



## SUSTAINABLE RESIDENTIAL DESIGN CHECKLIST

CITY OF VINCENT

A great majority of homes work against the climate, rather than with it. As stated in the City of Vincent's Sustainable Design Policy, the City recognises that it has become imperative for building design to incorporate elements that create more sustainable development, and to minimise impact on the environment. Accordingly, the City encourages the incorporation of sustainable features in residential design. Sustainable residential design results in benefits for the householder, the community and the environment, including:

- Reduced energy and water costs in the home;
- Greater natural comfort and amenity for building occupants;
- Conservation of water supplies; and
- Reduced greenhouse gas emissions.

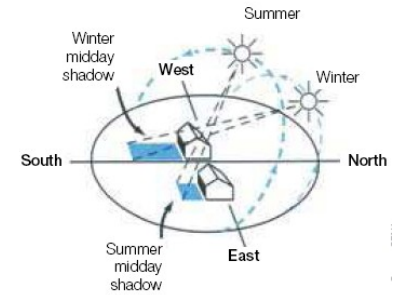
This checklist is designed for people who are thinking about building a new home or undertaking major renovations. It outlines some key considerations that you should discuss with your builder and/or designer at an early stage, to ensure that your home is constructed in a sustainable way. It is much more cost-effective to plan for these features at the outset of planning your home, rather than seeking to incorporate them after the building is complete. Including these features will reduce your energy and water costs and will ultimately save you money.

While the requirements in this checklist are not mandatory, the City strongly encourages the incorporation of as many sustainable design features as possible. Small steps can add up to big results, if enough people are prepared to take those steps.

More detailed information about sustainable design, including information about available rebates, can be obtained from the Sustainability Portal on the City of Vincent's website: <http://www.vincent.wa.gov.au>

### BUILDING ORIENTATION AND LAYOUT

Properly oriented buildings take advantage of the sun's seasonal movements by allowing the winter sun into the building to warm it and provide light, while minimising the effects of the hot summer sun (refer to image inset).



- Situate indoor and outdoor living and entertainment areas to the north where possible, to maximise winter sun and minimise summer sun.
- Locate areas that have lower heating and lighting requirements (laundries, studies covered parking, etc.) away from the northern aspect, as these spaces will prevent the northern orientation of main living areas.
- Set aside a sunny area for clothes drying, to reduce the need to use a dryer.

### WINDOWS

Glazing has a major impact on the energy efficiency of the building envelope. Poorly designed windows, skylights and glazed surfaces can make your home too hot or too cold.

- Living room windows should ideally face north to allow for efficient natural lighting all year round and solar warmth/heat in the winter months.
- Shade north-facing windows from the summer sun to reduce room temperatures in summer. Eaves or other overhangs prevent overheating by the high summer sun. The average window works well with a 450 mm overhang, while glass doors require 700 – 900 mm.
- Avoid designs using no eaves or minimal eaves, as too much heat will enter the building in the summer months.
- Avoid locating windows on the east or west elevations, or minimise them and cover them with adequate shading and/or tinting.
- Windows are a source of heat loss. Considerable improvement can be made with suitable window treatments, especially well fitted curtains and pelmets.

### INSULATION

Insulation acts as a barrier to heat flow and is essential to keep your home warm in winter and cool in summer. A well-insulated and well-designed home will provide year-round comfort, cutting cooling and heating bills.

- Include maximum insulation in the roof, walls and floor.

## VENTILATION

Natural ventilation relies on natural air movement, and reduces the need for mechanical ventilation and air conditioning. It keeps fresh air circulating and prevents moisture from building up inside the home, maintaining air quality and ensuring that the home doesn't become stuffy.

- Locate windows and doors to allow good natural cross-ventilation so the building can take advantage of the cooling westerly summer breezes (i.e. a door and a window opposite each other; two windows opposite each other).
- Ventilate roofs to enable the roof space to renew the air compressed in the roof space transferring down through the ceiling and into the home. Ventilation of roof spaces can be achieved through installing rotating roof vents, solar-powered roof vents, gabled vents, and unsealed eaves.
- Use ceiling fans to provide a comfort on hot days, at low running costs.

## LIGHT-COLOURED ROOFING

Light roof colours reflect heat, preventing surfaces from becoming excessively hot, while dark roof colours absorb heat and transfer it into the home. Choosing a light-coloured roof is one of the easiest ways to reduce the amount of heat entering the home.

- Use light-coloured roofing, except white or other colours that may reduce neighbours' amenity through reflected glare.

## ENERGY

Choosing the most appropriate energy source can significantly reduce your energy bills and improve the environmental performance of your home.

- Install energy-efficient appliances.
- Install a renewable energy source such as a photovoltaic system.
- Install a solar hot water system.
- Design the layout of the home so that living areas can be closed off from other areas to reduce the need to artificially heat or cool spaces and to avoid the need to heat or cool the *whole* home.

## MATERIALS EFFICIENCY

Environmentally sustainable design aims to use materials efficiently in the construction of a building. Wherever possible, materials should be locally sourced and re-used on site.

Use recycled materials (e.g. recycled timber/metal), rapidly renewable materials (e.g. bamboo, cork, linoleum) and recyclable materials (e.g. timber, glass, cork).

## LANDSCAPING

Landscaping can provide economic and aesthetic solutions to climate control, including providing shade and glare control in summer.

- Design should be mindful of existing vegetation. Wherever possible, trees should be retained on private lots. The space for trees within the City diminishes as urban development occurs and residential densities increase. Trees can add value to property, contribute to the neighbourhood amenity, provide shade, shelter from wind, habitat for wildlife and a filter for air pollution and traffic noise.
- Use a balance of soft and hard landscaping. Vegetated areas tend to have reduced heat gain compared to paved areas and this can reduce the amount of heat reflected to the building.
- Use waterwise plants. These are natives or low water use exotics that, once established, will flourish on one watering day a week or less during summer.
- Consolidate plants in defined areas to allow watering efficiency, and keep lawn areas, which have a high demand for water, to a minimum.
- Use a waterwise irrigation system, comprising an appropriate pressure regulating valve, water efficient sprinklers, sub-mulch drip irrigation, automated controllers and rain sensing devices to effectively monitor and manage the irrigation of garden areas.

## WATER

Available fresh water resources have been declining and are expected to continue to decline due to changing rainfall patterns associated with global climate change. There are some simple design features and water saving devices that can minimise water wastage and reduce your water bills.

- Locate the hot water system, bathrooms, ensuites, laundry and kitchen as close to each other as possible. This saves both water and energy by reducing the amount of cold water that needs to be flushed while waiting for hot water to arrive at taps and shower heads.
- Use water-efficient technologies such as low-flow showerheads, dual-flush toilets, low water use dishwashers and washing machines.
- Connect bathroom and laundry wastewater to a greywater system, which re-uses the wastewater for garden irrigation. Greywater systems are subject to WA Department of Health design standards and approval, and a permit must be obtained from the City before installation.

*NOTE: Designing buildings for energy efficiency may require detailed advice. It is important to seek appropriate professional advice in the implementation of the principles outlined in this document.*