 3

Scenario	Average annual dwelling requirement 2012 - 2030		
	Core Scenario	Sensitivity Scenario 2	Sensitivity Scenario 3
Jobs-led Cambridge	1,429	1,253	1,252
Jobs-led Experian	1,308	1,132	1,137
Jobs-led Oxford	1,350	1,173	1,178

Table 12: Bromsgrove – dwelling growth summary for Sensitivity Scenarios 2 and 3

Scenario	Average annual dwelling requirement 2012 - 2030		
	Core Scenario	Sensitivity Scenario 2	Sensitivity Scenario 3
Jobs-led Cambridge	530	471	479
Jobs-led Experian	533	475	482
Jobs-led Oxford	602	543	549

Table 13: Redditch – dwelling growth summary for Sensitivity Scenarios 2 and 3

Scenario	Average annual dwelling requirement 2012 - 2030		
	Core Scenario	Sensitivity Scenario 2	Sensitivity Scenario 3
Jobs-led Cambridge	425	374	376
Jobs-led Experian	319	270	275
Jobs-led Oxford	326	276	282

Table 14: Wyre Forest – dwelling growth summary for Sensitivity Scenarios 2 and 3

Scenario	Average annual dwelling requirement 2012 - 2030		
	Core Scenario	Sensitivity Scenario 2	Sensitivity Scenario 3
Jobs-led Cambridge	475	407	398
Jobs-led Experian	455	388	380
Jobs-led Oxford	422	355	347

Sensitivity Scenario 4

5.23 In Sensitivity Scenario 4, the internal in-migration flows for both Bromsgrove and Redditch have been altered (migration flows to Wyre Forest have remained unchanged). This sensitivity scenario is based on the 'Migration-led 10yr' core scenario and was developed to examine the impact of an increased inflow of internal (UK) migrants upon the annual dwelling requirement. In each year of the forecast period (2012–2030), the net internal migration flow from the 'Migration-led 10yr' core scenario has been increased by 20%.

5.24 In Bromsgrove, this results in a dwelling requirement 22% higher than that of the 'Migration-led 10yr' core scenario (Table 15). In Redditch, the dwelling requirement increases by 13%, from 274 to 310.

Table 15: North Worcestershire – dwelling growth summary for Sensitivity Scenario 4

District	Average annual dwelling requirement 2012 - 2030	
	Migration-led 10yr (Core Scenario)	Migration-led 10yr (SENS4)
Bromsgrove	280	341
Redditch	274	310
Wyre Forest	140	140
North Worcestershire	**694**	**791**

6. Appendix: Data Inputs and Assumptions

6.1 The POPGROUP model draws data from a number of sources, building an historical picture of population, households, fertility, mortality and migration on which to base its scenario forecasts. Using the historical data evidence for 2001-2012, in conjunction with information from ONS national projections, a series of assumptions have been derived which drive the scenario forecasts.

6.2 In the following sections, a narrative on the data inputs and assumptions underpinning the scenarios is presented.

Population, Births & Deaths

Population

6.3 In each scenario, historical population statistics are provided by the mid-year population estimates for 2001 to 2012, with all data recorded by single-year of age and sex.

6.4 These data include the revised mid-year population estimates for 2002–2010, which were released by the Office for National Statistics (ONS) in May 2013. The revised mid-year population estimates provide consistency in the measurement of the components of change (i.e. births, deaths, internal migration and international migration) between the 2001 and 2011 Censuses.

6.5 For the 'SNPP-2010' and 'SNPP-2011' scenarios, future population counts are provided for each area by single-year of age and sex, to ensure consistency with the trajectory of the official projections.

6.6 The 'SNPP-2010' scenario is scaled to ensure consistency with the 2011 mid-year population estimate total, following its designated growth trend thereafter. This enables the different scenario alternatives to be more easily compared and does not alter the underlying assumptions or growth trajectory.

Births & Fertility

6.7 Historical mid-year to mid-year counts of births by sex from 2001/02 to 2011/12 for each district

have been sourced from ONS Vital Statistics.

6.8 A 'national' age-specific fertility rate (ASFR) schedule, which measures the expected fertility rates by age and sex for England in 2013/14, is included in the POPGROUP model assumptions. This is derived from the ONS 2012-based national population projection and is used in combination with a local (i.e. district-specific) fertility differential to produce age-specific fertility rates for each area.

6.9 Long-term assumptions on changes in age-specific fertility rates are taken from the ONS 2012-based national population projection for England.

6.10 In combination with the 'population-at-risk' these provide the basis for the calculation of births in each year of the forecast period.

Deaths & Mortality

6.11 Historical mid-year to mid-year counts of deaths by age and sex from 2001/02 to 2011/12 for each district have been sourced from ONS Vital Statistics.

6.12 A 'national' age-specific mortality rate (ASMR) schedule, which measures the expected mortality rates by age and sex for England in 2013/14, is included in the POPGROUP model assumptions. This is derived from the ONS 2012-based national population projection and is used in combination with a local (i.e. district-specific) mortality differential to produce age-specific fertility rates for each area.

6.13 Long-term assumptions on changes in age-specific mortality rates are taken from the ONS 2012-based national population projection for England.

6.14 In combination with the 'population-at-risk' these provide the basis for the calculation of deaths in each year of the forecast period.

Migration

Internal Migration

6.15 Historical mid-year to mid-year counts of in- and out-migration by five year age group and sex from 2001/02 to 2011/12 have been sourced from the 'components of change' files that underpin the ONS mid-year population estimates. The original source of these internal migration statistics is the Patient Register Data Service (PRDS), which captures the movement of patients as they register with a GP. This data provides an accurate representation of inter-area flows, albeit with some issues with regard to potential under-registration in certain age groups (young males in particular).

6.16 For future internal migration flows, a schedule of Age-Specific Migration Rates (ASMigR) is used in combination with the 'population-at-risk'.

6.17 In the 'SNPP-2010' and the 'SNPP-2011' scenarios, the ASMigR schedules are drawn directly from the ONS 2010-based assumptions.

6.18 In the migration-led scenarios, the ASMigR schedules are derived from the historical migration data. In the 'Migration-led 5yr' a five-year history is used and in the 'Migration-led 10yr' scenario, a ten-year migration history is used.

6.19 In 'Sensitivity Scenario 4', the 'Migration-led 10yr' scenario output counts have been applied, but with a 20% uplift on the net internal migration counts for Bromsgrove and Redditch.

6.20 For the 'Natural Change' scenario, the ASMigR schedule sets the internal in- and out-migration flows to zero for each year in the forecast period.

6.21 The jobs-led scenarios calculate their own migration assumptions to ensure an appropriate balance between population, households and the labour force, given the 'constraints' on jobs growth that are imposed in each scenario.

International Migration

6.22 Historical mid-year to mid-year counts of total immigration and emigration from 2001/02 to 2011/12 have been sourced from the 'components of change' files that underpin the ONS mid-year population estimates. Any 'adjustments' made to the mid-year population estimates to

account for asylum cases are included in the international migration balance.

6.23 Implied within the international migration component of change is an 'other unattributable' figure, which ONS identified within its latest mid-year estimate revisions. The POPGROUP model has assigned the 'other unattributable' to international migration as it is the component with the greatest uncertainty associated with its estimation.

6.24 For future international migration flows, counts of migrants are defined.

6.25 In the 'SNPP-2010' and the 'SNPP-2011' scenarios, the international in- and out-migration counts are drawn directly from the ONS 2010-based assumptions.

6.26 For the 'Migration-led 5yr' and 'Migration-led 10yr' scenarios, the international in- and out-migration counts are derived from historical data, using a five and ten year history respectively. A schedule of ASMigRs is derived from either a 5-year or 10-year migration history and used to distribute future counts by single year of age.

6.27 In 'Sensitivity Scenario 4', the international migration assumptions are consistent with the 'Migration-led 10yr' core scenario.

6.28 In the 'Natural Change' scenario, the future migration counts set the in- and out-migration flows to zero for each year in the forecast period

6.29 The jobs-led scenarios calculate their own migration assumptions to ensure an appropriate balance between population, households and the labour force, given the 'constraints' on housing or employment growth that are imposed in each scenario.

Household Assumptions

6.30 For each scenario, the household and dwelling implications of the population growth trajectory have been evaluated through the application of headship rate statistics, communal population statistics and a dwelling vacancy rate. These data assumptions have been sourced from the 2001 and 2011 Censuses and the 2008-based and 2011-based household projection models from the CLG.

Household Headship Rates

6.31 A household is defined as:

> *"One person living alone, or a group of people (not necessarily related) living at the same address with common housekeeping - that is, sharing a living room or sitting room or at least one meal a day."* [8]

6.32 Household headship rates define the likelihood of a particular household type being formed in a particular year, given the age-sex profile of the population in that year. Household-types are modelled within a 17-fold classification (Table 16).

Table 16: Household type classification

ONS Code	DF Label	Household Type
OPM	OPMAL	One person households: Male
OPF	OPFEM	One person households: Female
OCZZP	FAMC0	One family and no others: Couple: No dependent children
OC1P	FAMC1	One family and no others: Couple: 1 dependent child
OC2P	FAMC2	One family and no others: Couple: 2 dependent children
OC3P	FAMC3	One family and no others: Couple: 3+ dependent children
OL1P	FAML1	One family and no others: Lone parent: 1 dependent child
OL2P	FAML2	One family and no others: Lone parent: 2 dependent children
OL3P	FAML3	One family and no others: Lone parent: 3+ dependent children
MCZDP	MIX C0	A couple and one or more other adults: No dependent children
MC1P	MIX C1	A couple and one or more other adults: 1 dependent child
MC2P	MIX C2	A couple and one or more other adults: 2 dependent children
MC3P	MIX C3	A couple and one or more other adults: 3+ dependent children
ML1P	MIX L1	A lone parent and one or more other adults: 1 dependent child
ML2P	MIX L2	A lone parent and one or more other adults: 2 dependent children
ML3P	MIX L3	A lone parent and one or more other adults: 3+ dependent children
OTAP	OTHHH	Other households
TOT	TOTHH	Total

6.33 Household headship rates used in the POPGROUP modelling have been taken from the CLG 2008-based and 2011-based household projections. The 2011-based household projections were released for local authority districts in England in April 2013, superseding the 2008-based model. However, as the 2011-based household model is underpinned by the 2011-based SNPP, the headship rate assumptions have only been published for the 2011-2021 period.

[8] CLG. *Household Projections: Notes and Definitions for Data Analysts*. https://www.gov.uk/household-projections-notes-and-definitions-for-data-analysts.

6.34 For the forecasting analysis presented in this report, three alternative headship rate assumptions have been applied:

- Option A: CLG 2011-based headship rates, with the 2011-21 trend continued after 2021.
- Option B: CLG 2008-based headship rates, scaled to be consistent with the 2011 Census, but following the original trend thereafter.
- Option C: CLG 2011-based headship rates applied to 2021, reverting to the 2008-based rate of change in headship rates thereafter.

6.35 The Option C alternative is used in the main presentation of the forecast outcomes. Option A and Option B alternatives are used to present the range of dwelling growth outcomes associated with 2011-based and 2008-based household formation rate assumptions (Sensitivity Scenario 1).

Communal Population

6.36 Household projections in POPGROUP take account of the 'population-not-in-households' (communal population). This data has been drawn directly from the 2011 Census.

Vacancy Rates

6.37 The relationship between households and dwellings is modelled using a 'vacancy rate'. Using Council Tax statistics provided by the South Worcestershire Councils, vacancy rates have been calculated from vacant properties and second homes (excluding holiday lets). These rates are defined as follows (remaining constant throughout the forecast period).

District	2011 Vacancy Rate (%)
Bromsgrove	2.8
Redditch	2.3
Wyre Forest	3.6

Economic Activity Rates

6.38 For each scenario (excluding the jobs-led scenarios), the labour force and jobs implications of the population growth trajectory have been evaluated through the application of three key data items: economic activity rates, a commuting ratio and an unemployment rate. In the jobs-led scenarios, these three data items are used to determine the population growth required by a particular jobs growth trajectory.

6.39 'Economically active' refers to the population that is both employed and unemployed, i.e. the labour force. Economic activity rates determine the level of labour force participation associated with a particular age-sex category.

6.40 The economic activity rates used in all the scenarios are based on the latest statistics from the 2011 Census, published in November 2013. In the 'core' scenarios, the rates are fixed across the forecast period (2012–2030). In Sensitivity Scenario 2, alterations have been made to the economic activity rates.

6.41 This section provides evidence and rationale for the derivation of the economic activity rate statistics used in the scenario analysis.

2011 Census Economic Activity Rates

6.42 Economic activity rates provide the basis for estimating the size of the labour force. Economic activity rates by five year age group (ages 16-74) and sex have been derived from 2011 Census statistics.

6.43 The 2011 Census statistics include an open-ended 65+ age categorisation, so economic activity rates for the 65–69 and 70–74 age groups have been estimated using a combination of Census 2011 tables, disaggregated using evidence from the 2001 Census. The 2011 economic activity rates for the three North Worcestershire districts are shown in Figure 12.

6.44 In the 'core' scenarios, the economic activity rates are fixed across the forecast period at the 2011 level and therefore do not take into account any increase in economic activity that may arise from changes to the State Pension Age (SPA).

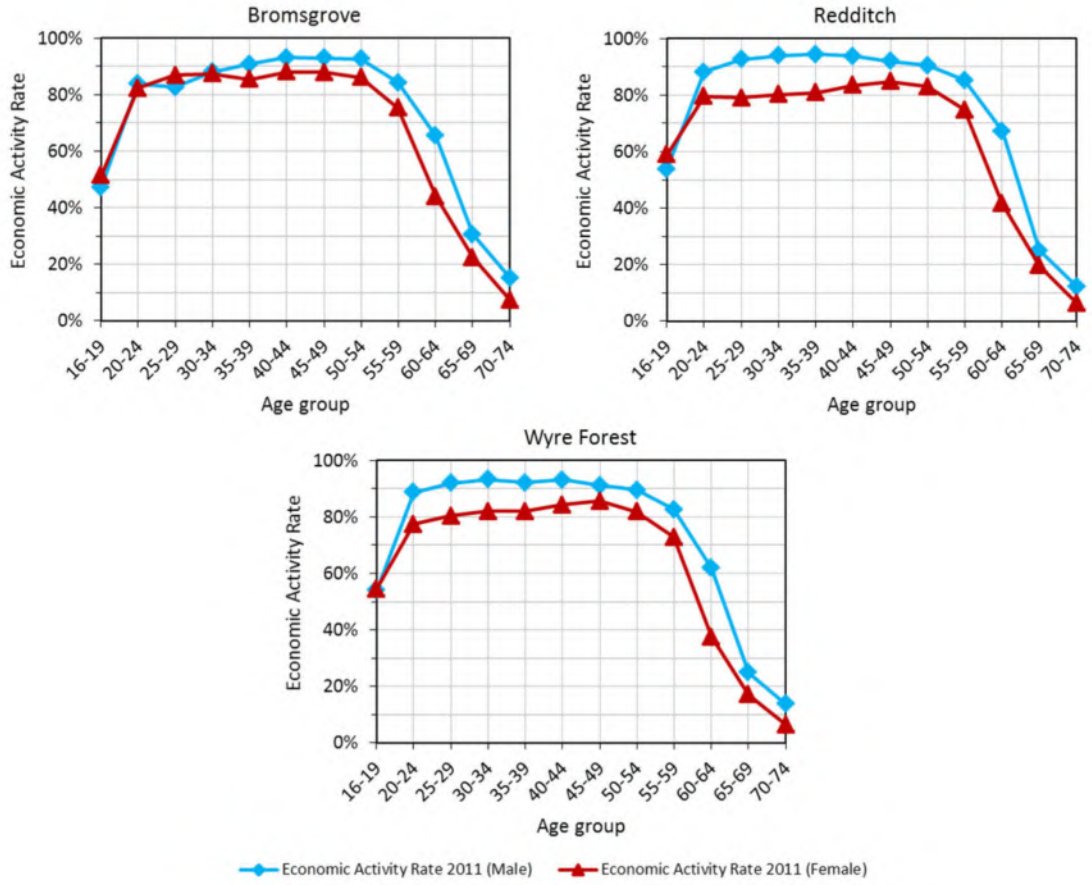


Figure 12: Economic activity rates 2011 – North Worcestershire Districts. Source: ONS

2001–2011 Economic Activity Rate Comparison

6.45 A comparison of the 2001 and 2011 economic activity rates for the three North Worcestershire districts is provided in Figure 13 and Table 18. This comparison indicates that economic activity rates have increased in the older age groups for both males and females in each of the three districts, particularly for females, for whom rates have seen a general increase across all age-groups 20+.

6.46 In Bromsgrove, for example, economic activity rates increased by 113% for females aged 65-69 between 2001 and 2011 (Table 18), compared to a 69% increase in the same age group for men. These trends in labour force participation rates are an important consideration when estimating how rates of economic activity might continue to evolve over the period of the scenario forecasts presented here.

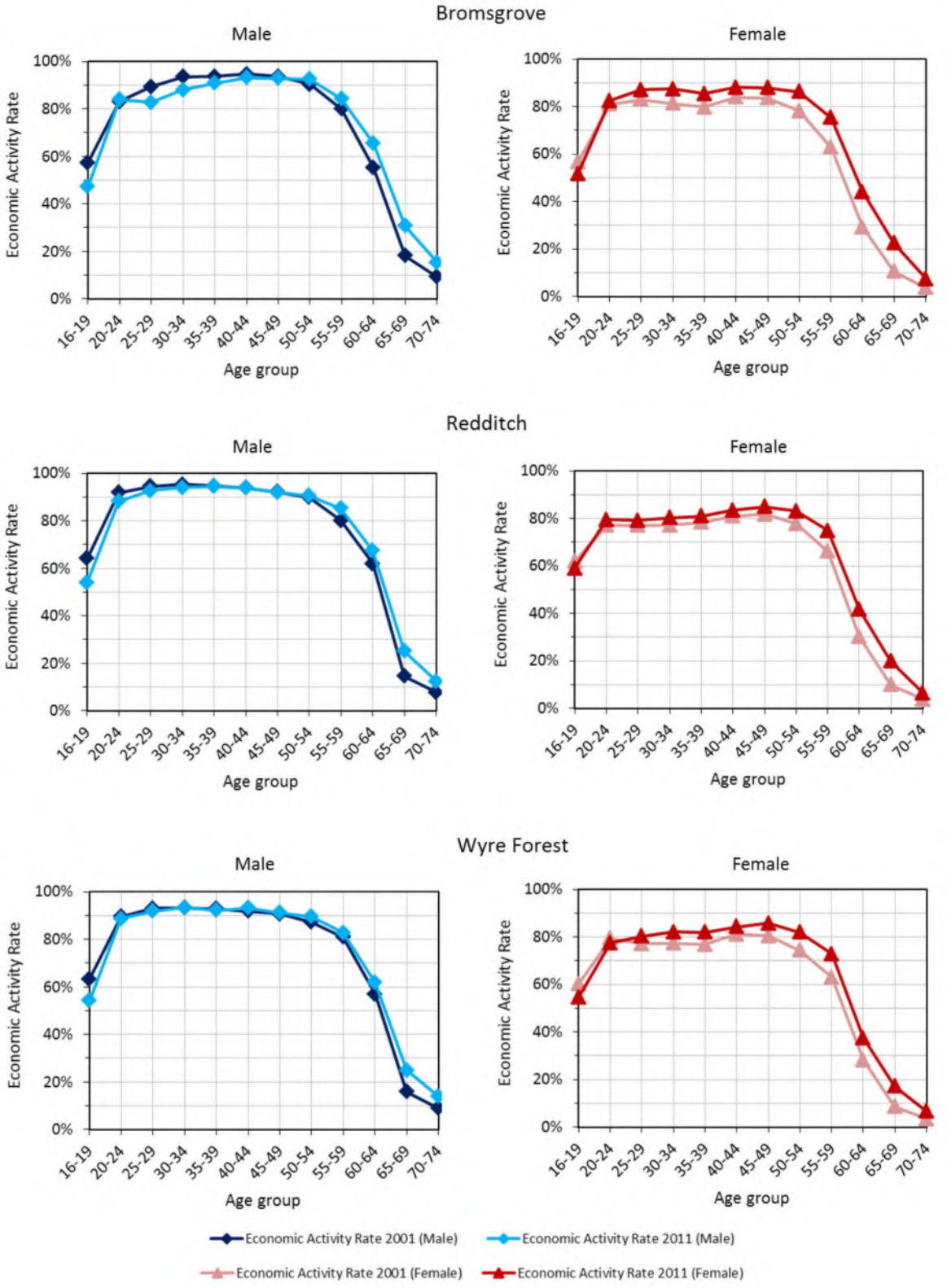


Figure 13: 2001 and 2011 Economic Activity Rate comparison

Bromsgrove						
Sex	Male			Female		
Age	2001	2011	Change 2001-2011	2001	2011	Change 2001-2011
16-19	57.3%	47.3%	-18%	56.4%	51.5%	-9%
20-24	83.1%	83.9%	1%	80.9%	82.4%	2%
25-29	89.3%	82.7%	-7%	82.9%	87.0%	5%
30-34	93.5%	88.1%	-6%	81.2%	87.4%	8%
35-39	93.6%	90.8%	-3%	79.7%	85.4%	7%
40-44	94.6%	93.2%	-2%	83.9%	88.1%	5%
45-49	93.7%	92.9%	-1%	83.5%	87.9%	5%
50-54	90.3%	92.6%	3%	78.2%	86.2%	10%
55-59	80.0%	84.3%	5%	62.8%	75.4%	20%
60-64	55.2%	65.5%	19%	29.3%	44.1%	51%
65-69	18.1%	30.7%	69%	10.6%	22.5%	113%
70-74	9.2%	15.3%	66%	3.7%	7.4%	101%

Redditch						
Sex	Male			Female		
Age	2001	2011	Change 2001-2011	2001	2011	Change 2001-2011
16-19	64.1%	53.9%	-16%	61.8%	59.0%	-4%
20-24	91.8%	88.2%	-4%	77.2%	79.5%	3%
25-29	94.5%	92.6%	-2%	77.0%	79.1%	3%
30-34	95.3%	93.9%	-1%	77.1%	80.2%	4%
35-39	94.6%	94.5%	0%	78.3%	80.9%	3%
40-44	93.8%	93.8%	0%	80.9%	83.5%	3%
45-49	92.1%	91.9%	0%	81.8%	84.9%	4%
50-54	89.9%	90.6%	1%	77.8%	83.0%	7%
55-59	80.1%	85.2%	6%	66.1%	74.8%	13%
60-64	61.9%	67.4%	9%	30.0%	41.7%	39%
65-69	14.6%	25.2%	72%	9.9%	19.8%	100%
70-74	7.8%	12.4%	60%	3.8%	6.5%	73%

Wyre Forest						
Sex	Male			Female		
Age	2001	2011	Change 2001-2011	2001	2011	Change 2001-2011
16-19	63.2%	54.1%	-14%	60.2%	54.5%	-10%
20-24	89.5%	88.8%	-1%	79.3%	77.4%	-2%
25-29	93.1%	91.9%	-1%	77.1%	80.3%	4%
30-34	93.2%	93.4%	0%	77.2%	82.0%	6%
35-39	92.9%	92.2%	-1%	76.8%	82.0%	7%
40-44	91.9%	93.2%	1%	81.1%	84.3%	4%
45-49	90.7%	91.1%	1%	80.4%	85.7%	7%
50-54	87.2%	89.5%	3%	74.4%	81.9%	10%
55-59	80.9%	82.7%	2%	63.0%	72.8%	16%
60-64	57.0%	61.8%	9%	28.3%	37.5%	33%
65-69	15.9%	24.9%	56%	8.6%	17.1%	99%
70-74	9.0%	13.9%	54%	3.5%	6.5%	85%

Alterations to Economic Activity Rates: Sensitivity Scenario 2

6.47 In Sensitivity Scenario 2, changes have been made to the age-sex specific economic activity rates to take account of changes to the State Pension Age (SPA) and to accommodate potential changes in economic participation which might result from an ageing but healthier population in the older labour-force age-groups.

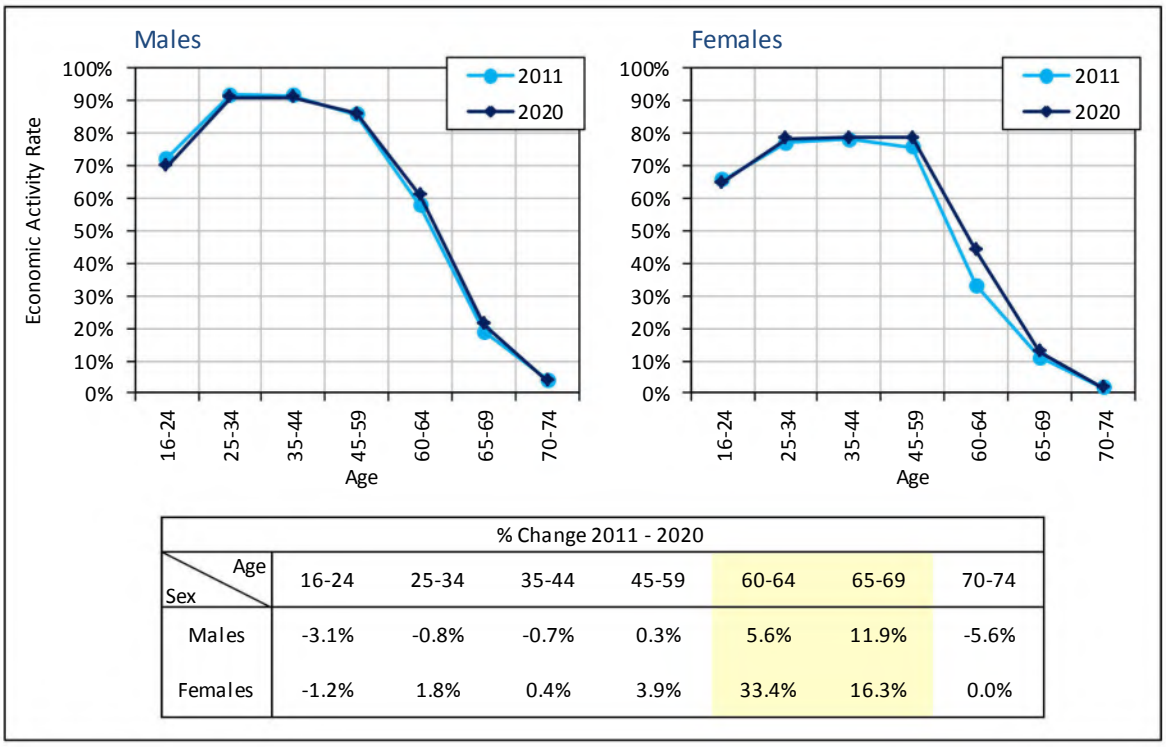
6.48 Employment forecasts (including those from Cambridge Econometrics, Oxford Economics and Experian forecasts that are used in this report) have routinely applied changes to older-age economic participation rates in the derivation of longer-term forecasts of jobs growth. It is therefore important to give these assumptions due consideration in the demographic assessment of these forecasts.

6.49 The SPA for women is increasing from 60 to 65 by 2018, bringing it in line with that for men. Between December 2018 and April 2020, the SPA for both men and women will then rise to 66. Under current legislation, the SPA will be increased to 67 between 2034 and 2036 and 68 between 2044 and 2046. It has been proposed that the rise in the SPA to 67 is brought forward to 2026–20289.

6.50 ONS published its last set of economic activity rate forecasts from a 2006 base10. These incorporated an increase in SPA for women to 65 by 2020 but this has since been altered to an accelerated transition by 2018 plus a further extension to 66 by 2020. Over the 2011–2020 period, the ONS forecasts suggested that male economic activity rates would rise by 5.6% and 11.9% in the 60-64 and 65-69 age groups respectively. Corresponding female rates would rise by 33.4% and 16.3% (Figure 14). Given the accelerated pace of change in the female SPA and the clear trends for increased female labour force participation across all age-groups in the last decade, these 2011–2020 rate increases would appear to be relatively conservative assumptions.

[9] https://www.gov.uk/changes-state-pension

[10] ONS January 2006, Projections of the UK labour force, 2006 to 2020
http://www.ons.gov.uk/ons/rel/lms/labour-market-trends--discontinued-/volume-114--no--1/projections-of-the-uk-labour-force--2006-to-2020.pdf



% Change 2011 - 2020							
Sex \ Age	16-24	25-34	35-44	45-59	60-64	65-69	70-74
Males	-3.1%	-0.8%	-0.7%	0.3%	5.6%	11.9%	-5.6%
Females	-1.2%	1.8%	0.4%	3.9%	33.4%	16.3%	0.0%

Figure 14: ONS Labour Force Projection 2006 – Economic Activity Rates 2011–2020. Data source: ONS

6.51 To take account of planned changes to the SPA, the following modifications have been made to the economic activity rates in 'Sensitivity Scenario 2':

- Women aged 60-64: 40% increase from 2012 to 2020.
- Women aged 65-69: 20% increase from 2012 to 2020.
- Men aged 60-64: 5% increase from 2012 to 2020.
- Men aged 65-69: 10% increase from 2012 to 2020.

6.52 Note that the rates for women in the 60–64 age and 65–69 age-groups are higher than the original ONS figures, accounting for the accelerated pace of change in the SPA. No changes have been applied to other age-groups. In addition, no changes have been applied to economic activity rates beyond 2020. This is an appropriately prudent approach given the uncertainty associated with forecasting future rates of economic participation.

6.53 These alternative economic activity rates are presented as realistic and robust alternatives to the very unlikely scenario of 'fixed' rates over the forecast period. A detailed illustration of the changes that have been applied to the economic activity rates in each of the jobs-led scenarios in Sensitivity Scenario 2 are summarised in Table 19 and Figure 15.

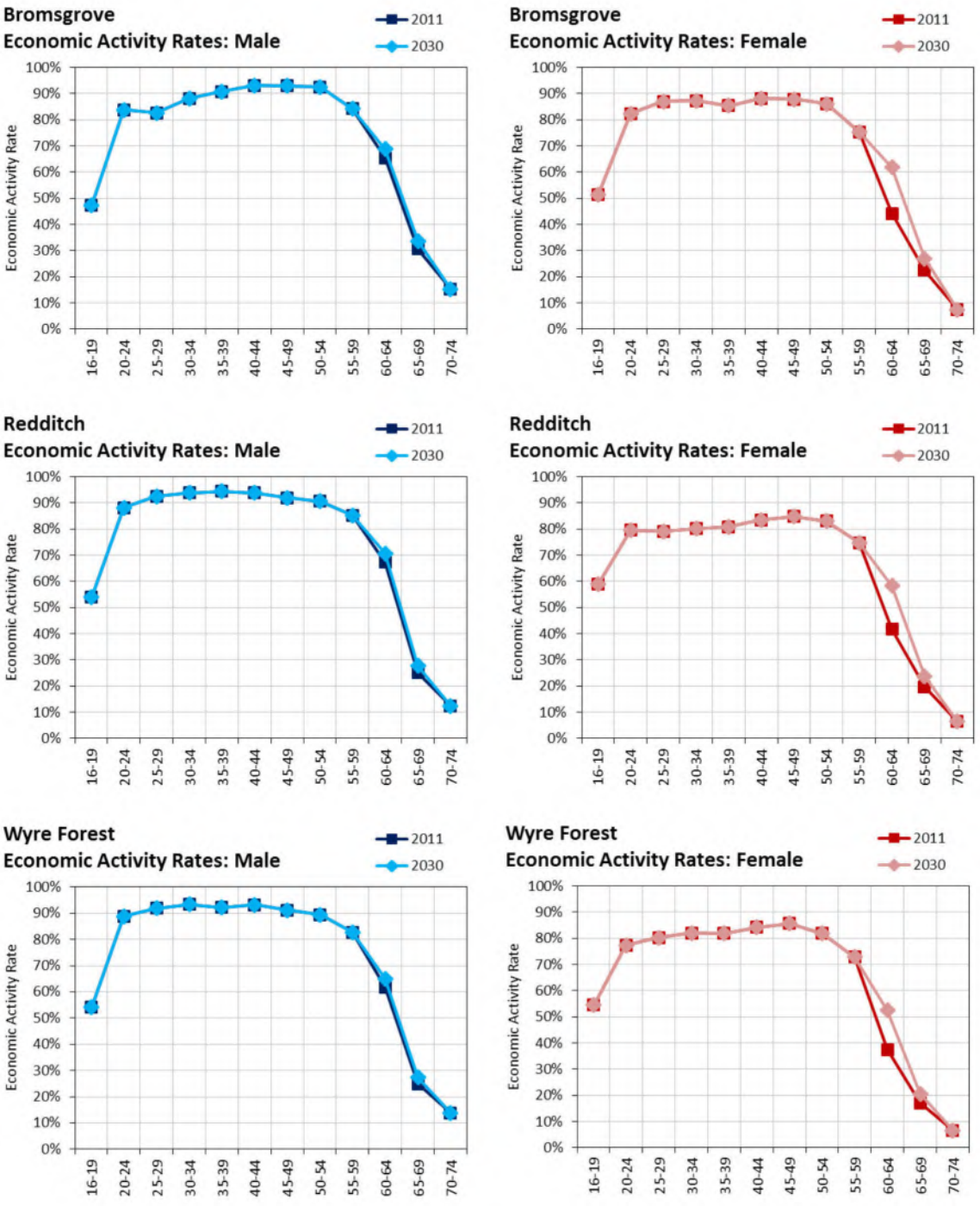


Figure 15: 'Sensitivity Scenario 2' Economic Activity Rate profiles

Table 19: 'Sensitivity Scenario 2' Economic Activity Rate alterations. Changes are highlighted in blue.

Bromsgrove (Sensitivity Scenario 2 Economic Activity Rates)						
Sex	Male			Female		
Age	2011	2030	Change 2011-2020	2011	2030	Change 2011-2030
16-19	47.3%	47.3%	0%	51.5%	51.5%	0%
20-24	83.9%	83.9%	0%	82.4%	82.4%	0%
25-29	82.7%	82.7%	0%	87.0%	87.0%	0%
30-34	88.1%	88.1%	0%	87.4%	87.4%	0%
35-39	90.8%	90.8%	0%	85.4%	85.4%	0%
40-44	93.2%	93.2%	0%	88.1%	88.1%	0%
45-49	92.9%	92.9%	0%	87.9%	87.9%	0%
50-54	92.6%	92.6%	0%	86.2%	86.2%	0%
55-59	84.3%	84.3%	0%	75.4%	75.4%	0%
60-64	65.5%	68.7%	5%	44.1%	61.8%	40%
65-69	30.7%	33.7%	10%	22.5%	27.0%	20%
70-74	15.3%	15.3%	0%	7.4%	7.4%	0%

Redditch (Sensitivity Scenario 2 Economic Activity Rates)						
Sex	Male			Female		
Age	2011	2030	Change 2011-2020	2011	2030	Change 2011-2030
16-19	53.9%	53.9%	0%	59.0%	59.0%	0%
20-24	88.2%	88.2%	0%	79.5%	79.5%	0%
25-29	92.6%	92.6%	0%	79.1%	79.1%	0%
30-34	93.9%	93.9%	0%	80.2%	80.2%	0%
35-39	94.5%	94.5%	0%	80.9%	80.9%	0%
40-44	93.8%	93.8%	0%	83.5%	83.5%	0%
45-49	91.9%	91.9%	0%	84.9%	84.9%	0%
50-54	90.6%	90.6%	0%	83.0%	83.0%	0%
55-59	85.2%	85.2%	0%	74.8%	74.8%	0%
60-64	67.4%	70.7%	5%	41.7%	58.3%	40%
65-69	25.2%	27.7%	10%	19.8%	23.7%	20%
70-74	12.4%	12.4%	0%	6.5%	6.5%	0%

Wyre Forest (Sensitivity Scenario 2 Economic Activity Rates)						
Sex	Male			Female		
Age	2011	2030	Change 2011-2020	2011	2030	Change 2011-2030
16-19	54.1%	54.1%	0%	54.5%	54.5%	0%
20-24	88.8%	88.8%	0%	77.4%	77.4%	0%
25-29	91.9%	91.9%	0%	80.3%	80.3%	0%
30-34	93.4%	93.4%	0%	82.0%	82.0%	0%
35-39	92.2%	92.2%	0%	82.0%	82.0%	0%
40-44	93.2%	93.2%	0%	84.3%	84.3%	0%
45-49	91.1%	91.1%	0%	85.7%	85.7%	0%
50-54	89.5%	89.5%	0%	81.9%	81.9%	0%
55-59	82.7%	82.7%	0%	72.8%	72.8%	0%
60-64	61.8%	64.9%	5%	37.5%	52.5%	40%
65-69	24.9%	27.4%	10%	17.1%	20.6%	20%
70-74	13.9%	13.9%	0%	6.5%	6.5%	0%

Alterations to Economic Activity Rates: Sensitivity Scenario 3

6.54 In 'Sensitivity Scenario 3', the base 2011 Census economic activity rates have been modified; firstly, to account for planned changes to the SPA; and secondly to ensure consistency with the assumptions being made within the Cambridge Econometrics, Oxford Economics and Experian employment forecasts. These changes have been made following recommendations from AMION Consulting (for information on these changes please refer to the AMION Consulting report, above).

6.55 The changes applied in the 'Jobs-led Experian' scenario are summarised in Table 21 and Figure 17. The changes applied in the 'Jobs-led Oxford' scenario are summarised in Table 20 and Figure 16. The changes applied in the 'Jobs-led Cambridge' scenario are summarised in Table 22 and Figure 18.

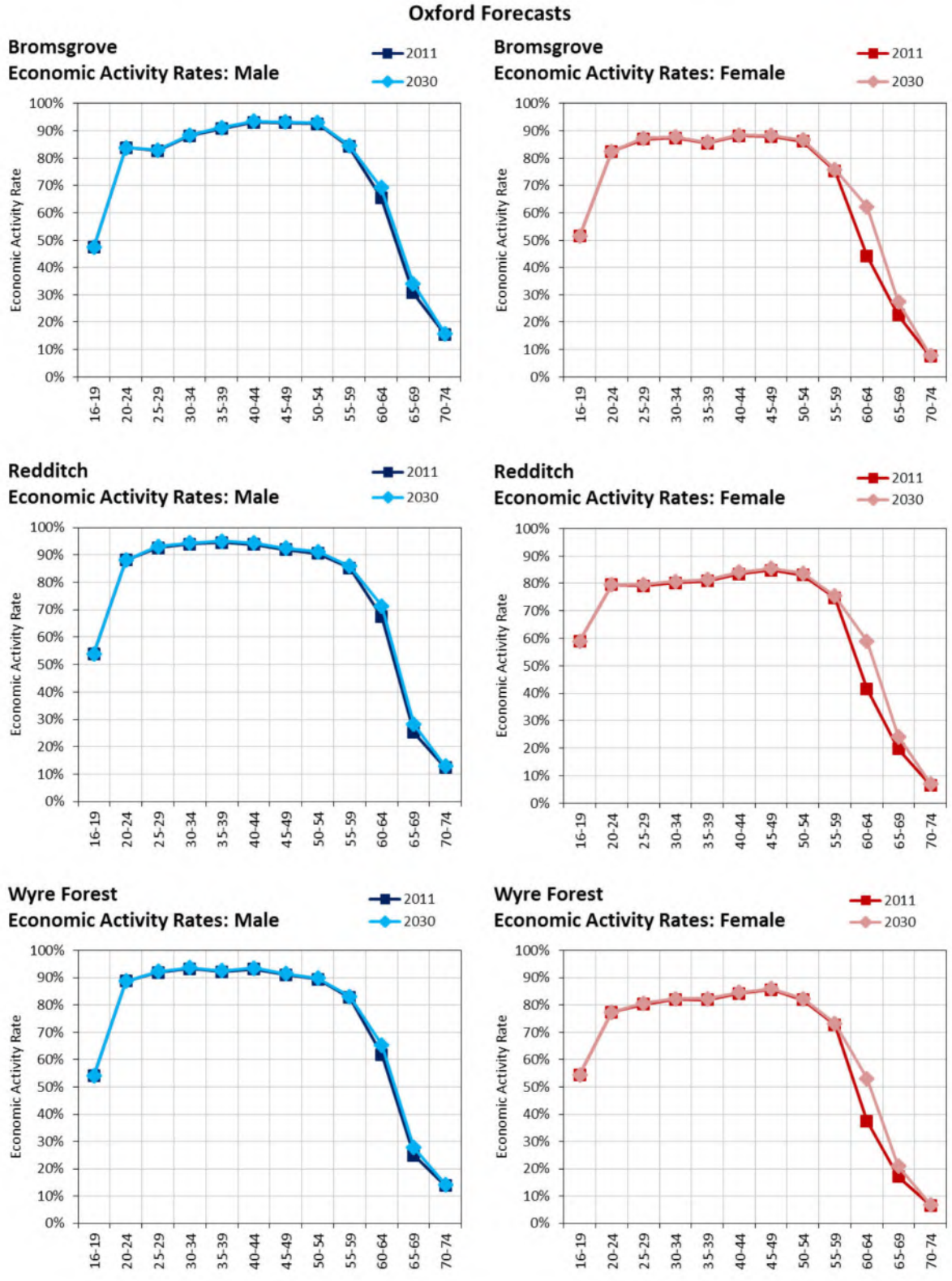


Figure 16: 'Sensitivity Scenario 3' Economic Activity Rate profiles used in the 'Jobs-led Oxford' scenario

Table 20: 'Sensitivity Scenario 3' Economic Activity Rate alterations for the 'Jobs-led Oxford' scenario

Bromsgrove (Sensitivity Scenario 3 Economic Activity Rates) Oxford						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	47.3%	47.3%	0%	51.5%	51.5%	0%
20-24	83.9%	83.9%	0%	82.4%	82.4%	0%
25-29	82.7%	83.0%	0%	87.0%	87.3%	0%
30-34	88.1%	88.5%	0%	87.4%	87.7%	0%
35-39	90.8%	91.2%	0%	85.4%	85.8%	0%
40-44	93.2%	93.5%	0%	88.1%	88.5%	0%
45-49	92.9%	93.3%	0%	87.9%	88.3%	0%
50-54	92.6%	93.0%	0%	86.2%	86.6%	0%
55-59	84.3%	84.7%	1%	75.4%	75.8%	1%
60-64	65.5%	69.2%	6%	44.1%	62.2%	41%
65-69	30.7%	34.0%	11%	22.5%	27.3%	21%
70-74	15.3%	15.7%	2%	7.4%	7.7%	4%

Redditch (Sensitivity Scenario 3 Economic Activity Rates) Oxford						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	53.9%	53.9%	0%	59.0%	59.0%	0%
20-24	88.2%	88.2%	0%	79.5%	79.5%	0%
25-29	92.6%	93.1%	1%	79.1%	79.7%	1%
30-34	93.9%	94.5%	1%	80.2%	80.7%	1%
35-39	94.5%	95.1%	1%	80.9%	81.5%	1%
40-44	93.8%	94.4%	1%	83.5%	84.1%	1%
45-49	91.9%	92.5%	1%	84.9%	85.5%	1%
50-54	90.6%	91.3%	1%	83.0%	83.7%	1%
55-59	85.2%	85.9%	1%	74.8%	75.5%	1%
60-64	67.4%	71.4%	6%	41.7%	59.0%	42%
65-69	25.2%	28.2%	12%	19.8%	24.2%	23%
70-74	12.4%	12.9%	4%	6.5%	7.0%	8%

Wyre Forest (Sensitivity Scenario 3 Economic Activity Rates) Oxford						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	54.1%	54.1%	0%	54.5%	54.5%	0%
20-24	88.8%	88.8%	0%	77.4%	77.4%	0%
25-29	91.9%	92.3%	0%	80.3%	80.7%	0%
30-34	93.4%	93.7%	0%	82.0%	82.4%	0%
35-39	92.2%	92.6%	0%	82.0%	82.4%	0%
40-44	93.2%	93.6%	0%	84.3%	84.7%	0%
45-49	91.1%	91.5%	0%	85.7%	86.1%	0%
50-54	89.5%	89.9%	1%	81.9%	82.4%	1%
55-59	82.7%	83.2%	1%	72.8%	73.3%	1%
60-64	61.8%	65.4%	6%	37.5%	53.0%	41%
65-69	24.9%	27.7%	11%	17.1%	20.9%	22%
70-74	13.9%	14.2%	3%	6.5%	6.9%	5%

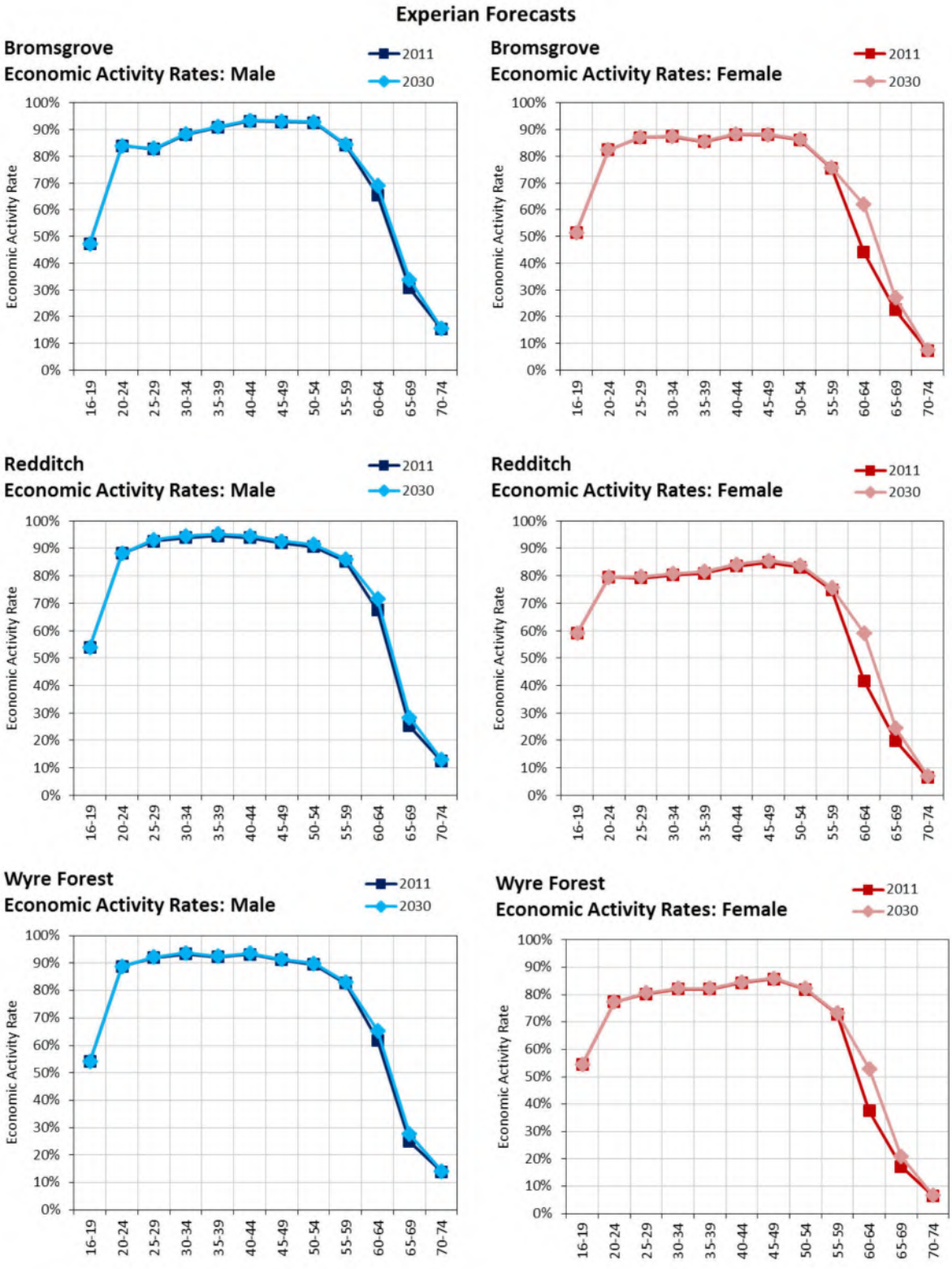


Figure 17: 'Sensitivity Scenario 3' Economic Activity Rate profiles used in the 'Jobs-led Experian' scenario

Table 21: 'Sensitivity Scenario 3' Economic Activity Rate alterations for the 'Jobs-led Experian' scenario

Bromsgrove (Sensitivity Scenario 3 Economic Activity Rates) Experian						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	47.3%	47.3%	0%	51.5%	51.5%	0%
20-24	83.9%	83.9%	0%	82.4%	82.4%	0%
25-29	82.7%	82.9%	0%	87.0%	87.2%	0%
30-34	88.1%	88.3%	0%	87.4%	87.6%	0%
35-39	90.8%	91.0%	0%	85.4%	85.7%	0%
40-44	93.2%	93.4%	0%	88.1%	88.3%	0%
45-49	92.9%	93.1%	0%	87.9%	88.1%	0%
50-54	92.6%	92.8%	0%	86.2%	86.4%	0%
55-59	84.3%	84.5%	0%	75.4%	75.6%	0%
60-64	65.5%	69.0%	5%	44.1%	62.0%	41%
65-69	30.7%	33.9%	11%	22.5%	27.2%	21%
70-74	15.3%	15.5%	1%	7.4%	7.6%	3%

Redditch (Sensitivity Scenario 3 Economic Activity Rates) Experian						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	53.9%	53.9%	0%	59.0%	59.0%	0%
20-24	88.2%	88.2%	0%	79.5%	79.5%	0%
25-29	92.6%	93.2%	1%	79.1%	79.8%	1%
30-34	93.9%	94.6%	1%	80.2%	80.8%	1%
35-39	94.5%	95.2%	1%	80.9%	81.6%	1%
40-44	93.8%	94.5%	1%	83.5%	84.2%	1%
45-49	91.9%	92.6%	1%	84.9%	85.6%	1%
50-54	90.6%	91.4%	1%	83.0%	83.8%	1%
55-59	85.2%	86.0%	1%	74.8%	75.6%	1%
60-64	67.4%	71.5%	6%	41.7%	59.1%	42%
65-69	25.2%	28.3%	12%	19.8%	24.3%	23%
70-74	12.4%	13.0%	5%	6.5%	7.1%	9%

Wyre Forest (Sensitivity Scenario 3 Economic Activity Rates) Experian						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	54.1%	54.1%	0%	54.5%	54.5%	0%
20-24	88.8%	88.8%	0%	77.4%	77.4%	0%
25-29	91.9%	92.2%	0%	80.3%	80.6%	0%
30-34	93.4%	93.7%	0%	82.0%	82.3%	0%
35-39	92.2%	92.5%	0%	82.0%	82.3%	0%
40-44	93.2%	93.6%	0%	84.3%	84.6%	0%
45-49	91.1%	91.5%	0%	85.7%	86.0%	0%
50-54	89.5%	89.8%	0%	81.9%	82.3%	0%
55-59	82.7%	83.1%	0%	72.8%	73.2%	1%
60-64	61.8%	65.3%	6%	37.5%	52.9%	41%
65-69	24.9%	27.7%	11%	17.1%	20.9%	22%
70-74	13.9%	14.2%	2%	6.5%	6.8%	5%

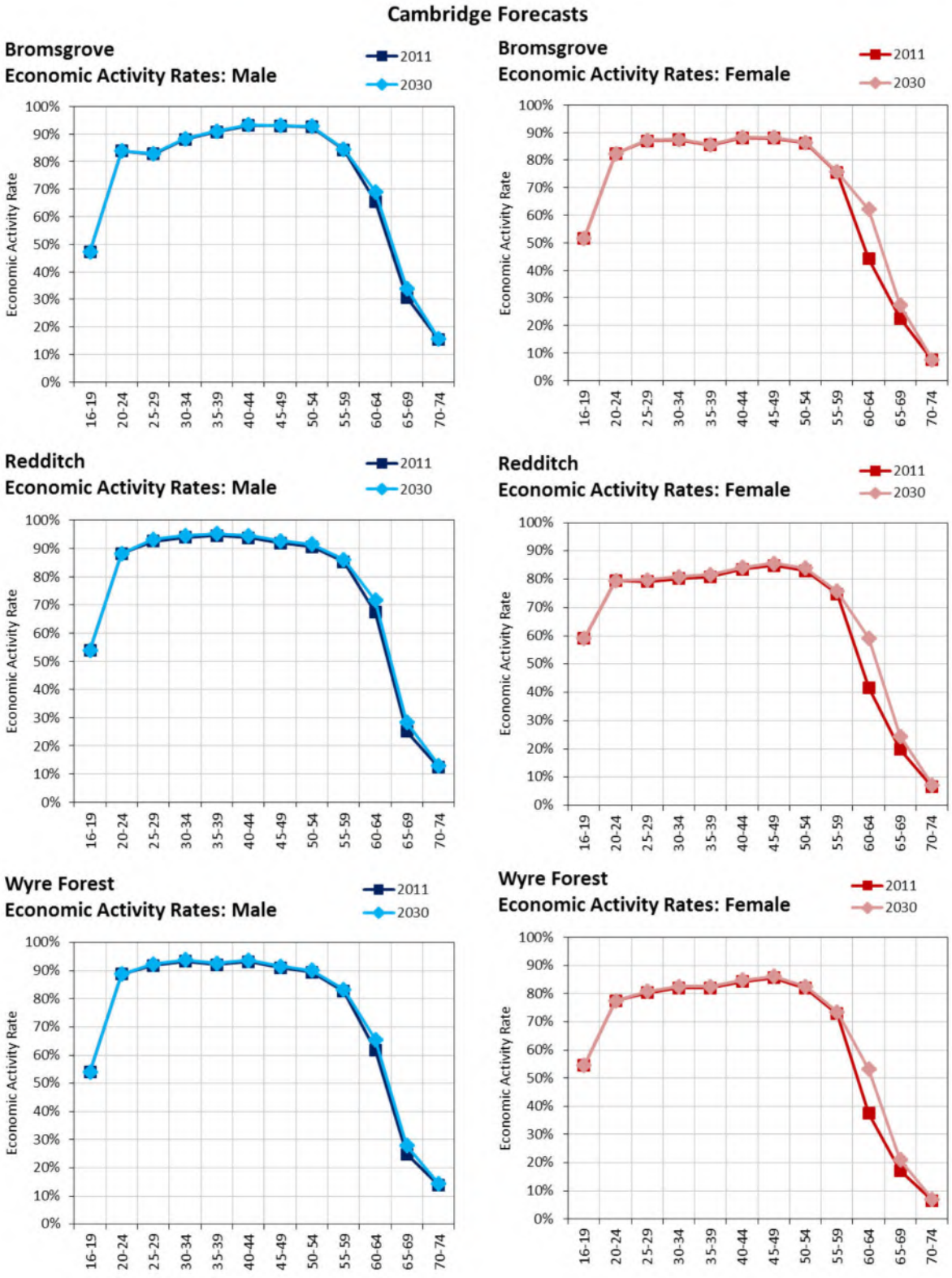


Figure 18: 'Sensitivity Scenario 3' Economic Activity Rate profiles used in the 'Jobs-led Cambridge' scenario

Table 22: 'Sensitivity Scenario 3' Economic Activity Rate alterations for the 'Jobs-led Cambridge' scenario

Bromsgrove (Sensitivity Scenario 3 Economic Activity Rates) Cambridge						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	47.3%	47.3%	0%	51.5%	51.5%	0%
20-24	83.9%	83.9%	0%	82.4%	82.4%	0%
25-29	82.7%	82.9%	0%	87.0%	87.2%	0%
30-34	88.1%	88.3%	0%	87.4%	87.6%	0%
35-39	90.8%	91.0%	0%	85.4%	85.7%	0%
40-44	93.2%	93.4%	0%	88.1%	88.3%	0%
45-49	92.9%	93.2%	0%	87.9%	88.2%	0%
50-54	92.6%	92.9%	0%	86.2%	86.5%	0%
55-59	84.3%	84.5%	0%	75.4%	75.7%	0%
60-64	65.5%	69.0%	5%	44.1%	62.1%	41%
65-69	30.7%	33.9%	11%	22.5%	27.2%	21%
70-74	15.3%	15.6%	1%	7.4%	7.6%	3%
Redditch (Sensitivity Scenario 3 Economic Activity Rates) Cambridge						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	53.9%	53.9%	0%	59.0%	59.0%	0%
20-24	88.2%	88.2%	0%	79.5%	79.5%	0%
25-29	92.6%	93.3%	1%	79.1%	79.8%	1%
30-34	93.9%	94.6%	1%	80.2%	80.9%	1%
35-39	94.5%	95.2%	1%	80.9%	81.6%	1%
40-44	93.8%	94.6%	1%	83.5%	84.2%	1%
45-49	91.9%	92.7%	1%	84.9%	85.6%	1%
50-54	90.6%	91.5%	1%	83.0%	83.9%	1%
55-59	85.2%	86.1%	1%	74.8%	75.6%	1%
60-64	67.4%	71.6%	6%	41.7%	59.2%	42%
65-69	25.2%	28.3%	13%	19.8%	24.4%	23%
70-74	12.4%	13.0%	5%	6.5%	7.2%	10%
Wyre Forest (Sensitivity Scenario 3 Economic Activity Rates) Cambridge						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	54.1%	54.1%	0%	54.5%	54.5%	0%
20-24	88.8%	88.8%	0%	77.4%	77.4%	0%
25-29	91.9%	92.4%	1%	80.3%	80.8%	1%
30-34	93.4%	93.8%	1%	82.0%	82.5%	1%
35-39	92.2%	92.7%	1%	82.0%	82.5%	1%
40-44	93.2%	93.8%	1%	84.3%	84.8%	1%
45-49	91.1%	91.7%	1%	85.7%	86.2%	1%
50-54	89.5%	90.1%	1%	81.9%	82.5%	1%
55-59	82.7%	83.3%	1%	72.8%	73.5%	1%
60-64	61.8%	65.6%	6%	37.5%	53.2%	42%
65-69	24.9%	27.8%	12%	17.1%	21.0%	23%
70-74	13.9%	14.3%	3%	6.5%	7.0%	7%

Unemployment Rate

6.56 For each scenario (excluding the jobs-led scenarios), the labour force and jobs implications of the population growth trajectory have been evaluated through the application of three key data items: economic activity rates, a commuting ratio and an unemployment rate. In the jobs-led scenarios, these three data items are used to determine the population growth required by a particular jobs growth trajectory.

6.57 The unemployment rate, together with the commuting ratio, controls the balance between the size of the labour force and the number of jobs available within an area.

Historical Unemployment Rates

6.58 Unemployment statistics from NOMIS provide an indication of the variation in the unemployment rate since 2004/05. Whilst sampling issues introduce some uncertainty to the data, a 5-year and a 9-year average is presented to give an indication of how unemployment has altered during the recessionary period (Table 23).

Table 23: Historical unemployment rates for the three North Worcestershire districts. Source: Annual Population Survey, NOMIS

Date	Unemployment Rate (%)		
	Bromsgrove	Redditch	Wyre Forest
2004/05	4.1	3.4	4.0
2005/06	3.3	2.7	1.9
2006/07	-	3.9	6.3
2007/08	4.5	4.7	4.5
2008/09	5.5	9.3	9.3
2009/10	6.4	5.8	4.9
2010/11	7.6	8.4	4.7
2011/12	5.8	3.2	8.3
2012/13	3.7	5.9	7.2
Maximum	7.6	9.3	9.3
Minimum	3.3	2.7	1.9
9yr Average	**5.1**	**5.3**	**5.7**
5yr Average	**5.8**	**6.5**	**6.9**

Note: These figures are July to June unemployment rates. – indicates missing data

6.59 On average, the unemployment rate would need to reduce by 17% across Worcestershire if the 5-year average was to revert to its 9-year equivalent (

6.60 Table *24*).

Table 24: Unemployment rates for the six Worcestershire districts. Source: Annual Population Survey, NOMIS

	Unemployment Rate % (9 year average)	Unemployment Rate % (5 year average)	% change	5yr unemployment reduced by 17%
Bromsgrove	5.1	5.8	-13%	4.8
Malvern Hills	4.2	5.1	-21%	4.2
Redditch	5.3	6.5	-24%	5.4
Worcester	4.6	5.1	-10%	4.2
Wychavon	3.4	3.8	-12%	3.1
Wyre Forest	5.7	6.9	-21%	5.7
		Average	**-17%**	

Note: 9 year average from 2004/05 to 2012/13 and the 5 year average from 2008/09 to 2012/13

Core Scenarios

6.61 An average unemployment rate for ages 16+ has been calculated from the APS unemployment statistics for the nine-year period 2004/05–2012/13 (Table 23). For each of the three North Worcestershire districts, this nine-year average has been used in the core scenarios:

- Bromsgrove 5.1%
- Redditch 5.3%
- Wyre Forest 5.7%

6.62 For the core scenario analysis, the unemployment rate is fixed throughout the forecast period.

Sensitivity Scenario 2

6.63 In 'Sensitivity Scenario 2', the unemployment rate has been modified to account for a period of recovery post-2013. These assumptions assume that an initial unemployment rate is defined based upon the average for the last five years (2008/09–2012/13) (see Table 23). Over the 2013–2020 forecast period, these initial unemployment rates have been incrementally reduced and remain fixed thereafter (Table 25). The reduction in unemployment is equivalent to the (17%) average difference between the 9 year and 5 year unemployment rates for the six Worcestershire districts (

6.64 Table *24*).

6.65 These improvements to unemployment rates are considered to be quite conservative but do provide an appropriate basis for what is likely to be a gradual recovery from current economic conditions.

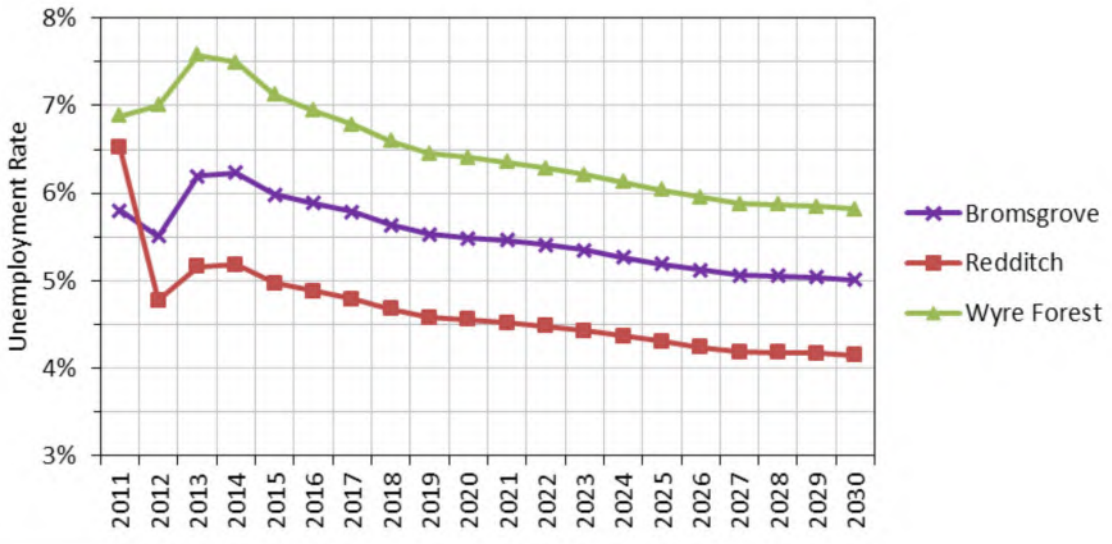
Table 25: Sensitivity Scenarios 2 unemployment rates

District	Unemployment Rate (%) 2013	Unemployment Rate (%) 2020	Change
Bromsgrove	5.8	4.8	-1.0
Redditch	6.5	5.4	-1.1
Wyre Forest	6.9	5.7	-1.2

6.66 The most recent unemployment statistics, published by ONS in January 2014, suggest that unemployment rates continue to fall; for the West Midlands, the unemployment rate was down 1.3 percentage points from June to August 2013 and down 0.8 from a year earlier11.

Sensitivity Scenario 3

6.67 In 'Sensitivity Scenario 3', the unemployment rate has been reduced over the forecast period (2012–2030). These modifications have been made using an index based on the Experian employment forecast (for information on these changes please refer to the AMION Consulting report above). The changes to the unemployment rates are summarised in Figure 19.



[11] Labour Market Statistics, January 2014. ONS Statistical Bulletin http://www.ons.gov.uk/ons/dcp171778_347785.pdf

Figure 19: SENS2 unemployment rates

Commuting Ratio

6.68 For each scenario (excluding the jobs-led scenarios), the labour force and jobs implications of the population growth trajectory have been evaluated through the application of three key data items: economic activity rates, a commuting ratio and an unemployment rate. In the jobs-led scenarios, these three data items are used to determine the population growth required by a particular jobs growth trajectory.

6.69 The commuting ratio, together with the unemployment rate, controls the balance between the size of the labour force and the number of jobs available within an area.

6.70 Information on commuting from the 2011 Census has not yet been published. Using a combination of statistics from the 2011 Census, commuting ratios have been derived by Edge Analytics for each of the three North Worcestershire districts. In all the scenarios (both 'core' and sensitivity) these rates are 'fixed' and held constant for the forecast period 2012 to 2030.

6.71 The commuting ratio is the balance between the number of workers living in a district (i.e. the resident labour force) and the number of jobs available in the district. The number of workers includes all economically active residents (i.e. all residents aged 16–74). The number of jobs has been calculated by subtracting the number of residents not in employment and the number of residents aged 0–15 and those aged 75+ from the district's workday population.

6.72 The derived 2011 commuting ratios for Bromsgrove, Redditch and Wyre Forest are shown below in Table 26. For comparison, these are presented alongside the 2001 commuting ratios, derived from 2001 Census statistics. In the case of the 2001 commuting ratio, 'workers' and 'jobs' are both derived from aggregating the travel-to-work statistics. A commuting ratio greater than 1 indicates that the size of the resident workforce exceeds the number of jobs available in the district, resulting in a net out-commute.

Table 26: Commuting ratio comparison

Bromsgrove		2001 Census	2011 Census
Workers	*a*	44,334	44,867
WorkDay Population			86,399
minus those not in Work			22,940
minus 0-15 yr olds			16,530
minus 75+			9,300
Jobs	*b*	34,865	37,629
Commuting Ratio	*a/b*	1.27	1.19

Redditch		2001 Census	2011 Census
Workers	*a*	41,096	41,464
WorkDay Population			80,332
minus those not in Work			21,059
minus 0-15 yr olds			16,558
minus 75+			5,133
Jobs	*b*	37,467	37,582
Commuting Ratio	*a/b*	1.10	1.10

Wyre Forest		2001 Census	2011 Census
Workers	*a*	48,350	45,060
WorkDay Population			88,991
minus those not in Work			27,271
minus 0-15 yr olds			16,785
minus 75+			8,859
Jobs	*b*	37,831	36,076
Commuting Ratio	*a/b*	1.28	1.25