Medway

Housing & Demographics

April 2021

edge analytics

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Acknowledgements

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Contents

1 Introduction

Context

1.1 Medway Council is in the process of updating its Local Plan. As part of this process the Council is seeking to produce a Local Housing Needs Assessment (LHNA), compliant with the National Planning Policy Framework (NPPF), Planning Practice Guidance (PPG) and Emerging Local Plans.

1.2 In completing the LHNA, the Council requires consideration of the Ministry of Housing, Communities and Local Government's (MHCLG) 'standard method' housing need calculation, against the current demographic evidence. The 2020 standard method output for Medway identifies a need for +1,662 dwellings per annum (dpa) to 2037.

Approach

1.3 Edge Analytics has used POPGROUP technology to configure a range of scenario evidence for Medway for the plan period 2021–2037. These scenarios are underpinned by the latest population and household growth assumptions and include demographic (trend) and dwelling-led outcomes.

1.4 Section 2 of the report presents a demographic profile for Medway, including evidence on births, deaths and migration trends, a summary of the latest housing completion statistics, plus economic statistics for the district.

1.5 Section 3 presents a suite of growth outcomes for Medway, with a summary of the evidence in Section 4.

1.6 The Appendices provide supplementary detail on the methodology, data and assumptions used in the formulation of the analysis.

2 Area Profile

Geography

2.1 Medway borders Swale, Maidstone and Tonbridge and Malling to the south and Gravesham to the west, with the north and eastern borders as predominantly coastal (Figure 1).

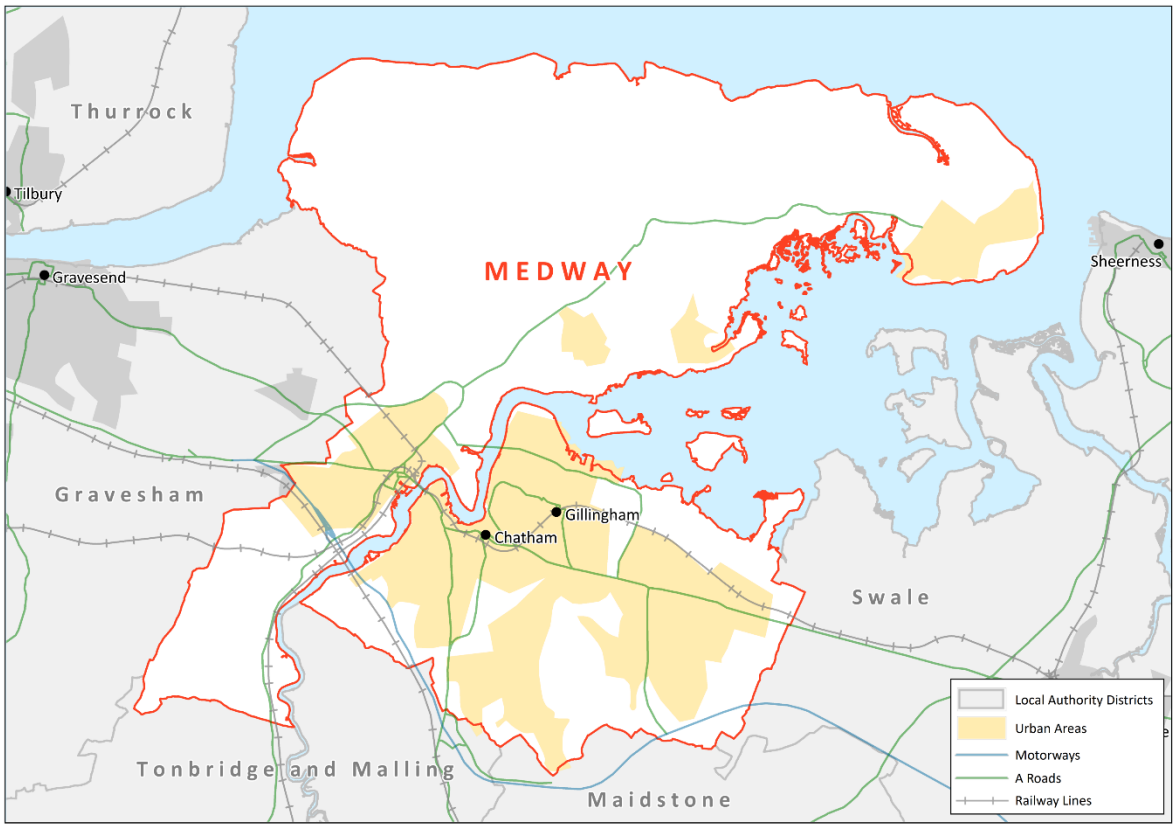


Figure 1: Medway – Geographical Context

Population Change

2.2 According to Office for National Statistics (ONS) mid-year estimates (MYE), the population of Medway was estimated to be 278,556 in 2019, an increase of +701 (0.3%) since 2018. Over the 2001–2019 period, the population of Medway is estimated to have risen by +28,852 (11.6%) (Figure 2).

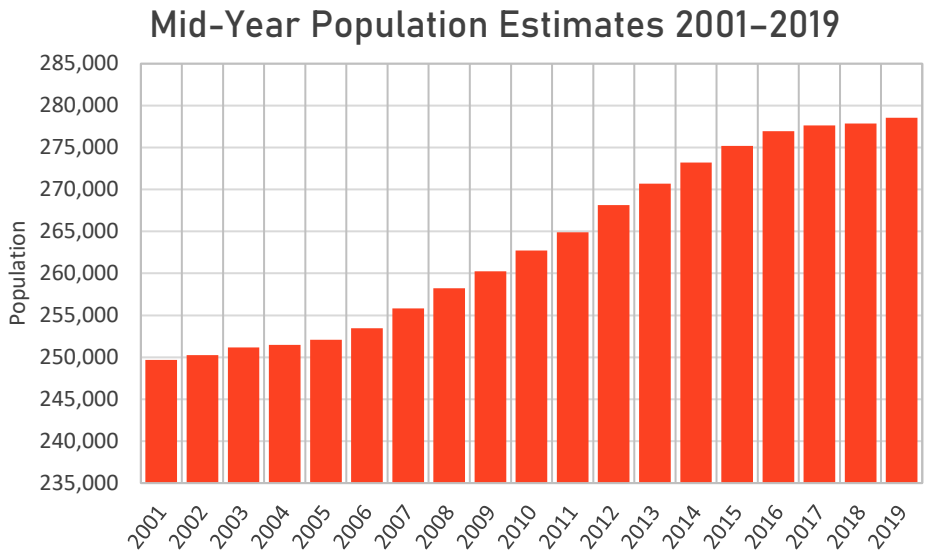


Figure 2: Mid-Year Population Estimates, 2001–2019 (Source: ONS)

2.3 Medway's population is estimated to have increased in each year since 2001/02, with the highest annual population growth recorded in 2011/12. Since 2011/12, lower levels of annual population growth have been recorded, with particularly low growth between 2016/17–2018/19. (Figure 3).

2.4 The change in growth rate in the latest 3 years coincides with the introduction of ONS' new Higher Education Leavers Methodology[1] (HELM), designed to better reflect the speed and pattern of student migration, following graduation. As a university district, the HELM is likely to have impacted net migration flows in Medway, resulting in an increase in Medway's net *outflows* as students are better relocated to elsewhere in the UK, following graduation. At the same time, the district is likely to have experienced an uplift in its net *inflows* as a result of a higher student return to Medway.

[1] Population Estimates for the UK, mid-2019 method guide, July 2020.

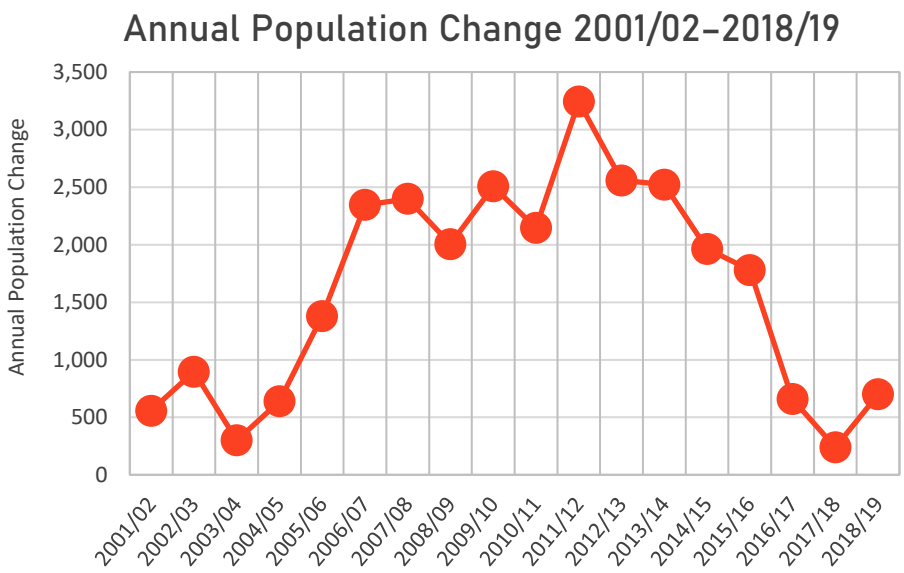


Figure 3: Population Change, 2001/02–2018/19 (Source: ONS)

2.5 An index of population growth for each of four broad age-groups reveals important demographic changes that are taking place within Medway (Figure 4). There has been significant growth in the older age groups, 65–79 and 80+, with the number of 65–79 year olds in Medway increasing by 42% between 2001–2019. The school-age population (0–15) and working-age population (16–64) has also grown over the historical period, but to a lesser extent.

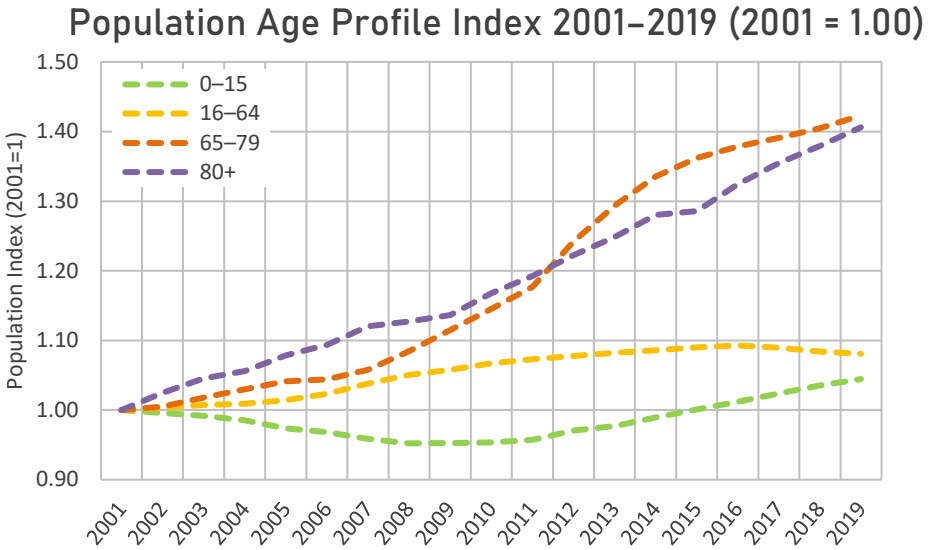


Figure 4: Population Age Profile Index, 2001–2019 (Source: ONS)

Births, Deaths & Migration

2.6 Examination of the 'components' of population change in Medway reveals the factors that are estimated to have driven the change in population since 2001, including an upward adjustment (unattributable population change) to its population following the 2011 Census (Figure 5).

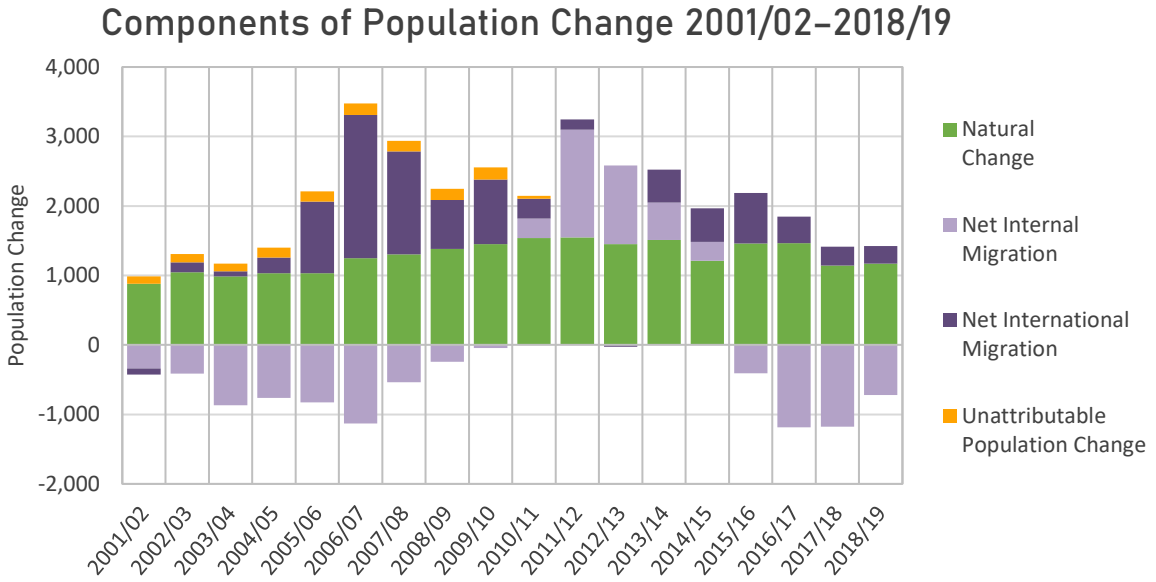


Figure 5: Components of Population Change, 2001/02–2018/19 (Source: ONS)

2.7 Natural change (the difference between births and deaths) has had a positive impact upon population change in all years since 2001/02. The size of the positive impact increased up until 2011/12 and has remained broadly stable thereafter.

2.8 Net internal migration (the balance of migration flows between Medway and elsewhere in the UK) has had a varied impact on population change since 2001/02. In 2010/11, internal migration changed to a net *inflow* for the first time in nine years. This positive impact was sustained for five years before a return to a net *outflow* from 2015/16–2018/19.

2.9 The importance of student flows is emphasised in Medway's internal migration age profile, with a large net *outflow* in the student age-group (15–19), as students leave the district for study. A corresponding net *inflow* is recorded in the 20–24 age-group, reflecting the return of students following graduation. Net *inflows* are also recorded for all young working-age groups (20–44) and school-age groups (0–14), whilst all ages 45+ report a net *outflow* (Figure 6).

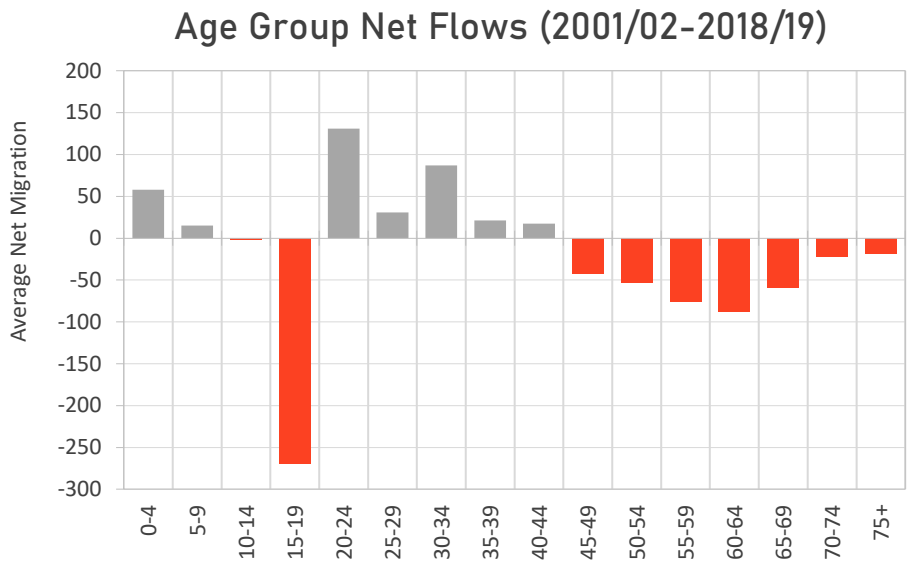


Figure 6: Internal Migration Age Profile, 2001/02–2018/19 (Source: ONS)

2.10 Geographically, Medway's most significant net migration *inflow* exchange (2001/02–2018/19) has been from Bexley, Gravesham and Greenwich, in addition to a collection of districts in the London region. Its net migration *outflow* exchange has been greatest with Swale (Figure 7).

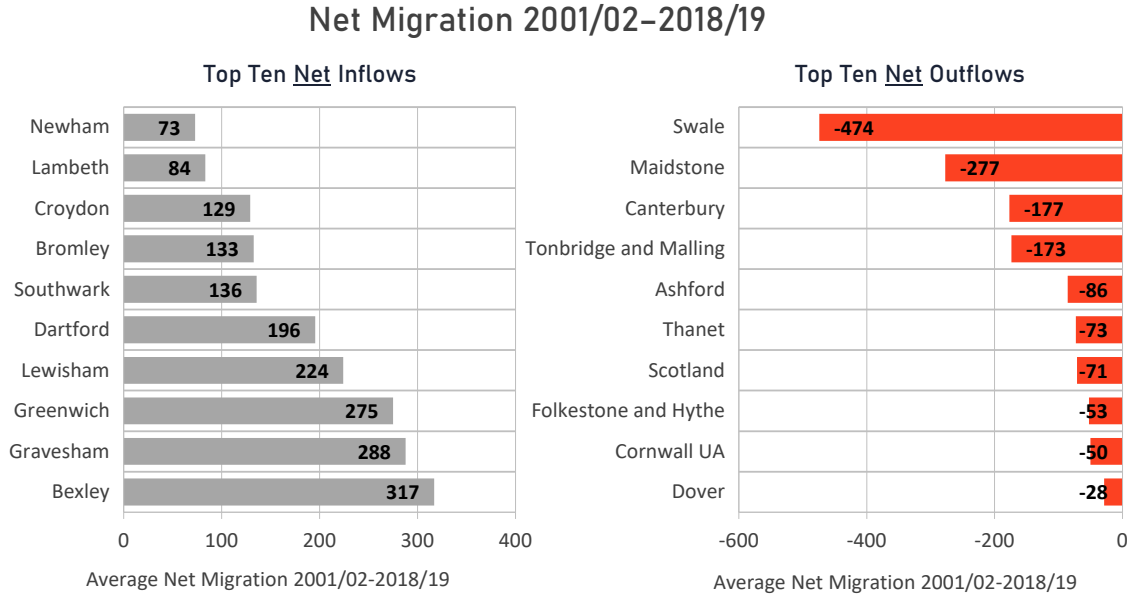


Figure 7: Top Ten Net Migration Inflows and Outflows, 2001/02–2018/19 (Source: ONS)

2.11 International migration continues to be the most difficult component to estimate robustly; so much so that ONS has downgraded its output to 'experimental statistics' status, whilst improvements continue[2]. The International Passenger Survey (IPS) is the mainstay of the UK's immigration and emigration estimates but this is being discontinued, in favour of a mix of administrative datasets,

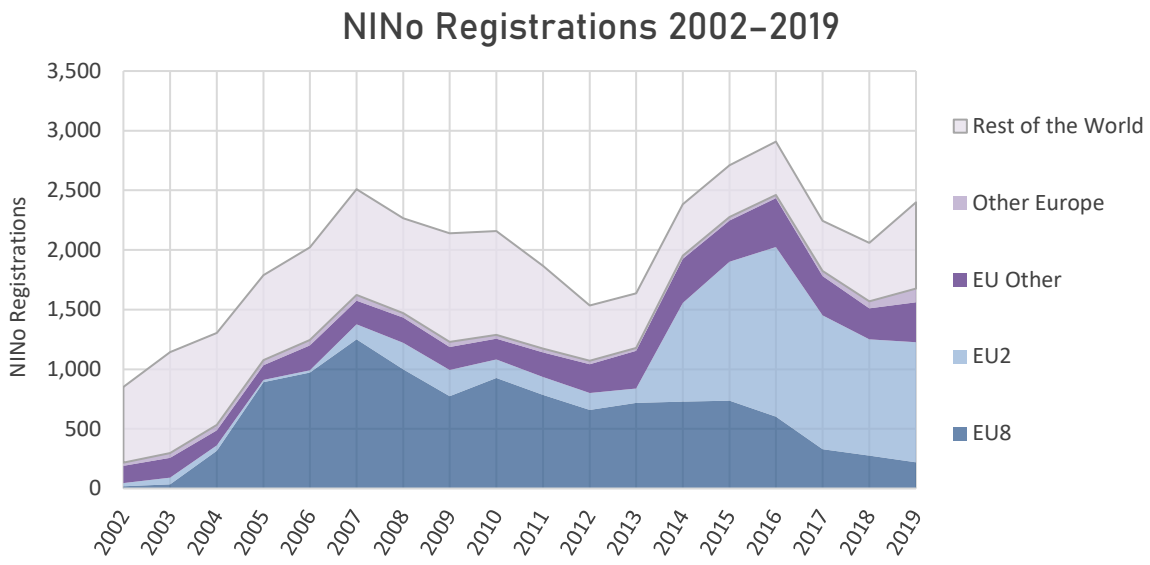
[2] Statement from the ONS on the reclassification of international migration statistics, August 2019.

including the patient register, higher education statistics and national insurance number (NINo) registrations.

2.12 With the exception of 2001/02 and 2012/13, net international migration has had a positive impact upon population growth in all years of the historical period, averaging +604 per year (Figure 5). However, there has been a noticeable fall in net international migration since the 2011 Census, from an average annual net inflow of +685 per year (2001/02–2010/11) to +339 (2011/12– 2018/19).

2.13 NINo statistics provide a complimentary illustration of international migration inflow to Medway; different to the ONS MYE statistics in that they refer only to work-based in-migration and include migrants whose stay may be shorter than 12 months (Figure 8).

2.14 Between 2004 and 2013, NINo registrations were predominantly associated with migrant workers from countries that joined the European Union in 2004 (EU8) and from other European countries, but over the last six years this number has declined and the number of migrant workers from Bulgaria and Romania (EU2) has increased. NINo totals peaked in 2015 and have fluctuated around an average of approximately +2,200 per year thereafter.



EU8 refers to countries joining the EU in 2004: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia
EU2 refers to Bulgaria and Romania

Figure 8: NINo Registrations by Country of Origin, 2002–2019 (Source: DWP)

Housing Completions

2.15 Annual housing completions in Medway peaked in 2019/20 at +1,130 dpa, following a seven-year period of reduced housing growth, below the historical average of +717 dpa. The housing growth in 2019/20 is the highest level of annual housing growth achieved over the full historical period (2001/02–2019/20) (Figure 9).

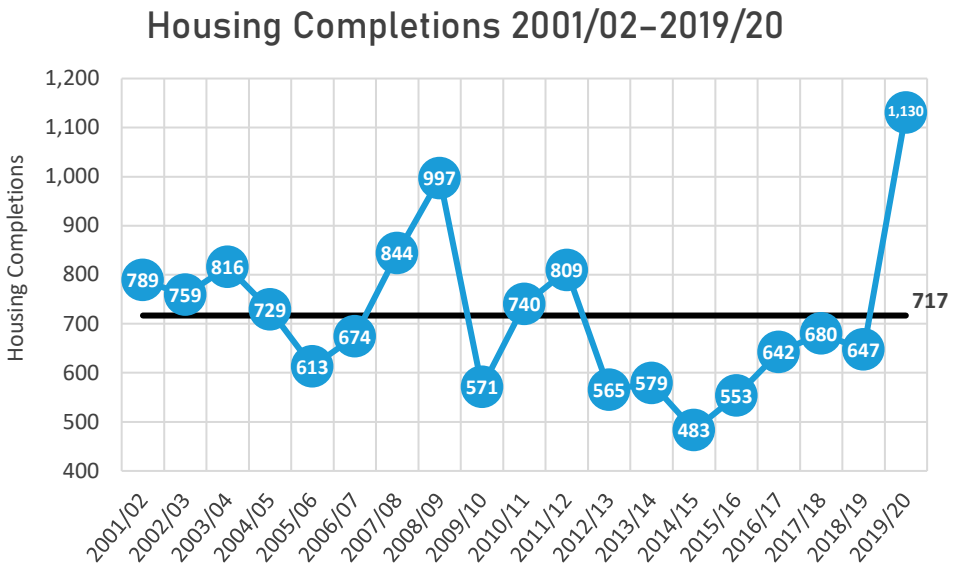


Figure 9: Housing Completions, 2001/02–2019/20 (Source: Medway AMRs[3] & MHCLG[4])

Employment Profile

2.16 Economic activity rates (or participation rates) are the proportion of a population that is actively engaged in the labour force, either employed or unemployed and looking for work. Since 2001, Medway's activity rates have increased for older age groups in both sexes (Figure 10). For females, there has been a significant increase in participation since 2001 in all age groups, except 16–19 year-olds.

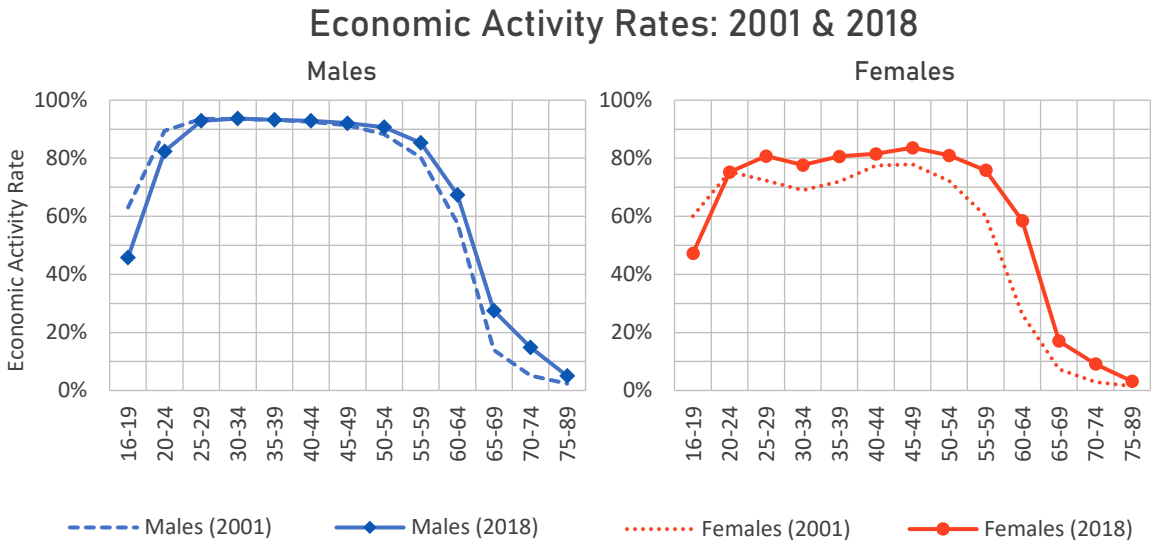


Figure 10: Economic Activity Rates by Age and Sex, 2001–2018 (Source: ONS and Office for Budget Responsibility (OBR))

[3] Medway Authority Monitoring Reports.
[4] MHCLG - Live Table 122 - housing supply; net additional dwellings, by local authority district, England 2001-02 to 2019-20.

2.17 Medway's unemployment rate has fluctuated since 2004 (Figure 11). After a sharp rise following the 2008 recession, the unemployment rate peaked at 9.4% in 2009, peaking again in 2013. Since then, the unemployment rate has dropped below pre-recession levels, reaching a low point of 3.9% in 2018.

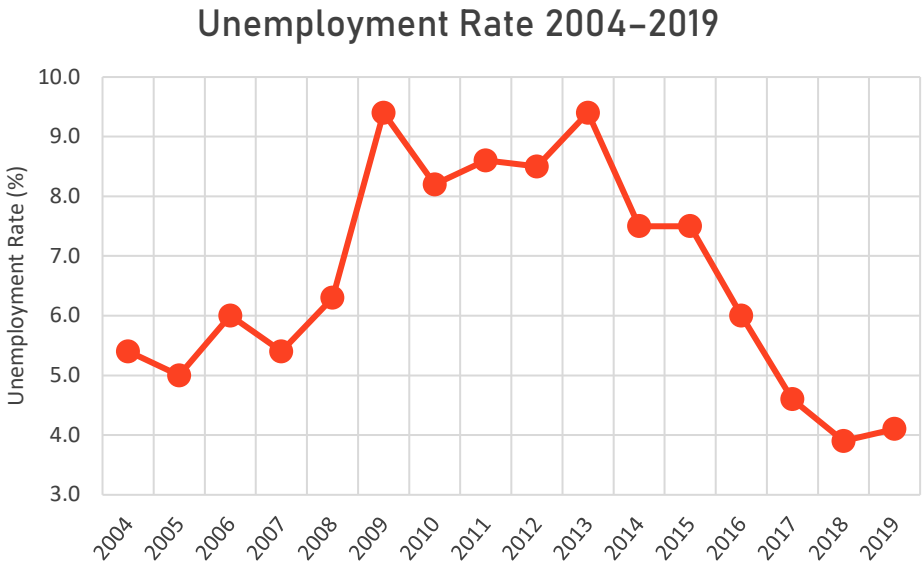


Figure 11: Unemployment Rate (%), 2004–2019 (Source: ONS)

2.18 The balance of commuting is an important component of the relationship between Medway's resident labour force and the level of employment. The commuting ratio indicates the balance between the level of employment and the number of resident workers.

2.19 A commuting ratio greater than 1.00 indicates that the size of the resident workforce exceeds the level of employment available in the area, resulting in a net out-commute. A commuting ratio less than 1.00 indicates that employment in the area exceeds the size of the labour force, resulting in a net in-commute.

2.20 In Medway, according to the 2011 Census, the number of resident workers was approximately 127,127, with the number of employed workers at 99,144. This results in a commuting ratio of 1.28, indicating a net out-commute, typical of a district that has a range of commuting options, into London and to other parts of Kent.

2.21 Figure 12 illustrates the top ten commuting locations for Medway residents at the time of the 2011 Census. Whilst a very large proportion of residents live and work in Medway, there is a strong commuting association with Maidstone, Tonbridge and Malling and Central London.

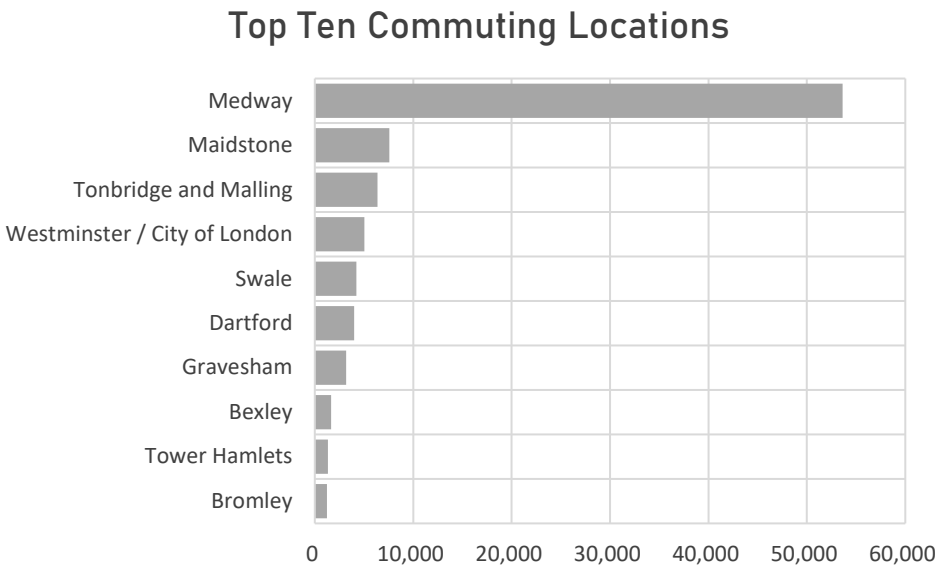


Figure 12: Commuting Locations of Medway Residents (Source: 2011 Census)

3 Growth Scenarios

Scenario Definition

3.1 POPGROUP technology (Appendix B) has been used to configure a suite of growth scenarios for Medway (Table 1). Additional detail on scenario data inputs and assumptions is provided in Appendix C.

3.2 The ONS Sub-National Population Projection (SNPP) scenarios include the 2014-based *Principal* projection, plus the full suite of variants that make up the 2018-based ONS projections. These scenarios have 2014 and 2018 base years, respectively.

3.3 POPGROUP (PG) trend scenarios consider the growth outcomes based on a continuation of short-term and long-term migration histories. Both scenarios incorporate a 2019 base year and include the latest fertility and mortality assumptions from the ONS' 2018-based projections.

3.4 The dwelling-led scenario considers how the MHCLG's standard methodology target for Medway of +1,662 dpa would impact upon future population growth, again incorporating a 2019 base year and the latest fertility and mortality assumptions from the ONS' 2018-based projections.

3.5 Under each scenario, population, household, migration, dwelling and employment growth is presented over a 2021–2037 plan period, in line with Medway's local plan. In addition, each scenario has also been presented over an extended 2021–2040 period in Appendix A.

3.6 For all scenarios, household and dwelling growth is estimated using assumptions from MHCLG's 2014-based household projection model (HH-14). The potential for higher rates of household formation amongst young adult populations is also considered in the scenario analysis (HH-14R). Each scenario has also been run using assumptions from the ONS' 2018-based household projection model for comparison (HH-18).

3.7 In modelling the relationship between household and dwellings, a Medway vacancy rate of 3.5% has been applied, derived from 2011 Census statistics.

Table 1: Scenario Definition

1.	SNPP-2014	Replicates the ONS 2014-based SNPP *Principal* population projection, using historical population evidence for 2001–2014.
2.	SNPP-2018	Replicates the ONS 2018-based SNPP *Principal* population projection, using historical population evidence for 2001–2018, drawing its migration assumptions from a two-year period that is consistent with the new ONS HELM methodology.
3.	SNPP-2018-HIGH	Replicates the ONS 2018-based SNPP *Higher Migration* population projection, using historical population evidence for 2001–2018. This variant assumes higher levels of net international migration.
4.	SNPP-2018-LOW	Replicates the ONS 2018-based SNPP *Lower Migration* population projection, using historical population evidence for 2001–2018. This variant assumes lower levels of net international migration.
5.	SNPP-2018-ALTERNATIVE	Replicates the ONS 2018-based SNPP *Alternative Internal Migration* population projection, using historical population evidence for 2001–2018. This variant uses five years of internal migration data to inform the projection, two years using ONS' new HELM methodology and three years using its previous methodology.
6.	SNPP-2018-10YR	Replicates the ONS 2018-based SNPP *10-year Migration* population projection, using historical evidence for 2001–2018. This variant uses 10 years of all migration data to inform the projection.
7.	PG-Short Term	Uses an ONS 2019 MYE base year and calibrates its migration assumptions from a 5-year historical period (2014/15–2018/19).
8.	PG-Long Term	Uses an ONS 2019 MYE base year and calibrates its migration assumptions from an 18-year historical period (2001/02–2018/19).
9.	Dwelling-led_StandardMethod	Models the population impact of the MHCLG's standard method target of +1,662 dpa.

Scenario Outcomes

3.8 The 2001–2037 population growth trajectories for all scenarios are presented in Figure 14.

3.9 In Table 2, each of the scenarios is summarised in terms of population and household growth for the 2021–2037 plan period, alongside the average annual net migration and dwelling growth outcomes.

3.10 Population change for the 2021–2037 period ranges from 0.7% under the **SNPP-2018-LOW** scenario to 19.3% growth under the **Dwelling-led_StandardMethod** scenario. This range of population growth equates to an estimated housing requirement of +282 to +1,662 dpa.

3.11 The **SNPP-2014** scenario records population growth of 14.1% to 2037, almost five times the 3.1% growth estimated by the **SNPP-2018** scenario, with corresponding housing growth of +1,333 dpa and +453 dpa, respectively. The components of change illustrations for the two scenarios reveal the differences in the components driving these growth outcomes.

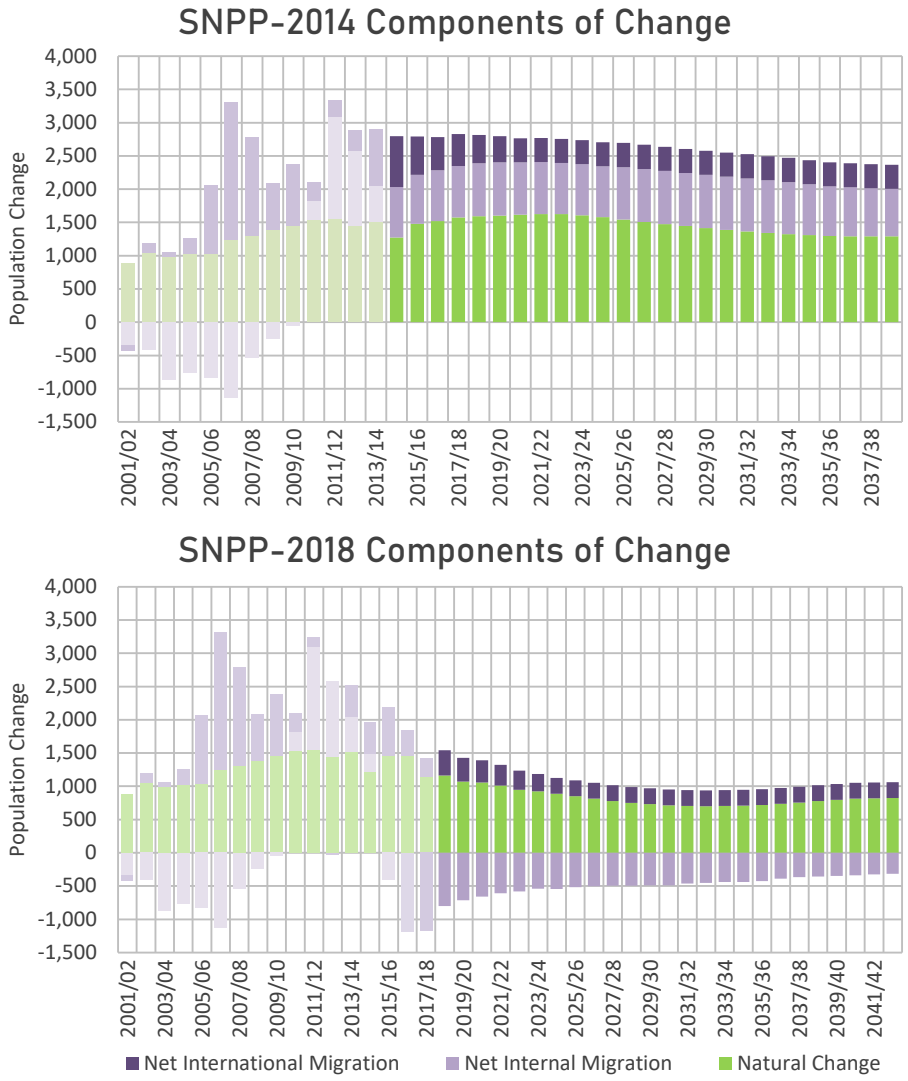


Figure 13: Components of Change under SNPP-2014 and SNPP-2018 scenarios (Source: ONS)

3.12 The **SNPP-2014** scenario projects that all components will have a positive impact upon population growth, with the largest impact coming from natural change and internal migration. In contrast, the **SNPP-2018** scenario projects a net *outflow* through internal migration and a smaller positive effect from natural change. Across England and Wales, the ONS SNPP-2018 projections have introduced dampened assumptions on both fertility and mortality, reducing birth estimates and the rate of improvement in life expectancy. As is the case for Medway, these revised assumptions have generally resulted in a lower growth outlook for local authorities, compared to the 2014-based round of evidence.

3.13 The **SNPP-2018-LOW, SNPP-2018-HIGH, SNPP-2018-ALTERNATIVE** and **SNPP-2018-10YR** scenarios provide alternative outcomes to the principal **SNPP-2018** projection, incorporating variations in internal and international migration assumptions. The scenarios estimate population growth of 0.7%, 5.6%, 6.3% and 8.6% respectively, with an accompanying dwelling requirement of +282, +623, +716 and +914 dpa.

3.14 The **PG-Short Term** and **PG-Long Term** scenarios, drawing their migration assumptions from a 5-year and 18-year history respectively, estimate population growth of 4.2% and 5.8%, with a dwelling requirement of +554 and +681 dpa.

3.15 The **Dwelling-led_StandardMethod** scenario estimates a higher rate of growth compared to the suite of trend scenarios. Its +1,662 dpa, results in an estimated population growth of 19.3%.

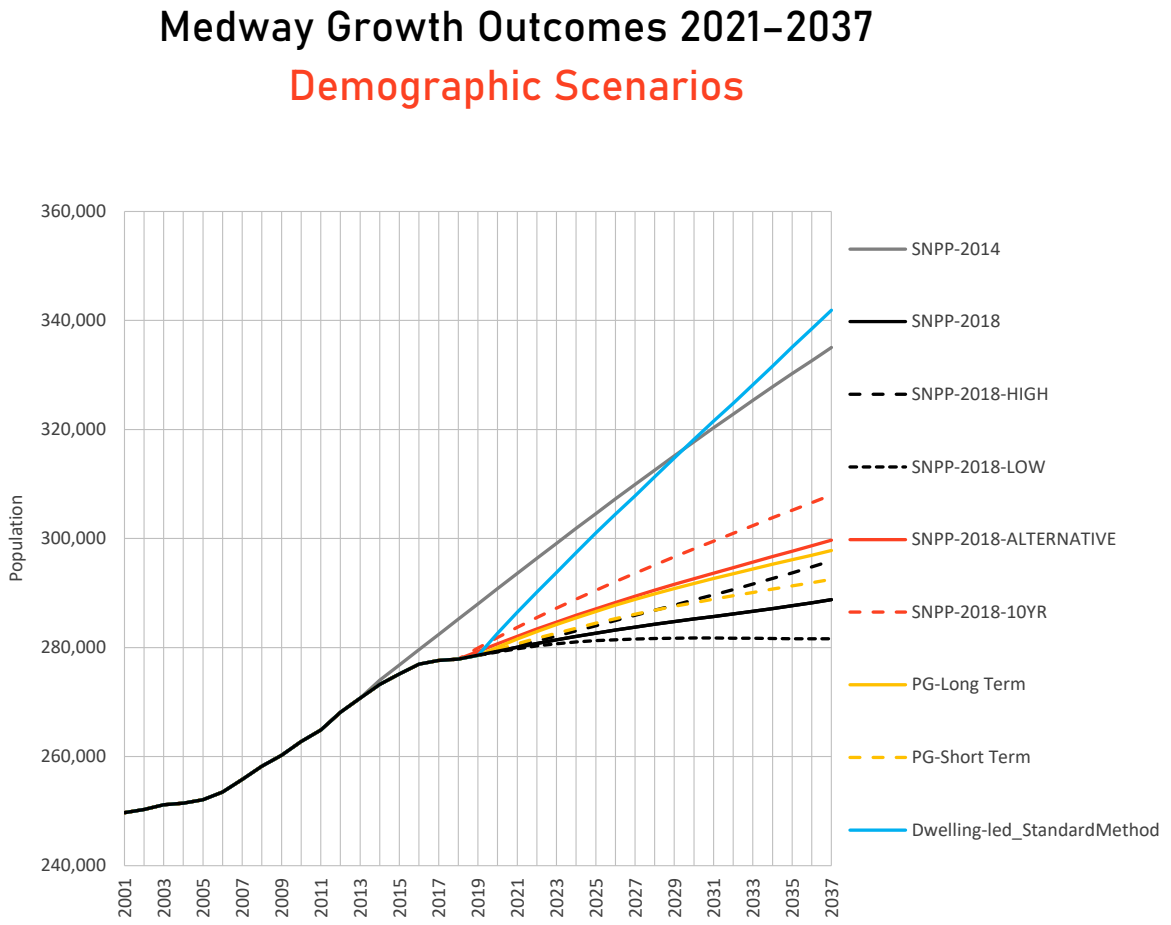


Figure 14: Medway Growth Scenarios, 2001–2037

Table 2: Medway Scenario Outcomes, 2021–2037

Scenario	Change 2021–2037				Average per year	
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
Dwelling-led_StandardMethod	55,404	19.3%	25,651	21.7%	2,347	1,662
SNPP-2014	41,438	14.1%	20,577	17.0%	1,143	1,333
SNPP-2018-10YR	24,309	8.6%	14,099	12.0%	713	914
SNPP-2018-ALTERNATIVE	17,659	6.3%	11,047	9.5%	316	716
PG-Long Term	16,256	5.8%	10,503	9.0%	215	681
SNPP-2018-HIGH	15,607	5.6%	9,621	8.3%	109	623
PG-Short Term	11,829	4.2%	8,558	7.4%	-41	554
SNPP-2018	8,732	3.1%	6,990	6.0%	-247	453
SNPP-2018-LOW	1,849	0.7%	4,356	3.8%	-603	282

Note: All scenarios presented here have been configured using 2014-based household representative rates (HRR)

HRR Alternatives

3.16 In addition to the default assumptions from the MHCLG's 2014-based household projection model (HH-14), each scenario has been run with two alternatives: a variant on the 2014-based household projection model assumptions (HH-14R) and the ONS 2018-based household projection model (HH-18).

3.17 Under the HH-14R scenarios, adjustments to the 2014-based HRR have been applied between 2019 and 2039 to allow a 'return' to higher household formation rates experienced in 2001 in the 25–34 age-group. All other age-groups are unadjusted.

3.18 The 2018-based rates have been formulated differently to 2014-based (see Appendix C) and remain fixed from 2021, unlike the 2014-based rates which are projected over a 25-year horizon.

3.19 Table 3 compares dwelling growth outcomes under the different HRR assumptions. The HH-14R scenarios result in higher average dwelling growth than the HH-14 scenarios, whilst the HH-18 scenarios result in lower dwelling growth. Under the **Dwelling-led_StandardMethod** scenario, the dwelling requirement is fixed at the standard method target of +1,662 dpa. For all other scenarios, the average annual dwelling growth ranges from +282 to +1,333 dpa using the 2014-based model, from +291 to +1,329 dpa using the 2018-based model and +465 to +1,565 dpa using the 'returned' 2014-based model.

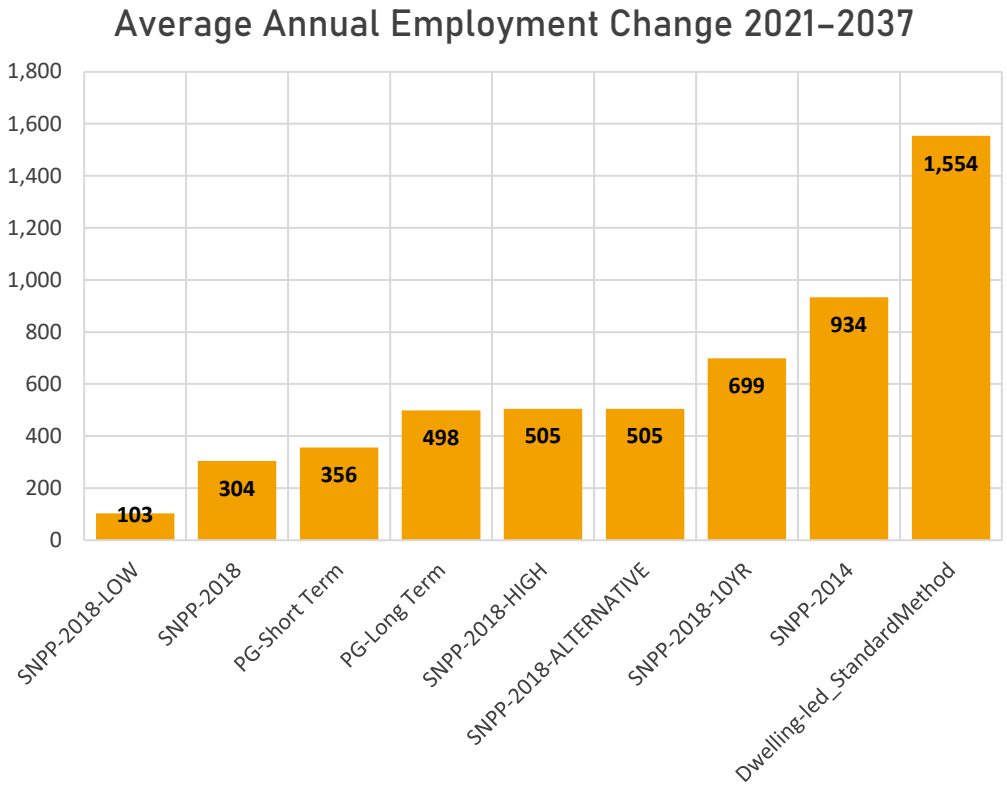
Table 3: Medway Annual Dwelling Requirements under Alternative HRR, 2021–2037

Scenario	Average Annual Dwelling Growth		
	HH-14	HH-18	HH-14R
Dwelling-led_StandardMethod	1,662	1,662	1,662
SNPP-2014	1,333	1,329	1,565
SNPP-2018-10YR	914	911	1,125
SNPP-2018-ALTERNATIVE	716	714	913
PG-Long Term	681	686	889
SNPP-2018-HIGH	623	621	827
PG-Short Term	554	555	748
SNPP-2018	453	456	646
SNPP-2018-LOW	282	291	465

Labour Force & Employment

3.20 A final set of summary statistics presents the estimated impact of each scenario upon potential employment growth within Medway. The relationship between population and employment is modelled using key assumptions on economic activity rates, unemployment and commuting (see Appendix C). The economic activity rates determine the estimated annual change in Medway's resident labour force, whilst the unemployment and commuting ratios link the labour force to workplace-based employment in Medway.

3.21 Application of these assumptions to each scenario across the 2021–2037 plan period results in a range of employment growth outcomes, from +103 per year under the **SNPP-2018-LOW** scenario, to +1,554 per year under the **Dwelling-led_StandardMethod** scenario (Figure 15).



Note: All scenarios presented here have been configured using 2014-based household representative rates (HRR)

Figure 15: Average Annual Employment Growth Scenarios, 2021–2037

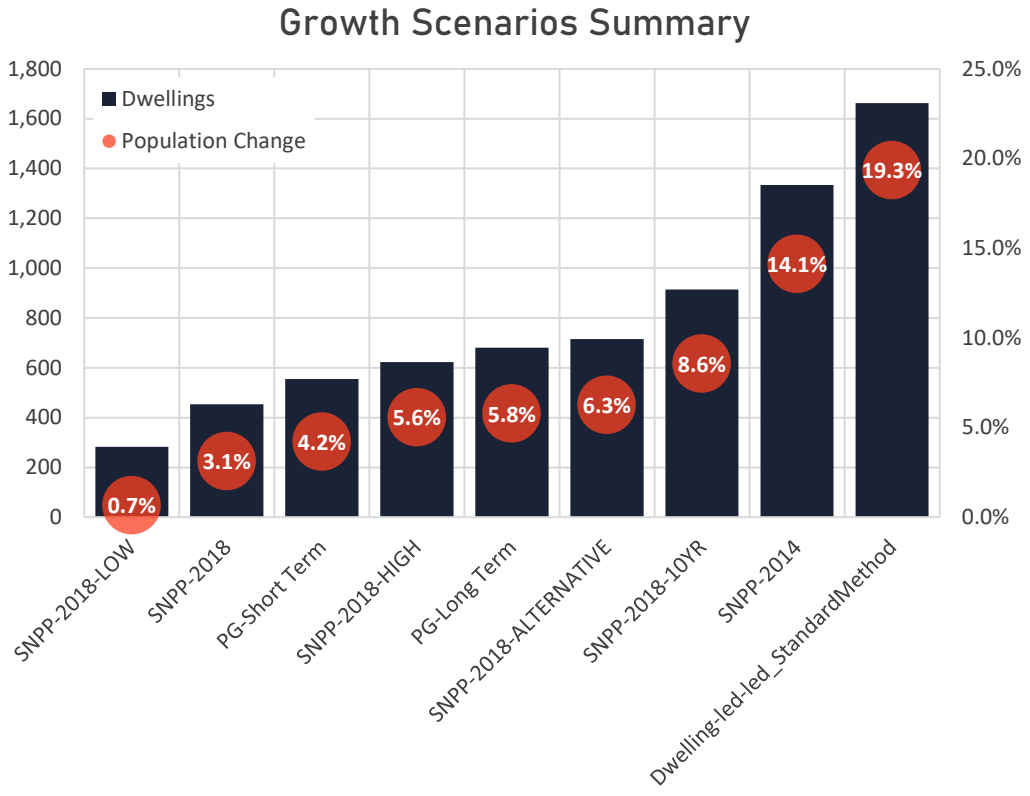
4 Summary

4.1 In updating its Local Plan, Medway Council is formulating a LHNA, evaluating the MHCLG's 'standard method' housing need target against current demographic evidence.

4.2 POPGROUP technology has been used to configure a range of growth scenarios for Medway. Under each scenario, population, household, migration, dwelling and employment growth is presented over a 2021–2037 plan period (see Appendix A for 2021–2040 growth outcomes). The 2014-based ONS *Principal* projection plus the full suite of variants that make up the 2018-based ONS projections are compared directly to alternative trend- and dwelling-led scenarios.

4.3 Under each scenario, household growth has been estimated using household representative rate assumptions from the MHCLG's 2014-based and ONS' 2018-based household projection models, alongside a 'return' variation of the 2014-based model.

4.4 Over the 2021–2037 plan period, population growth of 0.7% to 19.3% is estimated under the range of scenarios, using the 2014-based HRR. The associated average annual dwelling growth ranges from +282 to +1,662 dpa.



Note: All scenarios presented here have been configured using 2014-based household representative rates (HRR)

Figure 16: Medway Growth Scenario Summary, 2021–2037

Appendix A Growth Scenarios to 2040

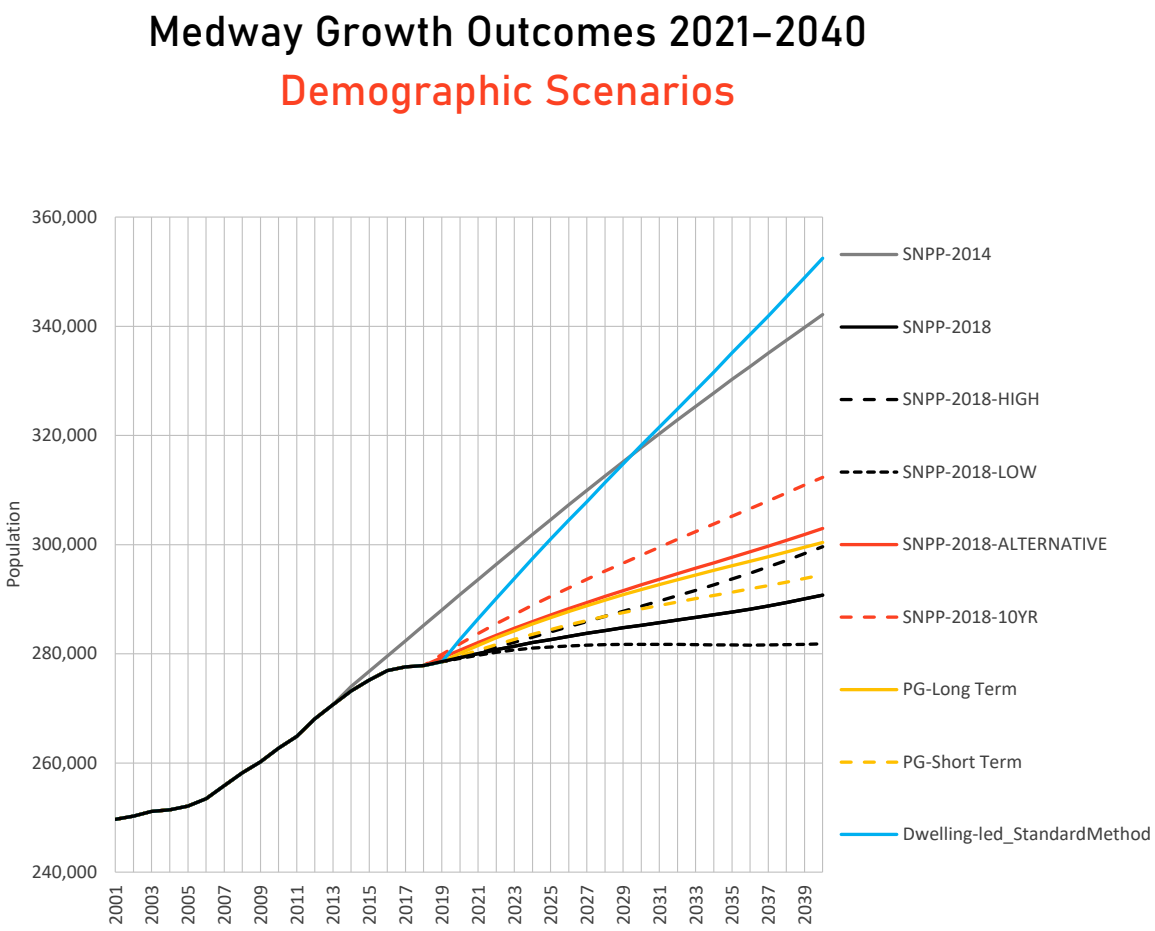


Figure 17: Medway Population Growth Scenarios, 2021–2040

Table 4: Medway Scenario Outcomes, 2021–2040

Scenario	Change 2021–2040				Average per year	
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
Dwelling-led_StandardMethod	66,011	23.0%	30,460	25.8%	2,327	1,662
SNPP-2014	48,522	16.5%	24,108	19.9%	1,131	1,315
SNPP-2018-10YR	28,644	10.1%	16,408	14.0%	701	895
SNPP-2018-ALTERNATIVE	20,925	7.4%	12,869	11.0%	320	702
SNPP-2018-HIGH	19,309	6.9%	11,496	9.9%	141	627
PG-Long Term	18,832	6.7%	12,012	10.3%	194	655
PG-Short Term	13,789	4.9%	9,791	8.4%	-46	534
SNPP-2018	10,694	3.8%	8,168	7.1%	-228	446
SNPP-2018-LOW	2,071	0.7%	4,836	4.2%	-597	264

HRR Alternatives

Table 5: Medway Dwelling Requirements under Alternative HRR, 2021–2040

Scenario	Average Annual Dwelling Growth		
	HH-14	HH-18	HH-14R
Dwelling-led_StandardMethod	1,662	1,662	1,662
SNPP-2014	1,315	1,324	1,545
SNPP-2018-10YR	895	904	1,106
SNPP-2018-ALTERNATIVE	702	711	899
SNPP-2018-HIGH	627	633	829
PG-Long Term	655	670	861
PG-Short Term	534	545	726
SNPP-2018	446	458	637
SNPP-2018-LOW	264	283	445

Appendix B POPGROUP Methodology

B.1 Demographic forecasts have been developed using the POPGROUP suite of products. POPGROUP is a family of demographic models that enables forecasts to be derived for population, households and the labour force, for areas and social groups. The main POPGROUP model (Figure 18) is a cohort component model, which enables the development of population forecasts based on births, deaths and migration inputs and assumptions.

B.2 The Derived Forecast (DF) model sits alongside the population model (Figure 19) providing an associated model for both household and labour-force projections and the basis for the dwelling-led and employment-led scenario options.

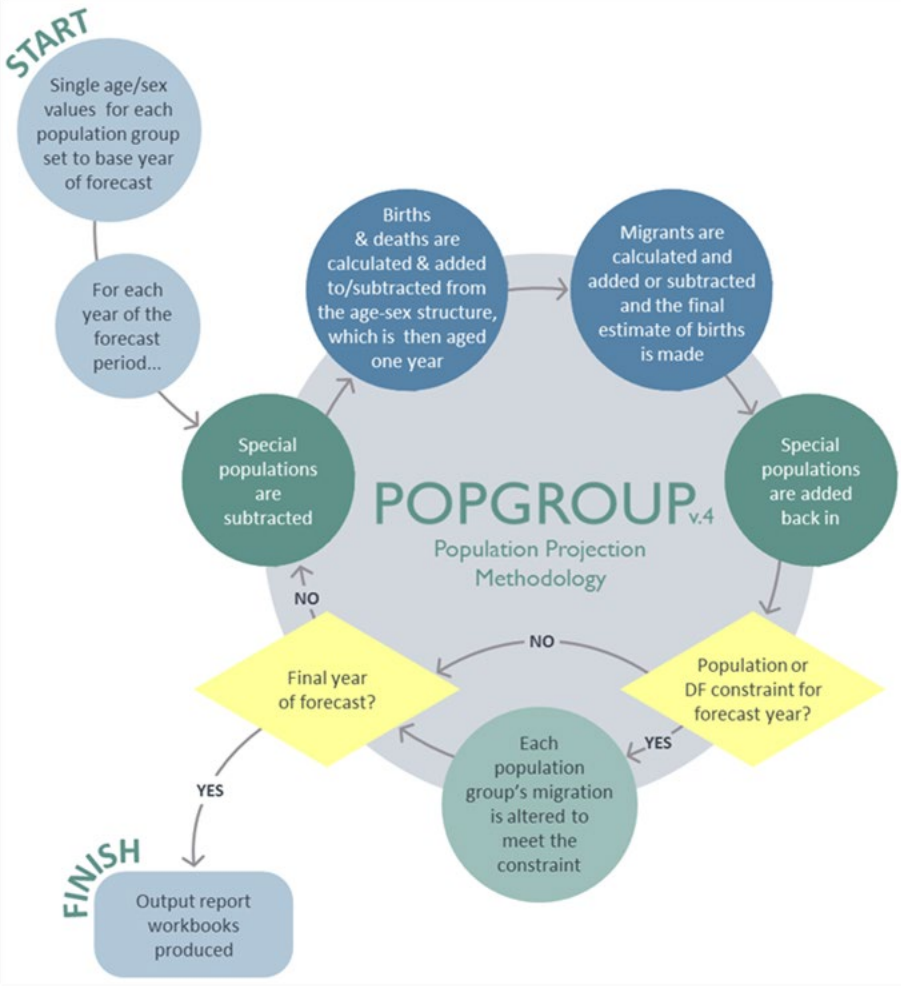
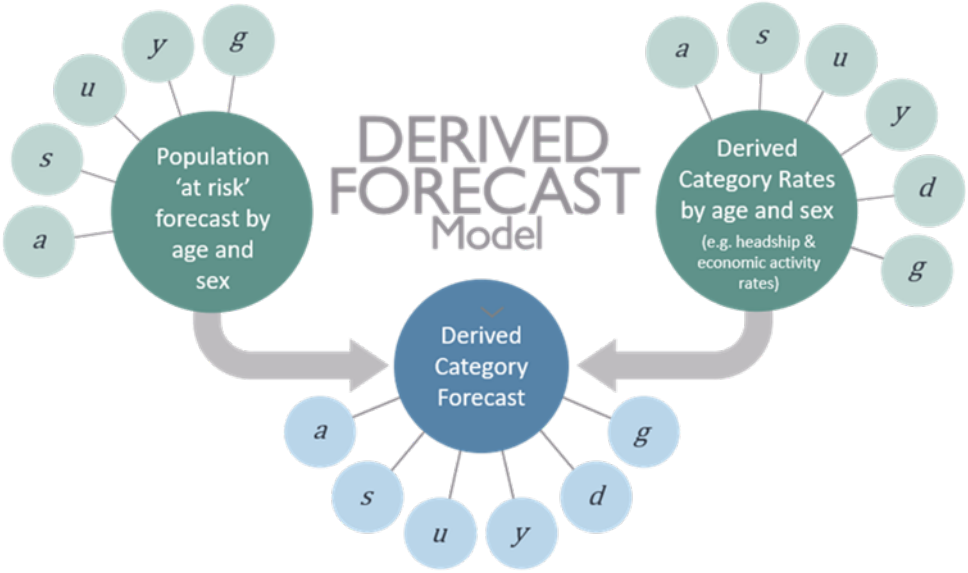


Figure 18: POPGROUP Population Projection Methodology



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

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

Figure 19: Derived Forecast (DF) Methodology

Appendix C Data Inputs & Assumptions

Population

C.1 In each scenario, historical population statistics are provided by ONS mid-year population estimates (MYEs), with all data disaggregated by single year of age and sex. MYEs are used up to the respective base years of each scenario. From the base year onwards, future population counts are estimated by single year of age and sex to ensure consistency with the official projections. The **SNPP** scenarios use MYE populations up until their respective 2014 and 2018 base years. The **PG** and **Dwelling-led** scenarios use an ONS 2019 MYE as their base year.

Births & Fertility

C.2 In each scenario, historical mid-year to mid-year counts of births and sex have been sourced from the ONS MYEs. Under the **SNPP** scenarios, historical births counts have been used until each scenario's base year.

C.3 For the **PG** and **Dwelling-led** scenarios, birth counts are used from 2001/02 to 2018/19. From 2019/20, an area-specific and age-specific fertility rate (ASFR) schedule is derived from the 2018-based National Population Projections (NPP). In combination with the 'population at risk' (i.e., all women between the age of 15–49), these ASFR assumptions provide the basis for the calculation of births in each year of the forecast period.

C.4 In each of the **SNPP** scenarios, the future counts of births are reproduced from the base year onwards to ensure consistency with the respective population growth outcomes.

Deaths & Mortality

C.5 In each scenario, historical mid-year to mid-year counts of deaths by sex and 5-year age-group have been sourced from the ONS MYEs. Under the **SNPP** scenarios, historical deaths counts have been used until each scenario's base year.

C.6 For the **PG** and **Dwelling-led** scenarios, death totals are used from 2001/02 to 2018/19. From 2019/20, an area-specific and age-specific mortality rate (ASMR) schedule is derived from the latest 2018-based NPP.

C.7 In each of the **SNPP** scenarios, the future counts of deaths are specified from their base year onwards to ensure consistency with the respective population growth outcomes.

Internal Migration

C.8 In each scenario, historical mid-year to mid-year estimates of internal in- and out-migration by five-year age-group and sex have been sourced from the 'components of change' files that underpin the ONS statistics.

C.9 In the **SNPP** scenarios, these historical estimates are used up to each respective base year, with future counts of migrants specified to remain consistent with the corresponding projection.

C.10 Under the **PG** scenarios, an area and age-specific migration rate (ASMigR) schedule is derived from a number of years of historical internal migration data, which then determines the future number of internal in- and out-migrants for the remainder of the plan period. For the **PG-Short Term** scenario, this is derived from five years of historical data (2014/15–2018/19) and for the **PG-Long Term** scenario, this is derived from the full eighteen years of historical data (2001/02–2018/19).

C.11 Under the **Dwelling-led** scenario, future internal migration assumptions have been derived from an eighteen-year historical period (**PG-Long Term**), with migration altered to meet annual dwelling growth requirements.

International Migration

C.12 Historical mid-year to mid-year counts of immigration and emigration by five-year age-groups and sex have been sourced from the 'components of population change' files that underpin the ONS MYEs.

C.13 In the **SNPP** scenarios, these counts are used up to each scenario's respective base years, with future counts of migrants specified directly from the projection statistics.

C.14 In the **PG-Short Term** and **PG-Long Term** scenarios, historical counts of immigration are used from 2001/02 to 2018/19. From 2019/20 onwards, an ASMigR schedule of rates is derived from a five-year and eighteen-year international migration history respectively and used to distribute future counts by single year of age and sex.

C.15 For the **Dwelling-led** scenario, future international assumptions are derived from an eighteen-year historical period (**PG-Long Term**).

Households & Dwellings

C.16 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".* In POPGROUP, a dwelling is defined as a unit of accommodation which can either by occupied by one household or vacant.

C.17 The household and dwelling implication of each population growth trajectory have been estimated though the application of household representative rates, communal population statistics and a dwelling vacancy rate. These assumptions have been sourced from the 2011 Census and the 2014-based and 2018-based household projection models.

Household Representative Rates

C.18 A household representative rate is defined as the *"probability of anyone in a particular demographic group being classified as being a household representative"*[5].

C.19 The household representative rates used in the POPGROUP modelling have been taken from the MHCLG 2014-based and ONS 2018-based household projection model, which are underpinned by the ONS 2014- and 2018-based SNPPs. The household projections are derived through the application of projected headship rates to a projection of the private household population. The methodology used by MHCLG in its household projection model 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.
- **Stage Two** provides the detailed 'household-type' projection by age-group, controlled to the previous Stage One totals.

C.20 Under each scenario, **Stage Two** headship rates have been applied by age-group, sex and 'household type' (Table 6 and Table 7).

Table 6: MHCLG 2014-based Stage Two household type classification

MHCLG Category	Description
One person male	One person households: Male
One person female	One person: Female
Couple no child	One family and no others: Couple households: No dependent children
Cple+adlts no child	A couple and one or more other adults: No dependent children
One child	Households with one dependent child
Two children	Households with two dependent children
Three+ children	Households with three or more dependent children
Other households	Other households with two or more adults

Table 7: ONS 2018-based Stage Two household type classification

ONS Category	Description
One person male	One person households: Male
One person female	One person households: Female
One child	Households with one dependent child
Two children	Households with two dependent children
Three+ children	Households with three or more dependent children
Other households	Other households with two or more adults

[5] Household Projections 2014-based: Methodological Report. Ministry of Housing, Communities & Local Government (July 2016).

Each scenario has also been run with a variation on the 2014-based HRR, with the rates returning between 2019 and 2039 to higher levels of household formation experienced in 2001 in the younger adult age-group (25–34). All other age-groups are unadjusted.

Communal Population Statistics

C.21 Household projections in POPGROUP exclude the population 'not-in-households' (i.e., the communal/institutional population). These data are drawn from the ONS 2018-based household projections, which use statistics from the 2011 Census. Examples of communal establishments include prisons, residential care homes, student hall of residence and certain armed forces accommodation.

C.22 For ages 0–74, the number of people in each age-group 'not-in-households' is fixed throughout the forecast period. For ages 75–85+, the population 'not-in-households' varies across the forecast period depending on the size of the population.

Vacancy Rate

C.23 The relationship between household and dwellings us modelled using a 'vacancy rate', derived from the 2011 Census using statistics on households (occupied household spaces) and dwellings (shared and unshared). A vacancy rate of 3.5% has been applied and fixed throughout the forecast period. Using the vacancy rate, the 'dwelling requirement' of each household growth trajectory has been estimated.

Labour Force & Jobs

4.5 The labour force and jobs implications of each population growth trajectory have been estimated through the application of three key economic assumptions: economic activity rates, commuting ratio and unemployment rate. The economic activity rates determine the estimated annual change in Medway's labour force, whilst the unemployment rate and commuting ratios link the labour force to *workplace-based employment* in Medway.

Economic Activity Rates

C.24 Economic activity rates measure the proportion of the population that are actively involved in the labour force, either employed or unemployed and looking for work.

C.25 Economic activity rates by five-year age-group (ages 16–89) and sex have been derived from the Census statistics, with adjustments made in line with the OBR analysis of labour market trends in its 2018 Fiscal Sustainability Report[6] (Figure 20). The economic activity rate adjustments have been applied to all scenarios.

[6] OBR Fiscal Sustainability Report 2018.

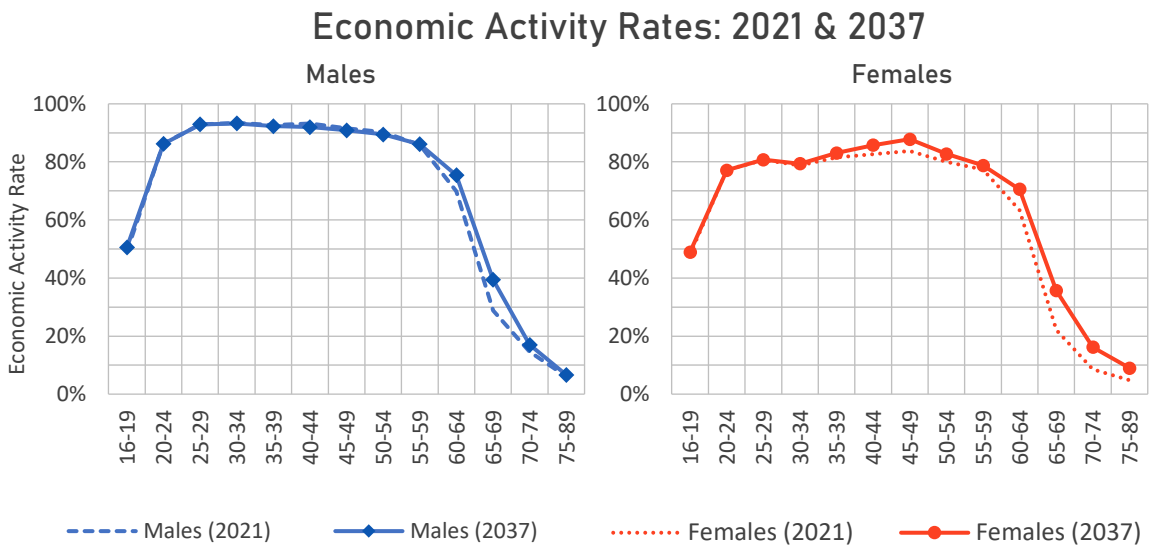


Figure 20: Economic Activity Rates for Medway (2021 & 2037)

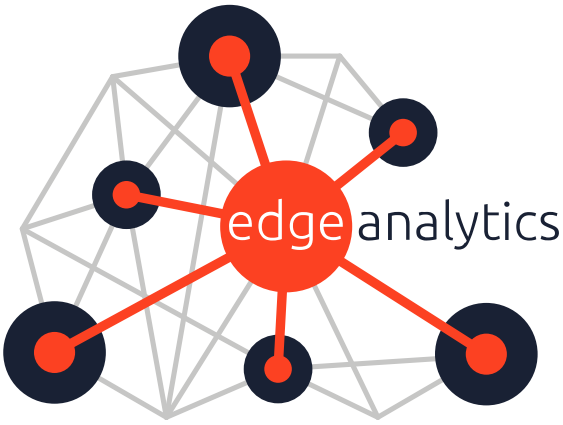
Commuting Ratio

4.6 The commuting ratio indicates the balance between the level of employment and the number of resident workers. A commuting ratio greater than 1.00 indicates that the size of the resident workforce exceeds the level of employment available in the area, resulting in a net out-commute. A commuting ratio less than 1.00 indicates that employment in the area exceeds the size of the labour force, resulting in a net in-commute.

4.7 The 2011 Census recorded 127,127 resident workers and a total of 99,144 people engaged in (workplace-based) employment in Medway. This results in a balanced commuting ratio of 1.28, a net out-commute, which is applied in all scenarios and fixed throughout the forecast period.

Unemployment

4.8 The unemployment rate is the proportion of unemployed people within the total economically active population. Historical unemployment rates are sourced from the ONS model-based estimates. For Medway, the 2019 rate of 4.1% has been applied in each scenario and fixed throughout the forecast period.



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