The Objectively Assessed Housing Needs of Cotswold District

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December 2016

NMSS

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This report has been prepared for Cotswold District Council.

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Aim

i. To present an up to date estimate of the full objectively assessed housing needs (the 'full OAN') of the Cotswold District. The report is based on the latest available evidence as of September 2016.

Approach

ii. This report follows the approach indicated by the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG). It takes as its starting point the official population and household projections.

iii. To assess the housing requirement of any area it is necessary to:

- Estimate the size and age structure of the population that will need to be housed.
- Take a view on how that population will group itself into households. This, combined with the population estimate, enables the number of extra households which will need to be housed to be estimated.
- An allowance needs then to be added for properties which will be empty or second homes to produce a preliminary estimate of the housing requirement.
- Finally, consideration needs to be given to whether there are any factors which will not have been reflected in this approach. These might include:
    - market signals which suggest that the local housing market has been under particular stress;
    - unmet housing needs or past undersupply which will have affected the trend-based assessment of future housing needs produced by a demographic approach; and,
    - whether additional housing is needed to ensure that the area can accommodate sufficient workers to support the projected level of economic growth.

iv. The report follows through these steps in order.

v. NMSS have produced earlier reports on the OAN of Cotswold District. This report updates that work and is intended to present in a single, standalone document all of the material that is relevant to an up to date assessment of the OAN: it is not an update report that needs to be read alongside earlier reports.

vi. The starting point for this report is the DCLG's 2014-based household projections (DCLG 2014) which were released in July 2016. These were based on the ONS's 2014-based Sub-national Population Projections (2014 SNPP) which were published in May 2016. However, more recent evidence on how the population has changed since 2014 is available from the 2015 Mid-Year Estimates (2015 MYE) which were issued in June 2016 and the international migration statistics for the year to March 2015 which were released in August 2015. This report also takes that additional evidence into account to provide the most up to date view possible.

Conclusions on the population to be planned for

vii. It is proposed that three adjustments should be made to the ONS's 2014-based Sub-national Population Projection for Cotswold to reflect both weaknesses in those projections and the latest evidence available from the 2015 Mid-Year Estimates and the most recent international migration statistics.

viii. The proposed adjustments are shown in Figure S1 (below):

- The ONS's 2014 Sub-national Population Projections (2014 SNPP) use 2009-14 as the trend period for projecting flows to and from the rest of the UK. Although less affected by the economic downturn than the period used for the 2012 SNPP (2007-12), adjusting the projections to reflect flows in the latest 10-year period for which data is available (2005-15) is likely to provide a better view of future flows as the impact of the atypical flows during the recession is balanced by the higher flows in earlier years and greater weight is given to flows since the downturn. At the same time it makes sense to adjust the projections (re-base them) so that they reflect the ONS's estimate of the actual population in 2015 rather than the projection made for that year in the 2014 SNPP. The effect of this set of adjustments is to increase the projected population increase between 2011 and 2031 from 10199 in the 2014 SNPP to 10492, an increase of 293 or 3%. (Rows B and C)
- Net international migration into the UK is currently about twice that assumed by those who compiled the 2014 SNPP. There is a case for adjusting those projections to reflect this. To avoid giving undue weight to the most recent years' figures whilst reflecting what has actually happened in Cotswold, it is proposed that the international flows should be adjusted to reflect average flows over the latest 10-year period for which data exists i.e. 2005-15. This reduces the projected population increase between 2011 and 2031 by 160 or 1.5%, cutting the projected increase from 10,492 to 10,332. (Rows D and E)
- It is debatable whether the projections should make an allowance for Unattributable Population Change (UPC). The ONS made no such allowance in the 2014 SNPP. However, earlier analysis for Stroud, Cotswold and the Forest of Dean took the view that it was appropriate to err on the side of caution to avoid any possibility of underestimating the population to be planned for. It had therefore assumed that for the authorities for which UPC was positive all of UPC would have contributed to future population increases and that where UPC was negative (as in Cotswold) no adjustment should be

made. This assumption was at the other extreme of the range from the ONS's assumption that none of UPC would have contributed to future population increases. The likelihood is that the actual position will lie somewhere between the two extremes. As there is no way to determine where in the range is most likely, the mid-point has been used. The effect is to reduce the projected population increase of Cotswold by 471 or 5%, from 10,327 to 9,839. (See Rows F and G.)

Figure S1: Summary of adjustments to 2014 SNPP		
Change 2011 - 2031		Population
A	**2014 SNPP**	**10199**
B	Adjustment for 2005-15 UK flows + 2015 MYE	293
C	**2005-05 UK flows + re-basing to 2015 MYE**	**10492**
D	Adjustment for 2005-15 international flows	-160
E	**2015 UK and international flows + 2015 MYE re-base**	**10332**
F	Adjustment for 50% UPC	-471
G	**05-15 trend all flows + 2015 MYE re-base + 50% UPC**	**9861**

ix. The overall effect of these adjustments is to reduce the 2014 SNPP's projection for the increase in the population of Cotswold over the plan period of 10,199 to 9861, a reduction of 3%.

x. The purpose of the adjustments is to correct for cyclical and other factors which might have distorted the ONS projection to produce a projection which is better indication of the likely long term population growth. The fact that the adjustment is small indicates that the 2014 SNPP has not been significantly distorted by the economic downturn or other factors (unlike the 2012 SNPP).

How the population is likely to group itself into households

xi. To turn an estimate of a population change into an estimate of the change in the number of households a view needs to be taken on how the tendency of people to form separate households (the household formation rate) is likely to change. The latest DCLG household projections (DCLG 2014) provide the most recent official view on this. Having reviewed the latest projections, NMSS believes that they should be used as published.

xii. In particular, there is no longer a need to make adjustments to the projected household formation rates for young adults (those aged 25-34) that were appropriate when using the 2011-based interim projections. Those projections envisaged a continuing sharp deterioration in the household formation rates of that age group.

xiii. NMSS believe that the latest DCLG projections represent a realistic view of likely trends in household formation patterns when account is taken of the changes that have occurred since the last pre-recession projections were published (the 2008-based projections).

xiv. Moreover, Inspectors examining the local plans of the other Gloucestershire authorities have accepted that their OANs should be calculated on the basis of the

most recent, unadjusted DCLG household formation rates. Given that household formation rates in Cotswold have departed from the trajectories envisaged in the pre-recession 2008-based projections by less than for any other Gloucestershire authority, the argument for using the 2014-based household formation rates without adjustment is even stronger.

xv. Once an allowance is made for empty and second homes (based on council tax data), applying the 2014-based DCLG household formation rates to the adjusted 2014 SNPP population projections produces a demographically-based estimate of the OAN of the Cotswold area of 6,600 homes over the period 2011-31 if the DCLG 2014-based household formation rates are use 'as published'. If those household formation rates are adjusted to that no group is worse off than in 2011 the OAN becomes 6900 homes. See Figure S2 which also shows the figures that are implied by the unadjusted DCLG 2014-based projection. Note that all figures for the plan period have been rounded to the nearest 100 and the annual figures to the nearest 10. This is to avoid suggesting spurious accuracy.

Figure S2: Demographically-based estimates of the OAN			
Change 2011 - 2031	Population	Homes	Homes/yr
2014 SNPP/DCLG 2014	10200	6300	320
Demographic OAN	9900	6600	330

Conclusions on adjustments for 'other factors'

xvi. As far as market signals are concerned, Cotswold is an area with high house prices and rents and poor affordability. This, however, reflects the attractiveness of the area and is not necessarily a basis on which to apply a 'market signals adjustment'. The potential grounds for a market signals adjustment are the rate of increase in house prices and rents; the deterioration in the affordability ratio; and the suggestion that there may have been under supply in the years before the economic downturn.

xvii. The evidence from the data on house prices, rents and affordability is not conclusive. The evidence on undersupply is more persuasive particularly as it is corroborated by the data on net migration which suggest that after 2006-07, the reduction in net migration was deeper and more sustained than for the rest of the Gloucestershire HMA and that the increase in the net flow after 2012-13 has been proportionately less than the rest of the HMA.

xviii. By creating an "adjusted historic projection" which has a net migration flow which tracks the net migration flow seen in the rest of Gloucestershire after 2006-07 it is possible to estimate what the population projection would have looked like had it been based on migration flows in the trend period in line with the rest of the HMA. This increases the projected population in 2031 from 93,000 to 95,900 and the number of homes needed from 6,600 to 7,900 (2011-31), an increase of 1,300 homes or nearly 20%.

xix. Whether the housing requirement should be set above the OAN to allow a larger proportion of the assessed need for affordable housing to be met is outside the scope of this report.

Conclusion on homes needed to support economic growth

xx. Updated (November 2015) economic forecasts have been obtained for both Cotswold and Gloucestershire as a whole from Cambridge Econometrics (CE) and Oxford Economics (OE). These have been reviewed by Nupremis who have produced alternative scenarios which adjust unlikely or implausible elements in both projections. Two alternative analyses of the housing implications of these projections have then been produced (which assume the DCLG 2014-based household formation rates are used 'as published'):

- A **'standalone analysis'** which looks at the forecasts for Cotswold in isolation. This provides two ranges:
    - 7,300 – 8,900 homes (2011-31) based on unadjusted OE and CE jobs forecasts
    - 7,500 – 8,600 homes (2011-31) based on the Nupremis alternative scenario

  The latter range is more realistic as it is based on the adjusted projections but there is little difference between the mid-points of the two ranges: 8,100 homes for the unadjusted projections and 8,000 for the alternative scenarios.
- An **HMA-wide analysis** which suggest that across Gloucestershire as a whole there is no need to increase the number of homes above the demographic OAN.

xxi. It could be argued that this provides a range for the full OAN from 6,600 homes 2011-31 to 8,900 homes. However, there are good reasons for not regarding either figure as a credible or prudent figure.

xxii. The 8,900 figure is based on analysis of the unadjusted Oxford Economics forecast for Cotswold on a standalone basis. To adopt that figure it would be necessary to:

- Disregard completely the (lower) estimate based on the Cambridge Econometric forecast: that would be unjustifiable as there are no clear reasons for believing that one forecast is better than the other.
- Ignore entirely the evidence that suggest that across the HMA as a whole there is now no need to add to the demographically based OAN.
- Give no weight at all to the concerns identified about:
    - the very high population growth implied by the OE forecasts;
    - the possibility that the increase in self-employment amongst older people may not involve significant numbers of people moving to the area but greater participation in the workforce of existing residents; and,
    - the possibility that both the OE and CE forecasts may over-estimate the likely increase in jobs as a result of assuming relatively small productivity increases.

xxiii. In view of these considerations it would be reasonable to regard the mid-point of the figures suggested by the analysis of the unadjusted OE and CE forecasts – i.e. 8100 homes 2011-31 as the plausible top of the range figure.

xxiv. On the other hand it would be unwise to regard 6,600 homes 2014-31 as a plausible bottom of the range figure. This comes from the HMA wide analysis. It is appropriate to be a little cautious in interpreting this as:

- The HMA-wide analysis assumes that Gloucestershire functions seamlessly as a single housing and employment market area and that those coming to the area to live and those creating new jobs will be indifferent to where within the area they locate. That is an idealised view of a single housing and employment area. The practical reality is likely to lie somewhere between that view and the standalone view – which in effect assumes that Cotswold acts as an isolated area.
- The Gloucestershire jobs forecasts have been more volatile than those for Cotswold District. There is therefore considerable uncertainty about the robustness of any individual forecast even at the county level. That is underlined by the equivalent analysis in the NMSS October 2014 Report which suggested that 1300 homes should be added to the demographic OAN for Cotswold to produce its full OAN. Adding that number to the updated demographic OAN (6,600 homes) would produce a full OAN of 7,900 homes.

xxv. These concerns about the HMA-wide analysis suggest that it would be prudent to give more weight to the standalone analysis in setting the OAN.

Summary and Conclusion on the OAN

xxvi. **Adjusting the ONS's latest projections (the 2014 SNPP) to correct for cyclical and other factors and applying the DCLG's 2014-based household formation rates as a realistic view of likely future household formation patterns gives a demographically-based OAN of 6,600 homes 2011-2031 or 330 homes a year.** These are very close to the figures that would have been obtained using the latest population and household projections without any adjustment i.e. 6,300 homes 2011-31 or 320 homes a year. It should, however, be noted that planning on this basis assumes that the chances of some younger groups (most notably couples) setting up their own, separate households, would continue to fall.

xxvii. Whilst the evidence of constrained housing supply from market signals is inconclusive, **a comparison of net additions to the housing stock and net migration flows with the rest of the Gloucestershire HMA does indicate that there may have been some undersupply in the years following 2006-07. Adjusting the projections to correct for this suggests a need for 7,900 homes 2011-31 or 390 a year.** There is, however, no evidence that this affected household formation rates. Indeed, the latest past and projected household formation rates for Cotswold are closer to the 2008-based projections than they are for any or the other Gloucestershire authorities.

xxviii. **An HMA-wide analysis of the number of homes needed to support economic growth suggests that across Gloucestershire as a whole no additional homes are needed to support economic growth above those indicated by the demographically –based OAN.**

xxix. **In contrast an analysis based on the latest jobs forecast for Cotswold on its own suggests that 8,000 – 8,100 homes 2011-31 are needed to support economic growth.**

xxx. There are a number of factors that should be taken into account in weighing the evidence:

- There are grounds for believing that greater weight should be given to the 'standalone' analysis of the homes needed to support economic growth than HMA-wide analysis (see paragraphs xxi to xxv above).
- Whilst the latest DCLG projections present a realistic view of what is likely to happen to household formation patterns, they envisage that the household formation rates of some younger groups will continue to fall. It can be argued that this is not a very positive approach to planning.
- Although the case for a market signals adjustment is not conclusive, the District is an area of high house prices and rents and poor affordability.

xxxi. **Taking these factors into account it is suggested that the top of the range figure for the homes needed to support economic growth calculated using DCLG's latest household formation rates should be regarded as the jobs-led OAN i.e. 8100 homes 2011-31 or 410 homes a year.**

xxxii. Figure S3 summarises the three estimates of the OAN, with the figure suggested by the unadjusted 2014 SNPP/DCLG 2014 projections given for comparison.

Figure S3: Estimates of Cotswold's objectively assessed needs compared

Change 2011 - 2031	Population	Homes	Homes/yr
2014 SNPP/DCLG 2014	10200	6300	320
Demographic OAN	9900	6600	330
OAN adjusted to reflect possible undersupply	12700	7900	390
Jobs-led OAN	14400	8100	410

xxxiii. **As the jobs-led figure is the highest this should be adopted as the Full OAN i.e. 8,100 homes 2011-31 or 410 homes a year.**

xxxiv. Note that it would be inappropriate to add an undersupply adjustment to the jobs-led OAN estimate as there is no evidence that undersupply affected the household formation rates in DCLG's 2014-based projections. On the contrary, the evidence suggests that undersupply led to a lower net migration and a lower population projection. Correcting for this increases the projected population but an even larger adjustment to the population projection is needed to support economic growth so it is that larger population projection that determines the Full OAN.

xxxv. The updated estimate of the Full OAN is 300 homes lower than the figure of 8,400 estimated in the March 2016 NMSS Report. That is a difference of 3.6% and as such is well within the error margins of this kind of analysis and typical of the changes that

inevitably occur during the gestation period of a local plan. There is therefore no necessity to adjust the proposed housing requirement in the draft Local Plan

xxxvi. Given the inevitable uncertainties, the demand for homes and the growth in employment should be closely monitored and the OANs should be reviewed periodically in the light of what actually happens.

AN UPDATED ASSESSMENT OF THE OBJECTIVELY ASSESSED HOUSING NEEDS OF COTSWOLD DISTRICT

1. INTRODUCTION

Aim

1.1. To present an up to date estimate of the full objectively assessed housing needs (the 'full OAN') of the Cotswold District. The report is based on the latest available evidence as of November 2016.

Approach

1.2. The report follows the approach indicated by the National Planning Policy Framework[1] (NPPF) and the Planning Practice Guidance[2] (PPG). It takes as its starting point the latest official population and household projections. These are the Office for National Statistic's (ONS's) 2014-based Subnational Population Projections for England[3] (2014 SNPP) and the Department for Local Government's (DCLG's) 2014-based Household Projections[4]. Account has also been taken of the ONS's Annual Mid-year Population Estimates, 2015[5] (2015 MYE) and the latest estimates of international migration[6]

1.3. To assess the housing requirement of any area it is necessary to:

1.3.1. Estimate the size and age structure of the population that will need to be housed.

[1] The *National Planning Policy Framework* was published on 27 March 2012 and sets out the Government's planning policies for England and how these are expected to be applied. See http://www.communities.gov.uk/publications/planningandbuilding/nppf

[2] The *Planning Practice Guidance* was launched by the Department for Communities and Local Government (DCLG) on 6 March 2014 as a web-based resource and has been periodically updated since then. It is available at http://planningguidance.planningportal.gov.uk/

[3] The *Subnational population projections for England: 2014-based projections* were published on 25 May 2016 and are available at http://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/subnationalpopulationprojectionsforengland/2014basedprojections

[4] The *2014-based Household Projections: England, 2014-2039* were published on 12 July 2016 and are available at https://www.gov.uk/government/statistics/2012-based-household-projections-in-england-2012-to-2037

[5] The *Population Estimates for UK, England and Wales, Scotland and Northern Ireland: mid-2015* were published on 23 June 2016 and are available at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/latest

[6] See *Migration Statistics Quarterly Report, November 2015* which was released on 26 November 2015 and is available at http://www.ons.gov.uk/ons/rel/migration1/migration-statistics-quarterly-report/november-2015/index.html

1.3.2. Take a view on how that population will group itself into households. This, combined with the population estimate, enables the number of extra households which will need to be housed to be estimated.

1.3.3. An allowance needs then to be added for properties which will be empty or second homes to produce a demographically-based estimate of the housing requirement – the 'demographic OAN'.

1.3.4. Finally, consideration needs to be given to whether there are any factors which will not have been reflected in this approach. These might include:

- market signals which suggest that the local housing market has been under particular stress;
- unmet housing needs or past undersupply which will have affected the trend-based assessment of future housing needs produced by a demographic approach; and,
- whether additional housing is needed to ensure that the area can accommodate sufficient workers to support the projected level of economic growth.

1.3.5. Any such adjustments are added to the demographic OAN to produce the 'full OAN' (FOAN).

1.4. The report follows through these steps in order. In doing so it considers both the Cotswold District Council area and the wider housing market area of Gloucestershire.

1.5. There are earlier NMSS reports on the OAN of Cotswold District[7, 8]. This report updates that work and is intended to present in a single, standalone document all of the material that is relevant to an up to date assessment of the OAN: it is not an update report that needs to be read alongside the earlier reports.

[7] *The Objectively Assessed Housing Needs of Stroud, Forest of Dean and Cotswold (Revised)*, Neil McDonald with Christine Whitehead, October 2014. See: https://www.fdean.gov.uk/media/Assets/ForwardPlan/documents/AllocationsPlan/141215_Report_to_Stroud_Cotswold_and_Forest_of_Dean_with_appendices_Revised.pdf

[8] *An Updated Estimate of the Objectively Assessed Housing Needs of Cotswold District*, NMSS, March 2016. See http://www.cotswold.gov.uk/media/1392223/OAN-update-Mar-16.pdf

2. COTSWOLD AND THE GLOUCESTERSHIRE HOUSING MARKET AREA

2.1. Cotswold is one of six districts in Gloucestershire. It is the most easterly and has close links to Swindon, Oxfordshire and Wiltshire, with all of which it shares boundaries. In view of those linkages it is appropriate to review briefly the extent to which it is properly part of the Gloucestershire HMA rather than the HMAs of other adjacent authorities.

2.2. A key issue in determining whether an area is an appropriate one to consider as an HMA is the extent to which it is self-contained both in terms of house moves and employment. By the same token, one way of determining whether Cotswold fits best as part of the Gloucestershire HMA or some other HMA is to consider whether more of its house moves or in and out commuter journeys are to and from the rest of Gloucestershire or some other HMA.

2.3. Figures 1.1 and 1.2 below show the Census 2011 data for moves within the year before the census within and to and from Cotswold. As can be seen, moves within Cotswold itself dominate. There are more moves from Wiltshire into Cotswold than moves from Cheltenham but that is hardly a like for like comparison given the size of Wiltshire. If moves to and from the rest of Gloucestershire are compared with moves to and from both Oxfordshire and Wiltshire, the moves to and from the rest of Gloucestershire are larger by a factor of more than two. Moves to and from Swindon rank below moves to and from both Cheltenham and Stroud. It is therefore clear that on this measure Cotswold is a better fit with the rest of Gloucestershire than other counties or Swindon.

Figure 2.1: Moves within and into Cotswold

Address one year ago	
Cotswold	4,105
Wiltshire	412
Cheltenham	340
Stroud	277
Swindon	256
West Oxfordshire	225
Stratford-on-Avon	209
Wychavon	132
Tewkesbury	124
Gloucester	111
Rest of Gloucestershire	915
Oxfordshire	430

From ONS 2011 census table MM01CUK

Figure 2.2: Moves within and out of Cotswold

Address moved to in last year	
Cotswold	4,105
Cheltenham	419
Wiltshire	412
Stroud	329
Swindon	280
Stratford-on-Avon	198
West Oxfordshire	172
Wychavon	148
Gloucester	125
Tewkesbury	125
Rest of Gloucestershire	1,068
Oxfordshire	369

From ONS 2011 census table MM01CUK

2.4. Figures 2.3 and 2.4 present similar data from the 2011 census for in and out commuting. For inflows, the flows from Stroud are larger than those from either Wiltshire as a whole or Swindon. The flow out to Swindon is, however, larger than

that to Cheltenham but less than half that to the rest of Gloucestershire. In terms of county flows, the flows in from and out to the rest of Gloucestershire are very much larger than those from and to both Wiltshire and Oxfordshire. Therefore on this measure Cotswold is also a better fit with the rest of Gloucestershire than with any neighbouring HMA.

Figure 2.3: Commuter flows into Cotswold	
Stroud	2,334
Wiltshire	1,982
Swindon	1,776
Cheltenham	1,768
Wychavon	1,460
Gloucester	948
Tewkesbury	873
Stratford-on-Avon	786
West Oxfordshire	683
Forest of Dean	329
Rest of Gloucestershire	6,252
Oxfordshire	984

From ONS 2011 census table WU01CUK

Figure 2.4: Commuter flows out of Cotswold	
Swindon	1,915
Cheltenham	1,487
Wiltshire	1,398
West Oxfordshire	1,052
Stroud	957
Gloucester	796
Tewkesbury	687
Stratford-on-Avon	634
Westminster,City of London	418
Wychavon	382
Rest of Gloucestershire	4,074
Oxfordshire	1,911

From ONS 2011 census table WU01CUK

2.5. The overall conclusion is that Cotswold is appropriately considered as part of the Gloucestershire HMA rather than as part of any other HMA.

3. WHAT POPULATION SHOULD BE PLANNED FOR?

Introduction

3.1. The first step in preparing a demographic estimate of an area's objectively assessed needs (OAN) for housing is to reach a view on the number of people to be planned for by age group and gender. This section takes as its starting point the most recent ONS population projections and considers whether they provide a prudent basis on which to plan.

The recent ONS population projections

3.2. There are now three sets of ONS population projections which post-date the 2011 census:

3.2.1. The Interim 2011-based subnational population projections for England[9] (2011 SNPP) which were published on 28 September 2012. They only cover the period 2011-21 and have a number of acknowledged weaknesses stemming from the fact that they were produced relatively quickly following the census, before the necessary data was available to update the trends on which they are based. As a result they can over-estimate births in some areas and either over- or underestimate population flows between local authorities. As they have been superseded by both the 2012-based and 2014-based population projections they are not discussed further in this report.

3.2.2. The 2012 Sub-national Population Projections for England (2012 SNPP) which were published on 29 May 2014[10]. They take as their starting point the 2012 population estimates. They cover the period 2012 to 2037. Unlike the 2011-based interim projections, the 2012 SNPP involve a full re-working of the trends which are used to project population growth. However, there are two significant issues with these projections:

- The projections for flows between local authorities are estimated from data from the five years 2007-8 to 2011-12, a period which included a severe economic downturn, during which activity in the housing market and population flows between local authorities were generally depressed, although the effect varies considerably from authority to authority.

[9] Interim 2011-based subnational population projections for England, ONS, 28 September 2012, http://www.ons.gov.uk/ons/rel/snpp/sub-national-population-projections/Interim-2011-based/index.html

[10] The *2012-based Subnational Population Projections for England* were published on 29 May 2014 and are available at http://www.ons.gov.uk/ons/rel/snpp/sub-national-population-projections/2012-based-projections/stb-2012-based-snpp.html

- The projections ignore population changes which occurred between 2001 and 2011 which the ONS have not been able to attribute to any of the 'components of change' (births, deaths, and flows in and out, from and to the rest of the UK and abroad). For some authorities these 'unattributable population changes' (UPCs) can be large compared with the total population change between the censuses. Not taking them into account may have introduced significant errors into some projections.

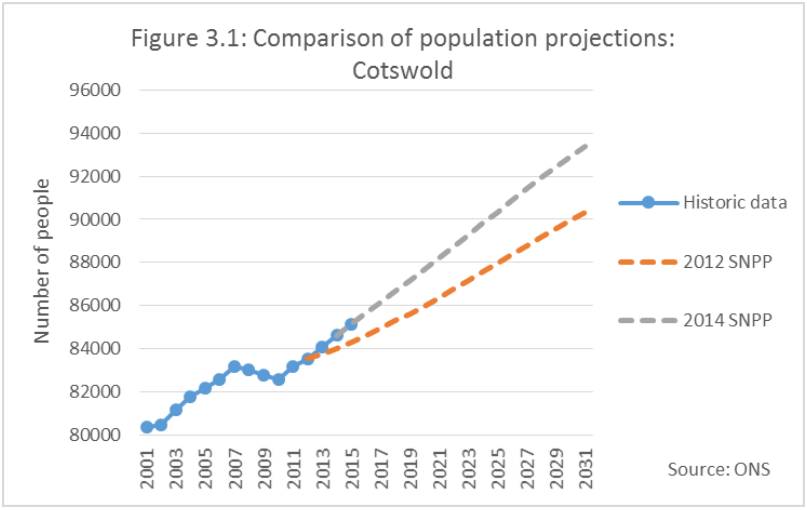
3.2.3. The latest ONS local authority level population projections are the 2014 Sub-national Population Projections for England (2014 SNPP) which were published on 25 May 2016[3]. They take as their starting point the 2014 population estimates. They cover the period 2014 to 2039. As with the 2012 SNPP, they involve a full re-working of the trends which are used to project population growth. The same issues about the use of 5-year trend periods and ignoring UPC also apply, although the impact of the economic downturn is less as the trend periods are two years later.

3.3. The ONS's Annual Mid-year Population Estimates, 2015 (2015 MYE)[5] were published on 23 June 2016 and provide the best available estimates of the actual (as opposed to projected) population of local authorities at 30 June 2015. In some cases the population estimate is higher than that estimated in the 2014 SNPP and in other cases it is lower. This section also considers the consequences of the 2015 MYE for Cotswold.

3.4. The latest estimates for international migration[6] suggest that the net inflow to the UK in the year to 30 June 2015 was 336,000. This is about twice the level assumed in the 2015 SNPP. The implications of this for Cotswold also examined.

What the 2014-based population projections say

Figure 3.1: Comparison of population projections: Cotswold

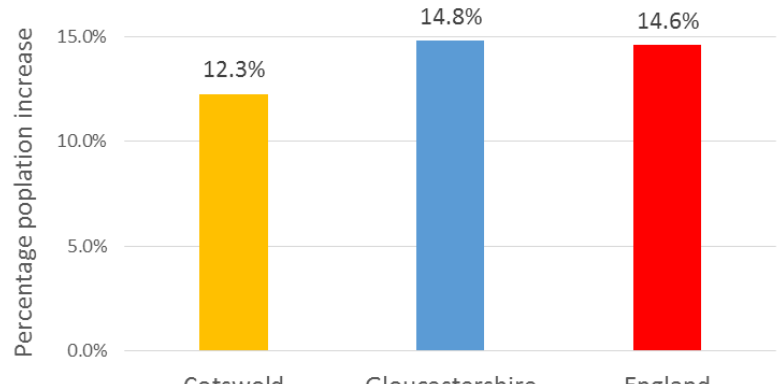


3.5. Figure 3.1 shows the projected growth of Cotswold District according to the 2014 SNPP alongside the 2012 SNPP projection. The blue line indicates the actual

population estimates that are now available. Note that there are three data points which have become available since the 2012 SNPP was produced (i.e. those for mid-year 2013, 2014 and 2015). All of these suggest that the 2012 SNPP was underestimating the likely population increase, which the 2014 SNPP has now corrected. Over the period 2011-2031, the 2014 SNPP envisages a population increase of 10,199 compared with the 2012 SNPP's 7144. The difference is 3055: the 2014 SNPP increase is 43% faster than that suggested in the 2012 SNPP. Indeed, Figure 3.1 suggests that the district has settled back into population growth similar to that seen in the period 2002-07 before the economic downturn intervened.

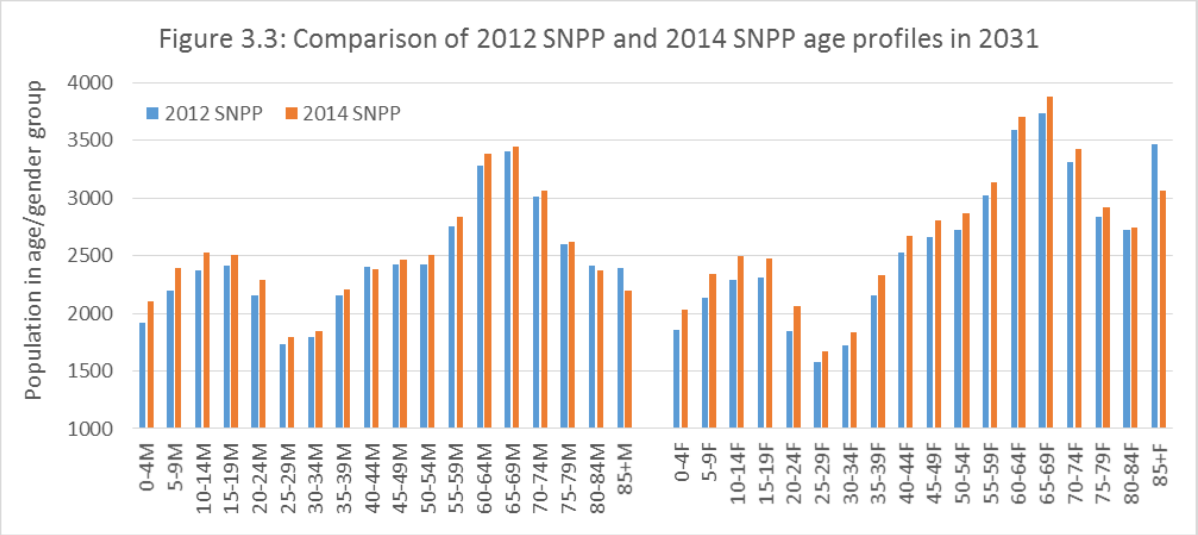
3.6. Figure 3.2 shows how the projected population increase for Cotswold in 2014 SNPP compares with that projected for Gloucestershire and England.

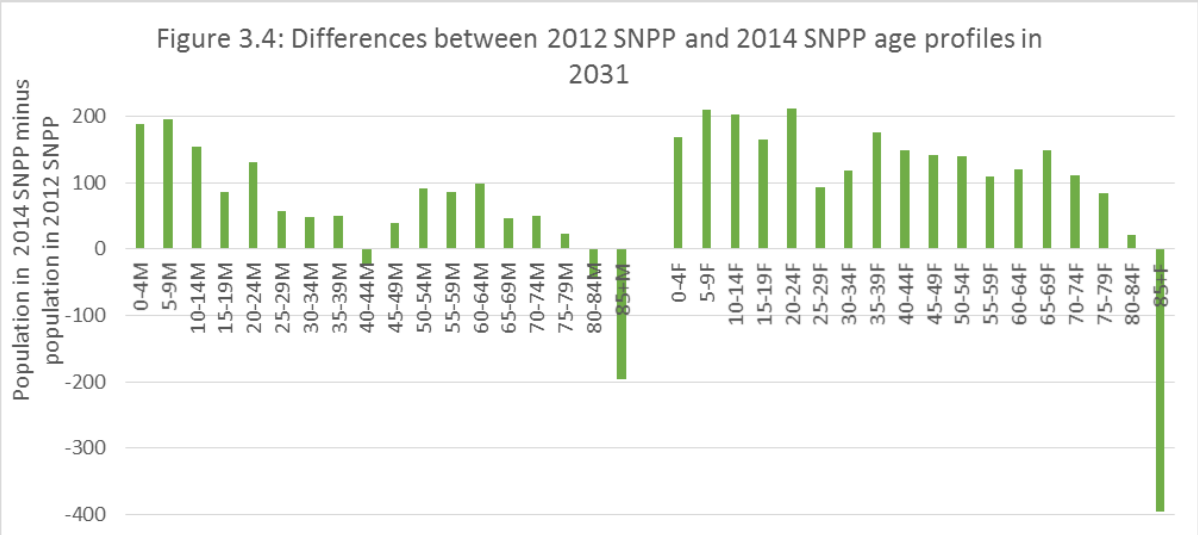
Figure 3.2: Population increase 2011-31: 2014 SNPP



3.7. As the chart shows, the projected growth rate for Cotswold is a little slower than for both Gloucestershire and England. However, the differential is much lower than suggested by the 2012 SNPP, which envisaged that the population of Cotswold would grow by only 8.6% between 2011 and 2031 when Gloucestershire was projected to grow by 13.3% and England by 13.8%. Such a disparity had seemed strange for an area with a buoyant economy.

3.8. As the tendency to form separate households (the household formation rate) varies considerably with age and gender, how the age profiles of the 2012 and 2014 SNPPs differ is almost as significant as the total population increase that they envisage. Chart 3.4 compares the age profiles of the two projections at the end of the plan period in 2031. Chart 3.5 plots the differences between the two projections in 2031 to enable them to be seen more clearly.





3.9. As can be seen, in almost all age groups the 2014 SNPP envisages higher population. The notable exceptions being the over 85 age group. The difference there is likely to be due to the slightly higher mortality rates assumed in the 2014 SNPP (see below).

2015 Mid-Year Estimates

3.10. The 2015 Mid-Year Estimates (2015 MYE) provide the ONS's latest estimates of the population in each district at 30 June 2014 as well as estimates of the 'components of change' (births, deaths and flows into and out of an area) that have caused the population changes in the year 2014-15 (as well as earlier years). They therefore provide a year's actual data in the period in covered by the 2014 SNPP and so give an initial indication of how close those projections are to what is happening. In this case the figure projected in the 2014 SNPP for 2015 (85,159) is extremely close to the 2015 MYE figure (85,162). This should, however, be treated with some caution: what has happened in the first year of a 25 year projection period is not necessarily

a reliable indication of what is likely to happen over the period as a whole. The mid-year estimates are also subject to sampling error and other uncertainties[11].

Understanding how populations change

3.11. To understand why the projected population increase has changed between the 2012 SNPP and the 2014 SNPP and to take an informed view as to whether either should be used as a basis for planning for housing with or without adjustments, it is necessary to understand how populations change and how the ONS projects populations.

3.12. The future population of any area is simply the current population plus those who come less those who go. Those who come are those who are born in the area plus those who move in from outside. Those who go are those who die plus those who leave the area. It is helpful to divide arrivals and departures into those who come from or go to the rest of the UK and those who come from or go to other countries. This gives six 'components of population change':

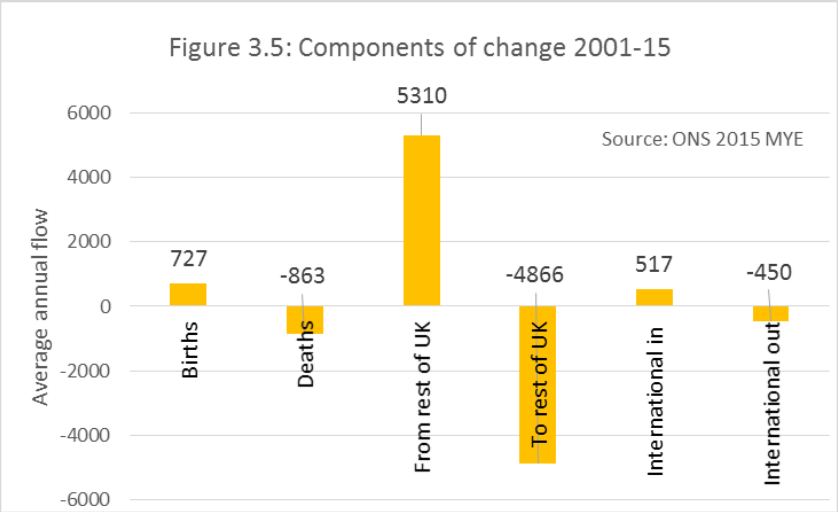
- Births
- Deaths
- Arrivals from other parts of the UK – "UK flow in"
- Departures to other parts of the UK – "UK flow out"
- Arrivals from abroad – "international migration in"
- Departures abroad – "international migration out"

Taking a view on the plausibility of a projected population change

3.13. The ONS constructs it projections by making projections for each of the components of change and applying these to the base population one year at a time. After each year's births, deaths and migration flows have been taken into account a new base population is established to which the next year's births, deaths and migration flows are applied. The cycle then continues to the end of the projection period. By examining each of the six components of change individually it is possible to take a view on how reasonable or otherwise the overall projection for the population of any local authority area might be. This can be done by comparing the projected flow with the recent past to assess how plausible it might be.

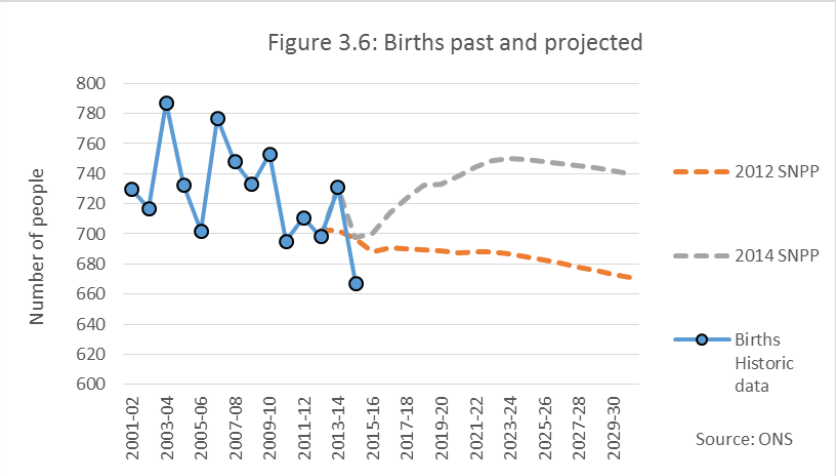
[11] In the Background notes to *Annual Mid-year Population Estimates, 2014* (paragraph 12) the ONS notes in relation to the national population estimates (which the local authority area estimates are constrained to be consistent with) that, "As the national population estimates rely on Census estimates of the population in 2011 and survey estimates of international migration since then, the population estimate will be affected by sampling error." There are also significant additional uncertainties at the local authority level due to the difficulties in determining the ultimate destinations of international in migrants; the origins of international out migrants and the estimation of flows between local authorities. Mid-year estimates become increasingly uncertain the further they are from the most recent census.

3.14. Figure 3.5 shows how the six components of change have contributed to the population changes which occurred in the district between 2001 and 2015. This gives an indication of the relative size of the flows. The flows to and from the rest of the UK have been substantially larger than the other flows. Although the flow out to the rest of the UK has partially offset the flow in, the net flow from the rest of the UK has been by a large margin the biggest driver of population change.



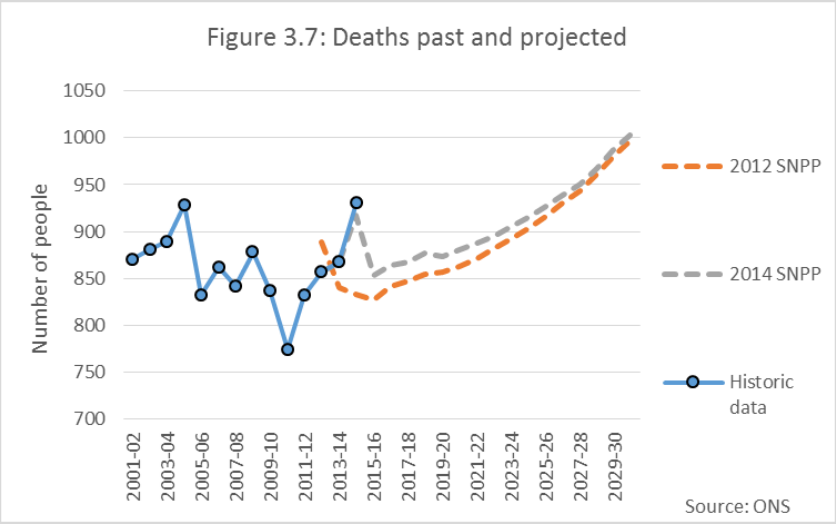
Births

3.15. Figure 3.6 compares the 2012 and 2014 SNPP projections for births with the historic data up to and including the 2015 MYE. The higher number of births in the 2014 SNPP reflects the higher projected population. The falling projection (after an initial increase in the 2014 SNPP) almost certainly reflects the ageing of the population. The projections fit reasonably well with the historic data so there is no case for adjusting this aspect of them.



Deaths

3.16. Figure 3.7 compares the 2012 and 2014 SNPP projections for deaths with the historical trends. The difference between the two is relatively small and the rising trend will again reflect the ageing of the population. There is no reason to question this aspect of the projections.



Flows to and from the rest of the UK

3.17. As already noted, the flows to and from the rest of the UK are by some way the largest of the six components of change. Unlike births, they have an immediate impact on the adult population of an area and therefore have significant implications for household numbers and housing requirements. This suggests that the projections in this area deserve careful attention.

3.18. There are two complicating factors: the data sources on which the trends are based (primarily GP registrations) are not of a high quality and, in the 2012 SNPP, the projected flows between local authorities in the UK were based on flow rates in the period 2007-12, a period which included the most severe economic downturn for more than a generation. For some authorities this latter factor will have had a significant impact on net flows, and hence the rate at which the population is projected to increase.

3.19. It can be argued that the appropriate course of action is to base the projections on either a 'typical' period or a longer period. A longer period would have the advantage of being less affected by economic or housing market cycles. This argument is particularly strong at a time such as this when the economy is recovering after a prolonged and deep recession. It is likely that flows will return to higher levels once more normal economic conditions return, although that is not to say that the years immediately before 2008 were typical or that those flow rates will necessarily occur again.

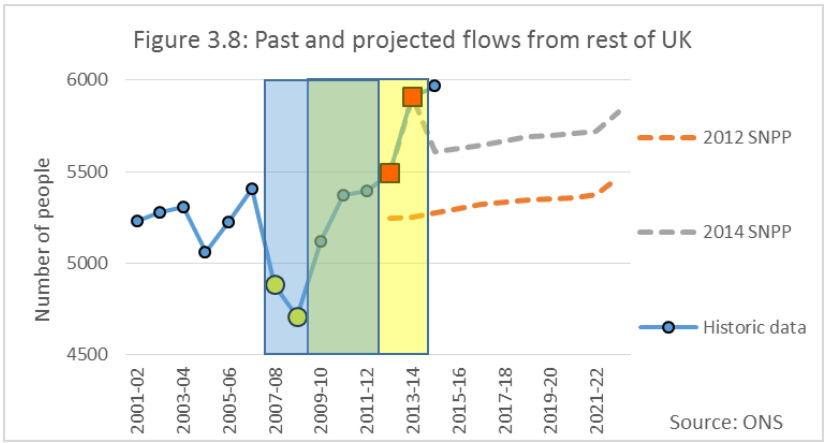
3.20. The ONS do not, however follow this approach in the official population projections: they base their trends on the most recent five year period available at the time. This has the advantage of picking up changes in trends more quickly, but the disadvantage of potential distortions as a result of cyclical changes.

3.21. A key consideration is that, by definition, net internal migration flows between local authorities in the UK must sum to zero. This means that adjusting the projected net flow into an authority to reflect a longer trend period should be accompanied by compensating adjustments in the other direction for the authorities which are net exporters of people to that authority. Or, to put this another way, making this kind of adjustment would have the effect of moving a projected population increase between authorities, whilst keeping the overall UK population increase unchanged.

3.22. As the net UK flow is often a relatively small difference between two much larger gross 'in' and 'out' flows a small percentage change in either the projected 'in' or 'out' flow can result in a large change in the projected net flow. This in turn can have significant consequences for the projected change in population and hence the housing requirement.

3.23. Figure 3.8 compares the 2012 and 2014 SNPP projections for inflows with the historical data. Note that the inflow into Cotswold fell after 2006-7 but has recovered strongly since 2009-10. The trend period used by the2012 SNPP – 2007-8 to 2011-12 is highlighted in blue and that for the 2014 SNPP is yellow. An inflow projection based on the 2012 SNPP trend period would be based on the data that gave rise to the low flows in 2007-08 and 2008-09 (shown as yellow circles) as well as the flows in the overlapping area (shown as small blue circles). Moving the trend period forward two years to produce the 2014 SNPP causes the low flows in 2007-08 and 2008-09 to drop out of the period and the much higher flows in 2012-13 and 2013-14 (shown as red squares) to come into the period. The net result is that the average flow rates in the 2014 SNPP trend period are higher than those in the 2012 SNPP trend period, resulting in a higher projected inflow.

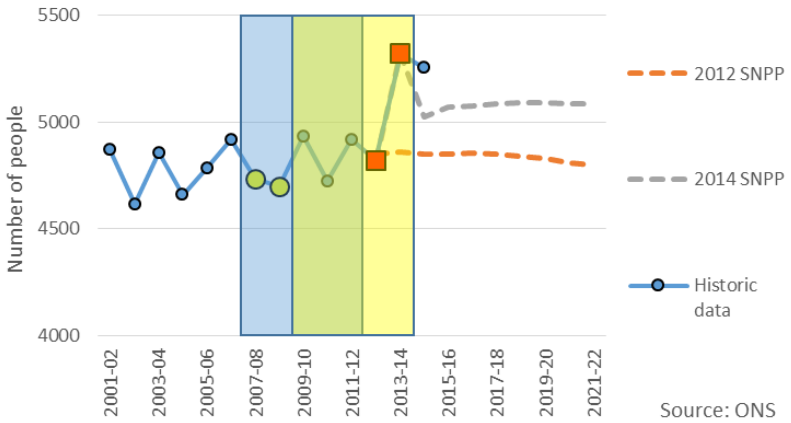
Figure 3.8: Past and projected flows from rest of UK



3.24. Figure 3.9 (below) is the equivalent chart for flows out of Cotswold District to the rest of the UK. The historic data suggests that the economic downturn did not have much impact on flows out of Cotswold but in 2013-14 and 2014-15 the outflows have been higher than at any time since 2001-02, if not earlier. Moving the trend

period from the years used for the 2012 SNPP to those used for the 2014 SNPP causes two low years to drop out of the period and two high years to come into it. The net result is that flow rates are higher and the projected outflows are also higher.

Figure 3.9: Past and projected flows to the rest of UK



3.25. As the increase in the projected inflows between 2012 SNPP and 2014 SNPP is larger than the increase in projected outflows, the net inflow is larger in 2014 SNPP. It is this which drives the faster population increase in the later projection.

3.26. From Figure 3.8 it seems fairly clear that the flows into Cotswold the years 2007-08 and 2008-09 were atypically low and that using them as two of five trend points is likely to result in a population projection that is too low. The 2014 SNPP trend period does not suffer from this kind of distortion, at least not to anywhere near the same extent, although it might be argued that it gives too much weight to the higher in and out flows in 2013-14 which might also not be typical. This suggests that there is a case for adjusting the projected flows to reflect a longer tend period. Given that we now have data for the 10-year period 2005-15 that is the obvious choice.

3.27. At the same time it makes sense to re-base the population projections so that they start from the population in the 2015 MYE as this is the ONS's best view of what the position actually was at that date. The population projections are produced by adding births and inflows to a base year position and subtracting deaths and outflows to produce the next year's estimated population – and then repeating that process until the end of the projection period is reached. What re-basing does is replace the population projection for 2015 that has been produced by the ONS in the 2014 SNPP with the ONS's estimate of the actual population for that year from the 2015 MYE. The revised projection then 'steps forward' from those figures for the rest of the projection period. The analysis continues to be for the period 2011 to 2031: it is just that the projection for 2031 is improved by using the data from the 2015 MYE.

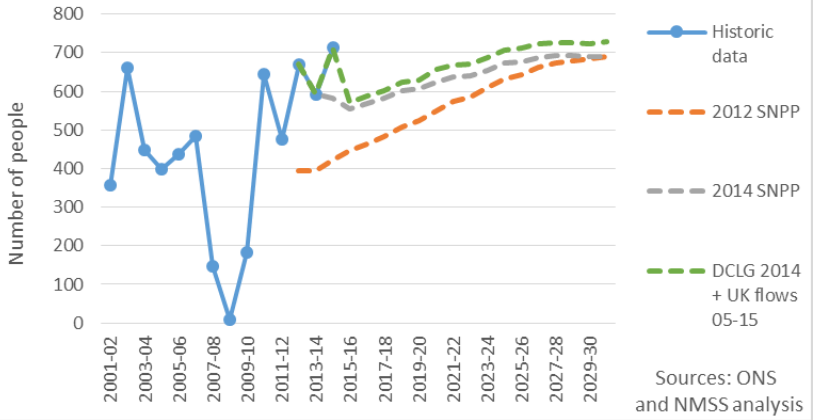
3.28. There is a significant technical issue in adjusting the 2014 SNPP to reflect a different trend period. It is relatively straightforward to adjust the projected outflows as

these are calculated by applying average flow rates from the chosen trend period to the projected future population (after adjustments for births and deaths in the year in question). The ONS does not, however, project inflows as such but instead projects the outflows from all local authorities in the country and allocates these to destination authorities in line with the historical pattern of flows. The projected inflow into a local authority is the sum of the proportions of the projected outflows from all 325 other local authorities plus Wales, Scotland and Northern Ireland that are expected to have that authority as their destination. It is therefore impractical to replicate exactly what the consequences would have been of the ONS using the period 2005-15 as their trend period rather than 2009-14: an approximation needs to be made.

3.29. The approach used is to express the annual historic inflows in each year of age and gender group as a percentage of the population of the rest of the UK in that year of age and gender group to produce a flow rate. The average flow rates for the periods 2009-14 and 2005-15 are then calculated. The average 2005-15 rate is expressed as a percentage increase or decrease compared with the average 2009-14 rate and that increase or decrease is used to adjust the projected inflows in the 2014 SNPP for each year of age and sex. For example, if the average inflow rate for 2005-15 for females age 24 was 5% higher than the average rate for 2009-14, then the inflows projected by the ONS would be uplifted by 5%, that percentage being regarded as a proxy for the higher flow rates the ONS would have calculated had it used 2005-15 as its trend period. Other approaches could be used to make this adjustment. They each have their advantages and disadvantages. The impact of some of the alternative approaches is explored in the chapter on sensitivity analysis.

3.30. Figure 3.10 shows the impact of adjusting the UK flow projections so that they are based on flows in the period 2005-15. The result is a projection which is reasonably close to, but slightly higher than, the 2014 SNPP.

Figure 3.10: Past and projected net flow from the rest of UK



3.31. The Table at Figure 3.11 below sets out the results of adjusting flows to and from the rest of the UK to reflect the period 2005-15 and re-basing the projection to the 2015 MYE population estimates.

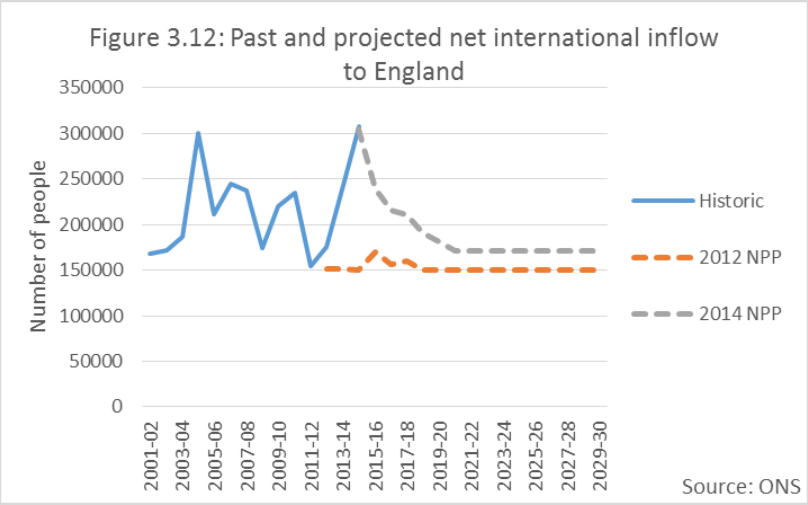
Figure 3.11: Adjusting for 10-year UK flows and 2015 MYE		
Change 2011 - 2031		Population
A	**2014 SNPP**	**10199**
B	Adjustment for 2005-15 UK flows + 2015 MYE	293
C	**2005-05 UK flows + re-basing to 2015 MYE**	**10492**

3.32. As can be seen, the impact of these adjustments is small. The additional population increase above that suggested by the 2014 SNPP is only 293 people over the 20 year period i.e. 15 a year or 3% of the projected population increase.

International flows

3.33. The ONS project international migration to and from local authorities by disaggregating their national projection for international flows. The share which is attributed to an authority is based on the flows to and from that authority over the six years up to the base year of the projection.

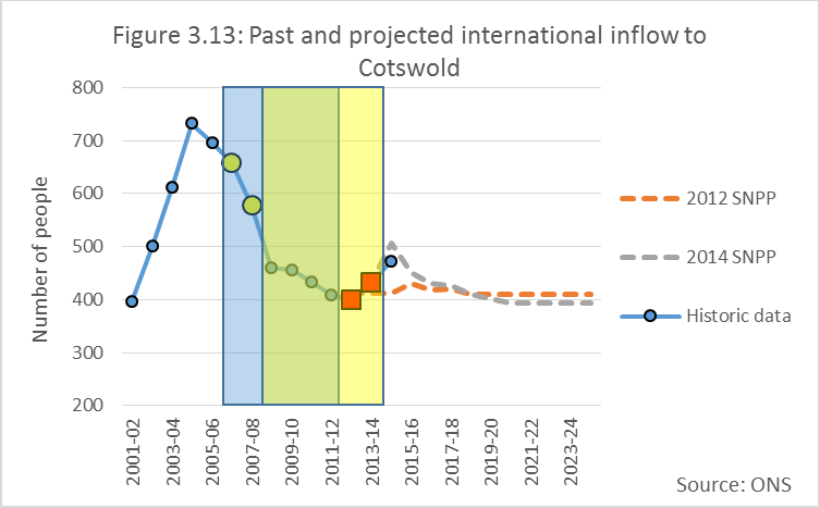
3.34. Figure 3.12 shows the 2012-based National Population Projection[12] (2012 NPP) and its 2014-based successor, the 2014 NPP[13]. The former underpins the 2012 SNPP and the latter the 2014 SNPP. As can be seen, both national projections are below the net flow seen in the previous 10 years and about half of the net flow suggested by the most recent data. The 2014 NPP settles to a slightly higher long term net flow: 170,000 people a year rather than 150,000. As result, all other things being equal, you would expect net international flows into an authority to be slightly larger in the 2014 SNPP than in the 2012 SNPP unless the authority's share of the net international flow has fallen between the 2012 and 2014 SNPP trend periods.



3.35. Figure 3.13 compares the 2012 SNPP and 2014 projections for international inflows to Cotswold, with the trend periods for each shaded in blue and yellow as before.

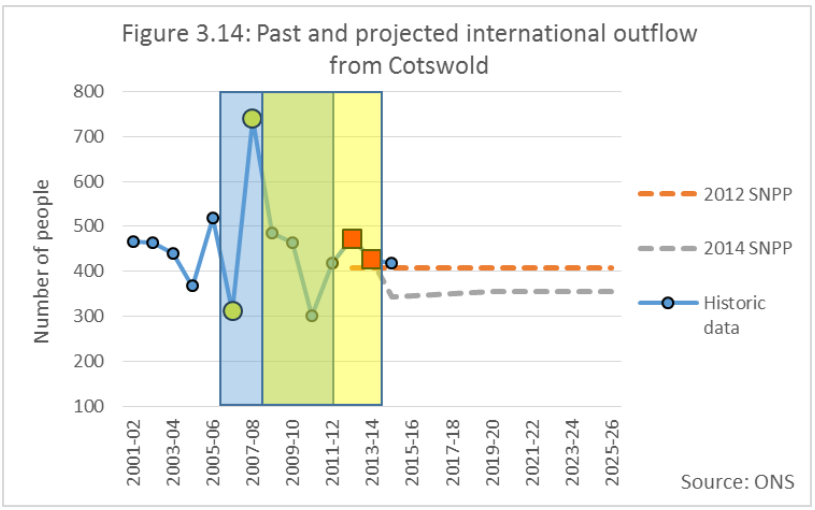
[12] See *National Population Projections, 2012-based Statistical Bulletin* published on 6 November 2013 and available at http://www.ons.gov.uk/ons/rel/npp/national-population-projections/2012-based-projections/stb-2012-based-npp-principal-and-key-variants.html#tab-Introduction

[13] See *National Population Projections, 2014-based Statistical Bulletin* published on 29 October 2015



3.36. The two data points which fall out of the trend period between the 2012 SNPP and the 2014 SNPP (2006-07 and 2007-08, shown as yellow circles) are both significantly higher than the two data points which enter the trend period (2012-13 and 2013-14, shown as red squares). As a result the projected inflow to Cotswold settles to a lower long term level in the 2014 SNPP than in the 2012 SNPP notwithstanding that the 2014 NPP envisages a higher net England inflow.

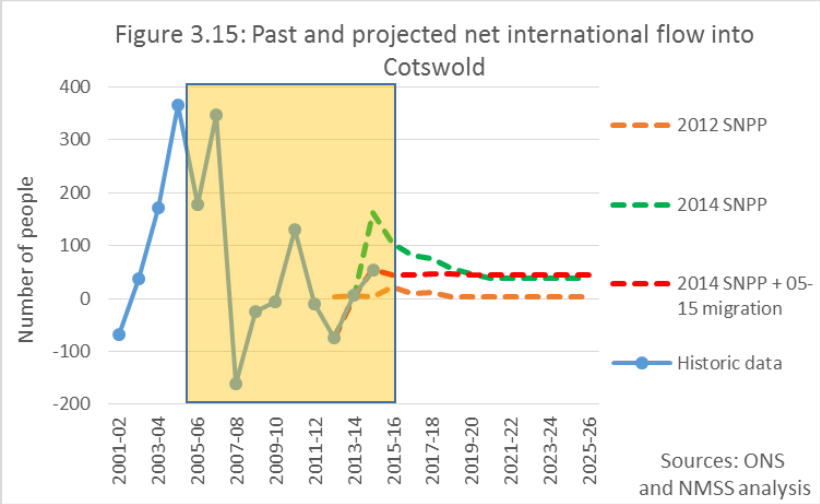
3.37. Figure 3.14 is the equivalent chart for international outflows. As with the inflows, the data points which leave the trend period between the 2012 SNPP and the 2014 SNPP have a higher average than those which enter it. The result is that the 2014 SNPP has a lower projected outflow.



3.38. The discrepancy between the national projections which underpin both the 2012 and 2014 SNPPs and the recent flow levels has led some to suggest that there should be a substantial uplift to the projected net international flows into local authorities to reflect a more realistic view of future international migration. Whilst there may be a case for some uplift, it would be wrong to uplift the projected international flows for individual local authorities by some standard national factor as the discrepancy between what has happened recently and what is projected varies considerably from one authority to another. A better approach would be to

adjust the projected flows to and from individual authorities to reflect what has actually happened in those areas.

3.39. Figure 3.15 shows the impact of adjusting the net inflows to reflect the actual flows into Cotswold in the period 2005-15. The trend period is shaded orange.



3.40. Note that the 10-year trend projection:

3.40.1. does not include the peak net inflow which the 2014 SNPP (green dashes) envisages in 2014-15 but which the 2015 MYE suggests did not happen;

3.40.2. brings into its trend period two years of higher net flows in 2005-06 and 2006-07 and it can be queried whether it is appropriate to include those years as so far there is no indication that net international flows are returning to the high levels seen in 2003-07.

3.41. Overall the 10-year projection is more realistic, albeit possibly a little on the high side compared due to the inclusion of the high years at the beginning of the trend period, although these are counterbalanced to some extent by the low flow in 2007-08.

3.42. Figure 3.16 shows the impact of adjusting to reflect 10-year international flows. Again the impact is small. The change is a reduction of only 160 over the 20 year period i.e. 8 people a year or -1.5% of the projected population increase.

Figure 3.16: Adjusting for 10-year international flows		
Change 2011 - 2031		Population
A	**2014 SNPP**	10199
B	Adjustment for 2005-15 UK flows + 2015 MYE	293
C	**2005-05 UK flows + re-basing to 2015 MYE**	**10492**
D	Adjustment for 2005-15 international flows	-160
E	**05-15 trend for all flows + 2015 MYE re-base**	**10332**

Unattributable Population Change (UPC)

3.43. If all of the data were completely accurate the population in one census plus the cumulative effect of the components of change in the intervening years would equal the population counted in the next census. That is not the case: there is a discrepancy known as the 'Unattributable Population Change' (UPC). At the national level the discrepancy was 103,700 people between the 2001 and 2011 censuses. That is not a large number in the context of England's population of 53 million in 2011, only 0.2%. It is, however, 2.8% of the population change between the two censuses and that is arguably the more relevant comparison.

3.44. At the local authority level UPC can be much larger proportionately. There are 28 English local authorities for which the total UPC over the period 2001-11 is more that 5% of the population in 2011 and 83 for which the average UPC is more than 50% of the average population change between 2001 and 2011. A discrepancy of that size is highly significant in estimating population changes.

3.45. It is not thought likely that there are significant errors in the estimation of births and deaths as we have effective registration systems for both. That leaves three possible causes of UPC:

- International migration estimates
- Flows within the UK
- Census estimates in both 2001 and 2011

3.46. The ONS considered the arguments for and against taking UPC into account in its 2012 sub-national population projections and decided not to. The main reasons were that:

3.46.1. It is unclear what proportion of UPC is due to errors in the 2001 and 2011 censuses and what proportion is due to errors in the components of change. Insofar as the errors are in either the 2001 and 2011 censuses they will not affect projections based on trends in the components of change.

3.46.2. If UPC is due to international migration, the biggest impacts will have been during the earlier years of the decade as significant improvements in the migration estimates were made in the latter part of the decade.

3.47. For Cotswold UPC for the period 2001-11 was -908 or -33% of population change suggested by the 2001 and 2011 censuses. This means that the ONS estimates of births, deaths and flows in and out taken together exaggerate the population change the 2001 and 2011 censuses by a third. This is a substantial discrepancy.

3.48. The ONS publishes[14] 95% confidence intervals[15] for its census population estimates. For Cotswold these were 1.1% for the 2001 census and 1.09% for the 2011 census, implying an uncertainty of +/- 884 in the 2001 census and +/- 908 in the 2011 census. It is therefore possible that all of the UPC of 908 may have been entirely due to errors in the two census population estimates and none of it to errors in the estimates made of the components of change. If this is the case UPC would not have affected the population projections. The assumption at the other end of the spectrum is that all of UPC was due to errors in the components of change. That is equally unlikely. Given the uncertainty, a prudent approach would be to make an allowance for 50% of UPC having affected the projections and then use sensitivity analysis to test the implications of the actual position being either 0% or 100%.

3.49. It should be acknowledged that this approach is different from that adopted in the October 2014 NMSS Report. In that report the analysis erred (doubly) on the side of over-estimating the projected population by including a 100% adjustment for UPC but only where that adjustment had the effect of increasing the projected population. It is now clear that that is an excessively cautious approach, particularly for authorities with significant negative UPCs. This revised view has been given greater weight recently by the interim findings of the Inspector examining the Swale Local Plan in which she endorses that authority's analysis which makes an allowance for negative UPC16. This has the effect reducing their OAN by 24 dwellings a year[17].

3.50. Figure 3.15 shows the effect of making a 50% UPC adjustment (see Row F and G). The impact is to reduce the projected population increase 2011-31 by 471 or 5% of the projected population increase.

Figure 3.17: Adjusting for 50% UPC

Change 2011 - 2031		Population
A	**2014 SNPP**	**10199**
B	Adjustment for 2005-15 UK flows + 2015 MYE	293
C	**2005-05 UK flows + re-basing to 2015 MYE**	**10492**
D	Adjustment for 2005-15 international flows	-160
E	**2015 UK and international flows + 2015 MYE re-base**	**10332**
F	Adjustment for 50% UPC	-471
G	**05-15 trend all flows + 2015 MYE re-base + 50% UPC**	**9861**

[14] http://www.ons.gov.uk/ons/guide-method/census/2011/census-data/2011-census-data/2011-first-release/first-release--quality-assurance-and-methodology-papers/census-confidence-intervals.xls

[15] A 95 per cent confidence interval is a range within which the true population would fall for 95 per cent of all possible samples that could have been selected.

[16] *Inspector's Interim Findings – Part 2,* 4 February 2016, see http://archive.swale.gov.uk/assets/Planning-General/Planning-Policy/Evidence-Base/Interim-Findings-2016/ID9c-Final-04022016.pdf

[17] *Note on Unattributable Population Change*, 18 November 2015, see http://archive.swale.gov.uk/assets/Planning-General/Planning-Policy/Evidence-Base/Local-Plan-2014/Examination-documents/SBCEX04-Note-on-Swale-UPC.pdf

3.51. The combined impact of the three adjustments is to reduce the population increase projected in the 2014 SNPP by 338 people over the 20 year period i.e. just 17 a year or 3% projected population increase.

3.52. As the tendency to form separate households varies with age and gender it is also useful to understand how the age profile of the projected population has been affected by the adjustments made to the 2014 SNPP. Figure 3.18 compares the adjusted population projection (the 'demographic OAN' projection) with the 2014 SNPP in 2031 and Figure 3.19 plots the differences between the two.

Figure 3.18: Comparison of 2014 SNPP demographic OAN age profiles in 2031

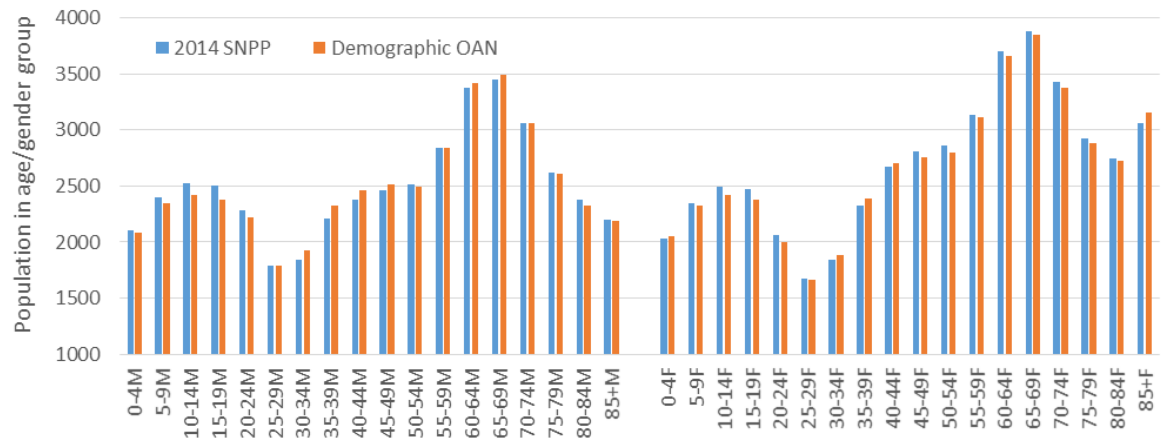
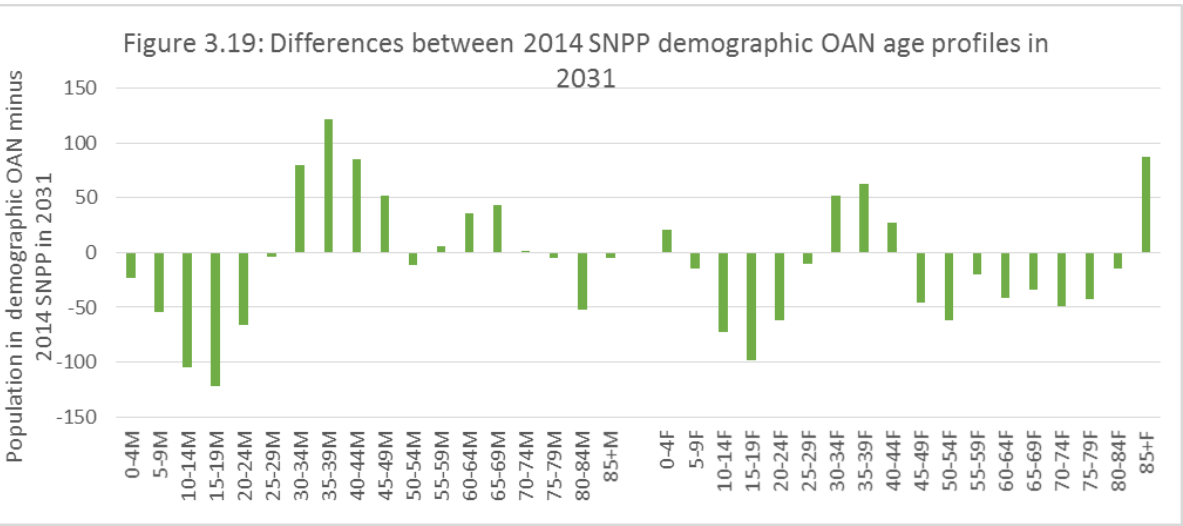


Figure 3.19: Differences between 2014 SNPP demographic OAN age profiles in 2031



3.53. As can be seen most clearly from Figure 3.19, the differences in individual 5-year age/gender groups are small and there is no very clear pattern to them. This is not surprising given that the changes between the 2014 SNPP and demographic OAN projection are the result of three sets of small changes, one of which partially cancels out the effect of the other two.

Comparison with the March 2016 NMSS analysis

3.54. The March 2016 NMSS report proposed that the population to be planned for should be based on the 2012 SNPP, re-based to start from the 2014 MYE

population, with UK and international flows adjusted to reflect flows during 2004-14, and with a 50% UPC adjustment. That gave a population increase of 9839 over the period 2011-31. That is just 22 people fewer than the current analysis i.e. just over one person less a year, a difference of only 0.2% of the projected increase. For all practical purposes the two projections are the same.

3.55. It might be noted, however, that whilst the adjustment in the March 2016 analysis increased the population increase projected in the 2012 SNPP by 38% the current analysis reduces the 2014 SNPP increase by only 3%. In both cases the intention of the adjustments made is to remove any cyclical effects in the official projections and produce the best possible estimate of the likely longer term trend. The fact that such a large adjustment was necessary to the 2012 SNPP indicates that that official projection had been significantly affected by the economic downturn whereas that is not the case for the 2014 SNPP. Moreover, the small difference between the two adjusted projections indicates how effective the method is in producing a stable estimate of the likely longer term trend.

Conclusions on the population to be planned for

3.56. It is proposed that three adjustments should be made to the ONS's 2014-based Sub-national Population Projection for Cotswold to reflect both weaknesses in those projections and the latest evidence available from the 2015 Mid-Year Estimates and the most recent international migration statistics.

3.57. The proposed adjustments are shown in Figure 3.17 (above):

3.57.1. The ONS's 2014 Sub-national Population Projections (2014 SNPP) use 2009-14 as the trend period for projecting flows to and from the rest of the UK. That period was much less affected by the economic downturn than the trend period used in the previous set of official population projections (the 2012 SNPP, which used 2007-12). However, adjusting to reflect flows in the latest 10-year period for which data is available (2005-15) is likely to provide a better view of likely future flows as the impact of the atypical flows during the recession is balanced by the higher flows in earlier years and more weight is given to the flows that have been seen since the downturn. At the same time it makes sense to adjust the projections (re-base them) so that they reflect the ONS's estimate of the actual population in 2015 rather than the projection made for that year in the 2014 SNPP. The effect of this set of adjustments is to increase the projected population increase between 2011 and 2031 from 10199 in the 2014 SNPP to 10492, an increase of 293 or 3%. (Rows B and C)

3.57.2. Net international migration into the UK is currently about twice that assumed by those who compiled the 2014 SNPP. There is a case for adjusting those projections to reflect this. To avoid giving undue weight to flows over a short period whilst reflecting what has actually happened in

Cotswold it is proposed that the international flows should be adjusted to reflect average flows over the latest 10-year period for which data exists i.e. 2005-15. This actually reduces the projected population increase between 2011 and 2031 by 160 or 1.5%, cutting the projected increase from 10,492 to 10,332. (Rows D and E) The fact that the adjustment for Cotswold is small reduction when the national figures would suggest a significant increase underlines the point that the disparity between what has happened and what the ONS method projects varies significantly between individual authorities.

3.57.3. It is debatable whether the projections should make an allowance for Unattributable Population Change (UPC). The ONS made no such allowance in their projections. However, analysis for the Stroud, Cotswold and the Forest of Dean in October 2014 took the view that it was appropriate to err on the side of caution to avoid any possibility of underestimating the population to be planned for. It had therefore assumed that for the authorities for which UPC was positive all of UPC would have contributed to future population increases and that where UPC was negative (as in Cotswold) no adjustment should be made. This assumption was at the other extreme of the range from the ONS's assumption (that none of UPC would have contributed to future population increases). The likelihood is that the actual position will lie somewhere between the two extremes. As there is no way to determine where in the range is most likely, the mid-point has been used in this analysis. This revised view has been given greater weight recently by the interim findings of the Inspector examining the Swale Local Plan in which she endorses that authority's analysis which makes an allowance for negative UPC. The effect is to reduce the projected population increase of Cotswold by 338 or 5%, from 10,332 to 9,861.

3.58. The overall effect of these adjustments is to reduce the 2014 SNPP's projected population increase for Cotswold over the plan period from 10,199 to 9,861, a reduction of 338 or 3%.

4. HOW PEOPLE ARE LIKELY TO GROUP THEMSELVES INTO HOUSEHOLDS

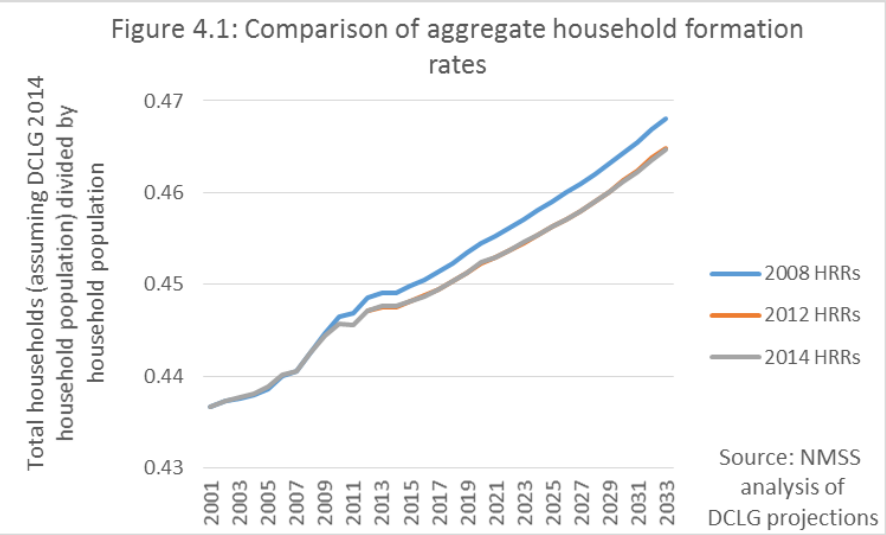
The household projections

4.1. The assumptions made about how people will group themselves together into households are crucial in estimating the number of homes needed. The key issue is whether household formation patterns will revert to the earlier trend towards smaller average household sizes or will the economic downturn, a long period of deteriorating housing affordability and other factors have caused a permanent change?

4.2. There are four recent DCLG household projections: those with base dates of 2008, 2011, 2012 and 2014. The 2008-based projections, in effect, predate the economic downturn and are taken by some as broadly indicative of the previous longer term trend, although there are good reasons to believe that they were optimistic even from the standpoint of the time when they were formulated. The 2011-based projections were produced following the 2011 census and take some account of census data which generally found fewer households than had been envisaged in the 2008-based projections, suggesting that household formation patterns had departed from the previous long term trends. However, they were something of a temporary measure and were not based on a full update of the earlier projections. Now that they have been superseded by more recent, full projections they are of little relevance and are not discussed in any depth in what follows. The 2012-based projections were the first full set of projections following the 2011 census and take much fuller account of that census. They have subsequently been superseded by the 2014-based projections which were published in July 2016.

4.3. Figure 4.1 summarises the view the 2008, 2012 and 2014-based projections take of the likely direction of travel of household formation rates in the Cotswold area.

Figure 4.1: Comparison of aggregate household formation rates



4.4. Note that:

4.4.1. Unlike many other areas, household formation rates continued to rise between 2001 and 2011, albeit at a slower rate than previously.

4.4.2. The difference between the 2008-based projection for the years between the censuses and what we now believe to have happened is relatively small – again unlike many other areas.

4.4.3. The aggregate household formation rates in the 2012 and 2014-based projections are very similar – so much so that in Figure 4.1 the two lines are indistinguishable[18]. As a consequence of this, replacing the 2012-based household formation rates with the 2014-based set only changes an estimate of the OAN by of the order of 1 home a year.

4.4.4. The 2012 and 2014-based projections envisage that aggregate household formation rates will return to rates of growth which are broadly comparable to those envisaged in the 2008-based projections (as can be seen from the way in which the lines for the 2012 and 2014-based projections move to become roughly parallel to the blue line for the 2008-based projections).

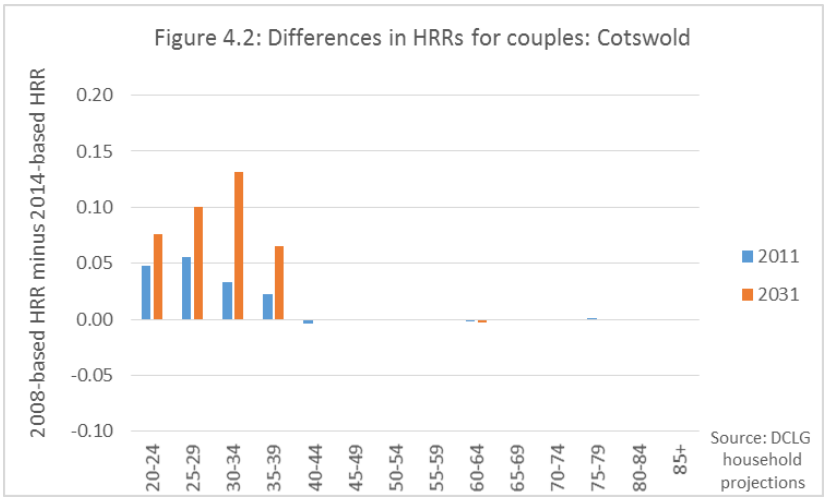
Will household formation rates move towards those in the 2008-based projections?

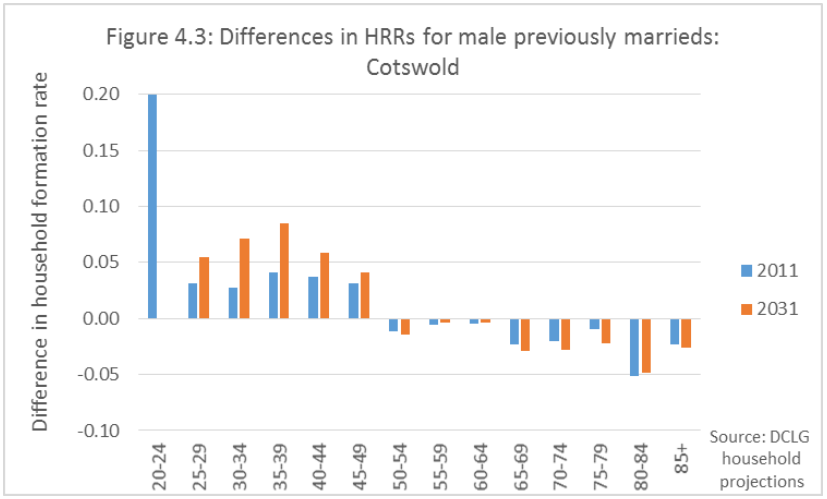
4.5. The key issue is whether or not it should be assumed that household formation rates will not just return to rates of growth similar to those envisaged in the 2008-based projections but will also catch up some or all of the lost ground relative to those earlier projections. As Cotswold is a little different from the typical authority in terms how the 2012 and 2014-based projections compare with the 2008-based projections it is necessary to examine those differences in some detail in order to understand what is happening and give an informed answer to this question. This means looking at the projections for the individual 5-year age groups for each of the three marital status groups used by DCLG in its Stage 1 projections[19]. As there are 75 of these, the challenge is to find a way to see the whole picture. Figures 4.2 – 4.6 attempt to do this. They show for each group the difference in both 2011 and 2031 between the 2008-based household formation rate and the 2014-based rate. A

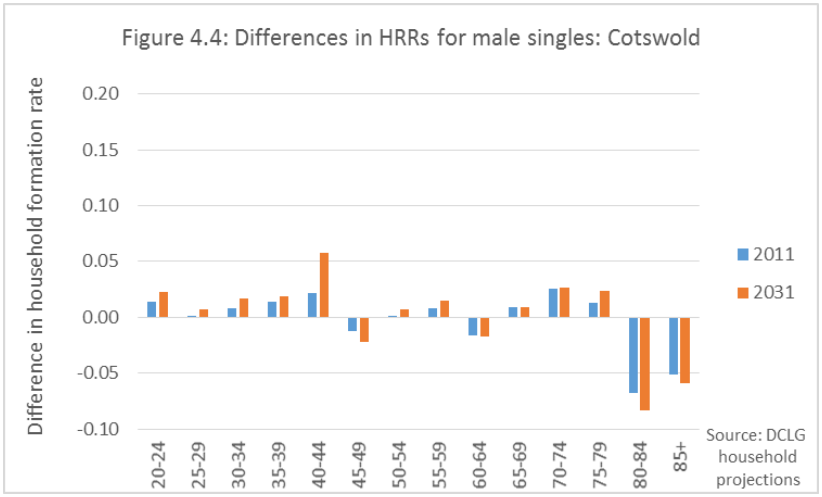
[18] Note that the aggregate household formation rate has been defined to mean the total number of households divided by the total household population. As the total number of households projected depends not just on the total household population but also the age distribution within the population (as different age groups have different household formation rates), the aggregate household formation rates shown in Figure 4.1 have all been calculated using the DCLG 2014-based household population projection.

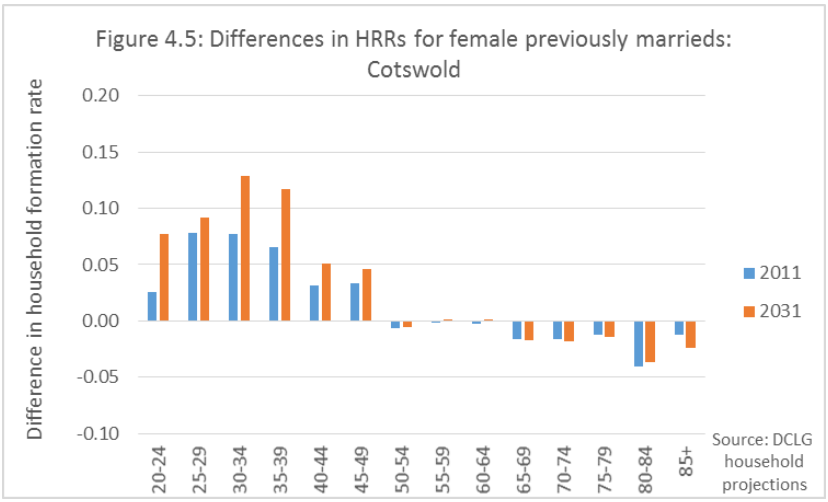
[19] It is necessary to use the Stage 1 projections for the 5 marital status groups as the alternatives – using the Stage 2 headship rates or the 'all marital status' HRRs for the 5-year age groups combine changes due to differences in the assumptions made about marital status splits and the projections made for the future tendency of each group to set up separate households. So, for example, if the 2012-based Stage 1 HRR for those aged 60-64 is lower than the HRR for the same group in the 2008-based projection this might be because there are assumed to be a higher proportion of couples in the 2012-based projection or it might be because the 2012-based HRRs for some or all of the marital status groups are lower – or both. Only by separating out the individual marital status groups is it possible to see what is happening.

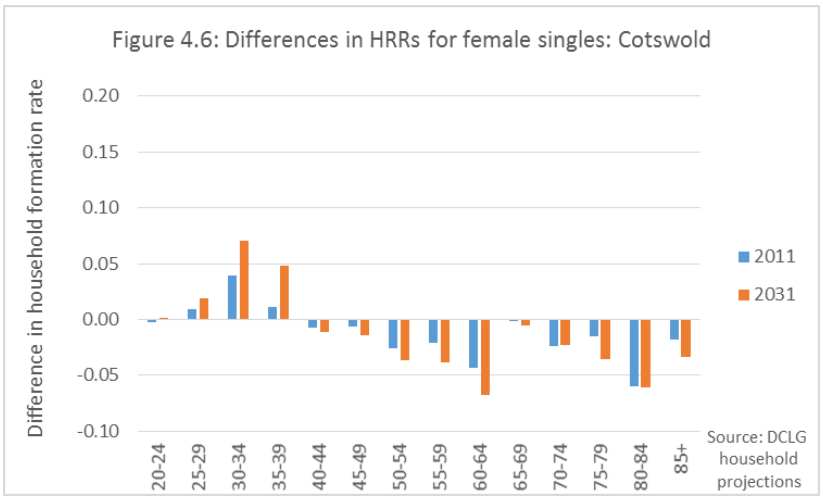
positive number implies that the 2008-based rate is higher than the 2014-based rate.











4.6. In the above charts there are both elements that follow the 'standard' pattern (with lower household formation rates in the newer projections) and some significant differences:

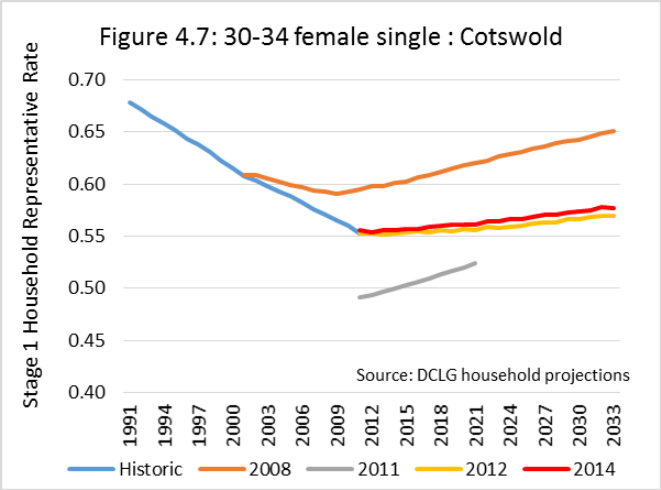
4.6.1. For younger age groups the 2014-based HRRs are lower than the 2008 ones. The age up to which this applies varies between marital status groups and the differences are small for single men.

4.6.2. For couples there are no significant differences for those aged over 40. This is because for these age groups the HRR is for all practical purposes 1 in both the 2008 and 2014-based projections i.e. all couples over 40 are assumed to have their own, separate household. This means that, whilst the 2014-based projections envisage that younger married couples will have lower chances of setting up separate households in their 20s and 30s than suggested by the 2008-based projections, by the age of 40 they will have 'caught up' and virtually all couples will be able to live as separate households.

4.6.3. For both single women and previously married men and women, older age groups have **higher** HRRs in the 2014-based projection than in the 2008-based projections. This is a very significant aspect of the Cotswold projections.

4.6.4. The 2014-based projections suggest the previously married men and women under 50 will be less likely to live in separate households than indicated by the 2008-based projections. However, these groups will also 'catch up', albeit not before the age of 50.

4.7. It may help to illustrate this with some examples of particular groups. Figure 4.7 shows the projections for 30-34 year old single women.

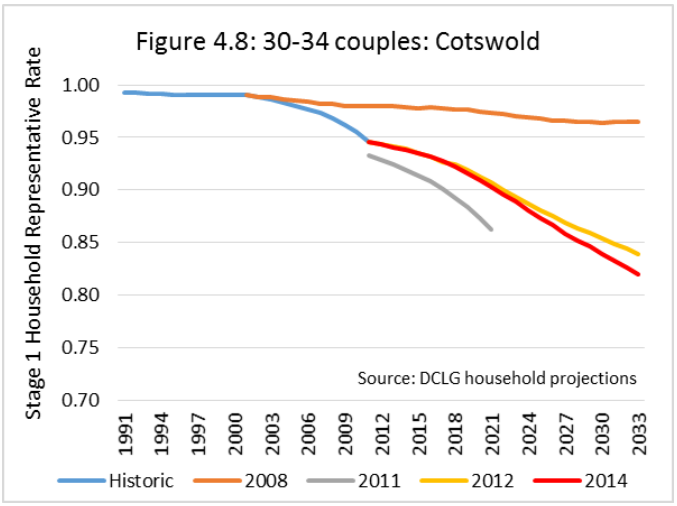


4.8. This is a fairly typical pattern with the historic data suggesting that there has been a steady decline in the household formation rates of this group since at least 1991. Note also that:

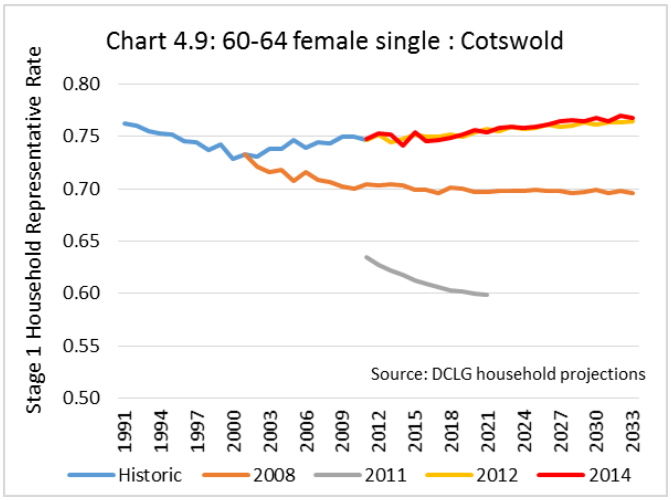
4.8.1. The actual HRR in 2008 was lower than assumed in the 2008-based projection i.e. the 2008-based projection started from too a high a point.

4.8.2. The 2011-based projection seems to bear little relation to the historic data – a further indication that it is no longer a useful indicator.

4.9. Figure 4.8 shows the HRRs for couples aged 30-34. Again the pattern is a fairly standard one. Note that even the 2008-based projection envisaged a falling HRR, albeit at a much slower rate. The 2014-based projections suggest that the fall will be faster, albeit not as fast as that in the 2011-based projection. This may not be what one would hope to see as it implies that more and more couples in this age group will not be setting up a home of their own but living in someone else's household. That, however, does not mean that it is not what is likely to happen.



4.10. Figure 4.9 is for single women aged 60-64. This is a reversal of the 'standard pattern'. The 2014-based HRR was higher than the 2008-based HRR in 2011 and is projected to grow faster than the 2008-based rate.



4.11. It should be noted that, owing to the number of older age groups for which the 2014-based projections envisage higher household formation rates, a scenario that assumes that the household formation rates for all age groups move to the 2008-based rates produces a lower household growth and housing need estimate than a scenario that assumes that this happens just for households aged 25-44.

4.12. The overall conclusion from this analysis is that there is a significant distinction between younger and older households. For many older age groups a move towards the 2008-based household formation rates would mean lower rates than envisaged in the 2014-based projection. This is hardly consistent with the hypothesis that the household formation rates in the 2014-based projections are suppressed. It therefore seems reasonable to conclude that such a move is unlikely. For younger age groups the 2014-based HRRs are lower than the 2008-based rates and whether a move towards the 2008-based rates is likely depends on understanding what has been happening in these age groups.

4.13. There are two reasons for believing that a return towards the 2008-based household formation rates is unlikely in these younger age groups:

4.13.1. The 2008-based household formation rates were optimistic even when they were first issued.

4.13.2. The departure from the earlier trend in household formation rates which occurred between 2001 and 2011 was not primarily due to the economic downturn but to other factors, most of which are unlikely to reverse.

2008-based household formation rates optimistic

4.14. There are a number of reasons for believing that the 2008-based household formation rates were optimistic for the younger adult age groups.

4.14.1. As already noted, their starting point was a pattern of household formation rates in 2008 that we now believe to have been too high. (See Figures 4.7 and 4.8 above).

4.14.2. The DCLG at the time discounted some evidence which suggested that their projections were too high. This included evidence from the Labour Force Survey[20] and on cohort effects (which were ignored by the methodology used).

Reasons for the departure from the earlier household formation rate trends

4.15. There are a number of reasons for believing that the departure from the earlier household formation rate trends, which began well before the economic downturn, is unlikely to be reversed as a result of the economy emerging from recession. These have been summarised by Professor Simpson writing in the TCPA Journal in December 2014[21]. In that article he argues that, "The causes of reduced household formation are varied, began before the recession, and mostly are likely to continue with or without recession". He refers to:

4.15.1. "…a sustained increase among young people not leaving home" which began at the turn of the century and accelerated after 2008;

[20] See "Updating the Department for Communities and Local Government's household projections to a 2008 base: Methodology" DCLG, November 2010, (available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7484/1780350.pdf) which includes the following comment on page 10:

Labour Force Survey (LFS) data suggests that there have been some steep falls in household representative rates for some age groups since the 2001 Census. If these shifts in household formation behaviour are sustained in the longer term, and this can only be truly assessed once the 2011 Census results are available, the household projections using the method as in the 2006-based and previous projection rounds would turn out to be too high.

[21] Professor Simpson is Professor of Population Studies at the University of Manchester and is the originator and designer of Popgroup. His article in the December 2014 TCPA Journal was entitled, "Whither household projections".

4.15.2. " …the introduction of student fees from 1998"

4.15.3. "…the increase in precarious employment, including the rapid growth of part-time work…."

4.15.4. "The long term increase in the number of childless women…which increased the number of smaller households, stopped and has fallen since 2000."

4.15.5. "Increasingly older formation of couples or families, which had increased the number of single person households in the 1980s and 1990s, has levelled out since 2001."

4.16. Whilst it is possible that some of these factors may change, that does not seem very likely. Professor Simpson suggests that the first three, "…appear at the moment as fixed circumstances of the policy and economic environment."

4.17. Professor Simpson concludes that, "…we are not in a position to expect further increases in household formation rates of the same kind [as suggested in the 2008-based projections].....The future in the UK is likely to be a continuation of precarious household formation. It will probably be lower than once projected and carry more uncertainty…."

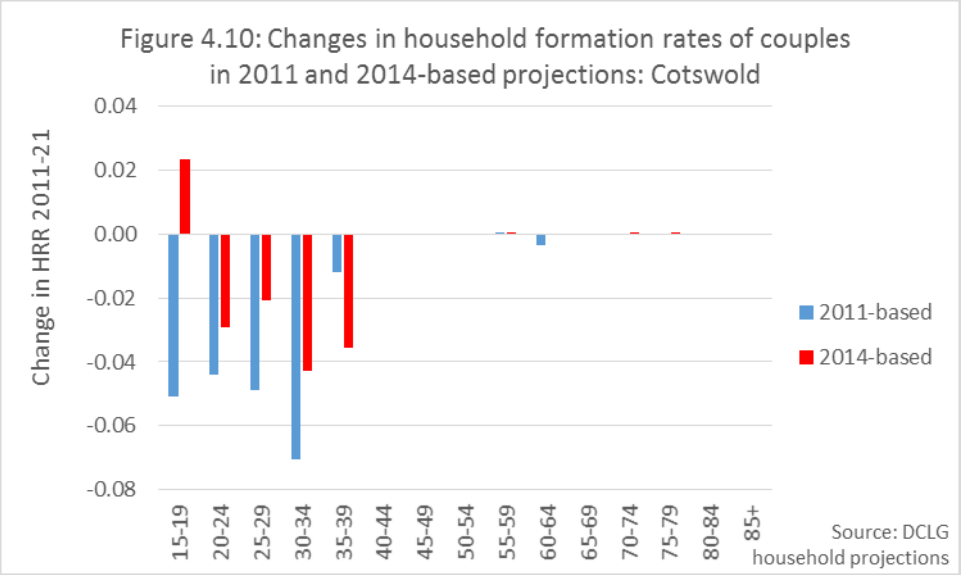
4.18. It might also be noted here that there are a number of factors such as increasing levels of student debt and welfare reform that are likely to serve to reduce further household formation rates. These will not have been reflected in the 2011 census or the 2014-based household projections.

Why not assume a partial return to 2008-based rates for at least the 25-34 year olds as in the October 2014 NMSS Report?

4.19. The short answer to this question is, "because the 2014-based projections are very different from the 2011-based projections".

4.20. It should be noted that the 2011-based projections were labelled in their title as "interim" projections. DCLG were fully aware that they were a stop-gap measure and for that reason they only extend to 2021, and not the 25 years of a full set of projections such as the 2012-based set.

4.21. One aspect of particular concern with the 2011-based projections was the way in which they envisaged sharp and continuing fall in household formation rates for some young adults. Such falls have been much reduced in the 2014-based projections. See Figure 4.10 which compares the projected changes in household formation rates between 2011 and 2021 in the 2011 and 2014-based projections.



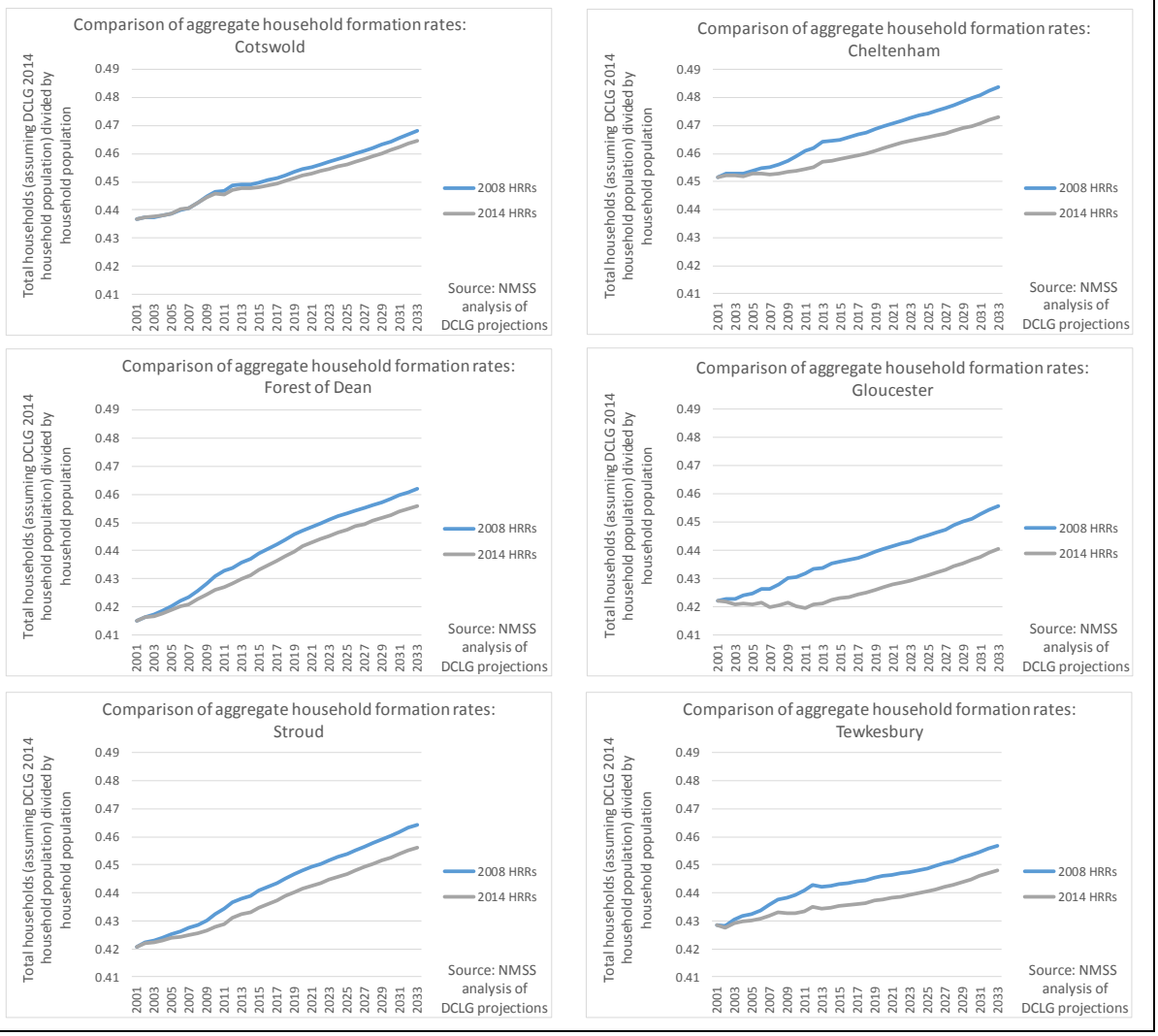
4.22. Faced with such large projected declines in household formation rates for young adults in the 2011-based projections it was reasonable to conclude that this aspect of the projections had been influenced by something that was unlikely to continue (although it was not, and is not, possible to link the projected falls to any particular cause).

4.23. The falls in the household formation rates of some younger age groups are part of an overall projection that envisages average household formation rates rising (and average household sizes falling). The issue is not that setting the OAN in line with the 2014-based household projection would necessarily lead to falling household formation rates: on the contrary more homes would be provided than would be needed to allow household formation rates to be maintained for all groups. The issue is that the projections suggest a combination of behavioural factors, external influences (such as welfare reform and student debt) and differences in purchasing power are likely to mean that that older groups will acquire a disproportionate proportion of the additional homes, with the result that younger age groups have lower household formation rates. Although this may not be a particularly desirable outcome, it is the likely outcome, without a significant policy intervention (which would take us into the realms of 'policy on' scenarios which should not be considered when estimating an OAN).

Comparison with the rest of Gloucestershire

4.24. As a final element in discussion of household formation rates it is helpful to compare Cotswold District with the rest of Gloucestershire. Figure 4.11 compares the past and projected aggregate household formation rates for Cotswold in both the 2008 and 2014-based projections with the rates for the other Gloucestershire authorities. The individual charts have been drawn on the same scale to enable accurate comparison.

Figure 4.11: Comparison of aggregate household formation rates



4.25. As can be seen from Figure 4.11, the difference between the 2008-based projections and the 2014-based set is smaller for Cotswold than any of the other authority in the Gloucestershire housing market area. This suggest that the events of the last 15 years have had less impact on household formation patterns in Cotswold than they have had in other parts of the HMA. This, and the fact that Inspectors examining the plans of the other Gloucestershire authorities have been content to accept that the most recent DCLG household formation rates should be used without adjustment, reinforces the case for planning for Cotswold on the same basis.

Conclusion on household formation rates

4.26. The conclusion from the above analysis is that the 2014-based household projections represent the best available view of what is likely to happen to household formation rates. This suggests that they should be used 'as published' even though they include falling household formation rates for some younger age groups.

5. EMPTY AND SECOND HOMES

5.1. To turn an estimate of the net number of additional households into an OAN assumptions need to be made about the proportion of the housing stock that will either be empty or used as second homes. The assumptions used have been based on 2011 data[22] as set out in Figure 5.1.

Figure 5.1: Vacant and second homes

	A	B	C	D = (A+B)/C
	Second homes[1]	Vacant homes[2]	Number of homes[3]	Percentage vacant or second homes
Cotswold	1540	1076	39940	6.55%

1. Second homes data from 2011 Council Tax data base
2. Vacant homes from DCLG Live Table 615
3. Number of homes in from DCLG Live Table 125

5.2. It should be noted that this figure for the number of homes that are empty or used as second homes differs significantly from the 2011 census estimate that 9.3% of homes that had "no usual resident". This is because:

5.2.1. Dwellings with no usual residents are not necessarily truly empty or vacant on census day. They may have been occupied by people who do not qualify as 'usual residents' such as non-UK born short-term residents, by one or more visitors, or by a combination of short-term residents and visitors.

5.2.2. Dwellings which are used commercial holiday properties (and as such are not part of the normal residential housing stock) will also have been classified as dwellings without a usual resident.

5.2.3. In areas with significant numbers of holiday homes it can be particularly challenging for census enumerators to determine what the status is of an address from which a census form was not returned. Dwellings may be

[22] 2011 data has been retained as it has been suggested that with the reduction in discounts for second homes and empty properties fewer owners are notifying authorities that their properties are empty or used as second homes. The sources used are:

- Vacant homes from DCLG Live Table 615 available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/423184/LT_615.xls
- Dwelling Stock numbers from DCLG Live Table 125 available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/423183/LT_125.xls
- Second homes from: Council Taxbase local authority-level data 2011 available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69898/2011_Local_Authority_level_data.xls

categorised as having no usual resident when there is some other explanation for the non-return of the census form.

5.2.4. Other areas with large numbers of second homes (such as King's Lynn and West Norfolk) also have similar issues with the census estimate for homes with no usual resident being significantly larger than estimates for empty and second homes derived from the council tax base.

6. THE DEMOGRAPHIC OAN

6.1. Applying these empty and second homes rates and the DCLG 2014 household formation rates to the proposed planning assumptions for population growth in estimated in the previous section produces the following estimates of demographic OAN (Figure 6.1).

Figure 6.1: Summary of adjustments to 2014-based DCLG projection

Change 2011 - 2031		Population	Homes	Homes/yr
A	**2014 SNPP**	**10199**	**6331**	**317**
B	Adjustment for 2005-15 UK flows + 2015 MYE	293	586	29
C	**2005-05 UK flows + re-basing to 2015 MYE**	**10492**	**6917**	**346**
D	Adjustment for 2005-15 international flows	-160	-59	-3
E	**2015 UK and international flows + 2015 MYE re-base**	**10332**	**6859**	**343**
F	Adjustment for 50% UPC	-471	-248	-12
G	**Demographic OAN**	**9861**	**6611**	**331**
H	Adjustment for 2011 floor on HRRs	0	311	16
I	**Demographic OAN + "no one worse off than in 2011"**	**9861**	**6922**	**346**

6.2. As can be seen from Figure 6.1:

6.2.1. Adjusting the 2014 SNPP projection to reflect flows to and from the rest of the UK in the period 2005-15 rather than 2009-14 and re-basing to start the projection from the ONS's latest estimate for the 2015 population increases the projected population growth by only a small amount (2.9%).

6.2.2. Adjusting the projected net flow from abroad to reflect the flows in the period 2005-15 reduces the population projection by a small amount (1.5%).

6.2.3. Making a 50% adjustment for the negative UPC reduces the population growth by 5%.

6.2.4. Adjusting household formation rates so that no group is worse off in 2031 than in 2011 (Rows H and I) has no impact on the population projection but increases the number of homes needed by 311 over the period 2011-31, or 16 a year. This is an increase of 4.7%.

6.3. The overall impact of the changes made to the 2014 SNPP and, hence, the DCLG 2014-based household projections is to reduce the projected population increase by 3% and but increase the number of homes needed 4% if the DCLG 2014-based projections are used 'as published' . (The difference between the population decrease and the homes increase is due to a large part of the population reduction being in younger age groups, including children who do not form households and younger adults who have low household formation rates.) Making the "no one worse off than in 2011" adjustment to household formation rates produces a housing requirement that is 9% higher than suggested by the DCLG projections.

7. ADJUSTMENTS TO REFLECT 'OTHER FACTORS'

Market signals

7.1. The PPG makes it clear that those planning for housing are expected to take account of 'market signals':

> *"The housing need number suggested by household projections (the starting point) should be adjusted to reflect appropriate market signals, as well as other market indicators of the balance between the demand for and supply of dwellings. Prices or rents rising faster than the national/local average may well indicate particular market undersupply relative to demand."*[23]

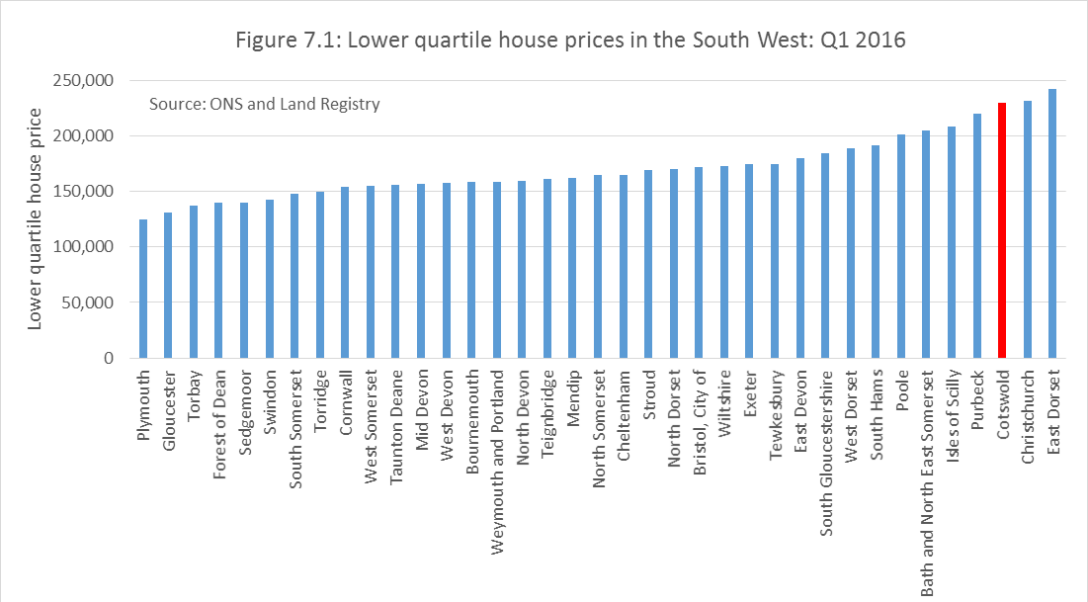
7.2. The reference to 'prices or rents rising faster than the national/local average' is important. Higher prices than in other areas may not necessarily indicate a particular problem but may simply reflect the mix of housing in an area or particular features which are thought desirable such as proximity to transport links, city centres, attractive countryside etc. For example, prices in central London are always going to be higher than elsewhere given the value those renting or buying homes attach to a central location – advantages that are inevitably limited to a finite number of properties no matter how adequate the supply of homes is in London as a whole. On the other hand, prices rising faster than other areas may indicate a supply problem. This is reinforced by the Planning Advisory Service's (PAS) recent technical advice note on Objectively Assessed Needs and Housing Targets[24] which advises at paragraph 7.13 that, "Proportional price change is generally a better indicator than absolute price, because a comparatively high price may indicate either comparatively high demand (an attractive area, better housing stock) or low supply (possibly due to planning). But if prices in an area are rising faster than elsewhere, this suggests that supply is tightening compared to other places – unless for some reason the area is becoming more desirable over time."

House prices

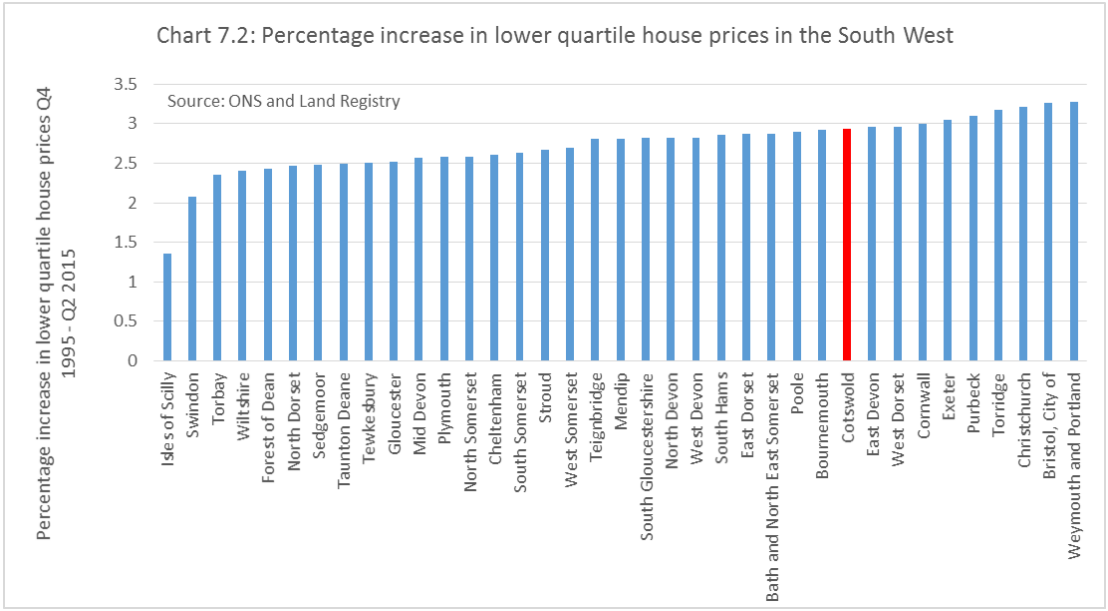
7.3. Figure 7.1 compares lower quartile house prices in the South West in Q1 2016. On this measure Cotswold is the third most expensive district in the South West. This, however, is to be expected as it is a highly attractive area. It does not necessarily indicate particular market stress.

[23] Planning Practice Guidance, Paragraph: 019 Reference ID: 2a-019-20140306

[24] Objectively Assessed Need and Housing Targets: Technical advice note, Second edition, July 2015, Planning Advisory Service http://www.pas.gov.uk/documents/332612/6549918/OANupdatedadvicenote/f1bfb748-11fc-4d93-834c-a32c0d2c984d

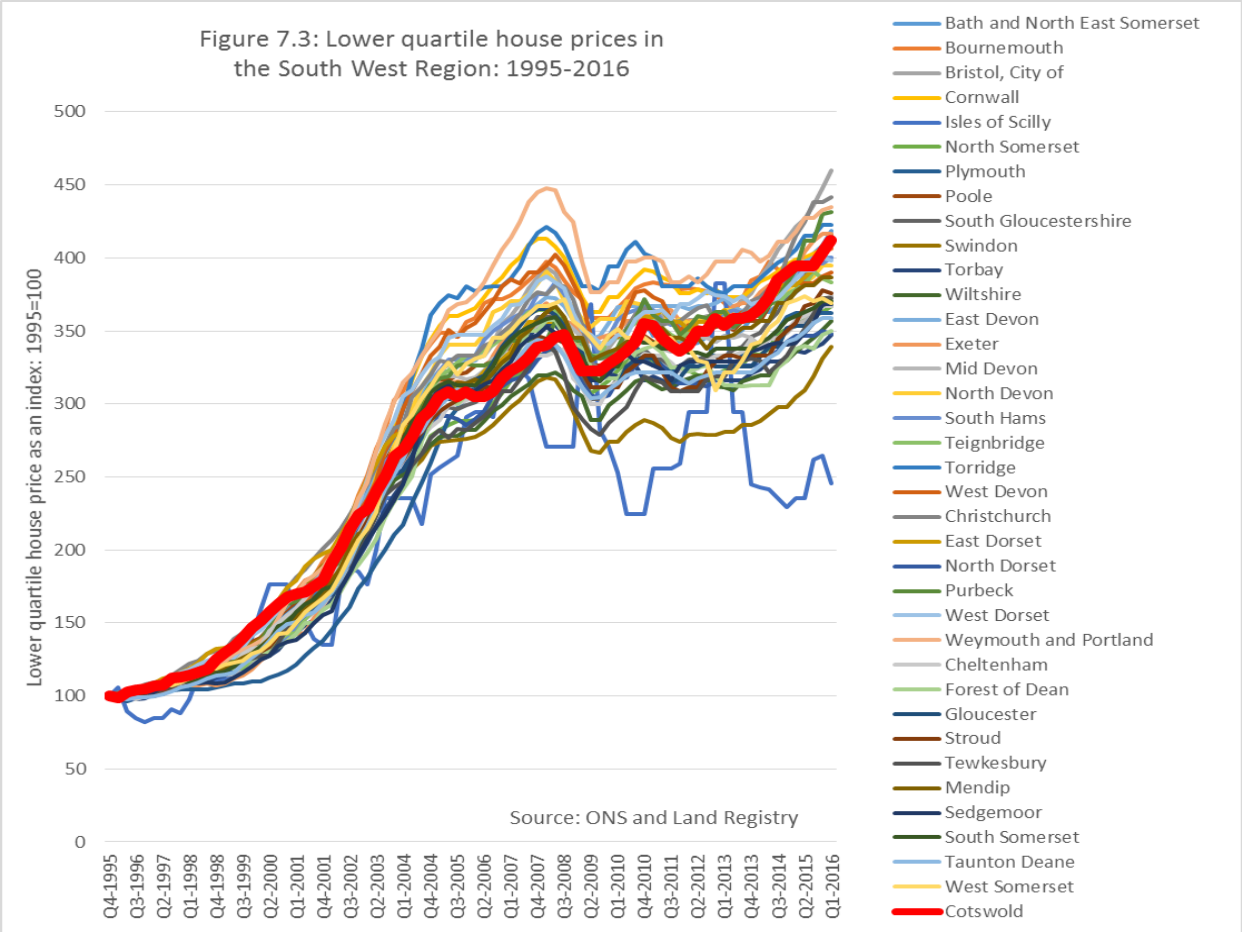


7.4. Of greater relevance is the data showing how house prices have changed over the last 20 years. On this measure Cotswold is by no means the worst performing authority: Cotswold was the third most expensive district in the South West in 1995 and remains in that position in 2016; about a quarter of South West authorities have seen their lower quartile house prices rise more quickly than Cotswold. See Figure 7.2 below:

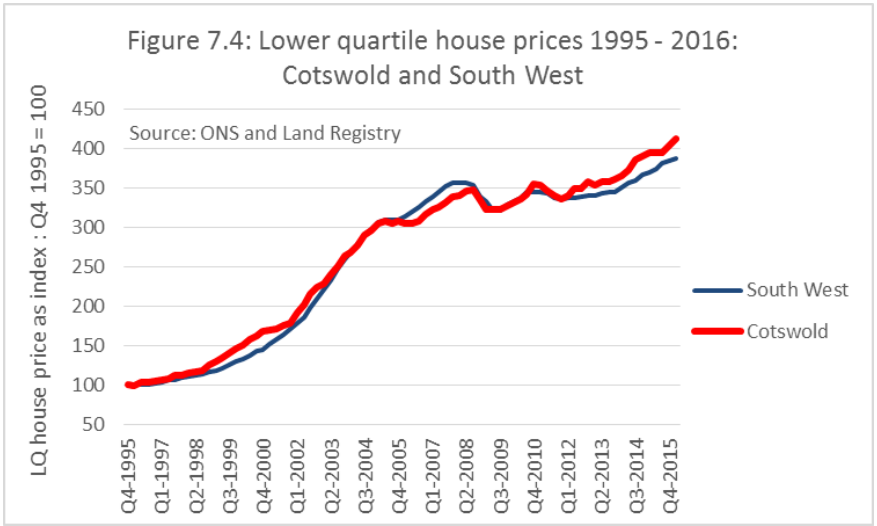


7.5. Figure 7.3 shows lower quartile house prices changes in the South West districts since 1995. This demonstrates that house price changes are by no means smooth and can be quite erratic. For that reason care needs to be exercised in drawing conclusions from a comparison of price changes between two specific years. Some areas see their house prices move ahead more quickly at some times and slower at other times. For example, had the chart above shown lower quartile house prices changes for the period 1995 – 2011 Cotswold would have appeared just below the middle of the rank order. Part of the reason that it appears as high up as it does in

Figure 7.2 is that house prices in Cotswold have increased more quickly since the economic downturn than many areas. This may not necessarily continue: other areas may well catch up.



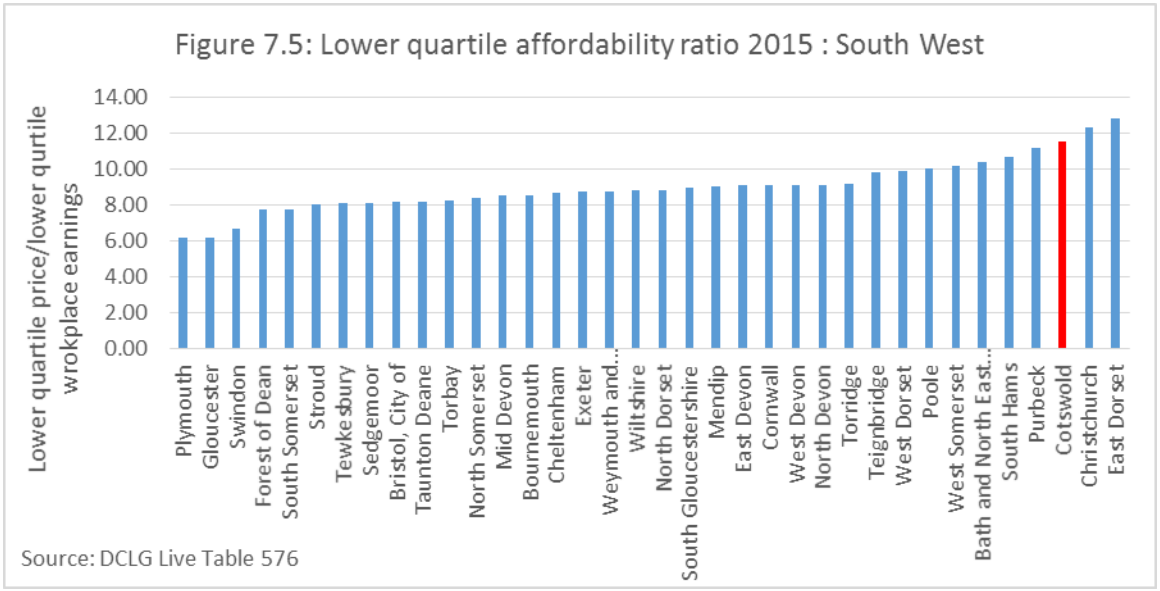
7.6. The movement of Cotswold house prices relative to the rest of the South West is perhaps brought out most clearly in Figure 7.4 which simply compares Cotswold lower quartile house prices with those for the region as a whole. The two lines criss-cross each other: in some years the Cotswold price increases faster and in other the South West price.



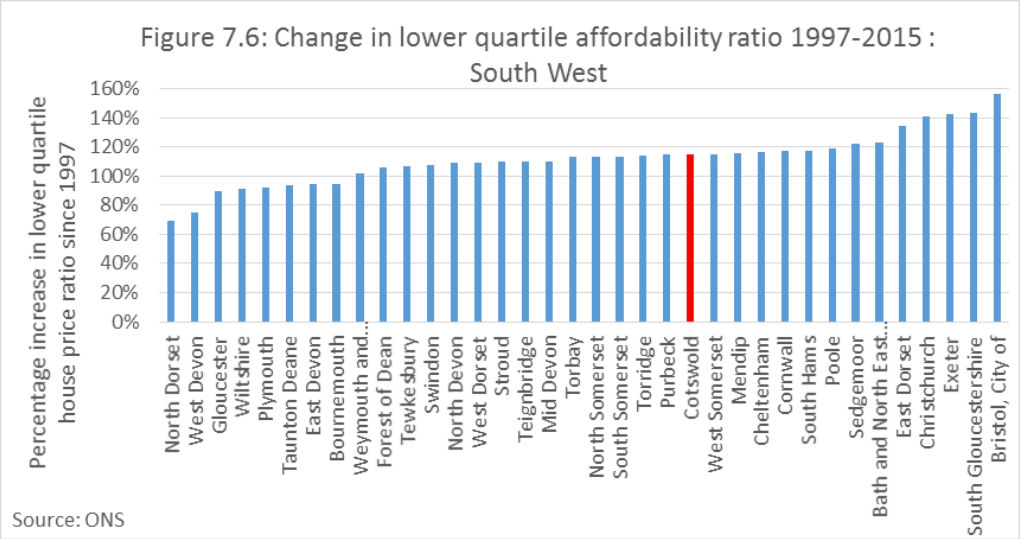
7.7. It might also be noted that Cotswold is one of the South West districts which borders the South East region, as are Christchurch and East Dorset, the two South West districts with higher house prices. It is not surprising that these three districts have house prices that are influenced by South East prices, compared with which their price levels are by no means exceptional. For example, Cotswold's lower quartile house price in the year ending Q1 2016 was £230,000. That compares with West Oxfordshire in the South East region with which it shares a border to the east, which had a lower quartile price of £232,500.

Affordability

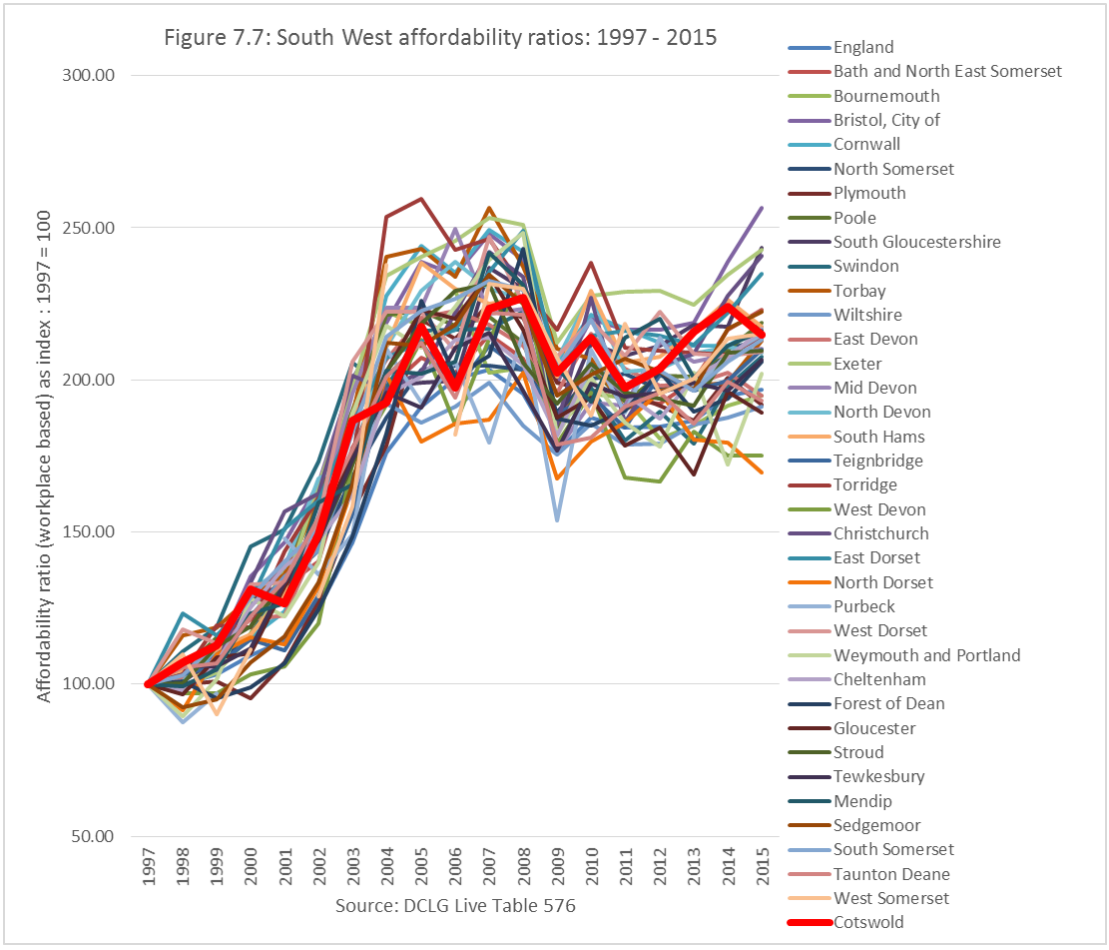
7.8. Arguably of greater relevance than either the absolute price or the change in price is the affordability of homes relative to earnings. The key indicator here is the lower quartile affordability ratio i.e. the price of a lower quartile home divided by the lower quartile workplace earnings for the area. Figure 7.5 below shows the affordability ratio for all South West authorities. As can be seen, Cotswold is the third least affordable area in the South West. This reflects the high house prices in the area, which in turn reflects the attractiveness of the district. Again it is notable that the two districts with even higher affordability ratios are Christchurch and East Dorset – two other districts that border the South East region.



7.9. More significant than the absolute value of the affordability ratio in 2014 is the rate at which it has changed. In this respect Cotswold is by no means the worst offender in the region: around a third of authorities have seen bigger percentage deteriorations in their affordability ratios since 1997, as Figure 7.6 shows.



7.10. Figure 7.6 shows the change between two dates – the dates that happen to be at either end of the range of data that is immediately available from the ONS data sets. However, there is a danger in focussing too closely on any two dates as the change can vary significantly depending on the choice made of start and end dates. To avoid this Figure 7.7 (below) plots the changes between 1997 and 2015. The picture is complicated one but the message is clear: Cotswold has not seen the worst deterioration in affordability in the region: it has generally been closer to the middle of the pack.



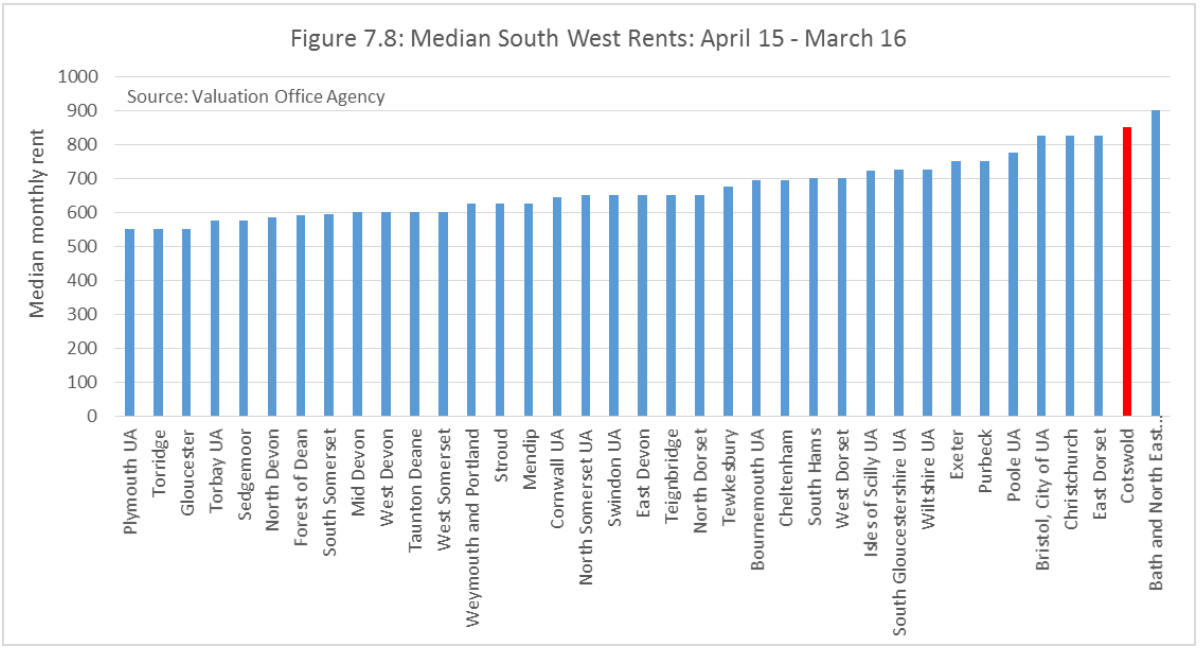
7.11. There can be no doubt that high house prices and poor affordability are issues in Cotswold District but that does not necessarily imply that a market signals adjustment is warranted. The discussion of this issue in the decision letter on a recent S78 appeal in the district (relating to a site in Mickleton – APP/R3650/A/14/2223115) is highly relevant here:

> *"A house in the Cotswolds costs more than other places at least partly because it offers attractions that do not exist elsewhere. The same applies to the Chilterns (also offering swathes of ANOB landscape and where similar differentials exist) and to Kensington and Chelsea (currently the place where the ratio of lower quartile prices to incomes is the highest in the land). Because location is an integral characteristic of any dwelling, there are numerous geographical discontinuities in housing markets…….It follows that a significant increase in the stock of houses in Cotswold would be likely to result, not in a noticeable decrease in house prices or improvement in affordability, but in new residents with the wherewithal to pay the prices sought……In my view the evidence adduced does not demonstrate that market signals warrant an increase in the objectively assessed need for housing in the District of Cotswold."*

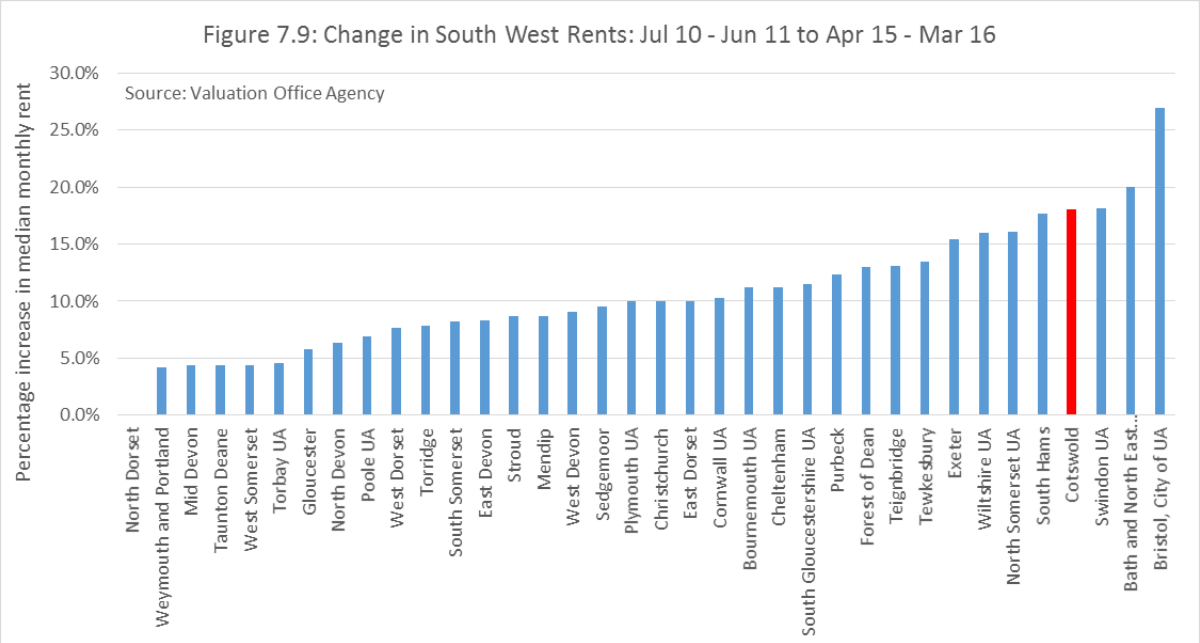
Rents

7.12. Rents are a further indicator. However, the available Valuation Office Agency data at the local authority level does not extend back beyond the year to June 2011 and so is of limited value in enabling trends to be identified. The data does suggest that rents in Cotswold are amongst the highest in the South West (see Figure 7.8 below), but that is to be expected as house price are amongst the highest in the South West and rents need to be set accordingly to allow those letting property to make a proportionate return on their investment.

Figure 7.8: Median South West Rents: April 15 - March 16



7.13. As Figure 7.9 below shows, rents in Cotswold have also increased faster than in most other districts in the South West since 2010-11. This may reflect the way in which house prices have moved since the economic downturn and it does need to be borne in mind that the data only covers a 5 year period.



Under supply

7.14. The PAS technical advice note offers some useful advice on what is meant by the references in the PPG to past under supply:

> *"7.3 The logic of the PPG is clear. As mentioned earlier, demographic projections roll forward trends from a past period known as the base period or reference period. If in that period planning underprovided land against demand or need, actual housing development – and hence household growth – will also have fallen short of that demand or need. By the same token, since projections roll forward past growth into the future, they will understate future demand or need, and therefore should be adjusted upwards.*
>
> *7.4 That logic is sometimes misunderstood, in that 'under-supply' and 'under-delivery' are taken to mean that house building was below policy targets. But in the present context these words mean something quite different - that house building was less than demand or need; in other words planning constrains the amount of housing development. This constitutes under-supply within the meaning of the PPG. Evidence that past delivery was in line with targets does not demonstrate that in that past period planning was not a constraint or that demand or need was met.*

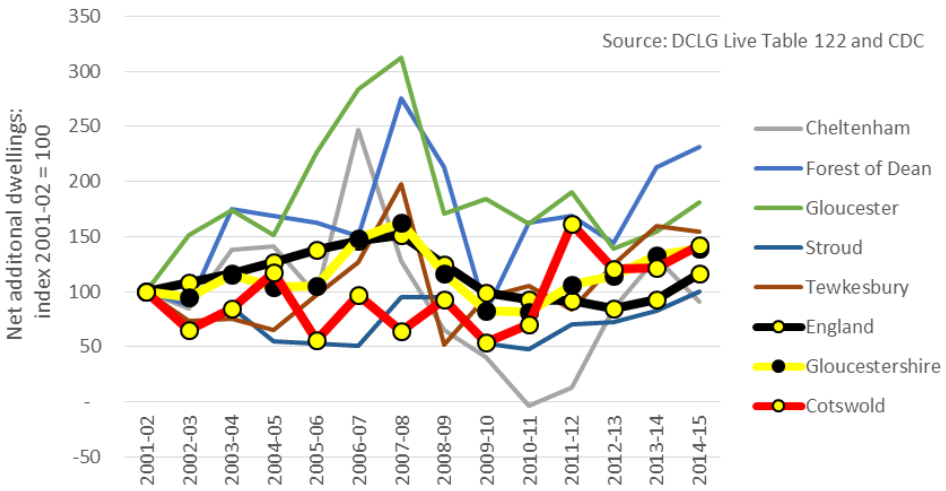
7.15. The PAS technical note goes on to advocate that "The past trajectory of housing completions is a good indicator of the severity of planning constraints…" The note also emphasises the importance of focussing on relative not absolute under supply,

recognising that is has not been unusual for planning to under-supply the market in much of the post-war period. The guidance therefore concludes that, "…demographic projections should be adjusted upwards only if in the base period the constraint was unusually tight compared with other times, to other places, or both.".

7.16. In this report we follow that approach and consider how house building in Cotswold has compared with other areas in order to take a view on whether there is evidence of particularly tight planning constraints in the base period.

7.17. Figure 7.10 below compares net additions to the housing stock in Cotswold with both the other Gloucestershire authorities and England.

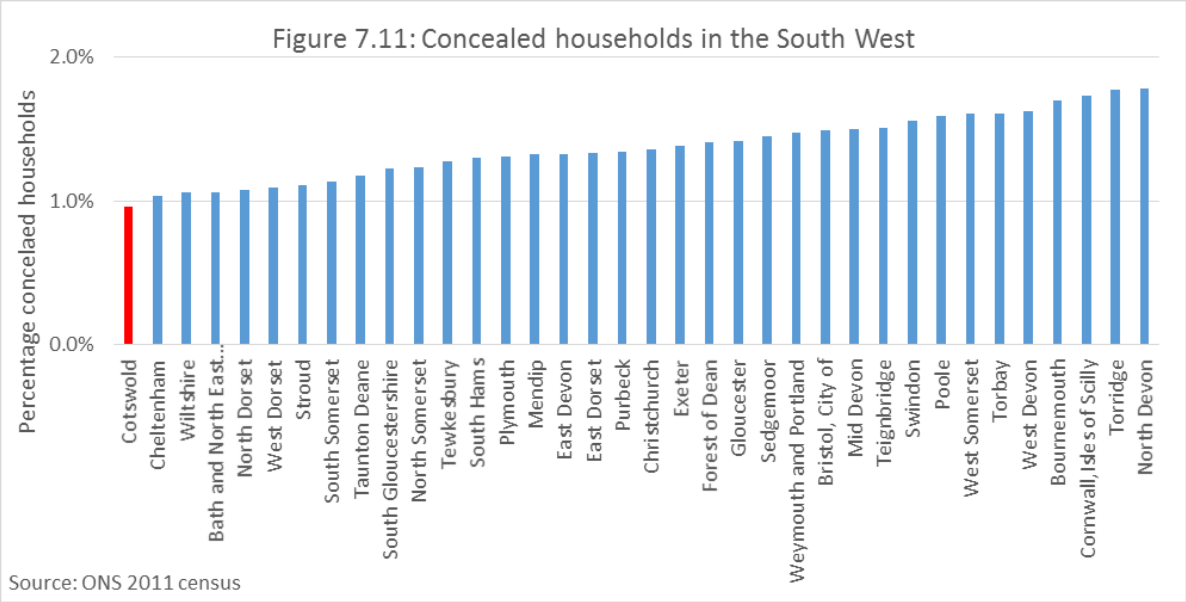
Figure 7.10 Net additional dwellings: Gloucestershire and England



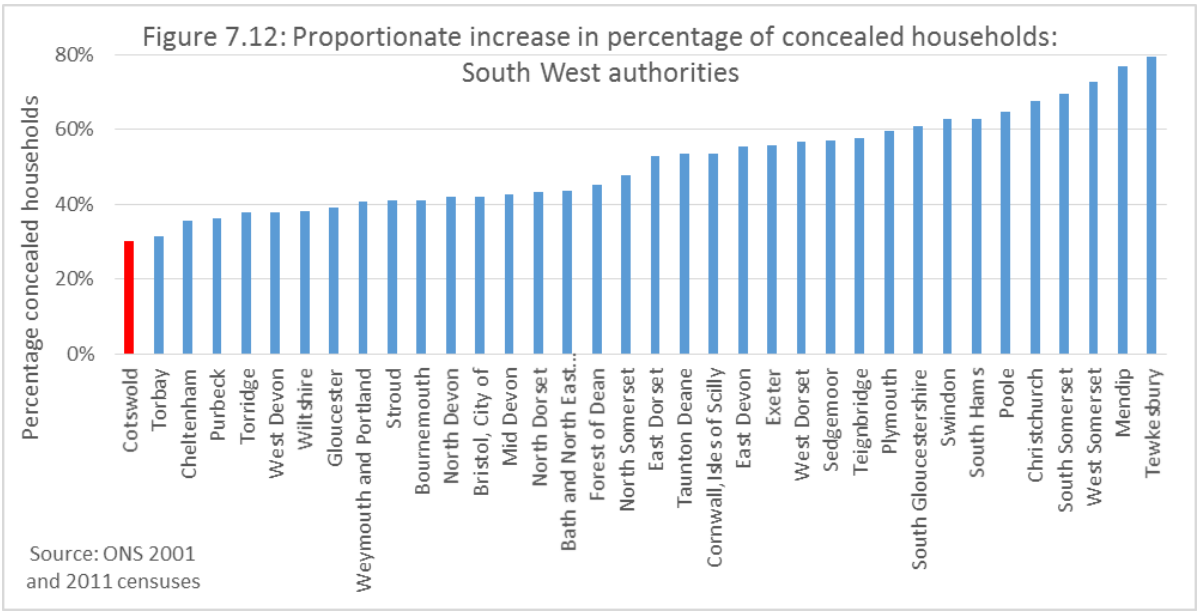
7.18. As can be seen, house building in Cotswold does not appear to have risen as it did in England as a whole and other parts of Gloucestershire in the years running up to 2007-08. Although house building recovered sooner and more strongly in Cotswold than in some other areas, there is a question mark about whether there was a degree of undersupply in the years before the economic downturn.

Concealed families

7.19. The proportion of concealed families (i.e. families living within another household) is another measure of the degree of stress in a housing market. Figure 7.11 below shows the data from the 2011 census for the South West authorities. Cotswold had the lowest percentage of concealed households in the region.



7.20. Some might argue that the increase in the proportion of concealed households might be grounds for a market signals adjustment. Figure 7.11 shows the proportionate increase in the percentage of concealed households for Cotswold and the other South West authorities. For example, in 2001 0.74% of households in Cotswold were concealed compared with 0.96% in 2011 i.e. there was an increase in the proportion concealed of 30%.

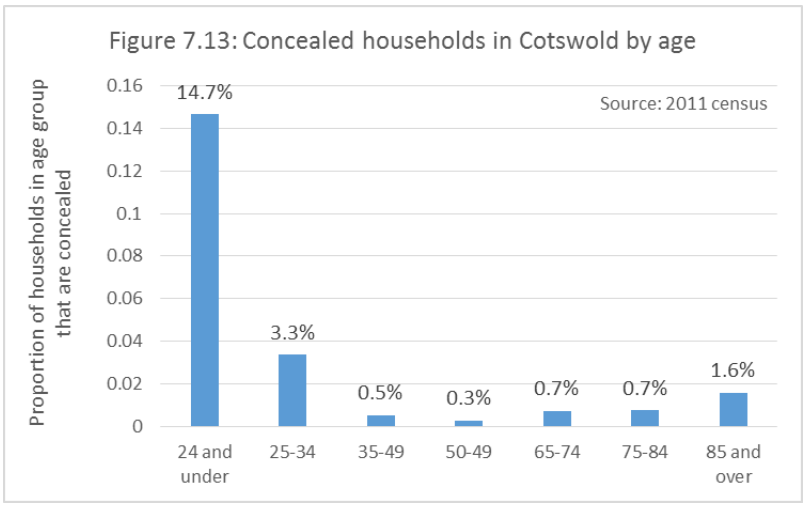


7.21. Two points are immediately clear from Figure 7.11:

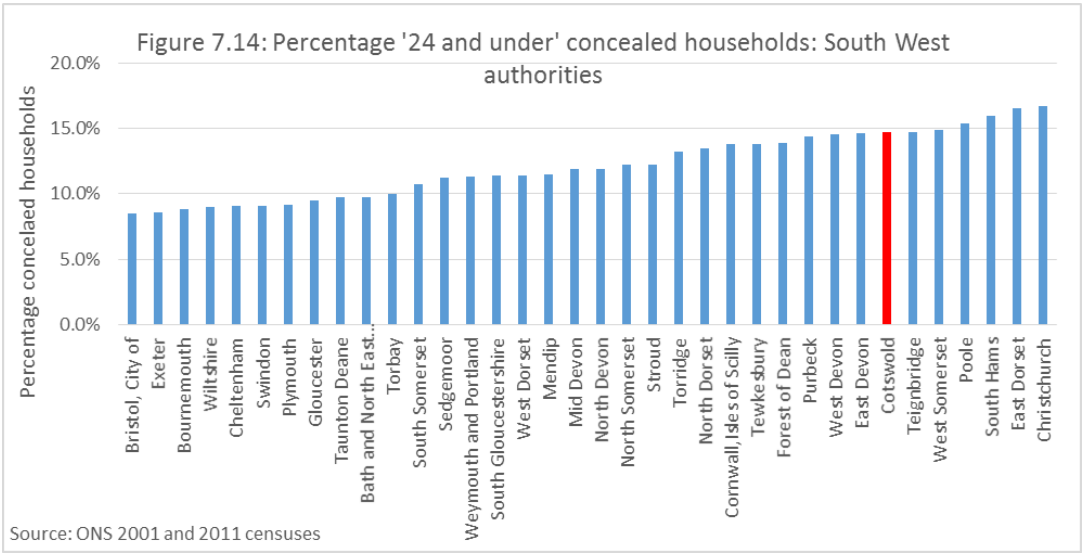
7.21.1. All authorities in the South West saw an increase in the proportion of concealed households: if an increase is grounds for a market signals adjustment then an adjustment should be applied to all South West authorities.

7.21.2. The proportionate increase in Cotswold was smaller than in any other South West authority, so the case for an adjustment is weakest for Cotswold.

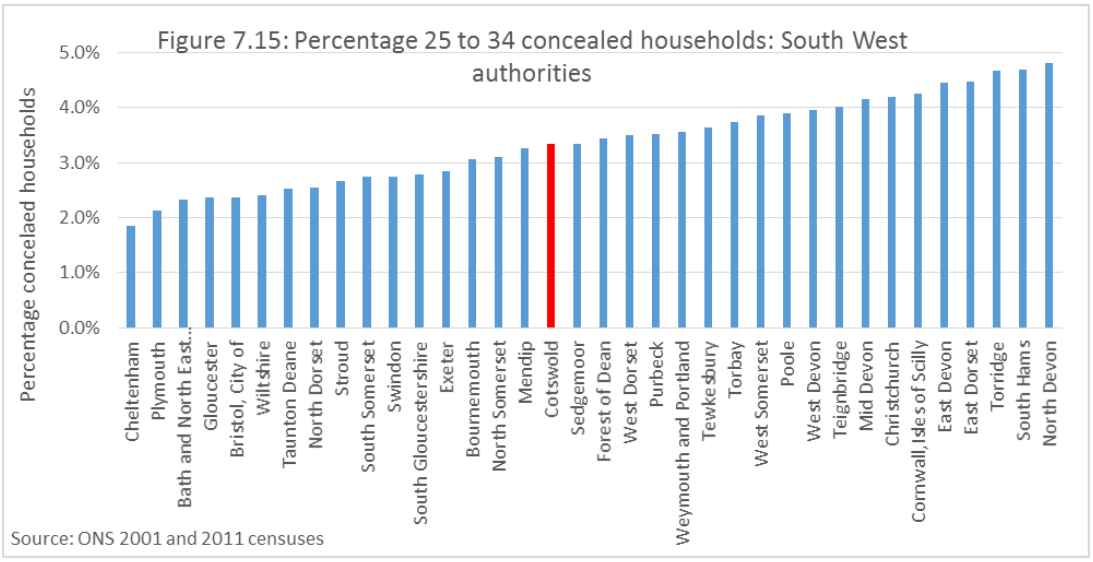
7.22. As Figure 7.13 shows, the proportion of concealed households in much larger in the younger age groups:



7.23. This pattern is fairly standard. The proportion of '24s and under' households which are concealed is high but not exceptionally so. As Figure 7.14 shows, Cotswold is in the top quartile on this indicator, but nearly half of South West authorities have over 12% of '24 and under' households that are concealed.



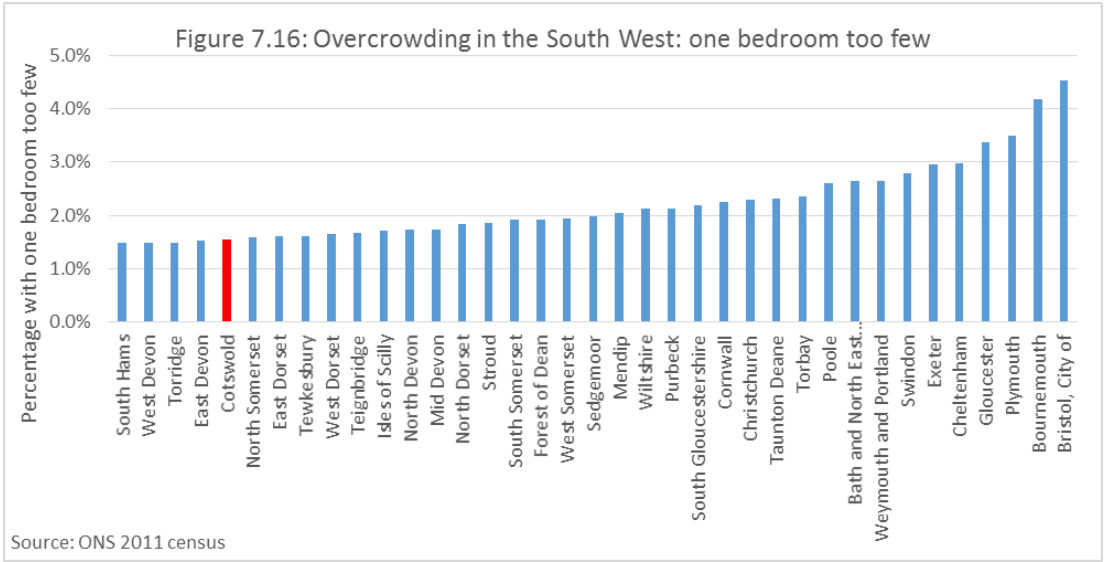
7.24. In considering Figure 7.14 it should be borne in mind that there are relatively few households headed by someone aged 24 and under: the 14.7% of those households that are concealed only amounts to 55 households. There is much smaller proportion of 25-34 households that are concealed (3.3%) but that is 70 households. As Figure 7.15 shows, the 3.3% of 25-34 households that are concealed puts Cotswold in the lower half of South West authorities on this measure:

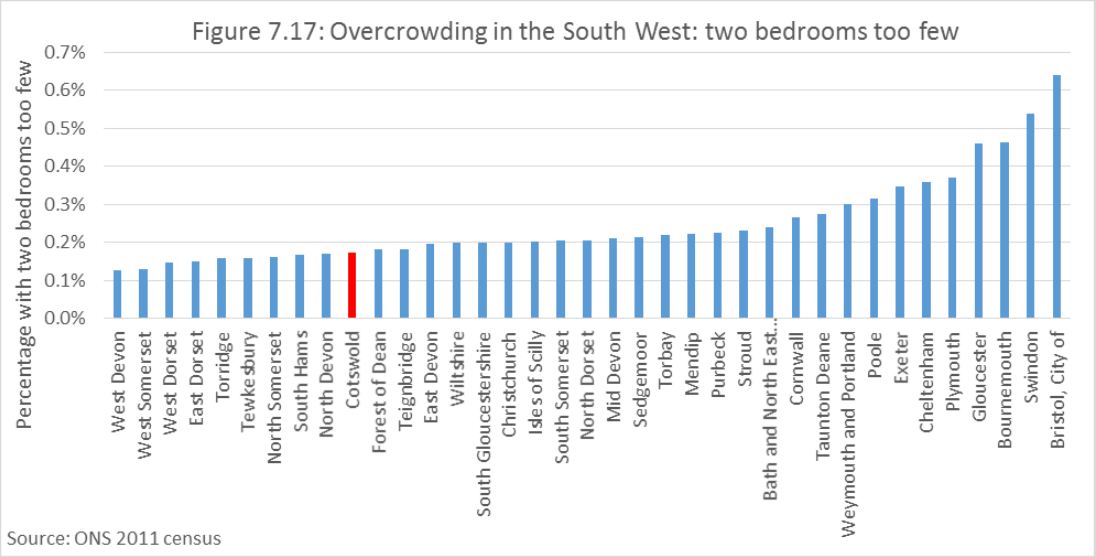


7.25. Given that Cotswold has the lowest proportion of concealed households in the South West and that proportion grew by less than any other South West authority between the 2001 and 2011 censuses it can hardly be argued that this indicator provides grounds for a market signals adjustment, notwithstanding the relatively high proportion of '24 and under' households that are concealed.

Overcrowding

7.26. Overcrowding provides a further indicator of potential stress in housing markets. Figures 7.16 and 7.17 present the census 2011 data for households which have either one bedroom too few or two or more too few – again for all South West authorities. Again the message is clear: there is no cause for concern in this area.





Affordable housing

7.27. The PPG includes the following guidance on affordable housing:

> "*The total affordable housing need should then be considered in the context of its likely delivery as a proportion of mixed market and affordable housing developments, given the probable percentage of affordable housing to be delivered by market housing led developments. An increase in the total housing figures included in the local plan should be considered where it could help deliver the required number of affordable homes."*[25]

7.28. The obligation on a local authority preparing a plan is to **consider** increasing the housing requirement in its plan where to do so would help deliver the required number of affordable homes. There is no obligation to set the housing requirement at a level which would enable the full need for affordable housing to be met (and in many cases the need for affordable housing will be so high that this would not be feasible)[26].

7.29. There is no official guidance on the factors which should be taken into account in considering whether a housing requirement should be increased for this purpose. In the absence of guidance it would be reasonable to assume that the view taken should depend on an assessment of benefits of providing more market and affordable housing compared with any dis-benefits this might have. This inevitably involves qualitative value judgements and must therefore be outside the scope an objective assessment of housing needs. This view is confirmed by the second edition of the PAS Technical Note[27]:

[25] Planning Practice Guidance, Paragraph: 029 Reference ID: 2a-029-20140306
[26] See Dove J in Borough Council of King's Lynn and West Norfolk v Secretary of State [2015] 2464
[27] Objectively Assessed Need and Housing Targets Technical advice note, second edition, July 2015. Available at http://www.pas.gov.uk/documents/332612/6549918/OANupdatedadvicenote/f1bfb748-11fc-4d93-834c-a32c0d2c984d

"In summary, it seems logical that affordable need, as defined and measured in paragraphs 22-29 of the PPG, cannot be a component of the OAN. The OAN does have an affordable component – which cannot be measured separately but will normally be much smaller than the affordable need…."[28]

This reasoning supports the conclusion that:

"…it seems clear from the PPG and Inspectors' advice that affordable housing need is a policy consideration that bears on policy targets, rather than a factor that bears on objectively assessed need."[29]

7.30. On the basis that the uplift, if any, to allow more affordable housing to be delivered is a policy matter to be considered in deciding how the housing requirement in the Cotswold Plan should be set in relation to the FOAN, it is outside the scope of this report.

Assessing the evidence on market signals and undersupply

7.31. As far as market signals are concerned, Cotswold is an area with high house prices and poor affordability. This, however, reflects the attractiveness of the area and is not necessarily a basis on which to apply a 'market signals adjustment'. The potential grounds for a market signals adjustment are the rate of increase in house prices and rents; the deterioration in the affordability ratio; and the suggestion that there may have been under supply in the years before the economic downturn. The evidence on house prices, rents and affordability is not conclusive: a significant proportion of South West authorities have seen a faster proportionate increase in house prices or a bigger deterioration in affordability; and the rental trend data only covers the 5 year period following the recession. The possibility that there may have been an under supply to the housing market in the period before the downturn is of greater concern.

7.32. The PAS Technical Note's advice on assessing whether housing supply has been constrained is as follows:

"7.5. To see if planning constrained housing supply in the past, and hence if demographic projections should be adjusted upwards, two kinds of evidence are available. Direct evidence is provided by past land provision and housing delivery, considered in relation to the planning policies in force at different times. Indirect evidence is provided by the market signals discussed in paragraph 19 of the PPG."

7.33. Paragraph 7.14 then adds the following caution:

"7.14. In short, an area with above-average growth in house prices is most probably an area where housing land has been particularly under-supplied. But the converse is not true: if house price growth is close to the average, it may

[28] PAS Technical Note, paragraph 9.7
[29] PAS Technical Note, paragraph 9.3

still be the case that housing land has been under-supplied. Where demand is relatively footloose, so households have the choice between different local authority areas which they regard as substitutes, one would expect the impact on prices of any local under-supply to be spread across large areas. This is probably why house price changes in most local authorities closely track one another, especially within each region.

7.34. The Technical Note also refers in the final bullet of paragraph 7.12 to the impact which under supply has on two drivers of housing need: household formation rates and migration. It then

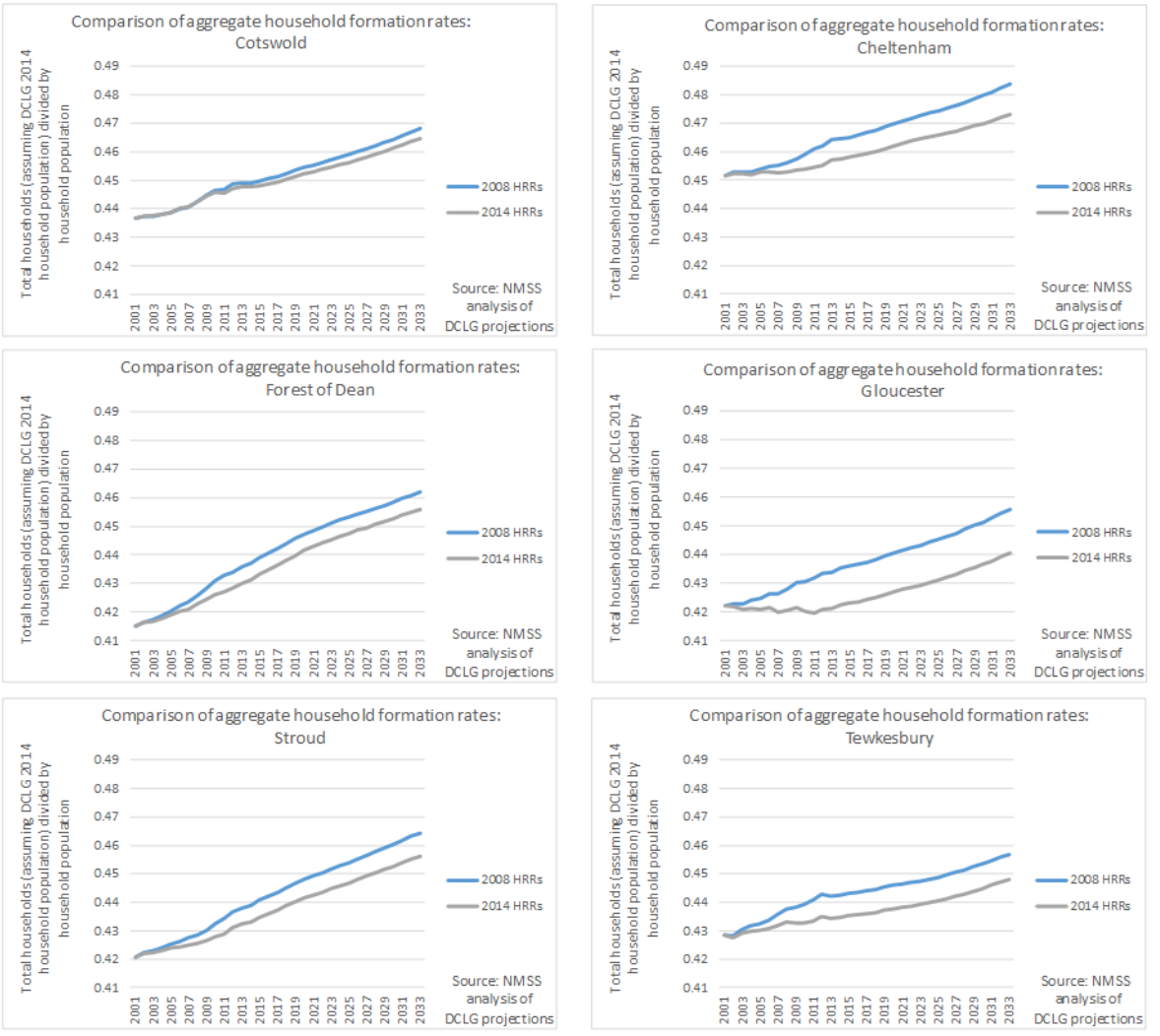
7.35. To put this another way, constrained housing supply can result in household formation rates and/or net migration being lower than they otherwise might have been i.e. by fewer separate households being established in an area or fewer people moving to an area. Both responses are reactions to their being fewer homes available in an area. This can be illustrated by a practical example: consider a couple living in one of their parent's homes who ten years ago might have moved to a flat in the same town to set up their own home. However, as house prices are higher than they were ten years ago they cannot afford to do this. They could either remain in the parent's home , thereby causing household formation rates to be lower than they would have been, or they could set up home in a local authority area in which prices are lower, thereby causing net migration to the area to be lower than it would have been.

7.36. Both lower household formation and lower net migration can be evidenced by market signals such as house prices rising faster than in surrounding areas, but if, as the PAS Technical Note puts it, demand is relatively footloose, the house price effect need not be that clear cut. The alternative to considering the market signals suggested by the PPG is to look at the available evidence on household formation rates and net migration.

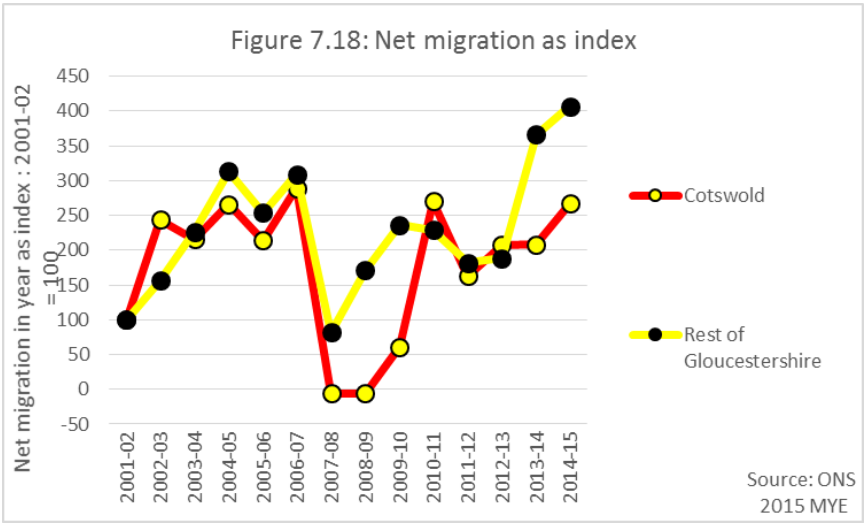
7.37. The DCLG household projections summarise the best available information on past and likely future household formation rates although it needs to be appreciated that the source measurements of actual household representative rates come from census data which is only available every ten years.

7.38. The DCLG projections have been discussed in some detail in Section 4. The aspect most relevant to the consideration of past undersupply is the way in which household formation rates have changed in Cotswold compared with the other authorities in the Gloucestershire HMA as shown in figure 4.11 (reproduced below for ease of reference). As can be seen, the aggregate household formation rate in Cotswold in 2011 had departed from the trajectory anticipated in the 2008-based projections by much less than in any other authority in the HMA. Moreover, the 2014-based projections envisage that in the future Cotswold will be much closer to the 2008-based projections than the rest of the HMA. The available evidence on household formation rates does not therefore indicate any market signal issue. It follows, that if other evidence suggests that supply has been constrained, it in not household formation rates that should be adjusted but the migration flows.

Figure 4.11: Comparison of aggregate household formation rates

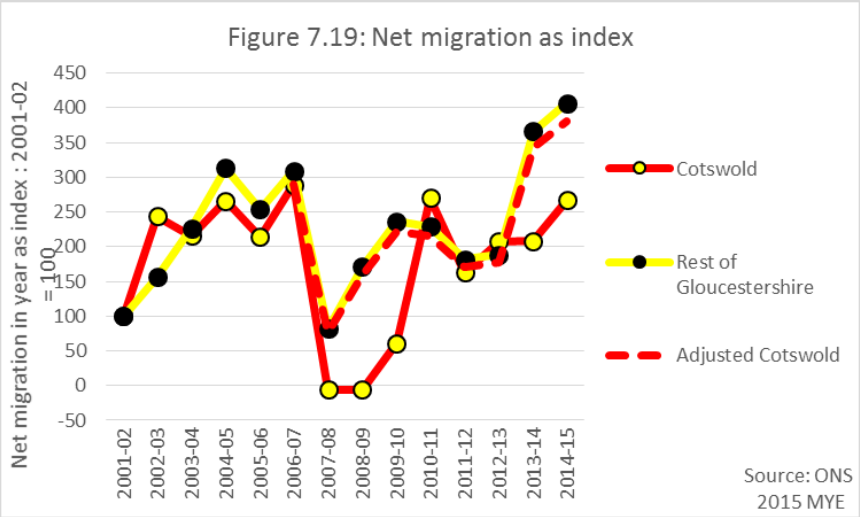


7.39. Figure 7.18 compares net migration to Cotswold since 2001-02 with the net flow to the rest of Gloucestershire.

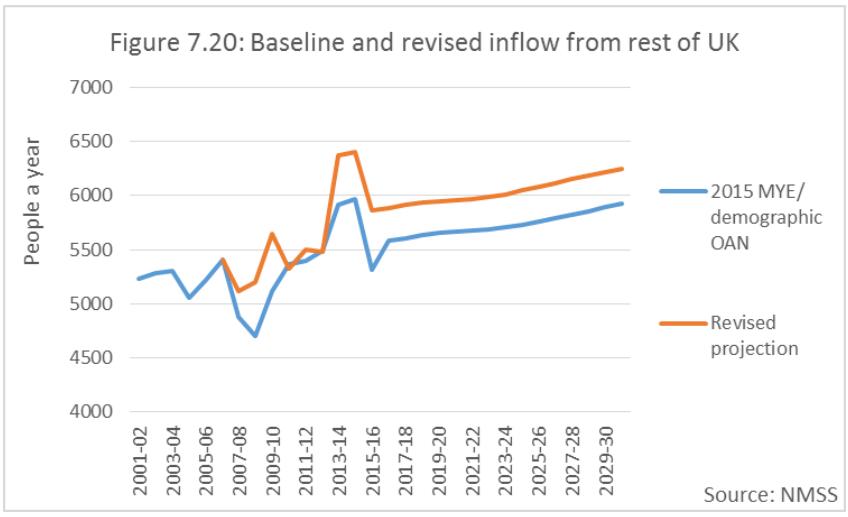


7.40. As can be seen, Cotswold follows the net flow to the rest of Gloucestershire up to 2006-07 within in small annual variations. After 2006-07, the reduction in the net flow was deeper and more sustained than for the rest of the HMA and the increase in the net flow after 2012-13 has been proportionately less.

7.41. To explore the extent to which this may have affected the projected population increase in the Cotswolds, an 'adjusted historic projection' has been created by increase the inflows from the rest UK on the same age profile as the historic flows to provide the necessary extra net migration. The additional incomers were assumed to have the same fertility and mortality rates as the existing population as well as the same tendency to move to other parts of the UK or abroad. International inflows were not adjusted. The net effect was to produce the adjusted net migration trajectory shown in Figure 7.19.



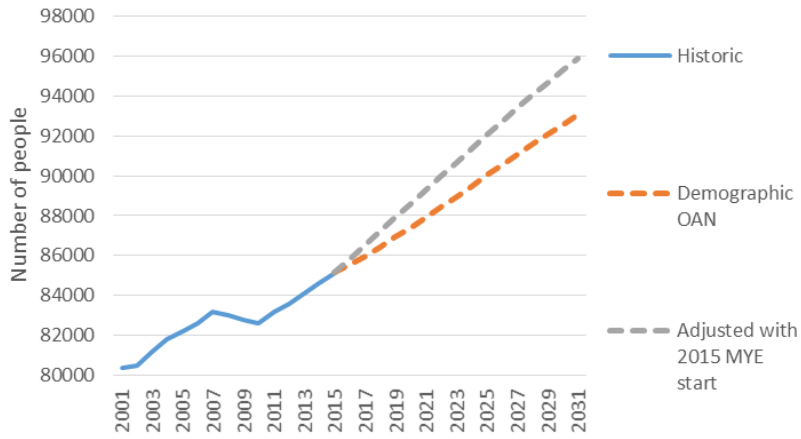
7.42. Adjusting the historic inflow in this way changes the inflow rates over the period 2005-15 used in the calculation of the demographic OAN resulting in a larger projected inflow and hence a faster population increase – as shown in Figure 7.20.



7.43. The effect which the increased inflow has on the population projection is shown in Figure 7.21. The projected population in 2031 rises from 93,000 to 95,900 which

means that the population increase over the plan period increases from 9,900 to 12,700.

Figure 7.21: Comparison on population projections



7.44. The higher population increase results in a larger household increase and hence a requirement for more homes. In total 7,900 homes are need over the period 2011-31 or 390 a year. That compares with the demographic OAN of 6600 homes 2011-31 or 330 homes a year. The undersupply adjustment is therefore an increase of 1300 homes or nearly 20%.

8. SUPPORTING ECONOMIC GROWTH

Government guidance

8.1. The PPG advises:

> *"Plan makers should make an assessment of the likely change in job numbers based on past trends and/or economic forecasts as appropriate and also having regard to the growth of the working age population in the housing market area. …..*
>
> *Where the supply of working age population that is economically active (labour force supply) is less than the projected job growth, this could result in unsustainable commuting patterns (depending on public transport accessibility or other sustainable options such as walking or cycling) and could reduce the resilience of local businesses. In such circumstances, plan makers will need to consider how the location of new housing or infrastructure development could help address these problems."*[30]

8.2. This makes it clear that Local Plans should be consistent with the economic prospects of an area and, in effect, directs those estimating an OAN to consider whether a demographically based OAN would accommodate a sufficiently large working age population to support the likely jobs growth. It is not acceptable simply to assume that commuting patterns will change to cover any shortfall between the resident labour force and what is needed to support the economic growth of the area.

Approach to assessing whether extra homes are needed to support economic growth

8.3. The PPG suggests two possible approaches to assessing the likely change in jobs numbers:

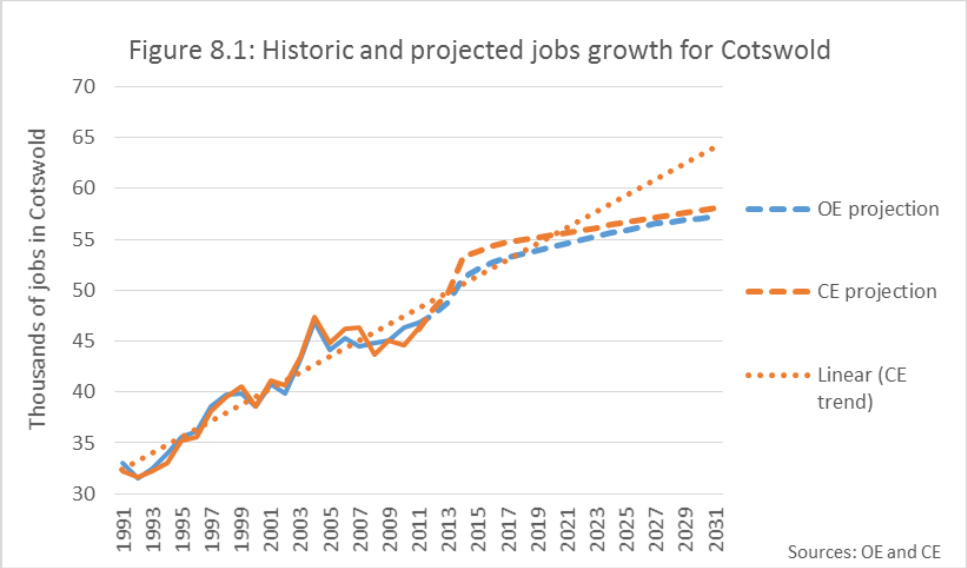
- Past trends
- Economic forecasts

The PPG does not require that both approaches should be used: the requirement is to make "*an assessment of the likely change in job numbers based on past trends* ***and/or*** *economic forecasts as* ***appropriate****"* (our emphasis). This clearly indicates that those preparing plans have a choice to do either or both, depending on what is considered appropriate.

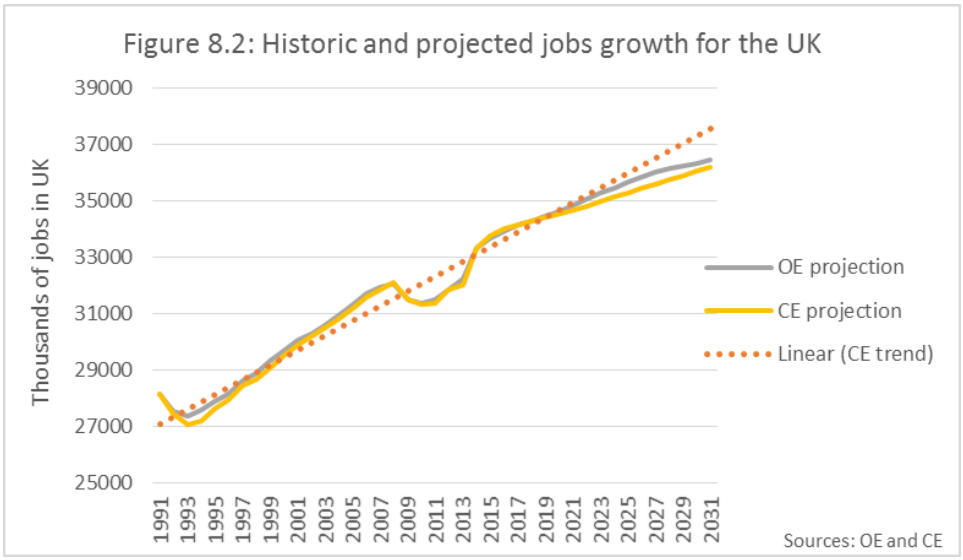
8.4. Economic forecasts have been obtained from Cambridge Econometrics (CE) and Oxford Economics (OE) dated November 2015. Figure 8.1 (below) shows how these

[30] Planning Practice Guidance, Paragraph: 018 Reference ID: 2a-018-20140306 http://planningguidance.planningportal.gov.uk/blog/guidance/housing-and-economic-development-needs-assessments/methodology-assessing-housing-need/

forecasts compare with past job growth, and includes a linear trend line based on jobs increases between 1991 and 2011.



8.5. As can be seen, the trend line indicates that both CE and OE envisage jobs growth at a slower rate than the trend between 1991 and 2011. The trend growth rate was 790 jobs a year in that period whilst OE envisages an average of 350 jobs a year between 2014 and 2031 and CE 280 jobs a year. However, it is unrealistic both nationally and locally to expect jobs growth to continue at historic rates as the working age population (which for these purposes we might take as those aged 16-64) is not projected to grow at the same rate in the past. It is for this reason that the projections for jobs growth at the UK level made by both OE and CE are below the historic trend rate, as Figure 8.2 below shows:



8.6. Whilst it could be argued that the national constraint on the number of 16-64 year olds in the population need not necessarily bite at the local level, the consensus of the last seven jobs forecast for Cotswold District (see Figure 8.3) is that job growth over the period 2014-31 will not be higher than 6000 jobs or 350 a year, below half the historic trend rate of 790 jobs a year.

8.7. On this basis and in the absence of compelling evidence that the recent jobs forecasts are badly awry, what follows considers the latest forecasts for jobs growth from OE and CE as the best available indications of likely job growth, notwithstanding their evident limitations.

8.8. Using the econometric projections there are two possible approaches to assessing the housing implications of the forecast increase in jobs:

- Considering Cotswold on a 'standalone' basis
- Analysing the housing market as a whole.

8.9. The October 2014 NMSS Report set out an analysis based on the Gloucestershire HMA. That approach inevitably requires any additional homes that might be needed above the demographic OAN to be allocated between the six districts in Gloucestershire. The Inspector examining the Stroud District Local Plan found the proposed allocation somewhat arbitrary and, in response to his comments, a standalone analysis was also prepared. However, others have since suggested that an HMA-wide analysis should be produced given the encouragement that the PPG gives to analysis at the HMA-level. This Update Report therefore offers both an HMA-wide analysis and a standalone analysis.

The new jobs increase forecasts

8.10. Figure 8.3 and 8.4 below compare the latest jobs increase forecasts (November 2015) with those obtained in 2014 and similar forecasts obtained earlier in 2015 by Barton Willmore and presented in evidence to support an appeal relating to a site in the Forest of Dean.

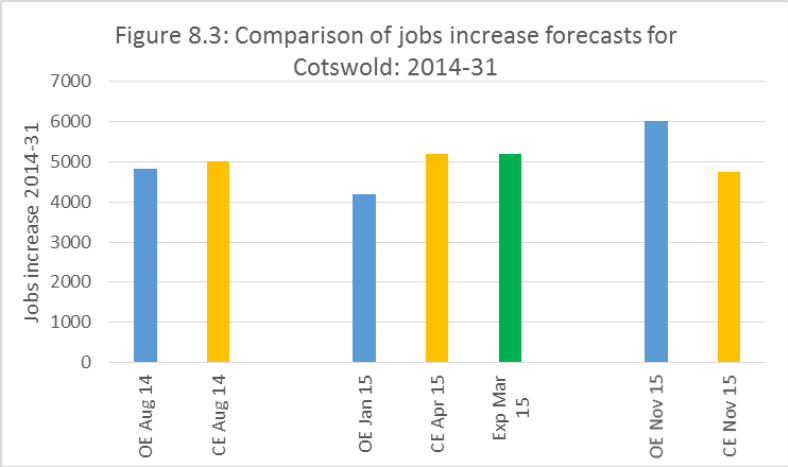


Figure 8.4: Comparison of jobs increase forecasts for Cotswold: 2014-31

OE Aug 14	CE Aug 14		OE Jan 15	CE Apr 15	Exp Mar 15		OE Nov 15	CE Nov 15
4800	5000		4200	5200	5200		6000	4700

8.11. The employment forecasts for Cotswold have changed less than for other parts of Gloucestershire. Nevertheless, the OE forecast has increased by 25% (from 4,800 to 6,000 jobs) between August 2014 and November 2015, a period of only 15 months. However, compared with the other forecasts shown in Figure 8.3, the November 2015 OE forecast is something of an outlier: five of the other forecasts are within the range 4,700 to 5200 extra jobs 2014-31. The CE forecast has moved much less, falling by 5% between August 2014 and November 2015 (from 5,000 to 4,700 jobs)

8.12. Note that the forecasts presented are for the period 2014-31 as the estimates for jobs, unemployment and other key parameters during the economic downturn and its immediate aftermath are subject to significant uncertainty. This can be seen from Figure 8.1 above. Between 2007 and 2014 the OE and CE figures for the number of jobs in Cotswold District follow different trajectories and are highly volatile. The CE figures in particular change markedly from one year to the next with the number of jobs falling by 2,700 between 2007 and 2008, then increasing by 1,400 between 2008 and 2009 and falling again by 500 between 2009 and 2010. Whilst the OE figures suggest an increase of 4,500 jobs between 2011 and 2014, the CE data suggests an increase of 7,200 jobs over the same period. These fluctuations and differences are as likely to be due to problems with the data sources used as to reflect actual changes in job numbers. Moreover, the scale of the fluctuations is large enough that any analysis of the housing implications of economic growth based on them could vary significantly depending on the year chosen as the start year. It is therefore better to analyse the housing implications of the jobs forecasts using forecasts for the more stable period after the recovery from the downturn i.e. the period from 2014. This is discussed more fully in Section 2 of the Nupremis report, *"Review of Economic Forecasts Cotswold, 29th February 2016"* which confirms that this is a better approach than using the forecasts for the period 2011-31.

8.13. There is no inconsistency between using the period 2014-31 for estimating the housing implications of job growth and the overall objective of this report which is to estimate the housing needed over the period 2011-31. The PPG advice quoted in paragraph 106 above is, in effect, saying that the key issue is whether the change in the economically active population is going to be consistent with the likely change in jobs and, if not, consideration should be given to additional housing (or infrastructure improvements). The concern is to avoid unsustainable changes in commuting or the reduced resilience of local businesses. That being so, as long as the starting point for the analysis is a point in time at which commuting was not unsustainable or businesses were lacking resilience, it does not matter what period is chosen for the comparison of the potential change in the size of the workforce with the forecast change in the number of jobs.

8.14. The method used to produce an estimate the implications of the forecast increase in jobs between 2014 and 2031 that is consistent with the 2011-31 plan period is different for the two jobs forecasts:

8.14.1. For the CE forecast the analysis considers what additional population would need to be accommodated between 2014 and 2031 to provide the

work force needed to support the projected job growth between those dates. Adding that population growth to the population growth which occurred between 2011 and 2014 (from the 2015 Mid-Year Estimates) enables the population in 2031 to be estimated. That allows the number of households that would be needed in 2031 to be calculated by applying the DCLG household formation rates. The increase in households between 2011 and 2031 can then be calculated by subtracting the number of households in 2011. The number of homes needed between 2011 and 2031 is then estimated by adding an allowance for empty and second homes.

8.14.2. For the OE forecast the analysis is based on OE's estimate of the 16-64 population in 2031 that would be consistent with their projection. This is compared with the 16-64 population in the demographic OAN scenario. The projected inflow to Cotswold from the rest of the UK is then adjusted up or down until the projected 16-64 population in 2031 matches that envisaged by OE for that year. The model used to adjust the inflows to Cotswold also calculates the total population in 2031 that would be associated with the adjusted 16-64 population. DCLG household formation rates are then applied to this total population estimate, split into 5-year age groups, to estimate the number of households that would need to be present in 2031. It is then straightforward to calculate the increase in households and the number of homes needed.

8.15. Figures 8.5 and 8.6 below show the comparable employment forecasts for Gloucestershire as a whole. Somewhat surprisingly, given that these relate to a larger area, they have been more volatile than the Cotswold forecasts. OE forecast has increased by 50% (from 16,900 to 25,500 jobs) between 2014 and November 2015 whilst the CE forecast has fallen by 38% (from 31,600 to 19,700 jobs over the same period.

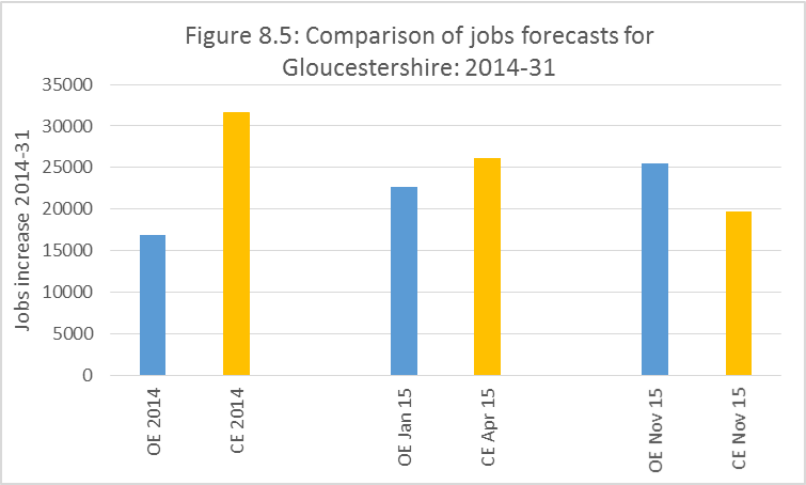


Figure 8.6: Jobs increase forecasts for Gloucestershire: 2014-31							
OE 2014	CE 2014		OE Jan 15	CE Apr 15		OE Nov 15	CE Nov 15
16900	31600		22700	26200		25500	19700

Allowing for the uncertainty in the forecasts

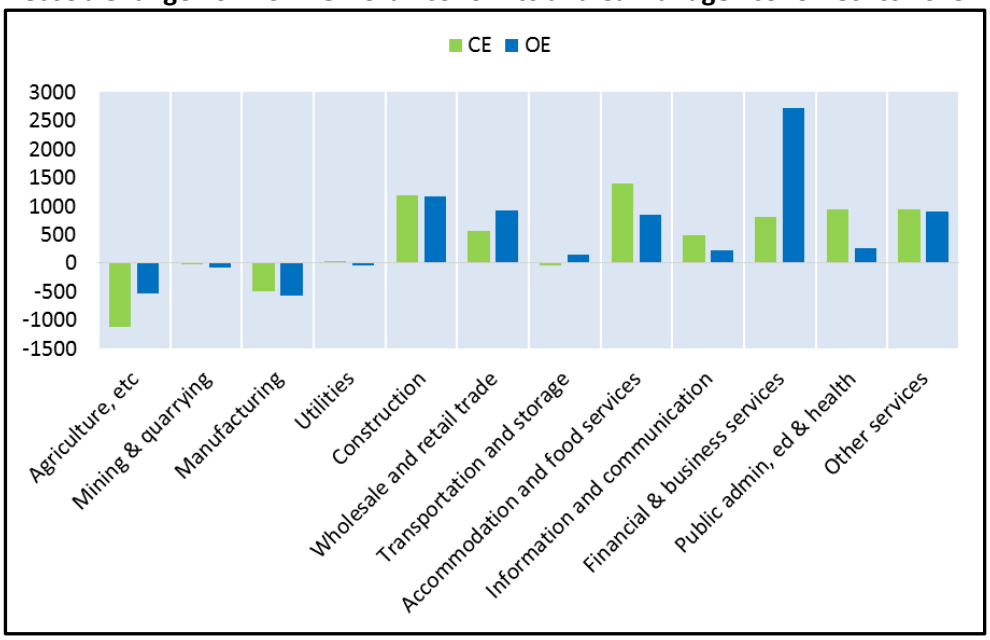
8.16. As already noted, the volatility of the individual forecasts and the variability between the forecasters is self-evident from Figures 8.3 and 8.4 above. This is not a criticism of the forecasters but a reflection of the inevitable uncertainties inherent in forecasting economic performance at the local authority level. The forecasters themselves acknowledge that their results become less reliable the smaller the area to which they are disaggregated. This uncertainty needs to be taken into account in interpreting the forecasts.

8.17. There are a number of ways in which the uncertainties in the jobs forecasts might be taken into account.

8.17.1. **Expert review of the local forecasts.** The local authority level forecasts are made up of forecasts for job and output growth in each sector of the local economy. As the chart[31] below shows, the sector forecasts can vary significantly between forecasters. Note in particular that OE and CE take significantly different views on the job growth prospects in financial and business services, accommodation and food services and wholesale and retail trade. There is also a sizeable difference in the extent to which employment in agriculture is forecast to fall. Such differences are to be expected as the local forecasts are produced by a fairly mechanical disaggregation of national forecasts. Expert review of the individual sector forecasts taking account of the latest local data can assess the plausibility of each element of the forecast in the local circumstances and produce alternative, more probable scenarios. Nupremis have done this for the latest forecasts in their report *"Review of Economic Forecasts Cotswold, 29th February 2016"*.

[31] From Nupremis report, *"Review of Economic Forecasts Cotswold, 29th February 2016".*

Net Job Change 2014-31 - Oxford Economics and Cambridge Econometrics 2015



8.17.2. **Averaging two or three forecasts.** Obtaining two or three forecasts and then taking the average of the jobs increases forecast in each is clearly better than relying on a single forecast. However, there are two major drawbacks with this approach:

- If there are anomalous sector forecasts in any of the individual forecasts then an averaging approach still gives weight to those anomalies, albeit less weight than would be given if only one forecast were used.
- The averaging approach produces an average figure for the increase in jobs which then has to be converted into an estimate of the population that would be needed to provide the necessary increase in the work force. That conversion requires a view to be taken on how the economic activity rates of the population will change. As discussed below, in calculating the housing implications of a jobs forecast it is important to use economic activity rates consistent with the projections being interpreted; to do otherwise risks making nonsense of the projections. However, unless the forecasts being averaged happen to use exactly the same economic activity rates, that is not possible if the forecasts have been averaged before the housing implications have been estimated.

8.17.3. **Using a larger area to estimate the housing implications of economic growth.** As jobs forecasts become less reliable the smaller the area to which they are disaggregated, a potential approach to reducing the impact of uncertainty is to use a larger area than an individual local authority district, the housing market area (HMA) being the obvious choice. However, in the case of Cotswold and Gloucestershire the jobs forecasts appear to be more volatile at the HMA level (Gloucestershire) than at the local authority district. As already noted, another issue with this approach

is that, having reached a view on how many (if any) additional homes are needed at the HMA level to support economic growth, a view then needs to be taken as to how those additional homes are to be allocated to the individual districts. That process can appear somewhat arbitrary.

8.18. In this analysis two approaches have been used:

8.18.1. **A standalone analysis for Cotswold using the findings of an expert review of the two forecasts.** The housing implications of the OE and CE forecasts have been estimated separately using methods which are consistent with the economic activity rates built into those forecasts. This has been done for both the unadjusted forecasts and the alternative scenarios produced by Nupremis. This produces a range for the number of homes needed to support economic growth, the mid-point of which can be taken as an estimate of the homes needed.

8.18.2. **A Gloucestershire-wide analysis.** This uses the latest jobs projections for the county as a whole from OE and CE. The number of homes needed are estimated separately using methods which are consistent with the economic activity rates built into the two forecasts. The results are then compared with the updated demographic OAN for the county as a whole to determine whether additional homes are needed to support economic growth. Again this produces two figures which provide a range, the mid-point of which can be taken as an estimate of the homes needed.

A standalone analysis of the homes needed to support economic growth in Cotswold.

8.19. As shown in Figures 8.3 and 8.4 above, the OE and CE jobs forecasts have moved in different directions between August 2014 and November 2015 and there is a substantial difference between the latest forecasts:

- The OE forecast for 2014-31 has increased from 4,800 jobs to 6,000, an increase of 25%
- The CE forecast for the same period has fallen from 5,000 jobs to 4,700, a fall of 5%[32].
- The latest OE jobs increase forecast for 2014-31 is 27% higher than the latest CE forecast.

8.20. The Nupremis report, "Review of Economic Forecasts Cotswold, 29th February 2016" examines the forecasts in detail. Key conclusions include:

8.20.1. **There has been a very large growth in self-employment in Cotswold, particularly amongst the over 64s.** Between 2009 and 2014 the number of employee jobs in Cotswold increased by 2,800 or 7.7% whilst the number

[32] Note that percentages have been calculated using the unrounded OE and CE figures. Those jobs increase figures have been rounded to avoid suggesting spurious accuracy.

of self-employed people increased by 4,500 or 45%. Self-employment amongst those over 64 increased from 900 in 2010 to 3,200 in 2013 i.e. it more than trebled. 25% of those who are self-employed are over 64.

8.20.2. Whilst CE projects jobs growth in Cotswold over the period 2014-31 at the same rate as it projects for the UK (9%), OE projects that Cotswold job growth (12%) will be much faster than it projects for the UK (also 9%).

8.20.3. The main differences between the forecasts for 2014-31 are:

- **CE envisage a much larger loss of jobs in agriculture than OE** (CE -1,100 as opposed to OE -520). However the two forecasts envisage very similar numbers of jobs in agriculture in 2031. The difference in the change in jobs between 2014 and 2031 appears to be due a very high increase in jobs in agriculture assumed by CE in 2013-14 – 1200 jobs.
- **OE envisage a faster growth in wholesale and retail jobs than CE** (OE +930 jobs; CE +560 jobs). The OE increase is higher than both their Gloucestershire and South West projections.
- **CE envisage faster growth in accommodation and food than OE** (CE 1,390 jobs; OE 850 jobs). This is seen as a growth sector. There is no clear basis for adjusting either forecast but Nupremis recommends that the sector is monitored closely.
- **OE projects growth in financial and business services which is more than three times that envisaged by CE** (OE 2,710 jobs; CE 810). The CE projection for 8% growth is below its forecasts for Gloucestershire (12%) and the South West (14%) which seems anomalous. In contrast the OE projections are for faster growth than it envisages for Gloucestershire, despite performance in the property sector and business administration in Cotswold having been below Gloucestershire levels.
- **CE forecasts a much faster increase in Government services jobs than OE.** (CE 950 jobs; OE 260 jobs) The CE forecast increase (10%) is significantly faster than its national increase (6%)

8.20.4. In producing their alternative scenario Nupremis have suggested adjustments in each of the sectors listed above with the exception of accommodation and food. The net result is to reduce the OE forecast from 6000 jobs to 5,300 and increase the CE forecast from 4,700 jobs to 5,000, bringing the two forecasts much closer together.

Estimating the housing implications of the employment projections

8.21. The housing implications of the new projections have been estimated using the NMSS model. In each case the projected inflow from the rest of the UK in the

demographic OAN scenario has been adjusted up or down until the population matches that necessary to support projected increase in jobs. In adjusting those inflows it has been assumed that, as the driving force for a change in migration patterns would be the availability or otherwise of jobs, those who move are not near or over retirement age. 50 is taken as the cut-off age.

8.22. The matching of the population projections with the jobs forecast has been performed in a different way for the two projections due to the differences between the forms in which the outputs are provided.

8.22.1. In the case of CE, economic activity rates for Cotswold have been estimated from economic activity rates for the South West region supplied by CE. Those economic activity rates have then been used to calculate the labour force which the population projected in the 2012 SNPP will provide in 2031. The population in 2031 has then been adjusted up or down until the increase in labour force between 2014 and 2031 matches that needed for the CE forecast for the jobs increase over this period.

8.22.2. For OE the inflow from the rest of the UK has been adjusted until the 16-64 population in 2031 matches that envisaged in the OE projections.

8.23. Having estimated the population needed in 2031 to provide the labour force implied by a jobs forecast, the number of homes needed to accommodate that population in 2031 has been calculated using the household formation rates from DCLG's 2014-based household projections. The Technical Annex gives much fuller details of how these calculations have been performed.

8.24. The results of this analysis are as follows:

Figure 8.7: November 2015 jobs forecasts for Cotswold

	OE		CE	
	Jobs	**Homes**	Jobs	**Homes**
	2014-31	**2011-31**	2014-31	**2011-31**
Unadjusted forecast	6000	**8900**	4700	**7300**
Alternative scenario	5300	**8600**	5000	**7500**

8.25. As the table shows, there is a significant difference between the numbers of homes indicated by the two projections and between the unadjusted and alternative scenarios. However, if the average between the two projections is taken, the figure (rounded to the nearest hundred homes) is 8,100 homes for the unadjusted forecasts and 8,000 homes for the alternative scenario.

Issues with the standalone jobs-led OAN estimates

8.26. A number of issues have been identified relating to the jobs-led OAN estimates derived from the OE and CE forecasts.

(a) Plausibility of implied population growth

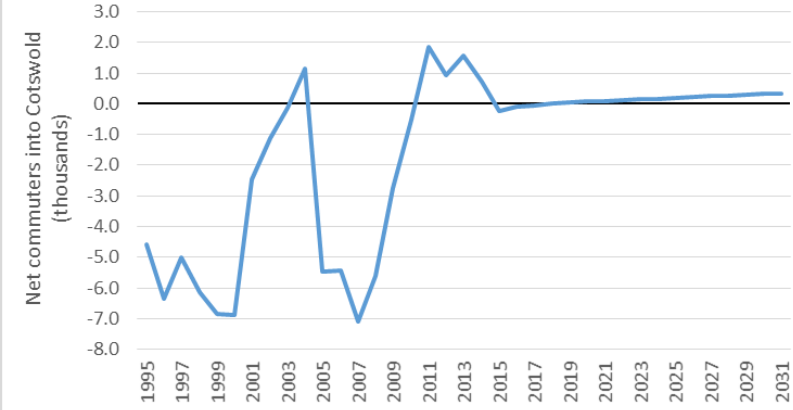
8.27. The NMSS model suggests that to produce the increase in the 16-64 population of Cotswold suggested by the (unadjusted) OE projection would necessitate the total population of the district to increase from 84,600 in 2014 to 100,100 in 2031, an average annual increase of 909 people a year. That is almost twice the average annual increase seen between 1991 and 2008 (481 a year). In comparison the demographic OAN implies a population increase over the same period that is only 3% faster than that between 1991 and 2008 and the CE projection implies an increase that is 28% faster. It is questionable how plausible a population increase of the size implied by the OE projection might be.

(b) OE assumptions on net commuting and unemployment

8.28. It has been suggested that it is possible that, in seeking to ensure a sufficiently large work force to support its jobs projection, the OE projection may adjust commuting flows and unemployment rates unrealistically. Moreover it is possible that the OE model might adjust net commuting in a way that is inconsistent with the PPG, which implies that it should not be assumed that commuting flows will change to make good any labour force shortfall. An examination of the OE projection shows that neither is the case.

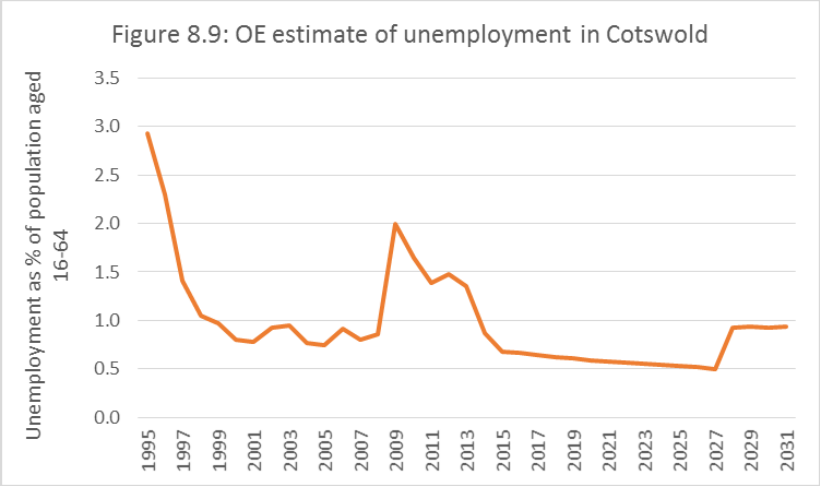
8.29. Figure 8.8 below plots the OE estimate for net commuting into Cotswold.

Figure 8.8: OE estimate of net commuting into Cotswold



8.30. The OE figures reflect the census data which suggests that Cotswold changed from being a net exporter of commuters in 2001 to being a net importer in 2011. The projection assumes that net commuting fell between 2013 and 2015 despite continuing strong employment growth. It also envisages that the net inflow in 2031 will be some 400 people fewer than in 2014. Thus, far from assuming that a labour force shortfall is met by increased net in-commuting, the projection errs slightly in the other direction. Indeed had, the projection been constrained to ensure no change in net commuting, the required increase in the resident population of 16-64 year olds would have been lower – significantly lower had the commuter flow been constrained to the 2011 net inflow.

8.31. Figure 8.9 below shows the OE output for the unemployment rate in Cotswold. Note that the measure used by OE is 'unemployment as a percentage of the 16-64 population'. This measure produces lower percentages than other measures such as the unemployment as a percentage of those economically active.

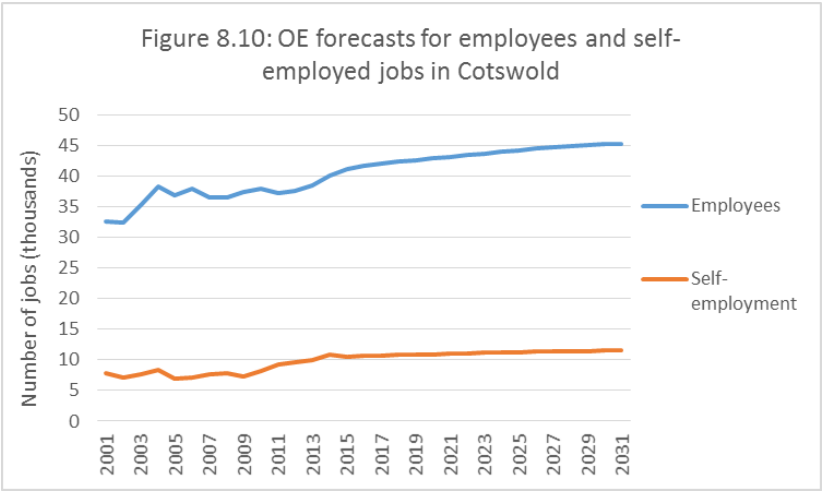


8.32. As can be seen from the chart, OE envisage that the unemployment rate continues to fall after 2015, albeit at a slower rate, until 2027 when there is a strange increase of 0.4%. The reasons for that late change are not clear. However, the unemployment rate assumed in 2031 is comparable to that in the period 1999 to 2008, before the economic downturn. It is therefore not unreasonable.

(c) Recent increases in self-employed older people

8.33. As noted above, there has been a substantial increase in self-employment in Cotswold in recent years and a large proportion of this has been amongst those over 64. A comparison of the increases in the self-employment amongst older people with the latest data on migration from the rest of the UK suggests that most of the additional self-employed people over 64 are likely to have been previously resident in the district and not new arrivals. They could have been existing self-employed people who have continued in work longer than their equivalents in earlier years or people who have entered the labour force on a self-employed basis, perhaps after leaving an employed role. However, the key point relating to the estimation of the number of homes needed to support economic growth is that, insofar as the additional self-employed workers were already resident in the area, they will not have given rise to demand for additional homes. This could suggest that conventional approaches to assessing the housing need to support economic growth might over-estimate the homes needed where there are high levels of self-employment amongst older people.

8.34. OE separate their jobs forecasts into employee and self-employed jobs. Whilst their figures for self-employed jobs reflect the increase that was seen between 2009 and 2014, thereafter they suggest that the bulk of jobs growth will be in employee jobs, as shown by figure 8.10 below:



A Gloucestershire-wide assessment of the jobs-led OAN

8.35. The October 2014 NMSS Report concluded that full OAN of Cotswold was the demographically based OAN (6,300 homes 2011-31) plus the district's share of the additional homes needed across the county to support forecast jobs growth (i.e. 1,300 homes), producing a full OAN of 7,600 homes. Using the Gloucestershire-wide jobs projections obtained from OE and CE alongside the latest Cotswold projections it is possible to update this calculation. Full details are provided in the Technical Annex.

8.36. The headlines from the new Gloucestershire-wide projections are:

8.36.1. The OE jobs forecast for Gloucestershire for 2014-31 has increased from 16,900 jobs to 25,500 jobs, an increase of 50%.

8.36.2. The CE jobs forecast for Gloucestershire has reduced from 31,600 to 19,722, a fall of 38%.

8.37. That reduction in the CE projection is particularly significant as it was the CE projection in the October 2014 NMSS Report that suggested that an additional 6,100 homes were needed above those envisaged by the demographically-based OAN. The revised projection suggests that the jobs forecast by CE can be supported by 10,600 fewer homes across Gloucestershire than the updated demographically-based OAN (of 54,600 homes 2011-31) suggests.

8.38. A similar analysis of the new OE projection indicates that 8,100 fewer homes than suggested by the demographically-based OAN for Gloucestershire would support the OE forecast increase in jobs. That compares with the 2014 analysis which suggested that OE jobs forecast could be supported with 7,100 fewer homes than suggested by the then demographic OAN.

8.39. Figure 8.11 compares the Gloucestershire-wide analysis[33]:

Figure 8.11: Updated estimates of homes needed to support economic growth				
Homes needed 2011-31 Jobs forecasts 2014-31	2014 jobs forecasts	2014 homes needed	2015 jobs forecasts	Updated homes needed
Oxford Economics	16931	44700	25472	46500
Cambridge Econometircs	31626	57900	19722	44100

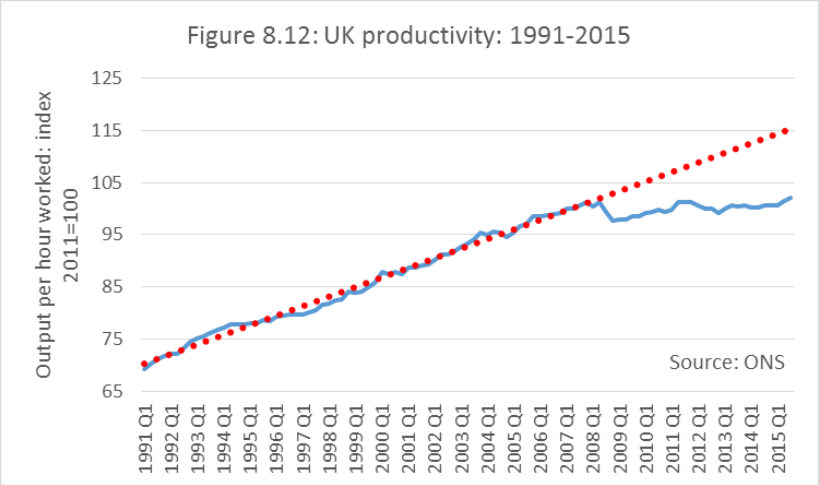
8.40. The overall conclusion is that the revised jobs forecasts from both agencies can be comfortably accommodated within the population envisaged in the revised demographically-based OAN for Gloucestershire of 54,600 homes 2011-31. **This would mean that, if an HMA-wide approach was taken to assessing the Cotswold FOAN, there would be no need to add to the demographic OAN of 6,600 homes over the period 2011-31 or 330 homes a year**.

Productivity assumptions

8.41. In "Fixing the Foundations: Creating a more Prosperous Nation"[34] the then Chancellor of the Exchequer described productivity as "the challenge of our time". He noted that the UK has a long-term productivity problem and that we perform poorly compared with many Western economies. He set out a strategy to raise productivity by encouraging long term investment and promoting innovation. The essential message is that rising employment has been a major source of growth, but over the longer term, productivity is the more essential ingredient. Figure 8.12 below illustrates the grounds for the Chancellor's concern: the recession has had an adverse impact on productivity growth and the economy has yet to return to the pre-recession trend in productivity improvements let alone achieve anything better.

[33] The figures for the homes needed to support the 2015 jobs forecasts are derived from Gloucestershire-wide forecasts without the benefit of forecast for all of the individual authorities so are not exactly comparable with the earlier forecasts. Whilst this may affect the accuracy of some of the numbers quoted, the key message is clear: the new forecast suggest that across Gloucestershire as a whole the updated OAN provides a much larger population than is necessary to support both the latest OE forecast and the latest CE forecast.

[34] "Fixing the Foundations: Creating a more Prosperous Nation" HM Treasury, July 2015 Cm 9098 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/443898/Productivity_Plan_web.pdf



8.42. Whilst both CE and OE assume some improvements in productivity, it is questionable whether they have made sufficient allowance for the likely improvements. In the last recession the fall in productivity was greater than in the previous two but so far there has been surprising little improvement in productivity as the economy has recovered from the downturn.

8.43. As the economy recovers from the downturn demand for goods and services will grow. That increased demand will not necessarily mean more jobs will be created. The last upturn in the economy showed what is called 'smart growth' with few extra jobs as output expanded. There are reasons to expect this will be more prevalent in this upturn because productivity has fallen so heavily – and unexpectedly.

8.44. The Nupremis report identifies that GVA growth is not dependent upon jobs growth alone and indeed in economic terms, there are several basic factors and processes which can lead to economic growth. Para 5.12 of that report sets out factors which can increase productivity. The processes which can generate growth without additional jobs include:

8.44.1. Existing staff may be more fully utilised with the result that the same number of people produce more output;

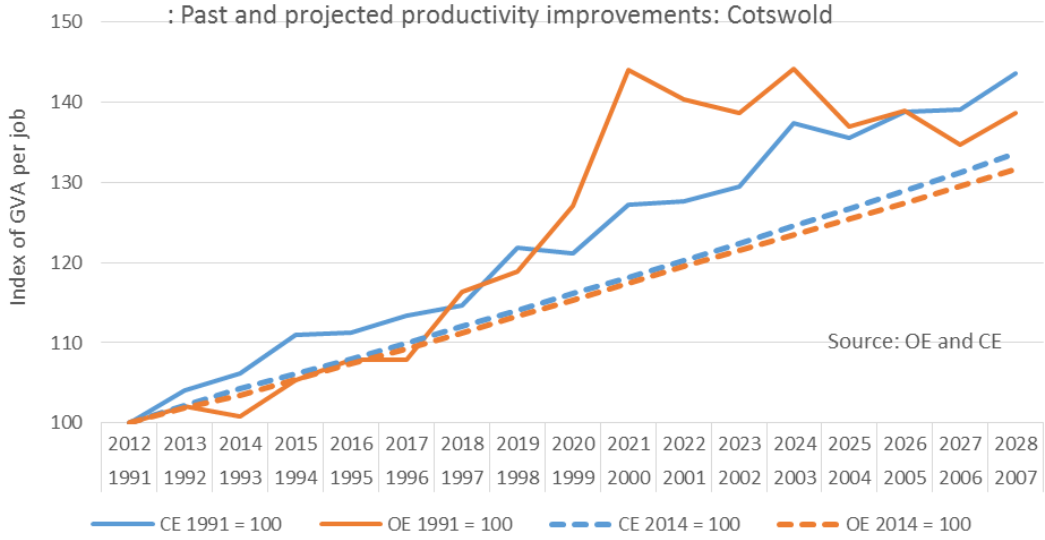
8.44.2. Many of the jobs that have been created over the last few years have been part-time. As the economy improves it is likely that people will be enabled to work longer hours or that jobs will be restructured to reduce the numbers of workers employed;

8.44.3. More overtime working;

8.44.4. Improvements in productivity arising from new technology. It is difficult to assess how much further these will go but, given the likely continuing cutbacks in public service jobs, such changes could well accelerate over the period to 2031.

8.45. One way of gauging how realistic the assumptions made about future productivity improvements are is to compare what is projected with what happened following the recession in the early 1990s. Figure 8.13 compares the productivity improvements achieved then with what is now projected.

Figure 8.13
: Past and projected productivity improvements: Cotswold



8.46. If it is the case that, as the economy continues to recover, productivity improves at or above the rates seen in the 1990s then the same output could be achieved with fewer additional jobs. Whilst it is possible that output could also be higher than forecast, it is perhaps more likely that job growth will be lower than forecast.

Conclusion on homes needed to support economic growth

8.47. The above analysis provides two contrasting views on the number of homes needed in Cotswold to support economic growth:

8.47.1. The **standalone analysis** provides two ranges:

- 7,300 – 8,900 homes (2011-31) based on unadjusted OE and CE jobs forecasts
- 7,500 – 8,600 homes (2011-31) based on the Nupremis alternative scenario

The latter range is more realistic as it is based on adjustments to unlikely or implausible elements in both projections. However, there is little difference between the mid-points of the two ranges: 8,100 homes for the unadjusted projections and 8,000 for the alternative scenarios.

8.47.2. The **HMA-wide analysis** suggest that across Gloucestershire as a whole there is no need to increase the number of homes above the demographic OAN. This would imply the full OAN is the demographic OAN i.e. it is 6,600 homes 2011-31.

8.48. It could be argued that this provides a range for the full OAN from 6,600 homes 2011-31 to 8,900 homes. However, there are good reasons for not regarding either figure as a credible or prudent figure.

8.49. The 8,900 figure is based on analysis of the unadjusted Oxford Economics forecast for Cotswold on a standalone basis. To adopt that figure it would be necessary to:

8.49.1. Disregard completely the (lower) estimate based on the Cambridge Econometric forecast: that would be unjustifiable as there are no clear reasons for believing that one forecast is better than the other.

8.49.2. Ignore entirely the evidence that suggest that across the HMA as a whole there is now no need to add to the demographically based OAN.

8.49.3. Give no weight at all to the concerns identified about:

- the very high population growth implied by the OE forecasts;
- the possibility that the increase in self-employment amongst older people may not involve significant number of people moving to the area but greater participation in the workforce of existing residents; and,
- the possibility that both the OE and CE forecasts may over-estimate the likely increase in jobs as a result of assuming relatively small productivity increases.

8.50. In view of these considerations it would be reasonable to regard the mid-point of the figures suggested by the analysis of the unadjusted OE and CE forecasts – i.e. 8100 homes 2011-31 as the plausible top of the range figure.

8.51. On the other hand it would be unwise to regard 6,600 homes 2014-31 as a plausible bottom of the range figure. This comes from the HMA wide analysis. It is appropriate to be a little cautious in interpreting this as:

8.51.1. The HMA-wide analysis assumes that Gloucestershire functions seamlessly as a single housing and employment market area and that those coming to the area to live and those creating new jobs will be indifferent to where within the area they locate. That is an idealised view of a single housing and employment area. The practical reality is likely to lie somewhere between that view and the standalone view – which in effect assumes that Cotswold acts as an isolated area.

8.51.2. As Figure 8.5 above shows, the Gloucestershire jobs forecasts have been more volatile than those for Cotswold District. There is therefore considerable uncertainty about the robustness of any individual forecast even at the county level. That is underlined by the equivalent analysis in the NMSS October 2014 Report which suggested that 1300 homes should be added to the demographic OAN for Cotswold to produce its full OAN.

Adding that number to the updated demographic OAN (6,600 homes) would produce a full OAN of 7,900 homes.

8.52. These concerns about the HMA-wide analysis suggest that it would be prudent to give more weight to the standalone analysis in setting the OAN.

8.53. Furthermore, the poor and deteriorating house price/earnings affordability in the district suggests that there is a case for erring in the direction of higher figures. This would be consistent with adopting the plausible top of the range figure of 8,100 homes between 2011 and 2031 as the full OAN.

8.54. All of the calculations in this section of the report have assumed that the DCLG 2014-based household formation rates should be used 'as published' to convert the population needed to provide the workforce that is required to support economic growth into a number households and homes. That involves planning on the assumption that household formation rates of some younger adult groups will continue to fall, which could be argued to be inconsistent with the need to retain and grow the resident workforce. On that basis there could be an argument for planning on the basis that the DCLG household formation rates should be adjusted so that no group has a household formation rate in 2031 that is lower than its rate in 2011 – the 'no one worse off' or '2011 floor' scenario. That would imply that the number of homes needed to accommodate the necessary workforce would be 8,400 homes 2011-31. (Full details of the calculation that produces this figure are in the Technical Annex.)

9. SENSITIVITY ANALYSIS

9.1. Any analysis of this kind depends on the assumptions made. This section reports the results of sensitivity analysis carried out to explore what the implications would have been had different assumptions been made.

9.2. The two main components in a household projection and OAN calculation are the estimate of the number of people to be accommodated and the assumptions made about how those people will group themselves into households i.e. the assumptions on household formation rates. This section therefore looks at the impact which alternative assumptions might have in both of areas. In each sensitivity test, only one parameter is changed from the assumptions made in the chosen OAN scenario.

Population sensitivities

9.3. There are three main areas in which adjustments have been made to the 2014 SNPP:

- Flows to and from the rest of the UK
- Overseas flows
- UPC

9.4. This sub-section looks at each in turn.

(a) Flows to and from the rest of the UK

9.5. As noted in paragraph 3.28 above, there are significant technical issues in adjusting the ONS projections for flows to and from the rest of the UK to reflect a 10-year trend period. This is because the ONS does not project inflows as such but instead projects the outflows from all local authorities in the country and allocates these to destination authorities in line with the historical pattern of flows. The projected inflow into a local authority is therefore the sum of the proportions of the projected outflows from all 325 other local authorities plus flows from Wales, Scotland and Northern Ireland that are expected to have that authority as their destination. It is therefore impractical to replicate exactly what the consequences would have been of the ONS using a 10-year period: an approximation needs to be made.

9.6. There are a number of possible approaches:

9.6.1. **Method A: Ratio of total flows:** Adjusting the projected flows in 2014 SNPP by the ratio of the average total flows in the period 2005-15 to the average in the period 2009-14.

9.6.2. **Method B: Ratio of flows:** As (i) but adjusting the flows for each age and gender group by the ratio of the average flows in each age and gender group.

9.6.3. **Method C: Ratio of rest of UK flows:** Calculating average flow rates for inflows by dividing the flows in each age and gender group by the population in that age and gender group in the rest of the UK. Ratios of average flow rates for the periods 2005-15 and 2009-15 can then be calculated and used to adjust the flows in the 2014 SNPP.

9.6.4. **Method D: Rest of UK rates direct:** The average flow rates calculated in Method C can be used directly by multiplying the flow rates by the projected population in the rest of the UK.

9.7. Each of these methods has its advantages and disadvantages.

9.8. Method A has the benefit of simplicity and was used in the October 2014 NMSS Report. It does not, however, take into account how the population in the originating authorities may have changed over the trend period and may not therefore fully reflect the changes in flow rates that may have occurred.

9.9. Method B is rather more sophisticated but may also not fully reflect changes in flow rates that have occurred.

9.10. Method C calculates flow rates but those flow rates are not the rates from the areas from which people will have moved to the authority in question. As noted, this is unavoidable as it is impracticable to create a suitably weighted set of flow rates that reflect the actual mix of originating authorities: some proxy has to be used. The accuracy of these methods depends on how good a proxy the rest of the UK is for the sending authorities.

9.11. Method D has the additional issue that the rate at which the projected inflow increases will depend on the rate at which the population in the proxy population grows, which could be faster or slower than in the actual originating authorities.

9.12. The proposed demographic population projection assumes that the 2014 SNPP flows are adjusted by the ratio of the average UK flow rates for 2005-15 to the average UK flow rates for 2009-14. To test how sensitive this assumption is to plausible alternatives the following alternative scenarios have been modelled:

9.12.1. Method A: Ratio of total flows 2004-14 to 2009-14.

9.12.2. Method B: Ratio of average flows by age and sex, 2004-14 to 2009-14

9.12.3. Method C: Ratio of rest of UK flow rates, 2004-14 to 2009-14. This is similar to the selected method except that the 10 year period used starts and ends a year earlier. As a sensitivity test it provides an indication of how sensitive the result is to the choice of 10-year trend period.

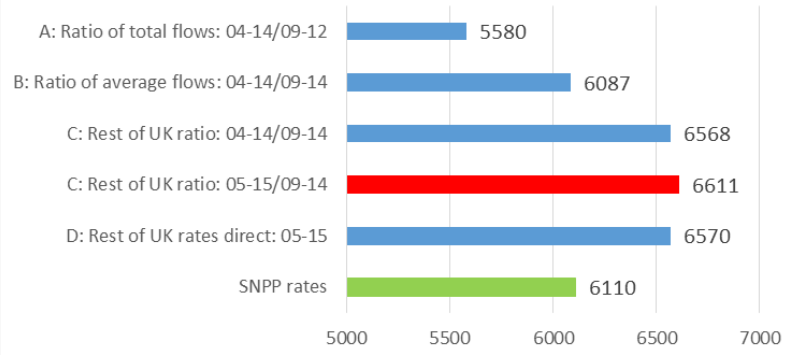
9.12.4. Method C: Ratio of rest of UK flow rates, 2005-15 to 2009-14. This is the selected method. It uses the latest 10-year trend period for which data is available.

9.12.5. Method D: Rest of UK flow rates used direct (rather than to scale the SNPP inflows as in Method C).

9.12.6. 2014 SNPP flows: This is the official baseline/starting point.

9.13. Figure 9.1 compares these scenarios with the chosen OAN scenario highlighted in red.

Figure 9.1: Sensitivity test on 10-year UK flow adjustment

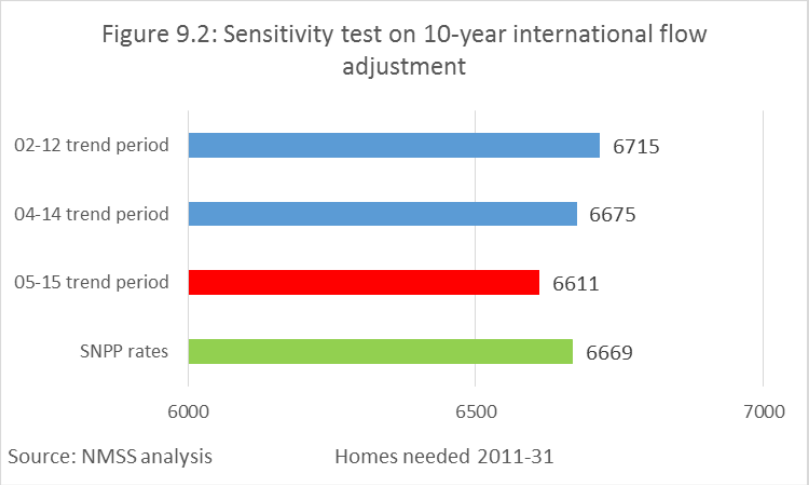


Source: NMSS analysis

9.14. As can be seen from the chart, the methods which use ratios of total flows and average flows (rather than flow rates) produce low results and, as such, are outliers. This is not, perhaps surprising as they are fairly simple methods. The three scenarios based on calculating inflows as a proportion of the relevant rest of UK population produce very similar results: the difference between them is only 0.6%. This provides reassurance that the chosen method provides a reasonable estimate.

(b) Overseas flows

9.15. The proposed demographic projection assumes that flows to and from abroad reflect the average flow rates seen over the most recent 10 year period for which data is available i.e. 2005-15. Figure 9.2 shows the impact of choosing an earlier 10-year period – 2002-12 or 2004-14 or leaving the international flows at the lower rate envisaged by the 2014 SNPP. It should be recognised that the chart has a 'cut-off' X axis which exaggerates the difference between the scenarios.



9.16. As can be seen, the difference between the various scenarios is small with the highest being only 1.6% larger than the lowest and the difference between the ONS's projection (based on a 6-year trend period) and the 10-year scenarios is also small. The conclusion is that the number of homes needed is not very sensitive to the international migration scenario chosen and the selected scenario provides a reasonable estimate.

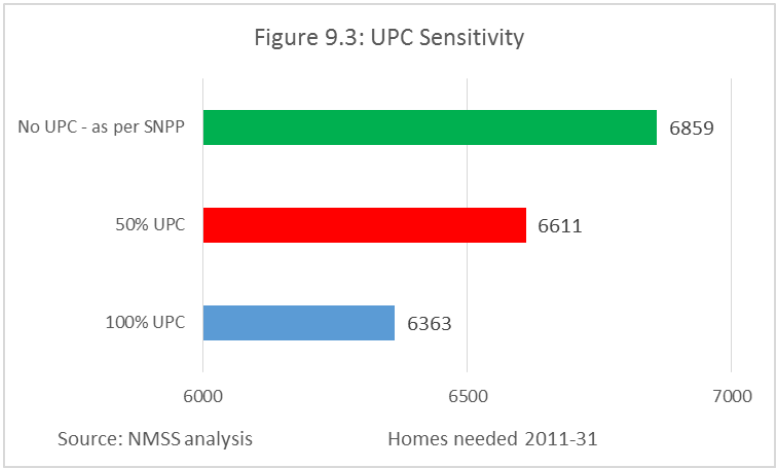
(c) Unattributable population change

9.17. Whether or not an adjustment should be made for UPC is debatable. The OAN scenario assumes that 50% of UPC would have contributed to population increases. That is a mid-range scenario. The extremes of the range are the obvious alternative scenarios to sensitivity test, i.e.:

9.17.1. None of UPC contributes to future population change – the ONS assumption; and,

9.17.2. 100% of UPC contributes to future population change.

9.18. Figure 6.3 shows the results for these two scenarios compared with the OAN scenario.

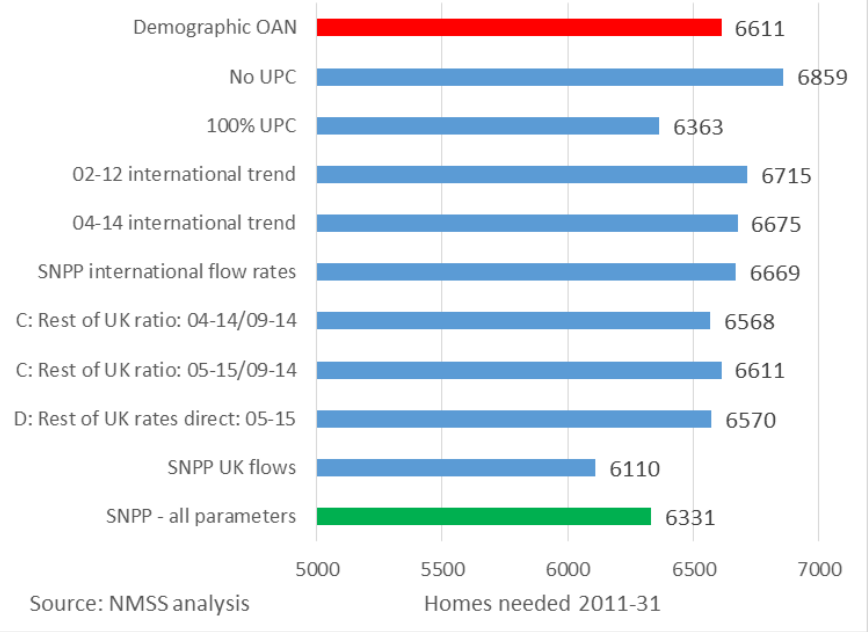


9.19. As is to be expected, these sensitivities are symmetrical, changing the projected homes needed by +/- 4%. This is not a very large range, indicating that UPC is not a major factor in estimating the Cotswold OAN.

Summary of population sensitivities

9.20. Figure 9.4 illustrates all of the population sensitivities discussed above with the exception of the internal migration scenarios based on ratios of flows rather than flow rates (as these are low outliers). It includes the unadjusted 2014 SNPP projection (green) to give a comparison with the starting point suggested by the PPG.

Figure 9.4: Summary of sensitivities



9.21. As can be seen, the range suggested by the sensitivities is not particularly wide: the highest figure is only 4% above the figure suggested for the demographic OAN and the lowest is 8% below. Note that all of the figures are below the employment-led-estimate of the OAN. This means that it is the assumptions made about employment that determine the full OAN for Cotswold, not the demographic analysis.

Household formation rate sensitivities

(a) Tests relative to the DCLG 2014 household formation rates

9.22. The discussion in paragraphs 4.5 – 4.27 above suggests that the 2008-based household formation rate projections are now of very limited relevance: those projections were optimistic even at the time they were formulated and the world has changed irreversibly since then. In this context the most relevant alternative

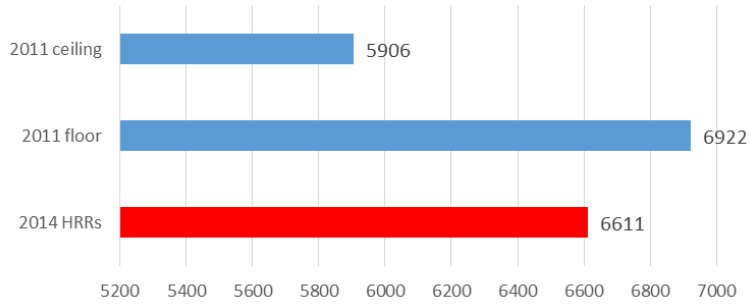
scenarios to test are those which address aspects of the new projections themselves. Two are suggested as being particularly worth investigating:

9.22.1. Although the household formation rates in the 2014-based projections are generally higher than those in the 2011-based interim projections and eliminate or reduce most of the instances in which the household formation rates of specific groups are projected to fall, there are still some groups for which a fall is still projected. Whilst this may well be a realistic prospect for those groups, as discuss earlier a prudent sensitivity test is the scenario in which the household formation rate of no group falls below the level it was at in 2011 and the rates for other groups rise as projected. This might be described as the '2011 HFR floor' scenario.

9.22.2. The above scenario is an 'upside' test. A balancing 'downside' test would be the scenario in which the household formation rate of no group rises above its level in 2011. This could be described as the '2011 HFR ceiling' scenario. This may sound excessively pessimistic, but with recent shocks to the world economy and the likelihood that emerging economies will catch up on the West, possibly growing at its expense, it is far from obvious that housing conditions will inevitably always move in the upwards direction. This test has the added advantage of providing a measure of the 'upside' included in the 2012-based projections for some groups.

9.23. Figure 9.5 gives the results for these two tests compared with OAN scenario (i.e. 2014 HRRs).

Figure 9.5: Alternative household formation rate assumptions



9.24. The 2011 floor scenario increases the number of homes needed over the plan period by 317 or 5%. This is a relatively small adjustment and indicates that the deterioration in housing conditions for some groups implicit in the new projections is relatively small.

9.25. The 2011 ceiling scenario reduces the number of homes needed by 705 or 11%. This is a somewhat larger margin and indicates that the improvements in housing conditions which some groups are projected to enjoy are reasonably significant.

Test based on the 2008-based household formation rates

9.26. Although there is growing evidence that the 2008-based household projections have very little relevance some still use them as the basis for constructing sensitivity tests, perhaps in the absence of any other benchmark. Six such tests have been carried out involving either a full return to the 2008-based household formation rates by 2031 for some or all age groups or a partial return, which is interpreted as a move to the mid-point between the 2008 and 2014-based rates by 2031. These tests are:

9.26.1. Full return to 2008-based rates for all age groups for all ages 'FRT 2008 all ages'.

9.26.2. Full return to 2008-based rates for 25-34 year olds 'FRT 2008 25-34s'

9.26.3. Full return to 2008-based rates for 25-44 year olds 'FRT 2008 25-44s'

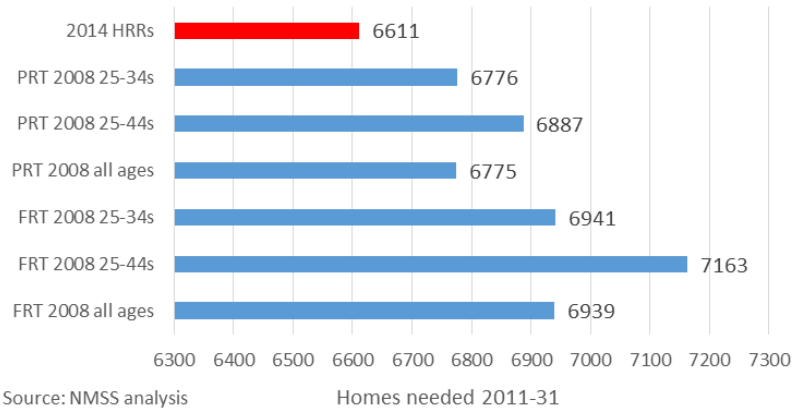
9.26.4. Partial return to 2008-based rates for all age groups 'PRT 2008 all ages'

9.26.5. Partial return to 2008-based rates for 25-34 year olds 'PRT 2008 25-34s'

9.26.6. Partial return to 2008-based rates for 25-44 year olds 'PRT 2008 25-44s'

9.27. Figure 9.6 shows the results of these tests. The demographic OAN figure is shown labelled "2014 HRRs".

Figure 9.6: Household formation scenarios based on 2008-based formation rates



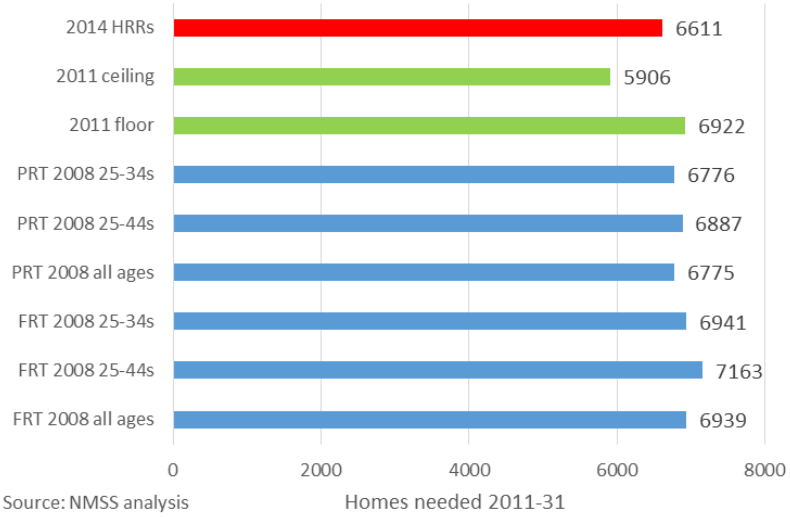
9.28. As expected all of these scenarios increase the number of homes needed. However, the biggest increase is not the full return to trend for all age groups: that distinction goes to the full return to trend of 25-44 year olds. The reason why the full return to trend of 25-44 year olds has a higher homes requirement is, as mentioned earlier, because the 2014-based projection has higher household formation rates than the 2008-based projection for a sizeable proportion of older age groups.

9.29. It might be noted that the impact of these scenarios, whilst not insignificant, is not that large. Even the full return to trend for 25-44 year olds only increases the number of homes needed by 553 homes or 8.4%.

Summary of the household formation rate scenarios

9.30. Figure 9.7 (below) summarises all of the household formation rate sensitivity tests relative to the demographic OAN (labelled "2014 HRRs"). Note that there is relatively little difference between the '2011 floor' scenario (6922 homes 2011-31) and the full return to 2008 all ages trend (6939). The difference is only 11 homes or less than one home a year.

Figure 9.7: Summary of household formation rate scenarios



Source: NMSS analysis

10. THE HOUSING MARKET AREA (HMA) PERSPECTIVE

10.1. A picture of the housing need of the wider housing market area – Gloucestershire – can be obtained by repeating the above analysis for all six Gloucestershire districts. For each authority the same assumptions have made as for Cotswold i.e. the ONS/DCLG projections have been adjusted as follows:

- Flows to and from the rest of the UK have been adjusted to reflect flow rate in the period 2005-15
- The projections have been re-based to the population estimates contained in the 2014 MYE
- International migration flows have been based on the average flows over the period 2005-15
- A 50% adjustment has been made for UPC irrespective of whether UPC is positive or negative.
- The DCLG 2012-based household formation have been used 'as published'.

10.2. Figure 10.1 shows the population projections made in calculating the demographic OANs for Cotswold and Gloucestershire as whole in October 2014, in the March 2016 NMSS Report and in this report. Note that the projected population increase has increased in successive projections for both Cotswold and Gloucestershire, although in both cases the changes from the March 2016 estimate are relatively modest.

Figure 10.1: Population change in demographic OANs of Cotswold and Gloucestershire		
OAN for 2011-31	Cotswold	Gloucestershire
2014 estimate	8300	87300
Mar 2016 estimate	9800	92200
Current estimate	9900	93500

10.3. Figure 10.2 compares the October 2014 demographic OAN estimates the latest estimates. Note again that for both Cotswold and Gloucestershire there was a modest increase between the 2014 and March 2016 estimates, but for both areas there has been a small reduction in the latest estimate.

Figure 10.2: Estimates of the demographic OAN of Cotswold and Gloucestershire		
OAN for 2011-31	Cotswold	Gloucestershire
2014 estimate	6300	51800
Mar 2016 estimate	6800	55300
Current estimate	6600	54600

10.4. Whilst this HMA-wide analysis provides useful context its direct relevance to the Cotswold OAN is limited as the other parts of Gloucestershire – the JCS area, Stroud and Forest of Dean – are proposing to meet their objectively assessed needs for housing within their own boundaries.

10.5. Of far greater relevance is the HMA-wide analysis of the implications of the jobs increases forecast by OE and CE. This is discussed in the section on 'Supporting Economic Growth' above but the key figures are set out in the table below for completeness.

Figure 10.3: Comparison of demographic and jobs-led OANs of Cotswold and Gloucestershire		
Homes needed	Cotswold	Gloucestershire
Demographic OAN	6600	54600
Homes needed: OE projection	8900	46500
Extra homes above OAN - OE	2300	-8100
Homes needed: CE projection	7300	44100
Extra homes above OAN - CE	700	-10600

11. SUMMARY AND CONCLUSIONS

11.1. The starting point for this report is the DCLG's 2014-based household projections (DCLG 2014) which were released in July 2016. These were based on the ONS's 2014-based Sub-national Population Projections (2014 SNPP) which were published in May 2016. However, more recent evidence on how the population has changed since 2014 is available from the 2015 Mid-Year Estimates (2015 MYE) which were issued in June 2016 and the international migration statistics for the year to March 2015 which were released in August 2015. This report also takes that additional evidence into account to provide the most up to date view possible.

Conclusions on the population to be planned for

11.2. It is proposed that three adjustments should be made to the ONS's 2014-based Sub-national Population Projection for Cotswold to reflect both weaknesses in those projections and the latest evidence available from the 2015 Mid-Year Estimates and the most recent international migration statistics.

11.3. The proposed adjustments are shown in Figure S1 (below):

- The ONS's 2014 Sub-national Population Projections (2014 SNPP) use 2009-14 as the trend period for projecting flows to and from the rest of the UK. Although less affected by the economic downturn than the period used for the 2012 SNPP (2007-12), adjusting the projections to reflect flows in the latest 10-year period for which data is available (2005-15) is likely to provide a better view of future flows as the impact of the atypical flows during the recession is balanced by the higher flows in earlier years and greater weight is given to flows since the downturn. At the same time it makes sense to adjust the projections (re-base them) so that they reflect the ONS's estimate of the actual population in 2015 rather than the projection made for that year in the 2014 SNPP. The effect of this set of adjustments is to increase the projected population increase between 2011 and 2031 from 10199 in the 2014 SNPP to 10492, an increase of 293 or 3%. (Rows B and C)
- Net international migration into the UK is currently about twice that assumed by those who compiled the 2014 SNPP. There is a case for adjusting those projections to reflect this. To avoid giving undue weight to the most recent years' figures whilst reflecting what has actually happened in Cotswold, it is proposed that the international flows should be adjusted to reflect average flows over the latest 10-year period for which data exists i.e. 2005-15. This reduces the projected population increase between 2011 and 2031 by 160 or 1.5%, cutting the projected increase from 10,492 to 10,332. (Rows D and E)
- It is debatable whether the projections should make an allowance for Unattributable Population Change (UPC). The ONS made no such allowance in the 2014 SNPP. However, earlier analysis for Stroud, Cotswold and the Forest of Dean took the view that it was appropriate to err on the side of caution to avoid any possibility of underestimating the population to be

planned for. It had therefore assumed that for the authorities for which UPC was positive all of UPC would have contributed to future population increases and that where UPC was negative (as in Cotswold) no adjustment should be made. This assumption was at the other extreme of the range from the ONS's assumption that none of UPC would have contributed to future population increases. The likelihood is that the actual position will lie somewhere between the two extremes. As there is no way to determine where in the range is most likely, the mid-point has been used. The effect is to reduce the projected population increase of Cotswold by 471 or 5%, from 10,327 to 9,839. (See Rows F and G.)

Figure S1: Summary of adjustments to 2014 SNPP		
Change 2011 - 2031		Population
A	**2014 SNPP**	**10199**
B	Adjustment for 2005-15 UK flows + 2015 MYE	293
C	**2005-05 UK flows + re-basing to 2015 MYE**	**10492**
D	Adjustment for 2005-15 international flows	-160
E	**2015 UK and international flows + 2015 MYE re-base**	**10332**
F	Adjustment for 50% UPC	-471
G	**05-15 trend all flows + 2015 MYE re-base + 50% UPC**	**9861**

11.4. The overall effect of these adjustments is to reduce the 2014 SNPP's projection for the increase in the population of Cotswold over the plan period of 10,199 to 9861, a reduction of 3%.

11.5. The purpose of the adjustments is to correct for cyclical and other factors which might have distorted the ONS projection to produce a projection which is better indication of the likely long term population growth. The fact that the adjustment is small indicates that the 2014 SNPP has not been significantly distorted by the economic downturn or other factors (unlike the 2012 SNPP).

How the population is likely to group itself into households

11.6. To turn an estimate of a population change into an estimate of the change in the number of households a view needs to be taken on how the tendency of people to form separate households (the household formation rate) is likely to change. The latest DCLG household projections (DCLG 2014) provide the most recent official view on this. Having reviewed the latest projections, NMSS believes that they should be used as published.

11.7. In particular, there is no longer a need to make adjustments to the projected household formation rates for young adults (those aged 25-34) that were appropriate when using the 2011-based interim projections. Those projections envisaged a continuing sharp deterioration in the household formation rates of that age group.

11.8. NMSS believe that the latest DCLG projections represent a realistic view of likely trends in household formation patterns when account is taken of the changes that

have occurred since the last pre-recession projections were published (the 2008-based projections).

11.9. Moreover, Inspectors examining the local plans of the other Gloucestershire authorities have accepted that their OANs should be calculated on the basis of the most recent, unadjusted DCLG household formation rates. Given that household formation rates in Cotswold have departed from the trajectories envisaged in the pre-recession 2008-based projections by less than for any other Gloucestershire authority, the argument for using the 2014-based household formation rates without adjustment is even stronger.

11.10. Once an allowance is made for empty and second homes (based on council tax data), applying the 2014-based DCLG household formation rates to the adjusted 2014 SNPP population projections produces a demographically-based estimate of the OAN of the Cotswold area of 6,600 homes over the period 2011-31 with the DCLG 2014-based household formation rates are use 'as published'. See Figure S2 which also shows the figures that are implied by the unadjusted 2014 SNPP and the DCLG 2014-based projection. Note that all figures for the plan period have been rounded to the nearest 100 and the annual figures to the nearest 10. This is to avoid suggesting spurious accuracy.

Figure S2: Demographically-based estimates of the OAN			
Change 2011 - 2031	**Population**	**Homes**	**Homes/yr**
2014 SNPP/DCLG 2014	**10200**	**6300**	**320**
Demographic OAN	**9900**	**6600**	**330**

Conclusions on adjustments for 'other factors'

11.11. As far as market signals are concerned, Cotswold is an area with high house prices and rents and poor affordability. This, however, reflects the attractiveness of the area and is not necessarily a basis on which to apply a 'market signals adjustment'. The potential grounds for a market signals adjustment are the rate of increase in house prices and rents; the deterioration in the affordability ratio; and the suggestion that there may have been under supply in the years before the economic downturn.

11.12. The evidence from the data on house prices, rents and affordability is not conclusive. The evidence on undersupply is more persuasive particularly as it is corroborated by the data on net migration which suggest that after 2006-07, the reduction in net migration was deeper and more sustained than for the rest of the Gloucestershire HMA and that the increase in the net flow after 2012-13 has been proportionately less than the rest of the HMA.

11.13. By creating an "adjusted historic projection" which has a net migration flow which tracks the net migration flow seen in the rest of Gloucestershire after 2006-07 it is possible to estimate what the population projection would have looked like had it been based on migration flows in the trend period in line with the rest of the HMA. This increases the projected population in 2031 from 93,000 to 95,900 and the

number of homes needed from 6,600 to 7,900 (2011-31), an increase of 1,300 homes or nearly 20%.

11.14. Whether the housing requirement should be set above the OAN to allow a larger proportion of the assessed need for affordable housing to be met is outside the scope of this report.

Conclusion on homes needed to support economic growth

11.15. Updated (November 2015) economic forecasts have been obtained for both Cotswold and Gloucestershire as a whole from Cambridge Econometrics (CE) and Oxford Economics (OE). These have been reviewed by Nupremis who have produced alternative scenarios which adjust unlikely or implausible elements in both projections. Two alternative analyses of the housing implications of these projections have then been produced (which assume the DCLG 2014-based household formation rates are used 'as published'):

- A **'standalone analysis'** which looks at the forecasts for Cotswold in isolation. This provides two ranges:
    - 7,300 – 8,900 homes (2011-31) based on unadjusted OE and CE jobs forecasts
    - 7,500 – 8,600 homes (2011-31) based on the Nupremis alternative scenario

  The latter range is more realistic as it is based on the adjusted projections but there is little difference between the mid-points of the two ranges: 8,100 homes for the unadjusted projections and 8,000 for the alternative scenarios.
- An **HMA-wide analysis** which suggest that across Gloucestershire as a whole there is no need to increase the number of homes above the demographic OAN.

11.16. It could be argued that this provides a range for the full OAN from 6,600 homes 2011-31 to 8,900 homes. However, there are good reasons for not regarding either figure as a credible or prudent figure.

11.17. The 8,900 figure is based on analysis of the unadjusted Oxford Economics forecast for Cotswold on a standalone basis. To adopt that figure it would be necessary to:

- Disregard completely the (lower) estimate based on the Cambridge Econometric forecast: that would be unjustifiable as there are no clear reasons for believing that one forecast is better than the other.
- Ignore entirely the evidence that suggest that across the HMA as a whole there is now no need to add to the demographically based OAN.
- Give no weight at all to the concerns identified about:

- the very high population growth implied by the OE forecasts;
- the possibility that the increase in self-employment amongst older people may not involve significant numbers of people moving to the area but greater participation in the workforce of existing residents; and,
- the possibility that both the OE and CE forecasts may over-estimate the likely increase in jobs as a result of assuming relatively small productivity increases.

11.18. In view of these considerations it would be reasonable to regard the mid-point of the figures suggested by the analysis of the unadjusted OE and CE forecasts – i.e. 8100 homes 2011-31 as the plausible top of the range figure.

11.19. On the other hand it would be unwise to regard 6,600 homes 2014-31 as a plausible bottom of the range figure. This comes from the HMA wide analysis. It is appropriate to be a little cautious in interpreting this as:

- The HMA-wide analysis assumes that Gloucestershire functions seamlessly as a single housing and employment market area and that those coming to the area to live and those creating new jobs will be indifferent to where within the area they locate. That is an idealised view of a single housing and employment area. The practical reality is likely to lie somewhere between that view and the standalone view – which in effect assumes that Cotswold acts as an isolated area.
- The Gloucestershire jobs forecasts have been more volatile than those for Cotswold District. There is therefore considerable uncertainty about the robustness of any individual forecast even at the county level. That is underlined by the equivalent analysis in the NMSS October 2014 Report which suggested that 1300 homes should be added to the demographic OAN for Cotswold to produce its full OAN. Adding that number to the updated demographic OAN (6,600 homes) would produce a full OAN of 7,900 homes.

11.20. These concerns about the HMA-wide analysis suggest that it would be prudent to give more weight to the standalone analysis in setting the OAN.

Summary and Conclusion on the OAN

11.21. Adjusting the ONS's latest projections (the 2014 SNPP) to correct for cyclical and other factors and applying the DCLG's 2014-based household formation rates as a realistic view of likely future household formation patterns gives a demographically-based OAN of 6,600 homes 2011-2031 or 330 homes a year. These are very close to the figures that would have been obtained using the latest population and household projections without any adjustment i.e. 6,300 homes 2011-31 or 320 homes a year. It should, however, be noted that planning on this basis assumes that the chances of some younger groups (most notably couples) setting up their own, separate households, would continue to fall.

11.22. Whilst the evidence of constrained housing supply from market signals is inconclusive, a comparison of net additions to the housing stock and net migration flows with the rest of the Gloucestershire HMA does indicate that there may have been some undersupply in the years following 2006-07. Adjusting the projections to correct for this suggests a need for 7,900 homes 2011-31 or 390 a year. There is, however, no evidence that this affected household formation rates. Indeed, the latest past and projected household formation rates for Cotswold are closer to the 2008-based projections than they are for any or the other Gloucestershire authorities.

11.23. An HMA-wide analysis of the number of homes needed to support economic growth suggests that across Gloucestershire as a whole no additional homes are needed to support economic growth above those indicated by the demographically–based OAN.

11.24. In contrast an analysis based on the latest jobs forecast for Cotswold on its own suggests that 8,000 – 8,100 homes 2011-31 are needed to support economic growth.

11.25. There are a number of factors that should be taken into account in weighing the evidence:

- There are grounds for believing that greater weight should be given to the 'standalone' analysis of the homes needed to support economic growth than HMA-wide analysis (see paragraphs 11.15 to 11.20 above).
- Whilst the latest DCLG projections present a realistic view of what is likely to happen to household formation patterns, they envisage that the household formation rates of some younger groups will continue to fall. It can be argued that this is not a very positive approach to planning.
- Although the case for a market signals adjustment is not conclusive, the District is an area of high house prices and rents and poor affordability.

11.26. Taking these factors into account it is suggested that the top of the range figure for the homes needed to support economic growth calculated using DCLG's latest household formation rates should be regarded as the jobs-led OAN i.e. 8100 homes 2011-31 or 410 homes a year.

11.27. Figure S3 summarises the three estimates of the OAN, with the figure suggested by the unadjusted 2014 SNPP/DCLG 2014 projections given for comparison.

Figure S3: Estimates of Cotswold's objectively assessed needs compared

Change 2011 - 2031	Population	Homes	Homes/yr
2014 SNPP/DCLG 2014	**10200**	**6300**	**320**
Demographic OAN	**9900**	**6600**	**330**
OAN adjusted to reflect possible undersupply	**12700**	**7900**	**390**
Jobs-led OAN	**14400**	**8100**	**410**

11.28. **As the jobs-led figure is the highest this should be adopted as the Full OAN i.e. 8,100 homes 2011-31 or 410 homes a year.**

11.29. Note that it would be inappropriate to add an undersupply adjustment to the jobs-led OAN estimate as there is no evidence that undersupply affected the household formation rates in DCLG's 2014-based projections. On the contrary, the evidence suggests that undersupply led to a lower net migration and a lower population projection. Correcting for this increases the projected population but an even larger adjustment to the population projection is needed to support economic growth so it is that larger population projection that determines the Full OAN.

11.30. The updated estimate of the Full OAN is 300 homes lower than the figure of 8,400 estimated in the March 2016 NMSS Report. That is a difference of 3.6% and as such is well within the error margins of this kind of analysis and typical of the changes that inevitably occur during the gestation period of a local plan. There is therefore no necessity to adjust the proposed housing requirement in the draft Local Plan

11.31. Given the inevitable uncertainties, the demand for homes and the growth in employment should be closely monitored. The OAN should be reviewed periodically in the light of what actually happens.

TECHNICAL ANNEX

1. This annex provides the detail of the assumptions, modelling techniques and results presented in the main body of the report.

Population projections

2. Figures TA1, TA2, and TA3 are the 2012 SNPP, the 2014 SNPP and the population projection used as the basis for the demographic OAN (with components of change) and are the source data for most of the analysis presented in Chapter 3 of the main report.

Figure TA1: 2012 SNPP Population projection

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Population	83181	83562	83771	84028	84313	84640	84959	85293	85635	85989	86364	86755	87148	87551	87964	88374	88785	89191	89583	89961	90325
Births	695	711	702	703	697	688	691	690	690	689	688	688	688	686	684	682	680	678	676	673	671
Deaths	774	833	889	840	833	828	841	848	854	857	863	871	882	892	903	916	931	944	961	980	998
England in	5103	5127	4994	5003	5023	5050	5069	5083	5096	5103	5110	5122	5139	5157	5184	5217	5250	5280	5311	5342	5370
England out	4498	4681	4620	4629	4621	4620	4624	4618	4607	4598	4577	4565	4571	4565	4570	4592	4606	4626	4651	4676	4698
Cross border in	266	268	250	250	250	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249
Cross border out	227	237	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231
International in	433	409	411	412	411	430	417	420	411	411	411	411	411	411	411	411	411	411	411	411	411
International out	302	419	407	408	408	408	408	408	408	408	408	408	408	408	408	408	408	408	408	408	408
UPC	-113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Adjustment	-17	37	-2	-3	-3	-3	-3	-4	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3

Notes: Population data is for 30 June in the year shown; other data is for the 12 months to 30 June in the year shown. The figures shaded orange are from the 2015 MYE. The 2015 MYE does not disaggregate the internal in and outflows between flows from and to the rest of England and other countries in the UK so for these purposes the disaggregation has been estimated based on the split in 2014-15 in the 2014 SNPP. In the orange shaded cells the 'Adjustment' is the sum of the ONS's "special change" and "other adjustments" from the 2015 MYE; in the other cells the adjustment is the small adjustments which the ONS makes in its projections to constrain the local authority projections to add to their national projection.

Figure TA2: 2014 SNPP Population projection

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Population	83181	83560	84076	84637	85159	85659	86156	86667	87179	87690	88208	88739	89269	89803	90346	90879	91410	91932	92436	92916	93380
Births	695	711	698	731	698	700	714	724	733	733	738	745	749	750	749	748	747	746	744	742	740
Deaths	774	833	857	867	917	853	864	867	877	874	880	888	895	905	915	927	939	951	968	987	1004
England in	5103	5127	5219	5618	5329	5344	5367	5391	5411	5421	5430	5444	5463	5485	5516	5550	5585	5617	5652	5687	5718
England out	4498	4681	4589	5063	4784	4827	4837	4848	4849	4853	4845	4845	4862	4869	4881	4913	4935	4963	4998	5036	5064
Cross border in	266	268	272	293	278	279	279	279	279	278	278	278	278	278	278	278	278	278	278	278	278
Cross border out	227	237	232	256	242	241	241	240	240	240	240	240	240	240	240	240	240	240	240	240	240
International in	433	409	399	432	506	450	430	426	410	402	394	394	394	394	394	394	394	394	394	394	394
International out	302	419	473	426	344	346	348	351	353	355	356	356	356	356	356	356	356	356	356	356	356
UPC	-113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Adjustment	-17	37	80	96	-3	-5	-3	-3	-2	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2

Notes: Population data is for 30 June in the year shown; other data is for the 12 months to 30 June in the year shown. The figures shaded orange are from the 2015 MYE. The 2015 MYE does not disaggregate the internal in and outflows between flows from and to the rest of England and other countries in the UK so for these purposes the disaggregation has been estimated based on the split in 2014-15 in the 2014 SNPP. In the orange shaded cells the 'Adjustment' is the sum of the ONS's "special change" and "other adjustments" from the 2015 MYE; in the other cells the adjustment is the small adjustments which the ONS makes in its projections to constrain the local authority projections to add to their national projection.

Figure TA3: Adjusted population projection used as a basis for the demographic OAN																					
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Population	83181	83562	84079	84637	85162	85566	85992	86441	86913	87399	87908	88427	88947	89474	90010	90541	91070	91589	92093	92573	93042
Births	695	711	698	731	667	693	709	720	732	734	741	749	754	757	757	757	756	755	753	751	750
Deaths	774	833	857	867	931	855	869	872	884	879	887	896	905	916	925	936	949	961	977	996	1013
England in	5104	5128	5220	5619	5671	5310	5332	5358	5379	5389	5400	5414	5434	5455	5486	5518	5552	5583	5617	5651	5680
England out	4498	4682	4589	5064	5001	4773	4779	4790	4790	4793	4779	4784	4799	4803	4815	4842	4863	4892	4923	4959	4981
Cross border in	265	267	271	292	295	276	276	276	276	275	275	275	275	275	275	275	275	275	275	275	275
Cross border out	227	236	232	255	252	241	241	239	239	239	239	239	239	239	239	238	238	238	238	238	238
International in	433	409	399	432	472	499	499	499	499	499	499	499	499	499	499	499	499	499	499	499	499
International out	302	419	473	426	418	455	454	454	454	454	454	455	455	455	455	455	455	455	455	455	455
UPC	-113	0	0	0	0	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45
Adjustment	-17	37	80	96	22	-5	-3	-3	-2	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2

Notes: Population data is for 30 June in the year shown; other data is for the 12 months to 30 June in the year shown. The figures shaded orange are from the 2015 MYE. The 2015 MYE does not disaggregate the internal in and outflows between flows from and to the rest of England and other countries in the UK so for these purposes the disaggregation has been estimated based on the split in 2014-15 in the 2014 SNPP. In the orange shaded cells the 'Adjustment' is the sum of the ONS's "special change" and "other adjustments" from the 2015 MYE; in the other cells the adjustment is the small adjustments which the ONS makes in its projections to constrain the local authority projections to add to their national projection.

3. The assumptions made in producing the adjusted population projection used as the basis for the demographic OAN are as follows:

3.1. **Re-basing to 2015 MYE:** the 2014 projection for 2015 has been replaced with the 2015 MYE estimate of the actual population at the end of June 2015 and that population is taken as the starting point of the projection.

3.2. **Births and deaths:** these have been estimated using fertility and mortality rates derived from the 2014 SNPP and have been used without adjustment.

3.3. **England in and cross border in:** these have been adjusted to reflect flows during the period 2005-15 rather than the period 2009-14 used by the ONS by adjusting the inflows projected by the ONS as follows:

- Using data from the 2015 MYE, the internal migration flows in for each year of age and sex have been expressed as proportion of the population of the rest of the UK for each year in the period 2005-15.
- The average flow rate for each year of age and sex has been calculated for both 2005-15 and 2009-14.
- By dividing for each year of age and sex the average flow rate for 2005-15 by the average flow rate for 2009-14 as set of scaling factors has been created for each year of age and sex.

- Those scaling factors have then been used to adjust the inflows projected in the 2014 SNPP, thereby producing flows that reflect the period 2005-15 rather than 2009-14.

3.4. **England out and cross border out:** the following method has been used:

- outflow rates for both 'England out' and 'cross border out' have been calculated from the 2014 SNPP for each year of the projection and for each year of age and sex by dividing the ONS's projected outflow by the 'aged-on' population for each year of age and sex.

- Using the 2015 MYE internal out flow rates have been calculated by dividing the outflow by the population at the end of each year for each year of age and sex for each year in the period 2005-15.

- The average outflow rates for each year of age and sex have been calculated for the periods 2005-15 and 2009-14.

- By dividing the average rates for 2005-15 by those for 2009-14 a set of scaling factors have been produced for each year of age and sex.

- Those scaling factors have been applied to the outflow rates calculated from the 2014 SNPP to produce a set of outflow rates that reflect the flows in the period 2015-15 rather than 2009-14.

- Those scaled outflow rates have been applied to the 'aged on' population in each year of age and sex to estimate the future outflows.

3.5. **International in:** for each year of age and sex that international inflow has been assumed to remain constant at the average inflow seen in the period 2005-15.

3.6. **International out:** the average outflows in each year of age and sex over the period 2005-15 have been expressed as proportions of the 2014 SNPP 'aged on' population for each year of the projection period. The rates so created have then been used to estimate the international outflows. (This method produces outflows that equal the average outflow seen over the period 2005-15 if the projected population is the same as in the 2014 SNPP. The projected outflow increases or decreases according to whether the projected population is higher or lower than 2014 SNPP.)

3.7. **UPC:** It has been assumed that for each year of age and sex the UPC error remains constant at 50% of UPC for that year of age and sex over the period 2001-11.

3.8. **Adjustments:** these are the same as those made by the ONS in 2014 SNPP to ensure that the local authority projections add up to the national total.

4. Figure TA 4 gives the age profiles of the different projections in 2014.

Figure TA 4: Age profiles in 2031

	2012 SNPP	2014 SNPP	Demographic OAN		2012 SNPP	2014 SNPP	Demographic OAN
0-4M	1921	2108	2085	0-4F	1860	2029	2050
5-9M	2201	2396	2342	5-9F	2135	2345	2330
10-14M	2372	2526	2422	10-14F	2292	2495	2422
15-19M	2416	2502	2380	15-19F	2310	2476	2377
20-24M	2156	2286	2219	20-24F	1849	2060	1998
25-29M	1734	1791	1788	25-29F	1580	1674	1663
30-34M	1794	1842	1921	30-34F	1719	1837	1889
35-39M	2158	2207	2329	35-39F	2155	2330	2393
40-44M	2404	2378	2463	40-44F	2523	2672	2699
45-49M	2420	2460	2512	45-49F	2664	2806	2761
50-54M	2419	2510	2498	50-54F	2726	2865	2802
55-59M	2752	2839	2844	55-59F	3024	3133	3113
60-64M	3280	3379	3415	60-64F	3583	3704	3662
65-69M	3399	3447	3491	65-69F	3732	3881	3847
70-74M	3012	3063	3064	70-74F	3313	3425	3376
75-79M	2594	2617	2612	75-79F	2837	2920	2878
80-84M	2416	2374	2322	80-84F	2722	2742	2728
85+M	2393	2197	2192	85+F	3461	3065	3153

Household projections

5. The report suggests that the 2014 DCLG household formation rates should be used as published but that an alternative would be to apply a flow so that the household formation rate of no age/sex/marital status group falls below its level in 2011. Figures TA 5 and TA 6 show how these formation rates have been used to turn the demographic population projection on which the OAN is based into a household projection.

Figure TA 6: Calculation of demographic OAN using DCLG 2014-based household formation rates

OAN population projection				Institutional population				Household population				DCLG household formation rates				Household projection			
Age	Gender	2011	2031	Age	Gender	2011	2031	Age	Gender	2011	2031	Age	Gender	2011	2031	Age	Gender	2011	2031
15-19	M	2450	2380	15-19	M	173	173	15-19	M	2277	2207	15-19	M	0.022	0.023	15-19	M	51	50
20-24	M	1972	2219	20-24	M	172	172	20-24	M	1800	2047	20-24	M	0.222	0.208	20-24	M	399	425
25-29	M	1755	1788	25-29	M	66	66	25-29	M	1689	1722	25-29	M	0.577	0.547	25-29	M	974	941
30-34	M	1696	1921	30-34	M	37	37	30-34	M	1659	1884	30-34	M	0.794	0.729	30-34	M	1318	1375
35-39	M	2358	2329	35-39	M	27	27	35-39	M	2331	2302	35-39	M	0.859	0.825	35-39	M	2002	1900
40-44	M	2990	2463	40-44	M	32	32	40-44	M	2958	2431	40-44	M	0.931	0.929	40-44	M	2755	2259
45-49	M	3201	2512	45-49	M	11	11	45-49	M	3190	2501	45-49	M	0.950	0.951	45-49	M	3032	2377
50-54	M	2962	2498	50-54	M	9	9	50-54	M	2953	2489	50-54	M	0.941	0.928	50-54	M	2780	2309
55-59	M	2824	2844	55-59	M	11	11	55-59	M	2813	2833	55-59	M	0.969	0.960	55-59	M	2725	2720
60-64	M	3071	3415	60-64	M	12	12	60-64	M	3059	3403	60-64	M	0.985	0.984	60-64	M	3014	3347
65-69	M	2656	3491	65-69	M	2	2	65-69	M	2654	3489	65-69	M	0.993	0.993	65-69	M	2635	3463
70-74	M	1984	3064	70-74	M	12	12	70-74	M	1972	3052	70-74	M	0.990	0.989	70-74	M	1952	3017
75-79	M	1582	2612	75-79	M	1.1%	1.2%	75-79	M	1565	2581	75-79	M	0.987	0.986	75-79	M	1545	2544
80-84	M	1175	2322	80-84	M	2.1%	2.0%	80-84	M	1150	2275	80-84	M	0.988	0.984	80-84	M	1136	2238
85&	M	935	2192	85&	M	9.1%	9.1%	85&	M	850	1992	85&	M	0.981	0.992	85&	M	834	1977
15-19	F	2393	2377	15-19	F	146	146	15-19	F	2247	2231	15-19	F	0.015	0.015	15-19	F	34	34
20-24	F	1919	1998	20-24	F	118	118	20-24	F	1801	1880	20-24	F	0.102	0.109	20-24	F	183	205
25-29	F	1670	1663	25-29	F	41	41	25-29	F	1629	1622	25-29	F	0.174	0.194	25-29	F	284	315
30-34	F	1817	1889	30-34	F	9	9	30-34	F	1808	1880	30-34	F	0.153	0.164	30-34	F	276	309
35-39	F	2484	2393	35-39	F	6	6	35-39	F	2478	2387	35-39	F	0.164	0.184	35-39	F	407	439
40-44	F	3166	2699	40-44	F	12	12	40-44	F	3154	2687	40-44	F	0.199	0.223	40-44	F	627	600
45-49	F	3431	2761	45-49	F	9	9	45-49	F	3422	2752	45-49	F	0.210	0.216	45-49	F	718	593
50-54	F	3270	2802	50-54	F	16	16	50-54	F	3254	2786	50-54	F	0.205	0.234	50-54	F	668	652
55-59	F	2957	3113	55-59	F	7	7	55-59	F	2950	3106	55-59	F	0.208	0.232	55-59	F	615	720
60-64	F	3245	3662	60-64	F	9	9	60-64	F	3236	3653	60-64	F	0.217	0.237	60-64	F	703	864
65-69	F	2783	3847	65-69	F	5	5	65-69	F	2778	3842	65-69	F	0.276	0.300	65-69	F	767	1154
70-74	F	2176	3376	70-74	F	18	18	70-74	F	2158	3358	70-74	F	0.358	0.362	70-74	F	773	1215
75-79	F	1893	2878	75-79	F	2.2%	2.1%	75-79	F	1851	2819	75-79	F	0.490	0.439	75-79	F	907	1238
80-84	F	1632	2728	80-84	F	4.0%	3.6%	80-84	F	1567	2629	80-84	F	0.632	0.526	80-84	F	991	1383
85&	F	1887	3153	85&	F	16.1%	14.8%	85&	F	1583	2687	85&	F	0.792	0.698	85&	F	1254	1876
																TOTAL		36359	42539

Household increase 2011-31 = 42539 - 36359 = 6180 **Homes needed 2011-31 = 6180/(1 - 6.55%) = 6613 or 330 a year**

Figure TA 7: Calculation of demographic OAN using DCLG 2014-based household formation rates with 2011 floor

OAN population projection			
Age	Gender	2011	2031
15-19	M	2450	2380
20-24	M	1972	2219
25-29	M	1755	1788
30-34	M	1696	1921
35-39	M	2358	2329
40-44	M	2990	2463
45-49	M	3201	2512
50-54	M	2962	2498
55-59	M	2824	2844
60-64	M	3071	3415
65-69	M	2656	3491
70-74	M	1984	3064
75-79	M	1582	2612
80-84	M	1175	2322
85&	M	935	2192
15-19	F	2393	2377
20-24	F	1919	1998
25-29	F	1670	1663
30-34	F	1817	1889
35-39	F	2484	2393
40-44	F	3166	2699
45-49	F	3431	2761
50-54	F	3270	2802
55-59	F	2957	3113
60-64	F	3245	3662
65-69	F	2783	3847
70-74	F	2176	3376
75-79	F	1893	2878
80-84	F	1632	2728
85&	F	1887	3153

Institutional population			
Age	Gender	2011	2031
15-19	M	173	173
20-24	M	172	172
25-29	M	66	66
30-34	M	37	37
35-39	M	27	27
40-44	M	32	32
45-49	M	11	11
50-54	M	9	9
55-59	M	11	11
60-64	M	12	12
65-69	M	2	2
70-74	M	12	12
75-79	M	1.1%	1.2%
80-84	M	2.1%	2.0%
85&	M	9.1%	9.1%
15-19	F	146	146
20-24	F	118	118
25-29	F	41	41
30-34	F	9	9
35-39	F	6	6
40-44	F	12	12
45-49	F	9	9
50-54	F	16	16
55-59	F	7	7
60-64	F	9	9
65-69	F	5	5
70-74	F	18	18
75-79	F	2.2%	2.1%
80-84	F	4.0%	3.6%
85&	F	16.1%	14.8%

Household population			
Age	Gender	2011	2031
15-19	M	2277	2207
20-24	M	1800	2047
25-29	M	1689	1722
30-34	M	1659	1884
35-39	M	2331	2302
40-44	M	2958	2431
45-49	M	3190	2501
50-54	M	2953	2489
55-59	M	2813	2833
60-64	M	3059	3403
65-69	M	2654	3489
70-74	M	1972	3052
75-79	M	1565	2581
80-84	M	1150	2275
85&	M	850	1992
15-19	F	2247	2231
20-24	F	1801	1880
25-29	F	1629	1622
30-34	F	1808	1880
35-39	F	2478	2387
40-44	F	3154	2687
45-49	F	3422	2752
50-54	F	3254	2786
55-59	F	2950	3106
60-64	F	3236	3653
65-69	F	2778	3842
70-74	F	2158	3358
75-79	F	1851	2819
80-84	F	1567	2629
85&	F	1583	2687

DCLG 2014 HRRs with 2011 floor			
Age	Gender	2011	2031
15-19	M	0.022	0.023
20-24	M	0.222	0.216
25-29	M	0.577	0.567
30-34	M	0.794	0.800
35-39	M	0.859	0.861
40-44	M	0.931	0.929
45-49	M	0.950	0.951
50-54	M	0.941	0.928
55-59	M	0.969	0.960
60-64	M	0.985	0.984
65-69	M	0.993	0.993
70-74	M	0.990	0.989
75-79	M	0.987	0.987
80-84	M	0.988	0.988
85&	M	0.981	0.992
15-19	F	0.015	0.015
20-24	F	0.102	0.110
25-29	F	0.174	0.194
30-34	F	0.153	0.166
35-39	F	0.164	0.186
40-44	F	0.199	0.224
45-49	F	0.210	0.216
50-54	F	0.205	0.234
55-59	F	0.208	0.232
60-64	F	0.217	0.237
65-69	F	0.276	0.300
70-74	F	0.358	0.362
75-79	F	0.490	0.439
80-84	F	0.632	0.526
85&	F	0.792	0.698

Household projection			
Age	Gender	2011	2031
15-19	M	51	50
20-24	M	399	442
25-29	M	974	976
30-34	M	1318	1508
35-39	M	2002	1982
40-44	M	2755	2259
45-49	M	3032	2378
50-54	M	2780	2309
55-59	M	2725	2720
60-64	M	3014	3347
65-69	M	2635	3463
70-74	M	1952	3017
75-79	M	1545	2549
80-84	M	1136	2249
85&	M	834	1977
15-19	F	34	34
20-24	F	183	207
25-29	F	284	315
30-34	F	276	312
35-39	F	407	445
40-44	F	627	602
45-49	F	718	593
50-54	F	668	652
55-59	F	615	720
60-64	F	703	864
65-69	F	767	1154
70-74	F	773	1215
75-79	F	907	1238
80-84	F	991	1383
85&	F	1254	1876
		36359	**42835**

Household increase 2011-31 = 42835 - 36359 = 6476 **Homes needed 2011-31 = 6476/(1 - 6.55%) = 6930 or 350 a year**

6. The principles behind both sets of calculations are exactly the same:

   6.1. The 2011 population figures are from the 2015 MYE; the 2031 projections have been produced as described in earlier sections of this annex.

6.2. For ages up to 70-74, the institutional population columns simply repeat the figures from the DCLG 2014 based projections (which assume that in these age groups the institutional population is fixed for the projection period). For the 75 and older age groups, DCLG assume that the proportion of the population that is in institutional accommodation remains fixed. Accordingly for these groups the institutional population is shown as a percentage.

6.3. The household population is simply the total population less the institutional population, whether the latter is expressed as number or a proportion.

6.4. The household population is then multiplied by the household formation rate to give the number of households

6.5. The increase in households is calculated by subtracting the number of households in 2011 from the number in 2031 – see line beneath table shaded grey

6.6. Adding an allowance for empty and second homes – 6.55% - gives the number of homes needed – also in the line shaded grey.

7. It should be noted that in the analysis set out in this report all of the calculations are carried out using the DCLG Phase 1 age/sex/marital status groups rather than the age/sex groups shown in Figures TA 6 and TA 7. The principles are exactly the same but there are three times as many rows in the tables.

8. Similarly, in calculating the '2011 floor' scenario the age/sex/marital status groups are used, not the age/sex groups shown in Figures TA 6 and TA 7. In this context it should be noted that the 2011 floor household formation rates in TA 7 have been calculated from the number of households produced by applying 2011 floors to the age/sex/marital status groups, adding the number of households across the three marital status groups in each age/sex group and then dividing by the household population in the age/sex group. This explains why in some cases the 2011 floor age/sex household formation rates are slightly lower in 2031 than the rate for the same age/sex group in 2011.

Estimating the number of homes needed to support economic growth

9. As the outputs provided by Cambridge Econometrics (CE) and Oxford Economics (OE) are different, different methods have to be used to estimate the number of homes needed to support the jobs forecasts they make. Both methods are, however, based on economic activity rates (or the equivalent) taken from the forecasts themselves.

10. Figure TA 8 shows the calculation of the jobs change supported by the demographic OAN using economic activity rates derived from the CE model

Figure TA 8: Calculation of jobs change supported by demographic OAN in 2014-31 assuming economic activity rates consistent with CE projection

	A	B	C		D	E	F = D/E		G = AxF	H = BxF	I =CxF			J	K	L		M	N	O
	2011 CE econ activity rate SW	2014 CE econ activity rate SW	2031 CE econ activity rate SW		2011 census econ activity Cotswold	2011 census econ activity rate SW	Scaling factor		2011 CE econ activity rate LA	2014 CE econ activity rate LA	2031 CE econ activity rate LA			Projected population	Projected population	Projected population		No. economically active	No. economically active	No. economically active
Males													Males	**2011**	**2014**	**2031**		**2011**	**2014**	**2031**
0-15													0-15	7061	7052	7326				
16-24	67.9%	64.2%	55.3%		64.8%	67.7%	0.957		65.0%	61.5%	53.0%		16-24	3974	4112	4122		2583	2527	2183
25-34	91.3%	92.5%	93.1%		94.7%	92.4%	1.026		93.6%	94.9%	95.5%		25-34	3452	3409	3709		3232	3234	3542
35-44	91.6%	92.1%	89.6%		95.7%	92.4%	1.037		95.0%	95.5%	92.8%		35-44	5347	4780	4792		5077	4563	4449
45-59	86.4%	89.0%	93.8%		92.5%	88.5%	1.044		90.2%	93.0%	98.0%		45-59	8987	9282	7854		8110	8629	7698
60-64	61.2%	64.1%	73.9%		70.9%	63.4%	1.119		68.5%	71.7%	82.7%		60-64	3070	2863	3415		2103	2054	2823
65&ove	12.9%	14.2%	15.8%		21.6%	14.8%	1.465		18.9%	20.8%	23.2%		65&over	8333	9300	13680		1575	1934	3174
Females													Females	**2011**	**2014**	**2031**		**2011**	**2014**	**2031**
0-15													0-15	6726	6855	7280				
16-24	64.8%	65.8%	64.8%		63.3%	64.5%	0.982		63.6%	64.6%	63.6%		16-24	3820	3878	3899		2431	2506	2479
25-34	78.5%	80.6%	84.1%		83.3%	81.2%	1.025		80.5%	82.6%	86.2%		25-34	3487	3631	3552		2806	3000	3064
35-44	80.3%	81.8%	79.0%		82.9%	82.4%	1.006		80.8%	82.3%	79.5%		35-44	5649	5141	5092		4563	4230	4047
45-59	78.8%	81.8%	93.2%		81.7%	80.6%	1.013		79.8%	82.9%	94.4%		45-59	9659	9978	8676		7712	8270	8193
60-64	39.6%	41.7%	60.4%		46.2%	40.5%	1.141		45.2%	47.6%	68.9%		60-64	3245	3073	3662		1466	1462	2524
65&ove	7.8%	8.4%	10.7%		11.0%	8.3%	1.330		10.4%	11.2%	14.2%		65&over	10370	11283	15982		1076	1261	2275
													Total persons	**83180**	**84637**	**93042**				
																		2011	**2014**	**2031**
																	Total economically active	42734	43670	46452
	Ratio: jobs supported/number economically active = 46170/42734 = 1.08												Jobs supported - no change in unemployment					46170	47182	50188
																	Unemployment rate assumption	3.9%	3.0%	2.4%
													Jobs supported after adjustment for unemployment change					46170	47623	50984
																	Change in jobs supported 2014-31		**3361**	

11. The calculation is as follows:

11.1. Columns A-C are economic activity rates for the South West supplied by CE, although the rates for 2031 have been produced by extrapolating from the 2030 rates supplied by CE. (It has been assumed that the change from 2030 to 2031 is equal to the average annual change from 2025 to 2030.)

11.2. Columns D and E are the census 2011 economic activity rates for Cotswold and the South West. By dividing the Cotswold rate by the South West rate a series of scaling factors have been produced (Column F) which can be used to estimate Cotswold activity rates from South West rates.

11.3. Applying the scaling factors in Column F to the CE South West activity rates produces a set of activity rates for Cotswold (Columns G-I) that are consistent with the CE model.

11.4. Multiplying the estimated CE activity rates for Cotswold by the demographically projected population in the years 2011, 2014 and 2031 (Columns J-K) gives the number who will be economically active in these years (Columns M, N and O).

11.5. To turn the number economically active into a number of jobs supported an allowance needs to be made for the proportion who will be unemployed; net commuting and double jobbing. It is assumed that these factors are proportionate to the number economically active. If the proportions remain fixed, the ratio between the number of people economically active and the jobs supported will remain fixed. That ratio can be calculated by dividing the number of jobs assumed by CE in 2011 (46,170) by the number economically active (42,734) to give a ratio of 1.08. Applying that ratio to the number economically active in 2014 and 2031 gives the number of jobs which could be supported in those years assuming no change in unemployment, net commuting or double jobbing rates – see line labelled “Jobs supported – no change in unemployment” below main table, Columns N and O.

11.6. The unemployment rate in Cotswold has, however, not remained constant since 2011 and is unlikely to remain constant into the future. According to the APS model-based estimates of unemployment, the unemployment rate (using the ILO definition, expressed as a percentage of the economically active population age 16+) was 3.9% in the calendar year 2011. It rose in 2012 before falling thereafter, reaching 3.0% in 2014. It has since fallen further, to 2.7% in 2015. For the purpose of this calculation it is assumed that the rate in 2031 will be equal to the average rate for the period 2004-07 i.e. 2.4%. To turn a number of people economically active into a number of people in employment you multiply the number economically active by ‘1 minus the unemployment rate’. Thus:

Number of jobs supported in 2031 assuming 2004-07 unemployment rate

$$= \frac{\text{Number of jobs supported assuming no change in unemployment} \times (1 - \text{2004-07 unemployment rate})}{(1 - \text{2011 unemployment rate})}$$

11.7. The line labelled "Jobs supported after adjustment for unemployment change" shows the effect of adjusting for the assumed changes in unemployment rate.

11.8. Subtracting the number of jobs supported in 2014 from the number of jobs supported in 2031 gives the change in jobs supported

12. As can be seen from Figure TA 8, the change in jobs supported 2014-31 in the demographic OAN scenario is 3361 extra jobs. This compares with the CE forecast which suggests that 4737 extra jobs will be created over this period. The Nupremis adjusted CE forecast increases this further to 5042. Thus in both cases there is a need to increase the number of homes provided above the figure suggested by the demographic estimate.

13. To calculate how many extra homes are needed an assumption needs to be made about how the population is increased above than envisaged in the demographic OAN as the number of homes needed depends on the age profile of the population as well as its overall size. The assumption made is that migration into Cotswold from the rest of the UK is increased but that, as the increase is driven by the need to fill jobs, the increase does not affect those who are over retirement age or near it – which has been taken to mean those over 50. A scaling factor has therefore been applied to increase the flows in from the rest of the UK of both males and females aged 50 and under. This includes children, the assumption being that most children who move to the area come with parents who are aged 50 and under. The extra migrants are 'aged-on' and subject to the same fertility, mortality and out-migration rates as the rest of the population. This means that by the end of the plan period some of the extra migrants will be over retirement age but still living in the district and probably not in employment, although still occupying homes.

14. Figures TA 9 and TA 10 show the calculations resulting from increasing the scaling factor applied to the flows in from the rest of the UK until the increase in jobs supported matches that in the unadjusted CE forecast (4737 extra jobs 2014-31; Figure TA 9) and the Nupremis adjusted forecast (5042 extra jobs 2014-31; Figure TA 10).

Figure TA 9: Calculation population needed to support unadjusted CE projection

	A	B	C		D	E	F = D/E		G = AxF	H = BxF	I =CxF			J	K	L		M	N	O
	2011 CE econ activity rate SW	2014 CE econ activity rate SW	2031 CE econ activity rate SW		2011 census econ activity Cotswold	2011 census econ activity rate SW	Scaling factor		2011 CE econ activity rate LA	2014 CE econ activity rate LA	2031 CE econ activity rate LA			Projected population	Projected population	Projected population		No. economically active	No. economically active	No. economically active
Males													Males	**2011**	**2014**	**2031**		**2011**	**2014**	**2031**
0-15													0-15	7061	7052	7629				
16-24	67.9%	64.2%	55.3%		64.8%	67.7%	0.957		65.0%	61.5%	53.0%		16-24	3974	4112	4270		2583	2527	2262
25-34	91.3%	92.5%	93.1%		94.7%	92.4%	1.026		93.6%	94.9%	95.5%		25-34	3452	3409	3861		3232	3234	3686
35-44	91.6%	92.1%	89.6%		95.7%	92.4%	1.037		95.0%	95.5%	92.8%		35-44	5347	4780	4988		5077	4563	4630
45-59	86.4%	89.0%	93.8%		92.5%	88.5%	1.044		90.2%	93.0%	98.0%		45-59	8987	9282	8064		8110	8629	7904
60-64	61.2%	64.1%	73.9%		70.9%	63.4%	1.119		68.5%	71.7%	82.7%		60-64	3070	2863	3433		2103	2054	2838
65&ove	12.9%	14.2%	15.8%		21.6%	14.8%	1.465		18.9%	20.8%	23.2%		65&over	8333	9300	13681		1575	1934	3174
Females													Females	**2011**	**2014**	**2031**		**2011**	**2014**	**2031**
0-15													0-15	6726	6855	7582				
16-24	64.8%	65.8%	64.8%		63.3%	64.5%	0.982		63.6%	64.6%	63.6%		16-24	3820	3878	4043		2431	2506	2571
25-34	78.5%	80.6%	84.1%		83.3%	81.2%	1.025		80.5%	82.6%	86.2%		25-34	3487	3631	3709		2806	3000	3199
35-44	80.3%	81.8%	79.0%		82.9%	82.4%	1.006		80.8%	82.3%	79.5%		35-44	5649	5141	5315		4563	4230	4224
45-59	78.8%	81.8%	93.2%		81.7%	80.6%	1.013		79.8%	82.9%	94.4%		45-59	9659	9978	8901		7712	8270	8406
60-64	39.6%	41.7%	60.4%		46.2%	40.5%	1.141		45.2%	47.6%	68.9%		60-64	3245	3073	3681		1466	1462	2537
65&ove	7.8%	8.4%	10.7%		11.0%	8.3%	1.330		10.4%	11.2%	14.2%		65&over	10370	11283	15983		1076	1261	2275
													Total persons	**83180**	**84637**	**95139**				
																		2011	**2014**	**2031**
																Total economically active		42734	43670	47706
	Ratio: jobs supported/number economically active = 46170/42734 = 1.08												Jobs supported - no change in unemployment					46170	47182	51543
															Unemployment rate assumption			3.9%	3.0%	2.4%
											Jobs supported after adjustment for unemployment change							46170	47623	52360
													Change in jobs supported 2014-31						**4737**	

Figure TA 10: Calculation population needed to support Nupremis adjusted CE projection

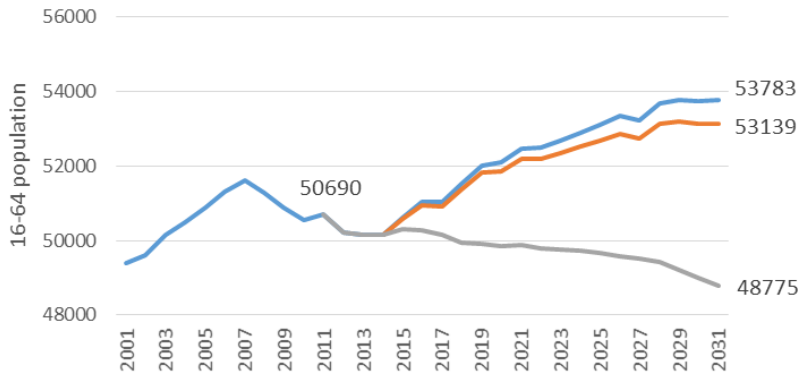
	A	B	C		D	E	F = D/E		G = AxF	H = BxF	I =CxF			J	K	L		M	N	O
	2011 CE econ activity rate SW	2014 CE econ activity rate SW	2031 CE econ activity rate SW		2011 census econ activity Cotswold	2011 census econ activity rate SW	Scaling factor		2011 CE econ activity rate LA	2014 CE econ activity rate LA	2031 CE econ activity rate LA			Projected population	Projected population	Projected population		No. economically active	No. economically active	No. economically active
Males													Males	**2011**	**2014**	**2031**		**2011**	**2014**	**2031**
0-15													0-15	7061	7052	7696				
16-24	67.9%	64.2%	55.3%		64.8%	67.7%	0.957		65.0%	61.5%	53.0%		16-24	3974	4112	4303		2583	2527	2279
25-34	91.3%	92.5%	93.1%		94.7%	92.4%	1.026		93.6%	94.9%	95.5%		25-34	3452	3409	3894		3232	3234	3718
35-44	91.6%	92.1%	89.6%		95.7%	92.4%	1.037		95.0%	95.5%	92.8%		35-44	5347	4780	5031		5077	4563	4670
45-59	86.4%	89.0%	93.8%		92.5%	88.5%	1.044		90.2%	93.0%	98.0%		45-59	8987	9282	8111		8110	8629	7950
60-64	61.2%	64.1%	73.9%		70.9%	63.4%	1.119		68.5%	71.7%	82.7%		60-64	3070	2863	3437		2103	2054	2841
65&ove	12.9%	14.2%	15.8%		21.6%	14.8%	1.465		18.9%	20.8%	23.2%		65&over	8333	9300	13682		1575	1934	3174
Females													Females	**2011**	**2014**	**2031**		**2011**	**2014**	**2031**
0-15													0-15	6726	6855	7649				
16-24	64.8%	65.8%	64.8%		63.3%	64.5%	0.982		63.6%	64.6%	63.6%		16-24	3820	3878	4074		2431	2506	2591
25-34	78.5%	80.6%	84.1%		83.3%	81.2%	1.025		80.5%	82.6%	86.2%		25-34	3487	3631	3744		2806	3000	3229
35-44	80.3%	81.8%	79.0%		82.9%	82.4%	1.006		80.8%	82.3%	79.5%		35-44	5649	5141	5364		4563	4230	4264
45-59	78.8%	81.8%	93.2%		81.7%	80.6%	1.013		79.8%	82.9%	94.4%		45-59	9659	9978	8951		7712	8270	8453
60-64	39.6%	41.7%	60.4%		46.2%	40.5%	1.141		45.2%	47.6%	68.9%		60-64	3245	3073	3685		1466	1462	2540
65&ove	7.8%	8.4%	10.7%		11.0%	8.3%	1.330		10.4%	11.2%	14.2%		65&over	10370	11283	15983		1076	1261	2275
													Total persons	**83180**	**84637**	**95603**				
																		2011	**2014**	**2031**
																Total economically active		42734	43670	47984
	Ratio: jobs supported/number economically active = 46170/42734 = 1.08												Jobs supported - no change in unemployment					46170	47182	51843
																Unemployment rate assumption		3.9%	3.0%	2.4%
											Jobs supported after adjustment for unemployment change							46170	47623	52665
																Change in jobs supported 2014-31			**5042**	

15. The projected populations calculated in Figures TA 9 and 10 can then be converted into revised household projections and homes estimates using the methods shown in Figures TA 6 and TA 7.

16. The estimation of the number of homes needed to support the OE jobs forecast is rather more straightforward as the OE output includes an estimate of the 16-64 population. This can be compared with the 16-64 population envisaged in the demographic OAN. If the 16-64 population envisaged for 2031 is lower than that required by the OE forecast then the demographic OAN will not provide the necessary workforce and the flow in from the rest of the UK needs to be increased as described above for the CE forecast.

17. Figure TA 11 compares the demographic OAN projection for 16-64 year olds with that envisaged in the unadjusted OE jobs forecast and the Nupremis adjusted OE forecast. The latter has be estimated by assuming that the double jobbing rate and net commuter flow remain as assumed in the OE forecast and that the ratio between the 16-64 population and the number of people in employment also remains unchanged).

Figure TA 11: Comparison of OE 16-64 population forecasts with demographic OAN



18. As can be seen, the demographic OAN envisages that the 16-64 population falls from 50,690 in 2011 to 48,775 in 2031 whilst the OE forecast requires an increase to 53,783, or 53,139 in the Nupremis adjusted scenario. Scaling up the inflows from the rest of the UK of those aged 50 and under to produce the required numbers of 16-64 year olds results in the age profiles shown in Figure TA 12.

Figure TA 12: Population needed for OE forecast			
	Demographic OAN	Unadjusted OE	Adjusted OE
0-15M	7326	8345	8214
16-24M	4122	4619	4555
25-34M	3709	4218	4153
35-44M	4792	5449	5365
45-59M	7854	8560	8469
60-64M	3415	3476	3469
65&overM	13680	13683	13683
0-15F	7280	8296	8165
16-24F	3899	4383	4320
25-34F	3552	4079	4012
35-44F	5092	5841	5745
45-59F	8676	9433	9336
60-64F	3662	3724	3716
65&overF	15982	15985	15984
16-64P	48775	53783	53139
Total population	93042	100092	99186

19. As with the CE forecast, the revised population projections can be converted into household projections and numbers of homes needed using the method illustrated in Figures TA 6 and 7 above.

20. Figure 8.7 in the main report (reproduced in unrounded form) below summarises the results obtained for both the CE and OE jobs forecasts.

Figure 8.7 (unrounded): November 2015 jobs forecasts for Cotswold					
	OE		CE		Average
	Jobs	**Homes**	Jobs	**Homes**	homes needed
	2014-31	**2011-31**	2014-31	**2011-31**	2011-31
Unadjusted forecast	6023	**8927**	4737	**7300**	8113
Alternative scenario	5342	**8630**	5042	**7452**	8041

Gloucestershire HMA analysis

21. Using the same assumptions as have been applied in the calculation of the Cotswold demographic OAN to the five other Gloucestershire districts it is possible to estimate the demographic OAN for the county as a whole. This gives a projected population increase of 93,458 over the period 2011-31 and a demographic OAN of 54,638 homes over the same period.

22. In addition, as the forecasts obtained from CE and OE in November 2015 included forecasts for Gloucestershire as a whole it is possible to use those in exactly the same way as the forecasts for Cotswold District to estimate the number of homes needed to support the jobs forecast for the HMA as a whole.

23. Figure TA 13 shows the calculation of the HMA jobs increase supported by the demographic OAN for Gloucestershire. Columns J, K and L summarise the HMA demographic population projection. As with the Cotswold calculation, the economic activity rates for Gloucestershire have been estimated using scaling factors derived from the 2011 census which have then been applied to CE's South West activity rates. The unemployment assumptions are from the APS model-based estimates of unemployment, with the 2031 rate being the average rate for 2004-07.

24. Figure TA 13 shows that the demographic OAN for the HMA could support a jobs increase of 38,978 2014-31 whereas the CE forecast suggests that only 19,722 extra jobs will be created over that period. This means that the demographic OAN would provide a bigger population than is needed to support the CE forecast by a substantial margin. To estimate how large that margin is Figure TA 14 calculates the population needed to support the CE jobs increase. This is similar to Figures TA 9 and 10 except in this case the flows from the rest of the UK of those aged 50 and under have been scaled down until increase in jobs supported just matches that forecast by CE.

Figure TA 13: Calculation of jobs change supported by Gloucestershire demographic OAN in 2014-31 assuming economic activity rates consistent with CE projection

	A	B	C	D	E	F = D/E	G = AxF	H = BxF	I =CxF		J	K	L	M	N	O
	2011 CE econ activity rate SW	2014 CE econ activity rate SW	2031 CE econ activity rate SW	2011 census econ activity Cotswold	2011 census econ activity rate SW	Scaling factor	2011 CE econ activity rate LA	2014 CE econ activity rate LA	2031 CE econ activity rate LA		Projected population	Projected population	Projected population	No. economically active	No. economically active	No. economically active
Males										Males	**2011**	**2014**	**2031**	**2011**	**2014**	**2031**
0-15										0-15	54594	55625	61737			
16-24	67.9%	64.2%	55.3%	69.6%	67.7%	1.029	69.9%	66.0%	56.9%	16-24	32820	32701	34730	22927	21599	19766
25-34	91.3%	92.5%	93.1%	93.6%	92.4%	1.013	92.5%	93.7%	94.3%	25-34	34012	34553	36687	31469	32390	34613
35-44	91.6%	92.1%	89.6%	93.8%	92.4%	1.015	93.0%	93.5%	90.9%	35-44	41158	37950	41718	38272	35482	37929
45-59	86.4%	89.0%	93.8%	90.1%	88.5%	1.018	88.0%	90.6%	95.5%	45-59	61433	64856	59149	54031	58758	56502
60-64	61.2%	64.1%	73.9%	66.7%	63.4%	1.053	64.4%	67.5%	77.8%	60-64	19270	18142	22977	12415	12242	17865
65&over	12.9%	14.2%	15.8%	16.5%	14.8%	1.119	14.4%	15.9%	17.7%	65&over	50027	55859	83452	7219	8873	14787
Females										Females	**2011**	**2014**	**2031**	**2011**	**2014**	**2031**
0-15										0-15	52211	53428	59352			
16-24	64.8%	65.8%	64.8%	66.3%	64.5%	1.028	66.6%	67.7%	66.6%	16-24	32173	31101	33704	21437	21042	22443
25-34	78.5%	80.6%	84.1%	82.3%	81.2%	1.014	79.6%	81.7%	85.3%	25-34	33545	35338	34558	26691	28870	29473
35-44	80.3%	81.8%	79.0%	83.3%	82.4%	1.012	81.3%	82.8%	80.0%	35-44	40929	38167	41309	33256	31591	33029
45-59	78.8%	81.8%	93.2%	81.8%	80.6%	1.015	79.9%	83.0%	94.6%	45-59	63367	66555	61468	50660	55234	58121
60-64	39.6%	41.7%	60.4%	43.4%	40.5%	1.073	42.5%	44.7%	64.8%	60-64	20371	19117	23827	8654	8552	15443
65&over	7.8%	8.4%	10.7%	9.0%	8.3%	1.083	8.4%	9.1%	11.6%	65&over	62379	67940	97080	5268	6179	11247
										Total persons	**598289**	**611332**	**691747**			
														2011	**2014**	**2031**
										Total economically active				312298	320811	351218
Ratio: jobs supported/number economically active = 317255/312298 = 1.02										Jobs supported - no change in unemployment				317255	325903	356793
										Unemployment rate assumption				5.2%	5.5%	3.3%
										Jobs supported after adjustment for unemployment change				317255	324872	363850
										Change in jobs supported 2014-31					**38978**	

Figure TA 14: Calculation of population needed to support CE jobs forecast

	A	B	C	D	E	F = D/E	G = AxF	H = BxF	I =CxF
	2011 CE econ activity rate SW	2014 CE econ activity rate SW	2031 CE econ activity rate SW	2011 census econ activity Cotswold	2011 census econ activity rate SW	Scaling factor	2011 CE econ activity rate LA	2014 CE econ activity rate LA	2031 CE econ activity rate LA
Males									
0-15									
16-24	67.9%	64.2%	55.3%	69.6%	67.7%	1.029	69.9%	66.0%	56.9%
25-34	91.3%	92.5%	93.1%	93.6%	92.4%	1.013	92.5%	93.7%	94.3%
35-44	91.6%	92.1%	89.6%	93.8%	92.4%	1.015	93.0%	93.5%	90.9%
45-59	86.4%	89.0%	93.8%	90.1%	88.5%	1.018	88.0%	90.6%	95.5%
60-64	61.2%	64.1%	73.9%	66.7%	63.4%	1.053	64.4%	67.5%	77.8%
65&over	12.9%	14.2%	15.8%	16.5%	14.8%	1.119	14.4%	15.9%	17.7%
Females									
0-15									
16-24	64.8%	65.8%	64.8%	66.3%	64.5%	1.028	66.6%	67.7%	66.6%
25-34	78.5%	80.6%	84.1%	82.3%	81.2%	1.014	79.6%	81.7%	85.3%
35-44	80.3%	81.8%	79.0%	83.3%	82.4%	1.012	81.3%	82.8%	80.0%
45-59	78.8%	81.8%	93.2%	81.8%	80.6%	1.015	79.9%	83.0%	94.6%
60-64	39.6%	41.7%	60.4%	43.4%	40.5%	1.073	42.5%	44.7%	64.8%
65&over	7.8%	8.4%	10.7%	9.0%	8.3%	1.083	8.4%	9.1%	11.6%

	J	K	L	M	N	O
	Projected population	Projected population	Projected population	No. economically active	No. economically active	No. economically active
Males	**2011**	**2014**	**2031**	**2011**	**2014**	**2031**
0-15	54594	55625	57215			
16-24	32820	32701	32556	22927	21599	18529
25-34	34012	34553	33849	31469	32390	31935
35-44	41158	37950	38672	38272	35482	35160
45-59	61433	64856	56481	54031	58758	53953
60-64	19270	18142	22750	12415	12242	17688
65&over	50027	55859	83441	7219	8873	14785
Females	**2011**	**2014**	**2031**	**2011**	**2014**	**2031**
0-15	52211	53428	55008			
16-24	32173	31101	31429	21437	21042	20928
25-34	33545	35338	31631	26691	28870	26976
35-44	40929	38167	38127	33256	31591	30485
45-59	63367	66555	58847	50660	55234	55643
60-64	20371	19117	23610	8654	8552	15303
65&over	62379	67940	97069	5268	6179	11245
Total persons	**598289**	**611332**	**660683**			
				2011	**2014**	**2031**
Total economically active				312298	320811	332631
Jobs supported - no change in unemployment				317255	325903	337911
Unemployment rate assumption				5.2%	5.5%	3.3%
Jobs supported after adjustment for unemployment change				317255	324872	344594
Change in jobs supported 2014-31					**19722**	

Ratio: jobs supported/number economically active = 317255/312298 = 1.02

25. The demographic OAN for Gloucestershire provides a 16-64 population of 390,000 whereas the OE jobs forecast only requires a 16-64 population of 373,000. As with the Cotswold OAN OE calculation it is possible to scale the flows in from the rest of the UK until the 16064 population project just matches that envisaged in the OE forecast. Figure TA 15 compares the population projection estimated in this way with the demographic OAN and the population needed to support the CE jobs projection.

Figure TA 15: Gloucestershire population projections for 2031

	Demographic OAN	CE jobs forecast	OE jobs forecast
Males			
0-15	61737	57215	58269
16-24	34730	32556	33063
25-34	36687	33849	34510
35-44	41718	38672	39382
45-59	59149	56481	57103
60-64	22977	22750	22803
65&over	83452	83441	83443
Females			
0-15	59352	55008	56021
16-24	33704	31429	31960
25-34	34558	31631	32313
35-44	41309	38127	38869
45-59	61468	58847	59458
60-64	23827	23610	23661
65&over	97080	97069	97071
Total	691747	660683	667926
16-64	390126	367950	373121

26. Figure TA 16 summarises the result obtained from this analysis and indicates that for the HMA as a whole the demographic OAN provides a workforce that is considerably larger than that required by both the CE and OE jobs forecasts.

Figure TA 16: Implications of CE and OE forecasts for HMA

	Jobs increase 2014-31	Population increase 2011-31	Homes needed 2011-31	Difference from demographic OAN
Cambridge Econometrics	19722	62394	44055	-10583
Oxford Economics	25472	69637	46522	-8116

The Full Objectively Assessed Housing Need (FOAN)

27. The main report concludes that, on grounds of prudence, the FOAN should be based on the mid-point of the housing need figures calculated for the unadjusted standalone OE and CE forecasts for Cotswold District. Figure TA 17 gives the detailed components of change for this scenario:

Figure TA17: Adjusted population projection for the jobs-led Full OAN

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Population	83181	83562	84079	84637	85162	86044	86895	87731	88556	89368	90182	90986	91774	92555	93332	94092	94839	95565	96266	96932	97576
Births	695	711	698	731	667	693	720	742	762	772	785	800	810	816	819	821	822	823	823	821	820
Deaths	774	833	857	867	931	855	869	873	885	881	889	897	906	918	927	938	951	964	980	999	1016
England in	5103	5128	5219	5619	5671	5764	5786	5812	5833	5842	5852	5865	5885	5906	5939	5974	6010	6044	6080	6116	6147
England out	4498	4682	4589	5064	5001	4773	4834	4888	4922	4954	4963	4989	5022	5043	5069	5110	5145	5187	5231	5279	5313
Cross border in	266	267	272	292	295	300	300	300	299	299	299	299	299	299	299	299	299	299	299	299	299
Cross border out	227	236	232	255	252	241	244	244	246	247	248	249	250	250	251	252	252	253	253	254	254
International in	433	409	399	432	472	499	499	499	499	499	499	499	499	499	499	499	499	499	499	499	499
International out	302	419	473	426	418	455	460	465	469	472	475	478	480	482	484	486	487	488	489	490	491
UPC	-113	0	0	0	0	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45
Adjustment	-17	37	80	96	22	-5	-3	-3	-2	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2

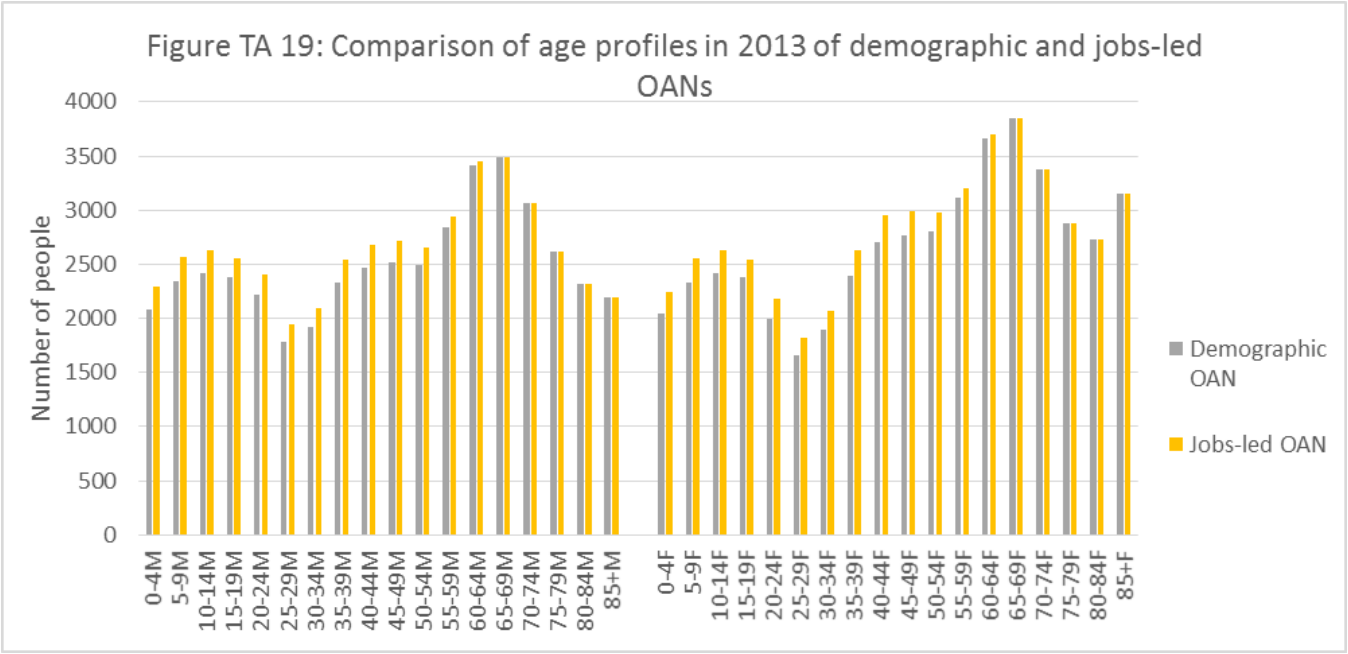
Notes: Population data is for 30 June in the year shown; other data is for the 12 months to 30 June in the year shown. The figures shaded orange are from the 2015 MYE. The 2015 MYE does not disaggregate the internal in and outflows between flows from and to the rest of England and other countries in the UK so for these purposes the disaggregation has been estimated based on the split in 2014-15 in the 2014 SNPP. In the orange shaded cells the 'Adjustment' is the sum of the ONS's "special change" and "other adjustments" from the 2015 MYE; in the other cells the adjustment is the small adjustments which the ONS makes in its projections to constrain the local authority projections to add to their national projection.

28. Figure TA 18 gives the age profile of the FOAN in 2031 alongside the demographic OAN and the 2012 and 2014 SNPPs

Figure TA 18: Age profiles in 2031

	2012 SNPP	2014 SNPP	Demographic OAN	Jobs-led OAN		2012 SNPP	2014 SNPP	Demographic OAN	Jobs-led OAN
0-4M	1921	2108	2085	2286	0-4F	1860	2029	2050	2247
5-9M	2201	2396	2342	2560	5-9F	2135	2345	2330	2548
10-14M	2372	2526	2422	2624	10-14F	2292	2495	2422	2625
15-19M	2416	2502	2380	2548	15-19F	2310	2476	2377	2547
20-24M	2156	2286	2219	2406	20-24F	1849	2060	1998	2175
25-29M	1734	1791	1788	1944	25-29F	1580	1674	1663	1818
30-34M	1794	1842	1921	2093	30-34F	1719	1837	1889	2073
35-39M	2158	2207	2329	2536	35-39F	2155	2330	2393	2625
40-44M	2404	2378	2463	2679	40-44F	2523	2672	2699	2948
45-49M	2420	2460	2512	2717	45-49F	2664	2806	2761	2990
50-54M	2419	2510	2498	2658	50-54F	2726	2865	2802	2970
55-59M	2752	2839	2844	2934	55-59F	3024	3133	3113	3203
60-64M	3280	3379	3415	3455	60-64F	3583	3704	3662	3702
65-69M	3399	3447	3491	3492	65-69F	3732	3881	3847	3849
70-74M	3012	3063	3064	3064	70-74F	3313	3425	3376	3376
75-79M	2594	2617	2612	2612	75-79F	2837	2920	2878	2878
80-84M	2416	2374	2322	2322	80-84F	2722	2742	2728	2728
85+M	2393	2197	2192	2192	85+F	3461	3065	3153	3153

29. Figure TA 19 compares the demographic and Full OAN age profiles in 2031, so that the age and gender groups which contain the additional population can be identified.



30. Figures TA 20 and 21 show the calculations which convert the FOAN population projection in households and homes using the DCLG 2014-based projections 'as published' (Figure TA 20) and with a '2011 floor' on household formation rates

Figure TA 20: Calculation of jobs-led FOAN using DCLG 2014-based household formation rates

FOAN population projection

Age	Gender	2011	2031
15-19	M	2450	2548
20-24	M	1972	2406
25-29	M	1755	1944
30-34	M	1696	2093
35-39	M	2358	2536
40-44	M	2990	2679
45-49	M	3201	2717
50-54	M	2962	2658
55-59	M	2824	2934
60-64	M	3071	3455
65-69	M	2656	3492
70-74	M	1984	3064
75-79	M	1582	2612
80-84	M	1175	2322
85&	M	935	2192
15-19	F	2393	2547
20-24	F	1919	2175
25-29	F	1670	1818
30-34	F	1817	2073
35-39	F	2484	2625
40-44	F	3166	2948
45-49	F	3431	2990
50-54	F	3270	2970
55-59	F	2957	3203
60-64	F	3245	3702
65-69	F	2783	3849
70-74	F	2176	3376
75-79	F	1893	2878
80-84	F	1632	2728
85&	F	1887	3153

Institutional population

Age	Gender	2011	2031
15-19	M	173	173
20-24	M	172	172
25-29	M	66	66
30-34	M	37	37
35-39	M	27	27
40-44	M	32	32
45-49	M	11	11
50-54	M	9	9
55-59	M	11	11
60-64	M	12	12
65-69	M	2	2
70-74	M	12	12
75-79	M	1.1%	1.2%
80-84	M	2.1%	2.0%
85&	M	9.1%	9.1%
15-19	F	146	146
20-24	F	118	118
25-29	F	41	41
30-34	F	9	9
35-39	F	6	6
40-44	F	12	12
45-49	F	9	9
50-54	F	16	16
55-59	F	7	7
60-64	F	9	9
65-69	F	5	5
70-74	F	18	18
75-79	F	2.2%	2.1%
80-84	F	4.0%	3.6%
85&	F	16.1%	14.8%

Household population

Age	Gender	2011	2031
15-19	M	2277	2375
20-24	M	1800	2234
25-29	M	1689	1878
30-34	M	1659	2056
35-39	M	2331	2509
40-44	M	2958	2647
45-49	M	3190	2706
50-54	M	2953	2649
55-59	M	2813	2923
60-64	M	3059	3443
65-69	M	2654	3490
70-74	M	1972	3052
75-79	M	1565	2581
80-84	M	1150	2275
85&	M	850	1992
15-19	F	2247	2401
20-24	F	1801	2057
25-29	F	1629	1777
30-34	F	1808	2064
35-39	F	2478	2619
40-44	F	3154	2936
45-49	F	3422	2981
50-54	F	3254	2954
55-59	F	2950	3196
60-64	F	3236	3693
65-69	F	2778	3844
70-74	F	2158	3358
75-79	F	1851	2819
80-84	F	1567	2629
85&	F	1583	2687

DCLG household formation rates

Age	Gender	2011	2031
15-19	M	0.022	0.023
20-24	M	0.222	0.208
25-29	M	0.577	0.547
30-34	M	0.794	0.729
35-39	M	0.859	0.825
40-44	M	0.931	0.929
45-49	M	0.950	0.951
50-54	M	0.941	0.928
55-59	M	0.969	0.960
60-64	M	0.985	0.984
65-69	M	0.993	0.993
70-74	M	0.990	0.989
75-79	M	0.987	0.986
80-84	M	0.988	0.984
85&	M	0.981	0.992
15-19	F	0.015	0.015
20-24	F	0.102	0.109
25-29	F	0.174	0.194
30-34	F	0.153	0.164
35-39	F	0.164	0.184
40-44	F	0.199	0.223
45-49	F	0.210	0.216
50-54	F	0.205	0.234
55-59	F	0.208	0.232
60-64	F	0.217	0.237
65-69	F	0.276	0.300
70-74	F	0.358	0.362
75-79	F	0.490	0.439
80-84	F	0.632	0.526
85&	F	0.792	0.698

Household projection

Age	Gender	2011	2031
15-19	M	51	54
20-24	M	399	464
25-29	M	974	1026
30-34	M	1318	1500
35-39	M	2002	2071
40-44	M	2755	2459
45-49	M	3032	2572
50-54	M	2780	2457
55-59	M	2725	2806
60-64	M	3014	3386
65-69	M	2635	3465
70-74	M	1952	3017
75-79	M	1545	2544
80-84	M	1136	2238
85&	M	834	1977
15-19	F	34	36
20-24	F	183	225
25-29	F	284	345
30-34	F	276	339
35-39	F	407	481
40-44	F	627	656
45-49	F	718	643
50-54	F	668	691
55-59	F	615	741
60-64	F	703	873
65-69	F	767	1154
70-74	F	773	1215
75-79	F	907	1238
80-84	F	991	1383
85&	F	1254	1876
TOTAL		**36359**	**43932**

Household increase 2011-31 = 43932 - 36359 = 7573 **Homes needed 2011-31 = 7573/(1 - 6.55%) = 8104 or 410 a year**

Figure TA 21: Calculation of FOAN using DCLG 2014-based household formation rates with 2011 floor

OAN population projection

Age	Gender	2011	2031
15-19	M	2450	2548
20-24	M	1972	2406
25-29	M	1755	1944
30-34	M	1696	2093
35-39	M	2358	2536
40-44	M	2990	2679
45-49	M	3201	2717
50-54	M	2962	2658
55-59	M	2824	2934
60-64	M	3071	3455
65-69	M	2656	3492
70-74	M	1984	3064
75-79	M	1582	2612
80-84	M	1175	2322
85&	M	935	2192
15-19	F	2393	2547
20-24	F	1919	2175
25-29	F	1670	1818
30-34	F	1817	2073
35-39	F	2484	2625
40-44	F	3166	2948
45-49	F	3431	2990
50-54	F	3270	2970
55-59	F	2957	3203
60-64	F	3245	3702
65-69	F	2783	3849
70-74	F	2176	3376
75-79	F	1893	2878
80-84	F	1632	2728
85&	F	1887	3153

Institutional population

Age	Gender	2011	2031
15-19	M	173	173
20-24	M	172	172
25-29	M	66	66
30-34	M	37	37
35-39	M	27	27
40-44	M	32	32
45-49	M	11	11
50-54	M	9	9
55-59	M	11	11
60-64	M	12	12
65-69	M	2	2
70-74	M	12	12
75-79	M	1.1%	1.2%
80-84	M	2.1%	2.0%
85&	M	9.1%	9.1%
15-19	F	146	146
20-24	F	118	118
25-29	F	41	41
30-34	F	9	9
35-39	F	6	6
40-44	F	12	12
45-49	F	9	9
50-54	F	16	16
55-59	F	7	7
60-64	F	9	9
65-69	F	5	5
70-74	F	18	18
75-79	F	2.2%	2.1%
80-84	F	4.0%	3.6%
85&	F	16.1%	14.8%

Household population

Age	Gender	2011	2031
15-19	M	2277	2375
20-24	M	1800	2234
25-29	M	1689	1878
30-34	M	1659	2056
35-39	M	2331	2509
40-44	M	2958	2647
45-49	M	3190	2706
50-54	M	2953	2649
55-59	M	2813	2923
60-64	M	3059	3443
65-69	M	2654	3490
70-74	M	1972	3052
75-79	M	1565	2581
80-84	M	1150	2275
85&	M	850	1992
15-19	F	2247	2401
20-24	F	1801	2057
25-29	F	1629	1777
30-34	F	1808	2064
35-39	F	2478	2619
40-44	F	3154	2936
45-49	F	3422	2981
50-54	F	3254	2954
55-59	F	2950	3196
60-64	F	3236	3693
65-69	F	2778	3844
70-74	F	2158	3358
75-79	F	1851	2819
80-84	F	1567	2629
85&	F	1583	2687

DCLG 2014 HRRs with 2011 floor

Age	Gender	2011	2031
15-19	M	0.022	0.023
20-24	M	0.222	0.216
25-29	M	0.577	0.567
30-34	M	0.794	0.800
35-39	M	0.859	0.861
40-44	M	0.931	0.929
45-49	M	0.950	0.951
50-54	M	0.941	0.928
55-59	M	0.969	0.960
60-64	M	0.985	0.984
65-69	M	0.993	0.993
70-74	M	0.990	0.989
75-79	M	0.987	0.987
80-84	M	0.988	0.988
85&	M	0.981	0.992
15-19	F	0.015	0.015
20-24	F	0.102	0.110
25-29	F	0.174	0.194
30-34	F	0.153	0.166
35-39	F	0.164	0.186
40-44	F	0.199	0.224
45-49	F	0.210	0.216
50-54	F	0.205	0.234
55-59	F	0.208	0.232
60-64	F	0.217	0.237
65-69	F	0.276	0.300
70-74	F	0.358	0.362
75-79	F	0.490	0.439
80-84	F	0.632	0.526
85&	F	0.792	0.698

Household projection

Age	Gender	2011	2031
15-19	M	51	54
20-24	M	399	483
25-29	M	974	1064
30-34	M	1318	1645
35-39	M	2002	2160
40-44	M	2755	2459
45-49	M	3032	2572
50-54	M	2780	2457
55-59	M	2725	2806
60-64	M	3014	3386
65-69	M	2635	3465
70-74	M	1952	3017
75-79	M	1545	2549
80-84	M	1136	2249
85&	M	834	1977
15-19	F	34	36
20-24	F	183	227
25-29	F	284	345
30-34	F	276	342
35-39	F	407	488
40-44	F	627	658
45-49	F	718	643
50-54	F	668	691
55-59	F	615	741
60-64	F	703	873
65-69	F	767	1154
70-74	F	773	1215
75-79	F	907	1238
80-84	F	991	1383
85&	F	1254	1876
		36359	**44254**

Household increase 2011-31 = 44254 - 36359 = 7895 **Homes needed 2011-31 = 7895/(1 - 6.55%) = 8448 or 420 a year**