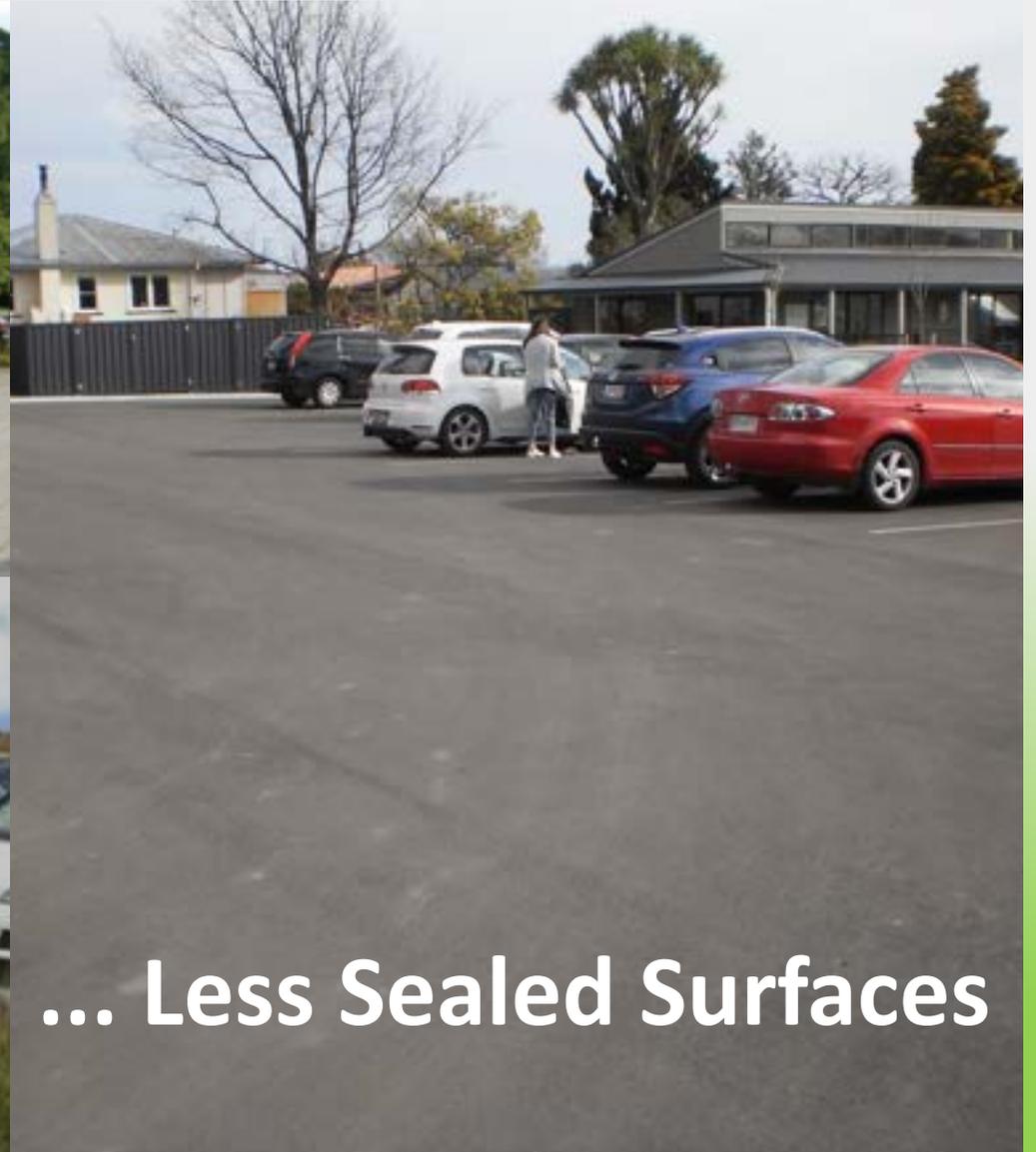


# More Urban Green ...



... Less Sealed Surfaces

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## Urban green and climate action

The United Nations Climate Change Conferences (Paris, COP21 and Glasgow COP26) highlighted the importance of cities to climate action. Cities around the world are developing strategies to reduce the impact of the climate crisis. Independent from the geographical location, size and socio-economic condition of the cities, all strategies prioritise the restoration and/or maintenance of natural green.



Taiao Ora, Tāngata Ora  
Working Together for Better Biodiversity

## Why is urban green important?

Urban green reduces the impact of climate change, improves air quality, sequesters carbon, increases biodiversity, reduces urban temperatures and promotes mental health.

## Who is this information for?

This brochure is designed to assist local authorities, businesses and private land-and houseowners for actions in urban and semi urban areas.

Hastings, Hawke's Bay is used as a case study to illustrate the points made. The suggestions included are offered as complementary actions to reduce greenhouse gas emissions, not as alternatives.

Walter Breustedt

ECO Management Group Limited, Hastings

December 2021

Supported by Biodiversity Hawke's Bay, with a special thank you to Sarah Reddish for help in editing, Dr Kathleen Kozyniak (HBRC) providing Hawke's Bay temperature information and Ben Hunt (HDC) with additional information on Urban Green

## How to improve our urban climate: more green and the right surface

More green and less sealed surfaces improve the air quality. Trees with leafy tops promote milder temperatures and greater humidity ensuring thermal comfort and a greater sense of well-being in cities. Sequestering carbon dioxide from the atmosphere, releases oxygen and reduces the incidence of respiratory problems such as asthma. Parks and connecting corridors between them may help to fight against biodiversity loss. Lighter surfaces reflect and absorb less heat .

### More Green



Shrubs and ground covers



Green walls



Shade trees



Green roofs

### Right Surfaces



Light coloured paving and asphalt



Permeable surfaces



Light coloured roofs and walls

## Case study: Hastings temperatures in summer

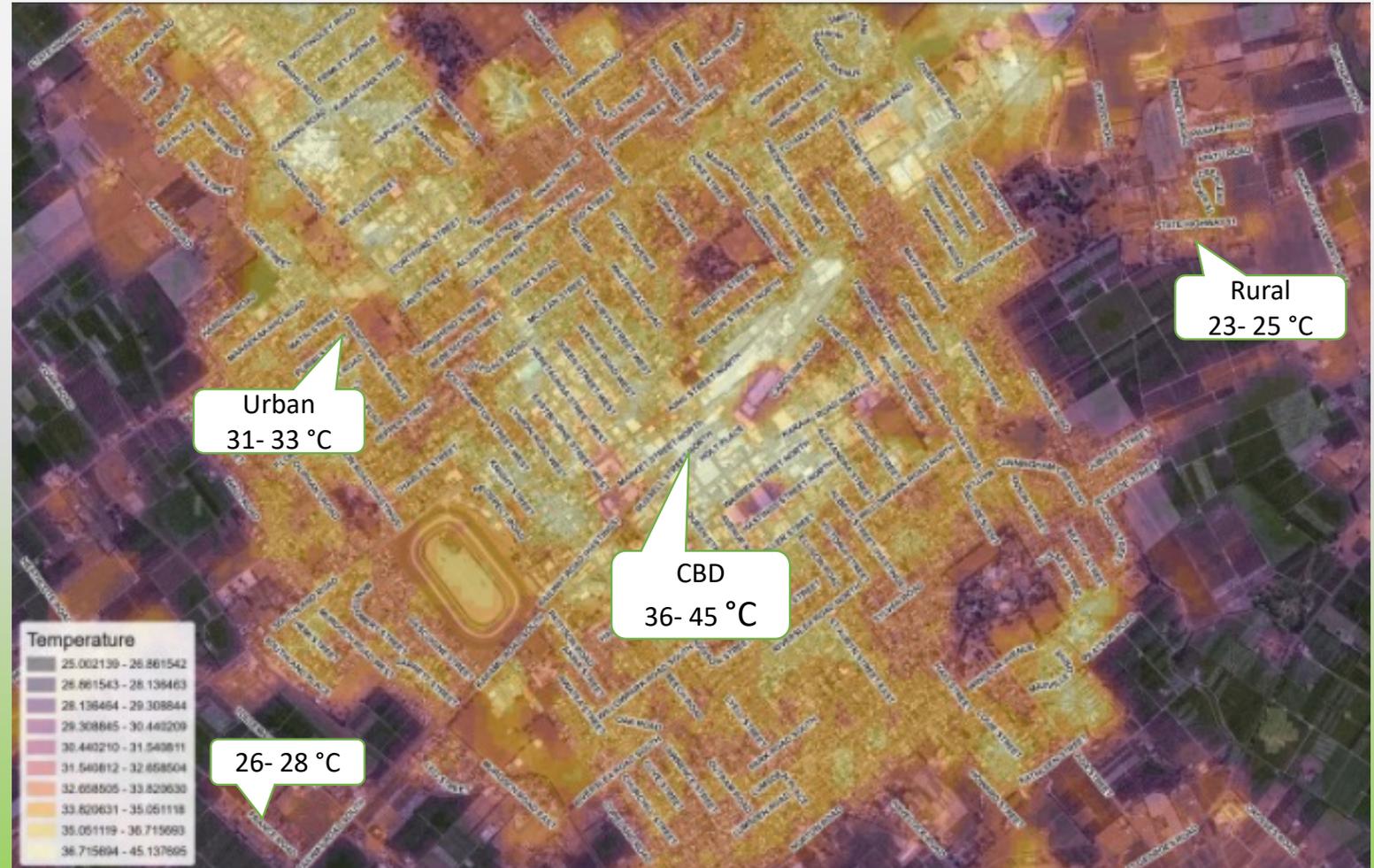
The Hastings CBD shows higher day time temperatures than the surrounding rural areas, causing reduced cooling at night.

The reason is because heat is stored in high density building blocks, concrete and asphalt, sealed surfaces, and areas where there is less green.

**The summer average maximum daily temperature in Hawkes Bay increased by 1.6 C since 1940.**



Summer average maximum daily temperature in Napier 1940 -2020  
<https://www.stats.govt.nz/indicators/temperature>



Hastings Surface Temperatures 22.Febr.2021,11am, ambient temperature at that time 23 to 24°C  
 Source: Landsat Level-2 Surface Temperature Science Product courtesy of US Geological Survey

## Case study Hastings :

### Suggested mitigation action to increase urban green & decrease sealed surfaces

1. **'Hot spot' car parks** act like “underfloor heating” in summer, contributing to high CBD temperatures.

**Mitigation** : motivate the owners for vertical green, permeable ground and planting trees and shrubs .

2. **Suburb Green Belt West** may help with cooler air supply for the CBD

**Mitigation** : Encourage residents to maintain and increase green areas and avoid additional surface sealing

3. **Biodiversity Civic Green** may be large enough to become home of indigenous birds and insects

**Mitigation** : Encourage local council to plant more native trees and shrubs.

4. **Green ventilation corridor** along the railway line

**Mitigation** : Encourage rail company and residents along the railway line to plant native shrubs and groundcover.

5. **Biodiversity Island Cornwall** (corridor area between park and school) may be large enough to attract indigenous birds and insects.

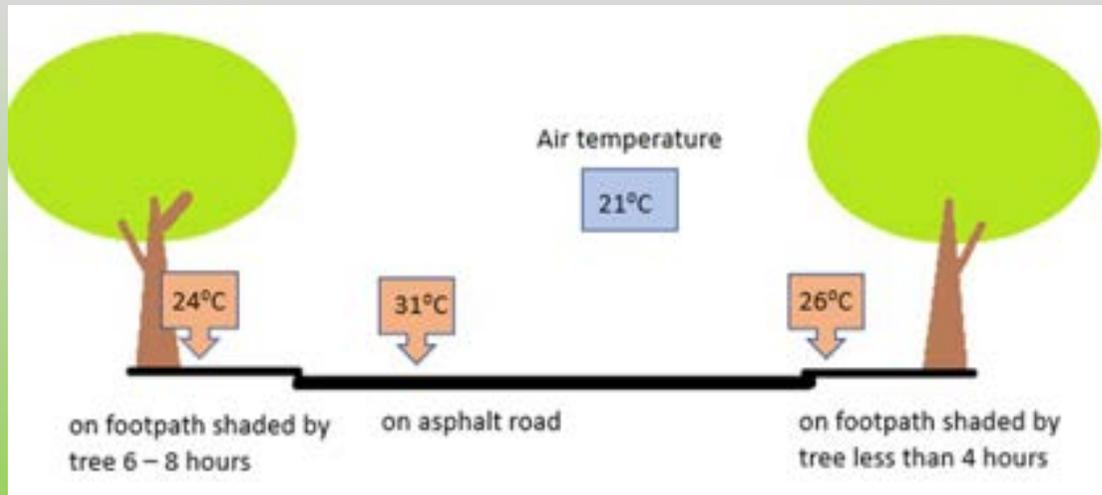
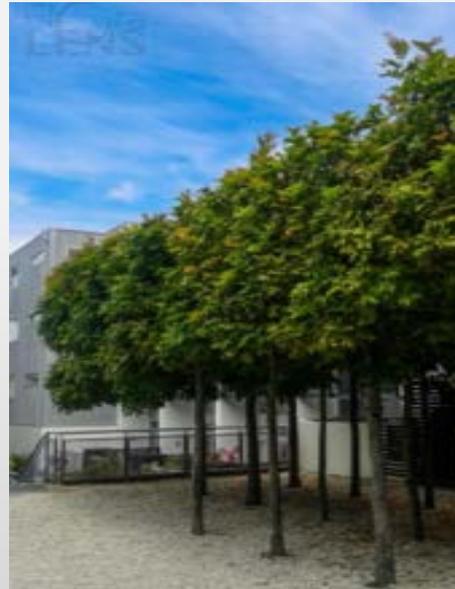
**Mitigation** : Encourage local council to plant indigenous trees and shrubs in local park and motivate residential property owners along the corridor to plant native shrubs.



## The value of Urban Green

### Trees and shrubs

- absorb emissions from burning fuel
- produce Oxygen
- are cooling the surrounding area
- filter dust
- absorb noise
- provide shade
- evaporate water
- make our city beautiful
- and if there are enough of them they create a home for animals



Surface temperatures <sup>4)</sup> 24 Jan 2021 9:00PM, Havelock North, Brookvale Rd.

Exposure to green space is promoting mental health and, in particular, relieving stress.

A result of a biometric review<sup>1)</sup> shows the importance of green space for public health.

### Oxygen production

US research<sup>2)</sup> found that, on average, 30 urban trees provide the amount of oxygen for 1 adult person/year.

### CO<sub>2</sub> absorption

2 native trees and 6 native shrubs <sup>3)</sup> planted today absorb after 30 years about 1000 kg CO<sub>2</sub>.

### Influence of shading trees on sealed surfaces<sup>4)</sup>

Surface temperature of shaded footpath significantly lower than temperature of unshaded asphalt.

1) Jinguang Zhang *et al* 2020 *Environ. Res. Lett.* 15 063001

2) Nowak, David J.; Hoehn, Robert; Crane, Daniel E. Oxygen Production by Urban Trees in the United States. *Arboriculture & Urban Forestry* 2007. 33(3):220–226.

3) <https://www.tanestrees.org.nz/resources/carbon-calculator>

4) ECO Management Group Ltd investigation

## Urban Green benefits

### Urban Green reduces the impact of climate change

#### Green roofs

- Improve microclimate
- Insulate buildings

#### Trees and shrubs

- Provide shading and make cities more liveable

#### Vertical green

- Reduces heat traps
- Has a cooling effect

#### Ground cover

- Reduces sealed surfaces
- Absorbs rainwater
- Evaporates moisture

#### Additional Information:

[https://issuu.com/newzealandrecreationassociation/docs/insights\\_28\\_urban\\_refuge\\_final\\_24\\_9\\_21](https://issuu.com/newzealandrecreationassociation/docs/insights_28_urban_refuge_final_24_9_21)



gruenstattgrau/grauchmann



Source:info @bugg.de



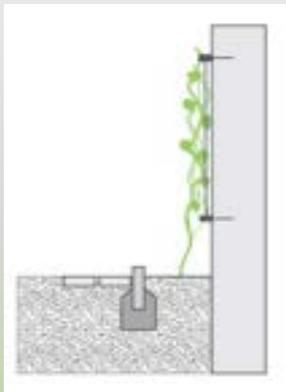
# Urban Green

## Vertical Green

Source and more Information:  
Leitfaden Fassadenbegrünung, Wiener Umweltschutzabteilung -  
Bereich Räumliche Entwicklung Austria 2019



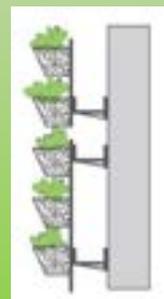
plants in 90° containers  
modular construction



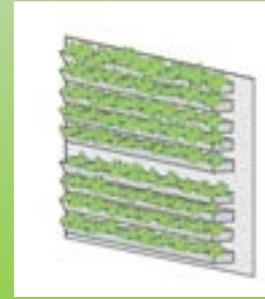
Ground planted with  
climbing support



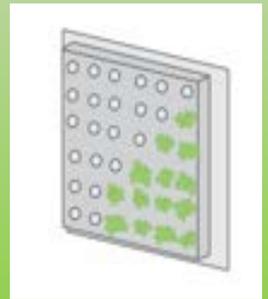
© Grünwand



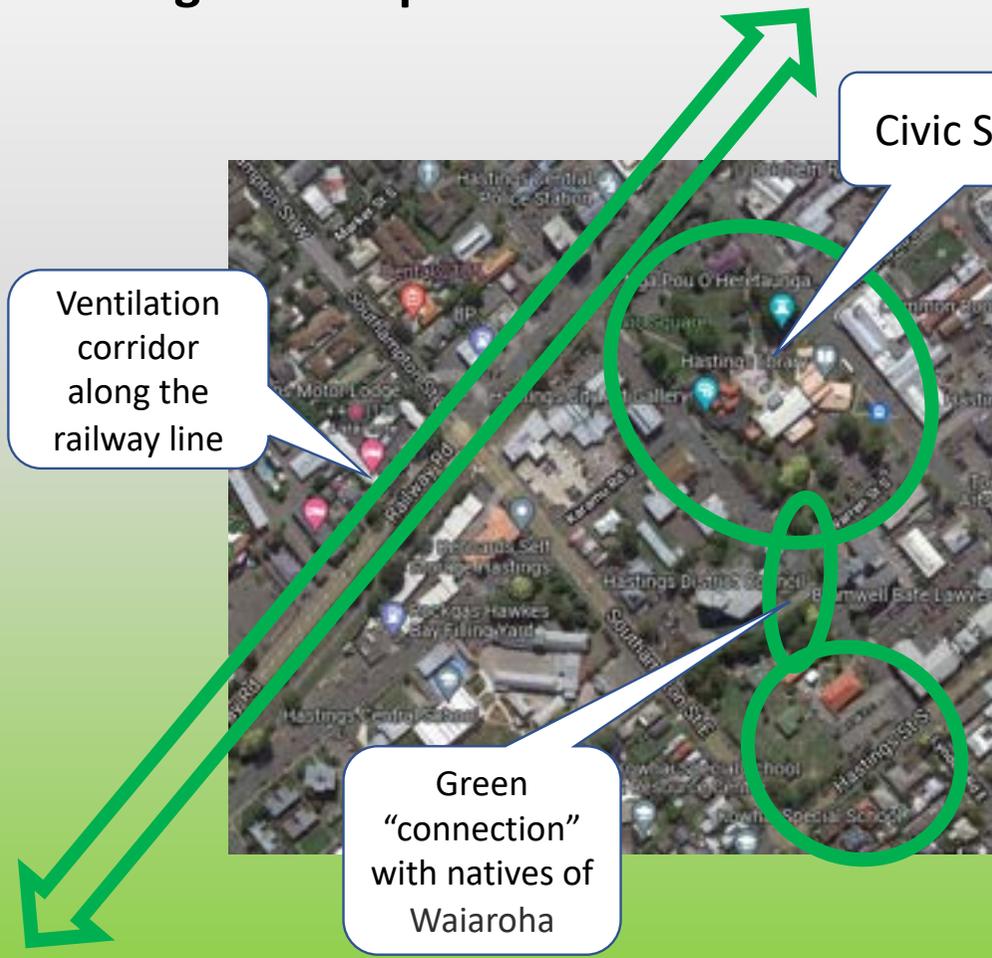
Linear plant  
boxes with  
irrigation  
system



plants in 90°  
containers  
In modular  
construction  
with irrigation  
system



# Case study: Suggested action to increase the Biodiversity value of Hastings Civic Square

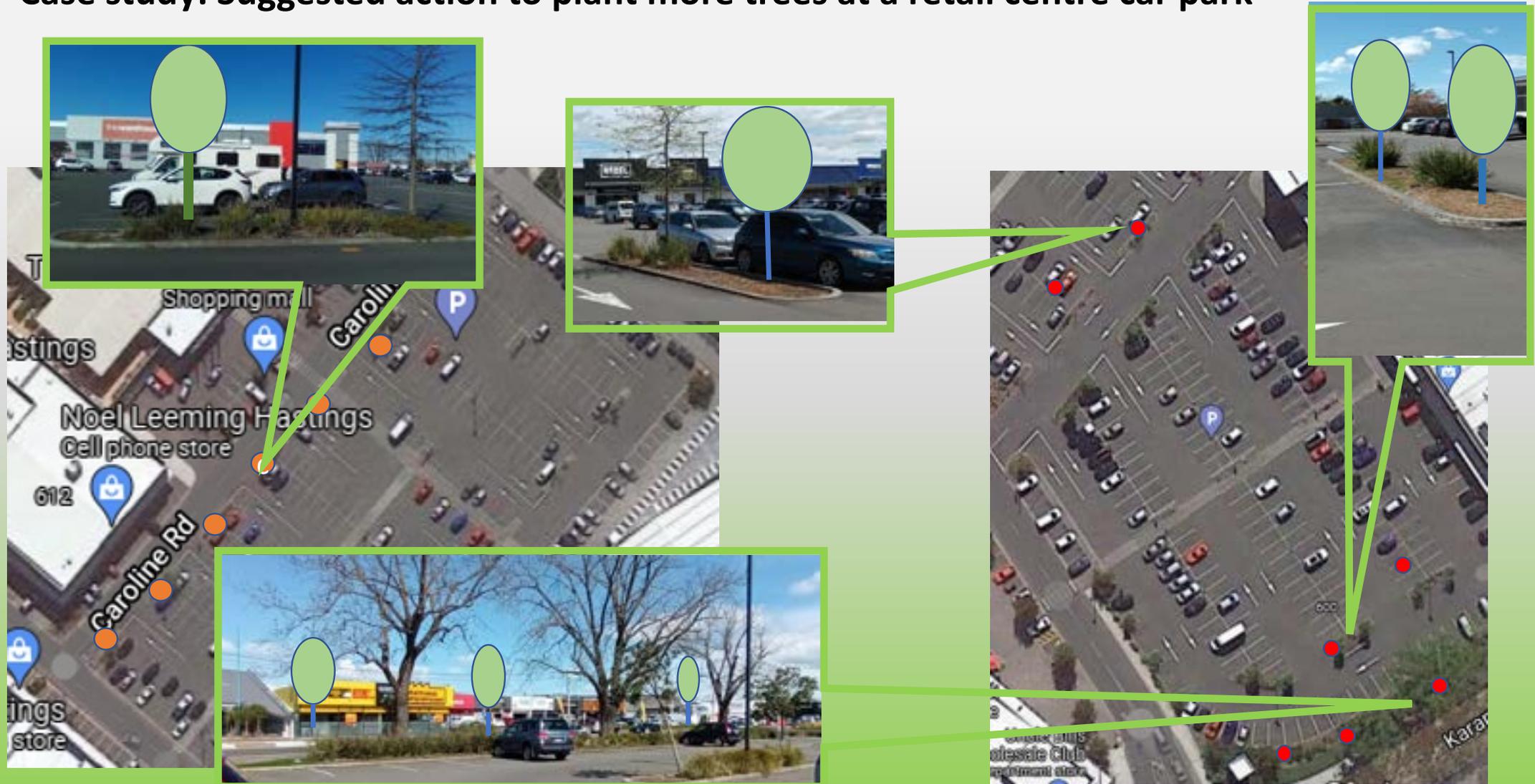


## Plant

- Indigenous trees
- shrubs and groundcover
- less lawn



## Case study: Suggested action to plant more trees at a retail centre car park



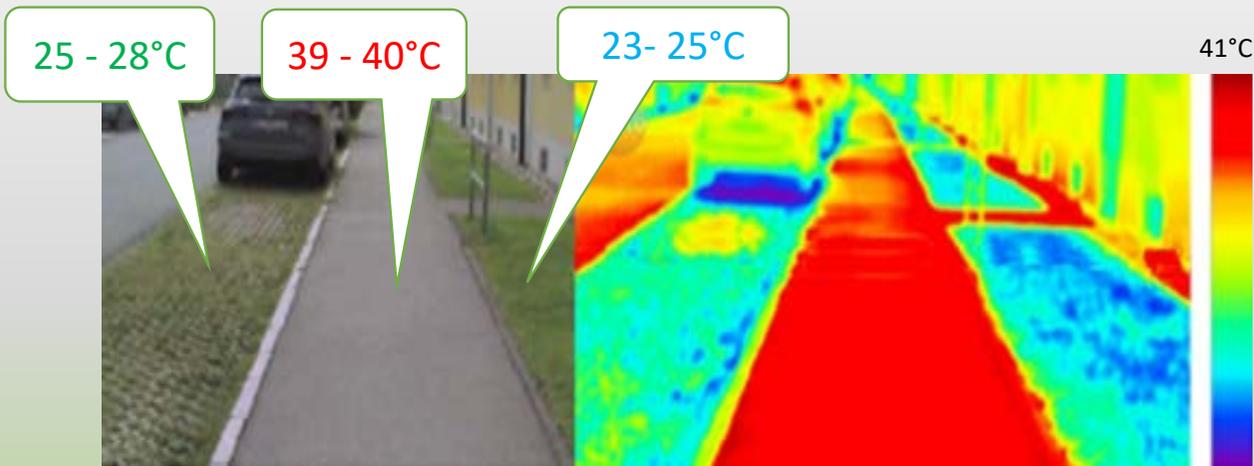
Plant young trees along the Karamu Road before the existing old trees have to be replaced

# Urban surfaces

## Surface material influences surface temperatures<sup>1)</sup>

Temperature on sealed surface are over 10°C higher than the surface on permeable car parks

<sup>1)</sup>Source: Stadtlabor Graz, Austria



Infrared Photo Graz, Austria 22.4°C

## Benefits of light instead of dark colours

- Light roofs and walls reflect radiating heat
- Light paving and asphalt absorbs less heat



## Benefits of permeable instead of sealed surfaces

- Allow rainwater to penetrate into soil
- Reduces stress on stormwater system
- Allows moisture evaporation and delivers cooling effect

### Additional information:

<https://sustainablesurfacing.com/porous-rubber-surfaces>

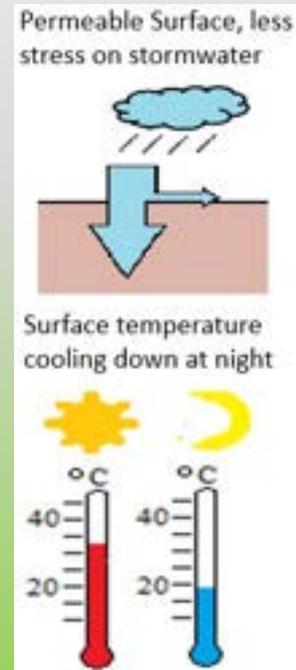


Source:  
Firth grass paver,  
permeable paver

# Urban Surface



## sealed car park versus permeable paved



Information on permeable surfaces in:  
 Planning by Design <https://www.montcopa.org/DocumentCenter/View/4326/Design-Shading-Parking-Lots>  
 Permeable Paving Materials and Bioretention in Parking Lot <https://www.mass.gov/service-details/demonstration-3-permeable-paving-materials-and-bioretention-in-a-parking-lot>  
 Permeable Pavement Construction Guide <https://www.aucklandcouncil.govt.nz/permeable-pavement-constructionguide.pdf>  
 Leitfaden Naturnahe Anlage...von Parkplätzen <https://docplayer.org/23970595-Turnahe-anlage-und-pflege-von-park.html>

