MONASH University

INTEGRATED WATER CYCLE MANAGEMENT (IWCM)

This Submission is in response to the Productivity Commission's Issues Paper on *National Water Reform*, May 2020 (*Issues Paper*), which is part of the Commission's National Water Inquiry

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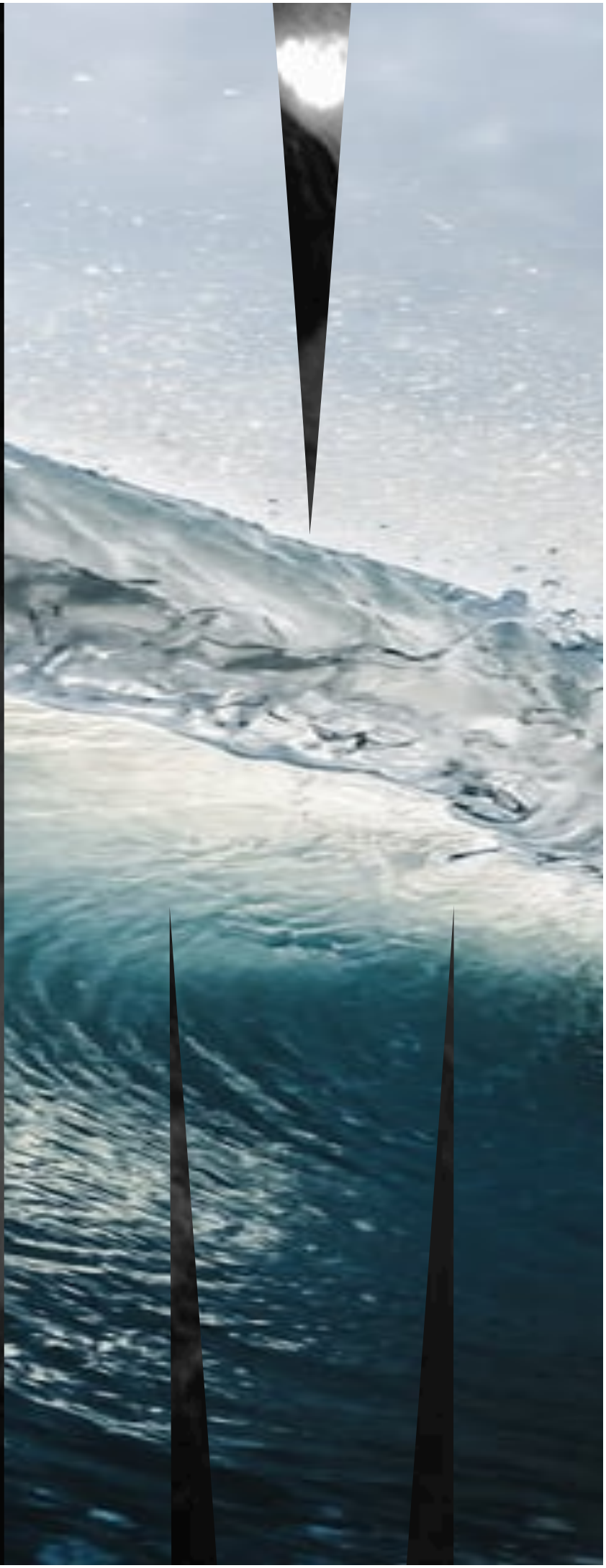

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1. INTRODUCTION

This Submission is in response to the Productivity Commission's Issues Paper on *National Water Reform*, May 2020 (*Issues Paper*), which is part of the Commission's National Water Inquiry. The main focus of this submission is on what the Commission refers to as *Integrated Water Cycle Management.*

Within this context, the Productivity Commission's special report on Integrated Water Cycle Management in March 2020 [1] noted that there are ten major impediments to the implementation of IWM in Australia, in the areas of

- policy environment;
- water services planning and delivery; and
- the regulatory environment.

This Submission recommends a framework of principles for IWM processes that will address the ten impediments identified in the PC Report. In addition, the Submission identifies some further impediments or challenges in the areas of:

- Community engagement and education
- Leadership and capacity
- Recognising Aboriginal values

Integrated Water Cycle Management (IWCM) is a relatively small part of the Water Services section of the Issues Paper. We note however that, by its very nature, IWCM is inter-related with matters raised in other sections of the *Issues Paper*, including parts of Water Entitlements and Planning; Environmental Water Management; Indigenous Water Use; and other parts of the Water Services section. These inter-connections are also addressed in this Submission.

The Submission presents a high-level overview of these issues. MSDI would welcome the opportunity to provide more details on these matters if the Commission wishes to pursue them further in the course of their enquiry.

2. A FRAMEWORK FOR THE PRINCIPLES UNDERPINNING IWM

Climate change and rapid population growth are challenging the liveability and resilience of Australian cities. To maximize the role that water can play in addressing these challenges the Water Services Association of Australia (WSAA) has said that "the next big gains for the water industry are likely to come through integration - looking beyond the narrow scope of water and sewerage provision and collaborating with other sectors (eg waste, energy, local government) … where value can be leveraged for the benefit of the whole urban water environment and urban communities within which they operate".[2] In line with this sentiment, this Submission proposes the following definition of IWCM:

Integrated Water Management (IWM) is defined as a process that brings together all stakeholders involved the planning and management of all water across the entire water cycle, to ensure that the liveability, resilience and sustainability outcomes that the community is seeking are maximized across of our cities and regions.

An IWM approach:

- Is a collaborative process, "owned" by all stakeholders involved in the water cycle, from its planning to ongoing management.
- It is driven by the outcomes that meet the needs of customers and the broader community.
- Takes a whole-of-water-cycle approach to planning, with all supply and demand options on the table
- Takes into account all options related to water, wastewater and drainage services
- Takes into account the environmental, cultural, social and economic dimensions of place.
- Strategic and statutory land planning and water planning are closely integrated
- Supports a circular economy through maximizing efficiency and working towards regenerative outcomes
- Is fit for purpose and can be operationalised for different scales (e.g. catchment, region, precinct) and context (places and communities)
- Is ambitious and transformative in striving for the broader outcomes of the Sustainable Development Goals.

This definition builds on that proposed in the PC Report and further developed in the Water Services Association of Australia's (WSAA) report [3] on principles and best practice for Integrated Water Management (IWM).

Following from this definition, a six-stage framework for IWM planning is proposed:

- Stage 1: Establishing appropriate enabling environments
- Stage 2: Agreeing on IWM Outcomes
- Stage 3: Agreeing on measures and targets (for each IWM Outcome)
- Stage 4: Developing IWM options in a comprehensive and collaborative process:
- Stage 5: Evaluating options
- Stage 6: Learning and innovation through implementation.

Each of these stages is supported by a set of principles, as discussed below.

3. ESTABLISHING ENABLING ENVIRONMENT (FIRST STAGE OF IWM)

An appropriate enabling environment for IWM involves a range of social, institutional and governance factors, summarised below:

i. **Engaged and educated stakeholders and community**
- Ensuring everyone has the capacity and opportunity to participate
- Local community objectives/aspirations are understood/articulated, and all voices are heard
  Collaborative platforms and processes strengthen stakeholder relationships and establish shared visions/agendas

ii. **Leadership and capacity**
- Collective and collaborative leadership exists that drives long term vision and outcomes
  - Noting that different elements of the water cycle within catchments and systems are often managed by different organisations, and that the full buy-in of all of them to work together is necessary
- Appropriate knowledge, skills and organisational capacity
- Constructive organisational culture
  - Must be driven by leaders at the highest level

iii. **Aboriginal water values recognized and self-determined**
- Indigenous partnerships in water planning

iv. **Satisfactory institutional, policy and regulatory arrangements**
- Policy, legislation and regulations
  - all relevant instruments to be outcomes based
- Cross-sector institutional arrangements and processes clarified with shared outcomes and targets across organisations
- Public engagement, participation and transparency
- Agreed financing and funding models and mechanisms exist
  - that relate to the Outcomes in Stage 2

v. **Research to develop new evidence and solutions** to support IWM implementation.
- Practical tools to support and guide implementation

A foundational premise of IWM is that the successful achievement of on-the-ground outcomes is dependent on having all elements of the enabling environments in place. This should preferably be achieved prior to commencing subsequent stages of the IWM process, or at least be addressed during the planning process to support successful the delivery of outcomes.[4]

4. AGREEING ON IWM OUTCOMES (SECOND STAGE OF IWM)

It is necessary to clearly identify what characterises *liveability* and *resilience* for a city, town or region. And given that IWM is to be a collaborative process that is "owned" by all stakeholders involved in the water cycle, from planning to ongoing management, it is important for the Outcomes to be co-developed and agreed to by all stakeholders from the outset of the planning process. The full range of IWM stakeholders includes relevant state and local government players, as well as private sector and community representatives.

Outcomes will vary depending on particular circumstances, but a recommended *high-level framework of IWM Outcomes* is:

1. **Safe, secure and affordable water supply and sanitation**
2. **Effective drainage and flood management**
3. **Healthy waterways and water related ecosystems**
4. **Equitable access to water services and systems - leaving no one behind - supporting diverse experiences, needs and capacities**
5. **Water use efficiency and sustainable water withdrawals**
6. **Liveability and valued landscapes for health and wellbeing**
7. **Jobs, economic benefits and innovation**
8. **Maximising opportunities for net-ero greenhouse gas emissions**
9. **System wide transformations towards a circular economy**

This recommended framework is a combination of those adopted by Victoria for its IWM planning[5] and WSAA[6], and is consistent with the goals of the Water Sensitive Cities Index developed by the CRC for Water Sensitive Cities[7].

These Outcomes need to be incorporated into whole-of -government strategies and commitments as part of the work required to establish the enabling environment for IWM. The linking of Outcomes between water and planning sectors has been attempted in some jurisdictions in Australia[8], although it is made more difficult in the situation where delivering IWM Outcomes is the joint responsibility of both state and local government.[9]

Linking Outcomes to whole-of-government commitments or obligations remains one of the major challenges for IWM.

AGREEING ON MEASURES AND TARGETS FOR EACH OUTCOME (THIRD STAGE OF IWM)

Having co-developed and agreed to a particular set of outcomes it is necessary to specify the measures and targets for each outcome. Again it is important that targets are agreed to by all stakeholders as it is these measures and targets that will be used to evaluate options at later stages. For this reason it is necessary to have targets that are quantified.

Experience shows that targets can vary across a city or region to suit local or sub-catchment conditions.[10]

Again, it is desirable for targets to be enshrined in formal policy or legal instruments such as regulations (environment, health, building, financial), planning provisions or requirements, Statements of Obligations, etc. Targets that are "obligatory" in this way serve two main purposes

- They provide clarity and certainty, and therefore a foundation for the generation of innovative solutions; and
- The obligatory nature can provide a basis for developing financing and funding solution (see Section 6 below).

For IWM projects that cross a range of jurisdictions, including local government, where there might be a variety of beneficiaries and funding models, it is often necessary for stakeholders to commit at the outset to using their "best endeavours" to find funding solutions. Under these circumstances it is more important than ever to have broad stakeholder involvement in the development of outcomes and targets, and an appreciation of the range of co-benefits that an IWM project might deliver.

5. DEVELOPING IWM OPTIONS (FOURTH STAGE OF IWM)

IWM is an approach that:

- Closely integrates strategic and statutory land planning and water
- Takes a whole of water cycle approach to planning with all supply and demand options on the table
- Takes into account all options related to water, wastewater and drainage services.
- Seeks to optimise relevant agreed outcomes including healthy waterways and urban environments

Developing options to meet agreed targets therefore requires a systematic process of review, involving the consideration of:

- Whether the agreed outcomes can be achieved by non-water interventions; for example, achieving water security outcomes through alternative corridor-scale land-use plans.

- For solutions involving water service systems, ensuring that all voices are at the table, and all options are on the table (Figure 1) including:

    - **Structural** options (dams, storm water capture and re-use, etc.) as well as **non-structural** options (pricing; water conservation; regulations; regulatory offset schemes; water conservation; operating efficiencies)
    - **Centralised** and **de-centralised** options
    - A systems wide view of options development, to examine synergies and tradeoffs over a both short and long term.

Understanding and agreeing "Business as Usual",or the base-case, is an important step in developing options because it will allow the marginal benefits and beneficiaries to be identified which is important when it comes to evaluating options and allocating costs.

IWM has sometimes been categorised as involving only decentralised projects (e.g. water sensitive urban design or local recycled water projects) to complement and add only marginal value to central networked systems. In fact, IWM does include the integration of regional or sub-regional strategies with system-wide and other long-term strategies and is a major contributor to achieving system-wide outcomes.

Examples of larger scale IWM strategies include the Western Sydney Regional Master Plan[11] and the Western Melbourne Growth Corridor IWM Plan[12].

To be effective in delivering transformational solutions at a citywide scale IWM needs to be integrated into state level water planning policy and strategic frameworks. The **Victorian water-planning framework** (see Fig 2) provides for a range of strategies for different timeframes and different system opportunities. For example: the long term water resource assessment is undertaken every 15 years; the Sustainable Water Strategies every 10 years; Urban water and river health strategies undertaken every 5 years; and there are annual plans for drought response and environmental watering. This framework has served Victoria well over recent years and provided the strategic foundation for big decisions such as the Victorian desalination plant to provide additional water security for Melbourne; determining how much water should be allocated to the Yarra River for environmental flows; flood management and river health strategies; demand management programs; some local recycling schemes; and more.

By overlaying IWM on this framework, water planning can more systematically consider the broader range of IWM outcomes across all scales and, importantly, incorporate the broader range of stakeholders who are responsible for delivering some of these outcomes - namely, local government, traditional land owners, catchment management authorities, planning authorities and private developers.

Figure 2 illustrates a framework for integrating all levels of water system planning. There is also the need to integrate water planning with other sector planning, including land-use planning, where the same principles of integration should apply. This is particularly true in the case of storm water and drainage that impact on a number of the IWM Outcomes presented in section 2 above, and where planning provisions and governance are in need of review and reform. This is made more complex by the fact that it is an area that covers activities across state authorities, local government and the private sector. Most states can provide examples of where such reviews and reform are already occurring[13]**, but this should remain a priority area for the Commission's current review.**

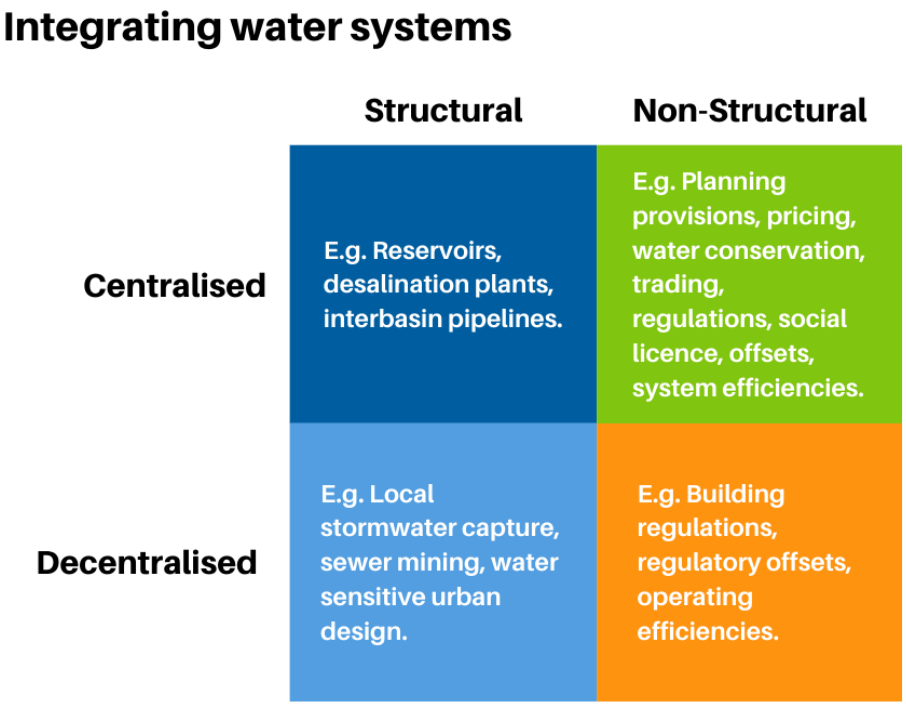

Figure 1. Matrix of options - a framework for scanning possible IWM options.

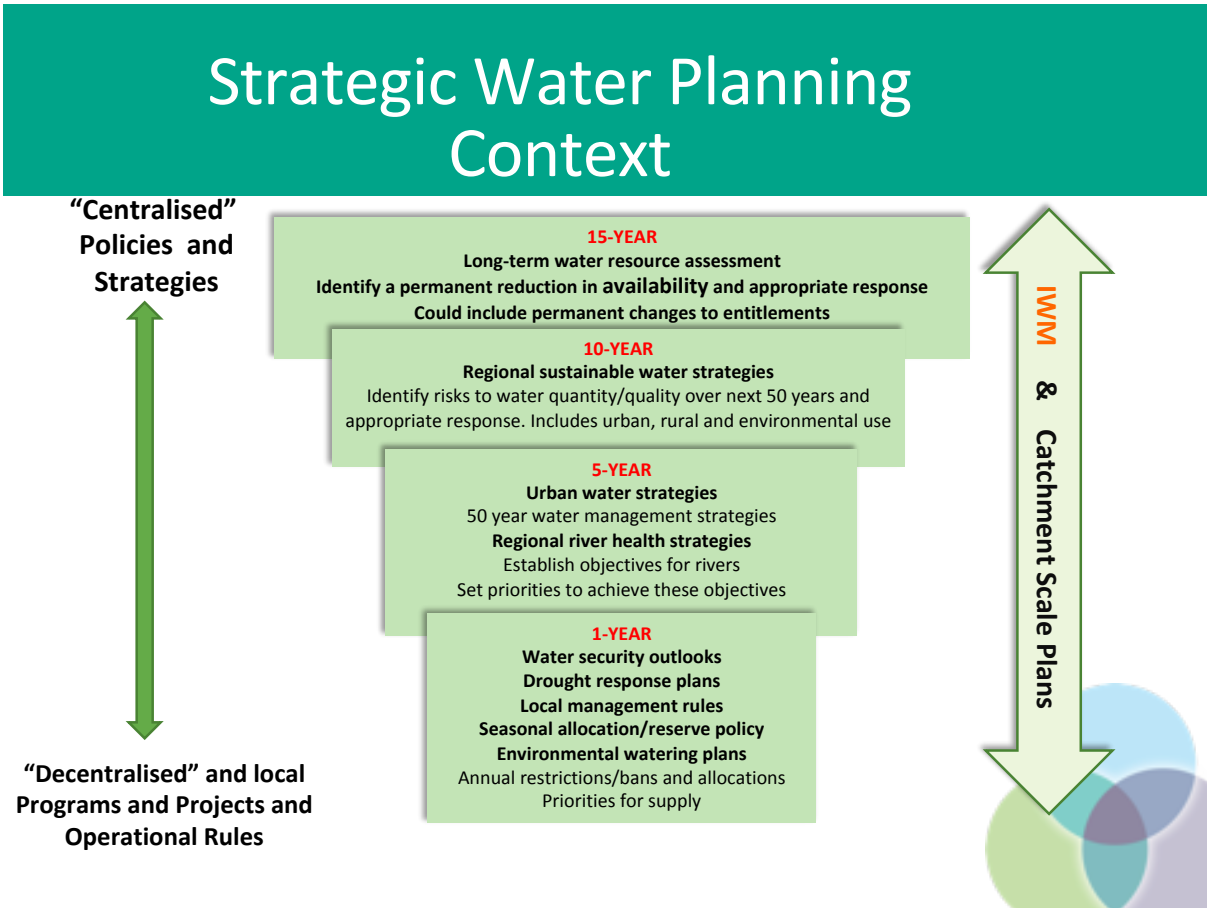

Fig 2. The Victorian water planning framework (DELWP)

6. EVALUATION, FINACING AND FUNDING OF OPTIONS (FIFTH STAGE OF IWM)

Assessment of Options

The essential first step of any IWM evaluation is to assess options according to the agreed outcomes and quantified targets (in Section 5 above), in as rigorous and transparent way possible. These assessments need to consider a whole-of-life perspective.

An important question is how to ensure robust decision pathways that are also flexible and adaptive in order to effectively account for uncertain futures over time. This involves appropriate governance and procedures with capacity to ensure:

- Planning processes embrace a 'no-regrets' mindset from the outset.
- All options are considered and attributed value, based on their ability to cope with a range of possible scenarios – rather than the most likely scenario.
- Short and long term needs are balanced
- An approach and mindset that sees a willing and transparent sharing of knowledge between stakeholders as part of the planning process[14].

Evaluation of options

The ultimate aim of a project evaluation is to direct investment to the highest value option that considers all benefits and costs over the life of the project, including externalities and non-market values of water services.

At a high level, an economic evaluation suitable for the complexities of IWM projects should incorporate the following principles[15]

- Capability to account for the value of all direct and indirect benefits and costs associated with the water-related IWM Outcomes.
- Whole-of-life-cycle assessment – including capital and operating and maintenance costs over the life of the project, as well as costs, risks and benefits for the broader system.
- Values the use of all resources – water, energy and waste in the circular economy.
- Incorporates a mechanism to identify appropriate funding sources, recognising the variety of costs and benefits and variety of stakeholders.

With agreed Outcomes and Targets at the centre of the IWM process, attributing value to the full range of liveability and resilience dimensions of IWM is a *relatively* straightforward process. However, clarifying responsibilities for financing and funding of IWM projects is more complex!

Financing and Funding of Options

Financing is about whom, at the outset, raises the cash for a project. This can be one of, or a combination of, water utilities, local government, commonwealth and state government or private sector. On the other hand, f*unding* is about who ultimately pays for it over the long term – a water utility's customers, council rate-payers, government taxpayers, or the users.[16]

For projects sponsored by water utilities that deliver regulated water services, financing can be from revenue derived from water utility customers. In these cases the ongoing funding is covered through the utility's prices approved by the pricing regulator.

However, for IWM projects that are aimed at delivering a wider range of benefits such as urban amenity and wellbeing outcomes across the community, determining and agreeing on appropriate financing and funding arrangements is more challenging. Such IWM projects often propose innovative investments that provide multiple benefits to many different entities including: developers; water corporations and their customers; new householders; the local environment (and community); waterway managers; and local government.

In these circumstances, water utilities have the ability to recover costs by a number of means including charges that apply to all customers; charges that apply to a subset of customers where service levels differ; or through capital contributions by developers on behalf of new customers. Local government can use rates to recover costs for IWM projects where benefits accrue to citizens in their municipality generally, or special purpose schemes for more targeted outcomes[17]

Mapping the various parties who benefit and those who can potentially finance and fund a project - and subsequently negotiating and agreeing financing and funding responsibilities - is assisted by a cost allocation framework of the sort outlined by DELWP. The *challenge can be to gain* agreement between parties to the levels of contributions or cost shares, and agreeing on the subsequent mechanism for transfers between parties. Mechanisms by which these transfers can be facilitated include the creation of **separate entities** to manage

a new function funded by different parties, according to the scale of their benefit; **developer charges**; and **value capture** instruments that levy beneficiaries according to the portion of value of the project they receivein practice. But the process will ultimately be one of negotiation by parties informed by data developed in the earlier stages of the IWM process.

If the outcome targets are mandatory, pursuant to policy or statuary planning requirements (eg Vic EPA's Best Practice Environmental Management Guidelines or other legal requirements) the costs of achieving the outcomes can be passed on to customers, ratepayers or through state taxes, whichever is applicable.

Having outcomes enshrined as obligations also provides the market with *certainty* that in turn provides the environment for innovation in both the public and private sector. Innovation will emerge in the range of *solutions* that are explored (structural and non-structural solutions) and *financing options* (eg outcome focused grants, incentive payments, green and social impact bonds, private equity investments, crowd funding, to name just a few).

If the outcome targets are *not mandated* there is an even bigger need for IWM collaborative agreements between parties to embed "*best endeavors"* to finding appropriate arrangements for financing and funding. In many IWM projects there are co-benefits to be gained for different customer groups - for example, water utility customers will benefit from IWM projects that deliver effective and efficient water security, whereas the IWM benefits of urban amenity improvements (eg. less urban heat impacts) will be enjoyed by all local government residents, whether they be utility customers of not.

In many cases, stakeholders will come to appreciate in the early stages of the IWM process that the co-benefits are significant but would not be generated in the absence of the IWM process. This appreciation can lead to parties committing to using their best endeavours to finding innovative financing and funding solutions.

Much of the planning and financing and funding complexity described in this Submission is a result of different components of the water services systems being planned by different agencies - or by different arms of the same agency being responsible for different service or regulatory obligations. IWM provides an opportunity to develop what might be referred to as Integrated Water Service Schemes (IWSS)[18] that would adopt a whole-of- government perspective to integrated water services planning at a sub catchment or catchment level. It would aim to bridge existing silos by "master planning" whole-of-water-cycle options for all IWM Outcomes, simultaneously.

This would require a reimagining of current institutional arrangements to ensure that the six stages of IWM planning discussed here, and the principles enunciated within them, are the strategic drivers of the planning process.

It is understood that a concept such as this is being presented in more detail by the CRC for Water Sensitive Cities in its submission to this Review. **MSDI recommends that the Commission consider incorporating the concept of IWSSs in its ongoing review for the National Water inquiry.**

Finally, what cannot be avoided in any discussion of financing and funding of IWM, is the reality that some of the critical outcomes of Integrated Water Management, such as valued landscapes and green corridors, are public goods. These are features of liveability that society values and which general members public cannot (or should not) be excluded from enjoying. There may be shortfalls in funding these outcomes that cannot be captured by traditional market mechanisms. This is where governments can resolve the problem by

either mandating outcomes through land use planning regulations or providing funding subsidies.

The extent of public sector subsidy needed to cover any financing and funding gaps can be addressed in a transparent way through cost allocation methodologies[19]. There is nothing unusual about governments providing funding for public goods and the IWM planning process described here will provide clear evidence of the Outcomes that citizens value highly and for which additional funding may be justified, on a case by case basis.

8. INNOVATION AND LEARNING THROUGH IMPLEMENTATION

IWM is an emerging practice. While there have been significant inroads in establishing effective policy frameworks in some jurisdictions, and IWM strategies are becoming more common, there is still much to be learned in how to effectively and efficiently implement IWM solutions. For example, the integration of centralised and decentralised solutions requires technical and governance innovation to ensure their system-level performance can be assured.

As such, it is important for organisations to recognise the need to invest in innovation and learning – through research and development, funding small and large-scale demonstrations, longitudinal monitoring and evaluation, reflecting on successes and failures among project participants, and sharing knowledge widely to advance IWM practice across Australian cities, towns and regions.

This commitment to learning will help further identify implementation barriers, as well as effective strategies and actions to overcome them. It will also be critical for IWM planning to be adaptive so it can respond flexibly to changing circumstances while maintaining focus on the agreed IWM Outcomes.

FOLLOW-UP CONTACT

This submission has been prepared by MSDI Water - a unit of the Monash Sustainable Development Institute. Enquiries regarding this submission can be directed to the Director of MSDI Water, Briony Rogers or Rob Skinner

REFERENCES

[1] Productivity Commission, 2020, *Integrated Water Cycle Management, Why a good idea*
[2] Water Services Association of Australia, 2017, *Next Gen Urban Water – the role of water in vibrant and prosperous communities, Occasional Paper 32*
[3] Skinner, R and Satur, P, 2020, Integrated Water Management: Principles and best practice for water utilities, Summary paper, prepared for the Water Services Association of Australia by Monash Sustainable Development Institute, Monash University, Melbourne
[4] *ibid*
[5] DELWP, 2017, *Integrated Water Management Framework for Victoria, an IWM approach to urban water planning and shared decision making throughout Victoria.*
[6] Skinner, R and Satur, P, Op. cit
[7] CRC Water Sensitive Cities, https://watersensitivecities.org.au/solutions/wsc-index/

[8] Examples include a) the explicit IWM link between the Victorian government's *Water for Victoria* strategy and the *Plan Melbourne* strategy documents and b) the linking of the Greater Sydney Commission's vision for a *Western Parkland City* and Sydney Water's *Western Sydney Regional Master Plan*.
[9] See CRC WSC White Gum Valley Case Study for example of where the success of the project was assisted by local government and state government vision and outcomes being highly aligned
[10] See for example Melbourne Water, 2018, *River Health Strategy* and DELWP, 2020, *Catchment Scale IWM Plans*
[11] Western Sydney Regional Master Plan in DELWP, 2018, Werribee Strategic Directions Strategy
[12] Western Melbourne Growth Corridor IWM Plan
[13] *see, for example* - DELWP, 2018, *Improving Stormwater Management Advisory Committee Final Report*. The committee recommended that the government consider changing the Victorian Planning Provisions to establish consistent stormwater planning requirements across all development types. It also recommended comprehensive suite of actions to planning system including:

- amending building and plumbing controls
- establishing effective offsetting arrangements
- clarifying the roles and responsibilities of local governments and water authorities
- strengthening compliance requirements
- determining funding sources for public stormwater infrastructure
- linking water management with urban planning
- setting stronger, place-based Best Practice Environmental Management guidelines for stormwater.

See also - McIraith, B. and Williams, D. 2015, *Policy Frameworks for WSUD in Five Australian Cities*, CRC Water Sensitive Cities.
[14] WSAA, 2020, *Adaptive Planning Pathways and Methods,*
[15] The CRC Water Sensitive Cities has developed a comprehensive IWM evaluation tool at https://watersensitivecities.org.au/content/benefit-cost-analysis-and-strategic-decision-making-for-water-sensitive-cities/

[16] Much of this section of the Submission draws from two documents in particular:

- DELWP (2017), *A cost allocation framework for IWM*
- Marsden and Jacobs, 2019, *IWM Financing and Funding*, Discussion paper

[17] Marsden and Jacobs, 2015, *Implementing stormwater treatment projects in Kinsgston,* draft report.

[18] Chesterfield, C and Tawfik, S, *Framework for Integrated Water and Urban Planning*, draft report, CRC for Water Sensitive Cities, 2020 (unpublished).

[19] DELWP (2017), *A cost allocation framework for IWM*