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Challenges of metropolitan scale green infrastructure: The Sydney Green Grid

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Abstract

In 2017, the Government Architect of New South Wales launched a draft policy known as Greener Places (Government Architect NSW 2017a). The new policy is underpinned by the Sydney Green Grid (SGG), an initiative pitched as transformative in its power to promote sustainable development, improve connectivity and enhance green infrastructure (GI) networks across the metropolitan region and the state (Government Architect NSW 2017b). How successful will the SGG be in delivering "greener places" for urban areas across the state?

This paper exams the claims of the transformative power of the SGG with a focus on two related objectives. First, because the SGG is predicated on principles of GI, a brief literature review highlights the potential challenges of GI as a planning strategy. Secondly, the paper explores how the SGG relates (if at all) to precedents for metropolitan green space planning precedents in Sydney—what in fact will the SGG transform? The paper extends previous research on metropolitan scale green space planning in Sydney by bringing the SGG into focus and introducing a critical perspective derived from the GI literature. The findings reveal that in Sydney the coherence of landscape concepts and principles underpinning the metropolitan planning strategies is difficult to sustain.

Introduction

The first metropolitan plan for Sydney (approved in 1951) included a green belt and a green web; a decade later, in the face of inevitable urban growth, a second metropolitan scale strategic plan deployed the corridor principle. The current plan envisions Sydney as three cities with a green grid undergirding equitable distribution of social, environmental and economic benefits across the region. Each of these iterations—a belted web, corridors, and now a grid—has interpreted the Sydney landscape differently, and each has employed multiple large-scale greenways as means of directing urban growth at the metropolitan scale. While neither of the earlier two schemes were fully successful, each generated significant regional green space including the Western Sydney Parklands (5280 hectares) and Sydney Harbour National Park (392 hectares). What form will the legacy of the Sydney Green Grid take?

The Sydney Green Grid and the Greener Places policy which supports it "inaugurated" green infrastructure into the urban planning framework in New South Wales in 2017 (Schaffer 2017). As powerful as this initiative may seem, the historical trajectory, governance arrangements, and site-specific intentions of the SGG present challenges for its implementation. To explore these challenges, this paper opens with an abbreviated literature review which situates the SGG within a historical trajectory of greenspace planning and identifies key questions for the successful implementation of green infrastructure. Working from the view that history matters, this paper then examines the green-space approaches of prior metropolitan strategic plans for Sydney in order to identify lessons and legacies that may inform the delivery of the

SGG. The paper closes with thoughts on the potential of the current governance arrangements for the SGG to achieve a legible and connected landscape for metropolitan Sydney.

Background

The SGG agenda is more complex than it may seem at first glance. On one hand the SGG charts a course of action for implementing green infrastructure across the state, but on the other hand, promoted as a pathway to securing livability and maximizing the quality of life in Sydney, the SGG is also interwoven with campaigns to enhance Sydney's status as a global city (Government Architect NSW 2017a). Sydney fares well in world rankings of livability. Sydney's second place ranking in the World Cities Culture Forum for public green space (World Cities Culture Forum) may seem to belie the need for a either a state or metropolitan scale green infrastructure policy. However, while Sydney is well-endowed with greenspace, equitable access is an ongoing challenge with most greenspace reserved as National Parks extending across the sandstone plateaus at the western, northern and southern edges of the city (NSW Department of Planning and Environment 2018).

Literature Review

Across the UK, Europe, the United States and Asia, green infrastructure is now integrated into policy (Mell 2017). Academics, practitioners, and policy-makers identify GI as a beneficial if not essential approach to urban and landscape planning. GI is not a uniform concept, nor is it a blunt planning instrument (Thomas and Littlewood 2010), and the ways in which GI is identified, valued and implemented vary with geopolitical context (Mell 2017).

Why the broad uptake of GI? Thomas and Littlewood (2010) argue that GI emerged as a viable policy option in Northern England as the acceleration of housing development resulted in reforms to the spatial planning system and governance. The increased development pressure on the urban fringe created opportunity for new policy discourse and it is in this context that green infrastructure emerged as a viable alternative to the green belt. Thomas and Littlewood also suggest that a key distinction between GI and earlier 'green' planning controls such as green belts lies in governance, with GI often reliant on 'soft' participatory governance, and green belts representative of 'hard,' top down approaches to governance (Thomas and Littlewood 2010).

Contemporary approaches to green infrastructure draw on antecedents of green space planning dating back to the late 19th century (Benedict and McMahon 2006; Mell 2017). This trajectory includes greenways, the Garden Cities movement and landscape ecology. Underscoring the benefit of working with existing green space systems, Mell (2017) has found that implementation of GI which relies on synergies between new and established green space antecedents contributes to the versatility and appeal of GI. At the same time, this versatility can also pose a risk. For example, in the context of Northern London Thomas and Littlewood (2010), found that development pressure may create a tendency to accelerate the acceptance of GI, in which case GI will "simply displace" earlier methods of landscape-based planning methods (Thomas and Littlewood 2010 219).

These points should be key concerns for GI planning. GI is a concept imposed on existing landscapes, and typically places with histories of landscape-based planning strategies. How does GI 'absorb,' integrate or otherwise reckon with existing green belts and other spaces of hard governance? The dominance of GI

discourse in planning circles risks overshadowing and/or devaluing the contribution of earlier concepts. The challenge then is to ensure that neither displaces the other; instead understanding how a GI approach might 'absorb' pre-existing green elements is a priority for the successful realisation of GI as a comprehensive and sustainable planning strategy.

Finally, the key to success of any plan is implementation. For GI this requires champions who can empower GI specific thinking through to implementation by embedding GI concepts and principles in policy. Successful implementation also requires managing these landscapes as they unfold in place, particularly because how this happens correlates directly to their success (Amati and Taylor 2010, 149). Governance and implementation approaches characterised as top down (Amati and Taylor 2010) or "hard" (Thomas and Little 2010) tend to be associated with the mid twentieth century but persist today. Today approaches to GI governance and implementation span the "harder", behind closed doors approaches to the more open, participatory and democratic thus clarity about where a governance approach is situated on this spectrum may be an avenue for improved long-term outcomes for GI.

Sydney's Green Belt, Green Web, Corridors and Green Grid

The Green Belt was the signature feature of the 1951 Planning Scheme for the County of Cumberland (PSCC), the first statutory land-use plan for metropolitan Sydney. The PSCC had three aims: coordination of land use, consolidation of development and conservation of natural and historical assets (Winston 1957, 39). The PSCC agenda integrated open space as a key contributor to metropolitan form, with open space working as buffers between land uses, protecting scenic areas, cultivating regional identity, articulating sub-regions and providing recreational areas. Five types of open space were proposed: a county green belt, district open spaces or green web, national parks and other major reserves (including foreshore scenic reserves), and rural areas (Evans and Freestone 2010). (See Fig.1)

The green belt was the emblematic feature of the Planning Scheme for the County of Cumberland partly due to its projected size, 33,100 hectares (81,792 acres), and partly due to its function as "a girdle of rural open space encircling the urban districts" (Cumberland County Council, 1948, 65). The Green Belt also allowed access for the urban residents to what conceptually was a rural area, with small agriculture parcels and scenic landscapes. In reality, however, the green belt was a strip on the urban fringe, mostly in private ownership and which linked two major National Parks (Freestone 1992).

The County of Cumberland Council (CCC), the author of the scheme, was a new type of regional authority. Its regional scope was often at odds with the interests of its local stakeholders, particularly the developers and small landholders who interpreted the Green Belt as a government imposed restriction on their individual rights to develop their land. In addition, because the Green Belt was adjacent to fast growing urban areas, it was vulnerable to develoment pressure. By 1957 16 sq km had been released for urban expansion, and two years later, when the Minister for Local Government released a further 119 sq km, the Green Belt for all intents and purposes abandoned (Freestone 1992).
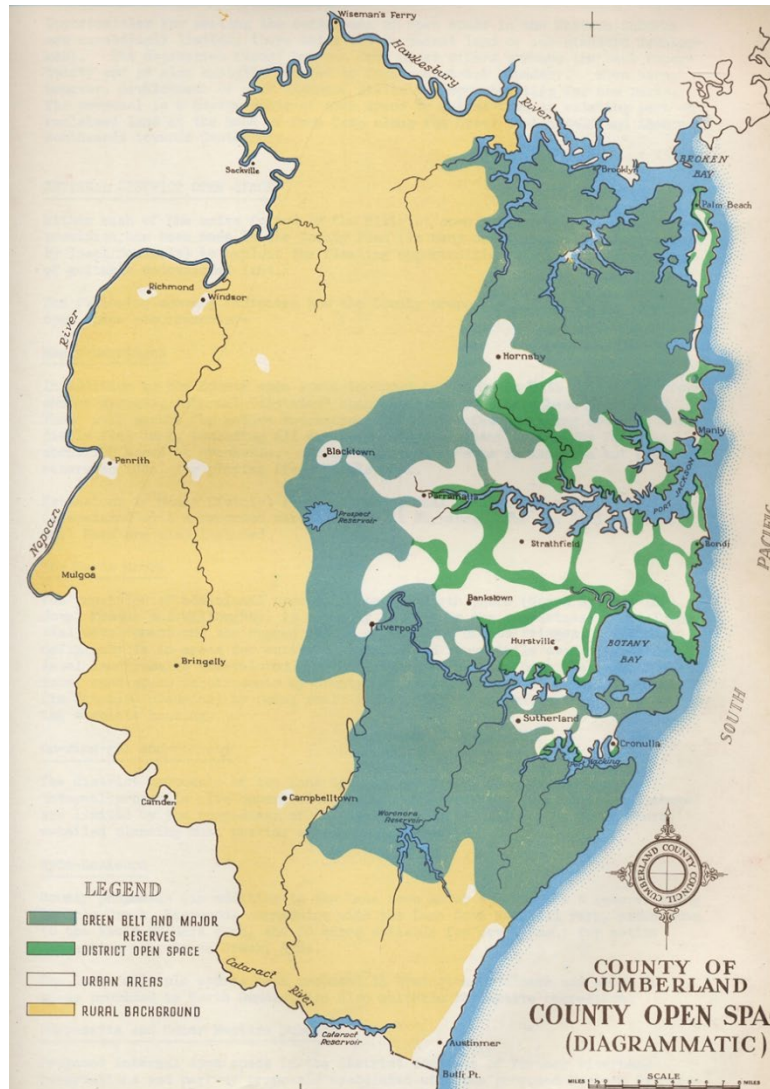
Figure 1. Open Space in the Planning Scheme for the County of Cumberland showing the Green Belt and the Green Web. (Source: Winston, Denis 1957)

The green web

The CCC proposal for the district open space system or the green web was a network within the area bounded by the green belt. The primary purpose of the green web was to preserve the landscape identity of the urban districts, as distinct from the rural areas within and beyond the Green Belt. It traced and stitched together existing open spaces lining Sydney's rivers and creeks to integrate recreational spaces with the preservation of much of "the County's best natural scenery" (Cumberland County Council 1948, 65; Evans and Freestone 2010).

Although involving a relatively small amount of land, a total of 8900 hectares (22,000 acres), the Green Web was more successful than the Green Belt. An early reduction of cost (and land included in the scheme) from £15 million to £5 million significantly reduced the scope of proposed open space development, but resulted in its most important and enduring legacy. It secured state parliamentary approval of the Scheme in 1951 but more signficantly led to an agreement whereby the acquisition cost for open space, roadways

and significant historic sites is split between local councils and the NSW State Government (Evans and Freestone 2010; NSW OSL 2017).

By 1964, when it was superseded by the State Planning Authority (SPA), the CCC had used this scheme to acquire several parcels designated in the PSCC along Sydney's rivers, harbours and northern beaches. As the scheme's signature Green Belt became increasingly at risk, the CCC proposed even larger National Parks, including Port Jackson (Sydney Harbour) National Park. In doing so, the CCC also signalled the importance of maintaining a regional approach to the provision and administration of green space (Evans and Freestone 2010).

Corridors

The SPA produced Sydney's second metropolitan plan, the Sydney Region Outline Plan (SROP) in 1968. This was a new vision for the growth of Sydney as a metropolitan region, focused on facilitating rather than limiting growth. A radial, corridor-based approach was introduced, and the Green Belt dismantled. Sydney's new limit to growth was topographic, comprising the sandstone plateaus to the north, west and south—steep, and not conducive to development. Importantly, this more distant girdle opened the rural lands formerly protected by the green belt to development (Evans and Freestone 2009).

The SROP continued the use of green space as a visual buffer between built up areas. Four "special use corridors" were designated to allow efficient movement of people, products and utilities across the metropolitan area (Evans and Freestone 2009; State Planning Authority 1968a, 53). An additional four open space proposals extended the concept of the PSCC green web by focusing on protecting waterways. Thus, the key distinction between the SROP and the PSCC was not in the ideas about open space, but rather in the ideas of metropolitan form (Evans and Freestone 2009). (See Fig. 2)

The SROP adopted a "hard" governance approach, with acquisition of corridor lands carried out by formalising the 1951 policy as the Cumberland Development Fund (CDF) in the 1963 State Planning Authority Act. This allowed the SPA to acquire extensive land designated for open space and roads in the SROP. As with the CCC, the cost was shared, and the land eventually transferred to the relevant council or state agency for management and development. Between the mid-1970s and 1980 approximately $20 million (AUD) had been spent and seventy-seven percent of the designated land acquired (Evans and Freestone 2009; NSW Planning and Environment Commission 1982).

Despite the failure of the Green Belt, the SROP expanded many of the PSCC proposals for open space. Without referring to the Green Web, the SPA often used the park systems that emerged from this aspect of the as evidence of the benefits of long-term open space planning and acquisition (see State Planning Authority 1968b, 2-3). A key example is the SPA supported Sydney Harbour Foreshore Study (1967) which in effect was an extension of the CCC campaign to protect Sydney Harbour Foreshores (Evans and Freestone 2009).
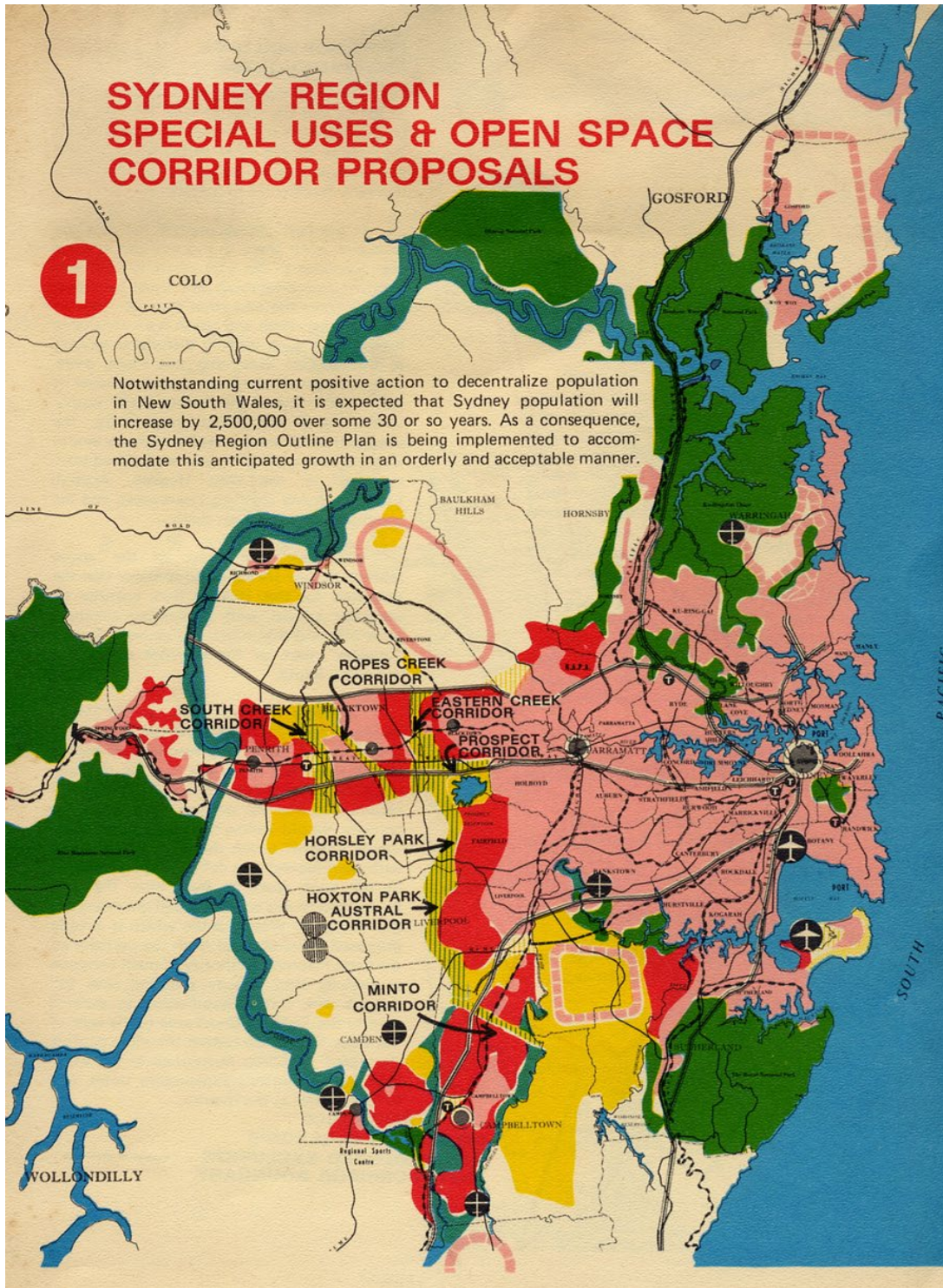
Figure 2. Special Use and Open Space Corridors in the 1968 Sydney Region Outline Plan. (Source: NSW State Planning Authority 1968).

An Interlude
Four metropolitan strategies were prepared for Sydney between 1968 and 2010, each progressively embedding spatially a policy of urban consolidation. As a result, today Sydney is a polycentric metropolitan region with a hierarchy of urban centres connected via corridors of transport and mixed-use development. Although the language of sustainability permeated these metropolitan plans and biodiversity, social justice and equitable access were key concerns, a spatially based plan or strategy for green space was absent. Instead from the 1980s the state government has supported open space in a manner best described as fragmented and at times opportunistic. This has nonetheless resulted in the creation of some significant regional green spaces (Evans and Freestone 2009). The 1979 Inner-City Open Space Acquisition Program supported the reclamation of several post-industrial sites in the inner city and along the harbour foreshores, including Sydney Park. Other key examples include the establishment of Sydney Harbour National Park in 1975, the transformation of the Homebush Peninsula into Sydney Olympic Park and the 2006 transformation of the largest of the SROP Special Use and Open Space Corridors into Western Sydney Parklands.

In all cases, the state government has made decisions about land use, and governance typically takes the form of discrete state-level authorities or agencies. An important exception to this top down approach was the 1983 establishment of the Metropolitan Greenspace Program (NSW Department of Planning 1991). The Greenspace Program uses the Sydney Region Development Fund to provide grants to local governments for improvements to open space, mainly in the form of strengthening linkages and remains an important funding source which links state and local governments.

The Sydney Green Grid
The Sydney Green Grid began as a pilot project in 2013 sponsored by the Government Architect of NSW. Inspired by the All London Green Grid and motivated by the lack oversight for metropolitan scale greenspace planning, in its first iteration the SGG was effectively a cartographic audit of open space provision at the local level. As it expanded to the precinct, district and metropolitan scales , its scope also broadened to include pedestrian, transportation, neighbourhood and open space networks. Currently the SGG output consists of reports documenting the "spatial framework and project opportunities" for the six districts within the Sydney metropolitan region (see Government Architect NSW 2017b). (See Fig. 3)

The Sydney Green Grid has set a new agenda for green space in NSW and represents a significant departure from previous attempts to integrate green space into metropolitan strategic planning. The SGG is particularly distinctive in that rather than focusing on major form giving projects (as prior schemes have), the SGG focuses on the potential of "green" links at all scales. Its supporting draft policy, *Greener Places* is the first attempt to introduce state-wide guidelines and a framework for open space, based on green infrastructure concepts, and again at all scales, across the state (see GANSW 2017a).

The SGG has also convinced politicians of the potential for maximizing and protecting open space as a state asset, evidenced by the fact that the SGG features across a range of government portfolios. This is at once opportune and challenging for the realisation of the SGG. The NSW Office of Strategic Land, which manages the Sydney Region Development Fund, identifies implementation of the SGG as a key priority (NSW OSL 2017). At the same time, a new Office of Open Space and Parklands has been established within the NSW Department of Environment and Heritage to lead Greener Places Policy and by inference the SGG, but currently its focus is limited to tree planting and playgrounds.
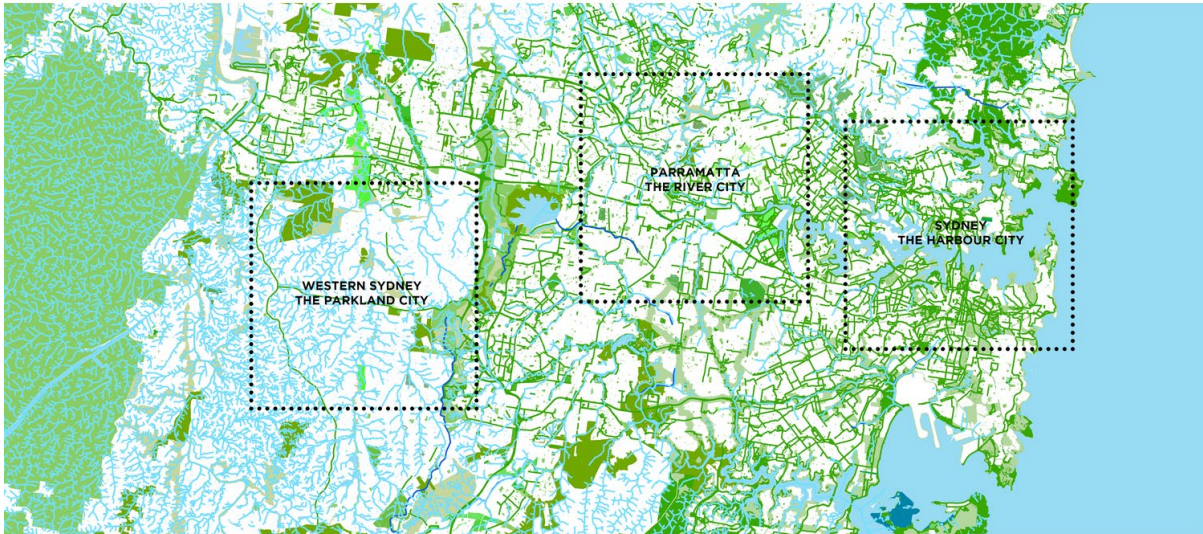
Figure 3. The Sydney Green Grid at the metropolitan scale. Image Courtesy Tyrrell Studio.
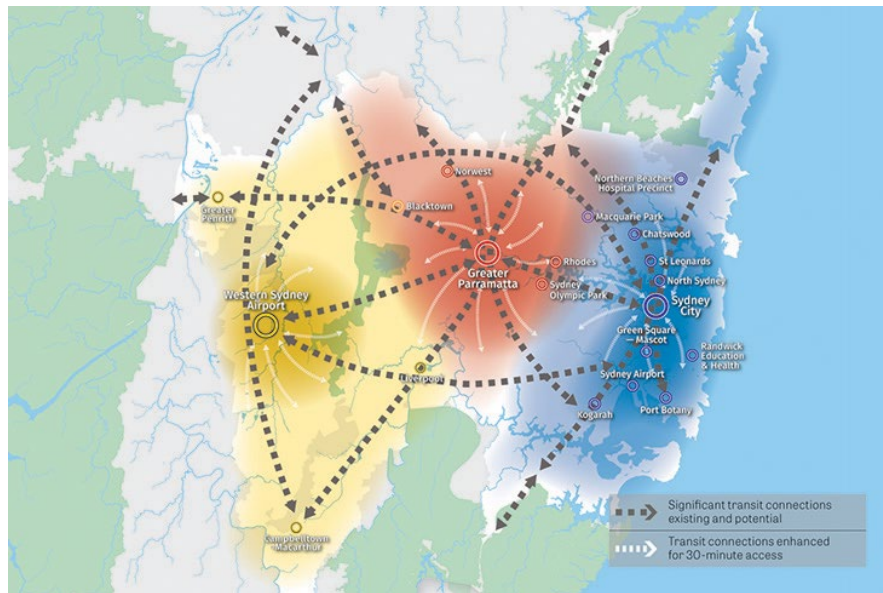

Figure 4. A Metropolis of Three Cities showing cities of Sydney, Greater Parramatta, and Western Sydney Airport. Significant green space featured are the large national parks and Western Sydney Parklands. © State of New South Wales through the Greater Sydney Commission.

Currently the NSW Department of Planning and Environment features the provision of open space as a subcategory of Housing Supply, with a commitment to "including new or retained hectares of open space in its land releases and precinct plans" (NSW DPE 2018). While the integration of open space provision into the chain of housing supply is positive, this is a missed opportunity to integrate GI principles of connectivity, multi-use, conservation, recreation into development, and to leverage with the form-giving capacity of green space.

The arrival of the SGG coincided with the re-introduction of metropolitan level governance in Sydney for the first time in fifty years. The Greater Sydney Commission (GSC) was formed in 2015 as an independent body of commissioners tasked with improving equitable housing supply, coordinating land use and infrastructure, aligning planning with principles of environmentally sustainable development, and enhancing resilience across metropolitan Sydney (NSW Government 2015). The GSC's strategic plan *Metropolis of Three Cities: A plan for growing Sydney* reconceptualised the metropolitan area into three "distinct but connected cities." Although *Three Cities* was prepared in alignment with separate strategic plans for transport and infrastructure, oddly, the power and potential of green infrastructural approach of the SGG is underplayed. (See Fig. 4) Instead of driving the approach to green space as a stand-alone aim, the SGG is a lower level concern, barely discernible as one objective of forty embedded in one of ten strategic directions.

Discussion and Conclusion

The SGG is a powerful metaphor for a green, connected, and vibrant metropolitan region which has elevated the provision of green space as a critical dimension of urban planning in Sydney. Together, the SGG and *Greener Places* have deployed green infrastructure concepts to influence city making processes. Both are significant and transformative achievements, but challenges remain.

The current fragmented governance and implementation processes are major issues. A main concern is the status and role of *Greener Places*: promoted as policy, currently it is more aptly described as a green infrastructure framework *to be adopted* as policy. How to embed Greener Places and cascade its principles and guidelines through and across agencies and levels of government? Currently, in the absence of effective policy, the uneven uptake of SGG across agencies is unsurprising. This may be a matter of the time required for intra-agency coordination. Likewise, the new Office of Open Space and Parklands may simply need time to clarify its agenda, its priorities and its relationship to the OSL. Nonetheless, governance arrangements which support and facilitate the uptake of the concept and principles of the Green Grid (and green infrastructure more generally) consistently across all levels of government are an imperative. Also striking is the top down approach to the delivery and governance of the SGG; alternative governance approach which encourages active and meaningful community participation and local champions to bolster the uptake of the SGG as a vital aspect of community identity is another imperative.

The SGG antecedents, the Green Belt, the Green Web and the SROP provide insights into the limits and benefits of using metaphors to promote ideas for urban form and growth. For now, the SGG is effectively a digital map of opportunities for enhancing connectivity across the region. It is a complex and layered matrix, integrating many factors. While a dense, messy but rich, connectivity registers clearly in these maps, specific landscape elements and systems do not. Extending the grid metaphor to articulate clearly a robust hierarchy and logic of elements, for example identifying main green 'streets' and hubs of green, would enhance the legibility of the SGG as well as the experience and appreciation of connectivity across the metropolitan region. In the same vein, the SGG presents an opportunity to celebrate and acknowledge the legacy of the PSCC and the SROP, and to demonstrate how the SGG leverages and builds on the significant and already existing elements of regional green infrastructure across the Sydney metropolitan region.

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