Falkirk Council Structure Plan

Consultative Draft Alteration

Technical Report 1 - Population and Household Projections

Falkirk Council

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FALKIRK COUNCIL STRUCTURE PLAN FIRST ALTERATION

TECHNICAL REPORT ONE

POPULATION AND HOUSEHOLD PROJECTIONS

1.0 Introduction

1.1 This paper sets out the background to the population and household projections which have been carried out for the first alteration to the Falkirk Council Structure Plan. It includes a description of the methodology, the results and the data sets used.

1.2 The methodology, assumptions and calculations are given in some detail. This Technical Report is likely to be of interest to a limited professional audience (although it is of course available to anyone with an interest in the topic), who may wish to check or question the methodology, assumptions and calculations. It is hoped that there is sufficient detail in this report to allow them to do so. The author and the Structure Plan Team would be happy to answer any queries on the report and to provide more details of the results of the projections which are only summarised here.

1.3 The report falls into three sections. The first sets out some brief background information and this is followed by two long sections which discuss the methodology, data requirements, assumptions and results for the population and the household projections. Reference is made to the changes which have been made to the projections since the ones carried out for the first Structure Plan, in particular the data updates which have been possible following the release of the 2001 Census results. Further details on the previous projections can be found in Falkirk Council Structure Plan Report of Survey Technical Appendices, "Population, Economically Active Population and Household Projections", February 2001.

1.4 The assistance of several organisations which provided the software and some of the data used in these projections is acknowledged in Appendix 1.

2.0 Background

2.1 The first Structure Plan for the Falkirk Council area was approved by Scottish Ministers in June 2002. It had always been the intention to review the population and household projections for the Structure Plan once the results of the 2001 Census became available. The results have now largely been published, and updated population estimates are available. 2002 based population projections were published by the General Register Office for Scotland (GROS) in January 2004. 2002 based household projections were produced by the Scottish Executive in April 2004.

2.2 These projections provide a useful comparison with those described in this report. In fact they are fairly similar to the Council's own projections. However, carrying out our own projections gives the Council flexibility to consider alternative scenarios and assumptions.

2.3 Following investigation prior to the production of the projections for the first Structure Plan, two Microsoft Excel spreadsheet packages were purchased from Norfolk County Council. These were amended to meet local needs and have been used again in the production of the projections described below.

3.0 Population Projections

3.1 Methodology

3.1.1 The population projections were carried out on a revised version of Norfolk County Council's NORPOP population projection package. This package consists of a suite of spreadsheets which allow base population and migration data to be input both for a single area model and for multiple "small" areas, macros to run the model and spreadsheets to take the results output from the projection model.

3.1.2 It uses a single year age/gender cohort survival model. This is a standard population projection method. It involves:

(a) taking the population of an area at a base date, split by single year of age and gender;
(b) ageing it forward on a year by year basis;
(c) adding new births as 0 year olds, calculated by applying age specific fertility rates to the female population aged 15-46;
(d) subtracting the number of deaths by single year of age and gender, calculated by applying single year age/gender specific death rates to the population;
(e) adding/subtracting age/gender specific numbers of migrants to/from the area.

3.1.3 The spreadsheets were renamed to refer to the base date for the projections of 2001, the base date for the first alteration to the Structure Plan, and to allow for customisation for Falkirk.

3.2 Data requirements and assumptions

3.2.1 The basic information required for the population projections was as follows:

(a) a base population - 2001 mid year estimates of population by single year of age/gender 0-90+;
(b) 2001 estimates of the student population in residential accommodation and the institutional population by single year of age/gender 0-90+;
(c) national fertility rates for women aged 15-46 for each year 2001/02 to 2019/2020;
(d) national mortality rates by single year of age/gender for each year 2001/02 to 2019/2020;
(e) local adjustment factors for the fertility and mortality rates; and
(f) migration age/gender structures for in-migrants from the rest of Great Britain, out-migrants to the rest of Great Britain and net migrants from outside Great Britain.

3.2.2 Base population estimates: The 2001 mid year estimates of population used were those produced by the General Register Office for Scotland in 2002. These were the first population estimates produced incorporating the results of the 2001 Census. Falkirk Council is satisfied that they are the best figures available as well as the most accurate.

3.2.3 During the 1990's, the Council monitored the population estimates that were produced by GROS. These were generally thought to be accurate. The results of the 2001 Census and the subsequent population estimates were consistent with past patterns and expectations.

3.2.4 These figures update the base from 1997 in the previous projections.

3.2.5 Institutional population: The second two sets of data required for the projections are 2001 estimates of students in residential accommodation and institutional population by single year of age/gender 0-90+. The student element is not relevant to Falkirk as we have no residential student population. However, Norfolk County Council, who developed the projections package, do have such populations which is why this element is included. Rather than make too many alterations to the spreadsheets, the

student population was set to zero, which is what Norfolk do in their District projections where there is no student population, and as was done in the projections for the first Structure Plan.

3.2.6 For the projections for the first Structure Plan, estimates were made of the institutional population by updating the 1991 Census for known changes such as closures and new homes opening. This enabled a five year age/gender institutional population to be estimated and single year age estimates were made by dividing the five year figures by five and smoothing the data.

3.2.7 The 2001 Census provides single year of age and gender figures for the institutional population for Falkirk Council area and these figures have been used in these projections. Since these are "real" figures, the age structure of the institutional population is less smooth than in the previous projections. There are also some differences which should be noted.

3.2.8 The total institutional population in the 2001 Census was 1,734 compared to 2,363 in the projections for the first Structure Plan. However, further monitoring between 1997 and 2001 produced an institutional population estimate of 2,137 in 1999 showing a declining number of people living in institutions consistent with the Census figure.

3.2.9 The institutional population in the Council area has changed character significantly in recent years. In particular the closure of the two large institutions of Royal Scottish National and Bellsdyke Hospitals and the opening of smaller homes for the elderly has taken place. The number of young offenders in Polmont has increased. Thus the age structure has also changed.

3.2.10 There are also some changes due to the slightly different definition of institutional population which was used in the 2001 Census[1] which have resulted in particular in an increase in the numbers counted in Polmont.

3.2.11 The projection methodology excludes the institutional population from being aged through in the cohort survival model. It is assumed to remain constant throughout the projection period. This is obviously somewhat unrealistic as para 3.2.8 shows. It is, however, the assumption which is made by GROS and the Scottish Executive in their population and household projections. It is almost impossible to predict with any accuracy what the future numbers of people in institutions will be which is why a constant figure is used.

3.2.12 Institutional population is only 1.2% of the total population and the changes monitored over the past 20 years have been relatively small, so it is thought that keeping the institutional population constant is a reasonable assumption.

3.2.13 Fertility: The General Register Office for Scotland kindly provided Scottish fertility rates per 1,000 females by single year of age for women aged 15 to 46 for each year from 2001/02 to 2019/2020 calculated by the Government Actuary's Department (GAD). These were calculated for the interim 2001 based national projections.

3.2.14 The spreadsheet package requires the fertility rates to be per person. This was easily calculated by dividing the GAD figures by 1,000. The appropriate rates for each year were input to the correct spreadsheet for calculating the projected population for each year.

3.2.15 Recent trends have shown steadily declining fertility in Scotland, which is mirrored in Falkirk. Fertility in Scotland is well below the rest of the UK although still above the

[1] The 1991 Census required people to *have been* resident in an institution for the six months prior to the Census date for them to be counted as usually resident there. The 2001 Census changed this to those who had been resident for the previous six months but also included those who, it was anticipated, would be resident in total for over six months. Thus elderly people who had only just moved into a home would be counted in the 2001 Census if they were expected to be long term residents. Also, young offenders sentenced to six months or more would also be counted, while previously they would only have been included if they had already served six months.

level in several other European countries. This low level of fertility is expected to continue although the projections show a small increase in the total fertility rate from 1.47 in 2001/02 to 1.60 in the long term.

3.2.16 Births are now below replacement level. This means that there will be a decrease in the population as a result of there being more deaths than births. The population will only increase if this is balanced by net in-migration. The lower fertility rates produce lower projected numbers of births compared with the ones for the first Structure Plan.

3.2.17 A further calculation of the ratio of male to female births was required. This was done by taking the total number of male and female births in the calendar years 1992 to 2002 from the Annual Reports of the Registrar General for Scotland for Falkirk, and calculating the average ratio between them. This gave 0.510009 male births to 0.489991 female ones. This is a marginally different ratio to that used in the previous projections. This follows the international pattern of more male births than female.

3.2.18 Mortality: Similarly, GROS provided single year age/gender mortality rates per 100,000 people for Scotland for 2001/02 to 2019/20 from the Government Actuary. These only had to be put into the correct format for the projections – i.e. rates per person in each case. The appropriate rates for each year were input to the correct spreadsheet for calculating the projected population for each year.

3.2.19 The mortality projections continue to show a small improvement in mortality rates over the projection period, although this varies with different age groups.

3.2.20 Local adjustment factors: In addition to the national fertility and mortality rates, local adjustment factors were used to take account of the fact that Falkirk's rates do not exactly match the national ones. GROS provided local variation factors which they calculated specially for the Council. These local scaling factors are calculated by taking account of the local variations observed in the three year period proceeding the projections base date.

3.2.21 This gave a local scaling factor for fertility of 1.022 – i.e. fertility rates in Falkirk are about 102% of the Scottish rates. The local scaling factor for male mortality was given as 0.993 and for female mortality, 1.010. The figure for females is above the Scottish average which it has been for some time and is a cause of some concern for those interested in social inequalities. The male figure is however, below the Scottish figure. These scaling factors have been applied across all age groups. This is a possible source of error in the projections as it is unlikely that the local variations are constant across all age groups. Considerably more work would be required to calculate variable factors for different age groups. The GROS projections also use a constant factor, so this has not been done.

3.2.22 The scaling factors which GROS have used in their 2002 based projections are somewhat different. However, comparison with previous projections shows that these factors change considerably between projections.

3.2.23 The difference between the GROS factors and those used in the projections in this report, is no greater than the difference between the factors in the GROS 2000 and 2002 based projections, or the projections in this report and the ones for the first Structure Plan. The difference between the GROS local factors and the ones described in para 3.2.21 account for some of the differences in the results of the projections.

3.2.24 Migration: As is usual in population projections, migration was the most difficult element to measure and project. The projection spreadsheet required a single year age structure for males and females separately for three different types of migrants – in-migrants from the rest of Great Britain, out-migrants to the rest of Great Britain and net migrants to/from outside Great Britain.

3.2.25 GROS fortuitously provided an early release of migration data from the 2001 Census at a local authority level just as work commenced on these projections. This provided gross counts of migrants[2] by five year age group age and gender up to age 80+ between each of the local authorities in Scotland, to and from each local authority and the rest of the UK and in-migrants from outside the UK.

3.2.26 These numbers were used to calculate the proportion of total migrants in each of the three flows (i.e. in-migrants from the rest of GB, out-migrants to the rest of GB and in-migrants from outside GB) who were in each age/sex group. To get single year proportions, the five year figures were simply divided by five, except for the age group 80+. For this age group the migrant proportions for those aged 80+ were pro rated by the age structure in the 2001 mid year estimates for these ages by gender.

3.2.27 It was assumed that the age/sex structure of the net migrants to/from outside Great Britain was the same as the age/sex structure of the gross flow into the Council area from outside Britain as there is obviously no information available about those moving out of the country.

3.2.28 There is also a danger in using information from one year's worth of data, the year prior to the 2001 Census, as it may not be typical. However, no other information is available.

3.2.29 Exactly the same method was used in the previous projections, but using information from the 1991 Census. A comparison was made of the 1991 Census and 2001 Census migration age structures. While there were obviously some differences, these were generally not large.

3.2.30 For the projections, the age/gender structure of the three migration flows were applied to the total number of projected migrants in each flow for each year. Varying these figures would alter the projections.

3.2.31 For the purposes of these projections, it was assumed that net migration to/from outside Great Britain was zero, as was the assumption in the previous projections. The gross flow into the Council area in the year prior to the 2001 Census was only 236 which is very similar to the 1991 Census figure of 282. It is expected that the gross outflow would be of the same order, giving a zero net figure. With no information on which to base any other assumption, a zero net figure was used.

3.2.32 The 2001 Census figure for total in-migrants from the rest of the UK in the year prior to the Census was 3,437, some 32% higher than the figure of 2,648 net in-migrants in the year before the 1991 Census[3]. The out-migration figure was 2,863, again higher than in 1991 when it was 2,403. These higher figures are not particularly surprising as it is generally believed that the population is more mobile now than in the past. Also, the higher levels of house building which have been achieved in recent years in the Falkirk area are likely to have attracted more incomers.

3.2.33 The gross figures give an estimate of net in-migration from the rest of the UK of 574 in the year before the 2001 Census. This compares with the GROS estimate of net in-migration of 620 in the year 2000/01, a very similar figure.

3.2.32 However, the 2001 Census figures have been used solely to provide an estimate of the gross migration flows and the age structure of the migrants. No account was taken of the net figure obtained by looking at the difference between the two gross

[2] A migrant in the Census is anyone who lived at a different address one year prior to Census day including children under one year old where their parent(s) had a different address one year before. However, it only counts those who moved more than once during the year as one migration move.

[3] The 1991 migration figures actually relate to Great Britain while the 2001 figures refer to the UK, the difference being that Northern Ireland is included in the 2001 figures. Migration numbers between Falkirk and Northern Ireland are thought to be small. Information from work carried out by GROS on the Community Health Index data and the National Health Service Central Register suggest that significantly less then 100 people move in either direction each year.

Census flows. The two figures in the previous paragraphs relate only to the migration figures within the UK as counted in the Census. They thus exclude international migration and so are only partial. It is not possible therefore to use the net Census internal migration figure as an estimate of the net migration likely over the period of the Structure Plan. The actual gross and net migration figures used are discussed below.

3.3 Results

3.3.1 Results: The above methodology, data requirements and assumptions sets out what has been used in the projections for the first alteration to the Structure Plan. As in the previous projections, consideration was given to different migration assumptions in order to determine the most appropriate ones to use.

3.3.2 As mentioned in para 3.2.16 above, without net in-migration the population of the area will decline. In fact, the natural decrease (i.e. deaths exceeding births) is expected to increase overtime. There is therefore a need for an increasing net in migration rate just to keep the population of the area the same. One of the main factors influencing net in-migration is the level of new house building, as this enables people to move into the area. In migration and new house building are therefore inter linked. In turn, the level of house building is influenced by a number of factors including the presence of environmental and infrastructure constraints.

3.3.3 A figure of +500 was selected as a realistic growth target. This is a close reflection of the recent average net in-migration figures and is comparable with GRO projections. Over the last five years net in migration has averaged +499.

3.3.4 This figure also provides a realistic increase in the number of households in the area when compared with recently achieved levels of house building.

3.3.5 The net annual migration assumption of +500 was achieved by assuming a gross in-migration flow from the rest of Great Britain of 3,360 per year and a gross out-migration flow to the rest of Great Britain of 2,860. These figures were chosen to be in line with the gross flows found in the 2001 Census (see para. 3.2.32).

3.3.6 However, since the actual net migration in 2001/02 was already known to have been +430 when the projections were run, this figure was used for the first year of the projections. A smaller number of in-migrants was assumed.

3.3.7 The basic results of the projections are shown in Table 1. This shows that the population is projected to increase from 145,270 in 2001 to 152,570 in 2020, an increase of 7,300, or 5%. The increase in population is evenly spread across the projection period.

Table 1 – Structure Plan First Alteration population projections 2001–2020

		Change	
Year	Population	No.	%
2001	145,270		
2006	147,275	+ 2,005	+ 1.38%
2011	149,297	+ 2,022	+ 1.37%
2016	151,198	+ 1,901	+ 1.27%
2020	152,570	+ 1,372	+ 0.91%

3.3.8 As well as an overall increase in the population over the Structure Plan period, there will also be differential changes in the age groups within the population. Some of the more important of these are shown in Table 2.

Table 2 – Population projections – selected age groups 2001-2020

Age Group	2001	2006	2011	2016	2020	Change 2001-2020 No.	Change 2001-2020 %
0-4	8,234	7,709	7,611	7,637	7,689	- 545	- 6.6%
5-11	12,922	11,909	11,032	10,889	10,868	- 2,054	- 15.9%
12-15	7,152	7,771	7,132	6,522	6,462	- 690	- 9.6%
16-24	15,252	16,212	17,253	16,730	15,678	+ 426	+ 2.8%
25-44	43,023	41,539	39,514	38,213	38,594	- 4,429	- 10.3%
45-59/64	32,162	34,245	36,438	38,338	38,595	+ 6,433	+ 20.0%
60/65-74	16,670	17,525	19,163	20,555	21,408	+ 4,738	+ 28.4%
75+	9,855	10,365	11,154	12,314	13,276	+ 3,421	+ 34.7%
Total	145,270	147,275	149,297	151,198	152,570	+ 7,300	+ 5.0%

3.3.9 The major changes are in the fall in the number of children and those aged 25-44 together with the large percentage increases in the number of elderly people, especially the very elderly. This has implications for the Structure Plan as it indicates that, overall, school rolls will fall but consideration will need to be given to providing additional specialised accommodation for the elderly.

3.3.10 There are also implications for the projections of economically active population, and consequently of the potential labour force, from the changes in the 16-59/64 age groups. In particular, the projections show a decrease in the younger working age groups, especially those aged 25-44, but a significant increase in the numbers of older working age, 45-59/64.

3.3.11 These patterns mirror national trends. They also show similar patterns of change to the previous projections.

3.3.12 The distribution of the population within the Council area is also a matter for the Structure Plan and could lead to local pressures on services even where numbers of people are falling in particular age groups. It must be remembered however, that the majority of people who will need to be catered for in 2020 already live in the Council area and that the Structure Plan can only affect the distribution at the margin.

4.0 Household Projections

4.1 Methodology

4.1.1 The set of spreadsheets purchased from Norfolk County Council included some by which to calculate household projections. Unfortunately, it proved impossible to use these spreadsheets because they had been designed to take the information used in the England and Wales household projections. This is substantially different from the data used by the Housing Statistics Branch of the Scottish Executive in their household projections.

4.1.2 Since the Scottish Executive made their national headship rate projections available for use in the first Structure Plan projections, it was necessary to design our own spreadsheets to carry out the Structure Plan household projections. These have been used again in the projections for the first alteration.

4.1.3 Household projections have two main inputs, population projections and headship rate projections. The population projections used were the projections described in Section 3 above. For household projections only the household population is required. This was calculated by subtracting the institutional population used in the population projections from the total projected population.

4.1.4 The methodology used was simply to apply the headship rates projected for each year 2001 to 2020 to the projected household population in the appropriate age/sex groups. More details are given below in the description of the data requirements and assumptions.

4.2 Data requirements and assumptions

4.2.1 Population projections: Since a single year age/sex count of the institutional population was prepared for the population projections base data, this information was input into the household projections spreadsheets in the "Instpop" sheet. The population projections "Results" spreadsheet was copied from the population projections spreadsheets into the "Popproj" sheet of household projections spreadsheets.

4.2.2 These two together allowed household population for the appropriate age/sex groups to be calculated for each year of the household projections 2001 to 2020, by subtracting the institutional population from the total projected population for each year. For completeness, the 0-15 age group was also included. The projected household population for each year headed the spreadsheet which contained the household projections for each year (see Table 3 for a sample of the household projections output for the base year).

4.2.3 Headship rates: Headship rates are applied to the population in each age group to calculate the number of households of each type headed by someone of that age. The headship rate projections which had been calculated by the Scottish Executive Housing Statistics Branch for Falkirk Council area for their 2000 based household projections for the years 2000 to 2014 were provided for our use. They also provided some preliminary information on headship rates from the 2001 Census.

4.2.4 These headship rates are calculated for 10 different age groups and seven different household types as follows:

age groups: 16-24;
25-29;
30-34;
35-44;
45-54;
55-59;
60-64;
65-74;
75-84; and
85+

household types:
1 person – male;
1 person – female;
2 person, 2 adults;
2 person – 1 parent;
3+ person, all adult;
3+ person – 1 parent;
3+ person – 2 adults plus children.

In addition, each age group has a "non-head" rate.

4.2.5 This produced a matrix of headship rates for all age groups and household types with an additional category of non-household heads for each year of the projections. This is illustrated for the base year, 2001, in Table 3. For each age group the total headship rate is 1. This means that every person in each age group has a probability of being the head of each type of household in the proportion given or the residual probability of not heading a household. With the exception of the single person households, which are split into male and female, no distinction is made between the sexes.

4.2.6 These headship rates were calculated by the Scottish Executive by applying trends in household formation observed in the 1981 and 1991 Censuses for each combination of age group and household type. Non-headship rate trends were also calculated rather than simply being a residual.

4.2.7 The headship and non-headship rates were then projected forward using a modified two-point exponential model[4]. They were constrained in two ways, firstly so that they cannot individually go above 1 or below 0 and secondly so that they sum to 1 within the area and household type. The projected households were also controlled to a Scotland total.

4.2.8 The Scottish Executive headship rates only went as far as 2014 while the household projections for the first alteration to the Structure Plan are needed up to 2020. In order to calculate all the headship rates for the years 2015 to 2020, SPSS was used to calculate regression equations for each of the 80 combinations of age groups and household types.

4.2.9 The slope and intercept figures calculated from the regression equations were then applied to the years 2015 to 2020 to calculate the headship rates for each of the 80 categories for each year. In a number of cases, as can be seen in Table 3, the headship rates were zero, and this was continued in the future projections. In a few additional cases, the rates fell to zero during the projection period. The constraints that no headship rate could exceed 1, or be less than zero, and that the total headship and non-headship rates for each age group should sum to 1, were kept.

4.2.10 Since the results of the 2001 Census were also available, these were used to adjust the projected headship rates. This was done by calculating the ratio of the actual headship rates in the 2001 Census to the projected rates for 2001. These ratios were then applied as adjustment factors to the headship rates from the Executive and those projected forward as described in the previous paragraph.

4.2.11 These adjusted headship rates were then applied to the population projections for each year to calculate the number of households of each type "headed" by people in different age groups. This is illustrated in Table 3 for 2001.

4.2.12 The first assumption in the household projections is that the population projections produced in Section 3 will prove to be correct. The second assumption is that there will be no change to the institutional population over the projection period. This is unlikely to be correct. It is however, impossible to predict what change there might be in that element of the population from 2001 to 2020.

4.2.13 The third assumption is that the headship rate projections produced by the Scottish Executive and the continuation of the trends in these rates to 2020 will prove to be the correct trends. The model used to calculate the headship rates and project them to 2014 is complex and it would be difficult to justify carrying out a similar exercise on our own behalf.

4.2.14 The results of the projections seem intuitively correct based on current household trends, e.g. the increase in single person and single parent households and the decrease in the number of households with children. However, they seem to suggest that using a straight line trend for changes in household types over the long period to 2020 may not take into account changes which may take place in the trends over that long period. In particular, the large decrease in the number of households with two or more adults plus children, taken together with the increase in single parents, seems to produce a rather low number of households with children in 2020 compared to the number of children in the population projections. This suggests that, in the longer term, the trend in the fall in the number of households of two adults with children is likely to tail off and will not continue at its current rate.

[4] For more details see Scottish Executive Statistical Bulletin, Housing Series HSG/2002/4, "Household Projections for Scotland:2000-based", August 2002.

4.2.15 In addition as can be seen from Table 4, the household projections result in a significant fall in average household size to 2 people per household in 2020. This seems a low figure. However, the average household size figures in these projections are almost exactly the same as those in the Scottish Executive 2002 based projections. The Executive's projections show average household sizes as low as 2 for at least one authority as early as 2006.

Table 4: Projected average household size

Year	Average household size
2001	2.29
2006	2.22
2011	2.14
2016	2.05
2020	2.00

4.2.16 Without carrying out a considerable amount of further work, which might be inconclusive given the amount of reliable information available to predict future trends, it is difficult to see what other assumptions could be made in order to carry out these projections. Trends are unlikely to change significantly in the short term and it is only in the longer term that they can be questioned.

4.2.17 Less reliability should therefore be placed on the longer term figures. This should not present a major problem for the Structure Plan as it should be reviewed regularly and updated several times over the plan period.

4.3 Results

4.3.1 The basic results of the household projections are shown in Table 5. This shows the increase in the number of households from 62,689 in 2001 to 75,496 in 2020, an increase of just under 13,000 or 20.4%. This can be compared with the projected increase in the population of 7,300 or 5.0% (see para. 3.3.6).

Table 5 – Structure Plan household projections 2001 – 2020

Year	Households	Change	
		No.	%
2001	62,689		
2006	65,597	2,908	4.6%
2011	68,899	3,302	5.0%
2016	72,833	3,934	5.7%
2020	75,496	2,663	3.7%

4.3.2 Changes in household types are shown in Table 6. These show much greater changes than the change in the total number of households. In particular there will be very large percentage increases in the number of single person households and single parent households. This will be balanced by a significant fall in the number of households consisting of two or more adults and children, both in actual and percentage terms. These patterns mirror the national trends to 2016, which is as far as the national household projections currently go.

4.3.3 While in the past the increase in the number of small households was used to suggest a change in the types of houses which would be required, increasing affluence has led to increased expectations in terms of size and type of house. However, this is another aspect which requires to be monitored over the period of the Structure Plan to ensure that the correct mix of new housing is provided.

Table 6: Household type projections 2001-2020

Household type	2001	2006	2011	2016	2020	Change 2001-2020 No	Change 2001-2020 %
1 person male	8,278	9,515	10,848	12,245	13,373	+ 5,095	+ 61.5%
1 person female	11,397	12,693	14,225	16,561	17,875	+ 6,478	+ 56.8%
2 person, both adult	18,676	20,092	21,625	23,252	24,426	+ 5,750	+ 30.8%
2 person, 1 parent	2,245	2,545	2,871	3,204	3,438	+ 1,193	+ 53.1%
3+ person all adult	5,950	6,125	6,342	6,409	6,246	+ 296	+ 5.0%
3+ person 1 parent	1,794	1,971	2,121	2,272	2,530	+ 736	+ 41.0%
3+ person 2 adults + children	14,349	12,656	10,867	8,890	7,608	- 6,681	- 46.6%
Total	62,689	65,597	68,899	72,833	75,496	+ 12,807	+ 20.4%

4.3.4 Comparing these projections with the latest household projections from the Scottish Executive shows that these figures are about 1,000 households higher in 2016, the last year for which comparisons can be made. The Council's projections show fewer households with children and more all adult households.

4.3.5 Household projections relate to people, and the dwelling stock is and will be higher than the number of households. The difference is due to vacant and non-effective housing stock. This can fall into a number of categories including second homes, new houses not yet occupied, houses under renovation or frictional vacancies which are required for the effective operation of the housing market. Account also has to be taken of likely demolitions of the existing stock.

4.3.6 The 2001 Census counted 1,826 vacant properties, including 100 second homes. Previously an estimate of 30 demolitions a year was used. It is considered that this should be increased to approximately 50 a year to reflect the likely increased demolition of particularly local authority housing stock. The total dwelling requirement is therefore calculated as follows:

Projected Households at 2020	75,500
+ Allowance for vacancies and non effective stock	1,720
+ Allowance for 2nd and holiday homes	100
+ Allowance for demolitions and conversions	1,000
Housing stock at 2001	64,500
= New dwellings	13,800

5.0 Conclusions

5.1 This paper sets out the methodology, data requirements, assumptions and results of the population and household projections carried out for the first alteration to the Structure Plan for Falkirk Council area. To achieve a growth target population of 152,000 by 2020 13,800 new houses will have to be built. It should be noted that approximately 11,000 new houses would be required to be built just to keep the population stable.

5.2 More details of the results can be made available on request.

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Appendix 1

Acknowledgements and Disclaimer

Falkirk Council gratefully acknowledges the assistance of the following in the production of its population and household projections:

1 Norfolk County Council, Planning and Transportation Department, especially Wendy Pontin, for supplying the original NORPOP and NORHOP population and household projections spreadsheets and for their assistance at various times during the population projection production process. Also for their permission to customise and revise their spreadsheets for our own use.

2 The General Register Office for Scotland for providing single year of age and sex mortality rates for Scotland for the years 2001-2020, single year of age fertility rates for Scotland for 2001-2020 from the Government Actuary's Department and also for the local (i.e. Falkirk Council) variation factors. The base population for the projections was the GROS 2001 mid year estimates of population by single year of age/sex for Falkirk Council area.

3 The Scottish Executive, Housing Statistics Branch for providing their headship rates for their six household types and ten age groups which were used in the 1998 and 2000 based household projections and also their early work on the 2001 Census.

None of the above bears any responsibility for the use which has been made of their spreadsheets or data within this paper. Responsibility for the assumptions and results used in the First Alteration to the Structure Plan lie solely with Falkirk Council.

Table 3: Household projections spreadsheet 2001 base year

Base year population - private household population

Age Group	0-15	16-24	25-29	30-34	35-44	45-54	55-59	60-64	65-74	75-84	85+	Total
Male	14,476	7,457	4,404	5,416	10,970	9,725	4,126	3,711	5,632	2,757	548	69,222
Female	13,825	7,477	4,646	5,949	11,464	10,128	4,287	4,056	6,772	4,416	1,294	74,314
Total	28,301	14,934	9,050	11,365	22,434	19,853	8,413	7,767	12,404	7,173	1,842	143,536

Headship rates

Age Group	1 person male	1 person female	2 person 2 adult	2 person 1 parent	3+ person all adult	3+ person 1 parent	3+ person 2 ad + ch	Non-heads	Total
16-24	0.02775	0.03246	0.03380	0.02486	0.00323	0.00739	0.02345	0.84706	1.00000
25-29	0.08704	0.06334	0.12373	0.04467	0.00470	0.03320	0.11740	0.52594	1.00000
30-34	0.08131	0.04894	0.09982	0.03783	0.00494	0.04586	0.22848	0.45282	1.00000
35-44	0.06949	0.03649	0.06824	0.03099	0.02464	0.03434	0.31460	0.42121	1.00000
45-54	0.06555	0.05891	0.16584	0.01148	0.14112	0.00433	0.14168	0.41109	1.00000
55-59	0.06844	0.08847	0.28675	0.00382	0.11577	0.00036	0.03517	0.40122	1.00000
60-64	0.07210	0.11242	0.31730	0.00207	0.07534	-	0.01297	0.40781	1.00000
65-74	0.08468	0.20250	0.36613	0.00250	0.05758	-	0.00532	0.28129	1.00000
75-84	0.11810	0.37630	0.18282	0.00308	0.01863	-	0.00098	0.30008	1.00000
85+	0.14044	0.52459	0.19727	0.00820	0.02240	0.00164	-	0.10546	1.00000

Age Group	1 person male	1 person female	2 person 2 adult	2 person 1 parent	3+ person all adult	3+ person 1 parent	3+ person 2 ad + ch	Non-heads	Total Households
16-24	414	485	505	371	48	110	350	12,650	14,934
25-29	788	573	1,120	404	42	300	1,062	4,760	9,050
30-34	924	556	1,134	430	56	521	2,597	5,146	11,365
35-44	1,559	819	1,531	695	553	770	7,058	9,449	22,434
45-54	1,301	1,169	3,293	228	2,802	86	2,813	8,161	19,853
55-59	576	744	2,412	32	974	3	296	3,375	8,413
60-64	560	873	2,464	16	585	-	101	3,167	7,767
65-74	1,050	2,512	4,541	31	714	-	66	3,489	12,404
75-84	847	2,699	1,311	22	134	-	7	2,153	7,173
85+	259	966	363	15	41	3	-	194	1,842
Total	8,278	11,397	18,676	2,245	5,950	1,794	14,349		62,689