curating SYDNEY

JILL BENNETT is a writer and curator who is currently professor of experimental arts and director of the National Institute for Experimental Arts (NIEA) at the University of New South Wales. She leads the collaborative project *Curating Cities,* for which she has developed exhibitions and a database of eco-sustainable art. Jill's books include *Practical Aesthetics: Events, affects and art after 9/11* (2012) and *Empathic Vision: Affect, trauma and contemporary art* (2005).

SASKIA BEUDEL is a writer whose books include *A Country in Mind* (2013) and the novel *Borrowed Eyes* (2002). Her essays and articles have appeared in a range of Australian and international publications including *The Iowa Review* and *Best Australian Essays*. She is currently a postdoctoral research fellow at the University of Sydney and previously worked on *Curating Cities* at UNSW.

This lively and well-documented study is a fabulous and welcome addition to the growing discourse around art and civic engagement. *Curating Sydney* gives voice to the increasingly influential practices of design and art in the public interest. Bennett and Beudel expose new ways of understanding the relationship between urbanism and art, challenging us to question the boundary that traditionally keeps the two on opposite sides of the fence. De-institutionalising the role of the curator, Bennett and Beudel liberate public art from the confines of mere spectacle, opening up new possibilities for art and urbanism alike.

Director of the Charles Phelps Taft Research Center and UNESCO
Co-Chair of Water Accessibility and Sustainability

What might happen if we stopped developing Sydney? If we abjured the grabbiness and greed in that deceptive verb? What say we the citizens commenced curating the place instead, caring for it and encouraging revelations and transformations in the city, as if the force of art zinged in its fabric? Here is a book – full of care and creativity – that leads us through such questions, past the real estate, into the really imaginative speculations we need.

Centenary Professor in Creative & Cultural Research, University of Canberra

curating SYDNEY

JILL BENNETT AND SASKIA BEUDEL

IMAGINING THE CITY'S FUTURE

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CITY OF SYDNEY 2030

curating cities

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UNSW AUSTRALIA

contents

introduction

I can only justify public art as the beginning of a system

Richard Goodwin

curating cities

Picture Sydney in 20 or 50 years from now. What might the city look like? How will it function? You may imagine major changes to the landscape and coastline – the effects of climate change, rising sea levels and human-engineered terraformation – or a city whose boundaries extend across the producing region to merge with neighbouring conurbations. You may simply envisage more of the same but bigger – more people, more buildings, more traffic. Or a city running on new energy and transport technologies that break reliance on coal and oil? Now think about how this will be brought about: the forces and agencies that shape public space. Chances are you'll think of planning departments and government at all its scales, local, state and national, of developers, builders, urban planners, landscape architects and engineers. Chances are too that public art does not spring to mind along with the larger scale developments and civic projects that transform the material and social environment. The term 'public art' has become synonymous with the kind of sculpture that appears in town centres or corporate atriums – often the least adventurous of artforms. Yet art itself – the exercise of creative imagination – is vital to reimagining the city and its future possibility. In an ideal world that exploits the potential of art along with technology and engineering, public art is an exciting prospect: a space in the public domain where creative thought is brought to bear. The current reality of urban development is somewhat different, however. Art is often an afterthought: the final addition to a completed project, rather than part of its overall conception. Projects that engage artists and curators in the development process are still few and far between. A habit of thought reflected in institutional practice too often deprives public art of a function beyond that of filling its designated place in a mall or corporate foyer. Nevertheless, in Sydney today, public art has much to say about the city – and many ways of intervening in its processes.

Curating Sydney is in part a book about public art – but not in the sense of the standard definition of public art, categorised purely by location in a public setting. It highlights art that actively investigates the nature of public place, and that sets about what artist-architect Richard Goodwin calls 'the revision of public space'. In

chatting about this one day at our institute at UNSW, Goodwin went on to insist that art justify itself as the beginning of a system for transformation. This conception of 'art as the beginning of a system' couldn't be further from the conventional idea of public art as adornment. For a start, Goodwin's work does not stay put in the atrium or piazza; it permeates the inner recesses of the city, precisely to expose and activate public space where you might least expect it – in private buildings or tunnels beneath the city, for example. 'Public', it assumes, is not a given but something to be claimed through exploration and repurposing, through adaptation and addition. Goodwin's project strikes at the heart of our assumptions about how to build a city; why, he asks, do we construct cities as self-contained boxes with no consideration of the space in between or potential interconnections?

In a different arena, Natalie Jeremijenko adopts a comparable systems perspective, initiating discrete public works within the larger framework of an environmental health project. The core of her public art is (as she says in her TED talk) 'a clinic like a health clinic at any other university, except people come into the clinic with environmental health concerns, and they walk out with prescriptions for things they can do to improve environmental health, as opposed to coming to a clinic with medical concerns and walking out with prescriptions for pharmaceuticals.' Her prescriptions include things like food to throw to fish in urban rivers, made up of nutritionally appropriate ingredients, along with chelating agents that bind to and remove heavy metals from the fishes' digestive systems; or urban 'butterfly bridges' planted with tempting plants and flowers that lure butterflies away from dangerous traffic and afford them safe passage through the city. In other words, small but efficacious interventions conceived in relation to big systems.

One way to expand the profile of public art is by increasing its physical scale and presence (in the manner of Anish Kapoor's monumental 114.5 metre folly, the ArcelorMittal Orbit). Another is for artists to take on the larger challenges of urban development in the 21st century: those of sustainable development and population expansion, resource management and conservation, emissions reduction and climate change. The creative systems thinkers discussed in this book develop remediative actions that address many of the pressing issues of our time. They represent a new form of public art that doesn't slot into a designated place for art. Where necessary, they trace flows across public and private boundaries, open up new public spaces, or question habitual practices, changing the way we inhabit and conceptualise the

domain of the city. This is not art that waits to be curated into institutional space; it is art that is operative in public space, itself curating the urban environment. Hence, this book is about curating a city, in the literal sense (the Latin *curare* means 'to take care of'). We ask how the arts might 'care for' – curate – the city.*

It has become impossible to talk about the future of the city without addressing the future of the planet. Problems of sustainability and adaptation to climate change are now too big and multifaceted for planners and policy makers alone. We need to effect 'massive change', in the words of the design thinker Bruce Mau. No discipline can do this on its own. In the context of problems that stymy forums of world leaders, working from the arts has both ironic appeal and serious value. If art doesn't generally *solve* world problems, its value often lies in abandoning the unproductive discourse of mainstream politics for creative leftfield approaches. 'Art-thinking', like the more formally established practice of 'design-thinking', casts problems in a new light and shows us when solutions don't in fact reside in current structures, organisations and practices. It envisions new ways of thinking, seeing, operating.

If *Curating Sydney* is a book about new forms of public art, it is also more than this. We extend the notion of curatorship to examine how the arts might constitute new perspectives and pathways, leading us through the city and serving as a 'guide' to specific physical locales or areas of inquiry. The book itself is a mode of curating in this way – a model of doing something *with* art, operationalising the ideas and models provided by creative thinkers. Essentially we invite the reader to use the rich resource of public art, which we construe in diverse but always exploratory terms: from a roadtrip to Botany Bay, exploring zoning collisions and traffic islands with architect Teddy Cruz (Part 1), to Ash Keating's procession of rubbish-clad figures in a shopping mall or artist Jeanne van Heeswijk's exploration of the impact of Sydney's waste on the community of Goulburn (Part 2), to artist David Watson's swimming of the Parramatta River (Part 3). Art is practical, but its functionality is distinctive; it expands cultural imagination and possibilities for thought and everyday practice. For this reason, it is vital to the city as an engine for change and not just as a 'creative industry' driving a particular sector of the economy. Art is public, not only in the literal sense of being on display. It is the very means of shaping our public life.

* The book *Curating Sydney* is one outcome of a larger research project, *Curating Cities* (p 259). Exhibitions and public artworks developed within this project are referenced throughout.

Ivan and Heather Morison, *Sleepers Awake*, 2014. Bungarribee Park, Western Sydney (collaboration between the MCA and Western Sydney Parklands under the C3West program).

P

IMAG

PART 1

GINED CITY

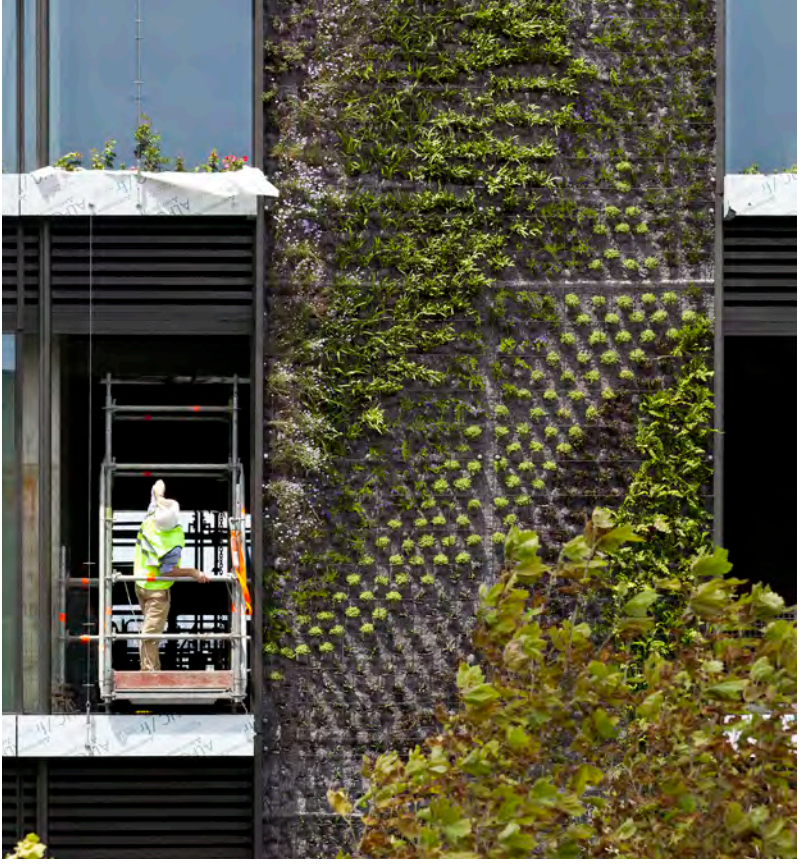
Richard Goodwin, *Denatured Contingency: The Dissolution of Architecture*, 2011.

castles

in the air

Imagine Sydney in the year 2030. It will be *green, global and connected*, according to the vision published in 2009 by the City of Sydney. The city centre will be activated 24/7, forming the hub of a network of villages, linked by green corridors of pedestrian and cycleways. In city planning terms the vision has shifted noticeably from the tentative aspiration of 20 years ago to create a 'vibrant city of world standing'. Twenty-first century Sydney assumes itself to be a well-connected World City. Its brand is not just aspirational but 'high touch': *green, global and connected* affirms belonging – connection to the world, to the planet, to places not yet built behind the hoardings of new civic developments of the 2010s.

Like global connectivity, greenness is today asserted as a matter of fact. A few years ago in Green Square, a world leading eco-village was announced ahead of construction – and in the absence of natural life forms – with a wash of olive-coloured bollards. Gamely overriding the ambient reality of a busy traffic intersection, signage in front of the Botany Road car dealership declared, 'Green is the colour of everyday life.' At the other end of town, a development at One Central Park on Broadway boasts the world's tallest vertical garden. No less direct in its self-proclaiming green-skin, this arresting icon is the touchstone for a look of the moment. Grass-clad rooftops, referencing Manhattan's High Line, the elevated track turned parkland, are proliferating in Sydney's upscale developments; further afield, plant numbers have become a metric for distinguishing hotels like Singapore's ParkRoyal on Pickering, which boasts 15 000 square metres of sky gardens ('a jungle in the sky') or Milan's Bosco Verticale, which brings a hectare of forest into the central business district (CBD).



Patrick Blanc, vertical garden for Jean Nouvel's One Central Park under construction, 2013.

Such emphatic self-cladding requires no interpretation: it simply declares itself Green. Living buildings are, in the words of Bosco Verticale's architect, Stefano Boeri, 'ecology billboards', commandeering wall space to deliver the green message and all-round experience within the structures that embody the aggressive scale and grandeur of urban development. But if, indeed, these 'billboards', like the literal signage at Green Square, give advance notice of a green future, what kind of city do they announce? Billboards, by nature, do not embody new form and in this sense give us little concrete indication of the shape or style of things to come. Twentieth century artists and architects conjured futuristic cities of soaring skylines, inspired by waves of Manhattan Deco and International Modernism.

Today's eco-futurism has no recourse to a programmatic style in this sense; it is a conceptual rather than aesthetic futurism, for which green coloured things are merely a sign. The looming metropolis, defined by its high peaks and skyline, has given way to a layering of multi-level verdant surfaces, which Boeri sees as a reaction against large rectangular boxes 'clad by glass, steel or ceramic'. But it is not yet clear how the fundamentals of ecology might transform the culture and ambience of the city. Sustainability, most progressive architects concur, is a compliance issue; a baseline, not a vision. Yet, its driving concern with ecological validity, with unseen connections to resources, to consumption, to atmosphere and earth systems, implies a way of seeing that is transformative: a paradigm shift from earlier conceptions of urban expansion as a goal in itself.

Robert Emerson Curtis, *Old Circular Quay with Sydney in the year 2000*, c1930. Ink and pencil on paper.

Blanc *Vertical Gardens*

Eschewing the notion that extensive plantings are only for the outer suburbs, Patrick Blanc's *Vertical Gardens* introduce luscious greenery into the architecture of high-rise apartments, primarily on the 'unused' vertical planes of buildings. Blanc insists 'you can have the same kind of nature [in high-density apartment living] as you could have in your house in the suburbs'. His gardens act, he argues, as a natural air purification system that mitigates greenhouse gas emissions. The gardens' foundation – a patented non-biodegradable felt – absorbs polluting particles from the air and slowly decomposes and mineralises them, transforming them into plant fertiliser. Providing this service, Blanc's *Vertical Gardens* show how natural systems can be integrated into urban living in densely populated areas as an efficient tool for air and water remediation.

Blanc completed his *Vertical Garden* for the Trio building in the Sydney suburb of Camperdown in 2009. This building is part of a larger regeneration project unfolding in Sydney's inner western suburbs that aims to set new, eco-sustainable benchmarks for building and architecture. Located on the building's northern façade, this *Vertical Garden* comprises 4528 native plants of over 70 species including *Acacia*, *Allocasuarina*,

Patrick Blanc, vertical garden for Jean Nouvel's One Central Park, 2013.

Carex, *Correa*, *Dianella*, *Goodenia*, *Grevillea*, *Lomandra*, *Poa*, *Themeda* and *Viola*. 'You can observe many of these species growing wild on maritime cliffs or along the cliffs and rocky slopes in mountainous areas, making this project a kind of "Botanical Vertical Garden",' says Blanc.

Blanc has also completed a vertical garden in the Qantas Lounge at Sydney Airport (2007), and as of 2014 his tower wall at Jean Nouvel's Sydney project, One Central Park, is the tallest vertical garden in the world. In an attempt to pre-empt the problem of high winds battering Central Park's tallest floors, Blanc undertook detailed wind-tunnel testing at the site, which informed the selection of plants. This 'living tapestry' of plants, flowers and vines contains 190 native Australian and 160 exotic plant species. The garden will cover 50 per cent of the building's 166-metre façade, extending the greenery from the adjacent park onto the eye-catching building of 624 apartments, shops, cafes, restaurants and office units. Blanc suggests, 'the building, together with my vertical garden, will be an architectural work floating in the air, with plants growing on the walls – it will create a very special result that will be very new to Sydney'.

Imagine, then, how Sydney might look 20 years beyond the span of the current city vision. For the Venice Architecture Biennale of 2011, the Australian pavilion commissioned a collection of 3D visualisations of its cities in 2050. The imagined cities were conceived against a backdrop of a warming climate, of floods and rising sea levels, necessitating not just building and landscaping, but massive terra interventions and population redistribution. Highlighting colonial Australia's predilection for coastal cities, one submission went so far as to propose a large inland sea, taking out tracts of the South Australian desert to extend coastline, whilst the impromptu collective Rag Urbanism – Richard Goodwin, Gerard Reinmuth (TERROIR) and Andrew Benjamin – focused on Sydney in its current formation. They propose radical interventions into the urban fabric with parasites and new growths penetrating existing structures to extend the city not as more and more building blocks, but as a kind of coral reef, building onto itself. Along with the prevailing sensitivity to atmosphere and biosphere ('For architects, it is quite a change in mindset to deal with living things' says Richard Hassell whose firm WOHA developed the ParkRoyal), this willingness to cut through and across these monumental and discrete structures emerges as the hallmark of a new approach.

Today's futurists are unsure whether the earth will be around to build on – whether rising waters will change the logic of how a building relates to ground. Tellingly the title concept of the 2011 Biennale exhibition, *Now and When*, is an incomplete phrase, conjuring an unspecified apocalypse or set of problems to come ('when' what? when the sea rises, when the land is submerged, or can no longer sustain life…?). Futurism is no longer idealistic but contingent. The task is always to create a better future but to do so in the knowledge that certain large problems will be, in an unqualified sense, worse. Of all the city visions on show, Rag Urbanism's Sydney is the least speculative insofar as it is grounded in the material here-and-now and not in a hypothetical. Its manifesto style and gritty, practical realism talks back to the knock-down-and-rebuild logic of Sydney

Richard Goodwin, *Governor Phillip & Macquarie Towers Parasite Proposal*, 2011.

development as well as to an obsession with the shiny and new. Instead, Rag Urbanism deals with 'fraying ground' and endlessly unravelling edges, looking to proliferate pathways and points of access to high-rise structures in the city whose rigid real estate hierarchy is neurotically indexed to harbour views.

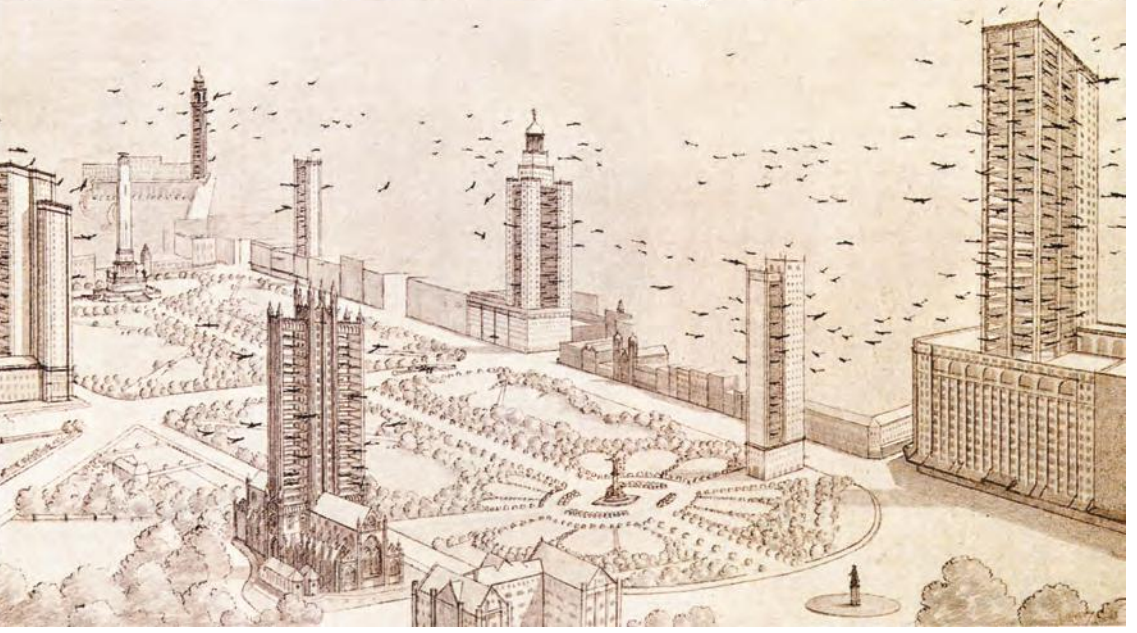
The Sydney with which Rag Urbanism engages is the one that in 2014 announced the eviction of tenants from the high-rise Sirius apartment building in The Rocks – along with the end of public housing in Millers Point, a community that includes descendants of the original Millers Point maritime workers. (The sale in this case was instigated by the state government; both the Lord Mayor and Federal MP pointed to the social costs, not just for the elderly tenants, but for a city centre transformed into a monoculture of wealthy apartment dwellers.) The Sirius, a product of 1970s

Ron Jennings, 84, will have to leave his home in the Sirius building. *Sydney Morning Herald*, 22 March 2014.

Brutalism with (ironically) now in-vogue balcony-sized roof-top gardens, was once heralded by some as a bold experiment in public housing. Tucked tightly between stone cottages and the Harbour Bridge, the Sirius emerged out of the 1970s Green Bans, when redevelopment in The Rocks threatened to force out public housing residents (see p 54). An anomaly in today's Sydney, its modest rooms, not much wider than a dining table, look directly onto the Quay. An 84-year-old tenant tells the *Sydney Morning Herald* that his daily life revolves around looking out at the ferries and ocean liners; a property market analyst from CBRE explains that a developer acquiring this block from the state government would want to 'maximise the built form' – in other words, replace the current structure with prestige apartments. The Sirius is an aberration to be corrected in the Sydney real estate world whose logic demands that an aspect this good can only be appended to high income housing.

Mark Szczerbicki, poster graphic for *The Shape of Things to Come*, 2010. Exhibition commissioned by City of Sydney, curated by Szczerbicki, held at Customs House for Sydney Architecture Festival, 2010.


39°C
Welcome.....



E Norsa, *Design for Sydney's future Airport for architect Norman Weekes*, 1928. Ink and pencil on paper.

At the other end of the spectrum to the Sirius, the most glamorous of high-rises promote a sublime and exclusive transcendence. At One Central Park, 'Sky residents enjoy a world of luxurious amenities, all to themselves, all above the clouds.' As part of its 'organic ethos', Sky doesn't merely offer a view, but is itself a nature-inspired 'oasis'. This 21st-century eco-brand contrasts sharply with the 1920s garden city, whose concrete boxes remained at some distance from the manicured nature of Hyde Park in this Sydney version above. But the altitude of premium real estate has always provided an escape from urban congestion. Futurists have imagined this facilitated by modes of sky-borne transportation to beat the metropolitan traffic, from hoards of de Havilland Moths servicing the Hyde Park penthouses (above) to jetpacks (pp 26–27). Ground level, by contrast, is often the darkened space of the overlooked: an unintended consequence of high-rise urbanism, giving rise to the dystopia whose aesthetic was crystallised in the film *Blade Runner* with its 700-storey skyscraper and polluted skies – an aesthetic which is also a touchstone for Goodwin's parasites.

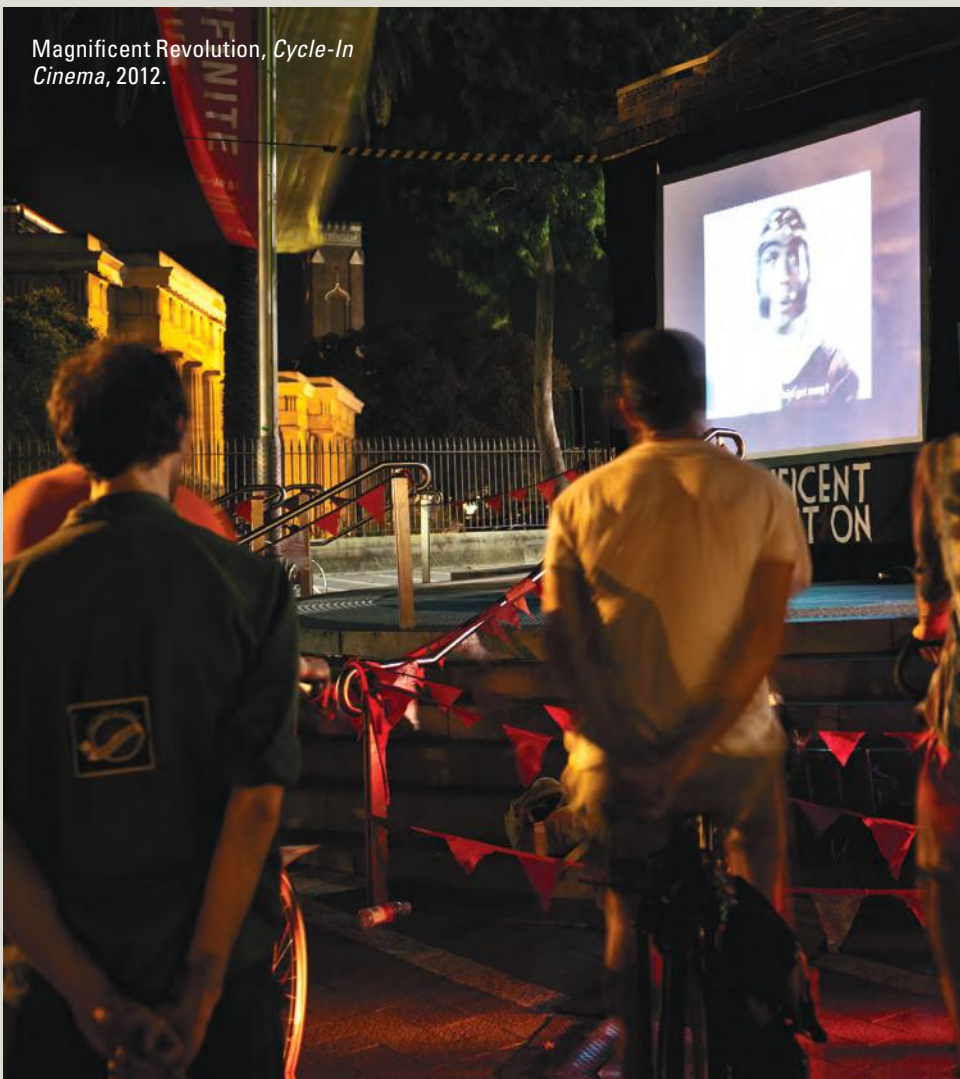
Today Sydney's CBD is one such 'dark' interior in the estimation of the city's advisor on public space, Danish architect Jan Gehl; a result not only of the dominance of the corporate high-rise but of narrow sidewalks and minimal walk-space. The cars-over-people logic of the CBD is compounded by the effective walling off of the harbour from the city, which forecloses on the possibility of street level water views a block in from the Quay. Gehl in his public talks likes to joke about the irony of the 'harbour city' in which virtually no one at street level can actually see ocean, gently mocking a series of monumental follies. Most European cities, he notes, have decided *not* to disgorge a major distributor into the heart of the city, or to build an expressway between the downtown area and its picturesque historic quay.

As it becomes evident that the quality of public space and public life is a pre-requisite of the sustainable city, the City Council's priorities are shifting. City planners are interested in ground level civic space; George Street, the city spine, will be purged of traffic and transformed into 'one of the world's great plazas', finally delivering on the promise of wide pedestrian boulevards with priority given to light rail over cars. And one day, Gehl publically muses, we will knock down the Cahill Expressway, returning Circular Quay to pedestrians. These shifts at the level of city planning are often hard wrought, even as they appear to restore something old and familiar (a George Street closer in ambience to the late 19th-century tram-lined boulevard than to the traffic snarl of the last few decades, or the capacity to ride a bike to work). Cycle lanes, in particular, are a key battleground in city politics today, perceived by opponents as a land-grab, threatening the viability of already strained car journeys. On one side is Lord Mayor Clover Moore, inspired by Gehl's transformation of Copenhagen into a cycling city; on the other, the shock jocks and the *Daily Telegraph*, for whom bike-bashing is a war of attrition, bogged in the interpretation of road-use statistics, rather than any great vision. This is the frontline of Sydney green politics. There is no High Line-style solution for cycleways in Sydney, no futuristic icon, like Norman Foster's SkyCycle plan, a 220-kilometre network of elevated bike paths above London's railway lines – just the road.

Magnificent Revolution *Cycle-In Cinema*

Imagine a drive-in cinema with bikes instead of cars. Magnificent Revolution Australia's *Cycle-In Cinema* was an 8 bike/16 leg-powered cinema that presented three diverse programs of short films and new media in Sydney's Taylor Square 24–26 February 2012, as part of the City of Sydney Taylor Square Art Program *We Make This City* (curated by Margaret Farmer). Visitors could simply cycle up, plug a bike into a generator and ride to power the performance.

We Make This City aimed to engage the communities of Taylor Square with the issue of climate change in a way that would encourage behavioural change. The emphasis was on community-based and interactive works, related to the site, unfolding over the period November 2011–March 2012.



Magnificent Revolution, *Cycle-In Cinema*, 2012.

Magnificent Revolution Australia, founded in 2011, is an offshoot of the UK not-for-profit Magnificent Revolution, which has been running *Cycle-In Cinema* events and bike power workshops since 2007 as a means of promoting low carbon lifestyles. According to co-founder Greer Allen, 'working with the *We Make This City* program was the boost we needed to get the Magnificent Revolution project off the ground … to design and build Australia's first 8 bike *Cycle In Cinema*'.

The Sydney *Cycle-In Cinema* presented three diverse programs of film/new media. The season opened with a program of short films selected by QueerScreen as part of Sydney's annual Mardi Gras. *Burn Baby Burn*, curated by London-based Australian curator Katrina Schwarz, presented new media works by British and Australian artists. The third program, *Re-direct*, explored the ways in which people are addressing climate change on a small scale.


2day
EXIT
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Castles, Henry David Thoreau suggested, should be built in the air. This is as true, metaphorically, for Sydney as anywhere; we need imagination to lift us out of the present. But it's all the more ironic for a city so fixated on its harbour views, and with so many road and transport network problems to solve. We have built 'castles' in the air and even, occasionally, designated them as public housing. But the unbreachable corporate high-rise is precisely what the Rag Urbanist manifesto seeks to penetrate. The US-based urbanist Mike Davis argues that 'the cornerstone of the low-carbon city, far more than any particular green design or technology, is the priority given to public affluence over private wealth'; in Gehl's terms, the public 'life between buildings' is what matters now. And for Sydney artist-architect Richard Goodwin, it is the way in which monolithic corporate towers might be transformed into interconnected 'non-homogenous forms', themselves extending public space.

The goal in these terms is to imagine and create new forms of public space. How do we find, identify and map such space? The *Porosity* manifesto tells us that public space is not confined to administratively designated areas. It is user defined and activated – and may even be temporary or defined on the fly; in fact, 'there is such a thing as a one-hour public space'. The test is a simple empirical one devised by Goodwin when he began his research into the permeability of Sydney's private real estate. He would go into a building and apply a basic measure: 'if you can stay in a private space for 20 minutes, make yourself a cup of tea, it's public'. Based on this test he mapped the city, developing an index of porosity. His maps and models provide interesting and provocative data – not just of the occupiable spaces within private buildings but of the tunnels beneath us. These works are public art not simply by virtue of a designated location, but in the truest sense: they bring public space into being.

Richard Goodwin, *Hide and Seek Performance, Zone 3*, 2005–07.

Goodwin *Parasites*

Richard Goodwin conceptualises the indeterminate space between interior and exterior, public and private, as 'chiastic space': a place of crossover or permeability. The skin of a building is thus a site for emergence, potentially of an architectural 'parasite'.

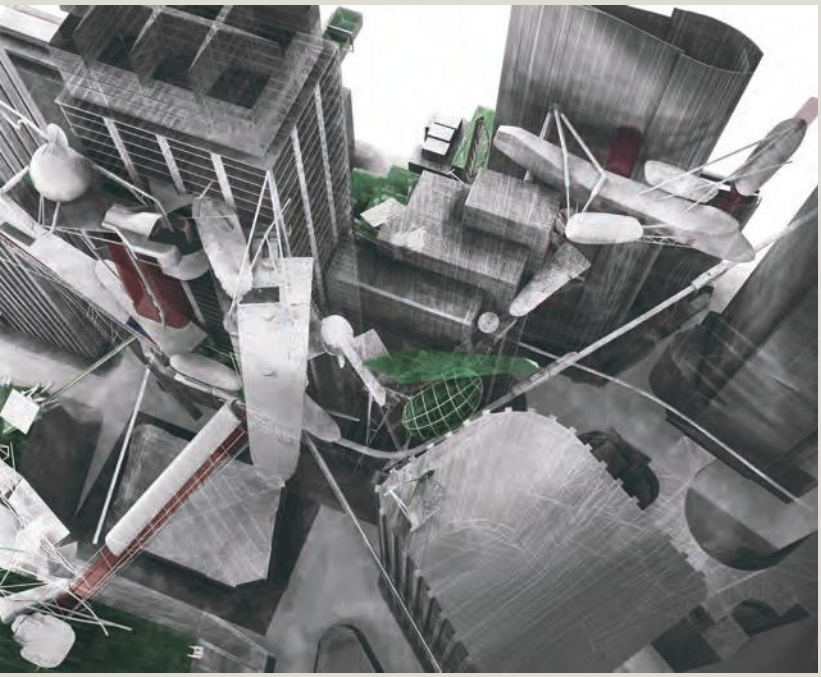
'Parasites' are a sustainable mode of architecture, meeting the demands of growing cities by adapting existing structures – easing the flow of foot traffic by appending pedestrian bridges between neighbouring skyscrapers, for example. Goodwin argues that we should 'accept architecture as malleable and in continual flux. This approach is predicated on the idea that … the greenest thing an architect can do in most cases is to rethink the existing architecture beyond the boundaries of current defining urban texts, to find a balance between public and private space, not as a utopian vision but as recognition of our human needs which must be addressed.'

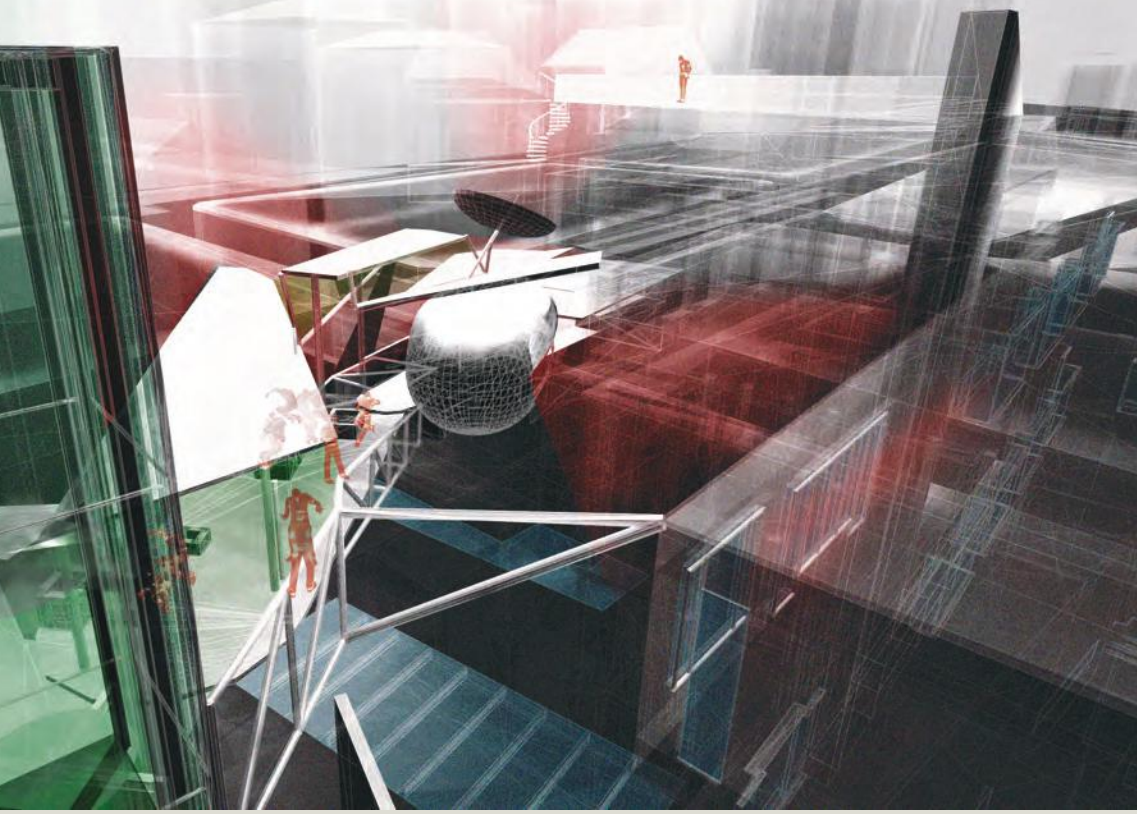
George Street Parasite is a 3D digital model of a parasitic link between floors and buildings at 345–363 George Street and Barrack and York streets in Sydney's Central Business District. The designed prosthesis is considered an independent entity. Once installed, it would become the parasitic organism, an attack on the closed system of the building.

The parasite, conventionally an unappealing concept, is here repurposed as an addition, aggregation or assemblage. Goodwin describes decay as a 'postponement of death' in which process the parasite should not be misperceived as a representative of mess or redundancy; rather than dismantling and starting again, city structures and patterns can be in constant flux and change, growing and burgeoning. The inside can regenerate the outside. People can reorganise above and below ground. In an era of poor zoning, over-emission, over-capitalisation and over-population, Goodwin's parasitic creations model new, contingent lifeforms engaged in hybridity, adaptation and constant transformation.

Richard Goodwin, *Cope Street Parasite* (photomontage), 2003–04.

Richard Goodwin, *345–363 George Street Parasite Proposal*, 2011.





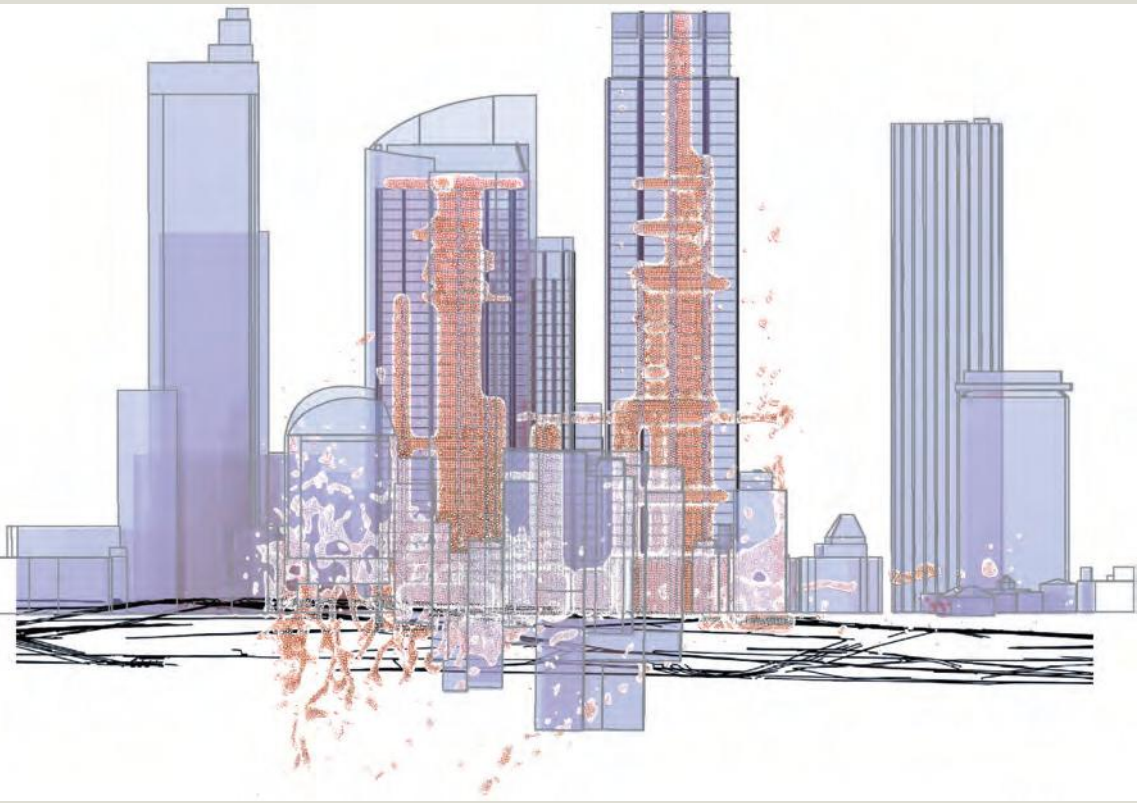
Goodwin *Porosity*

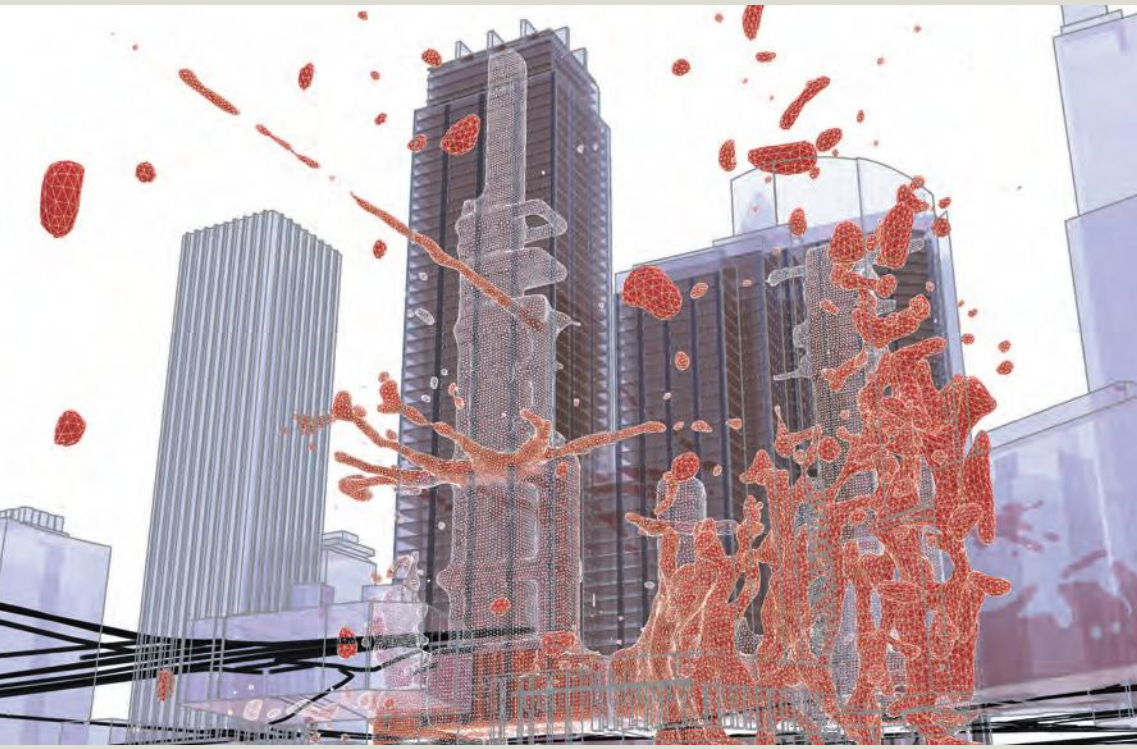
Richard Goodwin's *Porosity* is a radical revisioning of public space, conceptualising the city as interconnected public space made up of permeable buildings. 'The greater access there is for the public, the more porous a building is', Goodwin says.

Porosity through its various models and architectural interventions aims to promote adaptation, transformation, and continual licensing of new public spaces and private precincts; to foster an eclectic mix of styles and ages in the built environment; and to enrich the social construction of the city by actively creating new types of public. It seeks to transform lesser-used pathways in order to reveal and/or create public space beyond the conventional social 'outside' (of roads, footpaths, parks, public buildings).

Goodwin's first *Porosity* projects mapped all the accessible public space within corporate, private spaces in the City of Sydney, engendering a formal 'porosity index'. *Porosity* students' excursions into city buildings were recorded, indexed and mapped, and the resulting data assimilated into Maya, a program used in computer simulation and animation. 'We built "cactus" models and applied pressures to them equal to the numbers of people going into the building and accessing the public spaces. The images resulting from these social pressures resemble explosions in and of the buildings', Goodwin explains. These explosions represent 'energy flows' that indicate where a particular building wants to expand beyond its existing envelope, to open up, to reach out to another building.

Richard Goodwin, *Monkey Models, Zone 2*, 2005.





Goodwin and Lowe
Crysis in Parasite Paradise

The interactive installation *Crysis in Parasite Paradise* (2012) extends Richard Goodwin's 'porosity' concept to the mapping of underground space and tunnels in Sydney's Central Business District (CBD). An architectural model connects the landmarks of inner Sydney via a series of adapted 'parasites', monorails and pedestrian walkways between buildings. The virtual element uses a CryENGINE 3 gaming engine, the content of the original game stripped and replaced with CBD buildings, ground plans, 'parasites' and a customised avatar. During the exhibition *Running the*

City (UNSW), multiple visitors could use this interface to activate particular (often catastrophic) scenarios, modifying the built environment to envision alternative outcomes.

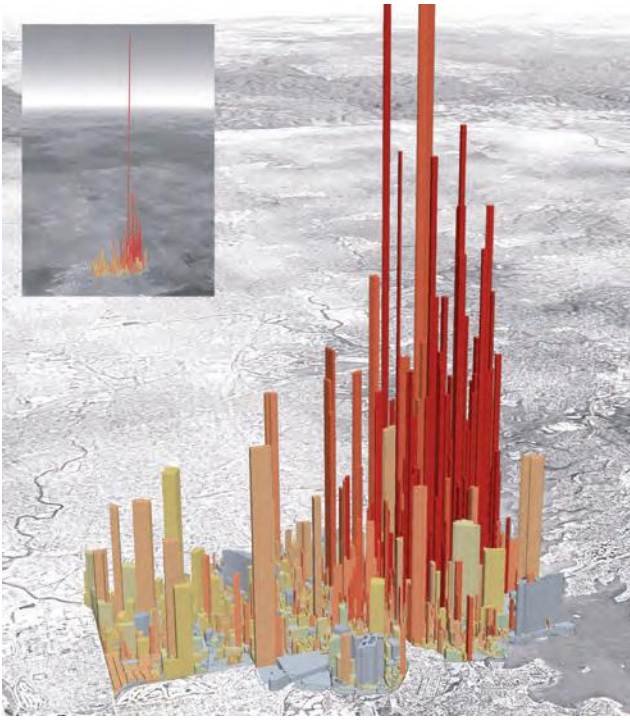
As part of the data collection process, scanners were attached to trains to film/scan the geometry of tunnels; records of sewers, water pipes, telecommunication cables, and access points were also gathered. The Emergency Information Coordination Unit (EICU), the security services of the Lands Department and state government in New South Wales, have shown interest in this data from the point of view of counter-terrorism and planning for emergency evacuations. *Crysis in Parasite Paradise* illustrates, for example, how people might respond to a terrorist attack in Town Hall train station.

Richard Goodwin and Russell Lowe, *Crysis in Parasite Paradise*, 2013.

an ecological

vantage point

Imagine the city from a different perspective, zooming out a few hundred kilometres. In the figure below, a conglomeration of towers, viewed at some distance from the Earth's surface, loom above Sydney Cove. At first glance this could be a downtown-Dubai-scale development – a variant of Robert Emerson Curtis's 20th-century fantasy of the infinite high-rise (see p 19). In the newer image, however, the peaks are not a physical extension of the city onto which they are superimposed. This is a data-graphic representing the carbon footprint of the city, the columns a measure of the building greenhouse gas emissions projected for 2030 if 'business as usual' is maintained. Eerily evoking the warming effects of a city on its environment,



City of Sydney, *Decentralised Energy Master Plan – Trigeneration*, 2012. Projection of Sydney's greenhouse gas emissions in 2030 based on current data.

dramatic red-orange blocks within an icy grey topography demarcate the metropolis like a heat map of human presence in high-rise towers. In place of bar graphs of comparative performance data, documenting how well the city is doing and how it will do better with an off-grid energy network, the visualisation transposes such urban data into a bigger picture, envisaging the city from an aerial perspective distant enough to register as the Earth's atmosphere. From this vantage point, marginal improvement is inconsequential. Sustainability is envisaged as a zero sum game, the ultimate goal of which is not simply emissions reduction – less of the same – but something completely new: the Zero Carbon City.

In *Curating Sydney* we are examining a city taking shape in imagination and practice. Unlike retrospective studies of fully formed images, this one looks forward, surveying emergent creative work and asking how a city image might be formed, modified, and put into practice. It does so at a transitional moment: the point at which our current era came to be defined as the Anthropocene. This newly coined geological time phase, dating back some 250 years to the industrial revolution, marks the period (ending the Holocene) in which human civilisation became a force impacting on earth systems. Though a geological term describing measurable changes in the lithosphere, the Anthropocene effectively names a new way of thinking about the past, the present and the future. This kind of energy visualisation (as much as the ecology billboard) is its imagery.

Colonial Australia exists entirely within the Anthropocene. The Nobel prize winning chemist Paul Crutzen proposes its symbolic beginning as 1784, the date of the invention of the steam engine that powered the industrial revolution. A neat story of Australia's part could be constructed around the foundation of the nation's fossil fuel economy, which dates from this era, even if the colony was not itself industrialised. Captain James Cook landed on the Kurnell Peninsula on 29 April 1770, on a ship that was once a coal hauler. Twenty years later, as Sydney developed as a port, coal – abundant along the eastern seaboard and deep under Sydney

Harbour – became its first export trade, shaping the economy of the nation. Today, the City of Sydney is committed to a vision built around different kinds of commerce and industry – finance, tourism and hospitality, digital and creative industries – and to a future in which renewable gases will replace fossil fuels. The illustration on page 43 relates to the city's proposal for trigeneration, an off-grid energy network that converts natural and waste gas into electricity, heating and cooling – an ambitious proposal, subsequently stymied by regulatory changes and a federal government unsympathetic to carbon pricing.)

The iconic skyline and architectural profile constitute only one dimension of the city whose physical structure is explored today in forensic CGI investigations of its geological formation, such as in the captivating episode of the television show *Strip the City*, in which the harbour is emptied to reveal the deep coal seams within. Still, as the artist-urbanist Patrick Keiller maintains, 'the true mystery of the world is the visible, not the invisible'. Keiller refers to Britain but his words have even greater resonance in a city of incomparable spectacle such as Sydney. Bits of Sydney – the harbour, the beaches – are dazzling to a degree that is in equal parts blinding. These radiant parts stand in for the otherwise invisible whole, propelling Sydney into Top 10 Most Livable City lists, as local commentators opine that international judges of these lists pay no heed to the day-to-day conditions of living in Australia's least affordable city.

For artist Robert Emerson Curtis (p 19) and his early 20th-century contemporaries the future city was an expression of global modernist ideals and technological dreams; today City of Sydney planning is guided by the title concept of the 2030 Vision document, *Sustainable Sydney* and the tagline *green, global and connected*. Global and connected by virtue of a finance sector, responsible for 65 per cent of Australian trading activity, Sydney is entwined with the world economy yet still lacks the infrastructure of leading world cities (second airport, extensive public transport network, affordable housing). Growth proceeds in precarious tension with the

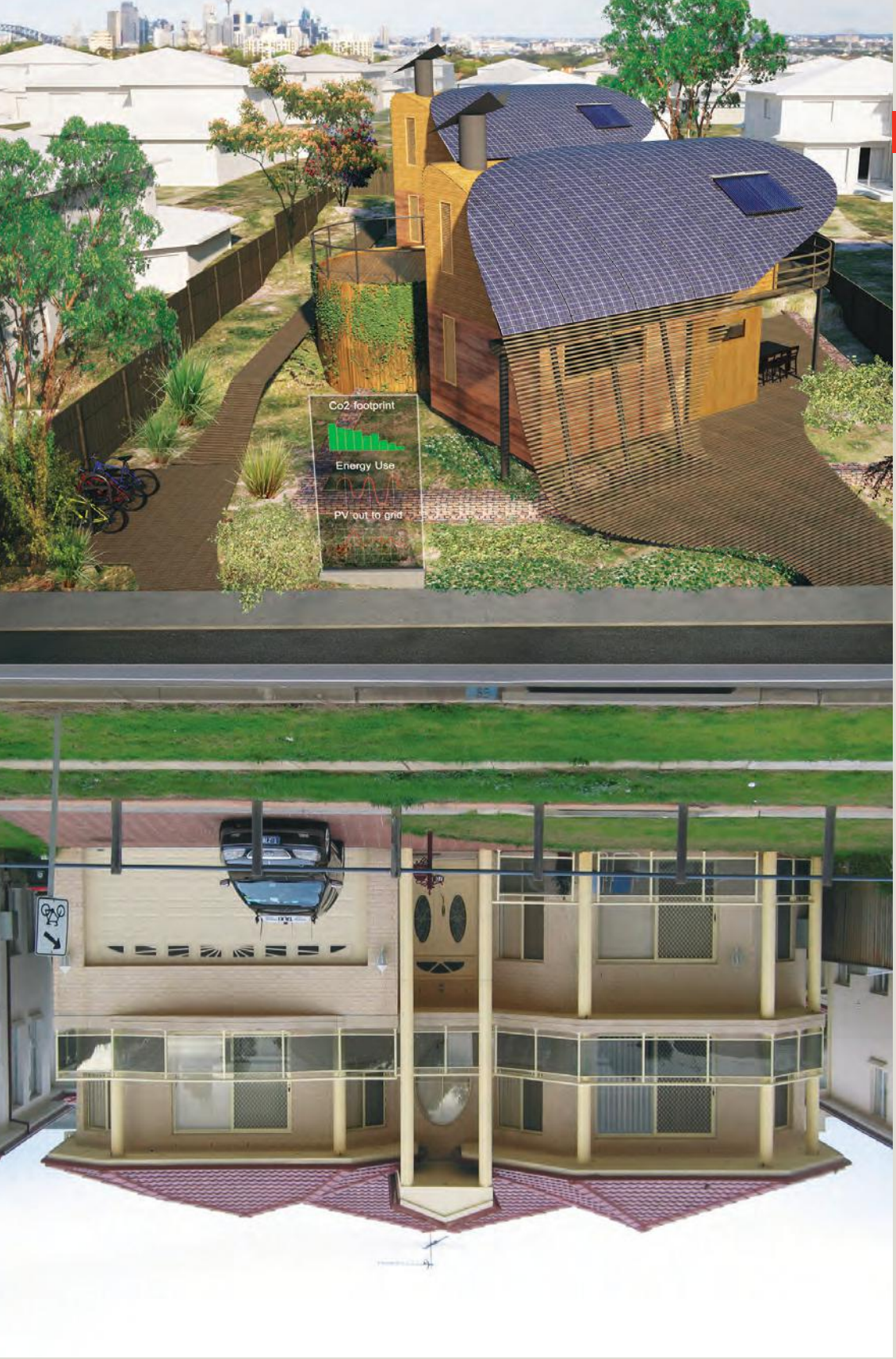
sustainability agenda and the Vision's ambitious emissions reduction targets (it is estimated that landmark developments at Barangaroo and Green Square, for example, will increase emissions by 11 per cent).

The population of the municipal area of City of Sydney is projected to double in the next 20 years; the encompassing metropolis of 4.4 million people could swell to as much as 8 million, according to some estimations. The urban region will continue to expand, although sustainable development will require greater densification to curtail the threat to the agricultural regions of Western Sydney. The McMansions of the outer suburbs are now identified as the scourge of a nation that builds the biggest houses in the world. They have become the emblems of conspicuous consumption, and of a sprawl presumed to promote car dependency by virtue of moving people further from the city and its amenities. Some (such as public affairs commentator Chris Berg, recently) draw attention to the snobbishness of deriding the upwardly mobile homeowners of Kellyville from the sanctuary of the high-consumption city; there is, after all, a case to be made for backyard food production. The suburban backyard – and even the outer suburban quarter-acre block – offer resilience in this regard as urban agriculture takes off in ingenious forms (supported by the City's Green Villages and City Farm initiatives as well as by community and arts projects for inner city apartment dwellers).

The suburb is in some ways beginning to penetrate the city, if only symbolically. The up-market Park Lane at the Central Park development makes a feature of its individual letterboxes. The City of Sydney promotes itself as a city of villages, harking back, it would seem, to a pre-modernist low-rise idyll. But this vision nevertheless couches a 'promethean environmentalism'. Rather than retreating from Sydney's aggressive development drive, it is characterised by bold technological solutions, densifying and activating the city 24/7. Sydney's proposed village network aspires to the principles of village life, imbuing suburbs with a distinctive street culture and identity, keeping New York, as always, in mind. Beyond

the developments for which Manhattan simply provides a marketable name (Central Park, East Village), the urban village is a concept inspired by Greenwich Village, famously promoted in the 1960s by urbanist Jane Jacobs as the downtown neighbourhood where locals have their 'eyes on the street' and where creativity and innovation flourishes as a result of encounters in public space. Creativity, the theory goes, stems from the urban mix, but more specifically from the streets that put people in close and regular proximity.

A 'cultural and creative city' is one of the ten strategic directions of Sustainable Sydney 2030. The City is keen to activate under-utilised commercial space with creative projects, thereby helping to rebuild Oxford Street as a dynamic cultural precinct and foster new hubs in areas such as William Street. The development of the creative economy and of mixed business precincts enriches and enables the creative sector, but it tells the story of creativity from the city or policy perspective. The creative sector needs to cast the city in new terms and create its own sustainable Sydney narrative. To this end we suggest a new way of thinking about public art; in a literal sense it is any art that pops up in civic spaces or corporate atriums. But it can play a more progressive role in changing the way we think about and inhabit public space. The most interesting question is not how to fill a space with art (official or unsanctioned) or extend the institutional space for art – but what if, rather than staying in place, we apply creative imagination to the city itself – to all the big questions of access and experience, or to the question of 'what buildings want', as Goodwin puts it? Let's envisage the future of the city fabric, but also expose how it needs to be cared for, revised and attended to.


Co2 footprint
Energy Use
PV out to grid

Gallois *Reincarnated McMansion*

Artist and architect Mathieu Gallois' prospective project addresses the phenomenon of the 'McMansion', an oversized and energy inefficient type of suburban family home that pervades Sydney's western suburbs (and suburbs around the world). Gallois proposes to dismantle a McMansion, recycle its materials, and convert it into two or three smaller, sustainable and energy efficient dwellings. He hopes that the *Reincarnated McMansion* project will enhance public awareness of unsustainable suburban architecture, intervene in existing building practices affecting Australia's 'suburban sprawl' and, most importantly, showcase some best-practice sustainable solutions for building and architecture.

Reincarnated McMansion is intended to engage homeowners emotionally and financially in sustainable practices, beyond the already ubiquitous domestic practice of recycling. Its larger goal is to forge a new model of sustainability for the suburbs, mobilising a shift in suburban housing planning.

This innovative project faces considerable economic and social challenges. To realise *Reincarnated McMansion*, Gallois needs the support of investors, councils, media, and ideally a major sponsor. Marketing firm Republic of Everyone has estimated that the media value of *Reincarnated McMansion* will be $2 million. Numerous companies and businesses have to date pledged support to the project, but such pledges are contingent on Gallois securing the participation of a homeowner. Thirty-five homeowners have indicated their interest, but project organisers have not been able to secure a firm commitment, despite the fact that Gallois estimates the revenue from the sale of each dual occupancy residence at approximately $650 000 – at least doubling the home's original value.

Mathieu Gallois, Peter Smith, Tone Wheeler, Jan O'Connor, Jason Veale, *Reincarnated McMansion*, schematic concept design, 2010. Concept image for *Reincarnated McMansion* (2008–).

Jeremijenko *xClinic Farmacy*

One of the many facets of Natalie Jeremijenko's Environmental Health Clinic (*xClinic*), *Farmacy* invokes a familiar medical model – the clinical trial – to directly involve people in reimagining the health of their bodies and their urban environment. *xClinic Farmacy* is a public experiment, a tool to test and develop scalable urban agriculture.

At the centre of each clinical trial (which to date have been held in Sydney, Boston and New York) is Jeremijenko's invention, the AgBag. A portable growing platform made of Tyvek, a high tensile, spun olefin material, AgBags are filled with soil, growing nutrients and a range of edibles, or what Jeremijenko calls 'U-foods' (U = Urban). The U-foods grown in AgBags are curated and cultivated for their extremely high nutrition value (including the colourful alpha-carotenes, polyphenols and micronutrients that allow a body to cope with the assault of urban pollutants). Designed to be suspended over existing architectural features such as railings, double-hung windows and balconies, AgBags are easily installed in small or crowded urban spaces, generating vertical urban farming solutions.

Farmacy and AgBags represent a closed and coupled agriculture system that has, Jeremijenko claims, 'NO nutrient run off, which means NO degradation of local ecosystem or water quality.' It is 'a demonstration that food production need not externalize the environmental costs, like fertilizers, contaminants or other additives' such as snail poison. Owners of AgBags – U-farmers – need only use rainwater (or grey water) and a simple automatic irrigation system to retain soil moisture. In return, *Farmacy* improves air quality and augments nutritional resources available for humans and non-humans; at each trial site growth responses of plants are monitored and air quality is evaluated. Like many of Jeremijenko's projects, the system is designed to foster biodiversification (including snails).

Farmacy's success depends on mass participation. 'People who may never have farmed can install AgBags and become active U-farmers, using their window or a railing as a "growcery"', says Jeremijenko. By creating more U-farmers, the project seeks to reinvent socioecological systems, combining agricultural and health related provocations to prompt reflection and action. Jeremijenko intends the AgBags as 'a platform for imaginative systems design to improve, rethink and adapt agricultural and food growing practices for urban contexts'.

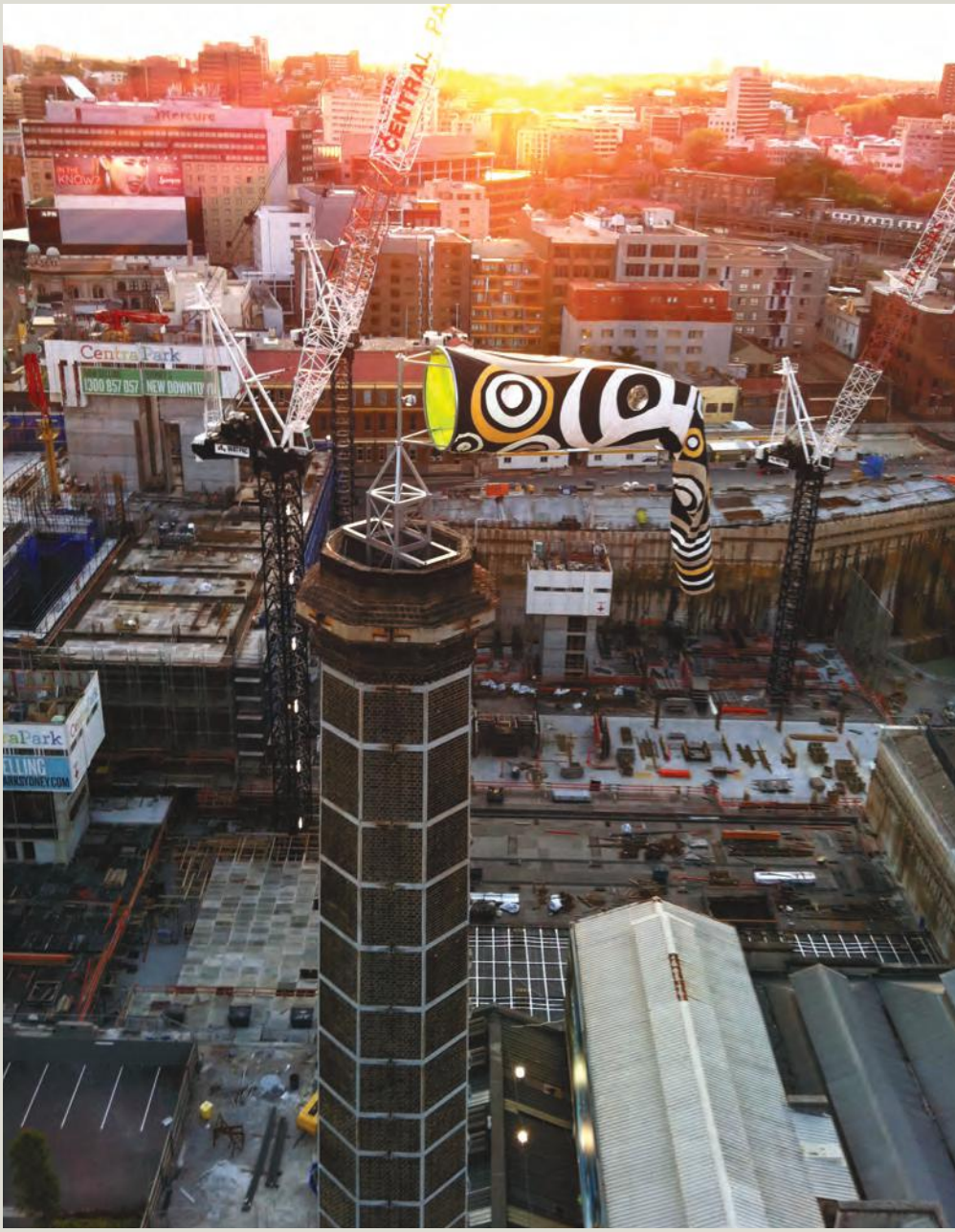
Natalie Jeremijenko, *xClinic Farmacy*, 2011. *Curating Cities* workshop at Customs House, Sydney.

Turpin + Crawford
Central Park Public Art Strategy

The City of Sydney stipulates that urban developments worth in excess of $10 million are required to develop a public art program aimed at enhancing the city's cultural and social fabric. In 2009, Frasers Property and Sekisui House commissioned artists Turpin + Crawford to develop a public art strategy for the $2 billion development of Central Park, situated on Broadway near Central station.

Turpin + Crawford take into account both the historical and future identity of the project and its site, the former Carlton & United Brewery. Central Park is an ambitious development, aiming to deliver Australia's first 6-star energy efficient precinct. It encompasses extensive and innovative sustainable energy infrastructure including a trigeneration plant, sewer mining, storm water retention, organic recycling, and rooftop photovoltaic solar collectors. Much of this infrastructure will be situated inside the heritage-listed brewery building and will be thus invisible to the public.

Turpin + Crawford sought to visualise this 'concealed' engagement with natural systems and sustainable design through the public art strategy. Mikala Dwyer was commissioned to produce *Windwatcher* (2011), a wind-direction sensor for the old brewery's 52-metre chimney. Brook Andrew's temporary installation *Local Memory* (2011) showcased 18 portraits of former brewery workers on the pre-demolition Brewery's façade, while Caroline Rothwell's sculpture *Symbiosis* (2012) referenced the mechanics of the old factory's pipes. Permanent public art includes a water feature by Jeppe Aagaard Andersen and Turf Design Studio, and the vertical garden by Patrick Blanc (p 20). Turpin + Crawford themselves produced *Halo* (2012), a large-scale kinetic sculpture affected by the lightest and gentlest of wind currents. *Halo*, they suggest, 'stands between the heritage, the contemporary and the building-in-progress' and 'gestures outward to the space and energy of the environment beyond'.



Mikala Dwyer, *Windwatcher*, 2011.
Located at Central Park, Chippendale,
Sydney.

Green Bans Art Walk

In 2011 a range of curators, artists and activists collaborated to create the *Green Bans Art Walk*. Initiated on the 40th anniversary of the emergence of the Green Bans movement, the *Art Walk* intended to both memorialise and reactivate the values of seminal Sydney environmental activism. The original Green Bans movement arose in 1971–74 in response to deregulation of New South Wales state planning laws and the resultant influx of foreign investment dedicated to modernising and expanding inner-city Sydney. During this period bushlands and other public areas were turned over to developers and investors.

At the behest of local residents in conjunction with the National Trust and the Institute of Architects, the NSW Builders' Labourers' Federation (BLF) acted to successfully impose bans protecting over 50 threatened culturally, historically and socially significant sites. Often working with the Building Workers' Industrial Union (BWIU) and the Federated Engine Driver's and Firemen's Association (FEDFA), the BLF intervened in the razing of heritage and low-cost housing. It prevented the destruction of natural environments for high-rise buildings and prompted the introduction of the *Heritage Act*, the *Environmental Protection Act*, and a new court, the Land and Environment Court. And crucially, it carved out a space for the community's voice to influence the future of the city.

Concerned about the demise of community consultation in recent Australian politics and urban development, the organisers of the *Green Bans Art Walk* invoked the memory of the Green Bans movement for the present generation of urban dwellers and (potential) activists. The *Walk* attracted over 200 participants to five public guided tours over a period of three weeks, traversing key historical sites central to the Green Bans movements in Potts Point and Woolloomooloo. The artists/convenors invited important figures from the Green Bans, as well as

a range of local specialists on the area and the movement's history, to speak to the tour groups. The *Green Bans Art Walk* not only reflected on the past but worked to generate new ideas for maintaining this form of community memory. The collective introduced a 'Green Plaque' signage system marking sites important to the movement, restored existing plaques, erected a statue to the movement's key figure, BLF secretary Jack Mundey, and began to map out new sites that they believed now required a Green Ban.

Exhibiting and contributing artists included: Louise Anderson, Pat Armstrong, Michelle Blakeney, Diego Bonetto, Josie Cavallero + Anne Kay, Alan Davies, Margel Hinder, Jo Holder, Lucas Ihlein, Fiona MacDonald, Marion Marrison, Mini Graff and Joe Szabo.

Green Bans Art Walk, collaboration between Big Fag Press and The Cross Art Projects, 2011. Presented as part of Performance Space *WALK* season.

Urban Cartography *Baadlands*

Baadlands: an Atlas of Experimental Cartography, a 2013 exhibition at Tin Sheds Gallery, Sydney, explored the politics of mapping in a world where Google Earth aspires to present a uniform image of the planet, superimposing satellite imagery with aerial photographs and geographic information system (GIS) technology. Curator Zanny Begg brought together nine creative approaches to the mapping of various 'badlands' (officially neglected places that are therefore available to unofficial uses). The exhibition focused on a series of undeveloped or quasi-fictitious locations that might manifest as glitches or blanks on conventional maps.

Diego Bonetto and Adrian O'Doherty created *Wild Sydney*, a user-friendly, citizen-driven mapping of wild botany living in the Sydney basin. Using new software, the interactive map harvested photographs from social media sites and provided a public platform for sharing seasonal and locative botanical information. The artists, as champions of the medicinal, commercial and edible qualities of the renegade plants often designated as 'weeds', sought to facilitate a participatory cartography charting plant life in the cracks and crevices of the urban fabric. The mapping happens in real time as the planned environment is fused and overlaid with the unplanned and experimental.

Sydney collective Yurt Empire follows a 'philosophy of occupation' focusing on the behaviour of locals to determine alternative possibilities for urban inhabitation. One of its projects, *Cartography Dept Despatch #1*, engages with the controversial redevelopment of Green Square, where $440 million will be directed towards a new library, plaza, open public spaces, transport and other infrastructure. The municipality is characterised by high level apartment blocks and traffic congestion, sitting alongside heritage terrace houses, bungalows and industrial warehouses. Yurt Empire's 'monster map' addresses the increasing unaffordability of Sydney housing and imagines low-cost, nomadic shelters as more sustainable and flexible than the monster apartment blocks.

Cartography Dept Despatch #1 was created by gathering data from two 19th century maps and a recent computer-generated council report. The use of urban overlay-cartography draws attention to changing demographics and the repurposing of urban spaces. The idea was to 'create a map that became unreadable through the accumulation of data. Each map was oriented correctly so the Green Square town centre became increasingly dominant while other features – like the swamp – disappeared.'

Tessa Zettel, with Jennifer Hamilton, Alexandra Crosby, *Panoramic sketch from the summit of Yurt Empire*, 2013. Watercolour and ink on paper.

curating

the city

Curating Sydney stakes out a new role for creative imagination in urban life, one that may be defined as *curatorial*. Increasingly, creative thinking is part of urban design and development – and it comes to the forefront when a fundamental shift in understanding occurs, such as that augured by the Anthropocene.

A curator (from the Latin *curare* meaning 'to take care of') is traditionally a caretaker of cultural heritage, of museums, buildings and cricket grounds. However, in the contemporary art or museum world, the curator does not simply 'look after' art, trundling it out for public appreciation. The curator aspires to *do something with* art, to tell a story, to deepen our understanding or perception, and put together exhibition components in a revelatory way. This kind of curator is defined not only by the objects for which he or she is responsible, but also by the creative endeavour of exhibition making.

Often, however, the work of curators is highly institutionalised, operating within the parameters of museums, galleries or public art programs. This institutionalisation is itself a symptom of the city of spectacle, in which art is on display – in the purpose-built museum, in the designated public festival or programmed spectacle – but is not itself functional or integrated within the wider operations of a city. The city of spectacle in this sense is generally regarded as a product of the postmodern preoccupation with surface and simulation, contrasting with the modernist commitment to functional design (or, more specifically, with what architect and theorist Stan Allen calls 'field conditions'). The city of spectacle appears to offer endless opportunities for art to appear, to be on view, to be curated into its programs. But at this level it does not integrate art into its organising processes or systems logic. What if art were not

merely to occupy the place of the spectacle; what if its role was to expose and engage with function?

In other words, what happens if we invert the conventional orientation of curatorship – the assumption that art itself needs to be curated – and allow the arts to *curate*? *Curating Sydney* is based on such a proposition. Playing on the original meaning of the term (to care for) we imagine an expanded brief for the curatorial role – to curate a city; and we consider how artists (the erstwhile curated), writers, designers, curators, and creative thinkers of all kinds perform in this role. Many architects' working process and interventions also fit this curatorial ethos. Consider, for example, Chris Bosse's dramatic reskinning of one of our existing and less distinctive tower blocks (p 65).

Art and design are integral both to the production of the spectacle and to its subversion or adaptation, and both artists and designers have for centuries engaged – invited or otherwise – with the processes of the city. In the late 1950s, the Situationist International challenged the commodified nature of the experience offered by the city of spectacle. Their antidote was psychogeography – a wandering directed by sensory engagement with local 'situation' rather than following official paths – and a 'unitary urbanism' incorporating arts and technologies to combat the detachment of art from its surroundings. Psychogeography is once again infusing contemporary visual art and literature, both in the resurgence of literature that celebrates wandering in urban environments, and in the forms of UrbEx (Urban Exploration) and place-hacking. The city generated by governments, corporations and institutional bodies whose maps and masterplans prescribe its organisation has always been made over by street dwellers and walkers who customise place, finding shortcuts and poaching on the territory of others. Urban hackers are those who repoint the system through tactical interventions, whether as street artists or guerillas scaling the Opera House sails, cavers in Sydney's underground waterways, gleaners, or *Park(ing) Day* hijackers of metered parking spaces (p 66).

In the face of unprecedented environmental challenges, the new psychogeographies present methods of reexamining connections to an environment, of moving beyond the grand plan to expose the logic of everyday use. Such a project resonates with Michel de Certeau's influential account of "Walking in the City", published over 30 years ago in his book on *The Practice of Everyday Life*. De Certeau celebrated the small-scale acts of resistance, customisation and tactical reappropriation that quietly subvert the intentions of planners. Today, however, the distinction between top-down strategy and everyday practice is not quite so clear. City planning increasingly foregrounds popular demand ('the city you want'), self consciously folding in citizen feedback. Prevalent throughout the 2030 Vision document, the appeal to public values creates community consensus around a bold environmental politics. It also underlines the degree to which a politics of sustainability is dependent on broad based culture change.

If the City of Sydney implemented all the proposed technological strategies for emissions reductions from the 2030 Vision it would leave the city with a 17 per cent shortfall on its target figure. This kind of gap – for which there are insufficient immediate engineering remedies – is often discussed as a cultural deficit, a shortfall that can be made good only with cultural change, and cultural means. This is the new space of operation for the arts and for creative thinking generally. Hence, the projects documented in this book are not simply products of public art schemes as we know them. Challenging the idea that public art should be limited to designated spaces, the approaches and styles profiled here emphasise the practical value of creative imagination across a diverse range of projects. For traditionalists who worry about art meddling in the serious work of urban planning, to which it offers little of real worth, we should be clear about what the creative disciplines can bring to bear. Creative thought/practice is adaptive, adept at thinking through possibilities that entail shifts in habits and behaviour. It has the capacity for activation – transforming new infrastructural possibilities into lifestyles. In the domain of the urban

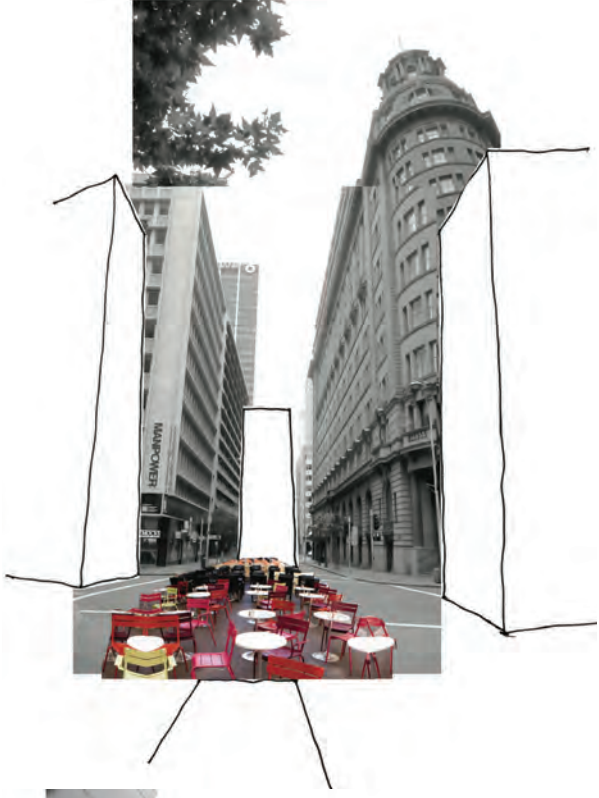
imaginary, where new sustainable futures are explored, these two facets of creativity – adaption, activation – are the characteristics of the new curatorial work, along with a third supervening characteristic, more generally associated with creative thought: imagination.

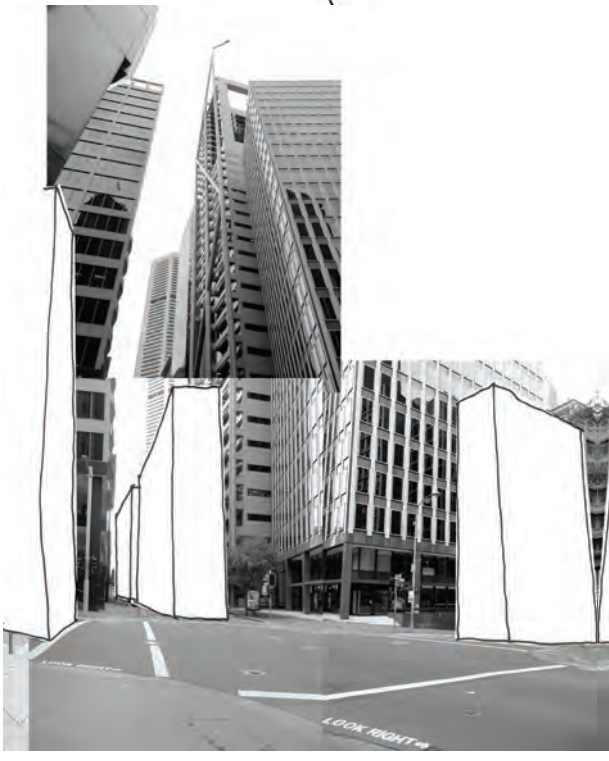
Futurism is now serious business. An increasing premium is placed on the capacity to imagine the future in its concrete and operational detail. A few years back, the multinational maker of semiconductor chips, Intel, launched an initiative called *The Tomorrow Project* with the taglines:

> What kind of future do you want to live in?
>
> What future do you want to avoid?

To research this question, Intel employed some of the world's leading science fiction writers, inviting them to work with engineers, not on product development, but on blue-sky imagination-fuelled invention. For an IT corporation (as for a city), the shape of things to come will be radically changed by the penetration of new technologies. To invent products is not enough; the key is to imagine the role of these products in future society – even better, to imagine the *society* before the product. This is precisely the craft of the sci-fi writer who not only imagines bold new shapes and forms but the narrative of their use within an imagined community. The skill of a sci-fi writer is to invent a coherent world, compelling in its internal logic. Fact-based science fiction is thus a means of facilitating a conversation about the future and enabling a form of science fiction prototyping: what Intel futurists call 'future casting'.

The science fiction city is, in this sense, neither fictional utopia nor dystopia but the basis of designing for change. Just as IT moves forward at a pace that requires more imaginative future casting, urbanists now confront new drivers of change (sustainability and the shift to renewables, combined with technological advances that make new kinds of service provision and connectivity possible) which will transform the nature of public space.





Tribe Studio Architects, *Sydney 2050*, 2008. Imagining a population displacement crisis in 2050 and Sydney's response, this scheme proposes the closure of roads and banning of vehicles to install a series of tall and narrow residential buildings in the city's centre, and underground carparks repurposed as waste and water management facilities. Sydney's intersections become intimate and lively public spaces.
Courtesy Tribe Studio Architects

Bosse *Tower Skin*

In 2009 the University of Technology (UTS), Sydney began a $400 million upgrade to its city campus. That same year German born, Sydney based architect Chris Bosse generated a speculative bid to 'retrofit' one of the university's most infamous and iconic high-rise buildings, the Tower. An example of late modernist Brutalist architecture, the Tower is a monolithic concrete structure of 27 storeys, punctuated with sealed and tinted windows. Built in 1969, the Tower is often voted the city's 'ugliest' building by the readers of the *Sydney Morning Herald*.

As a hermetic enclosure, which at the time of its construction adopted cutting edge technology, the Tower is over reliant on air-conditioning and constitutes an unsustainable form of architecture. Circumventing urban development trends that tend to raze outmoded buildings in order to erect sustainable ones, Bosse sought to maintain the original structure and materials, allowing it to attend to contemporary ecological demands by offering it a second skin. Comprised of a three-dimensional lightweight high performance composite mesh textile fabric, if implemented, the Tower's 'second skin' will wrap around the building, supported by a steel frame.

The membrane-like, organic structure replaces the Euclidean geometry of Brutalism and brings the Tower into a more harmonious relationship with natural systems. Generating a microclimate, the proposed 'skin' provides natural shading and improves the distribution of daylight, thus removing energy peaks and obviating the need for air-conditioning in the Tower. The skin will also collect rainwater for the building's toilets and has the capacity to integrate solar panels into its mesh for carbon sequestering. The skin incorporates LED technologies that light the building at night.

Critics such as Philip Drew argue that the process of re-skinning buildings transforms architectural façades, eroding historical icons central

Chris Bosse (LAVA), *Tower Skin*, 2009. Concept for high-tech light-membrane covering tower at University of Technology, Sydney.

to a city's collective memory/identity. Further, argues Drew, re-skinning is quite simply, 'bad civic design'. Bosse's 'opaque' packages, he claims, would intensify the Tower's feeling of claustrophobia. Bosse's proposal was a winner in the Zerofootprint Re-Skinning Awards in 2010.

Rebar *PARK(ing) Day*

PARK(ing) Day, which takes place on the third Friday of September every year, was initiated by San Francisco art/design studio Rebar in 2005 'to call attention to the need for more urban open space, to generate critical debate around how public space is created and allocated, and to improve the quality of urban human habitat'. Initially Rebar leased out a metered parking spot in their hometown and set up a temporary park using Astroturf, a potted tree and a park bench. Following the dissemination of an iconic photograph of the 2005 project on the internet, Rebar were overwhelmed with requests to create new iterations of the project in other cities. Rather than duplicating what they had done in San Francisco,

they decided to generate an open source project and an accompanying manual, to 'empower people to create their own parks' by assisting local organisers to identify specific community needs and values.

In 2008, Arup realised Sydney's first official *PARK(ing) Day* event, erecting a temporary community garden in the forecourt of Customs House. Comprising a shaded picnic table, cushions, picnic blankets, planter boxes of fruit trees, vegetables and herbs, hay bale borders and a chicken that laid fresh eggs, it suggested an urban garden for the production of sustainable food. It also revealed the capacity of such 'park' spaces to act as alternative workspaces, providing free wi-fi to nearby office workers who arrived at the park to work on their laptops.

Since 2008, numerous projects have emerged from disparate organisers on *PARK(ing) Day*. SJB, a Sydney architectural and planning firm, created an installation on Crown Street, Surry Hills, comprising hundreds of recycled coffee cups filled with plants, vegetables and herbs; during the day individual plants were offered to the public to take home for free. The Green Square local residents' community group constructed a recreational green space decked out with recycled garden chairs and a ping-pong table in the adjacent suburb of Alexandria. Place Partners, a place-making consultancy firm, created a 'passive' and green relaxation area on Oxford Street, Paddington, comprising recycled chairs and a giant Snakes and Ladders board game. Arup, as the city's most consistent organisers of *PARK(ing) Day*, developed *CityScape/SoundScape*, a one-hour installation that gave pedestrians the chance to manipulate the city's soundscape by turning down samples of the traffic's noise pollution and increasing the audio level of rustling leaves.

ARUP, *PARK(ing) Day (City Soundscape)*, 2012.

creative

communities

Futurists argue that the challenge in imagining the sustainable city is one of vision – not just strategic vision but creative vision. 'We can't build what we can't imagine', argues futurist Alex Steffen; to see its own future the city needs 'creativity' and 'applied imagination'. But what does creative imagination mean in this context beyond an inspired level of planning – and who are the new 'creatives' elaborating this vision? Creativity today has a broader remit than ever before. No longer confined to the cultural sector, it has become a watchword for problem solving in industry contexts, where so-called 'right brain' creative skills are cultivated to unlock out-of-the-box thinking. It is the hallmark of flamboyant corporates like Google, known for creative think-tanks in which engineers, execs and 'creatives' collaboratively brainstorm ideas. For Google, creativity is about fast, adaptive response to rapid technological change – part of the strategy that will develop smart cities that use information to provide better services.

Design firms operate within this space as the professional facilitators of creativity, marketing not only product but also design thinking as a means of addressing the dilemmas of traffic flow, crime reduction, place branding and climate change. Design thinking, as defined by industry leaders such as IDEO, is a process that taps into abilities that get overlooked by more conventional problem-solving practices (in this sense, design thinking is the most established and most niche form of what we are terming creative thinking). Rather than breaking down a problem so that its component parts can be 'solved' in discrete domains and industries, it styles a collaborative approach that brings experts and communities together.

Correspondingly, in urban planning we see an increasing emphasis on people-centred planning through listening and talking with the planner

as an intermediary, moderating community voices (as geographers Ash Amin and Nigel Thrift describe). This trend is evident in the City of Sydney 2030 Vision, which illustrates its ground-up approach with pages of people and thought bubbles describing 'the city people say they want'. The current New South Wales government architect, Peter Poulet, is a new style thinker in this regard, describing himself as a facilitator of conversation, bringing people together rather than simply building: a self-styled curator rather than a star architect. On a recent *Curating Cities* project we discussed this collaborative approach with Poulet and the architect Teddy Cruz, a well-known exponent of community generating projects. Poulet talked enthusiastically about Design Parramatta, and in particular a project (also involving TERROIR and Richard Goodwin) to create an 'identity' for the Parramatta City Ring Road, engaging with local 'users'.

Today such collaborative urban planning projects are equally likely to emerge in an Art Centre. *Vertical Villages*, for example, identifies and stages a consultative development project with an overlooked transient community of city residents. Working with the international student population living in Sydney's CBD *Vertical Villages* tracks individuals' movements within the city, not at the level of data but through personal inscriptions. Developed by ruangrupa ArtLab and Keg de Souza at 4A Centre for Contemporary Asian Art, the project was conceived to address a shift from low to medium and high density housing (evidenced in developments such as World Tower, Central Park and Green Square). It uses personal maps to examine the question of whether the City of Sydney is equipped for such a dramatic shift in the scale of personal and public space.

This shift in where the creativity lies – no longer just in monumental construction and top-down planning, but in collaboration – could be described as a curatorial turn. Curating is by definition a collaborative practice; today's curator is the field-sensitive creative practitioner or thinker who puts the arts or design to work. And the curator might well be artist, architect, or interdisciplinary team.

Installation at ruangrupa ArtLab, Keg de Souza, *Vertical Villages* [installation view], 2013. Installation at 4A Centre for Contemporary Asian Art.

Depending on where you come from, the rise of creativity – and the accompanying shift away from old style discipline thinking to new forms of collaboration – is motivated by different field conditions and economic drivers. One influential account of the rise of creative thinking arises from the US, and stresses the shift in first-world corporate work practices and the increasing premium on innovation (best-selling business analyst Daniel Pink is a prime exponent). In this view, creativity rather than constraint is the key to innovation and competitive edge in a world where all phones and MP3 players are broadly the same, and product narrative is everything.

Another paradigm-shifting narrative that sets the scene for urban curatorial work emerges from analysis of large-scale social organisation and ecological crisis. Leading thinkers of the Anthropocene such as Johan Rockström of the Stockholm Resilience Centre or Nobel prize winning economist Elinor Ostrom have advanced arguments for rethinking the governance of common resources, and the mechanisms for mobilising large scale collective action. For Rockström the challenge is to get 200 countries working together to build resilience to climate change. Ostrom tells us that models of common resource management, and assumptions about top-down control, need to be questioned. The driver today is the so-called 'wicked problem'. Problems like urban sustainability or climate change itself have no solution, no finite engineering remedy; responses to them consist only of better or worse actions in the face of a mass of interdependent variables and competing interests that politicise any kind of change. These problems self-evidently require new models of governance, management, resource sharing – and so give rise to new modes of conceptualisation and framing. At the sharp end are always the goals of mobilisation and of promoting new behaviour.

But how does this impact what happens at ground level – in everyday public space in the sustainable city? Behaviour modification is not the remit of the engineers who provide technological solutions. It implies a focus on social interaction that is within the scope of design and public art but nevertheless sounds heavy-handed in these terms – too programmatic and instrumental to be conducive to interesting art. Design in the public sphere is arguably linked to social engineering in some obvious ways. Behaviour in shopping centres, for example, is *designed* to induce (buying) behaviour and circumscribe the possibilities of engagement. This limiting function has distinct benefits not just for commerce but also for community. The idea of 'designing out crime', for example, is relatively uncontroversial and well established. At the University of Technology in Sydney, the Designing Out Crime research centre has an impressive list of commissions to its credit, addressing 'anti-social behaviour' in Oxford Street club zones, in Lethbridge Park public housing (where social

and environmental goals converge in the retrofitting of apartment buildings and a community centre) and in various shopping centres and transport hubs.

But *designing out* is not always simply a question of the elimination of dark and dangerous alleyways and underpasses. Critics (like Dolan Cummings) argue that it may implicitly entail *designing in* a form of citizenship. Put that way, the goal becomes a little more contentious than common sensical measures to reduce opportunity for crime. *Designing in* behaviour reflects an imposition of values that in Cummings' view often 'denigrates the essence of urbanism itself'. Along with the eradication of the threat of crime goes the 'sanitisation' of cities, which can in turn spell an end to the appealing 'edginess' of urban life. The Westfieldisation of experience, delivering choice, convenience, onsite parking and a Coles and a Woolworths that increasingly subsume all else (the artisan bakery, the deli, the pizza bar, the sushi take-away), reaches the peak of sanitisation in this sense. It is overdesigned in its uniform newness. There can be no mix of new and old, no self-defined experience or discovery of undesigned possibilities for action.

The curator should, by contrast, 'create space for the unplanned', says British curator Claire Doherty in a lecture on New Rules of Public Art at Sydney's Carriageworks in March 2014. To this exhortation she adds, more radically, 'Don't make it *for* a community. Create a community.' In other words, avoid top-down prescription or the designer/artist's vision of the good; create a genuine interface enabling people to come together. And finally, especially for Sydney: 'Demand more than fireworks; Get lost.' Spectacles, billboards, things to look at; much of this already exists in Sydney. Public art needs to catalyse something else: a *public* itself.

How is this done – and what is a community defined by public art, as opposed to the one that sociology can more reliably investigate? Public art effectively draws on its capacities for adaptation and activation to bring communities to visibility. But communities are agents rather than objects of curation. When Doherty warns, 'Don't make it *for* a community', she enjoins us to think twice about the community we think we know or can

serve. Rather than simply shining a light on people or cultures, public art can actively enable new formations and actions. In this sense, art may be pragmatic and contingent, prospective rather than representational – a means of recasting and reanimating place. And it may do this over a long or short time span with greater or lesser control over outcomes (a common approach in much sustainability-oriented work is to provide a catalyst or 'spark', something to 'try at home' in the terms of the 2011 *Curating Cities* event at Object: Australian Centre for Design).

Artist-driven or curatorial projects are adept at realising both temporary community and temporary space. *Vertical Villages* exemplifies this approach, working with a community that is transient and not always cohesive. 'Temporary' has become a value proposition and as such has slightly negative connotations: more precarious than permanent, it speaks to a lack of position, a lack of a secured future. In many of the works we are considering we see a valuation of non-space and a general sense that we make this space, we don't just dwell in it; Goodwin's free, half-hour public space is paradigmatic. Much as Goodwin's *Porosity* project 'finds' public space in private buildings or in tunnel systems below the city, new movements are emerging to repurpose what the group Rebar calls 'privately owned public open space' or POPOS. In more sustained but precarious territory, SquatSpace are a 'spaceless' organisation. Originating in the Broadway Squats in 2000, SquatSpace describe themselves as 'artists and activists engaged with the politics and pleasures of space in the city'. Their projects have included opening an 'unReal Estate' agency for squatters, and *Redfern Tour of Beauty* (p 78).

If these projects seem focused on the specific politics of unaffordable housing, it is, as Teddy Cruz has argued, impossible to envisage sustainability as a fundamental issue without first looking at how a territory is divided and sub-divided – and at how city, neighbourhood and community are shaped by top-down or market driven policy. For Cruz, it is vital to understand that 'environmental degradation is a direct result of social and political

degradation'. Mobilisation has to involve critical evaluation of top-down planning but agency, he suggests, lies not with an inner city elite. It is located at the level of the neighbourhood: 'The radicalisation of the local in order to generate new readings of the global will transform the neighborhood – not the city – into the urban laboratory of our time.' This same political sensibility is evident in a number of recent curatorial projects in Sydney, most notably in *There Goes the Neighbourhood* (Performance Space) and the *EmergenCity* exhibitions at Tin Sheds (*Dirt, Dust and Ruins, Baadlands,* and *Right to the City*), in which work such as Elvis Richardson's *National Housing Search <$250K* lays bare the aesthetics of a brutal real estate market, surveying the pictorial genre that defines property-linked lifestyle.

Elvis Richardson, *National Housing Search <$250K*, 2013. Installation at Tin Sheds Gallery.

Neighbourhood is, we could argue, in the purview of a City Council that understands the value of a village; but neighbourhood is also the vehicle for bottom-up change in the sense that city encompasses so many multiple identities, too diverse to envisage in a single image. Neighbourhood denotes something cohesive and relatively unitary – a set of interconnecting streets and precincts; a shared interest in services, resources and transport networks. Unlike the glamorous unfathomable city, it conjures small-town values and concerns, which cut both ways: *there goes the neighbourhood* … But if we now take bottom-up change much more seriously, so the neighbourhood, like community, has to be revisited.

Social change is often driven by behaviour that is neither prescribed nor predictable but emerges unexpectedly from the uptake of technologies and infrastructure. As Rachel Botsman notes in her TED talk on collaborative consumption, no one could have foreseen the re-emergence of an old style swap and share economy, dramatically enabled by internet markets and smart service provision, whether in the form of eBay or the borrowable GoGet cars and bikes appearing on our streets. Design and art is now about imagining new contexts and new relationships between people and things or people and services, and also the means by which new practices will take hold. In the domain of future casting, the focus is less on how to change behaviour (or the presumption that it lies within our power to do so), and more on how to predict the social change that will flow from new technology or service provision. Change often happens because and when people want it – when something better is on offer. Car usage, for example, will be reduced not by people 'giving up' a convenient means of transport, but by rethinking cities and population density in a way that brings services into the reach of a diverse population – whether physically or by remote access – without the need for car trips. This, as Alex Steffen points out, is the enticing part: 'Almost everything we need to do to reduce urban emissions will provide most people with better cities than they have today, with a quality of life better than the one they currently enjoy.'

Volker Kuchelmeister, Laura Fisher, Jill Bennett, *Veloscape: a Curating Cities* project [detail: data collection using Galvanic Skin Response, Go-Pro and GPS], 2014–. Sixty-five per cent of inner Sydney residents say that they would want to ride to work at least one day a week if they had facilities separating them from traffic. *Veloscape* collects and visualises data on affective responses to cycling in Sydney.

SquatSpace
Redfern-Waterloo Tour of Beauty

Sydney artist and activist collective, SquatSpace developed the *Redfern-Waterloo Tour of Beauty* in 2005. Designed as an ongoing, experiential project, the tour explored the social complexities of a largely working-class, Indigenous, migrant and aging community (50 per cent of whose residents lived in public housing). Inviting 'tourists' from the broader Sydney region and beyond to traverse Redfern-Waterloo in a minibus and/or on bikes, the tour visited sites of social and historical significance, such as the Block, the heart of Indigenous housing and culture in Sydney, and public housing towers in Waterloo. Along the way, a range of locals and activists provided insight into Redfern and Waterloo's past, present and future.

Operating over a period of four years, the tour emerged at a critical historical moment for the district. In 2004 the New South Wales government created the Redfern-Waterloo Authority (RWA) – now the Sydney Metropolitan Development Authority – in an attempt to develop the area. In order to address the precinct's high concentration of poverty whilst exploiting its close proximity to Sydney's Central Business District (CBD), the RWA was charged with the task of selling off selected state assets, including public land and heritage buildings, and of ushering in new and expanded residential and commercial spaces. Through their participatory, grassroots tour, the SquatSpace collective attempted to counter the RWA's 'top down' mode of addressing the social and planning problems in the area.

Redfern artist Nick Bleasel, one of the tour's invited speakers, argued that Redfern is not a wasteland waiting to be developed or gentrified. It bears its own complex and deeply embedded social structures that, however strained and problematic, need to be considered and addressed – rather than wished away – when forging a future for the area. Discussions within and around this project have addressed the ecological value of

conserving and retrofitting rather than erecting new, even sustainable, buildings. SquatSpace member Lucas Ihlein proposes that apartment complexes are an opportunity to share amenities and services, and might even allow for community gardens and large-scale solar power generation. Another SquatSpace tour guide observes that the current Redfern-Waterloo apartment developments are unlikely to be constructed with anything but the 'cheapest and meanest of technologies'.

On 26 May 2014, some nine years after the first *Tour of Beauty*, the Redfern Aboriginal Tent Embassy was established 'reclaiming the Block' for Aboriginal people. Once home to thousands of Indigenous people, today it houses less than 400.

SquatSpace, *Redfern-Waterloo Tour of Beauty*, 2005–09. Jack Barton, architect, with aerial map of the area, 2006.

the city

image in practice

Visualising or imagining something like a city is necessarily a reductive process. As author Peter Carey reflects in his account of Sydney, 'if you say you know a city, it's probably a town'. But to inhabit a city we need to acquire a working image. In the middle of the last century, the American urban planner Kevin Lynch wrote an influential book arguing that 'the image of the city' is not simply its external representation but the image in the heads of those who experience the city: a kind of 'cognitive map' that makes a city legible to its inhabitants. Lynch's notion of the image of a city was a practical one. For him, the task of planners was not to create the city in a certain kind of pre-formed image; it was to render the city *imageable* in a way that enhanced on-the-ground experience, making wayfinding easier and more pleasant. Lynch was in this sense the precursor of the curatorial/design thinking approach to consultative design. By locating the image of the city in the cognitive map, held by the city dweller but facilitated by the planner, architect and designer, Lynch inscribed the experience of the citizen at the heart of our conceptualisation of public space.

The image of the city may be functional – a generalised mental picture of the exterior world that enables an individual to navigate and move around; but how the city acquires such an image is a complex issue. Modern cities are heterogeneous combinations of old quarters and new developments, with no single logic. The affordances offered by architecture and planning that make wayfinding and access hard or easy are today supplemented by layers of information – a media infrastructure, delivered via mobile networks and GPS navigation. We can now access real-time information on transport networks or services, through an increasing range of interfaces: phones, touchscreens, Google Glass, augmented reality.

City images were judged by Lynch to exhibit five key elements: paths,

edges, districts, nodes and landmarks. When people are unfamiliar with a city, they may focus on elements that define its topography, such as districts – but for most of the people Lynch surveyed, paths were the predominant elements. These are the channels along which the observer moves. They may be streets, transit lines, waterways, railways or other access routes. Regardless of their aesthetic appeal, the legibility of paths is central to the functional image of a city. The *Curating Cities* project has focused on bringing some of these pathways to light, whether through citizen-sourced imagery or through uncovering the various means by which pathways are accessed and experienced (running, walking, cycling and so forth).

Lynch's model has also been used in more direct ways. A recent study by academics Stephanie Hemelryk Donald and John G Gammack, applying Lynch's schema to Sydney revealed a marked lack of functional paths and the general absence of coherent inner city imagery. The subjects in this case were tourists and students, asked to draw maps of Sydney. The maps they came up with exhibited a number of common themes: the Opera House and ocean are the Sydney 'fixers'; 'conceptual areas' were parks and mountains. But there was often no path identified other than the road to the Harbour Bridge. Mapping Sydney from memory, the newly arrived residents plotted a common route from airport (arrival point) to harbour (ultimate destination). One participant drew a comparative map of his hometown, Gdansk, which proved to have a much more differentiated interior – largely because of the prominence of the river. By contrast, Donald and Gammack noted the absence of river networks in Sydney maps, highlighting the fact that Sydney's rivers are not advertised as part of its identity politics or the dominant imagery that new arrivals might draw upon in their attempts to fathom the city.

Sydney, self-evidently, does not have a comparable river running through its heart; the Tank Stream that was the source of water in the early days of the colony is now buried below ground. Yet the Sydney river system has been fundamental to the image of Aboriginal Sydney. At La

MAP Office (Gutierrez + Portefaix)
flash run

On Monday 10 June, at 9:55 am, MAP Office invited participants to collectively undertake a 'flash run' – a flash mob combined with a *Runscape*. The duo's first *Runscape* was developed in Hong Kong, and involved filming runners racing through the streets in opposition to the slow moving masses. *flash run* proposed the urban centre as the next frontier for experimental, creative interventions within society. As one participant said: 'It was a fun exercise in reclaiming the city, getting together with other citizens and participating in a political statement about public space and its uses.'

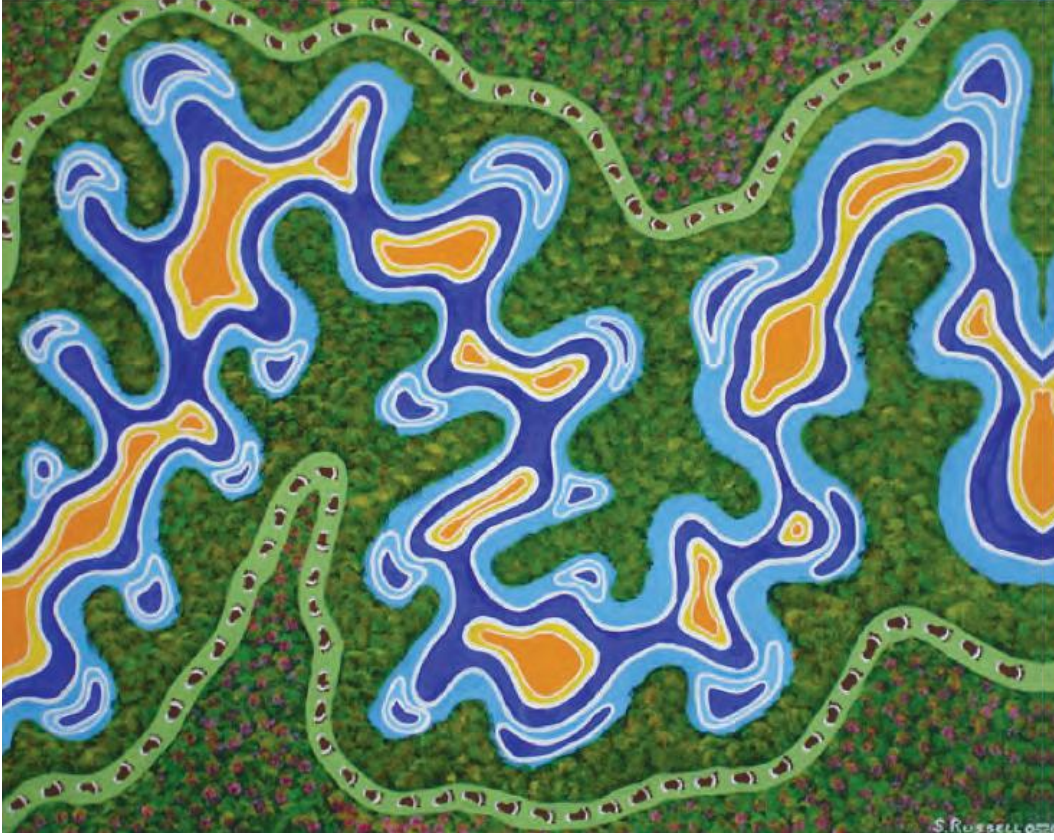
Without a set route or specific points of departure and arrival, *flash run* took place over an area close to Sydney's Town Hall. Donning a black shirt with a *flash run* logo, participants were invited to run in any direction, at any speed, for a limited time: 4 minutes and 33 seconds. This is the duration of John Cage's seminal, 'silent' composition *4'33"* (1952). It is the point at which people start to get bored, say Gutierrez and Portefaix.

MAP Office, *flash run*, 2013. Sydney Town Hall.

Perouse on the northern headland of Botany Bay, Steve Russell produces paintings of his country around Botany Bay and the Georges River that evoke a different cognitive map. The Georges, Lane Cove, Hawkesbury and Nepean Rivers were effectively the links or pathways that enabled extended kin-groups to know each other and to move around quickly. This is evidenced in the project website *A History of Aboriginal Sydney*, which describes the importance of various paths and waterways over time and their integration into personal and community histories. It documents that, in 1798, 'Koori people travel on the Georges River, from Wiradjuri country as well as Gandangara, commonly use both sides of the Georges River for travel towards and from the coast.' In 1881 the New South Wales state government 'rounds up Koori people from La Perouse and Georges River to go to a mission station'; the story of one girl, Ellen, is described by her path from Botany, upriver to camp and later to the lower Salt Pan Creek where it flows into the Georges Creek; others end up at a mission on the Murray River, some at familiar places along the Georges River.

The harbour and coastline exert a far greater pull in Sydney than in almost any other city. The maps produced in Donald and Gammack's experiment with students are about the pull but also the push. Visitors come with a sense that from the airport there is one place to go: harbour, and then perhaps out to the coast. We see these same 'fixers' reflected in maps of the city's most photographed locations (harbour, followed by Bondi beach) (p 120). When Sydney made *Monocle* magazine's top ten cities list a few years back, it was telling that the summary comment read, 'Sydney ushers its inhabitants outdoors'. The flip side of this appeal is the rather inhospitable interior from which we are ushered. As a result of planners' neglect (as Gehl intones), the interior of the city is not inviting, rich in narrative, or legible. The available image of Sydney does not provision visitors with a sense of the interior. Sydney, it seems, pushes visitors out to the harbour and beaches and does not invite them in.

Ushered, hurried along, rather than led or enticed by a path or a



Steve Russell, *Footprints on the Georges River*, 2006. Acrylic on canvas.

vista to the foreshore, we find our way to the harbour to experience its many spectacles. And it is on these terms that newcomers compete, as a Crown Resorts' press release attests ('the positioning of the proposed hotel and resort provides a wonderful opportunity to create an iconic landmark for the city that will help attract international tourists to Sydney and feature on postcards and travel magazines globally'). Mistakes can be made in a city of great natural beauty, where the logic of the spectacle is to outshine less iconic competition. Hence, Sydney's beauty is blighted but not dinted by its ill-conceived highways and haphazard, developer-driven foreshore. 'If Sydney were a colour, what would it be?', Donald and Gammack asked survey participants. As surely as Hong Kong is red, respondents deemed Sydney to be blue. One can also speculate about

its personality traits (If Sydney were a person …?), extrapolating from the writing of commentators who evoke a mix of self-obsession, vanity, bravado and carelessness. 'Dazzled by its improbable location', writer Delia Falconer notes, Sydney comes off as the 'brashest and most superficial of cities, almost a kind of unplanned holiday resort'.

Sydney's various biographers and commentators have over many years built up pictures of a starlet enthralled by her own beauty, compelled to be forever on show – from Anthony Trollope in the late 19th century noting that every Sydneysider asked him, somewhat obsessively, whether he found the harbour pretty, to the blogger and urbanist Dan Hill recently riffing on the bedazzlement theme and its sadder effects:

Anne Zahalka, *Open Air Cinema, Leisureland series (1998–2001)*, 1998. Type C print.

> In realising that beauty alone will not be enough, Sydney existentially ponders what it is, a little like a fading society beauty who commissions a nose job to realign her handsome features but secretly worries about what's at core.

Critical of the wider impact of the harbour fixation, Hill speculates whether 'endless admiration of [Sydney's] obvious gifts may have led to a careless misplacing of the armature for change'. The problem, he notes, is wider and deeper than Circular Quay (the 'aquiline nose, a.k.a. the CBD'). The real problems of Sydney lie with the endless sprawl, driven by unaffordable housing and underuse of the built fabric in the inner suburbs.

Spiers and Ryan *Nothing to See Here*

In August 2013 at the Underbelly Arts Festival, a makeshift PVC-clad structure housing a scenic lookout appeared on the eastern side of Cockatoo Island. Facing the spectacle of Sydney Harbour, the viewing platform's signage proclaimed *Nothing to See Here.* Visitors duly queued to peer through binoculars trained on the harbour, uninterrupted views of which are the gold standard of Sydney real estate. The lookout's viewfinder showed the harbour as it was at that moment – every seagull, sailboat and picnicker; the only thing missing was the iconic Harbour Bridge.

Artists Amy Spiers and Catherine Ryan suggest that the (in)complete vista delivered by *Nothing to See Here* may encourage reflection on the many ancillary absences in Australia's history. The strange disappearance of the bridge was intended to provoke consideration of the legitimacy of removal: of the erasure of Indigenous history, cultural removals in the name of capitalist development, and social denial of the homeless. The artists installed side-walls to encase viewers/tourists in the viewing area and block out other aspects on the harbour. This blocking technique strengthened the irony of the work's title and raised further political issues of obfuscation and the entry-denial of immigrants to Sydney.

The live screen (seen through the binoculars) relied on an augmented reality app created by Melbourne company Two Bulls. The artists' motivation was to create an immersive experience in a public place, a space for urban reimagination. This location-based reality experience was intended to unsettle and refresh affective perceptions of the city's appearance, including familiar senses of scale and clichéd 'noted landmarks'.

Amy Spiers, Catherine Ryan, *Nothing to See Here (Removal of Sydney Harbour Bridge)*, 2013.

the road to

circular quay

Circular Quay (as Jan Gehl's analysis underlines) is not the vista at the end of a road. It is simply the destination: a feature in the cognitive maps of those who know where they need to go but not how to get there. The route to Circular Quay was, of course, not primarily an inland one in the founding narrative of European settlement. Sydney is represented in the European-Australian imagination as a coastline before ever it becomes a city.

The story is well known in Australia. In 1770, on his way out of Botany Bay where he, Joseph Banks and Daniel Solander spent just a week ashore, Captain James Cook made note of the promising harbour to the north, naming it Port Jackson. Cook passed by the Heads without ever entering the harbour. When the First Fleet arrived in 1788, Botany was once again abandoned, after Governor Arthur Phillip's three-day foray to Port Jackson. John White, the chief surgeon to the colony who sailed with Phillip to establish settlement, famously declared Port Jackson to be 'without exception, the finest and most extensive harbour in the universe'. Sydney Cove, the inlet of the inner harbour where the town was to be sited, was a deep harbour with a fresh water source, long utilised by the Cadigaleans, and thus promised 'safe anchorage for all the natives of Europe'.

The visual impact of that coastline on those sailing into Sydney Cove is the founding image of the colony. 'It must have been like entering paradise on that summer afternoon', writes M Barnard Eldershaw in the 1938 biography, *Phillip of Australia*. So much of the visual repertoire of Sydney repeats that initial hit. The city's icons crowd the same stretch of water – Opera House at the tip of Bennelong Point, triumphal arch of the Bridge, toothy smile of Luna Park – so that new development feels compelled to present as 'an iconic landmark' to 'feature on postcards and

travel magazines globally' (Crown Resorts, see p 85). The conception of Sydney as a destination is distilled into the image of the harbour, but is in turn embodied in the mirroring imagery of Sydney seen *from* the harbour. There is an often-reproduced photograph by the photojournalist David Moore in the National Gallery of Australia. It is a portrait of *European migrants arriving in Sydney*, taken as the ship *Galileo Galilei* berthed at the overseas terminal at Circular Quay in 1966. Eight figures, spanning three or four generations, stand at the railing having reached their destination after a long voyage. A brilliant portrait of a first experience of encountering Circular Quay, it captures looks of restrained anxiety (certainly not of unfettered joy or appreciation) on the striking faces of what could be a migrant extended family. It has transpired that four of these iconic Europeans were returning Sydneysiders; two others were newly arriving from Lebanon and Egypt. Nevertheless, this metonymic image, first appearing in the *National Geographic* in 1967, stands as the reverse shot, the subjective counterpart of the postcard image of the Quay. These are the mid-20th century's iconic Australians, the beholders of Circular Quay.

The view from the shore of the initial 'arrival' or invasion, as it logically becomes – more specifically, the view from the perspective of the invaded – remains the 'reverse shot' that is insufficiently inscribed in the current environment. Without that inscription at a cultural level, there can be no 'green' Sydney, no recasting of the story of the Indigenous Australians' encounter with the new arrivals, described by an Elder as 'people who were driven by profit and loss. For them the land was nothing more than a commodity' (1998, <cadigalwangal.org.au>). For this reason, the City's *Eora Journey* is one of the key building blocks of the 2030 Vision, encompassing a Harbour Walk organised around sites of Aboriginal significance and a landscaped Walking Trail heading out from the harbour. More than a counter-monument, affirming the historical experience of invasion as opposed to the celebrated arrival, the Eora Trail activates pathways that are suppressed in a story of place that indulges European

arrival at the cost of Indigenous presence. It is, in other words, conceived as a mapping and manifesting of place: an alternative way of looking at and walking the harbour and its historical pathways. Indigenous artefacts embody this process and have for many years evinced pathways, such as the important thoroughfare linking Botany Bay to the harbour, in material and experiential ways (p 94).

In a 2010 performance work, *Alien*, Richard Goodwin re-enacted an arrival by boat at Circular Quay. Dressed like a space-alien, he made his way to Town Hall via Governor Macquarie Tower, Martin Place and Pitt Street, once again 'using public art to test the functional boundaries of built form'. Goodwin's work plays on the contemporary arrival thematic, at a time when alien arrival and the spectre of 'the boats' fuel national paranoia. It is fundamentally concerned with pathways and access, with connecting routes and the practical issue of how to find entry points. In the reverse of the aforementioned Kevin Lynch experiment in which new arrivals mapped a route out to the coast, Goodwin, forearmed with cultural knowledge, puts the route to the test. The hypothesis implicit here (as in Gehl's or Stephanie Hemelryk Donald and John G Gammack's accounts) is that beyond the overplayed arrival, the narrative falls down as it connects with interior pathways – both in planning and corresponding cultural terms, we could argue.

'Circular Quay: she loved even the sound of it', reads the opening line of Gail Jones's novel *Five Bells*, describing a recent migrant's encounter with Sydney Harbour. Glimpsed through the struts of ironwork as her train swings in a wide arc, the woman rhapsodises about its form, 'a circle like no other, the key to a new world'. Swooping around this over-determined circle is in this instance achieved by mass transit rather than the majestic approach of a sailing ship or ocean liner. The thrill of this approach enables us to envisage the Cahill Expressway (for a brief moment, at least) in a vaguely redeeming light. Driving across the Harbour Bridge and around the curve of the expressway in the days before the Sydney Harbour Tunnel

La Perouse Indigenous communities
shellwork

The shellwork industry developed by Indigenous women in Sydney dates from the 1870s and 1880s, when women sold shell baskets at Circular Quay and Botany Bay. At the La Perouse reserve, Christian missionaries encouraged this kind of handiwork. There was always a demand for Aboriginal women's shellwork at La Perouse, and some of that trade came from the steady stream of visitors to the Aboriginal mission. According to a report in the *Sydney Morning Herald*, of 9 November 1906: 'Hundreds of people patronize the trams weekly in order to visit the little mission church, and see the results.'

The Aboriginal women and girls reported as making shelled objects in the 1880s were familiar with the city's wharves, especially around Circular Quay, where they travelled to ply their trade. However, in 1903 a new policy was introduced, requiring Aboriginal people to pay fares on city trams, impacting significantly on this trade. An opponent of the scheme wrote that 'Aboriginal people at La Perouse are, in many cases, but half fed and clothed and they are to be still further impoverished by demanding from their already limited incomes (procured in some instances by selling shell-work, etc., in the city) fares for tram tickets' (New South Wales Aborigines Advocate, 30 June 1903: 2–3).

As is well documented, after the opening of the Harbour Bridge at Circular Quay in 1932 its iconography was inscribed onto wooden boomerangs made by Aboriginal men, whilst Aboriginal women such as Esme Timbery made shellwork models of it. The shellwork models of the Bridge produced by communities at La Perouse invite a different consideration of the route to Circular Quay. In one sense they are made-for-tourist-market images that speak to an acknowledged obsession with the icons of the harbour. But in their specific history, they represent a different axis of struggle, trade and travel between Botany Bay and Circular Quay.

Four *Harbour Bridge* shellworks made by Lola Ryan (Dharawal/Eora people, 1925–2003).

was part of the metropolitan experience in a car city where, as writer Delia Falconer puts it, walking was once for losers. The 'endlessly mobile world metropolis' is a new species of city requiring new modes of apprehension, Deyan Sudjic argued in his 1992 book *The 100 Mile City*; such a city is no longer an 'accretion of streets and squares that can be comprehended by a pedestrian but instead manifests its shape from the air, the car, or the mass transit railway'. Twenty years later, *Great Southern Land* presenter Steve Simpson informs us that the only way we can see and understand this land and its patterns of inhabitation is from above – literally by flying over it (and then as visual data, as we discuss in the following section). Here we should take note of the fact that the paths of Lynch's cognitive maps include railway, mass transit and highway as well as footpath. So how do we get around Sydney today?

Sydney traffic has been officially rated amongst worst in the world, according to TomTom's global Congestion Index report for 2012. The GPS manufacturer's report monitors and compares traffic congestion levels around the world, awarding Sydney seventh place, ahead of Rome and Tokyo. On average, it found that the overall congestion level in Sydney is 33 per cent. In peak traffic periods, this typically explodes to 78 per cent, which equates to around 40 wasted minutes for every hour driven. Jan Gehl's *Public Spaces Public Life* report attacks the problem head on, recommending the demolition of the Cahill Expressway and Western Distributor and burying Circular Quay railway station underground. That report says unequivocally that roads built between 1958 and 2000 have a 'harsh downgrading effect' on Sydney, splitting the city from its harbour. They are, above all, an impediment to walking, which is barely comfortable in many parts of the city. One of Gehl's best lines is that only 'platoon walking' is possible in this city with its narrow sidewalks and enforced waits on traffic islands. Progressive cities like Bogotá (Colombia), on the other hand, have long identified the war on cars as the key to happiness. The philosophising former mayor Enrique Peñalosa held that 'the most

dynamic economies of the 20th century produced the most miserable cities of all'. But now Madrid, London, New York have jumped on the bandwagon, all seeking to 'Copenhagenise', like the many Australasian cities embracing Gehl's commitment to pedestrian activity and cycle paths.

But do pedestrian developments really deliver the city we want? The experience of the generic waterfront development makes the city walkable, provides for outdoor dining, makes us a little more like San Francisco, London, Melbourne and everywhere else, but does it give away too much in the process of sanitisation? *The Guardian's* architecture critic is unconvinced, describing Gehl's work as 'piazzas, plazas, squares and other public spaces of unremitting blandness'. For all that purpose-designed walkability offers, it comes up against the same problem as organised fun in the natural environment; for the true exponents, walking is itself an exploratory activity, a means of discovery rather than a directed activity. In 19th-century Paris, the urban explorer was the *flâneur* – the strolling spectator, mingling with the multitude to experience the city on his pulse (the original *flâneur* being male). He lived, as the poet Charles Baudelaire put it, perambulating 'amid the ebb and flow of movement'. Similarly, Walter Benjamin's *The Arcades Project* allowed the minutiae of a city to unfold through a relatively aimless wandering and gazing that is scarcely possible in today's commercial developments. Somewhere in between then and now we forged, as Sudjic says, a city that can only be comprehended by car, mass transit or faster means. Little wonder that the reinvented walkspace, such as the generic waterfront described above, cannot recapture the accretions of established place. It eradicates dead zones, designs out crime, activates precincts with evenness that forecloses on surprise and unanticipated experience.

Walking itself has become an image. Ingo Kumic and Gerard Reinmuth argue that what Gehl presents is 'a document concerned with designing the city – its image – rather than empowering it to exist. So, while it is rich on images of happy people on bicycles, it falls short of

anything we may call a productive strategy.' Dan Hill opines that the image lacks any sense of the 21st-century informational city. Page after page of Gehl's report, he observes, catalogues activity on the street in terms of pedestrian traffic data and stationary behaviour without capturing the texture of what people are doing in the city. There is no acknowledgment of how pedestrians may be 'informationally active', for example. Alex Steffen believes that traffic is not the problem, access is. One aspect of access is mobility, moving people around; the other is delivery of services. Public transport and extension of the walkshed are key elements, but so are extension of the encompassing smart city and new forms of service provision or collaborative consumption. The networks that will enable services to come to our doors or communities will ultimately enable us to stay off the road, to take a stroll instead.

Donald and Gammack paint a gloomy picture of the affordances of this city with its sparkling surface. Sydney, they conclude, 'does inspire a strangely lean version of itself, with a noticeable emphasis on the main iconic features, and hardly any sense of movement through the city, beyond one main street'. There are no flashes of 'narrative energy', no mystery, just a path from nowhere (the airport) to a bridge. Lacking an identity, which inspires adventure, Sydney cannot compare to New York. This, they speculate, may be partly a function of the latter's rich film and literary history, through which an image of the interior and fabric of the city has cohered in the collective imagination. Yet such narrative is itself dependent on the affordances of the city fabric.

Sydney's cityscape is still relatively uncurated. Writers see a mix of glitter and melancholy – an over-reliance on natural gifts and surface sheen that in turn creates tension. The city that can only understand itself as young and beautiful never quite enables its history to surface. Benjamin wrote in *The Arcades Project*: 'Every present is determined by those [past] images which are synchronic with it.' When we walk a city we perceive its image as an amalgam of past, present and potential. Spectacle, however

enthralling in the moment, becomes obtuse and melancholic when it masks these synchronous images. In this sense, the crux of the curatorial task is not to engender more spectacle, but to activate the complex range of coexisting and competing images that animate a city. Grace Karskens, historian of Sydney, insists that while place is sometimes viewed with a sentimental nostalgia, it should be understood as territorial and contested. Ordinary places are not always seen this way in Sydney – a town which tends to view everywhere as *tabula rasa*, where 'developers, planners, politicians, Sydney's wider community still act as though the remnant bushland, the old farmland, the rusty dilapidated industrial areas are a blank canvas, simply waiting to be inscribed with new development'. As a consequence we create flatlands, not only of overdeveloped commercial space, but also of places where defining struggles occurred.

road

trip

The task of the curator is to engage the war between the visible and the invisible, says San Diego based architect Teddy Cruz. This formulation came to him from a community curator in Medellín (Colombia), but it occurs to Cruz as we look out across Botany Bay. As part of the *Curating Cities* project we have staged and videoed *Roadtrips*, inviting architects to travel with us through Sydney. We drove Cruz down Anzac Parade (which, he observed, somewhat resembled Central America) out to the airport and then to La Perouse, following the curve of the Bay all the way round to Kurnell at its southern end. Cruz has developed an acute sensitivity to boundaries and demarcations. He is especially good at reading the processes that shape the urban environment – the clashes of top-down or ad hoc planning and the adaptive practices of communities on the ground (much of his work is focused on the US–Mexico border, where he conducts walks to stimulate new ways of imagining public policy). In a city with no comparable transition point we are curious to see what Cruz has to say about our urban planning, and the identity expressed through it. In terms of both historical significance and environmental problems, Botany seems like the place to go. In its own way, the industrialised landscape of Botany Bay is as visually confronting as the harbour spectacle of Circular Quay. Although not the stuff of postcards, the aesthetic of the industrial sublime is no less romanticised than beach or city skyline. Its breathtaking impact lies in the assault to a natural landscape, the poignancy of which is unmissable at this location. In a shallow bay lies an oil refinery; a bay symbolically visited and more than once abandoned in the story of European colonisation but occupied for many thousands of years by the Tharawal and Eora peoples and associated clans. Around this bay the landscape has been shaped and altered by visible and less visible industry, by Orica, the desalination plant and terra-formation around the airport. We

Panorama of Captain Cook's landing site at the far end of Botany Bay, Sydney. The old La Perouse Orphanage is to the right of frame. Photographed in 2014 by Phillip George.

decide to criss-cross contrasting suburbs, moving from Brighton to Arncliffe, down to Cronulla, to follow some of the patterns of internal tourism rather than the road to the harbour prescribed for most international visitors.

We go first to La Perouse, on the northern headland of Botany Bay with its panoramic view across the bay and its carpark/lookout. Cruz is onto this straight away. The things we have most lovingly landscaped are the traffic island and manicured median strip, he notices. La Perouse strikes him as having poorly designed public space, in spite of its user-friendly walkways and parking spaces. Yet in a very obvious sense La Perouse, home to a longstanding Aboriginal community, presents an unusually rich and encompassing panorama (rocky coastline, historic military fort, landscaped parkland, industrial skyline). To Cruz this density reveals itself through 'hard demarcations' and zoning collisions.

The implication is not that we should somehow have smoothed over rough edges. Paradoxically, in this panorama that seems to pack in more than most, there is a lack of visibility, of articulation. Why, asks our visitor, isn't history – the systems that have shaped this place – more visible? Defining struggles seem to be buried, referenced only in cursory symbolism.

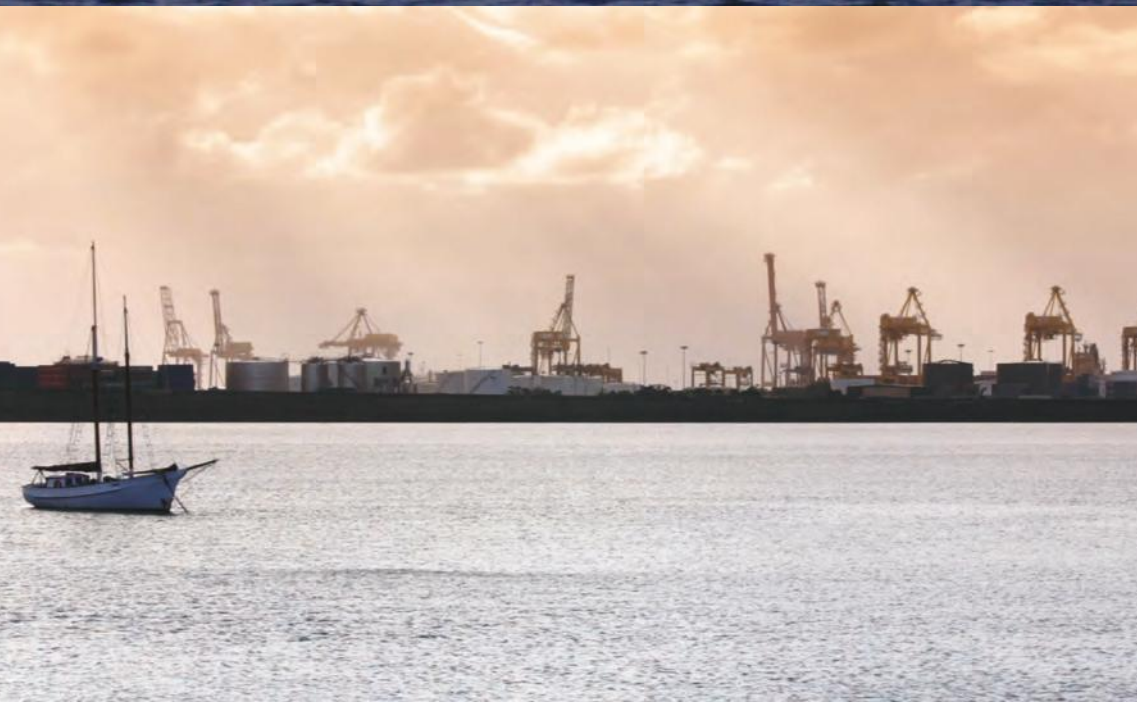
We stand around the Captain Cook monument at Kurnell with architect Peter Poulet, discussing the dilemma of how to activate a space

in a way that doesn't feel tokenistic. What is the difference between an inert or purely symbolic monument and public art that plays some kind of connective role? Cruz believes this goes to the larger question of function and the shift from modernism, with its logic of production, to the postmodern logic of display. Modernism was concerned not just with how things looked but also with how they performed – with the productive aspect of the landscape. But in the postmodern or contemporary city, where image and surface come to the fore, art is less of a 'doing' thing. On the other hand, postmodernism, to its credit, makes space for diversity. The corollary of the countercultural movements of the second half of the 20th century, it embraces difference and hybridity, and a set of conditions no longer amenable to programmatic modernism. If the task today is to unpick the logic of display, and to recapture a sense of functionality, we do so with a more complex image of the city in mind. A city that is multifaceted, culturally diverse, ecologically vulnerable: a landscape that needs to be co-curated. This is a huge endeavour, perhaps easier said than done; it is one that cuts across bureaucracy and institutionalised divisions and our inclination to keep communities, planners, architects, engineers in their traditional places. But in another sense, it is a simple proposition that can be enacted at all levels. For Cruz, creative practice is embedded: a

Curating Cities team: Jill Bennett, Richard Goodwin, Felicity Fenner, with Tolmie MacRae, Teddy Cruz, *Roadtrip #1 (Botany Bay)*, 2013. Documentary photography by Tolmie MacRae.

method of traversing and interpreting the landscape. The same commitment to engagement is evident at an institutional level today; it is the flavour of the City of Sydney vision: working with a city and its people to reveal stories. The trick for those who design and develop creative projects is not just to represent but to *render operative*, as Cruz would say: to move beyond the monument or the symbolic reference to a lost past, toward a living articulation that reveals the complexity of intersections between communities, institutions, the landscape and the territory.

The role of the curator in Cruz's view is to accompany and amplify process. Curating the city is, then, a way of attending to and enabling the exposure of a palimpsest – of all the systems that shape place but are not in evidence in the surface fabric of the city. As cities get bigger and more complex, so we need to rethink the challenges of visualising and imaging the city, not just as a meaningful whole but also as part of an ecosystem far bigger than anything previously envisaged in the urban imaginary. The scale of development and the scale of data are bigger than ever. What does this mean for the future? Cruz gives an intriguing and in some ways surprising response, 'I believe the future is small, and this implies the dismantling of the LARGE by pixelating it with the micro: an urbanism of retrofit.'



EXPA

Ross Harley, *Airportals (Sydney)*,
2001–11. Computer generated image mapping
air traffic landing in Sydney Airport.

PART 2

NSIVE CITY

Running the City

In *Running the City*, the 2013 *Curating Cities* exhibition exploring citizen experiences of pathways and mobility in the city, a range of art projects deployed various geo-mapping tools to create dynamic representations of movement. Two of these solicited or utilised 'found' personal data from the public.

#capillary gathered images and videos sourced via Flickr. In response to a call for participation, Sydney residents uploaded and tagged images and videos documenting local traffic flows and congestion, and other considerations relating to means of travel (walking, running and cycling), the difficulties of mobility and of disability, and the perception of public space and architecture. Developed by artists Brad Miller and Ian McArthur, *#capillary* transformed this data into an immersive interactive artwork, manifested as a large-scale, panoramic screen in a darkened room, on which the viewer encountered grids of variously sized images. Using the Interactive Media Platform (IMP) created by Miller in collaboration

with software developer Adam Hinshaw, the work allowed the viewer's movements, picked up by sensors overhead in the exhibition space, to play a role in shaping the data flows: the horizontal rows of the onscreen grids moved continually in opposing directions. As critic Keith Gallasch observed, this motion and the occasional 'bubbling' of images, embodies 'a liquid restlessness'.

Augmenting the flow of Flickr data in *#capillary,* a spatialised audio environment was constructed from fragments of digital noise, field recordings, and McArthur's audio compositions (using sound patches, designed by Derek Holzer and modified by Ian Andrews). Like the visual components of the work, these are processed, segmented and reassembled into new configurations and responsive juxtapositions, generating a multi-sensory, multi-faceted and continuously transforming experience of the city.

Running the City was curated by Felicity Fenner at the Galleries UNSW. Artists included were Jun Nguyen-Hatsushiba, Marnix de Nijs, Richard Goodwin and Russell Lowe (see also pp 40–41), Volker Kuchelmeister, Brad Miller, Ian McArthur, and MAP Office (see p 83).

Brad Miller, Ian MacArthur, Adam Hinshaw, *#capillary*, 2013.

Nold *Emotional Cartography and Transport Mapping*

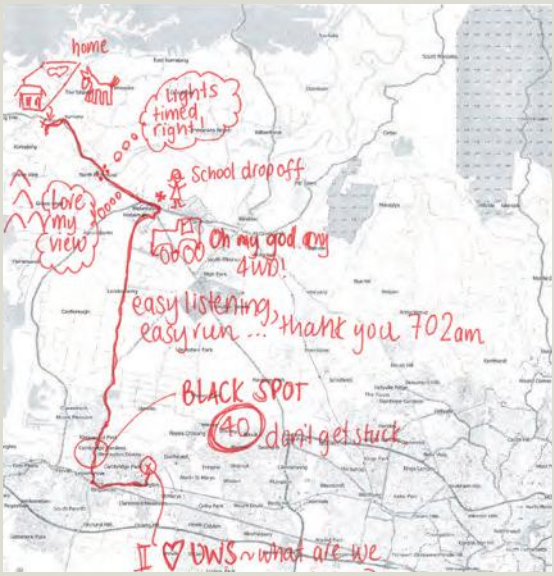
For his 2007 San Francisco *Emotion Mapping* project, Christian Nold invented a bio-mapping device, which was worn by participants to monitor physiological responses to surroundings. Using this device to generate bio data he created an 'affective map' of a neighbourhood, capturing the feelings and responses of participants. UK based Nold collaborates with international urban research groups to investigate issues of transport, food and sustainability, through such bio-mapping and data visualisation. Many of Nold's participatory representations have resulted from his mapping software, *Sensory Journeys*, which doubles as a web repository for communal visualisation of transport systems and reimagination of urban structures.

In 2011 Nold undertook a collaborative *Transport Mapping* project with Parramatta City Council in Sydney. Working with Louise Crabtree and Kaye Shumack from the University of Western Sydney, Nold charted 'experiential transport', accumulating behavioural and decisional social data. Students at the University of Western Sydney were encouraged to draw and hand-annotate maps of the sensory and emotional dimensions of their transport experiences. These were scanned and overlaid on street maps, with 2D barcodes tracing the virtual journeys. Collated data was shared by student and staff travellers at a kiosk during the university's Orientation Week. Dialogue between researchers and travellers became an important catalyst for further data capture and discussion about sustainability.

The Sydney project's aim was to better understand inherent problems with the transport infrastructure in the Western Sydney region using digital mapping as a research tool. The diversity of individual journey patterns, anecdotes and humorous play amongst mapping participants were ultimately designed to explore better options for commuters.

Christian Nold, *San Francisco Emotion Map* [detail], 2007.

Louise Crabtree, Christian Nold, Kaye Shumack, Jason Tuckwell, *Transport Mapping: Emotional cartography, mobility and the body politics of place*, 2012. Image extract detailing emotion/experiential-milestones along a plotted journey by car.



unbound

flow

Sydney, like other cities, is difficult to characterise. Its intricacies – whether geological and topographical (the harbour encircled by plains, river systems and sandstone escarpments), or cultural (its diverse histories and migrations, successive waves of urban planning, and styles of building) – resist easy encapsulation. Like Italo Calvino's cities in *Invisible Cities* – told as a series of vignettes of strange and fabulous cities, assumed by many readers to be myriad facets of the one city of Venice – Sydney is many places and worlds at once. It is a place of shifting mood and tempo: for novelist Delia Falconer its 'fundamental temperament is melancholy'. Author Peter Carey divides his Sydney narrative according to the four elements of earth, air, fire, and water, remarking that this set of associations works for Sydney in a way it could never work for Manhattan. A social geography of Sydney might focus instead on the regions and suburbs forming the distinctive blocs that convey relative privilege or lack thereof (North Shore and Eastern Suburbs; Western Suburbs). But what more is the city, when, as geographers Ash Amin and Nigel Thrift have it, 'we can no longer even agree on what counts as a city'?

Sydney is hard to demarcate geographically. It pushes out to the west, claiming vast tracts of the local food bowl or producing region, and threatens to sprawl into a massive conurbation corridor to merge with Wollongong and Newcastle. The City of Sydney itself is a constricted, artificial political designation – a Local Government Authority (LGA) that takes in only the Central Business District to South Sydney, not even the historically laden industrial heartland of Botany Bay. Lopped off from much of the urban region, 'the City' is obliged to represent its history and culture through a limited number of symbolic sites. But however

great or small its spatial formation, the urban imaginary is inflected by the experience of class, race, gender, age, occupation – in other words, by various social relations as people move through and live in the city, creating it and interpreting it in diverse ways.

In contrast to conceptualising Sydney in terms of frontiers of horizontal urban sprawl, 'Aboriginal Sydney' is bounded by Picton in the south, Lithgow in the west, and the Wollemi National Park and Norah Head in the north-west and north. *A History of Aboriginal Sydney* tells us that this is an area rather bigger than that of modern Sydney, but that Sydney Aboriginal people did – and still do – recognise it as their country. The concept of rigid boundaries between groups of people is not useful here. Instead of set divisions within the broader Aboriginal Sydney area, people associated with particular places were linked to other places and other peoples through kinship. *A History of Aboriginal Sydney* states:

> Kooris living along the Georges River were well acquainted with locations and kinfolk down the coast. Many people who knew the Blue Mountains well had connections into Wiradjuri country in the western slopes and plains. Those living near Broken Bay may have been more familiar with Kooris on the Hunter River than on the Georges River.

Hence, it is possible to map ongoing Aboriginal presence within the growing city of Sydney along river corridors, especially the Georges River (as historians Heather Goodall and Allison Cadzow suggest). Because land immediately surrounding the river wasn't suited to agriculture or settlement due to its poor soils, the expanding city leap-frogged over it. And so it became a place where Aboriginal people could gather, survive and persist, creating a kind of city within a city that was also networked through kinship and cultural obligation to other places.

Another way to envisage Sydney is as a World City. Implied in the 2030 Vision brand identification *global, connected* is belonging to a globalised economy that today shapes the character and primary

relationships of this city, which is as likely to compare itself to Copenhagen or New York as to Melbourne or others in the region. Australia's finance capital, Sydney, influences the nation, but is concurrently affected by the fortunes of global markets. Globalisation in this sense has both material and cultural effects. But which networks are the defining ones for the city that professes itself *green, global and connected*? The sustainable city as a political entity and a set of practical actions is shaped and sustained through transnational networks, such as C40, a network of the world's megacities taking action to reduce greenhouse gas emissions.

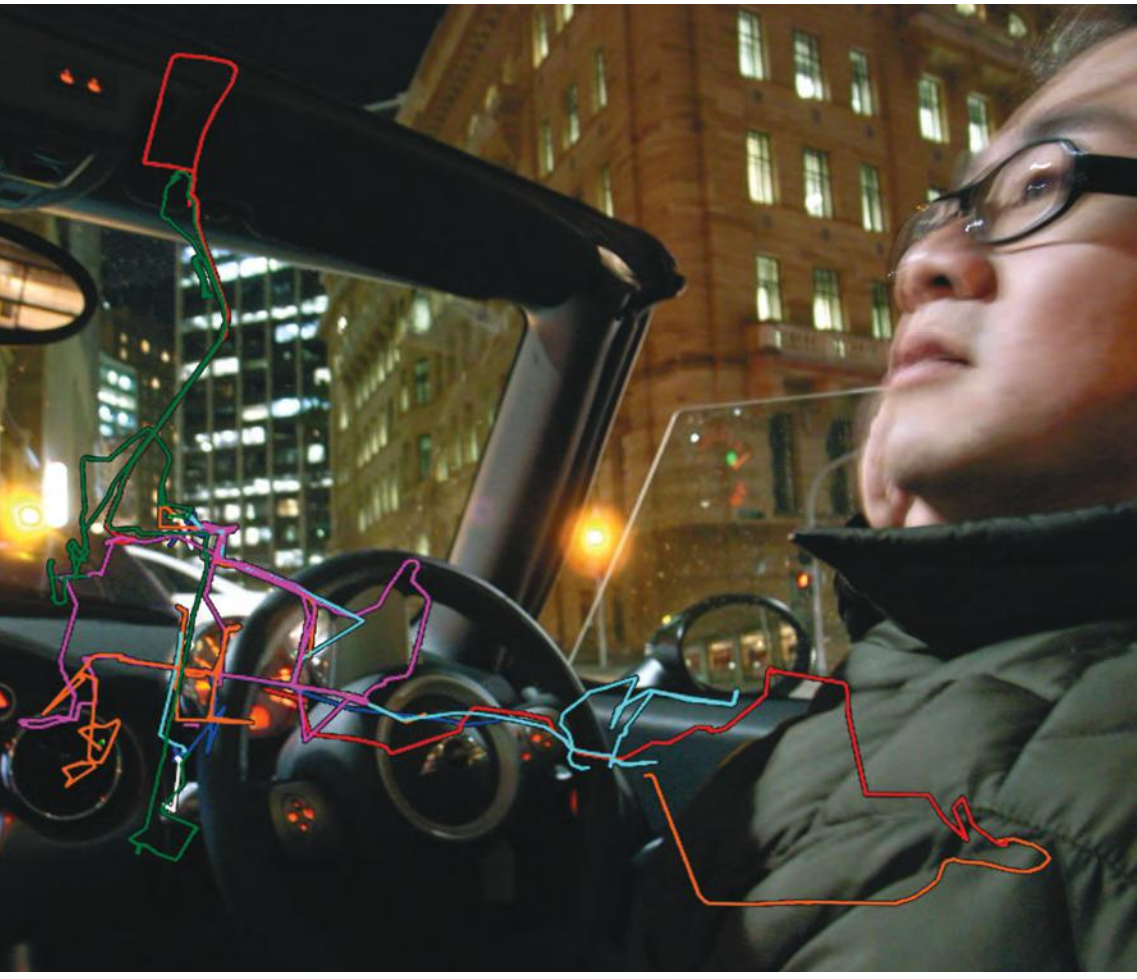
The very concept of sustainability envisages the city as a consuming entity within a producing region. Considering the city in terms of its networks and dependencies is not just a question of abstract economics but of physical and material impact. Currently, for example, 20 per cent of Sydney's waste is shipped by train to be processed in a bioreactor 250 kilometres away at Woodlawn near Goulburn. The physical environment near Goulburn, linked to Sydney in this output loop, is actually shaped in part by our waste – and is a vital part of the city's dynamic. The same holds for things flowing into rather than out of the city. People, commodities, energy, information (an expandable list of tangible and intangible flows) pass through streets, air, subterranean pathways, homes, offices, industrial sites and so forth, linking urban natures with distant sites and ecologies. In so doing, writes geographer Bruce Braun, they 'unbound' the city, operating through multi-scaled networks at local, transnational and global levels.

Vital natural resources such as water are drawn from beyond the city's edges and networked extensively throughout, effectively fusing nature and city, well beyond geographic or political boundaries. The history of cities can even be written and read as a history of water (as geographer and urbanist, Matthew Gandy, and others show) since sources of reliable clean water were a prerequisite of the establishment

and ongoing viability of cities in the 19th century. A similar case can be made for food consumption. Think of a city, writes architect Carolyn Steel; whatever you imagine, it probably involves buildings. But, she goes on, the story of a city is the story of its food – cities are what they eat. Food comes in, is stored, prepared, consumed, wasted; this cycle shapes land use and development, transport infrastructure and social life. Food, in other words, is not a sub-theme but a structuring principle of urban experience – and indeed of the process of settlement.

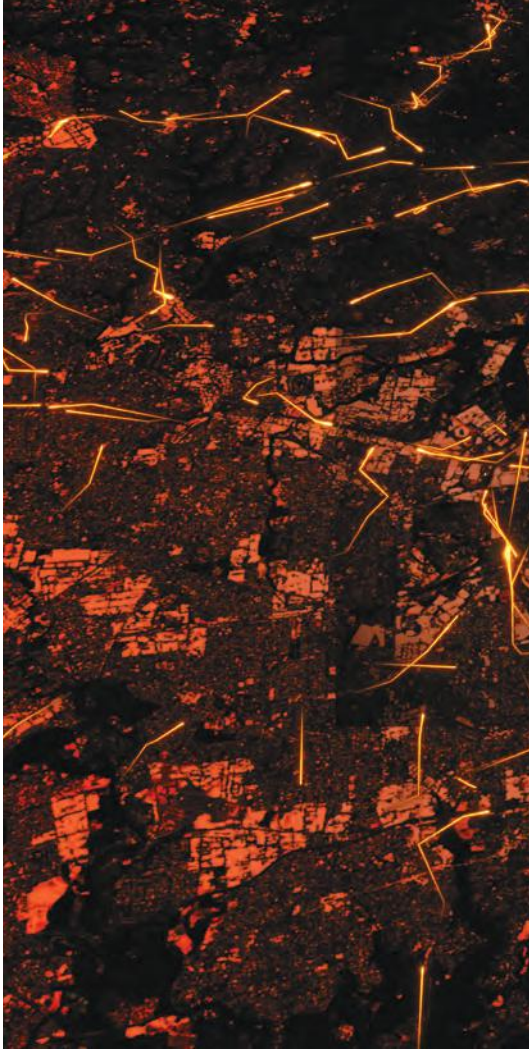
As early as 1973 critic and academic Raymond Williams showed that city and country are inextricably connected in his landmark book *The Country and the City*. Since then, writers, artists and cartographers have effectively reinvented the traditional atlas with new forms of mapping that trace the components in the production and disposal of consumer products literally as linear flows: a cup of coffee for writer Rebecca Solnit, who considers water sources and engineering, dairy farming, coffee importing and distributing, along with water treatment plants and sewer lines all involved in bringing a cup of coffee to the café in San Francisco then disposing of it again; or a taco for design collective Rebar who created a 'tacoshed' much like a watershed that maps the geographical boundaries of the taco's origins, including everything from spices in the sauce, corn, tomatoes, and the foil used to wrap it. Such work begins to explore the question of how to realise and render the flows of the contemporary city – the vectors of consumption that dismantle any notion of city as bounded entity.

As Amin and Thrift point out, the city is not captured unless in terms of the transitivity and porosity that endlessly reshape and expand the metropolis, not just at local, geographic borders but also via global networks and transient populations. In 2012, 37 million people passed through Sydney airport; the number of cruise ships docking in Sydney Harbour is heading to 300 a season, with thousands tipped into Circular Quay from a single large cruise liner (the New South Wales Ports Minister



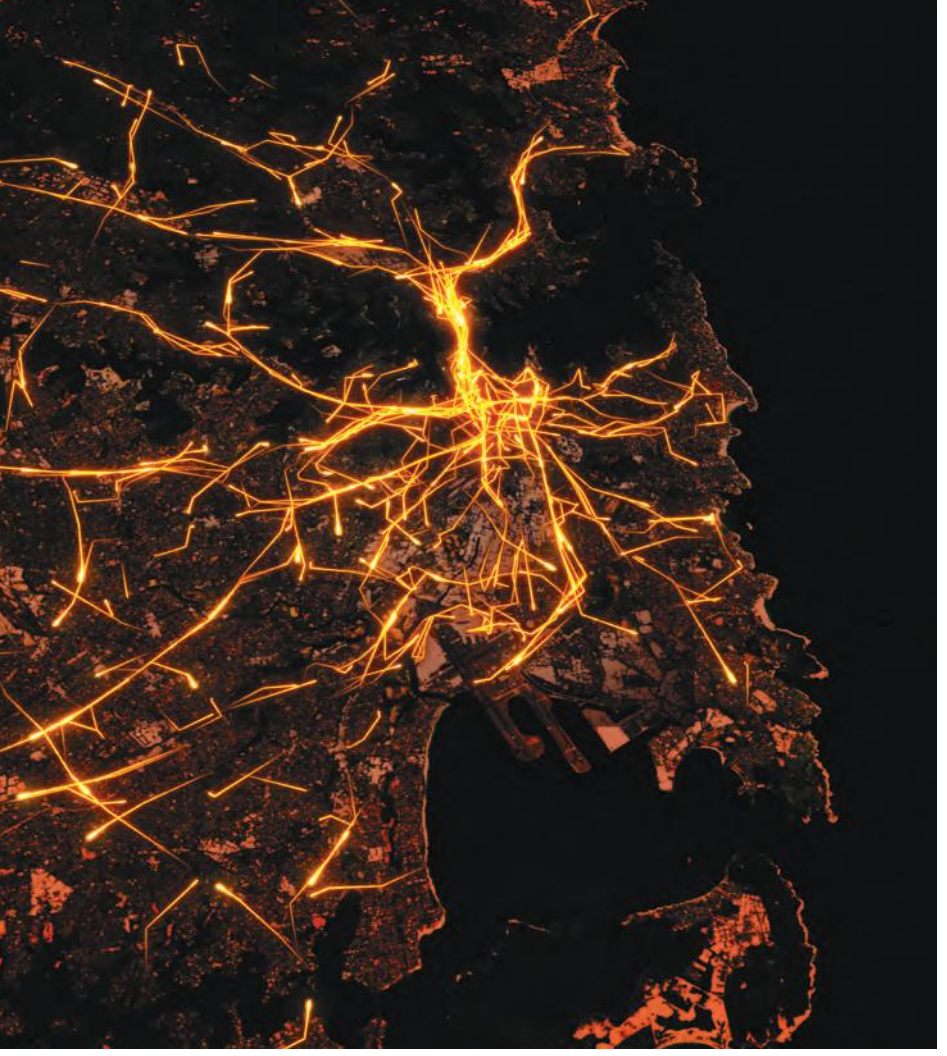
Emil Goh, *Esquisse by Mini*, 2006. Drawn by driving a Mini around the city.

reports that if the upward trend continues, by 2020 nearly 1 million cruise passengers could conceivably be visiting Sydney each year). Circular Quay is not merely an historic or symbolic point of arrival; its character and day-to-day dynamic is shaped by a largely transient population, passing in and out. The logic of the city is, by extension, driven by people in motion. And today we can track, represent and qualify mobility in many ways.

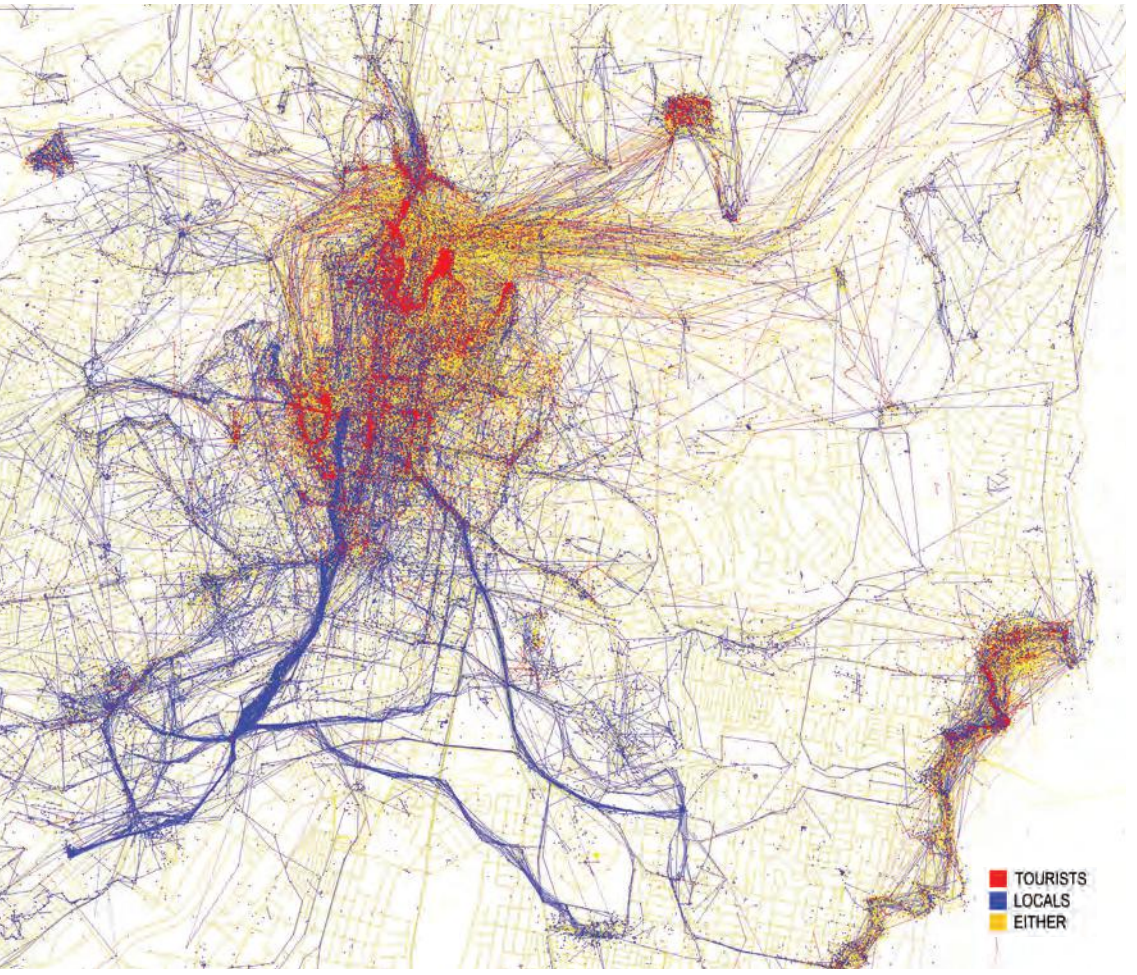


Luke Eve (series dir), Taxis in Sydney, *Great Southern Land, Episode 3 – On the Move* [still], 2012.

Increasingly, we leave traces of movement, through our use of GPS-enabled devices, of E-Toll and RFID transport cards, wi-fi and 4G, and through our affiliation to FlyBuys and Everyday Rewards programs (and so on). The city is itself 'sentient', as architect and artist Mark Shepard highlighted in one of the first major exhibitions to explore the effects of ubiquitous computing and how this infrastructure creates a new set of possibilities for creative intervention. Sensors are now embedded in everyday urban space; information processing capacity is everywhere. The city fabric is imbued with the capacity to remember and anticipate, to remind us of our shopping habits, to advise us of the whereabouts of our next taxi.



For something like a decade we have been growing accustomed to the flowprint; the dynamic fingerprint image that captures the trace of a sensor and thus the flow of people and traffic across the city. *Sydney Design 06*, an exhibition at Customs House, featured 'personal reinterpretations of the city' produced with the then novel GPS Create tool (p 117). Using this custom GPS, festival-goers tracked their movements on foot, bicycle, skateboard, car, train and ferry to generate colourful GPS line drawings. By today's standards these squiggles yield minimal information about the journey. We are increasingly offered more complex pictures, aggregating data sources – and interfaces that enable interactive



Eric Fischer, *Locals and Tourists #12*
(GTWA #27) Sydney, 2010.

engagement with data, whether through apps or artworks. We can see our taxi approaching on a functional taxi app and can also see the flow of taxis across the city (p 118). Eric Fischer's *A Geotagger's World Atlas* combines data from Flickr and Picasa to generate maps of the locations most often photographed by Sydney tourists (harbour, followed by beaches) and locals (outer suburban areas).

Data-aesthetics encompass self-representation, but also open up access to new layers of information and new methods of mapping. Artist and designer Christian Nold has advanced the affective mapping of the city, incorporating qualitative data into personal trails (p 111). *Veloscape*, a *Curating Cities* project that gathers information on cycling routes in Sydney, uses a sensor array to combine geo-data with information on arousal levels and measures that reflect the subjective experience of riding a bike on the city's roads (p 77). For the 2013 exhibition *Running the City*, Jun Nguyen-Hatsushiba exhibited his 'running drawings' of cities, realised with a GPS-equipped wristwatch that enables the artist to design intricate shapes (of plant forms or political symbols) and to realise these on Google Earth maps as he runs the routes defined by these shapes. In the same show, Rotterdam based artist Marnix de Nijs worked with data from Flickr and Map My Run to establish and visualise some of Sydney's most popular runs.

At the Massachusetts Institute of Technology (MIT), SENSEable City Lab explores the 'real-time city', visualising processes that often remain invisible. The Trash Track team along with local volunteers attached over 3000 smart tags to waste objects discarded by households and schools in the Seattle area. The tags' trajectories were monitored in real time from a central server at MIT. 'As the location reports from the tracked objects started coming in, we were fascinated to see an invisible infrastructure unfolding', said project leader Dietmar Offenhuber. Trajectory lines of particular waste objects – light bulbs, cell phones, batteries, coated paper – spring outward from Seattle across the continent, revealing how far city waste travels, with some notable items, such as a printer cartridge, travelling 6152 kilometres to reach its final resting place. Such data-mapping not only provides insight into waste disposal flows and transport miles: in the words of Assaf Biderman from SENSEable City Lab, 'Trash Track presents a new opportunity for citizens to engage with the urban system. It is a bottom-up process in which pervasive technologies allow individuals to monitor and describe their environment, while also providing an insight into the impact of their own actions.'

sydney

and waste

Those at the big end of the waste disposal business concur that personal insight among the general populace is often lacking. The CEO of a large waste disposal and environmental management company commented to us that most people don't really care what happens to their rubbish. 'Once people put their rubbish in the wheelie bin', he said from the company's glass-walled meeting room overlooking a corner of Sydney Harbour, 'they don't think much about where it ends up.'

Flows of people and things have material, tangible and ecological impacts. Our detritus seeps outward. 'The city is an immense machine for creating waste', writes academic Esther Leslie. 'The city's inhabitants ingest, eject, digest, disgorge, discard, acquire, stockpile. The city is full of rubbish.' And its disposal is no simple matter. Things, as theorist Jane Bennett puts it, can never really be thrown 'away'. This applies not only to large objects readily associated with waste called gross contaminants – PET bottles, plastic bags, takeaway food containers, wrappers, scraps – but also to less visible traces and compounds, all of which continue their lives in earnest far beyond the moment when they exit our own.

In 2012 an environmental action group called Two Hands sent divers into Sydney Harbour to film the rubbish strewn across its floor. The footage reveals bikes, shopping trolleys, take-away food containers, clothing, peaked caps and, most alarmingly, vast amounts of plastic swaying gently like kelp in the currents. This imagery has a similar poetic flow to Raquel Ormella's video *We Are Here*, which follows the drift of so-called 'rubbish' bird species – flocks of Indian mynahs that thrive in urban settings, pecking at our refuse, almost invisible because of their ubiquity. A single white plastic bag is arrested in flight or drifts with a strange kind of loneliness along the city street. Under Sydney Harbour such soft plastics are abundant.

Rossler and King *Plastic Fantastic*

In 2011 Liane Rossler and Sarah King began experimenting with methods of processing plastic waste. Discovering that they could manipulate plastic bags by wrapping them around a mould and blasting them with a heat gun, they created a series of vases, bowls and other homewares, and named the design range *Plastic Fantastic*. Dubbing their practice 'supercycling' (as plastic is a 'super-material'), Rossler and King moved away from the craftier feel of upcycling ('It's not just taking a bent fork and turning it into a bangle').

The aquatic colour tones of the *Plastic Fantastic* range are a deliberate allusion to the challenge of The great Pacific Garbage Patch and the trillions of plastic bags that end up in the ocean. Supercyclers set out 'to tackle issues like the plastic mess we've made in our oceans by changing perceptions about waste and what we do with it'. A key strategy is running workshops to transfer supercycling skills to the public. The *Plastic Fantastic* methods are simple enough for anyone to learn; instructions are on <supercyclersarego.blogspot.com.au>. The overarching aim of the *Plastic Fantastic* project is to encourage supercycling within the broader community as a means of placing aesthetic and monetary value on common urban waste while revealing the potential of eco-sustainable design practices.

Supercyclers, *Plastic Fantastic*, 2011.

Now a recognised sustainable design model exhibited at showcases such as Milan Design Week and London Design Festival, the Supercyclers campaign has succeeded not only in introducing an eco-homewares range, but also in advancing a participatory eco-design practice that reimagines our relationship to consumer waste.

Raquel Ormella, *We Are Here*, 2012.

Rubbish enters the harbour through drains, pipes and tributaries. Although the City Environmental Services Department collects around 900 tonnes of garbage from Sydney's beaches and foreshores each year, no systematic program collects the tonnes of rubbish lurking beneath the harbour's surface. As well as moving throughout the harbour and estuaries on the tides, the rubbish is drawn into Pacific Ocean currents beyond the harbour mouth. 'That means it's taken away from Australia, past New Zealand, across thousands of kilometres of open ocean', says Dean Cropp, Two Hands' chief underwater camera operator. This systemic permeation of plastic throughout the world's oceans, much of it disgorged from cities including Sydney, leads zoologist Jennifer Lavers to suggest that any species coming from the ocean – including the fish we eat – can no longer be considered organic due to vast amounts of plastic particles ingested.

Sydney is developing means to convert waste to energy, to recycle larger volumes of municipal waste, and in the process to reduce greenhouse gas emissions. A facility at Eastern Creek, 35 kilometres

west of Sydney, uses the Urban Resource Reduction, Recovery and Recycling (UR-3R) process to treat municipal solid waste from two Sydney municipalities to produce renewable energy and return carbon to the soil in the form of organic fertiliser for farmlands across the state. Run through a public/private partnership between the Australian company Global Renewables and two Sydney municipal governments, it saves 210 000 tonnes of CO_2 emissions annually and generates $11.5 million per year.

Also in Sydney's west – Camellia – lies Australia's first regional food-waste-to-energy facility. Here EarthPower Technologies accepts organic waste material from the industrial, commercial and residential sectors and converts it to green energy and nutrient-rich fertiliser. Meanwhile, on the city streets, 'freegans' are taking action to combat high rates of food wastage. They challenge mainstream definitions of waste, with dumpster divers harvesting food from supermarket dumpster bins and stretching the officialdom of 'use by' dates. The global movement 'Food Not Bombs' collects leftover food from markets to serve to people on the street; and OzHarvest takes excess food from catered events and redistributes it to disadvantaged communities.

Slow Art Collective (Dylan Martorell, Tony Adams, Chaco Kato), *Untitled*, 2011. Mixed media installation, abandoned objects left outside by local residents for a scheduled council clean-up.


VEGEMITE

Keating *Activate 2750*

C3West – initiated by the Museum of Contemporary Art, the University of Western Sydney, and consultant Jock McQueenie – is a strategic partnership exploring ways for artists and cultural institutions to creatively engage with business. Its focus is on community, sustainability and regional development. Initially C3West commissioned four artists – Craig Walsh, Sylvie Blocher, Ash Keating, and Jeanne van Heeswijk – to produce art with partners in Western Sydney.

In 2009 Ash Keating developed *Activate 2750*, a one-week installation in the western Sydney suburb of Penrith (postcode 2750). The installation comprised 10 tonnes of waste temporarily diverted from the

Davis Street Transfer Station by SITA Australia, a provider of resource recovery solutions and sustainability outcomes (the waste was returned to SITA's transfer station at Wetherill Park after the project). Surrounded by two fences, the installation of industrial detritus was positioned on the front lawn of the Joan Sutherland Performing Arts Centre (in Penrith's city centre), near the local Westfield mall.

Activate 2750 also entailed a series of performances. Over four nights, Keating and local choreographers and performers paraded across town and through Westfield, donned in spectacular costumes fashioned from the installation's waste, pushing shopping trolleys – or 'mobile sculptures' – brimming with more waste.

The project did not aim to intervene in waste management systems – to redistribute waste for recycling or upcycling. Via its diversion of a mass of industrial and consumer waste to Penrith's city centre, *Activate 2750* aimed to raise public awareness of waste-producing consumer behaviour, bringing the public into proximity with landfill and waste. During the project, researchers from the Centre for Cultural Research at UWS interviewed the public. Some interviewees were unconvinced ('It's a joke! It's the biggest load of rubbish I've ever seen!'); others engaged with the project's goals ('I wouldn't exactly call a pile of trash "art", but raising community awareness is always tops in my books'). 'Local people will question this as being more of a pile of waste than an art project', predicted Keating, 'and they are right in thinking this because the aim of the exercise is to replicate a small pile of … thousands of these types of piles being created and compacted daily in landfill around the country.'

Ash Keating, *Activate 2750* (Westfield Procession, Penrith, NSW, Australia), 2009.

wood

lawn

Woodlawn, a bioreactor built and run by global environmental solutions company Veolia, processes around 1800 tonnes a day of Sydney's waste. Each day rubbish leaves the city by rail, shunted 250 kilometres to the Goulburn region and offloaded onto trucks at a siding established specifically for Woodlawn's use. A few kilometres from the railway, the bioreactor lies in a deep excavated site left by a former copper, lead and zinc mine. Since its establishment in 2005 Woodlawn has processed over 4 million tonnes of metropolitan Sydney's decomposable waste.

These figures represent only a fraction of Sydney's overall waste 'production' and are a reminder of Australia's high rates of waste generation. Australia has the highest rate of municipal waste generation in the world, according to the *Waste Atlas*; the average municipal solid waste in Australia is 2080 kilograms per person per year. As mentioned in the last chapter artist Ash Keating's *Activate 2750* drew attention to Sydney's waste disposal in a sculptural mountain of rubbish and a series of live performances, processions and actions in Penrith. This project connected art with business, predominantly in the Western Sydney area (C3West), and engaged two waste management corporations: SITA in the case of Keating, and Veolia in the case of Jeanne van Heeswijk whose project *Talking Trash: Personal relationships with waste* was based on interviews with householders in the Goulburn region.

Despite the vast amounts of Sydney's municipal rubbish handled by Woodlawn, the facility's presence is discreet. Tucked into a narrow and otherwise empty rural valley not far from the township of Tarago lies an isolated railway platform known as the Crisps Creek Intermodal Facility. Waste arrives at this unassuming location from the city, to be transported via a short road journey to Woodlawn. From the road there is little to see – a glimpse of the rim of the open-cut mine set alongside a quiet single-lane

country road among a swathe of open paddocks bleached in winter by the area's heavy frosts. Along a small ridge stands a row of wind turbines with blades slowly spinning. A few kilometres further lies Lake George with its vast grass-filled lakebed. Along its most distant rim, more wind turbines stand out in white, dozens generating power to offset energy used by Sydney's desalination plant. These pieces of quiet rural geography with their energy and waste infrastructures are plugged into the distant city.

On our visit to Woodlawn, operations manager Henry Gundry met us in the foyer and led the way to the education centre, past a 3D model of the repurposed mine pit, surrounded by large information boards.

'Do you think people care where their rubbish goes once it's been put in the bin and disappears?' we asked.

'People need to think more about how they dispose of their waste and to practice due diligence when deciding what goes in which bin', he said without hesitation. 'The main cost in waste management is in sorting. People don't understand that if they put the wrong thing in the recycle bin it can ruin the whole system. Some people make a lot of effort to put their plastic bottles and tubs and things into a plastic bag and tie it up. They think they've done the right thing and they've really tried. But that plastic bag is then mixed up with the PETs and it can't be recycled. Which means the whole bag full will then go to landfill. People need to realise that their actions can contaminate the sorting process.'

Landfill, he explained, is a cheap way of handling waste. It costs millions of dollars to build a sorting facility. And, as the documentary made by Sydney's Total Environment Centre, *Waste Not*, makes clear, hands-on human labour is still vital to the sorting process. People stand at conveyor belts sorting through streams of rubbish quite literally by hand.

Jeanne van Heeswijk, Paul Sixta, *Talking Trash: Personal relationships with waste*, 2010.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van Heeswijk + Goulburn residents
Talking Trash

For C3West (p 128), Dutch artist Jeanne van Heeswijk conceived a program of community art investigating cultural attitudes to waste. Initially proposed to the waste multinational SITA as a project for Liverpool, Western Sydney, *Talking Trash: Personal relationships with waste* evolved as a partnership with Veolia Environmental Services in Goulburn in the vicinity of the Woodlawn bioreactor. Veolia's Mulwaree Trust has developed a relationship with the Goulburn community, supporting cultural and regional programs.

Van Heeswijk understands that community is not just something that exists, it needs to be generated through social interactions. This notion of citizenship encourages a group to 'become visible' at certain moments, coalescing around an issue. In *Talking Trash* the issue was how to deal with waste in everyday life. Van Heeswijk elicited narratives from local residents on their feelings about waste and recycling, creating charts to delineate shades of feeling. The residents then re-enacted scenarios derived from the interviews in a series of short films (shot by Paul Sixta). The eventual outcome of *Talking Trash* comprised 25 short videos, displayed in 'wheelie' bins (via touch-screens and headphones) in Goulburn Regional Art Gallery in April 2010 and later at the Museum of Contemporary Art Australia, in Sydney.

Jeanne van Heeswijk, Paul Sixta, *Talking Trash: Personal relationships with waste*, 2010. Mixed media installation.

Woodlawn currently serves the domestic market and for each tonne of waste they receive they extract around 40–50 per cent of biodegradable material to create biogas. Biogas is a combustible gas comprised mainly of methane and CO_2 that would otherwise be emitted into the atmosphere. Woodlawn aims to produce biogas from landfill at 60 per cent methane and 40 per cent CO_2 as an ideal ratio. Each day they receive about one-third of Sydney's waste in terms of that particular waste stream – putrescible waste. Around 58 shipping containers arrive per day, and their contents are spread around the bottom of the void left by the old mine. Currently, at its deepest point, the waste is 85 metres deep. Here, at the receiving end of this waste export route, Jeanne van Heeswijk conducted interviews with Goulburn residents to create insight into the role and passage of rubbish items in everyday life, bringing to light personal attitudes towards 'wasting' practices, and revealing intimate relationships with waste – all of which sit against this backdrop of mass and amassed disposal.

According to Gundry, Woodlawn is unique in that it spreads waste and lays a network of pipes designed to extract biogas simultaneously. The difference between it and other landfill sites around the world is that Woodlawn is extracting the gases as they're produced. Other sites have capped former landfill sites, perhaps revegetated them, and only then sunk pipes for capture. At Woodlawn biogas is used to generate energy that then enters the grid. This is one future of waste that cannot be recycled – the most abject of waste that decays and stinks – reconceptualised as an energy source rather than something to be buried out of sight and forgotten.

As we leaned against a fence, trucks unloaded rubbish onto the floor of the pit and graders spread it about. The liquid formed through decomposition is called leachate, which is a fluid with a high bacteria count. Gundry explained that there's more concentrated leachate in the lower and older layers of waste, so part of the process of enhancing decomposition involves redistributing the leachate to the more recent layers. Most of the leachate is formed through the decomposition process,

along with some 'water ingress', or water from rainfall. 'Preferential paths are created throughout the waste-bed that blankets the bottom of the void', said Gundry, 'to increase the zone of influence for biogas capture.' He made it sound like a finely honed art.

'Veolia is very aggressive in terms of reducing its emissions', Gundry said. 'The project is innovative because it transports waste by rail rather than road. And it captures methane that is otherwise a major emissions problem.'

Pulling up outside the engine rooms we put our safety glasses on and enter a dim room filled with heat and dials.

'When we started', he said, 'we only had a flare. Then once we knew we were reliably producing 500 cubic metres of gas per hour we commissioned our first engine. Once we were producing another 500 cubic metres of gas per hour, we built our second. And so on. That's how we gauge we're ready for our next engine.' They've produced 120 000 megawatt hours since they began and currently run five engines, with a view to running up to 24 in the future.

Behind heavy metal doors radiating heat, Sydney's waste was firing electricity.

'We're powering a few thousand houses as we speak', Gundry said.

In an adjacent room additional trials are taking place – a fish farm that utilises waste heat produced from the energy generation. And hydroponically grown leafy greens that are part of a filtration process that removes excess nutrients from the fish tanks. Schools of fish swam past a porthole of glass set into a large vat-like tank. In this room with its concrete floor and bare brick walls there is a sense of experimentation and innovation. Grim, perhaps, for the fish, lettuce and silverbeet all growing without direct sunlight. But testing the limits of possibility nonetheless. Waste is converted to energy, this process produces waste heat which is directed to other purposes; each category of 'waste' rethought into something new and productive.

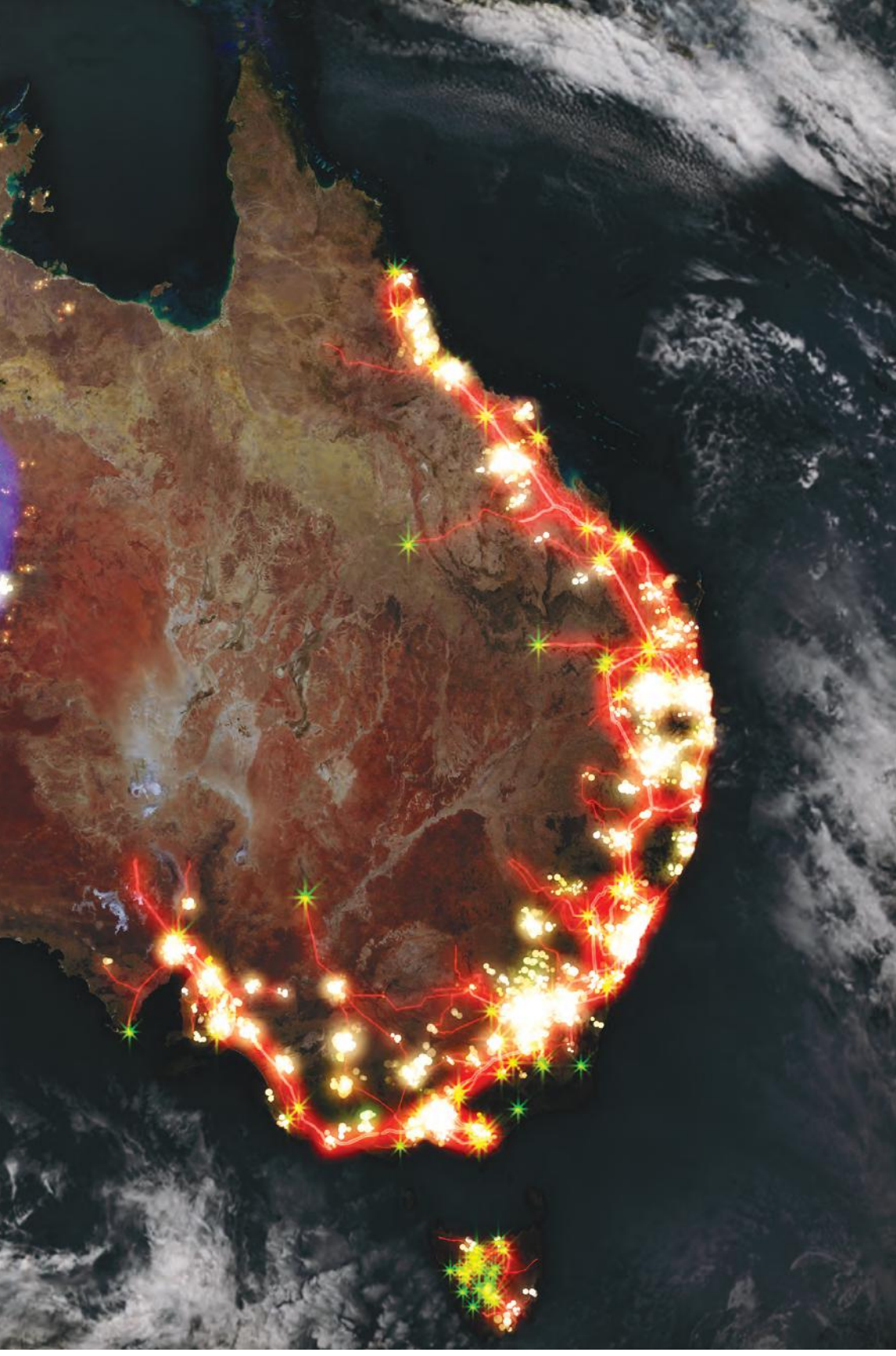
energy

and agency

The current atmospheric CO_2 rise from approximately 280 to 397–400 parts per million exceeds any measurement in the geological record. We are frequently reminded of this looming crisis by climate scientists, climate change activists, Intergovernmental Panel on Climate Change reports and the media. But the question remains, obviously, and pressingly, of what to *do*. Artist Natalie Jeremijenko states that, 'What the climate crisis has revealed to us is a secondary, more insidious and more pervasive crisis, which is the crisis of agency … Somehow buying a local lettuce, changing a light bulb, driving the speed limit, changing your tyres regularly, doesn't seem sufficient in the face of climate crisis.' Our own actions seem incommensurable with the scale of the problem, either at an individual or a national level. Smaller developed nations such as Australia, responsible for only fractions of overall global emissions, ask themselves whether their actions count – despite their wealth and long history of resource consumption, and among the highest per capita emissions in the world.

Literary theorist Timothy Clark understands this crisis of agency in terms of a 'derangement of scale'. A mismatch occurs when, as he puts it, 'the easy, daily equations of moral and political accounting' are dropped into both 'a zero and an infinity', with the effect that actions and outcomes are disproportionate to one another. 'The greater the number of people engaged in modern forms of consumption then the less the relative influence or responsibility of each but the worse the cumulative impact of their insignificance.' Think of this in terms of how we *feel* and the derangement is clear: the more people involved in resource-intensive lifestyles the less each individual feels responsible. Paradoxically, as each person feels her/his relative influence and responsibility diminishing, the worse the overall impact becomes.

Luke Eve (series dir), *Great Southern Land, Episode 1 – Great Australian Bite* [still], 2012.



Bizarrely, as Clark suggests, discussion of the 'possible collapse of civilization can end, no less solemnly, with the injunction never to fill the kettle more than necessary when making tea'. This distortion of scale – and the difficulty of reconciling personal actions with global consequences – presents a fundamental challenge to long-established notions of human freedom and responsibility. Old ideas of ethical action and moral responsibility, conceived at human scale are inadequate to the demands of the new situation with its pervasive sense of urgency, uncertainty and anxiety about the future. They are clearly strained by 'footprint' calculations that somehow render the act of filling a kettle equivalent to political deliberations. The *Natural Fuse* project plays on this mismatch – establishing a network of plant ownership across the city and bestowing on owners the power to determine life and death at the flick of a switch – the switch not of a weapon of destruction, but of a domestic appliance.

Despite the derangements of scale and proportion, it is precisely at the locus of private, quotidian and seemingly banal domestic acts (that could, as *Natural Fuse* illustrates, become lethal) that real differences might

Haque Design + Research, *Natural Fuse*, 2009.

be made in greenhouse gas (GHG) emissions. A recent study of Australian cities and their prospects for decarbonisation, *Australia's Unintended Cities: The impact of housing on urban development*, shows that Australian cities are responsible for at least two-thirds of the nation's GHG emissions. And around one-fifth of all GHG emissions from end-use energy consumption in Australian cities can be traced directly to domestic transport and housing-centred activities. Number crunching on a moderately 'green' Sydney household compared to a 'typical' Sydney household reveals that significant reductions can be, and are, made in annual GHG emissions precisely through choices made about transport, household activities and appliances. The so-called 'green' household – which is a long way from a 'freezing in the dark' scenario – uses 64 per cent less energy than the typical household through using energy- and water-saving appliances and equipment, taking fairly short showers, using public transport for longer trips, walking or cycling for local trips, and not driving the fuel-efficient car a lot. All of which might amount to some kind of reassurance as to whether half-filling your kettle actually makes a difference or has a logic beyond the merely rhetorical.

Haque Design + Research *Natural Fuse*

Natural Fuse is a citywide network of carbon sinking plants, designed to actively sequester carbon emissions in a way that provocatively engages human agency. During the Australian summer of 2011–12, the network was established in Sydney through the *Curating Cities* exhibition *Try This At Home* from which *Natural Fuse* units could be borrowed and taken home.

Each *Natural Fuse* unit comprises one or more plants and an electrical output socket linked to a small domestic appliance (a fan or a light). The unit is designed so that the amount of energy consumed and the amount of carbon absorbed by the unit's plant/s is balanced. A single plant can only absorb a limited quantity of carbon dioxide. Accordingly, each unit has a restricted energy output, and would struggle to light even a low (50) watt light bulb for more than a few minutes. The *Natural Fuse* network interconnects a city's units via the internet and effectively comprises an expanded energy grid. Through networking, the plants are able to share their capacity and take advantage of carbon-sinking-surplus in the system since not all *Natural Fuses* will be in use at any one time.

The amount of energy used by an individual unit is controlled via a knob that can be switched to three different modes: off, selfish and selfless. In selfless mode, a *Natural Fuse* unit will expend as much energy as it can without damaging the network's carbon footprint. In this mode the energy available to any unit is contingent on how much energy has been/is being consumed by other users within the network; if the network's carbon sequestering capacities are low, the unit may only be able to be used for a small amount of time. When on selfish mode, the unit will provide as much energy to the user as is asked of it. However, if such usage exceeds the network's carbon sequestering capacities, the system will automatically and randomly threaten to harm someone else's plant/s. *Natural Fuse* thus engages plant owners in a version of the 'prisoner's dilemma', presenting

the choice between 'selfishly' powering a kettle or saving the life of an unknown plant somewhere in the network.

Each unit has three 'lives', or chances, before a shot of vinegar will kill its plant/s in response to someone else's energy overdraw. As it loses each life, the network delivers an email to the threatened plant's owner with the contact details of the person responsible for the damage. In this sense, the project is about community participation, dialogue and cooperation as much as it is about sustainability. The entire networked community is responsible for the success of the network.

Haque Design + Research, *Natural Fuse* (Sydney), 2009–11.

With these kinds of tangible and measurable impacts in mind, ElectriCITY Sparks held at the Windmill pop-up at The Rocks focused on energy efficiency, flagged as 'a journey that everyone of us can embark upon' and calling 'upon the creative sector and the creative in all of us to make this journey fun, rewarding and effective'. An ElectriCITY Gadget Demo run by artist and electrical engineer Pierre Proske showed how to measure amounts of electricity used by specific household appliances, providing a finer grained breakdown of more general rates provided by standard electricity meters and energy provider accounts to consumers. The demo was housed inside a pop-up windmill erected where real windmills once stood early in Sydney's history, providing a glimpse into a little-known non-coal reliant moment in the city's past. The ubiquitous kettle, along with hair dryers and laptop chargers were all measured; kettles and hair dryers using particularly high amounts of electricity. We might make different choices, the demo suggested, if we knew more intimately how the things in our homes operate, and how much electricity individual appliances consume. We could balance the use of one appliance with another, for example, or choose what time of day to use them, or make different choices at the time of purchase. The public might interact with the energy supplies that sustain their lives in new and more nuanced ways.

If this is design for behaviour change, it seems modest and uncontentious: hands-on productive action. When we drop into the show 'n' tell, there is no immediate impression of a 'crisis of agency' – but plenty of practical DIY information from artists and hackers making innovative customisations. This is tactical action and micro intervention; the everyday evidence of the anthropocentric paradigm shift occurring at the macro level. Historians of the future may recognise in this moment and these small activities the cultural symptoms of the collapse of a certain conception of human agency – one founded, and built on inherited notions of humans presuming dominion over material things; the illusion of an ever-expandable frontier of resources or new land for the taking. Philosophically

GreenUps gathering as part of the Windmill pop-up program of events organised by the Sydney Harbour Foreshore Authority, 2013.

as well as practically we may need to rethink the nature and extent of ethical responsibility, expanding our concept of agency and influence to fit a contracting dominion. We will have to come to terms with the planetary dimensions of everyday activities in both big and small ways.

Now, we live with hallmarks of finitude rather than the fantasy of endlessly expanding frontiers. Images from Apollo missions in the late 1960s and early 1970s expressed this finitude in pictorial form. On Christmas Eve of 1968, Apollo 8 produced the *Earthrise* photograph, which was followed by Apollo 17's *The Whole Earth* photograph of 1972 (also well known as the *Blue Marble*). Although these images were generated out of missions fuelled by Cold War imperialism, they transcended their origins to represent the one vulnerable home we inhabit, and have long been employed by the green movement as an emblem of planetary environmentalism. The image of the blue planet along with its 'whole Earth' metaphor was reprised and reanimated in the 1990s through Voyager 1's production of the *Pale Blue Dot (Earth seen from 4 billion kilometres)*. This time our view of Earth was even more attenuated, the planet's vulnerability ever more heightened, more like a mote of dust floating in the abyss.

In the era of big data where the challenge is to render sense-able information that exceeds the realm of direct or visceral experience, the 'whole world' image is now the surface onto which dynamic data visualisations are projected. Visualising global connections has become a means by which to understand one's place in the world – whether in terms of food miles, global communications, patterns of energy use and flight paths zigzagging across the world, or the imagery featured in the ABC television series *Great Southern Land* (see pp 118–119 and pp 140–141).

The discrepancy between macro and micro conditions is ultimately between scale and experience. The 'average global temperature has no correlate in living conditions', notes Paul Edwards in his study of climate data. Because of its long-term statistical character even local climate change is difficult to grasp experientially – although careful observers

might witness it in changes in the world around them: salmon carrying eggs in the wrong season as one woman from the Kimberley noted; certain trees flowering later or earlier, as observed by long-time beekeepers; magnolias and jacarandas blooming in Sydney gardens about four weeks earlier, as urban gardeners may have noticed.

Arguably though, climate change, at least in terms of global levels of atmospheric CO_2, is literally beyond sensing (aside from technological sensing), which is why, says Rufus Pollock, president and founder of the Open Knowledge Foundation, the current hype or dependence upon 'big data' misses the point. The real revolution is small data, 'small pieces loosely joined'. The coming decade, he argues, belongs to 'collaboration not control, and to small data not big data'. Crucial to this argument is the notion of collective agency: having the right data irrespective of size helps more people than ever to solve problems or address questions via collaboration. Examples of small data are times of local buses, government spending, anything processed in Excel. In some instances small data fits the task at hand. It can also be scaled up by 'componentising': 'by creating and integrating small data "packages" … by partitioning problems in a way that works across people and organisations, not through creating massive centralised silos'. The resulting distributed ecosystem of information means that more people can collaborate more effectively.

When it comes to energy consumption and GHG emissions, big centralised data can be comprehended by reducing the data into small packets, or visually senseable objects. 'Small data' is essentially about people and situations. It is the experiential end of energy data: the information on household energy use, or the global industrial food complex rendered as the food miles in a specific food or drink.

At the recent *Melbourne Now* exhibition, OOM Creative staged large-scale projections of city information (traffic accidents, city trees, waterways, buildings) in the form of a 'Data Tapestry'. This image of a living city – like the visualisations in *Great Southern Land* – is the animation of the blue

Caroline Rothwell, *Sydney Hawk Dragonfly*, 2012. Mazda 323 exhaust emission and acrylic binder on paper.

planet; a visualisation of the 'green, global, connected' city insofar as it's an ecological reality. But what does a tapestry do with the data; can it prompt new critical interpretations? Whose data does it present? And what agency does the visualisation offer once the data is accessed by an audience?

These questions become more acute, perhaps, when art projects start to measure local energy consumption and carbon emissions – imbued (or encumbered) as they are with the weight of politics. As author Paul

Edwards says: you might ask where the politics lie in climate science (and, by extension, in responses and adaptations to climate science's propositions). And the answer is 'everywhere'. But everywhere is a hard concept to visualise; energy lacks the materiality and immediate visible impact of waste. Closer to the image of flow – and a city of movement and circulation – than to stasis and petrifaction, energy is visualised for the most part in terms of outputs and effects. Engaging the very stuff of fossil fuels – seams of ancient vegetation buried, compressed, heated, and altered chemically over millions of years into coal; or layers of plankton 'cooked' in subterranean ovens, also over millions of years, into oil – a number of Sydney art projects deal with these fuels' less tangible effects. Artist Caroline Rothwell, for example, scrapes carbon from car exhaust pipes to create detailed drawings of insects, frogs and plants.

The more common tendency, though, is to use data sets and data streams to visualise carbon emissions, rates of energy consumption, or fluctuations in levels of CO_2 in the atmosphere at any given time. Bonita Ely's *Thunderbolt* at Sydney Olympic Park (p 166) uses a solar powered digital interface to change the colour of lights played across the sculpture in response to live data streams that measure local energy consumption. The Centre for Digital Urban Living (DUL) monitored CO_2 levels at locations in Sydney to render fluctuating levels through LED lights and soundtracks in *Atmosphere: The sound and sight of CO_2* at Customs House (p 154). *Neighbourhood Scoreboards* zooms in from the broader 'community' scale to analyse energy data across five households in Darlington, keeping tallies displayed on the homes' façades (p 158). Pierre Proske's *dotBLUSH* imagines a sustainable building with a skin that 'blushes' with pleasure when energy consumption falls below a certain level – sensing data from the building to become a 'sentient building'. The implication that these anthropomorphised structures can communicate our anxiety is hard to miss; if a building blushes with pleasure, it likewise manifests shame.

In these examples data is not an end in itself. Visualisation provokes a spirit of neighbourly competition: see the data, play the game, be a little inspired to win, or at least avoid shameful levels of consumption. Information about and traces left by energy consumption activities and their usually invisible and intangible atmospheric effects are returned to the city and made available, potentially at least, for sense-making response. But these 'running' and 'blushing' buildings also raise questions: how do audiences interact with a 'sentient building'? When Javier Candeira gives his work the tongue-in-cheek title of *How to Publish your Household's CO_2 Footprint for Geeky Fun and Societal Benefit*, he is surely cognisant of a lurking discomfort with name-and-shame tactics – and of the inevitable time limit on the fascination with novel data. (Candeira developed a widget for PC, accessed by utility bill log-in details, where users can compare their performance, receive advice, publish their data to the resource and observe visualisations – placing the 'publishing' power in the hands of the consumer/creator.)

The hope expressed by many of these projects is that knowing will lead to a change in doing (as writer and researcher Martijn de Waal suggests). Knowing where our waste ends up, or when our emissions spike, should make us more aware of the problems we create. Data visualisation often comes with an implied or explicit assumption of efficacy or 'correct' outcomes. Art and design projects in this vein aspire to a corrective role. Zina Kaye and Mr Snow's *Home: Water recycling*, for example, is a data visualisation system developed to improve the environmental behaviour of residents in properties fitted with green infrastructural systems. It was directed at residential developments where compliance with the water recycling system was lacking (people were tipping banned products like milk and oil down the sink), and the failure of the system was not reported. The work was created as a data record of participation and outputs, its aim being to motivate system participants to bond with neighbours and compete against other apartment blocks.

Curiously, studies by environmental psychologists show that heightened awareness is a poor predictor of behavioural change. Professed views on conservation and environmental matters often do not connect with conservation behaviours. Nevertheless, as academic Benjamin Bratton and Jeremijenko point out, many have faith that the data gathered and manifested within the sentient city will lead to engagement with important issues of our times. There is a caveat though. What we need, and what art can offer, is not simply mapping, but the interface that provides the public with 'an agency to actually get involved'. If art can transform data into experience, it is more importantly the means to public interaction – to creating a public, as writer and curator Claire Doherty says.

One of the more radical moves prompted by climate change is the redrawing of assumed boundaries of privacy. It is no longer taken for granted that an individual's professional life belongs in the 'public' realm, while 'the resources sequestered to that person's sole use remain a supposedly "private" matter', as Timothy Clark suggests. Built into a liberal tradition is the assumption you can use as much as you choose, whenever and however you like, as a presumed democratic right. How you go about your 'sequestering' is considered no one else's business. Through *Building Run*, *dotBLUSH*, DUL, *Neighbourhood Scoreboards* (pp 154–159), and the like, it is precisely these assumed private relationships with resources, traditionally kept quiet and out of sight through notions of decorum, that now enter the public sphere. Indexes of water and energy consumption, GHG emission rates – things that usually lack material form – take on an image and shape within the public space of the city and become 'things' that a public might assemble around. While there are no guaranteed outcomes of civic interactivity, and tensions between aesthetics of display (merely mapping) and functionality remain unresolved, these works do – however tentatively – suggest new ways of living with the outputs and effects of energy that once dwelled unproblematically in the 'private' realm.

DUL *Atmosphere*

Commissioned for the 15th annual United Nations Climate Change Conference (COP15) in Copenhagen in December 2009, the Centre for Digital Urban Living (DUL's) *Atmosphere: The sound and sight of CO_2* was shown at Customs House in Sydney as part of the *Curating Cities: Sydney–Copenhagen* exhibition in 2011. The work grapples with the aesthetics of climate change, particularly the invisibility of carbon emissions. We are unable to gauge the impact of carbon dioxide on our

Digital Urban Living, *Atmosphere: The sound and sight of CO_2*, 2009. Shown at *Curating Cities: Sydney–Copenhagen*.

daily lives or how our actions contribute to the damage, argue DUL; we are constantly debating phenomena that we are unable to sense.

In Sydney, DUL set up smoke sensors in Taylor Square (Darlinghurst), International Grammar School (Ultimo) and Circular Quay. Detecting CO_2 levels at these locations, the sensors transmitted data to Customs House where DUL had set up a 2-metre high transparent, low-resolution quadrant LED installation. Horizontally stratified in three sections the installation rendered audible and visible the CO_2 levels at the three respective sites. Each location/level had its own basic colour in the RGB spectrum: red represented Customs House, green International Grammar School and blue Taylor Square. The LED installation responded to the levels of CO_2 recorded at each locale, so that if the installation turned green, for example, then the amount of CO_2 was highest at International Grammar School, and so forth.

Atmosphere's audio track was similarly dynamic, composed in the genre of electronic glitch music. Transmitted via headphones attached to the installation, it was divided into three frequency bands, the highest frequency belonged to Customs House, the middle to International Grammar School, the lowest to Taylor Square. As the level of CO_2 rose in a location, the pitch of its frequency band was affected, and the tempo of the soundtrack's repeating pulses grew more rapid. Moreover, each time a CO_2 value changed, the installation was designed to generate a short audio and visual glitch, effecting a disruption to the otherwise repetitive pulsating drones.

An experience-oriented installation, *Atmosphere* attempted to balance scientific data and artistic expression, offering a sensory means by which to conceive of a normally non-sensuous phenomenon at the everyday perceptual level.


04:87:34
1 MARKET STREET
126 PHILLIP STREET
DEUTSCHE BANK PLACE
31 ALFRED STREET
CUSTOMS HOUSE

Deverell *Building Run*

Keith Deverell's *Building Run* is a data-driven public artwork, commissioned by the City of Sydney and Carbon Arts to engage the public in sustainability issues through creative use of real-time data and public space. It is a video art installation using data from five buildings in Sydney's Central Business District that have implemented energy efficiency measures. Data is supplied to the artwork through a private organisation called Buildings Alive, which receives data from the buildings' management systems every 15 minutes.

A runner on each of the five screens acts as an avatar for a different building, each contending in a daily race for continual improvement. The runner's behaviour on the screens is controlled by the received data stream, such that the more energy a building is using, the faster the runner runs.

Icons appear onscreen alongside the runner recording the following:

- **Date and Time**: for the energy data driving the runner's performance.
- **Personal Best (PB)**: which compares a building's energy consumption at any moment with its predicted consumption based on historical data.
- **Level of Effort**: equated to the amount of energy being consumed by the building. The day's highest consumption is the runner's highest effort, and the lowest consumption is the lowest effort.

The project received funding and support from the City of Sydney, Investa Office and Deutsche Bank.

Keith Deverell, *Building Run*, 2013.

Neighbourhood Scoreboards

Neighbourhood Scoreboards was a 2009–11 study to explore the effects of public accountability on residential energy use. The project was conceived by a Sustainability Cluster at University of Sydney's Design Lab, in collaboration with KU Leuven University, The Netherlands (led by Martin Tomitsch and Andrew Vande Moere).

Five houses in the Sydney suburb of Darlington were recruited to submit to analysis of their energy use between October and November 2010. Data was manually entered and updated daily on large chalkboards displayed on the homes' façades. Small blackboards embedded with energy monitors were located inside each home.

The low-tech visualisation represented daily/weekly changes in electricity consumption and a neighbourhood ranking (relative surface area, number of inhabitants, and types of appliances used were taken into account). Chalkboard was selected as a design material because unlike electronic display it does not require energy and is easily updated and maintained. This became 'a prototype evaluative tool', embedding digital information whilst displaying it accessibly in a physical communal space. The researchers believe that the presence of a public display directly induced 'conservation behaviour'. Energy performance was compared to two control groups, demonstrating a reduction of energy use in houses where data was exposed. The team reports:

> The quantitative measurements showed that households that received a public display decreased their energy usage on average by 2.5% per week compared to a decrease of 1.0% per week in the control group with common electricity monitor and 0.5% per week in the control group with no feedback … Interviews with participants confirmed the effect of the competitive neighbourhood ranking as being ideal for initiating behaviour change, but also revealed several unexpected side effects (e.g. clustering energy-

intensive activities to specific strategic times) and suggestions for improvement.

Ongoing research and design is being undertaken by Tobias Ebsen from the Centre for Digital Urban Living at Aarhus University, Denmark, to create an interactive version of this urban experience-oriented project.

Andrew Vande Moere, Martin Tomitsch, Monika Hoinkis, Elmar Trefz, Silje Johansen, Allison Jones, Josh Mcinerheney, Damien Kwan, *Neighbourhood Scoreboards*, 2009–10.

connection

to systems

We now need to understand our own agency in new ways, even though at one level this might seem trivially expressed (not filling kettles, buying the right light bulb, or slightly less destructive cars etc etc). We are also enjoined to understand our cities as a point of connection to systems. The most recent Intergovernmental Panel on Climate Change report states this clearly: urban centres have far-reaching impact on systems around them. Cities are comprised of complex interdependent systems and they also influence an array of surrounding systems, not only the 'distant elsewheres' that supply resources:

- terrestrial biomes (major regional ecological communities of plants and animals) are transformed, fragmented and depleted with increasing amounts of the world's land surface used to accommodate crops and pastoral land to support expanding urban populations;
- urban heat islands create higher temperatures at night and, in the case of megacities, can influence land–sea breezes, shifts in pressure systems, and even weather phenomena such as rainfall, lightning and the hydrological cycle;
- urban effects also spread far beyond the city's boundaries and trigger complex feedback/responses in the biosphere.

Scientist and author Tim Flannery writes:

> To live in ignorance of Earth system science is akin to living without knowledge of human physiology. Symptoms of planetary sickness cannot be interpreted, and corrective action cannot be taken. The discipline teaches us that environmental damage is self-mutilation.

Natalie Jeremijenko responds to this planetary sickness with her Environmental Health Clinic that offers prescriptions in exactly the way of a GP's surgery or other health clinic. This is public art beyond the representational or symbolic. It delivers assessments, designs new food systems and engineering solutions but also dramatises their application within the city.

Jeremijenko is the living embodiment of small data strategy – and evidence of why we need creative imagination, and a small dose of fantasy, to cut through a 'business as usual' mindset. She describes her work as a 'kind of systems design'. This approach is manifested in a vast repertoire of projects spanning dramatic engineering experiments including alternative aerial transport systems, solar chimneys with HVAC filters (standard heating, ventilation and air conditioning filters) that extract carbon black from the atmosphere, and urban agriculture facilities for city rooftops – along with less audacious feats of urban acupuncture, for example to reestablish pathways for butterflies. Jeremijenko is a persona – not a star artist exactly since she is always 'in character' in her white coat, but nor one who blends into the community project she orchestrates and leads with theatrical verve. If this is the way of psychogeographic 'small data' urban exploration, what she achieves is much bigger than any one action – her small acts of 'rescripting' aggregate into collective actions and creation of systems. The art lies in part in the connective process. These are real remediative projects, wrapped up and articulated (literally, joined) in a package that is more about spinning a yarn. Jeremijenko's actions are focused on specific local effects, but are all about the power of enacting and storytelling. Tiny interventions like a moth cinema and a butterfly bridge demonstrate possibilities of re-imagining urban infrastructure as part of a bio-diverse ecosystem, scaled up through the Environmental Clinic whose mission is to cure and curate through citizen participation.

Jeremijenko's plan for Barangaroo south of the Sydney Harbour Bridge on the verge of redevelopment conceives the city through the routes, habits and flows of cohabitants including bats, butterflies and water-birds intersecting with the built environment and with purpose-built structures contrived by Jeremijenko, along with events and happenings like 'charring' your waste materials or accessing wi-fi in a tree office (p 165). This is not site-specific public art in the old sense but the kind of community generating creative work that we identified in Part 1. It takes the urban ecosystem in its entirety as its sphere of operation, conceiving curatorial strategies for its maintenance and growth. Underpinning such remediative action is an ecological map, explicitly visualised in this case.

The term 'ecology' refers broadly to the living organisms of the Earth interacting as a whole. Ecologists also use the word 'connectivity' to describe the way animals and plants are interconnected through energy webs with each other, across places and through time. Jeremijenko expands both these usages to conceptualise the city as part of interconnected systems. This is not a romantic ecology that restores the balance of nature or preserves intact habitat, but an urban ecology of flux, chaos and disorder that turns our creative attention toward the points of intersection. Futurist Alex Steffen recently tweeted that he would 'love to see a practice of urbanism that understand[s] place as point of connection to systems, not system itself'. If there is a general precept that describes the challenge of public art today, Steffen's could be it. Just as we cannot take for granted the city – or determine its parameters or defining relationships – place in general can only be effectively understood as a point of connection to multiple systems. The exciting part of this challenge lies not only in visualising the map of connections, but also in forging links, in creating and manifesting the conjunctions that enable participation and new forms of community.

A 5000 years Urban Plan for Sidney City

✖BIOCHAR CHA CHA

Bring along your waste materials (like junk mail) to one of our Biochar Barbecues and help transform it into biochar that helps regenerate the soil in the park grounds, in the hanging agbags, or anywhere that you care about.

What comes first, the salamander or the migration route?

SLMNDR✖SUPERHIGHWAY

The Salamander Superhighway makes Sidney more salamander-attractive by providing an underpass that helps them on their voyages and enables us to monitor them more effectively, provides the gentle reminder to people in vehicles above that we are not alone.

Overpass to provide safe passage for urban pollinizators

BUTTERFLY✖BRIDGE

Providing butterflies an intervention to navigate obstacles in urban settings, the Butterfly Bridge is planted with enticing flowers and plants that lure them away from dangerous traffic, re-imagining our urban infrastructure for the diverse species with which we share space and resources.

Trees In Deed

TREE✖OFFICE

A new co-working space in the canopy of a tree in the parks of Sidney. This workspace overlooks the riverfront and has magnificent views of the city skyline, wifi and locally-produced power. The facility is owned and operated by the tree itself, acting as your landlord.

✖CLINIC the environmental health clinic+lab

Supervised: Natalie Jeremijenko
Drawings: Fran Edwards

✖PRESENTS...

CROSS(X)SPECIES SPECIES CROSSING

In the "Cross(X)Species Crossing" plan developed by Natalie Jeremijenko's Environmental Health Clinic team, the systems for energy, food, manufacturing, distribution, and mobility in Sydney are creatively, but practically adapted to improve environmental and human health and explore a tasty, biodiverse future. Participation is structured around this common good of shared environmental health, creating a new (organismcentric) urbanism of BiodiverCITY, ComplexCITY, and SynchroniCITY

How to increase bat population?

FLIGHT✖LINE

Biomimetic wings for urban flylines can facilitate fast, safe, inexpensive, quiet and emissionless mobility, which will re-engage the wonder, pleasure, and fascination of flight. At this stand you can simulate the gentle phenomena of lift and the maneuverability you will experience in the proposed flyline system.
Would u like to fly through Sidney City?

Natalie Jeremijenko's Environmental Health Clinic team, *Cross(X)Species Crossing* plan developed for Sydney, 2014.

A second life for fire hidratants

NOPARK

NoPark returns "no parking zone" – mostly those associated fire hydrant placement – to low growth mosses and grasses. These micro engineered green spaces prevent storm water run off, use foliage to stabilize the soil, and to provide a durable low maintenance surface cover.

How to create arable land out of thin air?

FARMACY

Farmacy dispenses inexpensive modular urban farming systems called AgBags suitable for any railing, double hung window, or parapet in Sidney to create arable land for growing food and improving air quality, water quality, and biodiversity.

How to increase bat population?

BAT BOARD

Bat Billboard provides a place for city bats to rest their wings. What's more, the screen on the surface of the billboard translates bat calls from within, comparing the sounds to archival call patterns, and giving these bats a "voice."

Darkness interspersed with flashes of light and dance

MOTH CINEMA

The silver screen that hangs in the park is illuminated each night shortly after sunset. A beam of light shines over a garden, attracting moths, casting dramatic shadows as they play out nightly dramas of love, survival and the fluttering lifestyles of the dark and mysterious.

Bonita Ely, *Thunderbolt*, 2010. Sydney Olympic Park. *Thunderbolt* uses a solar powered digital interface to change the colour of the lights in response to live data streams that measure local energy consumption.

Allan Giddy, *Weather Cranes*, 2007. Installation of weather-responsive lights on two heritage-listed cranes at Newington Armory, Sydney Olympic Park.

Giddy *Earth v Sky*

Earth v Sky (2012) is a light installation in two Moreton Bay fig trees at Bicentennial Park, Glebe Point. The project was a 5-year research and development collaboration between artist Allan Giddy and the City of Sydney, and involved extensive community consultation. It incorporates the City of Sydney's first wind turbine, and new colour-sensitive light-controlling technology that continuously samples the colour of the sky.

During the hour and a quarter of dusk light each evening an embedded surveillance camera photographs the sky at 5-second intervals. Computerised calculations are made of the average colour of the sky at each moment, then the opposite or inverted colour is projected by nine luminaries – each containing three colours of LEDs mixed to offer a spectrum of 300 colours – onto the two trees. The projected colours are subtle at first, intensify during sundown, and fade once darkness falls.

The energy drawn by the artwork is entirely offset by the turbine. The artwork uses 965 kilowatt hours (kWh) per year and the turbine returns 5500 kWh per year to the city's grid. The energy usage is measured and tracked in real time. The impact of lighting on the trees was assessed by the Australian Museum's Business Services Unit, as was the threat to birdlife and grey-headed flying foxes from the propeller of the wind turbine. The initial report yielded no likely adverse effects, and was extended into the first year-long scientific study on the effects of wind turbines on flora and fauna in Australia.

Allan Giddy, *Earth v Sky*, 2006–.
Interactive light installation projected upon two Moreton Bay fig trees in Bicentennial Park, Sydney.

P

WATE

OCULUS, *Embassy of the Drowned Nations*, 2010.

PART 3

RWAY CITY

invisible

waters

Imagine you're coming in to land at Sydney airport and instead of the ravaged and razed ecosystems of Sydney's south, you see a complex chequerboard of wetland systems spread beneath you, not unlike intricately layered and patterned landscapes of rice paddy terraces. As you draw closer, you notice wetlands fusing with and creating a protective apron along the coastline to wrap around airport runways and spread inland along the Cooks River and Alexandra Canal. They confound more traditional 19th and 20th century urban barriers and boundaries between water and built environment – sea walls, harbour walls, groynes, concrete river and stream banks, and stormwater drains. Instead, as you descend lower, the metropolitan region merges with shades of aquatic blue, and the runways themselves are interspersed with patches of mangrove.

The intertidal infrastructure proposed by design company OPSYS (p 175) suggests how Sydney might harness and capitalise on climate change into the 21st century. OPSYS's project, *Subtropical Sydney*, responds to a competition brief to use Sydney Harbour and its surrounds to explore innovations in urban design, planning and management for adaptation to rising sea levels. The New South Wales government, based on projections from the Intergovernmental Panel on Climate Change, predicts a 40-centimetre rise by 2050 and 90 centimetres by 2100.

Subtropical Sydney evokes a city that cares for or curates a component of the urban environment that for much of its history has been seen as useless or even abject – a 'rotten spongy bog', to use First Fleet Captain-Lieutenant Watkin Tench's words when he described stumbling in exasperation through this area in 1790. These formerly undervalued waterways used as industrial drains and sewers now, in turn, care for the city through addressing challenges posed by climate change. *Subtropical*

OPSYS *Subtropical Sydney*

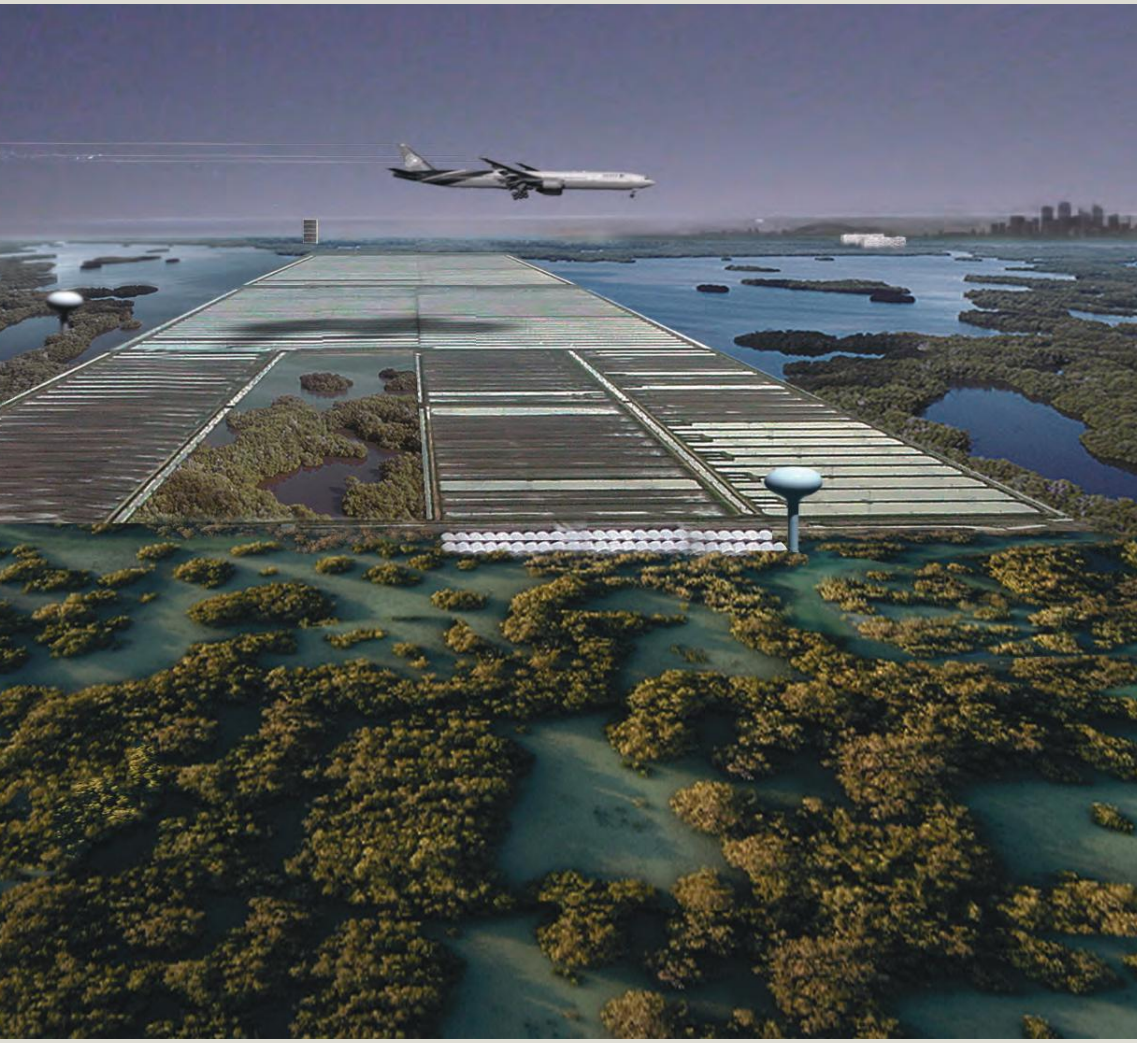
The international ideas competition 'Sea-Change 2030+' was run by the Australian Institute of Landscape Architects NSW in 2010, with the goal of developing 'windows of optimism' for shared positive futures adapted to climate change.

One of three winning designs, *Subtropical Sydney: Projecting the future of Sydney's next urban century with an intertidal infrastructure for the metropolitan region* by Boston design company OPSYS examined sustainable living in Sydney as a subtropical urban centre. OPSYS describes itself as part laboratory and part studio, combining information from the earth, engineering and economic sciences to envisage what they call open-ended, fluid ecological systems as the basis for infrastructures that support and promote contemporary urban life.

Subtropical Sydney proposed adaptive measures for a Sydney that is 'becoming tropical'. These consist of an intertidal infrastructure between the city and the sea designed to address the combined challenges of rising sea level, infrastructural decay and freshwater supply. The proposal describes

> an ecological apron of wetland systems including coastal mangroves, lagoons and sea grass marshes that wraps around the city and spreads inland across low lying areas of the watershed. Each wetland system serves a distinct and integrated function. Protecting coastlines from sea level rise, storm surges and shoreline erosion, treating wastewater, storing stormwater, producing fresh drinking water from waste water, generating precious nutrients for urban flora, this constructed ecology demonstrates how a vast system of subtropical swamps – the mangrove environments that were cut and slashed by early pioneers – become the basic building block for Sydney's shoreline armouring in an entirely new landscape of contemporary cosmopolitan infrastructure.

OPSYS, *Subtropical Sydney: Projecting the future of Sydney's next urban century with an intertidal infrastructure for the metropolitan region* (33°56′28.74″S 151°10′28.90″E) [detail], 2010–14.



Another winning entry, OCULUS' *Embassy of the Drowned Nations* repurposes Fort Denison as an inverted island, revealed as sea levels rise, to temporarily house climate change refugees and a climate change research facility.

Sydney, OPSYS says, places the city on the frontier of a new kind of tropical and aquatic urbanism.

If we take seriously the suggestion made in Part 1 that the interior fabric of Sydney is hauntingly absent in the collective imagination, with cognitive maps of the city dominated by the spectacle of iconic features, and a single path from nowhere (the airport) to a bridge – then the terrain that *Subtropical Sydney* reanimates is precisely the 'nowhere' of this strangely lean version of the city. Here we trace another kind of pathway or system of pathways: those that begin at the 'nowhere' around the airport with its distinct wetland ecologies and waterways that drain into Botany Bay. And we ask how Sydney's other less visible waterways – not its iconic harbour views or famed beaches – reveal the city. These other waterways include, for our purposes, the Alexandra Canal that flanks the airport to join the Cooks River; Botany Bay; the Parramatta River; and less popular views of the harbour. We ask how the arts reveal these less visible waterscapes of Sydney, helping us to imagine them beyond either the purely functional

Botany Bay West, Kingsford Smith Airport and Botany Bay container terminal. Photographed in 2014 by Phillip George.

(and self-interested) category of 'resource' or the reductive flat postcard view. The task is to write other kinds of water ecologies into the story of the city, not just the human, so that they too become an integral part of how we conceive and imagine Sydney.

In *The Companion Guide to Sydney*, writer Ruth Park evoked the uncanny persistence of the waters of southern Sydney as she led her readers on a kind of guided walking tour toward Botany Bay in the early 1970s. She described the area as a 'wilderness that one feels but shallowly marked with mankind's small scratchings and scribblings'. A place of wild winds and oozing sands. 'Give Botany Bay half a chance', she wrote, 'and it would blow down the factories, submerge the rows of demure mousy houses, steal back the reclamations, and flood the droplet lakes that curve in a chain through the Lakes golf course until the whole bayside became a water meadow once more.' Park sensed, prophetically we now realise, how the Botany Bay area and the freshwater corridor that feeds it might defy the city's tenuous grip.

Botany Bay remains an unsettling place, only tenuously part of the larger city. The supposed profound indifference that marked the first meeting between Aborigine and stranger when Captain James Cook arrived on these shores in April 1770 continues to haunt the place (suggests historian Maria Nugent). Park's passage also evokes a fragility that owes as much to the forces of water itself – on a local scale, waterways engineered and manipulated for urban purposes, and on a global scale, sea level rise – as it does to its colonial past.

The Botany Swamps Scheme formed Sydney's third main source of water supply, following the demise of the Tank Stream that supported the settlement until early in the 19th century, and Busby's Bore which flowed from the Lachlan Swamps to a reservoir where Hyde Park now stands and which supplied the town from 1830 to 1858. The Botany Swamps Scheme was created prior to the establishment of the Board of Water Supply and Sewerage in 1880, so can be understood as a transitional phase in the city's relationship with water as it moved away from a local and riparian system – where people drew water directly from streams, wells and rivers – to a centralised supply. It included a series of six dams feeding a pumping station that delivered water to two reservoirs. Fragments of the pumping station building remain and can be seen alongside General Holmes Drive, flanking ponds of still, brown water next to the airport's long-term parking area called the Blue Emu. The pattern of dams created during this period corresponds closely to the current wetland layout. Some are the 'droplet lakes that curve in a chain' of Ruth Park's description. Others lie surrounded by reeds and tangles of shrubs along roadsides and amid the airport. Every now and then they pop back into public view. (In 2010, for example, thousands of dead fish were found floating in one of the small lakes inside the airport; and toxic spills and contamination of the underlying aquifer make headlines.) Taken together these waterways might be considered some of Sydney's forgotten waters. There is

nothing in their current appearance that suggests they were once fresh enough to drink.

Our re-imagining of Sydney waterways begins from this specific locale. In the spirit of a new psychogeography it aims to re-examine – in the face of unprecedented environmental challenge – terms of connection to urban environments to expose both the logic and the poetics of everyday use and engagement. Contemporary psychogeography relies, in part, on the immersive strategies of a renewed tradition of flânerie (the 19th and early 20th century tradition of strolling through the city is adapted to walking in the 21st century city with its fresh idiosyncrasies and challenges). But in this case it also combines creative and curatorial practice embedded and active within 'the landscape', particularly localised urban landscapes. Art and design projects are a means of enabling the city to unfold in this regard – they guide us around Sydney, reshape the interrelationship between city and water in the imaginary, and expose alternative pathways (or waterways) through the city. If art and design 'projects' are like markers along a route, some in public spaces, some in gallery settings, they can be selectively curated – drawn into a larger city image – not simply to showcase, but to open up visual and experiential perspectives. A larger more copious map is revealed so that urban water is not merely seen as surface spectacle (harbour, surf beaches) but comprised instead of undertows; underwater topographies and ecologies; polluted rivers that might nevertheless be swum; 'invisible' waters so contaminated the city would prefer to forget them; and a complex layering of historical engagements that mark water's state in the present. The city's water is also mapped as part of a larger hydrological cycle and resource network that the city aims to engage with in new ways into the 21st century.

Goodwin, Lowe and McGregor *Seven Metre Bar*

For the City of Sydney's *Laneways – By George! Hidden Networks* program, *Seven Metre Bar* converted Underwood Street, a laneway near Circular Quay, into a bustling social hub, serving drinks from 7 pm to 12 am, four days per week. The concept of a *Seven Metre Bar* references the rise in sea level predicted as a consequence of polar ice melting. At 7 metres, Underwood Street would be submerged. Anticipating this dystopian scenario, Richard Goodwin, Russell Lowe and Adrian McGregor created a large-scale installation from flotsam and jetsam including cars and boats, above their *Seven Metre Bar*. Using digital gaming technology, the artists created a reactive space, simulating volatile weather scenarios in the bar. Sensors reacted to increasing crowd density by triggering an increase in the water level and ferocity of weather conditions in the simulation. Once the bar was packed, everyone in the simulation would go under.

Operated by local small business Grasshopper, the bar itself offered cocktails such as Storm and Greenhouse Punch in recycled jars. Using such recycled materials and sustainable operating procedures, the bar generated a productive model for future pop-ups and public engagement in debate. 'At what point', ask the creators of *Seven Metre Bar*, 'do we raise or lower the bar?'

Richard Goodwin, Russell Lowe, Adrian McGregor, *Seven Metre Bar*, 2009.


8

beginning

from nowhere

Sydney's airport with millions of people annually passing through is of course not 'nowhere'. French anthropologist Marc Augé famously characterised airports as 'non-places', as one of many homogenised and globalised built structures where we spend increasing amounts of our time in transit: international hotels, motorways, superstores, railway stations. While one airport interior might arguably be exchangeable for another, beyond its tinted windows lies a distinctive place and material setting. Sydney's airport exists in a kind of 'borderland' on the 'proper' city's southern edge. As a pedestrian it's difficult to access the airport's surrounds, to grasp the main entry points, encircled as it is by loops of busy roadway, flanked by stretches of tangled wetlands and industrial land, and, on its southernmost tip, locked away by the waters of Botany Bay. Nevertheless some vantage points give you glimpses across the airport terrain. One of the most arresting of these, says digital media specialist Gillian Fuller, is along the banks of the highly polluted Alexandra Canal where the airport landing lights skip from one grassy bank edged by stacks of shipping containers, across the canal, over the road and along the tarmac on the far side. Fuller discovered this view during the making of the *Aviopolis* project by her and Ross Harley, which considers not only airports and flight paths, but also their embeddedness in geographies at multiple scales – regions, local suburbs, the city, numerous global cities.

The impact of the Sydney airport is felt locally and in suburbs adjacent to Botany Bay through the large-scale re-engineering of the physical landscape that Fuller and Harley refer to as 'terraforming'. This estuarine landscape has been massively reshaped and overwritten. The passage of the Cooks River to the sea was radically altered after World War II when major airport work began. Over the years, the mouth of the river has been moved

Map showing original passage of Cooks River prior to airport construction. Department of Public Works, *Cooks River and Shea's Creek Showing Reclamations and Fascine-Dyke Work*, c 1897. Plan Room Drawing 34313.

1.25 kilometres south. Mangroves have been cleared and wetlands reclaimed. Botany Bay has been dredged and the excavated material used to reclaim 600 hectares of land from the bay and foreshores for the port, runways and industrial land. A V-shaped channel 2 kilometres long is dredged into the bay, and overall the shoreline has been increased by nearly 20 per cent.

The supposedly tamed waters involved in the airport reclamations and terraformation return to haunt people's everyday lives sometimes in tragic ways. They played a part in the recent drowning of five-year-old boy Ayman Ksebe at Dolls Point at Botany Bay, and two other drownings at the same beach in 2007. In the aftermath of Ayman's death, the Rockdale City Council said that the construction of the third runway at Sydney Airport has

resulted in instability of the shoreline and beach. It 'has caused erosion and sand build-up along the 8-kilometre stretch of sand and the beach is constantly changing as a result'. The council claims that the 'shifting sand has worsened since the expansion of Port Botany and the construction of the [Kurnell] desalination plant and its associated pipelines that run across the bed of the bay', and calls for a whole of government response to deliver a strategy to stabilise the bay and its shoreline.

Sandbanks can create the illusion of shallow waters off Dolls Point. However, not far from shore runs a deep channel with a powerful current where the Georges River empties into the bay. According to artist Phillip George, locals are aware the beach has a sudden and steep drop off of around five metres. 'They know too', he says, 'just below the water at Dolls Point are reeds that wrap around your legs and pull you down.' He lets the statement hang. It could be the stuff of urban myth, or else sound local knowledge that might just serve you in good stead.

George is a regular surfer and believes that the characteristics of Australian beach waters are often poorly understood, perhaps most pressingly among people new to the country and unfamiliar with its environmental and oceanic idiosyncrasies. This lack of familiarity that leads to dire consequences is encapsulated in recurrent media stories of tourists who underestimate the vastness, heat and aridity of Australian deserts. It also exists, though, George argues, in a flimsy comprehension of the oceans, beaches, and bays we swim. He suggests viewing water as 'country', comprehending it as a kind of x-ray made up of layers.

'Green water is the valley', he says, 'and there can be deep rivers running in these valleys that we call rips. White water is the snow-capped peak of the mountain. And the water surface is only the liquid lid of the landscape that is continually reacting to the "country" below.' Then add time, tides, wind strength, wind direction, swell, sun and moon. 'You can start to see the complexity of what is operating upon the wet country. Most people only see the "lid", nothing more', says George.

AIRPORT

Fuller and Harley *Aviopolis*

Built for smooth and fast transit, airports, like information networks, operate through flows and interfaces. Gillian Fuller and Ross Harley's *Aviopolis* <aviopolis.com> envisions the airport as a transversal, urban environment, or networked node, extending vertically into flight zones, and connecting cities, regions and suburbs. This cross-platform project collates local geo-information and studies the airport's systems for queuing and flow, for security and the management of fear and threat, and for wayfinding.

Ross Harley, *Aerial view of Sydney Airport surrounds*, 2004.

Underpinning *Aviopolis* is the notion that airports are 'terraformers'; they flatten contours and reconfigure geography according to the spatiotemporal rhythms and cross-modal standards of global capitalism. More literally, terraforming evokes the land-changing process as part of an evolving ecology. Since its inception (first flight in 1919, first runway in 1933), Sydney Airport grew east into Botany Bay, reclaiming land as it evolved into new geometric forms. An example of its terraformation is the north–south runway (16R/34L) extension in the 1960s, 2 kilometres into the bay. Over the past 200 or so years, Botany Bay has been a site of disaster for Australia's Indigenous peoples, a location for nationalist myths-of-origin for Europeans settlers, a breeding ground for wetland bird species, and a focus for local activism over continuous redevelopment. Today, the Port Botany Cargo Facility is profoundly reshaping its immediate environs yet again, reclaiming 70 hectares of shoreline to meet a projected 20-year expansion of cargo capacity.

At first, the airport was remote from the working city at Port Jackson, which was ringed by market gardens and grazing pastures. Some of these, like the Market Gardens at Bestic Street in Brighton-le-Sands, remain today; workers at Bestic Street labour over long rows of vegetables at a site that might be compromised by avgas (aviation fuel) and other airborne pollutants and yet prospers in close proximity to a busy 880 hectare airport organism processing over 23 million passenger-units each year. The proposed Port Botany Cargo Facility expansion has triggered yet another debate about the nature of global and local borders, as beaches are buried under runways and port facilities, roads are expanded and the smell of avgas mingles with the diesel fuels of increasing freight.

The runway lights for 16R/34L (4 kilometres long) cross both Alexandra Canal and Qantas Drive, outside the perimeter of the airport. Here the airport's architecture rolls out over several geographical modalities, stitching paddock, river, road, airspace and runway into the one ecology.

AIRPORT

Jeremijenko *xAirport*

Flight is one of the most environmentally damaging human acts. Natalie Jeremijenko proposes restorative action through her project *xAirport: Re-imagining flight* (2010). Jeremijenko is concerned about environmental devastation to wetlands (p 240), and suggests that by re-purposing wetland water as airstrips, we might one day be able to restore native areas: 'It is less than half the cost to construct a wetland, and foster a biodiversity hotspot than to build a traditional dry landing facility', she argues.

Usman Haque, Natalie Jeremijenko, *Flightpath Toronto*, 2011. Mass participation spectacle.

By using biodiverse wetlanding ziplines for landing, less harmful impacts could be achieved and the apron between land and water around Sydney's harbour and bays would be restored to its mediatory wetland ecologies. 'Wetlanding' is a neologism referring both to recreating wetlands and to landing strips for amphibious planes (termed wetland ziplines or wetland zipping). Conceived initially for the 2010 San Jose Biennial, *xAirport* addressed the emergence of a new amphibious water plane, the Icon A5, and new private licenses to fly it, as a means to re-imagine flight and redesign mobility. Jeremijenko created an imaginary airforce, winched people over a thin passage/runway of wetlands, researched various plane redesign elements, offered flying lessons, and designed a new water-landing craft.

The flat waters of Botany Bay can too easily be read as safe water. Because they lack the more recognised green and white of eastern suburbs' ocean beaches – normal Aussie surf beaches – they are perceived as still waters. Instead, George says, dynamic rips are at work there. For a while, he recalls, local Aboriginal people surfed a point break that developed briefly off one of the Botany Bay runways just after it was completed, until the sand banks shifted and the break disappeared.

George has an interest in the coastline as a border where images, ideas and varied media – both liquid and solid – start to collide. 'New ideas arrive by water', he says, 'other ideas escape by water.' He has an interest, too, in the confluence of well-known Sydney beaches and shorelines with their more uneasy, even sinister, status as national borders and boundaries to be policed and controlled.

When he views the press photograph of Ayman Ksebe's family returned to Dolls Point the day after the boy drowned, George comments: 'Notice everyone is from non-surf culture of the Middle East and they think "flat water" is safe.' He notes that Botany Bay closely resembles the seaside promenades that are common and widely used in the Middle East. 'You see the poor family with their backs to the water, which is showing all that they can "see". They do not see the energy flow of the bay and the scale and volume of water surging past the point, behind their backs.' George believes that they, and we, all need to learn to see what is before us – to see beneath the 'lid' of the water.

Water has been a subject of contention and conflicting interpretation on these same shores from earliest colonial encounters onward. As is well known through the nation's foundational tales, on 28 April 1770 the *Endeavour* landed in a bay originally named Stingray Bay by James Cook after the abundance of large and weighty stingrays found there. He later settled, via a series of revisions, on the title of Botany Bay in recognition of the diversity of plant life along the shore (in which botanist Joseph Banks delighted). Here, one of the earliest negotiations

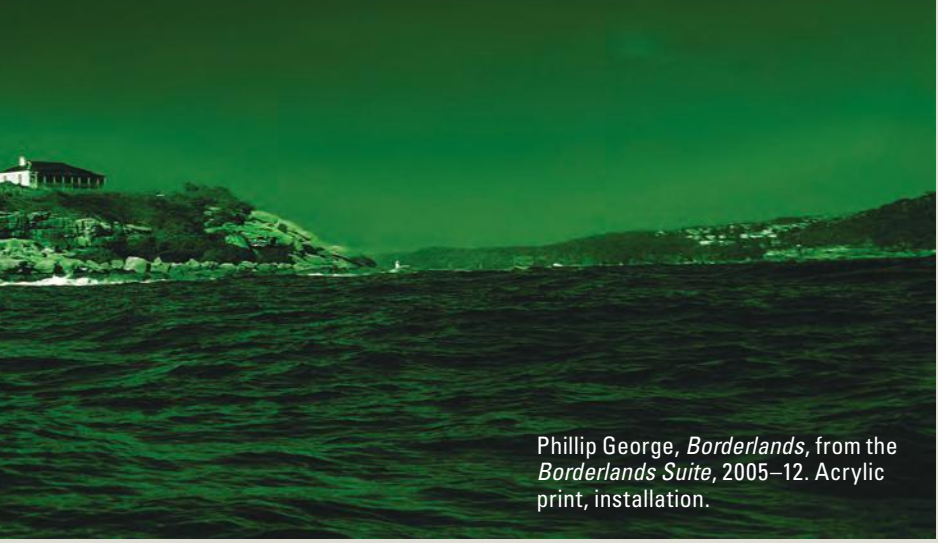
with Aboriginal people was over water. Cook's first landing involved shots being fired at two men 'shaking their lances and menacing, in all appearance resolvd to dispute our landing to the utmost tho they were but two and we 30 or 40 at least'. This impasse on the rocks lasted for 'about a quarter of an hour, they waving to us to be gone, we again signing that we wanted water and that we meant them no harm'. One of the men was struck, but, according to Cook, his efforts were barely impeded. Once the men had made off, the episode concluded without the party finding the fresh water they were in search of, 'except [for] a little in a small hole dug in the sand'.

The party went over to the north point of the bay where they found 'some fresh water which *came trinkling down* and stood in pools among the rocks'. This, however, was 'troblesome' to get at, so Cook sent a party of men back to the site of the first landing. Here they dug in the sand fed by a small stream, thereafter referred to as the watering place. 'Wooders' and 'waterers' did their business here – collecting wood, bearing casks to fill, some of which were left lying about on the sand. And from this point, the 'natives' on shore largely avoided them and their belongings, apparently disinterested.

In tracking Cook's descriptions of the establishment of a source sufficient to water the ship, editor of Cook's exploration journals, John Cawte Beaglehole, notes that over the course of their week-long stay Cook marked 'Fresh Water' in six places on his *A Sketch of Botany Bay in New South Wales*. In this early visual mapping of terrain that would become southern Sydney, it's possible to sense in Cook's six Fresh Waters a memorial to lost or transfigured waters. Similarly a lasting memorial to the arrival of the *Endeavour* and all who followed 'was the destruction of almost all the forms of plant life that gave this place its name', writes sociologist and arts theorist Nikos Papastergiadis. This too is a kind of visual mapping – one predicated on absence rather than presence. We can map the city through its erasures.

George *Borderlands*

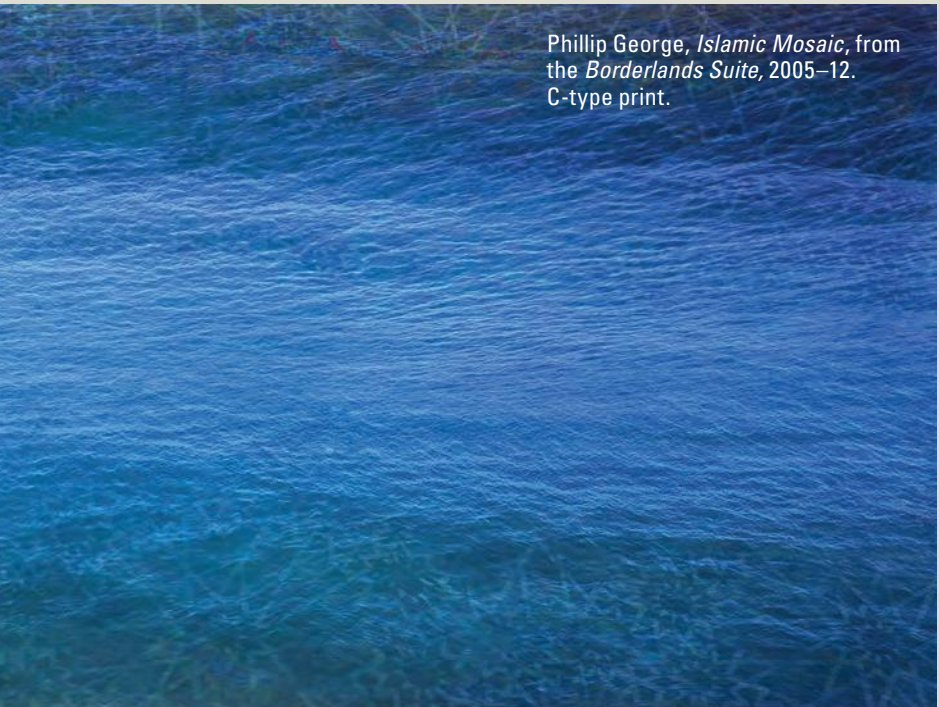
Phillip George's 2008 *Borderlands* exhibition at Casula Powerhouse included a 25-metre long photograph called *Border Patrol*. It depicts 6 kilometres of the Sydney coastline reaching from Sydney Harbour's South Head to the north headland of Bondi. The stretch of cliffs is viewed like a wall from the water, creating a profile not unlike 19th-century horizontal drawings produced from a ship's vantage point delineating navigational landmarks along the coast of New Holland. Instead of the pale blondes we expect of Sydney's sandstone, and deep Pacific Ocean blues, the entire photographic image is tinted in the distinctive acidic green produced by night vision goggles. The green night vision of the military comes ready-scripted with its own narratives and loads the image with trepidation and mystery.



Phillip George, *Borderlands*, from the *Borderlands Suite*, 2005–12. Acrylic print, installation.

Geography associated with familiar and popular Australian coastal culture shifts into terrain under surveillance, suggestive of strident anti-refugee policy and rhetoric.

Much of George's work focuses on the intersection of Islamic cultures with the icons of Sydney coastal living – a means of addressing a local tendency to see the Middle East only in terms of conflict. Exhibited with *Border Patrol* was a series of surfboards, each decorated with intricately coloured and detailed Persian, Ottoman or classic Arabic patterning. These hybrid objects were produced in the context of the Cronulla riots of 2005, when the surf beach became the site of territorial violence between mainly Anglo- and Lebanese-Australian men.



Phillip George, *Islamic Mosaic*, from the *Borderlands Suite,* 2005–12. C-type print.

a well-worn

pathway

The geographies surrounding Botany Bay have a long history of large-scale reshaping that stretches back well before the inauguration of the airport. The Alexandra Canal that afforded Gillian Fuller her view of the mesmerically enfolded airport geographies was excavated in the late 19th century. It was originally intended to run all the way from Botany Bay to Sydney Harbour in the belief that this waterway, named after Princess Alexandra, would encourage manufacturing and industrial opportunities in the southern part of the city through offering shipping to transport cargo. The area would flourish as the 'Birmingham of Australia', with barges given direct access between the two bodies of water. Dredging of Sheas Creek to adapt into the artificial waterway began in 1887, but despite the grander vision, only a portion of the canal was ever completed. Construction took place in two phases. But the waterway was prone to siltation, which limited the draught of vessels. Work ceased in 1900 with the channel stretching from its junction with Cooks River in the south – the original juncture has been altered during three phases of airport expansion – to Huntley Street in Alexandria in the north.

If all had gone according to plan, the Alexandra Canal would've forged a watery passage between two quite different facets of the growing town at the close of the 19th century: one evolved around the working harbour; the other which had, since an 1848 Act of Parliament banning noxious industries from Sydney proper, become the receptacle of the city's stenches and foul waters, its industrial, commercial and human waste.

It would also have forged a tangible form of that famed, elusive and semi-mythical road to Botany Bay described by Watkin Tench when a 'straggling of the convicts' took place. Governor Arthur Phillip evacuated the fledgling colony from Botany Bay, where they had only just set foot, to

establish the Sydney Cove camp in 1788. Only days after the relocation, when the camp had barely begun, a party of convicts made their way overland from the cove to the rejected Botany Bay to visit French explorer Jean-François de Galaup La Pérouse's ships lying there at anchor. As Tench put it when recounting the convicts' cross-country trek over unfamiliar terrain, 'they soon found the road to Botany Bay'. Cultural theorist Paul Carter points out this could not possibly have been a road in the 20th century sense of a metalled surface or highway; nor 'in the eighteenth century sense of an established pathway or track'. More likely, he suggests, this road belonged to the numerous Aboriginal tracks 'that crisscrossed the country between the two harbours'. When Phillip removed from Botany Bay, Carter argues, he constituted Botany Bay as 'the first "other" place in the colony'. It was to this other place that the convicts were escaping. And this same place now figures, in the popular imagination, as the 'nowhere' of the path that runs straight to Circular Quay.

Some suggest that the Botany Bay region has remained Sydney's other place ever since the convicts beat, or appropriated, this early track. For the first hundred years of British settlement, historian Maria Nugent says, the area 'languished, living up to its reputation as a wild, unruly, untamed place'. It lacked the more fertile soils found along the Hawkesbury and Nepean rivers, and was perceived as being uncultivable and unproductive despite its namesake of botanical abundance. The swamps, rivers and creeks characteristic of this area were later appreciated for their abundance of bird and animal life by early settlers and hunters. On the whole, though, as greater Sydney became intensely colonised, its southern margins remained of dubious reputation and scantily settled. Because of this very isolation, in the early 1880s the area became a place to cordon off and isolate the city's abject and unwanted. The 'victims of a smallpox epidemic, mendicant Aborigines and the dead interred in an inner-city cemetery were especially targeted' for removal from the increasingly cosmopolitan city, writes Nugent. Botany Bay, especially its northern

peninsula, became a place of exile. It also became a place associated with invisibility – through the function of this locality the undesirable components of the city were made to disappear. And so we find in the figure of a single path from nowhere (the airport) to a bridge, surrounded by an under-imagined city fabric, an uncanny resonance with some of the earliest tracks, pathways and spatial patterning of the city, along with residues of the social and cultural assumptions and functions that were their shaping force.

subterranean

water

The earliest settlers at Sydney Cove were a water people in that they were a 'maritime people, water was their element'. As well as searching for and sounding out safe harbours, 'the rivers became their routes inland, ways of exploring, travel and transport. Until the 1820s, all their towns and villages and most of their settlements were coastal, or they were inland "islands" on rivers', writes historian Grace Karskens. Their first industries were maritime, including sealing, whaling, and sandalwood collecting involving trader ships. The early town was peopled by sailors and 'the culture of authority among the whites was maritime'. Life revolved around port. Historian Tom Griffiths states that lives were animated and threatened by 'cycles of winds, currents, tides, the dangers, risks and opportunities of the sea'. Academic and writer Ross Gibson suggests that when 'we consider the maritime culture that dominated the town of Sydney, at least until the late 1830s, we can recognise a mentality of boundlessness that flourished despite the tight intentions of the rulers'. This prevailing protean mentality, he contends, emanated from a town that felt itself perched on the edge of the Pacific. Local people with whom the early settlers shared their shores were also water people, paddling their canoes with great dexterity, moving about the harbour and into its tidal reaches, night fishing from canoes lit by burning torches and moonlight, diving from rocks into ocean swell, hunting confidently among the same swamps the newcomers stumbled through wary of miasmic airs.

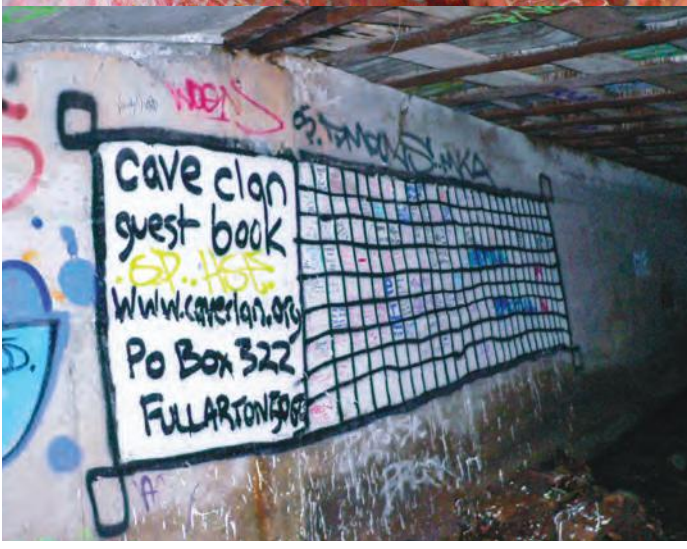
It is ironic then, as architect Jan Gehl points out, that Sydney has failed to become a water city. One of its greatest harbour vistas is obscured by the Cahill Expressway where, as he provocatively puts it, the rights of cars take precedence over human rights. Imagine, he prompts his audiences, if the powers-that-be decided to similarly place an overpass across the shorelines of Venice. A visitor to Sydney's Central Business District unfamiliar with the city's geography might have no idea the city centre is perched just above the water.

And the Tank Stream that sustained the settlement for its first few years until it was abandoned in 1826, now lies encrypted beneath the city streets, tracing a subterranean path from its original source among swamps where Hyde Park now stands, beneath the former Post Office at Martin Place, down Pitt Street to Circular Quay. Writer Delia Falconer describes its fugitive presence there, flooding basements, and contributing to the popular appeal of the city. As she notes, the twice-yearly tours conducted by the Historic Houses Trust in the subterranean watery passageways of the city are so keenly sought that places can only be gained by ballot.

Meanwhile, an urban exploration movement called the Cave Clan makes its own way underground, moving through a network of drains beneath the city. Each drain has its own story, nickname and distinctive features. Australian drains are quite different from Europe's, the Cave Clan points out, because they canalise rainwater separately from sewers. In Sydney one well-known drain is nicknamed Swoo because of its strong slope – 'When you slip, Swoooo!' The Drainstation is named after the train station that can be seen from within the drain. The suite of images on the clan's Forbidden Places website indicates not only a strong appreciation of the adventure offered by this subterranean world but also of its picturesque qualities – contrasts of light and dark, diminishing points, mysterious entries through metal manholes lifted aside in parks and streets, steep descents, stormwater glinting against concrete, curves of highly-crafted and skilled brickwork. The pragmatic efforts of engineers are turned into an underground aesthetics, networks to be mapped, challenges and dangers to be negotiated. Each drain has a guest book graffitied onto its wall, neatly drawn up into a grid of attendance panels.

When Jan Gehl was brought in as advisor for the City of Sydney's vision, he suggested the Tank Stream could be brought back up to the surface in places. 'Purified, it could become a living symbol of the city of Sydney's commitment to be a "green" and healthy city. It could extend the harbour's reach into mid-town, cool the air and bring delight to the city streets.' A successful model for this is Cheonggyecheon Creek in Seoul (South Korea),

Sylvain Margaine, *Sydney Swoo (beautiful brick tunnel)*, 2005. Unrevealed location in Sydney's drain network.



Sylvain Margaine, *Every Drain Has Its Guestbook*, 2005. Unrevealed location in Sydney's drain network.

which was brought back to the surface of the city and reopened in 2005. It was once covered in concrete and buried beneath pavements and elevated expressways. Transportation infrastructure was removed and the stream flow restored. Although expensive, the project is seen as a success for the simple but compelling reason that citizens love the reclaimed space. It is now studied and copied by municipalities all over the world. The stream's ecosystem is enriched, with bird species increasing from six to 36, insects from 15 to 192, and fish from four to 25. Urban air temperatures are lowered and air quality improved.

water shapes

the early city

Water, like many things, is subject to shifting fashions and taste. It has not always been popular to bathe in the sea. Sydney's rivers were once favoured for recreational water activities (boating, picnics). Bondi and the coast south of Coogee used to be working class suburbs. So too have the waterways of southern Sydney been subject to shifting cultural perception – understood first as undesirable swamps and now as valuable wetlands that supply 'ecological services'.

Wetlands have long suffered an image problem. Cook recorded finding in 1770 'a very fine stream of fresh water on the north shore in the first sandy cove within the Island before which a Ship might lay almost land lock'd'. But it soon became almost obligatory to deride Cook's fine stream and meadows. 'We had passed through the country, which the discoverers of Botany Bay extol as "*some of the finest meadows in the world*." These meadows, instead of grass, are covered with high coarse rushes, growing in a rotten spungy bog, into which we were plunged knee deep at every step', wrote First Fleet Captain-Lieutenant Watkin Tench in an irritable response that typifies this derisive tradition. Admittedly, he was out of sorts at the time, but his perception of the area as unhealthy, unproductive and unwelcoming – a rotten spongy bog – extended well beyond Tench's particular circumstances. In a period prior to the rise of germ theory, when concepts of human health and disease were strongly connected to environmental phenomena such as winds, temperatures, moisture, and 'miasmic airs', it is not surprising that Governor Arthur Phillip suspected the area's damp soils 'by which the people would probably be rendered unhealthy', or that Governor Philip King described it as 'exposed … swampy … with insufficient water … and possibly unhealthy'.

When noxious industries were banned from 'proper' Sydney in 1848, they were relocated to this swampy region (alongside the diseased, abject, and dispossessed also expunged from the city, as mentioned earlier). The location south of Sydney was chosen because of a freshwater corridor running among deep wind-shaped sands. These waters would be used to drain waste or drawn for industrial purpose. Patterns of water flow in the city, along with associated physical environments, thus helped define the city's character and distribution, its legal and less formal spatial demarcations and divisions.

Prior to European settlement in the southern Sydney region, water ran from the heights of Paddington ridge and Bondi Junction through a

Botany Bay container terminal.
Photographed by Phillip George.

Greenpeace activists protesting the export of Orica's toxic waste in Botany Bay, 2010.

chain of ponds, marshes, swamps and creeks contained within a vast area of sand dunes cradled in a topological depression known as the Botany Basin, which, in turn, is cradled within the larger geological formation of the Sydney Basin. Historian Scott Cumming describes the area as a 'natural water reservoir and drainage corridor' that binds southern Sydney suburbs into the larger wetland environment. The Botany Wetlands is the largest coastal freshwater system in the Sydney region. It interacts with and recharges the Botany Sands Aquifer lying below, and its sands have accumulated over at least the last 100 000 years, reaching a depth in places of over 80 metres. Geologists refer to these as aeolian sand deposits – borne, deposited and formed by wind – from the Pleistocene and Holocene. This freshwater system forms, among others, the Lachlan and Botany Swamps that were once so fresh they acted as Sydney's main water supply from 1858 until 1886 (as mentioned above).

In the 19th century the huge growth of American cities relied upon 'the vital importance of water supply', and historian Casey Nelson Blake describes water as the 'indispensable precondition' to their viability. So too were there indispensable preconditions in the late 18th century colonial enterprise of establishing the colony that would later become Sydney. It hardly needs to be said that a reliable supply of fresh water was vital here too. Deep harbours were necessary so ships could lie sheltered from bad weather and readily access shore, along with fertile soils to grow food and establish agriculture, and timber supplies for building and for repairing ships.

When, only days after descending upon the much awaited and keenly anticipated Botany Bay, Governor Phillip chose the site at Port Jackson in preference it was for its clear stream of water. 'The different coves of this harbour [Port Jackson] were examined with all possible expedition, and the preference was given to the one which had the finest spring of water', reads the official account of events. By 1789 to 1790 the Tank Stream had dwindled in the first of many dry periods the settlement

and later town and city was to experience. By the early 19th century 'the run of fresh water, which stole silently along through a very thick wood' had become 'little more than a sewer'. Nevertheless, it remains one of the essential preconditions of the settlement.

The city's deep, clear harbour – that other essential precondition – is still clear to this day, observes scientist, author and climate change activist Tim Flannery. The very clarity of the water is due to broader patterns of water flow in the Sydney region. Because no major river empties into Sydney Harbour, silt levels are low. Rather, the Hawkesbury-Nepean River girdles the modern city, running from highland tributaries in the south-east, flowing north through river flat country at the foot of the Blue Mountains, then winding east through sandstone labyrinths to empty into Broken Bay. The Cooks and Georges Rivers flow into Botany Bay, as we've seen. Flannery's observation might seem commonplace at first, but there is something startling about a global or mega-city – as Sydney is often termed – seated on the edge of these clear waters. As we previously noted in Part 2, though, the harbour waters are clear in terms of sedimentation only – the environmental action group Two Hands reveal in their video footage a harbour floor scattered with tonnes of rubbish.

closer views

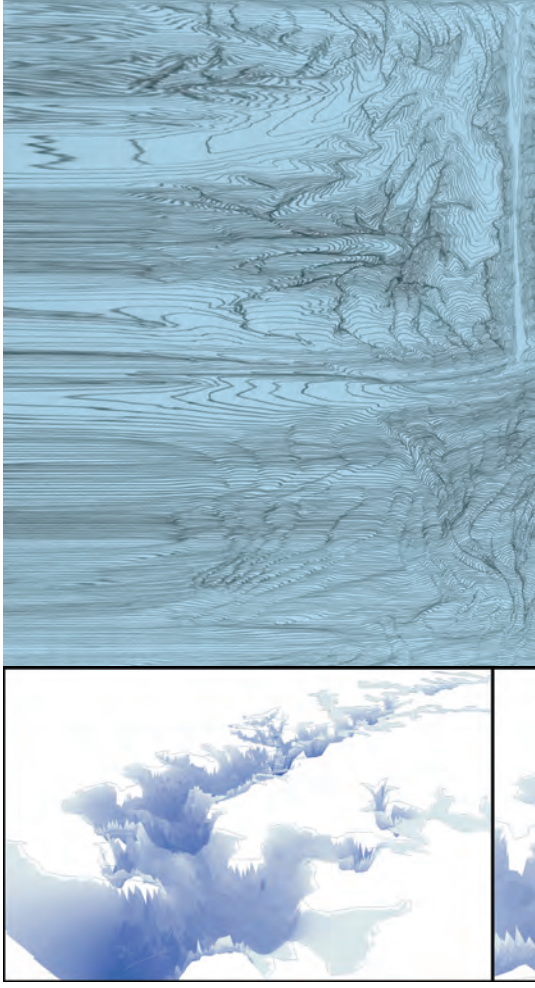
of the harbour

Poet Kenneth Slessor captures the shifting and multifarious waters of Sydney Harbour in his introductory essay to the *Portrait of Sydney*, a collection of photographs of the city published around 1950.

> The water is like silk, like pewter, like blood, like a leopard's skin, and occasionally merely like water. Its pigments run into themselves, from amber and aquamarine through cobalt to the deep and tranquil molasses of a summer midnight. Sometimes it dances with flakes of fire, sometimes it is blank and anonymous with fog, sometimes it shouts as joyously as a mirror.

He likens Sydney, famously, to a 'kind of dispersed and vaguer Venice'. It is the harbour, he suggests, that continually shapes the character and life of the city as it 'creeps between the thousand inlets like a series of grand canals'. But he also reminds his readers that, above all, this is a working harbour. Ferries glide about with their suburban commuters and only accidentally become nocturnal 'fairy boats'; day and night 'liners and colliers, tramps and tugs', rusty ships, spick and gleaming ships, enter and leave the heads; the 'lugubrious mooing of steamboat whistles' joins the thrum and vibration of Sydney's noise; and the vessels become part of the city's skyline.

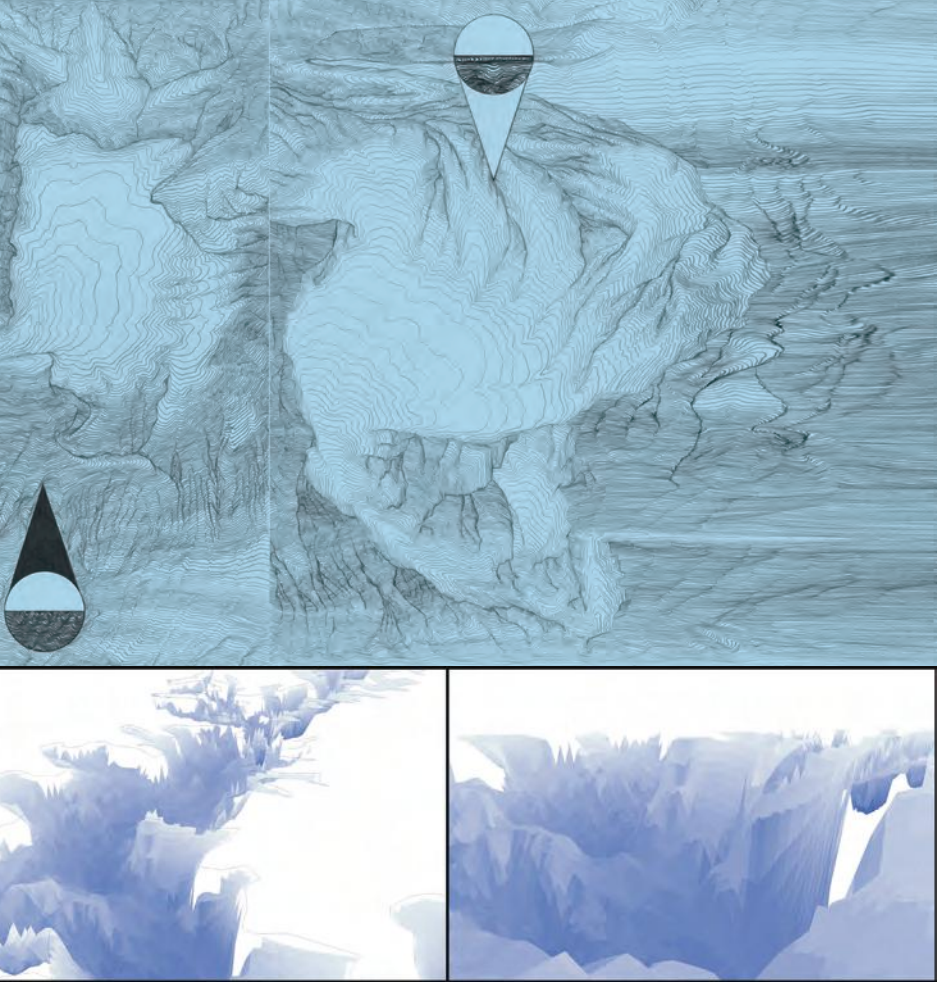
In Slessor's tribute water and city merge, 'masts and funnels float at the ends of suburban streets, as if the houses had gone fishing or the liners come ashore on liberty'. He evokes a functioning workaday harbour that is not just about display or spectacle. Its aesthetics occur almost in spite of itself – or because the city's waterscapes are enmeshed so deep and landlocked inside the city fabric. Author Peter Carey, too, evokes a working harbour, where rusting hulks moored at the bottom of his yard leave their generators running all night even as he joins (in his Sydney account) novelist Anthony Trollope's almost futile quest to somehow convey 'such a world of loveliness of water as lies within Sydney Heads'.



James Geurts, *Drawing In, Drawing Out: Sydney Harbour* (low tide 07:37 – high tide 14:10), (high tide 14:16 – low tide 21:09), 23 August 2012. Site-specific durational works on paper as photographic print. (below) *Fathoming*, 2014. 3D model of shape and volume of water contained within Sydney Harbour via Geographical Information Sciences data-mapping.

Artist James Geurts believes there is much about Sydney Harbour we still don't know well. As he points out, it is widely recognised as the deepest natural harbour in the world. Yet despite or perhaps because of this we have very little sense of its underwater topography, or of how this topography influences the dynamics of water. We have little idea of the world beneath its surface. It comes as no surprise that he, like artist Phillip George, is also a long time surfer, attuned to the world of currents, tides, swell, and wind.

In 2013 Geurts sat at the entrance of the harbour, at North Head, just as the tide came in, positioning himself to begin a drawing that would be a bodily rather than representational response to the incoming tide. All



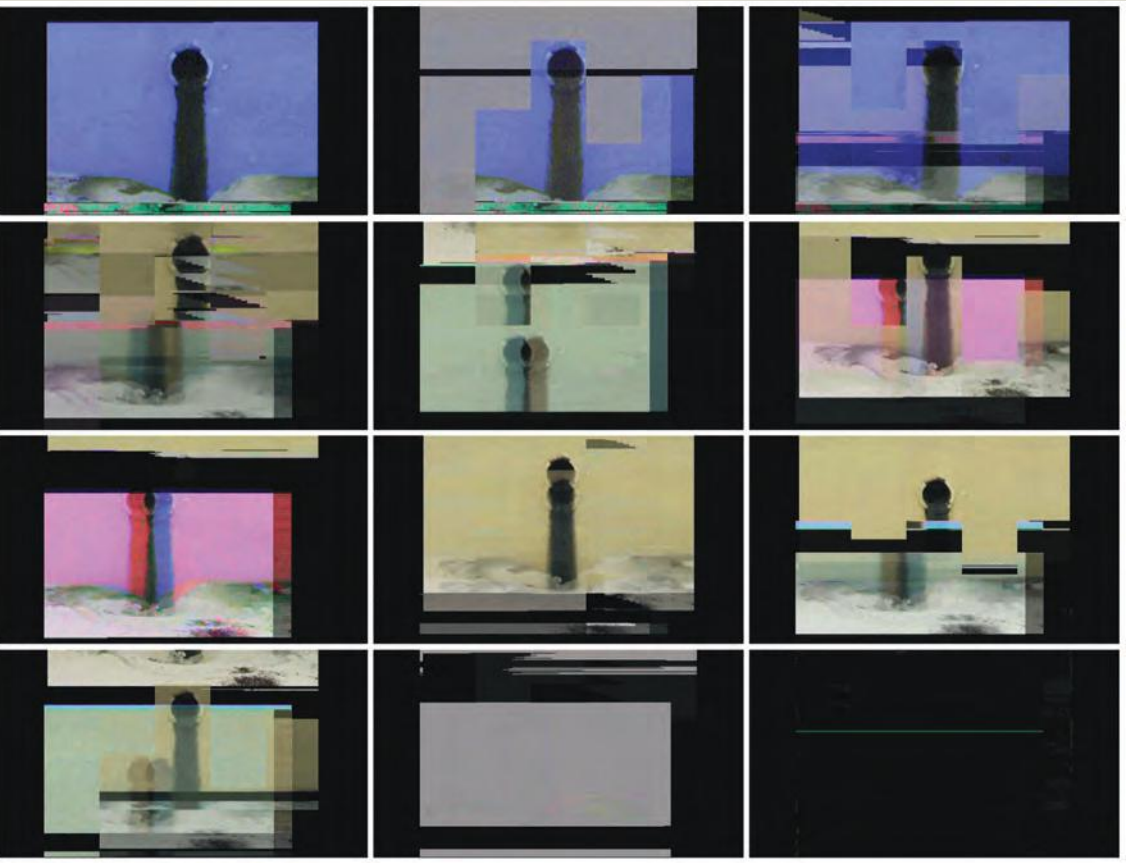
the drawing movements, executed in fine pencil line, drew inward across a large sheet of paper towards his body. This process would last the full duration of the incoming tide, a total (at that particular site) of five-and-a-half hours. He drew without pause during this period.

'I chose the site', Geurts says, 'because it's the threshold where one water body meets another, ocean and harbour. I worked with my body's understanding of that tidal movement.' During the pause that exists between tides – a lull – he relocated to South Head. Geurts likens this tidal pause to the moment between breathing in and breathing out. At South Head he began another five-and-a-half hour drawing in response to the outgoing tide, this time with all drawing movements working outward,

Geurts *Run-off and Slipstream*

Run-off (2004) captures video data of the flow from a stormwater outlet where it drains into Sydney Harbour. James Geurts stationed a video camera at the outlet and intervened in the live-feed, manipulating the data to form colour field abstractions. The process of recording, which he describes as a form of video drawing, attempts to evoke the complexity of the layered hydrological systems moving into and through Sydney's overall water cycle. He 'interrupted the flow of circuitry' to echo the disturbance occurring as polluted water poured into the harbour water.

Run-off draws attention to the multitude of stormwater outlets scattered throughout the urban landscape that might otherwise blend into the background of our everyday activity. Each has its own history and local significance, reflecting and revealing the pulse of water – rainfall – that courses through the city.



James Geurts, *Slipstream*, 2003. Site-specific in-camera multi-exposure photograph. Film soaked in salt water at Obelisk Bay Sydney, the photographic site.

Geurts's Sydney works also include *Slipstream* (2002), created by the immersion of celluloid at the Bondi Baths and at Obelisk Bay looking back out through the Heads. At these sites he used a Bellows camera to first take a large format photograph of an underwater photographer emerging from Sydney's coastal waters. Remaining onsite, he continually wound the film back and re-exposed it over the incoming tidal period at that location. He then soaked the negative in the seawater during the outgoing tide. Because of the camera's mechanics he was able to expose the film to both light and salt simultaneously to develop a series of abstractions that not only reveal the effect of salt water on film, but also suggest the correlating effect of salt water on the human body. The work examines the meeting of two different but related water bodies. As is widely known, the human body is comprised of up to 70 per cent water. This is the same percentage, Geurts notes, of the Earth's surface that is covered in water. The photographic images, *Slipstream*, with their aqueous layered transparencies, blotches, and dense opaque stains created by salt corrosion, were exhibited at the Australian Centre for Photography in 2003.

James Geurts, *Run-off*, 2004. Video still. In-camera video abstraction of live feed, Sydney Harbour stormwater outlet. Experimental Art Foundation, Adelaide.

away from his body. 'It was a way to create an imaginary shape for that body of water pushing in through the geography. Because it's so unknown, I try to find a shape for things that are mysterious, complex and ephemeral, that don't necessarily have well known forms', he says.

Geurts dubs this process 'psycho-topographical mapping' – a practice associated with psychogeography and its exploration of space, particularly urban spaces – and explains that it is only one part of a working process that responds to specific geographic sites and their water systems. Frequently he develops work across a number of media in response to a single site. He gains a sense of each place through extended periods of fieldwork, taking note of what the site reveals, hides and suggests over time. His Sydney Harbour drawings are, for this reason, just one component of a multi-modal work that is still in progress. It involves commissioning a Geographic Information Science (GIS) data-mapping scientist to develop a 3D model of the water body contained within the harbour, based on the topography of the sea floor. This model will be translated into a glass sculpture, and is a way to start visualising and making that sub-surface world tangible.

In *Run-off*, Geurts's footage is suggestive of the vast stormwater infrastructure that patterns water flow in the city. This water would once have fed pools, creeks, swamps, rivers and estuaries, and permeated into the ground and aquifers. During the bulk of the 20th century it was considered 'waste' or unwanted surplus to be shunted as quickly as possible out of the city. As the city developed, stormwater increased – for the obvious reason that permeable surfaces were replaced by impermeable ones. With increased flooding of property, rivers and creeks were channelled and piped or 'streamlined'. Through streamlining, more property was made available for development. Stormwater in the present day city is controlled and directed via the infrastructure constructed during this period. Rainfall flows overland into the drainage system that's an almost invisible part of our everyday urban lives: along gutters and down drains

to disappear beneath our feet and beneath the city surface into the local drainage pipe network that feeds into larger trunk drains and channels and ultimately into 'receiving waters' (ocean, harbour, river, bay). The City of Sydney's main receiving waters are the harbour and Alexandra Canal, which flows into Botany Bay via the Cooks River. The remainder flows into Centennial Park.

Geurts's work animates and gives visual form to an element of this vast stormwater network and process. Through the notion of 'interruption' – polluted water interrupting the circuitry of the water cycle – we can also trace a long history of assumptions about the value of the harbour conceived as a waste drain. In January 1886 the *Sydney Morning Herald* pronounced that 'Farm Cove, Woolloomooloo Bay, Blackwattle Swamp, and Rushcutters Bay are used as cesspits, and so the harbour, which Nature made pure, as well as beautiful, has been defiled with foul matter'. A letter to the same newspaper in 1854 complained about the dumping of 'cartloads of rubbish intended for a street, into the harbour'. The stench was bad enough to deter waterfront real estate. 'The bad miasmatic air thus generated is becoming sensibly felt in warm evenings … and it is not surprising that few citizens … like to fix their abodes in that vicinity.' Barges piled with waste dumped their loads into the water. Legally, this was meant to occur five miles out from shore, but when rules were broken the air became close, and shores washed with the city's detritus. There is a long tradition that leads to the contemporary city's dense accretion of rubbish on the harbour floor, with its gently swaying fields of plastic, balloon ties, peaked caps, bicycles and shopping trolleys, almost as if a whole other abandoned city floated beneath the surface.

When stormwater, traditionally conceived of as 'waste', enters receiving waters it carries pollution with it. The City of Sydney's *Decentralised Water Master Plan* brings the city back into relationship with local water sources, partly to reduce water pollution and partly to

rethink the city's future water supplies in response to climate change and projected population expansion. It reconsiders three main water cycle elements of the contemporary city – potable water, wastewater (sewage), and stormwater – as integrated flows. Historically, these three elements have been treated, handled, and conceptualised separately.

Sydney is a notoriously thirsty city – in keeping with Australia's overall high water consumption habits. A study of Sydney householders' commitment to reducing their water consumption during a recent drought revealed that, unlike other environmental issues that can polarise and divide opinion, concern about water wastage was shared across ideological and demographic differences. Even so, Sydney's current per capita water use is almost double that of England and Wales, for example, and well over double that of many European countries including Germany and Denmark. Sydney also has low rates of water recycling. According to design company OPSYS, currently Sydney recovers less than 5 per cent of its annual 630 000 megalitres of wastewater.

The City of Sydney aims to alter some of Sydney's entrenched water use practices that rely on a centralised supply with its main sources lying well beyond the city edges. Sydney's water catchment forms a hinterland of natural systems upon which the city is fundamentally reliant and with which it is inextricably intertwined. It receives its water through a system that Tim Flannery describes as 'one of the largest domestic water supplies in the world'. It's able to store four times as much per capita as New York's water supplies, and nine times as much as London's. Unlike other Australian cities, such as Perth with its vast groundwater supply, Sydney is almost completely reliant upon rainfall and stream-flow. (The Kurnell desalination plant is the only exception.) The city's drinking water is drawn from catchments on four main river systems in eastern New South Wales. In its entirety the catchment occupies more than 1.6 million hectares, stretching from the Coxs River near Lithgow in the Blue Mountains, to Goulburn and the Mulwaree River and down

to the headwaters of the Shoalhaven River near Cooma. It includes 16 collecting dams and reservoirs. The Warragamba Dam alone has a catchment of 9050 square kilometres, and water is delivered to Sydney consumers via 11 treatment plants and 20 000 kilometres of pipes. This vast catchment and water infrastructure system can be thought of as an 'ecological frontier' of water technologies that has extended deep into Sydney's surrounds as the city has grown. Geographers and historians propose we think of the enmeshment of water with city as socio-environmental networks through which any perceived polarity between 'nature' and 'city' is undone.

Centralised water supply systems can also be understood as dependent on 'lifeline' infrastructure transporting vital resources across vast distances and therefore as vulnerable to disruption. The City of Sydney's *Decentralised Water Master Plan* aims to deliver 10 per cent of water supply through local capture and reuse, and to reduce stormwater pollutants by 50 per cent by 2030. In this regard, the city's relationship with water has come full circle: from early reliance on local sources, to the development of centralised sources drawn from afar, back to a re-engagement with local water. A number of current and proposed sites not only harvest wastewater and stormwater, now treating it as resource rather than waste, they also use principles of Water Sensitive Urban Design (WSUD) to treat stormwater to reduce pollutants. WSUD principles integrate vegetation, permeable surfaces and natural processes into the design of streets, roads, open spaces and buildings with the aim to slow down, retain, detain and filter stormwater runoff. Water is released slowly and in a cleaner form into surrounding waterways. Turpin + Crawford's *Storm Waters* steps in Joynton Park in Zetland in southern Sydney are integrated into this larger precinct-scale and city-scale project. 'The work brings stormwater that is usually invisible back up to the urban surface', says Turpin of the steps, 'and encourages people to play amongst it.'

Turpin + Crawford *Storm Waters*

The Joynton Park site was once part of a series of swamps spreading from Botany Bay to Redfern. It was drained in 1906 by digging a trench to Sheas Creek, leaving a peat-filled depression in the sandy landscape. Jennifer Turpin and Michaelie Crawford worked with this topographical feature to construct two sets of stairs, *Storm Waters*, set into the park's embankments. The stairs face one another across the floor of the park, which is scattered with paperbarks that grow happily throughout this suburban area, hinting at the wetland environment that lurks beneath the urban surface.

'The story goes like this', says Turpin. 'All the streets running east–west were designed to slope in towards swales at their centre, rather than curve around to gutters at their edges.' The swales are planted with eucalypts, reeds and lomandras, and lined with layers of gravel and sand. Rainfall and runoff filters through leaves and roots to seep through the gravels into agricultural pipes below. The pipes drain into a holding tank beneath Joynton Park. Here the water is treated through an electro-magnetic process. No chemicals are used. The stormwater is pumped up to flow over the *Storm Waters* stairs, which are subtly and ingeniously angled so that water flows across them, almost counter-intuitively, at a 45 degree angle. As the shallow skein of water flows down the stairs it is oxygenated and aerated. It does not linger on the stairs but continually recirculates across them. Each day at midday the pumps are turned off so the stairs can dry to discourage algae from thriving.

'The stairs are an integral part of the water treatment', Turpin explains. 'There were meant to be storyboards explaining the process, but funding ran out. So, apart from the locals, people don't necessarily know the story. They don't know it's stormwater on the stairs.'

There's something satisfying about re-integrating the runoff that results from rainfall with the city, inviting it to linger. Because in spite of the persistent but unpredictable cycles of drought that are endemic to its climate, Sydney is in so many ways a moist city. Yet, as an environmental manager said to us in reference to the desalination plant, people throw up their hands in surprise when it rains. They are just as indignant about drought. Sydney's average rainfall is higher than that of London and Paris, but it is distributed quite differently. It occurs in larger doses, with more sunny days in between. In this moist city ferns sprout out of cracks in buildings, steps, and walls. Self-sown rainforest trees like Moreton Bay figs and Port Jackson figs grow out of tiny crevices. After heavy rain paperbark buttresses continue to seep for days. Water oozes down the cut faces of sandstone you find everywhere along and among the streets, forming clefts of moss gardens. Left to its own devices, much of Sydney would form spontaneous vertical gardens (discussed in Part 1) that are now a feature of developments such as One Central Park on Broadway.

Jennifer Turpin, Michaelie Crawford, with Louise Pearson, *Storm Waters*, 2002. Environmental water artwork, Joynton Park, Zetland.

city

rivers

When artists Josephine Starrs and Leon Cmielewski were invited to participate in the Sister City Biennial: San Francisco and Sydney, they ended up exploring an entanglement of iconic harbour waters with their darker undersides. Curators Meg Shiffler and Justine Topfer asked selected artists to create works addressed to the mayors of the two cities 'that propose visionary solutions to make each city more humane, green and liveable'. When Starrs and Cmielewski first set to work on their *Waterways* project, they envisaged that focus would be on the Sydney Harbour so many people know and love. They approached members of the public with a set of questions including: What do you love most about the harbour? What sorts of activities do you do there? And what would you improve?

An unexpected common thread ran through the responses, especially to the question about improvements: people were concerned about fishing and the high toxicity of the Parramatta River. This toxicity makes itself felt to recreational fishers in an imaginary line drawn by the Harbour Bridge. Fish caught east of the bridge may be eaten, but the New South Wales Department of Primary Industries recommends that no fish or crustaceans caught west of the bridge should be consumed. 'I'm sure fish swim up and down the harbour regardless', quips Starrs.

Commercial fishing has been banned since 2006 because of elevated levels of dioxins found in fish and crustaceans across the harbour, Parramatta River and interconnected tidal waterways. The topic of fish from the west emerged as a theme people were passionate about. 'Local people from around Parramatta River know their water well. They know about pollution, and about major polluters like Union Carbide. And they know about the state of the water.' A rich web of interviewee stories about fishing, places where it was once possible to swim, and intimate memories

of the past river and the past harbour began to weave around particular sites. In response, the focus of Starrs and Cmielewski's work shifted away from the harbour's more iconic sites – Circular Quay, the Opera House, the Harbour Bridge – to include its juncture with the Parramatta River and the ferry passage along the river. 'It's very relaxing taking the ferry up the river', says Starrs.

The resulting *Waterways* two-channel video installation, which was commissioned by the San Francisco Arts Commission (SFAC) and exhibited at both the SFAC Galleries and in *Urbanition* at Carriageworks in Sydney, presents multiple water narratives and images in correlation with one another. On one screen the camera might dwell simply on the water's surface, while on another animated solutions for the harbour's problems unfold. A protective layer is unrolled to cover toxic sediments lining the harbour floor. Landfill is gathered from along harbour edges and towed away to form its own island. The much-loved fish of the Parramatta River are protected from the sediment floor by housing them in floating cages suspended mid-stream. Simultaneously, snippets of the popular TV series, *Water Rats,* relay a seemingly endless discovery of corpses found at the bottom of the murky harbour. And locals recount the occasional eating of fish caught from the notorious west of the bridge. 'We're still standing', says one woman.

When we spoke to artist David Watson about his 14-kilometre swim down the Parramatta River for his durational work *swimming home*, he repeated those exact words. We asked him whether he'd been worried

Josephine Starrs, Leon Cmielewski, *Waterways*, 2011. Video still, 2-channel video installation.

about pollution. 'Well, I'd been talking about immersion in my work for several years', he said. 'And I'd toyed with the idea of canoeing between two points, my childhood home in Dundas and my current home in Rozelle. But that seemed a bit lame. So I thought, let's get truly immersed. No one swims in the harbour. People are overly wary nowadays. So it seemed important to do that. And I'm still standing.'

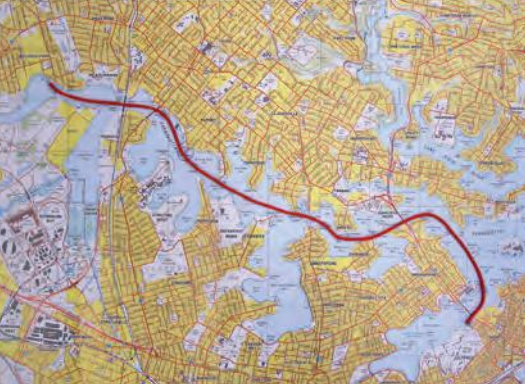
Watson's swim grew from an earlier body of work, *Wild Ryde*, which he describes as a municipal pilgrimage through the 'blandlands' of the Parramatta River corridor. In 2005 he set out on foot across suburban Sydney to re-imagine and connect with the postcodes of his youth. He wanted to not only engage with personal memory but also to excavate and discover broader cultural histories woven around place. His process incorporates a notion historian Grace Karskens calls 'ground truthing' wherein historical events are interpreted through an expanded range of sources including ecology, geology, archaeology, prehistory, geography, art, media, architecture, material culture and natural history, but also through spending time in particular places to gain a more visceral sense of the past. Over a two-year period Watson meandered 100 kilometres between Rozelle and Dundas. As he travelled westward following the spine of Victoria Road, he found himself increasingly drawn away from inland streets to the harbour's edge. The water intrigued him in a way he hadn't expected. In April 2011 he reversed his route and swam home to Rozelle down the Parramatta River.

Josephine Starrs, Leon Cmielewski, *Waterways*, 2011. Video still, 2-channel video installation.

Watson refers to the river as Sydney's original highway – a water route between Sydney Cove and more fertile soils discovered at the head of the harbour. Governor Arthur Phillip established a public farm there in 1789, and when the first crops flourished he named it Rose Hill, 'the first township' built where salt and fresh waters meet. The settlement, later named Parramatta, supplied Sydney with grain, fruit, potatoes, cabbages, and timber, along with quarried blue metal for road building. By 1820 Sydney itself housed only a quarter of the colony's population, and was dependent on outlying settlements including Parramatta and farmers on the Hawkesbury-Nepean for staple foods. In turn, Sydney's port and storerooms supplied the settlements with goods and commodities that arrived by ship.

By the 1880s and 1890s, with construction of bridges and railways, the Parramatta River was less widely used. But as suburbs grew and heavy industry boomed along its banks, there remained substantial boat trade along the river until the 1960s. Names of sites along the route reflect its water transport history. Kissing Point at Ryde, for example, is the site where the two banks of the river draw close and boats once regularly ran aground.

David Watson, *Paintings by Fish*, 2007.
Photo of marks left by fish nibbling algae on sideboards of Dawn Fraser Baths, Sydney.



David Watson, *Swimming Home*, 2011.
Map of Watson's proposed journey.

David Watson, *Swimming Home*, 2011.
Performance still taken at Iron Cove Bridge, Rozelle.

'Much of the so-called Parramatta River is not technically a river at all', Watson says. 'A good length of it is actually harbour.' Beyond the murky upper reaches of the mud and mangrove lined river, Watson launched his swim from Wharf Road in Ermington, close to his childhood home. Nevertheless it was the most challenging stretch of his swim – here along the riverbanks once stood Berger Paints and the infamous Union Carbide (responsible for producing Agent Orange and DDT). Their chemical legacies were rarely far from his mind as he swam.

One of 'the most compelling sensory experiences of water is that of immersion', writes anthropologist Veronica Strang. Yet much of Sydney's celebrated harbour is rarely swum; its waters remain out of bounds. They are waters to be viewed, crossed, strolled along, photographed, backdrops to other activities, and a massive boost to real estate value. There are a few favoured swimming spots and baths, though, cordoned or netted off from the rest of the harbour. Watson swims regularly at the Dawn Fraser Baths (in Elkington Park, Balmain). Despite its once questionable water quality, 'Dawny' has remained popular with local swimmers for generations. In summer these days, Watson says, swimmers share the baths with schools of prawns, and leatherjackets graze at algae on the wooden sideboards, creating fish paintings as Watson calls them – intricate patterns etched by their teeth revealing white paintwork through dark algae, like ice flowers. 'Since commercial fishing was banned in the harbour there seem to be fish everywhere.' Kingfish, jewfish, bream, mullet, whiting, luderick, stingrays. These, of course, are all fish from very far west.

Fear of sharks, understandably, plays a part in the general undesirability of swimming in the harbour, especially since navy diver Paul de Gelder was severely injured in an attack by a bull shark in Woolloomooloo in 2009. In the weeks just prior to Watson's swim his local paper, the *Inner West Courier*, ran headlines urging pet owners to keep dogs out of Iron Cove after a number of shark sightings in the very

waters he had marked as the endpoint to his aquatic journey. He decided then to wear a Shark Shield deterrent device, and was accompanied by a support team including professional diver and cinematographer George Evatt travelling alongside in a Zodiac. They devised an emergency plan just in case.

'It's hard to care about or look after places you don't know well', Watson said. 'We live in antiseptic times. We're fearful.' His *Swimming Home* work is thus intended, in part, as a playful celebration of the harbour, an acknowledgment that its fate might be on the turn – water quality improving, its remnant bushlands better tended. It also involves forging what he calls a more primal relationship with Sydney, relishing its soil, water and topography. And it is a tribute to his now-deceased parents, a pilgrimage to and from their suburban homelands they would've appreciated. 'I'd initially conceived the swim as a serendipitous quasi-guerrilla act', he told us, 'but I decided eventually to seek permission and make it official.' At first the harbour authorities, Maritime NSW, refused to allow him to swim a route carrying RiverCats and other vessels. But when he sent them a catalogue to an earlier walking work, and explained the swim's nature they consented. And so the RiverCats and his support team stayed in radio contact with one another, the ferries slowing and sounding their horns in recognition as he passed and made public his swim home through the usually untouchable Parramatta River waters.

alexandra

canal

Alexandra Canal has a vexed environmental history. The canal has notoriously high contamination levels and is embedded within the most heavily industrialised and polluted area in Australia. Yet as Sydney continually revamps itself – Barangaroo, Darling Harbour, Green Square, One Central Park, Harold Park – the canal is being warily eyed as yet another development prospect. This is an ambiguous zone. Its long history of industrialisation reveals through its legacy cultural assumptions about this particular kind of place – a wetlands environment (read swamp) – and how it deserves to be treated. Simultaneously and prospectively, it is yet another *tabula rasa* – blank slate – in the city's mindset. It's also a place apart: quiet as a country lane, full of lyricism and urban nature, yet neglected, with a sense of possible danger.

A briefing note from the Environment Protection Authority (EPA) describes the Alexandra Canal as possibly 'the most severely contaminated canal in the southern hemisphere'. A complete fishing ban and a Do Not Disturb order enacted by the EPA has been in place since the year 2000. An attempt to reinvent this area as Sydney's 'little Venice' around the same period came to nothing because of the toxicity of the canal's beds. Efforts to remediate the canal would only disturb sediments containing chlorinated hydrocarbons including organochlorine pesticides (chlordane, DDT and dieldrin), polychlorinated biphenyls (PCBs) and heavy metals such as lead, zinc, iron and mercury. Add to this concoction build-ups of oil and grease, high levels of faecal coliforms after wet weather, and nutrient loads that encourage algal blooms (leaves and grass clippings), and the risk of releasing this medley of pollutants into the lower Cooks River and so into Botany Bay was deemed too high. The *Alexandra Canal Masterplan* prepared by architectural company Allen Jack + Cottier proposed to

transform the canal corridor into a green regional spine that would link the Cooks River with Sydney and Moore Parks. Instead, plans were laid to rest – at least temporarily. The University of Sydney subsequently ran a research project based on the canal to develop a series of speculative design projects by graduating Master of Architecture students that imagined a new future for the canal and urban development in Sydney. The project was premised, in part, on a certain sense of inevitability: that with the expansion and development of Green Square and surrounding suburbs, the canal too would soon be ripe for redevelopment.

On a subdued and drizzly winter day, the pedestrian bridge spanning the mouth of the canal where it joins the Cooks River next to the airport is wired off from the banks. But it's easy enough to slip through a hole pried into the fencing. The wire's been folded back and moulded through regular use. The canal is imbued with an uneasy sense of trespass – you can never quite tell whether you're somewhere you're not meant to be. But it's evident through the folded-back wire that someone or something frequents this place; foxes, fishermen, teenagers, homeless, or urban explorers.

Parked just inside the locked gate is a white hatchback with a large black briefcase resting on its back seat. The banks of the canal are draped and carpeted with great swathes of morning glory vine in flower. Above the track to the left is a thick rim of vegetation beneath a raised yard filled with shipping containers stacked three or four high, their sides printed with HAMBURG SUD, UASC and HANJIN, hinting at goods carried from faraway places. On the far side of this vast stretch of containers, on the outskirts of the IKEA carpark, plane spotters sit with their front car windscreens trained at the distant runways. Along the dirt track, running parallel with the canal is a large black pipeline balanced on concrete supports. This is the pipe that's meant to run fresh water from the desalination plant in Kurnell – when it's operating – to join Sydney Water's supply. The canal is curiously peaceful, even though it lies

directly beneath the flight path. On the far side of the water, over a busy road, are glimpses of airport tarmac, lines of stationery aircraft, stacks of metal containers used to transport in-flight food, a refinery painted white, and a huge billboard spanned by an image of the Sydney Harbour Bridge set up like a portal into the city for the millions of visitors flowing past via the airport – as if they could skip this bit of the city to arrive straight at their destination.

Nathan Etherington who ran the architectural research project based on the canal quips publicly that this is 'the most visible invisible stretch of water in Sydney'. You get a full panoptic view of it whenever you come in to land at the airport, yet it remains strangely obscure, easy to miss, and difficult to access at ground level. Large tracts of it are closed to the public by commercial and industrial businesses that back straight onto its banks.

Beneath the pedestrian bridge a pelican drifts, searching for food. At the foot of oyster-encrusted banks a school of tiny fish turns and flips just beneath the water's surface. A pied cormorant dives, surfaces, dives again, making its way downstream. Blue wrens are busy among the undergrowth. Stands of castor oil bushes with their stems of liverish purples are framed against panels of silvered water, interspersed with other species that were once garden escapees but now grow wild through parts of Sydney: clumps of pampas grass plumes, marshmallow weed, a bush with large red pea-flowers shaped almost like birds, thickets of lantana. Scattered among them are slender casuarina saplings, a local species, their needles collecting water.

This peaceful scene belies the toxicity of the canal. Contaminants are lodged in its bed rather than in the water column itself. They reside in a layer of sludge that in places is well over half a metre thick. These obstinate residues are the legacy of sustained commercial and industrial pollution that began in the first half of the 19th century. As we've mentioned, the canal was constructed during the 1880s from the

Sheas Creek watercourse, a tributary running from low sandy hills east of Redfern close to where Moore Park now lies, to join the estuary of the Cooks River. When the 1848 *Slaughter House Act* banned noxious industries from operating within 'Sydney proper' many industries established themselves along or near the banks of Sheas Creek. Sydney had incorporated as a city in 1842, the city boundaries were extending, and the population was booming. Beyond the newly delineated city centre, wool washing and fellmongering (dealing in hides or skins) businesses, which exuded 'thick slimy matter', were established around the Waterloo Swamps now known as Green Square. Foul water and refuse from these noxious trades drained into Sheas Creek. Tanneries, abattoirs and boiling down establishments sprang up, along with sawmills, foundries, and soap, candle and chemical works, to name a few. The area was also used to drain sewage, with the southern outfall sewer system carrying the southern suburbs' human waste to a sewerage farm near the mouth of the Cooks River from 1882 to 1916. In places this system was an uncovered channel. In 1897 the MacDonald Town sewer was built, and the open channel directly entered the canal.

During an 1882–83 Royal Commission Inquiry into Noxious and Offensive Trades, one industry owner recalled his workers drawing water from Sheas Creek earlier in the century when he first established his wool scouring business there. Employees used the water to brew their tea. In 1896 palaeontologist and museum director Robert Etheridge was called in to examine the Alexandra Canal excavation site when an ancient submerged forest, stone 'tomahawks', and dugong bones bearing hatchet marks were unearthed. 'Previous to the cutting of the present canal and the artificial raising of the level of the surrounding land', he wrote, 'the area … was mostly a salt water swamp, through which crept the sluggish malodorous Shea's Creek.' Clearly this malodorous waterway was no longer a creek to brew tea from. Through its excavation, though, Etheridge began to grasp (amid a long-standing debate) the longevity of Aboriginal

presence in Australia as 'something approaching to a geological antiquity'. Work continued and the site, despite its archaeological treasures, was given back over to the canal where it remains.

In the 20th century an intensive period of industrial development occurred in the suburb of Alexandria through which the Alexandra Canal flows. By 1943 there were 550 factories in the area, making it the largest industrial municipality in Australia. Goods and materials produced from these factories included: 'Asbestos, Aircraft, Storage Batteries, Carbon Brushes, Soap and Tallow, Fertilisers, Springs, Engineers Requirements, Furniture, Glass, Sporting Goods, Matches, Industrial Gases, Paper Containers, Paints and Varnishes'. Controls on release of waste from factories into the Alexandra Canal and other parts of the environment were not tightened until after 1970.

Studies show, however, that far from being a phenomenon belonging to a surpassed and less enlightened era, the canal continues to be used as a dumping ground in the present day. Point source drains have been found to illegally discharge high concentrations of heavy metals in the Alexandra Canal catchment, resulting in very high localised pollution. Turpin + Crawford have proposed a suite of remediation projects at this site, some of which use reeds and gravels to filter water entering the canal, while others rely upon aeration and oxygenation of the water.

The canal's sorry state is a result, too, of an ecosystem constrained and curtailed: it was once a freshwater stream lined by casuarinas (*Casuarina glauca*) and rushes (*Juncus kraussii*) at its upper reaches, transitioning into estuarine swamplands where it was surrounded by mangroves, dry salt plain, and saltmarshes with their low-growing mats of succulents: samphire or glasswort (*Sarcocornia quinqueflora*) and seablite (*Suaeda australis*). The estuarine swamps along Sheas Creek were destroyed when it was channelled. The waterway can no longer flush and filter sediment and pollutants as it used to because of its

Jennifer Turpin, Michaelie Crawford, *Floating Linear Wetland*, 1999. Concept art for the Alexandra Canal Masterplan.

fabricated containment walls, the straightening of its once sinuous path, and the removal of vegetation communities at its edges.

The canal can easily be understood as belonging to the Promethean project of modernity, that is, the taming and controlling nature through technology, capital and human labour. Mutation and destruction occur through the process of modernisation, when modernity's programmatic planning and vision interacts with the specifics

of any given place (as geographer Maria Kaika suggests). These specifics include the material, ecological, cultural, social, economic and political processes particular to geographic locale. The idealised view of the harbour and Botany Bay connected by an engineered and efficient waterway met the little-understood estuarine and wetland ecology, mutating, in part, because of siltation and tidal patterns. The canal is a microcosm or localised instance of the numerous unintended consequences spawned by utopic urban visions across the globe. But the canal is not *only* one of an industrial era's numerous follies and failures. One of the most striking things about the Alexandra Canal and other parts of this water corridor with its chain of wetlands stretching from Paddington ridge and Bondi Junction down to Botany Bay is its distinctive and hybrid urban ecologies.

urban water

ecologies

In the drizzly Alexandra Canal carpark lays a long-dead frog flattened into a pale silhouette against rain-darkened bitumen. Somewhere here in this notoriously polluted stretch of urban landscape, frogs persist. Frogs are widely considered the canaries of the waterways. They are a reminder of the remarkable capacity of places like these to resist easy categorisation. Poets Paul Farley and Michael Symmons Roberts refer to indeterminate urban places as edgelands: not quite city, not quite country, post-industrial landscapes, brownfields, rust belts, holes in the city, ruins of industrialism, wastelands. Sociologist and arts theorist Nikos Papastergiadis describes them as 'thoughtful zones' that encourage moments of spatial reverie. Writer Iain Sinclair chronicles them as he follows the circumference of the M25 in *London Orbital*. Another English writer, Richard Mabey, arrived early at the notion of their potential to host birds, plants and animals in the middle of an otherwise highly urbanised environment in his 1973 *The Unofficial Countryside*.

The frog is an indication of the capacity of these places that are shot through with their own special kind of lyricism to harbour nature precisely because they're neglected by humans. While harbourside Glebe, for example, revegetates its foreshores to invite smaller native bird species such as blue wrens back into the area, the neglected canal abounds in the same species. Ironically, although heavily polluted in part, they also become urban oases retaining pockets of remnant species and fragments of once widespread vegetation communities. Because of the swampy, estuarine, wetland environment, the city could not completely take up this ground.

A colony of endangered Green and Golden Bell frogs (*Litoria aurea*) persists in a nondescript strip of ditches where it meets the steep

embankment of the M5 near Tempe. Past the M5 are pale grey sandy soils of market gardens and an abandoned sports stadium hulking among hummocks of grass in Rockdale. A solitary car lurks in an empty carpark. A much-graffitied sign, next to a concrete channel of water among great mounds of couch grass and swamp grasses, notes that migratory birds visit the location from China and Siberia. Nearby are the wonderfully named Landing Lights Wetlands, and the Patmore Swamp that's said to be the hiding place of Pemulwuy, the Dharug man who speared Governor Arthur Phillip's gamekeeper in 1790, led raids on settlers between 1792 and 1797, and was shot and then beheaded under Governor Philip King's orders in 1802. Vestiges of Sydney Freshwater Wetlands vegetation and Eastern Suburbs Banksia Scrub persist, both listed as Endangered Ecological Communities, surviving only across fragmented sites where the natural soil and associated seedbank is intact or partially intact – precarious archives of the botanical abundance Banks once celebrated.

Artist Natalie Jeremijenko engages in her work with this special capacity of wetlands to harbour life, and sequester carbon, especially as an urban ecology. 'Collectively we have drained and degraded well over half the wetlands in the US', says Jeremijenko. And frequently, as with Sydney, they are co-opted for the sake of airports. She suggests we might reimagine our interrelations with wetlands through what she terms the 'juicy interface' – the epithelial layers through which we inhale and ingest.

As part of a broader challenge to reinvent the role of wetlands in urban systems, Jeremijenko argues that we need to reacquaint ourselves with the 'slimy side' of these ecosystems with their longstanding image problem. At the *Curating Cities: Sydney–Copenhagen* exhibition, each globular *Murkish Delight* cocktail served up by her *Cross(x)Species Adventure Club* was perched on a white teardrop-shaped spoon, like food from a minimalist white-on-white high-tech future. Its pale gelatinous appearance might resemble blancmange, but when sampled it is surprisingly robust in texture and flavour. For a moment not much happens,

but then a full, bitter, salty taste kicks in, almost like a martini but more mysterious and slightly sweeter.

Jeremijenko delivered an *Echology* seminar in Sydney a few years ago, dressed as usual in her Environmental Health Clinic outfit – a white lab coat with trademark red cross (x) emblazoned on the back, and black cowboy hat – drawing spectacle and performance into the orbit of pressing environmental questions that are more often accompanied by dire predictions or, as she puts it, an overemphasis on reducing impacts such as food miles, petrochemical fertilisers, pesticides, and 'footprints'. 'It's necessary but not sufficient to reduce our negative damage', she says. On top of that we need to improve environmental health and increase biodiversity through more imaginative participation in reframing ecological arguments and the language that surrounds them. We need to reimagine interfaces between people, other species, and the natural world.

As part of this overarching ambition, Jeremijenko's *Amphibious Architecture* responds to fish and the quality of their surrounding medium in the East River and Bronx River in New York. Emphasis lies on the 'rescripting' of interactions between people, fish and water. The project was conceived with architect David Benjamin to reveal poorly understood urban ecosystems dwelling beneath the river surface. A network of tubes fitted with sensors and lights floated in the rivers, blinking when fish passed beneath. Other lights indicated water quality, responding to shifting rates of dissolved oxygen. The pair also developed fish sticks that are not only nutritionally appropriate for fish (unlike white bread) but also tasty to humans. You can break off a piece and eat it yourself as you feed the fish. 'It's a very visceral way of demonstrating that we share the same natural resources, we eat the same stuff', Jeremijenko explains. More than this, the fish sticks contain a chelating agent that binds to bio-accumulating heavy metals and PCBs. The agent targets mercury and allows the fish to pass it out as a 'harmless salt' that settles into silt and

Jeremijenko *Cross(X)Species Adventure Club*

The *Cross(X)Species Adventure Club* investigates solutions for improving natural systems through experimental culinary designs. Ecologically-conscious food for both animals and humans is cooked up to encourage cross-species interaction and further the possibilities for creating sustainable bio-diverse futures.

For the *Curating Cities: Sydney–Copenhagen* exhibition (Customs House, 2011), Natalie Jeremijenko and her collaborator, gastronomic chef Mihir Desai, produced two edible cocktails, *Wetkisses* and *Murkish Delight*. Both were designed to draw attention to urban ecologies, particularly to wetlands and the health of amphibians.

Since the 1990s, urban development has contributed to the severe and ongoing loss of wetlands. Jeremijenko argues that the urban regeneration of wetlands is crucial for the health of our cities and the environment. Not only do wetlands provide habitats for amphibians and other species, they are biodiversity hotspots critical for water purification, possessing enormous carbon sequestering capacity.

David Benjamin, Soo-in Yang, Natalie Jeremijenko, *Amphibious Architecture*, 2009. Installed in the East and Bronx rivers, a network of interactive buoys created feedback loops and allowed text messaging between fish and humans.

Jeremijenko's cocktail *Murkish Delight* was created through a process of 'inverse spherification', where a flavoured liquid is encased in a flavourless skin. The cocktail is designed to appear as a light 'terrestrial bubble', something akin to the inverse of an air bubble produced underwater – a bubble of liquid in the air. The texture and design of *Murkish Delight* encouraged its consumers to contemplate the nexus of terrestrial and aquatic environments, and the inhabitants of the respective environments.

Poetically and gastronomically evoking the health of amphibians that rely on wetlands, *Wetkisses* are marshmallow cocktails. The marshmallow is injected with crème de violette, a purple French liqueur intended to evoke the purple-pigmented lividium soil bacteria and the natural antibiotic anti-fungal agent, violacein, that it produces. When frogs have these anti-fungal agents on their skin they can fight the deadly chytrid fungus, which is a large factor in the extinction of amphibians. 'When you bite into the marshmallow, your lips are inoculated with the lividium', Jeremijenko explains. 'You are equipped to kiss the frog and protect them from this deadly fungus.'

Cross(X)Species Adventure Club hopes that urban dwellers will be affected by such culinary experiences to change their consumption habits and support a sustainable future. The club claims that environmental activism and change can begin in the urban space with a gesture as seemingly banal as eating. 'Our cities are natural systems', says Jeremijenko. 'It's a particularly urban design challenge, to transform our relationship with the ecosystem to become a form of cultivation rather than extraction or damage.'

Natalie Jeremijenko, *Cross(X)Species Adventure Club (Murkish Delight: a taste of wetlands)*, 2011. Shown at *Curating Cities: Sydney–Copenhagen.*

is removed from bio-availability. Jeremijenko reflects on the potential for collective remediative action held in what might at first seem small acts of 'rescripting' such as the chelating fish sticks. New interactive technologies offer a means to script our interactions 'not just as isolated, individuated interactions, but as collective aggregating actions that can amount to something'. Playful and practical acts of rescripting offer the means 'to address some of our important environmental challenges'. If enough people participate, tangible differences might be made.

Sydney's Homebush Bay on the Parramatta River has attracted public art strategies that respond (like Jeremijenko's) to densely accumulated layers of contamination. Responses range from the performative to direct remediation. Here the Sydney Olympic Park stands amid an area considered by some as one of Australia's worst toxic waste dumps. The site has housed the State Abattoirs and State Brickworks, a naval armaments depot surrounded by chemical industries, a fuel terminal, a petroleum products storage area, an oil refinery and a prison. As with the Botany Bay district, it's a landscape shaped by extensive land reclamation that began in the 1890s. Landfill and industrial waste has claimed sections of the bay and large areas of saltmarshes and wetlands. Artist-architect Richard Goodwin performed his *Mystic Dioxin: Alien Blues* wading among the mangroves along this harbour edge for the exhibition *Buffer Zone* (curated by Allan Giddy and Ihor Holubizky), which itself examined the site as a palimpsest of histories, noting its transition from so-called 'wasteland' to hosting the 2000 Sydney Olympics with appended 'unique wetlands environment' and sanctuary. Goodwin comments on the site: 'Under the mud lie large quantities of dioxin left by previous industry, which now leach out and prevent harbour fishing. Always known by the authorities, these facts were largely hidden within what was to be called the "Green Olympics", with its Green Bell Frog and water polishing camouflage.' Fitted out in helmet and overalls Goodwin used faux instruments to test this muddy mangrove environment, using

Richard Goodwin, *Mystic Dioxin: Alien Blues*, 2011. Performance, *Buffer Zone* exhibition, Sydney Olympic Park Armory Gallery.

public art to 'reveal the wound' as he puts it. Further back from the shore Janet Laurence's remediation project, *In the Shadow*, addresses water and air quality in this reclothed post-industrial landscape and invites native species back into revitalised habitats.

If *Amphibious Architecture*, *Mystic Dioxin: Alien Blues* and *In the Shadow* share a strategy, it is their activation of physical sites in the city that have borne the brunt of industrialisation and urbanisation and carry their less desirable legacies (pollution, contamination, species attrition, biodiversity loss). The most striking difference between them is their

Laurence *In the Shadow*

Addressing the industrial contamination of Sydney's Homebush Bay, this installation, visible from the three bridges that cross Olympic Park's Boundary Creek, comprises 21 apparatus wands standing in the creek-water at different heights. Symbolising a scientific monitoring system, these appear to measure water quality. At random times, water blurps and aerates while atmospheric fog emanates throughout the landscape transforming and cooling the creek environment.

A casuarina forest lines either side of the creek bed for 100 metres, and bulrushes occupy its banks, providing a habitat for native fauna. Janet Laurence initiated the planting of casuarina and bulrushes to improve air

Janet Laurence, *In the Shadow*, 2000.

quality and attract native birds and wildlife back to the area. Native water hens returned to the site to nest almost immediately after the project's completion. The casuarinas and bulrushes were also intended to reduce the creek's salinity, Boundary Creek having previously been a stormwater channel that released vast amounts of pollution into Homebush Bay. Laurence undertook qualitative evaluations of the waterway as part of the project.

In the Shadow generates, in the artist's words, 'a soft organic green ribbon-like space', in contrast to the built environment of Sydney Olympic Park. Laurence argues that the work reveals 'the transforming chemistry of water remediation by creating a poetic alchemical zone as a metaphor for the actual transformation of Homebush Bay from its degraded contaminated industrial past into a green and living site for the future'.

Natalie Jeremijenko, *Mussel Choir*, 2012.

temporal approach. *In the Shadow* maintains an ongoing restorative action as a self-contained but ecologically embedded project (filtering water, creating habitats). *Mystic Dioxin: Alien Blues* (p 243) relies on the moment of performance with prosthetic high-tech pump to display what's going on 'under the mud'. While *Amphibious Architecture* (p 240) draws its audience into the hands-on act of 'rescripting' interactions between river, fish, people – with fish health and water health shifting (and ultimately improving) at the receiving end of these actions.

Jeremijenko's *Mussel Choir* additionally encourages us to expand our view of what constitutes the city and its citizens. Jeremijenko is particularly adept at creating means of engagement with non-human species in urban spaces to reveal not only presences that might otherwise be overlooked, but also the role and function of those species. *Mussel Choir* emerged from *Echology: Making Sense of Data,* an initiative of Carbon

Arts and the Australian Network for Art and Technology (ANAT) but was first explored at the 2012 Venice Architecture Biennale, and envisaged to accompany a larger iteration of *Amphibious Architecture*. The work constructs habitats for mussels with Hall effect sensors glued to their shells. The sensors tell an automatic soundtrack whether the mussels are open or closed. Data about the mussels' activities is converted into sound. Jeremijenko refers to blue mussels as the 'heavy lifters of water quality improvement'. They can filter as much as 6–9 litres of water per hour. Through 'instrumentation' they provide a real-time register and measure of pollutants in the water. When the mussels are 'open-mouthed and singing' it means water quality is good. When they're 'closed and humming' it's less good. Jodi Newcombe of Carbon Arts explains that the songs map parameters such as water depth to sound pitch, presence of pollutants to sound timbre, and the rate of opening and closing of mussel shells to sound tempo. Mussels are given a voice conveying meaningful water quality information.

Sydney's rock platforms, estuarine mud flats, mangroves and sandy beaches around estuary foreshores provide habitats for a large number and variety of shellfish, including mussels. Many hundreds of shellfish species are recorded in Port Jackson alone. Hundreds of Aboriginal shell middens scattered around Sydney, now treated as archaeological sites, contain the remains of hundreds of thousands of shellfish used for food, fishing bait and decoration. Early British observers recorded only a few local names for shellfish: *dalgal* (mussel); *dotangby* (a rock oyster); *dainia* (an oyster); and *kaadia* (which could be one of several cockles). Oysters are still a common sight all along the harbour foreshores, even the most murky and rubbish-strewn. They cling too along the banks of the toxic Alexandra Canal. Shellfish species, says Jeremijenko, are not inhabiting a different world. And their fates are intimately linked to our own. Here her work takes a twist away from a more expected narrative of demise. In a period when *Fortune Magazine* can declare that 'Water promises

to be to the 21st century what oil was to the 20th century: the precious commodity that determines the wealth of nations', you might not expect to turn to mussels for hope or instruction. Yet hope is embedded within the *Mussel Choir* project. 'My primary interest is in the mussels' spectacular adaptability', Jeremijenko says. 'That puts me in a different class from traditional conservationism. I'm interested in how organisms adapt to the Anthropocene … as opposed to the Sierra Club "conserve and preserve" way of thinking.'

Her comment recalls OPSYS's *Subtropical Sydney* with its apron of protective, revitalised and highly functional wetlands wrapped between city and sea; and the City of Sydney's vision for decentralised water that reintegrates elements of the urban water cycle, rethinks the role and wellbeing of locally-sourced water, and breaks with the prevailing tradition of 'distant elsewheres' supplying water from afar. These projects share with Jeremijenko's work a concern with redesigning connections between people and urban water so that water is understood not merely as a resource for consumption, but as part of a broader hydrological cycle and ecology. Wetlands, notably, shift from maligned bog to the 'high-tech of the 21st century'. More than this, though, the projects share in the shaping of a philosophical stance that conceptualises the challenges posed by climate change as an opportunity for innovative adaptation – a response that does not rely upon restorative strategies alone. The question suggested by these works is no longer whether adaptation is necessary, but what forms will it take in the future?

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Part 3: Waterway City

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- Interviews conducted by the authors with artists Richard Goodwin, Ross Harley, Phillip George, James Geurts and Natalie Jeremijenko.

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