GREEN COVER DEMONSTRATION PROJECT
LIVERPOOL CITY CENTRE AND PENRITH

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INTRODUCTION

Scientific research and assessment indicates that urban environments experience increased temperatures due to infrastructure development, hard paved and dark coloured surfaces, car engines, air conditioners, reduced green cover, soil sealing and global and local climate change.

Increased density and heat contributors in cities are creating an urban heat island effect that is increasingly affecting the economy and quality of life of those in our cities (Hopkins and Goodwin, 2011). Consideration of projected climate scenarios will enable urban planners and designers to create urban environments that can best mitigate the impacts of climate change. By integrating green cover and green spaces into the urban environment, there is potential to moderate the effects of increased heat.

Climate change is likely to have significant impacts on NSW – it is the most populous state in Australia, accounting for 32 per cent of the national population (ABS 2011). Sydney’s daily summer temperatures are now 0.5°C to 0.9°C hotter than the long-term average (DECCW, 2010 in DP&I, 2010) and the NSW Climate Impact Profile (DECCW, 2010b) projects that by 2050 the mean daily maximum and minimum temperatures are virtually certain to increase by 1.5°C - 3°C in all seasons. Research on the impacts of climate change on temperatures in Sydney also indicates that by mid century there is likely to be a larger degree of warming in Western Sydney than in coastal areas (CSIRO 2008).

Strategies for mitigating temperature increases will enhance a community’s resilience and local government capacity to respond to heat effects of climate change. Climate change adaptation, particularly for Western Sydney, is a priority for the NSW Government, as set out in the Metropolitan Plan for Sydney 2036 (The Metro Plan). The Metro Plan sets a target for Sydney to become a leader in urban adaptation to climate change in the Asia-Pacific region.

Urban green cover can include bushland, private and community gardens, parks, greenways and corridors, street trees, canopy trees, green roofs, green walls and green infrastructure. Green cover is an effective way to mitigate heat impacts in urban areas with a multitude of co-benefits, such as reducing energy demands, storing carbon, filtering airborne particles, providing aesthetic, social and health benefits, managing stormwater and providing habitat for local fauna.

The Metro Plan prioritises addressing climate change and protecting Sydney’s natural environment as critical to maintaining Sydney’s quality of life, its economic productivity and its competitive status as a global city.

The Department of Planning and Infrastructure has prepared Draft Centres Design Guidelines, which are under exhibition in 2011. The Draft Guidelines provide design principles to guide the urban renewal of existing centres and the design of new centres throughout New South Wales.

The Draft Guidelines have been developed to ensure centres are well designed, functional and liveable and can meet the need to accommodate additional population and activities within walking catchments. The Draft Guidelines are a tool to assist in the design

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2010 was the 18th consecutive year with above average maximum temperatures in Sydney, with an average maximum of 22.6°C, which was 0.9°C above the historical average. Minimum temperatures were also above average, at 15.0°C during 2010 compared to a historical average of 13.9°C.

(Source: BoM 2011)
of urban centres and to help accommodate growth and change. The Draft Guidelines include good practice planning and urban design principles which will standardise planning and design information to create a common understanding and language in adapting centres for growth.

The Draft Guidelines are not a policy document but support the directions of existing NSW Government planning policies.

The Draft Guidelines establishes the following principles for urban renewal relevant to this Green Cover Demonstration Project:

- Green cover
- Integrating water
- Street trees
- Water sensitive urban design
- Preserve nature and natural corridors
- Adapting to climate change

The purpose of this Green Cover Demonstration Design study is to demonstrate ways in which green cover can be employed by NSW local governments to mitigate heat impacts in typical urban situations.

Seven of the ten warmest years on record (151 years) for Sydney have occurred in the ten years between 2001 and 2010, with this decade the warmest on record for minimum temperatures.

(Source: BoM 2011)
EXECUTIVE SUMMARY

The Green Cover Demonstration Design Project has been undertaken by the NSW Government Architect’s Office in partnership with the Office of Environment and Heritage and the Department of Planning and Infrastructure.

The objectives of the project are:

- To develop potential site specific demonstration designs for urban green cover;
- To provide opportunities to demonstrate best practice landscape design of green cover for mitigating the heat island effect;
- To meet objectives of The Metro Plan actions, to enhance local government capacity and resilience to climate change, particularly in Western Sydney; and
- To assist NSW local governments to integrate green cover design into the planning process.

Two local government areas, Liverpool City Council and Penrith City Council were selected as study areas. The focus of the study for Liverpool was the city centre and at Penrith, Jameson Park and the adjacent industrial precinct.

The study areas were selected for their urban development patterns typical in Western Sydney, and the contrasting characteristics of city centre and regional park and industrial area, providing a broad canvas for exhibiting green cover principles. The focus sites are also recognised as regional cities in The Metro Plan under the Department of Planning and Infrastructure’s ‘City of Cities’ approach.

The extent of heat island effect contributors were mapped and quantified for each study area by the NSW Government Architect’s Office. This was completed by identifying and measuring the extent of the contributors using aerial photos and by undertaking site visits. The mapping showed that heat island effect contributors cover approximately 95 per cent of the Liverpool City Centre study area and 42 per cent of this area is within the public domain. The Penrith study found that 72 per cent of the study area potentially contributes to the heat island effect, with 53 per cent of this area within the public domain.

These findings illustrate the significant opportunity that local councils can have to implement green cover strategies in the public domain and reduce the urban heat island effect.

Key strategies for increasing green cover in urban areas were identified as:

- Cool Roofs - green roofs and light coloured and reflective roof surfaces;
- Cool Walls - green walls and shaded walls;
- Cool Pavements - reduced hard surface area, permeable pavements and light coloured, high albedo (highly reflective) pavements;
- Cool Streets - opportunistic street tree planting with shade providing canopy, mass planting understory, bio-swales and median planting;
- Cool Carparks - canopy tree plantings, median planting and bio-swales, permeable pavement;
- Cool Canopies - increased canopy trees and shade provision to parks, cycleways, footpaths, amenities and forecourts and shade structures, including structures covered with climbing plants; and
- Green Infrastructure - bio-swales, raingardens, soft-landscaped detention basins, de-channelisation of hard engineering (concrete culverts).

Within the Liverpool and Penrith study areas, site-specific opportunities were identified as demonstration design projects for implementing the key strategies and increasing green cover. These sites were selected following the site analysis and workshops with Liverpool and Penrith Councils. These sites were chosen for being achievable projects within the public domain and for their relevance and application to other local government areas.

Demonstration sites selected within the Liverpool City Centre include the Council Building Rooftop, Liverpool Library Forecourt, Bathurst Street surface carpark, George Street, Crawford service-way and laneways.

Demonstration sites selected within Penrith include Jameson Park, drainage corridors, Jameson Park carpark and netball court precinct, Batt Street and the industrial precinct.

This study demonstrated that there is a wide range of potential strategies that can be readily employed as part of regular Council maintenance programs and are within Councils resources and capabilities.

A variety of opportunities can be realised incrementally depending on resources through:

- Pilot projects
- Capital works projects
- Maintenance programs
- Public domain plans
- Local Government and private partnerships
- Development Controls and incentives
- Community programs.
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