

*A reliable and trusted volunteer based organisation
building safe and resilient communities.*

SASES Land Development Policy

Extreme Weather and Floods

The Policy of the South Australian State Emergency Service provides guidance, in respect to extreme weather and floods, for organisations that have responsibilities for land use planning and building design and construction.



Document Control Sheet

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INTRODUCTION

This document describes the South Australian State Emergency Service's (SASES) policy positions on land use planning and building design and construction to mitigate the risk of extreme weather and flood events to community health and safety, homes, businesses and the State's infrastructure. It provides the context and rationale for each policy statement with links to relevant legislation, regulations and other guiding documents.

SASES is responsible for providing leadership in a coordinated and consistent manner to plan for, respond to and recover from hazards associated with extreme weather. Although SASES does not have direct responsibilities for land use planning, building or development, they are identified as a government agency to be consulted on development plan amendments (DPAs) and have a role in providing advice in relation to hazard management during reviews of State planning policy and strategy

The policies describe what is considered best practice by SASES with regard to the mitigation of risks associated with extreme weather through appropriate land use planning and building controls.

It is acknowledged that a minimum requirement for the design, construction and performance of buildings throughout Australia is set by the National Construction Code.

THE ROLE OF SASES IN EMERGENCY MANAGEMENT

The South Australian SASES is identified in the *State Emergency Management Plan* as the:

- Hazard Leader for extreme weather;
- Control Agency for extreme weather; and
- Control Agency for flood.

SASES has a leadership role for the planning of emergency management activities which may include providing input to land use planning and provision of public information. Given these responsibilities, SASES aims to increase community awareness and preparedness through a number of programs including providing advice relating to policies it has adopted.

Consistent with emergency management across Australia, SASES undertakes a range of actions and programs to prevent, prepare for, respond to and recover from hazards (PPRR).

BACKGROUND

Extreme Weather and Flood Hazards

A hazard is anything that has the potential to cause damage or harm. Extreme weather hazards include heatwaves, storms and severe winds. Flood hazards include riverine flooding, flash flooding, coastal/sea inundation, flooding caused by infrastructure failure, groundwater flooding and dam burst events.

Extreme weather and heatwaves have the potential to impact the health and wellbeing of the community, infrastructure and essential services and local and regional economies. Recent extreme weather events have seen disruptions to essential services, loss of agricultural crops and damage to buildings and infrastructure resulting in high costs of repair and recovery.

More Australians die from extreme heat than from any other type of natural disaster [\(1\)](#). The effect of heat on the community, infrastructure and services is cumulative [\(2\)](#). A single day of high temperature can have an impact and this impact escalates with successive days of high temperatures.

In addition to the immediate and direct impacts that may include reduced health and wellbeing, loss of life, damage or destruction of homes, businesses, infrastructure or valued natural environments, indirect impacts resulting from damaged electricity infrastructure or roads can be felt for some time after the event has passed.

Climate Change

The South Australian climate is naturally variable, with extremes in temperatures and rainfall occurring regularly during the recorded weather history. In recent years, the frequency and duration of heatwaves has increased, and the hottest days recorded have become even hotter.

Modelling and research indicates changing climatic conditions are and will continue to increase in their frequency and intensity. Substantial increases in the frequency of hot days, maximum temperatures and the duration of heatwaves are projected with very high confidence across all of South Australia. Although average annual rainfall is projected to decline, there is high confidence that heavy rainfall intensity is projected to increase across all of South Australia as well as potential for cumulative, concurrent and large scale natural hazards.[\(3\)](#)

The need for greater community resilience and making our buildings, infrastructure and public realm more resilient to extreme weather will become increasingly important as climate change results in more frequent and intense extreme weather events.

Risk Management

Land use planning allows planning authorities to strategically consider potential hazards when planning for land use and development, and to set policy on acceptable risk and controls that increase the ability of individuals and the community to be prepared for and recover from a hazard event.

Mitigating risk from natural hazards is not about completely avoiding or eliminating the risk. Natural hazards are a feature of our environment and, in most instances, the potential impacts of natural hazards can be managed but not eliminated. Individuals, developers, communities and governments must balance the costs associated with managing the impacts of natural hazards against the benefits arising from development. In some cases, the costs (including the costs of mitigation) may outweigh the benefits and the government or a community may determine that it is prudent to avoid development in a particular area for that reason.

National Approach to Disaster Resilience

This policy document has been prepared with reference to the National Strategy for Disaster Resilience (NSDR).[\(4\)](#) Reducing risks in the built environment is a key strategy in building resilience. The NSDR identifies that responsible land use planning can reduce or prevent the likelihood of hazards impacting communities.

THE PLANNING SYSTEM IN SOUTH AUSTRALIA

The planning system in South Australia is in the process of significant reform which commenced with the introduction of the *Planning, Development and Infrastructure Act 2016*. The intended result is that South Australia will have an integrated planning and development system, with four distinct but interrelated parts; legislation, State Planning Policies, Regional Plans and the Planning and Design Code.

- The *Planning, Development and Infrastructure Act 2016* (the Act) and *Planning, Development and Infrastructure (General) Regulations 2017* (Regulations) provide an overarching framework for South Australia's planning and development system. It provides for matters relating to the use, development and management of land and buildings, including providing a planning system to regulate development within the State, rules with respect to the design, construction and use of buildings, and other initiatives to facilitate the development of infrastructure, facilities and environments that will benefit the community.
- The State Planning Policies set out the overarching goals for the state and requirements for the planning system.
- Regional Plans provide the long term vision for regions or areas about the integration of land use, transport, infrastructure and public realm.
- The Planning and Design Code sets out the policies, rules and classifications for the purpose of development assessment and related matters for the state, it includes Design Standards, Practice Guidelines and Practice Directions.
- The State Planning Commission (the Commission) has key responsibilities as according to the Act, to lead planning policies, ensure genuine engagement with the community and effective delivery of the Planning and Design Code.
- The Commission will help focus and coordinate future developments with the required and appropriate infrastructure provisions and provide guidance to local councils, practitioners and other users of the system in the delivery of a new planning services.

Development plans

Development plans are being transitioned into a new Planning and Design Code, but for the interim, are key on-the-ground development assessment documents in South Australia. They contain the guidelines that set out what can be done on any piece of land across the State, and the detailed criteria against which development applications will be assessed. Development plans cover distinct and separate geographic areas of the state. Development plans outline what sort of developments and land use are and are not envisaged for particular zones (e.g. residential, commercial, industrial), and various objectives, principles and policies further controlling and affecting the design and other aspects of proposed developments. Policies may include direction for development in areas subject to natural hazard risk. These policies typically cover flooding, bushfire, salinity, acid sulphate soils and landslip. Changes to Development plans are undertaken through a formal development plan amendment (DPA) process.

All acts or activities defined as development require the lodgement of a development application to seek development approval. Each application is assessed with regard to its conformity and consistency with the relevant development plan. The relevant authority for each application varies depending on the nature of the development. Relevant authority may be required in order to refer the application to other agencies. The SASES may also be requested to comment informally on development applications.

POLICY PRINCIPLES

SASES advocates the creation of safer, sustainable communities through:

1. The development and regular review of hazard information relating to heatwaves, wind, storms, flood and dam burst, including:
 - a. Ensuring flood hazard modelling and mapping outputs identify areas at risk from flood events including riverine flooding, sea level rise and dam burst,
 - b. Consideration of local factors that influence wind hazard, and
 - c. Consideration of heat island mapping (if available) and prevailing winds.
2. The sharing of hazard risk information with relevant authorities and the wider community, including engagement with communities, businesses and industries to increase awareness and understanding of risks and how to prepare for, respond to and recover from events
3. Using hazard data to inform the development of planning policy and regulations including development plans.
4. Ensuring all proposed developments or land uses are subject to an assessment of the level of risk to life, safety, health and property from extreme weather and flood events.
5. Ensuring the design, construction and location of critical infrastructure will minimise disruption (to people and the economy) during and after extreme weather and flood events.
6. Promoting the construction of buildings that where practicable exceed requirements of Federal, State and local government legislations, standards and guidelines, particularly with regard to access and egress, structural provisions relating to expected hazards and energy efficiency. This could be through the use of the international recognised Green Star sustainability rating system,

SOUTH AUSTRALIAN SASES POLICY STATEMENTS

Notwithstanding any requirements of the *Emergency Management Act 2004*, *Planning Development and Infrastructure Act 2016*, *Natural Resources Management Act 2004* or *National Construction Code 2016*, the following policies describe the position of SASES relating to land use planning and building design and construction.

1. An 'all hazards' approach should be applied to decisions relating to land use planning and the design and construction of buildings and infrastructure.
2. All levels of decision making in land use planning and building control should be responsible for considering the potential impact of extreme weather events.
3. The impact of future climate conditions on the increasing frequency and intensity of extreme weather events should be considered in decisions relating to land use planning and building design and construction.
4. Development should not increase the risk of flooding on adjoining areas.
5. Development should not increase the risk of landslip.
6. Development should not rely on flood levees or flood control dams for protection from flood inundation.
7. New dam approval should require applicants to consider the potential consequences of dam failure.
8. Hazardous materials should be stored and located to minimise the risk of escape during extreme weather or flood events.
9. Road provision should provide adequate access/egress during an extreme weather or flood event. Proposed development should not impede or block access/egress routes of existing developments.
10. Buildings, streetscapes and neighbourhoods should be designed to enable safe evacuation.
11. Building and infrastructure design and construction should be structurally adequate to withstand expected depth and velocity of flood flow, maximum probable wind speeds, hail loading and extreme heat.
12. Residential buildings should be designed and constructed to minimise heat and cold stress and provide year-round thermal comfort while reducing reliance on artificial heating and cooling.
13. Buildings, infrastructure, streetscapes and neighbourhoods should be designed to mitigate the impacts of extreme heat, including through the installation of green infrastructure.

Each of these policies is consistent with SASES' mission to *minimise the loss of life, injuries and damage from emergencies and natural disasters*. They are consistent with SASES' role in preventing extreme weather and flood events adversely impacting on community health and safety, homes, businesses and the State's infrastructure.

SASES Policy Statement #1

An 'all hazards' approach should be applied to decisions relating to land use planning and the design and construction of buildings and infrastructure

Context

Australia has adopted a comprehensive and integrated approach to emergency management; comprehensive in encompassing 'all hazards' and integrated across all levels of government, agencies and the community.⁽⁸⁾ Consistent with this, the South Australian State Emergency Management Plan (SEMP) has been based upon the 'all hazards' principles endorsed by the South Australian Emergency Management Council and Emergency Management Australia.

In any particular area there are a number of hazards that may occur. The 'all hazards' approach does not require planning for every possible hazard that may occur but requires consideration of the hazards that are more likely to affect people, assets, infrastructure and the environment.

Planning safer and more resilient communities requires consideration of potential hazards when making decisions relating to land use planning strategy and policy, as well as when designing and constructing buildings and infrastructure.

Roles and responsibilities

Decision making in land use planning and building occurs from a State and national level relating to the Building Code and State legislation, through to the decision of individual land owners to undertake development.

The State Emergency Management Plan (SEMP) identifies hazard leaders to take a leadership role in emergency management activities related to its appointed hazard. Each hazard leader is required to prepare a State level hazard plan based on the principles of the SEMP but with an emphasis on the particular hazard. This suggests each hazard plan should consider interactions with other hazards, consistent with an 'all hazards' approach however this is not always considered.

Within the Hazards section of the SA Planning Policy Library, principles of development control for some individual hazards are described however there is no reference to an 'all hazards' approach.

The *National Construction Code (NCC)* describes construction requirements for buildings. Volume One and Volume Two of the NCC comprise the *Building Code of Australia (BCA)* and Volume Three is the *Plumbing Code of Australia*. All three volumes contain performance requirements linked to hazard management. Satisfaction of all requirements does constitute to some extent an 'all hazards' approach, as requirements relate to construction and development in bushfire prone areas, flood hazard areas, energy efficiency, access and egress. Structural provisions of the BCA require a building or structure to perform adequately even under (reasonably expected) conditions including hazards such as wind, earthquake, rainwater and thermal effects.

Rationale

The application of an 'all hazards' approach is consistent with the national approach identified by Emergency Management Australia and the SEMP.

Where development is proposed, it is imperative that 'all hazards' are considered at the planning and design stage, including consideration of future hazards conditions. Consideration of hazards and associated risks is required to prevent the construction of buildings and infrastructure that continue to function under expected conditions, and do not cause harm to people, assets, infrastructure and the environment. In most cases it is more efficient and effective to consider hazards during the planning stage rather than to attempt to retrofit mitigation or management features after the development has been completed.

Application

In the role of Hazard Leader, the SASES may be sought to provide informal comment on development plan amendments or development applications. SASES should review the need for and where appropriate advocate the application of an 'all hazards' approach, with an emphasis on the extreme weather hazard for which SASES is Hazard Leader. This may also result in a request for confirmation that all hazards have been considered, not just those for which SASES is Hazard Leader.

Any documents prepared by SASES should advocate an 'all hazards' approach and consider the interactions of extreme weather with other hazards.

SASES should advocate this policy through the development plan amendments process and the *Planning and Design Code*.

SASES Policy Statement #2

All levels of decision making in land use planning and building control should be responsible for considering the potential impact of extreme weather events

Context

Australia has adopted a comprehensive and integrated approach to emergency management - comprehensive in encompassing all hazards and integrated across all levels of government, agencies and the community.⁽⁸⁾ The National Strategy for Disaster Resilience recognises the significant role of government at all levels to develop and implement risk-based land management and planning arrangements. ⁽⁴⁾ Land use planning can prevent or reduce the likelihood of hazards impacting communities by reducing the number of people or assets in known high risk areas.

In South Australia the planning and development system is made up of three parts with different levels of government who are responsible. The legislative framework is provided by the *Planning Development and Infrastructure Act 2016 and Regulations*. Currently, the South Australian Planning Policy Library (SAPPL) guides the preparation of development plans by councils and contains a number of policies relating to natural hazards. Although flooding is referenced in many of the current policies, there are no specific policies directly referencing extreme storm or extreme heat.

The *Guide to Best Practice Flood Risk Management in Australia* notes that individuals within the community need to recognise that they are responsible for informing themselves about flood risks and the need, availability and coverage of flood insurance. This also includes a requirement to be aware of how to respond to a flood threat in consideration of community response plans and heeding the advice of relevant government and emergency management personnel during flood events and other hazards.⁽⁹⁾ The notion of empowering individuals to be self-reliant and to take responsibility for the risks in their community, is also identified in the National Strategy for Disaster Resilience. For individuals to make effective judgements about the risks they face, risk information must be made available in a manner that can be easily understood which is the role of local and state government.

Roles and responsibilities

Decision making in land use planning and building occurs from a state and national level relating to the Building Code and state legislation, through to the decision of individual land owners to undertake development.

The State Emergency Management Plan (SEMP) requires the Hazard Leaders to take a leadership role in emergency management activities related to the appointed hazard and to lead a multi-agency approach to planning for the identified hazard.

The South Australian planning system identifies current responsibilities for local and state government relating to the development of planning policy and assessment of proposed development. Planning reform commenced with the introduction of the *Planning, Development and Infrastructure Act 2016* will see the development of the *Planning and Design Code* that will document the rules against which development is assessed, and the *Design Standards* for public realm and infrastructure.

At an individual building scale, the *Building Code of Australia* provides performance requirements linked to hazard management and it is the responsibility of builders to ensure compliance. Home or property owners also have responsibilities to inform themselves about the hazards that may impact their assets and to undertake appropriate risk mitigation.

Rationale

The application of an integrated approach to land use planning is consistent with the national approach identified by Emergency Management Australia and the SEMP. Responsibilities for land use planning and building decision making exist at all levels from governments to individual land owners. Recognition of the range of responsibilities is required to ensure extreme weather is appropriately considered.

Application

In the role of Hazard Leader, SASES may be sought to provide informal comment on Development Plan Amendments (DPA) or Development Applications (DAs). Where relevant, the SASES may seek confirmation that all levels of government have been consulted on the DPA or DA.

The SASES should support all decision makers through the provision of readily accessible information regarding the potential impacts of extreme weather across the State, to enable the best available information to inform land use planning and building design and construction.

The SASES should advocate this policy through the development plan amendments process and the *Planning and Design Code*.

SASES Policy Statement #3

The impact of future climate conditions on the increasing frequency and intensity of extreme weather events should be considered in decisions relating to land use planning and building design and construction

Context

Extreme weather and heatwaves have always occurred in South Australia but changing climatic conditions are increasing the intensity and frequency of many extreme weather events. In the last 50 years, the duration, frequency and intensity of heatwaves has been increasing and record breaking heatwaves have occurred in recent years.

Modelling and research indicates changing climatic conditions are and will continue to increase their frequency and intensity. Substantial increases in the frequency of hot days, maximum temperatures and the duration of heatwaves are projected with very high confidence across all of South Australia. Although average annual rainfall is projected to decline, there is high confidence that heavy rainfall intensity is projected to increase across all of South Australia.⁽³⁾

Supporting South Australian communities to become more resilient to extreme weather will become increasingly important as climate change results in more frequent and intense extreme weather events. The Climate Council compared recent heatwaves with heatwaves prior to 1980, and found that heatwaves in the state are becoming longer and more intense, with an average of 4 days increased length, 2.5 degrees increase in average heat intensity, and 4.3 degrees increase in peak heat intensity.⁽²³⁾ Increasing intensity of storms is also extremely likely due to the impacts of climate change.⁽¹⁰⁾

Higher intensity extreme weather events will increase impacts to the community, and hence there will be a need for greater capacity for response and recovery from extreme weather events.

Regional climate change adaptation plans across the state have identified the need for 'climate ready' buildings and places (e.g. Resilient East, Adapt West). These climate ready buildings and places will need to be designed considering the potential for extreme weather events to become more frequent and intense. The need for greater community understanding and resilience will become more significant when climate change impacts are considered.

Decisions about land use planning, assets and infrastructure need to consider how long the effect of each decision will be felt. For example, transport infrastructure may be designed to last for 40 to 50 years and hence the likelihood of hazards causing harm or loss must be considered for at least 50 years into the future. This then requires the consideration of how hazards may change in the future, in particular as a result of climate change.

Roles and responsibilities

Decision making in land use planning and building design and construction occurs from a State and national level relating to the Building Code and State legislation, through to the decision of individual land owners to undertake development.

The South Australian planning system identifies current responsibilities for local and state government relating to the development of planning policy and assessment of proposed development. Planning reform commenced with the introduction of the *Planning, Development and Infrastructure Act 2016* (the act) will see the development of the *Planning and Design Code* that will document the rules against which development is assessed, and the Design Standards for public realm and infrastructure. The act also requires the preparation of a climate change policy describing policies and principles to promote development that is resilient to climate change.

The Department for Environment and Water (DEW) is responsible for state-wide climate change policies and the delivery of climate change programs. A Government Action Plan for the Climate Change Adaptation Framework in South Australia was published in August 2012.⁽¹¹⁾ Strategy 4.2 of this Plan is to create climate resilient urban areas and address the needs of the most vulnerable members of the community. The Department of Infrastructure and Transport (DIT) (previously DPTI) are identified as the lead agency to undertake Action 4.2.1 to assess and address climate change impacts on South Australia's urban areas. Towards a Resilient State was published in 2018, which is the South Australian Government's Climate Change Adaptation Action Plan. Strategy 6 of the plan is to integrate climate change considerations into the instruments to be developed under the *Planning, Development and Infrastructure Act 2016*, DIT (DPTI) are identified as the lead agency to undertake this along with Strategy 7 Integrate climate smart building and urban design performance outcomes in planning instruments.

At an individual building scale, *the Building Code of Australia* provides performance requirements linked to hazard management and it is the responsibility of builders to ensure compliance. Home or property owners also have responsibilities to inform themselves about the hazards that may impact their assets and adopt appropriate risk mitigation.

Rationale

The need for greater community resilience and making our buildings, infrastructure and public realm more resilient to extreme weather will become increasingly important as climate change results in more frequent and intense extreme weather events. As hazard leader for extreme weather, SASES has responsibilities to provide a coordinated and consistent approach to mitigation, including commenting on matters that are relevant to these responsibilities relating to planning and development.

Application

In the role of Hazard Leader, SASES may be sought to provide informal comment on development plan amendments or development applications. SASES should review the need for and where appropriate seek confirmation that the impact of future climate conditions on the increasing frequency and intensity of extreme weather events has been considered.

SASES should advocate this policy through the development plan amendments process, the *Planning and Design Code* and the proposed *State Planning Policy on Climate Change*.

SASES Policy Statement #4

Development should not increase the risk from flooding on adjoining areas/land

Context

Living in a floodplain has an inherent risk, and the community and government need to recognise that all flood risk cannot be eliminated⁽⁹⁾. However across all levels of government it is identified that development should not increase the risk of flooding on adjoining land.

Increased flood risk may result from direct runoff, increased runoff as impervious areas increased, cut and fill, watercourse diversion, levees or changes in catchment land use. Land that is not identified as flood prone land (for example in a development plan) may become flood prone if development on adjoining land leads to an increase in the volume of water flowing off the development.

Roles and responsibilities

The South Australia State Emergency Management Plan (SEMP) identifies the Department for Environment and Water (DEW) as Hazard Leader for flooding. As Hazard Leader DEW are responsible for providing leadership in a coordinated and consistent manner to plan for, respond to and recover from flood events. SASES is the Control Agency for flooding and are responsible for directing and coordinating the response in an emergency situation.

Within the Hazards Module of the SA Planning Policy Library, objective 4 supports development that is located and designed to minimise the risks to safety and property from flooding. Further to this, principle 6(4) prevents development that will increase the risk of flooding on other land.

The function of a council under the *Local Government Act 1999* includes taking measures to protect its area from natural hazards (such as flooding) and to mitigate the effects of such hazards.⁽¹²⁾ Through its development plan a council can specify what can be undertaken on any piece of land, and the detailed criteria against which development applications will be assessed. Typically land prone to flooding is identified as a constraint to development within development plans. All development plans in South Australia refer to development on flood prone land (usually land inundated by a 100 year average return interval flood event) however some do not include development constraint maps that identify areas of flood risk.

Within the Building Code of Australia, there is a requirement to dispose of surface water (generated in a defined storm event) in a manner that avoids the likelihood of damage or nuisance to any other property.

Rationale

This policy is consistent with State Planning Policy and SASES' role in preventing extreme weather and flood events adversely impacting on community health and safety, homes, businesses and the State's infrastructure.

Application

SASES may be requested to provide informal comment on Development Plan Amendments (DPA) and Development Applications (DAs). The development plans identify flood prone land as land that is inundated in a 100 year average return interval flood event. There are many areas where smaller flood events may impact the community, homes, businesses or infrastructure and a property that is not identified as flood prone may become flood prone if development on adjoining land leads to an increase in the volume of water flowing off the development. When providing input on DPAs or DAs, the SASES should review the need for and where appropriate, seek confirmation that proposed development will not increase the risk of flooding on adjoining land whether or not it is within a designated flood prone area.

SASES should advocate this policy through the development plan amendments process and the *Planning and Design Code*.

SASES Policy Statement #5

Development should not increase the risk of landslip

Context

Landslip (mass movement) occurs on sloping ground where large slabs of the ground surface separate and slide downhill. Clearance of deep-rooted vegetation often contributes to landslip however excessive soil wetness and earthworks such as track or dam cutting are more frequently triggers for landslip events. The risk of landslip increases on nearly all slopes steeper than 30% once vegetation is cleared.⁽¹³⁾

Landslip has the potential to cause injury and death and property and infrastructure damage. Road closures can create secondary impacts on access and egress, potentially restricting emergency evacuation.

Land in South Australia (outside the Adelaide metropolitan area) with potential for landslip is identified in a spatial dataset maintained by the Department for Environment and Water (DEW).

Roles and responsibilities

Landslip is not identified as an emergency incident within the State Emergency Management Plan (SEMP) and hence does not have an associated control agency responsible. In recent years the SASES has received requests for emergency assistance associated with landslip, often associated with extreme heavy rainfall and storm events.

Landslip is identified as a hazard within the SA Planning Policy Library (SAPPL) Policies are included to restrict development including cut and fill, and prevent the risk of landslip increasing on the site or on surrounding land. Although the SAPPL identifies that landslip hazard overlays may be included as a development constraint, mapping is not included in many council areas where landslip potential is high (e.g. City of Onkaparinga, District Council of Yankalilla and Mount Remarkable Council).

The risk of landslip is exacerbated where woody vegetation is cleared from steep slopes. Clearance of native vegetation is regulated under the *Native Vegetation Act 1991* however clearance of non-native vegetation is not restricted unless the trees are regulated or significant under the *Planning, Development and Infrastructure Act 2016*.

Rationale

In many areas where landslip potential is high, council development plans do not contain hazard overlays that identify these areas. This makes it difficult for developers and planners to identify where landslip needs to be considered in the development application process. This policy is consistent with the SAPPL policy however its implementation may be hindered by a lack of hazard mapping within planning documents.

Application

In the role of Hazard Leader, the SASES may be sought to provide informal comment on development plan amendments or development applications.

SASES should advocate this policy through the development plan amendments process and the *Planning and Design Code*.

SASES Policy Statement #6

Development should not rely solely on flood levees or flood control dams for protection from flood inundation.

Context

Mitigating flood risk to existing development can be achieved by reducing the frequency of flood inundation by modifying flood behaviour and/or the flood plain, or by reducing the consequences of flooding by reducing the vulnerability of the community, homes, businesses and infrastructure. Flood mitigation programs generally rely on a variety of actions including physical works (e.g. flood control dams or levees), warnings and emergency response, planning and development controls and community engagement.

Levees are embankments or walls constructed along the course of a river or in coastal areas to prevent flood waters from inundating adjoining land. Although they prevent flooding, they also act to artificially contain watercourses which can lead to higher and faster flows. Levees are almost never designed to exclude the maximum probable flood level and hence are likely to overtop in extreme floods. They are usually constructed from soil or earth, meaning they are vulnerable to erosion and cracking, and require regular inspection and maintenance to maintain effective flood containment.

In South Australia, major levees have been constructed along a number of watercourses including the Gawler River, the lower reaches of the River Murray and along the coast near Port Augusta, Port Pirie and Whyalla.

Flood control dams hold back water that would otherwise reach the floodplain however for dams to have effective flood control, water levels must be sufficiently low to allow flows to be retained. In the Adelaide region, flood control dams have been constructed on a number of watercourses including Cobbler Creek, North Para River near Turretfield and the Sturt River. Other reservoirs and small dams constructed for the storage of water for supply provide a level of flood protection for downstream areas of the catchment.

Managing the Floodplain – A Guide to Best Practice in Flood Risk Management in Australia (AEMI Handbook 7⁽⁹⁾) is considered best practice in terms of flood management in Australia. The Handbook provides an outline of best practice and a framework for managing the flood threat to communities inhabiting floodplains in Australia and also discusses how to apply the information. It was developed with consideration to the National Strategy for Disaster Resilience and the findings of recent State and National Reviews following the multiple flood events of 2010 and 2011 that resulted in widespread flooding. The Handbook describes a range of measures through which flood risk can be mitigated, advocating an approach that is fit for purpose and meets community aspirations.

Roles and responsibilities

The South Australian planning system identifies current responsibilities for local and state government relating to the development of planning policy and assessment of proposed development. The SAPPL contains reference to levees in the coastal zone module however there is no reference to levees in the hazard module. Some development plans (e.g. Alexandrina Council) have specific requirements for levee construction associated with primary production land uses. The Gawler (CT) Development Plan however, advocates the avoidance of using levees for the protection of crops in flood prone areas. Within the Gawler Rivers Floodplain Area the development plan prevents the construction of privately owned levees for flood protection unless it can be demonstrated that the levee or floodwall does not increase the extent or hazard flood risk of land upstream or downstream.

The functions of a council under the *Local Government Act 1999* include taking measures to protect its area from natural hazards (such as flooding) and to mitigate the effects of such hazards, including providing infrastructure to protect people or assets from hazards.⁽¹²⁾

In the South East region, the significant drainage network is managed by the South Eastern Water Conservation and Drainage Board ⁽¹⁴⁾ in order to prevent or minimise damage caused by flooding the South East.

Ongoing community education is required to ensure that the population is aware of the risk of levee overtopping and associated emergency management plans, and does not lapse into the common belief that a levee or dam provide protection against all floods. Both DEW and SASES, (as the Hazard Leader and Control Agency) and local government are responsible for community engagement and education in relation to the risk of flooding.

Rationale

Levees can form part of an effective flood risk reduction strategy however levees can fail, no levee is flood proof and no two floods are the same. While flood control dams provide a greater security of protection from flood waters, they are also not flood proof and successive heavy flows can reduce the capacity to provide flood protection. For these reasons, development should not solely rely on flood levees or flood control dams for protection from flood inundation.

Application

In the role of Hazard Leader, SASES may be sought to provide comment on development plan amendments (DPAs) or development applications (DAs). Development plans in general identify flood prone land and identify constraints and risk mitigation measures where development is proposed on flood prone land. When providing input on DPAs or DAs, the SASES should review the need for and where appropriate advocate where development requires flood protection. This should include a range of measures to reduce flood frequency and consequences and not rely on flood levees or flood control dams for protection. The individual circumstances of each DPA or DA should be considered as there is no universal solution to flood mitigation.

SASES should advocate this policy through the development plan amendments process and the *Planning and Design Code*.

SASES Policy Statement #7

New dam approval should require applicants to consider the potential consequences of dam failure

Context

Dams may be constructed to provide stock, irrigation or fire water supply or may be constructed for flood control purposes. Dam failure refers to the failure to meet design objectives and may not be associated with the collapse of a dam. Failure may include leakage or erosion or the inability of a dam to retain water as designed. It may lead to a sudden release of water with the potential to cause injury, loss of life or damage to land, assets (including the natural environment) or infrastructure.

The Australian National Committee on Large Dams (ANCOLD) have prepared guidelines applicable to dams with the potential to cause loss of life or serious environmental or physical damage if failure occurs⁽¹⁵⁾. Although not prepared for small dams, the guidelines can be used to assist with decision on small dams. The Victorian State Government has also released guideline documents to minimise the potential for risk from the construction and maintenance of dams⁽¹⁶⁾. In other States in Australia, large dams or those with the potential to cause significant damage if they fail need to have a Dam Safety Emergency Plan. This is not currently required in South Australia.

Roles and responsibilities

The construction, enlargement or modification of a dam in South Australia is identified in the *Natural Resources Management Act 2004* as a water affecting activity⁽¹⁷⁾. Most Natural Resource Management (NRM) Regional Strategic Plans identify principles for water affecting structures such as dams are designed, constructed and managed in a manner to minimise the risk of structure failure and to ensure flood risk is not increased upstream or downstream of a dam. In most NRM regions, a permit from the relevant NRM Board or local council development approval may be required. Permit applications are assessed against the principles or requirements of the relevant NRM strategic plans.

Generally larger dams or those in prescribed surface water areas require a permit. The permit requires engineering drawings and calculation sheets to be provided that include flood flow estimates, spill way design (including flood capacity) and earthworks design. The permit also requires the identification of environmental risks associated with the construction of the dam however the permit forms do not require applicants to address specific requirements for consideration of the risks associated with dam failure.

A dam becomes “development” and requires approval under the *Development Act 1993* where it involves the excavation or filling of land for the purposes of a dam -

- (a) where a levee or mound with a finished height greater than 3 metres above the natural surface of the ground is to be formed; or
- (b) where a retaining wall which retains a difference in ground levels exceeding 1 metre is to be used or formed; or
- (c) where the dam is in the Hills Face Zone, in a Watercourse Zone, Flood Zone or Flood Plain delineated by the relevant development plan, or in any other zone or area shown as being subject to flooding or inundation in the relevant development plan; or
- (d) where the dam is to have a capacity exceeding 5 megalitres.⁽¹⁸⁾

However the construction, alteration or removal of a dam on land used for farming purposes, except where the dam is of masonry construction is considered to be complying in terms of building rules consent.⁽¹⁹⁾ In effect, this means that for the dams prescribed above, development plan consent is required, but the dam is not assessed (apart from where of masonry construction) for adherence to any building standards.

The SA Planning Policy Library contains a limited number of policies in relation to dams, with most appearing to have a focus on potential environmental impacts arising from dam construction, rather than on the dam itself.

Should a dam fail, its owners may be held legally liable for all associated damage.

Rationale

There is currently no requirement for applicants to consider dam safety as part of the approval process and dam construction is generally not assessed for compliance with any building standards. There is also no requirement for dam safety management plans as required elsewhere in Australia. As Hazard Leader for extreme weather and control agency for flooding, SASES has a role in ensuring development such as dam construction is subject to an assessment of the level of risk to life, safety, health and property from extreme weather and flood events. The SASES and DEW as the Flood Hazard Leader, have developed the *Private Dam Maintenance and Management in Emergencies Guidelines* (2018) which are intended to assist dam owners and emergency responders better prevent and respond to potential dam safety incidents.

Application

It is not anticipated that SASES will be asked to comment on individual applications for dam construction. Subsequently SASES should advocate to DEW and DIT (DPTI) for dam approvals to require consideration of the potential consequences of dam failure. Dam owners not only have access to the Guidelines, but can also conduct a Rapid Risk Assessment (RRA) to determine any potential risks.

SASES Policy Statement #8

Hazardous materials should be stored and located to minimise the risk of escape during extreme weather or flood events.

Context

Hazardous materials include dangerous goods that pose an immediate physical or chemical hazard, such as fire, explosion, corrosion and toxicity that may affect life, health, property or the environment as well as substances that have the potential to cause immediate or long term health effects. Hazardous materials may include poisons, substances that cause burns or skin and eye irritation, and substances that may cause cancer, explosives, flammable liquids and gases, corrosives, chemically reactive or acutely (highly) toxic substances.

Roles and responsibilities

Hazardous materials are covered by a number of separate regulations, standards and codes. The South Australian *Dangerous Substances Act 1979* and *Dangerous Substances Regulations 2002* set out requirements regulating the keeping and transport of dangerous substances identified in the regulations as those on the dangerous goods list published in the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code Ed 7.7 (2020)).

A number of Australian Standards also apply to the storage and handling of hazardous materials including AS 1940:2004: The Storage and Handling of Flammable and Combustible Liquids (and subsequent 2 amendments) and AS 3780:2008: The Storage and Handling of Corrosive Substances (and subsequent amendment). There are also a number of relevant codes of practice including the National Code of Practice for the Storage and Handling of Workplace Dangerous Goods [NOHSC: 2017 (2001)] and the Model Code of Practice – Managing Risks of Hazardous Chemicals in the Workplace (Safe Work Australia, 2020).

Within the Hazards section of the SA Planning Policy Library, objective 10 and a number of principles of development control describe the need to store and contain hazardous materials in a manner that minimise the risk to public health and safety and the potential for contamination.

To minimise the risk of environmental harm, the Environmental Protection Authority (EPA) have published a number of codes of practise for activities that have the risk of releasing hazardous materials to the environment including wastewater systems, intensive agriculture and milking shed effluent, and guidelines for bunding and spill management.

The escape of hazardous materials is a listed hazard under the SEMP with SafeWork SA identified as the Hazard Leader. The SACFS and SAMFS are identified as the Control Agencies for hazardous or dangerous materials emergencies.

Rationale

Although SASES does not have legislated responsibilities relating to the management of dangerous goods or hazardous substances, extreme weather or flood can lead to conditions that can increase the risk of accidental escape of dangerous goods or hazardous substances and subsequent risk to people, property or the environment.

Extreme storm (wind, hail or heavy rain) has the potential to damage buildings used for storage, flood waters can inundate storage areas and heavy rains may fill a bund reducing the effective volume for spill storage. Combustible substances may be more likely to ignite at higher temperatures. During extreme heat, cooled storage areas may be impacted by electricity supply disruptions.

SASES advocate the use of a risk based approach to assess the potential impact of hazardous material escape associated with extreme weather or flood.

Application

This policy applies to all activities where hazardous materials are used, produced or generated either as an input, direct product, waste or by-product. Hazardous materials are frequently associated with industrial land uses and when a development plan amendment or development application identifying industrial land use is referred, the SASES should review the need for and where appropriate seek confirmation that provisions are included that address the safe storage of hazardous materials.

SASES Policy Statement #9

Road provision should provide adequate access and egress to development during an extreme weather or flood event. Proposed development should not impede or block access and egress routes of existing developments

Context

In the event of extreme weather or flooding, emergency services may be required to provide support, assistance, rescue or evacuation. Road access to development means enabling vehicle approach and access. Egress enables safe evacuation from an emergency.

Each year SASES receives thousands of requests for emergency assistance. Without a well-designed and maintained road network, operational staff and volunteers may not be able to access those in need.

The road network in South Australia is maintained by both State Government (for arterial roads) and Councils (for local roads). In many regional areas of the State, unsealed local roads provide the only access and egress to properties and following heavy rainfall and storm events, roads and associated bridges and culverts are sensitive to damage from erosion. Fallen trees and standing water can lead to temporary road closures.

Roles and responsibilities

The design and construction of roads and road infrastructure is guided by a range of DPTI standards based on the Austroads Guides.⁽²⁰⁾ These standards describe the design, construction, maintenance and operation of the road network.

The South Australian planning system identifies responsibilities for local and State government relating to the development of planning policy and assessment of proposed development. The South Australian Planning Policy Library contains a number of principles relating to provision of access for emergency vehicles within the Coastal Areas, Hazards and Land Division Modules. Within the Hazard Module, Principle 15 requires vehicle access and driveways created by land division to be designed and constructed to facilitate safe and effective operational use for fire-fighting and other emergency vehicles and residents.

Volume 1 of the *Building Code of Australia* describes requirements for building access and egress including requirements to allow safe evacuation from buildings. For non-residential buildings, the *Australian Standard AS 3745-2010 Planning for Emergencies in Facilities* provides guidance on evacuation procedures. The Australian Standard, AS 1428-2010 *Design for Access and Mobility* series provides standards for disabled access.

Road maintenance is the responsibility of the road owner, i.e. private owner or local or state governments.

Rationale

SASES operations including emergency response require the provision of a safe and functional road network. Maintenance of existing roads is required to enable provision of access and egress, particularly after extreme weather and flood events. The design and construction of new roads needs to consider the current and future impacts of extreme weather and floods and ensure that access and egress to existing development is not impeded.

Application

This policy applies to the design and construction of new roads as well as the maintenance of existing roads.

In the role of Hazard Leader, SASES may be sought to provide comment on development plan amendments (DPAs) or development applications (DAs). When providing input on DPAs or DAs, SASES should review the need for and where appropriate seek confirmation that proposed development will not impede or block access and egress to existing development.

SASES should advocate this policy through the development plan amendments process and the *Planning and Design Code*.

SASES Policy Statement #10

Buildings, streetscapes and neighbourhoods should be designed to enable safe evacuation

Context

In the event of an emergency, evacuation may be required to move people from a dangerous or potentially dangerous location to a safer location. Natural hazards such as flood, storm and bushfire may create conditions that lead to recommendations or requirements for evacuation and under the *Fire and Emergency Services Act 2005* emergency response workers from SASES, SACFS or SAMFS are given powers to force evacuations. Emergency evacuations can range in scale from the removal of people from a house as a result of house fire or storm emergencies, to the large scale evacuation of people from a neighbourhood or suburb to avoid a bushfire, flood or storm.

Successful emergency evacuation requires the safe and efficient movement of people, and the time required to move people to safety can be influenced by the number of people residing or visiting the area and the design and capacity of transport networks. Depending on the emergency and location, evacuation may be required by driving, riding or walking. Potential evacuation requirements differ between emergencies, with evacuation from flood inundation often more easily predicted than those from storms or bushfire.

Roles and Responsibilities

The development of buildings, streetscapes and neighbourhoods is guided by the State planning system and in particular the SA Planning Policy Library (SAPPL). Within the SAPPL there are number references to the design of streetscapes and neighbourhoods that enable emergency vehicle access and public safety however there are no references to evacuation requirements.

The LGA's *Public Realm Urban Design Guidelines* (2014) describe a number of design principles to guide councils in the design of development that affects the public realm (i.e. streets, parks, green spaces and outdoor places). Whilst there are a number of principles relating to public safety, traffic safety, property safety and personal security, there is no reference to evacuation within the document.

The *National Construction Code* (NCC) requires buildings to be provided with means of evacuation which allow occupants time to evacuate safely without being overcome by the effects of an emergency. *The Development Act 1992* requires development to be certified as complying with the NCC. In addition to these requirements, building owners and occupiers have legal responsibilities to ensure the safety of occupants through the Essential Safety Provisions contained within the *Development Regulations* (1993).

Rationale

The design and layout of buildings, streetscapes and neighbourhoods can influence the effectiveness and safety of evacuation in the event of an emergency. It is important that those with responsibilities for the design, development and management of the buildings, streetscapes and neighbourhoods consider the safe evacuation of residents and visitors. This will make it easier for the SASES to provide safe and effective evacuations when required.

Application

With legislated powers to force evacuation, SASES should be advocating any approach that seeks to improve the safety and efficiency of evacuation.

In the role of Hazard Leader, SASES may be sought to provide comment on development plan amendments (DPAs) or development applications (DAs). When providing input on DPAs or DAs, SASES should review the need for and where appropriate seek confirmation that evacuation requirements have been considered in the design of neighbourhoods and streetscapes.

SASES should advocate this policy through the development plan amendments process, the *Planning and Design Code* and for evacuation to be included as a design principle in documents such as the *Public Realm Urban Design Guidelines*.

SASES Policy Statement #11

Building and infrastructure design and construction should be structurally adequate to withstand expected depth and velocity of flood flow, maximum probable wind speeds, hail loading and extreme heat

Context

The design and construction of buildings and infrastructure takes into account a period of time over which the asset should function effectively and provide the required service. Design processes subsequently take into account potential sources of failure including hazards that may affect effective function, such as flooding, extreme weather such as wind and hail, and heat.

Modelling and research indicates extreme weather events are and will continue to increase in frequency and intensity. Substantial increases in the frequency of hot days, maximum temperatures and the duration of heatwaves are projected with very high confidence across all of South Australia. Although average annual rainfall is projected to decline, there is high confidence that heavy rainfall intensity is projected to increase across all of South Australia⁽²¹⁾. New buildings and infrastructure will need to consider these projections during the design process.

Roles and responsibilities

The structural adequacy of buildings is largely dealt with under various requirements of the National Construction Code. Structural provisions of the BCA require a building or structure to perform adequately even under (reasonably expected) conditions including hazards such as wind, earthquake, rainwater and thermal effects. Specific requirements relate to the construction of buildings in defined flood hazard areas.

Understanding historic and potential future extreme weather events is required for design processes to adequately incorporate 'reasonably expected' conditions. In particular, flood hazard mapping including flood depth and flow velocity and wind hazard mapping need to be readily available to inform the design process.

Infrastructure design and construction is governed by a range of standards and guidelines at Federal, State and local levels including Australian Standards and departmental design standards. These standards may refer to hazards including design rainfall events or design wind speeds.

Within the South Australian Planning Policy Library there are a number of policy objectives within the Coastal Areas and Hazards modules that refer to the protection of development from the risk of natural hazards. Many of the objectives and principles relate to the location of development however there are also a number that refer to the design and construction of buildings. Principle 2 requires development located on identified hazard prone land to be designed with appropriate precautions being taken against the relevant hazards.

There are few guidelines requiring buildings and infrastructure to consider the impact of extreme heat in structural design or construction. Historically rail transport infrastructure has been vulnerable to extreme heat with many tracks closed due to buckling however in recent years significant investment has been made in rail track upgrades across the State including replacing timber sleepers with concrete sleepers which prevent buckling.

Rationale

During extreme weather events, damage to buildings and infrastructure can occur as a result of heavy wind, rain or hail. SASES receives hundreds of requests for assistance as a result of building impacts or collapse as a result of extreme weather.

Application

The SASES will advocate for the preparation of and distribution of hazard mapping data to allow building design and construction to appropriately consider reasonably expected conditions.

In the role of hazard leader, SASES may be sought to provide comment on Development applications (DAs). When providing input, SASES should review the need for and where appropriate seek confirmation that building and/or infrastructure design and construction has considered the expected depth and velocity of flood flow, maximum probable wind speeds, hail loading and extreme heat.

SASES should advocate this policy through the development plan amendments process and the *Planning and Design Code*.

SASES Policy Statement #12

Residential buildings should be designed and constructed to minimise heat and cold stress and provide year-round thermal comfort while reducing reliance on artificial heating and cooling

Context

People with vulnerabilities including the aged, children, ill and people with disabilities have an increased risk of adverse health impacts from both extreme heat and cold conditions.

Thermal comfort is influenced by both psychological and physiological components that must be met to feel comfortable and is influenced by temperature, humidity, air movement and exposure to sources of heat or cold. Heat stress can occur when an individual's core temperature rises above 38°C, and cold stress when core temperature falls below 35°C.

Research has found that having air conditioning in bedrooms lowers the risk of mortality [\(22\)](#) and heat-related hospitalisation [\(23\)](#) during heat wave events. As well as reducing the risk of mortality and hospitalisation, maintaining thermal comfort within houses can reduce mental health and heat related illness and improve mental well-being.

Climate change modelling projects predict increases in the frequency and intensity of extreme heat and hot days which is likely to result in increased risk to community health and safety, particularly for people with vulnerabilities.

Roles and Responsibilities

As the hazard leader for extreme weather (including extreme heat) SASES is responsible for providing leadership in a coordinated and consistent manner to plan for, respond to and recover from hazards associated with extreme heat. Subsequently SASES has a role to play in advocating that new buildings be designed to maximise thermal comfort.

Within the Energy Efficiency section of the SA Planning Policy Library, the objectives and principles encourage development to be designed and sited to conserve energy, with reference to solar access for natural light. The City of Adelaide Development Plan takes this a step further, identifying that buildings should provide adequate thermal comfort for occupants and minimise the need for energy use for heating and cooling by allowing for natural cross-ventilation to reduce internal temperatures in summer, locating and treating windows to reduce summer heat loads and using landscaping.

The *Planning Development and Infrastructure Act 2016* will see the preparation of a climate change policy describing policies and principles to promote development that is resilient to climate change. It is recommended that the SASES advocate that residential building thermal comfort be included in this policy.

The National Construction Code (NCC) describes all construction requirements for residential buildings. The three volumes of the NCC include requirements for access and egress, energy efficiency, sustainability and health and amenity. Volume One and Volume Two of the NCC comprise the Building Code of Australia (BCA). *The Development Act 1992* requires development to be certified as complying with the NCC and all new homes built must meet the minimum energy efficiency requirements prescribed in the BCA.

The Nationwide House Energy Rating Scheme (NatHERS) provides a measure to estimate a home's potential heating and cooling requirements. The objective of NatHERS is to help make Australian homes more comfortable for their inhabitants by calculating how the local climate heats and cools a house. Requirements for artificial heating and cooling to maintain comfort levels is calculated and a star rating applied based on these requirements. In South Australia, an energy requirement of at least 6-stars is required for most new homes. The maximum 10 star rating means that no artificial heating and only minimal cooling is required. Some developments in South Australia (e.g. Bowden and Tonsley) are requiring residential buildings to exceed the 6 star rating.

Rationale

Although SASES does not have legislated responsibilities relating to the design or construction of residential buildings, there is great potential for improving health outcomes through the provision of housing that provides adequate thermal comfort.

SASES advocates residential buildings be designed to minimise heat and cold stress and provide year-round thermal comfort while reducing reliance on artificial heating and cooling and encourages the development of residential buildings that exceed the 6 star energy rating.

Application

This policy applies to the design and construction of all residential buildings, including multi-level apartments, public and affordable housing.

In the role of hazard leader, SASES may be sought to provide comment on development plan amendments (DPAs) or development applications (DAs). When providing input on DPAs or DAs, SASES should review the need for and seek confirmation that residential buildings will be designed and constructed to minimise heat and cold stress and provide year-round thermal comfort.

SASES should advocate this policy through the development plan amendments process and the *Planning and Design Code*.

SASES Policy Statement #13

Buildings, infrastructure, streetscapes and neighbourhoods should be designed to mitigate the impacts of extreme heat, including through the installation of green infrastructure.

Context

Extreme heat events impact on the physical health of people throughout the state. Direct heat related illnesses include heat cramps and heat stroke, and extreme heat also triggers or exacerbates pre-existing medical conditions, causing higher rates of conditions such as heart attacks and renal failure.⁽²⁴⁾ In particular, people with vulnerabilities including the aged, children, people with chronic illness or disabilities are particularly at risk of adverse health impacts.

In urban areas, higher temperatures than regional areas are often experienced as heat is produced and retained by hard surfaces and structures such as roads, paving and windows.

Green infrastructure is the strategically planned network of green spaces and environmental or water management features that deliver a wide range of environmental, economic and social benefits including provision of clean water and clean air, more attractive and greener cooler cities, mitigation of urban heat island effects and improved wildlife habitat and biodiversity. It can mitigate extreme heat by shading hot surfaces, increase evapotranspirative cooling and modifying local scale wind patterns. Green infrastructure features can operate and provide benefits at small scales such as living walls, roof gardens and pathways and larger scales such as parks and reserves, transport corridors, water sensitive urban design features such as swales and rain gardens, watercourses and wetlands.

Modelling outputs project substantial increases in the frequency of hot days, maximum temperatures and the duration of heatwaves across all of South Australia.⁽²⁵⁾ Regional climate change adaptation plans across the state have identified the need for 'climate ready' buildings and places that include green infrastructure to mitigate high urban temperatures.

Roles and responsibilities

As the Hazard Leader for extreme weather (including extreme heat) SASES is responsible for providing leadership in a coordinated and consistent manner to plan for, respond to and recover from hazards associated with extreme heat. Subsequently SASES has a role to play in advocating that buildings, infrastructure, streetscapes and neighbourhoods are designed to mitigate the impacts of extreme heat.

The *Draft 30 Year Plan for Greater Adelaide - Update 2016* (part of the Planning Strategy) contains a number of policies to mitigate against and adapt to a changing climate and extreme heat. In particular Policy 102 aims to promote green roofs, water sensitive urban design techniques and other appropriate green infrastructure in higher density and mixed-use development to assist with urban cooling. Policy 116 aims to mitigate the impact of extreme heat events by designing development to create cooler communities through the use of green infrastructure.

Principle 12 of the Residential Development Module of the South Australian Planning Policy Library, promotes the provision of private open space to reduce urban heat loading. There are also principles within the landscaping module to minimise hard paved surfaces to minimise heat absorption and reflection and within the transport module to including landscaping within vehicle parking areas to reduce heat loads in summer.

The State Water Sensitive Urban Design (WSUD) Policy⁽²⁶⁾ outlines aims, objectives and targets for WSUD and describes techniques that can be included in large and small scale development. While the objectives of WSUD relate to the conservation of water and management of runoff quality and quantity, the benefits extend to improving urban amenity and ameliorating urban heat island effects.

Within the Building Code of Australia, requirements for energy efficiency are described. The provision of green infrastructure could assist in meeting energy efficiency requirements however are not required.

Rationale

With climate modelling projecting an increase in the number of hot days, and increasing frequency and intensity of extreme heat events, the importance of incorporating green infrastructure is increasingly important. Reducing urban heat will have positive outcomes for community health and wellbeing.

Application

In the role of Hazard Leader, SASES may be sought to provide comment on development plan amendments (DPAs) or development applications (DAs). When providing input on DPAs or DAs, SASES should review the need for and where appropriate seek confirmation that the proposed design aims to mitigate the effects of extreme heat, and should advocate the inclusion of green infrastructure.

SASES should advocate this policy through input to the development of the Planning and Design Code and for green infrastructure to be included as a design principle in documents such as the *Public Realm Urban Design Guidelines*.

Glossary

The following abbreviations and terms are used within this document.

Term	Description
Development	Any building work, change in land use, construction or alteration or any act or activity defined as development in the <i>Development Act 1993 (SA)</i> or associated regulations.
Extreme weather	For the purposes of this policy, extreme weather includes extreme heat and extreme storm.
Extreme heat	An extended period of very high temperatures, which is related but not confined to heatwave conditions.
Extreme storm	Heavy rainfall conducive to flash flooding (in excess of 30 mm/h), damaging wind (average of 63 km/h or greater, or gusts of 90 km/h or greater) and/or damaging hailstones (2 cm in diameter or greater).
Flood	The covering of normally dry land by water that has escaped or been released from the normal confines of: <ul style="list-style-type: none">• Any lake, river, creek or other natural water course, whether or not altered or modified• Any reservoir, canal or dam• Coastal or marine waters on to land• Pipes, dams, levees or other infrastructure due to structural failure, operations, malfunction, accident or other reasons.
Hazard	A source of potential harm, or a situation with a potential to cause loss.

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