



CRC for
Water Sensitive Cities

REPORT: Project A3.2. Better Regulatory Frameworks For Water Sensitive Cities

Conceptualising Urban Water Regulation – The Melbourne System



CRC for
Water Sensitive Cities

www.watersensitivecities.org.au

Email: admin@crcwsc.org.au
Telephone: +61 3 9905 9709
GF 103, Bldg 75, Monash University
Clayton, Victoria, Australia



An Australian Government Initiative





Report: Project A3.2

Better Regulatory Frameworks For Water Sensitive Cities

Conceptualising Urban Water Regulation – The Melbourne System

Author

Tara McCallum
Centre for Regulatory Studies, Monash University

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The Better Regulatory Frameworks for Water Sensitive Cities Project Team

Professor Graeme Hodge, Associate Professor Pamela O'Connor, Emeritus Professor Arie Freiberg, Associate Professor Alex Gardner, Dr Ruth Lane, Dr Edwyna Harris, Dariel deSousa and Tara McCallum. Professor Brian Head also leads the Governance and Regulation project overall. The assistance of the various team members in the development of this report is acknowledged.

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Cooperative Research Centre for Water Sensitive Cities
Building 75, Clayton Campus
Monash University
Clayton, VIC 3800
p. +61 3 9905 9709
e. admin@crcwsc.org.au
w. www.watersensitivecities.org.au

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Table of Abbreviations

ABBREVIATION	FULL REFERENCE
ADWG	Australian Drinking Water Guidelines
AGWR	Australian Guidelines on Water Recycling
BCA	Building Code of Australia
Berlin Rules	Berlin Rules on Water Resources
BPEM Guidelines	Best Practice Environmental Management Guidelines
BRF	Better Regulatory Frameworks
Building Act	<i>Building Act 1993 (Vic)</i>
Building Regs	Building Regulations 2006 (Vic)
CCA	<i>Competition and Consumer Act 2010 (Cth)</i>
CLPA	<i>Catchment and Land Protection Act 1994 (Vic)</i>
CRC	Cooperative Research Centre for Water Sensitive Cities
DEPI	Department of Environment and Primary Industries
DOH	Department of Health
DTPLI	Department of Transport, Planning and Local Infrastructure
EPA	Environment Protection Authority
Environment Protection Act	<i>Environment Protection Act 1970 (Vic)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
ESC	Essential Services Commission
ESC Act	<i>Essential Services Commission Act 2001 (Vic)</i>
EWOV	Energy and Water Ombudsman Victoria
HEMP	Health and Environment Management Plan
IWCM	Integrated Water Cycle Management
Monitoring Guidelines	Australian Guidelines on Water Quality Monitoring and Reporting
NCC	National Construction Code
NRMC	Natural Resource Management Council

ABBREVIATION	FULL REFERENCE
NWC	National Water Commission
NWI	National Water Initiative
NWQMS	National Water Quality Management Strategy
OLV	Office of Living Victoria
P&E Act	<i>Planning And Environment Act 1987 (Vic)</i>
Plumbing Regs	Plumbing Regulations 2005 (Vic)
PPWCMA	Port Phillip and Westernport Catchment Management Authority
RWQMP	Recycled Water Quality Management Plan
SCEW	Standing Council on Environment and Water
SEPPs	State Environment Protection Policies
SEPP (GoV)	State Environment Protection Policy (Groundwaters of Victoria)
SEPP (WoV)	State Environment Protection Policy (Waters of Victoria)
SoO	Statement of Obligations
VPPs	Victorian Planning Provisions
Water Act	<i>Water Act 1989 (Vic)</i>
Water Bill	The Water Bill Exposure Draft released by the Victorian Government in December 2013.
Water Quality Guidelines	Guidelines for Fresh and Marine Water Quality
WELS	Water Efficiency Labelling Scheme
WHO	World Health Organisation
WI Act	<i>Water Industry Act 1994 (Vic)</i>
WIRO	Water Industry Regulatory Order 2012
WMP	Waste Management Plan
WRMO	Water Resource Management Order
WSC	Water Sensitive City
WSUD	Water Sensitive Urban Design



Executive Summary

ABOUT THIS REPORT

A Water Sensitive City (**WSC**) has an urban environment that is ‘resilient, liveable, productive and sustainable’.¹ The Cooperative Research Centre for Water Sensitive Cities (**CRC**) is a major interdisciplinary and multi-institutional collaborative research initiative aimed at addressing some of the key challenges preventing the transformation of urban water management practices in Australia and the progressive evolution of WSCs. One of the CRC research projects is the Better Regulatory Frameworks (**BRF**) project which addresses barriers to the adoption of new urban water technologies and alternative water sources. To better understand which parts of current regulatory and risk regimes help and which parts hinder the progressive evolution of WSCs, the BRF project examines gaps, inconsistencies and constraints in regulatory frameworks with particular reference to Victoria, Western Australia and Queensland.

This report, *‘Conceptualising Urban Water Regulation – the Melbourne System’*, is the second communication of the BRF project. Undertaken by researchers at Monash University, it maps the current regulatory frameworks that impact on urban water management in Victoria, with a particular focus on the Melbourne metropolitan area. It is current as of September 2013, although significant developments after that date are noted where relevant.

It builds upon and extends the first report of the BRF project, *‘Results of Legislative Stock-take for Victoria’*, undertaken by Maddocks law firm that provides a legislative stock-take of primary and selected secondary Victorian legislation relating to urban water regulation. The two documents provide a foundation for other outputs of the BRF project.

This report represents a preliminary conceptual model and issues paper, which suggests areas where research is needed and advances some preliminary understandings to be tested. The report also synthesises and presents detailed descriptions of the principal actors, roles, responsibilities, legislation and tools which characterise the Melbourne urban water regulation space, and represents them in the form of diagrams, termed *maps* in this report. The BRF project team hope that this information will be of assistance to others, and will begin to develop a common lexicon and conceptual framing of the urban water regulatory space.

THE CONCEPTUAL FRAMEWORK USED

The BRF project adopts a broad conception of *regulation* as ‘an intentional measure or intervention that seeks to change the behaviour of individuals or groups’ (Freiberg, 2010, p.4).

Freiberg (2010) uses the terms *regulatory tools* or *regulatory methods* to describe the various means by which regulatory outcomes are produced through the exercise of government power and proposes a taxonomy of these tools to help discussions on government regulation.² However, the business sector as well as civil society also nowadays employs tools aimed at intentionally changing behavior according to standards. The BRF project uses an amended form of Freiberg’s taxonomy which encompasses the tools used by government, civil society and business. See *Table 1* below.

One result of adopting a wide conception of regulation is that the regulatory framework surrounding urban water management cannot to be visualised in a simple linear fashion as a set of cause and effect relationships solely focused on the actions of government. The framework must exist as a web of regulatory influences originating from a variety of sources. Regulatory scholars term this *regulatory space* (Hancher and Moran, 1989).

Table 1 – Categories of regulatory tools and sector usage

CATEGORY OF TOOL					
Economic tools Making markets <ul style="list-style-type: none"> • Auctions • Tenders • Tradeable permits Influencing markets <ul style="list-style-type: none"> • Information provision • Price regulation • Taxes, charges and levies • Bounties, subsidies, levies and tax expenditure 	Transactional regulation <ul style="list-style-type: none"> • Contract • Procurement contracts • Contract disqualification • Grants 	Authorisation as regulation <ul style="list-style-type: none"> • Licensing • Registration • Permission • Certification • Accreditation • Litigation 	Structural regulation <ul style="list-style-type: none"> • Physical design • Environmental design • Process design • Technology 	Informational regulation <ul style="list-style-type: none"> • Disclosure • Performance indicators • Credit ratings 	Legal regulation <ul style="list-style-type: none"> • Primary legislation • Delegated legislation • Quasi-legislation/ soft law
SECTORS USING TOOL					
Government Business Civil Society	Government Business Civil Society	Government Business Civil Society	Government Business Civil Society	Government Business Civil Society	Government

Source: adapted from Freiberg (2010)



METHODOLOGY

In regulating urban water governments are seeking to achieve various objectives. These include protecting public health and ensuring that finite resources are managed responsibly, sustainably and equitably. Our analysis discerned five key systems of regulation that most significantly impact on urban water management in Australian cities, each of which is aimed at the achievement of a different set of objectives. These can be called:

1. the Water Resource Regulation System
2. the Service Delivery and Price Regulation System
3. the Built Environment Regulation System
4. the Environmental Health Regulation System
5. the Public Health Regulation System

The five key *regulation systems* were mapped at a high level of generality with a focus on identifying the underlying philosophy or logic of the system,³ the prominent actors within the system, and the most significant regulatory tools used. Where available, information was gathered on the effectiveness of these tools and on any current proposals for regulatory reform to the system.

The findings for each regulation system have been reduced to one or more maps each of which shows the key actors and regulatory tools used in that system and the relationships between these. Whilst not fully comprehensive these maps nonetheless reflect the most significant features of each system and the interactions between them. As such, they provide an analytical foundation on which to investigate regulation and conduct debates on how better regulatory arrangements may be encouraged.

GENERAL OBSERVATIONS

The mapping exercise suggests several general observations about the Victorian urban water management regulatory space, and also suggests some research questions.

Complexity of the regulatory infrastructure

The space is made up of multiple webs of regulatory tools across each of the five key systems. The regulatory space across all five systems presents a picture of significant complexity, with each regulatory tool combining, linking and/or competing for influence with other tools. This suggests we need to think in more detail about how these multiple webs link together so that their combined influence pushes in the desired direction. Furthermore, when regulatory tools are already linking up in complex ways, we also need to better understand the currently unclear trade-offs that are being made between differing regulatory objectives.

Clusters of tools

A diverse set of regulatory tools is used across the regulatory space with most of Freiberg's (2010) tools being used to some degree to achieve regulatory change. However, we do observe a preponderance of particular tools being used in some areas. For example, in the environmental and public health systems, a significant role is played by guidelines which lack express legal compliance mechanisms.

Levels of intervention

Actions by all levels of government (Commonwealth, State and local municipality) contribute to the observed regulatory regimes. However, interventions made at the State level tend to be the most influential. This suggests that while there may exist opportunities for standardisation of approaches through national interventions, the current arrangements may reflect the importance of local requirements to specific States or local preferences or conventions which influence the choice of tools.

While a broad conception of regulation encompasses interventions by public and private actors, it is observed that the key regulation systems in this space are dominated by measures produced by government and independent regulators. While some regulatory role is also being played by business and in particular the water corporations, the parameters of this role are unclear and need to be better understood.

Scale of intervention

The regulatory regimes observed tend to exist at a geographical scale which does not match the scale of the greater metropolitan area either being at a higher scale or a lower scale.⁴ However, the city itself, in the sense of the greater metropolitan area, may well be an important unit if WSCs are to be achieved.

Underlying assumptions

Several regulatory regimes are premised upon assumptions about how water is to be used in society and by whom. The assumptions are not always express and reflect cultural factors, historical patterns of water use and industry structure. They may not best suit attainment of a WSC.

SPECIFIC OBSERVATIONS

A number of observations can also be made about individual regulation systems.

Water resource regulation

The Water Bill addresses several of the identified gaps, overlaps and inconsistencies in Victoria's water resource regulation framework. However, certain issues remain unresolved:

1. Water resource planning in Melbourne will still be conducted by a large number of entities with overlapping responsibilities. This may lead to continued co-ordination challenges.
2. Melbourne's current institutional framework exhibits a degree of blurring of roles and responsibilities between regulatory and service delivery functions. This will continue.
3. There are currently many points across the systems of regulation for resource planning/ allocation and service delivery where actors are making regulatory interventions aimed at balancing the supply and demand of water resources. This potentially introduces an unhelpful blurring of natural resource regimes, that should determine sustainable levels of resource consumption, and service delivery regimes, that should determine how much the community is willing to pay for urban water services. This is confusing at best and unlikely to produce optimum outcomes.



Service delivery and price regulation

Current frameworks for service standard and price setting in Melbourne's urban water sector operate largely within an economic efficiency paradigm which is not necessarily well aligned to the sustainability concerns of WSC.

Moreover, several well-informed commentators (Productivity Commission, 2011, Ben-David, 2012) suggest that Melbourne's current model of independent price regulation for urban water services is not delivering value to consumers and may need to be reconsidered.

Current service delivery and price regulation frameworks contain no mechanism that would enable a wider range of actors to provide decentralised supply.

Built environment regulation

The current regulatory frameworks which impact on the Victorian built environment tend to operate at a State-wide or municipal level, not at the level of the actual city as a greater metropolis. This may be creating tensions with the WSC initiative which operates at a city scale.

Environmental health regulation

Traditionally, Australian environmental health regulation regimes have focused on the control of point source pollution. However, environmental health regimes for the control of non-point source pollution and threats to the environment caused by stormwater flow amounts are less developed, less coherent and even when present are not always adequately enforced (Melbourne Water and Environment Protection Authority Victoria, 2009, p.92). While there are many national guidelines relating to the environmental regulation of water quality, these are of variable quality and are not always utilised (KPMG, 2011).

Public health regulation

A WSC would need to make greater use of alternative water sources for urban water supply and would exhibit a greater decentralisation in water supply. This would require a change in current Victorian Government policy and a re-evaluation of existing drinking water regulation frameworks and the risk profile on which they are based.

In addition, regulatory regimes aimed at protecting human health from incidental ingestion of water risks are currently sparse and inconsistent. To date health concerns have only been addressed as subsidiary issues within the environmental protection framework.

Section 1 Introduction

Introduction

1.1 ABOUT THIS REPORT

1.1.1 The BRF project

A Water Sensitive City (**WSC**) has an urban environment that is 'resilient, liveable, productive and sustainable'.⁵ The Cooperative Research Centre for Water Sensitive Cities (**CRC**) is a major interdisciplinary and multi-institutional collaborative research initiative aimed at addressing some of the key challenges preventing the transformation of urban water management practices in Australia and the progressive evolution of WSCs. One of the CRC research projects is the Better Regulatory Frameworks (**BRF**) project which addresses barriers to the adoption of new urban water technologies and alternative water sources. To better understand which parts of current regulatory and risk regimes help and which parts hinder the progressive evolution of WSCs, the BRF project examines gaps, inconsistencies and constraints in regulatory frameworks with particular reference to Victoria, Western Australia and Queensland.

The output of this BRF project will involve a series of reports, articles and presentations. The research will encompass reviews of existing regulatory arrangements in the three States, reviews of relevant academic regulatory and risk literature and reports on case studies exploring particular attempts to implement new urban water management practices within current regulatory frameworks. The overall outcome of BRF project will be to propose principles and methods for aligning legislative, administrative, regulatory and institutional arrangements with the goal of WSC and reducing institutional and practice barriers to innovation in Water Sensitive Urban Design (**WSUD**). It will also enable a broader understanding to be achieved of the crucial links between government regulation and the many other attempts to alter behaviour in order to promote WSC.

1.1.2 Preliminary conceptual model and issues paper

This report, '*Conceptualising Urban Water Regulation – the Melbourne System*', is the second communication of the BRF project. Undertaken by researchers from Monash University, it maps the current regulatory frameworks that impact on urban water management in Victoria, with a particular focus on the Melbourne metropolitan area.

It builds upon and extends the first report of the BRF project, '*Results of Legislative Stock-take for Victoria*', undertaken by Maddocks law firm, a CRC partner. That report provides a legislative stock-take of primary and selected secondary Victorian legislation relating to urban water regulation.

This report is a preliminary document to guide the development of the BRF project. It proposes a conceptual map of Melbourne's urban water regulatory space, to assist in comprehending relationships and identifying gaps, inconsistencies and overlaps. It also identifies issues raised in the literature without expressing any concluded view on them. The data is current as of September 2013, although significant developments after that date are noted where relevant.

This report represents a preliminary conceptual model and issues paper, which suggests areas where research is needed and advances some preliminary understandings to be tested. The report also synthesises and presents detailed descriptions of the principal actors, roles, responsibilities, legislation and tools which characterise the Melbourne urban water regulation space, and represents them in the form of diagrams, termed *maps* in this report.

Section 1 outlines the context for the development of the report, the conceptual framework applied, the methodology used, and how the resulting data is intended to be used. Sections 2 to 6 contain maps of the five key systems of regulation that impact on urban water management practices in metropolitan Melbourne and discuss the most significant features of these systems. Section 7 presents some primary observations from the mapping exercise.

1.1.3 Using the report

This report and the resulting maps contain a rich data set about the current regulatory frameworks surrounding urban water management in Melbourne. As such they will provide a solid foundation for future work of the BRF project.

The BRF project intends to explore through case study research how specific elements of the regulatory space are particularly impeding or facilitating the adoption of new urban water technologies and a progressive evolution towards a WSC in Melbourne. It is intended that this report and the resulting maps will support such detailed case study research and provide a useful tool to prompt discussions with interviewees.

In addition, it is hoped that BRF project participants, other CRC scholars, and industry partners will be able to use the maps contained within this paper during future stakeholder discussions. Further, it is intended that this report and the maps within it of the metropolitan Melbourne regulatory space will enable inter-jurisdictional comparisons to be made with the regulatory frameworks in place in other Australian cities. The BRF project team hope that this information will be of assistance to others, and will begin to develop a common lexicon and conceptual framing of the urban water regulatory space.

1.2 THE CONCEPTUAL FRAMEWORK USED

1.2.1 Definition of regulation

The BRF project adopts a broad conception of regulation as 'an intentional measure or intervention that seeks to change the behaviour of individuals or groups' (Freiberg, 2010, p.4). This conceptualisation of regulation itself builds upon much earlier work such as, for example, that of Black (2002) and Selznick (1985). Regulation as a practice focused on behaviour change encompasses both activities undertaken by governments and those undertaken by a wide array of non-governmental actors. Regulation includes both interventions by way of formal legal rules and interventions by a host of other mechanisms. Using this lens it is what becomes important is not the legal form of the action that becomes important but its influence on behaviour.

1.2.2 Regulatory tools/methods

Freiberg (2010) uses the terms *regulatory tools* or *regulatory methods* to describe the various means by which regulatory outcomes are produced through the exercise of government power and proposes a taxonomy of these tools to help discussions on government regulation.⁶ This taxonomy can be used by regulatory practitioners to better understand features of particular tools and how various tools may be combined to achieve a desired regulatory purpose.

Table 1 – Categories of regulatory tools and sector usage

CATEGORY OF TOOL					
Economic tools Making markets <ul style="list-style-type: none"> • Auctions • Tenders • Tradeable permits Influencing markets <ul style="list-style-type: none"> • Information provision • Price regulation • Taxes, charges and levies • Bounties, subsidies, levies and tax expenditure 	Transactional regulation <ul style="list-style-type: none"> • Contract • Procurement contracts • Contract disqualification • Grants 	Authorisation as regulation <ul style="list-style-type: none"> • Licensing • Registration • Permission • Certification • Accreditation • Litigation 	Structural regulation <ul style="list-style-type: none"> • Physical design • Environmental design • Process design • Technology 	Informational regulation <ul style="list-style-type: none"> • Disclosure • Performance indicators • Credit ratings 	Legal regulation <ul style="list-style-type: none"> • Primary legislation • Delegated legislation • Quasi-legislation/ soft law
SECTORS USING TOOL					
Government Business Civil Society	Government Business Civil Society	Government Business Civil Society	Government Business Civil Society	Government Business Civil Society	Government

Source: adapted from Freiberg (2010)

Each category of regulatory tool involves the application of power that is focused on behavior change yet each does this in a different way. For example, *economic tools* are concerned with the general exercise of economic power while *transactional regulation* is concerned with the specific use of economic power in direct commercial transactions. *Authorisation as regulation* encompasses a number of related tools concerned with the use of power to confer benefits by authorising certain conduct. *Structural regulation* is the manipulation of physical or technological environments to influence conduct and *informational regulation* is the use of power to influence knowledge and beliefs. *Legal regulation* can provide the underpinning legal structure for any of the other tools. It can also operate as a discrete tool itself through the application of government’s power to create authoritative rules. Each of these high level regulatory tools in turn includes many subcategories of further tools (see *Table 1* above).

With the exception of the tool of legal regulation, which can only be exercised by governments, this taxonomy also holds true when civil society or business is regulating conduct. Businesses, for example, can adopt economic tools such as pricing, and transactional tools such as contracts. Both the business sector and civil society may use authorisational tools such as certification, structural tools in physical design and informational tools such as disclosure. This BRF project uses an amended form of Freiberg's taxonomy which encompasses the tools used by government, civil society and business.

It is also important to note that these tools effect behaviour change by encouragement as well as by punishment. Freiberg (2010) observes there are fashions in the types of tools and in the combinations of tools that are used and that these choices are heavily influenced by place and culture.

1.2.3 Regulatory space

One result of adopting a wide conception of regulation is that the regulatory framework surrounding urban water management cannot be visualised in a simple linear fashion as a set of cause and effect relationships solely focused on the actions of government. The framework must exist as a web of regulatory tools originating from a variety of sources. Indeed, an issue as complex as urban water management will be impacted upon by a multitude of webs layered over each other. For example, webs relating to the protection of the environment and public health will be layered over those relating to urban planning, which in turn are layered over those relating to resource management. Regulatory scholars term this concept *regulatory space* (Hancher and Moran, 1989).

Taking such a broad conception of regulation is important so that the full range of potential regulatory impediments to or facilitators of WSCs can be considered and their relative influence established.

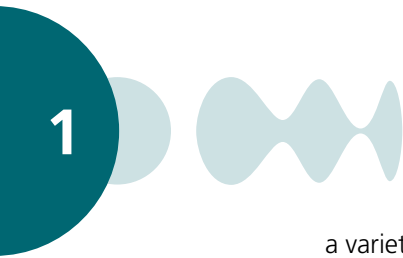
1.3 METHODOLOGY

1.3.1 The five key systems

In regulating urban water governments are seeking to achieve various objectives. These include protecting public health and ensuring that finite resources are managed responsibly, sustainably and equitably. Our analysis discerned five key systems of regulation that most significantly impact on urban water management in Australian cities, each of which is aimed at the achievement of a different set of objectives. Each system represents a particular set of regulatory objectives or purposes towards which behaviour change attempts are focused, and each consists of a particular web of actors and regulatory tools. These can be called:

1. the Water Resource Regulation System
2. the Service Delivery and Price Regulation System
3. the Built Environment Regulation System
4. the Environmental Health Regulation System
5. the Public Health Regulation System

The five key *regulation systems* were mapped at a high level with a focus on identifying the underlying philosophy or logic of the system,⁷ the prominent actors within the system and the most significant regulatory tools used. The mapping exercise for Melbourne used



a variety of publicly available information sources to identify the range of regulatory tools used in each system.⁸ Where available, information was gathered on the effectiveness of these tools and on any current proposals for regulatory reform to the system. The conceptual framework and methodology used were developed with input from the BRF project team and discussed in a workshop with stakeholders representing government, independent regulators and industry interests.








It is never possible to draw hard edges around a regulatory space and there are many other systems of regulation that will impact upon particular initiatives aimed at achieving aspects of the WSC vision.⁹ Understandably, such webs were not considered in depth in this mapping exercise. Although the five key systems that have been mapped are not intended to encompass every regulatory tool that could impact on the achievement of a WSC they are intended to provide a picture of the most significant current regulatory tools at work in the metropolitan Melbourne urban water management regulatory space.

1.3.2 The maps

The findings for each regulation system have been reduced to one or more maps, each of which shows the key actors and regulatory tools used in that system and the relationships between them. The maps are not intended to be fully comprehensive. Instead they are intended to reflect the primary features of each system and the interactions between them.

The following key has been used in the maps.

Key

	Actor
	Regulatory tools - Economic tools
	Regulatory tools - Transactional regulations
	Regulatory tools - Authorisation as regulation
	Regulatory tools - Structural regulation
	Regulatory tools - Informational regulation
	Regulatory tools - Legal regulation

For the purposes of this mapping exercise the term *legal regulation* has been used to identify regulation by way of government produced legislative tools.¹⁰ This term has not been used to encompass the wider concepts of regulation by way of common law principles (such as the law of contract) or through the operation of administrative law on decision makers.

Many regulatory tools can be classified into more than one category. For example, a single set of guidelines may operate as both an informational tool and legal tool, by providing information and education about a topic and also a set of rules that are expected to be followed. Accordingly, the classification of tools in the maps is not intended to be exhaustive and is based on the researcher’s impression of the tool’s most salient features or mode of influencing behaviour.

8 These included legislation, government reports, industry publications, academic literature and government, regulator and industry websites.

9 For example, the webs of regulation relating to occupational health and safety, financial markets and corporate governance.

10 Such as primary and secondary legislation and also quasi-legislation (e.g. guidelines incorporated into a legislative instrument).

Section 2
**The Water Resource
Regulation System**

The Water Resource Regulation System

2.1 FUNDAMENTALS OF THE SYSTEM

2.1.1 Philosophical foundations

2.1.1.1 The special qualities of water

Water has special qualities and is one of the most fundamental of natural resources. It is transient and flowing. It is a finite resource yet because it constantly moves through the hydrological cycle it can be consumed many times over. It offers benefits as both a consumable and environmental resource being essential for life, agriculture and a wide range of industrial uses, enhancing general amenity, offering welcome recreational opportunities and providing a habitat for fish, plant and animal species. Yet the relationship between water and society is complex. When it falls in the wrong place, when it falls in excessive quantities or when it becomes contaminated, it is viewed as a nuisance and a hazard.

One of the more fundamental roles played by any government is the establishment of suitable frameworks within which complex decisions about the management and allocation of limited resources can be made, and any entitlements to such resources delineated and protected.¹¹ Water resource regulation encompasses those frameworks and rules that seek to define who is entitled to use water, and for what purposes, at the point at which humans disturb the natural hydrological cycle (Gardner et al., 2009, p.3).

2.1.1.2 An arid country

Australia is the driest inhabited continent and has a highly variable pattern of rainfall. Such scarcity and variability means that security of water supply is a concern in Australia.

Traditional sources of urban water in Australia vary significantly depending on local hydrology.¹² However, across Australia in recent years, as concerns about water security have grown in prominence, there has been an interest in using water from non-traditional *alternative sources* in urban contexts. These alternative sources often involve the application of new technologies.

11 Where clear rights to a resource exist there may be economic gains available to a society from the trading of these rights in a market. Governments may also have a role to play in regulating such markets. As urban water markets are not prevalent in Australia this regulatory role is not considered in depth in this report.

12 These traditional sources involve taking water from rivers and storing it above ground in dams, taking water directly from underground aquifers and the direct capture of rainwater in tanks.

2.1.1.3 Frameworks for Australian urban water resource regulation

Historical approaches to water resource regulation in Australia applied common law legal concepts and rules derived from English law (Stoeckel et al., 2012). Over time it became apparent that they were not suitable to the vastly different Australian geographic, climatic and social landscapes, which presented a different set of water management issues.

The sets of rules for urban water resource regulation around Australia are still evolving. However, all jurisdictions now have State level legislative frameworks that largely share the following features (Gardner et al., 2009):

1. The control of water resources is vested in the Crown.¹³
2. Separate institutions are established for resource management/planning and service delivery.
3. A statutory planning system manages competing uses of the water resources including its environmental use.
4. Subject to the planning process, statutory authorisations to take and use water are defined and granted.
5. The use of water resources without statutory authorisation is prohibited.

These frameworks attempt to overcome some of the problems involved in regulating water resources in an arid country.

2.1.1.4 Water entitlement regimes

Understanding water 'property rights'

Due to its nature water has never been a good fit for concepts of absolute ownership (Gardner et al., 2009, p.183). Accordingly, some commentators (Frontier Economics, 2008, p.7) suggest that concepts of ownership are less important in relation to water in Australia than concepts of control.

Economists generally recognise four main types of *property rights* regimes (Frontier Economics, 2008):

1. private property
2. state/public property
3. common property
4. open access (i.e. no rules)

Actual *property rights* regimes tend to combine elements of several types. The regimes are generically known in Australia as *water entitlements* regimes. All involve the use of regulatory tools to authorise particular conduct in relation to water resources.

Common water entitlement regimes in Australia include (Frontier Economics, 2008, p.11):

1. statutory entitlements¹⁴
2. other statutory licences
3. other statutory rights¹⁵
4. contracts¹⁶
5. deemed supply contracts¹⁷

Some of these regimes authorise conduct directly through primary legislation while others use subsidiary instruments and tools (for example, licences, statutory entitlements and contracts) to authorise the conduct.

Statutory water entitlements

Over recent decades Australian water law has developed a sophisticated concept of statutory water entitlements or *water rights* which give the entitlement holder the right to take a share of water from a certain water source either for consumptive or environmental purposes. The entitlements are always subject to terms and conditions.

While bearing close resemblance to rights in land, the statutory water rights now have their own legal characteristics and are not linked to rights in adjacent land. Due to the finite nature of water, the entitlements ultimately have less benefits and protections attaching to them compared to rights in land (Stoeckel et al., 2012). Some types of statutory water entitlements are transferable and may be traded under legislative provisions that apply in declared areas.

Many alternative sources of water, such as stormwater and sewage, are not encompassed by current statutory entitlement regimes (Frontier Economics, 2008).

2.1.1.5 Water planning regimes

The purpose of a statutory water planning system is to guide both government and private decision making about the management and allocation of water resources (Gardner et al., 2009, p.273). As earlier assumptions about the continued abundance of water resources in Australia have become increasingly unsustainable, frameworks have evolved to enable limits to be set on the consumptive use of water (Gardner et al., 2009, Ch.14). This has led to the development of legal concepts of an environmentally sustainable level of consumption and the allocation of water for environmental benefits.

While some commentators (Gardner et al., 2009, Ch 13) have noted the potential for native title to play a role in water allocation and management frameworks in Australia, they also note this potential has not yet been realised. As native title is currently of limited significance to these frameworks in urban areas it is not further discussed in this paper.

14

These are common in the rural water sector and between governments and water corporations in the urban water sector.

15

These are often how landholders obtain a right to use rainwater.

16

These are common between desalinated seawater suppliers and water corporations.

17

These are common between consumers and water corporations in the urban water sector.

2.1.2 Victorian context

Historically, water in Melbourne has been supplied from rainwater captured and stored in dams. Current climate change modeling for southern Australia suggests that over the next few decades there will be a long term drying during winter and spring, more frequent droughts and periods of heavy rainfall (CSIRO and Bureau of Meteorology, 2012, Productivity Commission, 2011).

Melbourne's supply has recently been augmented by the Wonthaggi desalination plant which uses desalination technology to recover fresh water from seawater. Melbourne has also seen a degree of supplementation of supply from other alternative sources. These include household scale greywater systems and larger waste water recycling schemes which recover water from sewage (Ferguson et al., 2013). However, with the exception of desalinated seawater, these alternative sources have not been approved for use in potable supply and are currently only reserved for non-potable uses.¹⁸

Urban water services in Victoria are provided by corporatised publicly owned water corporations (Essential Services Commission, 2012). Metropolitan Melbourne has four water corporations and vertical separation between bulk supply-transmission and retail-distribution. Melbourne Water is the monopoly supplier of bulk potable water and bulk sewerage services. Three metropolitan retailers (Yarra Valley Water, South East Water and City West Water) supply retail potable water and retail sewerage services on a monopoly basis to domestic and business customers in defined geographic areas. Stormwater services are provided by both Melbourne Water and the various local councils across the metropolitan area.

2.1.3 Current issues and future trends

A combination of factors including climate change and significant population growth mean that current water resource regulation frameworks in Australia are likely to come under increasing pressure. Whilst significant changes have been made to such frameworks in recent decades the regulatory reform process is still in progress. There remain many potential gaps, overlaps and inconsistencies in these frameworks and these may impede the achievement of WSCs.

For example many *alternative sources* of water are not encompassed by current water entitlement regimes. However, addressing these deficiencies may not be simple as the interdependencies between various water sources in the water cycle are complex and the issues raised are not straightforward. Accordingly, some commentators (Frontier Economics, 2008) have cautioned that each water source should be separately considered.

In recent years Australian society has become more aware of the finite nature of its water resources and that many existing practices around water use could be considered wasteful. This awareness is connected to broader concerns about climate change and sustainability and was brought into focus during the Millennium Drought which ran from 1997 to 2009 (Ferguson et al., 2013). As a result, governments at the Commonwealth, State and local municipal levels now believe they have a social mandate to undertake regulatory interventions aimed at balancing supply and demand of water resources.

The resulting regulatory interventions have involved measures aimed at reducing the demand for water (particularly potable water demand) and those targeted at increasing the use of alternative water supplies (for non-potable purposes). These interventions represent an intersection between the regimes that control water resources and those that regulate urban water service supply.¹⁹ These interventions are significant and involve many actors but are currently based on fairly weak conceptual foundations. They potentially introduce an unhelpful blurring of natural resource regimes, that should determine sustainable levels of resource consumption, and service delivery regimes, that should determine how much the community is willing to pay for urban water services.

Currently, recognition of the human right to water is not a significant part of the regulatory framework surrounding water resources in Australia. However, this right is compatible with the WSC vision and could potentially become an additional tool for balancing the social and environmental aspects of water as a resource against its economic aspects.

2.2 KEY FEATURES OF THE SYSTEM IN MELBOURNE

2.2.1 International regulation

2.2.2.1 The human right to water

Australia is ‘an island state with permanent sovereignty over its natural resources’ (Stoeckel et al., 2012, p.3). However, in July 2010 the United Nations General Assembly made a non-binding resolution declaring that access to clean water and adequate sanitation was a human right. This right has not been formally protected in Australian law and there are no current proposals to change this (Good, 2011).

2.2.2 National regulation

2.2.2.1 National Water Initiative (NWI)

For constitutional reasons water policy, planning and regulation have historically been State responsibilities in Australia.²⁰ However, the 2004 Intergovernmental Agreement on a National Water Initiative set out an agreed national approach to best practice water management which is to be overseen by the National Water Commission (**NWC**).²¹ To date the NWI has focused on rural water management and in particular on the Murray Darling Basin. However, the NWI intends to focus more closely on urban water reform in the future (National Water Commission, 2011). The NWI contains high level principles for water entitlement regimes and water planning regimes and efficient market trading rules.²²

19 These are discussed in Section 3.
 20 Indeed, s.100 of the Commonwealth of Australia Constitution Act 1900 (Cth) specifically prohibits the Commonwealth from abridging, by law or regulation of trade or commerce, ‘the right of a State...to the reasonable use of the waters of rivers for conservation or irrigation.’ However, the referral of State powers to the Commonwealth in respect of the management of the Murray Darling Basin, and the enactment of the Water Act 2007 (Cth), has seen the Commonwealth enter the water policy space in a significant way.
 21 The NWI is not itself legally enforceable but relies on implementation by the States.
 22 The NWI Water Access Entitlements and Planning Framework.

2.2.2.2 Supply/demand regulation

The Commonwealth Government has been actively involved in the regulation of water supply/demand. On the supply side it has made direct investments in water projects aimed at encouraging alternative water source use in the urban water sector.²³ On the demand side resource use efficiency has been promoted through the Water Efficiency Labeling Scheme (**WELS**). This is a national, compulsory labeling and registration scheme for certain water saving/using products. The WELS regime works by providing customers with information aimed at influencing their purchasing decisions and by prohibiting the sale of certain non-certified/approved products.

2.2.3 Victorian regulation

2.2.3.1 Legislative framework

The *Water Act 1989 (Vic)* (**Water Act**) is designed to be the overarching legislative framework for water resource regulation in Victoria.

As the Water Act largely predates current interest in integrated water cycle management (**IWCM**) and alternative water sources, it is not a water cycle Act, and it contains significant gaps in relation to alternative water sources (Gardner et al., 2009, Frontier Economics, 2008). Therefore, while the legislative framework does regulate groundwater and surface water in waterways,²⁴ it does not provide a statutory definition for surface water that is not in a waterway (i.e. stormwater). Accordingly, stormwater is largely left outside the scope of this framework. Similarly, although the Water Act contains a limited definition of *recycled water*,²⁵ it also sits largely outside the mainstream regulatory framework of the Water Act.

2.2.3.2 Institutional framework

Policy, planning and management

The Department of Environment and Primary Industries (**DEPI**) is the lead agency managing both urban and rural water resources in Victoria. DEPI is responsible for policy, planning and management of the Victorian water sector. Current government policy in Victoria is to promote change in the urban water sector and embed IWCM practices. An office within DEPI, the Office of Living Victoria (**OLV**), is tasked with promoting such change.

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Such as the Water for the Future initiative and the National Urban Water and Desalination Plan.
S.3(1) of the Water Act defines groundwater and wastewater.
This includes treated sewage and trade waste but not treated stormwater.

Service delivery

Public ownership of the water corporations is enshrined in the State constitution.²⁶

Part 6 of the Water Act establishes the water corporations as statutory water corporations and details their objectives and governance arrangements.²⁷ Further regulation of the service delivery performance of water corporations is undertaken by the issue of a Statement of Obligations (**SoO**) by the Minister for Water.²⁸ The Minister for Water has the power to declare the boundaries of a water corporation's monopoly *water district* and *sewerage district*.²⁹

Service delivery regulation is discussed in Section 3.

Catchment and waterways management

The *Catchment and Land Protection Act 1994 (CLPA)* establishes catchment management authorities for different regions. The Port Philip and Westernport Catchment Management Authority (**PPWCMA**) is the body responsible for catchment management in the area occupied by metropolitan Melbourne.

Melbourne Water and PPWCMA are given significant regulatory powers and resource management functions for waterways management under the Water Act and CLPA. This blurs the separation between service delivery institutions and policy, planning and management institutions in Victoria and is out of step with the requirements of the NWI (Gardner et al., 2009, p.110). Such institutions might be expected to encounter difficulties in effectively reconciling their dual roles.

Groundwater

Groundwater resources in the metropolitan area are managed by DEPI and Southern Rural Water.

2.2.3.3. Water entitlements

Part 2 of the Water Act sets out the Victorian water entitlements framework.³⁰ It also provides that the Victorian Government is vested with the right to the use, flow and control of all surface water in waterways and all groundwater in the State.³¹ The Minister for Water is then responsible for granting statutory authorisations to take and use water. Certain residual statutory rights to take and use water are also granted directly by the Water Act itself to adjacent landholders and persons accessing public land.³² It is prohibited to take water from a waterway or aquifer without an authorisation under the Water Act.³³

26 Ss. 96 and 97 of the Constitution Act 1975 (Vic) provide that the public water utilities in Victoria must retain ultimate responsibility for providing water services even if they contract out some elements of service provision. This 'anti-privatisation' provision could potentially hinder the role for third parties in decentralised water service provision in Victoria.

27 Until recently a different regime had applied to the three metropolitan retailers whereby they were established under general corporations law and licensed under the Water Industry Act 1994 (Vic).

28 Including making these subject to oversight measures contained in the Public Administration Act 2004 (Vic).

29 S. 122GAA of the Water Act. The actual areas encompassed by such districts are identified by plans referenced in the Water Act.

30 This statutory framework specifically abolishes and replaces pre-existing common law rights, see s.8(7) of the Water Act.

31 S. 7(1) of the Water Act.

32 S. 8(1) of the Water Act. These rights are limited to domestic and stock watering uses.

33 SS.33E and 289 of the Water Act.

In Metropolitan Melbourne the most important statutory water entitlements are:

1. Bulk entitlements issued under Part 4, Div 1 of the Water Act. A bulk entitlement holder is entitled either to a water source (i.e. groundwater or surface water) or to water held in the storage works of a water corporation. Bulk entitlements can be subject to conditions which are enforceable under provisions in the Water Act. Bulk entitlements can only be issued to an 'authority'.³⁴
2. 'Take and use' licences issued under s.51 of the Water Act. These entitle the holder to take and use surface or groundwater.³⁵ These licences can also be subject to conditions.

The water entitlements framework embodies a historical view of Victoria's water sources and contains significant gaps and uncertainties about the right to use and trade in alternative water sources such as stormwater, recycled water, wastewater and greywater. For example, recycled water cannot form part of a bulk water entitlement, and regulation of ownership of stormwater in local council drains is unclear (DeSousa, 2013).

2.2.3.4 Water planning, management and allocation

There are many Victorian institutions with a planning function and many instruments with a planning effect (Gardner et al., 2009). For example:

1. The Minister for Water is responsible for ensuring various water resource assessments and plans are undertaken for Victoria. These include Sustainable Water Strategies,³⁶ Long Term Water Assessments,³⁷ and Water Supply Protection Area Management Plans.³⁸ The Minister for Water is responsible for allocations.
2. The PPWCMA is responsible for drainage and floodplain management and has some role in implementing State water plans at a catchment level..
3. Melbourne Water has waterways management, drainage and floodplains management functions under Part 10 of the Water Act and also specific obligations to plan for water and sewerage needs.³⁹ The SoO imposes further obligations regarding waterways and drainage planning on Melbourne Water..
4. The three metropolitan retailers,⁴⁰ as water corporations with water district and sewerage district responsibilities under the Water Act, have specific obligations to plan for water and sewerage services in their districts.⁴¹ Bulk entitlements also perform some planning functions.⁴² There are also obligations contained in the SoO obliging the water retailers to plan for IWCM.

This system is extremely complex and the overlapping responsibilities of the various institutions are not particularly clear.

34 S. 34 of the Water Act. 'Authorities' are primarily the water corporations but also include other specified organisations such as electricity generators and the environmental water holder.

35 Southern Rural Water has been delegated power by the Minister for Water to issue groundwater licences in the metropolitan area.

36 S.22 of the Water Act. The strategy for the central region of Victoria includes metropolitan Melbourne and has legislative effect.

37 Part 3 Div 1B of the Water Act.

38 S.27 of the Water Act. If the Minister for Water declares a Water Supply Protection Area.

39 Ss. 171 and 184A of the Water Act.

40 City West Water, South East Water and Yarra Valley Water.

41 S. 163 of the Water Act.

42 Part 4, Div 1 of the Water Act.

2.2.3.5 Supply/demand regulation

To meet their supply obligations the water corporations must balance supply and demand. In recent years the Victorian Government has become significantly involved in how this is done.⁴³ Local councils and the water corporations are also primary institutional actors in this space.

Supply management has largely taken the form of significant direct investment in rainfall-independent sources. Demand management measures have been aimed at both household and business consumers. The measures encourage behaviour change in the following ways:

1. By reducing the consumption of potable water even if other desirable consumer outcomes are sacrificed.⁴⁴ Measures to achieve this involve a combination of economic tools,⁴⁵ information tools,⁴⁶ and express legislative prohibitions on certain uses of water.⁴⁷
2. By increasing potable water use efficiency by consumers whilst retaining other outcome levels. Measures to achieve this include a combination of information tools,⁴⁸ economic tools,⁴⁹ and legal tools.⁵⁰
3. By recycling water/using alternative water sources to replace potable water for some uses. Measures to achieve this include a combination of economic tools,⁵¹ and information tools.⁵²

43 For example, by prescribing in the Water Act and SoO in significant detail what permanent water savings plans are to be developed and the restrictions on potable water use by the public that must be applied/developed by water corporations.

44 For example, watering outside plants.

45 For example, rebates for products which reduce water consumption.

46 For example, education campaigns.

47 For example, mandatory water restrictions under S. 170F of the Water Act.

48 For example, WELS regime and a number of education campaigns aimed at encouraging behaviour change both in individuals and organisations.

49 For example, rebates for water efficient products.

50 For example, WELS regime prohibiting the sale of certain non-registered products. Victorian legislation implements the WELS regime at the State level.








51 For example, direct government funding of IWCM project.

52 For example, community engagement and education programs about alternative water sources.

2.3 MAP OF THE WATER RESOURCE REGULATION SYSTEM IN MELBOURNE

Melbourne's Water Resource Regulation System, which is described in detail in Section 2.2, is shown diagrammatically in the map on the following page. This map shows the primary institutional actors involved in this regulation system, the most significant regulatory tools and the interactions between these. The following key has been used in the map.

Key

	Actor
	Regulatory tools - Economic tools
	Regulatory tools - Transactional regulations
	Regulatory tools - Authorisation as regulation
	Regulatory tools - Structural regulation
	Regulatory tools - Informational regulation
	Regulatory tools - Legal regulation

2.4 REGULATORY REFORM INITIATIVES

2.4.1 Water Bill Exposure Draft

The Water Bill Exposure Draft (**Water Bill**) was released by the Victorian Government in December 2013. It proposes significant changes to the substance of Victorian water law and the consolidation of the Water Act and the *Water Industry Act 1994 (Vic)* (**WI Act**) into one piece of legislation. Several of the proposed changes implement specific recommendations from recent regulatory reviews aimed at assisting the transition of Melbourne to a WSC. New legislation is anticipated to be enacted in 2014 and to be in force in 2016. While major changes to subordinate legislation are also anticipated their detail is currently unknown.

Particularly notable proposals in the Water Bill include:

1. measures aimed at making the Water Act a 'water cycle' Act. Specifically, the amendment of the legislative objectives to specifically include the promotion of whole of water cycle management. In addition, the Minister's power to impose obligations on water corporations in respect of whole of water cycle management by way of the SoO will be strengthened.
2. the introduction of a new streamlined, targeted and risk based long term resource planning framework.
3. the introduction of a new regulatory instrument, the Water Resource Management Order (**WRMO**), to consolidate all water entitlements in a given geographic area into one document. The WRMO will contain all licence restrictions, system management rules, trading rules, capping rules and resource management roles and responsibilities in relation to the area.⁵³ Specific water entitlements will sit underneath the WRMO for an area.
4. a streamlining of the *take and use* licensing process, particularly for managed aquifer recharge schemes.
5. significant changes to the water entitlements framework in relation to stormwater. The Crown's right to the use, flow and control of stormwater in stormwater works will be expressly recognised,⁵⁴ and a new statutory right granted to water corporations/local councils to take and use the water in their stormwater works. However, if the Minister declares an area a local *stormwater area* a take and use licence will be required to take and use the water in local council drains.⁵⁵ If no such declaration is made local councils will be able to enter into contractual arrangements to supply stormwater to third parties. These changes will be backed up by new statutory offences relating to the use of water without a licence/contract.
6. a certain amount of rationalisation and simplification to water corporation and catchment management authority powers.
7. the bringing of the protection of water supply catchment areas within the scope of the Water Act.⁵⁶

53 Provisions in some bulk entitlements relating to the management of water systems will also be moved to WRMOs.

54 S.33 of the Water Bill defines stormwater works as those 'works constructed to collect or transport water run-off' owned by/vested in water corporations or local councils. Presumably this definition is intended to be broad enough to encompass all kinds of soft drainage infrastructure.

55 Issued by the Minister or by a water corporation under delegated authority.

56 Rather than the CLPA.

2.4.2 Melbourne's Water Future

The OLV's recent draft water strategy, *'Melbourne's Water Future'*, recommended a number of changes to the water resource regulation system. Some of these have been addressed by the Water Bill (see the previous page) but many remain outstanding for future implementation. For example, the Water Bill does not seem to envisage the introduction of a trading regime for bulk water.⁵⁷ In addition, while the Water Bill will make it easier to change water corporation boundaries in future, these currently remain unchanged.⁵⁸

The OLV (2013) proposed regulatory reforms to the Water Act, SoO and Water Industry Regulatory Order 2012 (**WIRO**), aimed at incentivising the water corporations to focus to a greater extent on small localised projects. The suggested reforms included changing the security of supply objectives in the Water Act,⁵⁹ and enabling greater scrutiny/control by the Victorian Government of the investment decisions of the water corporations.⁶⁰ These proposals appear to be unaddressed by the Water Bill.

Finally, the OLV (2013) proposed continuing current regulatory interventions aimed at reducing the use of potable water supplies in circumstances where non-potable supplies could be used in the alternative and encouraging the development of alternative supplies for such purposes. Specific reform proposals to achieve these aims include:

1. a change to current building regulations and building permit requirements regarding the water performance of new buildings⁶¹
2. the publication of annual benchmarks for the efficient use of drinking water and reporting of performance against these to parliament.⁶² This has not been addressed by the Water Bill.

57 See initiative 3.4.9 of Melbourne's Water Future.

58 To align the water corporation areas more closely to geographical boundaries, see Initiative 3.4.3 of Melbourne's Water Future.

59 See Initiative 3.4.1 of Melbourne's Water Future.

60 See Initiative 3.4.4 of Melbourne's Water Future.

61 See Initiative 3.3.7 of Melbourne's Water Future. For more detail refer to Section 4.

62 See initiative 3.4.6 of Melbourne's Water Future.

Section 3

The Service Delivery and Price Regulation System

The Service Delivery and Price Regulation System

3.1 FUNDAMENTALS OF THE SYSTEM

3.1.1 Philosophical foundations

3.1.1.1 Service delivery regulation

Urban water services traditionally encompass three bundles of related services (Productivity Commission, 2011, p.4):

1. water services⁶³
2. sewerage services⁶⁴
3. drainage services⁶⁵

The consumption of water is vital to human life and is crucial for many agricultural and business purposes. Conversely the safe disposal of polluted water (such as sewage and trade waste) provides significant public and environmental health benefits. Meanwhile, the management of stormwater flows plays an important role in preventing property damage and human harm. Therefore, urban water services have the status of *essential services* and their provision to the public is seen as being of utmost importance.

For these reasons, it is commonly accepted in Australia that government has a role to play in controlling who may supply urban water services and the terms of the supply. Control can be achieved either by direct government provision of the service or by ensuring that another suitable entity delivers the service whose behaviour is adequately regulated. The objectives of this service-orientated regulation would be to ensure that a secure supply of affordable water and adequate and affordable wastewater disposal and drainage services are available to all households and businesses that require them.

63 These encompass the bulk harvesting, manufacture, storage, treatment, transmission, distribution and retail of water. Historically, in Australia this has been potable water.

64 These encompass the transmission, distribution, treatment, recycling and disposal of sewage and tradewaste.

65 These encompass the transmission, distribution, treatment, recycling and disposal of stormwater.

3.1.1.2 Price regulation

The network elements of water supply, sewerage and drainage systems have features of a 'natural monopoly', which means that they can be provided most efficiently by one entity. Due to these features it has usually made sense for a monopoly service provider to be responsible for service provision throughout a particular geographic area. The monopoly service provider may be either privately or publicly owned.

In economic theory, such an absence of a competitive market provides a second justification for government regulatory intervention. The aim in this instance is economic efficiency and to mimic the outcomes for consumers that a competitive market would provide. These outcomes are affordable and provide universal access to acceptable levels of the service, at a price that enables the monopoly provider to recover its costs and earn a profit, but not to earn a monopoly profit. This type of intervention to control both service quality and prices is commonly termed *economic regulation*. This report prefers to use the term *service delivery and price regulation* to economic regulation as this provides greater clarity about the functions of the regulatory framework.

3.1.1.3 Third party access regulation

It is common for monopoly service providers to be the owners of natural monopoly assets. These are the distribution and transmission pipelines used for moving water, sewage and stormwater which another entity could not economically afford to replicate. The network ownership provides a third justification for government regulatory intervention to prevent the asset owners from denying access to the asset to other potential service providers who may wish to provide services in upstream or downstream markets.⁶⁶ This type of intervention is commonly termed *third party access regulation*.

3.1.2 Victorian context

As noted in Section 2 Victorian urban water services are provided by corporatised publicly owned water corporations which operate as monopoly service providers within defined geographic areas.⁶⁷ Accordingly, the Victorian urban water service sector is characterised by a very low level of consumer choice. Furthermore, the Victorian water corporations are the owners of natural monopoly assets. For the reasons noted above, this provides justification for a significant level of governmental regulatory intervention in regard to service delivery, price and third party access.⁶⁸

3.1.3 Current issues and future trends

Recent large scale supply augmentation projects in Victoria, such as the Wonthaggi desalination plant, have resulted in significantly increased consumer prices, as the water corporations seek to recover the costs of the investments. This has focused public attention on the price regulation framework and consumer perceptions of whether they are being fairly charged for the value of the services they receive.⁶⁹

66 In this sector, upstream markets are the markets in bulk water/sewerage service provision and downstream markets are the markets in retail water/sewerage service provision.

67 However, almost all capital works and a significant amount of maintenance work in Victoria is outsourced to the private sector Productivity Commission (2011) "Australia's urban water sector", Inquiry report No.55. Final inquiry report ed. Canberra: Commonwealth of Australia. In addition, the Wonthaggi desalination plant is operated by a private company under a PPP arrangement.

68 Should future institutional change to the urban water sector result in increased markets in urban water services there would be less justification for price regulation. However, there would remain a justification for having in place adequate competition and consumer law frameworks aimed at correcting common imperfections in markets and the protection of consumer interests.

69 Dr Ron Ben-David has explored this issue in a series of papers and tentatively suggests what is required is a much greater level of engagement between Victorian water corporations and their customers. Ben-David, Dr Ron (2012) "Economic regulation and the water industry: between a rock, a hard place and a precipice", Water Services Association of Australia.

Achieving the vision of a WSC will involve a much greater focus on issues of sustainability in regulation of urban water services. A significant and unresolved issue is the crossover between economic regulation and emerging policies to promote sustainability (Liggins, 2010, p.4).

In addition, a WSC is likely to involve greater decentralisation in the supply of services which may result in service delivery by providers who are not water corporations. However, the entire Victorian regulatory framework around price and service delivery is based on a set of assumptions about who supplies urban services which 'does not contemplate competition or the free entry of innovative supply options' (Liggins, 2010, p.4). Therefore, service supply by new providers would require significant changes to be made to current frameworks both to enable the supply and to regulate for service quality. Decentralised suppliers may also require access to water corporation assets. Existing mechanisms in the regulatory framework which could be used to grant such access have not yet been tested.

3.2 KEY FEATURES OF THE SYSTEM IN MELBOURNE

3.2.1 International regulation

There are no international service delivery and price regulations that apply to the Australian urban water sector.

3.2.2 National regulation

3.2.2.1 NWI

Broadly speaking service delivery and price regulation of water utilities remains a State responsibility in Australia. However, best practice pricing and institutional arrangements are one objective of the NWI. Four sets of national metropolitan pricing principles have been developed which are intended to inform State pricing policies.⁷⁰

3.2.2.2 CCA

The framework for the regulation of markets, through the mechanism of competition law, and the protection of consumers through consumer policy, are set out at a national level in the *Competition and Consumer Act 2010 (Cth)* (**CCA**). The CCA is enacted in individual jurisdictions through State legislation. Part IIIA of the CCA contains a third party access regime for infrastructure of national importance.

3.2.3 Victorian regulation

3.2.3.1 Water Act/SoO framework

The Water Act sets out the statutory duty on metropolitan water corporations to provide urban water services to consumers.⁷¹ The Water Act also provides for a statutory deemed contract (Frontier Economics, 2008, pp.11-12) between consumers and the water corporations pursuant to which a water corporation may recover its service delivery costs from a consumer.⁷²

Although there is no retail competition in Victoria under the institutional structure established by the Water Act there is a degree of 'competition through benchmarking' (Baldwin et al., 2012) between the water corporations whereby public comparisons can be made about relative performance. The expectation here is that such public comparison will spur performance improvements by the water corporations.

The SoO is subordinate legislation aimed at the water corporations and is the main regulatory tool used by the Victorian Government to regulate the performance of the water corporations. The SoO imposes specific, and often detailed, operating obligations on the water corporations in addition to those found in the Water Act.

3.2.3.2 Industry oversight

Oversight of the performance of the water corporations in delivering their service supply and other obligations under the Water Act and SoO is conducted by the Minister for Water. An Annual Corporate Plan produced by each water corporation and approved by the Minister for Water provides for general performance monitoring (Department of Sustainability and Environment, 2011).⁷³ The Essential Services Commission (**ESC**) also has a role to play in compliance monitoring, as discussed in the remainder of this Section.

Financial regulation of the water corporations is undertaken by the Victorian Treasurer (Department of Sustainability and Environment, 2011) and annual reporting of financial information is required.⁷⁴ There is also a requirement that a water corporation submit a business case to the Minister for Water and the Treasurer for approval for significant items of expenditure.

3.2.3.3 Independent service delivery and price regulation

The ESC is Victoria's independent economic regulator. The *Essential Services Commission Act 2001 (Vic)* (**ESC Act**) establishes the ESC and provides the economic regulatory framework for all regulated industries. The ESC Act sets out the powers of the ESC and its objectives.

The Victorian economic regulation regime is not industry specific and was set up across all industries. The regime was deliberately framed in such a way to avoid industry capture of the regulator (Martin, 2012).

71 Part 8 of the Water Act requires the three metropolitan retailers to supply water services to the public and for Melbourne Water to supply bulk water services. Part 9 of the Water Act requires the three metropolitan retailers to supply sewerage services to the public and for Melbourne Water to operate and maintain bulk services for the collection, conveyance and disposal of sewage and to provide for the recycling of treated waste.

72 Part 13 of the Water Act.

73 S. 247 of the Water Act.

74 S. 122ZJ of the Water Act.

Victoria has full and independent service delivery and price regulation of the urban water sector. The WI Act provides that the water industry is a regulated industry for the purposes of the ESC Act and sets out specific objectives for the ESC regarding service delivery and price regulation of the water industry. The WI Act provides for the enactment of subordinate legislation which in turn establishes further detail of the regulatory framework.⁷⁵ In particular, the WIRO is the regulatory tool that specifies how the ESC is to regulate the standards and conditions of the supply of *declared services* and the price of *prescribed services*.

Through the price and service standard setting process described below the ESC sets prices for the regulated services provided by the Victorian water corporations. The current prices that each water corporation may charge for regulated services are set out in each water corporation's tariff schedule. Other services such as plumbing, which a water corporation may also provide, are not regulated for price.

The WI Act provides the ESC with a role in monitoring and publicly reporting on the performance of the Victorian water corporations both to inform customers and the State Government and to encourage *competition by benchmarking* within the industry. The WI Act requires the ESC to monitor and publicly report on regulated water industry performance and compliance with Water Plans, codes and the SoO.

The ESC is also provided with a dispute resolution function to resolve disputes over price and supply standards between regulated entities.

There is currently no mechanism in Victoria by which non-water corporation service providers could be regulated for service quality or price should they supply urban water services to the public.

3.2.3.4 Price and service standard setting process

Part 2 of the SoO establishes the price and service standard setting process. Each water corporation is obliged to prepare a Water Plan which must contain the service outcomes it will meet over the regulatory period. The Water Plan must include certain minimum standards called *Guaranteed Service Levels* that it will meet, details about how the outcomes will be delivered, revenue requirements and proposed prices. The Water Plan must accord with any guidelines produced by the ESC.⁷⁶ There are also requirements for consultation with government departments, regulators and customers. Water Plans can be viewed as self-regulatory tools produced by the water corporations.

The ESC assesses the Water Plan and makes a draft decision as to whether or not to approve the prices proposed. The proposed prices in a Water Plan must be approved by the ESC if these are in accordance with the procedural requirements specified in the SoO and certain *regulatory principles* which are listed in the WIRO. If approval is not granted the draft decision may specify what further actions or changes will be required for approval. ESC decisions can be viewed as quasi-legislative regulatory tools. The water corporations respond to a final decision with a revised tariff schedule.

Monitoring of compliance with service standards therefore occurs at two levels - externally validated self-monitoring by the water corporations, and external monitoring by the ESC.

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The SoO, WIRO and Customer Codes.

Such as ESC 2013 Water Price Review Guidance on Water Plans. Specific guidance also exists for particular issues such as the calculation of suitable prices for developer contributions for new developments. See Essential Services Commission (2011) "Water industry new customer contributions guideline", Issue No. 3. Melbourne: Essential Services Commission.

3.2.3.5 Consumer protection framework

The ESC regulates for general consumer protection by way of the Customer Service Code. This sets the minimum standards which water corporations must provide to consumers in relation to regulated services. Certain recycled water contracts may be exempted from this code. Water corporations implement the Customer Service Code by developing and complying with their own Customer Charters and Hardship Policies.

Water corporations must also make payments to individual customers if a Guaranteed Service Level set out in a Water Plan is breached.

The Water Act obliges water corporations to participate in an approved customer dispute resolution scheme. The scheme approved by the ESC in Victoria is that operated by the Energy and Water Ombudsman Victoria (**EWOV**). EWOV is a fully member funded body which can make binding decisions. Customer complaints under the Customer Service Code can be taken to EWOV.

Equity concerns around the affordability of urban water services are addressed through a combination of water corporation Hardship Policies, the application of concessions to certain disadvantaged customers and the payment of direct government grants to disadvantaged customers.

The ESC regulates for the consumer protection of trade waste customers by way of the Trade Waste Service Code.⁷⁷ Trade waste agreements are required to authorise the discharge of trade waste by a customer into the sewerage system.⁷⁸ The principles and terms for these agreements are set out in the Trade Waste Service Code. Different forms of agreement are available to reflect different customer risk profiles. Water corporations are obliged to develop Trade Waste Customer Charters to implement the Trade Waste Service Code. In addition, the Water Act authorises water corporations to make by-laws in respect of trade waste.⁷⁹

3.2.3.6 Competition and third party access framework

As there is no retail price competition for urban water services there is currently a reduced role for competition law in Victoria. However, the general competition regime and consumer protection framework of the CCA would apply to this sector to the extent to which it is relevant.

The CCA Part IIIA access regime does not apply to Victorian urban water infrastructure as no application has been made to declare a Victorian infrastructure asset one of national importance. There is currently no State-specific access regime in Victoria and consequently no role for access undertakings or agreements or for the ESC to act as a potential third party access regulator.








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Businesses who dispose of waste to the sewerage system.
Discharge without such an agreement is an offence under s.178 of the Water Act.
The content for such by-laws is set out in Part 3 of the WIRO.

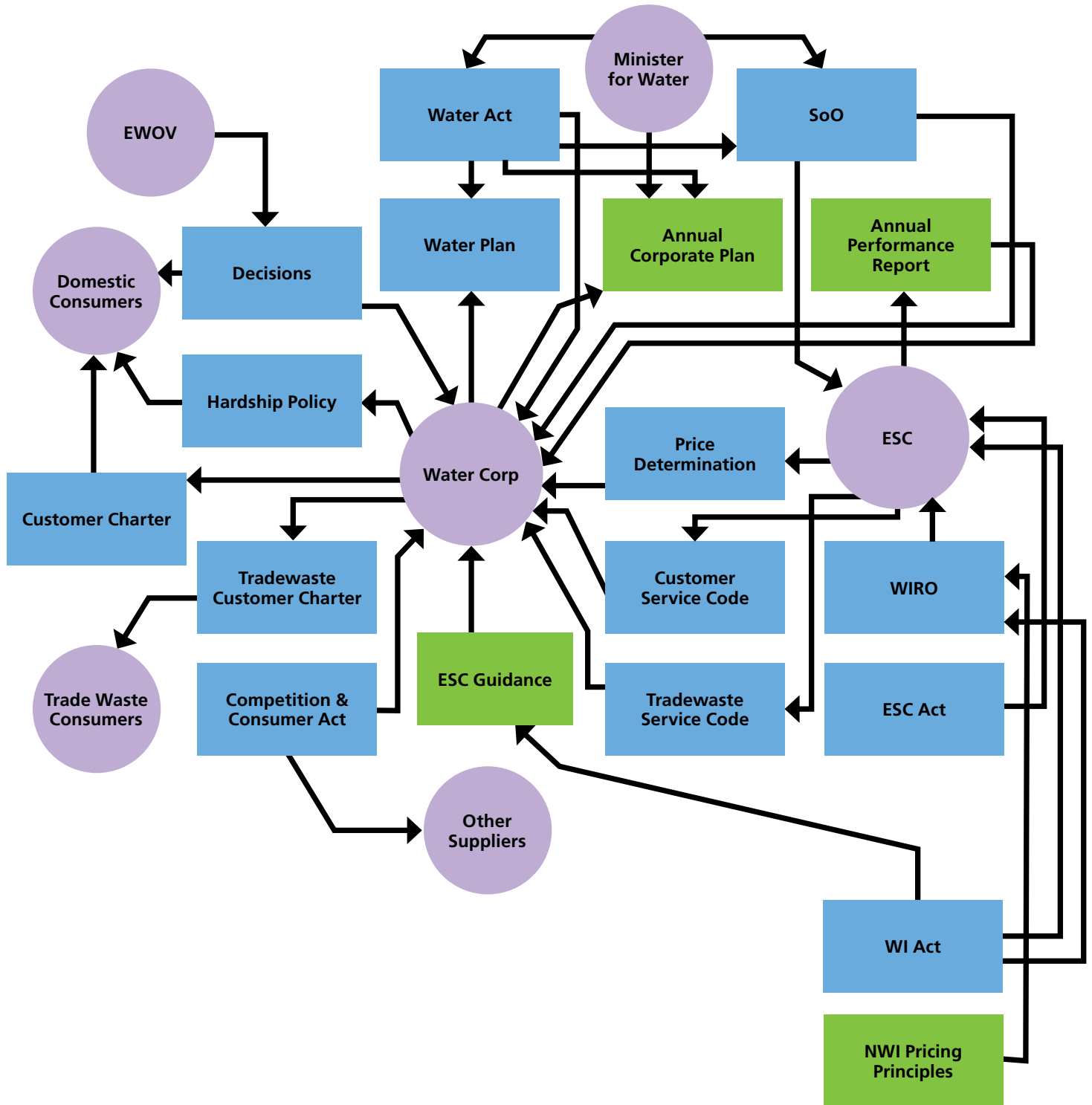
3.3 MAP OF THE SERVICE DELIVERY AND PRICE REGULATION SYSTEM IN MELBOURNE

Melbourne's Service Delivery and Price Regulation System, which is described in detail in Section 3.2, is shown diagrammatically in the map on the following page. This map shows the primary institutional actors involved in this regulation system, the most significant regulatory tools and the interactions between these. The following key has been used in the map.

Key

	Actor
	Regulatory tools - Economic tools
	Regulatory tools - Transactional regulations
	Regulatory tools - Authorisation as regulation
	Regulatory tools - Structural regulation
	Regulatory tools - Informational regulation
	Regulatory tools - Legal regulation

Map of the Service Delivery and Price Regulation System in Melbourne



3.4 REGULATORY REFORM PROPOSALS

The Water Bill⁸⁰ proposed changing the statutory objectives of the water corporations to specifically include the support of liveability and the promotion of the whole of water cycle management. How the liveability aspect of the objective would be interpreted in practice and how it would relate to the price regulation of the water corporations is unclear.

The Productivity Commission (2011) has suggested significant reforms to the way that service delivery and price regulation of the urban water industry in Australia is conducted. Most significant is the suggestion that the States end independent price regulation for retail and bulk urban water services. Instead, State economic regulators could assume a reduced price monitoring role in respect of the sector. The Productivity Commission (2011) also supports the licensing of third party service providers.

To date the most radical Productivity Commission recommendations have not been supported by the OLV. However, other changes to the service delivery and price regulation framework are likely in Victoria as the OLV (2013) supports introducing greater competition to the sector, and has flagged that changes will be made to the regulatory framework. However, the details of the changes are still to be identified.

Section 4
**The Built
Environment
Regulation System**

The Built Environment Regulation System

4.1 FUNDAMENTALS OF THE SYSTEM

4.1.1 Philosophical foundations

4.1.1.1 General foundations

The built environment encompasses man-made parts to our environment such as buildings, roads and other structures. Governments play a key role in controlling the makeup of the built environment in urban areas. They do this by balancing the many competing interests about how the built environment should look and what it should accommodate and by controlling against harms. These harms may arise from the environment itself.⁸¹ Alternatively they may arise from built aspects of the environment.⁸²

The built environment regulation system intervenes at several different levels upon decisions about how the built environment will take shape by:

1. controlling what use urban land and waterways can be put to
2. controlling and influencing the kind of infrastructure that can be developed
3. controlling and influencing how such infrastructure should be designed and built.

The three levels of intervention are dealt with in this report as three separate sub-systems of regulation each with its own particular objectives and specific tools. However, there are significant points of cross over between these sub-systems.

4.1.1.2 Urban drainage

Drainage services are different from other urban water services as their provision is intimately connected to how land is used and managed. Their delivery requires both high-level land management (flood plain management) and the provision of specific drainage infrastructure such as channels, drains and pipes at a more localised scale. Historically, stormwater was viewed as a nuisance, which was liable to cause flooding that could damage property and harm people. Due to this perception the traditional objectives of urban drainage service provision were nuisance control and harm prevention.

81 For example, from flood water as it passes through the urban area.
82 For example, from poorly constructed buildings.

However, in recent years it has become apparent that urban stormwater runoff is a significant environmental pollutant and a contributor to the poor water quality of Melbourne's waterways and bays. Therefore, modern approaches to drainage service provision focus on providing adequate drainage and on controlling for the environmental harms from urban stormwater run-off (Wong et al., 2013, pp.12-13).⁸³

4.1.1.3 Land and waterways use

There are several objectives for land and waterways management regimes which are relevant to urban water management. These regimes regulate how the land and water in catchments and waterways can be used so as to protect water supplies,⁸⁴ water quality and the health of the environment.⁸⁵ In addition, such regimes regulate how flood plains can be used so as to minimise harm to people and property from flood damage. (This aspect is considered in this Section.) Finally, they may regulate how public land is to be used to provide both public amenities and recreational services.⁸⁶

The objective of a planning regime is to provide a mechanism for balancing the complex and competing interests of society around how land is to be used, developed and protected. The logic of such a regime involves the authorisation, or prohibition, of particular land uses and development types.⁸⁷

4.1.1.4 Infrastructure planning

Infrastructure planning regulation involves both:

1. specific elements to control the infrastructure necessary to deliver water, dispose of sewage and provide drainage services - *water industry infrastructure*, and
2. broader elements to control all the types of urban infrastructure that society desires - *other infrastructure*.

Water industry infrastructure regulation involves establishing which bodies have responsibility for providing the necessary infrastructure to deliver urban water services and setting some parameters around the planning for such infrastructure to promote wider social objectives.⁸⁸

The planning control of all other infrastructure falls to planning regimes.

Public bodies can exert significant influence on decisions about all types of infrastructure through the use of their powers to procure works and services. Public procurement rules and practices have as their objective the control of such powers.⁸⁹

4.1.1.5 Infrastructure design and construction

The objective of infrastructure design and construction regulation is to control how built infrastructure is designed and constructed and the standards to which building and plumbing work is done. This is done to protect public health and safety, to protect consumers from poor quality work and to promote other desirable social objectives such as sustainability.

83 A further aspiration of some of these approaches is maximising the potential benefits of stormwater.

84 This aspect has been considered in Section 2.

85 These final two aspects are dealt with in Section 5.

86 Public amenities would include green open spaces and street trees. Recreational service would include waterways for fishing and boating. Recreational services are not considered in this report.

87 This report will only consider the Victorian planning regime in passing as this is the focus of a separate CRC project (Project B5.2).

88 The price regulation of water industry infrastructure provision is considered in Section 3.

89 A detailed examination of these rules is outside of the scope of this report.

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4.1.2 Victorian context

The current regulatory frameworks for the built environment in Victoria tend to operate at a state-wide or municipal level, rather than at the level of the actual city as a greater metropolis.

Victorian urban land and waterways use is regulated by a web of regimes relating to land and waterways management and to planning.

In Victoria, infrastructure planning is regulated by specific rules relating to water industry infrastructure which are contained in primary and delegated legislation and through the planning regime.

Building and plumbing regulation in Victoria consists of primary legislation allocating responsibilities to different entities and establishing the overall regulatory framework, delegated legislation/quasi-legislation containing detailed standards and rules, licensing/registration schemes for professionals working in the industry, and accreditation schemes for certain approved products/techniques. There is also some use of voluntary certification schemes to promote specific desired social objectives, such as sustainability concerns.

4.1.3 Current issues and future trends

The accommodation and use of water by the built environment is at the heart of a WSC. Key mechanisms to achieve the vision of a WSC involve the accommodation of IWCM practices into urban water management and the integration of WSUD practices into decisions about urban land and waterways use, infrastructure planning and infrastructure design and construction. A host of new regulatory tools have evolved over recent years to try to achieve this vision.

Much urban drainage service provision in Victoria reflects the traditional objectives of urban drainage service provision and the goal of controlling flooding risks through a variety of physical mechanisms typically involving the provision of hard infrastructure such as pipes, channels and drains. However, over time there has been a move towards greater use of WSUD to provide benefits in addition to drainage control. This has led to a host of new regulatory tools being developed which are aimed at encouraging both the control of the physical environment and the provision of environmental benefits. These approaches often involve the provision of softer landscape infrastructure such as rain gardens, swales and wetlands. Section 5 considers the environmental health protection aspects of such solutions.

4.2 KEY FEATURES OF THE SYSTEM IN MELBOURNE

4.2.1 International regulation

There are no specific international regulatory regimes for the built environment which apply to urban water management in Australia.

4.2.2 National regulation

4.2.2.1 Land and waterways use

Subject to comments made in Section 2 about the role of the NWI in water planning and policy, land and waterways management remains a State responsibility in Australia.

4.2.2.2 Infrastructure planning

As part of the NWI, non-mandatory national guidelines have been developed on WSUD option evaluation (BMT WBM Pty Ltd, 2009). There is also a certain amount of non-mandatory national advice of a technical and scientific nature on WSUD and stormwater harvesting produced by both Engineers Australia and through the National Water Quality Management Strategy (**NWQMS**). The advice is primarily directed towards the health and environmental risks of stormwater rather than the risks related to flooding.⁹⁰

4.2.2.3 Infrastructure design and construction

The National Construction Code (**NCC**) is a single national standard for all building and plumbing work in Australia. The NCC is updated annually and is given effect by State legislation. The NCC reflects a performance-based approach to regulation and contains performance standards which can be satisfied either by compliance with *deemed to satisfy provisions* or by providing an *alternative solution* which requires specific approval. The NCC cross references several hundred technical standards. Volumes 1 and 2 of the NCC contain the Building Code of Australia (**BCA**) and Volume 3 of the NCC contains the Plumbing Code of Australia within which the plumbing and drainage standards are contained.

The Green Building Council of Australia operates an optional quality mark/certification scheme for the design, construction and fit out of sustainable buildings across Australia.⁹¹ This enables innovative designs to be championed. Water is one of several factors assessed as part of the certification process.

The Watermark Certification Scheme is a compulsory national certification scheme for certain plumbing products.

Various industry-specific technical infrastructure guidelines also apply across Australia.

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See Sections 5 and 6 for a further discussion of these risks.
Both small and large scale.

4.2.3 Victorian regulation

4.2.3.1 Land and waterways use

Catchment management

Catchment management by the PPWCMA is discussed in Section 2. The strategies the PPWCMA produces may be incorporated into Planning Schemes or State Environment Protection Policies (**SEPPs**.) In addition, the Secretary may, by notice, impose special legally-binding landuse conditions on land in a water supply catchment.

Waterways/floodplains management

Part 10 of the Water Act sets out the functions of Melbourne Water as waterways manager for the metropolitan area. This responsibility includes flood plain management functions. Local councils are also given powers to construct, operate and control flood plains management or waterways management schemes. Melbourne Water may require a financial contribution from a local council/other water corporation towards the costs of undertaking waterway management functions. It is a statutory offence to build on a flood plain without appropriate permission from Melbourne Water.

Public land management

A variety of other pieces of State legislation, both primary and delegated, control how public land is managed in Victoria.⁹² These are not considered in this report.

Planning

The Department of Transport, Planning and Local Infrastructure (**DTPLI**) is responsible for planning in Victoria. The enabling framework for the Victorian planning system is the *Planning and Environment Act 1987 (Vic)* (**P&E Act**) which sets broad objectives, rules and principles and defines the roles of those who operate in the system. Also of relevance is the *Subdivision Act 1988 (Vic)* which sets out the procedures for the subdivision of land and the *Owners Corporation Act 2006 (Vic)* which provides the legislative framework for the management of common property.

The Victorian Planning Provisions (**VPPs**) are quasi-legislative rules operating under the P&E Act that set out standard provisions which should guide the development of specific municipal level Planning Schemes. The VPPs become operationalised through the Planning Scheme for an individual municipal area. A Planning Scheme, which is subordinate legislation, determines the zoning of land, specifies how land in a zone may be used/developed and specifies the uses and developments for which a planning permit is required.

Unless a particular land use or development is allowed *as of right* under the relevant Planning Scheme it will require authorisation through the issue of a planning permit by the local council. The conditions which attach to such permits are a significant regulatory tool. Some of these conditions may require developers to enter into an agreement with the council.

4.2.3.2 Infrastructure planning

Drainage infrastructure

Responsibility for providing drainage services to metropolitan Melbourne is shared between local councils and Melbourne Water.

Part 10 of the Water Act sets out the functions of Melbourne Water as waterways manager for the metropolitan area, this includes regional drainage functions. Part 6 of the SoO requires IWCM be taken into account in the planning of drainage services and Part 7 of the SoO sets out additional asset management planning requirements.

The powers of local councils are set out in the *Local Government Act 1989 (Vic)*. Ownership of public sewers and drains is vested in local councils who are given powers to manage and control these. Local council funding comes both from rates charged to local property owners (both residential and commercial) and from other charges and grants.

Both Melbourne Water and local councils are obliged to install and maintain suitable drainage infrastructure to fulfil their functions. Historically, drainage infrastructure used direct physical controls such as storm drains and retarding basins to manage the flow of stormwater and direct it safely away from people and property. This was usually achieved through engineering solutions that would convey the water to rivers and the bay.

However, as the science surrounding stormwater and its place in the environment has evolved there has been a gradual retreat from such approaches. Newer stormwater management practices involve capturing water closer to its source and finding uses for it that do not involve discharge to rivers and the bay. Such practices include stormwater and rainwater harvesting, road and hard area design and connection, and soil moisture retention strategies such as tree planting, rain gardens and wetlands.

The Best Practice Environmental Management Guidelines (**BPEM Guidelines**) provide State level technical scientific advice on WSUD and stormwater harvesting. However, this advice is primarily directed towards health and environmental risks rather than towards flooding risks. The BPEM Guidelines are currently under review.

There are a number of other regulatory tools aimed at education, capacity building and attitude change around WSUD. Recently Melbourne Water published maintenance guidelines about WSUD (Melbourne Water, 2013).

Water Industry infrastructure and other infrastructure

A significant regulatory tool in the planning regime aimed at promoting both supply and demand management and WSUD is cl56.07 of the VPPs which contains the various *integrated water management* requirements a developer must fulfil in relation to a residential subdivision. These are triggered when a planning permit to subdivide is sought.

Cl56.7 imposes obligations on a developer to ensure the supply of drinking water and sewerage services to a residential lot.⁹³ However, this is coupled with a requirement to substitute drinking water for reused or recycled water for non-potable uses.⁹⁴

Cl56.07-4 has the objective of reducing urban stormwater run-off for public safety, property safety and environmental protection purposes and requires urban stormwater management systems to be put in place.⁹⁵ These systems must comply with the BPEM Guidelines and satisfy certain performance requirements. Cl56.07-4 has an accompanying practice note. Cl56.07-4 is limited in scope as a tool as it currently only applies to residential subdivisions of more than two properties (Kay and Hussey, 2013).

Where compliance with cl56.07-4 is not possible the developer may pay an off-set amount to Melbourne Water to construct suitable assets elsewhere. The legality of the use of offsets by local councils is untested. Even if cl56.07-4 does not apply to a development some local councils still apply the BPEM Guidelines objectives as council policy and encourage voluntary compliance by developers (Kay and Hussey, 2013).⁹⁶

The power of a water corporation to levy a contribution from a developer towards the cost of urban water service infrastructure for the new development is a further regulatory tool. The use of this power is controlled by the ESC which has set out guidance to water corporations on appropriate pricing principles to apply in setting such levies (Essential Services Commission, 2011).

The Water Act also obliges local councils to impose conditions in a planning permit if drainage in an area may be affected.

4.2.3.3 Infrastructure design and construction

Water industry infrastructure

The Water Act gives water corporations the right to construct water industry infrastructure and requires:

1. that a works licence be obtained from the Minister for Water for the carrying out of works on a waterway
2. that Ministerial approval be obtained before any underground disposal is made
3. that Ministerial approval be sought before abandoning major works.

The Water Act also vests the Minister for Water with wide powers to give directions regarding such works. Once water industry infrastructure is built it is given certain statutory protections in the Water Act.

The Water Act also sets up a licence scheme to regulate drillers.

93 In cl 56.07-1 and cl 56.07-3.

94 Cl 56.07-2.

95 By increasing the quality of receiving waters.

96 Typically in urban infill situations.

Other infrastructure

The *Building Act 1993 (Vic)* (**Building Act**) establishes the framework for Victoria's building and plumbing regulation system and establishes Victoria's building industry regulator and its plumbing industry regulator.⁹⁷

The Building Regulations 2006 (Vic) (**Building Regs**) incorporate the BCA into Victorian law by making it a requirement that the BCA be complied with in all building works. Unless exempt, all buildings must comply with the requirements in the Building Act, the Building Regs and the BCA regarding the standard for building work. Additional regulatory tools operating under the framework of the Building Act include the regulation of building practitioners by a registration scheme and the accreditation of certain building products and methods. Building standards are also controlled by the mandatory requirement for building and occupancy permits to be issued by a registered building surveyor.

The Building Act regulates plumbing practitioners by way of a registration and licensing scheme and provides for self-certification of plumbing works. This is underpinned by a system of random audits. Plumbing work must only be carried out by a registered plumber. The Plumbing Regulations 2005 (Vic) (**Plumbing Regs**) incorporate the BCA into Victorian law by making it a requirement that the Plumbing Code of Australia be complied with. In addition, the Plumbing Regs contain additional Victoria specific rules relating to the quality of stormwater plumbing work.

The BCA includes the requirement that all new residential buildings and renovations achieve a 6 star standard for energy performance (Building Commission Victoria, 2011). The 'deemed to satisfy' provisions require the installation of a solar hot water system or a rainwater tank for toilet flushing in all new Class 1 buildings. Alternative solutions involving greywater recycling or purple pipe systems are possible but would require individual certification by a registered building surveyor. Alternative solutions must also comply with the Plumbing Regs.








The Building Regs set out specific requirements regarding the design and construction of stormwater drainage systems, septic tank systems and certain building works in flood prone areas. These specific requirements often require that additional approvals are obtained from the local council.

Local laws enacted by local councils may also impact on construction.

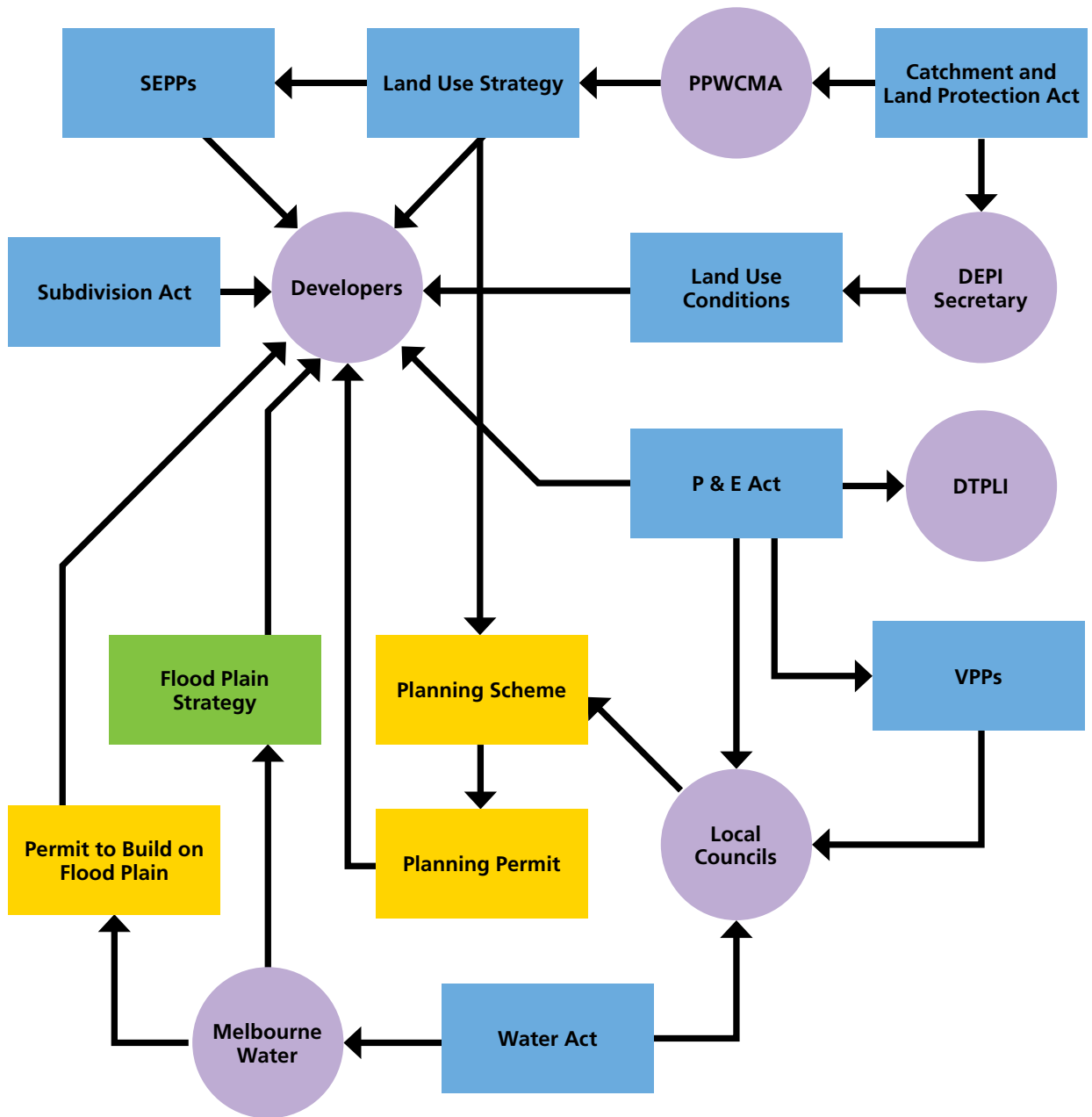
4.3 MAPS OF THE BUILT ENVIRONMENT REGULATION SYSTEM IN MELBOURNE

Melbourne's Built Environment Regulation System, which is described in detail in Section 4.2, is shown diagrammatically in the three maps on the following page. These maps show the primary institutional actors involved in this regulation system, the most significant regulatory tools and the interactions between these. The following key has been used in the maps.

Key

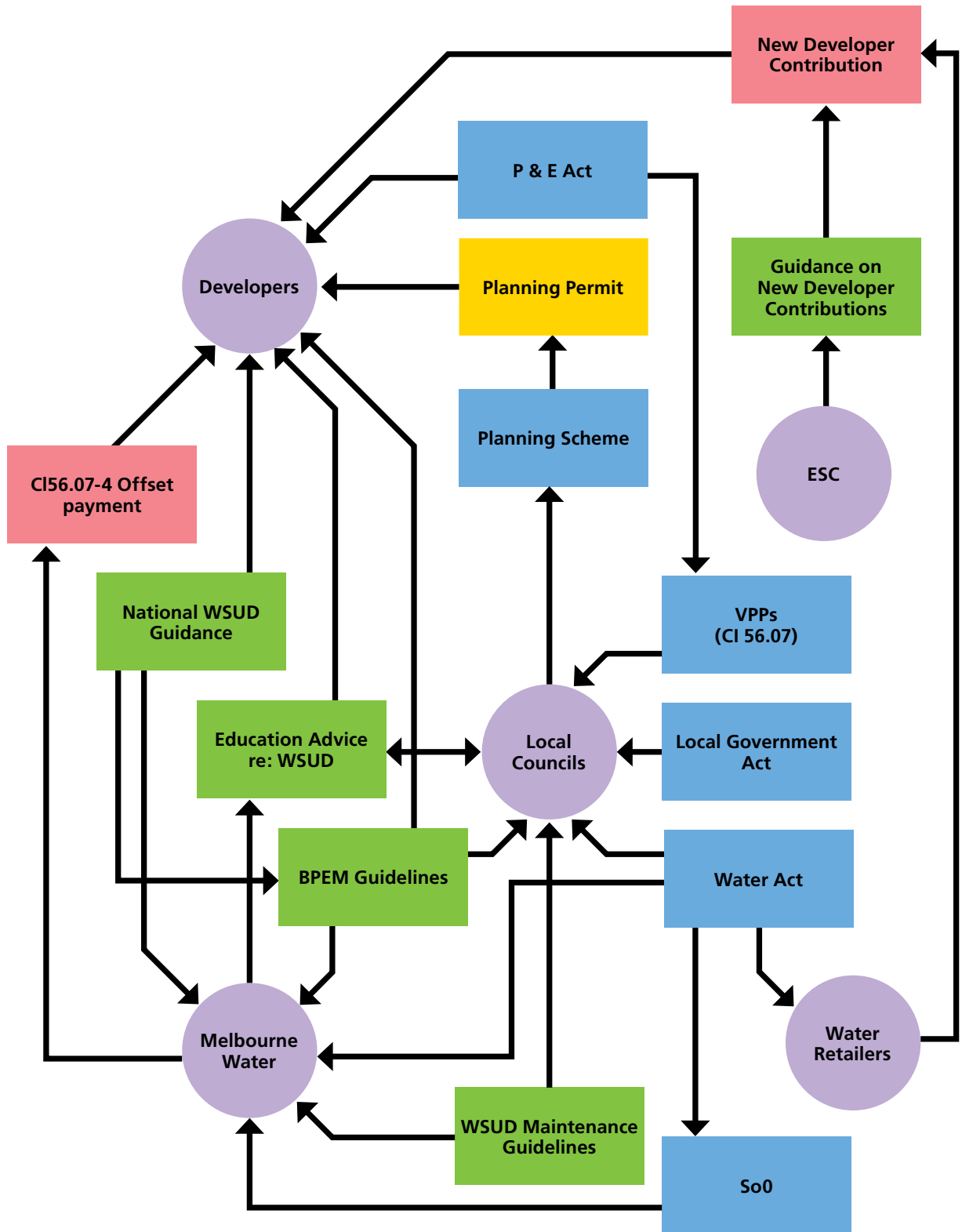
	Actor
	Regulatory tools - Economic tools
	Regulatory tools - Transactional regulations
	Regulatory tools - Authorisation as regulation
	Regulatory tools - Structural regulation
	Regulatory tools - Informational regulation
	Regulatory tools - Legal regulation

Map of the Built Environment Regulation System in Melbourne - Land and Waterways Use

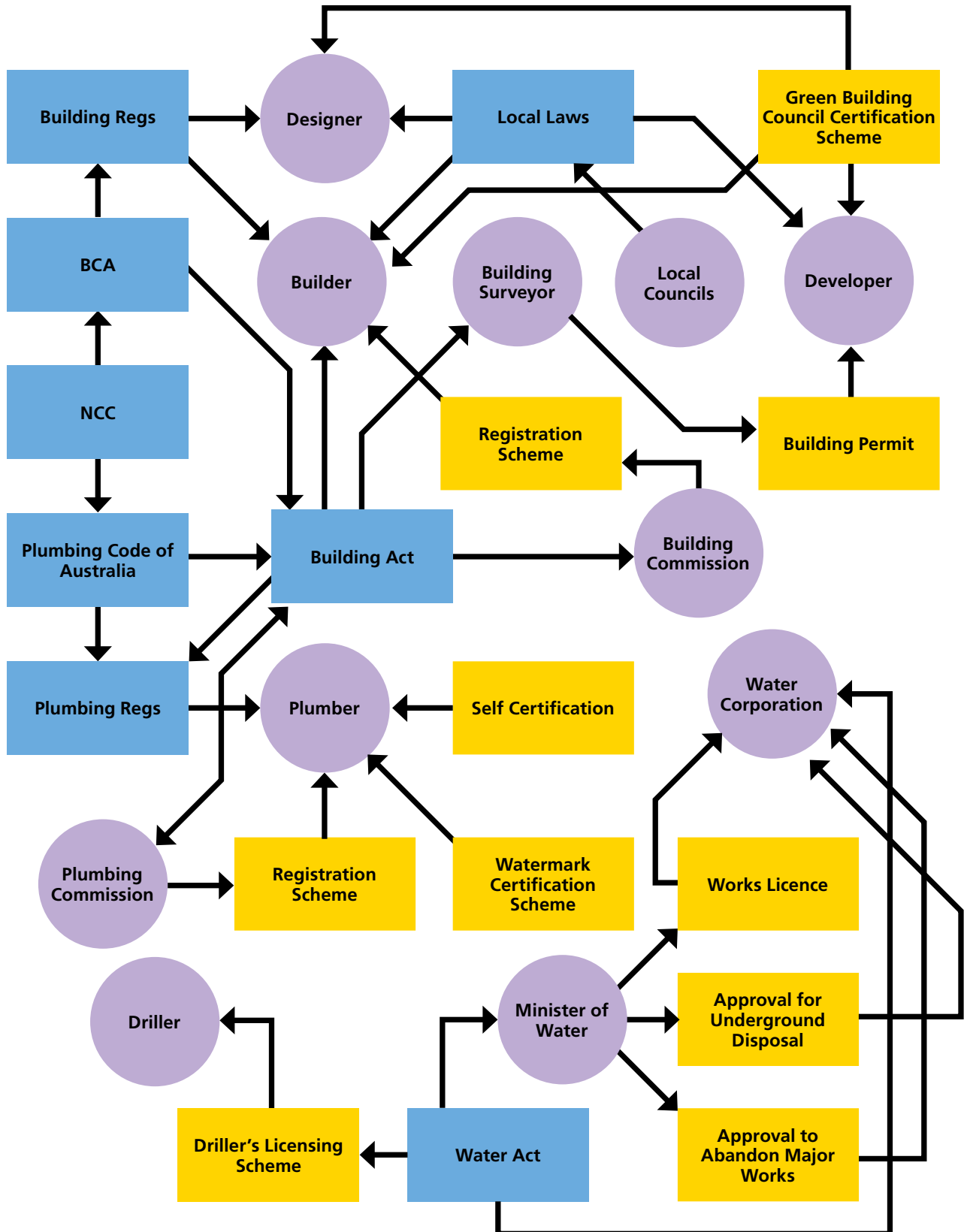


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Map of the Built Environment Regulation System in Melbourne - Infrastructure Planning



Map of the Built Environment Regulation System in Melbourne - Infrastructure Design and Construction



4.4 REGULATORY REFORM PROPOSALS

The Water Bill⁹⁸ proposed certain changes to the built environment regulation system. In particular:

1. the licensing of managed aquifer recharge schemes
2. the licensing of the operation of domestic bores
3. the licensing of activities such as tree and sand removal adjacent to waterways⁹⁹
4. the removal of the requirement for a water corporation to obtain ministerial approval for the decommissioning of works.

Several other regulatory reforms are currently underway in Victoria across the built environment regulation space (Office of Living Victoria, 2013):

1. the BPEM Guidelines are currently being revised
2. the OLV is actively looking at changing and extending c156.07-4
3. the OLV is actively investigating developing new mandatory building performance standards incorporating WSUD requirements.

In addition the OLV (2013) has identified certain other potential reforms which may be pursued in the future but which do not currently have timelines attached to them. These include:

1. making greater use of stormwater as a resource
2. new infrastructure guidelines for the water industry
3. new disclosure requirements, relating to the water performance of the property, which would apply when a property is sold or rented.

At the national level the Productivity Commission (2011) has suggested that a solution to the current lack of clarity and overlapping responsibilities in relation to drainage service provision would be for water corporations to have sole responsibility for the built transmission networks. Service delivery and local built infrastructure could then become local council responsibilities. There is no current suggestion that this approach will be adopted in Victoria. If adopted it would involve significant legislative change. In all likelihood, it would also involve a new suite of contractual regulatory tools to govern the relationship between local councils and the water corporations.

Section 5
**The Environmental
Health Regulation
System**

The Environmental Health Regulation System

5.1 FUNDAMENTALS OF THE SYSTEM

5.1.1 Philosophical foundations

5.1.1.1 Overview

The environmental health regulation system controls risks to the health of the Victorian environment. Risks to environmental health are often also risks to human health. Accordingly, there is a close relationship between this system and the system for public health regulation.¹⁰⁰

The intellectual logic of this system of regulation derives from environmental law and in particular the 11 *principles of environmental protection*.¹⁰¹ These principles are heavily influenced by environmental science and related disciplines.

There are two main categories of threats to the environmental health of *water dependent environments* and the ecosystems they maintain¹⁰² - threats to water quality and threats to water quantity. They are considered separately below. Urban water management practices may also threaten the health of the environment through the degradation of other environmental resources,¹⁰³ or the production of significant amounts of climate changing gases.¹⁰⁴ While these environmental impacts are important they are outside of the scope of this mapping exercise.

100 This is discussed in detail in Section 6.

101 The 11 principles are set out in s.1B-IL of the Environment Protection Act 1970 (Vic). These are: the principle of integration of economic, social and environmental considerations, the precautionary principle, the principle of intergenerational equity, the principle of conservation of biological diversity and ecological integrity, the principle of improved valuation, pricing and incentive mechanisms, the principle of shared responsibility, the principle of product stewardship, the principle of wastes hierarchy, the principle of integrated environmental management, the principle of enforcement and the principle of accountability.

102 For the purpose of this report the term 'water dependent environment' is used in broad sense to capture all urban rivers, streams, creeks, estuaries, wetlands and bays.

103 By, for example, failing to recover nutrients from sewage.

104 By, for example, the operation of recycling or desalination plants.

5.1.1.2 Water quality threats

Water quality can be threatened by pollution impacting on water dependent environments and the ecosystems they maintain. Pollution may be either point source, or diffuse (non-point source).¹⁰⁵ Pollution threats are reduced by controlling the discharge of polluted water to the environment. Historically, Australian environmental health regulation regimes have focused on the control of point source pollution. Only recently have such regimes considered non-point source pollution control in any depth.

Sewage, and water contaminated by industrial uses, released to the environment tends to be characterised as point source pollution as the contamination can be traced to identifiable sources. Common regulatory tools to control point source pollution involve a combination of primary and delegated legislation, and authorisational tools.¹⁰⁶

5.1.1.3 Water quantity threats

Urban water dependent environments and their ecosystems can be degraded by receiving too much water, too little water or water flows which do not match historical patterns. Such degradation may also result in less water being available for other beneficial environmental purposes, such as the irrigation of urban parklands.

Water quantity may be threatened by the over-extraction of water resources. Water quantity may also be threatened by the inefficient use of water resources. Threats to water quantity from over-extraction and inefficient resource use have consumptive as well as environmental impacts and are considered in Section 2.

As our understanding of the science surrounding stormwater and its place in the environment has evolved, it has been recognised that the changes to stormwater flow patterns caused by urbanisation itself are causing significant environmental degradation to urban waterways (Fletcher et al., 2011). This has led stormwater management practitioners to investigate alternatives to traditional engineering approaches to drainage that focused on conveying stormwater to rivers and the bay as quickly as possible. New stormwater management practices involve capturing the stormwater closer to its source and finding uses for it that do not involve discharge to rivers and the bay.

105 Point source pollution originates from a single identified source. Non-point source pollution originates from multiple sources. These may be harder to identify than a single source.

106 Legislation is used to establish acceptable discharge standards and create pollution offences, while authorisational tools, such as permits and licences, control the release of potentially contaminated water.

5.1.2 Victorian context

The regulatory regime, which controls point source pollution in Victoria has been in place since the early 1970s.

In recent times it has become apparent that urban stormwater runoff is a significant environmental pollutant and contributor to the poor water quality of Melbourne’s waterways and bays. As the non-point source pollution in stormwater originates from many sources,¹⁰⁷ its control is more complex than the control of point source pollution. Current Victorian regulatory approaches to the control of pollution from urban stormwater run-off involve a combination of two approaches:

1. control of the activities causing the pollution. This often involves the use of primary and delegated legislation to create pollution offences and to control particular activities that may be causing the pollution¹⁰⁸
2. capture and treatment of the polluted water before it can be discharged to the environment. This commonly occurs alongside the provision of urban drainage services (Wong et al., 2013, pp.12-13) and involves a host of new technologies involving soft landscape infrastructure.¹⁰⁹ Regulation may mandate the use of these approaches,¹¹⁰ or may encourage the uptake of such technologies through grants and rebates, and education and best practice guidelines.

5.1.3 Current issues and future trends

The vision of a WSC is in many respects well aligned to the objectives of the environmental protection regulation system. The WSC vision encapsulates several of the 11 ‘principles of environmental protection’ and encompasses concerns related to the protection of water dependent environments and their ecosystems. Indeed, the WSC vision goes even further and encompasses an additional objective of encouraging the greening of the urban environment (Office of Living Victoria, 2013). Evolving WSUD practices often link together several objectives relating to environmental health protection in mutually beneficial ways. For example a WSUD practice which captures stormwater may both prevent the degradation of urban waterways from pollution and excess water flows, and enable the irrigation of street trees.

While there are many potential regulatory tools aimed at controlling non-point source pollution from urban stormwater, there is some evidence that the existing legislative provisions are not always adequately enforced (Melbourne Water and Environment Protection Authority Victoria, 2009, p.92). There are also some gaps in the tools currently available, such as the lack of regulation for environmental purposes of, for example, the discharge of stormwater from local council drains.

Several new approaches to the regulation of stormwater for environmental purposes are currently being actively pursued in Victoria and are discussed in Section 5.4.

107 For example, vehicle emissions, litter, roofing materials, vehicles, animal faeces, leaf matter and cross contamination with the sewerage system. Such pollution may originate upstream in a rural catchment or in the urban area itself.
 108 Such as littering and poor building site maintenance.
 109 Such as rain gardens, swales and wetlands.
 110 For example, CI56.07-4 of the VPPs discussed in Section 4.

New approaches to waterways health are also focusing on the environmental health of upper catchments,¹¹¹ rather than upon remediation works to restore waterways and control pollution at the end of catchments. These are currently at an experimental stage. However, it is likely that funding best practice management actions to control the quality of stormwater run-off which are aimed at agricultural producers in rural catchments is substantially more cost effective than actions aimed at directly improving urban water quality (Melbourne Water and Environment Protection Authority Victoria, 2009). To date, upper catchment interventions have tended to concentrate on public land. However, an innovative approach has been trialed in Melbourne (Fletcher et al., 2011) which uses an auction process to encourage environmental remediation work for stormwater retention on private allotments.¹¹² This was accompanied by significant amounts of focused public education.

5.2 KEY FEATURES OF THE SYSTEM IN MELBOURNE

5.2.1 International regulation

Australia is a signatory to several international legal and policy instruments aimed at the protection of freshwater resources and ecosystems (Stoeckel et al., 2012).¹¹³

In addition, the *Berlin Rules on Water Resources* (**Berlin Rules**) while falling short of establishing binding legal rules have a strong influence upon domestic law in this area (Stoeckel et al., 2012).¹¹⁴ The Berlin Rules require the sustainable use of water resources and the protection of waters from environmental damage and pollution.¹¹⁵

5.2.2 National regulation

5.2.2.1 EPBC Act

The *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (**EPBC Act**) incorporates into Australian law certain international environmental commitments. The EPBC Act also prohibits certain actions that may have a significant impact on matters of national environmental significance.¹¹⁶ The EPBC contains a procedure to approve, subject to conditions, otherwise prohibited actions.

5.2.2.2 NWI

The NWI sets out several actions that State governments are expected to take in relation to environmental protection. However, these actions tend to focus on rural rather than urban water management.

111 There is then some cross over with land management regimes (see Section 4), in particular the discussion of the CLPA.

112 The approach was trialed in the Little Stringybark Creek catchment and was called a 'stormwater tender'. Private land owners bid for the minimum level of subsidy they would require to undertake stormwater retention works such as installing rainwater tanks, rain gardens and downpipe diversions.

113 The most significant being the Intergovernmental Agreement on the Environment, the Ramsar Convention on Wetlands of International Importance, the Convention on Biological Diversity, the World Charter for Nature and Agenda 21.

114 Customary norms of international law relating to the regulation of freshwater resources produced by the International Law Association.

115 Articles 7 and 8.

116 These include Ramsar listed wetlands, migratory species and nationally threatened species.

5.2.2.3 NWQMS

The NWQMS represents a national approach to improving water quality in Australia and New Zealand. The NWQMS was established in 1992 and is currently overseen by the Standing Council on Environment and Water (**SCEW**) and the Natural Resource Management Council (**NRMC**). The objective of the NWQMS is sustainable resource use through the protection and enhancement of water quality. The NWQMS is based upon the principle of economically sustainable development.

The NWQMS requires the preparation of management plans for individual water catchments, aquifers, estuaries and coast waters.

The NWQMS has also given rise to a large number of non-mandatory guidelines which are all based on a preventative risk management framework. These guidelines are designed to influence State approaches to regulation and include:

1. the Guidelines for Fresh and Marine Water Quality (**Water Quality Guidelines**). The Water Quality Guidelines outline water quality objectives and define indicators and trigger values to indicate when these qualities are threatened. These are currently being updated and revised
2. the Australian Guidelines on Water Quality Monitoring and Reporting (**Monitoring Guidelines**). The Monitoring Guidelines provide a framework for monitoring fresh, marine and groundwater quality
3. the Guidelines for Groundwater Protection in Australia
4. the Guidelines for Urban Stormwater Management
5. the Guidelines for Sewerage Systems¹¹⁷
6. the Australian Guidelines on Water Recycling (**AGWR**).¹¹⁸ The NWC promotes State-based regulatory approaches based on the AGWR. These are discussed in Section 6.

The uptake of these guidelines varies across Australian jurisdictions and many are not currently up to date. An independent evaluation of the NWQMS (KPMG, 2011) recommended greater clarity about the purpose of the NWQMS, closer links to other water reform agendas, clearer roles and responsibilities and a series of rolling reviews of the guidelines.

117 These include guidelines on effluent management, acceptance of trade waste, biosolids management, reclaimed water use and sewerage system overflows.

118 These include guidelines for general management of health and environmental risks, augmentation of drinking water supplies, stormwater harvesting and reuse and managed aquifer recharge.

5.2.3 Victorian regulation

5.2.3.1 Overview

Victoria's environmental protection regulator is the Environment Protection Authority (**EPA**). The EPA is part of DEPI and is accountable to the Victorian Parliament.

The key piece of primary legislation in relation to environmental protection in Victoria is the *Environment Protection Act 1970 (Vic)* (**Environment Protection Act**) which establishes the EPA and provides a risk-based framework for the protection of the environment. However, there are several other pieces of primary legislation that control for particular environmental hazards in relation to water dependent environments and their ecosystems. The most important of these is the Water Act.

Statutory policies are pieces of delegated legislation that operate underneath the Environment Protection Act, and which set out the specific standards required for the protection of particular parts of the environment.¹¹⁹ The SEPPs establish the environmental values which society wishes to protect, identify ways in which to measure if these are being protected, and identify measures to ensure their protection or remediation.

There are two SEPPs relevant to urban water management. The State Environment Protection Policy (Waters of Victoria) (**SEPP (WoV)**) sets out the framework and standards for the protection of Victorian waterways. The State Environment Protection Policy (Groundwaters of Victoria) (**SEPP (GoV)**) sets out the framework and standards for the protection of Victorian groundwater. Together these incorporate the Water Quality Guidelines into Victorian law although some of the water quality targets are aspirational at the current time.¹²⁰

The EPA also issues a large amount of non-binding guidance.¹²¹

5.2.3.2 Water quality threats

Point source pollution - overview

The main mechanism used by the EPA to protect the environment from point source pollution is the licence and/or works approval system. Under this system an occupier of premises likely to be undertaking polluting activities is required to obtain an operating licence and/or works approval from the EPA.¹²² The categories of premises that require a licence and/or works approval to operate are listed in the Environment Protection (Scheduled Premises and Exemptions) Regulations 2007 (Vic).

Water quality standards are set in SEPP(WoV) and all discharge of effluent to the environment must be in accordance with these standards.¹²³ The Environment Protection Act and the Water Act also set out various pollution offences.

The control of point source pollution through the mechanisms in the Environment Protection Act is perceived as 'robust and effective' (Melbourne Water and Environment Protection Authority Victoria, 2009, p.49).

119 State Environment Protection Policies (SEPPs) and Waste Management Policies (WMPs).

120 The SEPPs also have public health objectives.

121 To assist organisations in fulfilling the conditions of licences and works approvals and in complying with the legislative requirements in the Environment Protection Act and the SEPPs.

122 These are given effect by the Environment Protection Act.

123 S. 38 Environment Protection Act.



Point source pollution - sewage

Control of sewage pollution operates at three levels:

1. by controlling what goes into the reticulated sewerage system
2. by controlling what comes out of the reticulated sewerage system
3. by controlling what happens to sewage treated outside of the reticulated sewerage system.

Control of what goes into the reticulated sewerage system is done by the application of several legislative tools which attempt to ensure that only sewage is allowed into the system and strongly encourages the offsite discharge of domestic sewage into this system. Therefore, under the Water Act, water corporations are given extensive powers to require domestic properties to connect to sewerage networks. Further, SEPP(WoV) prohibits the offsite discharge of wastewater other than to a sewer. The Water Act also provides that it is a statutory offence to discharge non-sewage to a sewer.¹²⁴

Control of what comes out of the reticulated sewerage system is achieved by requiring sewage treatment plants discharging more than 5,000 litres of effluent to the environment per day to be licensed under the Environment Protection Act licensing regime. Traditionally such water treatment plants have been owned and/or managed by the water corporations. SEPP (WoV) contains further detail about what should be considered by the EPA in issuing such licences. The licensing regime for both public health and environmental health reasons is considered in detail in Section 6.

Control of what happens to sewage treated outside of the reticulated sewerage system is achieved by the regulation of small on-site sewage facilities under a modified Environment Protection Act licensing regime for both public health and environmental health purposes.¹²⁵ This is also considered in detail in Section 6.

Systems that recycle sewage in a closed loop fashion and accordingly do not discharge any effluent to the environment, as well as off-site systems that discharge less than 5,000 litres of effluent to the environment per day, are currently outside of the existing regulatory regimes.

Point source pollution – industrial waste

Control of industrial effluent pollution is managed by the terms of individual trade waste agreements between industrial effluent producers and the water corporations. These allow agreed amounts of waste to be discharged into the sewerage system (Melbourne Water and Environment Protection Authority Victoria, 2009, p.49) subject to certain conditions. The Water Act provides that it is a statutory offence to discharge designated trade waste to a sewer,¹²⁶ and grants water corporations extensive powers both to make by-laws for trade waste and to enforce trade waste agreements.

Industrial waste plants discharging more than 5,000 litres of effluent to the environment per day are required to be licensed under the Environment Protection Act licensing regime. SEPP (WoV) contains further detail about what should be considered by the EPA in issuing such licences.

124
 125
 126

S. 178 of the Water Act.
 Discharging less than 5,000 litres of effluent to the environment per day. These are termed septic tank systems.
 S. 178 of the Water Act.

Non-point source pollution – urban stormwater

A five year plan by Melbourne Water and the EPA sets out various targets which are consistent with the SEPPs to reduce non-point source pollution arising from urban stormwater flows in the bays and waterways. This plan also sets out a series of proposed actions to meet these targets (Melbourne Water and Environment Protection Authority Victoria, 2009). Achievement of the plan's targets will involve applying a number of different regulatory tools:

1. control of littering through littering offences contained in various pieces of primary legislation¹²⁷
2. control of potentially polluting building site practices through the provision of guidance and local laws¹²⁸
3. prevention of sewerage system overflows¹²⁹
4. improving stormwater quality and treatment through WSUD such as rain gardens and swales. The BPEM Guidelines provide state level technical scientific advice on WSUD and stormwater harvesting which is primarily directed towards health and environmental risks. The BPEM Guidelines place an emphasis on water quality (nutrients and sediment) objectives and amounts of litter in receiving waters and do not consider stormwater flow issues.¹³⁰ There are also a number of regulatory tools aimed at education, capacity building and attitude change around WSUD and the encouragement of WSUD uptake through the use of grants and rebates.¹³¹

The discharge of urban stormwater from local council drains is exempt from EPA licensing requirements.¹³² Therefore, a potential tool (EPA licensing) for controlling stormwater discharge quality is not currently being used.

5.2.3.3 Water quantity threats

The Water Act is the primary legislative tool which ensures that adequate water is available in all environments. The Water Act establishes an environmental water reserve and an environmental water holder.¹³³ Together these provide the conceptual framework to give water for environmental purposes a legal status in the water allocation and planning frameworks operating under the Water Act. For more detail on these planning and allocation frameworks see Section 2.¹³⁴ The tools aimed at encouraging WSUD are also used to control water quantity threats and are discussed above.

127 Such as those in the Environment Protection Act, the Health Act 1958 (Vic), the Litter Act 1987 (Vic) and the Public Health and Wellbeing Act 2008 (Vic).

128 Guidance would include the EPA Environmental Guidelines for Construction Sites. An example of a local law is the City of Kingston, Local Law, Section 10. Such local laws are in turn given legal effect by the operation of the Local Government Act 1989 (Vic).

129 SEPP (WoV), cl 35 requires water corporations to maintain their sewers to a standard of no leaks or spills for a 1 in 5 year rainfall event or equivalent to achieve certain water quality outcomes. Achieving these by way of sewer containment is very expensive and Melbourne Water have recently commissioned specialist research into ways that environmental benefits could be achieved by other broad interventions higher up the catchment.

130 The BPEM Guidelines are given some legal effect through the planning regime (CI56.07-4 of the VPPs) and potentially through SEPP (WoV).

131 For example, educational materials, the Clearwater initiative and prizes for rain gardens.

132 Environment Protection (Scheduled Premises and Exemptions) Regulations 2007 (Vic).








133 Ss. 4A and 4B, Part 3AA, Part 4, Div A of the Water Act.

134 See also Gardner, Alex, Richard Bartlett & Janice Gray (2009) Water Resources Law. LexiNexis Butterworths. For a discussion of these provisions which notes that in Victoria whilst this statutory framework exists there is no duty to make such an allocation.

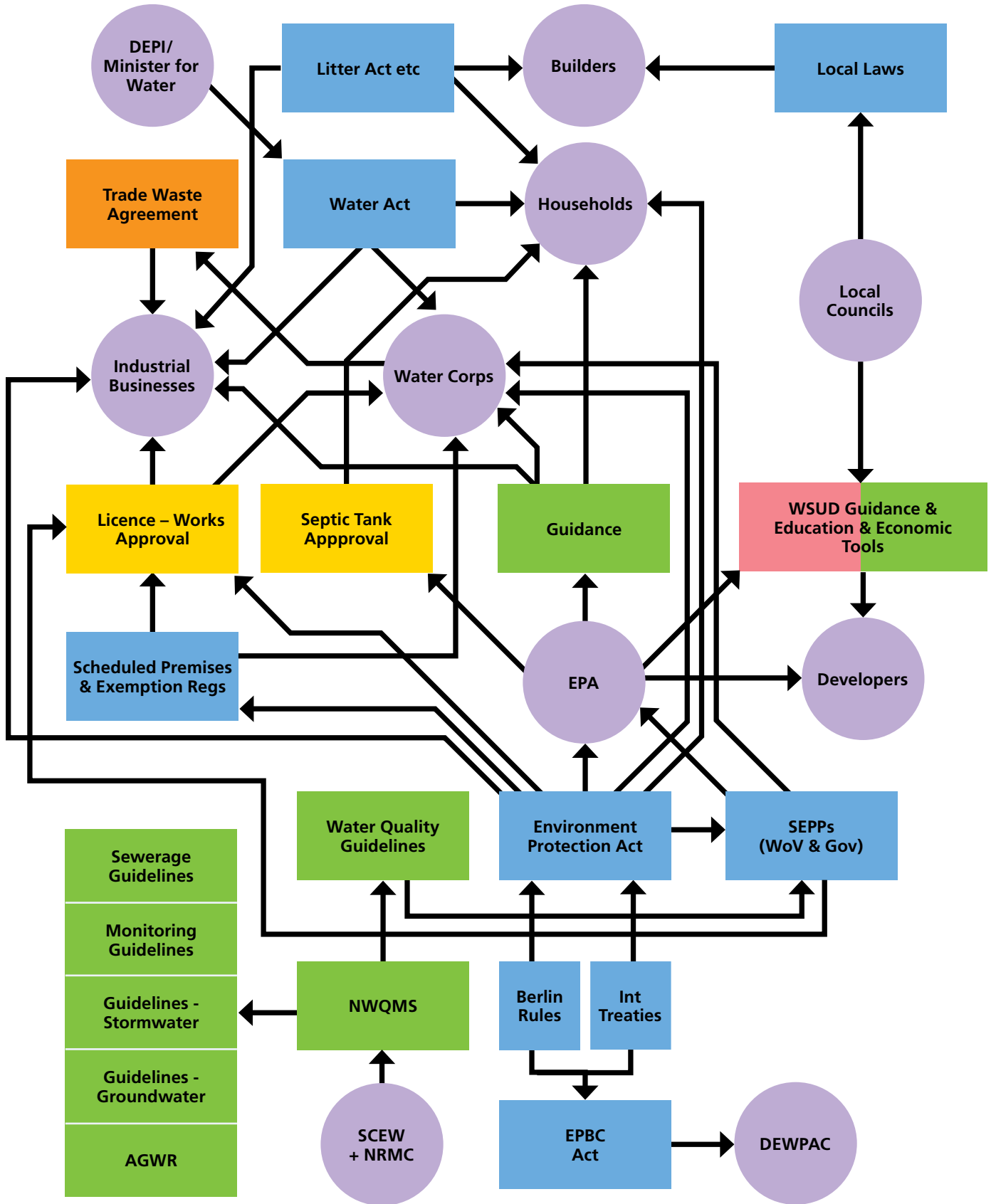
5.3 MAP OF THE ENVIRONMENTAL HEALTH REGULATION SYSTEM IN MELBOURNE

Melbourne's Environmental Health Regulation System, which is described in detail in Section 5.2 above, is shown diagrammatically in the map on the following page. This map shows the primary institutional actors involved in this regulation system, the most significant regulatory tools and the interactions between these. The following key has been used in this map.

Key

	Actor
	Regulatory tools - Economic tools
	Regulatory tools - Transactional regulations
	Regulatory tools - Authorisation as regulation
	Regulatory tools - Structural regulation
	Regulatory tools - Informational regulation
	Regulatory tools - Legal regulation

Map of the Environmental Health Regulation System in Melbourne



5.4 REGULATORY REFORM PROPOSALS

A central theme in Melbourne's Water Future, the recently released strategy on future water policy in Victoria, was the capture and reuse of stormwater and the reuse of sewage and greywater (Office of Living Victoria, 2013). To this end the OLV intends to promote better use of wastewater.¹³⁵ The OLV also supports the linking of water/energy/waste cycles,¹³⁶ which is an environmental issue that has received relatively little attention to date in Victoria.

The Victorian Government is actively pursuing several new approaches to the regulation of stormwater for environmental purposes. Some are listed below.

1. The EPA is currently reviewing and updating the BPEM Guidelines (Office of Living Victoria, 2013, p.85) to ensure that these continue to reflect scientific best practice.
2. Yarra Ranges Council is proposing to put an environmental significance overlay into the local Planning Scheme to encourage residents applying for planning permission for works that increase hard surfaces by a specified amount to take action to prevent stormwater run-off into the catchment (Office of Living Victoria, 2013, p.85).
3. The OLV intends to support new community education initiatives on how stormwater can impact on waterways health.¹³⁷
4. The OLV intends to fund upstream stormwater projects and also to monitor and regularly publish stormwater quality information.¹³⁸

As part of the NWQMS the Water Quality Guidelines are currently being updated (Council of Australian Governments Standing Council of Environment and Water, 2013).

The EPA is currently undertaking a review of the overarching framework for all statutory policies and intends to review the SEPPs once this is complete.

135 See Outcome 3.2 Melbourne's Water Future.
136 See Outcome 3.2 Melbourne's Water Future.
137 See Outcome 3.5 Melbourne's Water Future.
138 See Outcome 3.5 Melbourne's Water Future.

Section 6
**The Public Health
Regulation System**

The Public Health Regulation System

6.1 FUNDAMENTALS OF THE SYSTEM

6.1.1 Philosophical foundations

Australian governments have long played a role in developing regulation to protect the public from threats to health. The human consumption of water poses clear risks to human health, and this provides justification for government interventions to regulate the quality of the water supplied for drinking purposes.

Even water that is not supplied for direct human consumption may, if ingested, impact on human health. Ingestion of water may happen if it is used for irrigating food crops that are sold raw, if it is used to flush toilets and droplets of the flush water become airborne or if it is used to irrigate outside areas using a spray mechanism (Department of Sustainability and Environment and Department of Health, 2009, p.21). Many of these uses are unlikely to pose a significant risk to public health as the chance of ingestion is low but some may, and the risks are greatest if water is sourced from contaminated supplies. This provides a case for additional government intervention to regulate the quality of water that may be incidentally ingested.

This section considers the regulation which is aimed at reducing water quality risks to human health in the supply of urban water. Public health risks may also arise from the inadequate removal and treatment of wastewater and Section 3 provides a discussion about the regulation of wastewater service provision. Public health risks may also arise from contaminated water in the environment and Section 5 reviews environmental health regulation. Finally, poor-quality plumbing work may also threaten public health by allowing cross connections to occur between potable, non-potable and sewerage systems. Section 4 considers plumbing regulation.

6.1.2 Victorian context

Victoria draws a basic distinction between:

1. drinking (potable) water and
2. other (non-potable) water.

The quality of drinking water is regulated by a specific legislative regime and also through government control of the entities that are allowed to supply potable water. The reservation of drinking water service provision to large, centralised government-owned entities ensures that these providers have a certain level of technical competence and a long-term ownership interest in service provision (Department of Sustainability and Environment and Department of Health, 2009, p.8). Such entities are likely to have the skills and equipment required to operate to performance-based standards under a process-based regulatory regime.

Drinking water is not expressly defined in Victorian legislation but may be thought of as the water which is supplied to customers as potable water by the Victorian water corporations. The sources which the water corporations are permitted to use for potable purposes are controlled by Victorian Government policy. All other water sources are by default non-potable water supplies. The current policy in Victoria is not to use recycled sewage, recycled greywater or stormwater as potable water supplies. Moreover, in areas such as metropolitan Melbourne, where reticulated potable water is supplied, people are not encouraged to use rainwater as a drinking water supply.

6.1.3 Current issues and future trends

A WSC would need to make use of far more water sources than are currently used for urban water supply and is likely to exhibit a greater decentralisation of water supply. The future use of alternative sources in potable supplies would require a change in current State Government policy and may require a re-evaluation of existing drinking water regulatory frameworks to ensure that the current level of protection to human health is maintained. There is also a potential tension between the evolving risk-based regulatory models for water quality regulation, which require significant institutional resources, and innovative technologies which may lead to more decentralised solutions. Such decentralised solutions may lead to supply by smaller institutions without such institutional resources.

Until recently the use of alternative water sources in Victoria for potentially high risk non-potable uses where incidental ingestion could occur was minimal.¹³⁹ Therefore, regulatory regimes aimed at ensuring the quality of such alternative water sources from a public health perspective are currently sparse. In addition, whilst higher degrees of regulation would, from first principles, be appropriate for more risky sources of water and for more risky uses of water, this logic is not currently reflected in Victoria's regulatory framework.

6.2 KEY FEATURES OF THE SYSTEM IN MELBOURNE

6.2.1 International regulation

The World Health Organisation (**WHO**) has produced guidance on how to set up a regulatory framework for the safe use of recycled water. The AGWR (see Section 5 for more details) are based upon this guidance.

6.2.2 National regulation

6.2.2.1 Overview

In 1992 the Commonwealth and State governments created the NWQMS to provide a national approach to improving water quality. The NWQMS gave rise to a suite of non-binding national guidelines which are all based on a preventative risk management framework. These guidelines cover both drinking water and alternative water sources. For more details see Section 5.

6.2.2.2 Drinking water

The Australian Drinking Water Guidelines (**ADWG**) were developed to provide best practice guidance on the public health issue of drinking water quality. The ADWG applies an end point control approach to water quality management. The ADWG contain standards relating to the safety and aesthetic quality of water but acknowledge that the greatest risks to human health come from pathogenic microorganisms. There are further national standards in relation to the quality of bottled water.

6.2.2.3 Non-potable water

The AGWR (see Section 5 for further details) provide best practice advice on both the health and environmental aspects of water recycling. The NWC promotes State-based regulatory approaches based on the AGWR.

The AGWR manage health risks by establishing water quality objectives for individual treatment systems, which identify the tolerable risk levels for each system, and ensure the system operates so that it performs to meet these targets (Power, 2010, p.27-28). This is a significant change from the *end-point control* approach used in the ADWG and in previous guidance on recycled water. This approach requires a regulatory emphasis on system validation.

National guidelines exist (National Health and Medical Research Council, 2008) for the human health management of water bodies such as rivers, lakes and bays which are used for recreational water based activities. These are not binding.

6.2.3 Victorian regulation

6.2.3.1 Drinking water

The Department of Health (**DoH**) is the public health regulator for drinking water quality in Victoria. In metropolitan Melbourne, where reticulated water supplies are available, the regulatory system assumes these should be used for drinking purposes. This leads to regulatory measures focused on the actions of drinking water suppliers and water storage managers.¹⁴⁰

The *Safe Drinking Water Act 2003 (Vic)* and the *Safe Drinking Water Regulations 2005 (Vic)* provide the statutory framework for the regulation of drinking water quality in Victoria. This framework includes elements of prescriptive regulation, process regulation and of performance regulation and relies on the public disclosure of information.¹⁴¹ Should alternative sources be considered for drinking water purposes in the future the current regulatory framework may not be suitable as the underlying risk profile on which the regulatory regime is based would change.

The supply of drinking water by persons other than water corporations, such as bottled water sales by shops and restaurants, is treated as a supply of food and is regulated under the *Food Act 1984 (Vic)*.

6.2.3.2 Non-potable water - overview

Both the DoH and the EPA have a regulatory role in respect to the quality of non-drinking water supplies and their use in Victoria. Regulation in this space is currently patchy and reflects that the current regulatory regime evolved from measures aimed at securing environmental health through limiting the discharge of pollutants to the environment from large recycled water schemes. To date health concerns have been addressed as a subsidiary issue within this framework.

6.2.3.3 Rainwater

The quality and uses of rainwater are not legally regulated in Victoria. Use of rainwater is regulated by non-binding guidelines produced by the EPA and DoH which provide public information and advice. In addition, the general law of negligence imposes a duty of care on those operating rainwater harvesting regimes not to cause damage to other people.

6.2.3.4 Large recycled sewage and greywater schemes

Currently both the health and environmental regulation regimes for recycled sewage and greywater in Victoria derive from the Environment Protection Act. The starting point is that wastewater treatment, disposal and recycling facilities able to discharge more than 5,000 litres of effluent to the environment per day require an EPA licence to operate, in addition to an initial EPA works approval when constructed.



However, the Environment Protection (Scheduled Premises and Exemptions) Regulations 2007 provide an exemption to the EPA licensing requirements for individual schemes where the EPA is satisfied that the scheme meets discharge and operating specification requirements. Guidance produced by the EPA sets out when such an exemption may be granted and requires the production of a Health and Environment Management Plan (**HEMP**) for the scheme. These guidelines also establish 4 classes of recycled water. Each of these classes has its own water quality parameters, required treatment processes and acceptable end uses. These guidelines apply a preventative risk management approach consistent with the AGWR and are supported by an array of further technical guidance.

Schemes producing Class A recycled water (that is schemes where the permitted end uses are of highest risk) must also produce a Recycled Water Quality Management Plan (**RWQMP**) as part of the HEMP. The RWQMP requires endorsement by the DoH. The EPA produces further guidance on how to seek this endorsement. In addition, the DoH publishes guidance on how to complete a RWQMP.

A crucial part of the HEMP approval process is *validation* of the particular scheme. This requires demonstrating that the system can provide water of the required microbial quality under various operating conditions and that this can be monitored in real time. There are further DoH guidelines about how such systems can be validated.

Large schemes with no environmental discharge are called *closed loop* schemes and are currently not regulated for public health purposes. This is a significant regulatory gap.

6.2.3.5 Small recycled sewage and greywater schemes

Wastewater treatment, disposal and recycling facilities able to discharge less than 5,000 litres of effluent to the environment per day are regulated for both health and environmental purposes as septic tank systems under the regime set out in the Environment Protection Act. The approach taken is prescriptive and based on the authorisation of a scheme by a central regulator through a two stage process of approvals:

1. EPA certificate of approval for the system, and
2. local council permit for installation and certificate to use the system at a specific site.

Onsite sewage recycling is actively discouraged in areas with reticulated sewerage services. Despite being discouraged Power (2010, p.23) notes that such schemes are effectively 'orphaned' without any regulatory agency having power to oversee them if they do occur.








6.2.3.6 Stormwater capture and reuse schemes

The Victorian government recommends that the relevant guidelines in the AGWR relating to stormwater are followed in the design and management of stormwater reuse schemes. However, following this recommendation is not mandatory. The general law of negligence also imposes a duty of care on those operating stormwater harvesting and reuse regimes not to cause reasonably foreseeable damage to other people (Department of Sustainability and Environment and Department of Health, 2009, p.40).

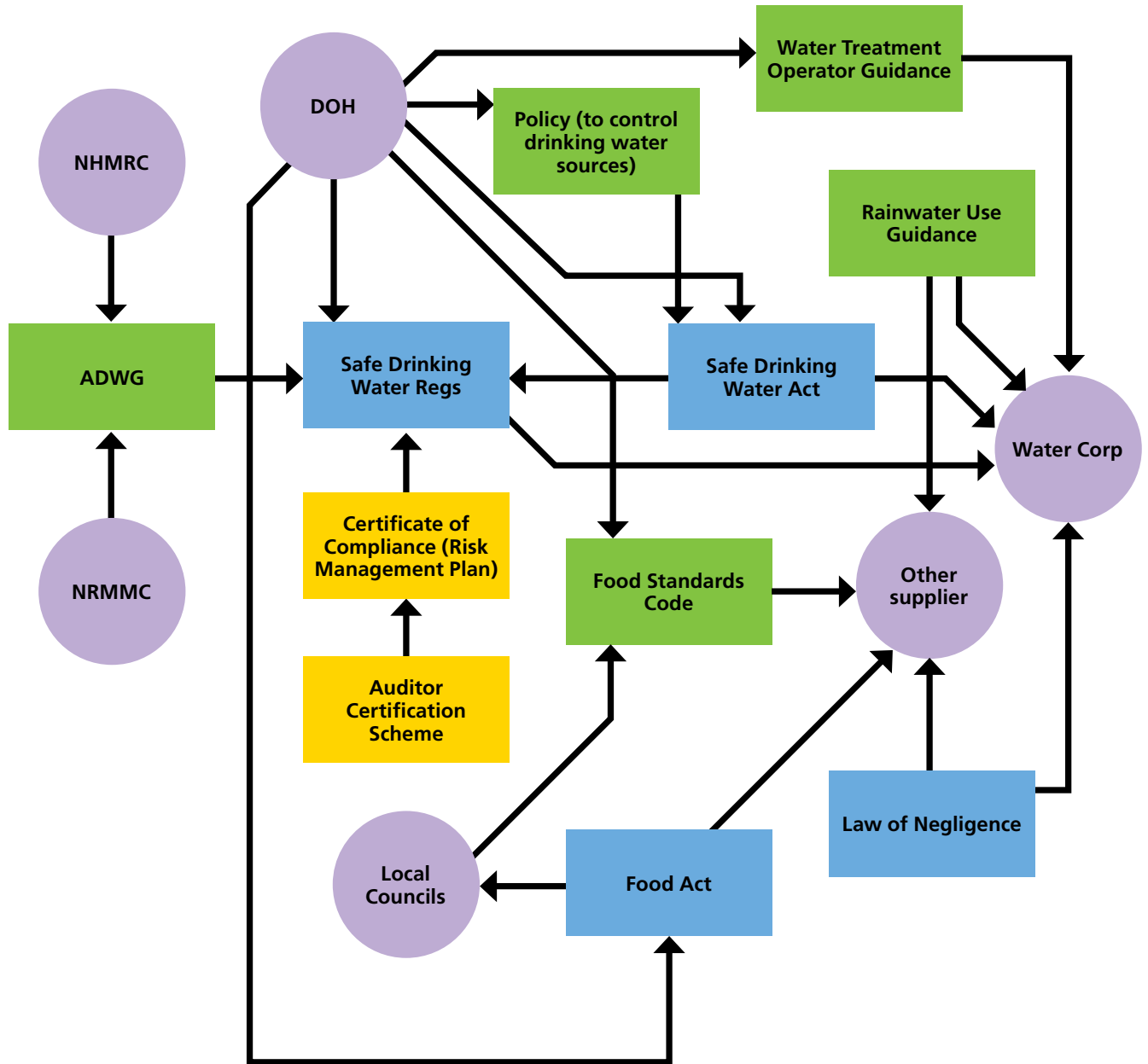
6.3 MAPS OF THE PUBLIC HEALTH REGULATION SYSTEM IN MELBOURNE

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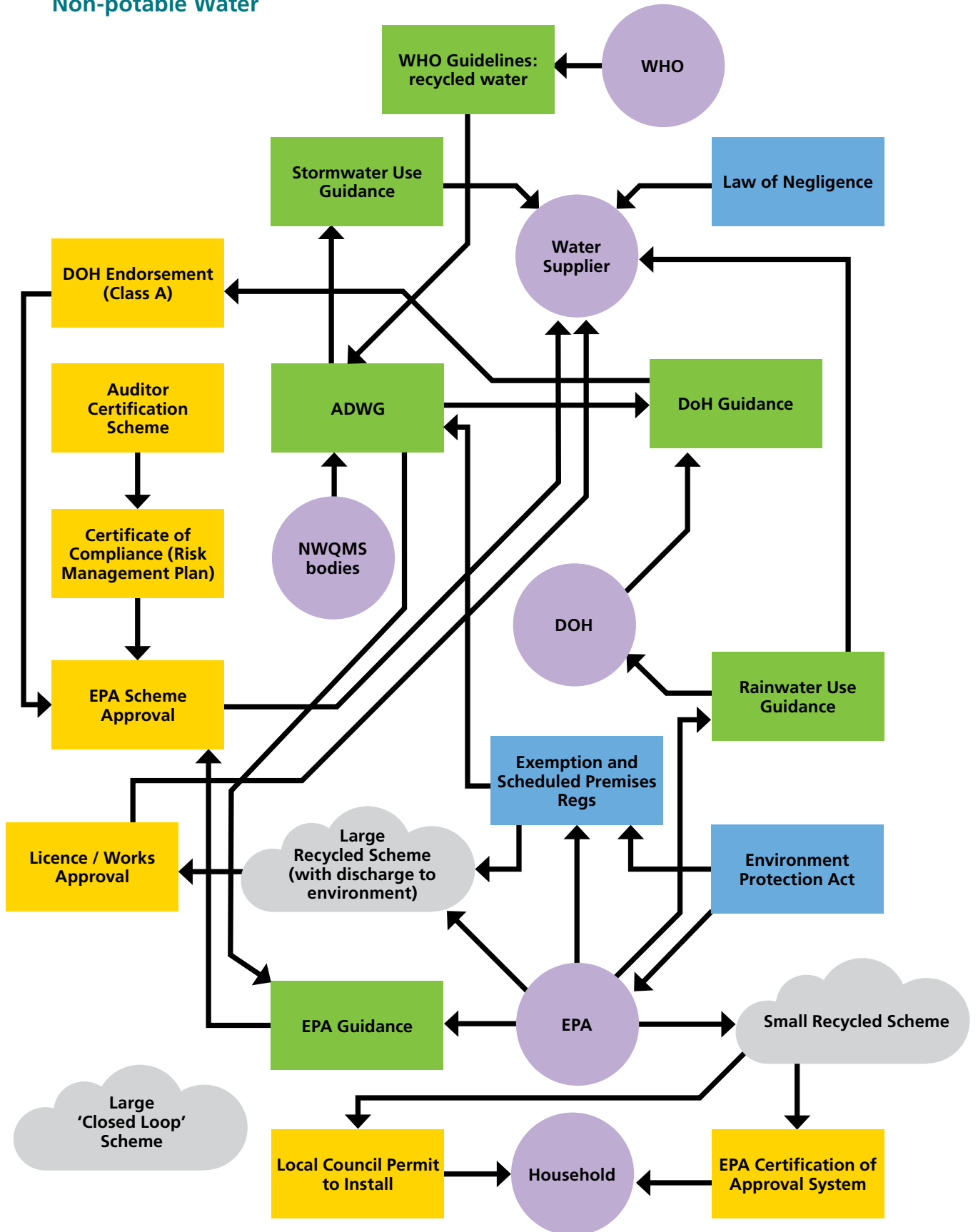
Key

	Actor
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	Regulatory tools - Legal regulation

Map of the Public Health Regulation System in Melbourne – Drinking Water



Map of the Public Health Regulation System in Melbourne – Non-potable Water



6

6.4 REGULATORY REFORM PROPOSALS

The DoH is currently undertaking an extensive review of the public health regulatory framework for alternative water supplies and is reviewing and updating the Safe Drinking Water Regulations 2005 (Vic).

Section 7 Conclusions

Conclusions

7.1 GENERAL OBSERVATIONS

The mapping exercise suggests several general observations about the Victorian urban water management regulatory space, and also suggests some research questions.

7.1.1 Complexity of the regulatory infrastructure

The space is made up of multiple webs of regulatory tools across each of the five key systems. The regulatory space within each individual system is already complex. Accordingly, the combined regulatory space as it links across all five systems is a picture of significant complexity. Each of the regulatory tools in these webs variously combines, links and/or competes for influence with each other tool.

This suggests we need to think in more detail about how these multiple webs link together so that their combined influence pushes in the desired direction. Furthermore, when regulatory tools link up in such complex ways, we also need to understand the currently unclear trade-offs that are being made between differing regulatory objectives.

7.1.2 Clusters of tools

A diverse set of regulatory tools is used across the regulatory space with most of Freiberg's (2010) tools being used to some degree to achieve regulatory change. However, we do observe a preponderance of particular tools being used in some areas. For example, in the environmental and public health systems, a significant role is played by guidelines which lack express legal compliance mechanisms.

Contrasting the tools prevalent in a key system in one jurisdiction with those aimed at the same objectives in a different jurisdiction may lead to interesting insights about how these tool clusters operate.

7.1.3 Levels of intervention

Actions by all levels of government (Commonwealth, State and local municipality) contribute to the observed regulatory regimes. However, interventions made at the State level are the most influential. This suggests that while there may exist opportunities for standardisation of approaches through national interventions, the current arrangements may reflect the importance of local requirements to specific State or local preferences or conventions which influence the choice of tools.

The current role played by international regulatory tools outside of the environmental protection space is extremely limited.

While a broad conception of regulation encompasses interventions by public and private actors, it is observed that the key regulation systems in this space are dominated by measures produced by government and independent regulators. While some regulatory role is also being played by business, and in particular the water corporations, the parameters of this role are unclear and need to be better understood.

7.1.4 Scale of intervention

The regulatory regimes observed tend to exist at a geographical scale which does not match the scale of the greater metropolitan area, either being at a higher scale or a lower scale.¹⁴² However, the city itself, in the sense of the greater metropolitan area, may well be an important unit if WSCs are to be achieved. We need to better understand the contribution of geographical scale to regulatory effectiveness.

7.1.5 Underlying assumptions

Several regulatory regimes are premised upon assumptions about how water is to be used in society and by whom. The assumptions are not always express and reflect cultural factors, historical patterns of water use and industry structure. They may not best suit attainment of a WSC.

For example, the current arrangements that regulate drinking water safety from a public health perspective assume that the only entities that will supply drinking water in Melbourne will be government owned large-scale water utilities. This framework does not conceive of potable water provision by smaller scale decentralised providers.

Further research will be required into the implications of these underlying assumptions.

7.2 SPECIFIC OBSERVATIONS

A number of observations can also be made about individual regulation systems.

7.2.1 Water resource regulation

The Water Bill¹⁴³ addresses several of the identified gaps, overlaps and inconsistencies in Victoria's water resource regulation framework. However, certain issues remain unresolved:

1. Water resource planning in Melbourne will still be conducted by a large number of entities with overlapping responsibilities. This may lead to continued co-ordination challenges.
2. Melbourne's current institutional framework suffers from a degree of blurring of roles and responsibilities between regulatory and service delivery functions. In particular, Melbourne Water has responsibilities for both service delivery and resource management. This will continue.

3. There are currently many points across the systems of regulation for resource planning and allocation and service delivery where actors are making regulatory interventions aimed at balancing the supply and demand of water resources. These actors include all levels of government and the service delivery providers. A plethora of tools are used, including legal tools (such as the SoO), economic tools (such as direct government funding) and educational tools. This potentially introduces an unhelpful blurring of the natural resource regime, which should determine sustainable levels of resource consumption, and the service delivery regime, which should determine how much the community is willing to pay for urban water services. This is confusing at best and unlikely to produce optimum outcomes.

7.2.2 Service delivery and price regulation

Being able to better meet sustainability concerns is a major driver of the WSC vision. However, current frameworks for service standards and price setting in Melbourne's urban water sector operate largely within an economic efficiency paradigm. These are not well aligned to emerging concepts of sustainability, and there are likely to be significant challenges in aligning these conceptual frameworks.

Several well-informed commentators (Productivity Commission, 2011, Ben-David, 2012) suggest that Melbourne's current model of independent price regulation for urban water services is not delivering value to consumers and may need to be reconsidered.

Decentralised supply in a WSC may involve service delivery by a wider range of actors than is currently the case in Melbourne. Current service delivery and price regulation frameworks contain no mechanism that would enable such providers to operate, nor would they provide adequate oversight of the operations of such providers. Third party access arrangements, which new providers may require to operate, also remain largely undeveloped and untested.

7.2.3 Built environment regulation

The current regulatory frameworks which impact on the Victorian built environment tend to operate at a State-wide or municipal level, not at the level of the actual city as a greater metropolis. This may be creating tensions with the WSC initiative which operates at a city scale.

Over recent years there has been a transition from the use of hard infrastructure to deliver drainage services to urban communities to the use of softer infrastructure that may also provide environmental benefits. Many new regulatory tools have been used to encourage this transition at national, State and local levels. These range from prescriptive legal tools such as c156.07-4 of the VPPs to softer informational tools. This area of the regulatory space is still evolving and the interactions between these tools and their relative effectiveness are underexplored.

Commentators (Productivity Commission, 2011) have noted that there is currently a lack of clarity and overlap of responsibilities at an institutional level between Melbourne Water and the local councils in relation to drainage service provision. Any attempt to clarify such responsibilities is likely to have significant implications for the shape of the regulatory space in relation to drainage service provision.

The planning regime is a crucial element of the built environment regulation system. While not the focus of the BRF project it is anticipated the BRF Project will work closely with Project B5.2 to identify the points of cross over between this regime and other parts of the regulatory space.

7.2.4 Environmental health regulation

Traditionally, Australian environmental health regulation regimes have focused on the control of point source pollution. Victoria's point source pollution controls are seen as 'robust and effective' (Melbourne Water and Environment Protection Authority Victoria, 2009, p.49).

However, environmental health regimes for the control of non-point source pollution and threats to the environment caused by stormwater flow amounts are less developed, less coherent and even when present are not always adequately enforced (Melbourne Water and Environment Protection Authority Victoria, 2009, p.92). For example, one of the key regulatory tools in this space is the BPEM Guidelines. However, in their current iteration these do not address stormwater flow issues. This is very much an evolving area and new regulatory approaches are currently being explored.

While there are many national guidelines relating to the environmental regulation of water quality, these are of variable quality and are not always utilised (KPMG, 2011).

7.2.5 Public health regulation

A WSC would need to make greater use of alternative water sources for urban water supply and is likely to exhibit a greater decentralisation in water supply. This would require a change in current Victorian Government policy and a re-evaluation of existing drinking water regulation frameworks and the risk profile on which they are based.

In addition, regulatory regimes aimed at protecting human health from incidental ingestion of water risks are currently sparse and inconsistent. To date health concerns have only been addressed as subsidiary issues within the environmental protection framework.



References

Website Links

www.abcb.gov.au accessed on 30 April 2004

www.austlii.edu.au accessed 27 May 2013

www.buildingcommission.com.au accessed on 30 April 2013

www.clearwater.asn accessed 4 September 2013

www.coag.gov.au/water_climate_change_and_the_environment/ accessed on 4 June 2013

<http://www.depi.vic.gov.au/water/> accessed on 14 August 2013

www.des.vic.gov.au accessed 27 June 2013

<http://www.dpcd.vic.gov.au> accessed 23 July 2013

www.environment.gov.au/water/australia/nwi/ accessed on 16 September 2013

www.esc.vic.gov.au accessed 17 June 2013

<http://www.gbca.org.au/green-star/> accessed on 29 July 2013

www.health.vic.gov.au/water/index.htm accessed 9 July 2013

<http://www.infrastructureaustralia.gov.au/water/>

www.kingston.vic.gov.au accessed 18 June 2013

www.nhmrc.gov.au/guidelines/publications/eh52 accessed 16 July 2013

www.nwc.gov.au accessed 5 June 2013

www.pic.vic.gov.au accessed on 30 April 2013

<http://www.ppwcm.vic.gov.au> accessed on 31 July 2013

www.smartwatermark.org accessed 5 June 2013

www.sustainability.vic.gov.au accessed 25 May 2013

<http://www.waterrating.gov.au/> accessed on 3 June 2013

<http://www.water.vic.gov.au/> accessed on 3 June 2013

<http://watersensitivecities.org.au/> accessed 2 September 2013

www.wsaa.asn.au/Codes/Pages/Water-Industry-Standards.aspx accessed on 3 September 2013

www.wsud.melbournewater.com.au accessed 18 June 2013

Other

Baldwin, Robert, Martin Cave & Martin Lodge (2012) *Understanding regulation; theory strategy and practice*. Oxford: Oxford University Press.

Ben-David, Dr Ron (2012) "Economic regulation and the water industry: between a rock, a hard place and a precipice", *Water Services Association of Australia*.

Black, J (2002) "Critical reflections on regulation", *27 Australian journal of legal philosophy* 1-95.

Bmt Wbm Pty Ltd (2009) "Evaluating options for water sensitive urban design", *A national guide*. Canberra: Joint Steering Committee for Water Sensitive Cities.

Building Commission Victoria (2011) "Residential sustainability measures", *Practice Note 2011-55*.

Council of Australian Governments Standing Council of Environment and Water (2013) "The Revision of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)", in National Water Reform Thematic Oversight Group, ed. *Revision update - April 2013*. Canberra: Council of Australian Governments Standing Council of Environment and Water.

CSIRO and Bureau of Meteorology (2012) "State of the climate 2012", *State of the climate report*. Canberra: Australian Government.

Department of Sustainability and Environment (2011) "A governance guide to the Victorian water industry", Melbourne: Victorian Government.

Department of Sustainability and Environment with Department of Health (2009) "Review of the regulatory framework for alternative urban water supplies", *Final project report*. Melbourne: Victorian Government.

Desousa, Dariel (2013) "Water property rights: how can they support a transition to water sensitive cities", *Presentation given to seminar 14 March 2013*. Melbourne: Cooperative research centre for water sensitive cities.

Essential Services Commission (2011) "Water industry new customer contributions guideline", *Issue No. 3*. Melbourne: Essential Services Commission.

Essential Services Commission (2012) "Water performance report", *Performance of Victorian urban water and sewerage businesses 2011-12*. Melbourne: Essential Services Commission.

Ferguson, Briony C, Rebekah R Brown, Niki Frantzeskaki, Fjalar J De Hann & Ana Delectic (2013) "The enabling institutional context for integrated water management: lessons from Melbourne", *47 Water Research*. (20).

Fletcher, Tim D, Christopher J Walsh, Darren Bos, Veronika Nemes, Sharyn Rosrakesh, Toby Prosser, Belinda Hatt & Rhiannon Birch (2011) "Restoration of stormwater retention capacity at the allotment-scale through a novel economic instrument", *64 Water Science & Technology* 494-502. (2).

Freiberg, Arie (2010) *The tools of regulation*. Sydney: The Federation Press.

Frontier Economics (2008) "Review of urban water entitlements in Australia", *A report prepared for the joint steering committee for water sensitive cities*. Melbourne: Frontier Economics Pty Ltd.

Gardner, Alex, Richard Bartlett & Janice Gray (2009) *Water Resources Law*. LexisNexis Butterworths.



Good, Meg (2011) "Implementing the Human Right to Water in Australia", 30 *Tasmanian Law Review*. (2).

Hancher, L & M Moran (1989) "Organising regulatory space", in L. Hancher & M. Moran, eds. *Capitalism, culture and economic regulation*. Oxford: Clarendon Press.

Kay, Esther & Karen Hussey (2013) "Evaluation of clause 56.07-4 of the Victoria Planning Provisions", Melbourne: Office of Living Victoria and Melbourne Water.

KPMG (2011) "Evaluation of the National Water Quality Management Strategy", *Final report*. Department of Sustainability, Environment, Water, Population and Climate.

Liggins, Paul (2010) "Economic regulation of the Australian water sector: past, present and future", Australia: Deloitte Touche Tohmatsu.

Martin, Vin (2012) "Policy and regulation: the relationship, what it means to the Essential Services Commission", *Paper presented to the Essential Services Commission*. Melbourne: Essential Services Commission.

Melbourne Water (2013) "WSUD maintenance guidelines: a guide for asset managers", Melbourne: Melbourne Water.

Melbourne Water & Environment Protection Authority Victoria (2009) "Better bays and waterways", *A water quality improvement plan for Port Philip Bay and Western Port*. Melbourne: Melbourne Water and Environment Protection Authority Victoria.

National Health and Medical Research Council (2008) "Guidelines for managing risks in recreational water", Canberra: Australian Government.

National Water Commission (2011) "The National Water Initiative -securing Australia's water future", *2011 assessment*. Canberra: Commonwealth of Australia.

Office of Living Victoria (2013) "Melbourne's water future", *Consultation draft*. Melbourne: Victorian Government

Power, Kaye (2010) "Recycled water use in Australia: regulations, guidelines and validation requirements for a national approach", *Waterlines report series No. 26*. Canberra: National Water Commission.

Productivity Commission (2011) "Australia's urban water sector", *Inquiry report No.55*. Final inquiry report ed. Canberra: Commonwealth of Australia.

Selznick (1985) "Focusing organisational research on regulation", in R. Noll, ed. *Regulatory policy and the social sciences*. Berkley CA.

Stoeckel, Kate, Romany Webb, Luke Woodward & Amy Hankinson (2012) *Australian Water Law*. Sydney: Thomson Reuters.

Wong, T. H. F., R. Allen, R.R. Brown, A. Deletic, L. Gangadharan, W. Gernjak, C. Jakob, P. Johnstone, M. Reeder, N. Tapper, G. Vietz & C. J. Walsh (2013) "Stormwater Management in a Water Sensitive City", *blueprint2013*. Melbourne: Cooperative Research Centre for Water Sensitive Cities.

CRC for Water Sensitive Cities: Partner Organisations

75 Partners

- 30 Local Governments
- 14 State Government Departments/Agencies (**3 Essential Participants**)
- 12 Research Organisations (**3 Essential Participants**)
- 8 Water Utilities (**3 Essential Participants**)
- 4 Land Development Organisations
- 4 Private Companies
- 1 Federal Government Agency
- 1 Community Group
- 1 Training/Capacity Building Organisations

