North East Lincolnshire Council

Demographic analysis & forecasts

October 2014

edge analytics

www.edgeanalytics.co.uk

Contact Details

Edge Analytics Ltd.

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.1.0.

Table of Contents

1. Requirements

Requirements

1.1 North East Lincolnshire Council (NELC) is currently updating the evidence base for its new Local Plan, using the most up-to-date demographic data inputs and assumptions, and the latest economic forecasts.

1.2 NELC require an updated position in relation to the Housing Projections previously anticipated in the 2013 Strategic Housing Market Assessment (SHMA)[1] for North East Lincolnshire (Figure 1). The aim of this project is to provide part of the evidence base for assessing the housing target for the Local Plan.

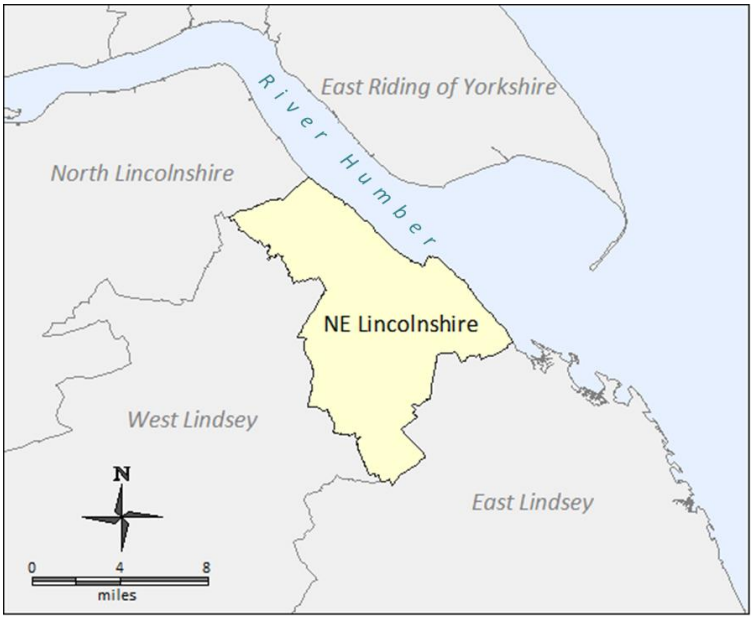


Figure 1: Area Definition – North East Lincolnshire

1.3 The project has been delivered in two stages. Stage 1 comprised initial forecast results delivery in a form of a report, delivered mid-August 2014. Stage 2 consists of a report presenting the final forecast results and analysis (this document).

[1] http://www.nelincs.gov.uk/council/planning-policy/evidence-base/local-documents/housing/strategic-housing-market-assessment/

This Report

1.4 **This Report constitutes stage 2 of the project deliverable and is organised as follows:**

- A demographic profile of North East Lincolnshire is presented in section 2. This includes an historical perspective on population change in the borough since the 2001 Census, an analysis of the 'components of population change' from the 2012-based SNPP and an indication of the effect of demographic ageing upon North East Lincolnshire's population profile.
- In Section 3, the range of scenario alternatives is detailed, with growth outcomes presented in section 4.
- Section 5 concludes with a summary of the analysis, scenario outcomes and issues for North East Lincolnshire Council to consider in the development of its Local Plan.
- Appendix A presents an overview of the POPGROUP methodology.
- Appendix B provides detail on the data inputs and assumptions used in the development of the POPGROUP scenarios.

2. Area Profile

Mid-Year Population Estimates

2.1 Between successive Censuses, population estimation is necessary. These mid-year population estimates (MYEs) are derived through estimation of the components of population change (i.e. counts of births and deaths and counts of internal and international migration).

2.2 Following the 2011 Census, the 2002–2010 MYEs were 'rebased' to align them with the new population evidence[2], ensuring the correct transition of the growth and age profile of the population over the 2001–2011 decade. At the 2011 Census, the resident population of North East Lincolnshire was 159,616, a 1.0% increase over the 2001–2011 decade. The 2011 Census population total proved to be considerably *higher* than that suggested by the trajectory of growth from the previous MYEs (Figure 2).

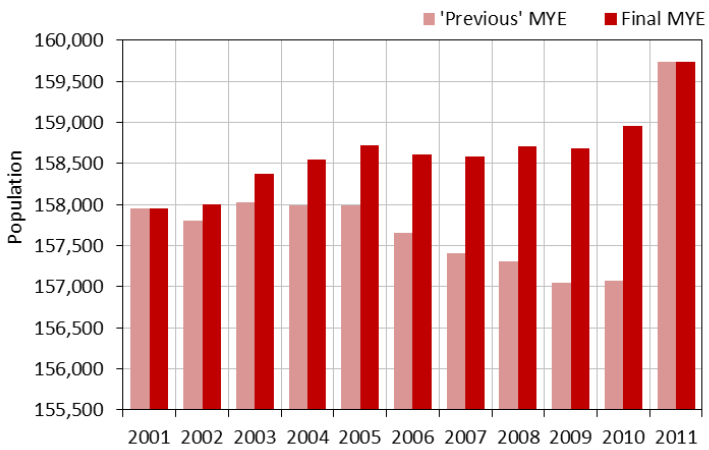


Figure 2: NE Lincolnshire – mid-year population estimates (source: ONS).

Components of Population Change

2.3 The rebasing of the MYEs involved the recalibration of the components of population change for 2001/02 to 2010/11.

[2] Revised Annual Mid-year Population Estimates, 2001 to 2010. ONS, December 2013
http://www.ons.gov.uk/ons/dcp171778_345500.pdf

2.4 Between Censuses, births and deaths are accurately recorded in vital statistics registers and provide a robust measure of 'natural change' (the difference between births and deaths) in a geographical area. Given that births and deaths are robustly recorded, and assuming that the 2001 Census provided a robust population count, the 'error' in the MYEs is due to the difficulties associated with the estimation of migration.

2.5 Internal migration is adequately measured through the process of GP registration, although data robustness may be lower where there is under-registration in certain age-groups (young males in particular). It is therefore most likely that the 'error' in the previous MYEs was associated with the mis-estimation of international migration, i.e. the balance between immigration and emigration flows to and from North East Lincolnshire.

2.6 However, ONS has not explicitly assigned the MYE adjustment to international migration. Instead it has identified an additional 'unattributable population change' (UPC) component, suggesting it has not been able to accurately identify the source of the 2001–2011 'error' (Figure 3).

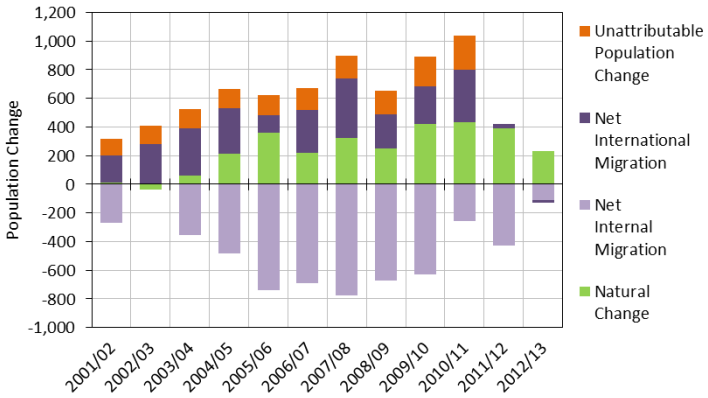


Figure 3: NE Lincolnshire – components of population change 2001/02–2012/13 (source: ONS).

Note: No UPC component is applied to the 2011/12 or 2012/13 statistics as these relate to the 2012 and 2013 MYEs, which followed the 2011 Census.

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

2.8 With the assumption that the UPC element is assigned to international migration (for estimates up to 2011) and with the inclusion of statistics from the 2012 and 2013 MYEs (ONS), a twelve-year profile of the 'components of population change' for North East Lincolnshire is presented (Figure 4).

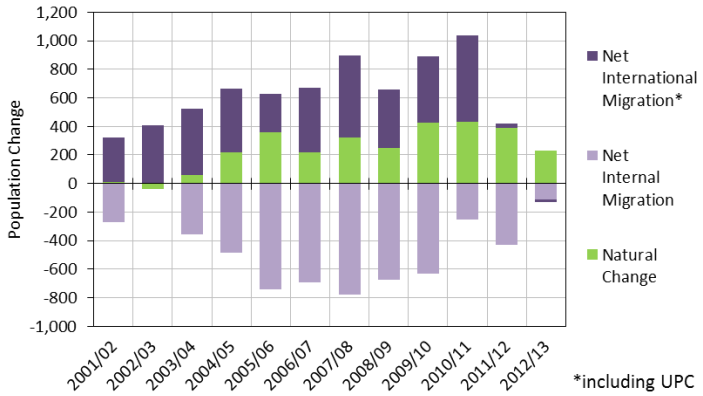


Figure 4: NE Lincolnshire – components of population change 2001/02–2012/13, including the UPC component (source: ONS).

2.9 Growth due to natural change was positive in all years of the twelve-year period, except for 2002/03. The contribution of net internal migration to population growth in North East Lincolnshire has varied over time but maintained the negative impact in all years 2001/02 – 2012/13, except for 2002/03, when the net internal migration was zero. Population growth due to net international migration was positive between 2001/02 and 2011/12, but negative in 2012/13.

Official Population Projections

2.10 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 sub-national population projection (SNPP) is the 2012-based SNPP, released by ONS in May 2014[3]. This projection is compared to the earlier ONS population projections for North East Lincolnshire, to illustrate the variation in projected growth outcomes for the borough (Figure 5).

[3] 2012-based SNPP for England, ONS, 29th May 2014 http://www.ons.gov.uk/ons/dcp171778_363912.pdf

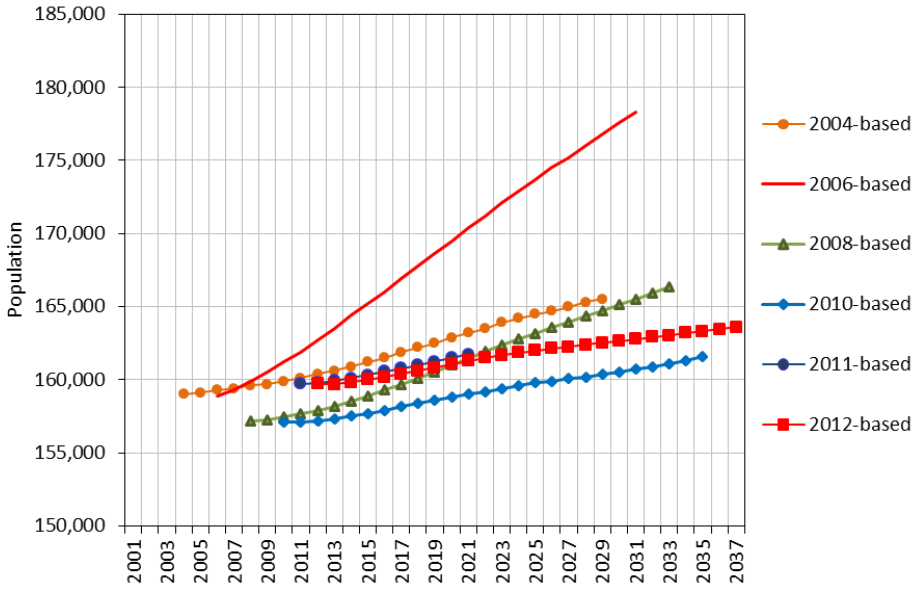


Figure 5: North East Lincolnshire – official sub-national population projections (source: ONS).

2.11 The 2012-based SNPP has a *lower* rate of growth than the earlier, 2010-based projections. Under the 2012-based SNPP, the population of North East Lincolnshire is projected to increase by 3,884 over the 2012–2037 projection period, a 2.4% increase. Under the 2010-based SNPP, the population was projected to increase by 2.9% over its 25-year projection horizon (2010–2035).

2.12 The 2012-based SNPP components of population change are presented in Figure 6, with the historical components of change for 2001/02 to 2011/12 included for comparison. The annual average natural change, net migration (internal and international) and population change for the 2012-based SNPP are compared to the historical 5-year and 10-year averages in Table 1.

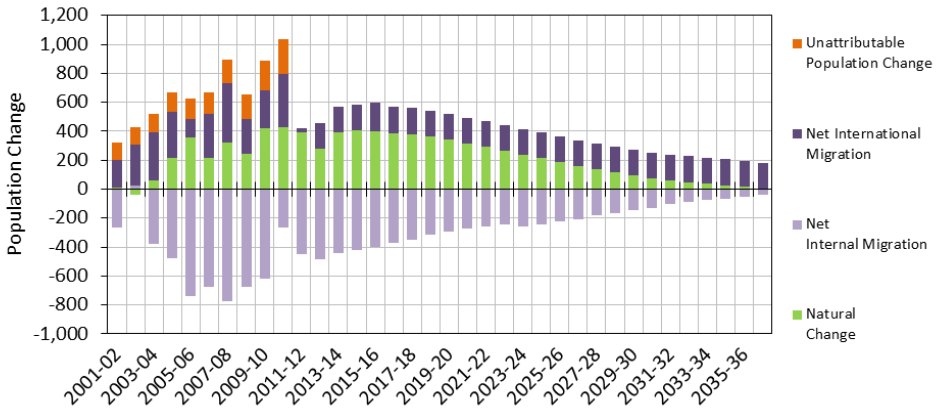


Figure 6: NE Lincolnshire – historical and 2012-based SNPP components of change (source: ONS).

Table 1: North East Lincolnshire – 2012-based SNPP components comparison (source: ONS)

Component of Change	Historical		Projected
	5-year average (2007/08–2011/12)	10-year average (2002/03–2011/12)	2012-based SNPP average (2012/13–2036/37)
Natural Change	363	263	209
Net Internal Migration	-556	-503	-233
Net International Migration	262	267	179
Unattributable Population Change*	156	147	-
Annual Population Change	223	170	155
Annual Population Change (%)	0.14%	0.11%	0.10%

* UPC is only applicable to the years 2001/02 - 2010/11

Note: In the historical data, annual population includes additional adjustments made by ONS to the final MYE populations.

2.13 Over the 5-year and 10-year historical period, average net international migration and average natural change have had a positive impact upon population growth. The 2012-based SNPP suggests a reduction in natural change and net international migration (compared to the historical evidence). Average net internal migration was negative over the 5-year and 10-year historical period. This continues in the 2012-based SNPP, but with a reduced net loss.

Population Structure

2.14 The aggregate population change statistics hide changes to the age profile of North East Lincolnshire's population that is projected by the 2012-based SNPP (Figure 7). The gradual ageing of the resident population has important implications for the size and structure of the local labour force and on the expected profile of future household formation.

2.15 Summary indicators on population ageing, quantify the importance of the issue in North East Lincolnshire relative to the wider regional and national population (Table 2).

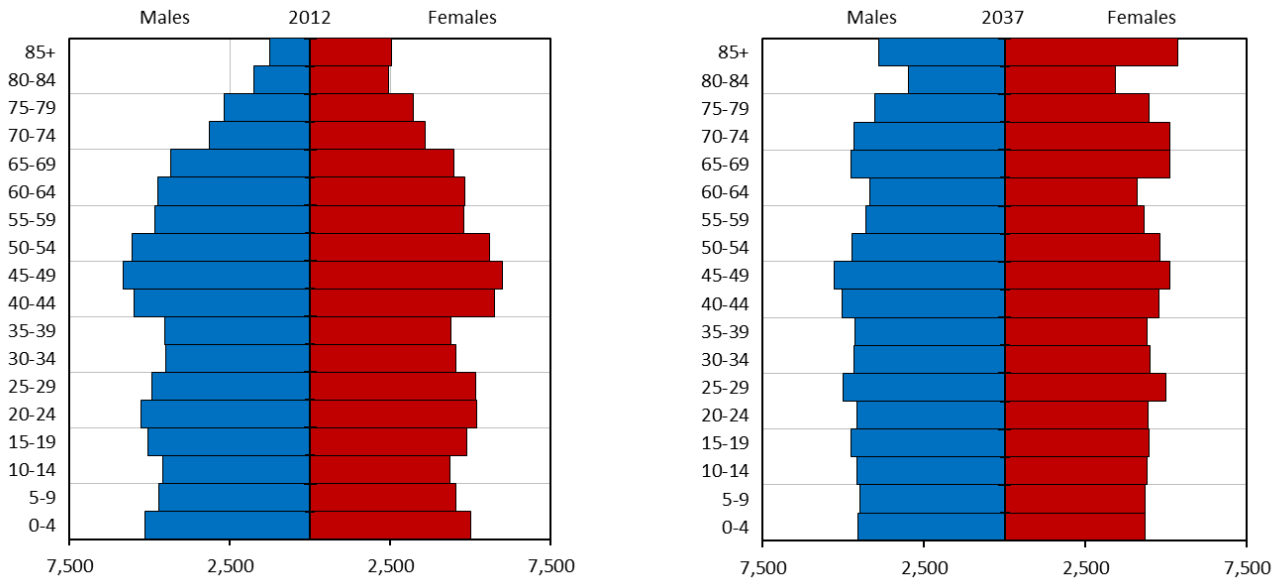


Figure 7: NE Lincolnshire – changing age structure, 2012–2037 (source: ONS 2012-based SNPP).

Table 2: NE Lincolnshire– indicators of population ageing (source: ONS 2012-based SNPP)

	NE Lincolnshire		Yorks & Humber		England	
Ageing Indicator	**2012**	**2037**	**2012**	**2037**	**2012**	**2037**
Percentage aged 65+	18%	27%	17%	24%	17%	24%
Percentage aged 80+	5%	10%	5%	8%	5%	8%
Old Age Dependency (OAD) ratio	29%	47%	26%	41%	26%	41%
Median Age	41.5	44.5	39.9	42.3	39.6	42.6

OAD = The proportion of the population aged 65+ relative to the working-age population 15-64.

Median Age = the age that divides the population into two numerically equal groups

2.16 The regional picture reflects what is projected to happen at the national level but the expected impact of population ageing is slightly more pronounced in North East Lincolnshire. The percentage of the population aged 65+ is projected to increase to 27% by 2037, with the percentage aged 80+ expected to double over the same period. North East Lincolnshire's median age is already higher compared to the national average, and is expected to reach almost 45 by 2037. As a consequence the old age dependency (OAD) ratio, which measures the relationship between the size of the population aged 65+ and the labour force population (aged 15-64), is projected to rise from 29% to 47% over the 25-year horizon.

2.17 These projected shifts in the age structure of North East Lincolnshire's population are especially important when considering the relationship between anticipated jobs growth and future demographic change. A gradual decline in the relative size of the labour force will inevitably result in a lower job 'requirement' under the current economic activity and commuting conditions. Forecasts of future jobs growth in North East Lincolnshire need to consider how these new jobs are to be fulfilled: through increased rates of economic participation in the resident labour force; through changes to the existing balance of commuting; or through the in-migration of additional population to counter-balance the ageing of the labour force.

Commuting Balance

2.18 North East Lincolnshire's commuting balance has remained largely unchanged over the 2001-2011 inter-censal period maintaining the balance between resident workers and employment (Table 3).

Table 3: North East Lincolnshire – commuting ratios (source: ONS)

North East Lincolnshire UA		2001 Census[1]	2011 Census[2]
Workers	a	65,921	70,776
Jobs	b	66,057	71,125
Commuting Ratio	a/b	**0.998**	**0.995**

[1] *2001 Census - Table T101 - UK Travel Flows*

[2] *2011 Census - WU02UK - Location of usual residence and place of work by age*

2.19 In both, 2001 and 2011, the number of jobs slightly exceeded the number of workers in North East Lincolnshire resulting in a net in-commute into the borough.

3. Scenario Definition

Introduction

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

3.2 Edge Analytics has used POPGROUP (v.4) technology to develop a range of scenario alternatives for North East Lincolnshire. The scenario alternatives, which include 'trend' and 'jobs-led' scenarios, are 'benchmarked' against the latest official population projection for the borough.

3.3 Sensitivity testing has been conducted to examine the impact of varying the rates of household formation on dwelling growth outcomes, using headship rates from both the 2011-based and the 2008-based Department for Communities and Local Government (DCLG) household models.

3.4 In all scenarios, 2011 Census economic activity rates have been applied (adjusted to account for changes to the State Pension Age), the unemployment rate has been incrementally reduced from 2013-2018 to account for recovery following the recession and a fixed 2011 commuting ratio has been applied.

3.5 Additional sensitivities have been tested to: examine the effect of further changes to the commuting balance upon demographic growth linked to the jobs forecast; and to examine the effect of incrementally reducing the unemployment rate over a longer period of time (2013-2023).

3.6 For detail on the POPGROUP methodology, refer to Appendix A. For detail on the household, dwelling and economic assumptions underpinning the scenarios, refer to Appendix B.

Scenario Definition

Official Projections

3.7 In accordance with the Government Planning Practice Guidance (PPG), the scenario alternatives are 'benchmarked' against the most recent (2012-based) official population projection for North East Lincolnshire, which was released by ONS in May 2014. The **'SNPP-2012'** scenario presented here replicates this official population projection.

3.8 The **'SNPP-2010'** scenario, which replicates the ONS 2010-based SNPP for North East Lincolnshire, is included for comparison. In this scenario, the population is re-scaled to the 2012 mid-year population estimate (MYE) to ensure consistency with the 'SNPP-2012' scenario, with the 2010-based growth trajectory continued thereafter.

Alternative Trend Scenarios

3.9 A five year historical period is a typical time-frame from which internal migration 'trend' assumptions are derived (this is consistent with the ONS official methodology). Given the unprecedented economic change that has occurred since 2008, and the differences between the historical migration data and the 2012-based SNPP projection assumptions (Table 1), it is important to give due consideration to an extended historical time period for assumption derivation.

3.10 Three alternative 'trend' scenarios have therefore been developed, based upon the latest demographic evidence:

- **'PG-5Yr'**: internal migration rates and international migration flow assumptions are based on the last five years of historical evidence (2008/09 to 2012/13) with the UPC adjustment included within the international migration assumptions.
- **'PG-10Yr'**: internal migration rates and international migration flow assumptions are based on the last 10 years of historical evidence (2003/04 to 2012/13) with the UPC adjustment included within the international migration assumptions.
- **'Natural Change'**: internal and international migration rates are set to zero. This provides an indication of the degree to which future population and household growth is driven solely by natural change (i.e. the balance between births and deaths).

Jobs-led Scenarios

3.11 In a 'jobs-led' scenario, population growth is linked directly to the change in the number of jobs available within an area. POPGROUP evaluates the impact of a jobs growth trajectory by measuring the relationship between the number of jobs in an area, the size of the labour force and the size of the resident population. Migration is used to balance the relationship between the size of the labour force and the forecast number of jobs. A higher level of net in-migration will occur if there is insufficient population and resident labour force to meet the forecast number of jobs. A higher level of net out-migration will occur if the population is too high relative to the number of jobs.

3.12 The jobs growth forecasts have been sourced from the 'Economic Futures Report' produced for North East Lincolnshire by Atkins in July 2014. As a result, the following 'jobs-led' scenarios have been produced:

- **'Jobs-led (Baseline)':** demographic change is constrained to the growth in employment as projected in the 'Baseline' scenario produced by Atkins.
- **'Jobs-led (Scenario 1)':** demographic change is constrained to the growth in employment as projected in the 'Moderate growth Policy Scenario 1' produced by Atkins.
- **'Jobs-led (Scenario 2)':** demographic change is constrained to the growth in employment as projected in the 'High growth Policy Scenario 2' produced by Atkins.

3.13 Table 4 provides details of the jobs growth targets for each of the jobs-led scenarios.

Table 4: North East Lincolnshire – jobs growth targets (source: Atkins)

Scenario	2013/14-2017/18	2018/19-2022/23	2023/24-2027/28	2028/29-2031/32	Total Growth 2013/14-2031/32
Baseline	1,137	1,560	1,252	484	4,433
Scenario 1	1,864	2,604	2,465	1,859	8,792
Scenario 2	3,095	4,367	4,279	2,443	14,184

3.14 Three key data inputs are required to run a 'jobs-led' scenario and link jobs growth to population change; economic activity rates by age and sex for each year of the forecast period; a corresponding unemployment rate to estimate that portion of the labour force that remains out of work; and a commuting ratio, which estimates the balance between the number of jobs

available and the size of the resident labour force. More detail on these items is provided in Appendix B.

3.15 The sensitivity of the jobs-led scenario growth outcomes to variations in these key data inputs has been tested. Each of the three jobs-led scenarios has been run with the following sensitivities:

- **'UR'**: The unemployment rate reduces from 11.5% to 7.2% by 2023 (compared to reduction in unemployment rate from 11.5% to 9.1% by 2020 in the original scenarios).
- **'UR CR1'**: The unemployment rate reduces from 11.5% to 7.2% by 2023 and the commuting ratio changes from 0.995 to 0.985 over the full forecast period (this crudely approximates to 10% of new jobs being taken by an increased net in-commute; compared to a fixed commuting ratio of 0.995 in the original scenarios).
- **'UR CR2':** The unemployment rate reduces from 11.5% to 7.2% by 2023 and the commuting ratio changes from 0.995 to 0.974 over the full forecast period (this crudely approximates to 20% of new jobs being taken by an increased net in-commute; compared to a fixed commuting ratio of 0.995 in the original scenarios).

Household & Dwelling Growth

3.16 In each of the scenarios, the implied number of households is derived using household headship rates, from both the 2008-based and 2011-based DCLG household models. This is in recognition of the uncertainty associated with future rates of household formation, given economic and demographic conditions.

3.17 The 2011-based headship rates were calibrated after a period of unprecedented economic change and stagnation in the housing market and thus suggest a lower rate of household formation than the previous 2008-based rates, which were calibrated from data collected in a time period with very different market characteristics. Assessing the household growth implications of a population projection using solely the 2011-based headship rates can be criticised as being overly dependent upon a period where household formation rates were supressed. Conversely, exclusive use of the 2008-based headship rates can be criticised as being influenced by rates of household formation associated with pre-recessionary conditions that are unlikely to be repeated in the immediate future.

3.18 The 2011-based headship rates and the 2008-based headship rates are therefore applied to each scenario, producing 'Option A' and 'Option B' outcomes:

- In 'Option A', the DCLG 2011-based headship rates are applied, with the 2011–2021 trend continued after 2021.
- In the 'Option B' alternative, the DCLG 2008-based headship rates are applied, scaled to be consistent with the 2011 DCLG household total, but following the original trend thereafter.

3.19 This approach presents a 'range' of household growth outcomes for each population forecast. The dwelling growth implications of these different household growth trajectories are then assessed through the application of a 'vacancy rate' (refer to Appendix B for further information). The 'Option A' and 'Option B' dwelling requirements are then averaged to provide an annual dwelling requirement for each scenario.

Scenario Summary

3.20 In summary, eight scenarios have been produced for North East Lincolnshire under three scenario types: 'official' projections, alternative 'trend' scenarios and 'jobs-led' scenarios (Table 5). In addition, the three jobs-led scenarios have been run with sensitivities regarding the unemployment rate and commuting ratio.

Table 5: North East Lincolnshire – Edge Analytics scenario definition

Scenario type	Scenario name	Scenario description
'Official' projections	**'SNPP-2012'**	This scenario mirrors the 2012-based SNPP from the ONS. This is the official 'benchmark' scenario.
	'SNPP-2010'	This scenario mirrors the 2010-based SNPP from the ONS. The population is re-scaled to the 2012 mid-year population estimate (MYE) to ensure consistency with the SNPP-2012 scenario, with the 2010-based growth trajectory continued thereafter.
Alternative 'trend' scenarios	**'Natural Change'**	In- and out- migration rates are set to zero.

	'PG-5Yr'	Internal and international migration assumptions are based on the last five years of historical evidence (2008/09 to 2012/13).
	'PG-10Yr'	Internal and international migration assumptions are based on the last 10 years of historical evidence (2003/04 to 2012/13).
'Jobs-led' scenarios	**'Jobs-led (Baseline)'**	The demographic change is constrained to the growth in employment as projected in the 'Baseline' scenario produced by Atkins.
	'Jobs-led (Scenario 1)'	The demographic change is constrained to the growth in employment as projected in the 'Moderate growth Policy Scenario 1' produced by Atkins.
	'Jobs-led (Scenario 2)'	The demographic change is constrained to the growth in employment as projected in the 'High growth Policy Scenario 2' produced by Atkins.

Note: Refer to Appendix B for further information on the scenario data inputs and assumptions

4. Scenario Output

4.1 A summary of the results of each scenario forecast produced for North East Lincolnshire (excluding the jobs-led sensitivities) is provided in the form of a chart and accompanying tables of statistics. The chart illustrates the trajectory of population change resulting from each scenario. The tables summarise the change in population and household numbers that result from each scenario.

4.2 The scenarios are ranked according to the estimated level of population change over the forecast period. Each table illustrates the average annual net migration associated with the population change, plus the expected average annual dwelling and jobs growth based on the assumptions used in each scenario.

4.3 Scenario results are presented in two separate tables, each relating to the application of different household headship rates. The 'Option A' results use the DCLG 2011-based headship rates and the 'Option B' results use the 2008-based headship rates.

4.4 Note that under the 'Option A' and 'Option B' alternatives, population growth, net migration and the annual average increase in the number of jobs and labour force are the same. Only the household and dwelling numbers are different, reflecting the two alternative approaches to assessing household growth.

4.5 The summary of the sensitivity runs for the three jobs-led scenarios is presented separately, in a series of tables showing the average dwelling requirement by five-year periods (except 2028/29-2031/32, when it is a four-year period), for Option A, Option B and the average of the two.

North East Lincolnshire: Scenario Outcomes

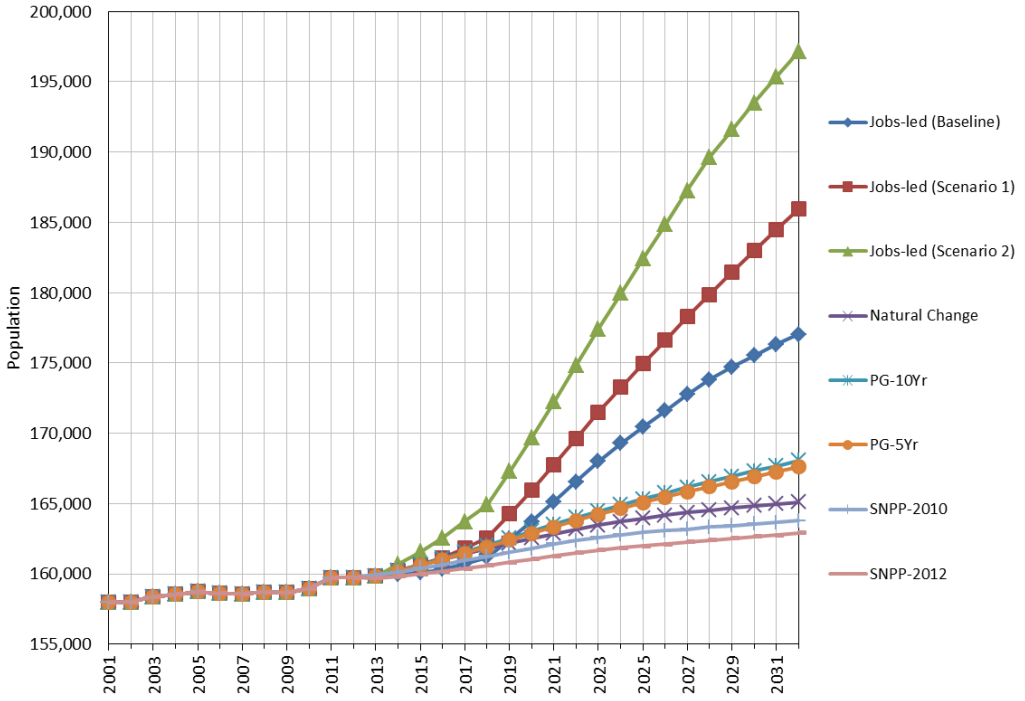


Figure 8: NE Lincolnshire – scenario outcomes: population growth 2001–2032

Table 6: NE Lincolnshire – 'Option A' scenario outcomes 2013/14–2031/32

Scenario	Change 2013 - 2032				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Jobs
Jobs-led (Scenario 2) A	37,323	23.4%	16,672	23.8%	1,487	913	747
Jobs-led (Scenario 1) A	26,117	16.3%	12,152	17.3%	980	665	463
Jobs-led (Baseline) A	17,213	10.8%	8,605	12.3%	564	471	233
PG-10Yr A	8,227	5.1%	5,181	7.4%	130	284	19
PG-5Yr A	7,780	4.9%	4,789	6.8%	123	262	-29
Natural Change A	5,271	3.3%	3,438	4.9%	0	188	-72
SNPP-2010 A	3,851	2.4%	3,098	4.4%	-85	170	-58
SNPP-2012 A	3,201	2.0%	2,981	4.3%	-85	163	-127

Table 7: NE Lincolnshire – 'Option B' scenario outcomes 2013/14–2031/32

Scenario	Change 2013 - 2032				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Jobs
Jobs-led (Scenario 2) B	37,323	23.4%	19,259	27.4%	1,487	1,055	747
Jobs-led (Scenario 1) B	26,117	16.3%	14,751	21.0%	980	808	463
Jobs-led (Baseline) B	17,213	10.8%	11,224	16.0%	564	615	233
PG-10Yr B	8,227	5.1%	7,804	11.1%	130	427	19
PG-5Yr B	7,780	4.9%	7,443	10.6%	123	408	-29
Natural Change B	5,271	3.3%	6,044	8.6%	0	331	-72
SNPP-2010 B	3,851	2.4%	5,458	7.8%	-85	299	-58
SNPP-2012 B	3,201	2.0%	5,603	8.0%	-85	307	-127

Scenario Outcomes

4.6 Population growth ranges from 2.0% under the 'SNPP-2012' scenario to 23.4% under the 'Jobs-led (Scenario 2)' scenario. These population growth figures result in a range of dwelling requirements, from 163–913 dwellings per year under 'Option A' (using the 2011-based headship rates) to 307–1,055 under 'Option B' (using the 2008-based headship rates).

Official Projections & Trend Scenarios

4.7 Population growth under the 'SNPP-2012' scenario (2.0%) is lower than under the previous official projection, the 'SNPP-2010' (2.4%). The 'SNPP-2012' scenario results in an average annual dwelling requirement of 163 dwellings per year under 'Option A' (using the 2011-based headship rates) and 307 dwellings per year under 'Option B' (using the 2008-based headship rates). Under the 'SNPP-2010' scenario, the dwelling requirement is higher, ranging from 170-299 dwellings per year.

4.8 The 'Natural Change' scenario, in which net migration is set to zero for each year of the forecast period, results in 3.3% population growth, driven solely by the balance between births and deaths. The 'Natural Change' scenario provides an important indication of the dwelling growth expectation in the absence of migration, with a range from 188-331 dwellings per year resulting from the 'A' and 'B' headship rate alternatives.

4.9 The 'PG' scenarios provide alternative 'trend' scenarios. They incorporate fertility and mortality assumptions that are consistent with the 'SNPP-2012' but differ in their calibration of future migration assumptions. For internal migration, both a five-year ('PG-5Yr') and a ten-year ('PG-10Yr') history is used to calibrate migration assumptions, compared to the five years typically used in the 'SNPP-2012'. In addition, the PG scenarios use the latest, 2013 MYE in the calibration process, an additional year of historical evidence compared to the 'SNPP-2012'.

4.10 With regard to future international migration assumptions, the PG scenarios consider both a five-year and a ten-year perspective, plus they also incorporate the UPC adjustment to the international migration estimates. ONS' treatment of international migration and UPC in the 'SNPP-2012' is not sufficiently transparent to enable definitive commentary to be provided. However, a five-year history is typically used for calibration of assumptions but this is scaled to ensure that the aggregate long-term assumption on international migration for England, in total, is achieved.

4.11 Significantly, the 2012-based SNPP for England has assumed a lower rate of long-term growth due to international migration and a lower net out-migration due to internal migration than has been recorded in the last five or ten years, even without the UPC adjustment.

4.12 Both the 'PG-5Yr' and 'PG-10Yr' scenarios suggest growth in excess of the 'SNPP-2012'. The latest, 2013 MYE has influenced the lower outcome of the 'PG-5Yr' due to the ONS estimate of a higher net outflow due to internal migration in this year. The 'PG-5Yr' estimates dwelling growth at 262–408 per year; the 'PG-10Yr', with its higher migration assumptions, at 284-427 per year.

Jobs-led Scenarios

4.13 Under the 'Jobs-led' scenarios, population growth is driven by the increase in the number of jobs, as defined in the Atkins' 'Economic Futures' report (July 2014). The jobs-led scenarios include economic activity rate assumptions which take account of the State Pension Age (SPA) changes, an unemployment rate that reduces from a 5-year average (2009-2013) to a 10-year average (2004-2013) and a commuting ratio that remains fixed at its 2011 level (see Appendix B).

4.14 Given the significant shifts in the age profile of North East Lincolnshire's population over the forecast period, these scenarios result in the most substantial population change ranging from 10.8% in the 'Jobs-led (Baseline)' scenario to 23.4% in 'Jobs-led (Scenario 2)'. 'Jobs-led (Scenario 1)' achieves a population growth of 16.3% over the forecast period. Significant net in-migration is necessary in each of the jobs-led scenarios to balance the jobs growth targets against the reduction in the size of the resident labour force. The dwelling growth required to meet these population growth trajectories is estimated at: 471-615 dwellings per year in the 'Jobs-led (Baseline)' scenario; 665-808 in 'Jobs-led (Scenario 1) and 913-1,055 in 'Jobs-led (Scenario 2)'.

Jobs-led Sensitivity Scenarios

4.15 The 'Jobs-led' dwelling growth outcomes are very sensitive to the key assumptions on economic activity, unemployment and commuting. Additional sensitivity scenarios are presented here to illustrate the range of outcomes resulting from alternative commuting and unemployment rate assumptions.

4.16 Additional sensitivities have been evaluated as follows:

- **'UR'**: The unemployment rate reduces from 11.5% to 7.2% by 2023.

- **'UR CR1'**: The unemployment rate reduces from 11.5% to 7.2% by 2023 and the commuting ratio changes from 0.995 to 0.985 over the full forecast period (this crudely approximates to 10% of new jobs being taken by an increased net in-commute).
- **'UR CR2':** The unemployment rate reduces from 11.5% to 7.2% by 2023 and the commuting ratio changes from 0.995 to 0.974 over the full forecast period (this crudely approximates to 20% of new jobs being taken by an increased net in-commute).

4.17 Average dwelling requirements by five-year periods (except 2028/29-2031/32, when it is a four-year period), for Option A, Option B and the average of the two, that result from applying the above sensitivities to the three jobs-led scenarios are presented in Table 8, Table 9 & Table 10.

Table 8: 'Jobs-led (Baseline)' – sensitivities – dwelling requirement

Scenario	Option A					Option B					Average Option A & B				
	2013/14-2017/18	2018/19-2022/23	2023/24-2027/28	2028/29-2031/32	2013/14-2031/32	2013/14-2017/18	2018/19-2022/23	2023/24-2027/28	2028/29-2031/32	2013/14-2031/32	2013/14-2017/18	2018/19-2022/23	2023/24-2027/28	2028/29-2031/32	2013/14-2031/32
Jobs-led (Baseline)	253	648	556	418	471	410	760	715	562	615	332	704	636	490	543
Jobs-led (Baseline) - UR	280	397	521	399	399	438	511	677	545	543	359	454	599	472	471
Jobs-led (Baseline) - UR CR1	252	364	485	360	366	410	478	641	507	509	331	421	563	434	438
Jobs-led (Baseline) - UR CR2	222	328	445	318	329	380	442	601	466	472	301	385	523	392	401

Table 9: 'Jobs-led (Scenario 1)' – sensitivities – dwelling requirement

Scenario	Option A					Option B					Average Option A & B				
	2013/14-2017/18	2018/19-2022/23	2023/24-2027/28	2028/29-2031/32	2013/14-2031/32	2013/14-2017/18	2018/19-2022/23	2023/24-2027/28	2028/29-2031/32	2013/14-2031/32	2013/14-2017/18	2018/19-2022/23	2023/24-2027/28	2028/29-2031/32	2013/14-2031/32
Jobs-led (Scenario 1)	360	821	770	722	665	517	934	929	861	808	439	878	850	792	737
Jobs-led (Scenario 1) - UR	388	564	731	697	590	545	680	886	838	732	467	622	809	768	661
Jobs-led (Scenario 1) - UR CR1	360	531	692	655	554	517	646	847	797	697	439	589	770	726	626
Jobs-led (Scenario 1) - UR CR2	329	494	650	608	516	486	608	805	751	658	408	551	728	680	587

Table 10: 'Jobs-led (Scenario 2)' – sensitivities – dwelling requirement

Scenario	Option A					Option B					Average Option A & B				
	2013/14-2017/18	2018/19-2022/23	2023/24-2027/28	2028/29-2031/32	2013/14-2031/32	2013/14-2017/18	2018/19-2022/23	2023/24-2027/28	2028/29-2031/32	2013/14-2031/32	2013/14-2017/18	2018/19-2022/23	2023/24-2027/28	2028/29-2031/32	2013/14-2031/32
Jobs-led (Scenario 2)	541	1,113	1,095	901	913	697	1,228	1,253	1,037	1,055	619	1,171	1,174	969	984
Jobs-led (Scenario 2) - UR	569	847	1,049	872	832	725	964	1,203	1,011	974	647	906	1,126	942	903
Jobs-led (Scenario 2) - UR CR1	541	812	1,007	826	795	697	928	1,161	965	936	619	870	1,084	896	866
Jobs-led (Scenario 2) - UR CR2	509	773	961	776	753	666	889	1,115	916	895	588	831	1,038	846	824

Notes:

- **UR** suffix indicates an unemployment rate reduction from 11.5% to 7.2% by 2023.
- **CR1** indicates a change in the commuting ratio from 0.995 to 0.985 over the full forecast period (this crudely approximates to 10% of new jobs being taken by an increased net in-commute).
- **CR2** indicates a change in the commuting ratio from 0.995 to 0.974 over the full forecast period (this crudely approximates to 20% of new jobs being taken by an increased net in-commute).
- In all other scenarios, the unemployment rate reduces from 11.5% to 9.1% in 2018 and the commuting ratio is fixed at 0.995 throughout the forecast period.
- In all scenarios, economic activity rates are consistent, accounting for State Pension Age changes to 2020, remaining fixed thereafter.

5. Summary

Requirements & Approach

5.1 NELC requires an updated position in relation to the housing projections previously anticipated in the 2013 SHMA[4] for North East Lincolnshire. The aim of this project has been to provide part of the evidence base for assessing the housing target for the Local Plan.

5.2 Edge Analytics has produced a range of scenarios using POPGROUP (v.4) technology, including the latest 'official' population projection from the ONS, the 2012-based SNPP. Alternative 'trend' scenarios have also been developed, together with 'jobs-led' scenarios, in which population growth is determined by jobs-growth forecasts for the borough, from the 'Economic Futures' report produced for North East Lincolnshire by Atkins in July 2014.

5.3 In all scenarios, household growth has been assessed using household formation rates from both the 2011-based and the 2008-based DCLG household models. Outputs for each scenario have been presented under an 'Option A' and 'Option B' alternative, the 2011-based and 2008-based headship rates respectively.

5.4 In all scenarios, 2011 Census economic activity rates have been applied, with adjustments made in the older age groups to account for changes to the SPA. The unemployment rate has been incrementally reduced to account for economic recovery following the recession and a fixed (2011 Census) commuting ratio has been applied. Sensitivities around these assumptions have been tested.

Scenario Outcomes

5.5 A summary of the average annual dwelling requirement for each of the scenarios is presented (Table 11) with the 'Option A' and 'Option B' outcomes for each scenario expressed as an average. Excluding the 'Natural Change' scenario, this produces a dwelling requirement range of

[4] http://www.nelincs.gov.uk/council/planning-policy/evidence-base/local-documents/housing/strategic-housing-market-assessment/

234 dwellings per year under the 'SNPP-2010' scenario to 984 under the 'Jobs-led (Scenario 2)' scenario.

Table 11: NE Lincolnshire – scenario dwelling requirement summary

Scenario	Average annual dwelling requirement, 2013 - 2032		
	Option A	Option B	Average
Jobs-led (Scenario 2)	913	1,055	984
Jobs-led (Scenario 2) - UR	*832*	*974*	*903*
Jobs-led (Scenario 2) - UR CR1	*795*	*936*	*865*
Jobs-led (Scenario 2) - UR CR2	*753*	*895*	*824*
Jobs-led (Scenario 1)	665	808	737
Jobs-led (Scenario 1) - UR	*590*	*732*	*661*
Jobs-led (Scenario 1) - UR CR1	*554*	*697*	*625*
Jobs-led (Scenario 1) - UR CR2	*516*	*658*	*587*
Jobs-led (Baseline)	471	615	543
Jobs-led (Baseline) - UR	*399*	*543*	*471*
Jobs-led (Baseline) - UR CR1	*366*	*509*	*437*
Jobs-led (Baseline) - UR CR2	*329*	*509*	*419*
PG-10Yr	284	427	355
PG-5Yr	262	408	335
Natural Change	188	331	260
SNPP-2012	163	307	235
SNPP-2010	170	299	234

Note: 'Option A' shows the dwelling requirement derived using the 2011-based headship rates; 'Option B' using the 2008-based headship rates. Scenarios are ranked in order of the average dwelling requirement.

5.6 The additional scenarios which test a range of alternative commuting and unemployment assumptions provide important sensitivities on the dwelling growth outcomes associated with the three jobs forecasts.

Issues for Consideration

5.7 This report provides a suite of demographic growth scenarios for North East Lincolnshire Council to consider as its Evidence Base and formulates the housing growth requirements of its New Local Plan.

5.8 Whilst the 'SNPP-2012' scenario provides the suggested starting point for the objective assessment of housing need, the alternative 'trend-based' outcomes presented by the 'PG-5Yr' and 'PG-10Yr' scenarios should be given due consideration, given the likely impact of the recession upon recent migration flows and given the continuing uncertainty with regard to future international migration impacts.

5.9 Dwelling growth outcomes linked to the jobs growth forecasts produced by Atkins have been presented, including variant scenarios to illustrate the significant influence of commuting and unemployment rates upon dwelling growth. It is recommended that the full range of 'jobs-led' scenario outcomes is considered when evaluating the additional impact of economic change upon the objective assessment of housing need.

5.10 Finally, DCLG intends to release a 2012-based household model for English local authorities in autumn 2014. The implications of these new data and assumptions upon the household and dwelling growth outcomes presented here will need to form part of the housing requirements evidence.

Appendix A

POPGROUP Methodology

A.1 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 9) is a cohort component model, which enables the development of population forecasts based on births, deaths and migration inputs and assumptions.

A.2 The Derived Forecast (DF) model (Figure 10) sits alongside the population model, providing a headship rate model for household projections and an economic activity rate model for labour-force projections.

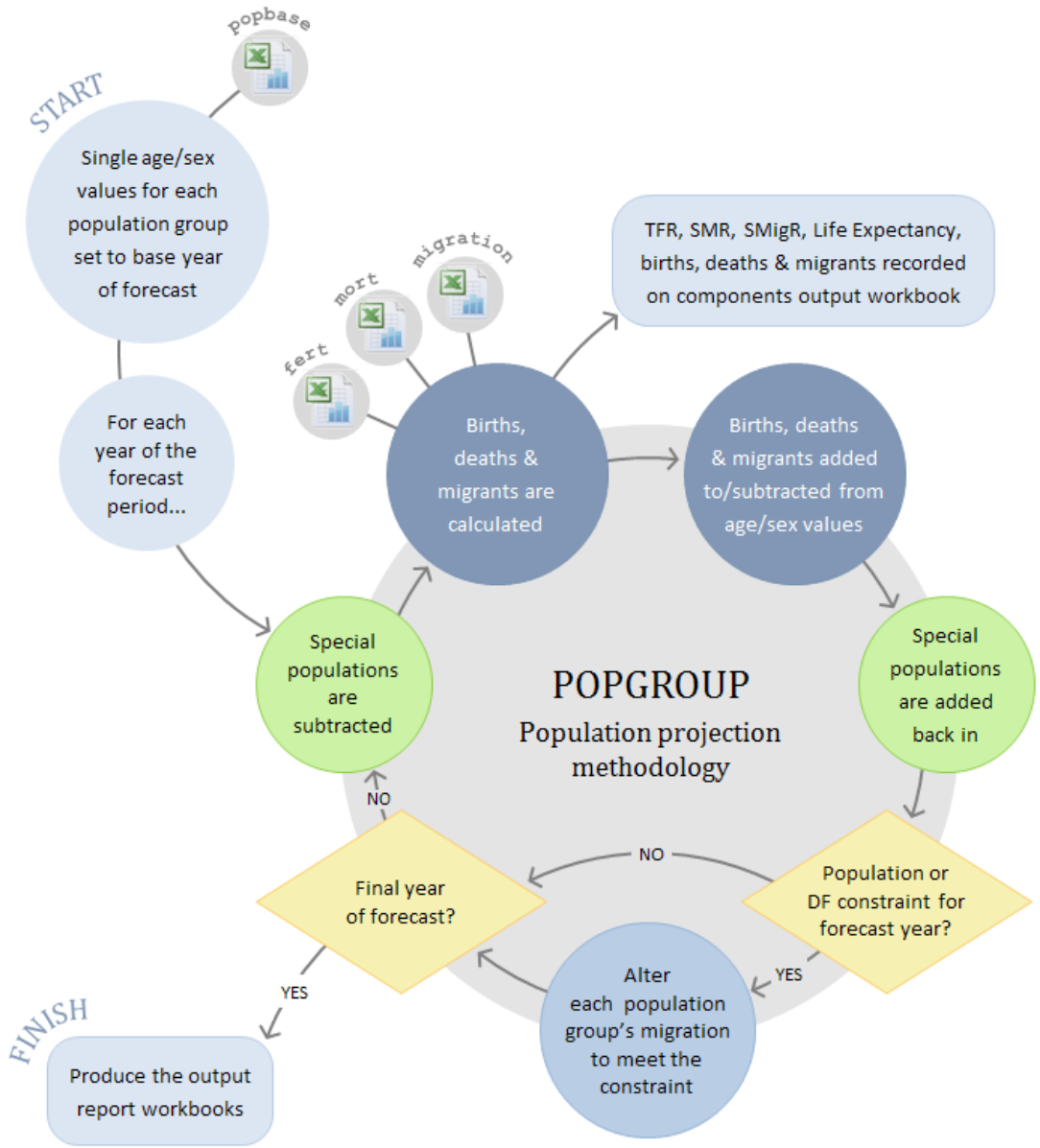
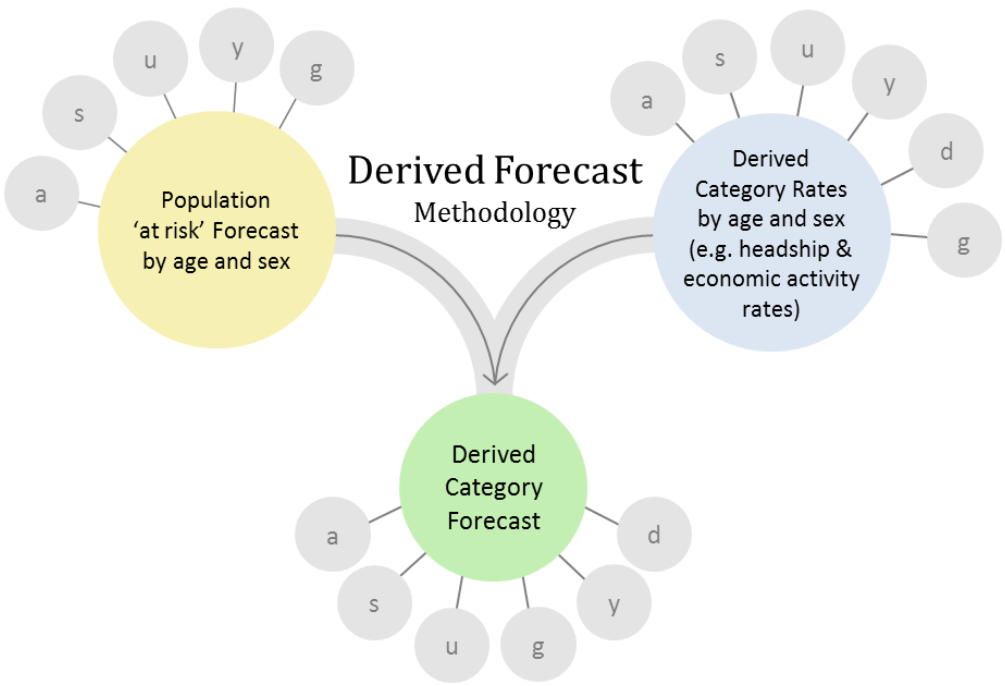


Figure 9: POPGROUP population projection methodology



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

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

Figure 10: Derived Forecast (DF) methodology

Appendix B

Data Inputs and Assumptions

Introduction

B.1 Edge Analytics has developed a suite of demographic scenarios using POPGROUP.

B.2 The POPGROUP model draws data from a number of sources, building an historical picture of population, households, fertility, mortality and migration on which to base its scenario forecasts. Using the historical data evidence for 2001–2013, in conjunction with information from ONS national projections, a series of assumptions have been derived which drive the scenario forecasts.

B.3 In the following sections, a narrative on the data inputs and assumptions underpinning the scenarios is presented.

Population, Births & Deaths

Population

B.4 In each scenario, historical population statistics are provided by the mid-year population estimates for 2001–2013, with all data recorded by single year of age and sex. These data include the revised mid-year population estimates for 2002–2010, which were released by ONS in May 2013. The revised mid-year population estimates provide consistency in the measurement of the components of change (i.e. births, deaths, internal migration and international migration) between the 2001 and 2011 Censuses.

B.5 In the 'SNPP-2010' scenario, future population counts are provided by single year of age and sex to ensure consistency with the trajectory of the official 2010-based sub-national population projection (SNPP). The 'SNPP-2010' scenario is scaled to ensure consistency with the 2012 mid-year population estimate total, following its designated growth trend thereafter. This enables the

scenario to be more easily compared to 'SNPP-2012' and does not alter the underlying assumptions or growth trajectory.

B.6 In the 'SNPP-2012' scenario, future population counts are provided by single year of age and sex to ensure consistency with the trajectory of the official 2012-based SNPP.

Births & Fertility

B.7 In each scenario, historical mid-year to mid-year counts of births by sex from 2001/02 to 2012/13 have been sourced from ONS Vital Statistics.

B.8 In the 'SNPP-2010' and 'SNPP-2012' scenarios, future counts of births are specified to ensure consistency with the official forecasts.

B.9 In the other scenarios, a 'local' (i.e. area-specific) age-specific fertility rate (ASFR) schedule, which measures the expected fertility rates by age and sex in 2013/14, is included in the POPGROUP model assumptions. This is derived from the ONS 2012-based SNPP.

B.10 Long-term assumptions on changes in age-specific fertility rates are taken from the ONS 2012-based SNPP.

B.11 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.

Deaths & Mortality

B.12 In each scenario, historical mid-year to mid-year counts of deaths by age and sex from 2001/02 to 2012/13 have been sourced from ONS Vital Statistics.

B.13 In the 'SNPP-2010' and 'SNPP-2012' scenarios, future counts of deaths are specified to ensure consistency with the official forecasts.

B.14 In the other scenarios, a 'local' (i.e. area-specific) age-specific mortality rate (ASMR) schedule, which measures the expected mortality rates by age and sex in 2013/14 is included in the POPGROUP model assumptions. This is derived from the ONS 2012-based SNPP.

B.15 Long-term assumptions on changes in age-specific mortality rates are taken from the ONS 2012-based SNPP.

B.16 In combination with the 'population-at-risk' (i.e. the total 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.

Migration

Internal Migration

B.17 In all scenarios, historical mid-year to mid-year counts of in- and out-migration by five year age group and sex from 2001/02 to 2012/13 have been sourced from the 'components of change' files that underpin the ONS mid-year population estimates. These internal migration flows are estimated using data from the Patient Register (PR), the National Health Service Central Register (NHSCR) and Higher Education Statistics Agency (HESA). This data provides an accurate representation of inter-area flows, albeit with some issues with regard to potential under-registration in certain age groups (young males in particular).

B.18 In the 'SNPP-2010' and 'SNPP-2012' scenarios, future counts of internal migrants are specified to ensure consistency with the official forecasts.

B.19 In the alternative trend-based scenarios, age-specific migration rate (ASMigR) schedules are derived from the area-specific historical migration data. In the 'PG-5Yr' scenario, a five year internal migration history is used (2008/09–2012/13). In the 'PG-10Yr' scenario, a ten year history is used (2003/04–2012/13).

B.20 In the 'Natural Change' scenario, internal in- and out-migration flows are set to zero in each year of the forecast period (i.e. no in- or out-migration occurs).

B.21 The jobs-led scenarios calculate their own internal migration assumptions to ensure an appropriate balance between the population and the target number of jobs that is defined in each year of the forecast period. In a jobs-led scenario, a higher level of net internal migration will occur if there is insufficient population and resident labour force to meet the forecast number of jobs. The profile of internal migrants is defined by an ASMigR schedule, derived from

the ONS 2012-based SNPP.

B.22 In the case of internal in-migration, the ASMigR schedule of rates is 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 and international migration), where the schedule of rates is applied to the area-specific population.

B.23 For North East Lincolnshire, the reference population is defined by considering the areas which have historically contributed the majority of migrants into the two Local Enterprise Partnerships (LEPs) that North East Lincolnshire is part of, i.e. the Greater Lincolnshire LEP and the Humber LEP. In this case, the reference population comprises all districts which cumulatively contributed 70% of migrants into the combined LEP area in 2008/09-2012/13.

International Migration

B.24 Historical mid-year to mid-year counts of total immigration and emigration from 2001/02 to 2012/13 have been sourced from the 'components of change' files that underpin the ONS mid-year population estimates. Any 'adjustments' made to the mid-year population estimates to account for asylum cases are included in the international migration balance.

B.25 Implied within the international migration component of change in all is an 'unattributable population change'[5] (UPC) figure, which ONS identified within its latest 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.26 In all scenarios, future international migration assumptions are defined as 'counts' of migration.

B.27 In the 'SNPP-2010' and 'SNPP-2012' scenarios, the international in- and out-migration counts are drawn directly from the official projections.

B.28 In the alternative trend-based scenarios, the international in- and out-migration counts are derived from the area-specific historical migration data. In the 'PG-5Yr' scenario, a five year international migration history is used (2008/09–2012/13). In the 'PG-10Yr' scenario, a ten year

[5] 2012-based Subnational Population Projections for England – Report on Unattributable Population Change. ONS http://www.ons.gov.uk/ons/about-ons/get-involved/consultations/consultations/consultation-on-the-2012-based-subnational-population-projections-for-england/index.html

history is used (2003/04–2012/13). An ASMigR schedule is derived from either a five year or ten year migration history and is used to distribute future counts by single year of age.

B.29 In the 'Natural Change' scenario, the future migration counts set the in- and out-migration flows to zero in each year of the forecast period (i.e. no immigration or emigration occurs).

B.30 In the jobs-led scenarios, international migration counts are taken from the ONS 2012-based SNPP (i.e. counts are consistent with the 'SNPP-2012' scenario). An ASMigR schedule from the ONS 2012-based SNPP is used to distribute future counts by single year of age.

Household & Dwellings

B.31 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."*[6]

B.32 A dwelling is defined as a unit of accommodation which may comprise one or more household spaces (a household space is the accommodation used or available for use by an individual household).

B.33 For each scenario, the household and dwelling implications of the population growth trajectory have been evaluated through the application of headship rate statistics, communal population statistics and a dwelling vacancy rate. These data assumptions have been sourced from the 2001 and 2011 Censuses and the 2008-based and 2011-based household projection models from the DCLG.

Household Headship Rates

B.34 Household headship rates define the likelihood of a particular household type being formed in a particular year, given the age-sex profile of the population in that year. Household-types are modelled within a 17-fold classification (Table 12).

[6] http://www.ons.gov.uk/ons/guide-method/census/2011/census-data/2011-census-user-guide/glossary/index.html

Table 12: Household type classification

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

B.35 The household headship rates used in the POPGROUP modelling have been taken from the DCLG 2008-based and 2011-based household projections. The 2011-based household projections were released for local authority districts in England in April 2013, superseding the 2008-based model. However, as the 2011-based household model is underpinned by the 2011-based SNPP, the headship rate assumptions have only been published for the 2011–2021 period. Therefore, the headship rates have been trended after 2021 to extend the rates to the end of the forecast period.

B.36 Edge Analytics assesses household growth using both the 2008-based and the 2011-based headship rates, in recognition of the uncertainties surrounding future rates of household formation.

B.37 Both the 2008-based and 2011-based headship rates have been applied, producing two alternative outcomes for each scenario:

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

Communal Population

B.38 Household projections in POPGROUP exclude the 'population-not-in-households' (i.e. the communal or institutional population). This data has been drawn from the DCLG 2011-based household projection, which uses statistics from the 2011 Census. Examples of communal establishments include prisons, residential care homes and student halls of residence.

Vacancy Rate

B.39 The model uses a vacancy rate (including second homes and holiday lets) as a conversion factor in order to determine the relationship between the number of households and the number of dwellings. The vacancy rate of 3.9% has been derived from the 2011 Census statistics and used in the scenarios, remaining constant throughout the forecast period.

Labour Force & Jobs

B.40 For each scenario (excluding the jobs-led scenarios), the labour force and jobs implications of the population growth trajectory have been evaluated through the application of three key data items: economic activity rates, a commuting ratio and an unemployment rate.

B.41 In the jobs-led scenarios, these three data items are used to determine the population growth required by a particular jobs growth trajectory.

Economic Activity Rates

B.42 'Economically active' refers to the population that is both employed and unemployed, i.e. the labour force. Economic activity rates determine the level of labour force participation associated with a particular age-sex category.

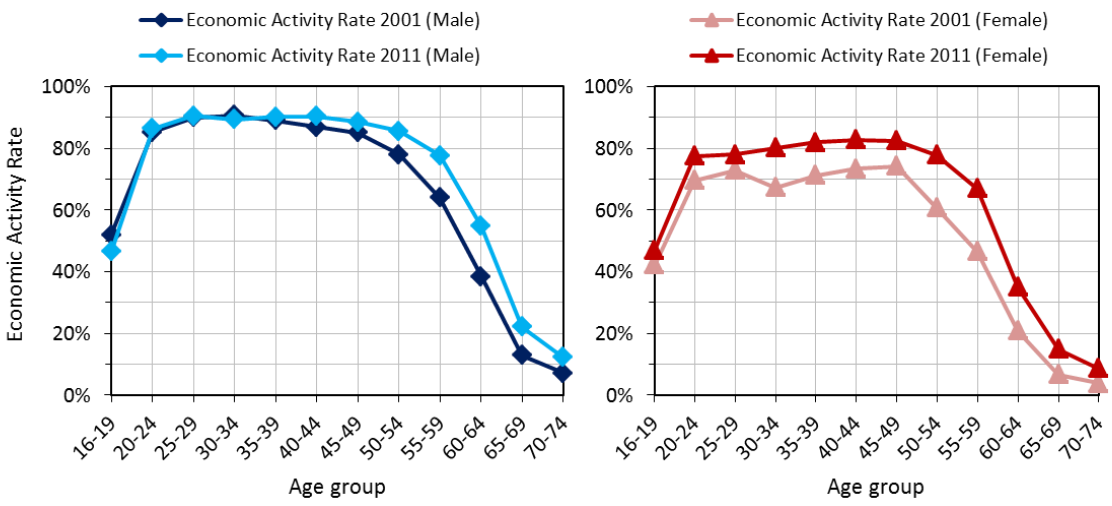
B.43 The economic activity rates used in all the scenarios are based on the latest statistics from the 2011 Census, published in November 2013. This section provides evidence and rationale for the derivation of the economic activity rate statistics used in the scenario analysis.

2011 Census Economic Activity Rates

B.44 Economic activity rates provide the basis for calculating the size of the labour force within the population. Economic activity rates by five year age group (ages 16-74) and sex have been derived from 2011 Census statistics.

B.45 The 2011 Census statistics include an open-ended 65+ age categorisation, so economic activity rates for the 65–69 and 70–74 age groups have been estimated using a combination of Census 2011 tables, disaggregated using evidence from the 2001 Census.

B.46 A comparison of the 2001 and 2011 economic activity rates for North East Lincolnshire is provided (Figure 11). This comparison indicates that economic activity rates have increased in the older age groups for both males and females, particularly for females, for whom rates have seen a general increase across all age groups.



Source: Census 2001 & 2011

Figure 11: Economic activity rates, 2001 vs. 2011 (males & females)

Amendments to Economic Activity Rates

B.47 Using the 2011 Census statistics as a base, changes have been made to the age-sex specific economic activity rates to take account of changes to the State Pension Age (SPA) and to accommodate potential changes in economic participation which might result from an ageing but healthier population in the older labour-force age groups.

B.48 Employment forecasts routinely apply changes to older-age economic participation rates in the derivation of longer-term forecasts of jobs growth. It is therefore important to give these assumptions due consideration in the demographic assessment of these forecasts.

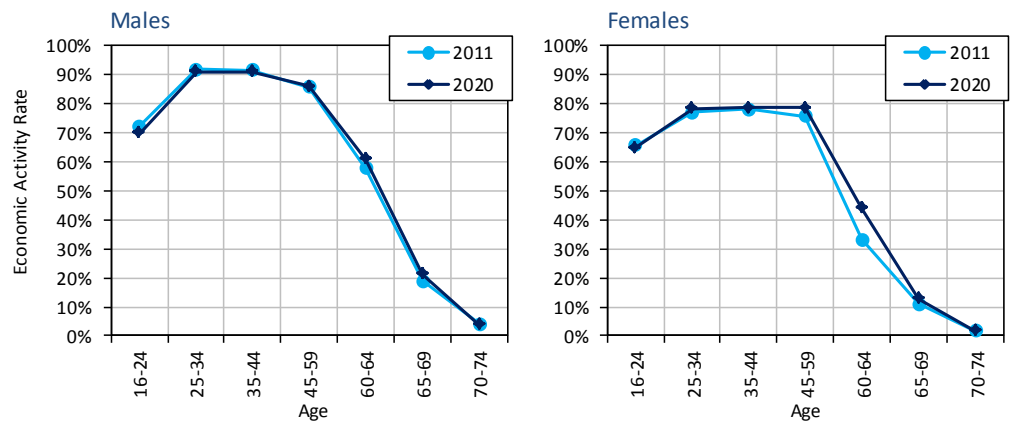
B.49 The SPA for women is increasing from 60 to 65 by 2018, bringing it in line with that for men. Between December 2018 and April 2020, the SPA for both men and women will then rise to 66. Under current legislation, the SPA will be increased to 67 between 2026 and 2028[7].

B.50 ONS published its last set of economic activity rate forecasts from a 2006 base[8]. These incorporated an increase in SPA for women to 65 by 2020, but this has since been altered to an accelerated transition by 2018 plus a further extension to 66 by 2020. Over the 2011–2020 period, the ONS forecasts suggested that male economic activity rates would rise by 5.6% and 11.9% in the 60-64 and 65-69 age groups respectively. Corresponding female rates would rise by 33.4% and 16.3% (Figure 12).

B.51 Given the accelerated pace of change in the female SPA and the clear trends for increased female labour force participation across all age groups in the last decade, these 2011–2020 rate increases would appear to be relatively conservative assumptions.

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

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



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

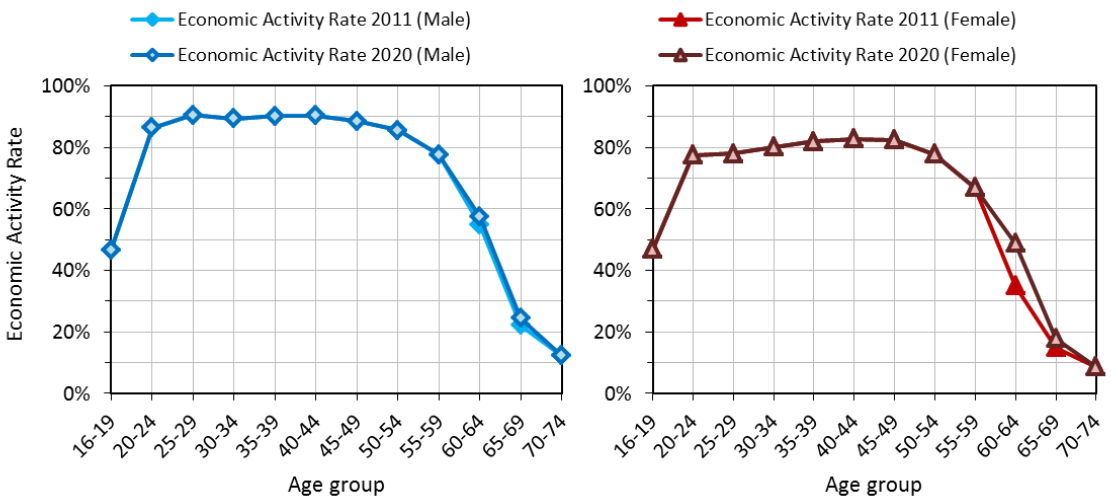
Figure 12: ONS Labour Force Projection 2006 – Economic Activity Rates 2011–2020 (Source: ONS)

B.52 To take account of planned changes to the SPA, the following modifications have been made to the economic activity rates for North East Lincolnshire:

- Women aged 60-64: 40% increase from 2011 to 2020.
- Women aged 65-69: 20% increase from 2011 to 2020.
- Men aged 60-64: 5% increase from 2011 to 2020.
- Men aged 65-69: 10% increase from 2011 to 2020.

Note: a 10% increase implies a 10% change in the economic activity rate. So for example, a 20% economic activity rate would be increased to 22%. A 10% change does not imply an increase from 20% to 30%.

B.53 Changes have been applied incrementally over the 2011–2020 forecast period. Note that the rates for women in the 60–64 and 65–69 age groups are higher than the original ONS figures, accounting for the accelerated pace of change in the SPA. No changes have been applied to other age groups. In addition, no changes have been applied to economic activity rates beyond 2020. This is an appropriately prudent approach given the uncertainty associated with forecasting future rates of economic participation (Figure 13).



Source: Census 2011; Edge Analytics

Figure 13: Economic activity rates, 2011 vs. 2020 (males & females)

B.54 These alternative economic activity rates are presented as realistic and robust alternatives to the very unlikely scenario of 'fixed' rates over the forecast period.

Unemployment Rate

B.55 Within the forecasting methodology, the unemployment rate, together with the commuting ratio, controls the balance between the size of the labour force and the number of jobs available within an area.

B.56 An initial unemployment rate for North East Lincolnshire is defined based upon the five-year average (2009-2013). Over the 2013-2020 forecast period, this initial unemployment rate reduces to a figure that is equivalent to a ten-year average (2004 – 2013), and is kept fixed throughout the rest of the forecast period (Table 13).

Table 13: Unemployment rate, 5-year and 10-year averages

Area Name	Unemployment rates (%), NOMIS	
	5-year average (2009-13)	10-year average (2004-13)
North East Lincolnshire	11.5	9.1

Source: NOMIS

B.57 The underlying unemployment statistics have been modified to account for a period of recovery post-2013. The change in the rate of unemployment is relatively modest but enables a recovery

to an unemployment rate position that is equivalent to North East Lincolnshire's 'average' position over the last ten years (for which data is available). These reducing unemployment rates have been applied in all scenarios except for the sensitivity jobs-led scenarios.

Commuting Ratio

B.58 The commuting ratio, together with the unemployment rate, controls the balance between the size of the labour force and the number of jobs available within an area.

B.59 The commuting ratio measures the number of workers living in a borough (i.e. the resident labour force) and the number of jobs available in the borough.

B.60 A commuting ratio greater than 1.00 indicates that the size of the resident workforce exceeds the number of jobs available in the borough, resulting in a net out-commute. A commuting ratio that is less than 1.00 indicates a net in-commute.

B.61 From the 2011 Census' Travel to Work statistics published by ONS in July 2014, a commuting ratio of 0.995 has been derived for North East Lincolnshire. Comparison of the corresponding value from the 2001 Census (Table 14) suggests there has been little change in commuting patterns in the area over the 2001-2011 decade.

Table 14: Commuting ratios

North East Lincolnshire UA		2001 Census[1]	2011 Census[2]
Workers	a	65,921	70,776
Jobs	b	66,057	71,125
Commuting Ratio	a/b	**0.998**	**0.995**

[1] *2001 Census - Table T101 - UK Travel Flows*

[2] *2011 Census - WU02UK - Location of usual residence and place of work by age*

B.62 In all scenarios (excluding the relevant sensitivity scenarios), commuting ratio is held constant for the duration of the forecast period 2013-32.