Wyre Forest

Demographic Update

October 2018

edge analytics

Leeds Innovation Centre | 103 Clarendon Road | Leeds | LS2 9DF
0113 384 6087 | www.edgeanalytics.co.uk

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

E.1 In early 2017, Edge Analytics provided demographic evidence to inform Wyre Forest's Objectively Assessed Housing Need (OAHN), later published by Amion Consulting and arc4 in April 2017. This identified an OAHN figure of +300 dwellings per annum (dpa) for the 2016–2034 plan period.

E.2 Since publication of the 2017 report, a number of new demographic and economic datasets have been published including: (i) 2016-based sub-national population and household projections (SNPP and SNHP) from the Office for National Statistics (ONS); (ii) two additional years of population and components of change data, together with revisions to the 2012–2016 mid-year population estimates; (iii) 2017 analysis from the Office for Budget Responsibility (OBR), providing an outlook on future labour market participation and; (iv) two additional years of unemployment rate data.

E.3 In addition, the Government published its revised National Planning Policy Framework (NPPF)1 and Planning Practice Guidance (PPG)2 in July 2018, providing a standardised methodology for determining a minimum housing need figure for local authorities across England. The new methodology supports the *"Government's objective of significantly boosting the supply of homes"* (paragraph 59, NPPF 2018), working towards its target of *"ensuring that 300,000 homes are built per year by the mid 2020s"* (PPG 2018). The revised PPG standardised methodology uses the ONS 2016-based SNHP (2018–2028) as a baseline for its calculation, supplemented by an uplift to account for affordability. For Wyre Forest, the PPG minimum housing need figure is +276 per annum (2018–2028).

E.4 The analysis presented in this report has used the latest demographic and economic evidence for Wyre Forest to develop a range of scenarios for comparison with the 2016-based SNPP and PPG housing need figure for Wyre Forest. The potential impacts of the PPG housing need figure (+276 per annum) on population and employment growth has been considered using assumptions from the ONS 2016-based SNHP model. In addition, three employment-led scenarios have been developed to consider the potential population and housing growth impact of economic growth in Wyre Forest, as defined by the emerging Employment Land Review (ELR).

E.5 All scenario growth outcomes are presented for the Council's 2016–2036 plan period, which includes an additional two years to the Council's previous OAN (2017) plan period (2016–2034).

E.6 The latest 2017 MYE for Wyre Forest estimated a population of 100,715, the highest population recorded for the district since 2001. Over the last five years, population growth has been driven by net internal migration into the district, at a level higher than that experienced pre-recession.

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/740441/National_Planning_Policy_Framework_web_accessible_version.pdf
[2] https://www.gov.uk/guidance/housing-and-economic-development-needs-assessments

E.7 The ONS 2016-based SNPP for Wyre Forest estimates population growth of 5.2% over the 2016–2036 plan period, with an estimated average annual dwelling growth of +214 per annum. Using assumptions from the ONS 2016-based SNHP, population growth of +8.5% is estimated to support the PPG housing need figure, supporting an average annual employment growth of +128 (2016–2036).

E.8 Under the employment-led scenarios, population decline (-2.2%) is estimated under the 'Past Trends' scenario, driven by a decline in employment change over the forecast period. Conversely, higher employment growth under the Policy On ELR scenario, results in population growth of +5.2%, closely aligned to the SNPP-2016. Over the 2016–2036 plan period, the employment-led scenarios would support an estimated dwelling growth range of 50–215 dpa.

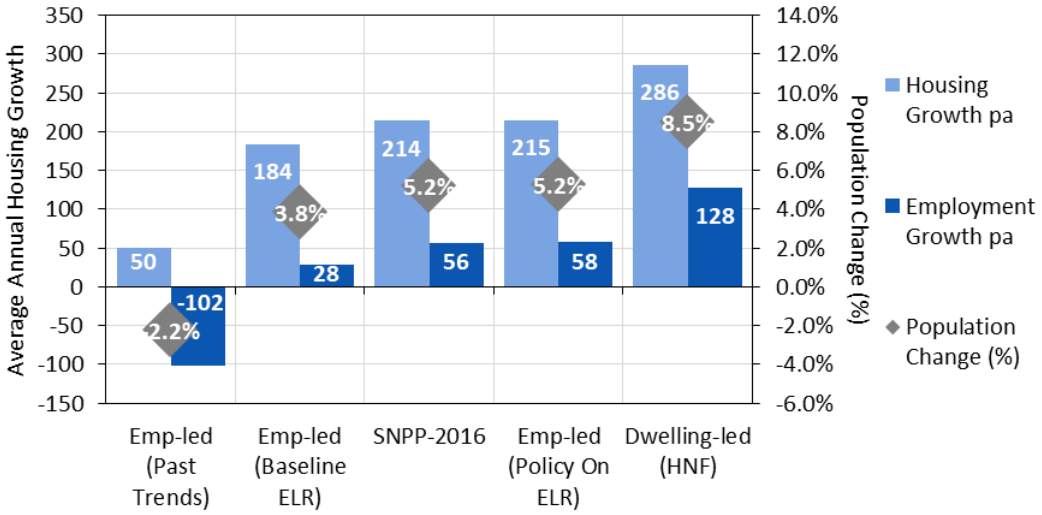


Figure 1: Wyre Forest population change (%) and average annual housing & employment growth (2016–2036)

Contents

1 Introduction

Context

1.1 In February 2017, Edge Analytics provided a range of demographic evidence to support AMION Consulting and arc4 in providing an updated Objectively Assessed Housing Need (OAHN) and Local Plan Review for Wyre Forest[3]. This was later published in April 2017, identifying an OAHN of 300 dwellings per annum over the 2016–2034 plan period.

1.2 The evidence produced by Edge Analytics took account of the 2014-based subnational population and household projections (SNPP and SNHP) from the Office for National Statistics (ONS) and Ministry of Housing, Communities and Local Government (MHCLG)[4], ONS mid-year population estimates to 2015 and labour market analysis from the Office for Budget Responsibility's (OBR) 2015 Fiscal Sustainability Report.

1.3 The 2014-based SNPP was presented as the demographic starting point, alongside four demographic scenarios based on variant migration histories. Household and dwelling growth was estimated using assumptions from the 2014-based SNHP and the 2011 Census vacancy rate of 4.5% for Wyre Forest. Headship rate sensitivity analysis considered the potential impact of higher household formation in the young adult age groups under each of the demographic scenarios.

1.4 In addition, the potential labour force and employment growth under each of the demographic scenarios was estimated using key assumptions on commuting, unemployment and economic activity rates. Two alternative economic activity rate profiles were applied, making adjustments to the older (60–75+) and all (16–75+) age groups. The estimated employment growth under each of the demographic scenarios was compared to the Experian (December 2016), Oxford Economics (October 2016) and Cambridge Econometrics (November 2016) economic forecasts for Wyre Forest.

1.5 In the absence of a population register, the UK continues to rely on the ten-yearly Census for a definitive count of population within its constituent local authority areas. Between Censuses, mid-year population estimates (MYE) are calculated, using data on births, deaths, internal and international migration to quantify annual population growth.

1.6 In the absence of a population register, the UK continues to rely on the ten-yearly Census for a definitive count of population within its constituent local authority areas. Between Censuses, mid-year population estimates (MYE) are calculated, using data on births, deaths, internal and international migration to quantify annual population growth.

1.7 Since the publication of the OAHN for Wyre Forest, a number of new datasets have been released:

[3] http://www.wyreforestdc.gov.uk/media/3004885/Wyre-Forest-OAHN-Revised-Final-Report-060617.pdf
[4] Previously referred to as the Department for Communities and Local Government (DCLG)

- 2016 and 2017 mid-year population estimates (MYE) and components of change from the ONS
- Revisions to the 2012–2016 mid-year population estimates (MYEs) by the ONS
- 2016-based subnational population projection (SNPP) from the ONS
- 2016-based subnational household projections (SNHP) from the ONS
- 2017 labour market analysis from the OBR
- 2016 and 2017 unemployment rates from ONS.

1.8 In July 2018, the government released its revised National Planning Policy Framework (NPPF)[5] along with Planning Practice Guidance (PPG)[6], outlining a standardised methodology to support the Government's objective of *"significantly boosting the supply of homes"* (para 59, NPPF 2018). Under the new guidance, the minimum housing need figure is calculated using the latest 2016-based SNHP from the ONS over a ten year period, in combination with an adjustment to take account of affordability (PPG 2018). Under the PPG methodology, the housing need figure for Wyre Forest is **+276** per annum (2018–2028), underpinned by annual 2016-based household growth of +223 pa, with a 24% uplift to account for affordability[7].

Requirements & Approach

1.9 Wyre Forest District Council has commissioned arc4 to provide an update to the OAHN, taking account of the latest demographic evidence, housing need figure under the revised PPG and employment growth trajectory under the Employment Land Review (ELR), undertaken by Lichfields.

1.10 As part of the OAHN update, Edge Analytics has been commissioned to configure scenarios to:

- consider the potential employment growth associated with the housing need figure under the PPG methodology for Wyre Forest and;
- consider the potential housing growth associated with the employment growth identified in the ELR.

1.11 Edge Analytics has used POPGROUP technology to develop the dwelling-led and employment-led scenarios outlined above. In each of the scenarios, historical data is included for the 2001–2017 period, with scenario results presented for Wyre Forest's 2016–2036 plan period. The following section presents the latest MYEs for Wyre Forest as context for the scenarios and analysis. Detail on data inputs and assumptions are included in Appendix A and Appendix B.

[5] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/740441/National_Planning_Policy_Framework_web_accessible_version.pdf
[6] https://www.gov.uk/guidance/housing-and-economic-development-needs-assessments
[7] 2017 affordability ratio was published in April 2018 by the ONS.

2 Historical Profile & ONS Projections

Mid-Year Population Estimates

2.1 In March 2018, the Office for National Statistics (ONS) revised the mid-year population estimates (MYEs) and components of change for the 2012–2016 period[8], reducing Wyre Forests' population by -105 persons.

2.2 In June 2018, the latest 2017 MYE was released, providing an additional year of historical births, deaths, internal and international migration estimates. The 2017 MYE recorded a population total of 100,715 for Wyre Forest, an increase of +708 (0.7%) from the previous year. The 2017 estimate, presents the highest recorded population for Wyre Forest since 2001, driven by increased net internal migration flows to the district.

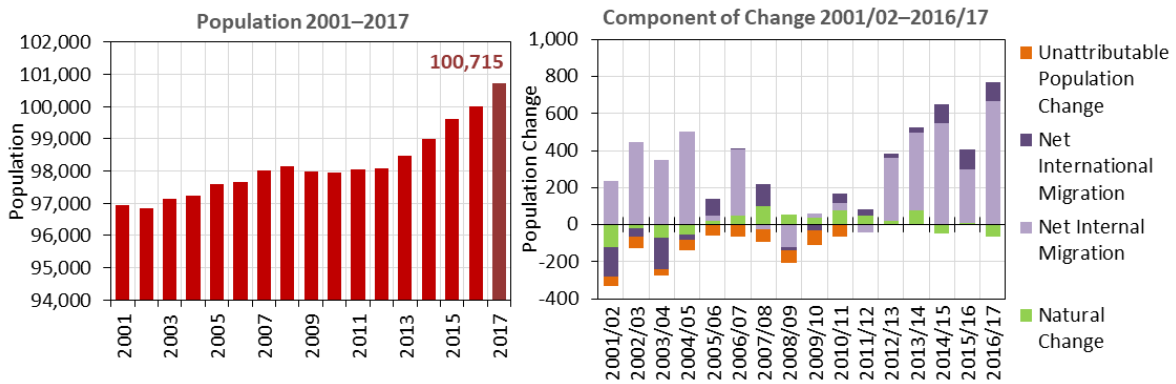


Figure 2: Wyre Forest Mid-Year Population Estimates & Components of Change 2001–2017 (Source: ONS)

2.3 Population change in Wyre Forest has been driven by net internal migration since 2001, but with lower net internal migration flows over the 2007/08–2011/12 period resulting in dampened population growth. Since 2012/13, net internal migration flows have increased, to a level higher than that recorded over the earlier years of the historical period. The latest MYE recorded the greatest net internal in-migration flow of +665, driven by a rise in inflows to the district. Net international migration has remained positive, at a similar level to the previous year (+105 persons), whilst natural change (the balance between births and deaths) has had a negative impact on population change (-62), driven by a fall in births operating in tandem with a rise in deaths.

[8] https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2012tomid2016

2016-based Population & Household Projections

2.4 The population and household projections from the ONS form the starting point in the assessment of future housing need. Every two years, the ONS publishes national and sub-national population projections, setting key assumptions on the long term effects of fertility, mortality and migration to estimate population growth outcomes for local authorities in England.

2.5 The latest 2016-based SNPP is calibrated using assumptions derived from a pre-2016 five-year historical period, in combination with national assumptions on fertility, mortality and international migration.

2.6 Under the 2016-based SNPP for Wyre Forest, population growth of +5,195 (5.2%) is estimated over the 2016–2036 plan period. Population growth under the 2016-based SNPP is driven by net internal inflows (i.e. people moving from other parts of the UK to Wyre Forest), with net international migration having a small but positive impact on population change. Conversely, natural change (i.e. the difference between births and deaths) is estimated to have a negative impact on population growth, reducing further toward the end of the plan period.

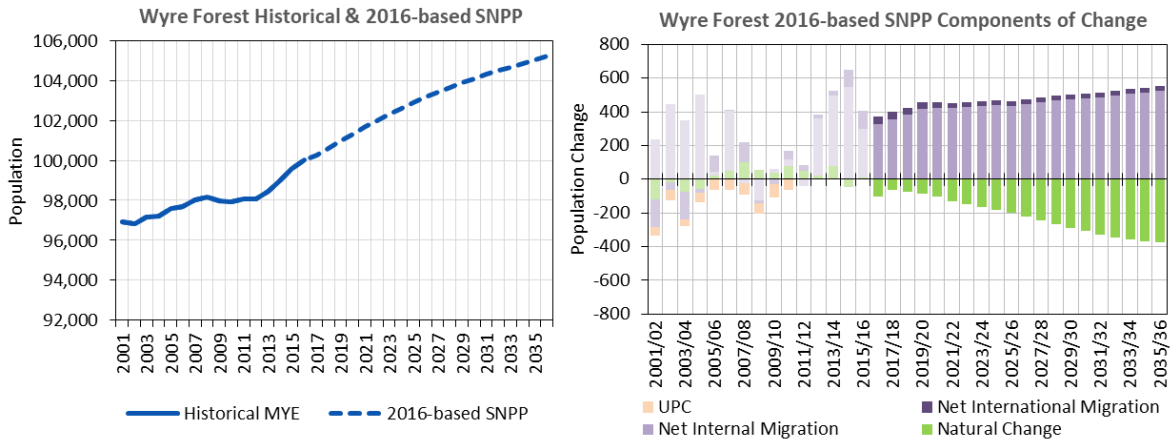


Figure 3: Wyre Forest 2016-based SNPP and components of change (Source: ONS)

2.7 The 2016-based SNHP are underpinned by the 2016-based SNPP. For Wyre Forest, household growth of +4,087 (204 pa) is estimated over the 2016–2036 plan period, an increase of 9.2% (Figure 4). This is driven by underpinning population growth, along with a falling average household size from 2.23 in 2016 to 2.14 by 2036, a 0.09 reduction.

2.8 Under the PPG methodology, the 'baseline' ONS 2016-based annual household growth for the 2018–2028 period is +223. To take account of affordability, a 24% uplift is applied (+53 per annum) resulting in an annual housing need figure of +276 per annum (2018–2028).

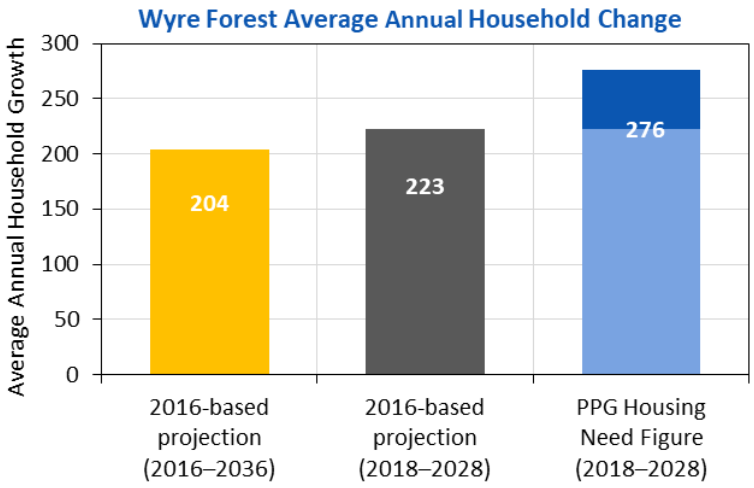


Figure 4: Wyre Forest Average Annual Household Change

3 Scenario Definition & Outcomes

Scenario Definition

3.1 For comparison with the latest 2016-based SNPP and SNHP, and to consider the potential impact of annual housing and employment growth on population change in Wyre Forest, four scenarios have been developed.

3.2 Under each of the scenarios (notwithstanding the SNPP-2016), historical population is defined to 2017, with the annual housing or employment growth targets applied thereafter. Under the **SNPP-2016** scenario historical population is defined to 2016, following the official projection thereafter. Under all scenarios, the relationship between population and housing growth is estimated using assumptions from the latest ONS 2016-based SNHP and a 4.5% vacancy rate from the 2011 Census.

Employment-led Scenarios

3.3 Three employment-led scenarios have been configured to consider the estimated migration, population, migration and dwelling growth associated with economic forecasts used in Wyre Forest's emerging Employment Land Review (ELR).

3.4 Under each of the employment-led scenarios, the estimated level of population growth required to support the annual change in employment, is driven by three key economic assumptions; economic activity rates, commuting ratio and unemployment rate.

3.5 **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). In the analysis presented here, economic activity rates by age group (16–89) and sex have been applied, with adjustments made to all age groups in line with the 2017 OBR analysis[9] (Figure 5).

[9] http://obr.uk/fsr/fiscal-sustainability-report-january-2017/

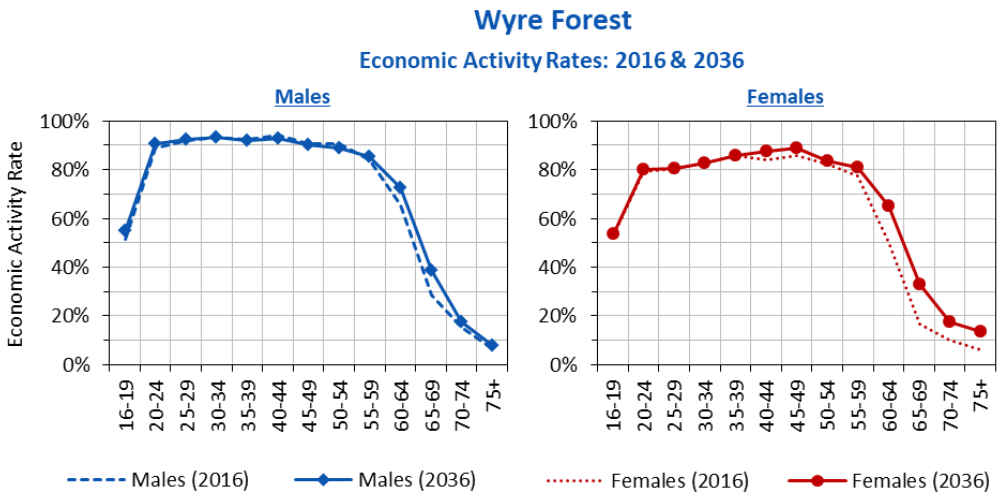


Figure 5: Wyre Forest 2011 Census economic activity rates with OBR adjustments 16–89 (2016 and 2036)

3.6 The **unemployment rate** determines the proportion of the labour force that is unemployed, and therefore employed. Historical unemployment rates have been defined to 2017, fixed at the current rate of 3.9% thereafter (Figure 6).

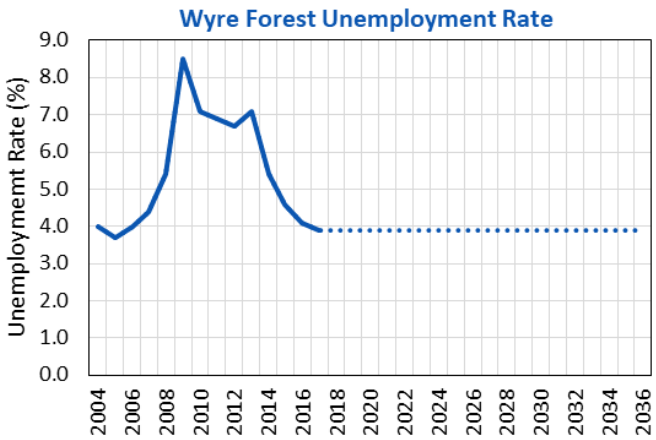


Figure 6: Wyre Forest unemployment rate (Source: ONS model-based)

3.7 The **commuting ratio** is the balance between the number of resident workers in Wyre Forest and the level of employment available. A commuting ratio greater than 1.00 indicates a net out-commute (i.e. there are a greater number of resident workers than employment), whilst a commuting ratio of less than 1.00 indicates a net in-commute (i.e. greater employment than resident workers). In the analysis presented here, the 2011 Census commuting ratio of 1.24 has been applied, fixed throughout the forecast period.

Table 1: Wyre Forest 2001 and 2011 Census commuting ratio

Wyre Forest	2001 Census	2011 Census
Workers	47,127	46,672
Employment	37,170	37,692
Commuting Ratio	***1.27***	***1.24***

3.8 Three employment-led scenarios have been developed using (i) past trends, (ii) Experian 'baseline' forecast; and (iii) a 'policy on' forecast for Wyre Forest. Under the employment-led scenarios, the annual change in employment has been applied in each year of the forecast period, taking account of double jobbing[10]. Under the 'Past Trend' trajectory -2,402 is estimated over the *forecast* period, whilst the 'Policy On' and 'Baseline' forecasts estimate growth of +799 and +192 respectively (2017/18–2035/36).

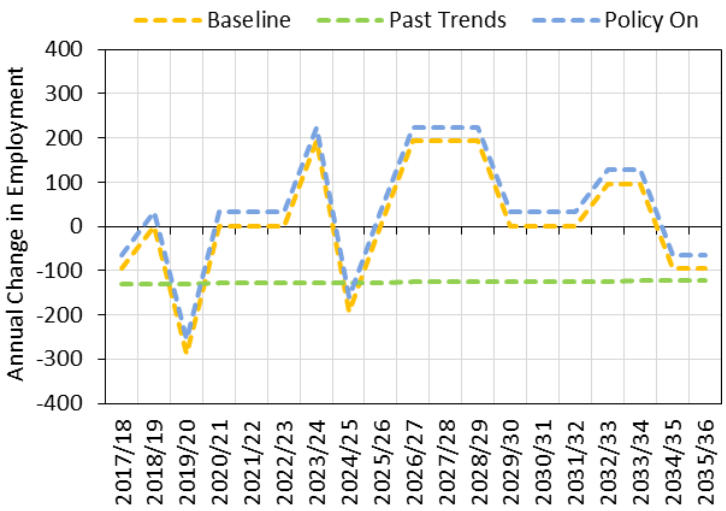


Figure 7: Wyre Forest employment forecasts (2017/18–2035/36)

- **Employment-led (Past Trend):** Annual change in employment is applied in each year of the forecast period (i.e. from 2017/18 onward), derived from past trend.

- **Employment-led (Baseline ELR):** Annual change in employment is applied in each year of the forecast period (i.e. from 2017/18 onward), in line with Experian forecasts used in the emerging ELR for Wyre Forest.

- **Employment-led (Policy On ELR):** Annual change in employment is applied in each year of the forecast period (i.e. from 2017/2018 onward), in line with the 'Policy On' forecast used in the emerging ELR for Wyre Forest.

[10] Under each of the employment-led scenarios, an adjustment of 3.9% has been made to account for double jobbing, fixed throughout the forecast period. This is based on a long term average (2004–2017).

Dwelling-led (HNF) Scenario

3.9 A dwelling-led scenario has been developed to consider the future implications of the PPG housing need figure (HNF), on population and subsequent employment growth in Wyre Forest. Under the **Dwelling-led (HNF)** scenario, the annual housing growth of **+276** dpa has been applied in each year of the forecast period (i.e. from 2017/18 onward).

3.10 The level of employment growth that could be supported by the forecast population growth under the **Dwelling-led (HNF)** scenario has been derived using three key economic assumptions on economic activity rates, unemployment rates and a commuting ratio. These three assumptions are consistent with those applied under the employment-led scenarios.

Scenario Outcomes

3.11 Figure 8 presents the population growth trajectory under each of the scenarios for the 2001–2036 period. The population and household change, along with average annual net migration and employment growth under all scenarios are presented in Table 2 for the 2016–2036 plan period.

3.12 Under the **SNPP-2016** scenario, population growth of 5.2% over the plan period is estimated to support household growth of 4,807 and an average annual dwelling growth of +214 dpa. The population size and age structure estimated under the **SNPP-2016** scenario could support an average annual employment growth of +56 per annum.

3.13 The standardised methodology applies a 24% uplift to Wyre Forest's 2016-based SNHP, to produce the housing need of +276 dpa. Converting these additional new homes into population (using the household representative rates that underpin the 2016-based SNHP) results in estimated population growth of 8.5% under the **Dwelling-led (HNF)** scenario. This higher population growth supports higher employment growth than estimated in the ELR scenarios.

3.14 Population and dwelling growth estimated under the **Employment-led (Policy On ELR)** scenario is closely aligned to the **SNPP-2016**. Under the **Employment-led (Past Trends)** scenario, a decline in employment change over the plan period, results in population decline of -2.2%, with an estimated average annual dwelling growth of +50 dpa.

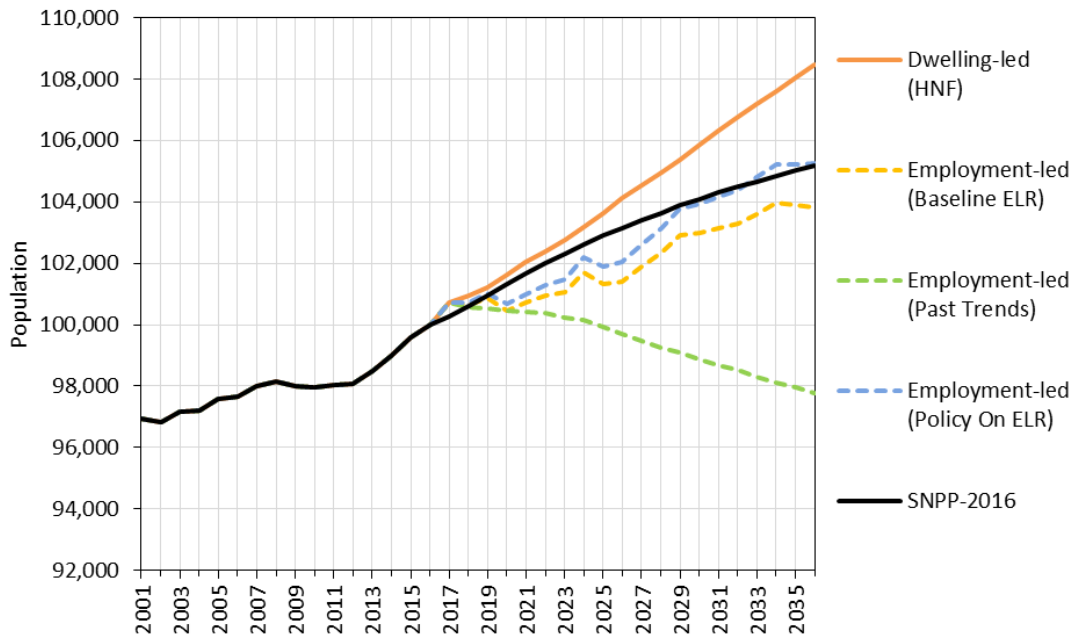


Figure 8: Wyre Forest population growth trajectory (2001–2036)

Table 2: Wyre Forest scenario outcomes 2016–2036

Scenario	Change 2016–2036				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Employment
Dwelling-led *(HNF)*	8,489	8.5%	5,472	12.3%	629	286	128
Employment-led *(Policy On ELR)*	5,246	5.2%	4,111	9.3%	479	215	58
SNPP-2016	***5,195***	***5.2%***	***4,087***	***9.2%***	***478***	***214***	**56**
Employment-led *(Baseline ELR)*	3,824	3.8%	3,512	7.9%	414	184	28
Employment-led *(Past Trends)*	-2,242	-2.2%	957	2.2%	132	50	-102

Historical population included to 2017, therefore scenario outcomes for the 2016–2036 plan period include one year of historical population estimates

4 Summary

4.1 The analysis has considered the potential population and housing growth implication of the employment growth trajectories under the emerging Employment Land Review (ELR) for Wyre Forest; in context of the growth implications of the 2016-based SNPP and PPG minimum housing need figure. For comparison with the SNPP-2016 and PPG housing need figure, three employment-led scenarios have been developed using the Past Trend, Baseline and Policy On economic forecasts.

4.2 Each of the scenarios has incorporated assumptions from the latest 2016-based SNPP for Wyre Forest and the latest 2017 mid-year population estimate from ONS (notwithstanding SNPP-2016 which retains its 2016 base year). In estimating future population required to support the PPG housing need figure, assumptions from the latest ONS 2016-based household projection model has been used, together with the 2011 Census vacancy rate for Wyre Forest. Under the employment-led scenarios, these assumptions estimate the household and dwelling growth that would be required to support the population growth trajectory.

4.3 Population change, average annual dwelling and employment growth under each of the scenarios is summarised in Figure 9. The **SNPP-2016** for Wyre Forest estimates population growth of 5.2% over the 2016–2036 period; supporting an average annual dwelling growth of +214 dpa and employment growth of +56 pa.

4.4 Under the **Dwelling-led (HNF)** scenario, the household formation rates under the 2016-based household model would result in a population growth of 8.5% over the plan period. This would support a larger labour force than estimated under the employment-led scenarios, resulting in an average annual employment growth of +128 (2016–2036).

4.5 Under the employment-led scenarios the economic growth forecast under the ELR, results in population change ranging from -2.2% to +5.2% (**Past Trend** and **Policy On ELR** scenarios respectively), with the upper end of this range closely aligned with the **SNPP-2016**. Under the 2016-based household projection model, a dwelling growth range of 50–215 dpa is estimated over the 2016–2036 plan period.

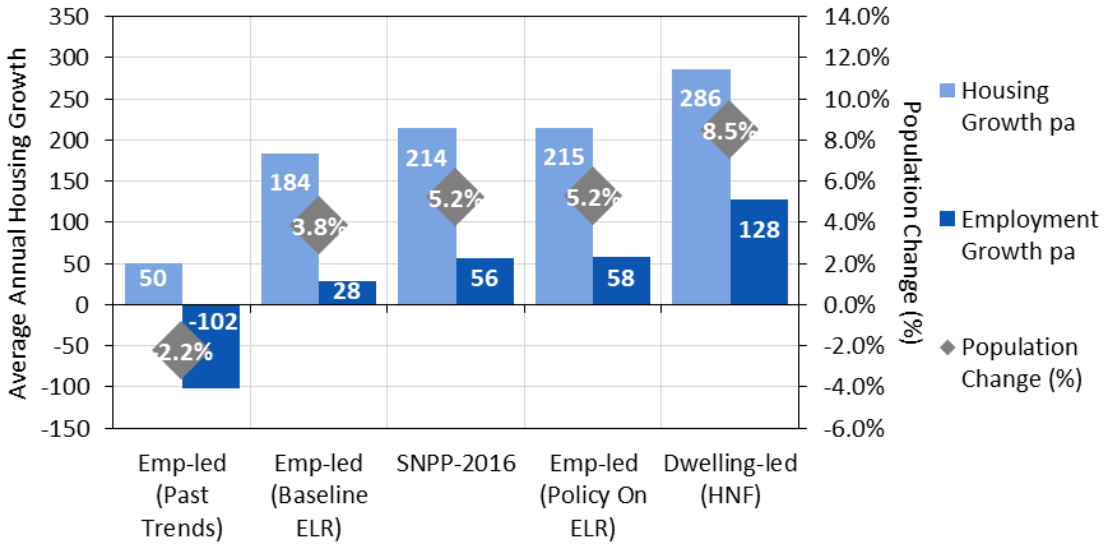


Figure 9: Wyre Forest population change (%) and average annual housing & employment growth (2016–2036)

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. The main POPGROUP model (Figure 8) is a cohort component model, which enables the development of population forecasts based on births, deaths and migration inputs and assumptions.

A.3 The Derived Forecast (DF) model (Figure 9) sits alongside the population model, providing a headship rate model for household projections and an economic activity rate model for labour-force projections.

A.4 In the absence of a population register, the UK continues to rely on the ten-yearly Census for a definitive count of population within its constituent local authority areas. Between Censuses, mid-year population estimates (MYE) are calculated, using data on births, deaths, internal and international migration to quantify annual population growth.

A.5 For further information on POPGROUP, please refer to the Edge Analytics website (http://www.edgeanalytics.co.uk/).

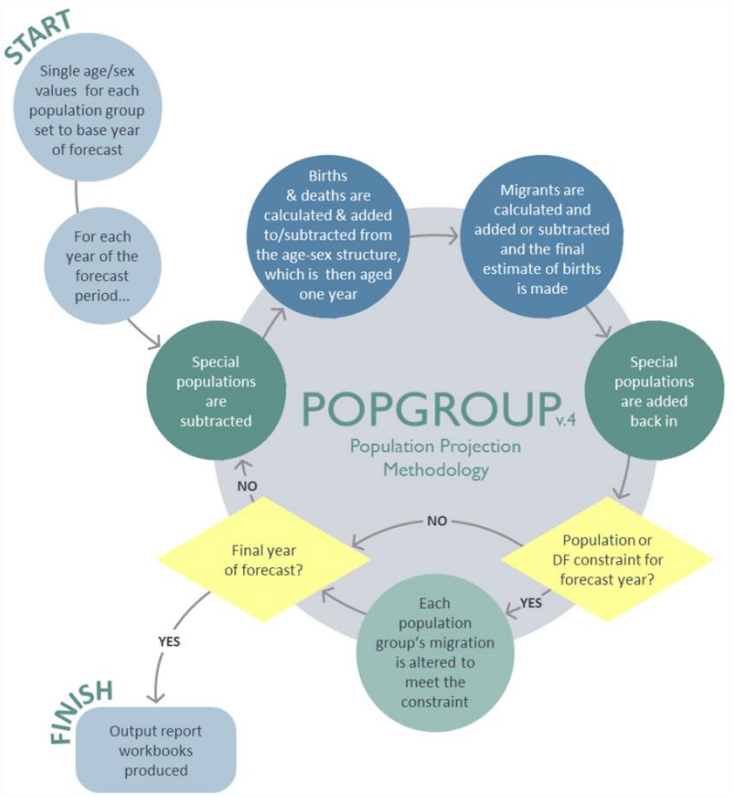
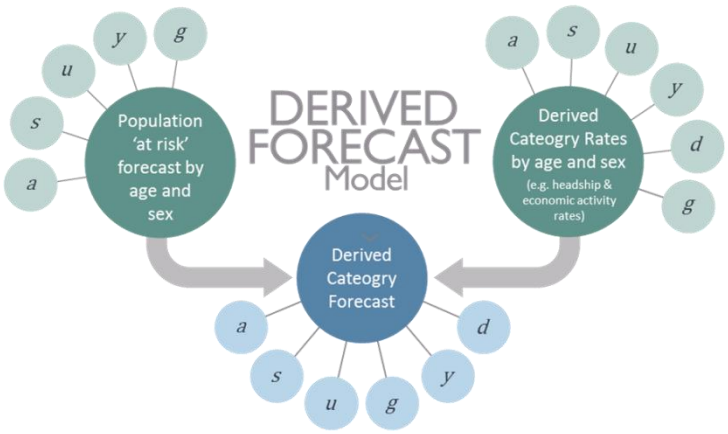


Figure 10: POPGROUP population projection methodology



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

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

Figure 11: Derived Forecast (DF) methodology

Appendix B
Data Inputs & Assumptions

Population

B.1 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, and 2012–2016 which were released in March 2018. The 2002–2010 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, whilst the revisions to the 2012–2016 MYEs included changes to the estimation of international migration. In all scenarios, the historical MYEs are used up to 2017.

Births & Fertility

B.2 In each scenario, historical mid-year to mid-year counts of births by sex have been sourced from the ONS MYEs.

B.3 In the **SNPP-2016** scenario, historical births are used from 2001/02–2015/16. From 2016/17, future counts of births are specified, to ensure consistency with the 2016-based official projection.

B.4 In all other scenarios, historical births are used from 2001/02 to 2016/17. From 2017/18, an area-specific age-specific rate (ASFR) schedule, derived from the ONS 2016-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.5 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 2018 onwards).

Deaths & Mortality

B.6 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.

B.7 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.8 In all other scenarios, historical deaths are used from 2001/02 to 2016/17. From 2017/18, 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.9 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 2018 onwards).

Internal Migration

B.10 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.11 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.12 In the **Employment-led** (**Past Trend, Baseline ELR and Policy On ELR**) and **Dwelling-led (HNF)** scenarios, historical counts of internal in and out-migrants are used from 2001/02 to 2016/17. From 2017/18, these scenarios then calculate their own internal migration assumptions to ensure an appropriate balance between the population and the targeted increase in the number of employment/dwellings/households 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, or if there is insufficient population to support the defined level of housing growth. In the **Employment-led (Past Trend, Baseline ELR and Policy On ELR)** and **Dwelling-led (HNF)** scenarios, the profile of internal migrants is defined by an ASMigR schedule, derived from the ONS 2016-based SNPP.

B.13 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 Wyre Forest, it comprises all districts which cumulatively contributed 70% of migrants into the Worcester and Greater Birmingham & Solihull LEP over the 2008/09–2016/17 period.

International Migration

B.14 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.15 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.16 In the **Employment-led (Past Trend, Baseline ELR and Policy On ELR)** and **Dwelling-led (HNF)** scenarios, historical counts of international in and out-migrants are used from 2001/02 to 2016/17. From 2017/18, international migration counts are taken from the ONS 2016-based SNPP). 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.17 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.18 In POPGROUP, a dwelling is defined as a unit of accommodation which can either be occupied by one household or vacant.

B.19 In the **Employment-led (Past Trend, Baseline ELR and Policy On ELR)** scenarios, the household and dwelling implications of the population growth trajectory have been evaluated through the application of household representative rate statistics, communal population statistics and a dwelling vacancy rate. These data assumptions have been sourced from the 2001 and 2011 Censuses and the 2016-based household projection model. The 2016-based model was released by the ONS in September 2018, and is underpinned by the 2016-based SNPP from ONS.

B.20 In the **Dwelling-led (HNF)** scenario, these assumptions are used to determine the level of population growth required by the defined dwelling growth trajectory.

Household Headship Rates

B.21 A household representative rate is the "*proportion of people in a particular demographic group who were the household reference person*"[11].

B.22 The household representative rates used in the POPGROUP modelling have been taken from the latest ONS 2016-based household projection model, which is underpinned by the ONS 2016-based SNPP. The ONS household projections are derived through the application of projected household representative rates to a projection of the private household population. Under all scenarios, the household representative rates have been applied by age groups and sex.

[11] Methodology used to produce household projections for England: 2016-based. Office for National Statistics (September 2018). https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/methodologies/methodologyusedtoproducehouseholdprojectionsforengland2016based

Communal Population Statistics

B.23 Household projections in POPGROUP exclude the population 'not-in-households' (i.e. the communal/institutional population). These data are drawn from the ONS 2016-based household projections, which use statistics from the 2011 Census. Examples of communal establishments include prisons, residential care homes and student halls of residence.

B.24 For ages 0–74, the number of people in each age group not-in-households is fixed throughout the forecast period. For ages 75–90+, the proportion of the population not-in-households is recorded. Therefore, the population not-in-households for ages 75–90+ varies across the forecast period depending on the size of the population.

Vacancy Rate

B.25 The relationship between households and dwellings is modelled using a 'vacancy rate', sourced from the 2011 Census[12]. The vacancy rate is calculated using statistics on households (occupied household spaces) and dwellings (shared and unshared).

B.26 A vacancy rate of 4.5% for Wyre Forest has been applied, fixed throughout the forecast period. Using the vacancy rate, the 'dwelling requirement' of each household growth trajectory has been evaluated.

[12] Census Table KS401EW: Dwellings, household spaces and accommodation type