Design Principles

‘When one tugs at a single thing in nature, he finds it attached to the rest of the world.’

John Muir

The design principles that follow draw directly on outcomes of the PhotoVoice workshops. They were iteratively refined during the Charrettes and afterwards in conjunction with the study participants, partners and design team. Further insight and elaboration of the principles are based on a review of evidence-based research literature. Each principle is illustrated with photos taken by seniors. For each principle, the challenges and opportunities for designers and planners are identified.

Table three illustrates the number of photos in each location analysed by theme. The photos selected represent the consensus view of each group but it must be emphasised that it is not indicative of all of the photos taken by the participants, nor of those shared in the PhotoVoice workshops. They were the photos chosen to tell the story each group wanted to convey. Thus it provides an indication of priorities, which were further tested in the Charrettes.

Table 3: Number of photos in the most frequently identified themes (with both positive and negative associations) by location

<table>
<thead>
<tr>
<th>Neighbourhood</th>
<th>Total</th>
<th>Sunshine Coast</th>
<th>Brisbane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavements maintained, accessible, unobstructed</td>
<td>34</td>
<td>30+</td>
<td>4</td>
</tr>
<tr>
<td>Outdoor environment and aesthetics</td>
<td>30</td>
<td>15</td>
<td>15#</td>
</tr>
<tr>
<td>Meeting places that include older people *</td>
<td>29</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>Accessible services, close proximity to housing **</td>
<td>27</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Green spaces – accessible</td>
<td>25</td>
<td>18+</td>
<td>7</td>
</tr>
<tr>
<td>Fostering interaction *</td>
<td>21</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Local gathering places *</td>
<td>21</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Outdoor seating</td>
<td>20</td>
<td>16+</td>
<td>4</td>
</tr>
<tr>
<td>Housing close to services **</td>
<td>18</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Built amenity</td>
<td>17</td>
<td>6</td>
<td>11</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Accommodation</th>
<th>Total</th>
<th>Sunshine Coast</th>
<th>Brisbane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal design</td>
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<td>44</td>
<td>44</td>
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<tr>
<td>Housing meet environmental conditions</td>
<td>36</td>
<td>20</td>
<td>16</td>
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<tr>
<td>Range of suitable housing options in local area</td>
<td>32</td>
<td>10+</td>
<td>22</td>
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<tr>
<td>Appropriate design, well structured</td>
<td>30</td>
<td>10</td>
<td>20</td>
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<tr>
<td>Sufficient space</td>
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<td>17</td>
<td>11</td>
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<td>Safe in the home</td>
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<td>10</td>
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<tr>
<td>Affordability</td>
<td>22</td>
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<td>11</td>
</tr>
<tr>
<td>Private outdoor space</td>
<td>18</td>
<td>11</td>
<td>7</td>
</tr>
</tbody>
</table>

* indicate themes similar to each other
+ reveal large differences in perceptions between the two locations
# Brisbane participants mainly reported negative aspects

Many of the principles derived from the ‘voices’ of seniors align with the widely recognised principles from best practice planning policies and guidelines reviewed in the previous chapter. These included ensuring connectivity via well maintained level walking paths to public transport, services and facilities; sense of community; and features enabling accessibility personal security both in home and neighbourhood. In fact, the greatest number of photos illustrated characteristics of universal design, although many participants were not familiar with the term at the beginning of the study. They provided photos of positive aspects of universal design such as ramps, hobless showers, lever taps and windows at an appropriate height, as well as negative features in a home such as narrow, winding, or patterned stairs, and difficult-to-reach kitchen cupboards and power points. However our participants also identified additional matters of interest to them that are not components of the WHO or other policies and guidelines.

We tentatively suggest that these additional themes partly reflect the sub-tropical location of the case studies and therefore incorporate those features that take advantage of mostly year-round comfortable temperatures, but also protect from extremes of rainfall and sunshine. Examples follow.

- Private outdoor space useable for gardens, relaxation or entertaining, such as good sized patios and balconies were considered important to extend their living space and provide fresh air.
- In spite of the potentially long-term return on investment, several participants had installed sustainability features such as solar power or rainwater tanks and indicated that a factor was the immediate cost savings. In addition, though, many also sought to maximise the benefits of environmental conditions such as natural light and cross ventilation, and to minimise energy use such as through using a clotheslines rather than a dryer. Again economics was a component of the rationale.
- The desire for sufficient indoor space for hobbies or interests extended the idea of sufficient space and privacy mentioned in the WHO criteria. The need for shade in relation to outdoor spaces and bus shelters extended WHO’s idea of ‘shelter’.
- Attractive built visual amenity and human scale developments including local shopping centres were appealing to seniors. Differences were apparent between photos taken by Sunshine Coast and Brisbane residents. The big city residents were more security conscious both on the street and in the home – this was illustrated with photos of security screens around patios and high fences preventing street surveillance. City dwellers were also more concerned with traffic congestion and air and noise pollution from a number of sources. On the other hand, Sunshine Coast residents valued their green outdoor spaces and natural amenities but complained about the poor public transport options, characteristic of a community with a dispersed population.

The following are divided into eight neighbourhood scale and seven accommodation scale principles. This does not mean that neighbourhood principles are the only ones to be addressed by urban planners, and the accommodation scale by architects. Design at one scale affects the other. For example, providing a large window for ventilation which exposes an unattractive view only partly contributes to quality of life. Building a sense of community can reduce fear from crime and avert the building of home fortresses. Thus a range of expertise is needed to plan and develop a vibrant liveable infill community.

Likewise many principles reflect all three themes of liveability, affordability and sustainability and illustrate the complex interrelationship between them. For instance, level shady treed walking paths and open space: enable exercise and physical well-being and reduce social isolation (liveability); reduce need for vehicle transport and therefore green house gas emissions (sustainability); and minimises costs in physical and emotional health care to the individual and the public purse (affordability). This became even more apparent at various stages when participants deliberated about photos to illustrate a theme during the Charrettes.

Importantly the following principles are illustrated with photos taken by the senior participants. The photos demonstrate rich meaning for the participants, derived from their own experience, knowledge, and thoughtfulness, demonstrating more than simply numbers of photos taken on a theme. Participants were motivated to share their photos, hoping that this will lead to improved living conditions for older people.
Neighbourhood Scale

The first set of principles reflect photos taken to illustrate what makes a neighbourhood or street a good place to live and what are the barriers to having a good neighbourhood or street to live.

**At the Neighbourhood Scale, the principles are:**
- **Principle 1** – Walking Paths and Walkways
- **Principle 2** – Proximity to Services and Facilities
- **Principle 3** – Outdoor Environment and Use of Green Space
- **Principle 4** – Public Transport and Connectivity
- **Principle 5** – Pedestrian Safety in Neighbourhoods and Towns
- **Principle 6** – Safety for Older Motorists in Neighbourhoods and Towns
- **Principle 7** – Sense of Community
- **Principle 8** – Perceptions of Personal Safety

Figure 8: Shaded neighbourhood park (B).
Principle 1

Walking Paths and Walkways

Sufficiently wide and well-maintained paths provide essential active transport connections between services, facilities, housing and outdoor spaces in our communities.

- Essential links are provided between services, facilities, housing and outdoor spaces.
- Accessible well maintained walkways have even grades and smooth surfaces with shade and seating.
- Walkways have a minimum width of 1.8 metres; adjoining verges are at level with footpaths to minimise uneven surfaces and risk of falls.
- Pedestrians should be physically separated from bicycles, mobility scooters, and vehicles, with clear signage.

Figure 9: Shady footpath with seating (SC).
What the participants told us...

Well maintained, even graded and accessible walkways provide connectivity between places as well as opportunities for exercise and relaxation. However, shade and seating to rest along the way is essential.

Steep streets were well documented as barriers for older people in the neighbourhood. Numerous images in both locations demonstrated how steep residential streets, some with cars parked along either side and/or without walkways presented a significant obstacle for older people walking to transport, services or facilities within their neighbourhood.

Concerns were raised about pedestrian/vehicle/cyclist road use conflicts – which are particularly valid in light of the academic literature documenting the vulnerability of older people as pedestrians. This issue is also captured from a pedestrian/vehicle perspective under Principle 5: Pedestrian Safety in Neighbourhoods and Streets.

What the research tells us...

Well built and maintained walking paths in neighbourhoods, town centres and outdoor spaces contribute to seniors’ social interaction and involvement in the community as well as their health and well-being. Participation in regular physical activity improves older people’s physical capability through enhancing muscle strength, aerobic capacity, balance and flexibility, and minimises the physiological changes associated with ageing. It enhances cognitive functioning and has a positive effect on negative emotions90.

Walking is the main form of physical exercise for older Australians but older people are concerned about the speed and inability to hear cyclists and mobility scooters on shared pathways91. Many studies indicate that diminishing visual acuity and lack of exercise are factors most associated with falls in the elderly population92. A clear safe ‘path of travel’, separated from traffic, enables access to a local transport stop, social activities, retail and health services. Uneven paths and steps increase risk93. Safe, even graded and well maintained walking paths are important because even if an older person lives within walking distance to services, a path of travel that is hazardous will inhibit use. The lack of footpaths in many residential neighborhoods mean that people walk on the road or nature strip, increasing the risk of falls or traffic accidents.

Accidents are a major cause of concern for older people, with falls being the most common reason for moving to residential aged care94. Older people represent a large proportion of pedestrian fatalities and serious injuries due to age-related mobility and perceptual impairment95. Falls can be minimised by ensuring that walking surfaces are slip-resistant, glare-free, of uniform texture and colour with clearly distinguishable borders and good contrast between the pavement and its immediate surrounds96. In addition, for ‘shufflers’, lack of coordination and balance can also be a problem so walkway surfaces should be non slip even when wet.

Figures 10 and 11: Left - Poorly maintained path is hazardous (SC); Right – Open space along the River (B).

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90 Alves and Sugiyama 2006
91 Quinn et al 2009
92 Brawley 2002
93 Joseph and Zimring 2007
94 Quinn et al 2009
95 Oxley et al 2006
96 Brawley 2002
Figures 12 and 13: A characteristic of both the Sunshine Coast and Brisbane is the attractive treed areas that are too hilly for comfortable walking for seniors and often do not have footpaths. (Left – SC; right – B).

**Challenges**

- Increased costs to Local Governments to provide adequate separation of pedestrians and cyclists as it is anticipated more people (including children) will use bicycles in the future, especially for commuting. Priorities will need to be identified for locations where this is feasible. It might not be practical at the neighbourhood scale.
- Topography and distance are key factors influencing provision and maintenance of sufficient and appropriate paths in both Brisbane and the Sunshine Coast.

**Opportunities**

- Councils could prioritise walkway maintenance programs in an 800m radius of centre facilities, services and transport stops and in areas with suitable topography.
- Methods that physically segregate pedestrians from vehicles and bicycles could decrease the exposure of older people to potentially dangerous road use conflict scenarios.
- New developments should allow sufficient space for street trees for shade and seating or rest areas in a subtropical climate.

Figure 14: Easy access to local park’s path and bridge, 5 minutes from home (B).
Principle 2

Proximity to Services and Facilities

Housing for seniors is located in close proximity to safe and accessible services and facilities that are important to them.

- Housing suitable for older people is located in close proximity to small scale shopping facilities and services. Particularly important are health services.
- Housing suitable for older people is located in close proximity to or easily accessible by public transit to sporting, fitness and recreation facilities, libraries, and Community Centres, to promote active ageing and participation in the community.
- Services and facilities are safe and accessible for older people (ideally without steps or stairways).

Figure 15: Apartments integrated with shops and services (B).
What our participants told us...

According to participants in both locations, features of a good neighbourhood involved living in close proximity and easy pedestrian access to services and facilities such as banks, post office, medical, cafes, community or recreational centres, and churches. A distinct preference was for small scale, low rise services and facilities in a “village style” setting. This was mostly associated with the need for ease of access (by public transport or car parking within close proximity of the facility) and ease of sourcing goods and services closer to home in an environment that was less congested with traffic and people than larger shopping complexes. Participants recommended efficient, safe, reliable and frequent public transport to and from large shopping facilities as well as “seniors only” parking zones.

What the research tells us...

Design of the urban environment has a major influence on older adults’ independence, safety, involvement in social activities, and access to services. Recent studies suggest that locational features are more important for older people than the dwelling itself, that is, being near family and friends, general health services, activities, and local shops97. Further, attachment to locality or a local community that is familiar appears to be more important with increasing age98. In Australia, 59% of seniors live within 15 minutes travel distance to a friend and 33% to one of their children99. “Baby boomers” intend to transition to retirement by working part-time,100 and workforce participation among older people is increasing101. Volunteering, both formal and informal, is a way for older adults to remain productive and involved in their communities. While the community benefits from a rich resource, older volunteers also tend to live longer102.

Livable communities foster involvement in community decision-making and intergenerational activities, an active lifestyle, and lifelong learning103. About 25% of older Australians are involved in formal or informal learning104 at a community centre, academic or religious institution, or at home via the internet or distance learning105. Such “later life learning” (or “leisure education”) has economic, social and health benefits106. Thus maintaining access to facilities and transit is crucial to retaining one’s independence and connections with the community, particularly as mobility decreases. In fact, it is clear that older people will take advantage of services and facilities if accessible on foot or by public transit107. Living within an 800m or 10 minute walking distance to facilities or public transport is generally considered acceptable by people of all ages108.

97 Weidmann and Kelly 2011, Oldsberg and Winters 200
98 Boldy et al 2009
99 Booth and Lopez 2011
100 Humpel and O’Dwer 2009
101 Quinn et al 2009; Spoehr et al 2009
102 Warbuton and Lovell 2005
103 Hwang et al 2008
104 Engelbrecht 2010
105 Arsenault 1998
106 Engelbrecht 2010; Skladzien and O’Dwyer 2010
107 Carp 1980
108 ALGA et al 2009
**Challenges**

- Managing noise impacts are a challenge in mixed-use developments and generally when housing is in close proximity to facilities and transport.
- Where seniors have to travel long distances to access services, it can be a significant expense. Extensive low-rise development in a neighbourhood does not foster walkable catchments.
- Cost of car parking is an issue with implications for design and market appeal in smaller centres where there is a limit on density and height of development.
- Rising land costs will inhibit current low-rise development into the future.
- At grade car parking (as opposed to more costly basement car parks) could involve unsightly overlooking of cars and imbalance of landscaping to tarmac. Site size influences type of development.

**Opportunities**

- Strategic spatial planning of services and facilities can take into account proximity needs of older people by designating land within 800m of small scale facilities and transport in quiet, accessible locations as age-friendly in Planning Schemes. Incentives (planning bonuses) could be offered for age-friendly dwellings constructed in these areas.
- Mixed use developments and housing above shops and offices may achieve sufficient density and resolve proximity issues. Partnering between not-for-profits, public institutions and/or private developers might facilitate multi-use developments.
- Mixed-use development (over a certain size) generally necessitates basement car parking which allows for a better street interface and communal open space. Off-peak car park sharing, car pooling and sharing schemes can reduce car accommodation which reduces housing/development costs.
- Larger shopping centres or community organisations could provide specialised concierge shopping services which assist seniors or other members of the community with navigating the centre, provision of mobility aids (if required), assisting with their shopping requirements and carriage of goods and transport to and from home. This could become even more important in the future if developments try more innovative approaches to mixing retail or commercial services with residential dwellings for older people.
- “Village” scale centres and neighbourhoods can facilitate relationships between residents and shop-keepers, and thus foster a caring sense of community.
- Human scale developments that welcome pedestrians can contribute to street vitality.

**Figures 19 and 20:** Left – Village atmosphere, trees and seats (SC); Right – Opportunities to socialise (SC).
Principle 3

Outdoor Environment and Use of Green Space

Natural places with shade, shelter and seating provide opportunities for social interaction, observation, exercise, and relaxation.

- Outdoor environments and green spaces provide opportunities for social interaction, observation and rest through shelter, shade, and seating.
- Residential areas, particularly those of higher density, have easy access to green open space.
- Attractiveness is enhanced through views of trees, water and wildlife.
- Neighbourhood living is generally free of pollution (air, water, land, noise).

Figure 21: View points with seats – but no shade (SC).
What the participants told us...
Sunshine Coast participants placed a strong importance on natural and scenic amenity, views, tranquility, and green open spaces with walkways that have seating to rest along the way and are well shaded, maintained, and accessible. This may reflect the level of land use change and development on its path to urbanism. In contrast, Brisbane participants emphasised safety, access, and interaction in ‘organised’ public spaces, such as neighbourhood parks. They were also concerned about land, water, noise and air pollution from litter, traffic and industry.

What the research tells us...
Extensive research has demonstrated the restorative and stress-reducing effects of the natural environment\textsuperscript{109} and\textsuperscript{110} and the positive effects of access to green spaces on health and longevity of older people\textsuperscript{111}. Early research on the relationship between age ing and nature found ‘that nature, defined as yards, trees, shrubs, gardens, parks, and landscaped settings, was valuable for elderly residents’ who lived in apartments and played a much more significant role for the elderly than developers and policy makers first thought\textsuperscript{112}. Certain environmental features influence older people’s choice and use of green open space and parks: seating, cafes, and shelters which facilitate social interaction or observation; toilets; quality of trees and plants; attractive views including wildlife and water features (fountain, river, beach); low nuisance (dog droppings and undesirable people); and easy access to the site (including public transport, car park, light traffic, short walk)\textsuperscript{113}.

\textsuperscript{109} Kaplan 1995
\textsuperscript{110} Grahn and Stigsdotter 2003
\textsuperscript{111} Takano et al 2002; de Vries et al 2003
\textsuperscript{112} Talbot and Kaplan 1991 cited in Wright and Lund, 2000
\textsuperscript{113} Joseph and Zimring 2007; Grahn and Stigsdotter 2003; Thompson et al 2007

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figures22and23.jpg}
\caption{Figures 22 and 23: Left – Litter detracts (B); Right – Beautiful places (SC).}
\end{figure}
Challenges

- In existing infill areas, the location and structure of open space is often already set and additional open space can only be provided by a private developer or at Council expense. This may limit the ability to maintain quality of life for older people as density increases.
- Effort is needed to retain, make use of, and enhance shade, trees, and views in existing older neighbourhoods.
- As the size of complexes and private outdoor space reduces, people will need to have access to more public open space. Public open space will need to accommodate an increasing variety of needs.

Opportunities

- Neighbourhoods subject to infill development should protect existing open space and in particular provide shaded areas and ensure useability through design of parks and walkways/trails.
- Infill developments can provide public or semi-public space for the existing neighbourhood to enjoy and attract demographically mixed users onto a site. This could involve housing that overlooks either public space or a communal courtyard.
- Green roofs, that is a roof that is partially or completely covered with vegetation, can provide thermal regulation, contribute to biodiversity and play a role in a hierarchy of communal or private open space. However roof top gardens with sufficient substrate for larger plants add cost and complexity to the construction process due to need to provide for to additional load bearing capacity.
- Public open spaces should provide for a diversity of ages, lifestyles, abilities and preferences. As neighbourhoods densify, there will be greater demands on the versatility and utility of public open space and shared open space. Active uses, spaces for quiet contemplation or relaxation and interaction should be designed to co-exist and be stimulating for all ages and not limited to playgrounds for children.
- Interactive public open space options that might appeal to older people include community gardens/vertical gardens/ green walls, interactive art /outdoor studio/classroom space, outdoor amphitheatre, wall for screening outdoor movies, dog parks, and giant chess.

Figure 24: Close to a quiet park in a safe area (B).
Principle 4

Public Transport and Connectivity

Seniors’ independence is supported through reliable, frequent, efficient and affordable public transport options, with comfortable and safe transport stops.

- Public transport is reliable, efficient, frequent and affordable.
- Public transport stops are within close proximity to housing.
- Transport stops have adequate seating, shelter and shade from the weather.

Figure 25: Close to good public transport (B).
What our participants told us...

Brisbane participants generally showed positive images about frequency and reliability of transit service, and adequacy and access to bus stops. In contrast, those in the Sunshine Coast presented a negative view of public transport due to concerns regarding frequency, reliability, efficiency, and connectivity. Other concerns included the lack of protection from weather by poorly designed public transport shelters. These became dangerous when people moved behind the shelter to find shade, due to drop offs or uneven surfaces. Some older participants also expressed concern about safety on public transport, such as the risk of a fall embarking/alighting from public transport (possibly due to an increasing difficulty in depth perception associated with ageing).

Public transport is important for older people in Brisbane, particularly if they wish to live affordably and/or sustainably. As older people become more frail, other community based alternatives to public transport become increasingly important in order to remain active and engaged within their community. One Sunshine Coast participant shared that, following a fall on a bus due to the driver starting to move the bus before she was seated, she was too frightened to use public transport after she recovered from her injuries. She now relies on friends and community care to help her to get to her volunteering job and pick up the groceries due to the steep hills around her home in the hilly hinterland village of Woombye.

What the research tells us...

An Australian study indicated that while 85% of older home owners had access to public transport of some form, the vast majority depended on private cars, partly due to the freedom and independence they offer\textsuperscript{114}. In both Victoria, Australia and the USA, research suggested that public transport accounts for less than 10% of all journeys by older adults\textsuperscript{115}. The barriers to using public transport are reported to being related to schedules prioritised for commuters; unsuitable routes; excessive distance or difficulty in accessing transit stops; lack of services (in some areas); irregular or unreliable services; logistics of boarding and alighting; lack of seating at bus stops; transfer/waiting times between transport modes; crowding; and concerns about crime and safety\textsuperscript{116}.

Public transport in many areas of Australia is limited and unviable due to low population densities. For older people in rural areas, loss of a driver’s licence often means a move into town, while for suburban residents public transport service levels may be poor. Loss of a driver’s license can impact on mobility with consequences for independence, social connection, self-esteem and depression, particularly in absence of adequate public transport\textsuperscript{117}.

The proximity to transit service increases older people’s transit use. Activity clusters of commercial and service facilities are advantageous to older suburban populations who age in place\textsuperscript{118}. The relationship between where a home is located and where jobs, facilities and services are located generates transport demand\textsuperscript{119}. In areas where public transport is limited, the majority of household travel is by car. This has impacts on the affordability of living due to vehicle operational costs and has collateral effects such as decreasing air quality through car emissions. For older people, proximity to reliable, efficient, frequent and affordable public or community based transport is particularly important so they can continue to be active and independent, even if they no longer use a vehicle.
Challenges

- Frequent public transport is not economically viable in existing low density areas suitable for infill. Peak services are often only provided to or within activity centre catchments. Off peak frequency of services (when seniors may be more likely to travel) is an issue for timetabling, particularly on the Sunshine Coast.
- Location of residences close to public transit can have mixed effect on amenity due to noise and air quality and can increase land use costs for infill development.
- Bus transport has greater challenges for seniors than trains which may account for perspectives on the Coast where buses predominate. As the proportion of older people increases, the number of priority spaces for older people on public transport needs to be reconsidered\textsuperscript{120}.
- Some locations simply do not provide an environment suitable for transitioning to public transport for seniors.

Opportunities

- Mixed land use, that is, locating key facilities such as shops and schools, close to homes and on the most convenient path of travel between major activity centres is key to ensuring a high level of active transport, and will also help ensure the sustainability of commercial activities\textsuperscript{121}.
- Location of housing close to public transport stops support access in two ways, i.e. more visitors for seniors and seniors leaving home to be involved in social interaction.
- Mixed-use development and an increase in density is a natural driver of public transport hubs.
- Where public transport cannot meet the needs of older people, other community-based transport should be considered. Services could include specialised community transport services such as small off peak buses, priority seating/parking for seniors, and subsidised taxi services.
- Training programs for bus drivers should include the importance of courtesy, obeying traffic rules, stopping at designated transport stops, waiting for passengers to be seated before driving off, and parking close to the curb so that it is easier for older people to step on and off the vehicle\textsuperscript{122}. This would benefit people of all ages.
- Weather in subtropical locations can be variable, and greater innovation in the design of public transport shelters could provide adequate shade and more effective protection from sun, wind and rain.

Figure 28: Proximity to bus stop and permeability (B).

\textsuperscript{120} Quinn et al 2009
\textsuperscript{121} ALGA et al 2009a
\textsuperscript{122} WHO, 2007
Principle 5
Pedestrian Safety in Neighbourhoods and Town Centres

Safe pedestrian infrastructure contributes to seniors’ confidence and independence.

- Pedestrian activated street crossings provide sufficient time to cross safely.
- Non-slip, easily accessible gutter crossings are not too steep for mobility support devices.
- Traffic islands and pedestrian crossings are located to provide sufficient visibility for drivers and provide time for older pedestrians to cross safely.
- Traffic calming devices promote slower speeds in local streets.
- Cul-de-Sacs provide safe ‘no thoroughfare for vehicles’ streets as well as pedestrian connectivity.
- Provision of infrastructure for motorised scooters does not conflict with vehicular, pedestrian or cyclist users.
- Access to public buildings needs to meet AS 1428.1 standards.

Figure 29: Pedestrian Island (SC).
What our participants told us...

In both case study locations, participants expressed concern with personal safety around pedestrian/vehicle/cyclist road use conflicts. Shared footpaths are becoming increasingly dangerous places for older pedestrians due to cyclist traffic. The need for footpaths that can accommodate mobility scooters was raised. In addition, streets should also be safe and quiet, with traffic calming devices or cul-de-sacs to prevent noise from through traffic. Pedestrian activated crossings are required that provide sufficient time to cross and are designed and engineered to allow safe ingress/egress for pedestrians using mobility devices through a shallow ramp angle. Roundabouts were seen as dangerous for pedestrians to navigate.

What the research tells us...

A recent South Australian study found that for older adults, maximising the attractiveness or safety of a walking path is more important than minimizing the distance to destinations. The biggest limitation to walking for everyday activities and exercise was a concern for safety, mainly busy and trafficked streets and unsafe street crossings\(^\text{123}\).

Non-intentional injuries from falls and road crashes are typically the most common events leading to injuries among older people. Pedestrian crossings need to consider the slower speed of crossing for people with mobility difficulties and to have a smooth transition from footpath to roadway\(^\text{124}\).

People with mobility restrictions still have some difficulties with inaccessible public buildings and recommendations are that design criteria in AS 1428.1 also need to be revisited to ensure they meet the needs of people aged over 60.

Older adults may have difficulty with wayfinding due to vision and hearing impairments and dementia. Familiarity with the neighbourhood, clear signage, logical routing, distinctive landmarks (a tree, garden, sculpture), distinctive doorways, and adequate lighting can all assist wayfinding\(^\text{125}\). This planning for ‘legibility’ needs to include the range of senses to provide cues: visual distinction and colour, materials with tactile differentiation, sound and acoustic design and smell (e.g. flowers and trees)\(^\text{126}\). There is a general desire among people, even with dementia, to remain living at home for as long as possible so it is important that the design of their local community supports their independence. The familiarity of their home and local neighbourhood has been shown to assist them to better cope with their mental and physical symptoms\(^\text{127}\). Small and discrete neighbourhoods are easier to find one’s way around.

Figures 30 and 31: Left – Steps interrupt public path (SC); Right – Pedestrian unfriendly bridge (SC).

\(^{123}\) Sivam, A 2011, p.9
\(^{124}\) Quinn et al 2009
\(^{125}\) Quinn et al 2009; Vic Health 2010
\(^{126}\) Judd et al 2009
\(^{127}\) Sheehan et al, 2006
**Challenges**

- Roads are barriers to pedestrians.
- Shared zones can sometimes cause confusion or frustration between road and pedestrian users if the rules of the shared zone are not clear.
- Provision of cul-de-sacs in neighbourhood design are debated by professionals. On one hand, they can impact on the connectivity of streets for vehicles and pedestrians, may cause confusion for visitors or emergency vehicles, and can be an inefficient use of land and more costly road construction option than through-streets. On the other hand, especially in areas where there are no footpaths, cul-de-sacs are seen as safer for pedestrians as there is no through traffic and cars travel at slower speeds. They also clearly define a small group of neighbours which contributes to sense of community.
- Manage noise impacts and street interfaces.

**Opportunities**

- Increasing the density in neighbourhoods can provide the impetus for addressing the needs of the increasing numbers of pedestrians and for slowing vehicles\(^{128}\).
- Priority should be given to pedestrians at local shopping areas, public transport stops and stations by requiring reduced vehicular speed and alternative routes.
- A clear road network hierarchy can delineate and link wider arterial and carrier streets with narrower local neighbourhood streets and cul-de-sacs.
- Streets are a fundamental element of public space which can contribute to urban amenity and social contact.

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\(^{128}\) Gehl, J 2010

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Figure 32: Quiet cul de sac.
Principle 6

Safety for Older Motorists in Neighbourhoods and Towns

Appropriate traffic design contributes to all motorists feeling safe and confident.

- Age friendly traffic design provides traffic signals, maximises visibility and assists motorists in judging distance and speed safely at intersections, turns and on-ramps.
- Options and incentives to minimise car use and ownership in infill neighbourhoods would reduce parking requirements.

What the participants told us...

Participants expressed discomfort and confusion in busy traffic, merge lanes, and at roundabouts. They also raised concerns about lack of parking spaces close to facilities or places such as the beach and difficulties in parking.

What the research tells us...

Older people are generally safe and cautious drivers and have fewer crashes than younger people\(^{129}\). However they are over-represented in serious injuries and fatalities in traffic accidents because of physical vulnerability in particular to restraint impacts during crashes\(^{130}\). They have also been found to be at risk due to issues such as slower responses to traffic hazards, difficulty judging distance from other vehicles and reduced ability to recognise hazards, especially multiple hazards\(^{131}\).

The primary problem for crash-involved older drivers was gap selection. This problem arose in two basic situations, namely, at intersections controlled by stop or give way signs, or at intersections controlled by traffic lights\(^{132}\). At intersections controlled by ‘stop’ or ‘give-way’ signs, the main problem for older drivers is selecting safe gaps to merge into traffic. Provision of a roundabout in place of intersections controlled by ‘stop’ or ‘give-way’ signs can greatly enhance safety (not only for older drivers, but for drivers of all ages). It is simpler than estimating a gap in two streams of traffic. Further, in a crash, injuries are less severe because of lower impact speeds and more favourable collision angles\(^{133}\).

At intersections controlled by traffic signals, research supports the introduction of fully-controlled turning signals to assist older drivers to make safe right-turns. In addition, longer sight distances at intersections would give older drivers more time to select a safe gap in which to turn across or enter traffic. Sight distances may be improved in a number of ways including removal of vegetation, utility poles, or signs that obstruct the view of approaching traffic\(^{134}\).

Older drivers are often aware of their decreasing physical, sensory and cognitive functioning and modify or “self-regulate” their driving to compensate. An Australian study found that the most commonly avoided situations were driving at night (25%), on wet nights (26%) and in busy traffic (22%). While the majority did not adopt such avoidance behaviour, those that did had certain characteristics. They were female, 75 years and older, not the principal driver in the household, had been involved in a crash in the last two years, reported vision problems and had lower confidence\(^{135}\). It has been recommended that older people select routes that reduce exposure to tricky intersections\(^{136}\).

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129 National Ageing Research Institute, 2001 p.85
130 Welsh et al 2006
131 Oxley et al 2006
132 Austroads, 2000 p.85
133 Oxley et al 2006
134 Oxley et al 2006
135 Charlton et al 2006
136 Langford and Koppel 2006
Challenges

- Older drivers may experience difficulty in judging distance and speed in negotiating traffic as a motorist.
- Older drivers report avoidance of driving in certain conditions (i.e., when it’s dark or wet).
- As areas increase in density, traffic congestion will increase stress for seniors when driving.
- Parking can become increasingly difficult in more densely populated areas.

Opportunities

- Driver Safety programs targeting older people, such as the free Driver Wiser Course for Seniors run by Frankston City Council in Victoria, allows older drivers to ‘upgrade their knowledge about changing road rules, opportunities to upgrade their skills, keeping cars roadworthy, alternatives to driving, and coping when the time comes to give up the drivers licence’.
- Roundabouts and traffic signals with turn arrows assist older motorists with issues of gap selection.
- Separating the purchase or rent of a dwelling unit from a car parking space in new multi-density developments may encourage residents to re-consider car ownership. This might be facilitated by car sharing arrangements within the complex. Minimising car parking spaces can reduce development costs but would need to be negotiated through the development assessment process if the proposal does not comply with planning scheme requirements.

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137 Frankston City Council 2011.
138 Austroads, 2000:88
Principle 7
Sense of Community

Opportunities to bring together people of all ages contribute to a shared sense of pride, community wellbeing, and capacity to enjoy “ageing in neighbourhood”.

- Neighbourhoods provide a vibrant and active village atmosphere with a range of places and events to meet, socialise and work with people of all ages and backgrounds.
- Discrete neighborhoods with identifiable boundaries and meeting places contribute to a sense of community.
- Opportunities to voice perspectives and participate contribute to a healthy, equitable, sustainable and liveable neighbourhood for all ages and abilities.
- A mix of age groups that include older people ageing in community, as well as seniors-only housing, contribute to social inclusion.
- Older people are valued and respected in the community.
- Well landscaped, maintained and aesthetically pleasing streets that are free of litter and graffiti contribute to amenity and sense of pride.

Figure 35: Dog parks make good meeting places (SC).
What the participants told us...

Participants in both locations emphasized the importance of a vibrant village atmosphere in their local neighbourhood – a place where they can meet people in their networks or connect to people of all ages in the broader community. Some participants suggested that this mix provides an active and diverse public realm that is desirable to access and participate in from time to time.

Some participants preferred a mix of age groups in their street, while others favour a peaceful street with neighbours who share a similar lifestyle with less potential for noise and other conflicts. Participants in both locations suggested that leafy, well landscaped and maintained, aesthetically pleasing streets were important elements of a good neighbourhood to live in. This suggests that active, social spaces in the neighbourhood need to be balanced with differences in lifestyle habits between people at different stages of their life cycle.

Housing diversity and lot sizes within a neighbourhood are critical to being able to move to more suitable housing as needs change. The majority of the participants would prefer to ‘age in neighbourhood’, particularly if a liveable, affordable, easy to maintain alternative to retirement village living was offered. However, the notion of a seniors ‘community’ as part of a neighbourhood had some attraction due to similar lifestyle habits which might prevent some of the issues such as noise that older people identified when living with people of different age groups in multiple dwelling developments.

What the research tells us...

Built form can contribute to a sense of community no matter what the type of community: a community of ‘place’ with delineated spatial boundaries such as a suburb or street; or communities of ‘interest’ such as a church, school, club, or sporting community. Residents can be part of a number of different communities simultaneously, many of which are within their neighbourhood. Recent Australian research indicates that locational features are more important to older people than the dwelling itself\[139\]. Ageing within their neighbourhood means they can maintain familiar relationships and activities. Active participation in social, physical and cognitive activities is recognised as contributing to older adults’ quality of life\[140\].

An overarching desire or concern among metropolitan residents is for urban environments to be ‘humanised’ as much as possible, which means living in neighbourhoods which embody clear signs of thriving, harmonious communities\[141\]. A mix of housing styles and densities mean that people of different ages and stages of life can be accommodated. Connecting new neighborhoods to existing facilities with a network of paths, trails and routes improves access and use\[142\]. Discrete well-sized neighbourhoods not only foster community but are understandable and easier to get around\[143\]. Research suggests that an aesthetically pleasing neighbourhood also reassures older people who may otherwise be reluctant to leave their homes, as together with fear of accidents, a perception of crime and intimidation is one of the major concerns of older people accessing the built environment\[144\].

Employment and volunteering help to contribute to a sense of worth. Older people provide important roles in the community through volunteering and multi-generational caring (e.g for grandchildren)\[145\].

139 Weidmann and Kelly 2011
140 Horowitz and Vanner 2010
141 DIT 2010(b), p.95
142 ALGA et al, 2009a
143 Judd et al 1998
144 ILC 2007, p.19
145 Hwang et al 2008
Challenges

- Perceptions of older people by the broader community and/or society often do not match the range and extent of their largely untapped skills and abilities. Employment or volunteering is a key part of interaction and feeling worthwhile. How to introduce opportunities in single-use or residential areas has traditionally been a barrier for Councils and communities.

- Contemporary life can be complex, stressful and extremely busy for large segments of the community. Changing family relationships and work migration patterns see older people increasingly less able to spend time with family or grandchildren, or to reside with a family member temporarily while they are ill.

- In Australia much post-war development was designed for cars rather than to be walkable. Infill development usually occurs in existing neighbourhoods where the boundaries, size and shape are already defined. So there is less opportunity to delineate a ‘smaller’ age-friendly environment. Infill brings about a change in built form character which can be a threat to existing residents. In addition, some areas are more suitable to infill than others.

- Even when residents are demographically similar to one another, their values, lifestyles and expectations may be quite different, potentially contributing to neighbour disputes.

Opportunities

- The stress of moving is much less when moving within neighbourhood, where there is the ability to retain existing relationships and visit familiar facilities and services.

- Integration of residential uses into community uses is an emerging area of innovation. Smaller mixed-use centres provide a way of enabling social interaction and engagement in volunteering and other activities. Traditional single-use community buildings and spaces are being increasingly opened up to provide unique opportunities for seniors to interact with each other and with other age groups, such as libraries, educational facilities, churches and church grounds. This multiple use of community spaces leads to breaking down of traditional barriers/norms.

- Larger sites can be reconfigured to provide better access, variety and clustering of built form, which brings community onto the site.

- A community Co-op could provide space for community services or a business incubator for small business providing services to the community. This might include “welcome to the neighbourhood” services, a local service exchange service (handyman skills swapped for meal) or co-ordinated assistance to the elderly (Centrelink, in-home care provision, Meals On Wheels, shopping and chores assistance).

- Pride in sense of community may be addressed by pro-active strategies about improved maintenance, street management, plantings and litter and graffiti removal.

- Denser communities may make it logistically easier for care agencies to service clients who choose to “age in neighbourhood”

- Councils should be considering how to retain amenity in areas designated for infill development.

Figures 36, 37, 38 and 39: from top clockwise – Markets – intergenerational interaction (SC); proximity to churches, pubs, clubs, U3A and health services (SC); communal BBQs are friendly (SC); and chess in the park (B).

Easthope and Judd 2010
Principle 8

Perceptions of Personal Security

Design and good networks contribute to personal and neighbourhood security.

- Good neighbour relations help to make safe and secure streets.
- Good street lighting and open, uncluttered streets and housing with high visibility make safe and secure streets.

Figure 40: Our annual court gathering nurtures ongoing relationships (B).

147 In this project, we use “security” to refer to being safe from crime, and use the term “safety” to refer to reducing physical risk from falls and unintended consequences of design.
What the participants told us...

Perception of security was a significant point of difference between Sunshine Coast and Brisbane participants. Participants in Brisbane mentioned security in parks and open spaces and illustrated the need for home security with images of security gates, fences and secure outdoor enclosures. In contrast, participants on the Sunshine Coast presented very few images around issues of security.

Participants recommended that streets should be well lit and not be blocked by high fences or on-street car parking to allow for passive surveillance of the street. They suggested that establishing better relationships and links to neighbours would enhance perceptions of security.

What the research tells us...

The vast majority of older Australians living independently in the community are not fearful for their personal safety, either in their home and neighbourhood\textsuperscript{148}. While they generally tend to have a higher fear of crime than the general population, they are also less at risk of being crime victims than other age groups\textsuperscript{149}. Of all the crimes committed against older people, investment and insurance fraud is the most common\textsuperscript{150}. It is suggested that the perception of security for older people may be more about their changing vulnerabilities due to factors associated with ageing rather than a genuine risk in public and private spaces. In fact fears for the future for self as a senior revealed mostly concerns about physical health (becoming disabled), experiencing a fall), loss of independence, and nursing home admission\textsuperscript{151}.

As well as environmental design to prevent crime, older people benefit from measures which assist them to be more active and involved in their community, which has been shown to reduce their anxiety about crime\textsuperscript{152}. Improvement in the valuing and support of older people in our society and communities should emanate from two factors: a change in the attitude of the elderly about themselves and recognition by the general public of the dignity and worth of Australian senior citizens\textsuperscript{153}.

Figures 41 and 42: Left – High fence inhibits surveillance (B); Right – Concrete jungle (B).

\textsuperscript{148} Quine & Morell 2008
\textsuperscript{149} AIC 2005; Quinn et al 2009
\textsuperscript{150} Muscat et al 2002
\textsuperscript{151} Quine & Morell 2008
\textsuperscript{152} Quinn et al 2009
\textsuperscript{153} Pinkerton 1992
Challenges

- Providing neighbourhoods that remain secure as people get older without feeling closed in.
- Perceptions of lack of personal security among older people in the community are disproportionate to the actual crime statistics. Concerns are often related to young people’s activities.

Opportunities

- Greater security could be enhanced through better connections and relationships with neighbours and the community (including community programs to address security issues).
- Neighbourliness in a diverse but small population cluster may provide an antidote to fear.
- Increased levels of personal security could be enhanced by education campaigns and free legal or body corporate advice and assistance provided to older people to protect them from unsound consumer practices.
- The design response can ensure housing overlooks communal spaces and views from/to home are retained.
- Appropriately scaled developments can promote familiarity and fostering of a communal understanding of acceptable behaviour – a social contract. This can be reinforced by a capable and active body corporate.
Accommodation Scale

Photos were also taken by seniors to represent the kind of housing design features (internal and external) needed to support people as they get older as well as the barriers in the home environment. These principles are:

- **Principle 9** – Density and Visual Amenity of the Built Form
- **Principle 10** – Universal Design
- **Principle 11** – Sustainable Design Features
- **Principle 12** – Private and Shared Outdoor Space
- **Principle 13** – Versatile Spaces
- **Principle 14** – Maintenance
- **Principle 15** – Security in the Home

![Figures 44 and 45: Above – direct at level access from garage; Below – manageable garden space.](image-url)
Principle 9

Density and Visual Amenity of the Built Form

Human scale development with variation in massing and building materials facilitate views and sustainable design and minimise effects of noise and pollution.

- Multiple dwelling developments have an intimacy of human scale designed with a variety of height, orientation, layout, materials massing or clustering of dwellings (e.g. stark concrete finishes are limited).
- Multiple dwelling developments have a range of exit options and safety plans in the event of an emergency or power failure e.g. lifts with temporary power.
- Dwellings provide visual amenity and views for residents to enjoy through a combination of private outdoor space and access to communal outdoor space onsite and nearby public open space. Good design helps to ensure an increase in density does not compromise views or amenity for residents or the community.
- Multiple dwelling developments are located in places close to services, facilities, public transport and green space.
- Good sound attenuation from internal and external noise needs to be considered in multiple dwelling units.
- Multiple dwelling developments are well managed to address residents’ concerns about noise from other residents, parking, privacy, and costs for maintenance of communal facilities.

Figure 46: Small parks separate different types of dwellings (SC).
Infill Development for Older Australians in South East Queensland

What the participants told us...

Participants in both locations were concerned with loss of natural and visual amenity through contemporary architectural approaches using minimalist “block style” multiple residence towers. Participants in both locations showed similar photos expressing their dislike for concrete “slab, block style” apartment complexes, as well as photos of a preferred apartment complex style, with a mix of massing and orientation of groups of apartments, generous private outdoor space, spaces between groups of apartments, and the exterior appearance softened by the use of timber features.

Participants stated that affordable housing should not be poorly designed and they expressed clear ideas of what this encompassed. Negative aspects of multiple dwelling developments were reported as: being too dark and needing lights on during the day time; no cross ventilation as the dwelling unit is ‘sandwiched’; no private outdoor space or pleasant outlook; insufficient insulation between dwellings to provide thermal comfort and acoustic privacy between neighbours; and located on busy transit corridors (vehicle/train) with associated noise and pollution if a window is opened for ventilation or if using a balcony or patio.

In addition to concerns about the human experience and the visual amenity of multiple unit developments, participants raised potential conflicts over noise and parking that could be experienced living in a multiple dwelling development with residents of differing ages and lifestyles. Many were also concerned about costs associated with strata titled developments and conflicts within the body corporate governance structure. This presented a sufficient enough risk to a participant’s quality of life in their home environment that it was another reason for avoiding multiple dwelling living.

A final key concern was about personal safety in the event of an emergency if power was to fail and the lifts were not available; they would feel trapped if it was difficult to exit quickly and safely, given potential mobility problems.

Participants were resoundingly against living in high rise developments, but indicated that two storey terrace housing and four storey apartments might appeal, providing they did not comprise a large number of units and had sufficient private outdoor space as well as access to outdoor green spaces, both shared onsite and in nearby public parks.

What the research tells us...

While contemporary approaches to urban planning suggest higher density is the solution to issues of urban sprawl and loss of green space, it may be that there is a threshold at which higher density housing becomes less liveable for residents, from an economic and experiential perspective.

Architectural design should use scale, proportion and detailing to convey a sense of individuality, personality and warmth, as well as a capacity for intimacy and small scale connections. A variety in dwelling size and form appeals to a range of different demographics and stages in the human life cycle. Visual stimulation and attention to detail are important considerations. Given that the attributes of a development are also one of the main reasons for relocation, landmarks, meeting places and smaller scale signatures, should have greater prominence in the built form as these elements ‘have always played a role in the life and design of cities’.

Furthermore, the setting location should offset some of the disadvantages of living in a smaller dwelling unit by judicious use of vegetation and access to private, shared and public outdoor space. This is important for the liveability of the dwelling and provides positive associations with wellbeing and mental health outcomes (see Principle 12, Private and Shared Outdoor Space). However good design of these spaces is essential to not compromise privacy. Architecture should convey a sense of individuality, personality and warmth, as well as facilitate small scale connections.

High density housing could in fact contribute to increased energy consumption when energy is being used for lighting in daytime, and cooling or heating when natural sunlight or breezes cannot thermally regulate the dwelling, and energy consumptive common facilities.

154 Andrea Young Planning Consultants et al. 2008
155 Gehl 2010
156 Wright 2010, p.7
Research conducted in 2010 found that the majority of resident disputes in a strata titled development were about use of common property, breaking of by-laws, parking and noise. A study of people living in relatively new medium density accommodation in Newcastle, Australia, found a high level of satisfaction with their living arrangements, partly due to reduced maintenance (primarily exterior), and partly for lifestyle or necessity reasons. The newness of dwellings reduced maintenance and the need to renovate. Most felt that neighbourly relations were harmonious and relied on ‘striking a balance’ between privacy and contact, a balance which was not the same for each resident. Tensions that arose within the development were mainly due to noise, frequently attributed by owner-occupiers to younger renters. A study of high density residents in Brisbane found limited tolerance for behaviours not deemed as acceptable particularly in relation to noise and parking. In a country where high density living is a relatively recent experience, there is a need to improve ‘in-built consciousness’ and consideration of others, possibly through introduction of ‘Good Neighbour Protocols’, by-laws, and a building manager conciliation system.

Figures 47, 48, 49 and 50: Clockwise from top left – Ugly streetscape (SC); Enclosed dark space (B); Houses too close together lead to neighbour disputes (B); Stalag 30 - boring and socially isolated.

157 Easthope & Judd 2010, p.20
158 Baker T 2011
159 CSD & NDG 2009
Challenges

- Multiple storey buildings are more expensive to construct in comparison with single storey detached dwellings however the land/unit ratio is improved and depending on the location, can compensate for the additional cost. Providing at-level car parking or fewer car parking spaces can reduce costs, although at-grade car parking might detract visually.
- Concrete block style construction is quicker and more cost effective to construct, but not always visually appealing.
- Design needs to be respectful of privacy and view from the street and other dwellings. Clotheslines on balconies can be an issue.
- Residents may have to deal with lifts breaking down which makes access difficult. The cost of elevators are often given as a reason for not building medium rise buildings, as it is generally accepted that residential buildings over 2 storeys require a lift.
- Depending on the size of the developable area, four to five storeys might be the maximum height to prevent too much shading of a central courtyard.
- Residents of multiple dwelling developments may have to deal with a body corporate and may experience conflicts with neighbours due to noise and car parking. The cost of on-site management to reduce conflict and maintain quality of life can be prohibitive.

Opportunities

- Increasing density is considered the best alternative to minimising urban sprawl, reducing the footprint of buildings, and reducing impact on green space, and therefore, the energy and environmental resources needed for housing.
- Multiple use of buildings in which residential floors are located above commercial and office uses that operate mostly during the day, might provide ease of access to facilities and compensate for costs of lifts. Functions might include lecture theatres/tutorial rooms, community meeting spaces, office space for voluntary organisations, telecommuters and small local businesses. Timing of uses might minimise noise attenuation requirements. Mixed tenure buildings can provide affordable housing in areas that are otherwise unaffordable as it can be cross-subsidised by the other housing.
- Multiple dwelling developments can have better acoustic insulation, and floor plans can be mirrored or offset to maximise the distance between the living spaces in units to minimise noise impact.
- Small scale dual aspect units in multiple dwellings can allow cross ventilation, natural light and outlook on communal space. Perimeter built form allows outlook on inner shared space or courtyard as well as surveillance and good views to exterior of complex.
- Concrete block style constructions can be ‘softened’ and ‘warmed’ by adding timber or other finishes that animate the façade. A variety of new materials and construction types continue to change. Visual amenity can be improved by use of human scale features and incorporating different designs within the same complex.
- These elements could also serve dual purpose as sustainable design features, i.e. external walls that allow for rainwater harvesting or propagation of plants for shade or amenity. Green walls can be used in this way to provide vertical planting spaces for residents and attenuate noise or undesirable views.
- Solar power systems could be used for communal or shared facilities such as common area lighting and power, offsetting the costs of the incorporation of a lift in a four storey development. Other water and energy savings features can be built into multiple dwelling buildings to provide cost efficiencies for residents.
- Security and good access for people with mobility issues can be designed into the building. It can provide a sense of community. Seniors can move within the same neighbourhood if they want to downsize. A smaller unit can be an affordable option for singles and couples. It can reduce the cost of maintenance.
- Communal or shared cars can reduce the car parking spaces needed. Separating ownership or rental of a dwelling unit from ownership or leasing of car parking space can provide flexibility and cost savings for residents.
Principle 10
Universal Design

Dwellings are usable by people of all ages and abilities, maximising the longer term sustainability of the dwelling and saleability to a broader market segment.

- Dwellings are universally designed to provide for safe and easy access to facilitate ageing in place, but also for people of all ages. The following are specific to provide clear guidance.
- Entrances are accessible, for a wheelchair or walking frame, with ability to modify any steps with ramps and handrails. Access paths should have a maximum gradient of one in eight over a distance of less than 1.5 metres and a maximum gradient of one in 14 over longer distances.
- Doorways should be at least 920mm wide and entry thresholds to all rooms in the dwelling should be level (no more than 10mm change). Passageways should be at least 1200mm wide.
- If vehicle parking is provided, access from the space to the dwelling should be level, with no more than a 10mm change. Parking space dimensions should be (at a minimum) 3800mm by 5500mm clear of walls and other obstructions such as posts.
- Dwellings should be single level living, or if two storeys: linear internal stairwell design to accommodate chair lift (if required), and/or sufficient floor space for the installation of a suitable affordable lift, water lift or dumb waiter for carriage of goods between floors.
- A bedroom should have a circulation space with a minimum width of 1550mm that is clear of obstructions and living area should have a central circulation space with a minimum width of 2250mm that is clear of obstructions.

At least one bathroom and toilet should have:
- minimum internal dimensions of 2250mm by 2300mm to accommodate a basin/cabinet, toilet and hobless shower and central area with a width of 1550mm clear of obstructions;
- if a separate toilet, minimum internal dimension of 1800mm by 1500mm;
- doors that open outwards or slide, with sufficient room for a wheelchair to access and manoeuvre; non slip tiles, hobless shower with screen or curtain to prevent overspray;
- structural plywood or similar on walls to enable flexible and easy retrofitting of mobility aids such as hand rails and mixer tapware.
- The main kitchen should be ideally designed to provide access to other areas in the dwelling, with a minimum width of 1550mm that is clear of benches, storage cabinets, fixed appliances and other furnishings.

Kitchens include features such as:
- oven at bench height with side opening door.
- good access and visibility to storage space with drawers and “lazy susan” rather than cupboards.
- width of kitchen bench limited to 700mm so that kitchen windows remain accessible to control ventilation and temperature.
- Sufficient power points are at waist height.
- Windows/lighting should enable views from seated position and provide natural lighting.

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160 "The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialised design". (Centre for Universal Design, 1997).
161 ULDA 2011c
162 ULDA 2011c
163 ULDA 2011c
164 One Brisbane based company quoted $25,000 for a basic externally fitted lift, $30,000 for a unit that can be installed internally or externally and approx $45,000 for a hydraulic model that can go to 3 levels. Service fee for all models is approximately $200 per annum. Manual dumb waiters installed cost $6,000 with no service program or costs (Pers. comm “Aussie Lifts”, 22/02/11).
165 ULDA 2011c
166 ULDA 2011c
Figures 52, 53 and 54: Top – Kitchen and doorways wide enough to manoeuvre walking frame and wheelchair (B); Bottom left – Cups in drawers are easy to reach; Bottom right – Accessible shower.
What the participants told us...

Participants in both locations strongly supported universal design as a key design framework in supporting people to age-in-place safely. Even without many of the participants being familiar with the actual term “universal design”, relevant features were highly represented in their selected photos. They included: at level entry; hobless shower, non-slip tiles, mixer style tapware, hand rails and handrails in the bathroom; a side-opening oven at waist height and drawers instead of cupboards below waist height in the kitchen; easy to reach powerpoints; doors and corridors wide enough to allow a wheelchair or walking frame to manoeuvre; ramps; and no stairs. If there are stairs, they should be linear and wide enough to accommodate a chair-lift. In particular, participants told us that carpeted stairs with a pattern and open staircases were an issue as they pose perceptual difficulties and increase the risk of falls in the home. In addition, participants emphasised the importance of good natural lighting if possible, as they age.

What the research tells us...

With an ageing population that prefers to remain living at home, an increasing issue is that most of existing housing stock in Australia is not accessible to people with mobility difficulties. This has implications for modifications to existing housing and for increasing the proportion of new housing that is accessible or adaptable, usable and safe for older people. Safety and independence for older people can be enhanced through design in homes that enables people of all ages and abilities to confidently navigate their surroundings.

The term “Universal Design” refers to design that incorporates features when a home is built which can accommodate changing health conditions and abilities of older residents (as well as those of any age with disabilities). It minimises the need for later custom modifications. Alternatively, design can be “visitable”, so that a person of any age with mobility challenges may visit, or “adaptable”, where the house can be adapted to provide other features such as hand rails if it is required.

Key features recommended in a variety of available guidelines generally include:

- easy step-free access to the entrance from the street or a garage.
- living space, bathroom & toilet and a bedroom space on the entry level to the dwelling.
- all internal and external doorways (920mm) and corridors (1200mm) wide enough for wheelchairs, crutches and walking frames.
- light switches, electrical outlets and thermostat controls in an easy to reach spot for a person sitting or standing.
- lever door handles.
- reinforcing the walls in the bathroom, shower and toilet to allow installation of grab rails if required.
- slip-resistant flooring throughout, especially in wet areas such as kitchens, bathrooms and laundries.
- kitchens with an open floor area with adjustable shelving and pull-out storage drawers. Lever handles on all taps to allow use with minimum force.
- sufficient floor space in bathrooms and toilets for access, and level entry to the shower recess. A hand held/height-adjustable showerhead for people sitting or standing.
- in two storey accommodation, extra space at internal stairs for later installation of a lift or stairclimber if needed.
- easy operable door and window controls.

Implementation of universal design around the world and in Australia has been limited, mainly restricted to demonstration homes often in combination with environmental sustainability such as Queensland’s Smart Housing program.

167 DIT 2011.79.
The alternative, “Adaptable Design” (AS 4299) is increasingly being adopted in Australia for a small proportion of housing. However, it is of limited use for visitors or for residents with temporary health impairment. While having the potential to increase safety and access so that older adults can be independent and remain at home, it is a costly option, often organised at a time when a person is more vulnerable, and is often not feasible for rental tenure. A low rate of compliance with modifications recommended by healthcare professionals has also been found.\(^{169}\)

The costs and benefits of universal versus adaptable design at the construction stage, and in comparison with later modifications to an existing dwelling, are debated among designers. Though making modifications to the home can make it safer and more accessible for a resident with reduced abilities, perceived disadvantages include cost, unattractive appearance, reduced dwelling value, and difficulty of implementation. However a cost-benefit analysis comparing Visitable Design, Adaptable Design and Universal Design with later home modifications or retrofitting indicated that allowing for access in the initial construction of a dwelling involves reduced initial design time and cost compared to the planning, future costs and otherwise unnecessary replacement of fixtures and fittings.\(^{170}\) In some cases retrofitting is the easiest or most economical solution and the Queensland government provides useful suggestions in ‘Over 100 ways to improve access at home’.\(^{171}\)

According to a Victorian government estimate, inclusion in the initial dwelling design adds minimal cost and is far more cost-effective than modifying conventional housing – up to 22 times cheaper.\(^{172}\) When comparing the Adaptable and Universal Design approaches, Universal Design (i.e. designing in all of the accessible features prior to construction) was preferable in terms of the cost and the design time.\(^{173}\) Some of the costs of Universal Design in new housing are little different from conventional housing, such as door handles, adjustable height shelves or rails, lowering the height of light switches, raising the height of powerpoints, and moving the bathtub controls closer to the outside edge. Advocates argue that the cost increase in providing wider doors is offset by the corresponding saving in wall material. When additional circulation space is required in areas such as bathrooms, it could be borrowed from cupboards or utility spaces.\(^{174}\) Specific areas that need to be considered when designing for wheelchair access upfront are: site layout, ramps, carparking, overall unit area, sanitary fixtures, reinforcement to bathroom walls and lifts.

Advocates for people with disability and older people in Australia have been calling for regulation for many years to ensure a reliable supply and adequate standard of accessible housing, as voluntary initiatives have not met the need.\(^{175}\) In the UK it has been found that over time regulation was absorbed into building practice with minimum disruption.\(^{176}\) In Australia, the Housing Industry Association argues that builders offer these features to consumers who ask for them and that builders have the skills to deliver.\(^{177}\) Thus consumers need to be more knowledgeable about the characteristics of Universal Design and demand such features. In order to facilitate uptake of universal design, Australian researchers Quinn and Judd\(^{178}\) also recommend that, among other things:

- design guidelines are communicated in a self-contained document with only the critical requirements in order to reduce complexity and ambiguity, minimise design time (and therefore cost) and allow flexibility to cater for the widest range of dwelling configurations; and
- product availability is considered in the development and the updating of design criteria, with opportunities for new products in the Australian market highlighted. e.g. measurable performance standards are needed for non-slip flooring.

\(^{169}\) Quinn et al 2009: 7
\(^{170}\) Quinn and Judd 2010
\(^{171}\) Dept of Housing
\(^{172}\) NDHHD 2010, p.10
\(^{173}\) Quinn et al 2009
\(^{174}\) Quinn and Judd 2010
\(^{175}\) Ward et al 2011, p.1
\(^{176}\) Imrie 2006 cited in Ward et al 2011
\(^{177}\) ABC 2010
\(^{178}\) Quinn and Judd 2010
Figure 55 and 56: Left – Typical Queensland home with poor access for seniors (B); Right – Added external water-weighted lift to move groceries from ground to first level (SC).

Figures 57 and 58: Left – Poorly place power points (SC); Right – Power points at higher level – easy solution at no additional cost (B).

Figures 59 and 60: Left – Impossible stairs (B); Right – Hazardous stairs (B).
Challenges

- Perception in the construction industry that universal design is expensive and makes a home look institutional.
- Perceptions of consumers of housing, e.g. aversion to hand rails etc due to association with diminishing health and nursing homes.
- Regulatory vs voluntary/non-regulatory approaches.
- The cost and maintenance of lifts adds expense in multiple storey dwellings.
- There is little accessible housing available in the private rental market.
- Existing housing stock is often hard to modify.
- Topography can make the design of accessible housing difficult.

Opportunities

- Participants’ high priority for universal design features suggest an unfulfilled market demand. Given that the construction industry claims to respond to market demand, it is essential to raise awareness of older people about universal design so that they voice their requirements.
- New products that improve accessibility now have a domestic quality. Inclusion of such features in new housing, even if initially targeted at younger people, increases its future marketability given the increased proportion of older people possibly wanting to move to accessible dwellings.
- The advantage of living quarters on one level can increase the attraction of multi-storey dwellings over two storeys, providing elevators can continue to run in a power failure. Medium density housing can support a lift.
- Universal design reduces social isolation by enabling older people to remain in their neighbourhood and access the external world.
- All government housing programs should include minimum requirements to provide a certain percentage of universally designed dwellings. The Australian Government has committed $1 million seed funding over three years 2011–12 to 2013–14 to work with industry, the disability, aged and community sectors to promote liveable housing design. The Liveable Housing design initiative may be one of the most significant opportunities to increase the proportion of housing incorporating accessible design features, given the federal government led approach with major industry partners signed up to voluntary targets179. New public housing funding allows for 20% adaptable housing.
- Future potential for the liveable housing guidelines to be incorporated into the BCA as regulatory elements as opposed to voluntary elements. Trends in open plan living increase mobility around a dwelling. Minimum requirements for future adaptations to wheelchair access include: one entrance that is level with the street, circulation space through doors and corridors, and internal circulation space within a bathroom.

Figure 61 and 62: Left – Ramp is easy modification; Right – Straight up staircase is wide enough for stair-lift if needed later.
Principle 11

Sustainable Design Features

Residents harness natural sunlight, ventilation, and natural resources to maximise the comfort and enjoyment of their environment in response to climate at minimal cost.

- Buildings should be sited in keeping with passive design principles. In Southeast Queensland, a northeasterly aspect takes advantage of breezes and sun movement. Use of overhangs can reduce direct sun in summer and permit light into dwellings during winter. Private outdoor space and living areas should maximise northerly aspect.

- Design can foster efficient resource use and reduce the ecological footprint. Good cross ventilation and passive heating and cooling reduces need for air-conditioning and provides optimal thermal comfort.

- Large windows and skylights provide natural light and minimise use of artificial lighting. Large windows can also provide views which increase amenity and enable surveillance for security purposes.

- Use of renewable energy such as solar power and solar hot water and rainwater tanks (the latter linked into laundry and toilets) reduce operational costs.

- External clothes lines take advantage of natural sunlight and breezes and minimise energy use. They might need to be covered to enable use during rainy season or screened if potential security issues.

- Noise sources need to be considered during design through orientation of living area and private outdoor space, and use of building materials that reduce noise such as high mass dense materials, insulation, and soft connecting and interior materials.

- Space should be allocated at the design stage for recycling waste facilities to be located in proximity to units or available on each floor in multiple dwelling buildings.

- Garden areas should be planned to limit need for watering, while providing amenity and shade.

Figures 63 and 64: Left – Natural lighting with louvres for shade (SC); Right – 5000 L water tank connected to house (B).
What the participants told us...

Participants in both locations demonstrated a keen awareness of the advantages of sustainable housing design features such as solar power and hot water, use of recycled or tank water for non-potable uses such as flushing the toilet or watering gardens, natural light through skylights, options for good cross ventilation and appropriate positioning of the dwelling on the building envelope to take advantage of passive design principles.

Of interest was the fact that most participants were primarily motivated by the opportunity to save money that sustainable design features offered. However, some participants made the point that the cost of installing these expensive sustainable options did not provide a good return on investment unless they planned to age in place. Participants also noted that having well-lit spaces preferably with natural light was essential with deteriorating eyesight.

In addition, tenure has an impact on whether design features such as these can be installed to take advantage of cost savings. People who have a body corporate arrangement in place require agreement for installation and provisions for allocating and metering usage. For renters, such an investment would unlikely be considered worthwhile. In the future, issues related to tenure need to be addressed to enable greater sustainable resource use and a reduction in housing operating costs.

What the research tells us...

Living affordably has become increasingly difficult in many parts of Australia over the past decade because a growing number of households are experiencing financial stress related to rising housing and living costs. Living costs can be minimised by sustainable design features that also reduce the ecological footprint.

Designers and developers of multiple dwelling buildings often assume that the provision of air-conditioning and artificial lighting will provide optimal comfort for residents but research suggests that residents prefer to regulate thermal control of their environment naturally. Features of the dwelling environment that are desirable for this reason include balconies and open spaces, the orientation of the building related to climate and the importance of natural air-flow and ventilation. A survey of high density residents in Brisbane found that over one-half believed it was important to conserve water and energy but that building infrastructure needs to be improved and costs are an impediment. It was also found that if residents needed to close their doors or windows to control external noise, this could have the undesirable effect of reduced natural air-flow.

According to our design team investigations, the current ‘feed-in’ tariff, which encourages solar photovoltaic, means that a one bedroom unit with a 1KW system can currently make money. A one to two bedroom unit should allow for a 2KW PV system. Multiple dwelling unit owners could band together as a single purchaser of energy and negotiate a bulk purchase of power at a cheaper rate. Alternatively a body corporate could pay for maintenance and access, negotiate to purchase power more cheaply, and distribute it using a master metering system (with individual meters). The savings on power or income generated from feeding power back into the grid could be used to offset other body corporate costs. However the ability to provide sufficient solar power is limited by the orientation and size of a complex and number of units in relation to required roof space.

Figure 65: Solar panels feeding electricity back to the grid (B).

180 Robinson and Adams, 2008
181 Buys et al. 2008
182 CSD & NDG 2009
Challenges

- In some cases, the economics of the ‘highest and best use’ of the land and local context makes siting to a north-easterly aspect difficult: it might mean less dwellings can be accommodated on a site.
- Dwellings in the middle of multiple unit developments often miss out on natural sunlight and ventilation as do complexes with a number of one bedroom or studio apartments.
- The payback period for upfront costs of installing solar power can be long and developers might not experience the financial benefits in terms of reduced ongoing costs. Clothes lines are often prohibited in the external spaces of multiple unit dwellings.

Opportunities

- An upfront investment into both passive and active environmental features can reduce operational costs over the longer term. Information about life cycle costs and period of return for investment in sustainability features needs to be continually updated and made available to developers and consumers.
- Planning Schemes and Councils could provide incentives such as reduced development assessment time or application fees, for those developments that can demonstrate a high level of sustainability, including NE aspect where practicable, to offset costs of construction.
- A potential market demand is in developing products in the solar and rainwater harvesting industry that have individual meterage capability in community title dwellings. Operational costs of shared infrastructure (outdoor lights) could be offset by use of sustainable energy and water sources.
- A market demand is for affordable architectural solutions to ‘sandwiching’ of dwellings and associated loss of environmental sensory elements.
- A market demand is for innovative approaches to outdoor drying solutions for multiple dwelling residences in a manner that still provides privacy and does not detract from the aesthetic values of the complex.

Figure 66: Undercover clothes drying saves electricity.
Principle 12

Private and Shared Outdoor Space

Crucial transitional spaces between indoors and outdoors facilitate enjoyment of nature, socialising, entertaining and hobbies.

- Patios, balconies and verandahs are of sufficient size to be useable as an outdoor ‘room’ (as an extension of indoor floor space) for relaxation and entertaining.
- Private individual outdoor space provides fresh air and is protected from the elements.
- Raised garden beds on the ground floor provide ease of gardening; or sufficient space is provided for planter boxes on balconies.
- A shed is provided for storage or tools.
- Shared or communal vegetated and safe outdoor space is provided in multiple dwelling complexes.

Figure 67: Private courtyard with greenery (B).
What the participants told us...

Participants in both locations illustrated the importance of private open space with photos of tiled and shaded patios and verandahs, outdoor table settings, raised garden beds and views from inside to green outdoor space. It was valued for relaxation and visual amenity, to entertain and socialize, to provide additional breezes in summer, and to connect with nature.

Participants in both locations preferred private outdoor space when given the option to choose between shared outdoor spaces with minimal private outdoor space or private outdoor space with less communal space. This suggests that amongst older people at least, a generous outdoor private space that is adaptable for a range of uses will be an important and appealing feature if they were to consider relocating to a smaller dwelling.

Participants also commented on the transparency of balcony railings and the importance of privacy, and not feeling one is on display.

What the research tells us...

Densification of cities to minimise urban sprawl may have unexpected negative health consequences unless sufficient outdoor space can be provided. Outdoor space in close proximity to the residence, including private space attached to the dwelling (balcony) or communal space in a multi-dwelling complex, has been found to provide benefits to health and well-being.

In multi-dwelling accommodation, sensitively designed shared outdoor space, can provide a critical transition between private dwellings and public open space. Shared outdoor space (that is, space that is owned by a group and usually accessible only to members of that group) provides for casual social interaction and strengthening social networks; children’s play and intergenerational contact; and enhancing a sense of responsibility and safety in the neighborhood.

Two factors need to be taken into account when designing for higher density living in comparison to lower density: the close physical proximity of neighbours to one another; and sharing of built features and facilities (common areas) with neighbours. In regard to the former, certain design and construction techniques can assist: location of ‘sound sensitive spaces’ such as bedrooms away from noise generators; and double glazing of windows and insulation. In addition, by-laws can also be used to manage behaviour.

Design of common areas can have a significant influence on resident interactions and social relationships; it can contribute to sense of safety, sense of belonging and community, and social networks. Yet poorly designed areas with poor visibility and access, and little green space affect safety and well-being. Integration of vegetation affects perceived quality of shared spaces and can reduce residents’ perceptions of crowding and foster a more satisfying residential environment. Such spaces should cater for the range of needs and lifestyles of residents and allow for multiple uses. For example an indoor common room could include a kitchen and be attached to an outdoor area to allow for overflow of groups or children to play. It also found that although over two-thirds of respondents in high density dwellings had a swimming pool in their complex, 31% never used the pool and 10% used them every day. This study concluded that shared spaces need to be private and secure within the development, accessible, comfortable and incorporate vegetation.

These outdoor spaces should be designed along with pedestrian circulation systems to foster informal social encounters and physical activity, while protecting the privacy of individual. Gardens designed for ageing residents and those with Alzheimer’s could have meandering paths that return residents to the beginning, sensory stimulation that is rich in association, and a safe and secure area with appropriate paving surface that allows independent mobility. Such freedom has been found to reduce agitation in those with Alzheimer’s disease.

183 Cooper Marcus 2003
184 Cooper Marcus 2003
185 Easthope and Judd 2010
186 Kearney 2006
187 CSD and NDG
188 Andrea Young Planning Consultants et al. 2008
189 Brawley 2002
Gardens have a calming influence on residents and visitors and open space in general provides other meaningful activities such as picnics. Deteriorating health and related issues such as reduced ability to look after oneself and/or the house/garden, have been identified as important factors influencing people’s housing decisions and choices as they age. Among the reasons given for moving house by individuals over 75 years was the size of the garden and associated maintenance. These same people sought a place with sufficient space and privacy and a small easy to maintain garden\textsuperscript{190}.

The quality of private open or outdoor space such as balcony, patio, courtyard attached to the individual dwelling has been found to affect resident satisfaction. Buys et al\textsuperscript{191} study of higher density housing in Brisbane found the balcony to be one of the most important features. In Australia many balconies in higher density housing have been too small and poorly designed to be useful. Other studies have shown the importance of balustrade materials (glass vs lattice) on balconies or walls and screening of patios to ensure privacy\textsuperscript{192}. These studies were of the general population, so it is noteworthy that it coincides with what seniors identified as important.

Figures 68 and 69: Top – Outlook to garden (SC); Bottom – No steps - garden, path, patio, house on one level (SC).

\textsuperscript{190} Boldy et al 2009
\textsuperscript{191} Buys et al 2008
\textsuperscript{192} Easthope and Judd 2010
Challenges

- The perception is that provision of private and shared outdoor space incurs extra costs by taking away from the developable area and increasing the floor area of a dwelling.
- Provision of private outdoor space creates design challenges in terms of privacy and noise, and is affected by size of complex, site factors, and location.
- Communal outdoor spaces in multiple dwelling complexes raise management and design issues of equitable access and safety and provision of shade, ventilation, and light. Poorly designed common areas are often not used and therefore can become a waste of space or encourage antisocial behaviour.
- As dwellings become smaller the need for communal areas, both internal and external becomes greater.

Opportunities

- Well-designed, private outdoor spaces can extend liveable space and provide a valuable and versatile space to enjoy leisure time.
- Floor plans can be designed to be offset, mirrored or flipped on the shared wall to minimise issues of privacy and noise.
- Building materials and design techniques are used that provide noise attenuation inside the dwelling, between windows (to allow for air circulation) and private open spaces.
- A range of design responses are available to provide shared outdoor space e.g. otherwise unused surfaces such as rooftop gardens. As dwellings get smaller, communal areas can be used for gathering and encouraging a sense of community. These often work best when there is a reason to use them e.g. next to a communal laundry, mailbox.
- Communal spaces can be designed to enable intergenerational transfer of skills and learning e.g. growing food; computer rooms. Gardens can have dual purposes: growing edibles as well as ornamentals.

Figures 70 and 71: Left – Community garden (B); Right – Raised garden beds are easier for seniors to manage (SC).
Principle 13

Versatile Use of Space

**Wider choice and flexible designs ensure that smaller dwellings meet seniors’ needs.**

- Greater choice in dwelling size and layout acknowledges diverse needs. Two bedrooms can accommodate couples who prefer separate sleeping quarters or space for a guest or carer.
- A private space is needed for computer, books, craft, woodwork or other hobbies. For some people, a well designed nook may be sufficient.
- Some people may require access to offsite or communal facilities for equipment or hobbies that take up larger amounts of space. Places such as “men’s sheds”, art studios or community office spaces or multi-functional community spaces are great places to meet, create and network.
- Innovative concealed features and functions can be provided: bike hooks, moveable weatherproof storage seating, parking space as an office, gym or art studio.

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*Figure 72: I’ve downsized my home but not my brain – computer or sewing room (SC).*
What the participants told us...

Participants in both locations told us that if they were to downsize it would be to avoid the burden of home and garden maintenance and perhaps to access care if they needed it. They agreed that the minimum dwelling size for a couple would be two double bedrooms plus a study or office space. This is because some older couples require separate bedrooms due to preferences or sleep disturbances as they age (apnea, snoring). One bathroom would be suitable if a second separate toilet was provided. In considering the trade-offs the participants might consider if downsizing, options would have to be attractive and convenient.

Participants in both locations identified the need for a private space for a computer or office, for books, craft or other hobbies. Most people preferred a separate room rather than a well designed ‘nook’ for a computer. They explained that they needed places for storage, filing of paperwork or generous desk space in addition to a workstation. Some other participants expressed interest in additional space external to the dwelling, such as garages, sheds and workshops. Participants illustrated how they had made space adaptable for their purposes, using their double garage as a place to sit, observing the street and passers-by and as a workshop space.

What the research tells us...

An implicit assumption in planning has been that older people need less space than other generations, whether in the home or in the community. This ignores the reality of life-long interests in activities, hobbies, exercise, social networks and community involvement\(^\text{193}\), as well as continuing part-time work. Some older residents may experience a constantly changing household, with temporary or semi-permanent co-habitation with adult children, a frail elderly parent, grandchildren (on holidays or extended care), a live-in carer, or extended visits from relatives. Roles such as caring for grandchildren require child-safe homes.

“Flexible Design” involves designing housing so that it can be adapted to a ‘household’s changing size, structure and lifestyle: becoming larger or smaller, changing the sizes and functions of rooms and even converting between single and multiple dwellings”\(^\text{194}\). Excess space in larger dwellings can be better used or smaller dwellings can be made more space efficient to accommodate temporary changes in household size and interests. A spare room can be used as a home office, a living room or a bedroom at different times with little modification. A garage can be converted to a studio, lounge or bedroom.

Adding an independent unit or granny flat onto the dwelling might provide privacy and independence for an ageing parent or adult children. In this case, older home owners benefit from the ability to remain in their home and re-configure a large family home into two or more self-contained dwellings, one of which can be rented out to provide additional disposable income. Alternatively the additional dwelling can provide cost-savings to related co-habitants, by assisting with care for pre-school grandchildren or avoiding retirement home fees for an elderly parent. However, planning requirements usually regulate the type, size, and nature of “accessory” or “secondary” dwellings.

Figure 73: Flexible uses of garages – Workshop or men’s shed (B).

\(^\text{193}\) ILC UK, 2007
\(^\text{194}\) Quinn et al 2009, p7
Challenges

- Adding a secondary dwelling can be an efficient means of providing additional income or assisting relatives. It can increase density while maintaining amenity. In general such additions require a planning approval.
- Mis-match of housing size with number of occupants in a community can be misleading. Older people, like any other age cohort, are diverse in their lifestyles, interests and spatial requirements.

Opportunities

- Planning schemes could be amended to allow secondary dwellings as-of-right in particular locations, if they meet certain requirements. Temporary or relocatable homes could be added as a secondary dwelling.
- Creative, adaptable floor plans and furniture could provide greater utility of floor space. Designs therefore could focus on innovative concealed (and potentially mobile) storage ‘walls’ so that floor plans can be adapted readily by the user.
- Use requirements of the dwelling could be considered in the context of what must be provided onsite versus offsite conveniently, providing greater economies of scale i.e. can creative or office spaces be provided offsite in close proximity as part of the purchase/lease price more cost effectively, and could this have broader positive implications for the community?
- Dwellings need to be designed with the entire life cycle in mind so that inhabitants can transition easily as they age.

Figure 74: Flexible uses of garages – Easy access socialising (B).
Principle 14

Maintenance

Dwelling construction and design minimise the ongoing requirement and cost of maintenance.

- Internal and external products and materials are durable to minimise maintenance.
- Compact houses, smaller lot sizes and easy to manage landscaping (including raised garden beds) minimise maintenance.

Figure 75: Small is beautiful.
What our participants told us...

Participants expressed concern about their ability to maintain their homes and their yards as they grew older. Sunshine Coast participants in particular showed images of lawns, palm trees and deteriorating fencing, all of which require ongoing effort and cost to upkeep.

What the research tells us...

In an Australian Housing and Retirement Survey study, one of the main reasons given for initiating a move in the future was house and garden maintenance, particularly on the death of a spouse or declining health. Another study found that a move usually involved a mix of reasons, one of which was to reduce time spent on house and garden maintenance in order to have more free time to pursue other interests or enjoy a different lifestyle.

The age of a dwelling can have a direct bearing on the need for, and cost of, repairs and maintenance. The Home Maintenance and Modification (HMM in New South Wales; HACC for Commonwealth program) service is provided by the Commonwealth government to people aged over 65 to assist them with four main services; structural modifications, non-structural modifications, repairs and improvements and maintenance (such as lawn mowing). The program can be instrumental in allowing people to continue to live in their homes and communities for longer. For example, the NSW Home Modification Information Clearinghouse found that ‘... maintenance and modification interventions have been shown to be effective in decreasing accidents and injury with a reported seven-fold reduction in reported morbidity .... Further, lack of access to appropriate housing’, is a cost to taxpayers and government especially if institutionalisation results.

Figures 76 and 77: Left – Lawns require high maintenance (B); Right – High maintenance cladding (SC).

195 Olsberg & Winters 2005
196 Bolty et al
197 Bridge, 2005
**Challenges**

- The cost of outsourcing home and garden maintenance can be significant once it becomes too difficult to manage.

**Opportunities**

- Awareness about the Home Maintenance and Modification (HMM) Service provided by the Commonwealth Government could be better promoted to older people by a range of health, community and support organisations.
- Well designed higher density living can reduce maintenance through use of new or robust materials (e.g. masonry) and more compact garden.
- Older people would be more likely to consider multiple dwelling developments (i.e. between 2–20 units) and thus reduce maintenance if:
  - Issues of noise and parking conflicts were thoughtfully dealt with;
  - A high standard of communal shared amenities and outdoor space was provided;
  - A suitable sized, universally designed dwelling is provided (2brm + study and adequate private outdoor space).
  - Provision for extra storage or extra room for hobbies is considered, even if provided offsite (i.e. caravans, sheds, office space, art studio).

*Figure 78: Easy to maintain garden; low water needs (SC).*
Principle 15

Security in the Home

Accommodation security features protect against crime and reduce perceptions of vulnerability.

- Principles of ‘Crime Prevention through Environmental Design’ (CPTED) are implemented i.e. design and effective use of the built environment reduces fear and opportunities for crime and nuisance. Features include surveillance, control of access, territorial reinforcement.
- Features at the home or development such as fences, security gates, intercom and security screens clearly define and protect private and communal areas.
- Landscaping does not restrict views for surveillance from home to external environment, or within the complex grounds.
- Adequate lighting is provided for passageways and entrances.

Figure 79: Low-rise units with good balconies, attractive railings, and secure entrance with intercoms (B).
What our participants told us...

Participants indicated that security gates and intercoms on a multi-dwelling complex fostered a feeling of security. Some illustrated the importance of having an outdoor private space such as a courtyard that was enclosed or a large window that enabled surveillance of their yard or street. Lighting in the street and around the dwelling was important and assisted neighbours to look out for each other. This helps to build rapport among neighbours and increase the sense of safety. However, there was an awareness that high fences can also provide a visual barrier for surveillance to the street or by neighbours.

In addition, women, particularly single women, expressed a greater feeling of vulnerability, with one indicating that she would not sleep in a ground floor bedroom. Others mentioned the desire to have two exits from their dwelling for security reasons.

What the research tells us...

Among the factors influencing adults over 75 years to move was safety and security\(^\text{198}\). Those people most involved in their communities were least likely to be anxious about security. Policies to improve security for older people in the community and their home are centred around education and community based solutions\(^\text{199}\). The Confident Living Program is one such education tool for older people that have a strong crime prevention message as well as a healthy living message, and seek to identify and address concerns that prohibit older people from feeling safe and secure. One of the topics, “Living confidently in your home” covers avoiding accidents and personal injury, fire safety, how to improve the security of your home, security devices and personal safety.

Figures 80 and 81: Left – Good security (B); Right – High security for garden (B).

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\(^{198}\) Boldy et al 2009

\(^{199}\) James et al. 2002, p.62
Challenges

- Security screens and locks, as well as stairs can sometimes provide safety issues in the event of an emergency such as fire.
- Vegetation that improves the amenity of a site needs to be well planned so that it does not affect line of sight.
- Stair and lift access to underground parking garages needs to be restricted to residents, with separate parking available to guests.
- Difficulty in providing two safe exits from a unit in two plus storey complex.

Opportunities

- Higher density living (up to 20 units in a complex) can provide sense of community where neighbours know each other and look out for each other. Development and support of community-based solutions for safety and security of older neighbours in their home and neighbourhood.
- Implementation of CPTED principles can enhance amenity if done well.
- Higher density living can build in technological solutions to security such as restricted access more easily than detached houses. Technology such as call buttons and special phones can provide solutions for security for those ageing in place.

Figures 82, 83 and 84: Top – View to garden from upstairs provides line of sight security (SC); Bottom left – Technology provides security (SC); Bottom right – Access to community via secure gate.
Implications for Designing for Seniors in Infill Locations

A review of relevant design policies and guidelines at the international, national, state and Brisbane/Sunshine Coast Council local government level illustrated that there is wide coverage of diverse policies which address affordability, sustainability, and liveability. Yet in comparing them to our principles, it also revealed that not one of the documents were able to integrate all the principles in this study. The WHO Age-friendly Guidelines do not mention private open space; whereas Healthy Spaces and Places does not refer to sustainable design features of buildings or visual amenity. The national Liveable Design guidelines focus on universal design. Few State or local government policies or guidelines refer to private open space, maintenance or security in the home. This research, then, is a way of consolidating those principles with greatest impact on seniors to highlight ways that their needs in particular can be addressed.

In comparing our participant-derived principles with the widely accepted principles and design guidelines mentioned in chapter two, a clear message is that older people also advocate many of these good practice design principles and for a reason. They make sense: connectivity and access to services and facilities contribute to safety, security, and sense of community and reduce social isolation. Walking paths and proximity to public outdoor space positively influence health and well-being. Concerns that older people have with high density living, such as noise, correspond with those of other age groups. So if these issues are addressed through planning and design practice, seniors will be amongst those who benefit. However there are some differences. A number of the published policies and guidelines do not address all issues of importance to older people or in a way that satisfies their needs. Our seniors identified that sustainability, visual amenity and outdoor private spaces were important to them. Designing for appropriate climatic orientation not only provides thermal regulation and physiological comfort but minimises household costs in a subtropical environment. This reinforces broader research on high density living and sustainable design in the sub-tropics. Being ‘environmentally correct’ seemed to be less of a factor in decision-making than cost-savings and affordability, at least for our participants.

Of greatest importance to the participants was implementation of universal design. While relevant policies and guidelines exist, there is little consistent implementation even by agencies which should be setting an example or directly meeting the needs of this client group. This affects overall liveability for this demographic group more than most others.

In summary, some key points arising from the consideration of senior’s photos, their presentations and resulting principles are:

- Infill development is by its nature, piecemeal, and unless managed carefully, will not deliver desirable outcomes for a neighbourhood such as improved connectivity, security, adequate outdoor space, and sense of community;
- Low to medium rise development and clustering of small numbers of units can facilitate relationship building and contribute to sense of community and sense of security, supported by design that enables opportunities for interaction;
- Perceptions of visual amenity may be related to human scale development and line of sight;
- Active seniors may eventually need to transition to greater care, so dwelling design needs to be responsive, flexible, and ‘universal’ to support ‘staying in neighbourhood’. A spectrum of infill options which responds to the diverse range of needs and preferences of individuals, at an appropriate density for the neighbourhood, will provide housing choice. In absence of being able to predict the future, additional choice goes a long way towards ‘future-proofing’ a neighbourhood.
- Sustainable design features need to give a viable economic return on investment.
- Embracing and using the natural environment in the neighbourhood, multi-dwelling complexes and in the home, contributes visual amenity, shade, privacy, noise reduction, and a comfortable lifestyle in the sub-tropics. Physiological needs are the drivers for design that makes use of natural light and prevailing breezes.

As communities become more consolidated and compact, planners, architects, developers, and care providers need to be more proactive in striving to achieve these principles. Consumers, that is, the increasing ‘bubble’ of seniors, need to demand appropriately designed accommodation and encourage Councils to set priorities to achieve an age-friendly community. Embracing principles is only a first step; the real challenge is in delivery. Local governments have a strong role in ensuring that infill development is well managed.

The next chapter explores how to implement these principles through designs at both a neighbourhood and dwelling level. It identifies planning constraints and possible approaches to achieve the seniors’ principles. As a result, the design team embraced the challenge of working with seniors to achieve affordable, sustainable and liveable built environments.