

Adapting to Climate Change

## Green infrastructure

Green infrastructure planning increasing connectivity, multifunctionality, and landscape performance in the built environment





## Green Infrastructure & Landscape Principles

The Australian Landscape Principles provide a strategic decision-making framework for green infrastructure planning, design and management within our cities and settlements.

They outline how integrated approaches for managing landscape value within the built environment can leverage existing resources and enhance design responses to broader challenges of urban sustainability and climate change adaptation.

[www.aila.org.au/landscapeprinciples](http://www.aila.org.au/landscapeprinciples)

# Addressing the Landscape Principles

## 1. value our landscape

Articulate the central function of landscape within the urban ecosystem, and *develop collaborative policy and planning strategies for valuing, measuring and monitoring urban landscape performance* within the context of an integrated “green infrastructure” framework.

## 2. protect, enhance, regenerate

Green infrastructure planning and management approaches should *incorporate innovative, measurable strategies to:*

- **Protect and reconnect** existing environmental features and ecosystem processes.
- **Enhance** existing natural resources in a creative, sustainable manner.
- **Regenerate** lost or damaged ecosystem services.

## 3. design with respect

Green infrastructure within the urban environment should:

- *Be planned and managed with regard to existing community values and expectations,*
- *Be measurably responsive* to existing environmental, socio-cultural and economic conditions,
- *Demonstrate respect* for local, regional and global context.

## 4. design for the future

Green infrastructure policy, design and management approaches should *adopt decision-making processes which increase resilience* within our built environments.

Improving the capacity of the urban fabric to adapt and respond to the possibility of future change enhances environmental, socio-cultural and economic outcomes for future generations.

## 5. embrace responsive design

Green infrastructure policy, design and *management approaches should be consistently innovative, adaptable and responsive*, continuously re-evaluating assumptions and values and adjusting to demographic and environmental change.



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“There is an urgent need to develop new design and management solutions for our built environments which increase their capacity to adapt and respond to change...”



## Key concepts of Green Infrastructure:

connectivity, multifunctionality, landscape performance

## About Green Infrastructure

The term ‘green infrastructure’ describes the network of natural landscape assets which underpin the economic, socio-cultural and environmental functionality of our cities and towns—i.e. the green spaces and water systems which intersperse, connect and provide vital life support for humans and other species within our urban environments.

Individual components of this environmental network are sometimes referred to as ‘green infrastructure assets’, and these occur across a range of landscape scales—from residential gardens to local parks and housing estates, streetscapes and highway verges, services and communications corridors, waterways and regional recreation areas etc.

## The value of Green Infrastructure

Human settlements are complex, evolving social-ecological systems which are dependent on the health of their associated natural environments for ongoing sustainability.

Our cities and towns are currently the focus of intensive efforts to reduce resource use and maximise efficiency, in response to escalating social, environmental and economic pressures from global development, urbanization, population growth and climate change.

How green infrastructure assets are managed, at both local and regional scales, can significantly influence the effectiveness of our responses to such challenges.

**Green infrastructure is fundamentally different from other aspects of built infrastructure, in that it has the unique, inherent capacity to enhance and regenerate natural resources, rather than simply minimise the damage to environmental systems.**

When existing landscape assets are strategically connected and managed in an integrated manner within and beyond settlement boundaries, this regenerative capacity increases exponentially.

## The Challenge

There is an urgent need to develop new design and management solutions for our built environments which increase their capacity to adapt and respond to change, including strategies which aim to proactively leverage landscape performance.

Green infrastructure strategies provide a framework for more holistic planning, design and monitoring of the complex interactions between the (non-regenerative) built form and the environment within which it is situated—in order to enhance the performance of both, and to enable human settlements to function as integral components of larger landscape processes affecting energy, water, carbon and biodiversity.

## Green Infrastructure and Landscape Performance

The key to better management of landscape value in cities and settlements lies in understanding how *integrated green infrastructure planning strategies can enhance overall urban ecosystem functionality*, and contribute positively to broader landscape processes affecting air and water quality, energy use and biodiversity.

- 1. ECOSYSTEMS SERVICES PROVISION:** Green infrastructure approaches enhance urban ecosystem functionality and improve landscape performance at local and regional scales via increasing capacity for provision of ecosystem services.
- 2. PHYSICAL ASPECTS OF GREEN INFRASTRUCTURE:** Geology, soils, vegetation, water and biodiversity all impact on urban landscape performance potential at local and regional scales, functioning as integrated components of broader landscape processes to deliver ecosystem services—and improving urban landscape connectivity exponentially compounds landscape performance potential.
- 3. CULTURAL COMPONENTS OF GREEN INFRASTRUCTURE:** Access to and interaction with the natural environment impacts on human physical, social and cultural needs at local and regional scales—and landscape quality directly impacts on human performance, health and well-being.
- 4. CLIMATE CHANGE ADAPTATION AND MITIGATION:** Green infrastructure planning and management approaches within the urban environment enhance the effectiveness of responses to climate change at local and regional scales.



...integrated green infrastructure planning strategies can enhance overall urban ecosystem functionality...



## BENEFITS OF CLIMATE CHANGE ADAPTATION AND MITIGATION

### Integrated Soil Management:

- Greenhouse gas reduction via carbon sequestration
- Biodiversity enhancement
- Food production capacity
- Water quality improvement

### Integrated Vegetation Management (including urban forests):

- UHI effect moderation—impacts on water and energy use, infrastructure economics, biodiversity and human health
- Air quality improvement
- Buffer/refuge capacity for extreme weather events
- Greenhouse gas reduction via carbon sequestration
- Increased local distinctiveness—supporting cultural identity
- Biodiversity enhancement—connectivity, corridors and linkages
- Economic values—aesthetic values, carbon trading potential, urban agriculture and forestry
- Value-adding WSUD—greater soil infiltration reduces risk of flooding and pollution from run-off
- Food production capacity

### Integrated Water Management:

- Drought and flood amelioration—greater resilience and adaptability for both long and short-term planning response scenarios
- Managing coastal retreat—in relation to SLR and storm surges
- Greenhouse gas reduction—(re energy requirements to pump water for supply in urban environments)
- Biodiversity enhancement—corridors and linkages for broader scale water quality outcomes; aquatic habitat
- Waste management—filtering and settlement for re-use and harvesting
- Economic values

### Integrated Planning Strategies:

- Support development of multifunctional landscapes—fostering interaction and stewardship, community identity, sense of connectedness, adaptive community capacity
- Value-add existing landscape performance—via improved connectivity, biodiversity, environmental quality and resilience
- Prioritise environmental, socio-cultural and economic benefits of improved landscape performance—strengthening adaptive capacity and reducing potential for adverse development impacts





“Draw from a broad range of science and theory, engaging expertise from a diversity of disciplines to inform design and management strategies for green infrastructure planning.”



## Planning—The way forward

### PRIORITISE THE VALUE OF LANDSCAPE AND GREEN INFRASTRUCTURE IN STRATEGIC PLANNING

1. Map regional and local opportunities for existing/potential green infrastructure networks. This should be done via a collaborative process involving regional and local planning authorities, together with local communities, as a matter of urgency. Incorporate opportunity maps into planning documents to influence land management decisions—including scope for integrated national spatial framework for landscape-scale conservation and regeneration.
2. Establish environmental limits to development—by using opportunity maps to help establish capacity for sustainable development which is in balance with natural resources and processes.
3. Design and plan green infrastructure *before* development and build in capacity for improving environmental connectivity and resilience in existing urban environments via setting priorities for acquisition and regeneration as retrofitting and redevelopment opportunities occur.
4. Look for opportunities to integrate green infrastructure initiatives across multiple jurisdictions and at different scales, to maximise connectivity and performance benefits. Work with all levels of government and private landholders at various scales to plan and implement green infrastructure systems.
5. Draw from a broad range of science and theory, engaging expertise from a diversity of disciplines (e.g. landscape architecture and ecology, conservation biology, urban and regional planning, GIS, landscape visualisation modelling, etc.) to inform design and management strategies for green infrastructure planning.
6. Provide leadership for local community involvement—by using community-based planning and capacity building to engage and inspire local participation and ownership of landscape-based solutions.

### INVEST IN GREEN INFRASTRUCTURE MANAGEMENT AND RESTORATION

1. Focus fiscal measures on strategic incentives for enhancing and supporting green infrastructure potential—e.g. conservation-based land ‘banking’ schemes, community title arrangements, public/private partnerships, landscape contribution credits/offsets etc.
2. Tailor existing funding capacity and structures towards ‘value-added’ development, including promoting best-practice examples of economic advantages of green infrastructure-based projects.
3. Set targets for green infrastructure restoration and establishment, and integrate social and economic indicators into this context.



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**Key web links**

- [www.aila.org.au/climate](http://www.aila.org.au/climate)
- [/landscapeprinciples](http://www.aila.org.au/landscapeprinciples)
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