NOTE ON THE PROPOSED HOUSING NUMBERS FORMULA AS APPLIED TO TEIGNBRIDGE

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Section 1. Background

1.1 Changes to the current planning system consultation

This note discusses the proposed housing numbers formula which is part of the consultation "Changes to the current planning system".

The consultation documents can be found here:

https://www.gov.uk/government/consultations/changes-to-the-current-planning-system

There is a deadline of 1st October for submission of responses.

1.2 Effect on Teignbridge

If you apply the formula to Teignbridge using 2020 as a reference year then the formula requires that 1532 houses are built, whereas the current formula requires 760.

There is already considerable public disquiet about the proposed 760, let alone 1532.

1.3 This is a climate matter

When a traditionally built house is constructed there are about 60tonnes of Carbon Dioxide equivalent (t CO_2e) of Green House Gas (GHG) emissions. Building 1532 additional houses would cause embedded emissions of 93kT CO_2e which is half Teignbridge's domestic emissions of 182kT CO_2e (for 2018). On this basis the previous formula's 760 houses would have emitted 46kT CO_2e. Also the formula seems to favour commuting because it uses the workplace based affordability index rather than the residentially based one. Alternatives need to be considered such as fewer newbuilds, repurposing and retrofitting existing buildings, all of which will result in lower emissions.

1.4 Summary criticisms of the formula

1. The adjustment is based on workplace affordability, which is based on median earnings for workplaces in the district.
2. The majority of projected housing growth is in older non-working households. Employment based affordability doesn't take account of pensioner incomes, which are now higher in the South West than employment incomes. Where the majority of households are not dependent on workplace income from Teignbridge, it is unlikely that an increase in housing numbers would improve affordability. It is more likely that the excess houses would be bought by people from outside the district, which would do nothing for those already working in Teignbridge.
3. Workplace affordability is used rather than residential affordability. Residential affordability is based on the median earnings of residents, which for Teignbridge was £1,600 higher in 2017 (the latest year available). This reflects the fact that many residents commute out of the district to work. Using workplace affordability increases building numbers in districts where commuting is likely. It is also likely that this will be by car. Road transport emissions account for about half of emissions produced in Teignbridge.
4. In the case of Teignbridge affordability ratios have been fairly stable since 2017, but the component of the adjustment factor which is based on the difference between current affordability and affordability 10 years ago causes year on year instability in the adjustment factor and so housing numbers. The intention of introducing this term is stated as responding to an increase in demand in a area of economic growth indicated by a recent increase in affordability ratio.

5. The housing target on which the formula is based is too high, other factors such as incomes and mortgage availability are more important in determining affordability.

Section 2. Worked example for Teignbridge

In this section I will work through the formula for an example year, and then summarise the results for calculations based between 2011 and 2020.

2.1 Input Variables

The formula is based on the following variables:

Variable	Value	Description
Current Housing Stock	59790	Housing stock at the end of 2020[i]
Projected household numbers 2030	67710	Projected household numbers 2030 for Teignbridge.[i]
2019 Affordability ratio	10.51	Ratio of median house price to median workplace earnings for 2019[ii]
2009 Affordability ratio	8.4	Ratio of median house price to median workplace earnings for 2009[iii]

2.2 Baseline

A baseline number is calculated as the greater of:

- 0.5% of the Housing Stock – for Teignbridge this is 0.5% of 59790 = 298.95
- 10% of the projected household growth – for Teignbridge projected housing numbers for 2030 are 67710, the growth is 67710 – 59790 = 7920. 10% of this is 792

10% of projected household growth is the larger, so the baseline is 792 to the nearest whole number.

2.3 Adjustment Factor

An adjustment is then calculated using the following formula:

$$Adjustment\ Factor = \left[\left(\left(\frac{Local\ affordability\ ratio_{t=0} - 4}{4}\right) x\ 0.25\right) + \left(\left(Local\ affordability\ ratio_{t=0} - Local\ affordability\ ratio_{t=-10}\right) \times 0.25\right)\right] + 1$$

Where $t = 0$ is current year and $t = -10$ is 10 years back.

It is probably easiest to express this as algrebraic variables:

A_t = Local affordability ratio at time t

Then factor = $((A_t - 4)/4)*0.25 + (A_t-A_{t-10})*0.25 + 1 = B_t + C_t + 1$

Where

$B_t = ((A_t-4)/4)*0.25$

$C_t=(A_t-A_{t-10})*0.25$

For 2019 $A_t = 10.51$ and $A_{t-10} = 8.4$

So

$B_{2019} = (10.51 - 4)/4)*0.25 = (6.51/4)*0.25 = 0.406875$

$C_{2019} = (10.51 – 8.4)*0.25 = 2.11 * 0.25 = 0.5275$

So the adjustment = 0.409375 + 0.32 + 1 = 1.934375

2.4 Housing numbers

Housing Numbers = Baseline * Adjustment

For a 2020 based calculation the result is 792 * 1.934375 = 1532 to the nearest whole number

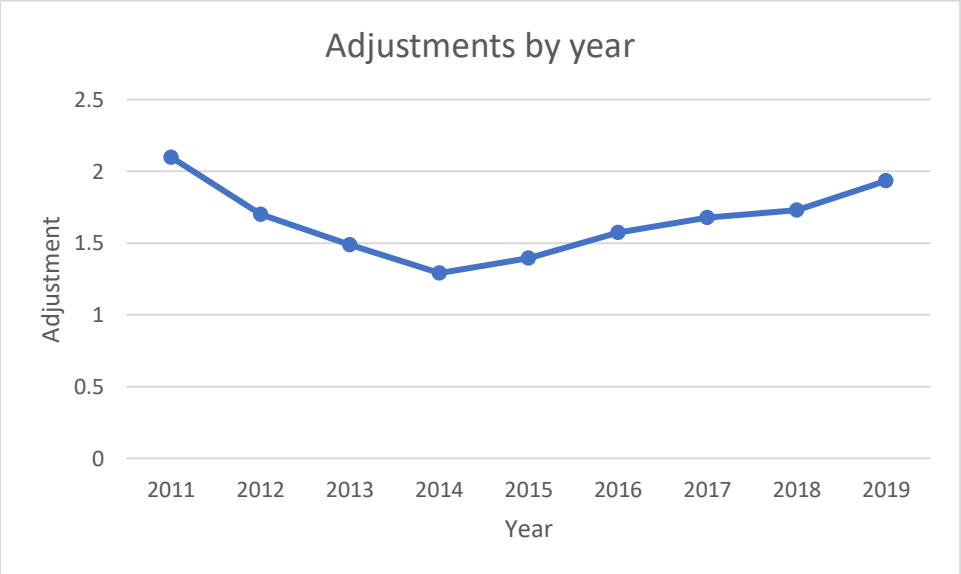
2.5 Other Years housing numbers

I have repeated the above calculation for 2011 to 2019

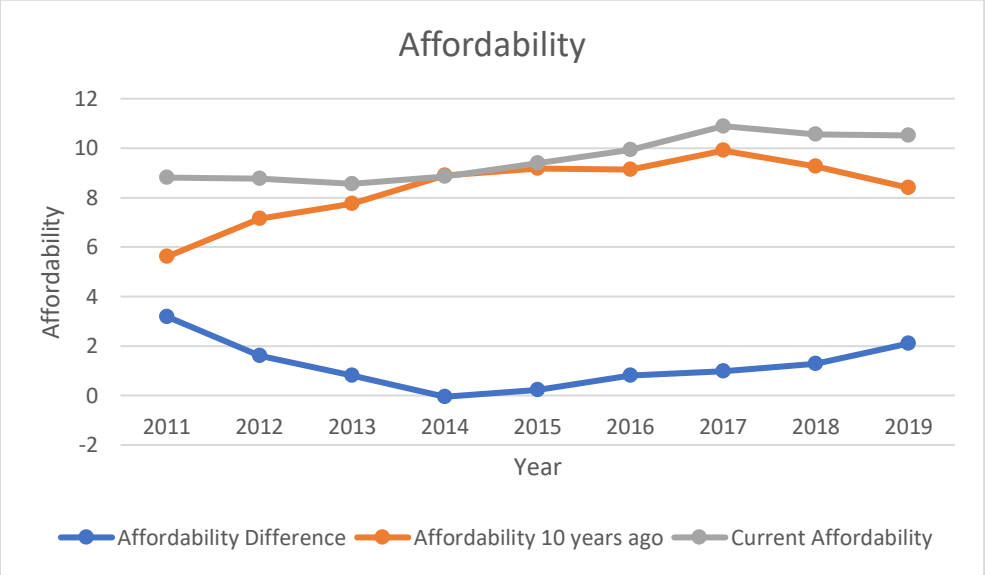
Year	Households	Workplace affordability	10 year projected households	Baseline	Workplace Afforability 10 years ago	Affordability Difference	Term B	Term C	Adjustmen	Housing Numbers	change in Households
2011	53,941	8.8	60,562	662	5.61	3.19	0.3	0.7975	2.0975	1389	431
2012	54,395	8.76	61,436	704	7.15	1.61	0.2975	0.4025	1.7	1197	454
2013	54,821	8.56	62,312	749	7.75	0.81	0.285	0.2025	1.4875	1114	426
2014	55,378	8.85	63,148	777	8.9	-0.05	0.303125	-0.0125	1.290625	1003	557
2015	55,982	9.4	63,938	796	9.17	0.23	0.3375	0.0575	1.395	1110	604
2016	56,510	9.94	64,718	821	9.14	0.8	0.37125	0.2	1.57125	1290	528
2017	57,348	10.89	65,501	815	9.9	0.99	0.430625	0.2475	1.678125	1368	838
2018	58,135	10.55	66,276	814	9.27	1.28	0.409375	0.32	1.729375	1408	787
2019	59,006	10.51	67,003	800	8.4	2.11	0.406875	0.5275	1.934375	1547	871
2020	59,790	10.51	67,710	792	8.4	2.11	0.406875	0.5275	1.934375	1532	784

Note that for 2020 affordability for the latest available year (2019) is used, so that adjustment is the same as for 2019.

This is probably easier to make some points in graph form



Above are the adjustments applied to each year, it is noticeable that the adjustments vary considerably between years.



Above we see that the affordability ratio has been falling slightly since 2017, but the adjustment has been increasing since then. This is caused by a drop in affordability toward 2009 during the financial crisis, followed in 2010 by a general election, after which the housing market stalled. If affordability were to remain stable for the coming years, the affordability difference would drop until it became negative in 2027.

This shows that even though affordability has been stable recently, its local fluctuations 10 years ago have an impact which is difficult to justify.

2.6 More stable adjustment formulae

Extreme events 10 years ago have an exaggerated effect on affordability. In this section we briefly consider some alternatives:

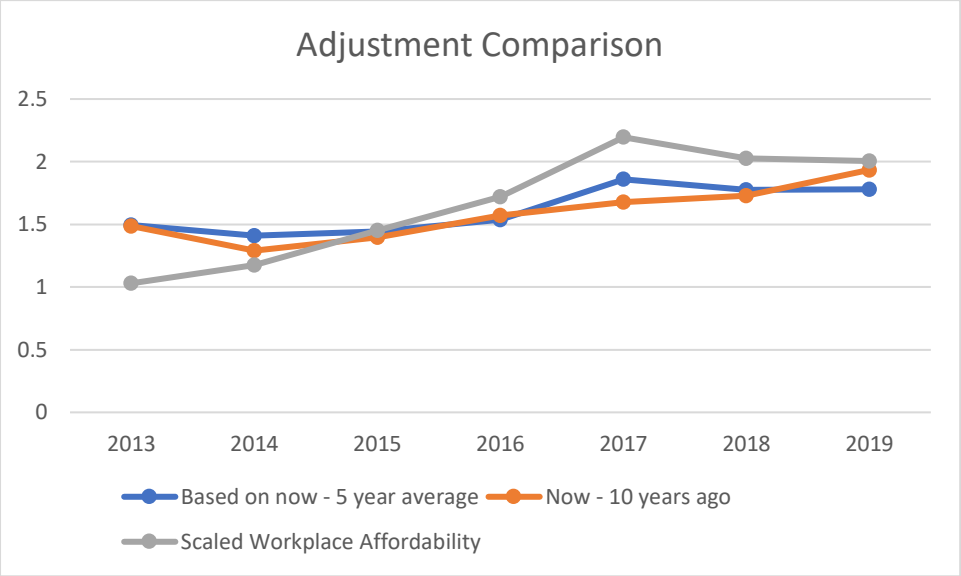
- Trend line for the last 5 years
- Current affordability compared with a 5 year average centred on 10 years ago.
- 10 year difference between district - england

2.6.1 Trend line for the last 5 years

This can easily be calculated in a spreadsheet using the SLOPE function. A factor then needs to be applied. Unfortunately in our example this appears to be less stable than using a simple 10 year difference.

2.6.2 Current affordability compared with a 5 year average around 10 years ago

Again this can easily be calculated in a spreadsheet using the AVERAGE function. This is better than the 10 year difference, in that the adjustment to some extent follows recent changes in affordability

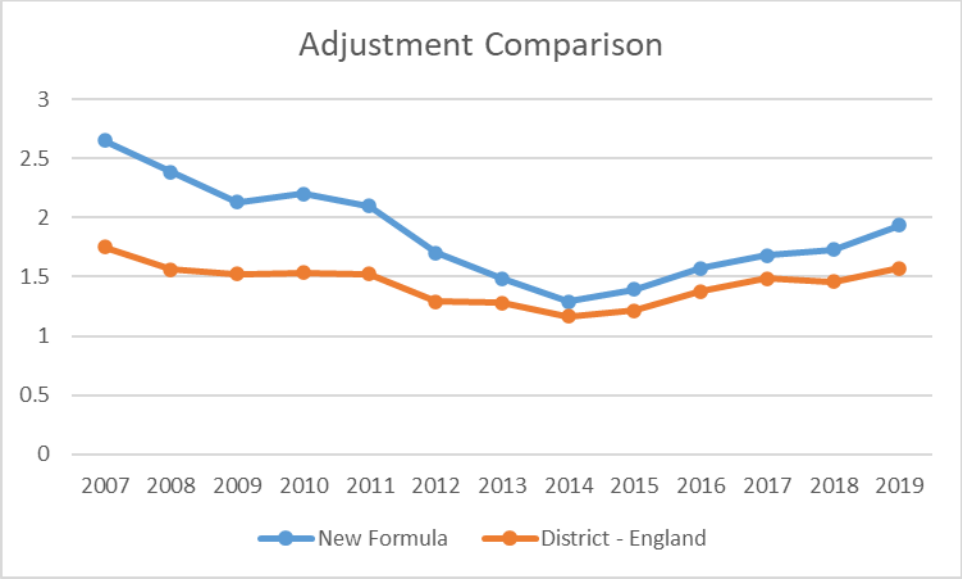


The adjustment for the new formula is shown in orange above, it can be seen that the adjustment term is increasing whilst district affordability (grey) is decreasing.

The blue graph shows an adjustment based on now – the average of 5 years around 10 years ago, this seems to follow district affordability a bit better.

2.6.3 10 year difference with England affordability deducted

In this method England affordability is deducted from District affordability before the 10 year difference is taken. This eliminates countrywide housing market fluctuations, so that only the district related component of affordability is considered.



Here the fluctuations in the adjustment are less pronounced than the new formula, so the effect is more stable.

Section 3. Taking account of the composition of households

In this section I look into the makeup of household growth and incomes in more detail.

3.1 The age composition of household growth

The latest edition of the ONS household projections is based on 2018, and contains projections by age group for each district for 2018 and 2043.

I have used projected housing numbers for 2018, 2028 and 2043 for all ages to interpolate projected numbers for each age group at 2028, this is presented in the following table:

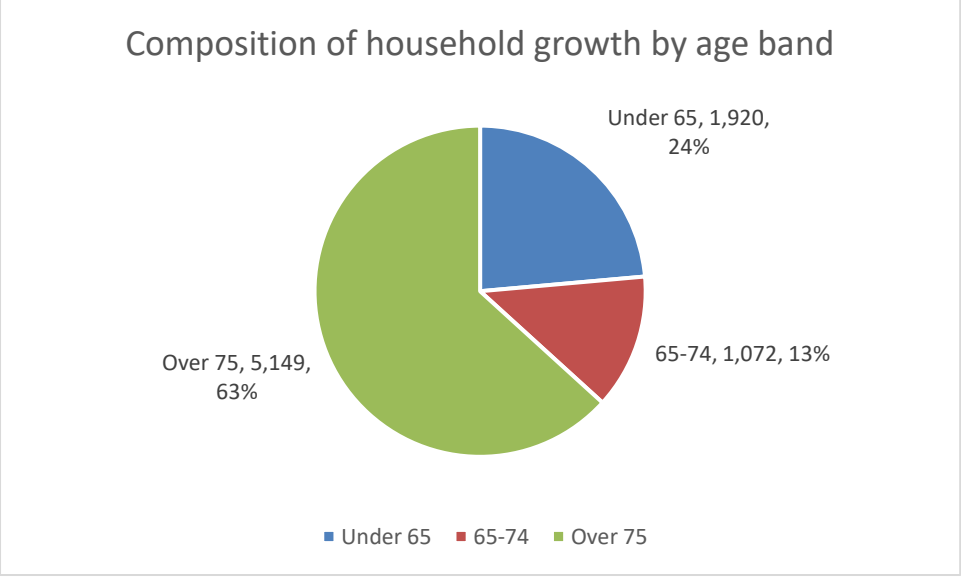
Age of principal householder	2018 Households	2043 Households	Growth 2018 - 2043	Growth 2018- 2028
Under 25	1,111	1,084	-27	-13
25-34	4,996	5,412	416	194
35-44	7,141	8,414	1,273	592
45-54	11,195	11,885	690	321
55-64	11,518	13,294	1,776	826
65-74	11,171	13,475	2,304	1072
75-84	7,575	15,094	7,519	3498
85 and over	3,428	6,978	3,550	1651

These days it is not clear at what age people cease working, there are plenty who retire early, and plenty who retire late. For simplicity I will assume retirement at 65.

Statistics are available for current pensioner income divided into 2 age groups with a dividing line at the 75th birthday. So we can classify households as follows:

Age band	2018 Households	2043 Households	Growth 2018 - 2043	Growth 2018- 2028
Under 65	35,961	40,089	4,128	1,920
65-74	11,171	13,475	2,304	1,072
Over 75	11,003	22,072	11,069	5,149

The 2028 split is also shown in the following pie chart:



3.2 Pensioner incomes

The pensioner income tables[iii] include a table of gross income by tax year from 1994/95 to 2018/2019

Table 2.7 gives gross incomes for pensioners under 75, and pensioners 75 & over. Table 2.7 only gives a national time series, it is worth noting that pensioner incomes in the South West are higher than the national average, so their affordability indices will be slightly lower.

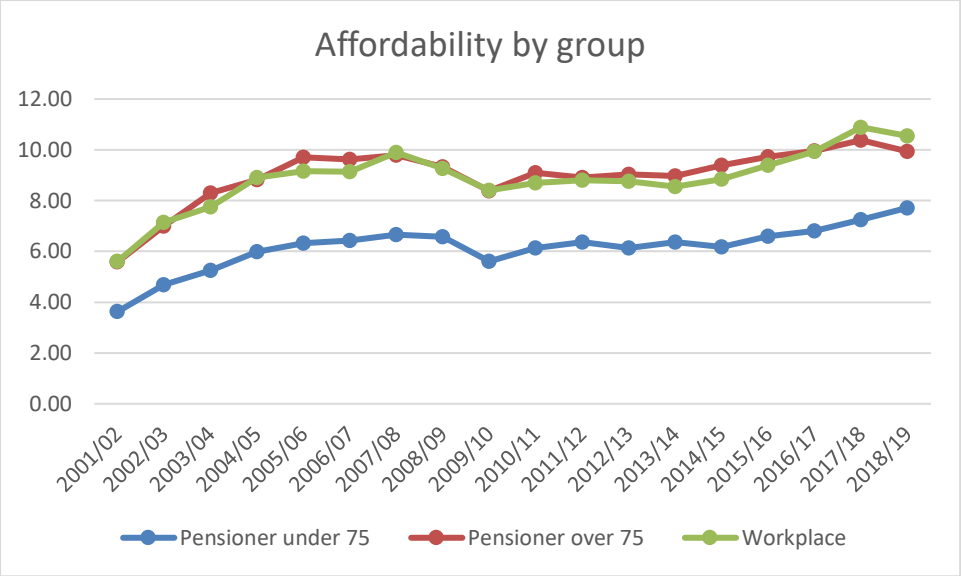
Table 2.4 shows 2018/2019 pensioner incomes by region:

	Weekly Income		Annual Income	
English Region	**Married**	**Single**	**Married**	**Single**
England	572	292	29744	15184
North East	537	287	27924	14924
North West	528	280	27456	14560
Yorkshire and the Humber	537	282	27924	14664
East Midlands	561	287	29172	14924
West Midlands	528	280	27456	14560
East of England	606	304	31512	15808
London	559	300	29068	15600
South East	665	306	34580	15912
South West	608	303	31616	15756

The following table shows Weekly gross incomes from table 2.7, together with median house prices, pensioner affordability and workplace affordability.

Financial Year	Under 75 weekly gross	75 & Over weekly gross	Median House Price	Affordability under 75	Affordability 75 and over	Workplace Affordability
2001/02	485	315	91500	3.63	5.59	5.61
2002/03	481	322	117000	4.68	6.99	7.15
2003/04	523	331	143000	5.26	8.31	7.75
2004/05	534	362	166000	5.98	8.82	8.9
2005/06	547	357	180000	6.33	9.70	9.17
2006/07	555	371	185725	6.44	9.63	9.14
2007/08	571	389	198000	6.67	9.79	9.9
2008/09	571	402	195000	6.57	9.33	9.27
2009/10	625	419	182500	5.62	8.38	8.4
2010/11	611	412	194950	6.14	9.10	8.7
2011/12	590	421	195000	6.36	8.91	8.8
2012/13	608	413	194000	6.14	9.03	8.76
2013/14	598	424	197995	6.37	8.98	8.56
2014/15	642	422	206000	6.17	9.39	8.85
2015/16	633	430	217300	6.60	9.72	9.4
2016/17	639	436	226000	6.80	9.97	9.94
2017/18	631	440	237500	7.24	10.38	10.89
2018/19	613	476	246000	7.72	9.94	10.55

Here affordabilities are shown in graph form:



Even before larger capital resources are taken into account houses in Teignbridge are more affordable to younger pensioners than those still working, affordability for older pensioners roughly matches workplace affordability. Older pensioner affordability has improved more than workplace recently, it is possible this trend will continue.

It could of course be argued that an income based ratio is the wrong approach for pensioners as they are likely to own a home that has been fully paid for. The statistics on pensioner incomes show housing costs.

Section 4. Workplace and Residential Affordability

4.1 Affordability

Affordability is the ratio of median house prices to median earnings.

There are 2 ways of measuring earnings that can be used to calculate affordability, which measure is used affects housing numbers differently in neighbouring districts. There possible denominators in the affordability calculation are:

- Workplace fulltime earnings
- Residential fulltime earnings

4.2 Workplace Earnings

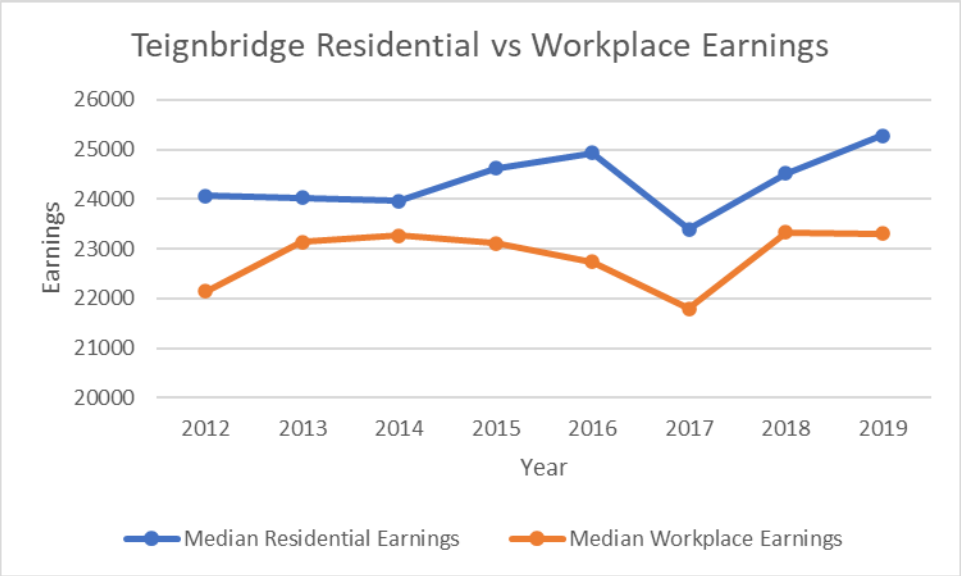
Workplace earnings are the median fulltime earnings of those employed in a district.

4.3 Residential Earnings

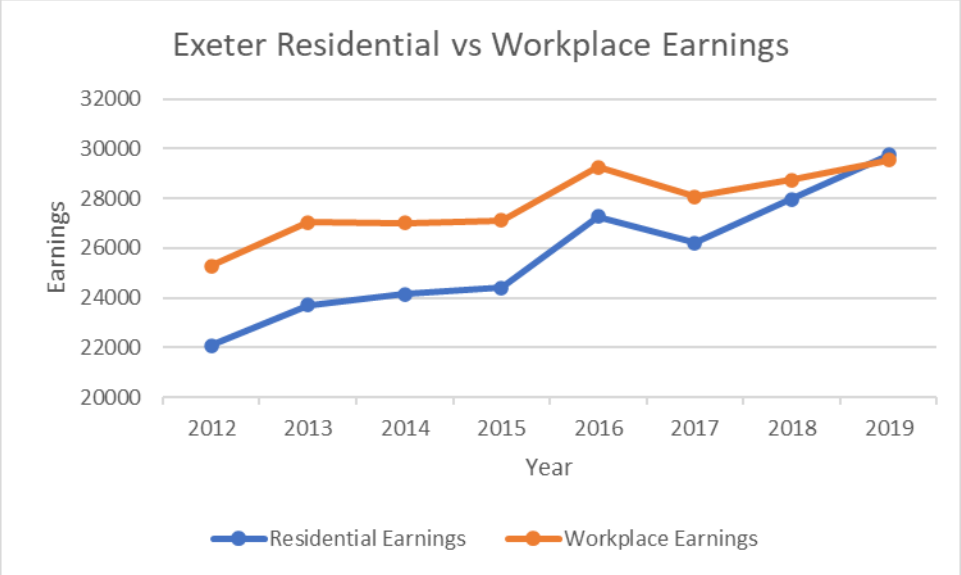
Residential earnings are the median fulltime earnings of those resident in a district.

4.4 Comparison between workplace and residential earnings

In a district where many residents commute to a neighbouring district with higher median workplace earnings, residential earnings will be higher than workplace earnings.



For Teignbridge it can be seen that residential earnings are consistently higher than workplace earnings.



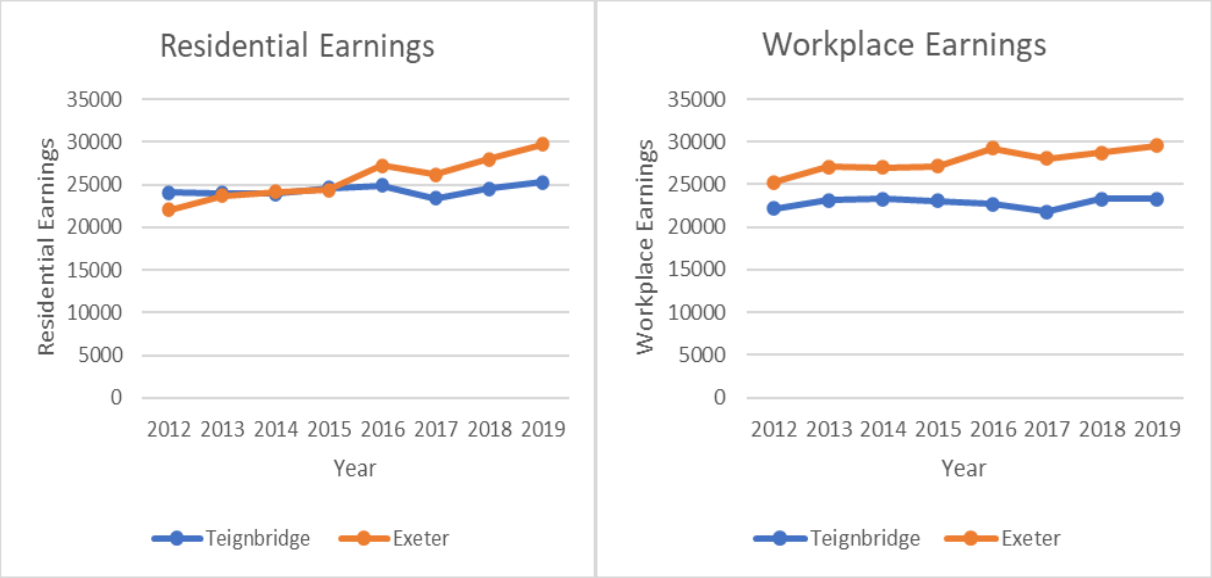
In Exeter the opposite pattern can be seen.

4.5 Teignbridge and Exeter

Many Teignbridge residents are employed in Exeter, the following graphs and table show workplace and residential earnings for both of these:

	Median Residence Earnings		Median Workplace Earning		Residence - Workplace	
Year	**Teignbridge**	**Exeter**	**Teignbridge**	**Exeter**	**Teignbridge**	**Exeter**
2012	24063	22089	22149	25291	1914	-3202
2013	24028	23714	23134	27037	894	-3323
2014	23964	24151	23265	27010	699	-2859
2015	24617	24404	23113	27105	1504	-2701
2016	24931	27275	22735	29262	2196	-1987
2017	23401	26210	21801	28065	1600	-1855
2018	24516	27975	23325	28745	1191	-770
2019	25278	29749	23307	29534	1971	215
				Average	1436.4286	-1897.1429

The difference between residential and workplace earnings for both areas is striking, and is indicative of commuting from Teignbridge to Exeter.



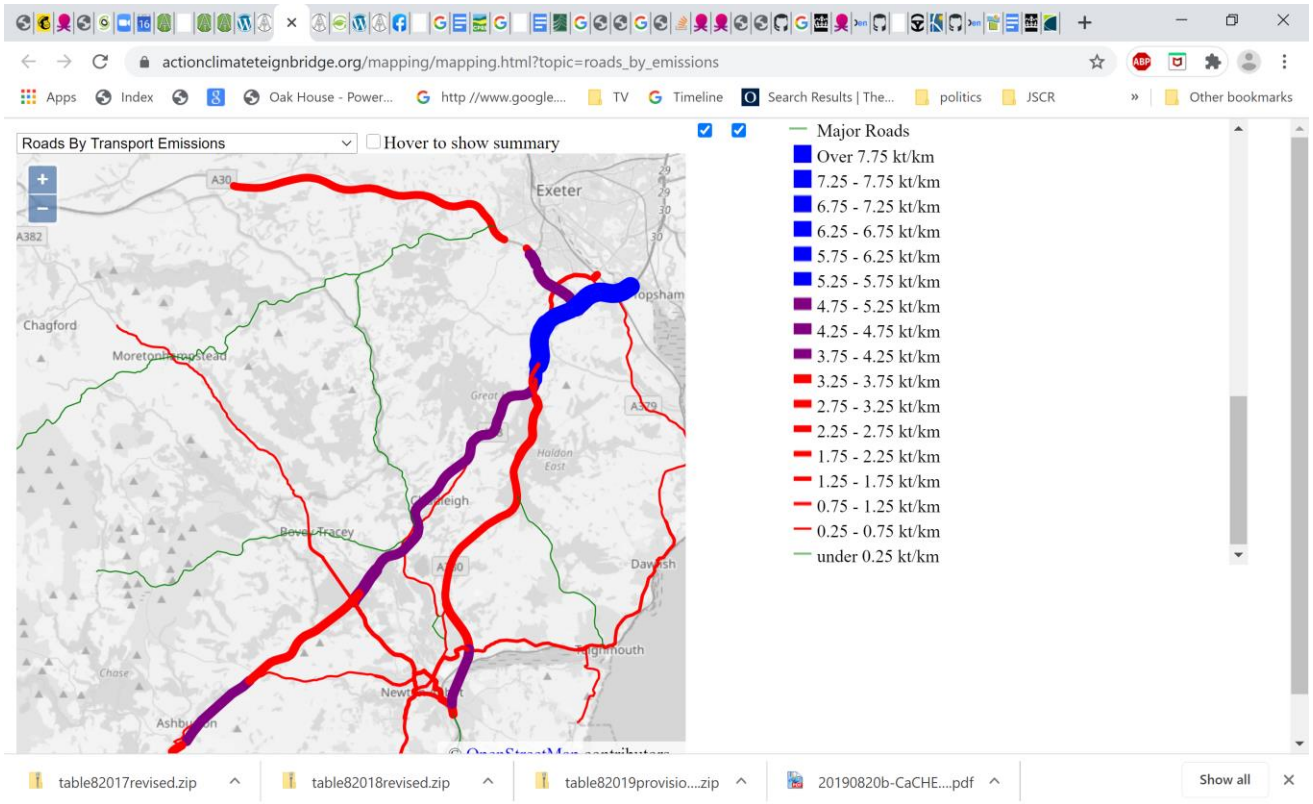
Recently earnings in Exeter have grown significantly, whereas in Teignbridge there has been relatively little change, this can be seen from workplace earnings.

If residential earnings are used the ratio will be lower for Teignbridge and higher for Exeter, so housing numbers will be lower in Teignbridge and higher in Exeter, which will mean less commuting.

4.6 Residence, Commuting and Road transport emissions

In 2018 road transport emissions for Teignbridge were 402 $ktCO_2e$ of which 329.8 $ktCO_2e$ were on A roads and motorways. These roads account for 45% of emissions produced in Teignbridge.

The following map shows these emissions allocated according to traffic flows to the road network in Teignbridge.



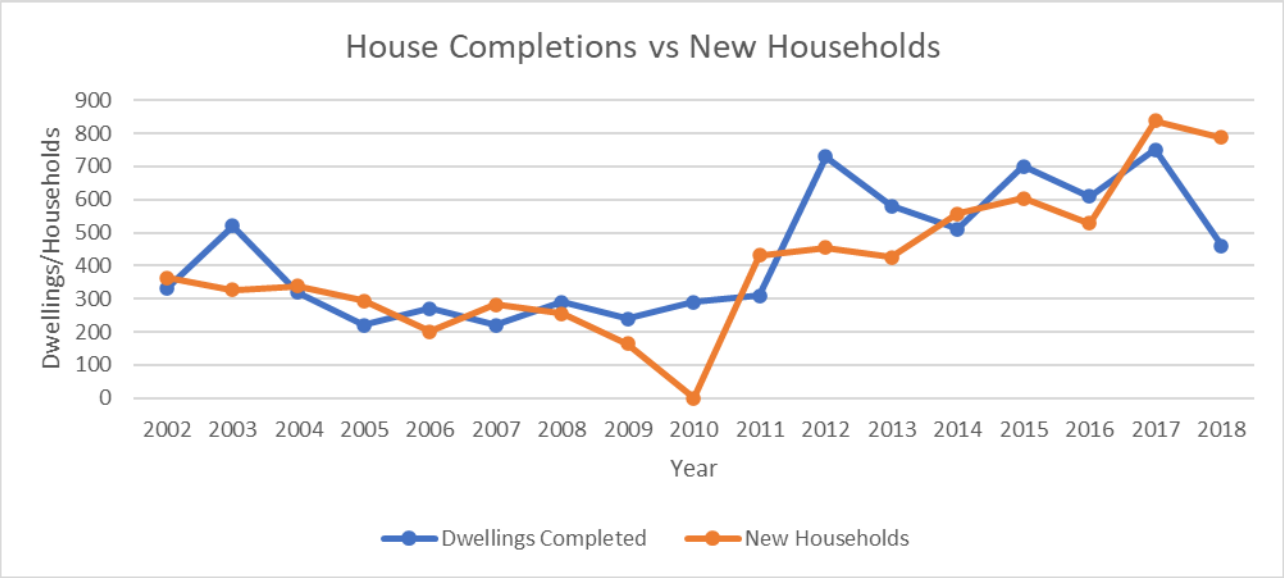
Using residence based affordability ratios will favour building in districts with higher workplace earnings and will therefore reduce commuting. I think therefore that residence based rather than workplace based earnings should be the denominator used.

Section 5. Teignbridge household increase vs house completions

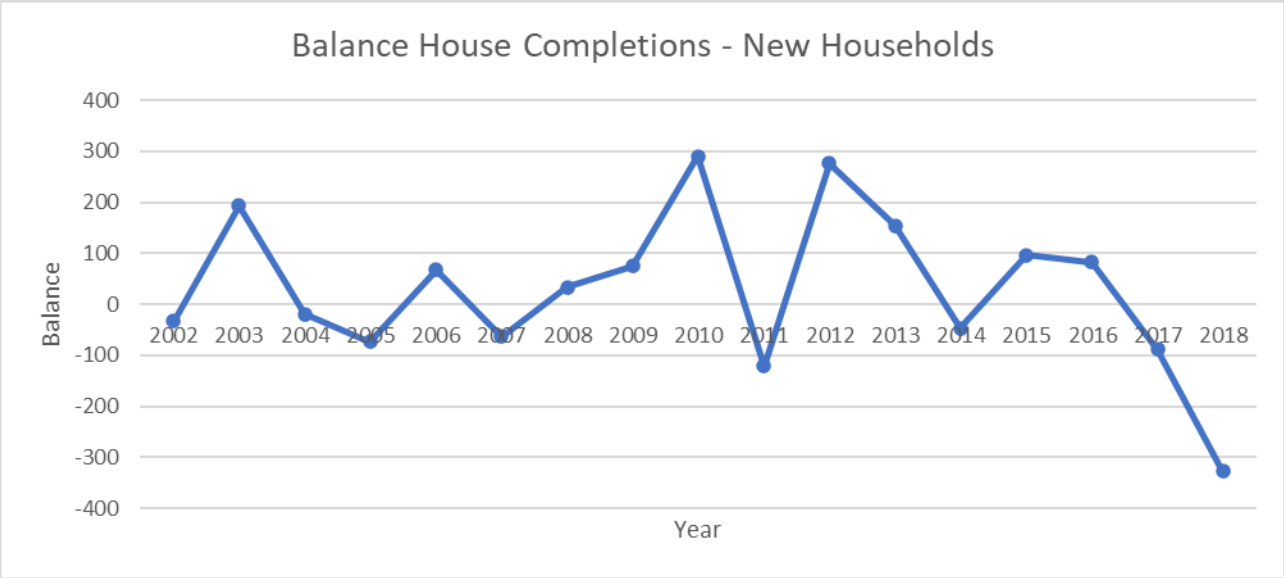
In this section I compare the increase in the number of households with the number of house completions in Teignbridge.

House Completions for the district are derived from table 253 of the live tables from MHCLG house building statistics[iv]. These are compiled from returns[v] completed by Local Authorities and do not include:

- Dwellings created through conversion of existing dwellings
- Change of use of commercial buildings to dwellings
- Communal accommodation such as student halls and care homes



497 fewer households were formed over the period than houses completed, this isn't that clear from the graph above, the balance New Households – Dwellings Completed shows this more clearly:



Here is the table behind this:

Year	Dwellings Completed	Change in Households	Difference
2002	330	363	-33
2003	520	327	193
2004	320	339	-19
2005	220	293	-73
2006	270	202	68
2007	220	283	-63
2008	290	256	34
2009	240	165	75
2010	290	0	290
2011	310	431	-121
2012	730	454	276
2013	580	426	154
2014	510	557	-47
2015	700	604	96
2016	610	528	82
2017	750	838	-88
2018	460	787	-327
			497

Some discrepancies year to year are to be expected because new builds may not be sold until the following year. This isn't evidence of a need to more than double the rate of building in the district.

Section 6. Teignbridge in the English context

6.1 ONS Projections of housing numbers

The following table shows ONS projections of numbers of households for England, together with a 10 year forward difference and resultant annual baseline.

		10 year forward growth	
Year	Households	10 years	Annualised
2018	23,204,246	1,640,162	164016
2019	23,385,139	1,612,613	161261
2020	23,542,797	1,604,434	160443
2021	23,688,898	1,610,484	161048
2022	23,868,499	1,582,859	158286
2023	24,040,824	1,560,417	156042
2024	24,209,028	1,537,289	153729
2025	24,367,032	1,521,583	152158
2026	24,524,692	1,509,032	150903
2027	24,685,867	1,489,497	148950
2028	24,844,408	1,468,625	146863
2029	24,997,752	1,446,501	144650
2030	25,147,231	1,425,561	142556
2031	25,299,382	1,405,795	140580
2032	25,451,358	1,382,535	138254

The projected number of households is substantially lower than the government target of 300,000 houses per year, and brings into question why 300,000 houses per year are needed. To examine this

compare historically with MHCLG house building statistics[vi] . The following table compares new household formations in England with new House Completions:

Year	New Households	House Completions	Completions - Households
2002	102,274	**136,800**	34,526
2003	97,707	**144,060**	46,353
2004	101,012	**154,070**	53,058
2005	173,728	**159,450**	(14,278)
2006	145,933	**160,850**	14,917
2007	151,725	**176,650**	24,925
2008	176,550	**148,010**	(28,540)
2009	161,968	**124,970**	(36,998)
2010	180,718	**106,720**	(73,998)
2011	233,642	**114,020**	(119,622)
2012	154,265	**115,590**	(38,675)
2013	160,640	**109,440**	(51,200)
2014	196,630	**117,810**	(78,820)
2015	193,424	**142,470**	(50,954)
2016	203,002	**141,870**	(61,132)
2017	163,018	**162,530**	(488)
2018	157,048	**164,390**	7,342
2019	180,893	**178,800**	(2,093)
			(375,677)

This shows that for England 375,677 more households were formed than houses completed. This is the reverse of the situation in Teignbridge.

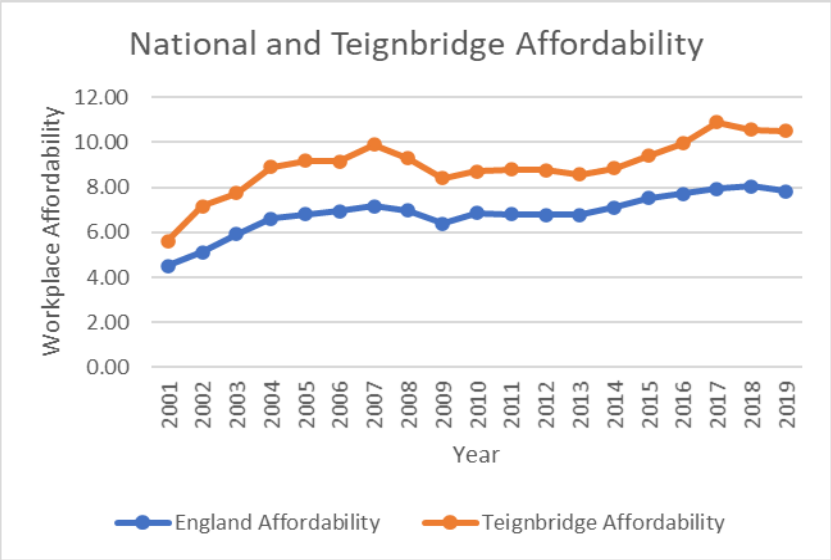
Remember that the new completions figure excludes several sources of additional dwellings:

- Change of use to residential
- Conversion of large dwellings into a number of smaller ones

6.2 England Affordability

The following table and graph shows England Affordability against Teignbridge Affordability:

Name	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
England	4.5	5.12	5.92	6.6	6.79	6.95	7.15	6.96	6.39	6.85	6.8	6.77	6.76	7.09	7.52	7.72	7.92	8.04	7.83
Teignbridge	5.61	7.15	7.75	8.90	9.17	9.14	9.90	*9.27*	8.40	8.70	8.80	8.76	8.56	8.85	9.40	9.94	10.89	10.55	10.51



The above shows that Teignbridge affordability is consistently higher than national, and that it is also more volatile. The difference between these was used in a variant of the adjustment formula discussed in 2.6.3

6.3 How many more houses are needed

ONS project that between 2020 and 2030 1.6 million households will be formed in England, nowhere near 3 million.

"The Government has based the proposed new approach on a number of principles for reform. These include ensuring that the new standard method delivers a number nationally that is consistent with the commitment to plan for the delivery of 300,000 new homes a year, a focus on achieving a more appropriate distribution of homes, and on targeting more homes into areas where they are least affordable."

"So the new standard method for calculating housing numbers takes into account existing housing stock, as well as projected household growth. It also puts more emphasis on affordability by taking into account changes over time, and it inflates the final number by removing the 40% cap that currently applies."

The intention behind the government's target of building 300,000 houses per year and the formula based on affordability is to ensure that affordability improves, probably by reducing house prices.

If 300,000 houses per year were built rather than the current (roughly) 180,000 this is an increase of 120,000. Assuming 60t embedded emissions per house, then the extra building accounts for 7.2Mt CO_2e of emissions.

The main perceived problem is the age at which people are able to buy their own home is getting older, this is blamed on the lack of affordable housing, but there are other causes that could be tackled with less environmental destruction:

- Privatisation of council housing
- Relaxation of restrictions on buy to let mortgages
- Low median incomes
- The lack of income progression recently in early careers.
- Difficulty of accessing mortgage finance.
- Competition with buy-to-let landlords.
- Speculative purchase of housing as an investment asset, particularly by foreign buyers.

UK Collaborative Centre for Housing Evidence provides an alternative view of the causes and solutions to the housing crisis:

https://blogs.lse.ac.uk/politicsandpolicy/tackling-the-uk-housing-crisis/

https://housingevidence.ac.uk/wp-content/uploads/2019/08/20190820b-CaCHE-Housing-Supply-FINAL.pdf

Housing evidence has calculated that there were 1.12million surplus houses by March 2018, and that taking this into account net additions to housing stock exceed household formations.

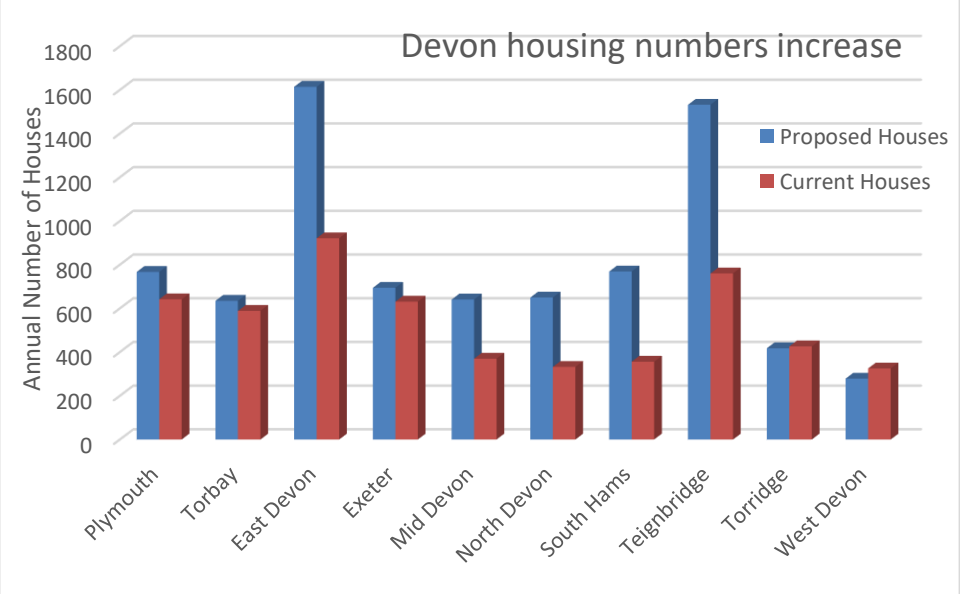
Section 7. Effect on Devon and Cornwall

7.1 Housing numbers for Devon and Cornwall

Teignbridge is not uniquely affected, there is a general trend towards more houses in rural areas than urban throughout the area. This is shown in the following table produced by Cllr. Gary Taylor:

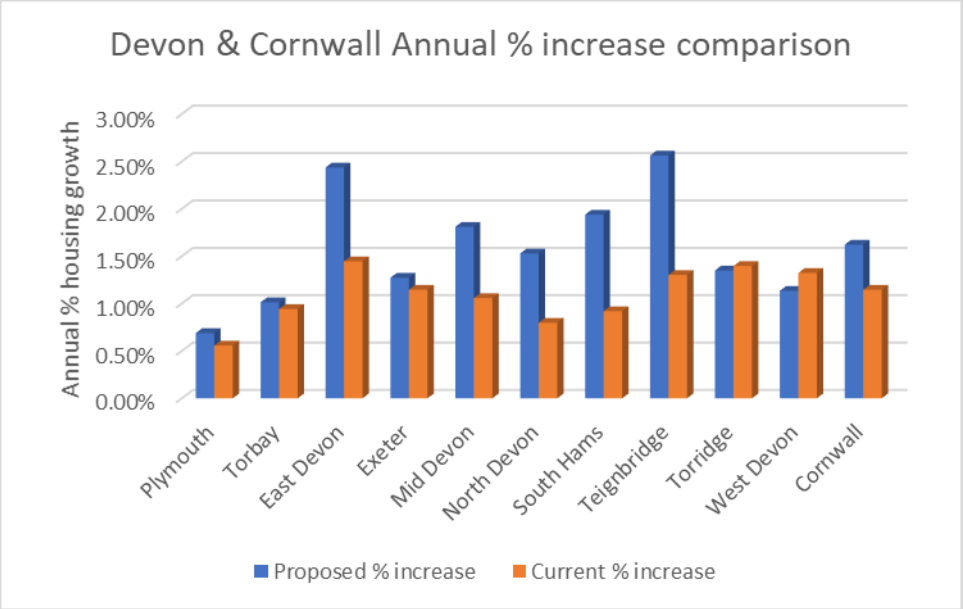
	Proposed method (using 2018 10-year data)	Standard Method, hybrid (using 2018 10-year data)	Current Standard Method (using 2014 data per NPPF)	Current vs Proposed Amt	Current vs Proposed %
Plymouth	767	436	642	126	19.56
Torbay	635	647	589	46	7.81
East Devon	1614	1293	921	693	75.27
Exeter	694	525	631	63	10.03
Mid Devon	641	470	370	271	73.17
North Devon	650	522	332	318	95.61
South Hams	769	498	356	413	115.93
Teignbridge	1532	998	760	772	101.55
Torridge	417	386	426	-9	-2.04
West Devon	278	279	325	-47	-14.35
Devon	7998	6055	5352	2646	49.44
Cornwall	4054	3240	2841	1214	42.72

Looking at the % increases above it would appear that South Hams has the biggest increase, but absolute numbers show something different:



This shows that the big increases in absolute numbers are to Teignbridge and then East Devon. (Cornwall is excluded from this chart as its numbers are significantly larger).

Another view, which compensates for current housing numbers is the increase expressed as a percentage of current housing numbers:



This shows again that the biggest changes occur in Teignbridge and East Devon. Cornwall is included in this view.

Section 8. National Comparison

The following table shows the result of applying various formulae to all England districts. Note that the sum of household differences by adding districts is a bit less than the pubished England total, so it is assumed that some districts are missing.

Method	Household Growth	Numbers from formula
2014 Projection applied to 2019 - 2029 Old Formula	2105549	289657
2018 Projection applied to 2020 - 2030 Old Formula	1561988	208791
2018 Projection applied to 2020 - 2030 New Formula	1561988	326092

[i] Housing projection is published by ONS https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/householdprojectionsforengland/2018based , and the data behind this is in a spreadsheet https://www.ons.gov.uk/file?uri=%2fpeoplepopulationandcommunity%2fpopulationandmigration%2fpopulationprojections%2fdatasets%2fhouseholdprojectionsforengland%2f2018basedprincipalprojection/2018basedhhpsprincipalprojection.xlsx Housing projections by district are available from table 406 of this spreadsheet. Table 420 gives household numbers in 2018 and 2043 broken down by age bands for each district.

[ii] Workplace affordability, median gross earnings and median house prices by year are available from ONS in a spreadsheet, which can be downloaded from here https://www.ons.gov.uk/peoplepopulationandcommunity/housing/datasets/ratioofhousepricetoworkplacebasedearningslowerquartileandmedian

[iii] Pension income tables are published by ONS https://www.gov.uk/government/statistics/pensioners-incomes-series-financial-year-2018-to-2019

[iv] MHCLG housing statistics https://www.gov.uk/government/collections/house-building-statistics

[v] Local authority build completion returns guidance https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/816739/P2_Guidance_-_Apr-Jun_2019.pdf

[vi] MHCLG housing statistics https://www.gov.uk/government/collections/house-building-statistics