

the beginning

“Heat kills more people in Australia than any other natural disaster, including floods, cyclones and bushfires”¹

My journey begins in Kingaroy, a regional town Queensland, where my grandparents were third-generation crop farmers and my father was a local agronomist. Growing up there, I experienced first-hand the crippling effects of droughts and heatwaves, watching as the tanks ran dry, the crops slowly wilted away, and the sweaty, restless nights falling asleep to the whirring of a pedestal fan. It didn't take long to realise how much our livelihood depended on the cyclical nature of the seasons; plant, rain and harvest, and the immense loss in time, energy and money that followed these events. However, moving to the city revealed the ramifications of extreme temperature on urban populations were equally as devastating and far more widespread.

At present, global warming combined with rapid population growth and consequent development, have seen a dramatic increase in extreme and unpredictable weather events such as heatwaves. During the 2020 bushfires, Western Sydney became the topic of conversation when a heatwave broke temperature records and Penrith was declared the hottest place on Earth at 48.9°C¹. Since then, a flurry of articles have emerged, highlighting an imminent and escalating existential crisis Australian suburbs are facing: the Urban Heat Island Effect.

The effects of this crisis can be seen many western suburbs, largely low socio-economic neighbourhoods, which contain a high proportion of ‘vulnerable’ residents, including the elderly, socially isolated, and those struggling financially. However, the impacts of extreme heat reach further than the local population, with documented impacts on areas such as agriculture, biodiversity and water demand².

A disturbing yet encouraging body of research has found that not only are our urban environments unequipped to deal with these extreme temperatures, the current design of our cities, including new developments, are exacerbating this crisis.

As designers, we have both the privilege and responsibility of shaping the public realm. However, we are trapped in an outdated and complacent paradigm that continues to see densely packed houses, dark asphalt roads, and bare expanses of concrete rolled out across new developments. We are designing cities that are rigid and vulnerable to our ever-changing environment, and as we are discovering in Western Sydney, the consequences are catastrophic.

It is time for a radical shift in the way we design.

As an emerging landscape architect in Australia, this is one of the critical environmental issues I am passionate about. Working on projects such as the Riyadh Urban Greening Strategy and the Powerhouse Parramatta, I have begun to see how the integration of design strategies from a wide range of related professions can shift this paradigm, mitigating extreme temperatures and creating resilient and adaptable urban environments. These solutions require innovation, motivation and design excellence, and I am excited to pursue this challenge.

1. ABC, 2021, <https://www.abc.net.au/news/science/2021-01-24/heatwaves-sydney-uninhabitable-climate-change-urban-planning/12993580>

2. Climate Council, 2021, <https://www.climatecouncil.org.au/urban-heat-island-effect-western-sydney/>



‘Tecoma’ | My family property in Kingaroy, Queensland

the journey

Riyadh Urban Greening Strategy (2019)

| Adapting Existing Infrastructure

After graduating university, I accepted an invitation to work in the competition department at Topotek 1 in Berlin, having met director Martin Rein-Cano through a student workshop at the 2018 IFLA Festival on the Gold Coast. During my time in Berlin, I spent two weeks working in Riyadh alongside a colleague to design a city-wide sustainable urban greening strategy for the 2020 G20. The aim of this strategy was to reduce urban heat through canopy cover, enhance the city aesthetic and minimise irrigation and erosion, focusing on streets and sidewalks.

It was fascinating to be immersed in such a radically different culture and observe how traditional Arabic design adapted to the harsh arid climate, challenging my ingrained cultural perceptions. Buildings enclosed around a central courtyard, allowing natural ventilation and cooling to regulate temperature, whilst materials such as sun-dried mud bricks and mud were used to insulate against the heat. Outside in plazas and small gardens, light coloured stone, decomposed granite pathways, water misting systems and native drought tolerant species were some of the many approaches implemented to create a comfortable outdoor micro-climate.

However, there was one key similarity with Australia. 12 lanes of dark asphalt cut through the urban sprawl, congested with petrol-sucking SUVs and recklessly swerving like ants in a maze. On an average 40 degree day in late September, the air was thick and dusty, the dry heat suffocating. Being outside for an extended period was unbearable, and the design of streets reflected this. Sidewalks were virtually non-existent and car parking and its related infrastructure was abundant.

Over the two weeks, my role was to undertake site visits and analysis, guide the production for the report, present progress to the client in Riyadh and coordinate between the client, Topotek's offices in Berlin and Zürich, and our partner firm in Krakow.

Our proposal connected and enhanced the vegetation cover in Riyadh, which over time had been reduced and fragmented by urban sprawl. Over a 20 year time frame, existing vegetation will be replaced with drought tolerant native species, hardscape such as road medians will be replaced with permeable gravel allowing for drainage, and existing roads will be painted with a white sealcoat to reflect the heat. At the same time, areas of parking will be replaced with small pockets of water, shade and furniture, aiming to lower extreme temperatures and allow people to walk comfortably between commercial and retail buildings.

Drawing inspiration from traditional Arabic design for desert environments, our strategy set forth a series of gradual and low-cost adaptations to Riyadh's existing urban infrastructure to reduce the effects of urban heat.



Proposed render of Eastern Ring Road | Riyadh, Saudi Arabia

Credit | Topotek 1

the journey

Powerhouse Parramatta (2020 - ongoing)

| Proposing a New Paradigm

Situated in Sydney's west, the city of Parramatta is undergoing rapid change. One of the significant developments proposed is the Powerhouse Parramatta, which is stated to be the largest investment in cultural infrastructure since the Sydney Opera House¹. A key design consideration for this area however, is the soaring temperatures experienced across Western Sydney throughout summer which often trigger heatwaves and urban heat islands. This is an escalating yet critical challenge for contemporary designers.

As one of my first projects at McGregor Coxall, I worked in a team alongside architects Moreau Kusunoki and Genton to take the winning Powerhouse competition scheme through rigorous design development and into construction documentation. Utilising the skills and experiences I gained in Riyadh, we developed the design to maximise evaporative cooling across the site and also welcome the natural flux of the Parramatta River during frequent flood events through addition of an extensive undercroft.

The design maximises the cool breezes along the river, connecting the podium and river levels with a large sloping lawn, extending into steps leading down to the river. Large areas of light-coloured hardscape on the podium and river levels are broken up by two major lawn areas to reduce the absorption of heat whilst maintaining flexible programming.

A series of WSUD strategies were implemented across the site to maximise stormwater runoff and minimise irrigation. These included directing runoff into adjacent planting areas, using planting to clean the stormwater before being discharged into the Parramatta River.

The planting palette was curated by selecting largely native and drought-tolerant species to minimise irrigation, including a mass of endemic Sydney Blue Gum (*Eucalyptus saligna*) trees providing shade along the riverfront.

New developments such as the Powerhouse Parramatta provide designers the opportunity to set forth a new standard of design excellence for climate-responsive design. Through the collaboration of numerous disciplines including landscape architecture, engineering and architecture, we have the ability to create a landmark cultural destination which sets the benchmark for mitigating urban heat in Western Sydney and providing a comfortable micro-climate for visitors year round.



Proposed render of the Powerhouse | Parramatta, Sydney

Credit | McGregor Coxall, Moreau Kusunoki & Genton

the vision

Health is no longer a condition that is internal and pharmaceutical, it is the external design of our shared urban infrastructure.

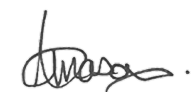
The escalating urban heat crisis in Western Sydney is a clear indication that our urban environments are unequipped to deal with these extreme temperatures, with poor design and planning further exacerbating this crisis. As extreme weather events such as heatwaves become more prevalent, it is critical that our design approach evolves to ensure our cities remain resilient and adaptable. At the forefront of this immense environmental challenge, we as landscape architects we must constantly push against conventional and outdated approaches, working in inter-disciplinary teams to raise the standard of climate responsive design in heat-affected areas.

As the next generation of landscape architects in Australia, this is one of the many issues I am motivated to pursue throughout my career. Through this paradigm shift, we can reposition our profession from the mere ornamentation of built form, to a vital process that dictates the health and resilience of our community. As such, 'health' is no longer a condition that is internal and pharmaceutical, it is the external design of our shared urban infrastructure.

The future of our cities rely on the future leaders of landscape architecture. And I am proud to be one of them.



Adrian McGregor (*nominator*)



Amie Mason (*nominee*)