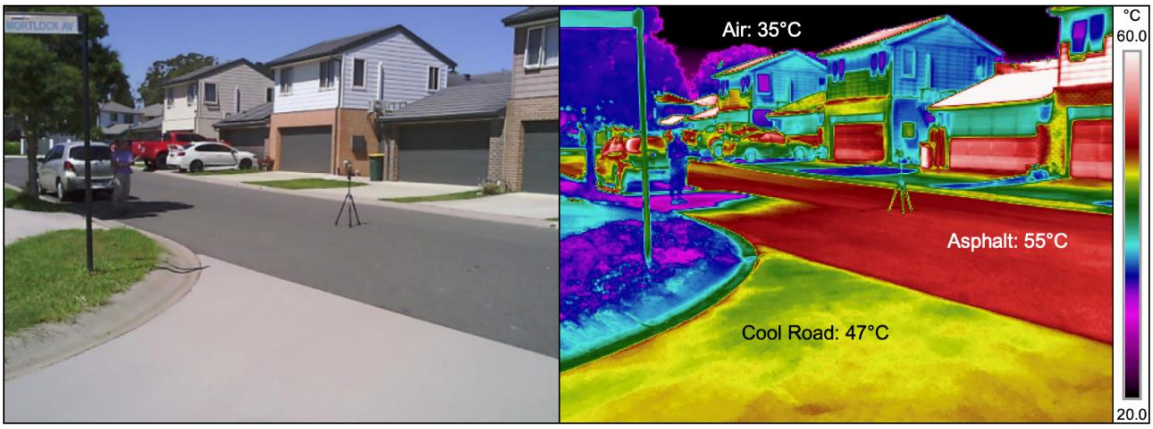
WESTERN SYDNEY COOL ROADS TRIAL

RESPONDING TO INCREASING HEAT IN URBAN AREAS.



Thermal imagary showing the variance in surface temperatures of CoolSeal and asphalt roads, and the impact of tree canopy. (Image © S. Pfautsch)

Project Summary

Summer temperatures across western Sydney are rising. The Cool Roads Trial was established in partnership with Blacktown, Campbelltown and Parramatta City Councils and Western Sydney University, to evaluate the efficacy of a reflective road sealant (CoolSeal made by GuardTop) to cool down road and car park surfaces.

Why cool asphalt?

It is well established that roads and car parks contribute to the urban heat island effect. This contribution is significantly increased when they are unshaded.
Asphalt surfaces, such as roads and car parks, have a low reflectivity and high thermal mass, effectively storing heat from the sun in the subsurface. Release of the stored energy contributes to the urban heat island effect. Reducing the build-up of heat on roads can help to encourage cycling and walking, reduce heat loads on cars and properties and contribute to cooler neighbourhoods.

Why CoolSeal?

CoolSeal is an established product for cooling urban roads in the United States where the product is installed across entire neighbourhoods in cities in California and Arizona.
In Australia, CoolSeal has been applied at suburb levels by the cities of Charles Sturt and Salisbury in South Australia. A number of local government areas in Victoria have also begun to apply the product on residential streets. Monitoring of the product in Australia has been focused on surface temperature impacts only.

How is this trial different to others?

This trial sought to understand the impact of CoolSeal on surface and ambient air temperature as well as human thermal comfort during the day and night.

Findings

The findings of the trial relate to (1) temperature effects, (2) road performance, (3) community feedback.

<u>(1) Temperature</u>

- CoolSeal is highly effective at reducing surface temperature of asphalt surfaces during the day – on average 6°C when compared with an untreated surface.
- CoolSeal reduced surface temperature by 1-2°C at night.
- Tree shade reduced temperatures of uncoated surfaces by 20°C.
- Tree shade reduced temperatures of surfaces coated with CoolSeal by 14°C, leading to identical surface temperatures in the shade of coated and uncoated surfaces.
- The thermal effect of CoolSeal on ambient air temperatures in residential streets, car parks was inconclusive.
- There was strong indication that directly reflected solar radiation decreased human thermal comfort during the day.

<u>(2) Road performance</u>

- Reduced bonding of the reflective coating with asphalt was observed where (a) aggregate was exposed, (b) surface textures changed markedly and (c) water pooled, or

(d) increased steering was in place, such as in carparks.

(3) Community Feedback

- Perception of increased glare on treated streets.
- Generally comparable performance for vehicle users and cyclists.
- Perception of increased slipperiness for pedestrians.
- Safety concerns (road burnouts) were a key issue at one site.

Outcomes

This project has elevated the conversation around heat impacts from asphalt surfaces during summer on living conditions in urban areas.
The findings have provided localised data to support Councils and other authorities to consider the use of cooling strategies for roads and car parks.
Additionally, the finds provide further support for the key role trees play in cooling our urban spaces.

Recommendations

I. Clearly define which temperature variable a cooling intervention will address.
II. Include on-site skid resistance and glare testing to allay perceived user concerns about surface slipperiness and light irritation.
III. Include continuous monitoring of environmental conditions to refine knowledge of reflective coatings on ambient air temperature and human thermal comfort.

The full temperature monitoring program report, undertaken by Western Sydney University is available online: https://doi.org/10.26183/hstd-bj72

Project partners

Blacktown City Council, Campbelltown City Council, City of Parramatta Council, Western Sydney University

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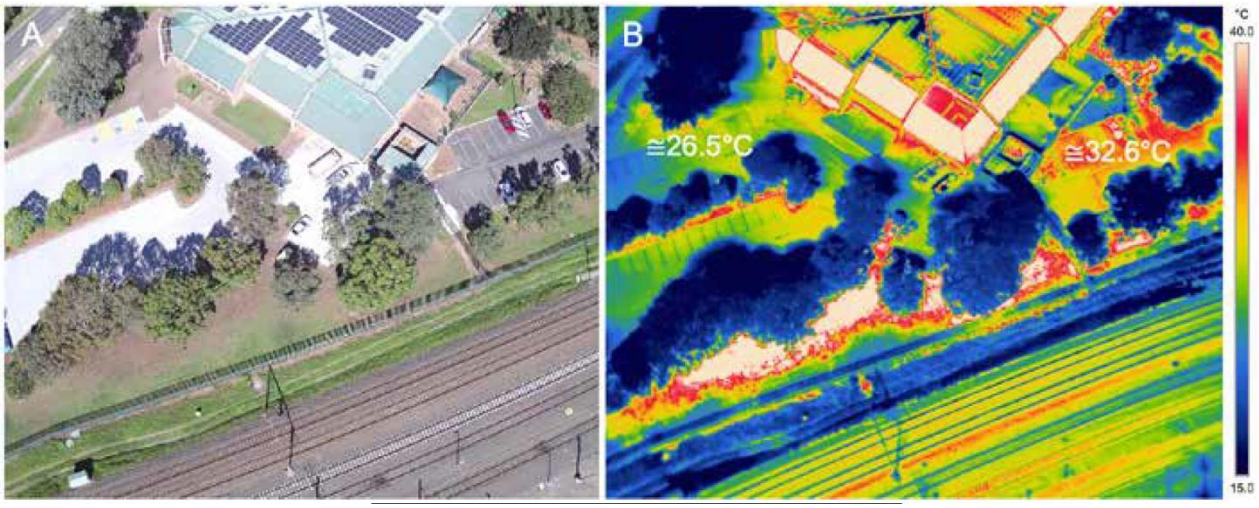

Image A – Aerial photo showing the application of the CoolSeal product at the H.J. Daley Library in Campbelltown. Note the 'control' car park to the east that was not coated with the CoolSeal product. Image B – Comparison of carpark surface temperatures. This image was taken at midday on a clear and sunny day (17 April 2020). The painted carpark surface was 6°C cooler compared to the unpainted carpark surface. (Image © S. Pfautsch)