





VULNERABILITY ASSESSMENT TABLE

Roofed buildings

This table highlights some of the ways ‘roofed buildings’ (e.g. including buildings from the nineteenth and early twentieth centuries and post-Second World War) may be vulnerable to the effects of climate change. It is not intended to be comprehensive and the examples of possible management approaches will not be appropriate in all cases. Qualified and experienced heritage specialists should be consulted in undertaking any climate vulnerability or risk assessment of your place.





EXPOSURE — GENERAL

Climate change variables	Key climate change impacts	Sensitivity of the place to climate change impacts	Examples of impacts on the place and its values	Examples of possible management approaches
 <p>Change in seasonal rainfall (chronic)</p>	<p>Increase in rainfall events and their intensity leading to increased frequency and intensity of flooding, erosion and soil degradation</p>	<p>Increased frequency and intensity of flooding leading to more frequent and prolonged saturation of foundations and exposed walls and erosion of soils</p>	<ul style="list-style-type: none"> Types of material (e.g. wood, metal, stone, brick, mortar cement, fibro) will be affected differently by more prolonged and frequent saturation; design and construction techniques will influence the nature and extent of impacts Increased water erosion and movement of soils may destabilise structures causing cracking and potential collapse, with associated loss of use 	<ul style="list-style-type: none"> Floods: build defences against flash flooding (e.g. divert water) and reinforce foundations to avoid collapse in a flood Re-engineer drainage Consider water attenuation away from the building Monitor erosion and increase maintenance and repair regime
 <p>Increase in mean temperature</p>	<p>Increased frequency, duration and intensity of drought events</p>	<p>Loss of ground cover, drying and cracking of soils, and wind erosion</p>	<ul style="list-style-type: none"> Drying, cracking or movement of soils may affect the stability of structures Types of material (e.g. wood, metal, stone, brick, mortar cement, fibro) will be affected differently by increasing dryness; design and construction techniques will influence the nature and extent of impacts 	<ul style="list-style-type: none"> Monitor cracking and increase maintenance and repair regime to ensure structural integrity Maintenance of roofs, rainwater and drainage infrastructure





EXPOSURE — GENERAL *continued*

Climate change variables	Key climate change impacts	Sensitivity of the place to climate change impacts	Examples of impacts on the place and its values	Examples of possible management approaches
 <p>More hotter days (>35°C and >40°C)</p>	<p>Increased frequency and intensity of bushfires</p>	<p>Directly related to proximity and/or connectively to bush</p>	<ul style="list-style-type: none"> ○ Types of material and construction will be affected differently by fire ○ Increased erosion following a bushfire event may affect the stability of structures ○ Access routes may be damaged ○ The setting of the building may be impacted 	<ul style="list-style-type: none"> ○ Bushfire planning ○ Retreat: plan for site recording and accept loss or relocation of site where feasible, in consultation with local community ○ Ensure there is a vegetation maintenance regime ○ Add defences where possible, such as sprinklers or wrapping against ember attack ○ Undertake post-bushfire risk assessment for cumulative impacts (water run-off and erosion) ○ Undertake post-bushfire remediation action including tree felling, vegetation clearance, firebreaks and grading ○ Install natural ventilation dampers to eliminate smoke penetration
	<p>Heatwaves and extreme temperatures</p>	<p>Construction materials and techniques will be affected differently by heat and soils will be susceptible to drying and cracking</p>	<ul style="list-style-type: none"> ○ Impacts will vary for different types of materials (wood, metal, stone, brick, mortar cement, fibro) ○ Drying, cracking and movement of soils may affect the stability of structures 	<ul style="list-style-type: none"> ○ Monitor cracking and increase maintenance and repair regime to ensure structural integrity ○ Improve ventilation potential where possible without impact to significant fabric
 <p>More extreme rainfall events (acute)</p>	<p>Flooding, erosion and landslips</p>	<p>Depends on terrain (local conditions)</p>	<ul style="list-style-type: none"> ○ Structural damage or collapse and damage to access routes 	<ul style="list-style-type: none"> ○ Floods: build defences against flash flooding (divert water) and reinforce foundations to avoid collapse in a flood ○ Retreat: plan for site recording and accept loss or relocation of site where feasible in consultation with local community




EXPOSURE — COASTAL

Climate change variables	Key climate change impacts	Sensitivity of the place to climate change impacts	Examples of impacts on the place and its values	Examples of possible management approaches
 <p>Sea-level rise</p>	<p>Worsened coastal flooding, storm surge and coastal erosion that over time can result in permanent inundation of low-lying areas</p>	<p>Depends on terrain and potential defences (e.g. sea wall) – refer to local information</p>	<ul style="list-style-type: none"> ○ Potential for inundation and flooding with damage to and destruction of buildings; depending on the elevation of the building; this may be intermittent during high tide and storm surge events (acute) and eventually permanent ○ The setting of the building may be impacted ○ Salt water may affect construction materials in different ways 	<ul style="list-style-type: none"> ○ Retreat: plan for site recording and accept loss or relocation of site where feasible, in consultation with local community ○ Protect: add barriers/diversions where possible ○ Consider early nature-based solutions such as revegetation of mobile coastal dunes
 <p>More intense or more frequent storms</p>	<p>Coastal erosion impacts</p>	<p>Depends on terrain and potential defences (e.g. sea wall) – refer to local information</p>	<ul style="list-style-type: none"> ○ Potential for storm damage or destruction of buildings (or parts) during storms and through coastal erosion caused by individual and recurring storm events 	<ul style="list-style-type: none"> ○ Increase maintenance and structural integrity regime ○ Increase rainwater management and drainage




EXPOSURE — URBAN

Climate change variables	Key climate change impacts	Sensitivity of the place to climate change impacts	Examples of impacts on the place and its values	Examples of possible management approaches
 More hotter days	Heat island effect in urban areas can increase local temperatures by several degrees compared to nearby rural areas	Local 'urban heat island' mapping determines specific micro-climate risks	<ul style="list-style-type: none"> Heat stress: types of building material materials will be affected differently by heat; the nature and extent of impacts will depend on the design of the building and the construction techniques used 	<ul style="list-style-type: none"> Increase shading (integrated planning) Increase monitoring and repairs regime Increase ventilation Consider thermal gain through windows, walls and roofs, retrofitting glazing and insulating building
	Flash flooding	Depends on the condition of the structure and surrounding terrain and drainage system	<ul style="list-style-type: none"> Direct impact on the fabric of the structure Pressure on house gutters and drainage with increased potential for flooding of roofed structures 	<ul style="list-style-type: none"> Increase monitoring, repair and/or upgrading of gutters, drains and stormwater infrastructure



EXPOSURE — ALPINE

Climate change variables	Key climate change impacts	Sensitivity of the place to climate change impacts	Examples of impacts on the place and its values	Examples of possible management approaches
 Higher daily minimum temperatures and changes in precipitation	Changed freeze-thaw cycles, reduced snow cover and fewer cold days	Water run-off and changing drainage patterns	<ul style="list-style-type: none"> Types of materials may be affected differently 	<ul style="list-style-type: none"> Monitor erosion and increase maintenance and repair regime

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