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Stormwater Management Authority

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Mr John Stimson
Presiding Member
Planning System Implementation Review
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Dear John

Deputation and submission to the Planning System Implementation Review

The Stormwater Management Authority (the Authority) is pleased to provide this submission to the Expert Panel for the Planning System Implementation Review (the Panel).

The Authority's interest in the planning system review relates principally to the impact that development (especially infill development) can have on the performance of the stormwater drainage system, increasing flood risk and environmental pollution. However, the Authority also recognises that stormwater is an underutilised resource which can play a role in furthering other planning system objectives relating to tree canopy cover, public open space and urban amenity.

This submission has been formulated to provide the Panel with a brief background on the Authority and stormwater management issues and challenges, and to respond to the Panel's recent discussion papers. Attached, and integral to this submission, is a one-page 'placemat' highlighting the importance of an effective planning system for stormwater management.

The Stormwater Management Authority

The Authority is established pursuant to the *Local Government Act 1999* in a spirit of partnership between state and local government. The Authority is comprised of a board of (currently) nine-members appointed by the Minister for Climate, Environment and Water, and includes nominees of the Local Government Association (LGA) of South Australia.

The Authority acts as a state-wide planning and prioritisation body for stormwater management; and promotes the management of stormwater in a way that delivers multiple benefits including flood protection, public amenity, healthy waterways and healthy coasts.

A priority for the Authority is providing financial, technical and policy support for the development of stormwater management plans (SMPs) by local government authorities. In this, the Authority is guided by its *Stormwater Management Planning Priorities for South Australia 2022*.[1]

[1] https://www.sma.sa.gov.au/wp-content/uploads/Stormwater-Management-Planning-Priorities-2022.pdf

Key stormwater management issues

Managing stormwater in cities and towns is critical for economic prosperity and the health, safety and wellbeing of communities:

- Flooding is the most economically damaging natural hazard in South Australia; between 1967 and 2013, flood events resulted in average annual losses of around $48 million (2013 dollars) and represented a significant proportion of all natural disasters in the state.[2]
- Untreated stormwater runoff from urban areas can be detrimental to the health of creeks, rivers, lakes, estuaries and coastal waters. The impact of stormwater borne pollutants on coastal seagrasses, for example, is well documented.[3]
- Urban stormwater is increasingly part of a diverse and secure water supply. Stormwater represents an under-utilised resource that can displace higher-valued sources of water for active and passive irrigation and industrial uses.
- There are strong synergies between stormwater management and the urban form. Effective stormwater management can promote positive outcomes for public and private open space, urban heat effects, urban amenity and community health and wellbeing.

Key stormwater management challenges

The Panel will already be familiar with many of the challenges facing stormwater management, as they are common to many aspects of urban planning and design. There is therefore no intent to address these in detail, other than to summarise that:

- Urban growth and densification contribute to the increasing imperviousness of catchments.[4] There is a direct correlation between imperviousness and stormwater peak flow rates. This has a significant impact on both the rate and volume of stormwater discharged to the built and natural drainage systems, the level of service provided by existing and new drainage systems, and the quality of stormwater discharges to receiving waters such as the Gulf St Vincent, which in turn impact on the health of our coastal systems.
- Climate change predictions for the south-east of Australia include sea level rise, an increase in the intensity of extreme rainfall events, and changes in rainfall seasonality with implications for the level of service provided by existing drainage infrastructure.[5]
- Significant costs to replace ageing infrastructure are on the horizon.[6] With construction of drainage infrastructure in Adelaide beginning in earnest in the 1930s and peaking in the 1960s, the Authority is aware that significant asset renewals will be required in coming decades and that, far from being 'like for like', these assets will need to provide a higher level of service to account for urban growth, climate change and contemporary community attitudes and expectations for environmental benefits and performance.

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[2] Handmer, J, Ladds, M & Magee, L (2018), 'Updating the costs of disasters in Australia', *Australian Journal of Emergency Management*, vol. 33, no. 2, <https://knowledge.aidr.org.au/resources/ajem-apr-2018-updating-the-costs-of-disasters-in-australia/>

[3] Environment Protection Authority (2013), *Adelaide Coastal Water Quality Improvement Plan (ACWQIP)*, <https://www.epa.sa.gov.au/files/477449_acwqip_final.pdf>

[4] Myers, B, Pezzaniti, D & Kemp, D (2018), *The impact of infill development and WSUD measures on minor drainage system* performance, University of South Australia, <https://www.sma.sa.gov.au/wp-content/uploads/2018/07/ImpactInfillDevelopmentMinorDrainageSystem_WEB.pdf>

[5] Westra, S, Leonard, M and Bennett, B (2018), *Accounting for climate change in the management and development of South Australia's stormwater infrastructure*, report prepared for Stormwater Management Authority<https://www.sma.sa.gov.au/wp-content/uploads/2018/07/AccountingForClimateSAStormwaterInfrastructure_WEB.pdf>

[6] Thomas, A (2018), *Adelaide metropolitan areas stormwater infrastructure valuation review*, report prepared for Stormwater Management Authority

Planning, Development and Infrastructure Act 2016 Reform Options

The Authority concurs with the Panel's view that the lack of uptake of the provisions for infrastructure schemes are "likely a consequence of the complexity of infrastructure schemes" and that "...in their current form [schemes] may be deemed too difficult to work with, thus resulting in them not being effectively utilised".[7]

The Authority would likely be supportive of any recommendations of the Panel aimed at:

- Simplifying the administration of and/or increasing the uptake of 'basic infrastructure schemes'; and,
- Taking the necessary steps to activate the 'general infrastructure schemes' provisions of the *Planning, Design and Infrastructure Act 2016*, with the supporting framework to facilitate a wide uptake of the schemes.

Planning and Design Code Reform Options

Infill development policies

The Authority appreciates the efforts made by the State Planning Commission to incorporate water sensitive urban design (WSUD) practices as deemed-to-satisfy (DTS) provisions relating to infill development in the Planning and Design Code.

The Authority's view (which was previously conveyed to the Commission) is that, for smaller allotments especially, the DTS provisions could be made more effective. For allotments of less than 200m^2, the requirement to connect a rainwater tank to a single fixture only means that stormwater use (and hence drawdown of the tank) is minimal. This results in the tank being full or nearly full at the commencement of most 'minor' rainfall events (e.g., rainfall events that occur on average about once in five years or more often) offering no reduction in site peak runoff. Furthermore, this single connection limits the potential for homeowners to realise cost savings by utilising stormwater in the home in place of mains water.[8] The Authority does not agree that plumbing more than one connection point adds significantly to the cost of construction, as plumbing to these additional points is required in any case regardless of the source of the water conveyed (mains or recycled).

Notwithstanding the above, anecdotal evidence suggests that the level of compliance with respect to both installing on-allotment rainwater tanks, and leaving them connected, is low. Effort may be better directed at broadening the range of DTS provisions available in the Code, for example, through permeable paving for driveways or larger areas of soft landscaping. Such measures aim to reduce the volume of stormwater generated on-allotment rather than just limiting its flow rate from the allotment.

The Authority notes the Panel's assessment that:

> *it is difficult to analyse the success of residential infill policies in our neighbourhoods at this early stage… it will be necessary for further time to pass before substantive data is available evidencing how effectively the infill policies are working.*[9]

[7] https://plan.sa.gov.au/__data/assets/pdf_file/0011/1125002/Discussion-Paper-PDI-Act.pdf, p.34

[8] BDO Econsearch 2020, *Costs and benefits of stormwater management options for minor infill development in the Planning and Design Code*, report prepared for Attorney-General's Department, <https://plan.sa.gov.au/__data/assets/pdf_file/0007/730744/Options_Analysis_-_Costs_and_Benefits_of_Stormwater_Management_Options_for_Minor_Infill_Development.pdf>

[9] https://plan.sa.gov.au/__data/assets/pdf_file/0012/1125003/Discussion-Paper-Planning-and-Design-Code.pdf, p.52

While the Authority appreciates that the Code has only been fully operational for 18-months or so, infill housing has been occurring across Adelaide for in excess of three decades. It is the Authority's view that experience of good policy is available, and that it requires implementation as a matter of urgency, because it is likely that the full impacts on infill-driven increases in catchment imperviousness have not yet been realised. There is already evidence of a substantial reduction in the performance of minor drainage systems in some parts of Adelaide as a result of infill development.[10,11] Coupled with the future impacts of climate change, we may well expect urban flash flooding to become more frequent and extreme in the future.

The Authority also notes the Panel's comment that "infill development does not necessarily need to be provided only through narrow, typically detached, often abutting housing". [12] It is the Authority's observation that this description characterises the vast majority of infill development constructed across metropolitan Adelaide in the last decade. This form of development rarely provides for good stormwater management outcomes.

In terms of better stormwater management outcomes, therefore, the Authority has an interest in exploring alternative forms of infill development (as suggested by the Panel) but cautions that there is a limit to what can practically be achieved on increasingly smaller allotments. The Panel's comments that "allotments far smaller than 200m^2 can accommodate a range of housing types…"[13] may be true, but small lots with building typologies that necessitate extensive site coverage are invariably associated with very high rates of imperviousness that has implications for stormwater runoff that need to be managed, while simultaneously reducing the space to do so. Research conducted in western Sydney shows a strong correlation between lot size and directly connected impervious area (Figure 1).

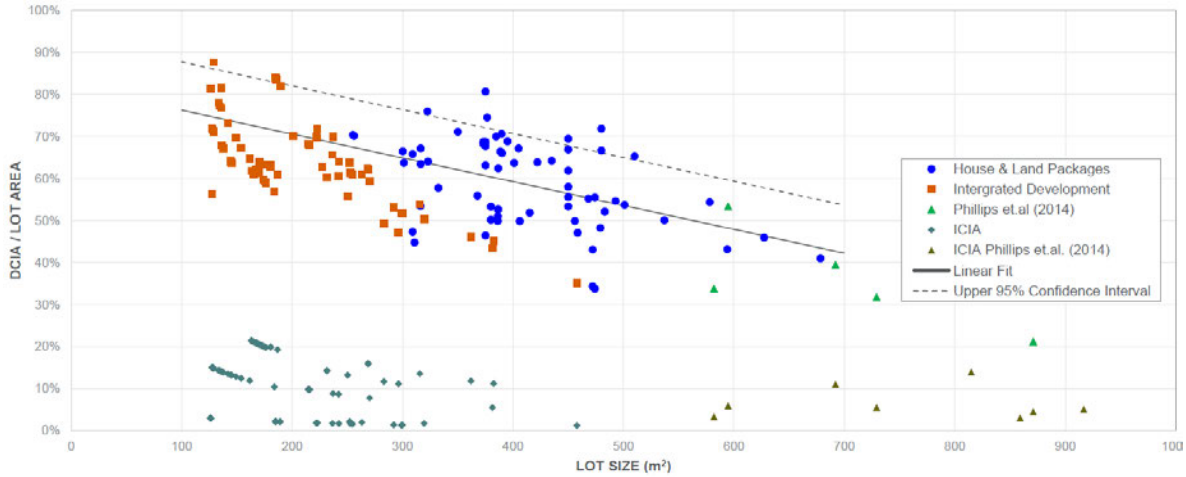

Figure 1: Allotment area vs directly connected impervious area (DCIA)[14] as a proportion of allotment area in western Sydney.[15]

[10] Myers et al.

[11] https://www.charlessturt.sa.gov.au/council/news-and-media/latest-news/2022/statement-following-the-recent-flooding-event

[12] https://plan.sa.gov.au/__data/assets/pdf_file/0012/1125003/Discussion-Paper-Planning-and-Design-Code.pdf, p.55

[13] ibid, p.55

[14] The directly connected impervious area (DCIA) includes only impervious area which drains directly to the stormwater drainage network via pipes and gutters. The total impervious area of a site also includes indirectly connected impervious areas (footpaths, garden sheds etc) and is therefore higher than the DCIA.

[15] Gribble, S (2018), *Directly connected impervious area in residential subdivisions in western Sydney*, Stormwater 2018 Conference, <https://stormwater2018.files.wordpress.com/2018/10/gribble-directly-connected-impervious-areas-in-residential-subdivisions-in-western-sydney.pdf>

Potential for a stormwater management offset scheme

Finding solutions to the problem of infill-driven increases in stormwater runoff rates and volumes requires a combination of both on-site and off-site measures. There is a view among some practitioners that managing stormwater off-site can provide a better community outcome. While there are practical limits to how far solutions to stormwater management problems can be 'offset' from their source, the Panel may wish to explore the feasibility of an offset scheme for stormwater management. An offset scheme could provide resources for off-site stormwater works and measures in circumstances where on-site solutions are genuinely not viable. Such a scheme would need to be carefully designed to ensure that:

- The offset payment represented an impost that was fair and proportionate, but not so low as to become a default mechanism for avoiding viable alternative courses of action
- The scheme was able to raise a meaningful level of capital to support activities such as land acquisition which can be very costly
- The schemes resources were quarantined for their intended purpose.

Spatial overlays and flood hazard information

A single online planning portal requires spatial information that is consistent, current and authoritative. Historically, SMPs have been the genesis of the majority of flood hazard information available in South Australia. The Authority recently commissioned Ms Simone Fogarty to undertake research and provide advice as to how SMPs could be better integrated with (and utilised within) the planning system.

In her draft report, Ms Fogarty noted that some of the features of "more successful integration [of stormwater management] with planning systems" included:

> *A lead agency/organisation responsible for coordination, collaboration, and collation of information* [and] *an agency/organisation that works with the planning system to provide evidence-based advice on mapping and technical standards, as well as provide location specific advice feeding into strategic plans, infrastructure projects and assessment policy.*[16]

Noting that flood hazard information is currently acquired by a myriad of local and state government authorities, the Panel may wish to touch on roles and responsibilities and what can be learned from the concluding Flood Hazard Mapping and Assessment Project[17] in terms of the ability of a state agency (that does not necessarily need to be the planning agency) to take a lead in producing flood hazard information that is consistent, accurate and timely. Ms Fogarty goes on to say:

> *The introduction of the [Planning and Design] Code highlighted that floodplain mapping is not consistently available. This is a critical issue for integration with the planning system which relies on spatial delineation of issues in order to apply different policy and procedure.*
>
> *It is unclear how this information will be managed longer term and how it will be updated, although the Code relies on this information so there is a need to resolve these issues.*[18]

It is the Authority's view that the ongoing acquisition and maintenance of flood hazard information is an issue to resolve for the benefit of the planning system.

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[16] Fogarty, S (2022), *Integrating Stormwater Management and the Planning System: Findings report*, draft report prepared for the Stormwater Management Authority, p.1

[17] https://plan.sa.gov.au/__data/assets/pdf_file/0020/1002368/Flood_hazard_mapping_and_assessment_project_-_Brochure.pdf

[18] Fogarty, p.8

Other matters

The Authority would like to bring some other matters to the attention of the Panel, acknowledging that they are not planning matters, but occur at the interface of planning and other functions of government:

- Public and commercial car parks 'at grade', in most cases, drain stormwater away from paved surfaces directly into drains. Through simple design choices relating to gradients and levels, it is often possible to divert stormwater to passively irrigate landscaped areas which can provide a cooling and shading benefit. The planning system could promulgate better design guidance for car parks.
- The Authority is aware of instances of owners of new developments being unable to obtain flood insurance. This highlights the importance of current and accessible flood hazard information (like Code spatial overlays) to assist owners (and potential owners) to understand their level of flood risk and insurability.

On a concluding note, the Panel will be consciously aware of the severe flooding being experienced across south-eastern Australia. While the planning system is not able to control natural events such as these, the experience from NSW in particular indicates that the planning system has a role in mitigating the impacts of such events on communities.[19]

Thank you for the opportunity to provide this submission and make a deputation to the Panel. If you have any queries, please contact the General Manager, Mr David Trebilcock, on telephone [redacted] or email [redacted].

Yours sincerely

[redacted]

Shanti Ditter
PRESIDING MEMBER

Date: 28 November 2022

Attachments:

1 *Planning for Better Stormwater Management*

[19] O'Kane, M and Fuller, M (2022), *2022 Flood Inquiry. Volume Two: Full report*, https://www.nsw.gov.au/sites/default/files/noindex/2022-08/VOLUME_TWO_Full%20report.pdf

Planning for Better Stormwater Management

Stormwater *is water that runs off the land, or structures on the land. As it moves through the landscape, stormwater collects material (**pollutants**) that become dissolved (soluble) or suspended (insoluble).*

*The system of drainage in cities and towns provides a **utility service**. The system is a complex **network** of **natural** and **constructed** features with many different owners and operators.*

*The prevalence of hard '**impervious**' surfaces in urban areas generates **more runoff** and higher stormwater volumes and discharges.*

Case Study: Lightsview

Lightsview is arguably Adelaide's greenest infill suburb. Lightsview is a living demonstration that good design encompasses more than building facades. Factors such as layout, orientation, aspect, frontage, adjacency, slope and elevation can work in synergy and have a critical influence on liveability and sustainability.

The developers of Lightsview placed 'people' and 'place-making' at the centre of its design. Lightsview's sustainable stormwater management practices achieve a high-density style of development without sacrificing flood protection or amenity. Stormwater is used to support a vast network of healthy street trees and grassy verges that will continue to mitigate heat and create an attractive streetscape for many generations to come.

9/10 South Australians live in towns and cities of 1000 people or more[1]

Average annual losses from flooding in SA, the state's costliest natural hazard[2] **$48m**

50,000 Buildings in Greater Adelaide at risk in a 1% annual exceedance probability flood[3]

Condition of sea grass communities off SA's coasts[4] **POOR**

135GL Stormwater discharged annually to Gulf St Vincent[5]

Estimated increase in Adelaide's water use to achieve canopy cover target in 30-Year Plan[6] **10-30%**

Estimated increase in flash-flood producing short-duration rainfall intensity of

10%

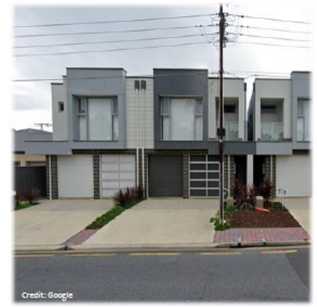
per 1°C of global-warming[7]

168,000

developable land parcels in Greater Adelaide[8]

Planning and development cannot be blamed for every stormwater management problem, but land use planning remains the single most effective tool for mitigating flooding and reducing water quality impacts.

Case Study: Impact of Infill Development on Drainage Systems



While infill development has potential benefits, it can be problematic for stormwater management. Infill development results in a gross increase in allotment impervious area, increasing both the *volume* and *rate* of stormwater runoff. At the same time, this denser form of development is usually associated with a reduction in space available (above and below ground) for stormwater management measures such as detention, retention and infiltration.

In older, established suburbs of Adelaide, the stormwater drainage system was not designed to cater for the volumes and rates of runoff generated as a result of infill-driven increases in imperviousness. A study of one Glenelg catchment (which experienced a 60% increase in impervious area between 1959 and 2013) identified that the minor (underground) drainage system, originally designed with a capacity to convey a 5-year average recurrence interval (ARI) storm now provides a level of service of less than a 2-year ARI storm. As a consequence, there is more regular stormwater flows above ground and over roadways.

Tackling increased runoff from infill development will require a range of both on-site and off-site measures, and in some cases, accepting the inconvenience of more frequent minor flooding. Installing larger stormwater pipes is not always practical; in many places there is simply no more available space under roads, and increasing discharges to the environment can exacerbate environmental impacts.

Case Study: Flood Hazard Mapping and Assessment Project

A centrally managed online planning system requires current, accurate and authoritative information on natural hazards which is difficult to achieve through a piecemeal approach.

The Flood Hazard Mapping and Assessment Project was initiated by Planning and Land Use Services (PLUS) to improve the coverage of flood hazard information in Planning and Design Code spatial overlays. The Project has demonstrated the advantages of an approach that is state lead but collaborative to:

- Improve the consistency of natural hazard information
- Coordinate across a large number of stormwater network owners and operators
- Achieve efficiencies of scale in the data acquisition, processing, storage, and subsequent Code amendments.

1 – ABS Census 2016; 2 – Handmer, Ladds and Magee (2018) in Australian Journal of Emergency Management ; 3 – State Flood Hazard Plan; 4 - South Australian Trend and Condition Report Cards 2020; 5&6 – Urban Water Directions Statement; 7 – Westra, Leonard and Bennett (2018) for the Stormwater Management Authority; 8 – Land Supply Report for Greater Adelaide.

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