East Lindsey

Updating the Demographic Evidence

June 2015

edge analytics

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Acknowledgements

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Executive Summary

Requirements & Approach

E1. In 2010, the Lincolnshire Coastal Study addressed coastal flooding issues and proposed a set of Principles and Options for development in East Lindsey and its neighbouring areas of Boston and South Holland. One of the aims was to restrict housing development in the coastal zones of areas of the highest flood 'risk' by assuming a stable population over the plan period.

E2. With the release of new statistics from both ONS and DCLG, East Lindsey District Council has commissioned this update to its demographic evidence, to inform its local housing strategy. The new statistical releases include:

- 2012-based population projection (Source: ONS)
- 2013 mid-year population estimate (Source: ONS)
- 2012-based household projection (Source: DCLG)

E3. Updated demographic forecasts have been developed at both district and sub-district level, maintaining the Wet-Dry area (Coastal-Inland) classification used in the previous 2012 and 2013 analysis.

E4. A revised set of scenarios has been developed using POPGROUP technology using historical evidence for the 2001-2013 time period to calibrate demographic assumptions. For consistency with previous analysis, scenario results are presented for the period 2011-2037.

Historical Growth Profile

E5. East Lindsey's historical profile of change is characterised by relatively high growth pre-2008, followed by much slower growth post-2008. This slow growth has comprised population decline in the Wet area, with a modest increase in population in the Dry area.

E6. Population growth since 2001 has been predominantly driven by a strong net inward migration from elsewhere in the UK to 2008, reducing thereafter. Natural change has had a consistently negative impact upon growth, with an excess of deaths over births in all years to 2012/13.

International migration has contributed a net population loss in all years to 2010/11, with a small positive gain 2011/12–2012/13.

E7. East Lindsey's population profile is ageing due to the natural progression of the larger birth cohorts of the 1950s and 1960s through the population. The district has experienced a continuing annual net outflow of young adults, with the most significant net inflow associated with those aged 50+. Since 2006, there has been a net outflow of population in the older 75+ age-group (Figure 1).

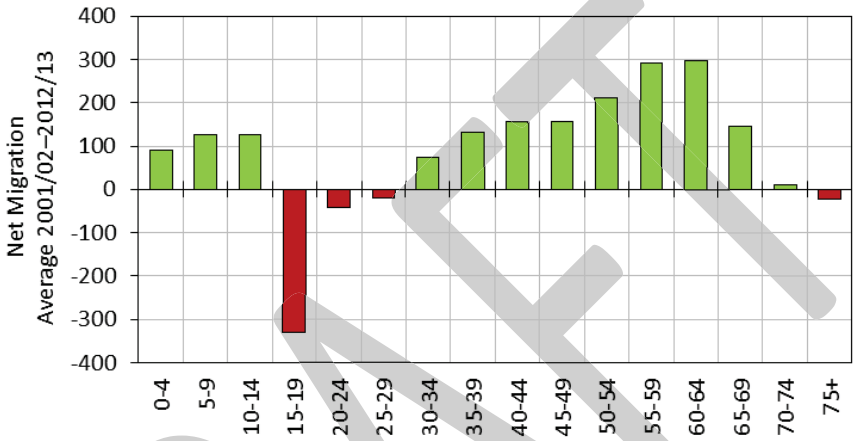

Figure 1: East Lindsey: Migration within UK,
average net flows 2001/02–2012/13 (source: ONS)

E8. In terms of the directional flow of migration, the 'top-ten' gross inflows and outflows to and from East Lindsey for the 2001/02–2012/13 period reveal that the largest exchange of migrants is with the neighbouring local authorities of West Lindsey, North Kesteven, Boston and North East Lincolnshire. The largest net balance of migration is associated with inflows from the cities of Leicester, Sheffield and Nottingham.

E9. Housing completions remained fairly stable in both Wet and Dry areas to 2010, averaging approximately 200 per year in the Wet area and 400 per year in the Dry area. Whilst not an exact correlation, the recessionary impact of a lower number of completions has had an impact upon migration-driven population growth in East Lindsey, most notably in the Dry area (Figure 2). Whilst net migration growth is estimated to have increased since 2010/11, housing completions remain below the pre-recession average.

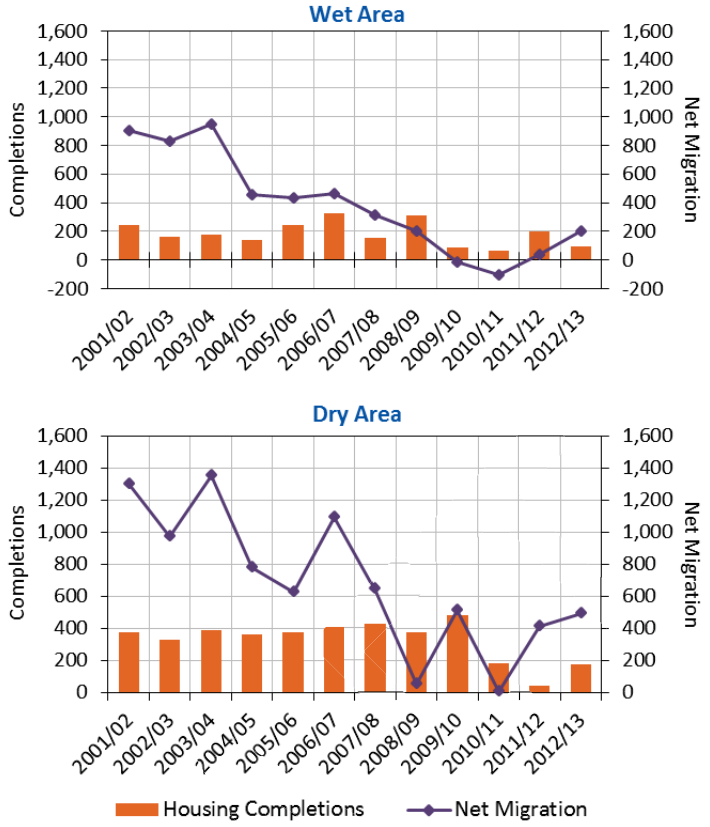

Figure 2: Housing completions and net migration – East Lindsey's Wet & Dry geographies

Scenario Outcomes

E10. The latest release of demographic statistics from the ONS and CLG has provided the basis for a revised suite of forecasts that suggest important changes in the range of growth trajectories estimated for East Lindsey and its Wet-Dry areas.

E11. The latest **SNPP-2012** has dampened the growth previously suggested by the pre-Census, **SNPP-2010** projection with an average annual dwelling growth of 413 per year under the HH-12 (2012-based DCLG headship rates) household assumptions, rising to 444 per year if the higher rates of household growth associated with the HH-08 (2008-based DCLG headship rates) assumptions are considered (Table 1).

E12. In all cases, the HH-12 outcomes, using data and assumptions from the 2012-based DCLG household projection model are lower than those estimated when the same scenarios are run using 2008-based headship rate assumptions.

E13. The two 'alternative trend' scenarios, **PG-5yr** and **PG-10yr** scenarios make more explicit use of the historical demographic evidence, using a 5-year and 10-year history respectively in the calibration of future migration assumptions. Growth under the **PG-10yr** scenario is higher than under the **SNPP-2012** scenario, whereas under the **PG-5yr** scenario, growth is lower. These differences reflect the patterns of population change in East Lindsey pre- and post-2008. The **PG-10yr** scenario generates a dwelling growth outcome that is reasonably consistent with that evidenced by the continuation of past house building rates across East Lindsey (as in the **10yr Dwelling Completions** scenario).

Table 1: East Lindsey: District scenarios

District-level Scenarios	Average Annual Dwelling Requirement (2011–2037)		
	HH-08	HH-12	Average
PG-10yr	499	462	481
10yr Dwelling Completions	471	469	470
SNPP-2012	444	413	428
PG-5yr	269	231	250

E14. For the Wet Area, the **10yr Dwelling Completions** scenario results in the highest average annual dwelling requirement (Table 2). Both the **PG-10yr** and **SNPP-2012** alternatives suggest a lower dwelling requirement (119–134 dwellings per year), one that is based on the changing size and shape of the Wet area population.

E15. Due to the recent decline in the Wet area population (see Figure 19 on page 32), the **PG-5yr** scenario, formulated using the last five-years of historical evidence, is roughly equivalent to the Zero Population Growth scenario, although there remains a positive dwelling growth requirement due to the declining average household size and changing age structure (see page 31 for further detail).

E16. The alternative HH-08 headship rates have only a small impact upon the Wet area dwelling requirement in each scenario, slightly higher than the equivalent HH-12 outcome.

Table 2: East Lindsey: Wet area scenarios

Wet Area Scenarios	Average Annual Dwelling Requirement (2011–2037)		
	HH-08	HH-12	Average
10yr Dwelling Completions	163	163	163
PG-10yr	136	132	134
SNPP-2012	121	117	119
Zero Population Growth	54	44	49
PG-5yr	34	38	36
Zero Dwelling Growth	0	0	0

E17. In the Dry Area, demographic change associated with the **PG-10yr** scenario has the highest average annual dwelling requirement (329 dwellings per year under the HH-12 assumptions) (Table 3). The **SNPP-2012** and the **10yr Dwelling Completions** scenarios are more consistent with each other, producing a lower annual average (296–305 dwellings per year).

E18. Despite modest growth in the Dry area post-2008 (Figure 20), the **PG-5yr** scenario is again projecting a much lower requirement than other scenarios at 186 dwellings per year.

E19. The application of the alternative HH-08 headship rates has a more significant impact upon the Dry area dwelling requirement in each scenario, raising the average annual dwelling requirement with a more rapidly-reducing average household size. It is likely that average household size will continue to fall but most likely following the shallower HH-12 trajectory rather than the HH-08.

Table 3: East Lindsey: Dry area scenarios

Dry Area Scenarios	Average Annual Dwelling Requirement (2011–2037)		
	HH-08	HH-12	Average
PG-10yr	360	329	344
SNPP-2012	322	296	309
10yr Dwelling Completions	307	305	306
PG-5yr	228	186	207

Key Considerations

E20. Given the changes that have taken place in East Lindsey's population growth profile since 2001, the longer-term perspective of the **PG-10yr** scenario would appear to be the most appropriate basis on which East Lindsey should consider its future housing requirements.

E21. This scenario includes the 'unattributable population change' (UPC) component, which was identified by ONS in its revisions to the mid-year population estimates (MYEs). The UPC adjustment has been included within the migration assumptions as it is most likely attributed to the mis-estimation of international migration. The **PG-10yr** scenario considers a higher level of net in-migration to the district, lessening the impact of the post-2008 recession years upon the future growth outlook (which are the basis of the **PG-5yr** scenario).

E22. In considering the Wet-Dry areas individually, it appears that a continuation of **10yr Dwelling Completions** would exceed the demographic requirements for dwelling growth in the Wet area but would be slightly less than that required in the Dry area. The Wet Area has historically absorbed around one third of total in-migration to the district. Future constraints on growth in the coastal area would require higher growth in the Dry area to accommodate demographic change subject to price and choice factors, or consideration of dwelling growth shared with adjacent local authorities.

E23. The district of East Lindsey has an internal migration profile characterised by a net outflow of young adults but a net inflow of older age migrants, particularly in the 50+ age-range. Whilst the migration exchange between adjacent local authorities is a key characteristic, the net inflow from Leicester, Sheffield and Nottingham has been an important element of population growth in East Lindsey.

E24. The net out migration of East Lindsey's young adults has increased since 2001, most likely due to more opportunities for higher education and employment. At the same time, net in migration for the 30–69s has been dampened by the prevailing economic conditions post-2008.

E25. Population ageing and the retention of young adults is a key issue for East Lindsey. The next 20 years will see a reduction in the size of the resident labour force as the larger birth cohorts of the 1950s and 1960s move beyond retirement. The alignment of economic and demographic forecasts is a key consideration when evaluating the potential housing implications of anticipated growth in jobs.

E26. The district-level scenarios applied relatively prudent changes to future rates of economic activity to accommodate changes to State Pension Age. These changes, in combination with a declining unemployment rate and no change to East Lindsey's commuting balance, estimate modest annual jobs growth in the **SNPP-2012**, **PG-10yr** and **10yr Dwelling Completions** scenarios (see Table 7 on page 28). The inevitable shift towards an older age profile for East Lindsey implies that higher rates of economic activity within older age-groups *could* help to maintain a larger local labour force, increasing the local capacity for jobs growth whilst reducing the requirement for more significant growth through net in-migration.

E27. The likely effect of international migration upon East Lindsey's future growth remains an area of uncertainty. Historical trends and future assumptions imply that international migration will not be a significant driver of population growth in the future. This factor should continue to be monitored as new evidence is published by ONS on its 2014-based national projections (due in autumn 2015).

E28. The latest, 2012-based household assumptions suggest lower household growth compared to the previous, 2008-based statistics. These differences are especially significant for the young adult age-groups, where acute affordability issues persist. Policies to dampen these affordability issues may improve the ability of young adults to form households sooner, a factor that could increase the overall dwelling requirement for East Lindsey.

E29. Further analysis of age-specific headship rate evidence may be a consideration for East Lindsey when new 'household-type' projections are released by DCLG in summer/autumn 2015.

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Introduction

Context

1.1 In 2010, the Lincolnshire Coastal Study addressed coastal flooding issues and proposed a set of Principles and Options for spatial development in East Lindsey and its neighbouring areas of Boston and South Holland.

1.2 The Coastal Study included a strategic aim ('Principle 1', see Appendix A) to provide only sufficient housing in the zones of the highest flood 'risk', and to hold the population 'broadly stable' over the Local Development Framework (LDF) plan period. The principle has been accepted by the District Council and incorporated into the draft Core Strategy.

1.3 In 2012 Edge Analytics provided demographic forecasts as part of the evidence base supporting Local Plan development. These forecasts were produced for 'Wet' and 'Dry' areas of East Lindsey. The 'Wet' area represents the flood hazard zone (yellow, orange and red areas in Appendix A) with the remainder being the low hazard, 'Dry' area of the district (green areas in Appendix A).

1.4 In 2013, figures were updated to support the draft Core Strategy, taking account of a variety of new demographic data. These data included 2011 Census results; updated household projections produced from the Department for Communities and Local Government (CLG) and revised mid-year population estimates for the period 2002-2010 released by the Office for National Statistics (ONS).

Requirements

1.5 With a further release of statistics from both ONS and DCLG, East Lindsey District Council has commissioned an update to its demographic evidence, to inform the planning process. The new statistical releases include:

- 2012-based population projection (Source: ONS)
- 2013 mid-year population estimate (Source: ONS)
- 2012-based household projection (Source: DCLG)

1.6 Updated demographic forecasts have been developed at both district and sub-district level, maintaining the Wet-Dry area classification from previous analysis.

Approach

1.7 The development and presentation of demographic evidence to support local housing plans is subject to an increasing degree of public scrutiny. The National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG) provide guidance on the appropriate approach to the objective assessment of housing need. The PPG states that the DCLG household projections should provide the "starting point estimate of overall housing need" (PPG paragraph 2a-015).

1.8 Local circumstances, alternative assumptions and the most recent demographic evidence, including ONS population estimates, should also be considered (PPG paragraph 2a-017). Evidence that links demographic change to forecasts of economic growth should also be assessed (PPG paragraph 2a-018).

1.9 The use of demographic models, which enable a range of growth scenarios to be evaluated, is now a key component of the objective assessment process. The choice of demographic assumptions has an important bearing on scenario outcomes. This is particularly the case when trend projections are considered alongside population and household forecasts. The scrutiny of demographic assumptions is now a critical component of the public inspection process, providing much of the debate around the appropriateness of a particular objective assessment of housing need.

1.10 The POPGROUP suite of demographic models, which is widely used by local authorities and planners across the UK, provides a robust and appropriate forecasting methodology. POPGROUP is a family of demographic models which enables forecasts to be derived for population, households and the labour force, for areas and social groups. Under licence to the Local Government Association (LGA), Edge Analytics provides product development and technical support to the product suite and its user base.

1.11 For the East Lindsey demographic analysis, forecasts have been developed using the POPGROUP suite of products. Appendix B provides a summary overview of the POPGROUP model methodology. More detail can be found online http://www.edgeanalytics.co.uk/popgroup.php.

Report Structure

1.12 This report is structured as follows:

- **Section 2** provides a definition of the Wet-Dry geographies used for the development of the growth forecasts.
- **Section 3** summarises the latest demographic evidence on population change and migration.
- **Section 4** examines the latest statistics from ONS and DCLG on population and household projections for East Lindsey.
- **Section 5** details the demographic scenarios that have been developed, at both district level and for the Wet-Dry geographies.
- **Section 6** summarises the results of each of the demographic scenarios.
- **Section 7** provides a comparison of the output from the previous 2013 update with the latest data presented in this report.
- **Section 8** concludes with a summary of the analysis, identifying the key issues for East Lindsey to consider in its housing development plans.

1.13 The Appendices to this document provides further detail on the Environment Agency's classification of flood risk areas, a summary of the POPGROUP forecasting methodology used in this analysis, plus an overview of the key data inputs and assumptions used in forecast development.

2 Area Definition

2.1 The focus of the demographic analysis and forecasts presented in this report is the local authority district area of East Lindsey (Figure 3). Given its position on the east coast of England, the district has a significant flood risk associated with its geography.

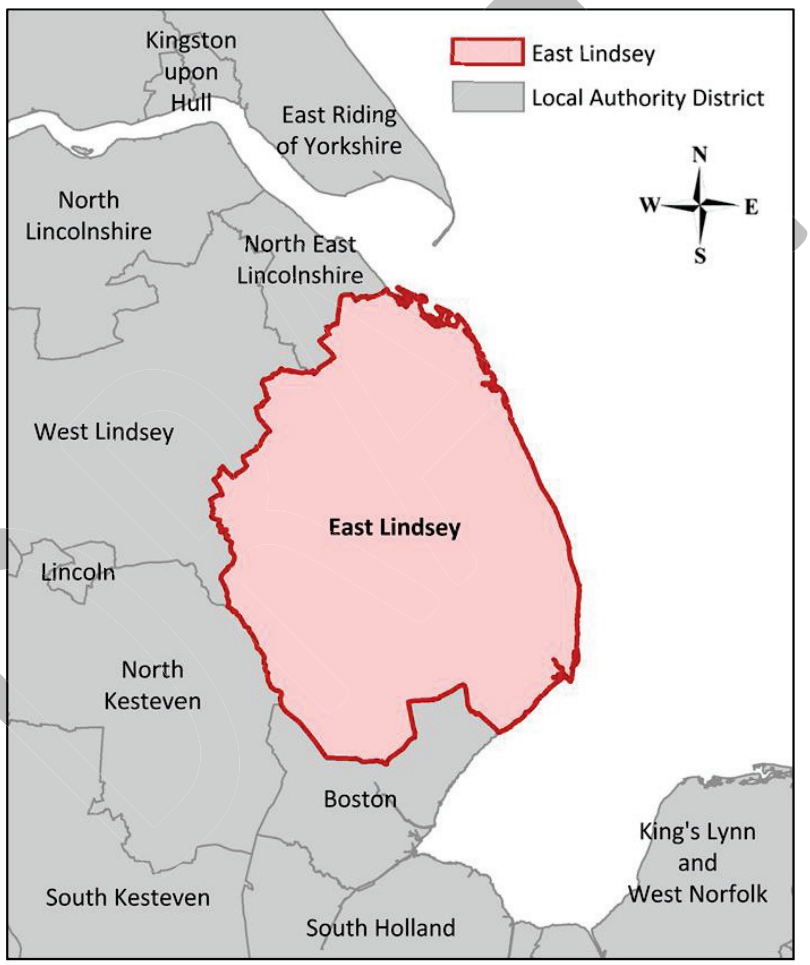


Figure 3: East Lindsey geography

2.2 The Environment Agency has developed detailed digital map overlays defining the extent of East Lindsey's flood hazard zones (Appendix A). With the exclusion of the lowest hazard (green) areas, the definition of the flood hazard zone is summarised in Figure 4 (a). It should be noted

that the district boundary data used in Figure 4 (a) illustrates the 'extent of the realm' boundary, which extends to the mean low water/tide mark, encompassing coastal mud flats to the east of the flood hazard area.

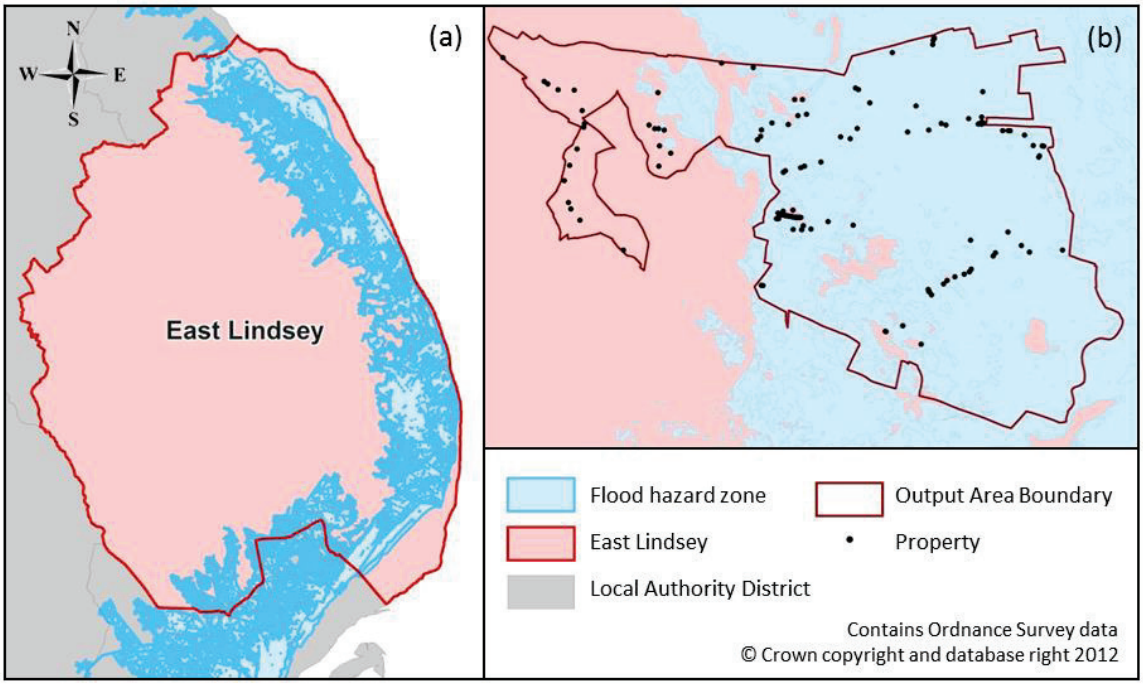


Figure 4: Flood hazard zone, Output Area boundaries and property points

2.3 In the analysis presented in this report, the area covered by the flood hazard zone has been labelled 'Wet', with the area outside of the flood hazard zone referred to as 'Dry'. These Wet and Dry zones provide the basis of the sub-district forecasting analysis presented here.

2.4 To enable demographic analysis of the sub-district geographies, it has been necessary to identify the precise geographical coverage of each of the Wet and Dry areas. This has been achieved using a combination of Census Output Area geography and property data from the National Land and Property Gazetteer (NLPG).

2.5 Output Areas (OAs) are the smallest geographical unit to which Census data are published. They nest directly into the administrative boundary of the district. East Lindsey contains 487 OAs, as defined by 2011 Census output.

2.6 The NLPG is a continuously updated set of properties, identifying the precise geographical reference point of each property and its 'type'. In defining Wet and Dry areas, only properties which are classified by the NLPG as being 'residential' (including dwellings and residential

institutions) have been considered and each has been identified as being within or outside of the defined flood hazard zone.

2.7 The extent to which each individual OA is defined as Wet or Dry has been calculated on the basis of the number of NLPG properties which fall inside or outside of the flood hazard zone. This has been illustrated in Figure 4 (b). In the example (OA 'UCHE0001') there are 150 property points contained within the NLPG, of which 85 are within the flood hazard zone and 65 outside. As a result, this OA is considered to have a Wet proportion of 0.57 and a Dry proportion of 0.43. This calculation has been repeated for all 487 OAs in the study area, providing the definition of Wet and Dry coverage across the district.

2.8 The resultant OA definition has been used as the basis for generating the historical demographic statistics, used to develop the sub-district forecasts presented within this report.

3 Population Change & Migration

Population Change

3.1 At the 2011 Census, the resident population of East Lindsey was 136,400, a 4.4% increase over the 2001–2011 decade. However, the 2011 Census population total proved to be lower than that suggested by the trajectory of growth from the mid-year population estimates[1] (MYE) (Figure 5).

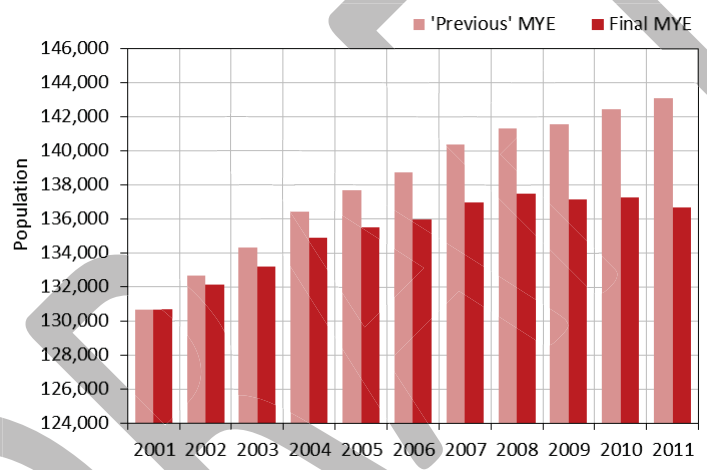


Figure 5: East Lindsey: Mid-year population change 2001–2011
(Source: ONS)

3.2 Following the 2011 Census, the 2002–2010 MYEs were 'rebased' to align them with the new population evidence and to ensure the correct transition of the age profile of the population over the 2001–2011 decade.

3.3 The rebasing of the MYEs involved the recalibration of the 'components of change' for 2001/02–2010/11. 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

[1]The figure for the 'previous' MYE 2011 comes from ONS' Quality Assurance pack and represents the ONS 'rolled forward estimate http://www.ons.gov.uk/ons/guide-method/census/2011/census-data/2011-census-data/2011-first-release/local-authority-quality-assurance/the-2011-census-qa-pack.zip

2001 Census provided a robust population count, the 'error' in the MYEs is due to the difficulties associated with the estimation of migration.

3.4 Internal migration (i.e. migration flows to and from other areas in the UK) is adequately measured using data from the Patient Register (PR), the National Health Service Central Register (NHSCR) and Higher Education Statistics Agency (HESA), 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 East Lindsey.

3.5 However, ONS has not explicitly assigned its 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 over-count (Figure 6).

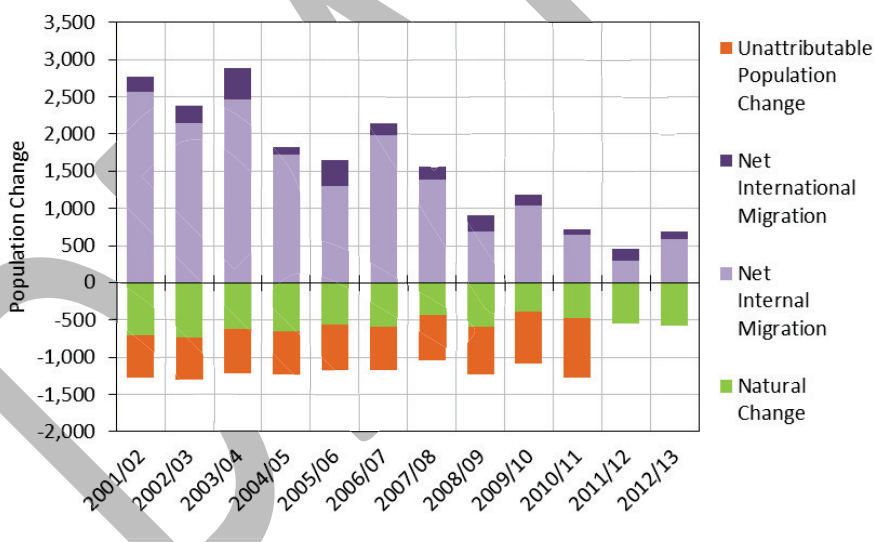


Figure 6: East Lindsey: Components of population change, final mid-year estimates (Source: ONS)

3.6 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 reasonable to assume that it is most likely to be associated with the latter.

3.7 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 from ONS, a twelve-year profile of the 'components of change' is presented for East Lindsey (Figure 7).

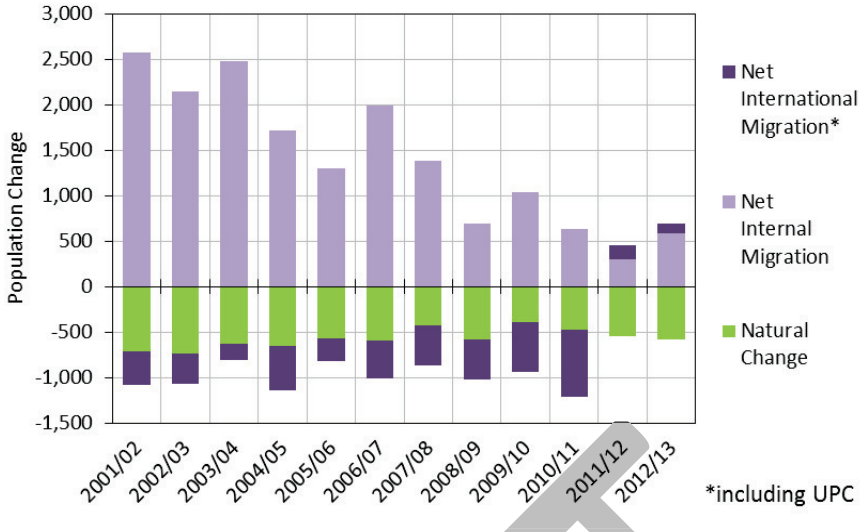


Figure 7: East Lindsey: Components of population change 2001/02 to 2012/13, including the UPC component in the 2001/02 to 2010/11 international migration component (Source: ONS)

3.8 For East Lindsey, population growth since 2001 has been predominantly driven by a strong net inward migration from elsewhere in the UK to 2008, reducing thereafter. Natural change has had a consistently negative impact upon growth, with an excess of deaths over births in all years to 2012/13. The international migration component, incorporating the UPC adjustment, has contributed a net population loss in all years to 2010/11.

3.9 Since 2011, East Lindsey's population has remained stable with a net inflow of population, primarily from internal migration, balanced by a net loss through natural change.

Population Age Structure

3.10 An age-sex population pyramid illustrates the extent to which recent population growth has been distributed across the age-groups and the degree to which the movement of large birth cohorts have affected the changing age profile (Figure 8).

3.11 The majority of the changes reflect the 'ageing' of the population over the decade, with additional impacts from in and out-migration flows. The movement of the post-World War Two baby boom cohort is particularly evident, with a spike in the 50–60 age-group in 2001 becoming a spike in the 60–70 age-range in 2011. The population in the older adult age-groups will have been supplemented through net in-migration since 2001.

3.12 The age-profile has a narrow base, reflecting a small number of births relative to the size of the older-age groups.The narrowing of the population profile in the young-adult age-groups reflects both the historically low birth numbers relative to the older population and the net outflow of this population from East Lindsey.

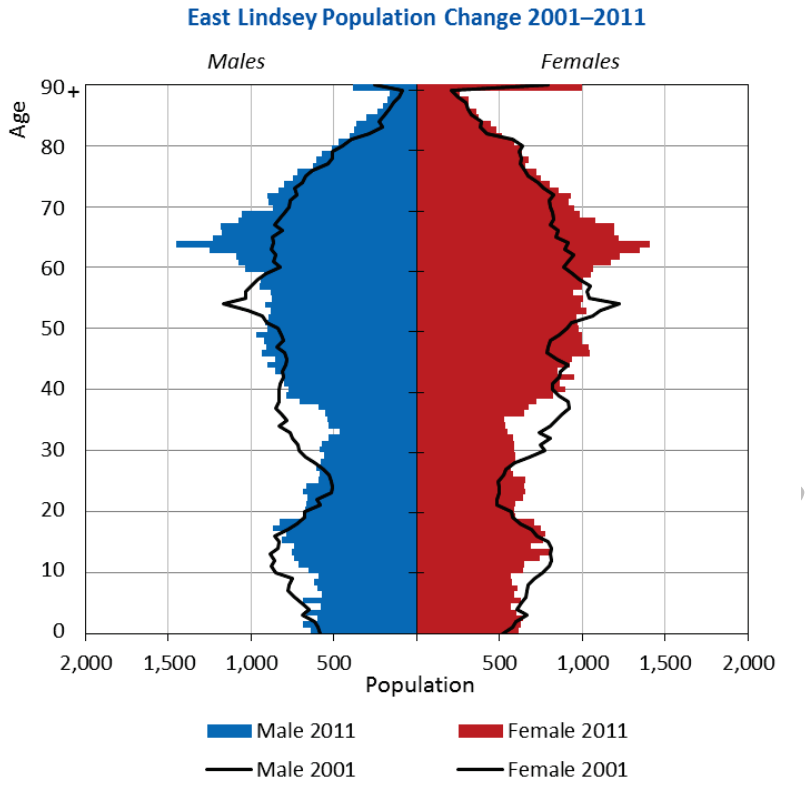


Figure 8: East Lindsey: Changing age profile of the population, 2001–2011 (Source: ONS)

3.13 Population ageing and the retention of young adults is a particularly important consideration for East Lindsey. The next 20 years will see a reduction in the size of the resident labour force as the larger birth cohorts of the 1950s and 1960s move beyond retirement. Retaining its young adult population or replenishing it through net inward migration is a key consideration for the district in meeting future economic and demographic growth aspirations.

Internal Migration

3.14 East Lindsey's components of population change for the 2001–2013 period demonstrate that internal migration has been a dominant driver of growth since 2001 but that its importance has reduced since the onset of the recession in 2008.

3.15 Internal migration has a key influence upon not only the size of East Lindsey's population but also the evolving age-profile that has been illustrated. Using migration statistics for the 2001/02–2012/13 period, the age-profile of net migration to/from East Lindsey is presented (Figure 9). ONS captures this data from GP registration statistics and information on student addresses from the Higher Education Statistics Authority (HESA).

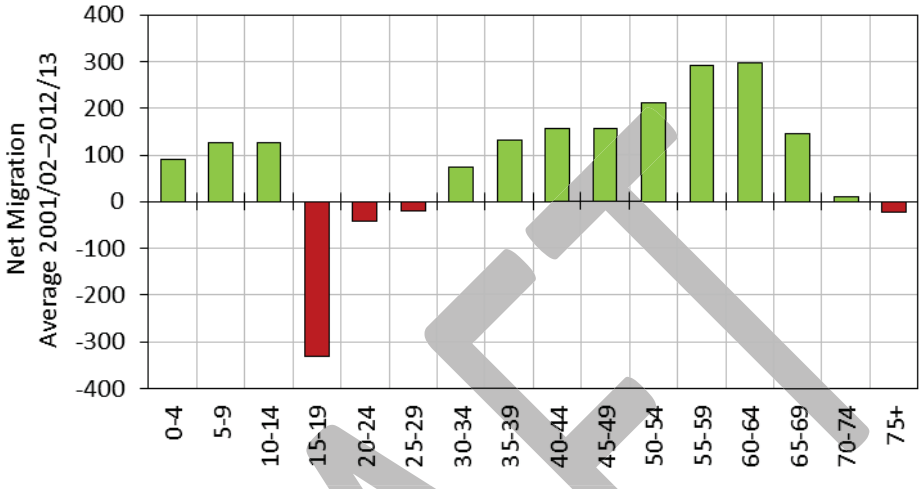


Figure 9: East Lindsey: Migration within UK, average net flows 2001/02–2012/13 (Source: ONS)

3.16 The annual net loss of the youngest adults is clearly evident, as those leaving school head off for further study or for employment outside East Lindsey. There is no evidence of these young adults returning immediately, in their early or late twenties. However, based on the average annual growth, East Lindsey has gained population in all age groups aged 30–74, and ages 0–14, suggesting that the district attracts not only the younger retired ages, but also younger families.

3.17 Using migration data from the beginning and end of the historical period (2001/02 and 2012/13) illustrates the extent to which the level of net migration to/from East Lindsey has changed and its influence upon different age-groups (Figure 10).

3.18 The more recent data show a larger spike in the net migration at ages 15–19, which is likely to be a result of higher university participation rates. Net flows of the 75+ age group were negative in 2006/07 and have remained so in all years since.

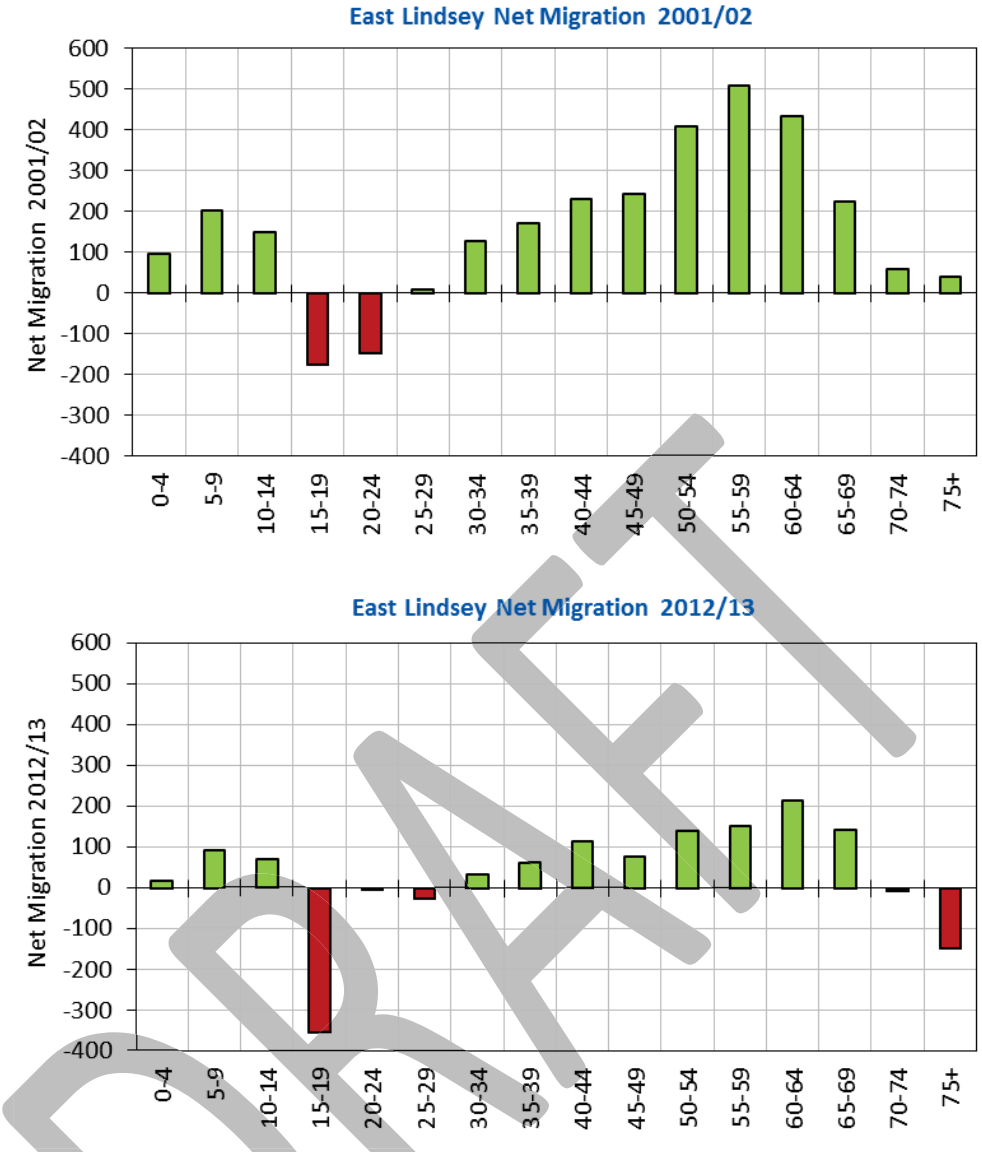


Figure 10: East Lindsey: Migration within UK –Net flows 2001/02 AND 2012/13 (Source: ONS)

3.19 In terms of the directional flow of migration, the 'top-ten' gross inflows and outflows to and from East Lindsey for the 2001/02–2012/13 period, reveal that the largest exchange of migrants is with neighbouring local authorities and university cities in the East Midlands and Yorkshire (Table 4). For neighbouring local authorities the gross flows are generally characterised by a large inflow matched to a large outflow, resulting in a relatively small net impact upon population change.

Table 4: East Lindsey - Top Ten migration inflows and outflows, 2001/02–2012/13 (source: ONS).

Top Ten Inflows	average 2001/02-2012/13
North East Lincolnshire	549
Boston	428
West Lindsey	277
North Kesteven	268
Nottingham	261
Sheffield	223
Lincoln	223
Leicester	125
Rotherham	107
Leeds	100

Top Ten Outflows	average 2001/02-2012/13
North East Lincolnshire	508
Boston	434
Lincoln	325
North Kesteven	316
West Lindsey	302
Nottingham	163
Sheffield	144
South Kesteven	94
North Lincolnshire	90
Leeds	89

3.20 Converting gross flows to the 'top-ten' net flows reveals that net flows have generally been quite small (100 or less) with the largest net inflows from the major cities of the East Midlands, Nottingham, Sheffield and Leicester. The largest net outflow from East Lindsey has been to the city of Lincoln.

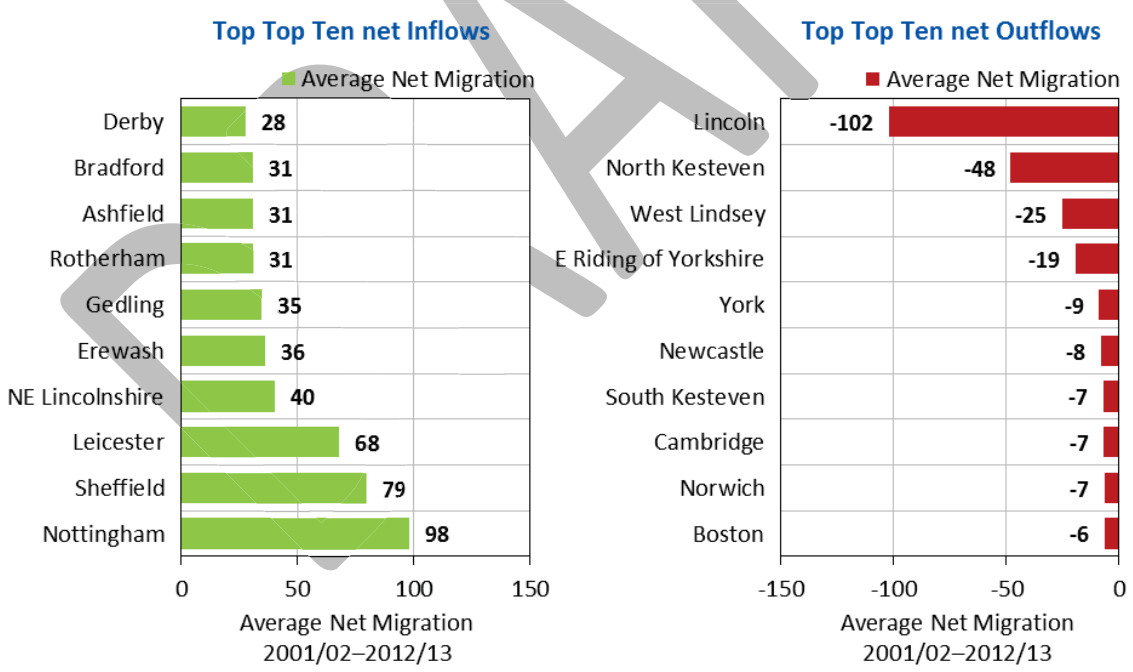


Figure 11: East Lindsey - Top Ten Local Authority internal migration net inflows and outflows, average 2001/02–2012/13 (Source: ONS)

3.21 Again, the change between 2001/02 and 2012/13 provides some indication of how migration patterns have changed pre- and post-recession (Table 5).

Table 5: East Lindsey - Top Ten migration inflows and outflows, 2001/02 compared to 2012/13.

Top ten Inflows	2001/02
North East Lincolnshire	590
Boston	440
North Kesteven	290
Sheffield	290
West Lindsey	270
Nottingham	270
Lincoln	160
Rotherham	140
Leicester	130
Leeds	60

Top ten Inflows	2012/13
North East Lincolnshire	544
Boston	418
North Kesteven	315
West Lindsey	309
Lincoln	294
Nottingham	188
Sheffield	133
Leeds	113
Rotherham	95
Leicester	78

Top ten Outflows	2001/02
North East Lincolnshire	550
Boston	450
North Kesteven	330
Lincoln	290
West Lindsey	260
Nottingham	150
Sheffield	140
North Lincolnshire	130
Leeds	90
South Kesteven	80

Top ten Outflows	2012/13
North East Lincolnshire	547
Boston	420
Lincoln	396
North Kesteven	366
West Lindsey	359
Sheffield	151
Nottingham	144
South Kesteven	109
Leeds	97
North Lincolnshire	71

Source: ONS

3.22 The top inflows (NE Lincolnshire, Boston and North Kesteven) have remained consistent, as have flows from West Lindsey. Adjacent local authorities remain the source of the largest inflows to East Lindsey. Sheffield, Nottingham, Rotherham and Leicester have all seen a reduction in migration to East Lindsey over the 12 years to 2012/13. East Lindsey attracted more people from Lincoln and Leeds in 2012/13 than in 2001/02.

3.23 In terms of migration outflows from East Lindsey, the top five destinations are again the neighbouring local authorities; NE Lincolnshire and Boston remain the biggest beneficiaries. There were larger outflows to Lincoln and to West Lindsey in 2012/13 than in 2001/02, whilst outflows to the larger cities of Leeds, Nottingham and Sheffield show similar patterns in 2012/13 to 12 year ago.

Housing Completions & Migration

3.24 It is informative to compare the historical scale and pattern of new housing completions against the pattern of migration change across East Lindsey. Housing completions have been assigned to the Wet-Dry geographies and the impact of net migration upon annual population growth has been estimated from historical population statistics.

3.25 At sub-district level, no distinction is made between internal and international migration effects, so net migration is a 'total' effect of both components (Figure 12).

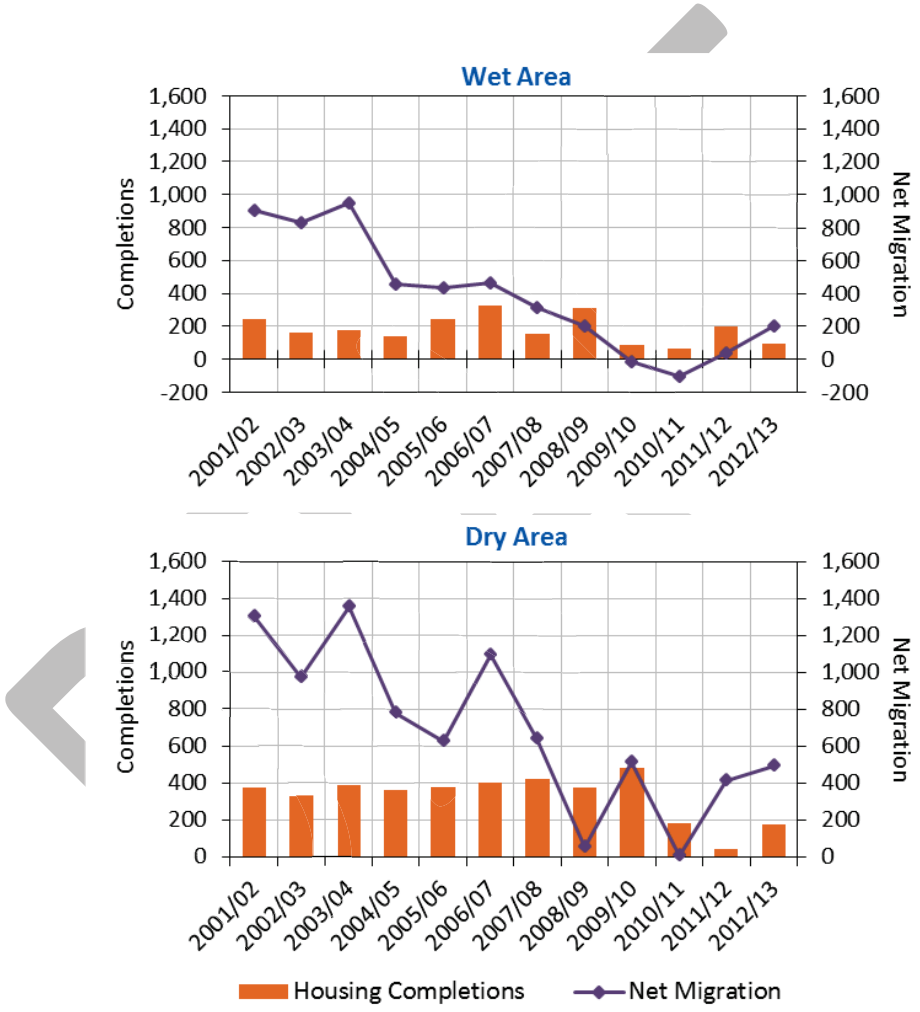


Figure 12: Housing completions and net migration – East Lindsey's Wet & Dry geographies

3.26 The fall in the impact of net migration is emphasised in both the Wet and Dry areas, although the impact is most pronounced in the Dry area. Both Wet and Dry areas have seen a recovery in net migration since 2011.

3.27 Housing completions remained fairly stable in both Wet and Dry areas to 2010, averaging

approximately 200 per year in the Wet area and 400 per year in the Dry area. Whilst not an exact correlation, the recessionary impact of a lower number of completions has had an impact upon migration-driven population growth in East Lindsey. Whilst net migration growth is estimated to have increased since 2011/11, housing completions remain below the pre-recession average.

4 Official Projections

Population Projections - ONS

4.1 In the development and analysis of population change, it is important to benchmark any growth alternatives against the latest 'official' population projection. The most recent official subnational population projection is the ONS 2012-based sub-national population projection (SNPP), released in May 2014, following the completion of the previous East Lindsey demographic report.

4.2 Under the 2012-based SNPP, the population of East Lindsey is projected to increase by 17,000 over the 2012–2037, 25-year projection period, an increase of 12.0%. This rate of growth is substantially lower than that suggested by the 2011-based interim and that recorded in the, pre-census, 2010-based SNPP (Figure 13).

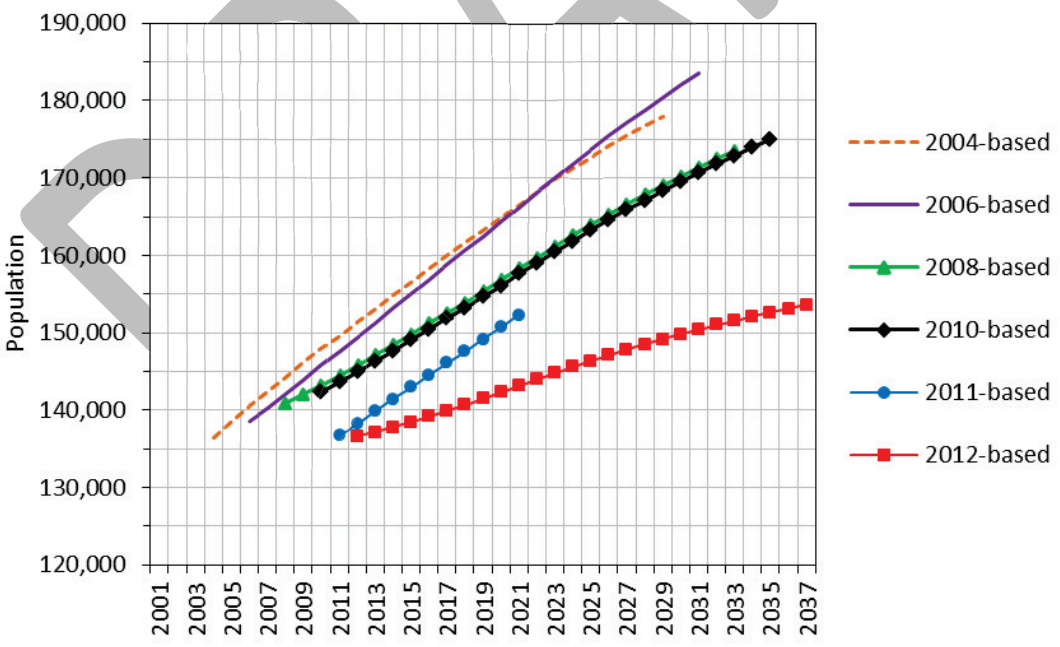


Figure 13: Official ONS population projections for East Lindsey (source: ONS)

4.3 The 2012-based projections are based upon demographic evidence that has resulted from the revised 2011 Census population count for East Lindsey. ONS typically uses a 5-6 year history of population change to derive its estimates of future migration change, combining this with

assumptions on the future impact of fertility, mortality and international migration. A five and ten-year average of the components of population change are presented here to allow direct comparison with the latest SNPP for East Lindsey (Table 6).

Table 6: 2012-based SNPP components of change (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	-482	-558	-612
Net Internal Migration	810	1,373	1,175
Net International Migration	154	204	116
Unattributable Population Change*	-553	-570	-
Annual Population Change	-65	446	679
Annual Population Change (%)	-0.1%	0.3%	0.5%

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

4.4 This data confirms that, historically, over both the 5-year and 10-year periods, net *internal* migration has been the dominant component of change. The impact of net internal migration is projected to continue in the 2012-based SNPP, at a level that approximates to the average of the five and ten-year histories. Natural change continues to have a negative impact upon population growth in the 2012-based SNPP, becoming increasingly negative over the projection period. International migration is expected to have a small positive net impact upon population growth over the 25-year projection period (Figure 14).

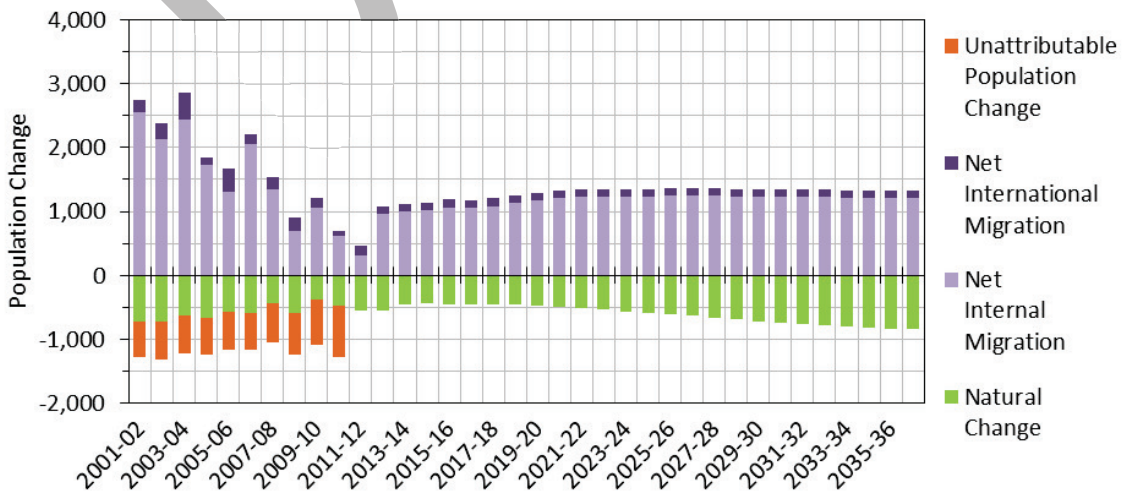


Figure 14: Historical and 2012-based SNPP components of change (source: ONS)

Household Projections - DCLG

New 2012-based household model

4.5 In the assessment of housing need, the PPG states that the DCLG household projections should provide the starting point estimate (PPG paragraph 2a-015). The 2012-based household projections were released by DCLG[2] in February/March 2015. Underpinned by the 2012-based SNPP, these new statistics provide a household growth projection and household headship rate assumptions for each local authority area for the 2012–2037 period.

4.6 The methodological basis of the 2012-based household projections is consistent with that employed in the previous 2008-based and 2011-based interim household projections[3]. In each, household projections have been derived through the application of projected household headship rates (also referred to as representative rates) to a projection of the private household population, disaggregated by age, sex and relationship status.

4.7 Whilst methodologically similar to previous releases, the 2012-based household projections provide an important update on the 2011-based interim household projections with the inclusion of the following new information:

- 2012-based SNPP by sex and age that extend to 2037 (rather than to 2021 as was the case in the 2011-based interim projections).
- Household population by sex, age and relationship status consistent with the 2011 Census (rather than estimates for 2011, which were derived from 2001 Census data, projections and national trends, as used in the 2011-interim projections).
- Communal population statistics by age and sex consistent with the 2011 Census (rather than the previous estimate, which were calibrated to the total communal population from the 2011 Census).
- Further information on household representatives from the 2011 Census relating to aggregate household representative rates by relationship status and age.

[2] 2012-based household projections in England, 2012 to 2037. DCLG 27th February 2015. https://www.gov.uk/government/statistics/2012-based-household-projections-in-england-2012-to-2037

[3] 2012-based household projections: methodology, DCLG 2nd March 2015. https://www.gov.uk/government/statistics/2012-based-household-projections-methodology

- Aggregate household representative rates at local authority level, controlled to the national rate, based on the total number of households divided by the total adult household population (rather than the total number of households divided by the total household population).
- Adjustments to the projections of the household representative rates in 2012 based on the Labour Force Survey (LFS).

(Source: DCLG Methodology[4], page 6)

4.8 The household projection methodology consists of two distinct stages. Stage One produces the national and local authority projections for the total number of households by age group and relationship status group over the projection period. All Stage One output and assumptions have been released by DCLG.

4.9 Stage Two provides the detailed 'household type' projection by age group. Seventeen different household types are typically included in household model outputs (see Appendix C). Stage Two assumptions and output, which provide the more detailed household type statistics, have yet to be released. Stage Two outputs would typically be controlled to the Stage One totals, so there should be no impact on the household and dwelling forecasts presented in this report when the Stage Two information is published. However, further guidance will be forthcoming from DCLG on release of the Stage Two analysis, anticipated in July-August 2015.

4.10 The Stage One data are used in this analysis, to provide the basis for the evaluation of the impact of the 2012-based DCLG model assumptions upon the household growth outcomes of each scenario.

Household Growth Outcomes

4.11 The 2012-based DCLG household projection model for East Lindsey, underpinned by the 2012-based SNPP, estimates that the number of households will increase by 10,000 over the 2012–2037 period: equivalent to approximately 400 additional households per year (Figure 15).

4.12 The 2011-based household projection from DCLG, provided only an 'interim' perspective on household growth, with a shorter projection horizon, underpinned by a 2011-based population projection that had inappropriately-formulated migration assumptions. Its projection suggested

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

growth of 759 households over the shorter 2011-2021 period.

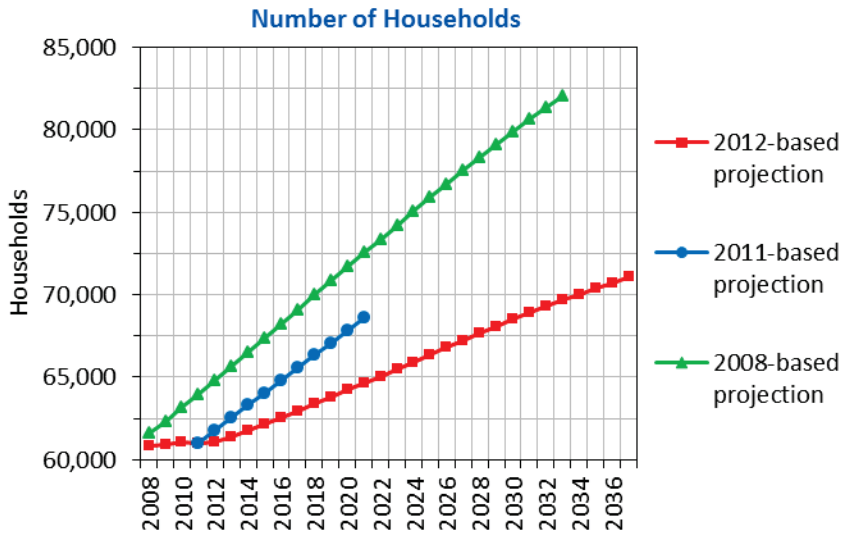


Figure 15: Household growth projections, DCLG projections (Source: DCLG)

4.13 The 2008-based household model was underpinned by a much higher population growth assumption and household headship rates that suggested a more rapid decline in average household size. As a result, the level of growth associated with DCLG's original 2008-based projection for East Lindsey was higher than the latest 2012-based outcome, achieving an annual average household growth of 817 per year over its 25-year horizon.

4.14 The different headship rate assumptions that are used by the respective household models are reflected in the change in average household size associated with each. The 2008-based model implies a sharper decline in average household size (Figure 16).

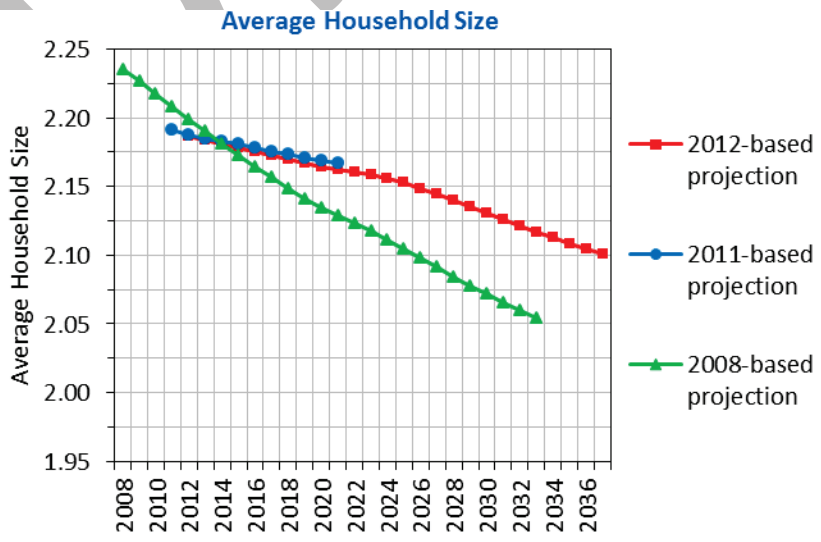


Figure 16: Average Household Size Source: CLG 2012-based Household Projections.

Headship Rates by Age

4.15 Underpinning the household projections are age-specific headship rates, which define the probability that a person in a given age group is head of a household. The variations between the headship rates under each of the 2008-based, 2011-based and 2012-based household projection models, is the factor that drives different household and dwelling growth outcomes.

4.16 The age-specific headship rates under the 2008-based, 2011-based and 2012-based household projection models are presented for comparison in Figure 17. The 2012-based household projection model supersedes the 2011-based interim household projection model; therefore, the comparison is primarily between the headship rates under the 2008-based and 2012-based models.

4.17 The most significant difference between the 2008-based and 2012-based headship rates is the headship rate profile associated with the young adult age-group 25-34, with higher and increasing rates in the 2008-based data, lower and reducing in the 2012-based model. These differences are a reflection of the variant market conditions that existed pre and post-2008, with affordability issues continuing to constrain household formation in this age-group.

4.18 The trend in headship rate change over time are generally similar in other age-groups, albeit from a higher or lower start point in either the 2008-based or 2012-based data.

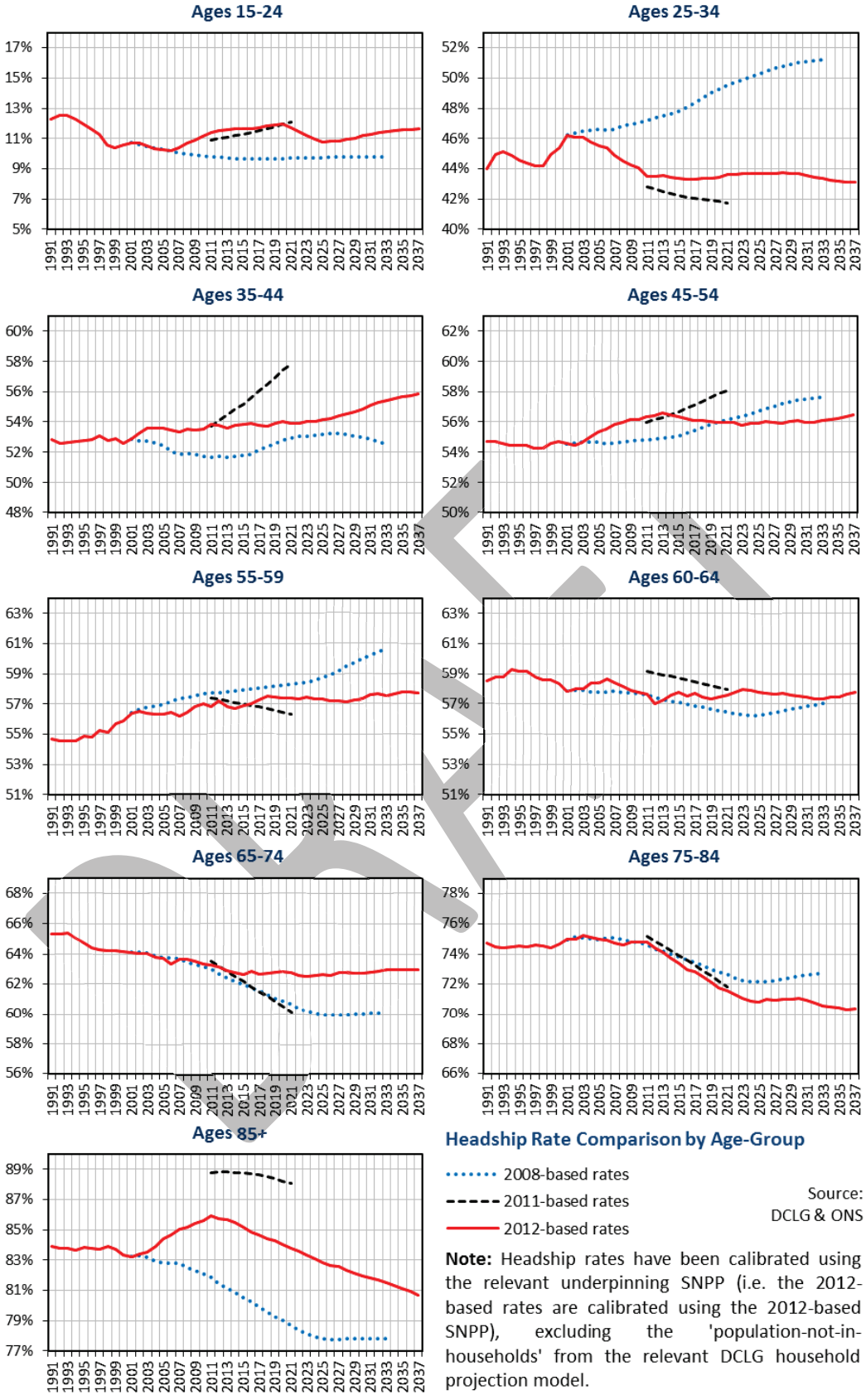


Figure 17: East Lindsey headship rates by age-group

5 Scenario Development

Introduction

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

5.2 POPGROUP (v.4) technology has been used to develop a range of scenario alternatives for East Lindsey. The scenarios are benchmarked against the latest 'official' population projection for the district. Scenarios have been formulated at both district and sub-district (Wet-Dry) level.

5.3 Sensitivity testing has been conducted to examine the impact of alternative headship rates upon dwelling growth outcomes, using assumptions from the DCLG 2012-based (see Figure 17 on page 2323) and the 2008-based household models. Scenarios run using the 2012-based headship rates are presented under an 'HH-12' outcome and those run using the 2008-based rates under an 'HH-08' outcome. In all scenarios, a 2011 Census vacancy rate for East Lindsey and its Wet-Dry areas has been applied, fixed throughout the forecast period.

5.4 At district level only, the economic implications of demographic change have been evaluated using three key assumptions: economic activity rates, an unemployment rate and a commuting ratio. In each scenario, 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 to 2018 to account for economic recovery following the recession and the districts 2011 Census commuting ratio remains fixed throughout the projection period.

5.5 For detail on the assumptions used in the scenarios, refer to Appendix C.

Official Projections

5.6 In accordance with the PPG, the alternative trend scenarios are 'benchmarked' against the most recent official population projections, the ONS 2012-based SNPP. The **SNPP-2012** scenario replicates this official population projection.

5.7 ONS does not produce official forecasts for sub-district geographies. The SNPP-2012 district-level population growth total is used in conjunction with sub-district assumptions on fertility, mortality and migration, to derive an appropriate population growth distribution for the Wet-Dry geographies of East Lindsey.

Alternative Trend Scenarios

5.8 A five year historical period is a typical time-frame from which migration 'trend' assumptions are derived. Given the unprecedented economic changes that have occurred since 2008, and the differences between the projected 2012-based SNPP data and the historical data (see Table 4), it is important to give due consideration to an extended historical time period for assumption derivation.

5.9 Two alternative trend scenarios have been developed, based upon the latest demographic evidence:

- **PG-5yr**: migration assumptions are based on the last five years of historical evidence (2008/09 to 2012/13) with the UPC adjustment included within the migration assumptions.
- **PG-10yr**: migration assumptions are based on the last 10 years of historical evidence (2003/04 to 2012/13) with the UPC adjustment included within the migration assumptions.

5.10 For the Wet-Dry sub-district areas, the calibration of migration assumptions for trend forecasts is handled differently to the district-level. There are no historical migration data available for small areas, other than Census statistics. To establish an indication of the historical impact of migration, its value is calculated as the 'residual' of the population after taking account of births and deaths. This calculation of 'net migration' equates to the cumulative impact of the four types of migration (in-migration, out-migration, immigration and emigration).

5.11 Using these derived migration assumptions, **PG-5yr** and **PG-10yr** scenarios have been derived for the sub-district geographies, each retaining consistency with its district-level equivalent by using the district-level population change as a constraint on overall sub-district growth.

Zero Growth Scenarios

5.12 Two additional scenarios have been developed to test the implications of both a 'zero dwelling' growth trajectory and a 'zero population' growth trajectory upon 'Wet' Area only:

- **Zero Dwelling Growth**: This scenario assumes no change in the number of dwellings 2013-2037. It represents the most cautious response to the Lincolnshire Coastal Study.

- **Zero Population Growth**: This scenario assumes that total population remains constant throughout the projection period (2013-2037). There is no population growth but the age profile of the population is allowed to change. Births, deaths and migration still take place but net migration is adjusted to offset any natural change.

Dwelling-led Scenario

5.13 For each of the Wet and Dry areas, the POPGROUP model has been used to evaluate the impact of a continuation of a 10 year average in housing completion rates. This scenario is referred to as **10yr Dwelling Completions**.

5.14 Housing completion rates have been derived from a 10-year period, 2004-2013, and allocated to Wet-Dry areas based upon a proportional split of historical (2004-2013) completions from Parish information.

5.15 The resulting annual dwelling growth targets are 180 dwellings per year for the Wet area, and 320 dwellings per year for the Dry area.

5.16 The targeted dwelling growth in each of the Wet-Dry areas acts as a 'constraint' on population and household growth, with migration used to balance the population and households required to achieve the dwelling target.

6 Scenario Forecasts

Introduction

6.1 Scenario results are presented for the East Lindsey district in total and for each of the Wet and Dry areas. Outcomes are summarised in the form of a chart and an accompanying table of statistics. The chart illustrates the trajectory of population change resulting from each scenario. The table summarises the change in population and household numbers from 2011-2037 that result from each scenario.

6.2 The scenarios are 'ranked' (high to low) according to the estimated level of population change for the 2011-37 time period. The table also shows the average annual net migration associated with the population change; plus the expected average annual dwelling growth based on the assumptions used in each scenario. An expected average annual jobs growth is provided at the district-level only.

6.3 All scenarios are presented based on the application of the CLG 2012-based headship rates, labelled 'HH-12'. Additional analysis is included to illustrate the impact of using 2008-based headship rates in preference to the 2012-based data in the household calculation.

District Scenario Outcomes

6.4 The **SNPP-2012** scenario is the 'official' benchmark against which other growth outcomes are compared. Despite limited growth to East Lindsey's population since 2008, the SNPP-2012 suggests 12.4% growth over the 2011-2037 time period, an additional population of 16,892. This growth profile equates to 413 dwellings per year and an annual net in-migration of 1,259 per year (Table 7).

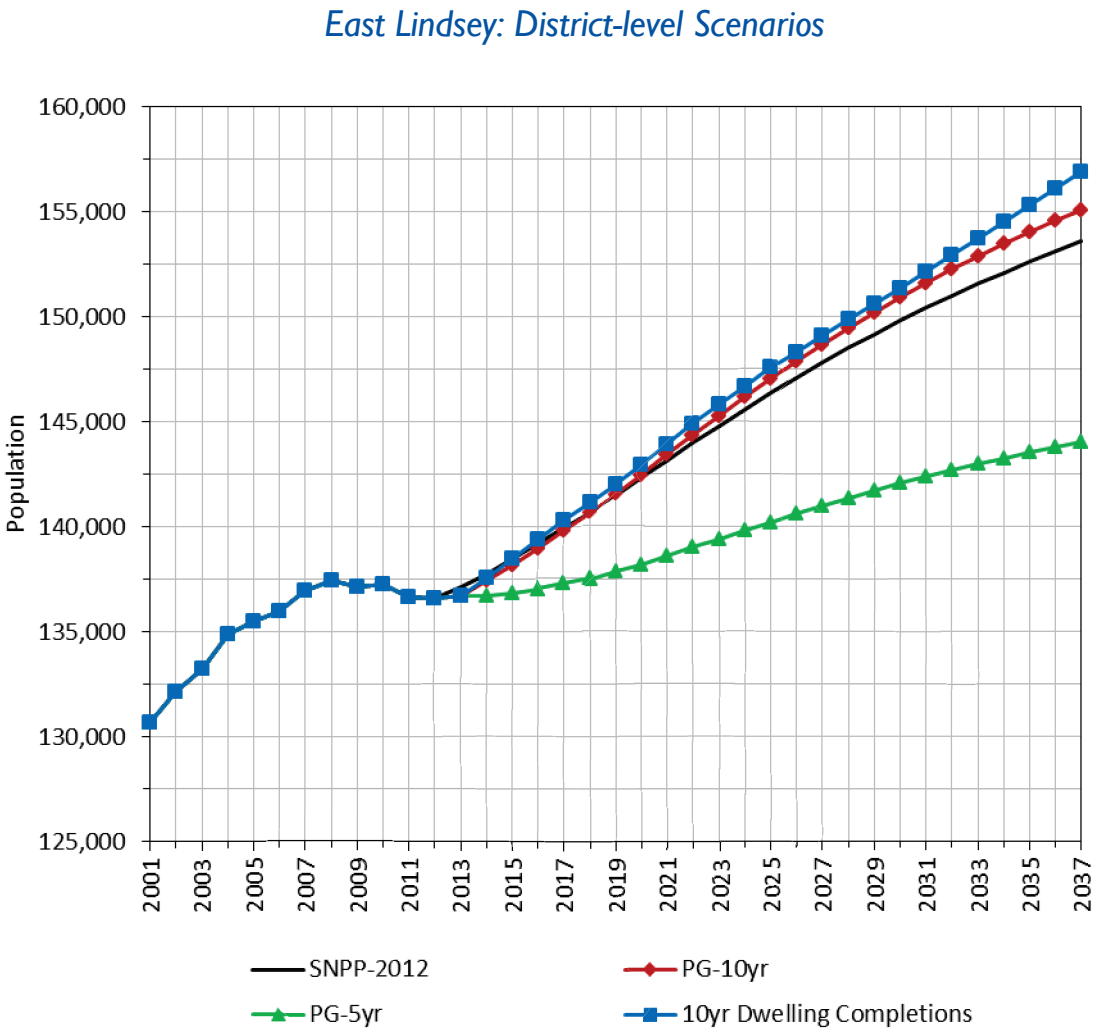


Figure 18: East Lindsey HH-12 scenario forecasts 2001–2037

Table 7: East Lindsey HH-12 scenario outcomes 2011–2037

Scenario	Change 2011–2037				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Jobs
10yr Dwelling Completions	20,183	14.8%	11,405	18.7%	1,378	469	67
PG-10yr	18,378	13.4%	11,237	18.4%	1,309	462	34
SNPP-2012	16,892	12.4%	10,049	16.5%	1,259	413	16
PG-5yr	7,332	5.4%	5,619	9.2%	863	231	-114

6.5 The **PG-5yr** and **PG-10yr** scenarios make more explicit use of the historical demographic evidence in setting future migration assumptions. As a result, the change in the relative importance of migration since 2001 is reflected in the outcome of the two scenarios.

6.6 The **PG-5yr** scenario includes the UPC component, and as migration has been more subdued during the most recent historical period, the growth projections are relatively low, with a 5.4% increase in population for 2011-2037, 230 dwellings per year and net in-migration of 900 per year. The dwelling growth expectation is almost 200 per year lower than the **SNPP-2012** estimate.

6.7 The **PG-10yr** scenario also includes the UPC component in its assumptions. However, the migration from elsewhere in the UK was much stronger in the earlier part of the 2000s with the net effect being a higher growth rate to 2037. Projected population change is 13.4% 2011-2037, equivalent to 460 dwellings per year and net in-migration of 1,309 per year. Dwelling growth is approximately 50 per year higher than the **SNPP-2012**.

6.8 For comparison with these trend scenarios, the **10yr Dwelling Completions** scenario presents the demographic implications of a continuation of previous rates of house building (500 new homes per year). This results in the highest population growth, with a net in-migration of 1,378 per year that is slightly in excess of the **PG-10yr** average.

6.9 The anticipated impact of each growth scenario is also presented in terms of the likely 'jobs' requirement that results from the changing size and age structure of the population. The jobs effect is calculated using three parameters in combination with the population profile: economic activity rates, an unemployment rate and a commuting ratio.

6.10 In each scenario, unemployment has been modelled to return to pre-recession rates by 2020, commuting levels are retained at their 2011 Census level throughout the forecast period. Economic activity rates change over time to reflect changes to the state pension age (for more detail see Appendix C, paragraphs C.47 to C.49).

6.11 With relatively prudent assumptions on changing rates of economic activity in the older age-groups, the anticipated jobs growth is affected by the changing age structure. The **10yr Dwelling Completions**, **SNPP-20012** and **PG-10yr** scenarios result in jobs growth over the forecast period.

6.12 The **PG-5yr** scenario results in a projected fall in the numbers of jobs. For this scenario, with negative jobs growth, the numbers leaving the jobs market through retirement is not being matched by replenishment of East Lindsey's labour force, either through natural change or migration.

6.13 Labour force and jobs calculations are not possible in the sub-district scenarios as the base assumptions on commuting, unemployment and economic activity are only available for the local authority geography.

Sub-district Scenario Outcomes

Wet Area

6.14 The original Lincolnshire Coastal Study included a strategic aim to provide only sufficient housing in the zones of the highest flood 'risk', and to hold the population 'broadly stable' over the plan period. The definition of the 'Wet' area geography has been used to evaluate the demographic impact of this policy.

6.15 Since 2001, the population of the Wet area is estimated to have experienced a period of growth to 2008, with population decline thereafter. This pattern of change is reflected in the growth outcomes of the trend scenarios.

6.16 The **SNPP-2012** and **PG-10yr** scenarios record similar growth outcomes for the Wet area, with population growth of 8.8-9.6% and associated dwelling change of 117-132 per year.

6.17 In contrast, the **PG-5yr** scenario, based on the more recent demographic history, suggests population decline over the forecast period. The dwelling requirement is small at 38 per year but remaining positive due to the ageing effect of the population upon household size.

6.18 The **Zero Population Growth** scenario produces a similar dwelling outcome to the **PG-5Yr** scenario, with the flat growth still subject to change through age structure and net migration influences.

6.19 These scenarios maintain a higher dwelling growth requirement than the **Zero Dwelling Growth** alternative, where the dwelling stock remains fixed at its current level. Net migration is still positive at 250 per year, with the population decline being driven by negative natural change (higher deaths than births).

6.20 Combining the latest five-years of build rates with the previous five years, the **10yr Dwelling Completions** scenario suggests the highest growth for the Wet Area, with a rate of population change that is double that estimated by the **SNPP-2012** and **PG-10yr** scenarios.

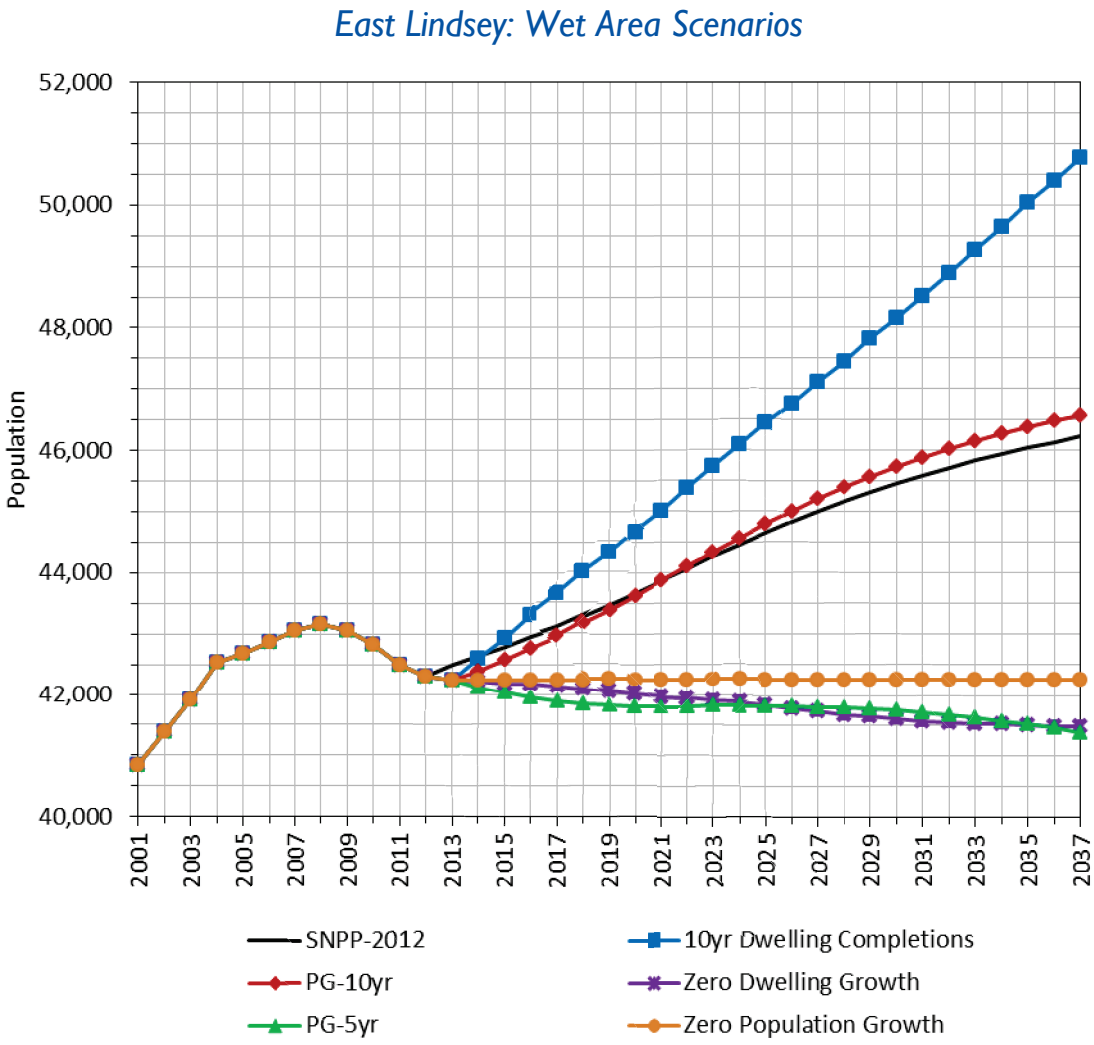


Figure 19: East Lindsey Wet Area: scenario forecasts 2001–2037

Table 8: East Lindsey Wet Area HH-12 scenario outcomes 2011–2037

Scenario	Change 2011–2037				Average per year	
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
10yr Dwelling Completions	8,271	19.5%	3,892	19.8%	578	163
PG-10yr	4,070	9.6%	3,140	15.9%	481	132
SNPP-2012	3,726	8.8%	2,789	14.2%	473	117
Zero Population Growth	0	0.0%	970	4.9%	369	44
Zero Dwelling Growth	-754	-1.8%	0	0.0%	260	0
PG-5yr	-1,107	-2.6%	918	4.7%	277	38

Note: the Zero Growth scenarios are presented for the 2013–2037 *forecast* period.

Dry Area

6.21 Since 2001, in contrast to the Wet area, the Dry area has experienced population growth throughout the 2001-2013 historical period, albeit with only limited growth since 2008. Again this pattern of change is reflected in the growth outcomes of the trend scenarios.

6.22 The **SNPP-2012** growth outcome falls between the **PG-10yr** and **PG-5yr** scenarios and suggests dwelling growth for the Dry Area of 296 units per year with a 14% increase in population to 2037.

6.23 Population growth suggested by the **PG-5yr** and **PG-10yr** scenarios vary less than in the Wet Area, ranging from 9.0 - 15.2%, again reflecting the differential effects of the high growth 2001-2008 period and the lower growth 2009-2013 period, but also demonstrating the different age structures and migration profiles of the two areas. The resulting range of dwelling growth is 186-329 per year over the forecast period.

6.24 The **10yr Dwelling Completions** scenario suggests dwelling and migration change that is consistent with the **PG-10yr** scenario outcome for the Dry area.

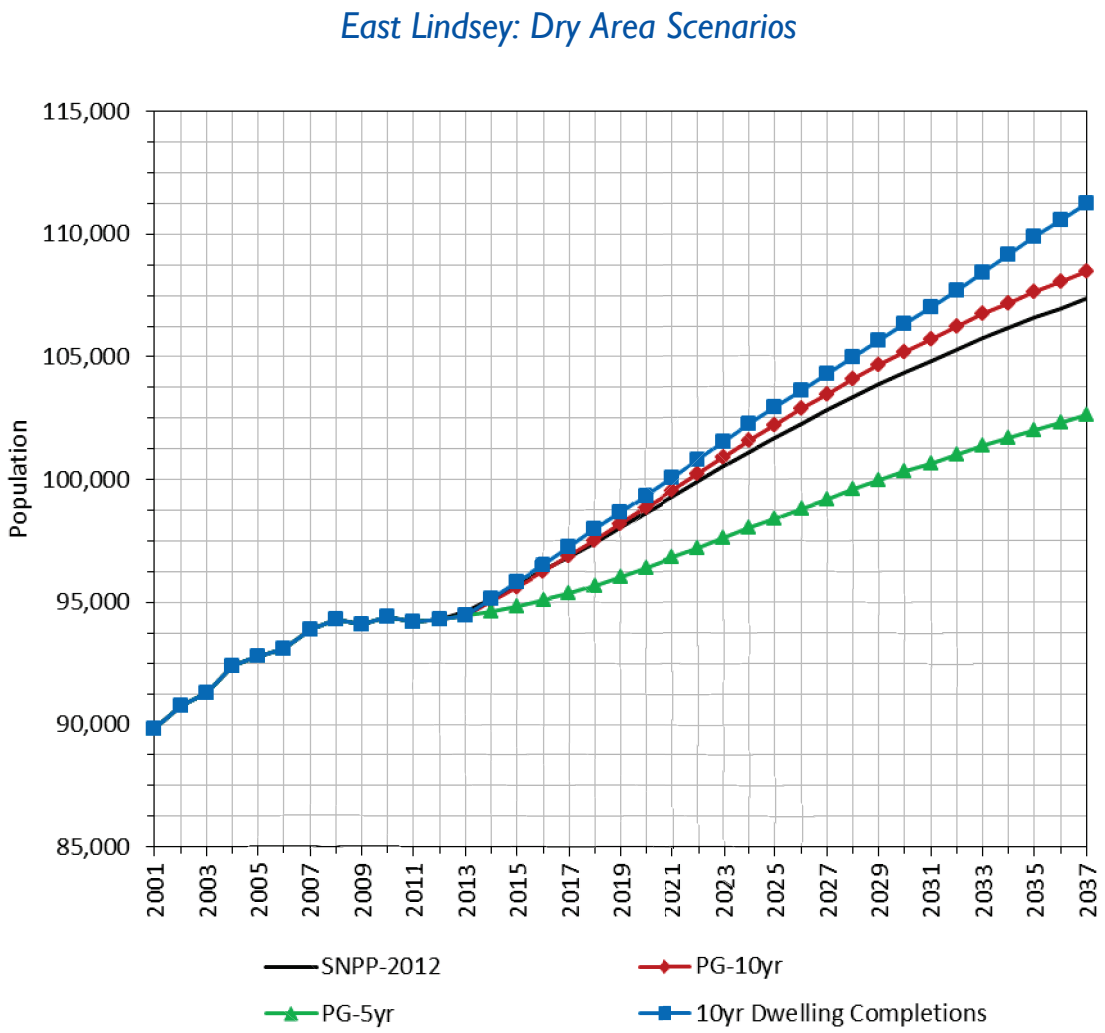


Figure 20: East Lindsey Dry Area: scenario forecasts 2001–2037

Table 9: East Lindsey Dry Area HH-12 scenario outcomes 2011–2037

Scenario	Change 2011–2037				Average per year	
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
10yr Dwelling Completions	17,077	18.1%	7,491	18.1%	991	305
PG-10yr	14,308	15.2%	8,059	19.5%	971	329
SNPP-2012	13,166	14.0%	7,253	17.5%	930	296
PG-5yr	8,439	9.0%	4,567	11.0%	725	186

Headship Rate Sensitivities

6.25 In the scenarios presented in the previous sections, the 2012-based DCLG headship rates (HH-12) have been used. For comparison, each scenario has also been run using the earlier 2008-based headship rates (HH-08) to illustrate the effects of these accelerated rates of household growth upon dwelling requirements. HH-08 headship rates assume a sharper decline in average household size, therefore a higher household growth relative to population growth when compared to the latest HH-12 evidence.

6.26 In the illustrations that follow, the **Zero Growth** scenarios are presented for the 2013–2037 forecast period. In addition, the HH-12 and HH-08 dwelling-growth outcomes of the **10yr Dwelling Completions** differ due to the inclusion of the two years of historical data (2011–2013). Numbers in the tables may not sum due to rounding.

District-level

6.27 The overall trend for East Lindsey is that the dwelling-growth outcomes are *lower* in the HH-12 alternative than in the HH-08 alternative (Table 10). Under the official benchmark scenario, the **SNPP-2012**, the average annual dwelling requirement using the 2012-based headship rates (i.e. HH-12) is 413 per year, compared to 444 per year using the 2008-based rates (i.e. HH-08).

Table 10: East Lindsey HH-12 and HH-08 scenario outcomes comparison

Scenario	Average Annual Change 2011–2037					
	Net Migration			Dwellings		
	HH-12	HH-08	Difference (HH-12 - HH-08)	HH-12	HH-08	Difference (HH-12 - HH-08)
10yr Dwelling Completions	1,378	1,320	57	469	471	-2
PG-10yr	1,309	1,309	0	462	499	-37
SNPP-2012	1,259	1,259	0	413	444	-30
PG-5yr	863	863	0	231	269	-38

6.28 For the **10yr Dwelling Completions** scenario, the target dwelling-is achieved through altering the migration component. In this dwelling- led scenario, the choice of headship rates affects the relationship between the annual dwelling constraint and the resulting population growth. The average annual net migration is *lower* under the HH-08 outcome due to the

headship rate trajectory resulting in a lower average household size, i.e. the same number of dwellings is associated with a smaller population size.

Wet & Dry Areas

6.29 The district-level pattern for higher dwelling requirements under the HH-08 alternative is replicated at the sub-district level. Note that the migration component is calculated differently in the Wet and Dry Area (sub-district) scenarios and so the Wet and Dry components do not sum to the East Lindsey district total.

6.30 In the Wet area, the difference between the HH-08 and HH-12 outcomes is small, with a maximum difference of fewer than 10 dwellings per year (Table 11).

Table 11: Wet Area HH-12 and HH-08 scenario outcomes comparison

Scenario	Average Annual Change 2011–2037					
	Net Migration			Dwellings		
	HH-12	HH-08	Difference (HH-12 - HH-08)	HH-12	HH-08	Difference (HH-12 - HH-08)
10yr Dwelling Completions	578	543	35	163	163	0
PG-10yr	481	481	0	132	136	-5
SNPP-2012	473	473	0	117	121	-4
Zero Population Growth	369	369	0	44	54	-10
Zero Dwelling Growth	260	217	43	0	0	0
PG-5yr	277	277	0	38	34	5

6.31 The overall impact in the Dry Area of using the 2008-based headship rates is similar to East Lindsey as a whole, with a maximum difference between scenarios of 42 dwellings per year (Table 12).

6.32 The **SNPP-2012**, **PG-10Yr** and **PG-5Yr** population growth for the Wet and Dry Areas are consistent with the district total but net migration, household and dwelling growth all differ due to the differential impact of migration, headship and vacancy rates upon the relationship between population, household and dwellings in the smaller Wet-Dry areas.

Table 12: Dry Area HH-12 and HH-08 scenario outcomes comparison

Scenario	Average Annual Change 2011–2037					
	Net Migration			Dwellings		
	HH-12	HH-08	Difference (HH-12 - HH-08)	HH-12	HH-08	Difference (HH-12 - HH-08)
10yr Dwelling Completions	991	890	102	305	307	-1
PG-10yr	971	971	0	329	360	-32
SNPP-2012	930	930	0	296	322	-26
PG-5yr	725	725	0	186	228	-42

7 Comparison with 2013 Analysis

Scenario Alignment

7.1 The scenarios presented in this report form an update to those produced by Edge Analytics in 2013. Since the 2013 scenarios were produced, new demographic statistics have become available (see Sections 3 and 4):

- A revised set of MYEs back to 2002 and updated MYEs to mid-2013;
- New 2012-based sub-national population projections from ONS, based on the corrected inter-Census population growth trends;
- A new set of headship rates from the 2012-based DCLG household projection model.

7.2 The implications of these new demographic statistics are that the forecasts presented in this latest report, differ to those presented in the 2013 analysis. This section compares the 2013 and 2015 evidence with an alignment of comparable scenarios (Table 13).

Table 13: East Lindsey 2013 and 2015 demographic forecasts scenario information

	2013 Scenarios	2015 Scenarios
Projection Period	*2011–2031*	*2011–2037*
Official Benchmark Scenario	SNPP-2010	SNPP-2012
Alternative Trend Scenarios	Migration-led 10yr	PG-10yr
	Migration-led 5yr	PG-5yr
	Zero-population	Zero Population Growth
Dwelling-led Scenarios	Zero-dwelling	Zero Dwelling Growth
	Completion Rate 10yr	10yr Dwelling Completions

7.3 In the 2013 scenarios, household growth was assessed using assumptions from the 2008-based and the 2011-based interim DCLG household projection models, with the results presented under two alternative outcomes. For the purpose of this comparison, the average dwelling-growth outcomes resulting from the 2008-based and 2011-based household assumptions for the 2013

scenarios are presented here. For the 2015 scenarios, the HH-12 dwelling growth outcomes are presented.

District-level Scenarios

7.4 The **SNPP-2012** projection for dwelling growth is significantly lower than the previous **SNPP-2010**, which projected higher population growth, prior to the 2011 Census population revision. The **SNPP-2012** suggests growth of 413 dwellings per year, compared to 740 based on the **SNPP-2010** (Table 14).

7.5 Each of the alternative trend scenarios presented here (**PG-10yr** and **PG-5yr**) result in *higher* dwelling growth figures than in those presented previously (**Migration-led 5yr** and **Migration-led 10yr**). This is a combination of higher projected net migration figures and lower natural change in the more recent historical population data compared to the 5 and 10 year period prior to the 2010-based projections.

Table 14: East Lindsey: comparison of 2013 and 2015 district-level scenarios

Average Annual Dwelling Requirement	
2013 Scenarios (2011–2031)	**2015 Scenarios (2011–2037)**
540 *Completion Rate 10yr*	**469** *10yr Dwelling Completions*
418 *Migration-led 10yr*	**462** *PG-10yr*
739 *SNPP-2010*	**413** *SNPP-2012*
104 *Migration-led 5yr*	**231** *PG-5yr*

Note that scenarios are ranked in order of the dwelling requirement of the 2015 scenarios

Wet & Dry Areas

7.6 For the Wet and Dry areas, similar differences are evident between the current and previous scenario results. The new assumptions and the revised household growth assumptions result in a lower dwelling requirement in the latest analysis for the Wet area, with the exception of the **PG-5yr** scenario (Table 15). For the Dry area, the comparison is more closely aligned to the

district total, with lower outcomes from the **SNPP-2012** but higher when considering the **PG-5yr** and **PG-10yr** scenarios (Table 16).

Table 15: East Lindsey 'Wet' areas: comparison 2013 and 2015 scenarios

Average Annual Dwelling Requirement	
2013 Scenarios (2011–2031)	**2015 Scenarios (2011–2037)**
222 *Completion Rate 10yr*	**163** *10yr Dwelling Completions*
138 *Migration-led 10yr*	**132** *PG-10yr*
246 *SNPP-2010*	**117** *SNPP-2012*
51 *Zero-population*	**44** *Zero Population Growth*
12 *Migration-led 5yr*	**38** *PG-5yr*
0 *Zero-dwelling*	**0** *Zero Dwelling Growth*

Note that scenarios are ranked in order of the dwelling requirement of the 2015 scenarios

Table 16: East Lindsey 'Dry' areas: comparison 2013 and 2015 scenarios

Average Annual Dwelling Requirement	
2013 Scenarios (2011–2031)	**2015 Scenarios (2011–2037)**
318 *Completion Rate 10yr*	**305** *10yr Dwelling Completions*
299 *Migration-led 10yr*	**329** *PG-10yr*
495 *SNPP-2010*	**296** *SNPP-2012*
102 *Migration-led 5yr*	**186** *PG-5yr*
140 *Zero-population*	**45** *Zero Population Growth*
0 *Zero-dwelling*	**0** *Zero Dwelling Growth*

Note that scenarios are ranked in order of the dwelling requirement of the 2015 scenarios

8 Summary

Requirements

8.1 With the release of new statistics from both ONS and DCLG, East Lindsey District Council has commissioned this update to its demographic evidence, to inform its local housing strategy. The new statistical releases include:

- 2012-based population projection (Source: ONS)
- 2013 mid-year population estimate (Source: ONS)
- 2012-based household projection (Source: DCLG)

8.2 Updated demographic forecasts have been developed at both district and sub-district level, maintaining the Wet-Dry area classification used in the previous 2012 and 2013 analysis.

Historical Growth Profile

8.3 East Lindsey's historical profile of change is characterised by relatively high growth pre-2008, followed by much slower growth post-2008. This slow growth has comprised population decline in the Wet area, with a modest increase in population in the Dry area.

8.4 Population growth since 2001 has been predominantly driven by a strong net inward migration from elsewhere in the UK to 2008, reducing thereafter. Natural change has had a consistently negative impact upon growth, with an excess of deaths over births in all years to 2012/13. International migration has contributed a net population loss in all years to 2010/11, with a small positive gain 2011/12–2012/13.

8.5 East Lindsey's population profile is ageing due to the natural progression of the larger birth cohorts of the 1950s and 1960s through the population. The district has experienced a continuing

annual net outflow of young adults, with the most significant net inflow associated with those aged 50+. Since 2006, there has been a net outflow of population in the older 75+ age-group.

8.6 In terms of the directional flow of migration, the 'top-ten' gross inflows and outflows to and from East Lindsey for the 2001/02–2012/13 period reveal that the largest exchange of migrants is with the neighbouring local authorities of West Lindsey, North Kesteven, Boston and North East Lincolnshire. The largest net balance of migration is associated with inflows from the cities of Leicester, Sheffield and Nottingham.

8.7 Housing completions remained fairly stable in both Wet and Dry areas to 2010, averaging approximately 200 per year in the Wet area and 400 per year in the Dry area. Whilst not an exact correlation, the recessionary impact of a lower number of completions has had an impact upon migration-driven population growth in East Lindsey, most notably in the Dry area. Whilst net migration growth is estimated to have increased since 2010/11, housing completions remain below the pre-recession average.

Scenario Outcomes

8.8 The latest release of demographic statistics from the ONS and CLG has provided the basis for a revised suite of forecasts that suggest important changes in the range of growth trajectories estimated for East Lindsey and its Wet-Dry areas.

8.9 The latest **SNPP-2012** has dampened the growth previously suggested by the pre-Census, **SNPP-2010** projection with an average annual dwelling growth of 413 per year under the HH-12 household assumptions, rising to 444 per year if the higher rates of household growth associated with the HH-08 assumptions are considered (Table 17).

8.10 In all cases, the HH-12 outcomes, using data and assumptions from the 2012-based DCLG household projection model are lower than those estimated when the same scenarios are run using 2008-based headship rate assumptions.

8.11 Using historical demographic evidence more explicitly, the **PG-5yr** and **PG-10Yr** scenarios reveal different outcomes, higher for the latter than for the former. This reflects the patterns of population change in East Lindsey pre- and post-2008. The **PG-10yr** scenario generates a dwelling growth outcome that is reasonably consistent with that evidenced by the continuation of past

house building rates across East Lindsey (**10yr Dwelling Completions**).

Table 17: District-level dwelling requirements 2011–2037

Scenario	Average Annual Dwelling Requirement (2011–2037)		
	HH-08	HH-12	Average
PG-10yr	499	462	481
10yr Dwelling Completions	471	469	470
SNPP-2012	444	413	428
PG-5yr	269	231	250

8.12 The calibration of a consistent suite of both district and sub-district forecasts is a challenging proposition given the degree of change in the underlying demographic statistics. Where possible, Wet-Dry scenarios have been constrained to ensure that population growth outcomes are consistent with district totals. However, the differential impact of household headship rates between the Wet-Dry areas does result in variability in the household and dwelling totals compared to the district forecasts.

8.13 For the Wet Area, the **10yr Dwelling Completions** scenario estimates the highest average annual dwelling requirement (Table 18). Evidence from both the **PG-10yr** and **SNPP-2012** alternatives, suggest this figure could be lower based on the changing size and shape of the Wet area population (119-134 dwellings per year).

8.14 Due to the recent decline in the Wet area population, the **PG-5yr,** formulated from the last five-years of historical evidence**,** is roughly equivalent to the **Zero Population Growth** scenario, although there remains a positive dwelling growth requirement due to the declining average household size and changing age structure.

Table 18: Wet area dwelling requirements 2011–2037

Scenario	Average Annual Dwelling Requirement (2011–2037)		
	HH-08	HH-12	Average
10yr Dwelling Completions	163	163	163
PG-10yr	136	132	134
SNPP-2012	121	117	119
Zero Population Growth	54	44	49
PG-5yr	34	38	36
Zero Dwelling Growth	0	0	0

Zero Growth scenario outcomes are presented for 2013–2037. Scenarios are ranked in order of the 'average' dwelling requirement.

8.15 The alternative HH-08 headship rates have only a small impact upon the Wet area dwelling requirement in each scenario, slightly higher than the equivalent HH-12 outcome.

8.16 In the Dry Area, demographic change associated with the **PG-10yr** scenario has the highest average annual dwelling requirement (329 dwellings per year under the HH-12 assumptions) (Table 19). The **SNPP-2012** and the **10yr Dwelling Completions** scenarios are more consistent with each other, producing a lower annual average (296-305 dwellings per year).

8.17 Despite modest growth in the Dry area post-2008, the **PG-5yr** scenario is again projecting a much lower requirement than other scenarios at 186 dwellings per year.

8.18 The application of the alternative HH-08 headship rates has a more significant impact upon the Dry area dwelling requirement in each scenario, raising the average annual dwelling requirement with a more rapidly-reducing average household size.

Table 19: Dry area dwelling requirements 2011–2037

Scenario	Average Annual Dwelling Requirement (2011–2037)		
	HH-08	HH-12	Average
PG-10yr	360	329	344
SNPP-2012	322	296	309
10yr Dwelling Completions	307	305	306
PG-5yr	228	186	207

Key considerations

8.19 Given the changes that have taken place in East Lindsey's population growth profile since 2001, the longer-term perspective of the **PG-10yr** scenario would appear to be the most appropriate basis on which East Lindsey should consider its future housing requirements.

8.20 The **PG-10yr** scenario includes consideration of the UPC element of change in setting migration assumptions and maintains a higher level of net in-migration to the district, lessening the impact of the post-2008 recession years upon the future growth outlook (which are the basis of the **PG-5yr** scenario).

8.21 In considering the Wet-Dry areas individually, it appears that a continuation of **10yr Dwelling Completions** would exceed the demographic requirements for dwelling growth in the Wet area but would be slightly less than that required in the Dry area. The Wet Area has historically absorbed around one third of total in-migration to the district. Future constraints on growth in the coastal area would require higher growth in the Dry area to accommodate demographic change, or consideration of dwelling growth shared with adjacent local authorities.

8.22 The district of East Lindsey has an internal migration profile characterised by a net outflow of young adults but a net inflow of older age migrants, particularly in the 50+ age-range. Whilst the migration exchange between adjacent local authorities is a key characteristic, the net inflow from Leicester, Sheffield and Nottingham has been an important element of population growth in East Lindsey.

8.23 The net out migration of East Lindsey's young adults has increased since 2001, most likely due to more opportunities for higher education. At the same time, net in migration for the 30-69s has been dampened by the prevailing economic conditions post-2008.

8.24 Population ageing and the retention of young adults is a key issue for East Lindsey. The next 20 years will see a reduction in the size of the resident labour force as the larger birth cohorts of the 1950s and 1960s move beyond retirement. The alignment of economic and demographic forecasts is a key consideration when evaluating the potential housing implications of anticipated growth in jobs.

8.25 The district-level scenarios applied relatively prudent changes to future rates of economic activity to accommodate changes to State Pension Age. These changes, in combination with a declining

unemployment rate and no change to East Lindsey's commuting balance, estimate modest annual jobs growth in the SNPP-2012, PG-10yr and **10yr Dwelling Completions** scenarios. The inevitable shift towards an older age profile for East Lindsey implies that higher rates of economic activity within older age-groups could help to maintain a larger local labour force; increasing the local capacity for jobs growth whilst reducing the requirement for more significant growth through net in-migration.

8.26 Employment growth across the wider region could have an additional effect upon the commuting balance of East Lindsey, altering the relationship between the resident labour force and the number of jobs within the district.

8.27 The likely effect of international migration upon East Lindsey's future growth remains an area of uncertainty. Historical trends and future assumptions imply that international migration will not be a significant driver of population growth in the future. This factor should continue to be monitored as new evidence is published by ONS on its 2014-based national projections (due in autumn 2015).

8.28 The latest, 2012-based household assumptions suggest lower household growth compared to the previous, 2008-based statistics. These differences are especially significant for the young adult age-groups, where acute affordability issues persist. Policies to dampen these affordability issues may improve the ability of young adults to form households sooner, a factor that could increase the overall dwelling requirement for East Lindsey.

8.29 Further analysis of age-specific headship rate evidence may be a consideration for East Lindsey when new 'household-type' projections are released by DCLG in summer/autumn 2015.

Appendix A

Lincolnshire Coastal Study

Principle 1

A.1 Development will be guided by the level of flood hazard. With respect to the red, orange and yellow zones identified in the following map:

A.2 Major development will be employment or business related only;

A.3 Exceptionally, development to meet local housing needs may continue subject to the mitigation of flood risk through flood resilient design and emergency planning;

A.4 It will not be appropriate for housing development in the red, orange and yellow zones to contribute to meeting the Region's strategic housing requirements. Rather, any new housing development should be of a level and type designed to keep the population in these zones broadly stable.

A.5 With respect to the green zone:

- Exceptionally, major development may be possible so long as flood risk is mitigated through flood resilient design and emergency planning.

A.6 With respect to all flood hazard zones:

- New and replacement community buildings may be permitted subject to flood risk being mitigated through flood resilient design and emergency planning;
- New caravan sites or extensions to existing sites may be allowed for short-let tourist use between the months of April and September subject to the mitigation of flood risk through flood resilient design and emergency planning;
- Development of buildings and infrastructure explicitly for use in emergencies may be permitted subject to flood risk being mitigated through flood resilient design.

A.7 Note: The definition of flood hazard zones used here follows that used by Defra and the Environment Agency. The classification is split into four categories (green, yellow, orange, red), defined by the depth and velocity of flood waters and the related ability of people to evacuate the area once a flood occurs.

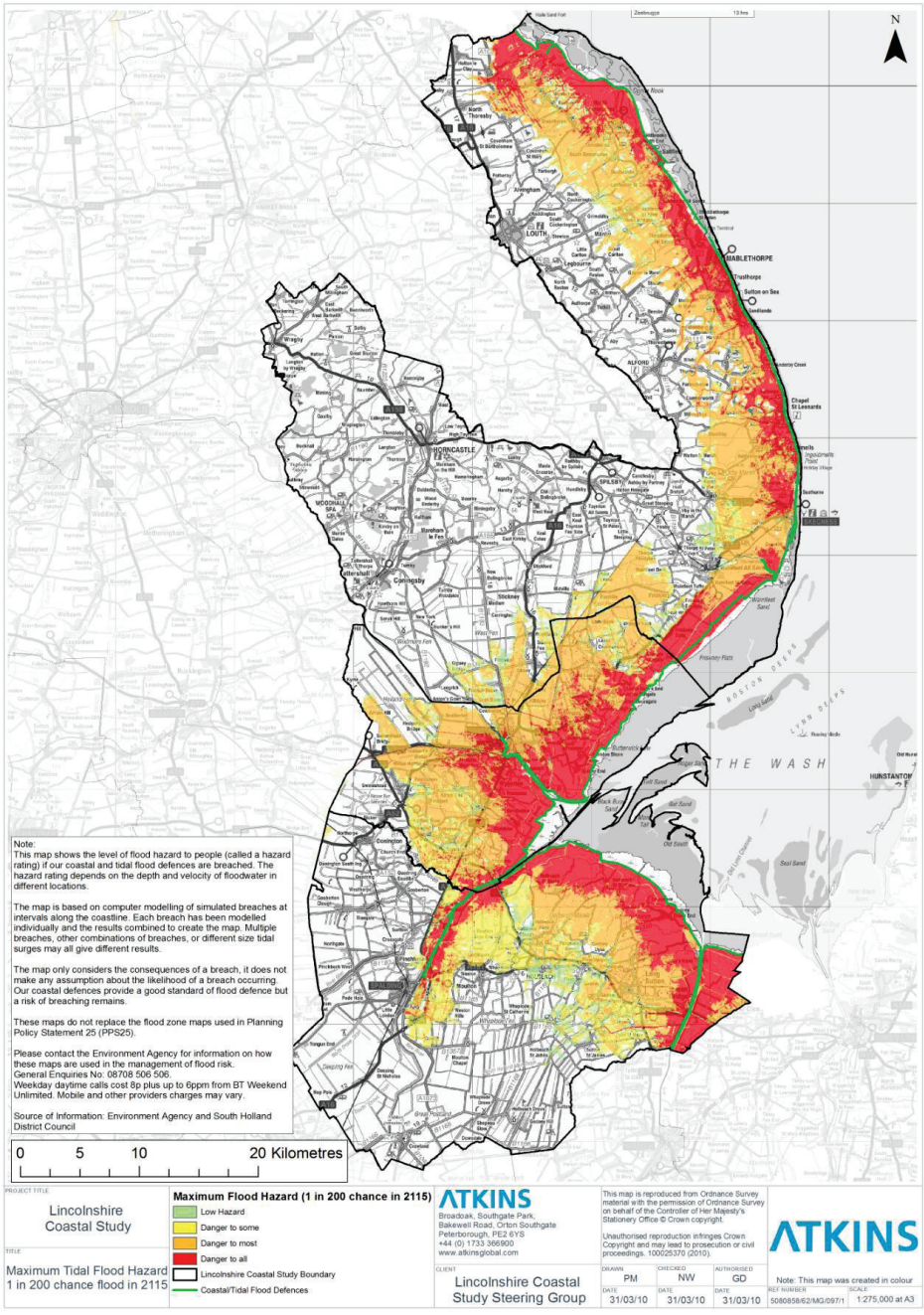


Figure 21: Flood Hazard Map for the Lincolnshire Coastal Study Area

Map data used in this project has been provided by Lincolnshire County Council under the terms of its Environment Agency licence.

Degree of coastal flood hazard	Hazard Rating	Colour on mapping	Description of flood water	Description of hazard
None	Little or no hazard	White	Outside of flood extent produced by model	Little or no hazard (from coastal flooding)
Low	Low Hazard	Green	Shallow flowing or deep standing water	Caution, low risk to people
Moderate	Danger to some	Yellow	Fast flowing or deep standing water	Risk to the vulnerable, such as children, the elderly and the infirm
Significant	Danger for most	Orange	Fast flowing and deep water with some debris	Risk to most, including the general public
Extreme	Danger for all	Red	Fast flowing deep water with significant debris	Extreme hazard, danger to all, including the emergency services

Figure 22: Flood hazard classification used in the Lincolnshire Coastal Study

Appendix B

Forecasting Methodology

B.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.

B.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 23) is a cohort component model, which enables the development of population forecasts based on births, deaths and migration inputs and assumptions.

B.3 The Derived Forecast (DF) model (Figure 24) sits alongside the population model, providing a headship rate model for household projections and an economic activity rate model for labour-force projections.

B.4 The latest development in the POPGROUP suite of demographic models is POPGROUP v.4, which was released in January 2014. A number of changes have been made to the POPGROUP model to improve its operation and to ensure greater consistency with ONS forecasting methods. The most significant methodological change relates to the handling of internal migration in the POPGROUP forecasting model. The level of internal in-migration to an area is now calculated as a rate of migration relative to a defined 'reference population' (by default the UK population), rather than as a rate of migration relative to the population of the area itself (as in POPGROUP v3.1). This approach ensures a closer alignment with the 'multi-regional' approach to modelling migration that is used by ONS.

B.5 For further information on POPGROUP, please refer to the Edge Analytics website: http://edgeanalytics.co.uk/popgroup.

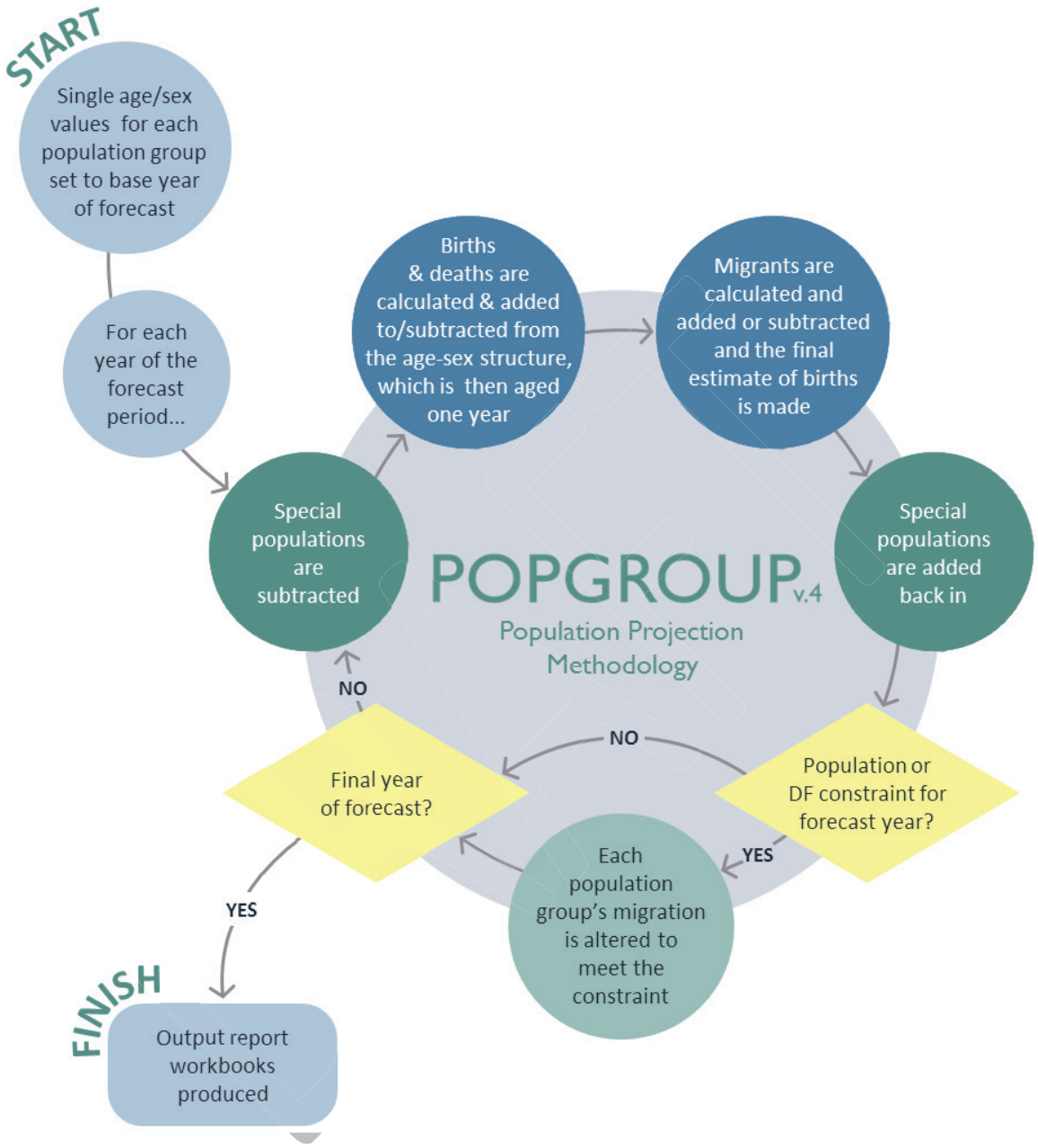


Figure 23: POPGROUP population projection methodology

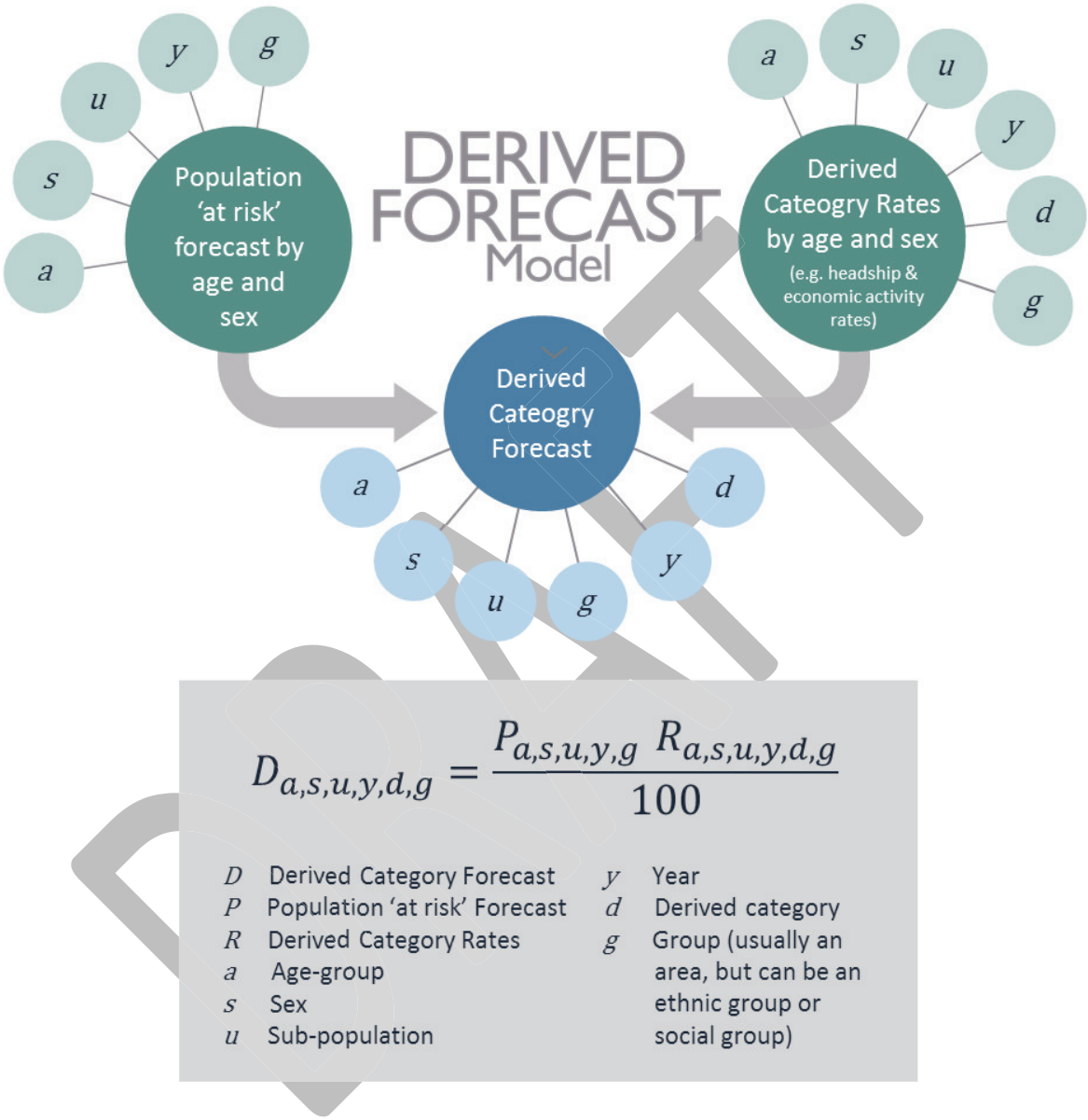


Figure 24: Derived Forecast (DF) methodology

Appendix C

District-Level Data Inputs & Assumptions

Introduction

C.1 Edge Analytics has developed a suite of demographic scenarios for East Lindsey using POPGROUP v.4 and the Derived Forecast model. The POPGROUP suite of demographic models draw data from a number of sources, building an historical picture of population, households, fertility, mortality and migration on which to base its scenario forecasts. Using historical data evidence for 2001–2013, in conjunction with information from ONS sub-national population projections (SNPPs) and DCLG household projections, a series of assumptions have been derived which drive the scenario forecasts.

C.2 In the following sections, a narrative on the data inputs and assumptions underpinning the following district-level scenarios is presented:

- SNPP-2012
- PG-5yr
- PG-10yr
- Population Zero Growth
- Dwelling-led Zero Growth
- Dwelling-led 10yr

C.3 The data inputs and assumptions used in the sub-district (i.e. Wet & Dry) scenarios can be found in Appendix D.

Population, Births & Deaths

Population

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

C.5 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 ONS 2012-based SNPP.

C.6 In the **Population Zero Growth** scenario, a total population count is provided in each year of the forecast, to ensure that the population is kept fixed at the 2013 MYE level (136,711).

Births & Fertility

C.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.

C.8 In the **SNPP-2012** scenario, future counts of births are specified to ensure consistency with the official projection.

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

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

C.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

C.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.

C.13 In the **SNPP-2012** scenario, future counts of deaths are specified to ensure consistency with the official projection.

C.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.

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

C.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

C.17 In all scenarios, historical mid-year to mid-year estimates 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 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 Higher Education Statistics Agency (HESA).

C.18 In the **SNPP-2012** scenario, future counts of internal migrants are specified, to ensure consistency with the official projection.

C.19 In the alternative trend scenarios, future internal migration flows are based on the area-specific historical migration data. In the **PG-5yr** scenario, a five year internal migration history is used (2008/09 to 2012/13). In the **PG10yr** scenario, a ten year history is used (2003/04 to 2012/13).

C.20 In the alternative trend scenarios, the relevant historical time period is used to derive the age-specific migration rate (ASMigR) schedules, which are then used to determine the future number of in- and out-migrants. 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 East Lindsey, it comprises all districts which cumulatively contributed 70% of migrants into the Local Enterprise Partnership (LEP) over the 2008/09–2012/13 period.

C.21 In the **Population Zero Growth** scenario, the profile of internal migrants is defined using the ASMigR schedules from the 2012-based SNPP.

C.22 The two dwelling-ledscenarios (**Dwelling-led Zero Growth** and **Dwelling-led 10yr**) calculate their own internal migration assumptions to ensure an appropriate balance between the population and the targeted increase in the number of dwellings that is defined in each year of the forecast period. A higher level of net internal migration will occur if there is insufficient population to meet the forecast number of dwellings. In the dwelling-ledscenarios, the profile of internal migrants is defined by an ASMigR schedule, derived from the ONS 2012-based SNPP.

International Migration

C.23 Historical mid-year to mid-year counts of immigration and emigration by 5-year age group and sex from 2001/02 to 2012/13 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.

C.24 Implied within the international migration component of change is an 'unattributable population change' (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.

C.25 In all scenarios, future international migration assumptions are defined as 'counts' of migration. In the **SNPP-2012** scenario, the international in- and out-migration counts are drawn directly from the official projection.

C.26 In the alternative trend 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 to 2012/13). In the **PG-10yr** scenario, a ten year history is used (2003/04 to 2012/13). In the alternative trend scenarios, an ASMigR schedule of rates is derived from either a five year or ten year migration history and is used to distribute future counts by single year of age.

C.27 In the **Population Zero Growth** scenario, the profile of international migrants is defined using the ASMigR schedules from the 2012-based SNPP.

C.28 In the dwelling-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 of rates from the ONS 2012-based SNPP is used to distribute future counts by single year of age.

Households & Dwellings

C.29 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."*

C.30 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).

C.31 Apart from in the dwelling-led scenarios, the household and dwelling-growth implications of each scenario 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. In the dwelling-led scenarios, these data assumptions are used to determine the level of population growth required by the defined dwelling-growth trajectory.

Household Headship Rates

C.32 A household headship rate (also known as household representative rate) is the *"probability of anyone in a particular demographic group being classified as being a household representative"*[5].

C.33 The household headship rates used in the POPGROUP modelling have been taken from the DCLG 2008-based and 2012-based household projections for East Lindsey. The DCLG household projections are derived through the application of projected household representative rates (also referred to as headship rates) to a projection of the private household population.

C.34 In the scenarios presented here, headship rate assumptions have been sourced from the new 2012-based household projection model, and from the earlier 2008-based model, producing two alternative outcomes for each scenario:

- In the **HH-12** outcome, the 2012-based DCLG headship rates are applied.
- In the **HH-08** outcome, the 2008-based DCLG headship rates are applied, scaled to be consistent with the 2011 DCLG household total, but following the original trend thereafter.

2012-based Headship Rates

C.35 The 2012-based headship rates have been sourced from the new 2012-based household projection model from DCLG. The methodology used by DCLG in its household projection models consists of two distinct stages:

- **Stage One** produces the national and local authority projections for the total number of households by sex, age-group and relationship-status group over the projection period. All Stage One output and assumptions for the 2012-based household projection model has been released by DCLG.
- **Stage Two** provides the detailed 'household-type' projection by age-group, controlled to the previous Stage One totals. Stage Two assumptions and output for the 2012-based model have yet to be released by DCLG.

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

C.36 In POPGROUP, the 2012-based headship rates are defined by age, sex and relationship status. These rates therefore determine the likelihood of person of a particular age-group, sex and relationship status being head of a household in a particular year, given the age-sex structure of the population.

2008-based Headship Rates

C.37 The 2008-based headship rates are provided by age-group and household type and therefore define the likelihood of a particular household type being formed in a particular year, given the age-sex profile of the population. Household-types are modelled with a 17-fold classification (Table 20).

C.38 The 2008-based headship rates are scaled to the 2011 DCLG household total from the 2012-based household projection model, following the original trend thereafter.

Table 20: 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

Communal Population Statistics

C.39 Household projections in POPGROUP exclude the population 'not-in-households' (i.e. the communal/institutional population). These data are drawn from the DCLG 2012-based household projections, which use statistics from the 2011 Census. Examples of communal establishments include prisons, residential care homes and student halls of residence.

C.40 For ages 0–74, the number of people in each age group 'not-in-households' is kept fixed throughout the forecast period. For ages 75–85+, the proportion of the population 'not-in-households' is recorded. Therefore, the population not-in-households for ages 75–85+ varies across the forecast period depending on the size of the population.

Vacancy Rate

C.41 The relationship between households and dwellings is modelled using a 'vacancy rate', sourced from the 2011 Census. The vacancy rate is calculated using statistics on households (occupied, second homes and vacant) and dwellings (shared and unshared).

C.42 A vacancy rate of 6.5% for East Lindsey has been applied, fixed throughout the forecast period. Using this vacancy rates, the dwelling requirement of each household growth trajectory has been evaluated. In the dwelling-led scenarios, the vacancy rate is used – in combination with the communal population statistics and the headship rates – to determine the level of population growth required by the defined dwelling-growth trajectory.

Labour Force & Jobs

C.43 In each scenario, the labour force and jobs-growth implications of the population growth trajectory are evaluated through the application of three key data items: economic activity rates, an unemployment rate and a commuting ratio.

Economic Activity Rates

C.44 The level of labour force participation is recorded in the economic activity rates. Economic activity rates by five year age group (ages 16–74) and sex have been derived from 2001 and 2011 Census statistics. 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.

C.45 Between the 2001 and 2011 Censuses, rates of economic activity increased for all female age groups 25+ and in the older age groups for men (Figure 25).

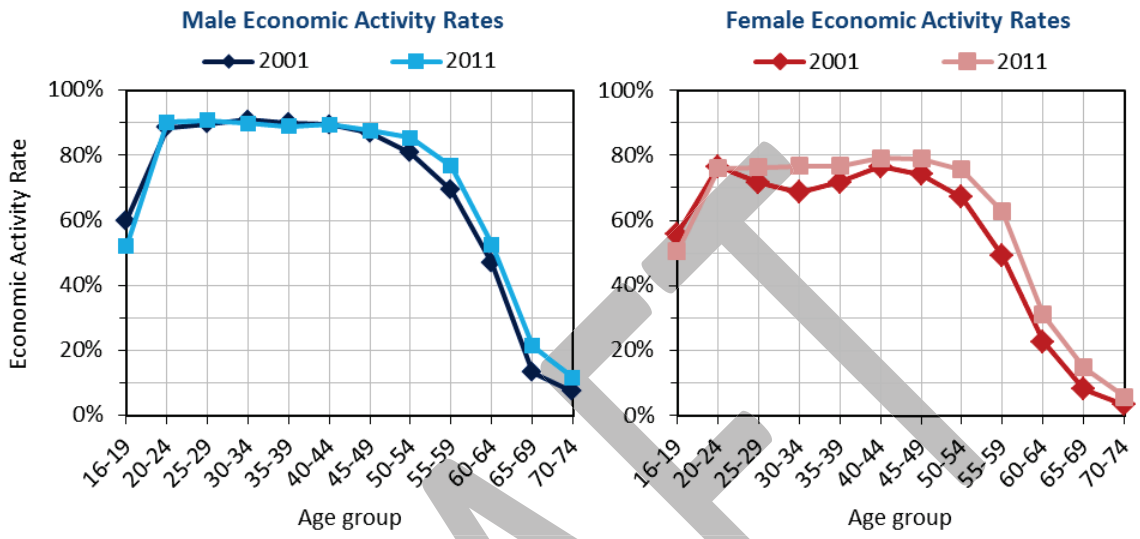


Figure 25:East Lindsey Economic activity rates: 2001 and 2011 Census comparison (source: ONS)

C.46 In all scenarios, Edge Analytics has made changes 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.

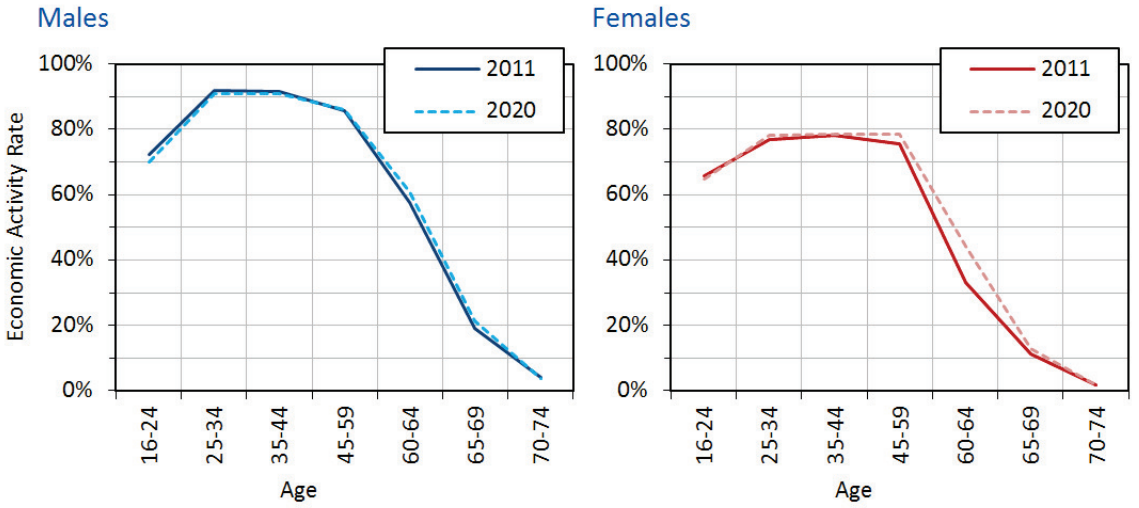
C.47 The SPA for women is increasing from 60 to 65 by 2018, bringing it in line with that for men. Between December 2018 and April 2020, the SPA for both men and women will then rise to 66. Under current legislation, the SPA will be increased to 67 between 2034 and 2036 and 68 between 2044 and 2046. It has been proposed that the rise in the SPA to 67 is brought forward to 2026–2028[6].

C.48 ONS published its last set of economic activity rate forecasts from a 2006 base[7]. 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

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

[7] 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

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 26).



% 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 26:ONS Labour Force Projection 2006 – Economic Activity Rates 2011–2020. Source: ONS

C.49 To take account of planned changes to the SPA, the following modifications have been made to the Edge Analytics economic activity rates:

- 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

C.50 Note that the rates for women in the 60–64 age and 65–69 age-groups are higher than the original ONS figures, accounting for the accelerated pace of change in the SPA. No changes have been applied to other age-groups. In addition, no changes have been applied to economic activity rates beyond 2020. This is an appropriately prudent approach given the uncertainty associated with forecasting future rates of economic participation.

C.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 (see Figure 25), these 2011–2020 rate increases (Figure 27) would appear to be relatively conservative assumptions.

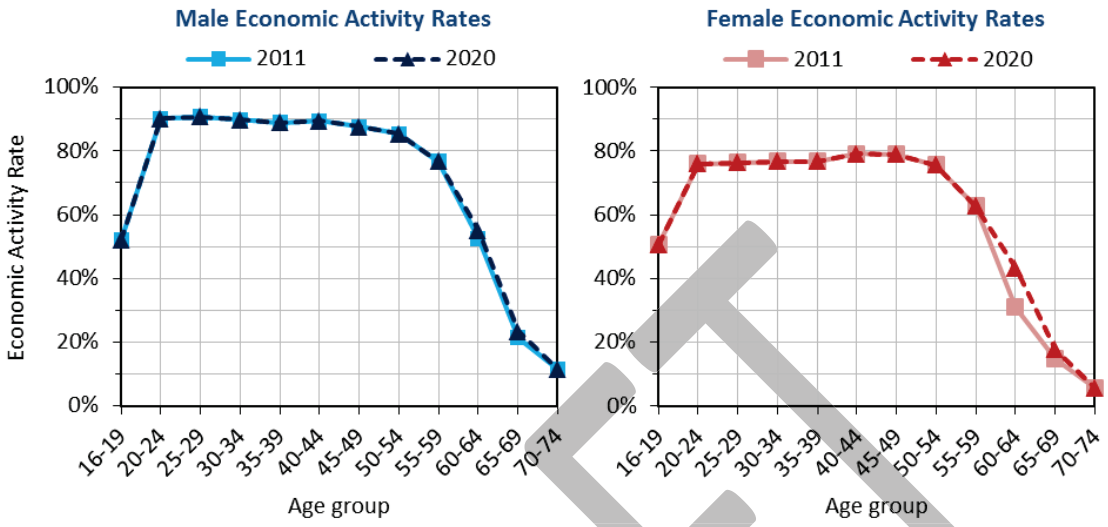


Figure 27: Edge Analytics economic activity rate profiles for East Lindsey, 2011 and 2020 comparison.

Unemployment Rate

C.52 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.

C.53 In all scenarios, historical unemployment rates are defined up to 2014 (Table 21). Between 2014 and 2020, the unemployment rate gradually reduces to a 'pre-recession' (2004–2007) average. This accounts for what is likely to be a gradual recovery in unemployment rates following the recession, and continues the reduction in the unemployment rate seen between 2013 and 2014. After 2020, the unemployment rate is fixed.

Table 21: East Lindsey historical unemployment rates 2004–2013

Area	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Pre-Recession (2004–07) Average
Unemployment Rate (%)	3.9	4.0	5.3	5.3	5.1	5.9	6.7	7.5	7.4	7.6	6.1	4.6

Source: ONS model-based estimates of unemployment, Annual Population Survey, Nomis

Commuting Ratio

C.54 The commuting ratio, together with the unemployment rate, controls the balance between the number of workers living in a district (i.e. the resident labour force) and the number of jobs available in the district. A commuting ratio greater than 1.00 indicates that the size of the resident workforce exceeds the number of jobs available in the district, resulting in a net out-commute. A commuting ratio less than 1.00 indicates that the number of jobs in the district exceeds the size of the labour force, resulting in a net in-commute.

C.55 From the 2011 Census 'Travel to Work' statistics, published by ONS in July 2014, commuting ratios have been derived for East Lindsey. This is compared to the 2001 Census value in Table 22.

Table 22: East Lindsey Commuting Ratio Comparison

East Lindsey		2001 Census	2011 Census
Workers	a	53,442	56,311
Jobs	b	46,226	51,754
Commuting Ratio	a/b	**1.16**	**1.09**

Source: 2001 data from Census Table *T101 – UK Travel Flows*; 2011 data from Census Table *WU02UK - Location of usual residence and place of work by age*.

Appendix D

Sub-District Data Inputs & Assumptions

Introduction

D.1 To produce demographic forecasts for the 'Wet' and 'Dry' areas, POPGROUP was configured for 'small-area' (i.e. sub-district) forecasts. The two sub-district areas were defined by aggregating Census Output Area statistics. Where the Output Areas were intersected by the small-area boundaries, postcode data were used to split the OAs proportionally between the two small-areas. This enabled a 'base' population to be derived for each small-area, together with associated fertility, mortality and migration assumptions.

D.2 Using historical data evidence for 2001–2013, in conjunction with information from ONS sub-national projections, a series of assumptions have been derived which drive the following sub-district forecasts:

- SNPP-2012
- PG-5yr
- PG-10yr
- Population Zero Growth
- Dwelling-led Zero Growth
- Dwelling-led 10yr

D.3 In the following sections, a narrative on these data inputs and assumptions is presented.

Population, Births & Deaths

Population

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

D.5 In the **SNPP-2012** scenario, future population counts are provided by single-year of age and sex from 2012 (i.e. not including the 2013-based MYE), to ensure consistency with the official projection.

D.6 In the **PG-5yr** and **PG-10yr** scenarios, future population counts are provided by single-year of age and sexat district-level, to ensure consistency with the district-level forecasts.

D.7 In the **Population Zero Growth** scenario, future counts of population are provided for the 'Wet' and 'Dry' areas separately, to ensure that the two populationsare fixed at the 2013 MYE level (42,235 for the 'Wet' area and 94,476 for the 'Dry' area).

Births & Fertility

D.8 In all scenarios, for the two sub-district areas, historical mid-year to mid-year counts of births by sex (2001/02–2012/13) have been sourced from ONS Vital Statistics, aggregated and apportioned from Census Output Area statistics.

D.9 In combination with the 'population-at-risk' (i.e. all women between the ages of 15–49), the assumptions listed below provide the basis for the calculation of births in each year of the forecast period:

- A district-level age-specific fertility rate (ASFR) schedule, which measures the expected fertility rates by age in 2013/14. This is derived from the ONS 2012-based SNPP for East Lindsey.

- A fertility differential for the two small-areas from the historical births data.
- Long-term assumptions on changes in age-specific fertility rates from the ONS 2012-based SNPP for East Lindsey.

D.10 In the **SNPP-2012** scenario, future births are calculated to ensure consistency with the official population growth trajectory.

Deaths & Mortality

D.11 In all scenarios, for each small-area, historical mid-year to mid-year counts of deaths (2001/02–2011/12) have been sourced from ONS Vital Statistics, aggregated and apportioned from Census Output Area statistics.

D.12 In combination with the 'population-at-risk' (i.e. the total population of each small-area), the assumptions listed below provide the basis for the calculation of deaths in each year of the forecast period:

- A district-level age-specific mortality rate (ASMR) schedule, which measures the expected mortality rates by age and sex in 2013/14. This is derived from the ONS 2012-based SNPP for East Lindsey.
- A mortality differential for each small-area, derived from the historical deaths data.
- Long-term assumptions on changes in age-specific mortality rates from the ONS 2012-based SNPP for East Lindsey.

D.13 In the **SNPP-2012** scenario, future deaths are calculated to ensure consistency with the 'official' population growth trajectory.

Migration

D.14 Other than Census statistics, there are no historical migration statistics available at a sub-district level. Therefore, migration is calculated as the 'residual' of the population, after taking account of births and deaths. 'Net migration' equates to the cumulative impact of the four types of migration modelled within POPGROUP (in-migration, out-migration, immigration and emigration).

D.15 Using the Census statistics, historical estimates of migration are derived at sub-district level by comparing the migration implied by the schedule of rates for all areas (in this case, the schedule from the 2012-based SNPP for East Lindsey) with the pattern of migration observed for small areas in the Census statistics.

D.16 Once historical estimates of migration have been derived, a weighted average of the last ten years (2003/04–2012/13) of estimated migrant counts is used directly as input to scenario forecasts for all years after the latest population estimate. The weighted average, calculated for each age-sex category and separately for each of the four migration flows, is repeated for each year of the scenario projection up to and including the last year.

D.17 The dwelling-led scenarios (**Dwelling-led Zero Growth** and **Dwelling-led 10yr**) calculate their own migration assumptions to ensure an appropriate balance between the population and the targeted increases in the number of dwellings that are defined in each year of the forecast period. A higher level of net internal migration will occur if there is insufficient population to meet the forecast dwelling target. The profile of internal migrants is defined by an age-specific ASMigR schedule, derived using a weighted average of the last ten years of estimated migrant counts.

Households & Dwellings

D.18 For each scenario (apart from the dwelling-led scenarios), 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. In the dwelling-led scenarios, these data items are used to determine the population growth required by a particular dwelling growth trajectory.

D.19 Household and dwelling data assumptions have been sourced from the 2001 and 2011 Censuses and the 2008-based and 2012-based household projection models from the Department for Communities and Local Government (DCLG).

D.20 The latest DCLG household projections provide headship rate statistics and communal population statistics, but only at local authority (i.e. district) level. Small-area (i.e. sub-county) household

assumptions have therefore been derived using DCLG county statistics in combination with sub-county statistics from the 2001 and 2011 Census.

Headship Rates

D.21 Household headship rates define the probability of anyone in a particular demographic group being classified as a household representative, given the age-sex profile of the population in that year.

D.22 The household headship rates at sub-district level have been derived from the DCLG 2008-based and 2012-based household projections for East Lindsey. Sub-district level statistics on the total number of households are available from the Census. These have been used to scale the DCLG district-level headship rates to sub-district totals, ensuring consistency with the total number of households for East Lindsey in 2001 and 2011.

D.23 Although sub-district headship rates are derived, the trend in headship rates for each small-area mirrors that evident in the district-level statistics. For the 2008-based rates, this trend is applied by household type, age and sex for all years of the projection period. For the 2012-based rates, the trend is applied by relationship status and sex.

D.24 As at district-level, the sub-district scenarios are presented under two alternative outcomes:

- In the **HH-12** outcome, the 2012-based DCLG headship rates are applied.
- In the **HH-08** outcome, the 2008-based DCLG headship rates are applied, scaled to be consistent with the 2011 DCLG household total, but following the original trend thereafter.

D.25 For detail on the 2008-based and 2012-based headship rates, please refer to Appendix C.

Communal Population

D.26 Household projections in POPGROUP exclude the population 'not-in-households' (i.e. the communal/institutional population). Examples of communal establishments include prisons, residential care homes and student halls of residence.

D.27 The 2011 Census provides information on the communal establishment population by age and sex for Census Output Areas. By aggregating and apportioning these data for the small-areas, the DCLG district-level communal establishment assumptions for 2012 have been updated.

D.28 For ages 0–74, the number of people in each age group 'not-in-households' is kept fixed throughout the forecast period. For ages 75–85+, the proportion of the population 'not-in-households' is recorded. Therefore, the population not-in-households for ages 75–85+ varies across the forecast period depending on the size of the population.

Vacancy Rate

D.29 A household/dwelling ratio (vacancy rate) based on households (occupied, second homes and vacant) and dwellings (shared and unshared) has been derived from the Census, for each sub-district area. The following vacancy rates have been derived and are fixed throughout the forecast period:

- **Wet**: 8.2%
- **Dry**: 5.7%