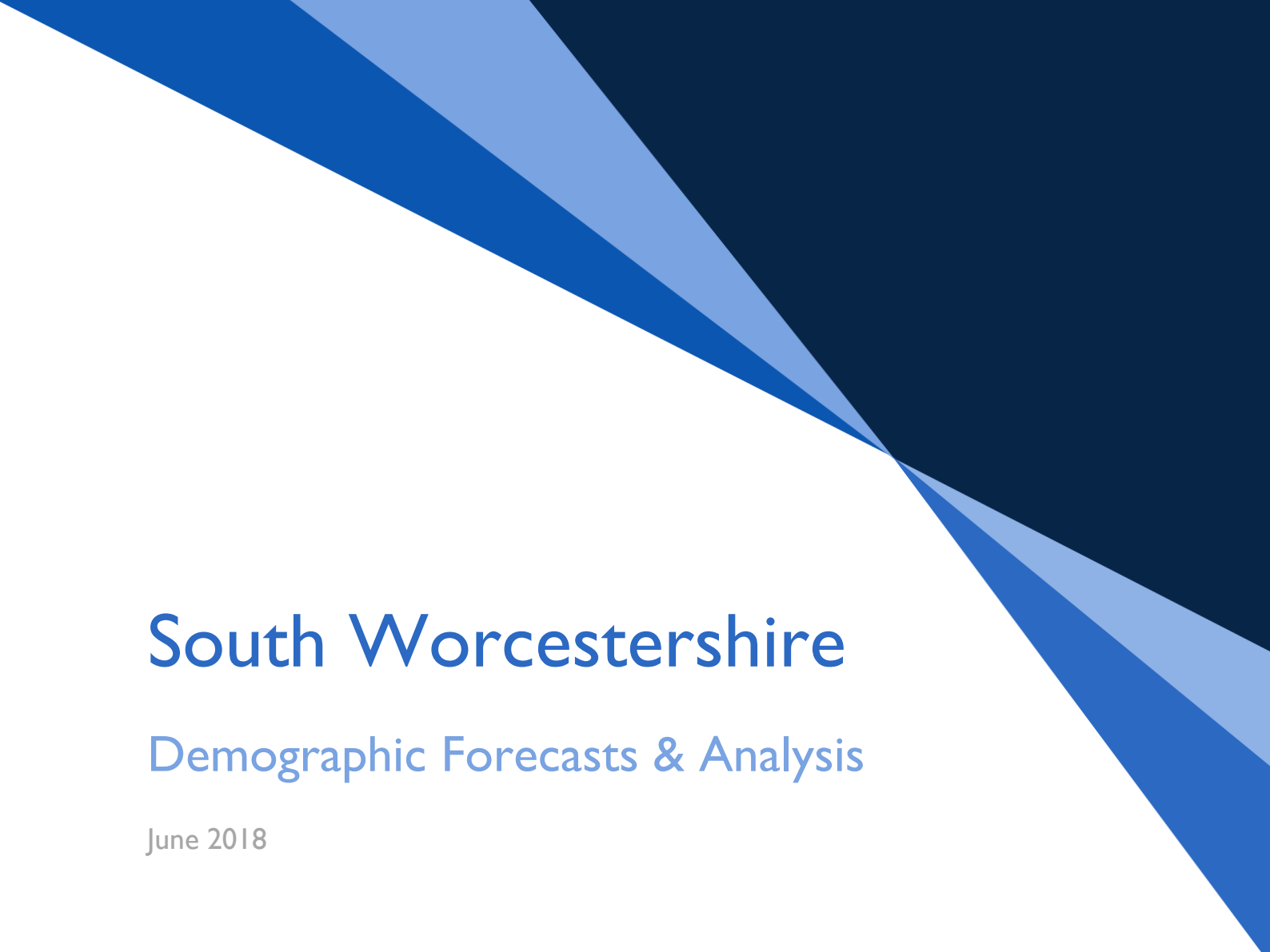




South Worcestershire

Demographic Forecasts & Analysis

June 2018

edgeanalytics

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Acknowledgements

Demographic statistics used in this report have been derived from data from the Office for National Statistics licensed under the Open Government Licence v.3.0.

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

Executive Summary

- 1.1 In 2014, Edge Analytics provided demographic evidence to inform the South Worcestershire Development Plan (SWDP), adopted in 2016. The SWDP outlined an objectively assessed housing need range of 26,700–27,300 for the 2006–2030 plan period.
- E1. The three South Worcestershire authorities (Malvern Hills, Worcester and Wychavon) have commissioned Edge Analytics to provide demographic evidence to inform the emerging Strategic Housing Market Assessment (SHMA) (undertaken by arc4), forthcoming review of the SWDP and resultant development of local housing strategies and policies. This evidence has been developed in parallel to the Economic Development Needs Assessment (EDNA), using consistent economic forecasts for the South Worcestershire authorities.
- E2. The analysis presented in this report has considered the latest mid-year population estimates and components of change to 2016, together with the latest published official population and household projections. The 2016-based sub-national population projection (SNPP) from the Office for National Statistics (ONS) has been presented alongside the previous 2014-based SNPP and two trend scenarios based on long-term (2001/02–2015/16) and short-term (2010/11–2015/16) migration histories.
- E3. In addition, employment-led scenarios have been configured to consider the estimated migration, population and dwelling growth associated with the Experian economic forecasts for each of the three South Worcestershire authorities. The ‘baseline’ employment-led scenarios use three key economic assumptions on economic activity rate, commuting and unemployment rates, derived from the Experian forecast. The analysis has also considered the potential impact of alternative commuting ratio assumptions from the 2011 Census and economic activity rate adjustments in line with the Office for Budget Responsibility’s (OBR) labour market analysis.
- E4. Over the 2001–2016 historical period, population growth in the South Worcestershire area has been driven by internal and international migration, with increased flows to the area evidenced over the latter half of the historical period. Population growth in Malvern Hills and Wychavon has predominantly been driven by migration to the districts, with natural change (the balance between births and deaths) having a varied impact on population change in Wychavon and an

annual negative impact in Malvern Hills. Conversely, natural change has been a dominant driver of population change in Worcester, reflective of its more youthful population age profile.

- E5. Under the 2016-based SNPP from ONS, the profile of the components of population change for Malvern Hills and Worcester are expected to remain consistent with their respective historical profiles. Conversely, Wychavon and the aggregate South Worcestershire area are estimated to experience an increasingly negative impact of natural change on population growth over the plan period, diverging from their respective historical components of change profile.
- E6. For the aggregate South Worcestershire area, the SNPP-2016 scenario estimates population growth of 12.4% over the plan period, with an estimated average annual dwelling growth of +904 per annum (pa). The highest population change under the 2016-based SNPP is estimated in Wychavon (15.5%), with an average annual dwelling growth of +423 dpa. Conversely, Worcester is expected to experience the lowest population growth rate over the plan period (9.8%), with an average annual dwelling growth of +258 dpa, whilst the 2016-based SNPP for Malvern Hills estimates population growth of 10.9% and +223 dpa.
- E7. Under the employment-led and demographic scenarios developed for each of the South Worcestershire areas, the average annual dwelling growth ranges from 180–266 dpa for Malvern Hills, 258–331 dpa for Worcester and 215–493 dpa for Wychavon, with a 696–1,055 dpa range for the aggregate South Worcestershire area.
- E8. For South Worcestershire, a continuation of historical migration trends under the PG scenarios results in higher dwelling growth than the SNPP-2016, with the employment-led scenarios presenting the upper and lower end of the dwelling growth range, driven by alternative assumptions on commuting ratio and economic activity rates. The SNPP-2016 results in an estimated annual dwelling growth that is lower than the adopted annualised SWDP target for the area.

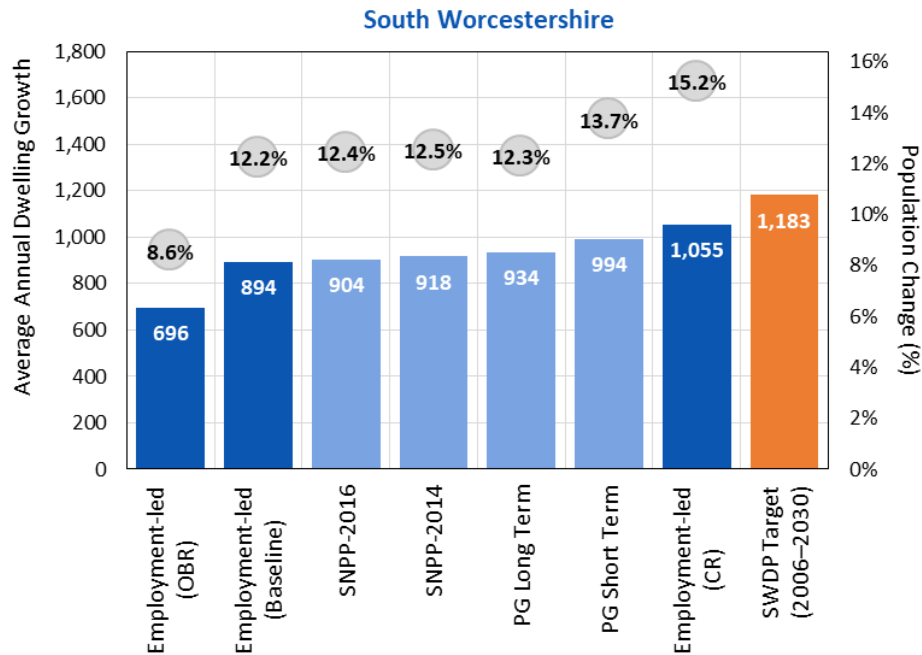


Figure 1: South Worcestershire population change and average annual dwelling growth under the SWDP, demographic and employment-led scenarios (2016–2041)

- E9. For Malvern Hills and Worcester, the PG and employment-led scenarios would indicate a level of dwelling growth that is higher than estimated under the SNPP-2016, notwithstanding the employment-led scenario using economic activity rate assumptions in line with the OBR for Malvern Hills (Figure 2). For both Malvern Hills and Worcester, the annual dwelling growth estimated under the SNPP-2016 is lower than the adopted annualised SWDP target (excluding WWA).
- E10. For Wychavon, the SNPP-2016 sits toward the upper end of the dwelling growth range, however lower than the SWDP target for the area (excluding the WWA) (Figure 2).

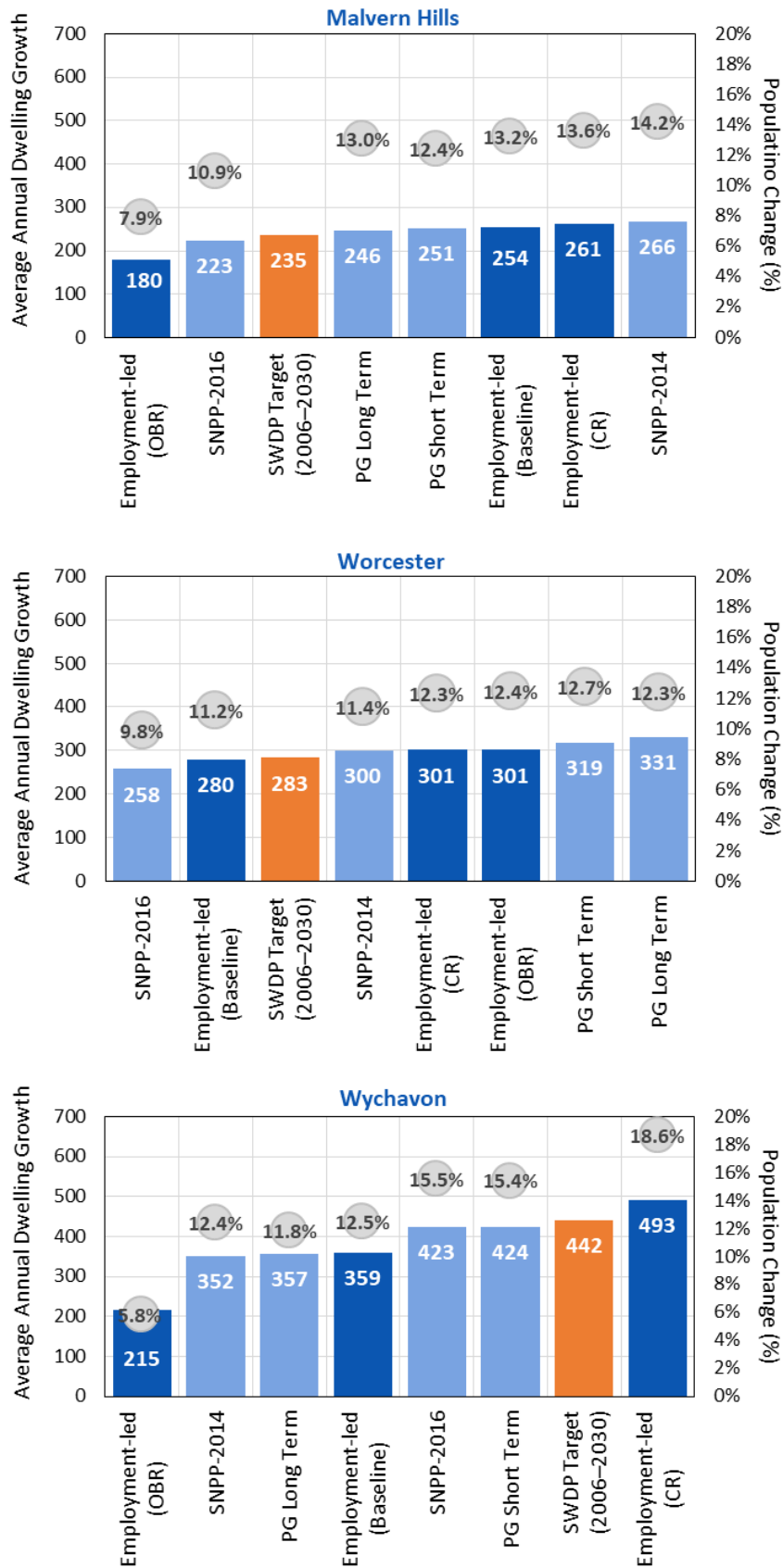


Figure 2: Malvern Hills, Worcester & Wychavon population change and average annual dwelling growth under the SWDP, demographic and employment-led scenarios (2016–2041)

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Introduction

Context and Requirements

- 1.1 In 2011, GVA undertook a Strategic Housing Market Assessment (SHMA) for the six Worcestershire authorities; Bromsgrove, Redditch, Wyre Forest, Malvern Hill, Worcester and Wychavon. The demographic evidence underpinning the SHMA included the 2008-based sub-national population and household projections and mid-year estimates (MYEs) to 2009; and provided the initial evidence for the South Worcestershire Development Plan (SWDP) Preferred Housing Options, published in 2013.
- 1.2 Following a review of the SWDP, Edge Analytics was commissioned by South Worcestershire Councils to provide a range of updated demographic and jobs-led scenarios, published in 2014. This took account of the 2012-based sub-national population projections (SNPP), 2008-based and 2011-based household projection models, MYEs to 2012 (including revisions to 2010 following the 2011 Census), and economic forecasts from Cambridge Econometrics, Oxford Economics and Experian. An addendum was later provided in 2015, following the release of the 2012-based household projection model.
- 1.3 The demographic evidence provided by Edge Analytics, informed the SWDP Objective Assessment of Need (OAHN), published by AMION Consulting in 2014. This identified an OAHN range of 26,700–27,300 for the 2006–2030 plan period, underpinned by an economic-led approach. The adopted plan was published in 2016, outlining economic and housing growth aspirations for South Worcestershire districts.
- 1.4 Since the evidence was provided to South Worcestershire, a number of new datasets have become available:
 - Mid-year population estimates and components of change 2012–2016 from the Office for National Statistics (ONS), including revisions to the estimation of international migration.

- 2016-based national population projections (NPP) from ONS.
- 2016-based sub-national population projections (SNPP) from ONS.
- 2014-based sub-national population projections (SNPP) from ONS.
- 2014-based household projection model from the Ministry of Housing, Communities and Local Government (MHCLG).
- Unemployment rates to 2017 from ONS model-based data.
- Long-term labour participation forecasts from the Office for Budget Responsibility (OBR) released in 2017.
- Experian March 2018 economic forecasts.

1.5 In recognition of the range of new available demographic evidence the three South Worcestershire Local Planning Authorities of Worcester City, Malvern Hills District and Wychavon District have commissioned Edge Analytics to provide demographic evidence.

1.6 The purpose of this report is to provide the evidence base to inform the SHMA (undertaken by arc4) and resultant development of local housing strategies and policies. In addition, the evidence will also support the forthcoming review of the SWDP. As part of this, the South Worcestershire Councils have commissioned BEGroup to undertake an Economic Development Needs Assessment (EDNA). In order to link the two studies and inform future economic and housing policies, Edge Analytics has considered the potential population and housing growth outcomes of the Experian economic forecast underpinning the EDNA.

Approach

Official Guidelines

1.7 The development and presentation of demographic evidence to support local housing plans is subject to an increasing degree of public scrutiny, particularly in light of recent government publications. At present, the National Planning Policy Framework (NPPF)¹ and associated Planning

¹ <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

Practice Guidance (PPG)² set out the methods by which local authorities should assess their housing requirements and plan for housing growth.

- 1.8 In February 2017, the government published its housing White Paper “Fixing our broken housing market”³, in which a range of reforms aimed at improving the housing market and increasing the supply of housing were set out. In September 2017, the government published a draft standard methodology⁴, providing each local authority with an ‘indicative assessment of housing need’. These proposed figures, calculated using an affordability ratio and levels of household growth from the 2014-based MHCLG household projections, potentially provide ‘minimum’ house-building targets for local authorities⁵. This methodology is reflected in the draft NPPF⁶ guidelines (published in early 2018), which remains subject to consultation. However, the OAN figures published by the MHCLG do not reflect the joint SWDP adopted in February 2016, in which areas of Malvern Hills and Wychavon are identified to help meet Worcester’s OAN.
- 1.9 In the objective assessment of need, demographic evidence is a key input. Whilst the current PPG states that the Ministry of Housing Communities and Local Government (MHCLG) household projections should provide the “starting point estimate of overall housing need” (PPG paragraph 2a-015) local circumstances, alternative assumptions and the most recent demographic evidence, including the Office for National Statistics (ONS) population estimates should also be considered (PPG paragraph 2a-017). Evidence that links demographic change to forecasts of economic growth should also be assessed (PPG paragraph 2a-018).
- 1.10 In May 2018 the ONS published the 2016-based SNPP for local authorities in England. This provides the new starting point in assessing future population change and will underpin the 2016-based household projection model, due for release in September 2018.

Edge Analytics’ Approach

- 1.11 Edge Analytics has used POPGROUP technology to develop a range of growth scenarios for the South Worcestershire authorities of; Malvern Hills, Worcester and Wychavon, summing to the

² <https://www.gov.uk/government/collections/planning-practice-guidance>

³ <https://www.gov.uk/government/collections/housing-white-paper>

⁴ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/652888/Planning_for_Homes_Consultation_Document.pdf

⁵ This proposed method and associated changes to the National Planning Policy Framework (NPPF) have been subject to public consultation, with the results of this expected early 2018.

⁶ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/687239/Draft_planning_practice_guidance.pdf

South Worcestershire total. In each of the scenarios, historical data is included for the 2001–2016 period, with scenario results presented for the 2016–2041 plan period.

- 1.12 The scenario analysis is prefaced with a demographic profile of each of the three South Worcestershire local authorities, illustrating its geographical context, its ‘components’ of population change (births, deaths, and migration) and its historical patterns of international and domestic migration ([Section 2](#)).
- 1.13 The starting point of the scenario analysis is the ONS 2016-based sub-national population and MHCLG 2014-based household projections for South Worcestershire ([Section 3](#)). Alternative trend scenarios, developed using varying migration assumptions, are developed and compared to the ONS 2016-based benchmark scenario ([Section 4](#)). In addition, population and housing growth outcomes linked to future employment growth are derived using key assumptions on economic activity rates, unemployment and commuting. Household and dwelling growth are estimated using assumptions from the MHCLG 2014-based household projection model for the three South Worcestershire local authority districts.
- 1.14 [Section 5](#) summarises the scenario evidence, with a summary of the POPGROUP methodology and further detail on key data and assumptions used in the development of the forecasts in an accompanying Appendix.

2 Area Profile

Geography

- 2.1 In 2016, Worcestershire's population was estimated to be 583,491, with 301,626 (52%) residing in the South Worcestershire area. South Worcestershire is comprised of Wychavon, Worcester and Malvern Hills, bordering North Worcestershire, Warwickshire, Gloucestershire, Herefordshire and Shropshire (Figure 3). In 2016, 41% of South Worcestershire's population resided in Wychavon, 34% in Worcester and 25% in Malvern Hills.

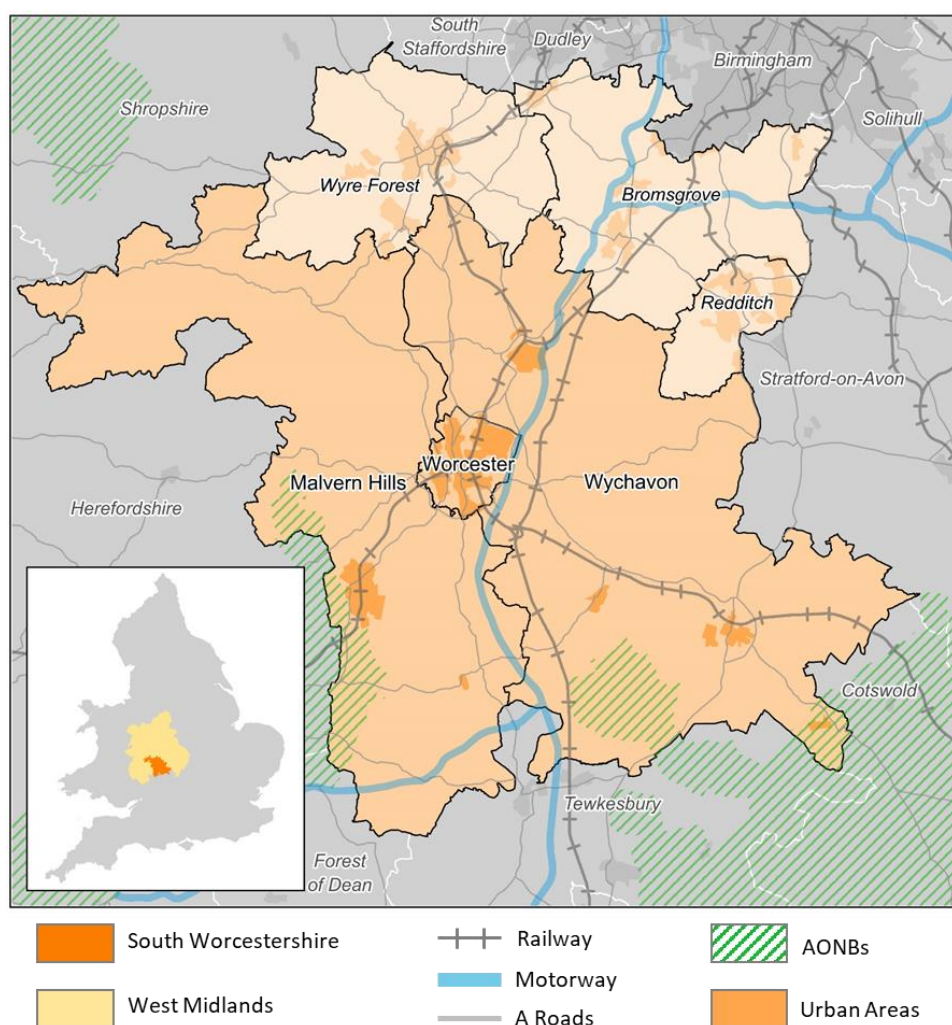


Figure 3: South Worcestershire and neighbouring authorities

Population Growth Profile

- 2.2 Since 2001, South Worcestershire has experienced an annual increase in its population, with higher growth rates evidenced post-2011 (Figure 4). This has been driven by an accelerated rate of growth in Wychavon, with 60% of its post-2001 population change in the last five years. Whilst Worcester has also experienced an annual growth in population, Malvern Hills has seen a lower annual change and a small decline in 2008/09 and 2014/15.

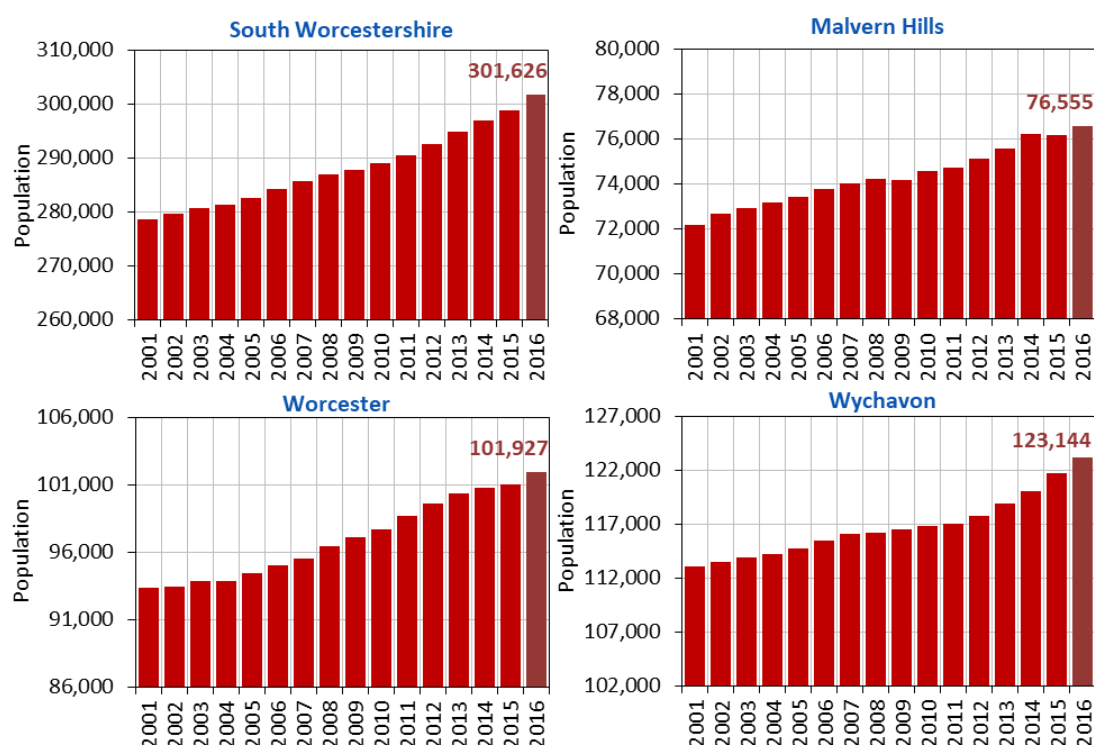


Figure 4: MYE population 2001–2016 (Source: ONS)⁷

- 2.3 Over the 2001–2016 period, South Worcestershire's population increased by +23,005, an 8.3% growth (Table 1). Whilst this rate of growth is above Worcestershire, it remains lower than both the region and England in total (10.0% and 11.8% respectively).
- 2.4 Over the full fifteen-year historical period, Wychavon (8.9%) and Worcester (9.2%) have experienced high growth rates than South Worcestershire and Worcestershire in total, whilst Malvern Hills has evidenced a notably lower rate of change (6.1%).

⁷ Not on the same scale to highlight trends within each area.

Table 1: Population change 2001–2016 (Source: ONS MYEs)

Area	Population Change 2001–2016			
	2001	2016	Change	Change %
Malvern Hills	72,171	76,555	4,384	6.1%
Worcester	93,369	101,927	8,558	9.2%
Wychavon	113,081	123,144	10,063	8.9%
South Worcestershire	278,621	301,626	23,005	8.3%
Worcestershire	542,233	583,491	41,258	7.6%
West Midlands	5,280,727	5,810,773	530,046	10.0%
England	49,449,746	55,268,067	5,818,321	11.8%

2.5 Between successive Censuses, MYEs are derived through the application of ‘components of change’ (i.e. counts of births and deaths and estimates of internal and international migration) to the previous year’s MYE. Following the 2011 Census, the 2002–2010 MYEs were ‘rebased’ to align them with the 2011 MYE and to ensure the correct transition of the age profile over the 2001–2011 decade.

2.6 The rebasing of the MYEs involved the recalibration of the components of change for the 2001/02–2010/11 period. Once methodological changes and errors in the components were accounted for, the remaining difference between the expected 2011 MYE and 2011 Census-based MYE is referred to as ‘unattributable population change’ (UPC). For South Worcestershire in aggregate, the total UPC adjustment had a relatively small impact upon population (a total of 445 over the 2001/02–2010/11 period). Worcester and Wychavon experienced the greatest UPC adjustment over the 2001/02–2010/11 period (+2,936 and -2,058 respectively), whilst Malvern Hills experienced a small adjustment of -430. Figure 5 presents the components of population change for South Worcestershire over the 2001/02–2015/16 historical period.

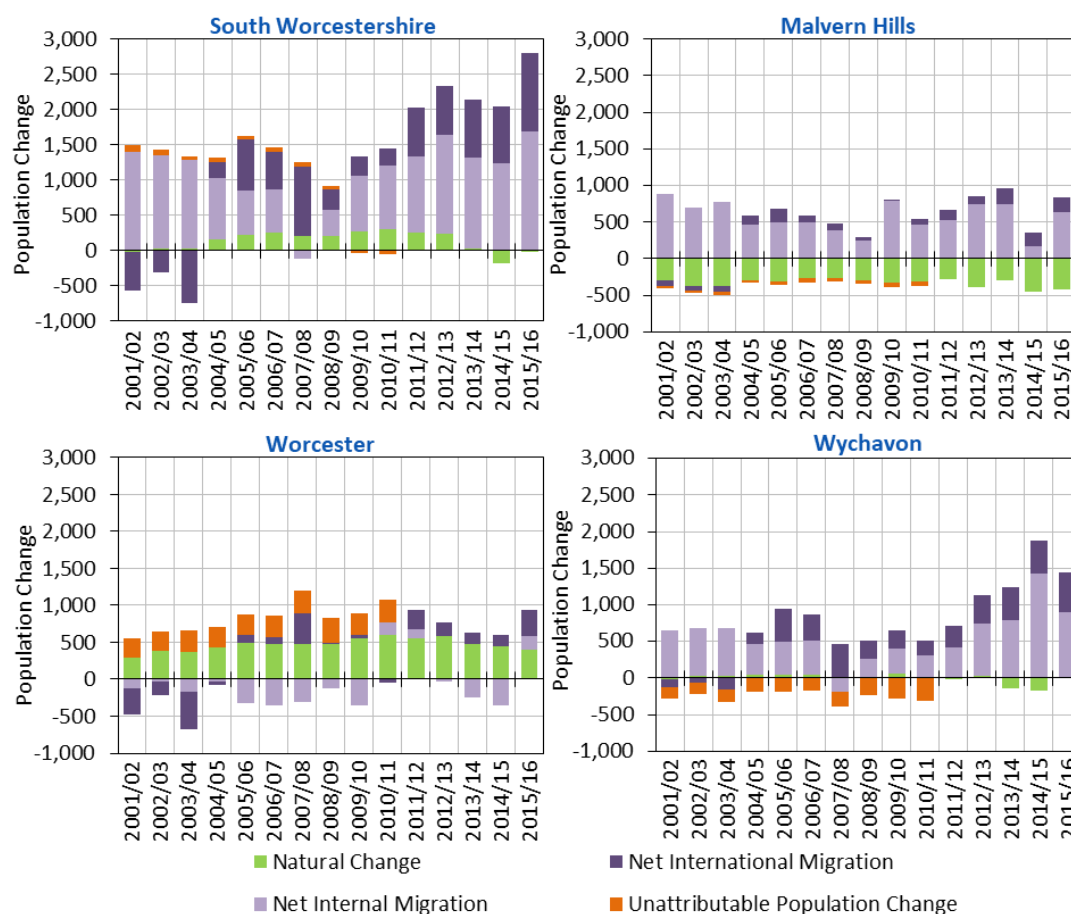


Figure 5: Components of population change 2001/02–2015/16 (Source: ONS)

2.7 South Worcestershire's population change since 2001/02 has been driven by a combination of natural change (i.e. the balance between births and deaths), net internal and international migration (Figure 5). Since 2001, net internal migration has been the dominant driver of population growth in South Worcestershire; a greater number of people moving into the area from the UK than moving out. Following an annual net outflow of international migration to 2004, net international migration has been positive, peaking in 2015/16 with a recorded net inflow of +1,113. Between 2002/03 and 2013/14, natural change has had a small but positive impact on population growth in South Worcestershire, diverging to an annual negative impact in the latter two years of the historical period driven by a fall in births and rise in deaths.

2.8 The three districts of South Worcestershire have very different demographic profiles. Population change in Malvern Hills has historically been driven by net internal migration and the small annual impact of net international migration since 2004/05. Conversely, natural change has had a negative impact on population change in the district (i.e. the number of deaths exceeded the number of births in all years), reflective of the older population age profile.

- 2.9 Worcester's population change profile has been driven by positive natural change (i.e. the number of births exceed the number of deaths), reflective of the more youthful population age structure of the district. Net international migration has had a small but mostly positive impact on population change since 2005. Net internal migration has been predominantly negative since 2001, notwithstanding 2010/11, 2011/12 and 2015/16 with a net inflow to the district. As later analysis shows (Figure 6, page 10), the small net inflow in 2010/11 and 2011/12 was driven by a rise in inflows to the district, with 2015/16 also recording a fall in outflows. As the internal migration flows to Worcester are predominantly driven by the younger (15–29) age groups (refer to Figure 8 on page 12), the increased net migration to the district in 2015/16 is likely associated with increased housing completions, employment opportunities and a rise in UK students to the University of Worcester.
- 2.10 Wychavon's population growth has been driven by net internal migration to the district in all years since 2001, excluding 2007/08 which evidenced a net outflow. Smaller net migration flows were recorded between 2007/08–2010/11 but have since recovered, peaking in 2014/15 with a net inflow of +1,433. Net international migration has had a varied impact on population change to 2010/11, indicating a notable increase thereafter. Since 2001, natural change has had a small but varied impact on population change, notwithstanding 2013/14 and 2014/15 which recorded a greater reduction in natural change driven by a significant fall in births and increase in deaths.

Internal Migration

- 2.11 Internal migration statistics record the in-flow and out-flow of population to and from the South Worcestershire districts from and to other parts of the UK. Figure 6 presents the separate in-migration and out-migration flows that make up the net totals from the components of change illustrations.
- 2.12 Throughout the historical period, Malvern Hills and Wychavon have experienced net inflows (notwithstanding 2007/08), whereas Worcester has experienced fluctuations between small net inflows and outflows. Malvern Hills has experienced the largest net internal migration flows, averaging +566 over the 2001/02–2015/16 period. The variance between internal in-migration and out-migration has remained relatively stable, with a sharp fall in inflows in 2008/09 and 2014/15, resulting in a reduced net inflow.

2.13 Since 2001, net internal migration to Wychavon has averaged +551. Between 2001/02 and 2007/08, out-migration remained relatively stable, whilst a sharp fall in the estimated level of in-migration to the district resulted in a net outflow from Wychavon to the rest of the UK. Since 2008/09, in-migration flows to Wychavon have been subject to a steady increase, peaking in 2014/15, whilst outflows have remained relatively stable, resulting in an overall increase in net in-migration.

2.14 Over the 2001/02–2015/16 period, the relationship between internal in- and out-migration flows to and from Worcester has remained relatively similar, resulting in a small but varied net migration flow. Since 2010/11, both in- and out-migration flows have increased, with the highest net in-migration estimated in 2015/16.

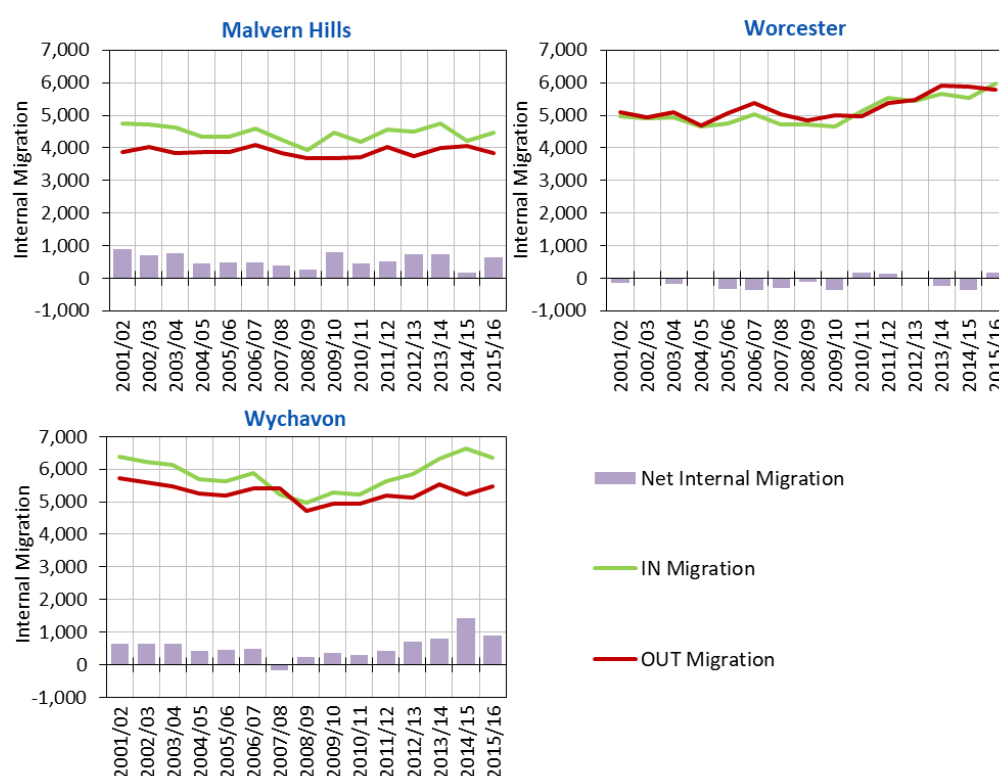


Figure 6: Internal migration flows 2001/02–2015/16 (Source: ONS)

2.15 Malvern Hills and Worcester have the strongest migration linkages, with an average of 191 people per year moving from Worcester to Malvern Hills (Figure 7). A smaller net inflow is evidenced to Malvern Hills from Wychavon, averaging +87 per annum. Smaller average net outflows are evidenced from Malvern Hills to the rest of the UK, predominantly to major cities such as Bristol, Oxford and Manchester, Cambridge, Cardiff and Camden.

2.16 For Worcester, the highest net outflows over the 2001/02–2015/16 period have been to neighbour authorities Malvern Hills and Wychavon (-191 and -163 per year), with smaller net outflows evidenced to Cornwall (-20) and Bristol (-12). Conversely, the largest average net inflows to Worcester have been from Birmingham and Dudley, averaging +34 and +27 respectively.

2.17 Wychavon has the largest average net inflows from other local authorities, compared to both Worcester and Malvern Hills. Besides Worcester, the main inflows are from Birmingham (159 per year), Bromsgrove (123 per year) and Redditch (88 per year). Notwithstanding Malvern Hills, average annual net outflows from Wychavon to other local authorities are relatively small (below -35 per annum).

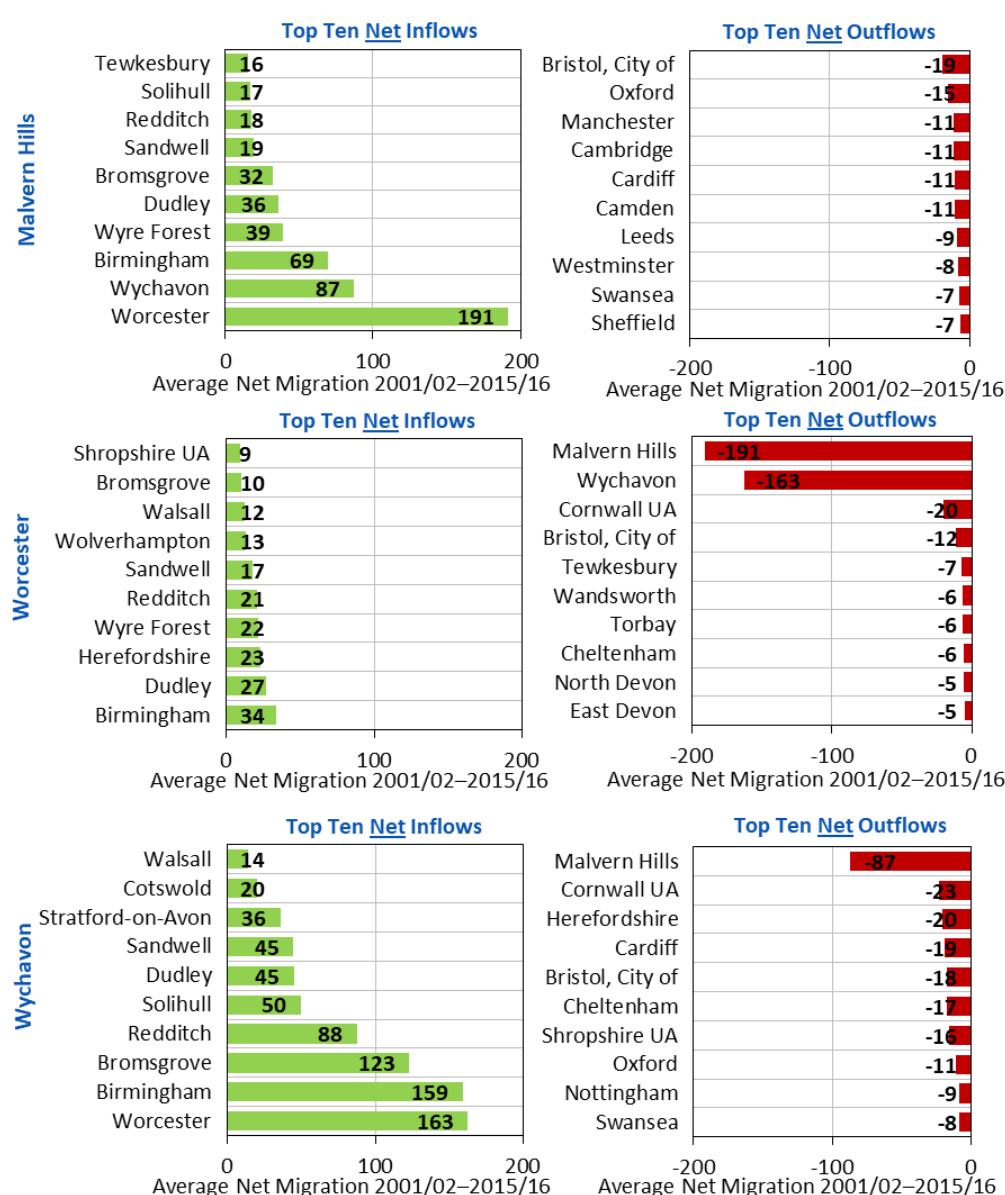


Figure 7: Top 10 net internal migration flows (2001/02–2015/16)

- 2.18 The age profile of migration over the last fifteen years reveals that South Worcestershire has experienced a net inflow in all ages, excluding the 15–19 age group which has an average annual net outflow of -446 (2001/02–2015/16).
- 2.19 Only Worcester has experienced a net inflow in the 15–19 age groups, associated with the student population at the University of Worcester. A notably smaller net inflow is evidenced in the 20–29 age groups, associated with the migration of young adults for employment opportunities and small retention of graduates. Worcester has experienced a net outflow in all other age groups.
- 2.20 The age profile of migration for Malvern Hills contrasts to Worcester, with a net outflow estimated in the younger 15–24 age groups (associated with moves for education and employment opportunities), whilst a net inflow is evidenced in all other age groups, particularly the older 75+ age group.
- 2.21 For Wychavon, a net outflow is evidenced in the 15–19 age groups with a smaller return flow of graduates in the 20–24 age groups. A smaller net outflow is evidenced in the 25–29 age groups, likely associated with young migrant age groups seeking employment opportunities. A net inflow is evidenced in all other age groups, however smaller in the older (70+) age groups.

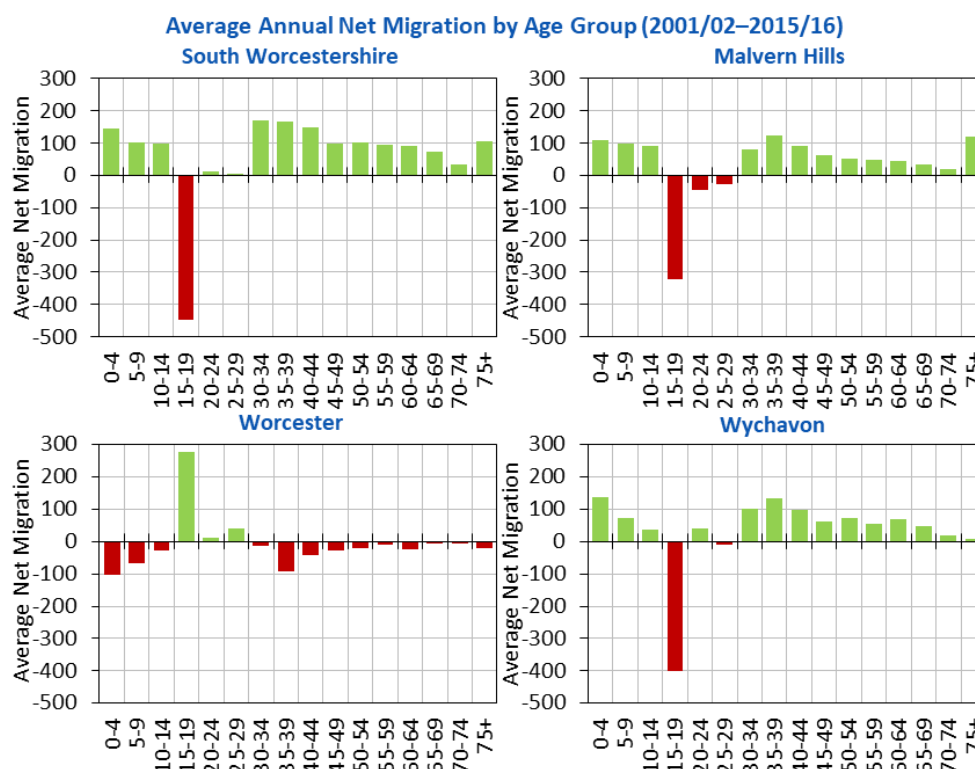


Figure 8: South Worcestershire net internal migration age profile
2001/02–2015/16 (Source: ONS)

International Migration

- 2.22 Since 2004/05, net international migration has been a consistent contributor to population growth in South Worcestershire, with the latest 2016 MYE recording the highest net international migration flow to the area since 2001.
- 2.23 National Insurance Number (NINo) registrations provide an indication of the number of foreign nationals that have registered to work in South Worcestershire since 2002 (Figure 9). Between 2009 and 2017, there was an increase in NINo registrations to the area, driven by increases in Romanian and Polish workers. From a peak in 2016, the number of registrations fell, reflective of the national and regional trend. In 2017, Migrants from EU13⁸ countries comprised of approximately 81% of total NINo registrations in South Worcestershire, with 40% and 18% of those made up of Romanian and Polish workers.
- 2.24 Wychavon and Worcester have the greatest proportion of NINo registrations in South Worcestershire (45% and 42% respectively of total NINo registrations since 2002), with Malvern Hills at 13%. For all areas, an increase in migrant workers from Poland since 2012, along with a sharp rise in Romanian and Bulgarian workers following the lifting of restrictions on migration to the UK from 2014, led to a significant increase in NINo registration to 2016. However, the latest data suggests a fall in NINo registrations, mainly driven by a decrease in Polish and Romanian migrant workers.

⁸ EU13 refers to countries that have joined the EU since 2004.

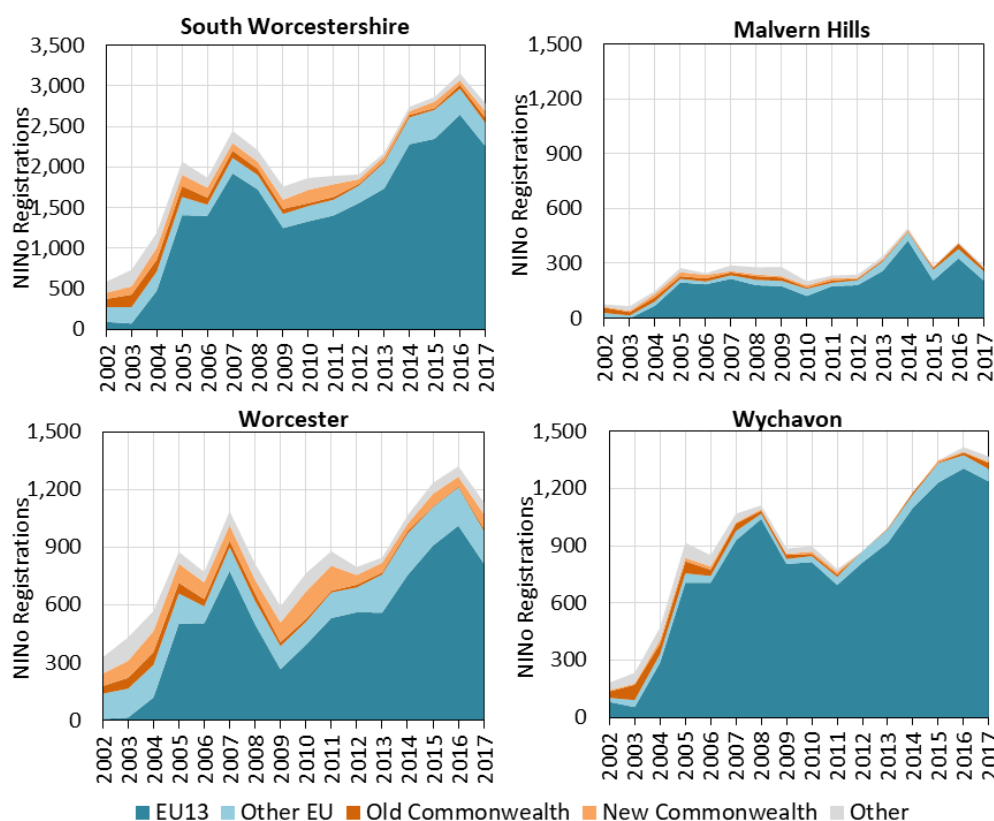


Figure 9: NINO registrations for South Worcestershire authorities 2002–2017 (Source: DWP)

Sub-District Migration

- 2.25** At sub-district level, the average annual net migration flows for the 2011/12–2015/16 historical period vary across the South Worcestershire area. In Wychavon, all wards experienced a net in-migration flow, notwithstanding Droitwich Central, The Littletons, Evesham South and Droitwich West which recorded an average annual net out-migration flow of -4, -9, -25 and -41 respectively. Conversely, Bengeworth and Pershore experienced the greatest net in-migration flow over the last five years (+326 and +120 pa respectively).
- 2.26** In Malvern Hills, all but West and Pickersleigh wards experienced a net inflow, with Dyson Perrins and Priory indicating the greatest average net in-migration over the 2011/12–2015/16 period (+118 and +117 pa respectively). Smaller net in-migration flows were recorded in the wards north and south/south-east of the district bordering Wychavon.
- 2.27** The greatest disparity in net migration flows is evidenced in Worcester, with wards to the south-west of the district (bordering Malvern Hills) recording the highest net in-migration flows, whilst wards north-east and south-east indicate a net outflow. Cathedral and Bedwardine recorded the

highest net in-migration (+148 and +126 pa respectively), whilst Wardon Parish North and St Peter's Parish evidenced the greatest net outflow (-79 and -73 pa respectively).

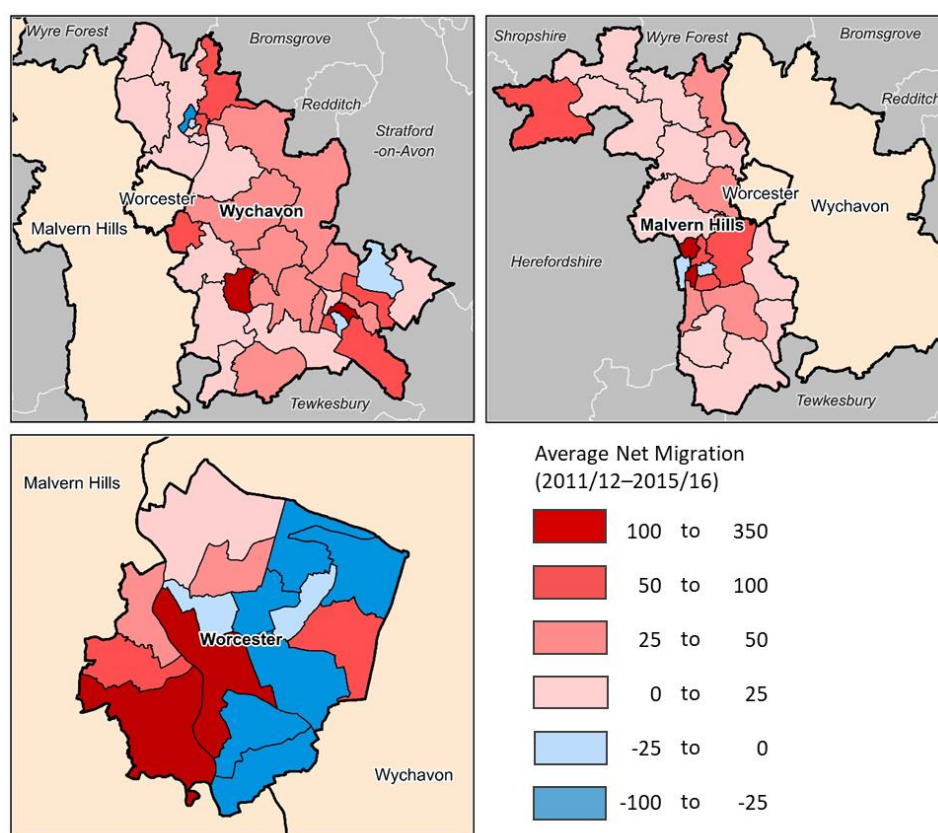


Figure 10: Average annual net migration by wards in South Worcestershire (2011/12–2015/16)

Students

- 2.28 The Higher Educational Statistical Agency (HESA) provides a time-series of data on both UK and non-UK students attending the University of Worcester. The University of Worcester is attended by students predominantly from the UK (~95%), with approximately 5% from outside of the UK. Since 2000, the total number of students has increased by +4,405, from a total of 6,335 in 2000/01 to 10,740 in 2016/17 (Figure 11).

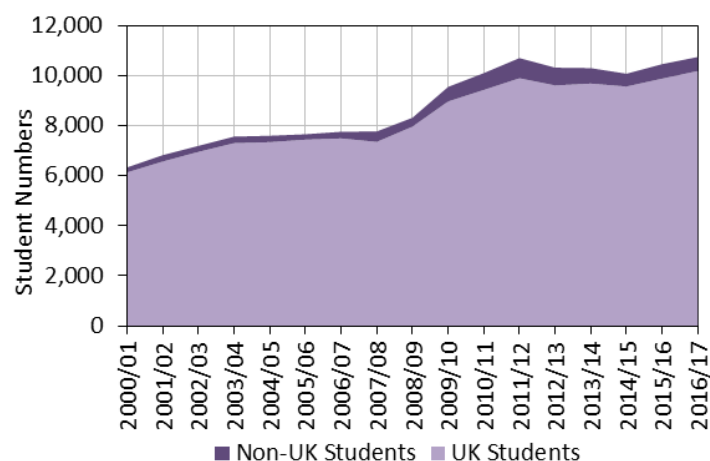


Figure 11: Students in the University of Worcester 2000/01–2016/17
(Source: HESA)

Housing Completions

- 2.29 Wychavon has seen significant growth in housing completions over the 2013/14–2016/17 period, averaging +892 pa, compared to +271 pa between 2006/07 and 2011/12 (Figure 12). Notably higher annual housing completions reflect the increased population change over the same period, driven by higher net internal migration flows to the district (refer to components of change charts page 8).
- 2.30 Over the 2006/07–2016/17 historical period, Malvern Hills has seen lower annual completion rates, rising after 2014/15. Whilst the annual population change does not correlate particularly well with the annual housing completions, the increase in population in 2015/16 is reflective of higher net completions compared to previous years.
- 2.31 Worcester City recorded an overall decline in completions from 2006/07, reaching a low of 142 completions in 2012/13. Annual housing completions and population change have since increased, peaking in 2015/16.

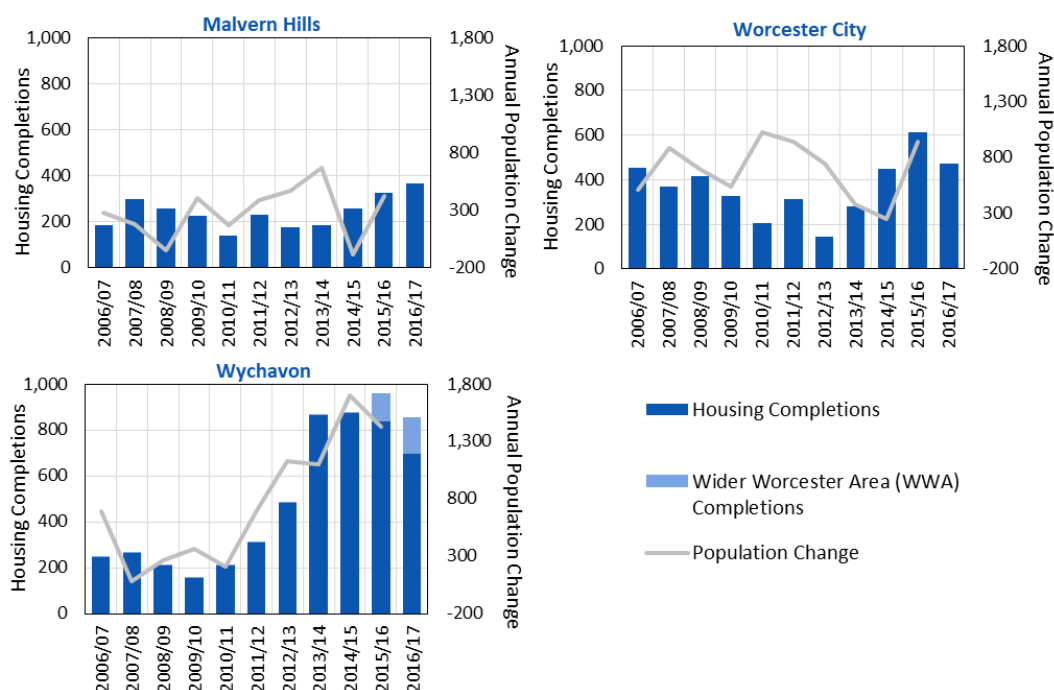
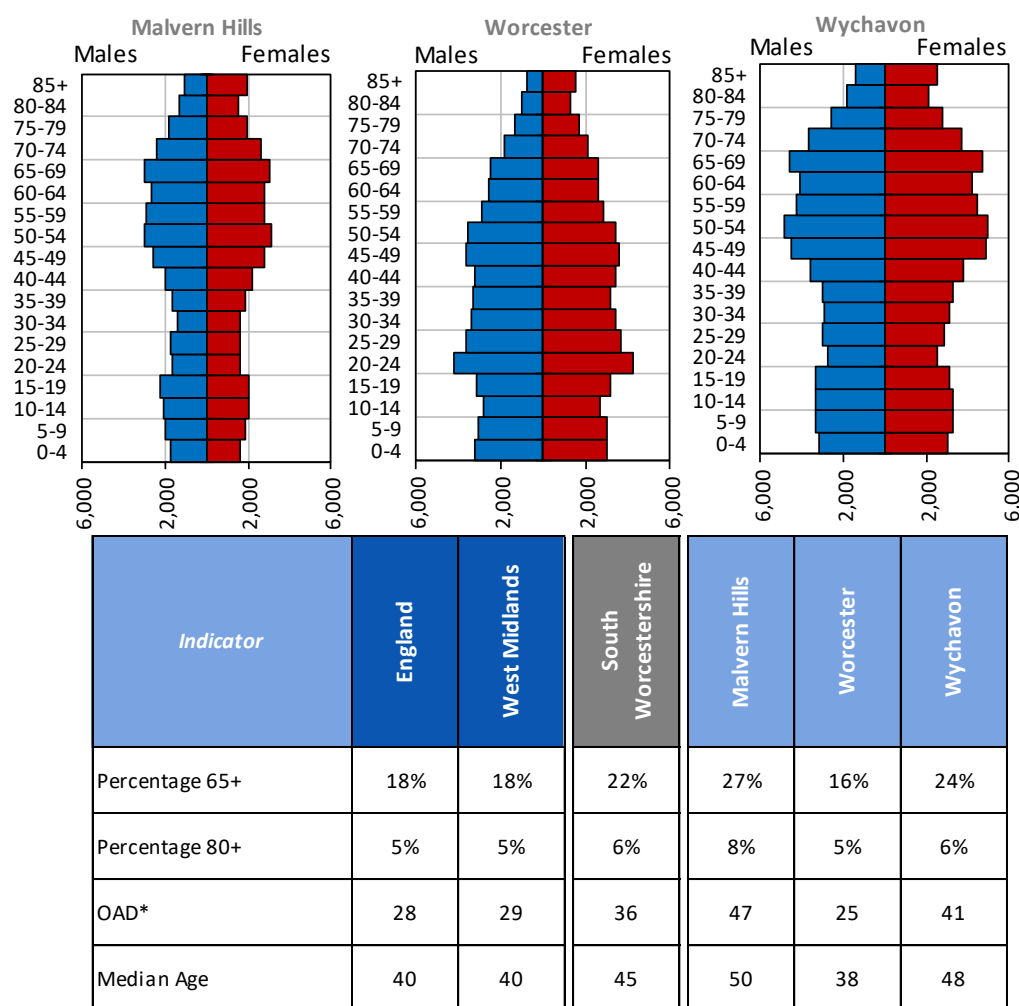


Figure 12: Historical housing completions and population change
(Source: South Worcestershire authorities & ONS)

Population Age Profile

- 2.32 When considering future housing needs and the size and shape of the resident labour force, the age structure of South Worcestershire's population is a key factor. Figure 13 compares South Worcestershire and its component authorities' 2016 MYE age profile to the region and England in total.
- 2.33 Whilst the age profile of the West Midlands and England are very similar, South Worcestershire has an older population profile. In 2016, 22% of South Worcestershire's population was aged 65+, with a median age of 45. South Worcestershire is estimated to have an old age dependency (OAD) ratio of 36; the size of the population aged 65+ is equivalent to 36% of its 15–64 age-group population in 2016. This compares to 28% and 29% for England and West Midland respectively.



OAD = Old Age Dependency Ratio (Population Aged 65+/Population Aged 15–64)

Figure 13: 2016 MYE population age structure (Source: ONS)

2.34 With 16% of its 2016 population in the 65+ age range and a median age of 38, Worcester has the youngest population age profile. Worcester's OAD ratio of 25% is notably lower than that estimated for Wychavon (41%) and Malvern Hills (47%). Wychavon and Malvern Hills have older population age profiles than the county, region and national average, with 24%–27% of the population in the 65+ age groups and a median age range of 48–50.

3 Official Projections

- 3.1 In this section, the latest sub-national population and household projections from the ONS and MHCLG are considered. Together with Section 2, this section provides the context for the presentation of alternative growth scenarios for South Worcestershire.

ONS National Projections

- 3.2 Every two years, ONS publishes its national and sub-national population projections, setting key assumptions on the long-term effects of fertility, mortality and migration to estimate population growth outcomes. The 2016-based national population projection (NPP) was released in October 2017⁹.

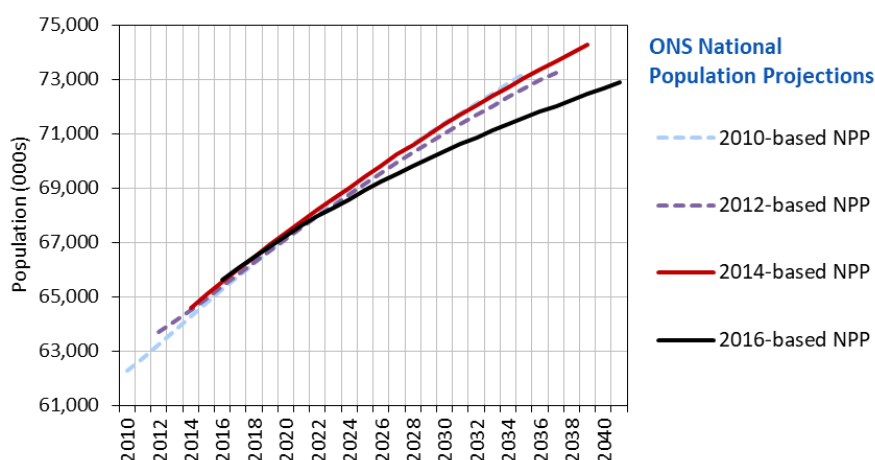


Figure 14: Population change under the official NPPs for the UK

- 3.3 At national level, the 2016-based NPP suggests a lower rate of population growth than under the earlier NPPs, driven by assumptions on lower natural change (i.e. increased deaths and fewer births) and lower net international migration. Under the 2016-based NPP, the population of the UK is projected to increase to 72.9 million by 2041, an 11.1% increase from the current 2016

⁹ <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/nationalpopulationprojections/2016basedstatisticalbulletin>

population estimate of 65.6 million. Under the 2014-based NPP, the population was expected to increase by 15.0% over the 2014–2039 25-year period.

ONS Sub-National Projections

- 3.4 In the development and analysis of population forecasts, it is important to benchmark any growth alternatives against the latest ‘official’ population projection. The most recent official subnational population projection is the ONS 2016-based SNPP, released in May 2018 and informed by the 2016-based *national* projection.
- 3.5 The ONS 2016-based SNPP uses demographic assumptions derived from a pre-2016, 5–6 year historical period, in combination with national assumptions on fertility, mortality and international migration to formulate a 25-year projection (2016–2041) for each local authority area¹⁰.
- 3.6 Under the latest 2016-based SNPP, the population of South Worcestershire is projected to increase by 37,411 over the 25-year projection period (2016–2041), an increase of 12.4% (Figure 15). This rate of growth is slightly *lower* than that estimated by the 2014-based SNPP (13.1%), however higher than previous projections (notwithstanding the 2006-based SNPP).
- 3.7 Compared to the 2014-based SNPP, the latest ONS 2016-based projection estimates a *lower* population growth trajectory for Malvern Hills and Worcester that is more closely aligned with the ONS 2012-based SNPP. For Malvern Hills, the 2016-based SNPP estimates population growth of +8,336 (10.9%) over the 25-year projection period, compared to +10,962 (14.4%) under the 2014-based projection. For Worcester, the 2016-based SNPP indicates population growth of +9,999 (9.8%), compared to +12,125 (12.0%) under the 2014-based SNPP.
- 3.8 Conversely, the ONS 2016-based population projection for Wychavon indicates population growth (+19,075) at a level that is higher than the previous 2014-based projection (+15,619). The population growth rate estimated under the 2016-based SNPP (15.5%) is higher than under all previous official estimates, notwithstanding the 2006-based SNPP.

¹⁰<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/methodologies/methodologyusedtoproducethe2016basedsubnationalpopulationprojectionsforengland#migration>

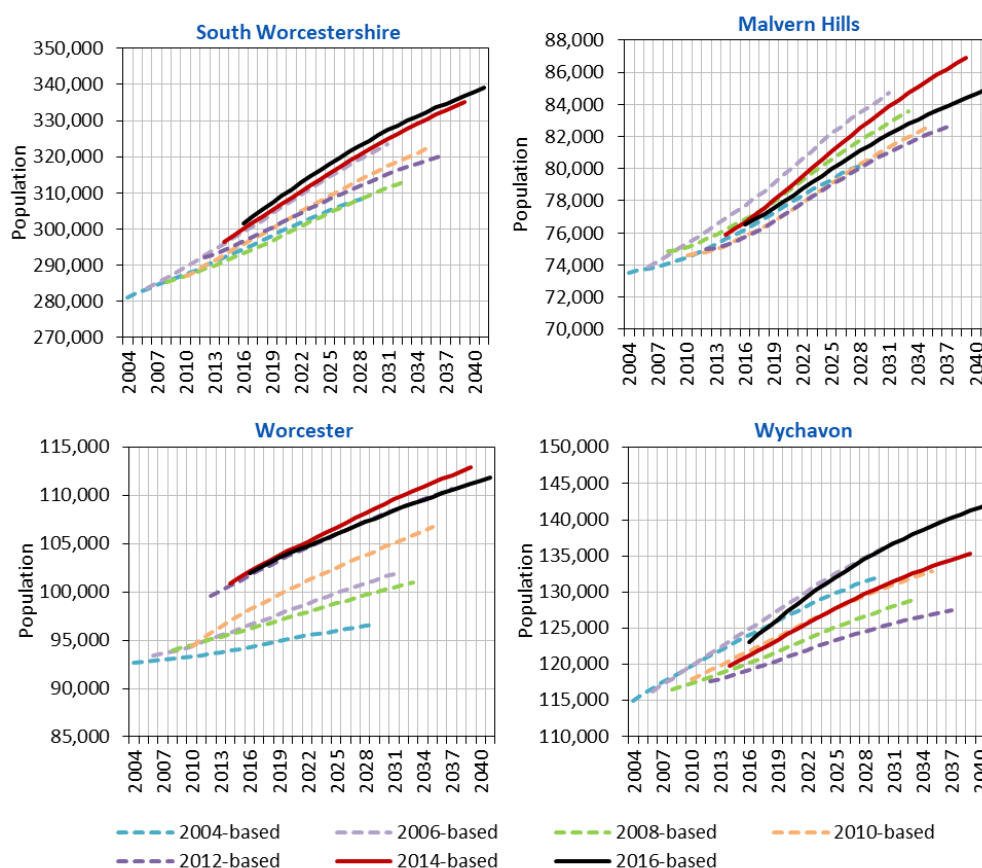
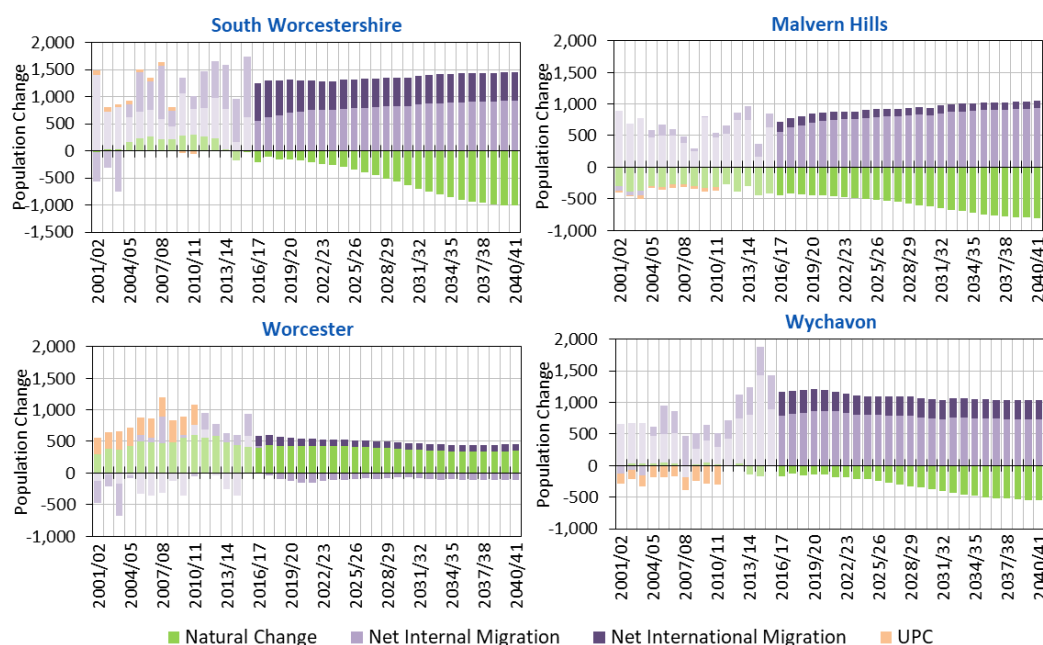


Figure 15: Official subnational population projections for South Worcestershire, Malvern Hills, Worcester and Wychavon (Source: ONS)

- 3.9 The components of population change that underpin the 2016-based projection for South Worcestershire and its three planning authorities are presented in Figure 16, with the historical components of change for 2001/02 to 2015/16 included for comparison.
- 3.10 Under the 2016-based SNPP, net internal migration is estimated to continue to be the dominant component of population change in South Worcestershire, consistent with its historical profile. Net international migration is expected to have a smaller but positive impact on annual population change than that recorded over the last 5 years (2012–2016). Conversely, natural change is estimated to have a reducing impact on population growth over the latter years of the projection period, driven by an ageing population profile operating in tandem with lower assumptions on fertility (Figure 16). The annual negative impact of natural change on population diverges with the longer-term historical profile.

3.11 Under the 2016-based SNPP, all local authorities in South Worcestershire are estimated to experience population growth within the range of 11%–16% over the 2016–2041 period, in line with the West Midlands regional growth rate of 12%.



Area	Population Change (%)	Natural Change	Net Internal Migration	Net International Migration
Malvern Hills	10.9%	-598	806	125
Worcester	9.8%	387	-99	112
Wychavon	15.5%	-334	782	315
South Worcestershire	12.4%	-546	806	552

Figure 16: Historical and 2016-based SNPP components of change (Source: ONS)

3.12 For Malvern Hills, internal migration is the dominant driver of population growth over the 2016–2041 projection period, with net international migration estimated to have a small but positive impact on population change. Natural change is estimated to have a negative impact on population change, increasing towards the end of the projection period as a result of population ageing and a steady rise in the estimated number of deaths.

3.13 The projected components of change under the 2016-based SNPP for Wychavon have a similar composition to Malvern Hills, with net internal and international migration having a positive impact on population change. The main driver of population growth is internal migration, with net international migration estimated at a slightly lower level than that recorded over the

historical 5-year period. Natural change has a small but increasingly negative impact over the projection period (averaging -334 per year), primarily driven by the increase in the number of deaths. This contrasts to Wychavon's historical profile in which natural change has evidenced a very small impact upon population growth.

- 3.14 Conversely, a younger population age profile in Worcester is reflected in the annual positive impact of natural change driving the population growth in the local authority, with the number of births exceeding the number of deaths in all years. Net international migration is estimated to have a small but positive impact on population throughout the 25-year projection period, at a level that is lower than the historical 5-year average, whilst a net internal out-migration flow is projected in all years.

Comparison with the 2014-based SNPP

- 3.15 The profile of the components of change under the 2016-based SNPP is similar to that projected by ONS in its earlier 2014-based SNPP. Over its 25-year projection period (2014–2039), South Worcestershire's population was expected to increase by 28,706, an increase of 13.1%. This level of growth is slightly higher than that projected under the latest 2016-based SNPP (12.4%). The projected components of change under the previous 2014-based SNPP are summarised for each area in Figure 17.

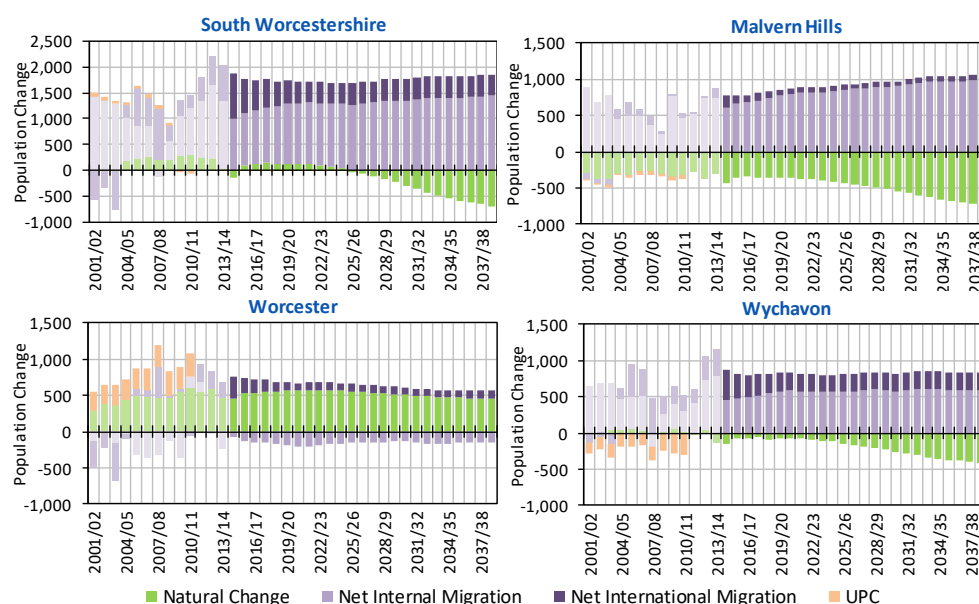


Figure 17: Historical and 2014-based SNPP components of change (Source: ONS)¹¹

¹¹ Note that historical MYEs 2011/12–2013/14 refer to the pre-revised March 2018 ONS estimates to reflect the assumptions in which the 2014-based SNPP was calibrated on.

- 3.16 Table 2 compares the projected components of change under the two most recent official population projections. For the South Worcestershire area, net internal and international migration is estimated to be higher than under the previous 2014-based SNPP, whilst the notably increased negative impact of natural change on population change results in an overall lower population growth trajectory. Natural change is estimated to be lower for each of the areas, driven by the estimated increase in the number of deaths relative to the forecast births.
- 3.17 Similarly for Malvern Hills, lower population growth under the 2016-based SNPP is driven by the larger annual negative impact of natural change. Whilst overall average annual net migration is similar between the two projections, the 2016-based SNPP estimates slightly lower annual net internal migration but higher net international migration to the district.
- 3.18 Under the 2016-based SNPP, the positive annual impact of natural change in Worcester is estimated to be lower than in the previous projection. Whilst a net internal out-migration is evidenced under both of the projections, smaller net internal out-migration flows are estimated under the latest 2016-based SNPP, compared to the previous projection.
- 3.19 For Wychavon, increased net migration (internal and international) to the district, operating in tandem with a reduced annual impact of negative natural change, results in higher population growth under the 2016-based SNPP compared to the previous 2014-based SNPP.

Table 2: Components of population change comparison: 2016-based & 2014-based SNPP

SNPP Components of Change		Malvern Hills	Worcester	Wychavon	South Worcestershire
2016-based SNPP (2016–2041)	Population Change	8,336	9,999	19,075	37,411
	Population Change (%)	10.9%	9.8%	15.5%	12.4%
	Natural Change	-598	387	-334	-546
	Net Internal Migration	806	-99	782	1,490
	Net International Migration	125	112	315	552
2014-based SNPP (2014–2039)	Population Change	10,963	12,126	15,620	38,708
	Population Change (%)	14.4%	12.0%	13.0%	13.1%
	Natural Change	-493	521	-201	-173
	Net Internal Migration	852	-157	568	1,262
	Net International Migration	79	121	258	459

MHCLG Household Projections

- 3.20 At present, the Planning Practice Guidance (PPG) states that the Ministry of Housing, Communities and Local Government (MHCLG) household projections should provide the *“starting point estimate of overall housing need”* (PPG paragraph 2a-015).
- 3.21 The ONS sub-national population projections underpin the household projection model for English local authorities. However, as the 2016-based household projections have yet to be released (due for publication from ONS in September 2018), the 2014-based model is the latest set of household projections from MHCLG, underpinned by the 2014-based SNPP. Under the 2014-based MHCLG household projection model, the number of households in South Worcestershire is estimated to increase by 22,688 over the 2014–2039 projection period, an average annual household growth of 908.
- 3.22 In September 2017, MHCLG published a standardised methodology and associated housing growth targets for all local authorities in England. The proposed standardised method and recently published revised NPPF remain subject to wider consultation and agreement. Over the **2016–2026** ten-year period, the published MHCLG housing target for Malvern Hills is **329** per annum, **396** pa for Worcester and **509** pa for Wychavon, a total of 1,234 pa for the South Worcestershire area (Figure 18).
- 3.23 However, it has been acknowledged by MHCLG that the published OAN figures for the three South Worcestershire planning authorities do not reflect the housing growth targets outlined in the adopted joint South Worcestershire Development Plan (SWDP). The SWDP is a joint plan which identifies Wider Worcester Areas (WWA) development areas within Malvern Hills and Wychavon in recognition that Worcester cannot achieve its OAN alone.
- 3.24 The SWDP identifies a total housing growth target of 28,600 (2006–2030), with 6,800 in Worcester City, 5,650 in Malvern Hills, 10,600 in Wychavon and 5,350 in the WWA (4,450 in Malvern Hills WWA and 900 in Wychavon WWA).
- 3.25 Excluding the published MHCLG figures, the SWDP outlines a higher annual OAN for South Worcestershire than suggested by previous household projection models. For Wychavon, the annual SWDP target (+442) is *higher* than the annual household growth estimated under the

2014-based model (+347), whilst the SWDP target (excluding WWA) for Malvern Hills and Worcester would suggest housing growth *lower* than under the 2014-based household model.

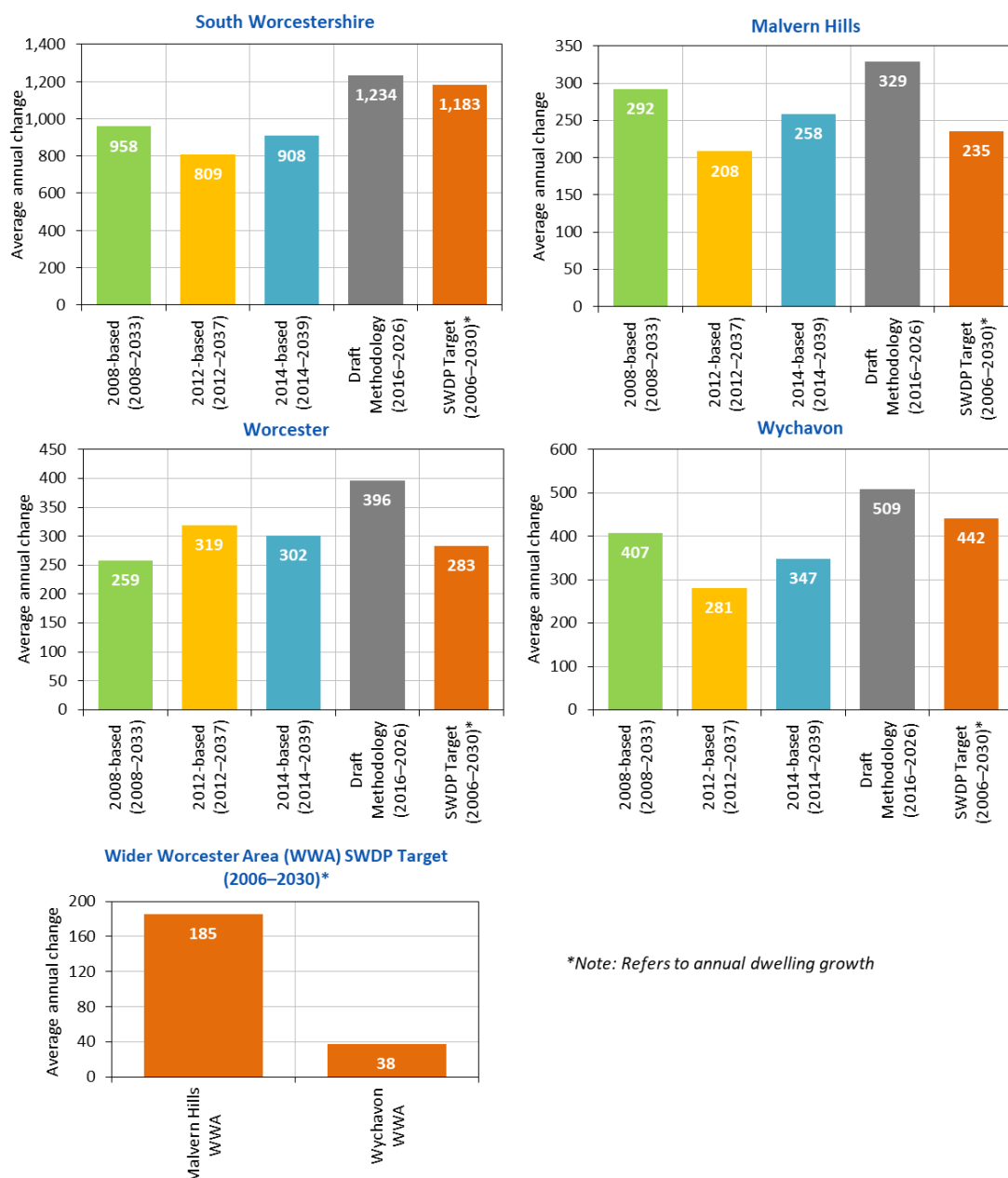


Figure 18: Annual household and dwelling growth under the household projection models and SWDP (Source: MHCLG & South Worcestershire)¹²

¹² Note that the MHCLG methodology refers to the 2016–2026 ten year period and the SWDP refers to the extended 2006–2030 period.

4 Demographic & Economic Forecasts

Demographic Scenario Definition

- 4.1 In Section 3, the latest 2016-based ONS population, MHCLG and SWDP household and growth targets have been presented. For comparison and to inform the Objectively Assessed Housing Need (OAHN), a number of demographic and economic scenarios have been developed using POPGROUP technology.
- 4.2 Two POPGROUP (PG) demographic trend scenarios have been developed for each of the three authorities, configured using migration assumptions derived from area-specific six-year (2010/11–2015/16) and fifteen-year (2001/02–2015/16) historical periods, incorporating fertility and mortality assumptions from the latest 2016-based SNPP.
- 4.3 Each of the demographic scenarios has been run with the inclusion of the 2001–2016 MYEs¹³, except for the ONS 2014-based SNPP scenario (SNPP-2014) which retains its base year of 2014. Scenario outcomes are presented for the 2016–2041 plan period for each of the three authorities and South Worcestershire in aggregate.
- 4.4 Under each of the scenarios, household and dwelling growth is estimated using assumptions from the 2014-based household projection model and a 2011 Census vacancy rate.

Scenario Summary

- **SNPP-2016:** this replicates the latest ONS 2016-based SNPP for each of the South Worcestershire authorities.
- **SNPP-2014:** this replicates the ONS 2014-based SNPP for each of the South Worcestershire authorities.

¹³ These include the March 2018 revisions (2012–2016)

- **PG Short Term:** Internal migration rates and international migration flow assumptions are based on a six-year historical period (2010/11–2015/16).
- **PG Long Term:** Internal migration rates and international migration flow assumptions are based on a fifteen-year historical period (2001/02–2015/16).

Scenario Outcomes

South Worcestershire

- 4.5 For South Worcestershire, the **PG Long Term** scenario results in the lowest population growth (12.3%) over the 2016–2041 plan period, driven by lower annual net migration to the area (Table 3). This results in an annual dwelling growth outcome of +934 per annum for the 2016–2041 plan period.
- 4.6 The **SNPP-2016** scenario results in a population growth of 12.4%, with an estimated average annual dwelling growth of +904 per year, lower than estimated under the **SNPP-2014** scenario (+918 dpa). The **PG Short Term** scenario results in the highest population growth outcome for South Worcestershire over the 2016–2041 plan period (13.7%), resulting in an average annual dwelling growth of +994 pa.

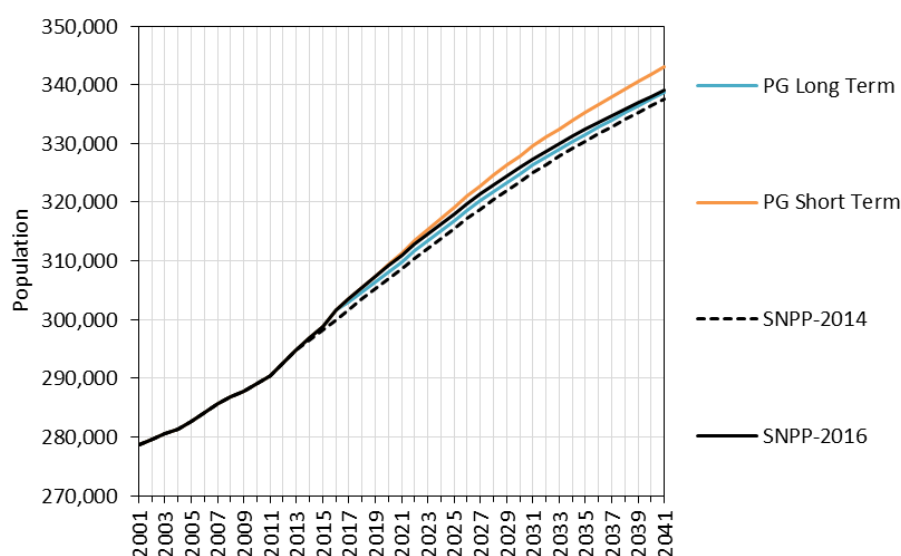


Figure 19: South Worcestershire population change demographic scenarios (2001–2041)

Table 3: South Worcestershire Demographic Scenario Outcomes (2016–2041)

South Worcestershire Demographic Scenarios	Change 2016–2041				Average per year	
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
PG Short Term	41,384	13.7%	23,834	18.4%	2,145	994
SNPP-2014	37,515	12.5%	22,029	17.1%	1,729	918
SNPP-2016	37,411	12.4%	21,675	16.8%	2,042	904
PG Long Term	37,082	12.3%	22,425	17.3%	1,906	934

Scenarios ranked in order of population change.

Malvern Hills

4.7 For Malvern Hills, population growth is estimated between 10.9% and 14.2% over the 2016–2041 plan period (Table 4). The **SNPP-2016** scenario results in the lowest population growth, with an average annual dwelling growth outcome of +223. Conversely, the **SNPP-2014** scenario estimates the highest growth over the plan period, driven by higher average annual net migration and a reduced impact of negative natural change. The population size and age structure under the **SNPP-2014** scenario, results in an average annual dwelling growth of +266 pa.

4.8 The **PG** scenarios suggest higher population change than the SNPP-2016, driven by assumptions on higher average annual net migration flows to the district. Whilst the estimated population growth under the **PG Long Term** scenario is slightly higher than the **PG Short Term** scenario (13.0% and 12.4% respectively), the population age structure results in a slightly lower average annual dwelling growth of +246 dpa, compared to +251 dpa.

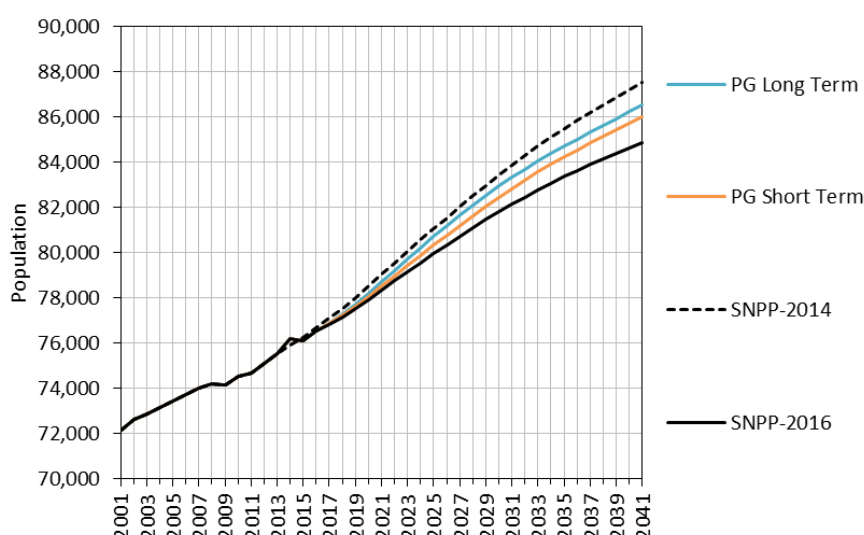


Figure 20: Malvern Hills population change demographic scenarios (2001–2041)

Table 4: Malvern Hills Demographic Scenario Outcomes (2016–2041)

Malvern Hills Demographic Scenarios	Change 2016–2041				Average per year	
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
SNPP-2014	10,852	14.2%	6,359	19.0%	956	266
PG Long Term	9,976	13.0%	5,886	17.6%	962	246
PG Short Term	9,486	12.4%	5,991	17.9%	957	251
SNPP-2016	8,336	10.9%	5,340	15.9%	931	223

Scenarios ranked in order of population change.

Worcester

4.9 Whilst population change under both of the SNPP scenarios is predominantly driven by natural change, the reduced annual impact estimated under the **SNPP-2016** scenario, results in lower population and dwelling growth over the plan period (Table 5). Under the **SNPP-2016** scenario, population change of 9.8% results in an estimated average annual dwelling growth of +258 per annum, compared to population and dwelling change of 11.4% and +300 per annum under the **SNPP-2014** scenario (2016–2041).

4.10 The PG scenarios indicate population and dwelling growth that is higher than estimated under each of the SNPPs, driven by increased net international migration to the area. The average annual net migration flows estimated under the **PG Short Term** scenario, reflect the larger net inflows experienced over the latter half of the historical period in Worcester. This results in population change of 12.7%, compared to 12.3% estimated under the **PG Long Term** scenario. Under the PG scenarios, the population size and age structure results in a dwelling growth range of 319–331 per year over the plan period (**PG Short Term** and **PG Long Term** respectively).

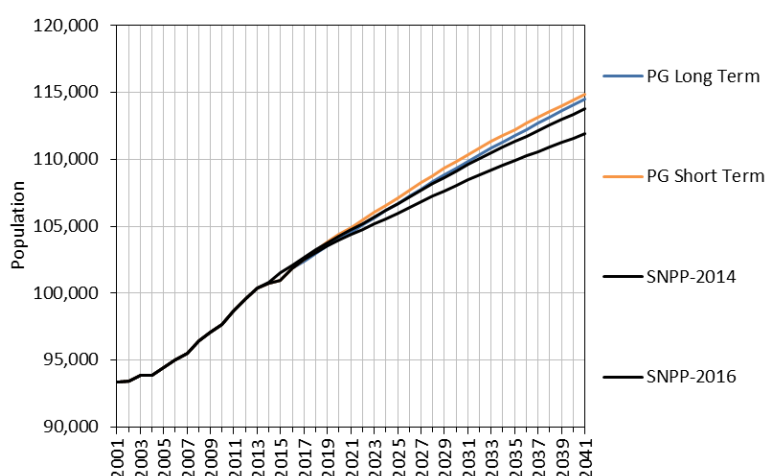


Figure 21: Worcester population change demographic scenarios (2001–2041)

Table 5: Worcester Demographic Scenario Outcomes (2016–2041)

Worcester Demographic Scenarios	Change 2016–2041				Average per year	
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
PG Short Term	12,940	12.7%	7,738	17.7%	108	319
PG Long Term	12,576	12.3%	8,031	18.4%	51	331
SNPP-2014	11,651	11.4%	7,280	16.6%	-53	300
SNPP-2016	9,999	9.8%	6,255	14.3%	13	258

Scenarios ranked in order of population change.

Wychavon

4.11 For Wychavon, population growth is estimated between 11.8% and 15.5% over the 2016–2041 plan period (Table 6). The **SNPP-2016** scenario has the highest population growth (15.5%), driven by higher average annual net migration flows (+1,097 persons pa). The **SNPP-2016** scenario results in an estimated average annual dwelling growth of +423 per annum over the plan period. Lower net migration under the **SNPP-2014** scenario results in lower population (12.4%) and dwelling growth (+352 pa) over the plan period.

4.12 Population change and dwelling growth estimated under the **PG Short Term** scenario is closely aligned to the **SNPP-2016** scenario, with estimated future net migration reflecting the notably higher net internal and international migration flows to Wychavon evidenced since 2011/12. Under the PG Short Term scenario, the estimated average annual dwelling growth to support the population change is +424 dpa. Conversely the **PG Long Term** scenario estimates the lowest population change (11.8%) over the plan period, with an average annual dwelling growth of +357 per annum.

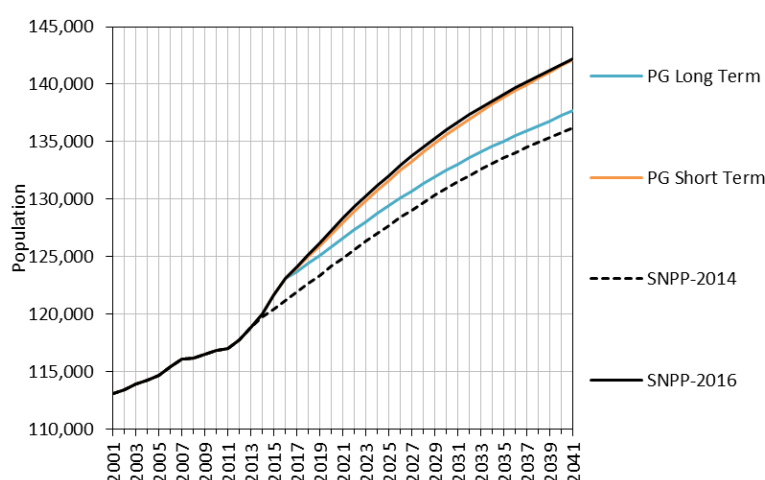


Figure 22: Wychavon population change demographic scenarios (2001–2041)

Table 6: Wychavon Demographic Scenario Outcomes (2016–2041)

Wychavon Demographic Scenarios	Change 2016–2041				Average per year	
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
SNPP-2016	19,075	15.5%	10,080	19.3%	1,097	423
PG Short Term	18,958	15.4%	10,106	19.4%	1,081	424
SNPP-2014	15,012	12.4%	8,391	16.3%	826	352
PG Long Term	14,531	11.8%	8,508	16.3%	894	357

Scenarios ranked in order of population change.

Household Formation Sensitivity

- 4.13 Each of the demographic scenarios has been run using the 2014-based DCLG headship rate assumptions, in line with the PPG. However, the existing PPG also recommends that “*alternative assumptions in relation to ... household formation rates*” are considered (PPG Paragraph 2a-017). Therefore, in this section, each of the scenarios has been run with an alternative set of 2014-based headship rates.
- 4.14 The 2014-based MHCLG headship rates are defined by age-group and sex. Although the latest evidence continues to suggest that the level of household formation has fallen from historical levels, many Local Plans are responding to national policy initiative aimed at reversing this trend. It is likely that it is the younger age groups that have seen the most significant change in household formation, due to a combination of housing undersupply and affordability issues, which in some areas may have led to ‘suppressed’ rates of household formation.
- 4.15 An alternative set of headship rates has been generated for South Worcestershire districts, in which the 2014-based headship rates for the young adult male age groups¹⁴ have been adjusted to return to 2001 headship rates by the end of the plan period (refer to Appendix B for detail on headship rate adjustments). This sensitivity analysis evaluates how a return to higher household growth rates could manifest itself in higher dwelling growth outcomes (Table 7).
- 4.16 Under the ‘Return’ headship rate sensitivity for South Worcestershire, the average annual dwelling growth range increases from 904–994 to 1,079–1,173, an uplift of 18%–20%.
- 4.17 Applying the higher headship rates in the younger age groups assumed under the ‘Return’ sensitivity to the population growth trajectory estimated in the demographic scenarios, results in a dwelling growth uplift ranging from 11% for Worcester to 26% in Wychavon.
- 4.18 Under the ‘Return’ sensitivity headship rates for Wychavon, the population growth trajectory and age structure estimated under the demographic scenarios, results in an additional 89–91 dwellings per annum over the plan period. This increases the average annual dwelling growth range from 352–424 dpa to 443–516 dpa.

¹⁴ Adjustments have been made to the 25–29, 30–34, 35–39 and 40–44 male age groups (refer to Appendix B). Household formation for young adult female age groups records an improvement over the plan period and therefore has not been adjusted.

4.19 Conversely, applying the 'Return' headship rates for Worcester to each of the demographic scenarios, results in a smaller uplift of approximately +36 dwellings per annum. This increases the dwelling growth range from 258–331 dpa to 293–367 dpa over the 2016–2041 plan period.

4.20 The 'Return' headship rate sensitivity results in a smaller annual uplift for Malvern Hills, averaging +52 per year. This increases the dwelling growth range from 223–266 dpa to 274–321 dpa.

Table 7: Headship rate sensitivity scenario outcomes 2016–2041

Scenario		Population Change %	Average Annual Dwelling Growth 2016–2041	
			2014-based	2014-based Return
South Worcestershire	PG Short Term	13.7%	994	1,173
	PG Long Term	12.3%	934	1,114
	SNPP-2014	12.5%	918	1,101
	SNPP-2016	12.4%	904	1,079
Malvern Hills	SNPP-2014	14.2%	266	321
	PG Short Term	12.4%	251	302
	PG Long Term	13.0%	246	299
	SNPP-2016	10.9%	223	274
Worcester	PG Long Term	12.3%	331	367
	PG Short Term	12.7%	319	355
	SNPP-2014	11.4%	300	336
	SNPP-2016	9.8%	258	293
Wychavon	PG Short Term	15.4%	424	516
	SNPP-2016	15.5%	423	512
	PG Long Term	11.8%	357	448
	SNPP-2014	12.4%	352	443

Scenarios ranked in order of annual dwelling growth for South Worcestershire areas.

Experian Forecasts

4.21 In seeking to align the evidence underpinning the Economic Development Needs Assessment (EDNA) and SHMA, the potential population and housing growth implications of the Experian economic forecast underpinning the EDNA is considered in this section.

4.22 Alignment of demographic and economic model forecasts is challenging due to different methodologies, data inputs and assumptions. Economic forecasts from Experian combine a national and regional outlook, with data on the sectoral mix of businesses to produce a forecast for each of the local authorities in South Worcestershire. This forecast has also been used to inform the EDNA.

4.23 The Experian (March 2018) economic forecast estimates total workplace-based employment growth in South Worcestershire to be +13,435 over the 2016–2041 plan period¹⁵, averaging +537 per annum. Worcester is estimated to experience the greatest increase in employment growth over the plan period (+6,985), followed by Wychavon (+4,810) and Malvern Hills (+1,640).

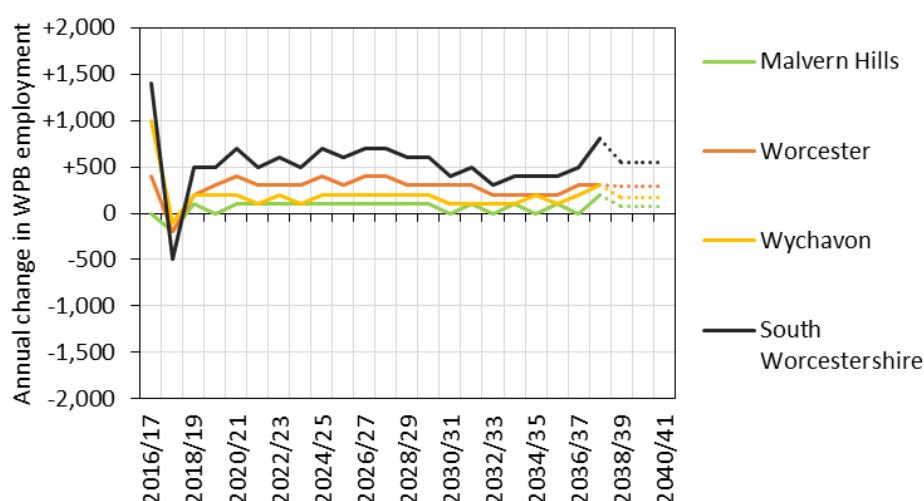


Figure 23: Annual change in workplace-based employment under the Experian economic forecast (2016/17–2040/41)

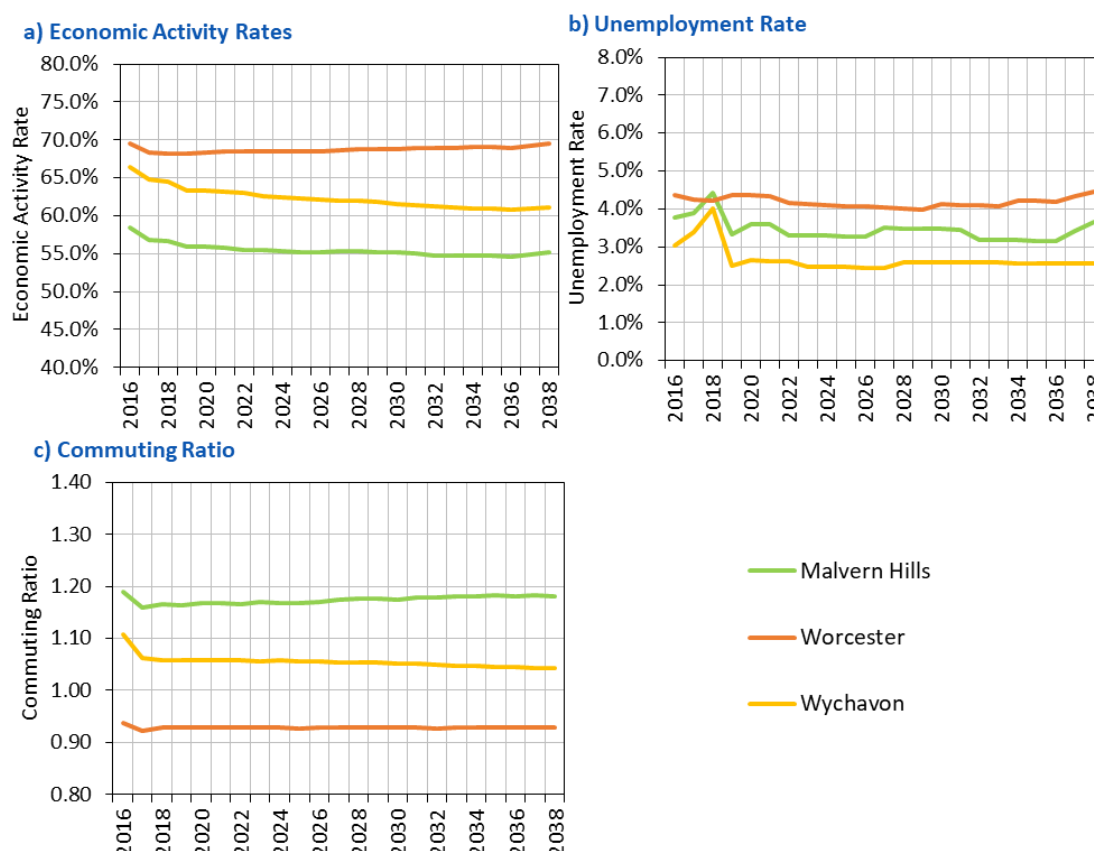
4.24 The Experian forecast incorporates the 2014-based SNPP as its underpinning population, using key assumptions on future economic activity rates, unemployment rate and commuting ratios to balance employment and population change.

4.25 Economic activity rates determine the proportion of the ‘working-age’ population (i.e. aged 16–89) that are in the labour force (i.e. workers and unemployed). The unemployment rate determines the proportion of the labour force that is unemployed, whilst the commuting ratio is the balance between the number of workers resident in an area and the level of employment available. A commuting ratio greater than 1.00 indicates a net out-commute (i.e. there are a

¹⁵ Note that as the Experian forecasts only extend to 2038, the annual change in employment has been extended to the end of the plan period using an average annual total of the 2018/19–2037/38 period for 2038/39–2040/41.

greater number of resident workers than jobs), whilst a commuting ratio of less than 1.00 indicates a net in-commute (i.e. a greater number of jobs than resident workers).

- 4.26 For Malvern Hills and Wychavon, the Experian forecast estimates that economic activity rates will reduce over the plan period from 59% to 55% and 66% to 61% respectively (Figure 24a). Conversely, Worcester's economic activity rate is estimated to remain relatively unchanged over the plan period, at approximately 69%.
- 4.27 The Experian forecast assumes a small improvement in unemployment rates over the plan period, from 3.8% to 3.6% in Malvern Hills and 3.0% to 2.6% in Wychavon (Figure 24b). In Worcester, the unemployment rate is estimated to reduce before indicating a small increase over the latter years of the Experian forecast, from 4.4% in 2016 to 4.5% by the end of the plan period.
- 4.28 Malvern Hills and Wychavon are estimated to experience a net out-commute throughout the forecast period, with Wychavon forecast to experience a reduction in net out-commuting flows from 2016 onward, whilst Malvern Hills is estimated to experience an increasing net out-commute from 2017 onward (Figure 24c). Conversely, Worcester is expected to continue to experience a net in-commute over the forecast period, reducing from 0.94 in 2016 to 0.93 by the end of the plan period (Figure 24c). For Worcester and Wychavon, the Experian model forecasts a commuting ratio similar with that recorded in the 2011 Census (0.94 and 1.08 respectively); whereas Malvern Hills is estimated to experience a higher net out-commute than suggested by the 2011 Census (1.10).

Figure 24: Experian economic assumptions 2016–2038¹⁶

4.29 In light of the uncertainty around future economic assumptions, it is deemed appropriate to consider the potential impact of alternative economic activity rates and commuting ratio assumptions on the population and dwelling growth required to support the forecast change in employment under the Experian forecasts.

4.30 Forecasting changes to economic activity rates is a challenging proposition. The Office for Budget Responsibility (OBR) has undertaken an analysis of labour market trends in its 2017 Fiscal Sustainability report¹⁷. Included within its analysis is a forecast of changing economic activity rates for males and females, extending to a long-term 2066 horizon. An ‘**Employment-led OBR**’ scenario has been presented here to compare how the OBR assumptions on economic activity (rather than the Experian model assumptions) might influence population growth in South Worcestershire under Experian’s employment growth forecasts.

¹⁶ Note that as the Experian model only extends to 2038, assumptions have been fixed thereafter.

¹⁷ <http://obr.uk/fsr/fiscal-sustainability-report-january-2017/>

4.31 For Malvern Hills and Wychavon, the OBR assumes higher aggregate economic activity rates over the forecast period compared to the Experian model (Figure 25). Conversely, the OBR forecasts for Worcester assume a small decline over the forecast period, contrasting to the Experian model assumption (Figure 25). Under the ‘**Employment-led OBR**’ scenario, assumptions on the commuting ratio and unemployment rate remain consistent with the Experian forecast.

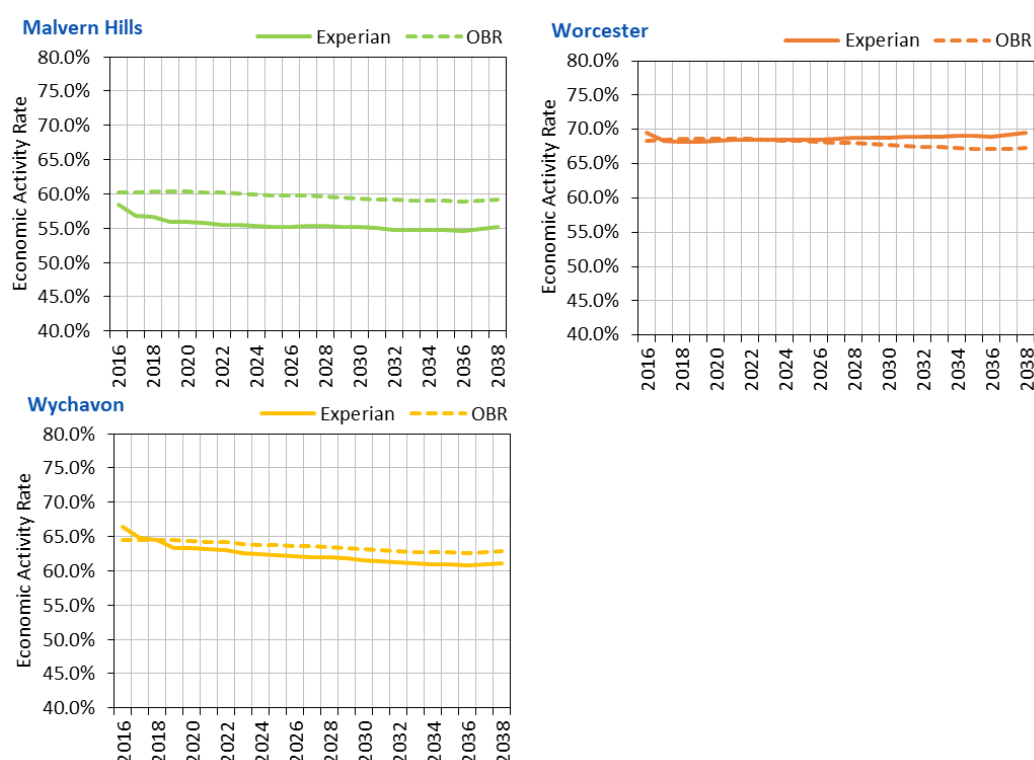


Figure 25: Aggregate economic activity rate assumptions (Experian & OBR) 2016–2038¹⁸

4.32 The commuting ratio measures the balance between the number of resident workers in the area and number of forecast jobs. The Experian model estimates variations in the commuting ratio for each area over the plan period. As a comparison, an ‘**Employment-led CR**’ scenario has been configured to consider the potential impact of maintaining a stable commuting ratio over the plan period, in line with the 2011 Census commuting ratio. Under the ‘**Employment-led CR**’ scenario, assumptions on economic activity rates and unemployment rate remain consistent with the Experian forecast.

¹⁸ Note that as the Experian model only extends to 2038, assumptions have been fixed thereafter.

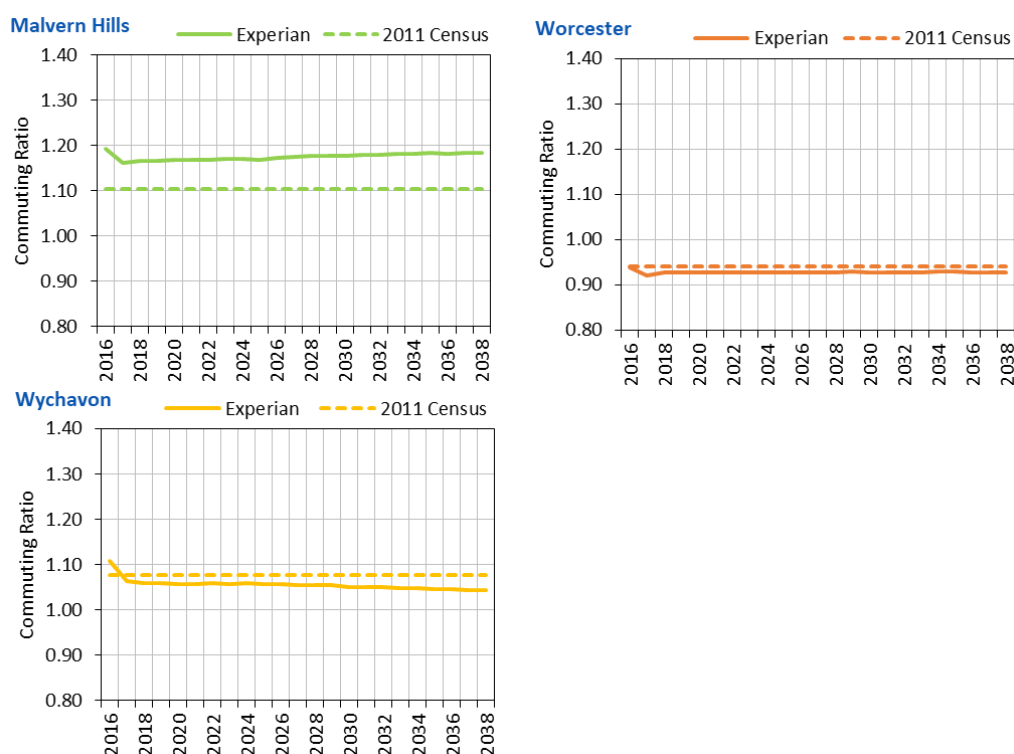


Figure 26: Commuting ratio assumptions (Experian & 2011 Census) 2016–2038¹⁹

- 4.33 The population change, average annual net migration and dwelling growth required to support the Experian employment growth trajectory under the variant assumptions are presented in Table 9–Table 11. The ‘**Baseline**’ Experian forecast is also presented, using all economic assumptions derived from the Experian model.
- 4.34 For South Worcestershire in total, the application of the OBR economic activity rates results in lower average annual net migration required to support the annual change in employment growth, as assumed by the Experian forecast (Table 8). This results in the lowest population and dwelling growth over the plan period (8.6% and +696 dpa respectively).
- 4.35 In contrast, assuming no change in the commuting ratio over the plan period results in a greater need for in-migration (averaging +2,352 pa) to South Worcestershire to support the annual change in employment. This results in the highest population change (15.2%) and average annual dwelling growth (+1,055 dpa) over the plan period.

¹⁹ Note that as the Experian model only extends to 2038, assumptions have been fixed thereafter.

Table 8: South Worcestershire Employment-led Scenario Outcomes 2016–2041

South Worcestershire Employment-led Scenarios	Change 2016–2041				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Employment
CR	45,862	15.2%	25,289	19.6%	2,352	1,055	537
<i>Baseline</i>	<i>36,828</i>	<i>12.2%</i>	<i>21,437</i>	<i>16.6%</i>	<i>2,025</i>	<i>894</i>	<i>537</i>
OBR	25,824	8.6%	16,736	12.9%	1,607	696	537

Scenarios ranked in order of population change.

4.36 For Malvern Hills and Wychavon, the higher economic activity rates under the OBR forecast maintain a larger local labour force. This reduces the need for net in-migration to Malvern Hills and Wychavon to support the assumed employment growth under the Experian forecast. Subsequently, a lower average annual dwelling growth is estimated under the ‘**Employment-led OBR**’ scenarios than the ‘**Baseline**’. For both of these areas, a fixed commuting ratio results in higher net in-migration and subsequent population change over the plan period. Subsequently, the **Employment-led CR** scenarios results in the highest average annual dwelling growth requirements.

4.37 Conversely, the Experian model assumes higher aggregate economic activity rates for Worcester than the OBR forecast. As a result, the **Employment-led OBR** scenario results in higher population growth over the plan period, as a smaller proportion of Worcester’s resident population is maintained in the labour force. The Experian model forecasts a commuting ratio for Worcester that is closely to that recorded in the 2011 census for the district. As a result, the population and dwelling growth under the **Employment-led CR** scenario is closely aligned to that under the **Employment-led OBR** variant. Population change of 12.3%–12.4% under the **Employment-led CR** and **Employment-led OBR** scenarios respectively, result in an average annual dwelling growth of +301 pa.

Table 9: Malvern Hills Employment-led Scenario Outcomes 2016–2041

Malvern Hills Employment-led Scenarios	Change 2016–2041				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Employment
CR	10,413	13.6%	6,251	18.6%	1,013	261	66
<i>Baseline</i>	10,105	13.2%	6,081	18.1%	1,000	254	66
OBR	6,019	7.9%	4,299	12.8%	837	180	66

Scenarios ranked in order of population change.

Table 10: Worcester Employment-led Scenario Outcomes 2016–2041

Worcester Employment-led Scenarios	Change 2016–2041				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Employment
OBR	12,635	12.4%	7,313	16.8%	115	301	279
CR	12,526	12.3%	7,306	16.8%	101	301	279
<i>Baseline</i>	11,376	11.2%	6,805	15.6%	66	280	279

Scenarios ranked in order of population change.

Table 11: Wychavon Employment-led Scenario Outcomes 2016–2041

Wychavon Employment-led Scenarios	Change 2016–2041				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Employment
CR	22,924	18.6%	11,732	22.5%	1,238	493	192
<i>Baseline</i>	15,347	12.5%	8,551	16.4%	959	359	192
OBR	7,170	5.8%	5,123	9.8%	655	215	192

Scenarios ranked in order of population change.

5 Summary

Approach

- 5.1 The analysis has considered the latest 2016-based sub-national population projections (SNPP) and earlier 2014-based SNPP from ONS and the 2014-based household projections from MHCLG. Two demographic forecasts have been derived using POPGROUP technology, considering variant migration histories and incorporating fertility and mortality assumptions from the latest 2016-based SNPP. Employment-led scenarios have been developed using the annual employment growth trajectory under the Experian (March 2018) model, alongside variant assumptions on economic activity rates and commuting.
- 5.2 Household growth under each scenario has been assessed using assumptions from the MHCLG 2014-based household projection model. Alternative household representative rates have evaluated the household growth outcomes associated with a return to higher rates of household formation for the younger age groups under the demographic scenarios. Dwelling growth under all scenarios has been evaluated through the application of a 2011 Census vacancy rate for each of the South Worcestershire authorities.

Growth Outcomes

- 5.3 The average annual dwelling growth under the demographic and employment-led scenarios for the South Worcestershire area is compared to the SWDP annualised growth target (Figure 27).
- 5.4 For the aggregate South Worcestershire area, the scenarios result in an average annual growth range of 696–1,055 dpa (2016–2041), lower than that outlined in the SWDP (+1,183 dpa). The demographic scenarios results in an average annual dwelling growth range of +904 dpa under the latest **SNPP-2016** to +994 dpa under the **PG Short Term** scenario.

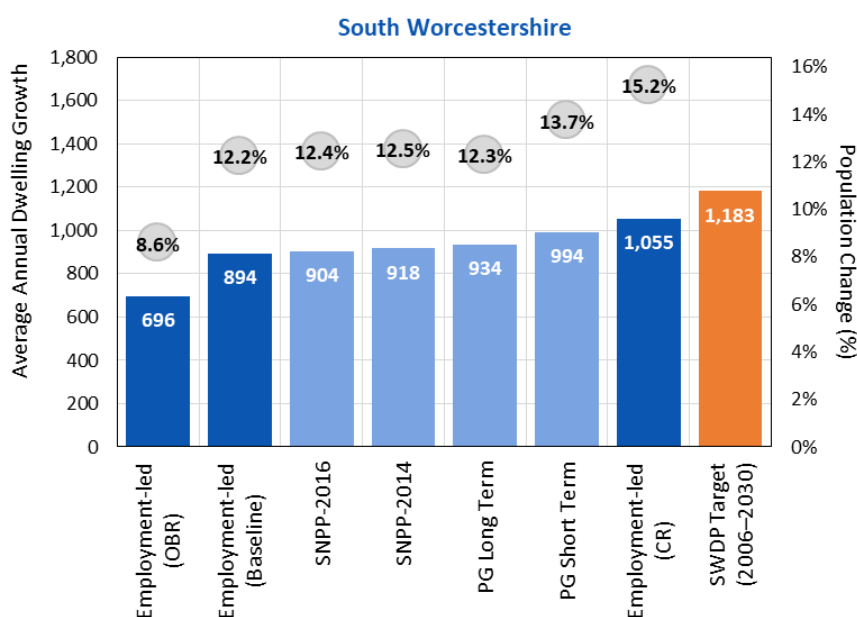


Figure 27: South Worcestershire population change and average annual dwelling growth (2016–2041)²⁰

- 5.5 For Malvern Hills, the employment-led and demographic scenarios result in a dwelling growth range of 180–266 pa over the full 2016–2041 plan period, with the **SNPP-2014** scenario at the upper end of this range (Figure 28). Conversely, the **SNPP-2016** results in the lowest population and dwelling growth of the demographic scenarios, with an average annual dwelling growth of +223 pa.
- 5.6 The Experian employment growth forecast for Malvern Hills, operating in tandem with the economic assumptions, results in an dwelling growth range of 180–261 dpa. Using assumptions derived from the Experian model, an average annual dwelling growth of +254 pa is estimated to support the assumed annual change in employment (**Employment-led Baseline** scenario). The higher aggregate economic activity rates assumed under the **Employment-led OBR** scenario reduces the average annual dwelling growth to +180 per annum (2016–2041). Conversely, maintaining a stable commuting ratio in line with the 2011 Census increases the average annual dwelling growth to +261 per annum. Excluding the **Employment-led OBR** scenario and the **SNPP-2016**, the latest evidence would suggest a higher annual housing growth target for Malvern Hills than that suggested in the SWDP (excluding housing provisions for the WWA).
- 5.7 The latest demographic and economic evidence for Worcester estimates an average annual dwelling growth range of 258–331 dpa over the plan period, with the **SNPP-2016** representing

²⁰ Note that the SWDP target refers to a different plan period than the demographic and employment-led scenarios.

the lower end of this range (Figure 28). Dwelling growth is highest under the **PG** scenarios (319 dpa and 331 dpa). Alternative economic assumptions on commuting ratio and economic activity rates increase the average annual dwelling growth from +280 under the **Employment-led Baseline** scenario to +301 dpa under the **Employment-led CR** and **OBR** scenarios. This is closely aligned to the level of growth estimated under the **SNPP-2014** scenarios. The annualised SWDP target for Worcester (+283 dpa) falls within the lower end of the dwelling growth range suggested by the latest demographic and economic evidence.

- 5.8 For Wychavon, the employment-led scenarios and economic assumption sensitivities result in a dwelling growth range of 215–493; with alternative assumptions on the commuting ratio and economic activity rates representing the upper and lower end of the range (Figure 28). The **PG Short Term** and **SNPP-2016** scenarios estimate a similar level of dwelling growth (423–424 dpa respectively), representing the upper end of the demographic dwelling growth range; whilst the **SNPP-2014** and **PG Long Term** indicate a lower dwelling growth requirement (352 and 2578 respectively). The demographic and employment-led scenarios (excluding **Employment-led CR**), indicate an annual dwelling growth over the 25-year plan period that is lower than the SWDP target for the district.
- 5.9 Accounting for a return to higher household formation rates in the young adult age groups, would raise the dwelling growth outcomes under each scenario by approximately +53 for Malvern Hills, +36 for Worcester and +92 for Wychavon, a total of 181 for South Worcestershire.

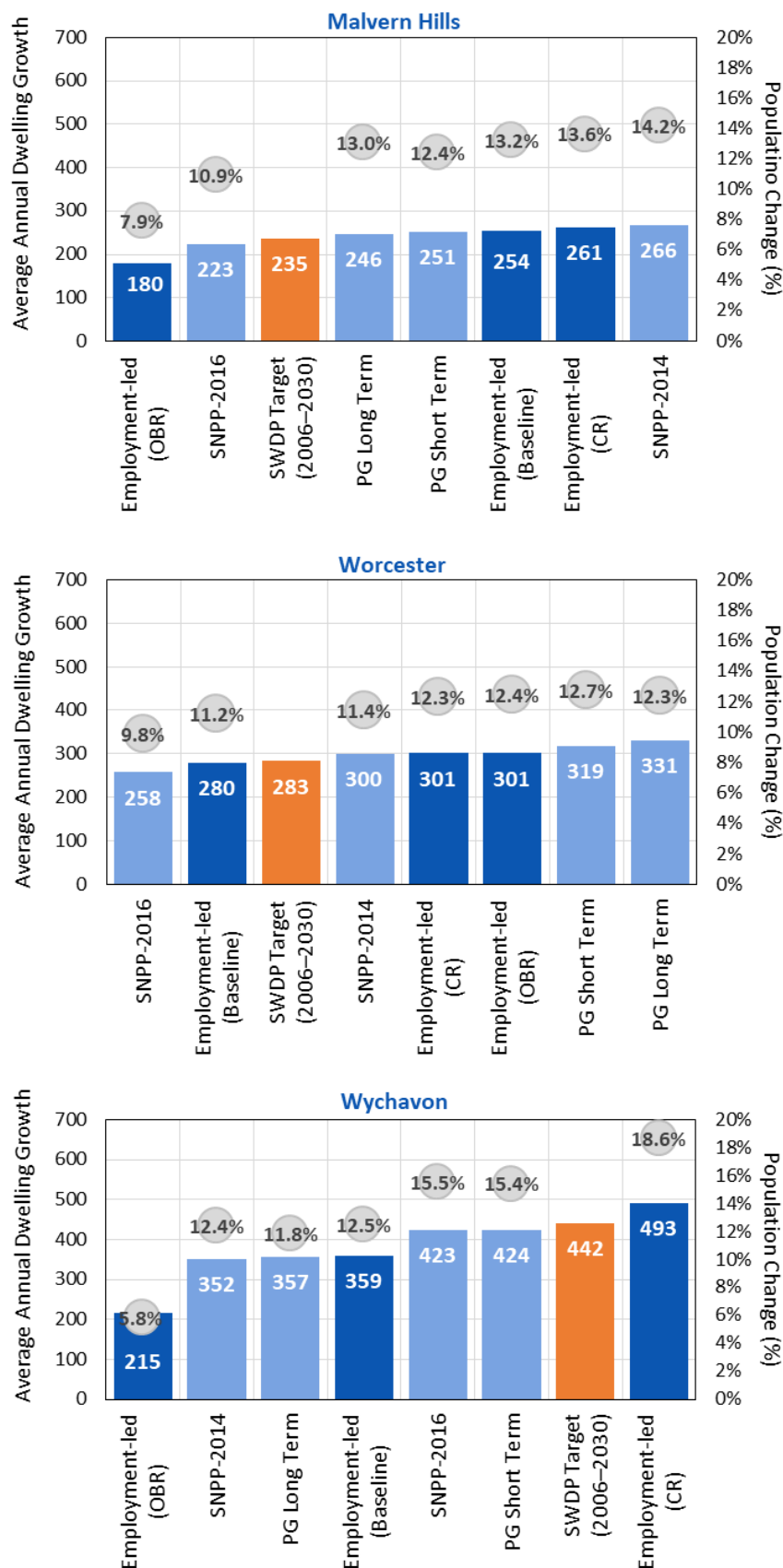


Figure 28: Population change and average annual dwelling growth under the employment-led scenarios, demographic-led scenarios (2016–2041) and SWDP

- 5.10 This report has presented the latest demographic evidence for South Worcestershire authorities and incorporated this to the configuration of a range of scenarios. The demographic evidence presented in this report will underpin the emerging SHMA and inform the Council in reviewing the adopted SWDP and future policy decisions.
- 5.11 For Malvern Hills and Worcester, the latest **SNPP-2016** would indicate a lower average annual dwelling growth than that assumed under the SWDP; whilst alternative migration assumptions under the PG scenarios would point to higher dwelling growth. For Wychavon, the latest demographic evidence would indicate dwelling growth that is lower than its SWDP target.
- 5.12 Household and dwelling growth has been estimated using the 2014-based household projection model from MHCLG, with sensitivity testing examining the potential impact of higher household formation in the young adult age groups. The 2016-based household projection model is due for release by the ONS in autumn 2018, providing an updated outlook on household formation in local authorities in England. It is recommended that the South Worcestershire Councils consider this new evidence when it becomes available.

Appendix A POPGROUP Methodology

Forecasting Methodology

- A.1 Evidence is often challenged on the basis of the appropriateness of the methodology that has been employed to develop growth forecasts. The use of a recognised forecasting product which incorporates an industry-standard methodology (a cohort component model) removes this obstacle and enables a focus on assumptions and output, rather than methods.
- A.2 Demographic forecasts have been developed using the POPGROUP suite of products. POPGROUP is a family of demographic models that enables forecasts to be derived for population, households and the labour force, for areas and social groups.
- A.3 The main POPGROUP model (Figure 29) is a cohort component model, which enables the development of population forecasts based on births, deaths and migration inputs and assumptions. The Derived Forecast (DF) model (Figure 30) sits alongside the population model, providing a headship rate model for household projections and an economic activity rate model for labour-force projections. For further information on POPGROUP, please refer to the Edge Analytics website (<http://www.edgeanalytics.co.uk/>).

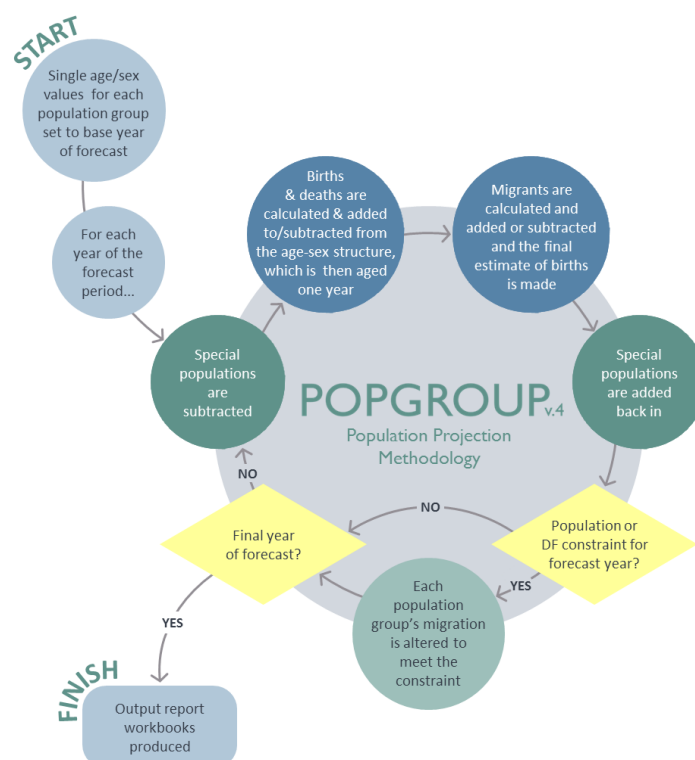


Figure 29: POPGROUP population projection methodology

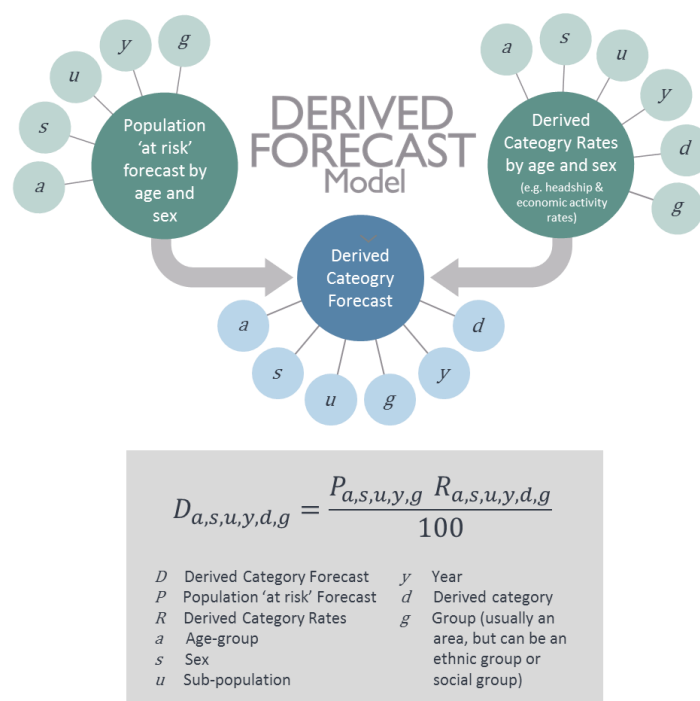


Figure 30: Derived Forecast (DF) methodology

Appendix B Data Inputs & Assumptions

Introduction

B.1 Edge Analytics has developed a suite of demographic scenarios for South Worcestershire using POPGROUP v.4 and the Derived Forecast model.

- SNPP-2016
- SNPP-2014
- PG Long Term
- PG Short Term
- Employment-led Baseline
- Employment-led OBR
- Employment-led CR

The POPGROUP suite of demographic models draw data from a number of sources, building an historical picture of population, households, fertility, mortality and migration on which to base its scenario forecasts. Using historical data evidence for 2001–2016, in conjunction with information from ONS sub-national population projections (SNPPs) and MHCLG household projections, a series of assumptions have been derived which drive the scenario forecasts. In the following sections, a narrative on the data inputs and assumptions underpinning the scenarios is presented.

Population, Births, Deaths & Migration

Population

B.2 In each scenario, historical population statistics are provided by the mid-year population estimates (MYEs), with all data recorded by single-year of age and sex. These data include the revised MYEs for 2002–2010, which were released by the ONS in May 2013. The revised MYEs provide consistency in the measurement of the components of change (i.e. births, deaths, internal migration and international migration) between the 2001 and 2011 Censuses. In March

2018, further revisions were made to estimates of international migration (2012–2016), these have been included with the scenario development.

- B.3** In the **SNPP-2016**, **PG** and **Employment-led** scenarios, historical MYEs are used up to 2016. In the **SNPP-2016** scenario, future population counts are provided by single-year of age and sex from 2016 onward, to ensure consistency with the trajectory of the ONS 2016-based SNPP.
- B.4** In the **SNPP-2014** scenario, the historical MYEs are used up to 2014. From 2014, future population counts are provided by single-year of age and sex to ensure consistency with the trajectory of the ONS 2014-based SNPP.

Births & Fertility

- B.5** In each scenario, historical mid-year to mid-year counts of births by sex have been sourced from the ONS MYEs.
- B.6** In the **SNPP-2016** scenario, historical births are used from 2001/02 to 2015/16. From 2016/17, future counts of births are specified, to ensure consistency with the 2016-based official projection.
- B.7** In the **PG** and **Employment-led** scenarios, historical births are used from 2001/02 to 2015/16. From 2016/17, an area-specific age-specific rate (ASFR) schedule, derived from the ONS 2014-based SNPP, is included in the POPGROUP model assumptions. Long-term assumptions on changes in age-specific fertility rates are taken from the ONS 2016-based SNPP.
- B.8** In combination with the ‘population-at-risk’ (i.e. all women between the ages of 15–49), the area-specific ASFR and future fertility rate assumptions provide the basis for the calculation of births in each year of the forecast period (i.e. from 2016 onwards).
- B.9** In the **SNPP-2014** scenario, historical births are used from 2001/02 to 2013/14. From 2014/15, future counts of births are specified, to ensure consistency with the 2014-based official projection.

Deaths & Mortality

- B.10** In each scenario, historical mid-year to mid-year counts of deaths by 5-year age group and sex have been sourced from the ONS MYEs. In the **SNPP-2016** scenario, historical deaths are used from 2001/02 to 2015/16. From 2016/17, future counts of deaths are specified, to ensure consistency with the 2016-based official projection.

- B.11** In the **PG** and **Employment-led** scenarios, historical deaths are used from 2001/02 to 2015/16. From 2016/17, an area-specific age-specific mortality rate (ASMR) schedule, derived from the ONS 2016-based SNPP, is included in the POPGROUP model assumptions. Long-term assumptions on changes in age-specific mortality rates are taken from the ONS 2016-based SNPP.
- B.12** In combination with the ‘population-at-risk’ (i.e. the whole population), the area-specific ASMR and future mortality rate assumptions provide the basis for the calculation of deaths in each year of the forecast period (i.e. from 2016 onwards).
- B.13** In the **SNPP-2014** scenario, historical deaths are used from 2001/02 to 2013/14. From 2014/15, future counts of deaths are specified, to ensure consistency with the 2014-based official projection.

Internal Migration

- B.14** In each scenario, historical mid-year to mid-year estimates of internal in- and out-migration by 5-year age group and sex have been sourced from the ‘components of population change’ files that underpin the ONS MYEs. These internal migration flows are estimated using data from the Patient Register (PR), the National Health Service Central Register (NHSCR) and the Higher Education Statistics Agency (HESA).
- B.15** In the **SNPP-2016** scenario, historical counts of internal in and out-migrants are used from 2001/02 to 2015/16. From 2016/17, future counts of migrants are specified, to ensure consistency with the 2016-based official projection.
- B.16** In the **PG** scenarios, historical counts of internal in and out-migrants are used from 2001/02 to 2015/16. From 2016/17, future internal migration flows are based on the area-specific historical migration data. In the **PG Short Term** scenario, a *six* year internal migration history is used (2010/11 to 2015/16). In the **PG Long Term** scenario, a *fifteen* year history is used (2001/02 to 2015/16). In the **PG Short Term** and **PG Long Term** scenarios, the relevant historical time period is used to derive the age-specific migration rate (ASMigR) schedules, which are then used to determine the future number of in- and out-migrants.
- B.17** In the case of internal in-migration, the ASMigR schedules are applied to an external ‘reference’ population (i.e. the population ‘at-risk’ of migrating into the area). This is different to the other components (i.e. births, deaths, internal out-migration), where the schedule of rates is applied to the area-specific population (i.e. the population ‘at-risk’ of migrating out of the area). The

reference population is defined by considering the areas which have historically contributed the majority of migrants into the area. In the case of South Worcestershire, the UK population has been used.

- B.18** In the **Employment-led** scenarios, historical counts of internal in and out-migrants are used from 2001/02 to 2015/16. From 2016/17, these scenarios then calculate their own internal migration assumptions to ensure an appropriate balance between the population and the targeted increase in employment that is defined in each year of the forecast period. A higher level of net internal migration will occur if there is insufficient population and resident labour force to meet the forecast employment growth. In the **Employment-led** scenarios, the profile of internal migrants is defined by an ASMigR schedule, derived from the ONS 2016-based SNPP.
- B.19** In the **SNPP-2014** scenario, historical counts of internal in and out-migrants are used from 2001/02 to 2013/14. From 2014/15, future counts of migrants are specified, to ensure consistency with the 2014-based official projection.

International Migration

- B.20** Historical mid-year to mid-year counts of immigration and emigration by 5-year age group and sex have been sourced from the 'components of population change' files that underpin the ONS MYEs. Any 'adjustments' made to the MYEs to account for asylum cases are included in the international migration balance. In all scenarios, future international migrant counts are specified.
- B.21** In the **SNPP-2016** scenario, historical counts of migrants are used from 2001/02 to 2015/16. From 2016/17, the international in- and out-migration counts are drawn directly from the 2016-based official projection.
- B.22** In the **SNPP-2014** scenario, historical counts of migrants are used from 2001/02 to 2013/14. From 2014/15, the international in- and out-migration counts are drawn directly from the 2014-based official projection.
- B.23** In the **PG** scenarios, historical counts of international in and out-migrants are used from 2001/02 to 2015/16. From 2016/17, future international migration counts are based on the area-specific historical migration data. In the **PG Short Term** scenario, a *six* year international migration history is used (2010/11 to 2015/16). In the **PG Long Term** scenario, a *fifteen* year history is used (2001/02 to 2015/16). In the **PG Short Term** and **PG Long Term** scenarios, an ASMigR schedule of

rates is derived from the relevant migration history and is used to distribute future counts by single year of age.

- B.24 Implied within the international migration component of change in **PG** scenarios is an 'unattributable population change' (UPC) figure, which ONS identified within its mid-year estimate revisions. The POPGROUP model has assigned the UPC to international migration as it is the component with the greatest uncertainty associated with its estimation.
- B.25 In the **Employment-led** scenarios, historical counts of international in and out-migrants are used from 2001/02 to 2015/16. From 2016/17, international migration counts are taken from the ONS 2016-based SNPP (i.e. counts are consistent with the **SNPP-2016** scenario). An ASMigR schedule of rates from the ONS 2016-based SNPP is used to distribute future counts by single year of age.

Households & Dwellings

- B.26 The 2011 Census defines a household as: *“one person living alone, or a group of people (not necessarily related) living at the same address who share cooking facilities and share a living room or sitting room or dining area.”*
- B.27 In POPGROUP, a dwelling is defined as a unit of accommodation which can either be occupied by one household or vacant. Under all scenarios, the household and dwelling implications of the population growth trajectory have been estimated through the application of headship rate statistics, communal population statistics and a dwelling vacancy rate. These data assumptions have been sourced from the 2001 and 2011 Censuses and the 2014-based household projection model from the MHCLG. The 2014-based model was released by the MHCLG in July 2016, and is underpinned by the 2014-based SNPP from ONS.

Household Headship Rates

- B.28 A household headship rate (also known as household representative rate) is the: *“probability of anyone in a particular demographic group being classified as being a household representative”*²¹.

²¹ Household Projections 2012-based: Methodological Report. Department for Communities and Local Government (February 2015). <https://www.gov.uk/government/statistics/2012-based-household-projections-methodology>

B.29 The household headship rates used in the POPGROUP modelling have been taken from the latest DCLG 2014-based household projection model, which is underpinned by the ONS 2014-based SNPP. The MHCLG household projections are derived through the application of projected headship rates to a projection of the private household population. The methodology used by MHCLG in its household projection models consists of two stages:

- **Stage One** produces the national and local authority projections for the total number of households by sex, age-group and relationship-status group over the projection period.
- **Stage Two** provides the detailed ‘household-type’ projection by age-group, controlled by the previous Stage One totals.

B.30 Under all scenarios, the Stage One headship rates have been applied by 5-year age group, sex and relationship status. Two sets of headship rates have been applied to all scenarios:

- **HH-14:** MHCLG 2014-based headship rates for each of the three South Worcestershire areas
- **HH-14 Return:** MHCLG 2014-based headship rates in the young adult age groups return to 2001 rates by the end of the plan period, continuing their original rate of growth thereafter. For all areas, adjustments have been made to the male 25–29, 30–34, 35–39 and 40–44 age groups . No adjustment is made to the female age groups.

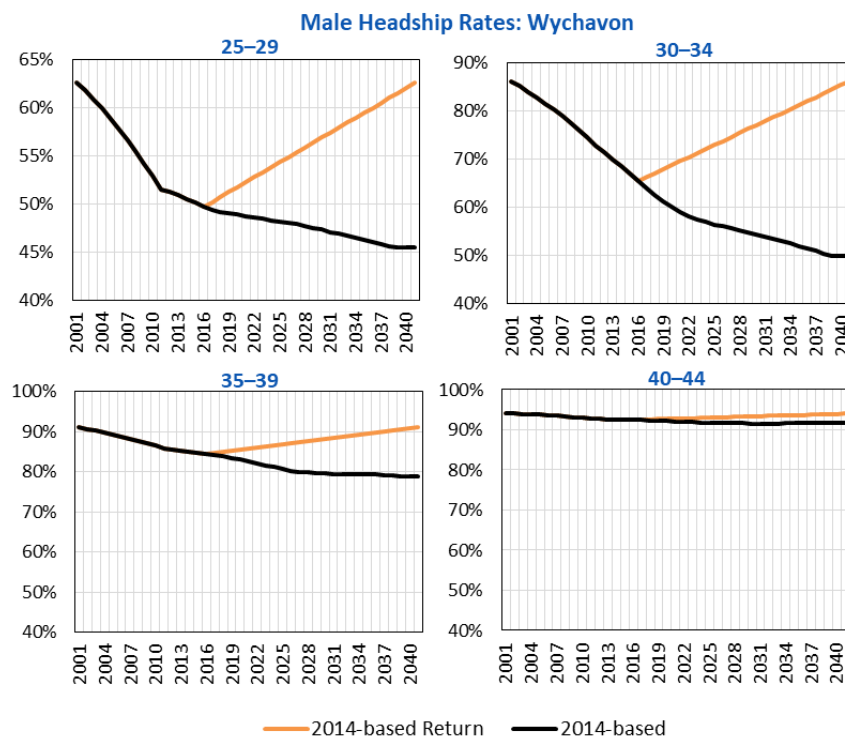


Figure 31: Headship rates for Wychavon – 2014-based and 2014-based Return

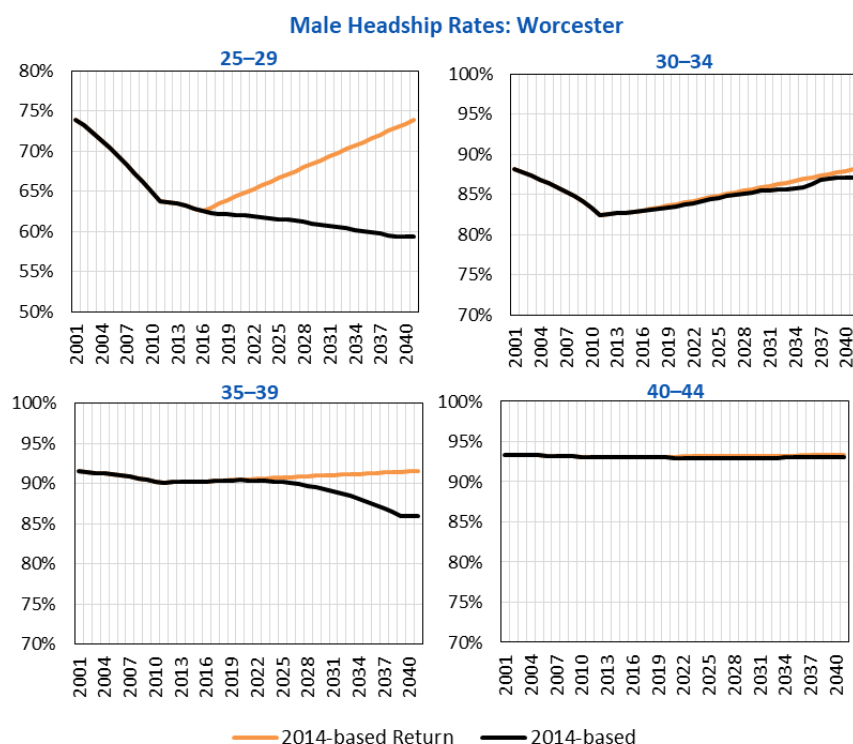


Figure 32: Headship rates for Worcester – 2014-based and 2014-based Return

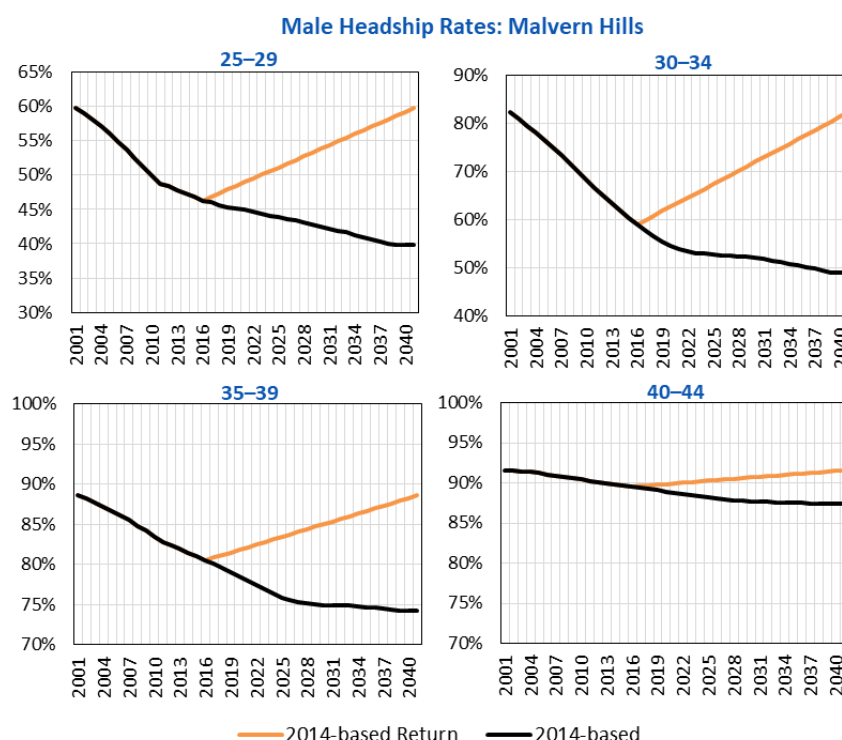


Figure 33: Headship rates for Malvern Hills – 2014-based and 2014-based Return

Communal Population Statistics

B.31 Household projections in POPGROUP exclude the population ‘not-in-households’ (i.e. the communal/institutional population). These data are drawn from the MHCLG 2014-based household projections, which use statistics from the 2011 Census. Examples of communal establishments include prisons, residential care homes and student halls of residence. For ages 0–74, the number of people in each age group not-in-households is fixed throughout the forecast period. For ages 75–85+, the proportion of the population not-in-households is recorded. Therefore, the population not-in-households for ages 75–85+ varies across the forecast period depending on the size of the population.

Vacancy Rate

B.32 The relationship between households and dwellings is modelled using a ‘vacancy rate’, sourced from the 2011 Census²². The vacancy rate is calculated using statistics on households (occupied household spaces) and dwellings (shared and unshared).

²² Census Table KS401EW: Dwellings, household spaces and accommodation type

- B.33 A vacancy rate of 4.4% for Malvern Hills, 2.8% for Worcester and 4.7% for Wychavon has been applied, fixed throughout the forecast period. Using the vacancy rate, the 'dwelling requirement' of each household growth trajectory has been evaluated.