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DELIVERING SUSTAINABLE HOUSING ALTERNATIVES

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1 EXECUTIVE SUMMARY

Ireland's housing crises continues to spiral out of control resulting in increased rental/purchase prices as demand for housing continues to soar. Inflated prices has set off an unprecedented rise in homelessness as families compete for long term accommodation. The minimum number of people experiencing homelessness in Ireland is over 5,100 and includes some 1,600 children according to the Peter McVerry Trust. The social housing waiting list exceeds 90,000 dwelling units.
An increase in supply is the only antidote, but the solution requires radical reform within the current design thinking. Such radical reform begins with a long term outlook that considers the human life cycle with a focus on providing sustainable options for the elderly cohort to downsize into newly built, age appropriate dwellings.

Downsizing into newly built, age appropriate dwellings advantages include;

- The release of existing family homes back onto the market place, increasing supply to house families.
- Age appropriate homes are built for purpose with a smaller floor area resulting in a significant reduction in construction costs and ecological inputs
- Increased comfort levels provided by A rated buildings
- Reduced energy inputs and carbon emissions on an annual basis eradicating fuel poverty and reduced carbon footprint
- Age appropriate dwellings provide a safer environment and could help to curtail the high level of accidents within homes
- Age appropriate dwellings also provide independent living options for people with disabilities
- Cluster grouping can create vibrant community spaces, increase wellbeing and independence
- Cluster grouping can reduce loneliness and isolation with improved security for residents.
- Downsizing has the potential to release equity and augment a pensioner's income and/or provide capital for investment opportunities

Continued building of developer-led family homes in the absence of research will result in further urban sprawl and associated costly infrastructure, while the provision of housing for the most vulnerable remains unresolved. The RIBA point out that downsizing for the elderly may be key to the future of housing by "encouraging older people to downsize in retirement and free up family homes that could have a significant impact on the housing crisis" (2014). Delivering safer sustainable housing for people to age in place with dignity has the potential to create much needed housing diversity and provide a tangible legacy for this country and its people.

Attention to the Central Statistics Office (CSO) recording of the baby boom in the early 1970's could have helped to predict the subsequent unprecedented high demand for housing and offset the celtic tiger housing boom/bust cycle. More recent CSO demographics predicts a population growth of an additional 1.8m people living in Ireland by 2046 equating to an additional 660,000 houses based on current household occupancy rates. That housing need is approximately 22,000 units per annum or 110,000 dwellings over the lifetime of the next government(s) until 2046. The location of the majority of the anticipated growth will be urban or city based with an estimated land take of up to 19,000 hectares based on current density control in suburban areas. By contrast, Inner city Dublin has approximately 60 hectares of development land. Dublin local authorities hold a similar land bank.

CSO figures remind us that Ireland had 315,000 people aged 65 and over in 1961. This figure increased to 535,393 in 2011 and is expected to grow to 1.4million by 2046 and will create an unprecedented demand in appropriate housing for the elderly. Unlike recent history, there is an urgent

need to pay attention to the demographics of our ageing nation and proactively respond with a pre-emptive long term housing strategy. Assessing future needs could be further researched with the National Census 2016 to determine the current housing stock suitability for ageing in place.

The report suggests that approximately 400,000 of the projected 660,000 new builds should be designed and built to provide age appropriate, barrier-free homes in locations that match current and future demand. Such reform could release 400,000 existing family homes onto the market for energy saving retrofitting to conserve energy. The location of such housing provides an opportunity of regenerating derelict or vacant sites to re energise and add diversity to enhance the public realm within existing urban areas. The RIBA recognised a similar trend in the UK and noted "the high streets are one area that the growing population of the elderly could have a long lasting positive impact. The high streets provide a focal point for an active, older population to energise and galvanise our high streets giving them a new lease of life" (RIBA,2014). Such a strategy would increase supply and in turn help to stabilise prices while regenerating our decaying urban areas.

Architecture and project management has an evolutionary role to promote awareness in the conservation of energy used in our built environment. Building age appropriate dwellings provides an opportunity to save billions of euro on capital costs while providing sustainable options for the elderly to age in place; help to promote independence and wellbeing; and delay eventual nursing home care. The end result would deliver greater diversity within our housing stock and provide safer, more energy efficient living spaces that are designed for purpose, which is important to elderly people. Nationally, the savings to Ireland's energy bill could be as high as €1billion per annum, enhancing the domestic economy. The energy savings would help to eradicate fuel poverty while also saving some 5 million tonnes of carbon emissions per annum.

Financing alternatives to government borrowing is also discussed in the report with the opportunity of providing income tax savings similar to the successful section 50 student accommodation. Such tax relief could encourage investors to provide funding for housing. Further options are for the government to introduce structural investment bonds instead of borrowing more money. Structural investment Bonds are the most important method of financing structural projects in the USA as state and local governments financed more than $1.65 trillion of infrastructure investment over the last decade (2003–2012) through the tax-exempt bond market. Similarly, Norway's sovereign wealth fund was established in 1990 and holds a massive €800bn with plans to double their property holdings.

SSIA's were popular in the last decade and raised approximately €16bn and clearly demonstrates an appetite for such investment opportunities within the Irish context. A similar fundraising scheme could provide Ireland's infrastructure requirements and housing needs. Prudent investment coupled with project management of design and build would eliminate land speculation and developer profit margins on social housing units because contractors would be hired at smaller profit margins to build out the dwellings. The removal of vat on purchase prices for owner occupiers aged 60 and over would encourage investment and downsizing within the private sector market. Vat is not charged on nursing home fees and could be removed from senior housing to encourage people to trade down.

Finally, providing safer, barrier free homes can reduce the numbers entering the A&E in hospitals and could help reduce hospital overcrowding and delays within the HSE. Currently, the annual cost to the economy of falls and fractures in older people is estimated at €500million with an unacceptable fatality rate of 250 preventable deaths each year. This will escalate to €1.3bn in annual costs and 650 preventable deaths each year if we continue to look after the elderly, without reform. Priority planning to fast-track senior housing is achievable if the political will is in place to support such radical reform.

2 INTRODUCTION

2.1 Rationale

For the first time in human history, our global population has surpassed 7 billion and the UN predicts this figure will grow to 9.6 billion by the year 2050 (United Nations 2012). Globally, the number of persons aged 60 or over is expected to more than triple by 2100, increasing from 841 million in 2013 to 2 billion in 2050 (World Population Prospects 2012). There is a global trend of inward migration as "70% of the global population will live in urban areas by 2050" (The World Fact book 2010). Consistent with global trends, Irelands growing population is confirmed at 4,588,252 (CSO 2011 census) and could reach 6.4m by 2046 (CSO 2011 census). In addition, the most recently published figures by the Central Statistics Office (CSO) remind us that Ireland had 315,000 people aged 65 and over in 1961. This figure increased to 535,393 in the 2011 census, representing a growth of approximately 70%, faster than that of our EU neighbours (BDO 2014). Further CSO projections suggest that this figure could reach 1.4 million people by 2046. Therefore, and while we may remain unaware of the consequences of an aging population on an individual level, its consequences are increasingly felt at a societal level, with the health care and housing sectors serving as two important examples.

Ageing is a persistent process and part of the natural life cycle; it is important to remember that ageing affects every one of us. Despite this, the Central Statistics Office's projections of the future accommodation needs for Ireland's house formation age group went largely unnoticed in the 1970s and 1980s. In 1981, the number of persons aged 0-14 years peaked at 1,044,000. From the 1970s onwards, Ireland experienced a baby boom, with those born within this period often referred to as 'Generation X'. In the 1990s, the unprecedented high level of demand for housing among 'Generation X' acted as a driving force for the housing boom in Ireland. The delayed government and construction sector response to the housing needs of 'Generation X' could be viewed as having contributed significantly to the inflation of house prices throughout Ireland over an eleven year period C.1998 – 2008, during which this 'catch up' period yielded over 700,000 dwellings to include houses and apartments (Finneran 2008) representing approximately one third of Ireland's housing stock.

The above was further exacerbated by irresponsible lending as well as the availability of cheap loans, causing house prices to soar to unaffordable levels. Eventually, and as the demand and supply laws of economics were tested year on year, the property sector eventually crashed in 2007/08. But the proverbial boom-bust cycle could have been tempered or even avoided if closer population studies and needs assessments had been conducted earlier, and an appropriate response from the construction industry had been launched to even out the demand/supply law of economics. The delayed response was further compounded by the delays in obtaining planning permission. This inescapable and destructive vortex of the planning system delayed house completions and curtailed supply causing house prices to continuously spiral out of control. A more detailed analysis of housing demand demographics could have also helped to design a 'softer landing' for the property market by carefully predicting housing demand per location and specific needs in terms of dwelling typology. In this way, the so-called "Celtic Tiger" housing boom could be viewed as an oversight on behalf of the Government and the construction industry to foresee the growing housing needs of the population.

The wave or spike in the ageing population today is depicted in Graph 2.0 in Appendix A, which shows the level of house completions since 1970. The graph highlights the Celtic Tiger build up and peak in 2006/7 and reflects the population peak of 'Generation X'. Further research on this subject is therefore necessary as the impending demand for elderly accommodation will once again cause a surge in requirements for residential housing and care for the elderly in the near future. In addition, the need for housing in larger urban areas has risen due to the construction's industry output contraction.

Completions went from an all-time high of 93,419 in 2006 to 10,480 in 2011, as shown in Table 2.1, Appendix A. This downward trend continues today with 8,301 house completions recorded in 2013 (Department of the Environment, Heritage & Local Government). Taken together, it is likely that 'Generation X' will once again drive a demand for suitable accommodation and age-appropriate housing in their later years.

2.2 Objectives

Predicting future housing needs based on the existing population and future projections and matching those needs with alternatives to institutional care, and what considerations should be taken into account for age-appropriate housing.

The aim of the research is to increase awareness of the underperformance of the country's current housing stock in relation to age specific requirements. This research is considered particularly important in light of the anticipated growth in demand for age appropriate housing. To achieve its objectives, this research first undertakes a review of the extant evidence-based research in the Irish context by analysing data published by the Central Statistics Office. Based on this analysis, the need for reform of the housing sector is explored. Furthermore, this research also reviews academic research and examines further statistics and publications from statutory bodies such as the Health Service Executive (HSE), which provides all of Ireland's public health services, both in hospitals and communities across the country and; the Health Information and Quality Authority (HIQA), which is the independent Authority established to drive continuous improvement in Ireland's health and social care services. The research also examines publications from the Irish Wheelchair Association (IWA), Nursing Homes Ireland (NHI), the Carer's Association and various reports from numerous non-profit housing associations.

A narrative exists that stigmatizes elderly people with advanced chronological age into a needy social category (Luken 1984). "Age and psychological well-being have a curvilinear relationship in that well-being is reportedly higher for young adults and older people (aged 60-69 and 70-79), than it is for men and women in their 40s and 50s" (Marmot & Steptoe 2012, p.5) and go on to offer a possible explanation for this observation in the form of stress (i.e. mortgage payments, rearing a family etc) playing a greater role in the lives of individuals in their 40s and 50s. This suggests that retirement and aging is something to look forward to and strategically plan for in advance, both collectively as policymakers and privately as individuals. Project management and planning are key to timely sustainable alternatives and interventions.

The United Nations Principles for Older Persons, was adopted by General Assembly resolution 46/91 of 16 December 1991 to appreciate the contribution that older persons make to their societies. The Principles for Older Persons further specifies that older people should have access to independence, adequate food and shelter, opportunity to work and education, to continue living with dignity in environments that are safe and adaptable to personal preferences and changing capacities. Older persons should remain integrated in society and benefit from family and community care (UN 1991). What Ireland needs now is a strong vehicle to challenge assumptions about older age as a period of ill health and decline and population ageing as a burden and a cost. "The reality is that older people are a vital resource for social and economic development" (Lynch 2013, p.12)

The planning system at policy level is once again ignoring or failing to pay heed to the early warning signs of an ageing population and the future residential needs of an ageing country as a whole.

2.3 Report Structure Explained

- Chapter 1 Executive Summary
- Chapter 2 provides the introduction and rational for this study including the research methods. Population trends and housing needs are established and suggests that a population peak in the 1970's would be the major cause for unprecedented ten year housing boom in the late 1990's
- Chapter 3 is a literary review of demographics from the Central Statistics Office and suggests an opportunity to compile additional data in terms of the existing housing stock and a house type breakdown with matching occupancy rates in the forthcoming census of 2016. Chapter 3 also suggests that a smaller, more sustainable barrier free house type option needs to be provided for the elderly, providing options to age in place while freeing up the existing family home stock to abate a repeat of escalating house prices due to an increase in demand and draws comparisons from previous government mitigation measures, which successfully relocated families out of unsuccessful high rise apartment complexes.
- Chapter 4 is a literary review of providing alternatives to nursing home care and compares costings to incentivise the elderly to trade down and relocate to smaller sustainable house types. The incentives include a release of equity in their home by selling it, reduced property taxes and reduced energy bills.
- Chapter 5 is a literary review of delivering age appropriate housing through privately funded tax shelter properties and the reintroduction of SSIA's to fund public senior housing projects. This chapter also discusses the health benefits of extra care housing for the elderly occupants.

3 POPULATION ANALYSIS AND FUTURE HOUSING NEED

3.1 Introduction

This study takes an in-depth look at the existing housing stock in Ireland from a house typology point of view and envisages an alternative age appropriate house type to augment the existing housing stock to meet transitional family needs over time. The vast majority of older people live well at home, and as such, '*ageing in place'* has emerged as the preferred option for many older persons. *Aging in place* is a popular term in current aging policy, and is defined as "remaining, living in the community, with some level of independence, rather than in residential care" (Wiles et al 2012, p.357)

"Ageing in place' means being able to continue to live independently in the community but not necessarily in the family home. It can also mean in a downsized home, rented home (whether public or privately rented) or in alternative accommodation. The desire to 'stay put' depends more upon attachment to location rather than emotional attachment to the family home." (Olsberg, www.adhc.nsw.gov.au)

The need for additional housing suitable for people to age in place is apparent from the Central Statistics Office (CSO) projections. The Central Statistics Office (CSO) statistics predict Irish population growth of an additional 1.8million people by the year 2046. As illustrated by Table 3 in Appendix A, the average household size has consistently decreased since 1926 and is currently reported at 2.73 persons per dwelling (Statistical Yearbook of Ireland, 2011,). Provided the 2011 occupancy rate remains constant, and taking into account the aforementioned projection growths, this suggests that a minimum additional 660,000 houses will be required to house the projected population. This equates to providing an average of C.22,000 new dwellings every year until 2046. To paraphrase the RIBA, this also equates to 110,000 houses during the lifetime of the next government (2014).

Historically, the majority of new dwellings were provided by developer-led schemes. Typically, these would range in size, with a 3 bedroomed semi-detached family type homes of approximately 115sqm being the popular choice. A closer examination of population aging projections reveal that an alternative national housing model is therefore required if we are to provide an alternative, more sustainable accommodation option for the Irish population in the long term.

CSO projects a steady increase in the old dependency ratio from 2011 onwards. The very old population (i.e. those aged 80 years of age and over) is set to rise even more dramatically, increasing from 128,000 in 2011 to between 470,000 and 484,000 in 2046 (Population and Labour Force Projections 2016-2046). In addition, there were 393,785 persons with a disability in Ireland in 2006 (Carers in Ireland, 2009). Taken together, the growing number of aged dependents and the significant number of persons with disability suggest an urgent need for suitable housing to provide barrier-free homes as sustainable options for the elderly and the disabled.

Although the elderly in Ireland are located in large numbers in every county, they also have an identifiable settlement pattern. This pattern is largely due to the movement of the younger population, rather than any congregating effect of the elderly community.

Two distinct patterns are noted in the 2006 census.

First, the elderly represent a higher than average proportion of the population in the older, mature suburbs of urban areas. This is due to "empty nesting", a phenomenon whereby younger family members move out of the family home. When they cannot find development land or affordable housing nearby, they are forced to move out further from the mature suburbs they grew up in. This

process causes a reduction in the younger population, with the elderly population remaining and representing a growing proportion of mature urban areas. This is evident in many of Ireland's cities and towns. The City Centre, which in the past would have experienced a similar profile, has been repopulated with younger people, due to the concentrated development of apartments since the 1980's (Carers in Ireland 2009).

The second pattern noted in the 2006 census is therefore the growing numbers of younger populations in commuter belt and suburban areas of Dublin. It is therefore estimated that from "2006 to 2021, the highest percentage increase in elderly persons will occur in the commuter belt and suburbs of Dublin, where the neighbourhoods built since the seventies will have matured, leading to a rapidly growing elderly population" (Carers in Ireland, 2009).

An opportunity to conduct further research into the viability of relocating the elderly into inner urban locations where amenities and services are readily available, is further discussed in Chapter 4.

3.2 Cost estimates of providing additional care

The current number of privately operated nursing homes in Ireland is approximately 400 with an estimated population of 22,000 elderly residents (www.nhi.ie). A simple mathematical calculation estimates this figure to grow to C.65,000 elderly residents based on 2046 population and labour force population projections. An estimated construction cost of nursing homes is shown in Appendix A, table 3.1 between €1700 - €2500 per sqm of floor area.(Bruce Shaw 2014, p.23). This translates to a capital expenditure of between €6 billion – €8.8 billion of construction work over the next 30 years to accommodate the anticipated figure of 63,000 elderly residents requiring residential nursing home care. The demand for nursing home care will escalate further because life expectancy is set to increase from "77.9 years in 2010 to 85.1 years in 2046 for males; 82.7 years in 2010 to 88.5 years in 2046 for females" (Population and Labour Force Projections 2016-2046, p.15)

The resultant 95% majority of older people live contentedly at home and this evidence suggests that the preferred option is to 'age in place'. The extent of the people aged 65 years and over will accumulate to some 1.4million people by 2046. Further CSO evidence suggests that the majority of this age group live alone; translating to a probability of continued reduction in household size and an immediate need for additional housing of smaller, more sustainable barrier free house type options. The vast majority of these people already live in their own homes, which are most likely to be of a larger type family dwelling type. A significant number of family homes have become vacant because the elderly residents have moved into nursing homes. The vast majority of these homes are also likely to have a very poor *Building Energy Rating* (*BER)*. A BER is an indication of the energy performance of a home (www.seai.ie) as illustrated in image 3.2 Appendix A. It therefore makes economic sense for the elderly to downsize to appropriate sized housing, of energy efficient sustainable design, which is built for purpose.

Furthermore, Rogers found the need for a broader range of older people's housing choices, including greater availability of options that bridge the gap between elderly people living independently and moving into a retirement home (Rogers 2011). As previously mentioned, "there were 393,785 persons with a disability in Ireland in 2006. This figure is projected to increase by 28% by 2021, representing a substantial increase in the number of people living at home with support needs" (Carers in Ireland 2009, p.11).

The Carers Association claim annual government savings of 2.5 billion per anum which will increase to over €3 billion (at today's rates) annually by 2021, (Carers in Ireland 2009). This further adds that the projected population with a disability and resident at home for 2021 will exceed 450,000, due to the aging of the population. It is estimated that every year between 2006 and 2021, over 6,000 persons will be added to the population of persons with a disability and a resident at home. This statistic alone suggests an immediate demand for specific barrier free housing as it represents nearly 30% of the aforementioned 21,000 new dwellings needed per year that should be built with barrier-free design. The Barthel Index is a simple tool for assessing self-care and mobility activities required for daily living. (www.strokecenter.org). It is widely used in geriatric assessment settings to determine a person's level of independence for ageing in place. Older people should not be forced to endure unsuitable accommodation. A long-term National Housing Policy to develop our shared future needs must therefore be implemented to provide better housing options for our most vulnerable populations and communities.

The standard availability-based design, build, finance and maintain (DBFM) Public Private Partnership model will be used to deliver a large-scale social housing development investment (Social Housing Strategy 2020 2014 p.32). The strategy includes Housing Adaptation Grant Schemes for Older People and People with a Disability and states that some "58,000 dwellings have availed of such assistance since 1997", equating to yearly average of 3411 (Social Housing Strategy 2020, 2014 p.36). The current government grant for people with a disability is subject to a maximum of €30,000 and may cover up to 95% of the cost of work, but the grant assistance is reduced to €10,500 for older people (Delivering Homes, Sustaining Communities,2007)

3.3 Financial means of the elderly cohort

The Central Statistics Office (CSO) also shows that the vast majority of older people own their own home (79%), either without a mortgage or other loan (71%) or with a home loan/mortgage (8%). Only a small proportion rent (6.6%). CSO demographics of incomes of older people in Ireland show that 10% of older people live on incomes deemed below the poverty line. Further studies indicate that 70% of households are comprised of one older person living alone, and 44% of households with older couples, live on incomes in the bottom 20% of the income distribution (CSO 2010). The net core expenditure of € 259 per week is required by pensioners living alone according to the" Vincentian Partnership 2014 summary table 3.3 in Appendix A. These statistics would suggest that older people have the potential to unlock equity within their own home by downsizing to a smaller more sustainable home, constructed to modern standards with barrier free design and high energy efficiency rating. Such measures would provide additional income to owner-occupier's because sale proceeds from the family home are income tax exempt (revenue.ie) and downsizing could be viewed as a supplementary pension plan. "Ireland is the only OECD country (along with New Zealand) with no statutory earnings-related pension provision in the private sector. Much of the responsibility for retirement saving provisions therefore lies with the individual, leading to large variations in pension levels and retirement income replacement rates" (NIVAKOSKI 2014, p.301)

Unlocking equity and downsizing could be encouraged by way of offering state aid grant assistance. Precedence exists as the Irish government successfully introduced a similar incentive in 1984 to entice the residents of the Ballymun flats to relocate elsewhere. The, now infamous, 'surrender grant' scheme allocated £5,000 to local authority tenants who were prepared to surrender their dwelling and to buy a home in the private sector (Norris 2001,Threshold 1987). Further research into average

house prices in 1984 show that the £5,000 grant was the approximate equivalent to 10% of house prices at that time and provided an adequate starter sum for people to relocate.The National Building Agency was set up to deliver the mass social housing building programme and remained in charge of the construction of the Ballymun flats complex during 1964 –1969. Ballymun was envisioned as a central expression of Ireland's embrace of modernity. The design thinking was based upon tower-blocks devised by the world-famous architect, Le Corbusier, as built in Marseille 1947. By 2004 however, the first block of flats in Ballymun was being detonated (Norris 2001, Threshold, 1987) to make way for a new paradigm of design thinking. This is perhaps an extreme, not to mention costly, example to demonstrate how ideologies evolve over time.

Dublin City council successfully rehoused elderly residents to a new Senior Citizen Housing project consisting of 38 dwellings at McKee Court (Image 3.4 in appendix A) by providing a monthly stipend to augment the new residents' incomes. This incentive successfully released 38 family dwellings back to their intended purpose, to house families on the council waiting list.

Another incentive measure to downsize already exists in the form of the local property tax, which was introduced in 2013 amid much criticism from opposition parties and home owners to boost revenue income. Annual rates vary from €90 - €3050 per dwelling depending on house values (revenue.ie). The abolition of property tax on age appropriate housing could encourage people to downsize on a national scale. By comparison, a similar incentive was successfully introduced by the Irish Government to incentivise the motoring industry to reduce CO_2 emissions with generous savings in vehicle registration tax followed by additional savings in annual road tax for vehicles with low CO_2 emissions. A similar incentive to target household emissions could encourage the elderly to relocate and downsize.

3.4 Future Housing Demand

Today, Ireland faces a new housing challenge requiring a radical reform in the housing supply sector. Building more houses and developing more land should not continue in isolation. Successful planning based on demographic need requires a national strategic plan that caters to the needs of young families, while also future-proofing for the needs of ageing communities and growing numbers of persons with disabilities over time. Relocating the elderly to energy efficient barrier-free new builds of C.55sqm, which are approximately half the floor area of a typical 3 bedroomed semi-detached house would greatly reduce household running costs for elderly end-users. What is more, the smaller dwelling of C.55sqm would significantly reduce construction costs and ecological inputs. Building more retirement type dwellings in lieu of larger family dwellings are necessary to deliver sustainable options for people to age in place and to add variety to the national housing stock. The smaller dwelling must be considered as an urban infill to increase urban density.

Therefore, and in the same vein of building more barrier-free homes, government incentives for trading down would release existing family homes back into the market for their intended purpose of housing families as well as alleviate the current supply shortage in the Dublin area.

3.5 Government Housing Strategy

The Social Housing Strategy 2020 commits to a six-year investment of some €4 billion for the provision of 35,000 new social housing units (Kelly 2014). The Government social housing strategy purports to Support, Supply and Reform and includes provisions for disabled people within society. However, it fails to identify the current and future needs of the population as it ages, nor does it provide any demographic data of future demand of specific house typologies in particular locations. The strategy also fails to predict requirements for beyond 2020.

Similarly, each local authority development plan, which includes land use zoning, has a myopic timeline of only 5 years. An opportunity therefore exists to provide a long-term comprehensive and coherent national housing strategy until 2046; one which includes social housing, housing for the elderly and the disabled. A long-term strategy should be based upon demographic data to respond to population need as well as include representations from all voluntary housing associations and all stakeholders, in order to deliver sustainable housing options for people to age in place.

The results of the 2011 CSO Census are shown in Table 3.5, Appendix A (CSO, Profile 4, p.55). The table provides statistics in relation to housing; classified by type of accommodation and total number of rooms occupied. However, it fails to provide vital information on the number of bedrooms as an indicator of house type and size. Such information is vital to determine the existing number of each house type in relation to the number of bedrooms so that an accurate account of one bedroom dwellings, two bedroom dwellings and so forth can be determined. Sustainable planning of future needs with accurate predictions of housing needs can proceed once an account of the existing housing stock is accurately obtained.

3.6 Assessing Future Needs

The next population census is due in 2016 (www.CSO.ie) and provides an opportunity to obtain information on dwelling size in terms of the number of bedrooms. Furthermore, it offers a chance to approximate how floor area corresponds to the household size, in terms of occupant numbers and occupant age profiles. The 2016 census could also include a question on barrier-free design to determine the existing housing suitability for ageing in place on a national scale. A good example of such data collection is shown in image 3.6, Appendix A (Blackburn with Darwen Borough Council)

CSO demographics from 2006, indicate that 29.5% of persons aged 65 & over indicated they had a disability (Central Statistics Office, Ageing in Ireland 2007, p.19). This figure increases to 58.6% for the 85 & over age group. This would suggest that up to 413,000 people are likely to have a disability by 2046 based on earlier CSO projections. This would also suggest an ever increasing demand for barrier free design dwellings with fully disabled access areas to include bathing and toileting facilities. It could therefore be argued that some 400,000 barrier-free dwellings should be built over the next 30 years in order to provide options for people to age in place. The big benefit here is that such a measure could release 400,000 existing family homes back into the market for energy upgrading and retrofitting for intended family use. “The energy efficiency of existing buildings can be radically improved through ambitious retrofit programmes” (The Energy Report Summary, p.6)

3.7 Urban planning and greater collaboration

CSO statistics also show a steady increase in inward migration as people migrate from rural to urban areas of larger towns and cities in search of employment. Since 1996, Ireland has shown a rise in its urban population of 738,898 people. More recent inward migration flows have influenced housing demand and Ireland's urban areas continued to experience substantial growth. Such inward migration is likely to add further pressure in the medium term as a reported 2,846,889 people lived in Ireland's urban areas in 2011; representing an increase of 272,576 or 10.6% from 2006. In contrast, rural Ireland experienced a lower rate of growth between 2006 and 2011 growing by 75,828 persons or 4.6 per cent, from 1,665,535 in 2006 to 1,741,363 in 2011. In 1961, fewer than 1 in 10 people in Ireland lived in urban areas or towns, compared with more than 1 in 4 at the time of the last census. Put another way, 62% of the population lived in urban areas in April 2011 compared with 46.4% of the population 50 years ago (CSO, This is Ireland 2011).

The Egan report, Rethinking Construction was commissioned to improve efficiency in construction across the UK. One of its recommendations suggests for a greater collaboration between clients and contractors in the form of partnering when it states, "Argent, a major commercial developer, has used partnering arrangements to reduce the capital cost of its offices by 33% and total project time in some instances by 50% since 1991. They partner with three contractors and a limited number of specialist sub-contractors, consultants and designers." (Egan Report 1998, p.9) A similar collaborative styled approach, with a common goal to encourage a greater alliance between the public planning and private sectors, would be beneficial in delivering sustainable housing models for the elderly.

A long-term vision for social housing, including a future proof sustainable barrier free design for the elderly with clearly defined roles and responsibilities for the parties involved, can be easily implemented at Local Government level if the political will exists to do so. Similarly, local authority housing needs and demands can be predicted from housing list applicant numbers. A timely and suitable delivery mechanism response could therefore be put in place as part of a national strategy objective on social housing for the elderly by allocating funds towards specific age-appropriate dwelling design and build projects. The need for additional housing is clear and senior housing should be fast tracked through the planning system. The need for further research to determine the best way forward in considering house typology requires a long-term sustainable action plan. The consequence of this is perhaps best described by Urizar when he states, "As we start to assess urban policies, we soon realise that there is no coherent social vision of what the 'future for your cities should be', and without such a vision, we are destined to continue with the same" (Urizar 2009,)

Despite our best efforts, we still cannot achieve a universal roadmap for our current and future generations. Flexible options and innovative design is required to avoid repetition. Most cities have a master plan to regulate development to achieve order and maximum potential. However, there is no one ideal model that fits all.(Gwilliam & Bourne 1999). The challenge and future for Ireland's growing population remain uncertain as energy security is set to become a growing concern. The government in the past failed to achieve an appropriate response to the current housing crises, as exemplified by the 90,000 people on current social housing list (Kelly 2014)Further research into the housing stock could be included within the upcoming 2016 census form, which could help to identify the existing housing stock and project future need. Similarly, the government could introduce long-term targets based upon such accurate information and projected needs.

From a project management point of view, providing some 400,000 additional homes for the elderly represents a significant cost reduction of providing the same number of conventional larger family homes. Building alternative age appropriate housing could save capital investment of up to €20billion

euro by building a smaller typology dwelling in urban areas with existing infrastructure. Providing alternative age appropriate housing options in appropriate locations where vital services exists provides a viable sustainable alternative for people to age in place. Such capital investment savings will be augmented year on year through much less reduced maintenance and running costs along with substantial energy savings as discussed in the following chapter.

The RIBA point out that downsizing for the elderly may be key the future of housing in the UK by "encouraging older people – who currently own a significant amount of the country's wealth, mainly as property assets – to downsize in retirement and free up a potential new family homes could have a significant impact on the housing crisis" (RIBA 2014, p60)

Downsizing to sustainable dwellings would release existing family homes back into the property market place for their intended use and help to curtail family house price inflation in the medium-term in Ireland. House price inflation eventually leads to wage increases and has a negative effect on Ireland's international competitiveness. A return to the Celtic tiger boom-bust cycle could be avoided through proper management of the existing housing stock and sustainable future proof planning of proposed housing to the match needs of the population. House typologies that correspond and harmonise with future needs could help to stabilise house prices and ensure sustainability for home-owners as a greater variant in house typologies becomes apparent.

3.8 Conclusion

The future of Irish housing remains unclear and lacks a definitive, long-term, proactive action plan to provide suitable accommodation for the elderly and persons with disabilities to age in place. Taken together, population growth, population ageing and an increasing migration trend towards urban settings, and longer life expectancies, serve to highlight the growing problem of delivering suitable housing for the elderly. The existing government policy of planning for five-year intervals is inappropriate; and a greater need for stakeholder involvement and a longer-term strategy is required to address the issues facing the elderly and persons with disabilities. An opportunity currently exists to include a holistic collaboration between Government Departments of the Environment, Finance and Health using demographic data and prediction's based on Central Statistics Office projections, and including input from the housing associations. Working together, these agencies could reveal an accurate need of house typologies in key target areas and provide alternatives to conventional models of identifying housing needs. The key target areas for consideration include the urban regeneration of urban areas that are in decay and dereliction.

4 ALTERNATIVES TO INSTITUTIONAL CARE – AGE APPROPRIATE DESIGN OF DWELLINGS AS A SUSTAINABLE ALTERNATIVE

4.1 Introduction

This chapter explores sustainable alternatives to institutional care as a means to reduce future admittance into nursing homecare or a residential nursing home setting. Whilst the alternatives proposed here provide options for the elderly and their families, they will also require radical reform in housing design and construction; reform that corresponds to age specific needs. This is aligned to the concept of ageing in place, put forward in Chapter 3 and The National Positive Ageing Strategy 2014 objectives to "Enable people to age with confidence, security and dignity in their own homes and communities for as long as possible" (Lynch 2013,p.34).

4.2 Background and Problem Statement

Ireland is heavily dependent on imported fossil fuels making up 88% of its energy needs. This equated to an energy import bill of €6 billion in 2011 (www.epa.ie). The architectural profession must regain influence by taking a heuristic approach and respond to the challenges of climate change and reduce emissions within the built environment. "The principal drivers for sustainability in the built environment are climate change, resource depletion, population increase and urbanisation" (RIBA 2012, p.7).

Architecture and project management has an evolutionary role to promote awareness in the conservation of energy used in our built environment. Similarly, Weinstein et al. (2013) urge for partnerships between the scientific, technological, political and social sectors to support environmentally sustainable human development on an international global scale. If architecture defines our cities and shapes our future, what will our cities look like in the year 2050 as 9 billion people inhabit our planet? It is estimated that massive construction growth will be required to house the estimated 6.3 billion people that will inhabit our cities and urban areas against a backdrop of rapidly depleting energy resources. We must thus learn to live or design to live within the Earth's fixed ecological budget. This sentiment is best encapsulated by Brundtland (1983) when she states, "sustainable global development requires that those who are more affluent adopt life-styles within the planet's ecological means - in their use of energy" (p.11)

Unfortunately, this statement, made in 1983, largely went unnoticed until the world learned of peak oil and a looming energy crisis. Inextricable from population growth is an increased demand for more public infrastructure and public buildings such as housing, schools, hospitals, etc. This in turn places greater demand on the construction industry and the architectural profession to deliver works in a more sustainable way. Architects in the future could lead by example when commissioned by political or public interest clients seeking to provide sustainable housing for the elderly. This has its many challenges, and will require considerable time investment and resources, while inevitably adding to the complexity of urban planning and building process, but it will also result in creating more sustainable relationships between the urban form and the natural environment (Urizar 2009). Such restructure and rationalisation is urgently required as an overarching process first by verifying the existing housing stock in terms of house type and floor area and then matching it with future population needs to re-energise existing neighbourhoods. As a viable accommodation option, the retirement village is widely accepted as promoting and enhancing the independence, choice and quality of life for older people (RICS 2013; Gardner et al 2005; Croucher 2006; Bernard et al 2007).

4.3 Fuel Poverty and the elderly

Elderly people require high levels of space heating and temperatures must be maintained at 21° Celsius in the day space or living areas to provide an adequate level of comfort (HIQA). Elderly people in general consume more energy as they spend more time in-house, making it even more important for their housing to be energy efficient to mitigate the impact on environment (Zuo et al 2014). Home heating can be a challenge for many of the elderly and is commonly referred to as fuel poverty. Fuel poverty among the elderly refers to an inability to heat their home to a level that is healthy and comfortable and is caused by the interaction of high fuel prices, low income and poor energy efficiency in the home (Lynch 2013, p.35).

The affordability of sustainable building is always a concern to developers, as the costs associated with sustainable buildings are normally higher (Zuo et al 2014). Energy Efficient housing designed to reduce fuel poverty by way of exceeding current building regulations to achieve an 'A' rated BER dwelling will substantially reduce energy use and costs. Similarly, a smaller typology home could be more appropriate in terms of sustainability and reduction in household expenses, including energy requirements, and would alleviate and offset recurring expense demand on what is sometimes a limited household income.

4.4 Sustainable Alternatives to combat fuel poverty

One such alternative includes providing smaller, passive housing types for the elderly to age in place. Such an option is consistent with the definition of sustainable development in that it, "meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland 1983, p.11) The built environment is highly dependent on the use of vast amounts of natural resources, including land, materials, energy and water as opportunities for reducing damage to the environment present themselves throughout the entire process. (Bond et al 2012). A feasible opportunity to reduce environmental damage is to encourage the elderly to downsize. The energy consumption chart 4.0 in Appendix A shows the energy required across a range of different energy rated homes. Let us assume an elderly person is living alone in an existing family home, with the assumption that the home was built in the 1970's; typically a 'G' energy rated dwelling, with an assumed and conservative average floor area of 115sqm. The energy consumption for such a dwelling would cost €2590 per annum and produce 13,225kg of carbon per year according to the performance chart. Energy security is a major concern in Ireland and we must also assume that energy prices are set to soar as oil and gas supplies further deplete.

Let us also assume the energy savings if an elderly person decides to downsize to an 'A' rated dwelling or apartment of C.55sqm, then these figures dramatically plummet to €193 per annum and produce 660kg of carbon per year. This could potentially yield significant saving of €2400 per dwelling and a massive carbon reduction of 12.5tonnes. Nationally, the savings to Ireland's energy bill could be as high as €1billion per annum, enhancing the domestic economy while also saving 5 million tonnes of carbon per annum (based on the aforementioned 400,000 elderly people predicted to be living alone by 2046) (www.CSO.ie). The carbon reduction of 5 million tonnes is a step closer to achieving targets set under the Kyoto Protocol on climate change. A carbon tax was introduced in 2013 and now costs €20 per tonne and equates to a further average household saving of €250.

The environmental and monetary savings alone easily justify the implementation of a 'surrender grant' to encourage the elderly to downsize. However, this requires urgent radical political reform to usher in new legislation to provide such options. Smaller, more sustainable barrier free house type options also

offer energy security to this vulnerable age group in an era where energy resources are becoming unstable. “The European Union agreed new climate and energy targets comprising of a 20% reduction in greenhouse gas emissions by 2020; 20% energy efficiency by 2020 and 20% of the EU’s energy consumption to be from renewable sources by 2020 under Directive 2009/28/EC” (National Renewable Energy Action Plan 2009, p.4). A shift to sustainable dwellings for the elderly has the potential to save up to €1 billion from the fuel import bill of €6 billion, accounting for a 17% reduction in fuel use and almost all of the agreed 20% energy efficiency EU target. Annual savings of up to €1 billion echoes the earlier statement in the hypothesis by Lynch, in that older people are a vital resource for social and economic development. In addition to the energy savings, smaller floor areas of sustainable design provide greater comfort and quality of life for elderly residents. More often older people’s housing can be poorer in quality and older people are twice as likely to report a major problem with their dwelling e.g. dampness. Moreover, their homes often require more frequent repair and maintenance than that of the general population. Research has highlighted that there are strong associations between cold temperatures and cardiovascular and respiratory morbidity and mortality (Lynch 2013). Older people are less likely to have modern insulation and other energy efficiency measures installed, mostly because they live in older houses with low energy ratings.

Lack of awareness including cost implications and/or cost savings, product demand and sustainable building typology demand prove to be the top barriers to sustainable design and buildings (Djokotop et al 2014). Architects and project managers therefore, must consider themselves as visionaries for the future by provoking a change of thought among business leaders and the general public. They must keep the profession relevant by pioneering sustainable design, thereby adding credibility to the theories of climate change, peak oil and the energy crisis we are currently facing. Shared ideas on sustainability and future technology should also include the importance of localised architectural context and ideally avoid generic design. In fact, by 2025, buildings will use more energy than any other category of "consumer." And 40% of the world's current output of raw materials goes into buildings. (www.ibm.com)

4.5 Economic case

The average cost (to the state) of a bed space in a public Health Service Executive (HSE) operated nursing home is a reported €1404 per week. The economic benefits of aging in place on a healthcare provision basis is easily demonstrated by the following analysis of Health Service Executive (HSE) publications. The average cost, under the fair deal scheme in a privately operated nursing homes is considerably less at €888 per week (BDO 2015). The alternative to nursing home care is a residential homecare assistance for people to remain ageing in place. The introduction of Home Care Packages or HCP’s was recommended by the Inter-Departmental Working Group on Long-Term Care, to reduce the utilisation of hospital care and residential long-term care by older people. According to data published from the Department of Health, approximately 16,400 people benefitted from HCP’s in 2012 (BDO 2015).

The cost of home care in that BDO report is calculated by assuming the provision of HCPs for five days a week, eight hours each day. This equates to a “weekly” cost of €1,178 for HSE/ Non-Profit home care services, and a weekly rate of €840 for home care services provided by private providers (BDO 2015). However, I carried out several in depth interviews with HSE care staff, all of which reported caring for a minimum of 6 elderly people per day, thus diluting the €1178 cost into €196 per person, per week. Albeit, the level of care required varies per elderly person given that age and other

health factors dictate the provision of such services. Moreover the type of services required are under constant assessment resulting in a possible increase or decrease in the level of care provide. These assessments are subject to a number of criteria in order to determine a dependency score, the person's functional ability and mobility, family support/informal care support and the availability of support services within the community such as day care, meals on wheels and respite care availability. The above figures suggest that a saving to the state is estimated at €1208 per resident per week is achievable if an elderly person is capable of living at home while benefiting from HCP's assistance. The equivalent saving for the private sector resident is estimated at €748. The benefits to the state can be calculated up to €62,816 per person per annum; the corresponding saving of €38,896 is applicable to private nursing home residents.

The total annual cost of providing nursing home care for 82,000 elderly residents will range in between €3bn and €5bn per year, based on earlier mathematical calculations for the 2046 population projection. Furthermore, HIQA (Health Information and Quality Authority) estimates that approximately 30% of nursing home occupants are unsuitably housed and further saving opportunities exist here if alternative sustainable housing is provided.

4.6 Conclusion

This research could form part of detailed action plan to reduce greenhouse gas emissions and other environmental impacts from housing. A partnership of stakeholders to include state agencies could be introduced to further develop the potential of creating sustainable village communities and eradicate fuel poverty among the elderly. This could be achieved by providing alternative accommodation options thus releasing family sized homes to be otherwise occupied by families.

Housing for the elderly should not only represent contextual and cultural expression, but should also be designed and constructed in a sustainable manner employing high performance materials and construction technologies. A new design standard of architectural ingenuity must be achieved to energize our design thinking in order to conserve our available energy and raw materials to include recycling of building materials.

The smaller footprint of retirement dwellings means that substantial savings can be achieved throughout the build process and help to reduce the ecological footprint of the construction process by reducing high demand for finite construction materials.

5 DELIVERING HOUSING THAT IS FIT-FOR-PURPOSE AND AGE APPROPRIATE

5.1 Introduction

Chapter 3 discussed that additional housing is required at a steady rate to meet population growth until 2046. Chapter 4 then describes how this additional housing should be fit-for-purpose, age appropriate, and designed and built to accommodate the future needs of the 1.4million elderly population by 2046. The provision of such housing will require huge capital investment to meet that projected demand. A possible opportunity exists to provide urban renewal in areas of towns and cities that have decayed over time; areas that are in need of investment and redevelopment. Therefore, the final objective of this study is to examine private sector investment in the form of tax incentivised development as a means to provide a safer house type for age appropriate housing.

5.2 Current unsustainable solution

The current Programme for Government (2011-2016) funds voluntary housing associations through the Capital Assistance Scheme (CAS) and is administered by the Local Authorities. It is also the principal funding mechanism under which the Approved Housing Bodies are enabled to provide accommodation. Unfortunately, the current Programme for Government does not include funding of the magnitude required to address the needs of the ageing population. The lack of funding remains a major barrier to providing barrier free housing.

To date, some 58,000 dwellings have availed of the Housing Adaptation Grant Schemes for Older People and People with a Disability. The housing adaptation mostly involves extending the existing family home by a minimum of an additional 33sqm of floor space to provide accessible bedroom and bathroom facilities as shown by Image 5.0 in Appendix A (Building Regulations 2010, Technical Guidance Document M Access and Use, p91). This compounds the problem of fuel poverty among elderly people living alone in dwellings that are already too large to heat and maintain and is not a long term sustainable solution. Each of the 58,000 dwellings that were adapted may be subject to further remodeling involving building works for conversion to family use following the elderly person's admittance to a nursing home or their faithful departure. Such a high uptake demonstrates a need for radical reform in the way housing is designed and procured going forward, and highlights a gap or underperformance in the existing housing stock. Worth noting however, is that this figure may not represent the total number of house adaptions as the more affluent in Irish society may not have availed of the grant scheme due to time constraints and other means tested barriers. The interviews revealed the bureaucracy and time delay involved with house adaptations.

> *Some reported a time delay of 18months from initial grant application to construction completion and handover. Common reoccurring problems are securing the grant aid assistance and obtaining planning permission.*

5.3 Future Proof Design Option

Newly built barrier-free, inclusive design provides a more comfortable and safer living environment for the elderly end user and their care givers. A design for the human life cycle can be easily incorporated into a new build home as shown in image 5.1, Appendix A and negates any need for a costly future extension and disruption. The Kids Play room on the left will evolve over time as the family changes and grows. Such harmonisation is easily achieved as the playroom becomes a teenagers' den for

homework etc. Following on from there, the room will be used as an office once the children move out for college/work. Finally, it will become the ground floor master bedroom, suitable for elderly use whereby daily use of the stairs can be avoided. The downstairs 'wet room' toilet becomes the en-suite by opening up a new doorway to communicate with the bedroom. Grandparents could avail of the room in the interim period if the family situation saw fit. The house could potentially cater for 3 generations of the family simultaneously, in a safe efficient design approach. The electrical layout will be carefully planned and 'future proofed' to accommodate each room function change over time. Awareness plays an important starting point as not all self-builders welcome such radical ideas. The first floor of such dwellings will not be used during the occupant's latter years to reduce heating and maintenance costs.

5.3 Health and Safety

Health and Safety for the elderly is mostly overlooked. "The annual cost to the economy of falls and fractures in older people is approximately €500 million" (Lynch, 2013, p.31).

According to the Health Service Executive (www.hse.ie), approximately 250 older people die each year from avoidable falls. This unacceptably high rate overshadows the 47 work-related fatalities in the workplace that was reported to the Health and Safety Authority (HSA) in 2013 (Summary of Workplace Injury 2012-2013) and highlights the urgent need and importance of providing safer dwellings for the elderly. Such high fatality rates would not be acceptable in the workplace. Safer homes can also help to avoid falls and fractures among older people. The cost of falls and fractures to the Irish economy could rise dramatically in tandem with elderly population projections to €1.3 billion annually by 2046 if current trends are permitted to continue. Likewise, the unacceptable fatality rate from accidents and falls among the elderly will increase from current levels of 250 to 650 preventable deaths each year if we continue to look after the elderly, without reform.

Health and Safety is heavily regulated, subject to rigorous enforcement by the HSA with onerous responsibilities for employers as the Safety, Health and Welfare Act 2005 (www.hsa.ie). This suggests a major gap in health and safety requirements for the elderly living within their own homes. The high fatality rates further suggest that the majority of houses in Ireland are not designed for elderly living. What is more, and as Davidson et al. describe, "older people spend over 75 per cent of their waking day sitting" (2013, p.54). Such sedentary behaviour is associated with elderly people spending the majority of their time in their homes. This further suggests that barrier-free living in purpose built housing of barrier free inclusive design might also include positive effects on Population Health in terms of Health and Safety for the elderly occupants and their care givers. Images 5.2 and 5.3 in Appendix A demonstrate an example of access barriers to a dwelling for elderly people with mobility issues.

A cost-benefit of barrier-free dwellings could significantly reduce the €500million cost figure associated with falls by helping to prevent falls or accidents, while also reducing workloads in the nation's accident and emergency hospital departments. Health and safety components of design should be taken into account for the elderly to mitigate against trip hazards and obstacles.

5.4 Independence and Wellbeing

The elderly are considered a vulnerable age group. Emotional wellbeing and mental health can be improved by living in comfortable surroundings where security is provided in the enjoyment of one's home with "good community facilities, feeling safe, having independence and control over their daily

lives (to be able to continue to live independently in their own home, rather than residential care, was important to people)" (Davidson et al 2013, p.23). The concern for wellbeing was repeatedly expressed throughout the interviews process as conducted for this research.

Many older adults lose their ability to live independently because of limited or reduced mobility, chronic pain, frailty or other mental or physical problems, and require some form of long-term care (www.who.int). A balance between safety and wellbeing needs to be achieved while people maintain their dignity and independence. "Further research found the difficulty and conflicts in incorporating good building design in extra care homes which maximise for health and safety whilst maintaining independence for older people" (Orrell et al, 2013,p.60)

Security and loneliness among the elderly remain as key issues in delivering sustainable housing to age in place. This view was further supported during the in-depth interviews conducted with care givers and public health nurses, when they reported that most falls occur inside the family home.

> *"A carer was asked to withhold information from an elderly woman's family to avoid being admitted to a nursing home" The elderly woman had sustained bruising from a fall and she didn't want her family to know because she thought her family would [put me into a home] (her words) for safety reasons. Incidentally, she was living alone in an old two storey house and had fallen over a step down into her bathroom"*

The interviews further revealed that falls are mostly caused by recurring trip hazards such as steps or stairs, narrow doorways and access routes, in addition worn carpets and floor mats, a lack of appropriate grab rails, all of which contribute to the mobility problems associated with ageing. Wet areas are of a particular concern, including getting in and out of the bathtub and toileting as a significant cause of accidents and falls.

Many of the existing, older houses are unsuitable for ageing in place due to a lack of convenient bedroom and toileting facilities.

> *"Many older people have to use a commode in their bedroom which can be unhygienic when a person's mobility becomes an issue. Mostly, elderly people try to retain their dignity, mobility and independence as much as possible and this can lead to accidents and spillage.*

5.6 Supply and management of support services

Research by Olsberg and Winters expressed a general reluctance about purchasing a unit in a privately-operated retirement village. She found that a general distrust about the standard of management of retirement villages concerning the lack of regulation of service provision and of maintenance payments to villages. (Olsberg and Winters 2005)

A possible solution may already be in place within the Irish context. Developer-led apartment buildings in Ireland are successfully controlled by the Multi-Unit Developments Act 2011, which came into effect on 1 April 2011(www.irishstatutebook.ie).

The Multi-Unit Developments Act 2011 protects the interests of owners, owner occupiers and tenants alike, the act regulates the ownership and management of the common areas of multi-unit developments, and provides for the setting up of owners' management companies to manage such

areas. The definition of a multi-unit development is a development in which there are at least 5 residential units and the units share facilities, amenities and services. Most apartment developments in Ireland are controlled by owners' management companies and provide an excellent framework to provide additional services to cater for the specific needs of elderly residents.

The Multi-Unit Developments Act 2011 offers an important platform that could be extended to sustainable retirement village settings. More specifically, the additional support services that may normally come through an assisted living or retirement community service could be adopted onto the management company's remit to ensure a timely co-ordinated support system is in place as residents get older. Such a support system could offer alternative options in a cost-effective way to keep seniors out of nursing homes and allows them to age with dignity and independence, with the ultimate goal of having them remain within their communities. The cost of support services may vary for each resident and can be itemised and billed accordingly. This residential option conforms to the philosophy of ageing-in-place, the home provides for continuity of living environment, maintenance of independence in the community and social inclusion (Barrett, Hale and Gauld 2012). Research by Olsberg and Winters revealed that retirement villages can be a positive experience, especially when compared to nursing home care. "Nursing homes were regarded as anathema, worse than death" (Olsberg and Winters,2005,p.97)

This suggests that the elderly clearly show a preference for remaining at home for as long as possible, thereby putting off an eventual move into a residential setting such as a nursing home. Older people prefer to "age in place" as it allows one to maintain their autonomy, independence, and ties to social support received from family and friends (Wiles et al 2011). Providing options for people living in their own homes for as long as feasibly possible is the goal of this research and as such, this study puts forward the following objectives. The provision of sustainable communities that deliver options for aging in place will play a vital role in society as the population needs change with aging. The introduction of the 'sustainable retirement village' provides alternatives for the elderly, but the choice of location is critical to success. "Locations must be close to sustainable transportation nodes and amenities and not segregating older people from the rest of society" (Rogers 2011, p.10). Providing alternative housing means providing safer choices and "Older people want choices about how and where they grow old" (Wiles et al 2011, p.357)

5.7 Financing the cost - Urban Renewal Tax Scheme

Urban renewal tax schemes in Ireland became known as Section 23 and Section 27 tax relief schemes. The schemes were introduced to address dereliction in towns and cities and to provide much needed accommodation to meet an increase in residential demand. The areas were selected based on submissions made by local authorities and the construction industry's response was to saturate the tax-designated zones with high-density residential blocks with a mix of commercial activity (www.Revenue.ie). Unfortunately, some of the tax incentive developments failed to meet expectation due to improper planning and subsequent poor management of the complexes built. However, there was a significant improvement with the final concluding tax incentive scheme which was known as Section 50. Its aim was to address the shortfall in student accommodation due to a continuous increase in student numbers. The scheme was successful in delivering a private investor solution to the student accommodation crises in comparison with section 23 and Section 27 tax shelter developments.

The Section 50 tax incentive scheme did not have predetermined locations as a prerequisite and each application was assessed and approved by revenue on location merits of proximity to the third level

college. This approach meant the scheme was available to any developer within an acceptable travel distance to the third level institution. Table 2.1 in Appendix A demonstrates that the state provided less than 10% of the houses built in the state between 2001 and 2011 and serves to suggest a greater need for private sector investment to augment the procurement of future public housing. A similar tax investment scheme to Section 50 could be introduced to entice private investors to capitalise a solution and provide smaller, more sustainable barrier-free house type options for the projected demands of a growing elderly population. A relaxation of the usual zoning constraints could provide development lands for such residential schemes.

Ireland's towns and cities were subject to radical change throughout the last two decades, leading to unprecedented levels of house building and massive growth in the retail sector. Much of the retail sector developments followed the global retailing trend of building large shopping centres on the outer hinterland. Unfortunately, and in most cases, the policy decayed the social, economic and cultural fabric of the existing urban areas by forcing existing retailers to compete with the introduction of shopping centres. These shopping centres usher in the global retail players thereby creating a retail hierarchy and squeezing out the indigenous, family owned businesses, altering the urban fabric and the traditional view of town or city centre as the existing retailer is forced out of business. Neo-liberalism arrived into Ireland in the 1970's and now dominates the retail trade. The resulting legacy is evident in almost every town in Ireland, the once busy town centre streets now remain overpopulated with abandoned shops and dereliction, as many were forced to close. The RIBA recognised a similar trend in the UK and noted "the high streets are one area that the growing population of the elderly could have a long lasting positive impact. The high streets provide a focal point for an active, older population to energise and galvanise our high streets giving them a new lease of life" (RIBA,2014, p58)

Commercial districts are a vital component to large urban residential developments, but they need to add variety in function and architectural form by creating vibrant streetscapes with a variety of commercial activity ranging from banking, finance, retail, office, bars and restaurants that will provide a lifeline for services and job creation. If cities are considered to be evolving organisms, then streets are to be considered the arteries supporting city life and making life ability more tangible. Urban regeneration helps to prevent urban decay and dereliction. A great example of this has been created by London based property developer Pocket (www.pocketliving.com). They provide viable solutions to enable first time buyers to get onto the property ladder at C.20% discounted rates provided that the buyer;

- earns a salary less than £66k
- lives or work in the borough – to sustain local people to stay in their communities
- is a first-time buyer
- is not investors trying to expand their property portfolio

A similar incentive could provide a sustainable alternative within the Irish context if the dwellings were built to include barrier free access for all age groups. The first time buyer could also include elderly people seeking to downsize, which would add occupant diversity to such a scheme as part of a wider sustainable housing strategy and could be implemented to provide age appropriate housing.

5.8 Curtailment of Urban Sprawl through Urban Renewal

Opportunities exist to introduce smaller, more sustainable barrier-free house type options of high quality design using social inclusion for the elderly by way of providing such accommodation within the inner urban areas where ancillary amenities and services already exist. A population increase within these areas could help to sustain existing high street outlets and important community based amenities and re-energise the local community. In addition, the regeneration of vacant or derelict inner urban brownfield sites into sustainable barrier-free house type options has the potential to curtail urban sprawl. The land take required to provide the additional 660,000 dwellings as determined in Chapter 3 is likely to range between 13,000 - 19,000 hectares, based on density guidelines of "35-50 units per hectare" (Guidelines for Planning Authorities, 2009, p.45) if the current trend continues to develop outer urban green field sites.

Inner city Dublin has approximately 60 hectares of development land according to Motti Ruimy, Redrawing Dublin. Dublin Local Authorities hold a similar land bank.

A review of land use zoning constraints could promote urban regeneration in the form of retirement housing. An opportunity to conduct further research into the viability of relocating the elderly into the city centre where amenities and services are readily available could provide valuable insight into how the elderly and their families would respond. "A sustainable way of increasing densities is to look at the existing housing stock with a view to such regeneration to provide flexible use and adaptation of property" (Morgan & Stevenson, 2005, p.7)

5.9 Financing the cost - Alternative Financing

Other methods of financing and ownership could be explored to provide age appropriate housing. For example, the shared ownership schemes provided through housing associations in the UK allows an occupant to buy a share of the dwelling (25% to 75% of the home's value). Once they own 75%, the occupant no longer has to pay rent on the remaining share. This scheme is called 'Older People's Shared Ownership' and is only applicable to occupants aged 55 or over with a stipulation that the occupant can only buy up to 75% of the dwelling (www.gov.uk) Alternatively, buying shares in a co-operative scheme has proven a successful approach to the procurement of Irish affordable housing in the past, and could be viewed as a financing model to provide suitable housing options for the elderly. Developers have long had a strong preference for the 3-bedroom semi-house type model for cash flow reasons. The format follows an established process whereby planning permission is obtained for a large number of dwellings. The developer then builds 10-15 houses at a time and subsequently sells these houses off in order to finance the following phases. Developer financing has become a barrier to house building as banks are only lending up to 60%, reduced from the norm of 80% in the 2000's (www.cif.ie). Larger complexes demand more finance in order to complete the building prior to occupation. Architectural design, Project management and phasing is critical to control cash flow and to minimise finance requirements and costs.

5.10 Alternative Financing - Hybrid Finance Model

The World has witnessed colossal failures of both capitalist and socialist economic models. We need a new financial system, a hybrid funding model to provide a long-term sustainable solution. A funding model that negates borrowing and removes the financial interest repayments from the housing construction sector. This can be easily achieved by Government mitigation measures such as the introduction of infrastructure bonds to fund major capital works programmes. Infrastructure bonds provide a secure investment opportunity for Irish people to invest in the economic recovery while providing urgently required housing projects.

In the USA, Structural investment Bonds are the most important method of financing structural projects. State and local governments financed more than $1.65 trillion of infrastructure investment over the last decade (2003–2012) through the tax-exempt bond market. Similarly, Norway's sovereign wealth fund was established in 1990 and holds a massive €800bn with plans to double their property holdings.

In Ireland, SSIA's were popular in the last decade and raised approximately €16bn and clearly demonstrates an appetite for such investment opportunities within the Irish context. A similar fundraising scheme could provide Ireland's infrastructure requirements. Prudent investment and project management of design and construction would eliminate land speculation and developer profit margins because contractors would be hired at smaller profit margins to build out the dwellings. One area in urgent need of investment is social housing. The local authorities could provide the land while the monies raised in the SSIA's could provide the capital required for the build cost. The popular state savings schemes have accumulated to €19billion which again, demonstrates an uptake of secure investments.

The removal of vat on purchase prices for people over the age of 65 would encourage investment in senior housing schemes. Vat is not charged on nursing home fees and could be removed from senior housing to encourage people to trade down. Similarly, the abolition of local authority development contributions would encourage developers to supply units into the private rental and sales market.

5.11 Conclusion

From a project management perspective, working in partnership with stakeholders and communities to develop safer, more sustainable dwellings that are affordable will be required for successful outcomes in delivering sustainable options for aging in place. Project management controls ensure that the procurement of projects are delivered on time, within budget and to a high quality finish within a transparent public procurement process.

Such housing options could create popular neighbourhoods of choice if put in place alongside reputable management of shared services. The future needs of aging can be anticipated through accurate and timely demographic projections. Analysis of CSO figures can also accurately target areas in need of alternative sustainable housing. Such projections could direct a more suitable and timely housing supply, one that guarantees sustainable housing that is fit for purpose, ensures better value for money, and provides options for the individual to age in place. Delivery of safer age appropriate homes in secure environments where people want to live may have the potential to improve home comfort levels and save the lives of many loved ones in our communities and provide opportunities for Irish people to invest in the economic recovery.

5.12 Further Research Opportunities

The result of this work suggests that future research should address issues surrounding housing of an ageing society, as well as supply and demand issues to predict demand in particular areas. Accurate predictions could avoid repeating similar dramatic changes to the Irish economy and in the housing market in particular. The economic and environmental benefits at societal level warrants additional research and subsequent findings could help shape the policies and future of Irish housing.

The health and safety of all citizens, irrespective of age is paramount to the future of population health. A multipurpose 'one size fits all' approach must be avoided and options for aging in place demands continuous review and iteration to provide alternative living choices and higher standards for individual requirements. The government could introduce easy to implement initiatives to supply more age appropriate homes within the private and social sector.The architectural design brief for housing for the elderly must include the basic principles of barrier-free design and ease of access, companionship, sense of belonging, healthcare support, ease of operation, and security (Zuo et al., 2014). These principles must be considered when choosing suitable locations to provide a sense of place and security for the elderly residents.

Finally, this research is intended to improve the lives of the elderly. The United Nations General Assembly adopted the UN Principles for Older People, 1991, (www.un.org). These principles should act as guidance for DELIVERING SUSTAINABLE SOLUTIONS FOR AGING IN PLACE WITHIN IRELAND

6 CONCLUSION

The findings of this research are not intended to suggest that old age is something we should not look forward to with contentment. However, preventing a repeat of the previous delayed reactionary response to increased housing demand means radical reform within the housing sector. Proactive collaboration concerning all stakeholders can avoid the recent housing boom/bust cycle caused by an underlying demand for housing.

Such a proactive collaboration begins with a stock take of the existing houses in Ireland in the next population census of 2016. The collected data could provide a framework to identify any gaps or underperformance, as the population's needs changes over time. This information can further help to determine a timely and proactive mitigation response from the construction industry in collaboration with planners and policy makers. Such mitigation measures could avoid repeating the legacy of so called "ghost estates", where excessive speculative building took place in locations of low population. Strategic planning would ensure an adequate and timely supply of appropriate housing in response to meet market demand in locations of apparent need. The additional housing should include age-appropriate, barrier-free housing to address any underperformance gaps that may be found in the 2016 census. Delivering sustainable housing options for people to age in place in turn, has the potential to return existing family homes back to their intended use – to house families and provide a variety of choice for the population as a whole.

This study revealed a greater need for an intra-sectoral approach to planning Ireland's future housing as part of an overall vision for a greener, smarter economy. A proactive collaboration between the private and public sector could provide substantial monetary, energy and carbon savings for the population while providing safer homes for the elderly members of society.

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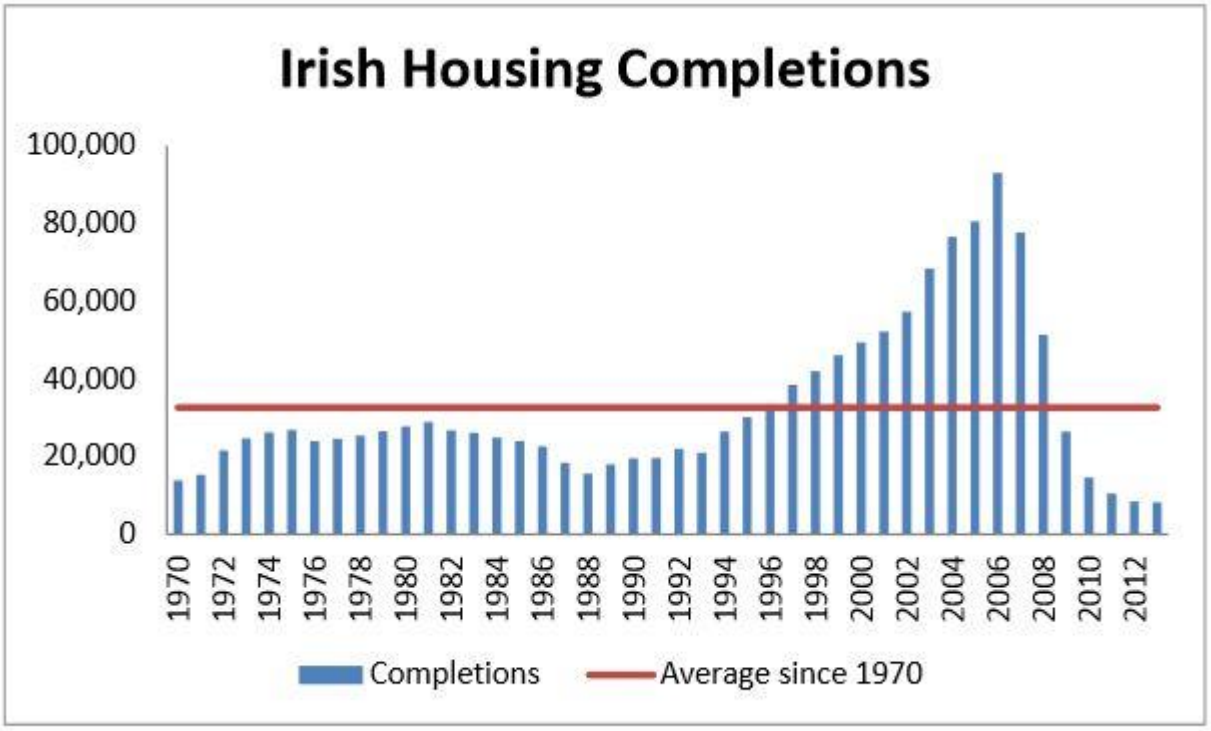
Appendix A



Source: DoECLG

Graph 2.0

Irish House Completions (Source DoECLG)

Annual House Completions 2001 -2011					
Source: Department of the Environment, Heritage & Local Government					
Year	**Social**	**%**	**Private**	**%**	**Total**
2001	4,875	9.3	47,727	90.7	**52,602**
2002	5,763	10	51,932	90	**57,695**
2003	6,133	8.9	62,686	91.9	**68,819**
2004	5,146	6.7	71,808	93.3	**76,954**
2005	5,559	6.9	75,398	93.1	**80,957**
2006	5,208	5.6	88,211	94.4	**93,419**
2007	6,671	8.5	71,356	91.5	**78,027**
2008	6,801	13.1	44,923	86.9	**51,724**
2009	5,344	20.2	21,076	79.8	**26,420**
2010	N/A	N/A	N/A	N/A	**14,602**
2011	N/A	N/A	N/A	N/A	**10,480**

Table 2.1
Department of the Environment, Heritage & Local Government.

Population in private households in permanent housing units, and average number of persons per private household, 1926-2011

	Number of private households	Number of persons in private households	Average number of persons in private households
1926	622,678	2,790,581	4.5
1936	647,362	2,791,047	4.3
1946	662,654	2,755,490	4.2
1961	676,402	2,686,301	4.0
1966	687,304	2,754,450	4.0
1971	726,363	2,858,603	3.9
1981	896,054	3,294,213	3.7
1986	976,304	3,442,303	3.5
1991	1,019,723	3,408,651	3.3
1996	1,123,238	3,528,552	3.1
2002	1,279,617	3,770,742	3.0
2006	1,462,296	4,106,753	2.8
2011	1,649,408	4,500,569	2.7

Source: CSO

Table 3.0

House hold size continues to shrink towards European norms. Source www.CSO.ie

Bruce Shaw Average Irish Construction Costs 2014

The average construction costs table is generated using Bruce Shaw's Cost Database and sets out typical building construction costs. Our database is the largest construction cost database in Ireland.

Average Costs	Cost Range			Including M & E Range
Commercial Offices				
Suburban Naturally Ventilated				
Shell & Core	€1,150	€1,550	per sq.m.	10-15%
Developer Standard	€1,250	€1,650	per sq.m.	15-20%
Extra for Air Conditioning	€165	€350	per sq.m.	-
City Centre Air Conditioned				
Shell & Core	€1,550	€2,200	per sq.m.	15-20%
Developer Standard	€1,700	€2,400	per sq.m.	20-25%
Office Fit Out				
95% Open Plan, No Catering	€450	€650	per sq.m.	20-30%
75% Open Plan, Limited Catering	€650	€850	per sq.m.	20-30%
60% Open Plan, Full Catering	€850	€1,250	per sq.m.	25-35%
Corporate HQ	€1,300	€1,650	per sq.m.	25-35%
Open Plan Work Station	€1,000	€2,800	each	-
High Tech Industrial				
Shell & Core	€850	€1,300	per sq.m.	20-25%
Developer Standard	€750	€1,300	per sq.m.	25-45%
Residential				
Estate House (Approx. 100 sq.m)	€1,000	€1,250	per sq.m.	10-20%
Developer Standard Apartments	€1,250	€1,850	per sq.m.	10-20%
Individual House Rebuilding Costs	(see chart - House Rebuilding Costs per sq.m)			
Shopping Centres				
Anchor Unit	€650	€850	per sq.m.	10-15%
Unit Shops	€850	€1,250	per sq.m.	10-15%
Mall	€1,500	€2,600	per sq.m.	20-25%
Retail Fit Out	€1,150	€1,650	per sq.m.	25-30%
Site Development Business Parks				
Roads & Primary Services	€155,000	€485,000	per hectare	
Warehouses				
Without Offices	€600	€750	per sq.m.	8-12%
With 10% Offices	€700	€1,050	per sq.m.	10-15%
Healthcare				
Acute Hospitals, Average Costs	€2,350	€2,750	per sq.m.	20-30%
Ward Blocks	€1,950	€2,350	per sq.m.	20-25%
General Operating Theatres	€3,500	€6,550	per sq.m.	45-60%
Nursing Homes	€1,700	€2,500	per sq.m.	20-25%
Accident & Emergency	€2,450	€3,500	per sq.m.	25-30%

Table 3.1

Bruce Shaw Average Irish Construction Costs 2014.

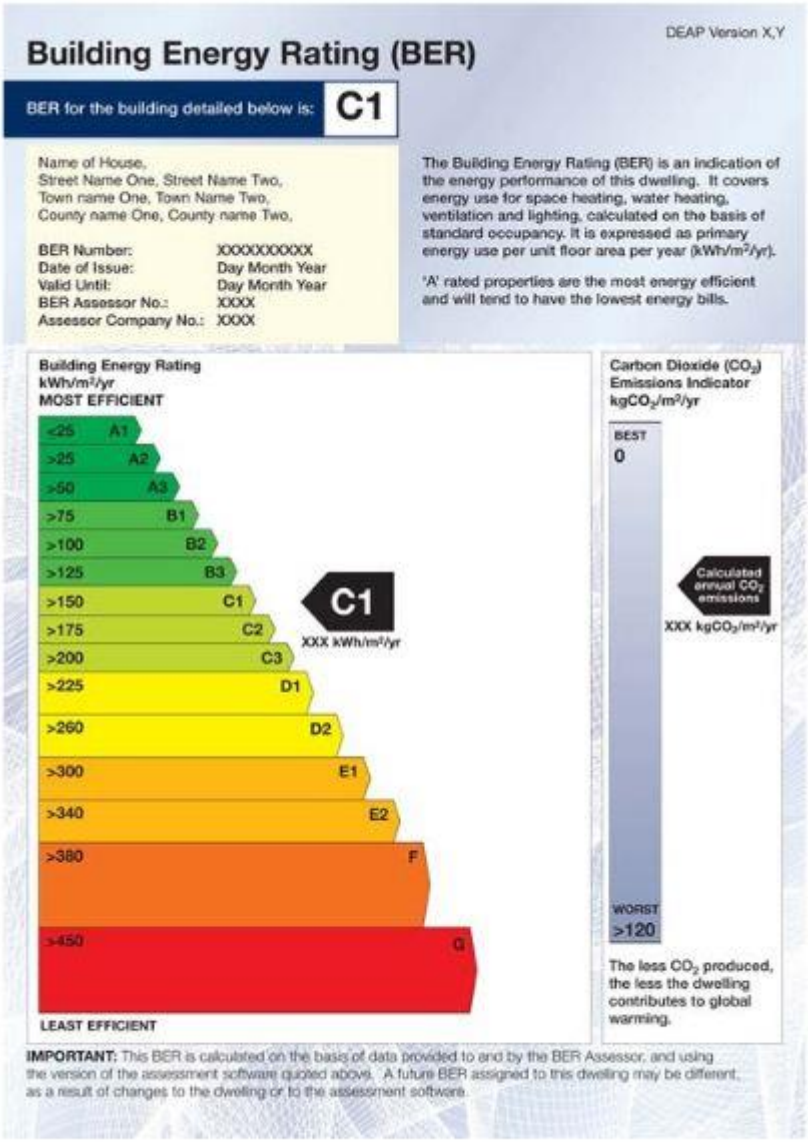


Image 3.2
Building Energy Rating (BER) Certificate.

http://www.seai.ie/uploadedfiles/InfoCentre/BER/BER_CERT_FINAL%281%29.pdf

URBAN 2014 Core Expenditure for Sample Household Types *Excludes Housing, Childcare, and the effect of secondary benefits*

2014	TWO PARENT					ONE PARENT			WORKING AGE		PENSIONER	
First Child	Infant	Pre-School	Primary	Infant	Primary	Infant	Primary	Pre-School	Single Adult living alone	Couple, co-habiting	Pensioner living alone	Pensioner Couple
Second Child		Primary	Secondary	Pre-School	Primary			Primary				
Third Child				Primary	Secondary							
Fourth Child					Secondary							
Food	95.16	125.19	150.37	155.97	236.37	66.19	72.32	96.22	57.05	83.96	69.23	82.41
Clothing	29.58	24.82	32.01	40.74	50.35	23.62	14.12	18.86	10.49	13.66	10.12	16.86
Personal Care	25.43	18.88	25.81	29.50	36.80	17.78	9.84	11.24	13.76	16.82	9.69	14.07
Health	16.63	16.33	16.88	24.36	25.16	13.72	9.54	13.43	6.19	9.42	12.18	24.29
Household Goods	25.25	20.76	21.72	30.62	27.69	24.08	16.94	19.58	5.92	6.89	17.17	18.54
Household Services	6.46	6.46	6.46	6.46	6.46	6.46	6.46	6.46	2.88	2.88	5.90	6.09
Communications	13.77	13.77	18.34	13.77	22.92	9.18	9.18	9.18	9.21	13.80	12.79	12.68
Social Inclusion & Participation	55.43	71.76	92.72	73.53	131.77	33.24	45.52	49.57	38.35	69.62	40.87	54.48
Education	1.98	8.70	24.25	8.70	46.52	1.98	8.70	8.70	5.26	8.74	...	...
Transport	56.77	62.30	62.30	62.30	67.84	28.38	31.15	33.92	34.38	68.77	...	...
Household Energy	46.34	44.84	44.84	49.18	50.50	46.07	44.57	44.57	28.77	31.73	51.17	53.06
Personal Costs	3.87	4.06	4.06	4.36	4.54	3.60	3.54	3.79	3.30	4.34	6.33	6.61
Insurance	34.63	39.09	38.85	43.55	47.53	20.44	20.44	24.91	15.67	29.86	12.91	23.97
Savings & Contingencies	24.66	29.98	29.98	35.30	40.62	19.93	19.93	25.25	10.64	15.96	10.64	15.96
Core Expenditure	435.95	486.94	568.58	578.33	795.08	314.68	312.27	365.67	241.89	376.45	259.01	329.00

Table 3.3

Vincentian Partnership for Social Justice, Minimum Essential Standard of Living Update 2014. Expenditure for a Pensioner living alone is outlined in red.

Image 3.4

Senior Citizens Housing Project, Mckee Court, Blackhorse Ave., Dublin 7, Ireland.
Source www.google.ie/maps

Table 4 Number of private households in permanent housing units, classified by type of accommodation, period in which built, nature of occupancy and number of rooms occupied

Household characteristics	Total	Type of accommodation						
		Detached house	Semi-detached house	Terraced house	Flat or apartment in a purpose-built block	Flat or apartment in a converted house or commercial building	Bed-sit	Not stated
Total	1,649,408	699,869	456,651	281,825	149,921	27,666	5,695	27,781
Period in which built								
Before 1919	149,939	80,020	16,176	37,923	2,975	9,977	1,818	1,050
1919 to 1970	357,018	134,504	106,889	95,788	10,383	5,813	1,552	2,089
1971 to 1990	386,610	186,695	119,336	61,707	14,046	2,241	498	2,087
1991 to 2000	238,724	111,618	79,107	19,021	25,626	1,962	293	1,097
2001 to 2005	266,110	103,994	77,125	33,883	47,196	2,081	260	1,571
2006 or later	171,397	69,646	39,852	21,032	37,763	1,588	210	1,306
Not stated	79,610	13,392	18,166	12,471	11,932	4,004	1,064	18,581
Nature of occupancy								
Own with mortgage or loan	583,148	275,810	184,275	89,670	30,218	1,313	59	1,803
Own outright	566,776	332,671	135,140	86,571	7,763	1,462	93	3,076
Renting	474,788	85,757	134,789	104,003	111,063	24,658	5,448	9,070
Renting from								
Private landlord or voluntary housing body								
Total	320,319	56,114	87,790	54,375	89,993	21,884	4,579	5,584
Average weekly rent (Euro)	166.61	157.94	165.33	169.62	180.60	142.89	109.38	156.64
Local authority								
Total	129,033	15,519	42,346	46,178	19,578	1,507	728	3,177
Average weekly rent (Euro)	59.01	60.90	57.98	56.28	63.70	81.34	60.34	63.40
Live here rent free from								
Private landlord	9,298	5,673	1,479	1,035	480	484	51	96
Local authority	614	278	91	94	113	24	7	7
Voluntary housing body	904	498	146	127	65	52	5	11
Landlord not stated	14,620	7,675	2,937	2,194	834	707	78	195
Not stated	24,696	5,631	2,447	1,581	877	233	95	13,832
Number of rooms occupied								
1 room	23,058	2,656	2,304	2,586	7,261	3,951	3,720	580
2 rooms	78,373	9,345	9,533	10,927	36,224	9,197	1,425	1,722
3 rooms	156,731	28,944	35,613	26,722	55,299	7,517	-	2,636
4 rooms	174,296	51,046	37,945	47,542	31,969	3,735	-	2,059
5 rooms	380,115	105,554	145,452	113,092	11,686	1,244	-	3,087
6 rooms	299,646	142,410	105,147	47,066	3,084	504	-	1,435
7 rooms	223,835	143,142	64,108	15,712	2	232	-	639
8 rooms	140,460	102,846	28,888	8,328	-	134	-	264
9 rooms	60,707	51,297	9,250	-	-	52	-	108
10 or more rooms	45,859	41,352	4,320	-	-	48	-	139
Not stated	66,328	21,277	14,091	9,850	4,396	1,052	550	15,112
Average rooms per household	5.3	6.3	5.4	4.7	3.0	2.6	1.2	1.9

Table 3.5

Central Statistics Office, Census 2011 – The Roof over our Heads.

Current provision of sheltered and extra care housing

The total stock of sheltered housing and Extra Care accommodation in the Blackburn with Darwen Borough is 1,574 units, comprising of individual flats, bedsits, bungalows or maisonettes. It is summarised below in Table 8.

Table 8 - Total Sheltered Housing Stock in Blackburn and Darwen at February 2011

Type of provision	Feb 2011	Comments
CAT 1	669	TVH describes these as "Good neighbour schemes"
CAT 2	400	
CAT 2.5	294	
Total	**1363**	

CAT 1 – purpose built for older people, alarm with no site warden but floating support

CAT 2 – self-contained accommodation for the less active older person which includes an element of warden support and range of communal facilities.

CAT 2.5 – frail and older people extra-care accommodation. This includes the full range of communal facilities, plus additional features, including wheelchair user environments and on-site care provision 24/7.

	Bedsits	Flats		Bungalows	
		1B	*2B*	*1B*	*2B*
TVH	152	290	13	182	35
Other	0	557	96	1	37
Total	**152**	**847**	**109**	**183**	**72**

The stock profile clearly identifies that the vast majority of the sheltered accommodation is 1-bedroom flats. Table 9 shows that over 80% of the sheltered accommodation available in the Borough has only 1 bedroom.

Table 3.6

Blackburn with Darwen Borough Council Older people's housing strategy (2011 - 2016) A strategy for housing and to support the wellbeing of older people.

Energy Costs

The chart below demonstrates how significantly energy costs vary between energy ratings. These costs have been derived from the average results of calculations of a 150m² typical Irish 1970's bungalow.

BER	Energy cost per m² (Approx)	Energy cost saving % (Approx compared to C1)	CO_2 emissions (Kg/m²/yr)
A	€ 3.50	84%	12
B	€ 6.00	73%	28
C	€ 9.00	60%	40
D	€ 12.00	47%	60
E	€ 16.00	29%	80
F	€ 19.50	13%	100
G	€ 22.50	N/A	115

Table 4.0

Refurbishment Solutions -The Road to Improving your Building Energy Rating (BER) Kingspan.ie

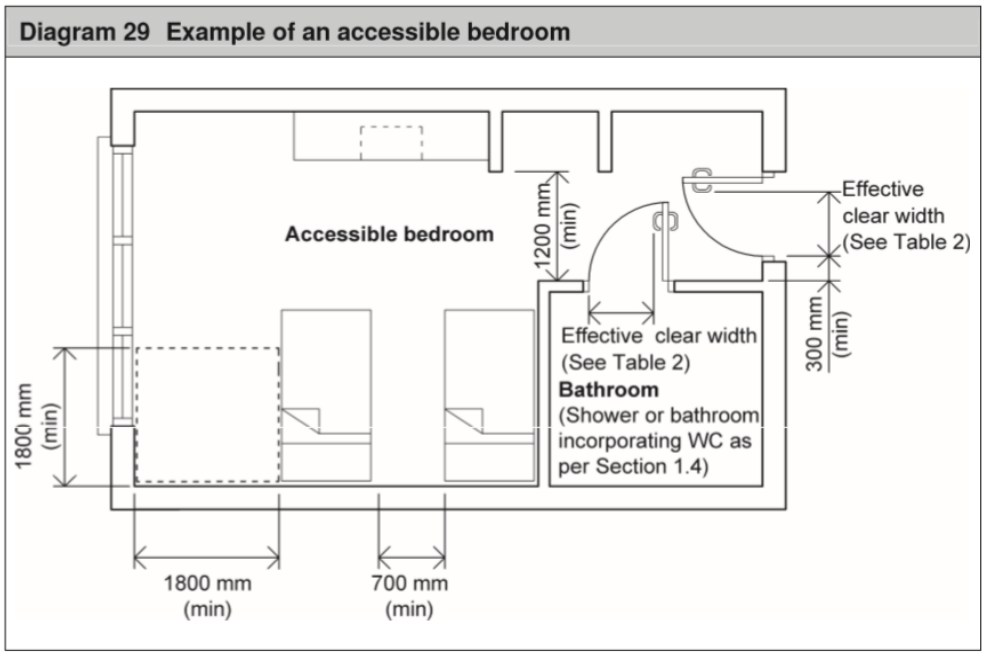
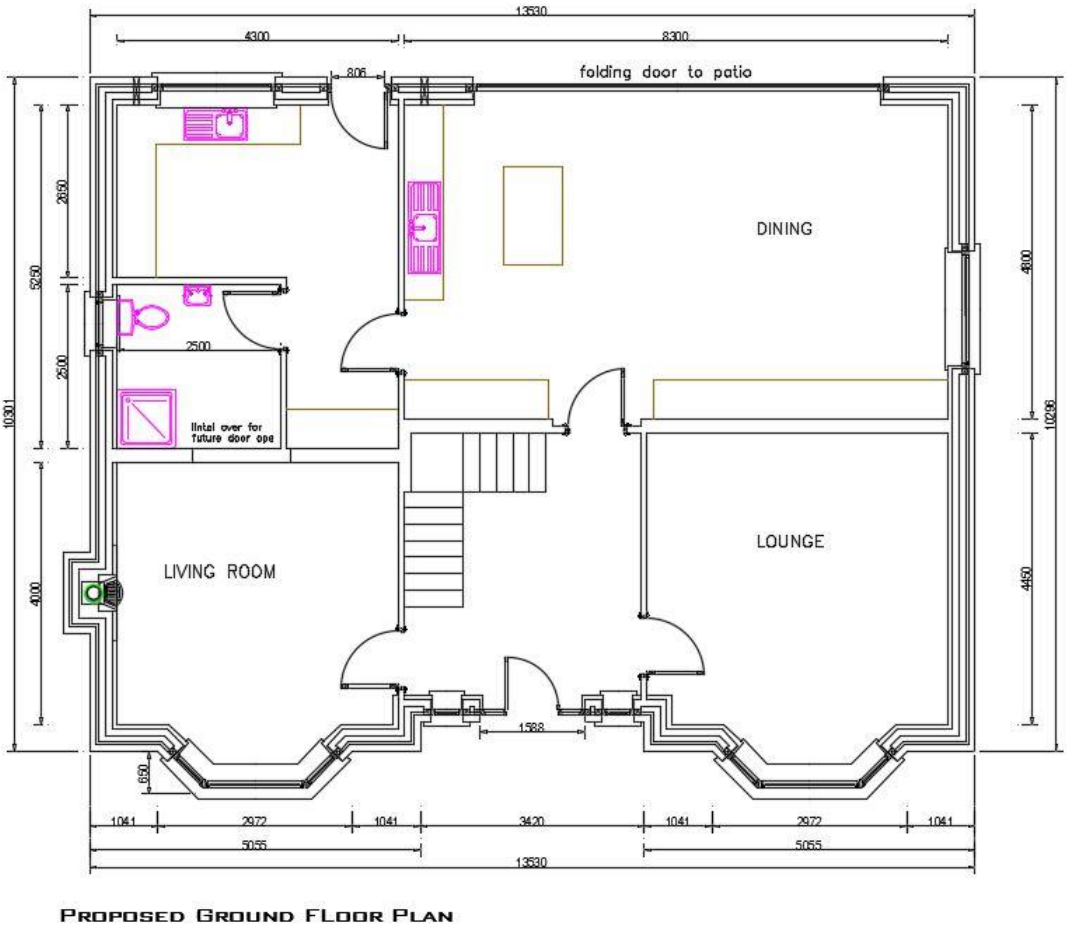


Image 5.0

Building Regulations 2010, Technical Guidance Document M Access and Use



PROPOSED GROUND FLOOR PLAN

Image 5.1

Future Proof Design of a two storey farmhouse for Multi-generational living. (Author's design)

Image 5.2
Access is a hazard in the 4 storey apartment blocks as shown above.Source www.google.ie/maps

Image 5.3
Access is a hazard to the large terraced houses above.Source www.google.ie/maps

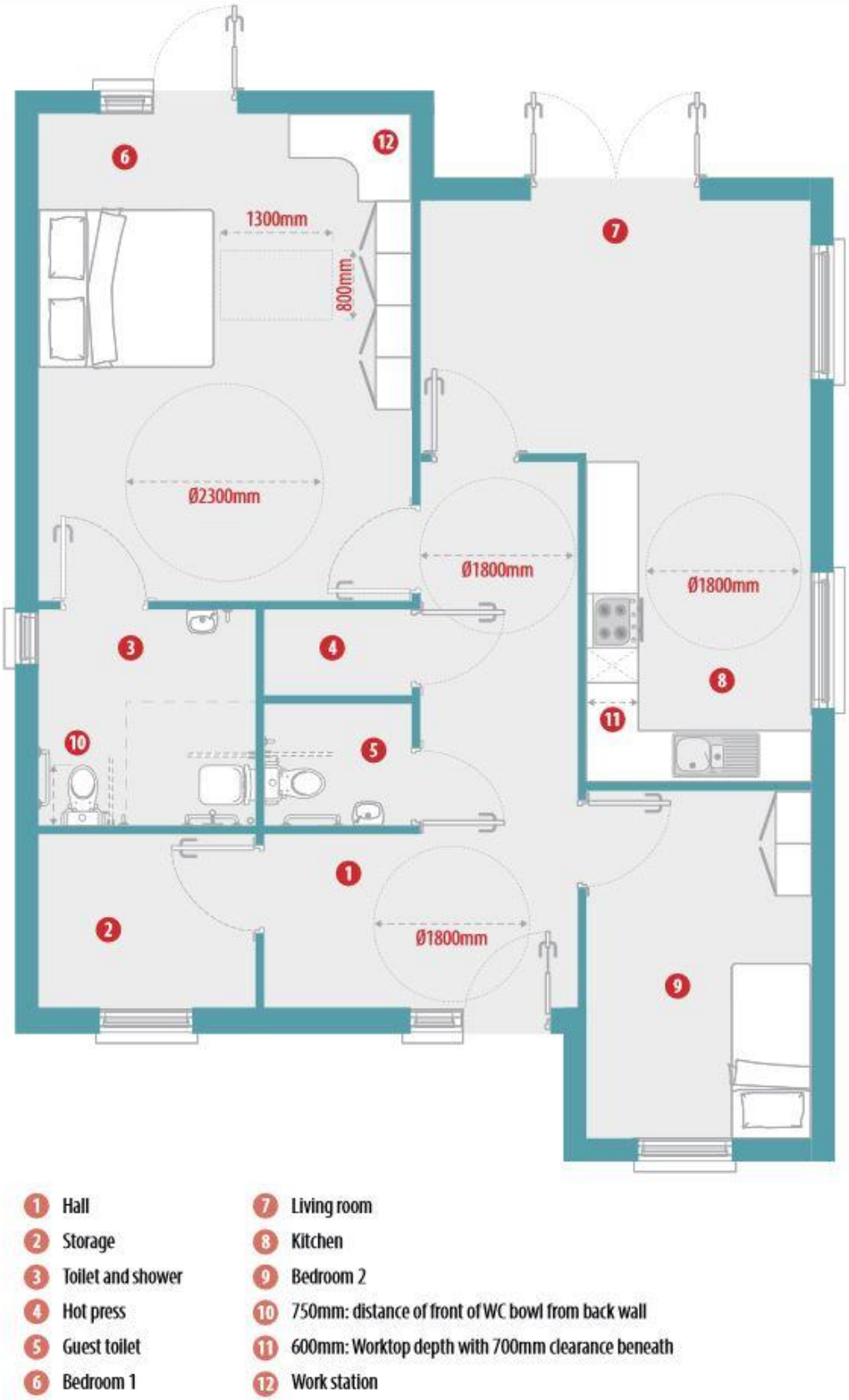


Image 7.0

Floor Plan Layout for a typical wheelchair accessible dwelling, p. 131 Irish Wheelchair Association, Best Practice Access Guidelines, Designinging Accessible Environments

Image 7.1
The Orchard Day and Respite Centre Blackrock, Co Dublin (Authors photo)