



# Designing for Ageing in Place

Drainage Solutions for Accessibility, Independence and Safety



## INTRODUCTION

“Ageing in place” is a term used to describe a person, as they get older, choosing to remain living in their home and independently managing the impacts of old age on their mobility and mental ability rather than entering an aged care facility. A study by the Australian Housing & Urban Research Institute found that between 78 and 81 per cent of Australians over 55 (depending on their age group) want to live in their own home as they age.<sup>1</sup> Economic factors come into play – retirement is becoming more expensive and people are being forced to work longer, so ageing in place is often not a choice, but a necessity.

New homes that are being built now by first or second time homeowners are likely to be the homes that they live in into old age. New builds need to prioritise safety, accessibility and comfort to meet the needs of occupants now and into the future. Among the key design priorities include, eliminating trip hazards, mobility considerations and facilitating daily living activities such as bathing, grooming and cooking. If such requirements are not considered early, the homeowner will face costly house modifications as they age.

A special area of concern are bathrooms and the transition between indoor and outdoor areas. Poorly-designed drainage can make thresholds difficult to navigate for people with limited mobility, especially if they require walking aids or a wheelchair, and introduce trip hazards that are difficult to remove at a later stage. It is important for a person’s overall health and wellbeing that they are given the choice of being able to age where they want to age, rather than have to move into an aged care facility simply because their home has trip hazards left in place from construction years prior.

In this whitepaper, we consider the importance of drainage design in creating a safe living space suitable for ageing in place. In doing so we identify drainage solutions that enhance the quality of life of occupants – giving them more choice as they age.

In order for a person to live comfortably in their own “place” as they age, the “place” must be one in which any person, regardless of age or physical ability, can live in.



## A BETTER QUALITY OF LIFE

The growing popularity of ageing in place can be attributed to greater health and happiness outcomes for seniors. Successfully ageing in place can give individuals and couples a good quality of life, with greater independence and freedom, self-reliance and a sense of familiarity and comfort – all of which contribute to a positive mental and physical state.

The goal of anyone wanting to age in place should be to maintain or improve their quality of life as they get older. In order to do that, a carefully-considered plan that covers the individual, their finances and their home arrangements should be created as soon as possible. A key component of this planning stage is ensuring the home itself is designed to accommodate present as well as future needs as the person ages.

In order for a person to live comfortably in their own “place” as they age, the “place” must be one in which any person, regardless of age or physical ability, can live in. The living space must provide freedom and support

that enables the person to remain in place safely and comfortably. Different fixtures and amenities in the home must be easy to operate and allow the person to independently conduct everyday activities. Removing trip hazards and obstacles that may limit access for a mobility-challenged individual is paramount. Such hazards are common around a home, for example slippery floors, shower hobs, stepdowns and elevated door sills.

Feeling safe in your own home is inexorably tied to a better quality of life. If safety risks are not eliminated, how will the person live comfortably in the space as they age? According to the Australian Institute of Health & Welfare (AIHW), 58% of hospitalisations for unintentional falls and 95% of falls deaths were for people aged 65 and over.<sup>2</sup> One out of three seniors will suffer a fall this year, but fewer than half of them will report it to their doctors.<sup>3</sup> Even if injuries are minor, the experience of falling can be so traumatic that the individual may avoid certain parts of their own home due to fear of falling again.







## AGEING IN PLACE DESIGN PRINCIPLES

The principles of universal design provide guidance on creating safe and functional living spaces for people choosing to age in place. Universal design refers to creating environments that offer safety and comfort for all people, regardless of age or physical ability, with no need for adaptation or functional changes. This design approach revolves around the below guiding principles:<sup>4</sup>

- **Equitable use.** The design can be used by people of diverse abilities.
- **Flexibility in use.** The design accommodates a wide range of individual preferences and abilities.
- **Simple and intuitive.** The design is easy to understand regardless of the user's experience.
- **Perceptible information.** The design effectively communicates the required information to the user regardless of the ambient conditions or user's sensory abilities.
- **Tolerance for error.** The design minimises hazards and the consequences of any unintended actions.
- **Low physical effort.** The design can be used by anyone, regardless of their physical characteristics, comfortably and efficiently.
- **Appropriate space for approach and use.** The design provides adequate space for approach and use regardless of the user's body size, posture, or mobility.

Design features that follow these guiding principles make living in a home accessible, easy and safe to use for everyone, without requiring modification as a person ages. Universal design principles can be seen in common ageing-in-place design strategies, including:

- single-level living to ensure all major functions are available on one floor;
- entrances and passageways without barriers;
- smooth floors that eliminate trip hazards;
- lever handles that make opening doors easier; and
- appropriate lighting for maximum visibility.

Ageing-in-place considerations should be accounted for early in the design phase. Correctly executed ageing-in-place design can add value to the home. It also eliminates the need for future alterations thus saving the homeowner money in the long run. For older Australians on reduced or lower incomes, housing costs can be greater than anticipated, and usually rise over time. Retrofitting or modifying an existing home can be costly, adding undue pressure and economic stress.

## DRAINAGE AREAS AND FALL PREVENTION: A CLOSER LOOK

Architects, designers and builders are uniquely positioned to meet the needs of ageing-in-place clients, provided they fully understand common accessibility issues and the corresponding solutions and products that make living in a home easier. While fundamental to every home, drainage design can sometimes be overlooked. A well-designed drainage solution not only fulfils a specific functional purpose, it contributes greatly to occupant safety, wellbeing and autonomy.

Bathroom falls are among the most common accidents in the home. AIHW reported that 12% of falls at home occur in the bathroom.<sup>5</sup> Uneven floor surfaces, and high gradient falls are common features in bathroom drainage areas. Traditional centralised drainage calls for multiple slopes in the shower, creating unevenness on the shower surface. Traditional drainage is also prone to ponding

(undrained water pools), which can make floors slippery and contribute to mould and bacterial growth in a building's interior.

Bathrooms are still being built with standard shower frames, prefabricated and put in place for cost savings. Shower hobs are a common feature used to prevent water seepage into adjacent spaces. However, any level changes or curbs on the bathroom floor not only create trip hazards, but prevent those needing a walker or wheelchair from accessing the bathroom.

The AIHW also reported that 17% of falls occurred in outside areas.<sup>6</sup> As land block sizes get smaller most, if not all, new builds will have a strong focus on an outdoor area. Any lip at the door sill or stepdown at the transition from inside to outside can also pose a safety hazard and should be designed out where possible.

## DESIGNING OUT ACCESSIBILITY BARRIERS

### Conventional vs. Linear Drainage

Choosing the right drainage solution for residential builds gives occupants the choice to age in place by removing accessibility barriers, providing a sense of security and safety and improving the quality of indoor conditions by protecting against water pooling and water ingress. For residential applications, the choice is typically between centralised drainage systems and linear drainage systems.

A linear drain is an elongated rectilinear design for water egress that captures the flow of water towards a single exit port to deliver the most efficient removal of liquid. Linear drains are typically level-plane and are specially designed to remove the access and mobility constraints of centralised drainage. Design features supporting ageing in place include:

- **Eliminates the need for shower hobs or curbs.**

Linear drainage is installed at either the back or side wall of where fixtures are installed or along the threshold or entrance. It provides a natural water barrier without the need for a raised hob. The linear drain lies flush against adjoining surfaces, so it does not pose a trip hazard and enables seamless access for occupants who use wheelchairs, walkers and frames.

- **Requires only a single fall or slope in the floor.**

Unlike conventional centralised drainage which requires a four-way fall, linear drainage only requires a single fall towards the drain. This results in a safer, more level floor. As they require only a single fall, linear drains are easier to install and can save homeowners on installation costs.

- **Provides superior drainage.** Linear drains extend the available drainage area, which can promote consistent drainage flow and reduce the incidence of ponding. This in turn reduces the safety risk posed by wet, slippery bathroom floors.

### Eliminating the Stepdown

Given the increasing trend of combining indoor and outdoor spaces in new builds, an alternative to potentially dangerous stepdown doorways should be considered. Traditional stepdown doorways and partitions are used to prevent water from the outside seeping into indoor areas. However, they require users to step up to enter indoors, which may be difficult for mobility-challenged users, especially if they use walking aids or wheelchairs. Accessible thresholds with low or no steps are becoming more common, but there is an increased risk of water ingress – if a user does not need to step up to come inside, neither does water.<sup>7</sup>

A threshold drain, itself a type of linear drain, eliminates the need for a stepdown, removing a potential trip hazard and accessibility barrier from the home. A quality threshold drain acts as both barrier and active water conduit, providing superior drainage around the doorsill area. Integrated into or beside the doortrack, a threshold drain provides a seamless transition between internal and external surfaces, allowing uninhibited movement through the doorway while allowing door sills to be drained and protecting interior areas from water ingress.



# LINEAL DRAINAGE FOR AGEING IN PLACE

## Stormtech

As Australia's premier drainage manufacturer and supplier, Stormtech is committed to delivering superior lineal drainage solutions that meet the needs of today's residential market. As the proud pioneer of this unique drainage system, Stormtech is recognised globally as an industry leader in design, consultation and manufacture of lineal drainage – solutions that enable the creation of safe, accessible homes that support the growing demand for ageing in place.

Stormtech's linear bathroom product range are either stainless steel or UPVC and available in modular kits, fixed-lengths units or customised lengths with variable outlet positions. Using a linear drain in the bathroom and shower allows the use of larger format tiles and floor surfaces in design: the floor is sloping towards one long, narrow grate and channel all on the same plane allowing the removal of hobs, steps and other floor level changes. Slimline grates are all high quality stainless steel manufactured in Australia and available in various widths, designs and finishes.

Stormtech's Threshold drain was designed to eliminate the "trip-and-slip" hazards of stepdown partitions, delivering uninterrupted access between indoor and outdoor living areas. The low-profile design consists of an external lineal grate which sits flush beside the doortrack, in precise alignment with the ground surface. An integrated, concealed, subsill collects water flows and condensation around the doorway, conveying it to the external drainage system.

The level Stormtech Threshold drains are available with a stainless steel grate or tile insert channel and are a made-to-length system ensuring they are compatible with major door manufacturers. Importantly they also comply with the access and mobility code (AS 1428). Threshold systems are suitable with sliding, hinged door, door track applications, bi-fold or top hung doors.

All Stormtech products are Australian-made and WaterMark certified. With a proud commitment to eco-friendly design, Stormtech offers the only linear drainage product in the world with Global GreenTag certification.

To learn more about Stormtech's lineal drainage solutions for ageing-in-place applications, visit [www.stormtech.com.au](http://www.stormtech.com.au)



“Choosing the right drainage solution for residential builds gives occupants the choice to age in place by removing accessibility barriers, providing a sense of security and safety and improving the quality of indoor conditions by protecting against water pooling and water ingress.”

## REFERENCES

- <sup>1</sup> Australian Housing & Urban Research Institute. "Older Australians and the housing aspirations gap." AHURI. <https://www.ahuri.edu.au/research/final-reports/317> (accessed 1 July 2021).
- <sup>2</sup> Australian Institute of Health & Welfare. "Injury in Australia: falls." AIHW. <https://www.aihw.gov.au/reports/injury/falls> (accessed 1 July 2021).
- <sup>3</sup> Centers for Disease Control & Prevention. "Important Facts about Falls." CDC. <http://cdc.gov/homeandrecreationalafety/falls/adultfalls.html> (accessed 1 July 2021).
- <sup>4</sup> University of Washington. "Universal Design: Process, Principles, and Applications." UW. <https://www.washington.edu/doi/universal-design-process-principles-and-applications> (accessed 1 July 2021).
- <sup>5</sup> Australian Institute of Health & Welfare. "Trends in hospitalisations due to falls by older people, Australia." AIHW. <https://www.aihw.gov.au/getmedia/5f84eadd-6f25-4429-82fc-5e9072278335/aihw-injcat-182.pdf.aspx?inline=true> (accessed 1 July 2021).
- <sup>6</sup> Ibid.
- <sup>7</sup> Saldanha, Adrian Gerard and David H. Nicastro. "Understanding why doors leak." The Construction Specifier. <https://www.constructionspecifier.com/understanding-why-doors-leak> (accessed 1 July 2021).

All information provided correct as of July 2021

