Healthy by Design SA

Heart Foundation

A guide to planning, designing and developing healthy urban environments in South Australia

A message from the Heart Foundation

The Heart Foundation is dedicated to reducing premature death from heart, stroke and blood vessel disease.

Cardiovascular disease accounts for over one-third of all deaths in South Australia and 1,000 of those annual deaths in SA are specifically due to heart attack.

Prevention through modification of lifestyle risk factors of cardiovascular disease such as physical inactivity and poor nutrition is vital. We cannot keep promoting individuals to change their behaviours and lifestyle when the environment in which they live and work gives little attention to supporting and facilitating making healthy choices easier.

Influencing long-term planning, policy and infrastructure measures are at the core of our active living efforts because by focusing on creating supportive environments for behaviour change, we help influence the social and political framework for the adoption of healthy lifestyles.

Since 2007, the Heart Foundation in South Australia has been leading the South Australian Active Living Coalition; a forum of government and non-government agencies working together to create places that encourage more South Australians to be more active every day.

This collaborative approach to delivering active living in South Australia in an integrated manner, has successfully delivered a range of projects and resources that are influencing policy and practice across our state.

This new South Australian version of the Healthy by Design guidelines will be a valuable addition to our suite of resources to support local practitioners to deliver healthier urban environments and the Heart Foundation commends it to you.

I thank the Office for Design and Architecture SA, the Office for Recreation and Sport, and the Department of Health and Ageing for funding this important guideline development. I particularly acknowledge the members of the Coalition, led by the Heart Foundation team, for their ongoing and dedicated work to improve the health and wellbeing of South Australians.

Dr Amanda Rischbieth
Chief Executive
Heart Foundation (SA)

Foreword

Office for Design and Architecture SA

The built environment can provide and support a high quality of life, wellbeing and health for our communities.

Good design achieves this by sourcing creative thinking early in how people, places and processes connect. We need to support ways of working to enable the people designing and building places to have the best chance of getting it right for the people using them.

Well designed public places encourage social connectedness and create easy, enjoyable and safe access for all people at all times. They offer a choice of sustainable mobility and support a diversity of cultures and ways of living. They are attractive, complementing our natural environment or offering respite from our harsher urban environments.

The Office for Design and Architecture SA is proud to support the Heart Foundation's Healthy by Design SA in providing guidance and direction for built environment professionals involved in the design of places and spaces. Its work complements that being undertaken at National, State and Local level in a range of policies, protocols and standards that demonstrate a belief in the value of the relationship of wellbeing to our environment.

This South Australian edition is grounded in the local environment of Adelaide, its climate, its politics, its landscape and its people. It includes local best practice research and thinking on green infrastructure, child and youth friendly cities and the role of streets in our urban environment.

Healthy by Design SA will assist built environment professionals in achieving better design outcomes for their projects. More importantly, it will help create resilient, safe and well designed places and communities that will benefit future generations of South Australians.

Ben Hewett
South Australian Government Architect
Office for Design and Architecture SA

Office for Recreation and Sport

The Office for Recreation and Sport (ORS) is the lead agency for the Government's policy on sport and active recreation.

To support more people to enjoy lifelong involvement in quality active recreation and sport we need to create environments where walking, cycling and other forms of physical activity and sport are appealing, accessible, and safe.

As a founding member of the South Australian Active Living Coalition, the ORS is proud to have supported the development of the Heart Foundation's Healthy by Design SA guidelines. These guidelines are an important tool to facilitate a strategic and integrated approach to the development and delivery of sport and active recreation and infrastructure in South Australia.

Paul Anderson
Executive Director
Office for Recreation and Sport

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Introduction

Our lifelong health and wellbeing and chronic disease rates are all affected by the design of the built environment.

The way cities, towns and neighbourhoods are planned and designed impacts on people's opportunity to walk, cycle and use public transport; to access healthy food; to recreate; and to participate in community life.

Healthy by Design: a guide to planning, designing and developing healthy urban environments in South Australia (Healthy By Design SA) aims to assist planners, urban designers and related professionals to design healthy urban environments that enable people to make healthy lifestyle choices and, in particular, to incorporate incidental physical activity—such as walking and cycling for transport and recreation—into their daily routine.

Initially developed in Victoria with support from the planning, transport, recreation, health and community sectors, Healthy by Design SA draws on 10 years of Heart Foundation research into providing tools to assist in planning and implementing urban design that promotes healthy, active living.

It also builds upon the Supportive Environments for Physical Activity (SEPA) project initiated by the Heart Foundation, which worked in close partnership with local and state governments to progress environments that support active living.

This South Australian edition of Healthy by Design SA seeks to update the guidelines to encompass new and emerging topics and provide guidance tailored to South Australia's unique legislative and policy environment.

The Heart Foundation, in collaboration with the Australian Local Government Association and the Planning Institute of Australia, has also developed *Healthy Spaces and Places: A national guide for planning, designing and creating sustainable communities that encourages healthy living* (see www.healthyplaces.org.au). Healthy Spaces and Places presents a complementary set of guidelines to those found in Healthy by Design SA, which is differentiated by its state specific focus.

The Healthy by Design SA guidelines are underpinned by the following seven key objectives:

1. **Walking, cycling and public transport** – Provide an integrated, accessible network of walking and cycling routes and footpaths for safe, convenient and pleasant connection to open space, public transport, shops, local destinations and points of interest.

2. **Streets** – Create functional and attractive street networks that prioritise safe and convenient travel for pedestrians and cyclists, and maximise opportunities to engage in planned and incidental activities.

3. **Local destinations** – Provide local destinations to support lively, walkable and cycle friendly neighbourhoods.

4. **Open space** – Provide a range of quality public open spaces within walking and cycling distance from dwellings. Open spaces should be accessible to a wide range of people with diverse needs and should foster community spirit.

5. **Supporting infrastructure** – Install supporting infrastructure that provides for comfort, amenity, social interaction, safety and convenience.

6. **Urban food** – Plan and design cities, towns and suburbs to ensure a more secure, resilient, healthy and sustainable food supply.

7. **Density** – Encourage well designed residential areas with higher density and mixed uses.

HEALTHYSPACES**&**PLACES

The role of Healthy by Design SA

The focus of Healthy by Design SA (HbDSA) is the public realm—the public spaces of our cities, towns and regions. It includes walking and cycling routes, streets, open spaces, parks and other urban spaces.

Healthy by Design SA aims to support the broad range of public and private sector professionals who have a role in the planning, design, development and maintenance of the public realm and make it easier to incorporate design considerations that will have a positive impact on the health and wellbeing of South Australians.

The Heart Foundation recognises that public realm initiatives can be complex and often require the careful balancing of competing interests and objectives. As outlined below, Healthy by Design SA is intended to perform a range of informative roles, having regard for the various contextual matters, stakeholder needs and other policy or regulatory imperatives that can form part of the process by which these projects are delivered.

Healthy by Design SA's role is not to mandate a prescriptive approach to urban design in the public realm. Rather, it is a tool to assist with developing policies that enable healthy, liveable urban environments and then translating those policies into practice.

Using Healthy by Design SA

Influence	Embedding healthy urban design policies into state and local government strategic plans
Guidance	Preparing plans (such as master, precinct, concept and detailed design plans) Developing style guides Assessing development applications
Initiation	Identifying opportunities for ongoing development and enhancement of the public realm
Professional development	Increasing the knowledge and skills of qualified professionals as well as tertiary students, including engineers, health planners, urban planners and designers, recreation officers and landscape architects
Capacity building	Educating the community, including local government councillors, about the ways in which public realm decisions influence our health

For more information about how Healthy By Design SA can be implemented, refer to 'How to Use Healthy by Design SA' on page 16.

The need for environments to support active living and healthy eating

Many of the factors that influence health lie in the complex social, economic and physical environments in which people live.

All of these influencing factors are known collectively as determinants of health[1]. Urbanisation is reshaping our public health problems[2] and contributing to increasing levels of chronic disease risk factors such as overweight and obesity, insufficient physical activity, sedentary behaviour and poor nutrition.

South Australia's current health status

Around 1 in 5 people in South Australia are affected by cardiovascular disease. We also have high rates of preventable risk factors, including:

- overweight and obesity – affects 67.2% of South Australian[3] adults and 24.7% of children[4]

- sedentary lifestyle/low exercise levels – reported by 52.9% of the population[4]

- inadequate vegetable consumption – reported by 90.7% of the population.[5]

Relationship between health and the built environment

The built environment is a powerful predictor of physical activity and dietary patterns and it can be shaped to support or inhibit physical activity and healthy eating.[6] There are three key streams within the built environment and health relationship, namely:

- the built environment and getting people active

- the built environment and providing access to healthy, nutritious food

- the built environment and connecting and strengthening communities.

These three streams address the major risk factors for chronic disease—physical inactivity, obesity and social isolation. Physical inactivity in particular doubles the risk of cardiovascular disease, type 2 diabetes and obesity and increases the risk of breast and bowel cancer.[7]

The planning and design of the built environment and the policies that guide or dictate planning and design outcomes are increasingly important to population health outcomes.

The following characteristics are all identified as impacting on population health outcomes[8]:

- loss of agricultural land to urban development

- limited availability and accessibility of

   o public transport

   o fruit and vegetable retailers

   o public open space and its features and facilities

- housing location, design and affordability

- noise and air emissions, particularly from exposure to busy roads and traffic

- prevalence of fast food outlets

- crime and perceptions of safety

- lack of vegetation and a predominance of hard surfaces, which results in increased air and surface temperatures.

The cost of poor health

Chronic diseases impact heavily on the use of health services and contribute to major funding pressures on the health care system.[4] They also impact on our economy through lost productivity and reduced participation in the workforce. South Australia cannot afford the social and economic costs of continuing to deal with illness only after it appears.

Healthy by Design SA provides a foundation to support and inform optimal design approaches so that well-integrated and accessible built environments are provided, enabling people to make healthy food choices and be more active in their daily lives. Keeping people healthy and active across all stages of life is vital to reducing the strain on the State's health services and budget.

$129 million	Estimated additional expenditure as a result of 9,410 additional acute public hospitalisations due to the occurrence of overweight and obesity in South Australia's population.[9]
2034	Year that the health budget is projected to exceed the entire State Budget.[10]
$64 billion	Estimated costs to the Australian economy associated with productivity losses that occur due to obesity.[11]

It's not just about health

Whilst the Heart Foundation promotes good urban design for the potential health benefits, there are many other compelling reasons to adopt the planning and design principles outlined in this guide.

Climate change and peak oil

Two of the largest challenges we face in coming decades are climate change and increasing fuel prices.

Walking, cycling and using public transport reduces emissions and demand on fossil fuels, thereby contributing to a cleaner and greener environment. It is therefore important to consider the relationship between climate change, the built environment and modes of transportation.

Providing infrastructure to support low-emission transport modes makes a contribution towards improving air quality, reducing greenhouse gas emissions and moving towards a more sustainable environment.

Rising fuel costs will have significant impacts on the overall cost of living, particularly for those without locally accessible services and facilities or alternative modes of travel. The spatial distribution of South Australia's residential population results in an over-reliance on private motor vehicles for our commuting and transport needs.

Good for Business

In 2011, the Heart Foundation commissioned a discussion paper to bring together evidence and case studies on the financial benefits to retailers and residents in making commercial streets more pedestrian and cycling friendly.

For a copy of *Good for Busine$$: The benefits of making streets more walking and cycling friendly*, visit:

www.heartfoundation.org.au/SiteCollectionDocuments/GoodforBusinessFINAL_Nov.pdf

Congestion

The costs of congestion include travel delays, high vehicle operating costs (including higher rates of fuel consumption), reduced productivity, increased driver and passenger stress, additional greenhouse gas emissions (vehicles under congested conditions use more fuel and emit more pollutants than vehicles under free-flow conditions), poorer urban environment and air quality and, as a consequence, higher health costs. In our capital cities the cost of congestion is estimated to rise from $9.5 billion in 2005 to $20.4 billion by 2020; however, if public transport, walking and cycling were to double their mode share, it is estimated that this could be reduced to $14 billion.[12]

Economic benefits

'A good physical environment is a good economic environment.'[13]

There are direct, measurable and financial benefits to improving the quality of the urban environment and, in particular, improving the 'walkability' of our cities, towns and neighbourhoods. These benefits include increased housing values, increased retail property values and rents, increased retail expenditure, and generation of new businesses.[13]

Ageing population

South Australia has the oldest population of all the states and territories[14] and it is recognised that this has potentially significant economic and social implications for our State's future. Enabling independence and 'ageing in place' are identified as key priorities in our State's strategic approach to this demographic trend.

The urban environment influences people's health, wellbeing and happiness as they age. Providing safe, walkable, vibrant communities with local shops, services and facilities, as promoted by Healthy by Design SA, is essential to providing continued quality of life for our population as it ages.

Strategic context

All spheres of government are now active in the urban design and policy area.

The table below identifies Healthy by Design SA's relationship to key strategic drivers.

Our Cities, Our Future: A national urban policy for a productive, sustainable and liveable future is the Australian Government's strategic policy framework for the 18 major cities of Australia. The associated Urban Design Protocol encourages the highest standard of urban design.	Healthy by Design SA (HbDSA) responds to this national urban design framework by providing a South Australian guide to planning, designing and maintaining healthy urban environments.
South Australia's Strategic Plan outlines the priorities, visions, goals and targets for South Australia's future.	HbDSA is a guide to improving community wellbeing by creating vibrant, safe and healthy neighbourhoods.
The Strategic Infrastructure Plan for South Australia sets out the State's infrastructure priorities.	HbDSA responds by identifying healthy urban design objectives to underpin the sustainability of infrastructure assets.
The 30-Year Plan for Greater Adelaide (The 30-Year Plan) sets out a range of policies and targets for accommodating population and economic growth; creating inclusive, vibrant and liveable communities; preserving regional hinterlands and primary production lands; and protecting natural resources.	HbDSA provides guidance on creating healthy urban environments that support active living and other outcomes that are reflected in the objectives, principles, goals and targets throughout the 30-Year Plan.
The Eat Well Be Active Strategy for South Australia sets out the actions for government to improve the health and wellbeing of the community by promoting healthy eating and physical activity.	HbDSA responds by recognising the significant role that land-use planning and the built environment plays in enabling healthy behaviours. It promotes healthy urban design as a means of making it easy for people to be active and eat a healthy diet.
Health in All Policies is based on the World Health Organisation's Social Determinants of Health, whereby the health of individuals and populations is shaped by the social, economic and physical environment as well as individual behaviours and characteristics.	HbDSA promotes awareness about how policy makers' decisions affect population health and articulates design objectives for health-promoting urban environments.
Local government strategic (community) plans reflect a council's long-term vision for their city and how it will be achieved. Recent legislative changes will see the introduction of regional public health plans for aligning public health planning with other strategic planning responsibilities at the local government level. (See the 'Public health and the role of local government' section of this guide for more information.)	HbDSA is designed to inform the preparation of local government strategic plans and subsequent key council plans such as annual budgets and plans for business, asset management, infrastructure, social development, public health and open space and recreation.

Public health and the role of local government

The South Australian Public Health Act 2011 aims to improve how our State prepares for, and responds to, modern public health challenges.

Importantly, the Act provides the basis for a strategic and integrated approach to public health planning at the local government level. It also addresses the prevention of non-communicable conditions and specifically links to public health outcomes the way buildings, infrastructure or other works are designed, constructed or maintained.

Health and wellbeing is already core council business, with local government playing a key preventative role in shaping and managing public health outcomes through, among other things:

• the provision of a wide range of direct services such as immunisation programs, inspection of food premises, community transport, animal control, waste management and stormwater management

• the provision and maintenance of parks, gardens, ovals, playgrounds, libraries and facilities for sports and leisure

• the provision and maintenance of roads, footpaths and cycle paths

• land use planning and controls

• the enforcement of building standards and conditions.

The design, creation and maintenance of public infrastructure, spaces, places and facilities are key local government functions. Ensuring that healthy urban design principles inform these functions is consistent with the Act and represents a form of primary prevention contributing to positive health outcomes. In order to have a greater influence on improving health outcomes through the built environment, a range of professionals within local governments must be involved in regional public health planning. This includes the engineering, economic, environmental and planning areas as well as health and community services.

Most of the services and infrastructure that councils build and maintain are not in isolation from other levels of government or from local services and agencies. Joint funding, partnerships and legislative or regulatory mechanisms are common across each area.

Regional public health plans provide a means by which local governments can develop a framework to better align existing infrastructure and asset management responsibilities with public health outcomes and develop the partnerships necessary to deliver them.

Source DPTI

Land use planning

An overview: Land use planning plays a significant role in constraining or encouraging physical activity and healthy food choices in communities.

Local, regional and state strategic plans, and particularly Development Plans, should require the creation of environments that enable people to walk and cycle in safety and with ease as part of daily life and to have ready access to nutritious and healthy food choices.

The land use planning decisions of the past have resulted in urban expansion across productive agricultural land, high motor vehicle dependency, segregated land use, disconnected streets, low residential density and limited public transport services. These attributes are associated with low levels of walking[15] and disparities in access to healthy foods, particularly for people in low and middle socioeconomic areas.[16]

Healthy by Design SA addresses the significant social and environmental impacts of such development through a series of objectives, design considerations and principles which aim to enable higher residential densities with mixed-use zoning (combining residential and commercial uses), interconnected streets and access to public transport.

Open space planning

The reservation of land designated for public open space is vital. Public open space provides a range of recreational and throughway opportunities for residents and visitors in addition to contributing to the liveability and appeal of a suburb or neighbourhood.

The strategies outlined in Healthy by Design SA are consistent with walkable communities, where in urbanised areas people have the opportunity to walk no further than 400–800 metres to local destinations, including parks and recreational facilities. For local government, upholding the minimum requirement for public open space in subdivisions—rather than negotiating a cash allocation to be invested in open space elsewhere—is necessary

and vital, especially in higher density developments. This will ensure equitable distribution of open space in each subdivision, providing easy walking access for most people.

Local government, in negotiation with developers, can begin to improve the health as well as social and economic viability of each subdivision by ensuring an allocation of quality open space. The more attractive and useful the land is for recreation and leisure and as a point of interest to walk to, the more buy-in and appeal is created for the area.

Recreation plans prepared by councils, either individually or as part of a regional approach, consider the sport, recreation and physical activity needs of communities and help guide the provision of settings, services and programs to support participation. However, the preparation of these plans needs to be considered in the context of broader land use planning, particularly in order to ensure the provision of adequate space for future demand.

The planning and design of sporting facilities caters for a specific demand and requires specialised guidance however these facilities also need to be developed as integrated components of our urban environments. Healthy by Design SA can be used to inform the development of open space strategies and recreation plans for active, healthy environments.

Policy planning

Healthy by Design SA's planning and design considerations can be incorporated from the outset through state and local government planning processes and can be used to contribute to reviews of land use legislation and regulation.

Healthy Spaces and Places

The Heart Foundation, in collaboration with the Australian Local Government Association and the Planning Institute of Australia, has also developed *Healthy Spaces and Places: A national guide for planning, designing and creating sustainable communities that encourages healthy living* (see www.healthyplaces.org. au). Healthy Spaces and Places presents a complementary set of guidelines to those found in Healthy by Design SA, which is differentiated by its state specific focus.

Development plans, structure plans and master or precinct plans are important tools for guiding the location, form and pattern of development and infrastructure within a defined spatial area and can promote active communities by:

- Delineating the location and extent of residential boundaries, open space networks, key physical and social infrastructure (such as transport and public transport routes) and services (such as schools, health care and employment centres), local destinations and transport-mode interchanges.

- Identifying existing and future connections within and between communities, including roads, cycling and walking pathways.

- Planning land use around existing and proposed public transport facilities, particularly mass transit systems, and local destinations to increase options for active transport in the form of walking, cycling and public transport use.

- Limiting the extent of dormitory suburbs (particularly low density suburbs) and 'exurbs' (residential development beyond the suburbs) which increase dependency on cars and reduce opportunities for active transport.

- Encouraging increased housing densities in appropriate areas. Many established areas are affected by falling occupancy rates due to changes in lifestyles and housing needs. Where increasing housing density occurs, ensure that opportunities for increasing active transport are maximised.

- Encouraging mixed-use areas in appropriate locations. Land zoned for mixed use can help to ensure close proximity between locally orientated businesses, services and residences and this enables active transport opportunities.

Development assessment

Healthy by Design SA's planning and design considerations can provide guidance when assessing development applications, particularly with regard to the objectives and principles contained in the South Australian Planning Policy Library modules for Open Space and Recreation, Land Division, Transportation and Access, by:

- ensuring that land division design integrates with adjacent land use through street connectivity

- ensuring that existing pedestrian pathways and bicycle lanes are well connected and continue into, and integrate with, the subdivision

- upholding the minimum required public open space contribution for land divisions and requiring installation of high quality infrastructure and facilities

- ensuring that large-scale land divisions have appropriate road networks that facilitate safe and convenient walking and cycling trips, maximise intra-suburb linkages, and support bus services through appropriate lane widths.

Source Lightsview

Source Renewal SA

Retrofitting

In the context of these guidelines, retrofitting refers to the installation of new or improved infrastructure or the undertaking of additional works to existing structures within the built environment.

What is retrofitting?

Retrofitting generally occurs within brownfield and greyfield sites that are undergoing a change of use, an intensification of use (densification of housing), or redevelopment (provision of new or improved infrastructure).

Which aspects of the built environment can be retrofitted?

Retrofitting can take place at a specific site (micro level) within a neighbourhood, such as through the construction of a shared pathway or the redevelopment of a local park. It can also take place at a metropolitan level (macro level) through the expansion of public transport networks and infrastructure.

Why is retrofitting important in South Australia?

Retrofitting as an issue has come to the fore in South Australia as a result of significant policy shifts outlined in *The 30-Year Plan for Greater Adelaide*. The 30-Year Plan is proposing that Adelaide becomes more compact, with the majority of new residential development to be accommodated within existing urban areas.

The 30-Year Plan also aspires to reducing car dependency by increasing public transport use, extending and improving cycling networks, and encouraging walkable neighbourhoods.

In many circumstances, meeting these and other commitments set out in The 30-Year Plan, as well as in other associated State strategic documents, will require substantial upgrading and renewal of existing public infrastructure and spaces.

Retrofitting guidance in Healthy by Design SA

Healthy by Design SA principles are applicable in the planning and design of any public realm initiative.

A number of case studies within these guidelines illustrate retrofitting initiatives that have been undertaken in South Australia. These case studies highlight innovative techniques, methods and solutions for achieving improved outcomes within the existing urban environment.

Top tips for retrofitting

While Healthy by Design SA principles are applicable for any urban design situation, implementing them within retrofitting situations can be challenging. This is due to the need to work within existing physical limitations, to balance the needs of stakeholders and expectations of the community, and to operate in accordance with budgetary and regulatory parameters.

Successfully implementing Healthy by Design SA principles in retrofitting situations requires greater emphasis on the process involved in delivering the project. The following principles and strategies may be used to guide retrofitting initiatives:

Creating places for People

Creating Places for People: an urban design protocol for Australian cities (www.urbandesign.gov.au) establishes four key principles for successful processes:

Context – work within the planning, physical and social context

Engagement – engage with relevant stakeholders

Excellence – foster excellence, innovation and leadership

Custodianship – consider custodianship and maintenance over time

The model prioritises design excellence through leadership, teamwork and integrated processes and can be tailored to the nature and complexity of any individual initiative.

CREATING PLACES FOR PEOPLE
AN **URBAN DESIGN PROTOCOL** FOR **AUSTRALIAN CITIES**

1. Working within existing physical limitations

- Avoid focusing on potential or perceived limiting factors; aim for an optimum outcome and find innovative solutions to achieve it.

- Acknowledge and embrace existing movement patterns and behaviour by identifying desire lines (i.e. 'goat tracks'), well-utilised services and facilities, focal points and areas where people informally congregate.

- Successful retrofitting can involve small, localised initiatives (e.g. inclusion of street furniture, signage) and does not necessarily have to entail large-scale refurbishment or replacement of existing infrastructure.

- Retrofitting is not necessarily about installing new facilities and infrastructure; it can be about conducting an audit to identify and remove hazards or obstacles (such as sandwich boards), or ensuring clear sightlines by trimming trees and landscaping.

- Identify connections to the broader area—how people get to a public space is as important as the space itself.

2. Balancing the needs of stakeholders and expectations of the community

- Understand the needs and desires of existing and potential users by preparing a community profile and collecting relevant data such as user surveys.

- Engage with existing users and stakeholders, particularly during the initiation stage, to develop an agreed vision, purpose and function for the initiative. These can be used to guide the preparation of detailed concept plans and provide a reference point for subsequent negotiations with stakeholders.

- Consult with local businesses that may be affected during the construction phase and negotiate strategies to minimise disruption during peak customer service times and accommodate essential daily operational requirements such as goods deliveries.

Evaluation Tools

There are a number of existing tools available for collecting data and evaluating public realm initiatives. For further details and links go to: www.healthyplaces.org.au

3. Operating in accordance with budgetary and regulatory parameters

- Consider cost implications beyond initial construction—there is often an imperative to minimise upfront capital costs and take the cheapest option, but poorly designed places and spaces and low-quality materials impose ongoing costs on our communities.

The Cost of Bad Design

The UK's Commission for Architecture and the Built Environment (CABE) has produced a range of useful resources, including *The Cost of Bad Design*, a compilation of essays that highlight the higher long-term costs and poorer performance from public buildings, spaces and places that are poorly designed. For further info see www.cabe.org.uk (now archived)

- Retrofit infrastructure, sites and facilities in ways that can satisfy diverse needs and achieve multiple outcomes. For further information see the Matrix of Design Considerations on page 45.

- Explore options for Public/Private Partnerships to share the cost of retrofitting initiatives.

Public/Private Partnerships

Public/Private Partnerships to deliver and manage public realm projects is a relatively new concept in Australia. 'The Highline' is a public park built on an elevated rail structure in New York. It is owned by the City of New York, but built and maintained by a non-profit organisation. For further information see www.thehighline.org.

Evaluating retrofitting initiatives

Establish clear aims for the project at the start and identify appropriate methods for determining if the project has achieved those aims. It is important to determine evaluation topics and methods prior to starting a project as it may be necessary to collect baseline data, such as qualitative and quantitative surveys of the subject area in its current state, which can subsequently be used to make pre- and post-construction comparisons.

Evaluation is also about ensuring an evidence-based approach to policy development and decision making, aimed at achieving public realm outcomes that are based on facts rather than perceptions.

Because no two sites or retrofitting projects are exactly the same, each initiative offers the opportunity of building on individual and collective knowledge bases to identify what works, what could be improved and how it could be improved.

How to use Healthy by Design SA

This resource contains discrete chapters, identified as Key Action Areas, that cater for the diversity in our public realm.

Each design consideration is accompanied by a brief explanatory text aimed not only at providing users with a quick understanding of how a design consideration contributes to achieving healthier outcomes, but also encourages further exploration of the research underpinning healthy urban design principles.

Policy makers, planners, designers and related professionals can select specific design considerations and detailed strategies that best suit the needs of individual policies or projects.

Tips on how to achieve desired outcomes in **retrofitting** situations are provided where relevant throughout the Key Action Areas.

The **case studies** included in these guidelines illustrate projects in South Australia that are consistent with healthy urban design principles.

The **Matrix of Design Considerations** identifies synergies between different guidelines that influence built environment design and supports an integrated and equitable approach to designing healthy and safe communities.

Implementation

The various roles stakeholders may have are described in the table below, along with specific examples of how the different roles can support the implementation of Healthy by Design SA principles into policies, projects and activities.

Stakeholder	Role	Role description	Application
State Government	**Leader**	Set state-wide policy directions and targets	Embed HbDSA objectives into State strategic policy documents such as the planning strategy for South Australia.
	Owner/ custodian	Lead by example through best practice when fulfilling obligations to manage community assets such as buildings, facilities, public spaces and reserves	Embed HbDSA principles within procurement process/strategies as standard criteria
	Regulator	Prepare and administer relevant legislation	Embed HbDSA objectives and principles into State Planning Policy Library (SPP) modules
	Funder	Administer funding programs Contribute funds or resources, as one of a number of parties that contribute funds or resources, towards an initiative or service	Include HbDSA principles as criteria for applications to funding programs such as Places for People and the Community Recreation and Sport Facilities Program Ensure HbDSA objectives are established for projects and included in evaluation or performance measurement criteria
	Partner/ initiator	Leading or collaborating with agency/community/private partnerships to plan, design and deliver an initiative or project	Ensure HbDSA objectives are included in partnership agreements (e.g. as project outcome statements or project evaluation criteria) and project plans (e.g. master/precinct plans)
	Innovator	Develop and trial new approaches or designs in the public realm	Demonstrate the practical application of HbDSA principles, particularly in flagship projects
	Service provider	Fully fund and provide a service	Use HbDSA to identify opportunities for retrofitting built environment during ongoing maintenance programs/work

Stakeholder	Role	Role description	Application
Local Government	**Leader**	Set policy directions to meet current and future needs through strategies, plans and reviews	Embed HbDSA objectives and principles into strategic management plans and Regional Public Health Plans
	Owner/ custodian	Lead by example through best practice when fulfilling obligations to manage community assets such as buildings, infrastructure, facilities and public spaces	Embed HbDSA principles within operational plans and strategies
			Embed HbDSA principles in community asset management plans and procurement processes/ strategies
			Embed HbDSA principles as criteria in tenders for external service providers
	Regulator	Administer or enforce relevant legislation	When assessing development applications, use HbDSA as a guide for how to achieve broad, qualitative objectives and principles
	Partner/ initiator	Lead or collaborate with a number of stakeholders/parties to deliver an initiative or project	Adopt HbDSA objectives and principles as part of agreed scope of project at initiation
	Information provider	Provide decision-making information to the public via meeting agendas, reports, studies, etc.	Use supporting statements in HbDSA to support the social, economic, environmental and health benefits for the community
	Service provider	Fully fund and provide a service	Use HbDSA to identify opportunities for retrofitting built environment during ongoing maintenance programs/work
	Funder	Contribute funds or resources towards an initiative or service	Include HbDSA principles as criteria for funding applications/agreements
Private sector	**Service provider**	Provide professional skills, knowledge and expertise to develop and/or deliver a project	Incorporate HbDSA objectives and principles into relevant projects, plans and designs
	Developer	Undertake a development that includes public space and infrastructure	Use Matrix of Design Considerations to self assess a development's consistency with HbDSA objectives and principles
Community sector (organisations and individuals)	**Advocate**	Make representations to councils or government agencies to support or influence urban design/ development policies and projects	Use HbDSA principles and supporting statements to inform submissions seeking healthier urban environments or development outcomes
			Use HbDSA as a benchmark for promoting the application of healthy design outcomes
	Information provider	Develop resources to promote common understanding	Promote the availability of HbDSA and increase workforce capacity by conducting awareness raising sessions for key stakeholders
		Develop resources to promote evidence-based decision making and policy formation	
	Partner/ facilitator	Collaborate with public and private sectors to promote an integrated design approach	Promote the Matrix of Design Considerations as a tool for ensuring an integrated approach to urban design

Key action areas

The objectives, principles and design considerations in Healthy by Design SA support and inform environments for healthy, active living.

The following sections suggest optimal design approaches that encourage healthy, active living in the key action areas of:

- ➡ **Walking, cycling and public transport**
- ➡ **Streets**
- ➡ **Local destinations**
- ➡ **Open space**
- ➡ **Supporting infrastructure**
- ➡ **Urban food**
- ➡ **Density**

The following principles should be incorporated when planning and designing for healthy, active environments.

- **Safety and security** – Incorporate high quality design and Crime Prevention Through Environmental Design (CPTED) principles to provide amenity and cultivate feelings of safety. Crime prevention is a key factor in increasing the use and uptake of public areas and facilities.

- **Accessibility** – Refers to the ability of people to safely access places, goods and services using an acceptable amount of time, cost and ease; it also refers to enhancing access for the mobility impaired, linking destinations and ensuring legibility (way finding) to enable people to confidently negotiate areas they are unfamiliar with.

- **Diversity** – Refers to the unique character of the public realm—recognising that places have their own identity and that there is a need to respond to the social and cultural needs of our diverse communities.

- **Equity** – Refers to fairness and justice and resource distribution guided by community need. This also aims to create equal opportunities for physical activity, healthy food choices and the associated benefits, regardless of a person's abilities.

- **Quality** – High quality public space contributes to both the sustainability and success of place making. Use high quality design and features to ensure attractiveness, durability, quality of finish and suitability to desired use.

- **Social connectedness** – Refers to connecting people through developing physical design solutions and well planned environments that facilitate and encourage interaction. The development of 'community spirit' or 'place making' is critical to community wellbeing.

Source Lightsview

Lightsview

Lightsview is a new suburb in the north-east of Adelaide that has incorporated Healthy by Design SA principles into the whole development, with a focus on walking and cycling routes that are connected and integrated with surrounding areas. For further information see http://www.healthyplaces.org.au/site/casestudies.php?task=show&id=3

What is an Australian Standard?

Throughout these guidelines reference is made, where applicable, to relevant Australian Standards. Standards usually specify minimum safety and quality criteria or provide minimum measures for meeting technical and performance requirements. Australian Standards, unless specifically referenced in a legislative document, are industry guidance documents only and are not enforceable.

As previously acknowledged designing the public realm is complex and often requires practitioners to balance an array of sometimes competing interests. Furthermore, current best practice sometimes exceeds the minimums set out in the Standards. The flexible application of Australian Standards may therefore be required in some instances.

Walking, cycling and public transport

A well planned and well designed network of walking and cycling routes allows people to move about and through their community safely and with ease.

Walking and cycling routes include a well connected network of footpaths along streets, shared paths or suitably treated streets for commuting, recreation and leisure.

Public transport services connect people with places and enable access to employment, education, health services and cultural and sport facilities, regardless of car ownership status.

Using public transport can be cheaper than driving a car; reduces congestion, greenhouse gas emissions and pollution; reduces traffic accidents and road fatalities; and enables people to fit more activity into their daily life by walking or cycling to stops. Using public transport can reduce social isolation and foster community spirit.

To encourage increased public transport use, services need to be accessible, frequent, reliable, inexpensive and safe.

Greenways

A key policy of *The 30-Year Plan for Greater Adelaide* is the creation of a network of 'greenways' that are dedicated walking and cycling routes following public transport corridors or linear open space; for example, along rivers—improving access to homes, shops, schools, workplaces, public transport, open space and local walking and cycling routes. For further information see: http://www.infrastructure.sa.gov.au/major_projects/greenways_project

Source Lightsview

Source Lightsview

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Planning and design considerations

Objective

To provide an integrated, accessible network of walking and cycling routes and footpaths for safe, convenient and pleasant connection to open space, public transport, shops, local destinations and points of interest.

A connected network

- Plan walking and cycling routes that provide variety, offering both direct and leisurely paths.

  While proximity and directness to destinations is important for commuting walkers, aesthetics is important for recreational walkers. It is therefore important that a variety of paths are provided, to meet the needs of a range of users.[6]

- Link walking and cycling routes to local destinations and activity centres—such as major work and retail centres, schools, parks, residential areas and public transport stops—via the most direct and convenient routes possible to encourage commuting by active forms of transport.

  Connection of destinations through walking and cycling routes enables individuals to commute between a number of locations, including open spaces and destinations such as shops, services and employment.[6, 17]

- Provide route continuity through local streets, linking footpaths with shared paths and providing safe access through road closures and cul-de-sacs.

  Creating linked and direct routes between destinations increases the likelihood that individuals will walk for transport. In particular, a grid layout enables direct connections.[6, 18]

RETROFIT TIP: Conduct an audit of road closures and cul-de-sacs that may prevent pedestrians and cyclists from travelling to key destinations in a direct path of travel. Prioritise these areas as potential projects to provide through-access for pedestrians and cyclists. Remove obstructions; reassess the need for, and design of, existing street furniture; bridge gaps; and connect existing scattered routes.

- Situate walking and cycling routes along linear features to maximise linking potential; for example, disused railway reserves and along watercourses and coastal environments.

  Locating walking and cycling paths along linear features enables direct connections to a range of destinations, as well as the opportunity to provide an attractive route.[17]

- Achieve clear, legible and safe connections through the use of signage, landscaping, lighting and edge treatments.

  Safety and comfort are important factors in the use of walking as a mode of transport. Research has found that the presence of these factors increases the number of walking trips undertaken.[18]

Create stimulating and attractive routes

- Design walking and cycling routes to and around local landmarks and points of interest.

  Walking is strongly related to the number of destinations within walking distance.[6]

- Invite engagement with the built and natural environment by incorporating points of interest such as art, sculptures or historical and botanical interpretation.

  Providing positive aesthetics, points of interest and natural features increases the walkability of routes.[19]

- Complement walking and cycling routes with trees to increase attractiveness of routes and provide shade.

  Trees provide shade and wind protection and add to the aesthetics, making walking more enjoyable, which in turn can increase levels of physical activity.[20]

- Replace surfaces that are vulnerable to vandalism and antisocial behaviour with ones that are not conducive to graffiti, are vandal-proof and easy to clean and maintain.

  The removal of evidence of graffiti and vandalism through positive maintenance can reduce the fear of crime and induce legitimate behaviour.[21] This in turn enhances perceptions of safety, which is associated with increased physical activity.

Create safe and functional routes

- Maintain walking and cycling routes to a high standard to ensure continuous, accessible paths of travel.

  Maintaining continuous paths has consistently been found to be correlated to higher levels of walking.[17, 22]

- Maximise the choice and availability of amenities along key walking and cycling routes by introducing, for example, seating, toilets, drinking fountains, bicycle parking and dog waste disposal bins. For more information, please refer to 'Supporting infrastructure'.

  Providing facilities on walking and cycling routes is positively related to increased levels of physical activity, including commuting.[18, 23, 24]

- Maintain clear sightlines along walking and cycling routes by using low vegetation (up to 70 cm) and clear-stemmed trees (up to 2.4 m). Ensure an ongoing maintenance process is in place.

  The inability to see what is ahead along a route is a serious impediment to feeling and being safe.[21]

RETROFIT TIP: Conduct a walking and cycling site assessment to ensure clear sightlines along walking and cycling routes. Assess the need for more appropriate landscaping, low walls or permeable fencing, mirrors and effective lighting. Avoid blank walls and solid fencing.

- Provide good lighting along routes where night use is expected, consistent with Crime Prevention Through Environmental Design principles.

  Lighting adds to perceived and real levels of safety at night, and therefore networks should be well lit.[6]

- Position walking and cycling routes so that people using the path can be seen by other users, motorists and people in dwellings and other buildings. Avoid tunnels and underpasses that limit visibility.

  Having 'eyes on the street' promotes visibility of public spaces and routes and contributes to perceived and actual safety.[6]

- Categorise recreational walking trails according to relevant standards and design them accordingly.

  For further information about techniques for uniformly grading walking trails and communicating that grade to the walking public, see Australian Standard 2156.1 for walking trail construction and the Australian Walking Track Grading System.

Ensure walking and cycling routes are accessible for all

- Provide footpaths on both sides of all streets.

  The presence and quality of footpaths is essential for both transport and recreational walking.[25]

- Keep paths clear, accessible and free of obstructions such as vegetation and tree debris and obsolete or dysfunctional street furniture.

  Poor maintenance of paths is an identified barrier to walking.[26]

RETROFIT TIP: Conduct an inspection of route surfaces to assess risks and hazards and to ensure vegetation does not overhang walking and cycling paths and restrict access for users.

- Provide seating and amenities at regular intervals along walking routes. Locate seats in an easily accessible position, with space for people in wheelchairs to sit next to people on seats.

  The provision of seating is particularly supportive of physical activity in older people.[27]

- Create paths with gentle gradients and turns where the topography allows. Where feasible, keep gradients gentler than 1:14.

  A steep slope on a footpath is a deterrent to walking; therefore, creating paths with gentle gradients is important in enabling access.[28]

- Ensure continuous footpaths with a non-slip, even, durable and low-maintenance surface, uninterrupted by variation in surface material. Avoid treatments with a shifting surface such as coarse, loose gravel.

  Poorly maintained footpaths are a barrier to walking. Conversely, providing well maintained footpaths is positively correlated to walking.[6] Shifting-surface treatments are inaccessible for people in a wheelchair or walking frame.

- Assess the need for public toilet provision or provide links and signage to existing toilets along routes. Ensure access to baby-care facilities and for people in wheelchairs.

  Provision of amenities is an important enabler for physical activity.[23, 24] In particular, provision of toilets is important for older people, people with disabilities, and those with young children.

Neighbourhood Walkability Checklist

The Neighbourhood Walkability Checklist has been developed to help community members survey their local walking environment and raise awareness of the role the built environment plays in helping or hindering walking. However, it can also be a useful tool for practitioners to assess existing facilities and infrastructure and identify areas for improvement. For further information see www.heartfoundation.org.au

Provide shared paths to accommodate different modes of travel

- Retrofit walking paths or design shared-use paths to accommodate different modes of travel, including pedestrians and cyclists, with different travel speeds.

  Shared paths enhance the path infrastructure, supporting increased physical activity through cycling and walking.[29]

- Create shared paths that are wider than separate pedestrian or cycle paths and wide enough to allow comfortable passage for side-by-side walking/cycling and passing in opposite directions. Shared-use paths should be 2.5–4 metres wide, depending on the purpose of the path and the level of use.

  The width of shared paths significantly affects the ability to meet and pass, as well as the level of enjoyment gained from use. Wider paths enable meetings and easy passing, which promotes use.[30]

- Ensure signs indicate that the path functions as a shared pathway, mark centre lines to delineate two-way traffic, and include information for users on how to share paths safely.

  Ensuring that all users understand that a path functions as a shared pathway helps to reduce intermodal conflict and encourage more people to walk and cycle safely.[25]

Promote and maximise legibility of walking and cycling routes

- Install pointer signs giving distance and walking and cycling times along routes.

  Signage with distances and points of interest provides users with information that supports physical activity. This information is particularly important to support those who do not know the area, such as tourists and new residents.[31]

- Use appropriate detailing (i.e. path materials, edging, etc.) to define walking and cycling routes and assist way-finding.

  Detailing and other visual cues assist users to determine their location within a setting and reinforce that they are travelling in the right direction.[32]

Make public transport easily accessible

- Provide clearly signed, well lit and direct routes for people walking and cycling to and from public transport stops.

  It is important that routes to and from public transport stops are well lit to enhance accessibility and perceived safety, whilst signage provides users with information, thereby supporting physical activity participation.[33, 34]

- Locate new residential areas or ensure existing residential areas are within 400 metres walking distance of existing public transport stops.

  Creating neighbourhoods that are less dependent on cars requires good public transport infrastructure within easy access.[34]

- Locate pedestrian crossings adjacent to public transport stops. Where possible, accommodate pedestrian desire lines (i.e. goat tracks) for convenient crossing.

  Safety of public transport users is compromised by poorly located bus stops and crossing points.[18] A lack of safety is a barrier for public transport, particularly in certain population groups such as young and older people.

Provide safe, visible stops

- Ensure new or existing public transport stops are located in active locations, clearly visible from surrounding dwellings and businesses.

  Locations which support natural surveillance promote a high sense of safety and act as an enabling factor for public transport use.[6, 35]

- Ensure public transport stops are well lit for night use.

  Providing well lit public transport access points increases perceived safety and supports increased public and active transport. It is also important that routes to and from public transport stops are well lit.[33, 34]

- At public transport stops use materials that resist graffiti, are vandal-proof and easy to clean and maintain.

  Reducing the potential for graffiti increases perceived safety and can enable public transport use.[36]

Encourage dual-mode journeys as a means of reducing car dependence

- Provide safe and secure cycle parking facilities close to existing public transport stops and interchanges.

  Providing cycling facilities close to public transport enables active and public transport to be combined for longer trips, where public transport is unavailable for the whole journey.[6, 37]

- Provide car parking facilities close to existing public transport stops and interchanges in outer suburbs and rural areas.

  Trips involving a combination of car and public transport are common, particularly for people residing in rural areas. Therefore it is important to provide car parking to promote public transport use, as the public transport section of the journey can easily be substituted with car journeys.[37, 38]

Provide facilities for comfort and convenience

- Maximise the choice and availability of amenities such as toilets, drinking fountains, waste disposal bins and bicycle lock-up points at public transport interchanges and major stops/stations. For more information, please refer to 'Supporting infrastructure'.

  The provision of amenities such as drinking fountains, bins and secure bike parking increases the levels of comfort and enjoyment and promotes the use of walking, cycling and public transport.[6, 20, 33]

- Ensure adequate provision of seating with back and arm rests.

  The accessibility of seating is important in encouraging use of public transport and participation in physical activity.[39] Arm rests are important for those who need assistance in sitting down and standing up.[40]

- Provide adequate shelter to shield public transport users from sun, wind and rain.

  Shade and wind protection at public transport stops provides comfort and supports public transport use, particularly when the weather is extreme.[20]

Streets

Streets are not just isolated elements in the urban landscape; they are integral components of our neighbourhoods that facilitate various modes of travel as well as serve as destinations in their own right.[53]

Putting people first and creating pedestrian and cycling-friendly streets makes our communities more vibrant and healthy. A legible street network with attractive frontages encourages people to be out and about.

Street design based on a grid pattern integrates people with surrounding streets by providing

clear and direct routes for pedestrians and cyclists. Ensure safe, easy and convenient access across streets.

Low traffic speeds improves safety for all road users and contributes to increased rates of walking and cycling.

Streets for People: Compendium for South Australian Practice

The *Streets for People: Compendium for South Australian Practice* (the Compendium) supports a South Australian practice of designing people-friendly streets that promote cycling and walking, and aims to make the design and approval of innovative pedestrian and cycling-friendly streets easier and desirable.

The Compendium:

- gives strategic policy imperatives for increasing levels of cycling and walking in our community

- explains the rationale for rethinking conventional approaches to street design and identifies key issues and barriers to implementing people-friendly streets (focusing particularly on low-traffic streets in South Australia)

- clarifies the approval process and provides assistance in addressing common barriers such as risk and liability issues for street design in South Australia

- draws from the best national and international practice in street design, including case studies

- presents key principles to shape pedestrian and cycling-friendly street designs in the South Australian context

- introduces the 'Link and Place' street design approach

- presents case studies on the application of the Link and Place approach to South Australian, interstate and international examples

- provides links to further useful resources.

The Compendium is available for download at http://saactivelivingcoalition.com.au
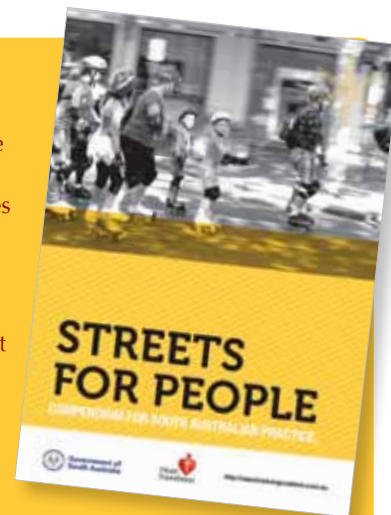
Planning and design consideration

Objective

To create functional and attractive street networks that prioritise safe and convenient travel for pedestrians and cyclists and maximise opportunities to engage in planned and incidental activities.

Create street networks that are clear, direct and legible

- Plan street grid layouts that are permeable and assist pedestrians and cyclists to find their way and travel the shortest route.

  Traditional grid layouts are positively correlated to physical activity as a form of transport. A grid layout minimises the travelling distances between points and is legible and direct, supporting easy navigation.[6, 18]

- Develop a signage strategy to ensure cul-de-sacs are well signed, with pedestrian and cycle access through to adjacent streets.

  Many suburbs have barriers to pedestrian and cyclist connectivity, such as disconnected cul-de-sacs and arterial roads. However, the barrier of cul-de-sacs can be overcome by building connections to provide continuous access.[41] Way-finding signs can provide information on these connections.[31]

- Review existing street signage to ensure that it provides information along cycle routes, such as the availability and location of amenities, destinations, travel times and distances.

  Way-finding signs that provide information on routes, distances and times to various points of interest will be useful for locals, tourists and those new to the area.[31]

- Link street networks to local destinations and activity centres via the most direct and convenient routes.

  Direct, easy-to-navigate and connected street networks that link destinations and points of interest are important for encouraging active transport. This is particularly the case for groups such as children and older people who are less able to travel long distances.[6]

Create a safe speed environment

- Design for low speed limits (30 km/h or below) in residential streets and peak pedestrian areas such as shopping precincts and community facilities.

  Speed is the single most important contributor to road fatalities. The human tolerance to injury is exceeded when the vehicle impact speed is more than 30 km/h.[42] Lower speed limits also encourage better and safer forms of interaction between road users, resulting in a more attractive space.

- Reduce and calm vehicle traffic to facilitate safe pedestrian and cyclist movement along residential and collector streets.

  Calm traffic conditions and effective traffic control measures are positively associated with higher levels of physical activity. Calmed traffic increases perceived safety, which is a key factor in enabling walking and cycling.[33]

- Incorporate traffic-calming measures and design features to encourage more careful movement of motor vehicles.

  Including traffic-calming measures in street design has been shown to calm traffic and reduce the reliance on speed limitations.[22, 43]

Where roundabouts exist or are proposed, ensure designs achieve current best practice in pedestrian and cycle friendly roundabouts, including high visibility and safe movements for cyclists and pedestrians.

Key factors affecting pedestrian and cyclist safety at roundabouts are the availability traffic gaps that are long enough to cross safely and being able to accurately perceive the length of the gap. Being able to find an appropriate gap is of particular concern for people with disabilities, older people and children.[44]

Create attractive and welcoming streets

- Design attractive, interesting and welcoming street frontages.

  Attractive, interesting and enjoyable frontages are positively correlated with physical activity and utilisation.[18]

Source Taylor Cullity Lethlean

- Consider the importance of the human dimension and scale in street design.

  People on foot and people in cars process information and streetscape details differently because of the difference in travel speed and angle of observation.[45]

- Provide broad-canopy trees to provide shade and a pleasant environment for people on the street. Maintain an overhead clearance of 2.4 metres above ground level.

  Trees and other vegetation can modify urban microclimates and provide benefits of improved shade, aesthetics and air quality.[46] However, appropriate overhead clearance is required to ensure sightlines are not impaired.

- Consider the use of landscaping and trees to perform functions that may normally be performed by engineered 'grey infrastructure'.

  Street trees and landscaping can act as 'green infrastructure', providing alternative methods of stormwater management, traffic noise abatement and traffic calming.[47]

- Design streetscapes to enable natural surveillance of people walking, cycling and gathering at points of interest.

  Natural surveillance can enhance the sense of safety, therefore acting as an enabling factor of utilisation.[6, 35]

Create pedestrian friendly streets

- Maintain clear sightlines for pedestrians and cyclists, particularly at intersections, roundabouts and pedestrian crossings.

  Maintaining clear sightlines for pedestrians and cyclists is an important element of safety for users at intersections and crossings.[48]

Bowden Development

The redevelopment of Bowden is a State Government initiative to deliver a high quality transit orientated development on the fringe of the Adelaide central business district (CBD). Innovative street designs and features are being incorporated within the 16 ha site to prioritise walking, cycling and public transport modes and ensure that car drivers are not able to achieve speeds much above 30 km/h. The Bowden development is a featured case study in Chapter C of the *Streets for People Compendium*.

- Locate all crossings as close as possible to the direct line of travel for pedestrians and cyclists.

  The directness of the route can be significantly affected by the location of pedestrian crossings; hence crossings should be located to minimise distance travelled.[18]

- At signalised pedestrian crossings provide enough time to accommodate crossing by all walkers, including older people, children and people with impaired mobility.

  Older pedestrians have a shorter stride length and therefore require a longer period to reach their destination.[49] Ensuring that pedestrian signals provide adequate crossing time is important as it supports mobility, and has been connected with an increase in physical activity.[49]

  RETROFIT TIP: Assess whether existing pedestrian crossings are suitably located and enable direct lines of travel for pedestrians and cyclists.

- Implement a maximum waiting time of one minute at pedestrian signals for convenience and to discourage pedestrians crossing before the green signal. Increase the frequency of pedestrian crossing phases in peak pedestrian periods, such as when children are walking or cycling to and from school.

  Research has shown that as the delay between being able to cross lengthens there is an increase in the number of pedestrian violations, which increases pedestrian risk.[50]

- Use tactile ground surface indicators to mark the edges of pedestrian crossings.

  Tactile ground surface indicators use differing ground surfaces to provide information about the edge of a pedestrian crossing and are particularly important for those with vision impairment.[51] For further information see Australian Standard 1428.4 *Design for access and mobility – Part 4.1: Means to assist the orientation of people with vision impairment – Tactile ground surface indicators*.

- Install kerb ramps at pedestrian crossing points to facilitate access for people with limited mobility and people with prams, trolleys, scooters and wheelchairs.

  Footpath infrastructure, including safe transitions from footpath to street, is correlated to higher levels of walking, particularly for those with limited mobility.[49, 52]

- Design footpaths that meet the needs of all users. As a guide, paths should be wide enough to allow comfortable passage for people walking side by side, people in wheelchairs, people with prams, and learner cyclists.

  Recommended footpath widths are:

  - 3.5 metres or wider along busy shopping strips
  - 3 metres alongside bus stop areas
  - 2 metres for two wheelchairs to pass one another
  - 1.5 metres for a wheelchair user and accompanying guiding person.[53]

- Ensure a smooth transition from footpaths to streets. Gradients should be minimal and ramps should be at least as wide as the footpath to enable safe and comfortable access for people, including those using wheelchairs, prams and trolleys.

  Footpath infrastructure, including continuous footpaths and safe transitions from footpath to street, is correlated to higher levels of walking.[52]

- Create shared paths wider than separate pedestrian or cycle paths and wide enough to allow comfortable passage for side-by-side walking and passing in opposite directions. Shared use paths should be 2.5–4 metres wide, depending on the purpose of the path and the level of use.

  The width of shared paths significantly impacts the ability to meet and pass, as well as the level of enjoyment gained from use. Wider paths enable meetings and easy passing, which promotes use.[25, 30] For further information on paths within a roadside environment see Austroads Guide to Road Design: Part 6a Pedestrian and Cyclist Paths.

- Ensure signs indicate that the path is legally declared for shared use. So that it functions as a shared path, mark centre lines to delineate two-way traffic and include information for users on how to share paths safely.

  Ensuring that all users understand that a path functions as a shared pathway helps to reduce intermodal conflict and encourages more people to walk and cycle safely.[25]

- Consider the needs of people with impaired mobility and provide ramps (not necessary where kneeling' buses are in frequent use) and hand rails where appropriate.

  For further information see Australian Standards 1428:1–4 *Design for Access and Mobility*.

Create cycle friendly streets

- In streets with higher vehicular volumes and speeds, provide separate facilities for cyclists.

  The presence of bike lanes has shown to increase active transport and reduce fatalities.[54]

> **RETROFIT TIP:** The *Streets for People Compendium* provides guidance on suggested speed and traffic thresholds for bicycle lanes and separate paths.

- Provide crossings where cycle routes cross main roads. Prioritise the provision of signals and use detection suitable for cyclists.

  Intersection safety is important for cyclists, as they must deal with conflicts from both crossing and turning motor vehicle traffic, pedestrians and other cyclists while traversing through an at-grade intersection.[48]

- Ensure continuity of bicycle lanes through and between council areas, new subdivisions and existing neighbourhoods. The continuity of bicycle lanes requires careful consideration to ensure that they are not abruptly terminated, compromising both cyclists and drivers.

  Connectivity and continuity of bicycle lanes is positively associated with adults cycling for transportation and is an important enabling factor.[55]

> **RETROFIT TIP:** The beginning and end of cycle lanes require particular consideration. Dropping a bicycle lane creates a 'squeeze' point that results in a safety hazard for cyclists. Where it cannot be avoided, ensure there is clearly marked signage near the termination points that is visible to cyclists and motorists and provides direction to the next connection point.

- Ensure on-road cycle lanes are appropriately designed and are of a sufficient width.

  For further guidance see Chapter B5 of the *Streets for People Compendium - Establish conditions for cycling*.

> **RETROFIT TIP**: To accommodate new on-road bicycle lanes, consider reducing on-street car parking or narrowing car lanes where possible. To avoid injuries from car doors, consider design solutions that do not result in car doors opening into cycle lanes.

- Maximise the availability of supporting infrastructure, such as drinking fountains and bicycle lock-up points, at prominent locations along streets where cyclists may stop for rest breaks or where they reach their destination. For more information, please see 'Supporting infrastructure'.

  Accessibility of supporting infrastructure is an important enabling factor for cycling, particularly commuting. The provision of secure, undercover bike parking is a particularly important factor.[6]

- Review existing street signage to ensure that it provides information along cycle routes about availability and location of amenities, destinations, travel times and distances.

  Way-finding signs that provide information on routes, distances and times to various points of interest will be also useful for locals, tourists and those new to the area.[31]

Heart Foundation | Healthy by Design SA

Local destinations

Destinations such as food stores, newsagents, chemists, cafés, schools, childcare centres, parks and gardens, and community centres provide local focal points for people to walk or cycle to in their neighbourhood.

Local destinations support mixed-use, walkable neighbourhoods and reduce dependence on the car for short journeys.

Destinations naturally attract a range of people of all ages, abilities and backgrounds, and this fosters community spirit and contributes to individual and community health.

Planning and design considerations

Objective

To provide local destinations to support liveable, walkable and cycle friendly neighbourhoods that encourage physical activity as part of daily life.

Encourage mixed-use, walkable neighbourhoods

- Locate shops, services and local facilities within close walking distance of dwellings and businesses. The concept of 'close walking distance' will vary according to people's fitness levels and local topography, but a widely used benchmark is a 400 to 800 metre radius[33, 56, 57] This equates to about a five- to ten-minute walk.

  A main feature of neighbourhoods that promote physical activity is the location of important destinations near homes. Walking as a means of transport increases when stores are within close walking distance.[18, 58]

- In areas where there is a high population of elderly people, housing and services should be placed within a very short distance of each other and linkages between those destinations must be made safe and accessible for people using walking sticks, walking frames, mobility scooters and wheelchairs.[24]

  Many older people are not able to walk the distances that younger adults can, and also take longer to walk them.[24, 59, 60] Research has found that individuals aged 65 and over who live closer to shops and services are more likely to walk and use public transportation and take more total trips outside the home.[59, 60]

- Create neighbourhood clusters through the use of corner stores and cafés. This encourages people to socialise and contributes to the local economy and community life. To make these facilities viable for business owners and convenient for local residents, co-locate them with community centres, medical facilities, schools, parks and public transport.

  The variety and proximity of destinations is a critical factor influencing the choice to walk for transport.[18] Mixed land use, which enables close proximity and accessibility to shops, services and work, is positively related to the level of walking and cycling.[22, 61]

Provide a community 'heart' to foster community spirit

- Design community buildings and public spaces to support a wide variety of neighbourhood uses that provide activity at different times of day and night. For example, using school facilities outside school hours for community learning, and parks that can support everyday recreation as well as other activities such as community festivals and farmers' markets.

  Expanding the use of community buildings and public spaces, such as schools, provides increased opportunities for physical activity when the location is near the individual's home.[33] This is particularly the case for children.[62]

- Locate community buildings and spaces in a way that allows them to contribute to a sense of place and provide a community heart.

  Community buildings and spaces are important for a healthy community. Providing these buildings within an easily accessible distance enables social activities, reduces isolation and contributes to developing strong relationships within the community.[63]

- Integrate public art to enhance and enrich the built environment.

  Public art, whether temporary or permanent, contributes to the creation of attractive and engaging environments.[64]

Provide facilities for comfort and convenience

- Maximise the choice and availability of amenities and end-of-trip facilities at local destinations. These include seating, drinking fountains, toilets, bicycle lock-up points and dog-waste disposal bins. For more information, please refer to the 'Supporting infrastructure'.

  The provision of amenities and facilities has been shown to have a positive impact on the comfort of a destination and the level of active transport to and around a destination.[23, 65]

- Create an attractive microclimate—shade in summer, sun in winter and shelter from winds—through use of street trees and suitable shade shelters at public destinations such as open space reserves and public squares, and over play equipment, barbecues and picnic seats.

  Providing trees for shade and wind protection increase the level of enjoyment when using amenities and promotes the use of the destination.[20]

Support pedestrian and cycle access to local destinations

- Provide safe pedestrian and cyclist access to local destinations. For further information, please see the 'Walking, cycling and public transport'.

  The connection of destinations with convenient, safe and attractive paths supports the creation of neighbourhoods which promote physical activity.[33]

- Clearly mark pedestrian access and routes through car parks.

  Provision of pedestrian routes is crucial through car parks for safety and accessibility.[66]

- Provide secure bicycle parking facilities, such as bike hoops and lockers, at end-of-trip cycling destinations such as universities, supermarkets, parks or sporting ovals.

  Good bike parking will generally facilitate increased cycling, especially if it is secure and protected from the weather.[6, 67]

- Where fences already surround parks and recreation areas, ensure sufficient pedestrian and cyclist entry and exit points.

  Having sufficient entry and exit points promotes accessibility and reduces the risk of entrapment zones.[35]

- Review existing signage to ensure that it provides information highlighting local destinations, travel times and distances to the local destination, opportunities for the mobility-impaired, and the location of amenities at the destination.

  Way-finding signs provide users with important details such as directions, distances, accessibility of amenities, and times to destinations. This information is particularly important in supporting tourists and new people to the area who are walking.[31, 67]

Source City of Marion

Rajah Street Reserve Project

The Rajah Street Reserve Project in Marion converted an existing house into a community hub for hosting programs, activities and events. For further information see saactivelivingcoalition.com.au

Source Lightsview

Open space

Open spaces connect people with the natural environment and provide an important sense of place.

An iconic aspect of our capital city is the parklands that form a green belt around our central business district. South Australians also enjoy access to natural landscapes located within close proximity to the metropolitan area: National parks such as Belair, Morialta and Mount Lofty Summit, as well as the River Torrens Linear Park and the Botanic Gardens of Adelaide, offer pleasant spaces for people of all ages to walk or cycle.

Existing smaller pockets of open space can be retrofitted to form important focal points of interest along cycle and pedestrian routes and open space networks.

Planning and design considerations

Objectives

- Provide a range of public open spaces within easy walking and cycling distance from dwellings, places of work, shopping centres and schools.

- Clearly define walking and cycling routes passing through open spaces and places of natural beauty, and connect these with the broader walking and cycling network.

- Provide high quality spaces, both purposefully designed and of natural beauty, that are attractive and accessible to a wide range of people with diverse needs and that foster community spirit.

- Encourage individuals to engage in physical activity in open spaces when carrying out their daily activities such as shopping, working and studying.

Provide open spaces within safe and comfortable walking and cycling distance

- Provide large local parks (1 hectare minimum) within 500 metres safe walking distance from all dwellings, and small local parks within 150–300 metres safe walking distance of all dwellings.

  There is substantial evidence that physical activity is positively associated with the presence of open and green spaces within walking distance from home.[68, 69]

Connect open spaces to the broader walking and cycling network

- Connect walking and cycling routes to and within open spaces to the broader path network. For more information, please see the 'Walking, cycling and public transport'.

  Linking open spaces with walking paths and networks supports their use.[69]

- Undertake an assessment of local parks situated on busy roads. Ensure the provision of convenient pedestrian crossings leading to park entrances.

  Accessibility is a key factor influencing the use of open and green spaces. The presence of major roads preventing access impedes use of open spaces.[69]

- Provide public transport access for locations that are further away.

  Accessibility to open spaces is a known factor of physical activity. For those who live further away, a public transport stop located less than 100 metres from the entry of the open space supports accessibility.[69]

Create attractive open spaces

- Design and landscape open spaces and places of natural beauty so that they are pleasant places for people to play, sit, meet and talk.

  Aesthetic features and pleasant scenery increases the utilisation of open and green spaces.[33, 68]

- Plant suitable trees—with attributes such as tall trunks, broad leaves and broad canopies—to provide shade for park users and to create an aesthetically pleasing environment. Select appropriate species and situate trees to maximise access to shade throughout the day, winter and summer.

  Vegetation is important in open spaces, as it provides shelter and adds to the attractiveness and positive atmosphere of the space.[35]

- Maintain open spaces and their facilities to a high standard to encourage usage.

  The quality and level of maintenance of open spaces are factors which have been shown to influence their use.[69]

- Replace surfaces that are vulnerable to vandalism and antisocial behaviour with ones that resist graffiti and are vandal-resistant and easy to clean and maintain.

  The removal of indicators of crime, such as graffiti and vandalism, and the use of positive maintenance gives the impression of care and ownership which can reduce the fear of crime and induce legitimate behaviour.[70]

Source Taylor Cullity Lethlean

Source Alison Collins

Source Taylor Cullity Lethlean

Encourage active recreation and sport

- Provide a range of facilities to enable active recreation; for example, children's play equipment, grassed areas for organised sports and informal ball games, skate parks, basketball rings and playground markings that encourage activities like hopscotch.

  People, particularly children, are more active in parks that include facilities that enable active recreation, such as basketball courts.[71-74]

- Ensure that the space and facilities for organised sports activities meet the demand in the region. Design these facilities so that they are integrated with the surrounding environment and are accessible and useable by the wider community.

  Having nearby and accessible sports centres and parks has been shown to significantly increase weekly vigorous-to-moderate physical activity in adolescents.[75]

  RETRO FIT TIP: Conduct a sport and recreation needs analysis to identify existing facilities in the region and determine adequacy and capacity of facilities, gaps in provision, new facility requirements, time frames and priorities.

- Provide exercise and training equipment along walking and cycling paths to encourage more vigorous activity.

  The availability of physical activity equipment is a key determinant for vigorous activity. In particular, the provision of adult exercise equipment alongside childrens' playgrounds can encourage female participation rates in physical activity.[6, 76]

- Design a variety of paths that allow for recreational walking and cycling within parks and places of natural beauty, as well as direct passage through them. For more information, please see 'Walking, cycling and public transport'.

  Studies show that while proximity to destination and the directness of route are important factors for commuters, aesthetics are important for recreational users.[6]

- Provide areas for people to be active with their pets; for example, dog exercise areas.

  Access to open spaces where dogs are allowed significantly affects individuals' ability to exercise with their dog, and hence their level of physical activity.[77]

- Consider the development of community gardens.

  Community gardens have a threefold impact. They enable people to access fresh and healthy food, partake in physical activity and foster connection with community members and the land.[6]

- In large open spaces, provide space and services for community gatherings such as markets, festivals and concerts.

  Large open spaces can be designed to enable multiple use, which makes efficient use of the community resource and cultivates community spirit.[69]

Provide for comfort and convenience

- Maximise the choice and availability of amenities within open spaces; for example, seating, shade, drinking fountains, secure bicycle parking and waste disposal bins. Design seating to encourage social interaction. For more information, please refer to the 'Supporting infrastructure'.

  Studies show that the use of open spaces is increased by the provision of amenities.[33, 65]

- Assess the need for public toilets, including baby-care facilities.

  Provision of accessible public toilets is important for enabling comfort and convenience in open spaces and is positively related to utilisation. Accessible public toilets are particularly important for young children, older people and those with disabilities.[23, 78]

- Provide seating and suitable shade at regular intervals along walking and cycling paths located in open spaces.

  The provision of amenities, such as seating, increases the level of enjoyment from walking. Providing trees for shade and wind protection increases comfort, which further increases enjoyment.[20, 33]

- Locate cafés, restaurants and kiosks within or on the edge of open spaces or in close proximity to other points of interest, such as public art and lakes.

  Cafés add to the attractiveness and complexity of spaces and, in addition to attracting people, encourage the use of the space.[64]

Create safe open spaces

- Ensure that routes through open spaces intended for night use have good lighting consistent with surrounding street lighting.

  Studies have shown that the provision of lighting in open spaces is positively associated with an increase in physical activity.[71]

- Create parks with street frontages to facilitate natural surveillance from nearby housing, businesses or passers-by.

  External surveillance can enhance the sense of safety for users.[35]

- Avoid solid fencing or walls along park perimeters.

  Surveillance from outside the space can enhance the sense of safety, therefore external sightlines should not be compromised by fencing or walls.[35]

- Provide multiple entry and exit points to open spaces.

  Limiting the number of entry and exit points can reduce accessibility and result in entrapment zones, leading to safety concerns.[35]

- Ensure that landscaping and vegetation are regularly maintained.

  Poorly maintained vegetation can impair natural surveillance of the space. Maintenance programs should therefore ensure clear sightlines are maintained.[35]

SpaceShaper

A practical toolkit developed by the Commission for Architecture and the Built Environment (CABE UK) to measure the quality of a public space before investing time and money in improving it. SpaceShaper captures the views of professionals who are running the space as well as those of the people that use the space. Facilitated workshops discuss the results, design quality and how the space works for different people. SpaceShaper encourages people to demand more from their local spaces. This is now able to be provided through an arrangement with Parks and Leisure Australia

See http://www.parksleisure.com.au

Supporting infrastructure

Supporting infrastructure is the important design detail that can encourage the use of the public realm by making it attractive, connected, social, comfortable, convenient, functional and safe.

This includes regular seating, signs for way-finding, adequate lighting on routes and places used at night, mature trees and landscaping, public art, bike parking, public toilets, bins and drinking fountains.

Planning and design considerations

Objective

To attract pedestrians and cyclists to public places and spaces by carefully considering supporting infrastructure that assists way-finding; provides for comfort, social interaction and convenience; and makes the area a vibrant and safe place to be.

Provide seating for people with restricted mobility and to encourage social interaction

- Provide seating at regular intervals along walking and cycling routes for people to rest, 200–400 metres intervals are recommended.

   The accessibility of seating is an important attribute for encouraging physical activity. A lack of seating at a destination or the distance between seats and an inability to use them due to design or location are all barriers to walking.[39]

- Use seats with backs and armrests at a suitable height for older people and people with restricted mobility. For example, ensure seating is not too low to the ground, and provide an angular armrest that assists with getting up and sitting down.

   Older people prefer seating with back- and armrests. Arm rests are important for those who need assistance in sitting down and standing up.[40]

- Locate seats in an easily accessible position, with space for people in wheelchairs to sit next to people on seats, and arrange seats to facilitate social interaction.

   Seating enables social interaction and is an important element in creating social spaces.[6, 79]

- Place seats to take advantage of attractive landscape views or areas of activity, such as sports ovals and children's playgrounds.

   Placing seating in positions that allow the enjoyment of scenery and pleasant surrounds will promote physical activity and use of open spaces.[33]

- Provide seating with shelter from wind, rain and sun.

   Providing shade and wind protection for seating increases comfort and enjoyment.[20, 33]

Provide signage to assist with way-finding on foot and bicycles

- Provide directional signage and maps to local destinations and points of interest. Review signage to ensure it provides information relating to routes, availability and location of amenities, destinations, travel times and distances.

   Way-finding signs that provide distances and times to various points of interest will be useful for locals and tourists and in areas with cycle routes.[31]

Source ACC Splash Adelaide

Splash Adelaide

Spalsh Adelaide was a program run by Adelaide City Council (ACC) with support from the State Government, which aimed to deliver a series of temporary pilot activation projects. The program enabled ACC to test innovative and experimental ideas for public spaces in the city quickly, economically, and in collaboration with business, stakeholders and other community partners. For further information see www.splashadelaide.com.au

- On recreational trails, provide signage leading to the start of the route and at regular intervals along the route. Include distances, trail grading, permitted uses and walking/cycling times to destinations.

   For further information, see the Australian Walking Track Grading System, a technique for uniformly grading walking tracks and communicating that grade to the walking public.

- Use clear, concise, legible and consistent signage with appropriate colour contrasts, letter font and size.

   For further information, see Australian Standard 2156.1 *Walking Tracks Part 1: Classification and signage*.

- Replace surfaces that are vulnerable to vandalism and antisocial behaviour with ones that resist graffiti, are vandal resistant and easy to clean and maintain.

   The removal of evidence of crime, such as graffiti and vandalism, and implementing positive maintenance gives the impression of care and ownership—this can reduce the fear of crime and induce legitimate behaviour.[21]

- Maintain clear sightlines to signs and illuminate at night.

   Knowing where you are and which way to turn contributes to a feeling of security.[21]

To increase safety, provide and maintain lighting at routes and spaces used at night

- Locate lighting for pedestrians and cyclists along walking and cycling routes, key road-crossing points and intersections, and at local destinations and places where people gather.

  Street lighting has been associated with increased path use.[64]

- Avoid low-level or in-ground lights along walking and cycling routes.

  In-ground path lighting (where lights are implanted into the path edges) and luminescent line-marking are not recommended for path lighting because they limit the vision of walkers and cyclists moving along the path and do not allow path users to see hazards or each other.[80]

- Provide lighting to areas intended for night use and/or areas accessed by pedestrians and cyclists after dark. Avoid lighting areas not intended for night use.

  Research shows that physical activity levels are higher when neighbourhoods are well lit.[33, 64]

Use tree planting and landscaping to contribute to the functionality of streets and open spaces, improve the microclimate and create attractive and legible routes and spaces that encourage active use

- Consider the use of landscaping and trees to perform functions that may normally be performed by engineered grey infrastructure.

  Street trees and landscaping can act as green infrastructure, providing alternative methods of stormwater management and treatment and potentially also providing cost savings as a result of reduced demand for conventional stormwater infrastructure.[47]

- Use clear-stemmed trees with high canopies, or prune trees to create a raised canopy on a bare trunk to maintain clear sightlines and surveillance.

  The inability to see what is ahead along a route is a serious impediment to feeling and being safe.[21]

- Plant large trees and allow trees grow to maturity to maximise their benefits and improve the microclimate.

  Large trees outperform small trees in moderating air temperatures, blocking UV radiation, conserving energy, sequestering carbon and reducing air pollution—this is directly related to the size of the tree canopy.[81]

Pet Friendly Planning Award

The HbDSA Matrix of Design Considerations was awarded the inaugural Pet Friendly Planning Award by the Planning Institute of Australia and the Petcare Information Advisory Service.

There is an established association between dog ownership and adult physical activity levels with research showing that a greater proportion of regular dog walkers meet the recommended 150 minutes of physical activity per week.

The Matrix highlights that pet friendly planning extends beyond the provision of dog parks and helps promote the integration of pet friendly design principles into all public realm initiatives. The provision of dog related infrastructure is an important factor in the accessibility of open spaces and walking paths for dog owners.

For further information about the Matrix see page 45.

Green Infrastructure Project

The Green Infrastructure Project is a collaborative initiative that aims to have green infrastructure embraced as an integral element of the urban environment. For further information see: http://www.environment.sa.gov.au/botanicgardens/Learn/Green_Infrastructure

- Use tree planting to reduce the 'urban heat island effect'.

  Trees and other vegetation can modify urban microclimates and help reduce the urban heat island effect by shading urban surfaces from solar radiation and through evapotranspiration, which has a cooling and humidifying effect on the air.[82-84]

- Select sustainable trees and plants that are non-invasive, suited to the local conditions, enhance biodiversity and create habitats.

  The sustainable landscapes project, a joint initiative between the Botanic Gardens of Adelaide and other state government agencies, has developed an online resource to assist with plant selections. For further information refer to the Landscapes Alive Plant Selector: http://www.environment.sa.gov.au/botanicgardens/Learn/Sustainable_Landscapes_Project/Landscapes_Alive_Plant_Selector

- Where appropriate, label trees and vegetation to add interest.

  Providing positive aesthetics, points of interest and natural features increases the walkability of routes.[19]

Ensure fences and walls contribute to safety and attractiveness and maximise connectivity

- Use low walls or transparent fences along street frontages to allow surveillance from adjacent buildings.

  Natural surveillance can enhance the sense of safety; sightlines should therefore not be compromised by fencing or walls.[6, 35]

- Design buildings and residential dwellings that are adjacent to and overlooking public open space, to contribute to surveillance.

  Natural surveillance provides perceived and actual safety. Enabling natural sightlines from buildings can enhance the sense of safety.[6, 35]

- Avoid 'fortress' or gated residential developments lacking connectivity to the public realm.

  Gated communities can create barriers to direct lines of travel and have a capacity to reduce the pedestrian connectivity of neighbourhoods.[85]

- Ensure fences that surround parks and recreation areas have sufficient pedestrian and cyclist entry and exit points.

  Having sufficient entry and exit points enables accessibility, reduces the risk of entrapment zones and provides sightlines to increase safety.[35]

Provide facilities to encourage and support cycling and walking

- Provide bicycle parking on premises of public buildings; in public spaces and shopping centres; at supermarkets, food and takeaway shops; in major office and industrial developments; at selected public transport stops and interchanges; and other destinations. Ensure parking is safe and secure, located in an area with good surveillance and lighting.

  Access to bike parking is strongly associated with an increased level of cycling. Secure, undercover parking further increases this.[6]

- Provide shower and change amenities in public facilities close to major cycle parking areas and encourage their inclusion in major commercial and industrial developments.

  The provision of amenities promotes and enables walking and cycling.[6, 20, 33]

- Provide dog waste bag dispensers, bins and drinking fountains in dog exercise areas and along walking routes.

  The provision of dog-related infrastructure is an important factor in the accessibility of open spaces and walking paths for dog owners.[86]

Incorporate public art to contribute to attractiveness and social connectedness

- Integrate public art to enhance and enrich the built environment.

  Public art, whether temporary or permanent, contributes to the creation of attractive and engaging environments.[64]

Urban food

Easy access to environmentally sustainable, nutritious and healthy food choices in the areas where people live, work and play is important in improving population health outcomes.

To ensure a sustainable, healthy food supply we must protect and conserve productive land, encourage retail of healthy food, grow food locally, support community food systems and provide access to food via supportive infrastructure.

Urban spaces and the public realm can be used for food production through city farms, food boulevards, community gardens, allotments, street verges, median strips and edible landscapes. The presence of a diverse range of food outlets within communities ensures healthier food is available and provides a destination for pedestrians and cyclists.

Food-sensitive planning decisions can facilitate food access, utilisation and distribution; increase production; and reduce food waste.

Source Lightsview

Source Oxigen

Source Lightsview

Planning and design considerations

Objective

To plan and design our cities, towns and suburbs to ensure a more secure, resilient, healthy and sustainable food supply.

Protect and conserve productive land

- Protect peri-urban and urban fringe food production areas from conversion to non-agricultural uses.

  Greater Adelaide is built on some of the most fertile land in the country, and as the population continues to grow, so will the pressure on the high quality peri-urban food producing areas. It is important to protect high quality agricultural land in the regions surrounding major cities, so that local agriculture can continue to supply seasonal fresh produce in a timely manner. This kind of system is more resilient than systems that are reliant on transport or extensive irrigation from distant sources.[87]

- Minimise the spatial, energy and material resources needed to get food from the point of production to consumers by protecting and preserving transportation routes and facilities and by planning and reserving land for local food processing and distribution centres.

  The design and location of infrastructure for processing and distributing food can have significant water, energy and material requirements and can affect the availability, price, quality, variety and nutritional value of the final product.[16]

21,073	The average kilometres of road transportation required to get a typical Australian food basket to consumers.[88]

1 in 10	The number of South Australian children aged under 15 years reported as food insecure in 2005.[89]

Support community food systems and enable food to be grown locally

- Use public spaces such as streets, easements, laneways, verges, sports and recreation areas, parks and gardens to incorporate edible trees and plants.

  Productive gardens within urban settings have many benefits. These include providing communities with locally grown, seasonal, fresh foods; making efficient use of land; connecting the community with food and nature; and building social capital and social inclusiveness for people of all ages, abilities and cultures.[90]

- Consider using public and private buildings to contribute to food production by creating productive green roofs and walls.

  Green roofs and walls provide food growing sites in a landscape where productive land is very difficult to obtain.[91]

- Ensure new residential development has a dedicated amount of private open space, either at rooftop or balcony level or in the front or backyard, to provide opportunities for edible garden space.

  The provision of private open space enables inhabitants to produce food if they want or need to.[16] Productive food gardening can be achieved in garden beds as small as a single square metre.[92]

- Consider opportunities for establishing community gardens, particularly in higher density housing precincts. These may be incorporated into broader open space planning strategies.

  Community and allotment gardens are an important component of food production in urban environments that are becoming increasingly dense.[87] Access to fruit and vegetables is the most cited benefit of community gardens, along with the increased intake, decreased cost and increased variety and freshness.[6]

Encourage healthy food retail

- Ensure retail space is available within walking distance of dwellings and businesses.

  People who live near supermarkets are more likely to eat recommended amounts of fruits and vegetables.[93]

- Enable mixed-use developments and higher residential densities in appropriate suburbs to support local food retail businesses.

  The availability of retail food outlets that sell nutritious foods at affordable prices is an important factor in encouraging individuals to select a healthy diet[94] and in subsequently reducing their risk of contracting diabetes and/or becoming obese.[95]

- Identify permanent sites for farmers' markets, with access via public transport and incorporating necessary services, facilities (such as water, power, lighting, toilets) and parking into the design.

  A farmers' market within a community provides competition for nearby food stores and may contribute to a decrease in the retail price of fruit and vegetables.[96]

Provide access to food via supportive infrastructure

- Provide direct, safe and pleasant walking and cycle routes to retail centres and fresh food outlets.

  A diverse range of food outlets within communities not only ensures healthy food is available, but also provides a destination for pedestrians and cyclists and encourages social interaction.[16]

- Provide public baby-care rooms and breastfeeding facilities.

  Breastfeeding confers health benefits to babies and mothers. While it is important for mothers to be able to breastfeed in public places, some mothers and babies will require access to a space suitable for breastfeeding that is out of public view and is quiet.[97, 98]

Food Sensitive Planning and Urban Design

Food seems plentiful and readily available both day and night within our urban environments. However, a growing concern among governments, public health organisations and academics is about having access to enough safe, affordable, culturally appropriate and nutritious foods to meet the population's nutrition requirements. In other words, living near a strip of fast food outlets may give nearby residents access to plenty of cheap foods with low nutritional value, but not the variety and healthiness needed to prevent chronic disease.

The Heart Foundation's **Food-Sensitive Planning and Urban Design (FSPUD) Framework** provides an approach to planning and urban design that addresses the critical points of intersections between public health, nutrition, planning and urban design, and environmental sustainability. For further information, see www.ecoinnovationlab.com/research/food-sensitive-planning-and-urban-design.

Density

Higher residential densities can contribute to creating vibrant neighbourhoods by ensuring that there are enough people to support local shops, services, public transport and community facilities. Compact communities provide more opportunities for walking and cycling and using public transport.

Source DPTI

Source Lightsview

Planning and design considerations

Objective

To encourage well designed, higher residential densities with mixed uses (a combination of residential and commercial uses).

Encourage mixed-use, walkable neighbourhoods

- Encourage well designed, higher residential densities with mixed uses.

  Low density, car-dependent cities have a detrimental impact on human health and the environment by encouraging unhealthy behaviours such as physical inactivity and sedentary behaviour and increasing the number of vehicle miles travelled, traffic congestion and air pollution. Increasing residential densities, if planned and designed effectively, has the potential to produce numerous benefits to the community, including health benefits.[75]

- Locate higher density housing near employment opportunities, schools, shops and services, and public transport. For further information see 'Local destinations'.

  The ability of higher density housing to positively impact physical and mental health will depend upon its location, the amenities available and the quality of the neighbourhood.[75]

Create safe open spaces and public areas linked by safe and direct walking and cycling paths

- Locate higher density housing near high quality public open space (POS) and other recreational opportunities. For further information, see 'Open space'.

  Higher density housing needs to be located in areas where there is access to high quality public open space, catering for residents across their life courses.[75]

  RETROFIT TIP: In existing urban areas, consider using community buildings such as school grounds to provide increased opportunities for safe play spaces for children after school, as well as for other recreational and social activities.

Increasing density in Australia

The Heart Foundation commissioned the Centre for the Built Environment, University of WA to conduct a literature review into the impact of density on health. The evidence review was to address the following:

- the intended and unintended consequences of increased density, and

- the types of amenity associated with positive health and physical activity outcomes in areas of high residential density

The report is available for download at http://www.heartfoundation.org.au/active-living/built-environment/Pages/Density-and-Health.aspx

Transit Oriented Developments through a Health Lens

The South Australian Government has developed a specific resource for high-density residential developments around mass transit systems - *Transit Oriented Developments through a Health Lens*. http://tinyurl.com/cw85mx4

- Maximise opportunities for passive surveillance of public areas, maintain sightlines along walking and cycling routes and provide lighting along routes where night use is encouraged, in accordance with Crime Prevention Through Environmental Design (CPTED) principles.

  Reducing disorder through the application of CPTED principles can contribute to the success of higher density housing.[75]

- Provide well surveilled, age-appropriate play areas within higher density housing developments.

  The needs of children and adolescents living in high-density housing are often poorly served.[99, 100] This increases the potential of negative mental health impacts on both the parents and the children,[101, 102] as well as creating social problems.[103, 104]

Design public places that enable people to actively engage with the built and natural environment and with one another

- Design spaces to accommodate community events and activities such as walking and discussion groups, local arts, community markets and festivals.

  Living in higher density housing can increase social isolation in residents by limiting the development of social networks and access to social support. It is therefore important to provide opportunities for selective interactions between residents through design.[75]

- Consider opportunities for establishing community gardens in higher density housing precincts.

  Community gardens have a threefold impact: they enable communities to access fresh and healthy food, to partake in physical activity, and they foster connection with community members and the land.[6]

Reduce exposure to environmental stressors

- Use tree planting to reduce the urban heat island effect.

  Trees and other vegetation can modify urban microclimates and help reduce the urban heat island effect through two major natural mechanisms: temperature reduction through shading of urban surfaces from solar radiation, and evapotranspiration, which has a cooling and humidifying effect on the air.[82-84, 105, 106]

- Plant large trees and allow trees to grow to maturity to maximise their benefits.

  Large trees outperform small trees in moderating air temperatures, blocking UV radiation, conserving energy, sequestering carbon and reducing air pollution—this is directly related to the size of the tree canopy.[8]

Matrix of Design Considerations

Built environment professionals are increasingly being asked to consider a broad range of seemingly competing guidelines and design frameworks that impact on health, safety, access, sustainability and equity.

Why use the Matrix?

The Matrix of Design Considerations (the Matrix) is a practical tool that can be used to demonstrate the synergies between the different guidelines that influence built-environment design.

The Matrix supports an integrated life-course approach to planning and delivering healthy communities and provides practical guidance to practitioners, helping them to achieve and/or demonstrate value-added design outcomes.

How to use the Matrix?

The Matrix is arranged so that key elements of the public realm are listed down the left-hand side and design agendas are arranged in columns. Readers move across particular element rows to identify relevant principles for that element and the synergies between design agendas.

While the Matrix can be used as a quick reference guide, it is also important to consider every project or initiative in its own context and seek further information from the relevant guidelines in order to select design principles that will successfully guide development.

	Healthy by Design SA	Shade	Crime prevention through environmental design (CPTED)	Access design	Road user safety	Age friendly	Child/youth friendly	Pet friendly	Water-sensitive urban design (WSUD)
Connections	Ensure permeable street networks to provide both direct and leisurely paths to local destinations Ensure continuity of bicycle lanes through and between council areas, new subdivisions and existing neighbourhoods Walking, Cycling & Public Transport, pp. 19–23; Streets, pp. 24–28	Maximise shade over paths and cycle routes with consideration for road user safety	Provide clear sightlines to enable natural navigation to destinations Avoid movement predictor routes (such as underpasses) and allow for multiple routes if possible	Provide safe and convenient transitions from street to destination Provide continuous accessible paths of travel, including consistent wayfinding directional cues through a neighbourhood, and inform pedestrians about different path functions Use tactile ground surface indicators when design does not provide wayfinding cues	On local streets, avoid straight uninterrupted road sections longer than 400 metres to discourage excessive speed by drivers Where local route straight sections exceed 400 metres, use design features and traffic calming measures to slow motor vehicles	Ensure various uses in the neighbourhood are well connected through a pedestrian network that is easily understood and minimises the need for backtracking	Children and young people should be able to walk and cycle from their homes to local destinations such as parks, shops and schools Make connections legible and logical	Provide walkable access and connections to open space throughout a neighbourhood	Create green corridors based on reinstating natural drainage networks Use WSUD to enhance the legibility of pedestrian connections
Sightlines and surveillance	Provide clear sightlines to enhance safety and visibility for pedestrians and cyclists Walking, Cycling & Public Transport, pp. 19–23	Ensure shade structures and trees allow clear sightlines	People should be able to see, be seen and interpret their surroundings	Ensure continuous accessible paths of travel are clearly defined	Ensure approach speeds and road conditions are consistent with sightlines for all road users	Clear sightlines together with the careful design and placement of public infrastructure provides for pedestrian safety, wayfinding and casual social interaction	Allow for natural surveillance and 'eyes on the street' by designing buildings with frontages that look out onto the street or a park Identify movement barriers such as poorly lit or inaccessible areas	Pets, in particular dogs, can be provided with a direct interface with public areas where they can see and hear public activity, but which can be closed off by the owner	Ensure trees and vegetated components of WSUD installations do not impede sightlines for traffic and pedestrians
Walking and cycling routes	Design safe and attractive routes Design wide footpaths and convenient crossing points adjacent to neighbourhood destinations Shared-use paths should be 2.5 to 4 metres wide, depending on the purpose of the path and the level of use Walking, Cycling & Public Transport, pp. 19–23	Maximise shade over paths and cycle lanes and at rest stations Ensure shade structures do not obstruct access	Achieve clear and safe connections through signage, landscaping, lighting and edge treatments Integrate cycle lanes into the road and open space networks Provide appropriate lighting for pedestrians and cyclists in addition to road/street lighting Do not separate walking and cycle paths from street networks unless there are clear sightlines, opportunities for natural surveillance and no entrapment spots	Provide continuous footpaths with a non-slip, even, durable and low maintenance surface, uninterrupted by variation in surface material. Avoid treatments with a shifting surface such as coarse, loose gravel paths, ramps and walkways to comply with AS 1428.1, 1428.4 and 4586	Provide paths and safe crossing points along predictable pedestrian and cyclist routes or desired lines of travel and at locations such as approaches to schools, parks and shopping precincts Align kerb cut-outs and ramps with pedestrian and cyclist access requirements and desired lines of travel Where possible, separate shared pathways away from the road edge Provide low gradient vehicular driveways at crossing points with walkways and cycle paths	Paths are constructed to cater for a range of users, including wheelchairs and gophers, and use non-slip smooth paving, tactile features and other treatments that some users require Ensure mixed-use paths are wide enough to allow passing, and that seats are placed off the path to minimise interference with pedestrians and cyclists Provide pairs of ramps and safe road crossings in predictable locations	Provide walking and cycling routes that have safe and accessible footpaths Provide footpaths and bike tracks on children's movement routes	Provide dog litter bins, bags and water bowls along walking routes Design some divided paths where appropriate for separate use by walkers and cyclists	Use WSUD to create 'green streets' and 'greenways' that enhance the pedestrian and cycling environment Integrate WSUD into linear public open space networks
Public transport	Provide clearly signed, well lit and direct routes for people walking and cycling to and from public transport stops Provide secure bicycle parking facilities to enable dual mode journeys Walking, Cycling & Public Transport, pp. 19–23	Provide useful and appropriate shade at transport stops such as bus shelters	Ensure bus/taxi stops are not located in isolated places and are clearly visible from surrounding development and houses Ensure well used movement routes between transport stops are designated and designed for safe movement with clear, well lit and visible signage and emergency call points	Public transport infrastructure must comply with DisabilityStandards for Accessible Public Transport (DSAPT)	Connection points must be clear to and from both sides of the road and should take into consideration 'desire lines for convenient crossing Reduction of vehicle speed around connection points should also be considered on all roads On high speed roads, provide appropriate tapers to allow buses to enter and leave the bus stop	Ensure that a range of public, community and special needs transport options are accessible from all residential areas Position stops for frequent transport services so that they are co-located with shops and other facilities and are constructed with shelter and seating	Provide accessible and safe public transport options and choices	Promote policy which allows well behaved, appropriately restrained pets on public transport	Capture stormwater and roof runoff from public transport shelters for reuse in landscaping irrigation

	Healthy by Design SA	Shade	Crime prevention through environmental design (CPTED)	Access design	Road user safety	Age friendly	Child/youth friendly	Pet friendly	Water-sensitive urban design (WSUD)
Street design	Provide safe, comfortable and accessible routes to homes, shops, businesses and community facilities and link them to pedestrian and cycle paths Design footpaths that are wide enough to allow comfortable passage for people walking side by side, people in wheelchairs, people with prams, and learner cyclists Recommended minimum footpath widths are: - 3.5 metres or wider along busy shopping strips - 3 metres alongside bus stop areas - 2 metres for two wheelchairs to pass one another - 1.5 metres for a wheelchair user and an accompanying guiding person Streets, pp. 24–28	Plan shade provision to maximise sun protection without compromising sightlines or access for people with disabilities Provide street trees wherever possible and practical	Design streets to balance the needs of all users Ensure active frontages and use buildings to frame spaces Design streets that encourage walking to put more 'eyes on the streets'	Property and fence lines must be clear and barrier free to enable continuous accessible paths of travel Required facilities, including car parks and public toilets, must be linked by continuous accessible paths of travel, including circulation spaces for people using mobility aids	Design local streets and high pedestrian-use streets to reduce and calm traffic speeds and make it clear that these are pedestrian and cyclist-friendly environments Design roundabouts to slow vehicles down and promote pedestrian visibility and safe movement	Streets are designed and laid out with all users in mind and minimise backtracking when taking people where they want to go Footpaths are non-slip, free of obstructions and wide enough for wheelchairs, with pedestrian crossings and pairs of ramps located in predictable locations	Streets should provide direct, safe and convenient access that is attractive and welcoming Provide high quality bike and pedestrian infrastructure Provide adequate road crossings and traffic restrictions/mitigation measures corresponding to children's movement patterns	Design road networks, footpaths and streets that are safe, well lit, green and walkable	Provide small-scale 'at source' WSUD treatments in urban streets which treat runoff from local catchments Reduce the use of potable water for irrigation in urban streets Use alternative water sources such as stormwater harvesting to create 'self-watering' landscapes Integrate WSUD installations with other street infrastructure, including below-ground services Use porous pavements and surfaces to reduce heat retention and encourage soil moisture retention
Open space	Ensure equitable distribution of open space within walking distance of all dwellings Provide a range of facilities to enable both passive and active recreation, including organised sports activities Provide bicycle parking facilities, particularly near play equipment Open Space, pp. 32–35	Provide shade through planting broad canopy trees and installing shade structures	Ensure clear sightlines Use robust and vandal proof finishes and fixtures, including fencing, seating and signage	Provide continuous accessible paths of travel within all parks, playgrounds and gardens Provide accessible furniture and equipment and manoeuvring space for mobility aid users	Provide safe access for maintenance vehicles	Ensure areas of open space are well maintained, safe and easily accessed, supporting informal social interaction and intergenerational contact In open space, areas designed for intensive recreation uses are physically set back from areas of less intensive uses, where older people feel comfortable to sit and observe Open space areas include facilities that meet the needs of older people, such as adult recreational equipment and tables that accommodate people in wheelchairs	Provide green spaces for outdoor nature play and to promote contact with nature Open space should provide sensory-rich experiences, be inviting, inspiring, creative, active and promote exploration Increase opportunities for accessing green open spaces and natural areas through safe and accessible linkages to residential areas and schools	Provide fenced off-leash areas that are easy to access and appealing as a part of integrated public open space Provide flexible built spaces in public open spaces that can house uses such as a kiosk, community facility, shelter, information board or training room, so that these could potentially be used by pet owners or a broader participant group A fully fenced in off – leash dog park should not be smaller than one hectare and should be integrated with other recreational areas and furniture Incorporate exercise equipment and activities in fenced off - leash areas that are suitable for use by a large range of dog breeds and sizes	Use stormwater management to enhance the multiple uses of open space, including water quality, flood control, recreation, visual amenity and wildlife habitat Aim to restore degraded waterways and/or replicate the natural hydrological processes of the site Reduce potable water use for landscape irrigation by providing at source treatment, management and reuse of stormwater Maximise site permeability by replacing asphalt and concrete with porous surfaces to reduce heat retention and encourage soil moisture retention
Signage	Provide clear orientation to places of interest for pedestrians and cyclists Signage should be clear, concise and consistent Signage should complement the overall landscape/ streetscape design Supportive Infrastructure, pp. 36–39	Identify communal shaded areas on maps and community information boards	Provide clear signage of paths, connections and destinations Design sign hierarchies to show information from most to least important Use vandal and graffiti resistant material	All signage to be large, clear and adjacent to continuous accessible paths of travel Signage should include information in tactile and Braille forms	Signage must be clearly visible and comprehensible for all road users The location of signage and posts should not be a hazard to road users Minimise the number of signs, as sign clutter can be distracting	Large and clear signage should be provided in predictable locations to support wayfinding, access to services and facilities, identification of the location of building entries and car parking areas (including designated disabled parking places) and navigation when driving	Involve children in the planning and design of interpretive signage Provide directional signage to green open space and natural areas and consider incorporating elements of art and storytelling into signage that may involve wayfinding to places children visit	Incorporate interesting and creative signage techniques to assist in wayfinding to dog recreation areas and parks Ensure pet friendly areas are well signposted and times/ restrictions relating to dogs on leashes are clear, easily visible and concise	Incorporate interpretive signage to provide information about WSUD installations Design should make natural processes visible to reconnect people with the natural water cycle Design engaging and informative WSUD installations to contribute to streetscapes and to increase community awareness of WSUD

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	Healthy by Design SA	Shade	Crime prevention through environmental design (CPTED)	Access design	Road user safety	Age friendly	Child/youth friendly	Pet friendly	Water-sensitive urban design (WSUD)
Lighting	Ensure lighting meets the visibility needs of pedestrians and cyclists Highlight crossing points Supportive Infrastructure, pp. 36–39	Provide lighting in shade structures if required; for example, bus shelters	Use lighting to designate safe paths and places Lighting can encourage or discourage use; for example, effective lighting at crossovers and public transport shelter/stops Light safe connections from shops to public transport	Provide a safe, comfortable visual environment for pedestrian and wheeled transport movement at night	All road users should be considered when providing overhead lighting Provide higher levels of lighting at crossing points, roundabouts and intersections Light structures within the clear zone to be frangible	Lighting is provided to ensure safety along streets, roads, public areas, car parks and at venues used for events and activities	Provide lighting that allows for visibility and adult surveillance on movement routes and in public spaces Achieve consistency of lighting	Provide lighting in public parks and off-leash dog parks to improve safety and surveillance after hours	Ensure trees and vegetated components of WSUD installations do not impinge upon lighting installations
Landscaping, trees and vegetation	Provide trees for shade and aesthetics along access routes and places where people gather Incorporate edible trees and plants into landscaping Open Space, pp. 32–35; Supportive Infrastructure, pp. 36–39; Urban Food, pp. 40–42	Provide broad canopy, deciduous, tall trunk trees to ensure shade during times of peak UV radiation Plant vegetation to minimise reflected UV rays; for example, climbing plants on walls	Incorporate low vegetation up to 700 mm and broad canopy trees with sightlines clear to 2,400 mm above ground level Use vandal resistant treatments such as tree guards	Remove tree debris from paths Trim foliage to a height of 2,400 mm and at the sides of paths	Ensure that tree plantings do not obstruct driver visibility of any other road users, particularly at conflict points such as intersections and accesses Ensure that vegetation, particularly within clear zones on roads with speed limits over 50 km/h, is forgiving of any errant motorist	Trees and vegetation are used to shade and improve the appearance and useability of open spaces, trails and seating areas Plantings that screen front fences should not exceed 600 mm when mature, so that people can see over them	Provide low to medium-height shrub planting and/or taller-stemmed trees in open space areas that children are likely to frequent Mature height and spread of vegetation should be considered in order to preserve sightlines into and out of an open space Plant tall shade trees that move and rustle in the wind	Avoid plants and plant materials that are toxic to pets Fruit trees and vegetable gardens may need to be protected Outdoor spaces should contain a mix of permeable and paved surfaces and be an attractive environment with trees and other natural features	Integrate WSUD installations with the provision of street trees Use vegetated (rather than non-vegetated) WSUD installations to provide a range of benefits in addition to stormwater treatment Maintain soil moisture levels that support healthy growth of vegetation Use stormwater harvesting to provide passive irrigation for trees and other vegetation Select tree and vegetation species that are relatively hardy and tolerant of periods of drought as well as regular inundation
Seating	Ensure frequent and accessible seating for pedestrians and cyclists Arrange seating to facilitate social interaction Walking, Cycling & Public Transport, pp. 19–23; Local Destinations, pp. 29–31; Open Space, pp. 32–35; Supportive Infrastructure, pp. 36–39	Provide shade for seating and picnic areas	Place seating in well connected areas to allow clear sightlines of paths, play areas and toilets Ensure vandal and graffiti resistant materials are used	Provide seats with backrests and arm rests regularly along the continuous accessible paths of travel Drinking fountains to be wheelchair accessible and adjacent to continuous accessible paths of travel	Seats made out of solid materials that could damage errant vehicles and their occupants should be located outside the clear zone	Seating with backs and armrests is provided in sheltered locations in parks and adjacent to pedestrian paths at 200–400 metre intervals and is set back from the flow of pedestrian and cycle traffic Fixed tables in public places are of a height and design that can be easily used by people in wheelchairs and gophers	Provide seating and gathering places in public spaces for congregation Locate seating where users can see and be seen Incorporate interesting and unique design features and materials into seating design in areas frequented by children	Provide seating as a part of integrated open space and pet recreation areas	Use WSUD edge treatments to create additional public seating
Shelter	Provide shelter for protection from weather extremes Walking, Cycling & Public Transport, pp. 19–23; Local Destinations, pp. 29–31; Open Space, pp. 32–35; Supportive Infrastructure, pp. 36–39	Avoid locating shelter on or near surfaces that reflect UV radiation	Shelter interiors should be visible from paths, placed near areas of high activity and well lit Use vandal and graffiti resistant materials	All constructed shelter to comply with the Building Code of Australia and AS 1428 standards Approaches must be continuous accessible paths of travel	Shelters, for example at bus stops, should not block the sight requirements for road users at intersections and access points	Shade and shelter are provided frequently in open space, along paths/ trails and in public spaces to encourage strolling and sitting	Provide shade and shelter in public spaces	Provide shade and shelter that is useable and comfortable for use by owners in pet exercise areas	Use vegetated WSUD systems, including trees, to provide shade and shelter
Fencing and walls	Use low walls or transparent fencing along street frontages and open space Open Space, pp. 32–35; Supportive Infrastructure, pp. 36–39	Ensure the tops of shade structures cannot be accessed by climbing nearby fences, walls, buildings or trees Avoid surfaces that reflect UV radiation	Keep fences low or transparent for clear sightlines Provide front fences and walls no more than 1.2 metres high if solid, or up to 1.8 metres high if at least 50% transparent Avoid high fences backing onto public space, roads or parks Plant thorny creepers to discourage climbing or graffiti on walls	Do not use turnstiles Bollards, gates and chicanes must provide access for wheeled transport	Avoid back fence lot orientations on collector and arterial roads by providing service roads or boulevards Fences should not obstruct sightlines for any road users, particularly at intersections and accesses Fences should be avoided in clear zones, but if necessary, ensure materials do not constitute a hazard to errant motorists	Fencing and walls are kept low in places where sightlines, entry points to buildings and casual social interaction are desired	Walls should be of an appropriate scale, relevant to users of the space Fencing or walls should not be blank or impede sightlines. Visual interest can be added through the use of interesting materials or artwork	Perforated fencing is preferable; if solid fencing is required then a number of 'viewing windows' can be inserted Residential side fences should be 1.7 metres high; front fences should be 1.2 metres high Picket spacing should be no wider than 100 mm apart. If spacing is wider, chicken wire can be used Provide a clear, rather than solid, balustrade	Provide edge treatments where necessary to keep vehicular and pedestrian traffic away from WSUD surfaces to maintain the integrity of WSUD systems

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	Healthy by Design SA	Shade	Crime prevention through environmental design (CPTED)	Access design	Road user safety	Age friendly	Child/youth friendly	Pet friendly	Water-sensitive urban design (WSUD)
Concealment and entrapment	Locate paths away from potential hiding places and entrapment spots Walking, Cycling & Public Transport, pp. 19–23; Open Space, pp. 32–35	Ensure vegetation does not create hiding places or entrapment spots	Design out potential entrapment spots and hiding places Avoid blank walls, loading docks off walkways and recessed entrances	Design spaces to ensure that users, particularly women, children, older people and people with disabilities, can see a safe route during day and night	Locate car parking away from potential entrapment spots	Seating should be set back from paths and the flow of pedestrian and cycling traffic, while still ensuring users are visible	Ensure vegetation does not conceal paths or play equipment	Avoid small, fenced off-leash spaces that create a feeling of being enclosed and behind a fence	Design WSUD installations to minimise risks of concealment or entrapment
Active frontages	Promote more active and lively streets that encourage people to interact Streets, pp. 24–28; Local Destinations, pp. 29–31	Provide tree plantings and encourage the use of verandas to provide shade and amenity for shoppers	Active frontages add interest, life and vitality to the public domain Incorporate frequent doors and windows, with few blank walls Encourage lively internal uses visible from the outside or spilling onto the street Articulate façades with projections such as porticos/verandas	Property and fence lines must be clear and barrier free to enable continuous accessible paths of travel	Encourage active frontages along commercial and shopping precincts Design streets to encourage lower speeds Road network should be permeable	The interface between public and private spaces is carefully designed to facilitate social interaction	Facilitate active frontages in areas where children congregate, such as parks, entertainment areas and bike and skate parks	Promote active frontages for interesting and varied experiences and opportunities for socialising on popular walking routes to and from pet exercise areas	Incorporate WSUD initiatives in the design or retrofitting of building forecourts Incorporate waterscape public art in spaces fronting the public domain
Mixed use	Provide local focal points to support walkable neighbourhoods Increase mixed-use development through the provision of housing, shops, services, parks and commercial spaces that facilitate active transport Local Destinations, pp. 29–31; Urban Food, pp. 40–42; Density, pp. 43–44	Consider tree height, growth, seasonal effects, root system and maintenance Consider when built structure may be more appropriate	Provide a mix of uses in neighbourhood centres to create activity and increase vitality Provide for 'eyes on the street' day and night Encourage uses compatible with residential areas	Ensure all uses are accessible and comply with the requirements of the Disability Discrimination Act 1992	Design safe access for all road users, giving priority to pedestrians, cyclists and public transport modes	All residential dwellings and especially age friendly residential developments should be located in close proximity to public transport, shops, community and medical services, and open space to reinforce these as nodes of activity Encourage a range of activities and uses in community facilities and spaces to support social inclusion of people of all ages and interest groups	Different uses must be well integrated and accessible Enable children to independently access a diverse range of child-friendly services and activities Buildings should be inclusive and multi-use	Provide pet friendly outdoor dining opportunities and spaces	Use WSUD to enhance the functioning and amenity of mixed-use developments
Building design	Design buildings to facilitate a variety of uses within a neighbourhood; for example, schools used after hours as community facilities, and public libraries used for educational and training sessions Local Destinations, pp. 29–31; Density, pp. 43–44	Be aware of daily and seasonal shade patterns created by surrounding structures to maximise effectiveness of supplementary shade Build and use materials to minimise both direct and reflected UV radiation	Design windows and activities to overlook streets, pedestrian routes, open spaces and car parks to support natural surveillance Ensure entrances are clearly defined, face the street and provide clear sightlines	Buildings can be easily accessed by all people and must comply with DDA and the Building Code of Australia (BCA) requirements For building elements not included in the BCA refer to AS 1428 suite of standards	Loading bays should be separated from pedestrian paths/routes Design should facilitate forward vehicular movements between buildings and arterial roads	Public and commercial buildings are accessible for people using walking sticks, walking frames, mobility scooters and wheelchairs Entrances to all buildings should be clearly evident Buildings are designed to foster social interaction between users and passersby and to provide casual surveillance Public/community buildings are used by people of different ages and interests to foster interaction between these groups	Promote housing design that provides street surveillance Ensure that areas likely to be used for ball games are separated from windows or large areas of glass Provide storage space for children's toys, bicycles and sporting equipment	Maximise the space available to pets i.e. allow pet access to garages and carports and allow cats access to the vertical environment Provide good insulation, double glazing and acoustic separation in higher density developments Use appropriate materials to provide non-slip floors Provide opportunities for ventilation through security screens and lockable open windows	Capture stormwater and roof runoff from buildings for reuse in the public domain Incorporate green roofs and walls on buildings with public frontages Use alternative water sources for landscape irrigation, including recycled greywater and wastewater
Maintenance	Ensure foot and cycle paths are free of obstructions such as overgrown vegetation or fallen branches Walking, Cycling & Public Transport, pp. 19–23; Supportive Infrastructure, pp. 36–39	Ensure regular maintenance of built shade structures	Ensure adequate and timely asset management and maintenance A run down or vandalised appearance can suggest an area is unsafe Use vandal and graffiti resistant materials and design features	Ensure adequate maintenance for continuous accessible paths of travel Rough or damaged surfaces and puddles are not accessible to users of wheeled transport	Provide call-out phone numbers for hazard removal	Public and private spaces are maintained to be attractive, safe and convenient The use of public and private spaces by all people is facilitated by obstruction- and trip-free construction and maintenance	Remove vandalism as it appears Encourage community ownership of parks and public spaces	Provide bags and bins for the collection and disposal of pet waste in a location that is easily noticeable and accessible Provide only robust and easily maintained/replaceable furniture and infrastructure in pet friendly areas, especially fenced off-leash spaces	Ensure durable robust design to minimise accidental or deliberate damage Provide for regular and long-term maintenance to maintain system functioning, extend expected service life, and to maintain visual and aesthetic values

Winner of the Planning Institute of Australia and Petcare Information Advisory Service's Pet Friendly Planning Award for the Matrix of Design Considerations

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Further information

Design agenda	What is it?	Where can I get more info?
Shade	Encourages the provision of shade that is functionally, environmentally and aesthetically sympathetic to surrounding areas.	Under Cover: Guidelines for shade planning and design http://www.cancersa.org.au/aspx/Under_Cover_Guidelines.aspx
Crime Prevention through Environmental Design (CPTED)	The basis of CPTED is that good design and an intelligent layout and use of the built environment can reduce both the fear of crime and its incidence.	Designing out crime: Design solutions for safer neighbourhoods www.dpti.sa.gov.au
Access	Focuses on addressing the needs of people with disabilities, but seeks to create environments that will be easier for all people to use, regardless of abilities, age or current state of health.	Guidelines for Disability Access In the Pedestrian Environment www.dpti.sa.gov.au Refer to AS 1428 suite of standards
Road-user safety	Promotes consideration of road safety issues for all users.	Streets For People: Compendium for South Australian Practice www.saactivelivingcoalition.com.au
Age friendly	Age friendly means an inclusive and accessible environment that promotes active ageing by optimising opportunities for health, participation and security in order to enhance quality of life as people age.	South Australian Age Friendly Guidelines http://www.sa.gov.au/subject/Seniors/Age-friendly+Communities
Child/youth friendly	Cities provide a diverse range of services, experiences and opportunities and enhance the possibilities for a child's mobility and independence. A child-friendly approach aims to ensure that all urban environments provide positive advantages for their development. The Children's Protection Act 1993 (SA) places a legal obligation on Councils (and other organisations providing services wholly or partly to children) to ensure all children and young people in their care are safe from harm. This includes giving consideration to maximising safety through appropriate design features of public places, Council buildings and facilities, parks and reserves, playgrounds and areas where young people gather, access services and participate in programs.	Built for Kids: A good practice guide to creating child-friendly built environments http://www.kids.nsw.gov.au/kids/resources/publications.cfm?itemID=0665D537F09D577164DEE83D91C57AAC For further information see http://www.families.sa.gov.au/pages/protectingchildren/CSEHome/
Pet friendly	Pet ownership is shown to have significant health and social benefits. These guidelines address the needs of pets, particularly dogs, and their owners in public open space.	Public Open Space and Dogs: A design and management guide for open space professionals and local government http://www.petnet.com.au/sites/default/files/PIAS_-_public_open_space_and_dogs.pdf
Water-sensitive Urban Design (WSUD)	WSUD is an approach to urban planning and design that integrates the total water cycle and water from all sources, including rainwater, storm water, groundwater, mains water and waste water, into urban development and building processes.	Technical manual for water-sensitive urban design in Greater Adelaide http://www.sa.gov.au/subject/Housing,+property+and+land/Building+and+development/South+Australia's+land+supply+and+planning+system/Water-sensitive+urban+design

Glossary

Terms	Definition
Accessibility	The degree to which places and spaces are accessible for all members of the community regardless of age, ability or income. Also, the distance to or from destinations or facilities.
Active frontage	Street frontages where there is an active visual engagement between those in the street and those on the ground floors of buildings. This quality is assisted where the front facade of buildings, including the main entrance, faces and open towards the street.
Active transport	Walking, cycling and/or using public transport.
Ageing in place	Creating an enabling environment for older people which offers them the opportunity to continue to live independently in their own home and enjoy a quality, healthy, and productive lifestyle.
Brownfield	Land that is abandoned or underused, usually considered as a potential site for redevelopment.
Built environment	Means the structures and places in which we live, work and play, including land uses, transportation systems and design features.
Crime Prevention Through Environmental Design	A crime prevention strategy that aims to redesign and modify the environment to reduce opportunities for crime. It focuses on the effective design and use of the built environment to reduce the incidence and fear of crime and improve quality of life.
Density	Density is the number of units (people or dwellings) per unit of land area (usually hectares).
Enclosure	The degree to which streets and other public spaces are visually defined by buildings, walls, trees and other vertical elements.
End-of-trip facility	The provision of infrastructure that caters to the needs of cyclists at their destination and includes safe and convenient access, secure bicycle parking, changing facilities, showers and lockers.
Food security	The ability of individuals, households and communities to acquire appropriate and nutritious food on a regular and reliable basis using socially acceptable means.
Greenfield	Land that has not been previously developed and usually outside of the existing urban edge.
Grey infrastructure	Engineered services and infrastructure – roads, stormwater drains, stobie poles, etc.
Green infrastructure	Describes the network of natural green spaces and assets, plants, trees, parks, reserves, etc.
Liveability	The perceived quality of a place, including the built environment and open space, as well as the location and accessibility of services and facilities required to undertake daily activities. It can also encompass intangible elements such as a place's character, cultural heritage and 'sense of place'.
Tactile ground surface indicator	A tile with raised projections to indicate either danger or a change in level, or to act as a directional guide to people with visual impairment.
Urban heat island effect	Refers to the phenomenon where the air and surface temperatures of cities are typically much higher than surrounding rural or forest areas, especially at night.

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