CRC for
Water Sensitive Cities

The Risky Business of Water Sensitive City Innovation:

A Legal Analysis of Risk Allocation

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The Risky Business of Water Sensitive City Innovation: A Legal Analysis of Risk Allocation
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Executive Summary

Report aims

This report seeks to further examine the role of risk in relation to Water Sensitive Cities (WSCs) and to examine innovation risk from a legal perspective. It also seeks to marry together two pivotal notions that are frequently discussed in the literature on WSC innovation: the meaning of decentralised water activities and the meaning of risk itself.

Research question

Historically, Australia has adopted a particular model of legal risk allocation which reflects the conventional provision of urban water services. Yet, innovations in urban water management often demonstrate a move away from this model to one which is more decentralised, or to use our preferred terminology, more 'decentred'. For an explanation of why we have adopted the term 'decentred' in this report see Box 2 on p.13. Such change raises the question of whether the current model of legal risk allocation will continue to be suitable for these new water management practices. Crucially, our focus is not on the prevention of risk, but on what the consequences may be if a risk manifests, that is if the harm sought to be avoided actually occurs. These consequences can often be best understood in terms of who bears the costs of the risk manifesting.

Our key research question was:

'How will individuals fare in the event that something goes wrong with the management or supply of water, in a decentred model of water service provision?'

Our research

We combined a number of different methodologies, including literature reviews, case studies, a regulatory analysis and a legal analysis. Our research was also informed by input from Cooperative Research Centre for Water Sensitive Cities (CRCWSC) stakeholders.

We start, in Chapter 2, by critically analysing the concept of decentring in relation to urban water. We then explore the key features and potential consequences of one important mode of urban water decentring: legally decentred service provision. Under such legal decentring, consumer water services are provided by either a private or a community-owned water service provider. Chapter 3 applies a legal lens to the concept of risk management and liability allocation with regards to urban water. We articulate a model of the current allocation of legal risk in relation to urban water in Australia. This model reflects a legally centred approach to water service delivery, involving service delivery by public water utilities. This chapter also identifies the risks of harm that may arise from decentred urban water management practices.

Chapter 4 sets the scene for our legal analysis of the potential legal liability that owners and operators of innovative, spatially decentred systems may have to their customers and to members of the wider public. We do this by developing a number of hypothetical incidents of harm which occur because of operation and maintenance failures in two theoretical - but factual and credible - decentred scenarios. In the first scenario, a new greenfield suburb in which stormwater is supplied for potable use is considered from the perspective of public health risks and flooding. In the second scenario, a high-rise precinct with wastewater supplied for non-potable use is considered from the perspective of environmental risks and supply security risks. Both scenarios examine how the situation differs when legal responsibility lies with the traditional publicly-owned entity, compared to a new private company or body corporate. Chapter 5 contains the key findings from our legal analysis of urban water in Australia. It includes a critical discussion of the legal and practical implications of potential changes to the current model of legal risk allocation. Building on this, Chapter 6 then presents a number of potential policy options to reallocate risks in order to encourage greater WSC innovation in Australia.

Conclusions

Are WSCs a risky business?

We conclude that WSC innovation may indeed be a risky business when seen from a legal perspective. The future allocation of risks, as innovation takes place, matters fundamentally, and our analysis of decentred WSC innovations suggests that decentring may lead to an increased chance of harm arising compared to existing centred operations. What is more, when harms did arise there were significant hurdles placed before those seeking to recover damages from legally decentred service providers. Yet, innovation in urban water management is vital and we should not be deterred. Our work suggests, however, that we need to proceed cautiously and ensure that appropriate legal and regulatory frameworks are in place to allow this innovation to occur in a socially as well as commercially optimal way.

We require a shared language

We also conclude that any significant change to urban water management practices is likely to require a clearer shared understanding as to what it meant by phrases such as 'decentralisation' and 'risk'. For example, our research demonstrated that there are at least eight different ways or modes through which the decentring of water activities can occur. However, the language of decentralisation has tended to conflate these. This has obscured, rather than illuminated, the policy and legal challenges faced. Crucially though, the modes involving spatial dimensions of decentring are quite distinct from the mode of legal decentring.

Legal decentring represents a key break with past practices

Private companies are heavily involved in urban water in Australia, but usually behind the veil of the public water supplier. It is rare for there to be a direct relationship between a private or community entity and water consumers. Legal decentring, where the water supplier is a smaller, non-traditional entity, such as a private company or a body corporate, therefore represents an important break with past practices. It is also unclear what institutional form such legal decentring should ideally take. What is clear, however, is that neither the current legal and regulatory frameworks nor the legal risk allocation mechanisms inherent in these models are suitable in such circumstances. Pursuing a policy of encouraging legal decentring would require most Australian state governments to scrutinise existing legal and regulatory frameworks far more closely than they have to date.

The harm lens

WSC practices may not give rise to any new harms, but any new hydro-social contract that develops around such practices will still need to control for the four broad categories of harm: public health, flooding, environmental health and security of supply. The possibility of failure is always present in any system innovation. Failing to carefully consider this from a legal perspective would be naive. Our work adopts an alternative perspective on risk from that which has been applied to date in relation to urban water innovation. By focusing on the legal consequences of harm once it has occurred, we have been able to consider what would happen if something went wrong with a decentred innovation and, crucially, whether these legal consequences are ones which are likely to be acceptable to the Australian public.

The legal risk allocation model – problems and solutions

We discovered that in relation to urban water, the current model for allocating legal risk between service providers, consumers and the wider Australian public is somewhat imperfect. Anyone seeking to recover damages for harm suffered would probably face significant practical difficulties in doing so. Yet the significance of these practical difficulties has been limited until now because urban water has been provided by large, government-owned utilities. These public utilities have generally been good at both preventative risk management and making good on harm suffered.

However, legal decentring would bring the recovery problems to the fore, in addition to introducing some new issues. There are several potential policy options that governments could adopt in order to reallocate the risks of water sensitive innovations and to mitigate or manage possible adverse legal consequences of innovative water supply arrangements. These involve better harm prevention, a reallocation of liabilities for harm, or the development of informal recovery mechanisms. Suitable solutions are likely to be heterogeneous and reflect the differing political, historical, legal and institutional features of the individual States and Territories.

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Chapter 1 - Introduction

Background

The combined impacts of climate change, urban population growth and increasing urban densification are placing significant pressures on Australian hydrological systems and water service delivery mechanisms. In turn, these pressures are driving calls to reform the urban water sector and ensure urban water management practices make our cities more sustainable, resilient, productive and liveable. Such a place is termed a Water Sensitive City (WSC) (Brown, Keath et al. 2009, Wong and Brown 2009). Reforming our cities to become WSCs will require the adoption of innovative technologies and new urban water management practices.

In developed nations, the conventional model for urban water service provision involves water being collected, distributed and treated in large infrastructures which are centrally organised at the city level. The delivery of urban water services is also usually undertaken by corporatised utilities with a monopoly on supply in a given geographical area (OECD 2015). This conventional, centred service delivery model is typical in Australian cities. However, the process of transition towards a WSC will require changes to this model (Brown, Keath et al. 2009, Wong and Brown 2009, Marlow, Moglia et al. 2013, Quezada, Walton et al. 2016).

The Cooperative Research Centre for Water Sensitive Cities (CRCWSC) is a major joint research initiative aimed at revolutionising water management within Australia and overseas. The CRCWSC is focused on producing collaborative, multi-disciplinary research that will be of assistance to its stakeholder partners, both in industry and government, in transitioning our cities towards more integrated and sustainable urban water management. Current regulatory and risk allocation frameworks have been identified as key impediments to making the changes necessary to bring about WSCs in Australia (Brown, Farrelly et al. 2009, Farrelly and Brown 2011, Dobbie, Brookes et al. 2014).[1]

Problem addressed

Our research is focused on the regulatory and risk allocation implications of innovative service delivery options. Many innovations will involve the exploitation of new water sources in pursuit of the promise of multi-functional benefits to a large number of actors. These innovations will require significant changes to current urban water management practices and a move away from the highly centred, conventional model of service delivery, to one which is more decentred.

In concept, legal risks can be allocated in any number of ways, by contractual or legislative mechanisms. However, the reality is that in Australia, a particular model of legal risk allocation has historically been adopted. This model reflects the institutional provision of water services by publicly-owned water utilities, with all the embedded traditional practices and operational assumptions that this entails. Our working hypothesis is that any significant change to urban water management practices towards a WSC is likely to require a clearer shared understanding as to what is meant by phrases such as 'decentralisation' and 'risk'. Such changes will also draw attention to the ways in which the current model of legal risk allocation is likely to be unsuitable for these new practices.

Importantly, our focus is not on the prevention of risk, but on what the consequences may be if a risk manifests, that is if the harm sought to be avoided actually occurs. The consequences of a legal risk manifesting can often be best understood in terms of who bears the costs of the risk manifesting. This dimension of legal risk manifestation is often neither explicit nor well discussed in the literature around urban water innovation. Our key issue is how will individuals, as both consumers and citizens, fare in

[1] The title of this report follows earlier thinking about risks, both within the context of getting the best out of any partnership between the public and private sectors, as well as in the context of the water domain: see Hodge, GA 2004, 'The risky business of public–private partnerships', *Australian Journal of Public Administration*, vol. 63, no. 4, pp. 37-49; see also Dobbie, M, & Brown, R 2012, 'Risky business? Risk perceptions of water practitioners towards stormwater harvesting and treatment systems in Australia' in WSUD 2012, *7th International Conference on Water Sensitive Urban Design,* 21-23 February 2012, Melbourne Cricket Ground, Barton A.C.T. Engineers, Australia, pp. 346-353.

the event that something goes wrong with the supply of water, in a decentred model of water service provision?

Box 1: How might unsuitable legal risk allocation retard the transition to WSCs?

Inappropriate legal risk allocation has the potential to derail the transition to a WSC. This may occur in two ways:

By impeding the uptake of innovation

Unsuitable legal risk allocation arrangements may act as an impediment to the greater uptake of decentred innovation. For example, operating on a new scale may create new risks or new processes which will need to be suitably assessed and managed.

Australian water industry professionals do indeed tend to associate decentred innovations with a broader risk profile than conventional centralised systems (Dobbie and Brown 2014). Moreover, whether a risk is real or not, if it is perceived to be a problem then this is likely to negatively impact on innovation and uptake. Transactions and projects will not proceed to implementation unless parties are able to arrive at a mutually satisfactory distribution of risk.

By undermining support for WSCs in the longer term

Even if unsuitable legal risk allocation arrangements do not prevent innovative schemes from proceeding, such unsuitable arrangements may mean that if a risk with a decentred innovation does manifest, an entity may bear a loss which it may not have traditionally borne. The OECD has recognised that legal liability remains an issue that needs to be resolved in relation to distributed urban water systems, namely 'who is responsible and accountable for the service provided at the building or district level?' (OECD 2015, p.111).

Understanding changes in legal risk allocation, and being comfortable with the implications of these changes, will be crucial to building and maintaining ongoing public, political and commercial support for decentred innovation.

There are potentially significant 'costs of failure' if alternative water supply schemes do fail (Department of Health 2013). These costs of failure include meeting the legal liabilities of people adversely affected by the failure event and the wider impacts on community confidence in the safety and security of alternative supply schemes.

It is clear that as governments and commercial entities pursue innovative practices in the future, changes to water policy and practices will need to be viewed as legitimate by citizens. This demands that if significant changes are proposed to an essential service, the consequences to society of such changes need to be fully explored and any adverse impacts of such changes identified. Wong and Brown (2009) put it well when they said that a WSC will require a new hydro-social contract to be adopted between governments and the public in relation to urban water. However, to gain public and political support for a new hydro-social contract, the public will need to be reassured that it will be adequately protected from harm and have suitable avenues of redress should harm occur.

Research aims and objectives

Risk is a subject that crosses the boundaries of many disciplines, and several other CRCWSC researchers are exploring risk issues from a variety of perspectives.[2] Our work seeks to further open up the risk discourse in relation to WSCs and to examine risk from a legal perspective.

The legal perspective on risk is an important one, because "the internal legal context is fundamental to how risk regulation operates in any legal culture – the statutes do count, the case law does matter" (Fisher 2013, p.131). Only through a fuller understanding of how our legal system manages risk can an informed discussion be had about alternative risk assessment and management arrangements that may further the goal of WSCs.

The research which is the focus of this report aims to better understand the regulatory and risk allocation implications which would result from the uptake of innovative urban water service delivery options. This research builds upon our earlier work, which focused on identifying the enablers and impediments to the uptake of such service delivery options in existing Australian regulatory frameworks.[3] Our aim is to explore the allocation of legal risk between the public, private and community sectors in relation to innovative urban water service delivery; and to develop, in consultation with CRCWSC stakeholders, new models for allocating these risks. This report is an important step towards the development of such new models for legal risk allocation.

In the urban water industry, the well-understood risks of traditional practices are often adequately managed without explicit risk assessment and analysis occurring, by following the risk management practices embedded in appropriate technical standards and guidance (MacGillivray, Hamilton et al. 2006). However, explicit risk assessment and analysis becomes important when there are significant changes in practice, such as those changes that transitioning to a WSC will entail. Our work uses a legal lens to conduct such a risk assessment and to develop new models for legal risk allocation.

In particular, our research aims to:

1. Critically analyse the concept of decentralisation, or 'decentring', in relation to urban water, and clarify the terminology used.

2. Critically analyse both the features and potential consequences of legally decentred service provision.

3. Develop a conceptual understanding of legal risk management and liability allocation in relation to urban water.

4. Articulate a model of the current allocation of legal risk in relation to urban water in Australia. This model reflects a legally centred approach to water service delivery, involving service delivery by public water utilities.

[2] For example, Sub-project A4.1 is looking at how water industry practitioners perceive the risk profiles of different water systems; Sub-project B4.1 is undertaking quantitative spatio-temporal risk modelling; and Sub-project C3.1 has undertaken a literature review of the risks to the long-term viability of residential non-potable water schemes. These Sub-projects are all focused on aspects of risk prevention.

[3] This involved conducting stocktakes of the existing primary legislation related to urban water across three Australian jurisdictions: see http://watersensitivecities.org.au/wp-content/uploads/2014/12/ProjectA3.2-Dec2013.pdf, http://watersensitivecities.org.au/wp-content/uploads/2014/12/ProjectA3.2-June2014.pdf and http://watersensitivecities.org.au/wp-content/uploads/2015/01/Legislative-stocktake-Qld-FINAL.pdf. We also employed the technique of regulatory space mapping to better conceptualise and understand urban water regulation in Melbourne, Victoria: see http://watersensitivecities.org.au/wp-content/uploads/2014/05/A3.2report2conceptualisgurbanwaterregFinal.pdf. We then extended this by undertaking a comparative review of the urban water regulatory space in the three Australian metropolitan areas of Melbourne, Perth and Brisbane: see http://watersensitivecities.org.au/wp-content/uploads/2015/01/A3.2_1_1_regulation-review1.pdf. A companion piece of work investigated how issues of regulation and risk presented as problems and opportunities on a particular innovative water supply project: see http://watersensitivecities.org.au/wp-content/uploads/2015/01/1765-MON_WaterSensitiveCity-KalkalloCaseStudy-W.pdf.

5. Analyse the potential legal liability that owners and operators of innovative water systems may have to their customers and members of the wider public in respect of harm that may be caused by these systems.

6. Critically discuss the legal and practical implications of potential changes to the current model of legal risk allocation in relation to urban water in Australia.

7. Present a number of potential policy options to address some of the issues that may be caused by changes to the current model of legal risk allocation in relation to urban water in Australia. These policy options are intended to be used by the water industry, governments, and those involved in water research and water policy. The policy options are intended to inform consideration of how to mitigate any potentially adverse implications that may arise from changes to the current model in the transition to a WSC. A specific combination of policy options would be the new model of legal risk allocation in relation to urban water for a particular jurisdiction.

Methodologies used

Our research combined a number of different methodologies:

1. Literature review – we undertook an extensive review of the Australian and international literature on decentralised water systems, the concept of decentralisation, and conceptual understandings of risk and risk management frameworks.

2. Case studies – our earlier research involved undertaking a detailed case study of regulatory and risk allocation barriers and enablers relating to the Kalkallo stormwater harvesting and reuse project in Melbourne. Findings from this case study were utilised in this report. In addition, we undertook extensive desk-top research into other case studies of innovative Australian water supply schemes.

3. Regulatory analysis – we conducted an analysis of the ways current Australian regulatory frameworks proactively manage risk to prevent harm from occurring.

4. Legal analysis - we undertook a detailed review of the potential legal causes of action that could be available to those harmed by innovative water supply, which drew on relevant legislation and case law.

5. Stakeholder consultation – the methodologies used in our research, our initial research findings, and our proposed new risk allocation policy options were then tested in a workshop format with a number of key CRCWSC stakeholders.[4]

About this report

Chapter 2 of the report explores the concept of decentralisation, or decentring, in relation to the WSC and identifies that there are many overlapping modes within which this phenomenon may occur. The focus of our work is on exploring the implications of legal decentring where the legal owner of a service provider is an entity, such as a private company or a body corporate, which has not traditionally been involved in urban water service provision in Australia.

In Chapter 3, we develop our conceptual understanding of risk, in particular legal risk, in relation to urban water. Legal risk management is both proactive, to prevent harm from occurring, and retrospective, so that the consequences of any harm that does occur, or manifest, are appropriately allocated. It is this retrospective allocation of the risks of manifested harm that forms the primary focus of our work. We use this understanding to identify both the current model of legal risk allocation in relation to urban water and the risks of harm arising from decentred urban water management practices. In Chapter 4, we undertake a legal analysis of a number of hypothetical incidents of harm. These incidents of harm occur because of operation and maintenance failures in two hypothetical

[4] Stakeholder consultation workshops were held in Melbourne and Brisbane in February 2016.

factual scenarios designed to represent credible decentred innovations. Further details of the methodology used are contained in Appendix 1.

Chapter 5 presents the findings of our legal analysis and discusses the implications of these findings. Further technical details of the findings from the legal analysis are contained in Appendix 2. In Chapter 6, we propose some potential policy options from which new models of legal risk allocation can be developed. These policy options form the key output of this research. Finally, Chapter 7 sets out the conclusions from our research.

Chapter 2 - The decentred WSC

Decentred innovations

According to commentators, sustainable urban water management will involve the use of decentralised water technologies and management practices (Brown, Keath et al. 2009, Marlow, Moglia et al. 2013, Quezada, Walton et al. 2016). These technologies and practices are considered to be a means of providing additional benefits on top of those already available under current centralised supply practices (Warnken, Johnston et al. 2009, Moglia, Alexander et al. 2011, Yu, Brown et al. 2011, Marlow, Moglia et al. 2013, Dobbie, Farrelly et al. 2014). In particular, while centralised systems have historically delivered benefits in terms of economic efficiency, standardisation and economies of scale, they are not flexible, resilient or adaptive, and are consequently slow to change (Biggs, Ryan et al. 2008). By way of contrast, decentralised systems offer the promise of increased resilience and sustainability (Biggs, Ryan et al. 2008, Moglia, Alexander et al. 2011). Moreover, under certain conditions, high infrastructure costs and variable rainfall patterns may even make decentralised systems more economically efficient than centralised solutions (Quezada, Walton et al. 2016).

Innovation and decentralisation are not inevitably linked, however. Indeed, centralised water utilities have been responsible for a number of significant recent innovations in urban water practices in Australia. An example would be the Managed Aquifer Recharge trials currently being undertaken in Western Australia by the Water Corporation. A further example is the Western Corridor Recycled Water Scheme in South East Queensland. Notwithstanding this, one key feature of the WSC is the likelihood that it will demonstrate a greater degree of decentralisation in urban water supply compared to the current centralised supply paradigm (Wong and Brown 2009).

Box 2: Our ‘decentring’ terminology

The term decentralisation has a long history of use in the context of governance and public administration (Naisbitt 1982). It has been a powerful and versatile concept in this context.

The work of regulatory scholar Julia Black utilises the concept of decentralisation, or ‘decentring’, as a mechanism to synthesise the broad literature on contemporary governance and regulation (Black 2001). ‘Decentring’ as a concept provides Black with a mechanism to link developments within regulation to a wide range of other changes in governance and administration involving factors such as globalisation, devolution, federalism and regionalism.

We have chosen to adopt the term 'decentring' rather than 'decentralisation' for the remainder of this report. Whilst this is unconventional terminology within the water sector, the term decentring has the advantage of not being burdened with preconceptions. As a consequence, it is a useful term to use when exploring and analysing precisely what aspects of the phenomenon are being discussed in the literature.

So, what is meant by 'decentralised'? An early lesson in reading the literature is that there is no settled definition of a decentralised water system. The term has multiple meanings, but no single shared meaning either within or outside of the water industry (Cook, Tjandraatmadja et al. 2009, Warnken, Johnston et al. 2009, Institute for Sustainable Futures 2013a). The meaning ascribed to the term tends to be variable and context specific (Warnken, Johnston et al. 2009). There is also significant crossover in use between the terms ‘decentralised system’ and the closely related concept of a ‘distributed system’ (Biggs, Ryan et al. 2008). Despite this, there are certain common features in how the terminology is used, particularly when these systems are compared to their centralised, conventional alternative. The centralised counterfactual is characterised by 'large-scale, highly engineered, linear systems built for efficiency and expansion, managed by technical elites' (Brown, Ashley et al. 2011, p.4039). We use the term ‘decentred innovations’ in the remainder of this report to refer to all decentralised, hybrid and distributed water systems.

The many modes of decentring

Our reading of the literature on decentring in relation to urban water indicates that there are, in fact, many modes in which decentring can occur. Each of these modes reflects a different understanding about how control is exercised.

Control occurs over at least eight different levels: through the structure of the water industry sector as a whole; when making policy; in legal terms; when making investment decisions; in terms of management responsibility; in terms of service planning; in terms of technical control; and at the level of physical infrastructure. Table 2.1 on the next page provides examples of how each of these different modes of decentring exists in urban water management.[5]

One important aspect of Black's decentred analysis of regulation was that decentred regulation was able to be best understood by reference to centred regulation, the ‘‘other’ against which it is explicitly, or implicitly, defined’ (Black 2001, p.105).[6] Following this logic, the table also shows how each mode of decentring of urban water can be contrasted with its own centred control counterfactual. Some of these modes are more explicitly identified in the literature than others, and the modes are not mutually exclusive. More often than not they overlap with each other, sharing concerns about scale, localisation, and the inclusion of a greater number of actors in decision-making.

It is clear from Table 2.1 that two broad clusters of modes can be observed: those modes which are primarily decentred in a spatial dimension, and those modes which are primarily decentred in a governance dimension. For example, in the spatial dimension of decentring, both supply and demand become physically closer to the end-user and technologies are applied at a more localised level. A good example of this might be the local collection of stormwater for use within a precinct. By contrast, in the governance dimension of decentring, there is a distribution of governance functions amongst more actors. An example of this would be arrangements whereby water services are planned, managed and perhaps even owned by a multiplicity of actors, which may even include local communities.

The implication of this analysis is that when using terms such as decentralisation or decentring, it is crucial to be clear about which mode or modes are being discussed. Our particular focus is on the legal mode of decentring. In this mode, the legal ownership and operation of infrastructure is shared among many more numbers and types of legal entities than is currently the case.

Legal decentring

Advocates of decentred water systems tend to accept that decentring will inevitably involve more private sector involvement in urban water (Nelson 2008, Quezada, Walton et al. 2016). Indeed, there are good arguments that may be put forward for such private sector involvement, such as encouraging creativity and innovation (Nelson 2008).

But it is neither as clear nor as simple as this. Table 2.2 on page 16 analyses the ways in which several urban water supply schemes that have been developed over the past decade can be understood as being decentred. This analysis focuses on the spatial and governance dimensions, and demonstrates that while spatial decentring does commonly involve some decentring of governance

5 In Canada, the term decentralisation is used in the water governance literature in yet another sense, namely to describe the level of government, within Canada’s federal political and legal system, at which legal rules in relation to drinking water quality are developed and applied: see Dunn, G, Bakker, K, Harris, L 2014, 'Drinking water quality guidelines across Canadian provinces and territories: jurisdictional variation in the context of decentralised water governance', *International Journal of Environmental Research and Public Health*, vol. 11, no. 5, pp. 4634-4651Dunn, G., K. Bakker and L. Harris (2014). "Drinking water quality guidelines across Canadian Provinces and Territories: Jurisdictional variation in the context of decentralised water governance." International Journal of Environmnetal Research and Public Health **11**: 4634-4651. This use of the term is not common within Australia and is not investigated in this report.

6 In the case of regulation, the centred counterfactual is regulation by the state, using a command and control model. This centred regulation can be understood as being linear, simple and unilateral; while in contrast, decentred regulation is made up of complex, overlapping webs.

Table 2.1: Observed modes of decentring in urban water management

	Mode of decentring							
	Governance (actors)					Spatial (location)		
	Industry structure	**Policy making**	**Legal**	**Investment**	**Managerial**	**Service planning**	**Technical control**	**Infrastructure**
Example	Industry composed of many actors undertaking different functions such as bulk supply, retail supply and infrastructure management	Water policy developed by a broad range of actors, including the community and business groups	Legal ownership and operation of infrastructure shared among many legal entities, including private utilities and owners corporations	Investments in infrastructure from a range of sources, including developers, homeowners and utilities	Responsibility for water management located close to end-users	Localised service planning, with community involvement and a focus upon local solutions	Localised and site specific technical control of water systems, potentially on site	Location of assets closer to end-user and/or using a water resource closer to point of capture
Counterfactual	Industry composed of single, vertically integrated water utility	Political control of policy making primarily by Minister or Ministerial Department	Legal ownership and operation of infrastructure by a large, monopoly water utility	Investments in infrastructure solely from utility and government sources	Responsibility for water management resides with large utility using mostly professional staff	Service planning undertaken by centralised government departments focused on city-wide solutions	Central technical control systems which are located off-site and of a general design	Fresh water obtained from catchments outside urban area, storage in large dams and reticulated supply
Relevant literature	(Powell 1989, Productivity Commission 2011)	(Powell 1989)	(Powell 1989, Biggs, Ryan et al. 2008, Warnken, Johnston et al. 2009, Dobbie, Farrelly et al. 2014, OECD 2015, Quezada, Walton et al. 2016)	(Powell 1989, Quezada, Walton et al. 2016)	(Powell 1989, Biggs, Ryan et al. 2008, Yu, Farrelly et al. 2012, Dobbie, Farrelly et al. 2014, OECD 2015)	(Powell 1989, Watson, Mitchell et al. 2013, OECD 2015)	(Biggs, Ryan et al. 2008)	(Yu, Farrelly et al. 2012, OECD 2015, Quezada, Walton et al. 2016)

Table 2.2: How decentring is occurring in Australian urban water supply schemes

Scheme	Description	How is the scheme decentred?
Kalkallo Stormwater Harvesting and Reuse Scheme: Melbourne, Victoria (McCallum 2015)	Suburb scale scheme to harvest and treat stormwater for all local uses (including potable)	**Significant spatial decentring** - local source, infrastructure and users **Limited governance decentring** - large government-owned utility designed and will own and operate scheme; some shared ownership of stormwater assets with other public bodies
Fitzgibbon Chase Development: Brisbane, Queensland (Bettini 2015)	Suburb scale scheme to harvest and treat stormwater (non-potable uses) and rainwater (all uses)	**Significant spatial decentring** - local source, infrastructure and users **Significant governance decentring** - ownership and operation of system likely to be by non-traditional service provider (not yet resolved) and design decisions were made by land developer and equipment provider
Silva Park/Payne Road: Brisbane, Queensland (Davis and Farrelly 2009)	Small residential development scale scheme collecting rainwater (potable purposes) and recycling greywater (open space irrigation)	**Significant spatial decentring** - local source, infrastructure and users **Significant governance decentring** - ownership and operation of system by a community-owned entity (body corporate) and design decisions made by land developer
Wonthaggi Desalination Plant: Victoria (Department of Environment)	Large scale scheme to desalinate seawater and provide to Melbourne's bulk water supplier for onward distribution through the reticulated system as potable water	**Highly spatially centred** - water source at a significant distance from point of end use, large scale infrastructure and distribution network **Partially decentred governance** - planning decisions made centrally but scheme design, build, operation and finance by a non-traditional entity (PPP contractor)
Inkerman D'Lux development: Melbourne, Victoria (Farelly and Davis 2009)	Building scale scheme to supply residents with treated greywater and stormwater (non-potable uses), now decommissioned	**Significant spatial decentring** - local source, infrastructure and users **Variable level of governance decentring** - significant decentring of scheme design and ownership but large government-owned utility operated scheme
Central Park: Sydney, NSW (Flow Systems 2016)	Multi-building scale scheme using sewer mining and on-site waste water recycling (non-potable uses)	**Significant spatial decentring** - local source, infrastructure and users **Significant governance decentring** - private utility designed scheme and will own and operate

(often of legal ownership and operational responsibility), there is no necessary correlation between the two dimensions. Each scheme really does need to be understood on its own terms. Indeed, the normative question of how best to govern decentred innovations is currently unanswered, and there are no agreed upon governance structures to own and operate these systems (Yu, Farrelly et al. 2012, Institute for Sustainable Futures , Dobbie, Farrelly et al. 2014, OECD 2015).

This can be contrasted with Australia's settled structures for the ownership and operation of centred urban water supply systems by large-scale corporatised, government-owned water utilities (often of legal ownership and operational responsibility), which have a monopoly in a certain geographic area.[7] These public utilities also typically have responsibility for providing sewerage services, but they do not typically have responsibility for the provision of stormwater/drainage services. The government shareholder is usually able to exert significant control over these public utilities. This supply arrangement may be understood as being a legally centred arrangement. In legally centred supply the private sector already plays several important roles. For example, the private sector has been involved as the financer, designer, builder and operator of a number of PPP desalination plants and also commonly operates wastewater treatment facilities. But crucially, these roles are not directly customer facing (Productivity Commission 2011).

Changing the relationship between the public and their water supplier is the central difference between legal centring and decentring. Decentring of water supply in the spatial dimension opens up the possibility of new operational models developing for urban water supply in Australia. If there are going to be a greater number of smaller water supply systems in urban areas, there is at least in theory an opportunity for some of these systems to be owned and operated by new players in an expanding urban water servicing market. Schemes which are legally decentred - where water supply is provided by smaller, non-traditional entities - are not currently mainstream in Australia, although they do exist as outliers.

Forms of legal decentring

A single household could theoretically harvest and recycle sufficient water for that household's needs, and indeed such innovation at the lot level may form an important aspect of the WSC. However, it is not likely to represent the sole model for water supply across the entire urban area. When considering new arrangements for the supply of water to more than one household, there are two different conceptual models of legal innovation: supply by a for-profit entity which is privately owned, and supply by a not-for-profit entity which is community-owned (Warnken, Johnston et al. 2009). These two models represent the main legally decentred approaches to direct water supply.

The 'for-profit legal model' would involve a new utility, most likely established as a limited liability company with private shareholders. The entity might also offer other services in addition to water and sewerage services, such as waste collection and/or energy services. It is highly likely that the 'for-profit legal model' entity would also operate the infrastructure. Although adoption of this model of service provision is uneven across Australia,[8] a future involving a significantly enhanced role for this emerging industry does not seem entirely fanciful (Institute for Sustainable Futures 2013). Even so, an expanded role for the private sector in directly supplying water to citizens would be a significant break with current practice, which overwhelmingly involves the public supply of urban water services. Competitive urban water markets do not yet exist in any country in the world (Productivity Commission 2011).

The *'*not-for-profit legal model' might conceivably adopt one of a number of legal structures. For example, it could be a limited liability corporation with shares owned by community members or a local council, or it could be a limited liability trading co-operative. However, the primary 'not-for-profit legal model' adopted to date in Australia for alternative water supply schemes has been a body corporate (Warnken, Johnston et al. 2009). These bodies corporate are established under state legislation to enable a number of landowners to own certain shared property in common with each

[7] These government-owned utilities may be state government owned, such as in Victoria and Western Australia, or local government owned, such as in much of Queensland and New South Wales.

[8] The model is not currently common in either Western Australia or Queensland, but is possible under the regulatory frameworks in both states. In contrast, it is highly questionable whether the model is possible in Victoria at the present time. Conversely, the model is not only possible but has been expressly encouraged in the state of New South Wales, with the result that a private water service provider industry is emerging.

other.[9] The body corporate model can offer several practical benefits as a potential model of community ownership. These advantages include the ability to own property, levy fees, and impose controls on how householders use water systems by way of body corporate generated by-laws (Warnken, Johnston et al. 2009). The body corporate structure has a successful track record as a pragmatic model to manage street-scale stormwater treatment technology projects, such as rain gardens and swales (Davis and Farrelly 2009).

Consequences of legal decentring

Legal decentring in an urban water supply has two important sets of consequences. The first set of consequences arises out of the change in the legal form of water supply entities; in other words, water supply entities being private companies or bodies corporate rather than publicly-owned utilities. In contrast, the second set of consequences arises not from the legal form of the entity but from the fragmentation of supply amongst a numerically larger number of entities than is currently the case.

Legal form of service provider

The legal structure of the supply entity has a number of consequences. Specifically, it affects the legal functions, powers and rights that the entity has; it impacts upon the regulatory arrangements the entity is subject to; and it may change the organisational culture of the service provider.

Legal functions, powers and rights

In Australia, publicly-owned water utilities are usually established under specific state government legislation that sets out the full extent of their functions, powers and rights.[10] By contrast, private companies are established under the general federal corporations law and bodies corporate under state specific body corporate legislation. Publicly-owned water utilities are often granted specific powers which are ancillary to their water supply role - such as powers to compulsorily acquire private land - which private corporations and bodies corporate do not have.[11] However, publicly-owned water utilities may also be subject to restrictions and controls that do not apply to other entities, such as public financial accountability requirements or the requirement to act sustainably.[12] Therefore, there are subtle differences between the legal functions, powers and rights of centred and decentred supply entities. These differences may impact on their ability to deliver services or on their incentive, as an organisation, to act in certain ways.

Regulatory arrangements

Urban water regulation in Australia is complex, consisting of a vast number of overlapping laws, along with other regulatory influences such as regulations, guidelines and licensing arrangements (McCallum 2014, McCallum and Boulot 2015). These regulatory influences are aimed, amongst other things, at controlling the quality of drinking water which is supplied to the public, preventing environmental pollution by water suppliers, controlling consumer prices, and establishing rights to access water resources. Most of these regulatory arrangements developed within an historical paradigm of legally centred water supply. Therefore, it is not surprising that there are significant gaps in how, if at all, these arrangements apply to legally decentred supply entities. For example, in Queensland, bodies corporate are specifically excluded from the requirement to be licensed as a water service provider when solely providing water to their lot owners.[13] In Victoria, however, the

[9] Examples of such state legislation are the Owners Corporation Act 2006 (Vic), the Body Corporate and Community Management Act 1997 (Qld) and the Strata Title Act 1985 (WA).
[10] For example, the Water Act 1989 (Vic), the Water Corporations Act 1995 (WA) and the South East Queensland Water (Distribution and Retail Restructuring) Act 2009 (Qld).
[11] S.130 of the Water Act 1989 (Vic).
[12] An example of a financial accountability requirement can be found in ss.14-16 South East Queensland Water (Distribution and Retail Restructuring) Act 2009 (Qld), while s.93 of the Water Act 1989 (Vic) sets out a sustainability requirement.
[13] See the definition of 'water service' in Schedule 1 of the Water Supply (Safety and Reliability) Act 2008 (Qld). Discussions with stakeholders involved with decentred schemes on the ground in Queensland suggest that a number of these schemes are deliberately structured to fall outside of the regulatory framework in the Water Supply (Safety and Reliability) Act 2008 (Qld).

regulatory framework governing safe drinking water supply does not envisage the possibility of private or community-owned entities directly supplying potable water to the public.[14]

Organisational culture

Legal decentring may well involve a move away from the highly risk averse and cautious organisational culture found in legally centred Australian water utilities. Such changes may result in greater risks being taken in service delivery. Whilst this concern is currently a theoretical one, it may nonetheless be important if harms arise through excessively optimistic innovation. The culture of the water service provider and the sense of personal responsibility that staff feel for safe water delivery have been empirically identified as key factors in the effective management of water contamination incidents (Hrudey and Hrudey 2014).

Size of water supplier

A second important way that legal decentring may have an impact is in relation to the size of the supply entity. In practical terms, new legally decentred suppliers are likely to be smaller than current legally centred suppliers. An entity's size impacts upon its competency and capability, its financial robustness, and its ability to comply with complex regulation.

Competency and capability

There is clear evidence that a significant number of regional water utilities (which tend to be smaller) fail to meet the current national drinking water quality guidelines, resulting in adverse implications for human and environmental health (Productivity Commission 2011). This is due to their reduced economies of scale. Current (smaller) regional utilities also suffer from skills shortages.

The community ownership model also raises particular issues related to competency and skills:

1. The model relies on voluntary community input. In many cases this voluntary input may simply not be available, or if available, it may not be of adequate quality, and "problems can be expected where members of a body corporate are naïve or apathetic about their responsibilities and obligations to govern a scheme" (Warnken, Johnston et al. 2009, p.95). This may lead to community schemes being exposed to incompetence at best, or fraud and mismanagement at worst.

2. The community ownership model has been developed for the delivery of fairly basic services, such as rubbish collection. Such community-owned bodies may not be capable of being responsible for more complex services like water delivery. This has been identified as an issue in the US, where the model has not performed well in relation to decentred sewerage provision (Water Environment Research Foundation).

3. Unlike large-scale public water utilities, for whom water management is their central concern, bodies corporate will have other responsibilities and priorities. Water management would merely be one of these priorities and would compete for resources and management focus.

4. Urban water systems have physical lifetimes of several decades and require management over their entire lifetime. Whether bodies corporate would even exist for such a length of time is questionable.

A logical consequence of a service provider having reduced competency and skills would be that there may be a greater use of external skills and competencies. This may result in a larger amount of subcontracting occurring in urban water service delivery, with legal responsibility for operating and maintaining decentred systems being shared among a large number of entities (such as equipment manufacturers, external contractors and independent auditors).

[14]Safe Drinking Water Act 2003 (Vic).This means that the direct supply of drinking water by a private water entity in Victoria would operate in legally unchartered territory, along with commercial, social and political uncertainty.

Financial robustness

There is also clear evidence that smaller water utilities in Australia have a higher average operating cost per property than larger utilities and are less robust on other financial measures (Productivity Commission 2011). Again, this is likely due to their reduced economies of scale.[15]

Bodies corporate also have particular difficulties related to financial robustness. In addition, they are likely to face challenges in ensuring adequate sinking funds are available to enable emergency repairs of water systems to be carried out (Warnken, Johnston et al. 2009).

Regulatory and administrative burden

The regulatory and administrative burden of complying with the large amount of urban water regulation will also be higher for smaller entities (Productivity Commission 2011).

[15] For a review of the literature on economies of scale in utilities, see p.123 of Productivity Commission 2011, *Australia's urban water sector,* Inquiry Report No. 55, Canberra.

Chapter 3 - Understanding risk

General understandings of risk

Risk is 'one of the key unifying themes that shape the contemporary social sciences' (Baldwin, Cave et al. 2012, p.83).[16] It has been labelled a 'contemporary obsession'. In nations such as Australia, both the government and private sectors have shown a keen interest in concepts of risk and risk management over the past twenty years, often as part of improving governance and achieving greater productivity (Power 2004). This interest in risk and risk management is evident across a range of policy arenas, including environmental protection, food safety, financial market regulation and corporate governance.

Yet, risk is also a complex notion. It holds multiple, albeit related, meanings when used by different disciplines and professions. One major use of 'risk' concerns the occurrence of harms and is intimately connected with security and safety (Giddens 1999). Another major use of the phrase 'risk' is in relation to uncertain futures (Fisher 2010) and a 'desire to control present and future outcomes' (Dobbie, Brookes et al. 2014, p.430). So while common definitions of risk often describe it in terms of the probabilistic likelihood of something bad happening, such as a harm or injury (Hrudey, Hrudey et al. 2006, Lindsay and Riebl 2013),[17] at the highest level of abstraction, all conceptions of risk simply imply that there is a future 'possibility that things can go wrong or not turn out as expected' (Power 2004, p.61). Overall then, risk can clearly have a variety of meanings, ranging from injury or harm at one extreme, to events in the world not turning out as we might expect or desire at the other.

It is also important to distinguish the concept of risk from the negative outcome which will follow if the risk eventuates, which is often termed a 'hazard' or a 'danger' (Giddens 1999, Dobbie, Brookes et al. 2014). Without an appreciation of the specific hazard or danger, risk becomes an empty concept (Fischhoff and Kadvany 2011). Therefore, risk can be understood as a term to which real context and content needs to be ascribed to provide it with true meaning. The important questions to answer are: the risk 'of what', and 'to whom'?

Risk at the societal and institutional level

We have a long history of controlling risks through the use of legal rules as well as other regulatory techniques like licensing schemes, technical standards and professional guidelines. The use of risk management as an organisational management technique is much more recent, however (Power 2004).

[16] Much academic discourse on the subject of risk is influenced by Ulrich Beck's 'world risk society thesis'. Beck's thesis was originally published in *Risikogesellschaft* (Suhrkamp, Frankfurt) in 1986. Beck's thesis contends that a central feature of late twentieth century modernity was that scientific and technological progress - instead of heralding in a safer society - was paradoxically leading to society experiencing, or at least perceiving, greater risk. Beck envisioned the 'risk society' as one constantly on the edge of a technological frontier. This frontier position generates an acute awareness of many possible societal futures, but the society consequently experiences increased risk and uncertainty, and will crave mechanisms to control this: see Giddens, A 1999, 'Risk and responsibility', *The Modern Law Review,* vol. 62, no. 1, pp. 1-10. For a fuller explanation and critical appraisal of Beck's thesis, see Jarvis, D. (2007). "Risk, globalisation and the state: A critical appraisal of Ulrich Beck and the world risk society thesis." Global Society **21**(1): 23-46.

[17] A definition of risk that would be familiar to the Australian water industry is 'the likelihood of identified hazards causing harm in exposed populations in a specified time frame, including the magnitude of that harm and the consequences': see Hrudey, SE, Hrudey, EJ, & Pollard, SJT 2006, 'Risk management for assuring safe drinking water', *Environment International*, vol. 32, no. 8, pp. 948-957. This definition is forward looking and scientific, and derives from that used in the Australian Drinking Water Guidelines and the World Health Organisation Guidelines for Drinking Water Quality.

This broader use of risk management, as an organisational management technique, is leading to a change in focus from concerns about the management of primary risks to citizens or society, to concerns about secondary institutional risks (such as reputational risks) to an organisation (Rothstein, Huber et al. 2006). This expansion in concern is not without problems. It has become the 'risk management of everything' (Power 2004p.59) and may even be dangerously diverting organisational time, money and energy away from the adequate management of societal risks.

Box 3: Common understandings of risk in the urban water sector

Alongside the rise in interest about risk, there has been a commensurate increase in the use of specific techniques to identify, assess, analyse and manage risk. And while historically the use of risk management techniques may have been less widespread in the water industry than in some other industries, this has now changed (MacGillivray, Hamilton et al. 2006). Water utilities now make widespread use of risk management techniques at a business level as operational management tools (Pollard et al. 2004).

Some common risk management frameworks that the Australian water industry use include the AS/NZS ISO 31000 Risk Management Standards and Guidelines (Standards Australia 2009); the International Risk Governance Council's Risk Governance Framework (IRGC 2005); the Australian Guidelines for Water Recycling (NRMMC, EPHC et al. 2006); and the Australian Drinking Water Guidelines (NHMRC and NRMMC 2004). Typically, the risk management frameworks utilised in the urban water sector distinguish between an initial objective and ostensibly scientific process of risk assessment, and a subsequent, more overtly political and subjective process of risk management and communication. The frameworks tend to operate either at the organisational level or at the level of a particular water supply project or process. They may be purely managerial tools or they may also represent statutory requirements.

This change in focus may also have occurred progressively in the Australian water industry. Risk management frameworks used in the water industry may originally have been concerned with managing the health risks to individual citizens and urban communities posed by unsafe drinking water, but these frameworks now commonly extend to the management of all 'business' risks. The potential for this change in focus to be problematic for the water industry has also been acknowledged in the literature. MacGillivray et al. (2006) cautioned a decade ago that the widespread adoption of a business-focused risk governance model by the water industry could potentially conflict with the management of wider societal goals in relation to the protection of human health.[18] Likewise, Hrudey, Hrudey and Pollard (2006) also argued that in order to secure good public health outcomes in the urban water industry, managing health risks should take express priority over the management of other business risks. Of course, similar tensions can be identified in other industries, all of which have an inevitable tension between regulatory regimes designed for safety (and often adopting an engineering paradigm), and the need to concurrently meet resource constraints (and adopt an economic efficiency paradigm) (Haines 2011).

Our research focus is on issues of risk allocation at the societal level rather than those at the institutional level.[19] The rationale here is that issues of risk allocation at the societal level will ultimately influence whether decentred innovations will be seen as legitimate and accepted by the public.

[18] An alternative perspective on this matter is that the pervasive influence of risk management for public health protection in the water industry has already become a source of conservatism and led to a reluctance to experiment within the urban water industry: see Farrelly, M, & Brown, R 2011, 'Rethinking urban water management: experimentation as a way forward', *Global Environmental Change,* vol. 21, no. 2, pp. 721-732.

[19] A useful conceptual framework to understand risk management at the societal level is the risk governance framework proposed by Renn, O., A. Klinke and M. v. Asselt (2011). "Coping with complexity, uncertainty and ambiguity in risk governance: a synthesis." AMBIO: A Journal of the Human Environment **40**(2). This framework builds on the earlier work of the International Risk Governance Council but specifically acknowledges the role played by a multitude of actors and processes in developing collectively binding decisions about risk management.

Legal understandings of risk

Legal dictionaries (2010, 2014) do not proffer a single definition of risk. This in itself is instructive. The law understands risk in different ways for different purposes, reflecting the many functions law plays within society.[20]

Harm prevention

A central and continuing theme for the meaning of risk is the proactive management of risk to prevent harm from occurring (Freiberg 2010). This is clear from the title of regulatory textbooks such as Malcolm Sparrow's (2008) *'The Character of Harms'*. The law, for example, may mitigate the risk of a potentially harmful activity by requiring those undertaking it to obtain a licence, without which it will be illegal to carry out the activity.[21] Risk management provides the underlying rationale for the licensing system, because an entity will only qualify for a licence if it possesses certain qualities and expertise, as the possession of such qualities and expertise logically reduces the likelihood of things going wrong. Another way the law may act to proactively manage risk is through applying the precautionary principle to justify prohibiting an activity if the scientific information on which to make an informed risk assessment is not available (Freiberg 2010).[22]

Allocation of manifested harms

A further way the law may understand risk is in terms of the consequences of a risk manifesting. Law plays a role in allocating the consequences of things going wrong and enabling those harmed to seek redress. It is a primary enabler of business and commerce and a foundation for economic activity. There are various legal mechanisms, such as the law of negligence, that allocate legal responsibility (or 'liability') for manifested risks. An understanding of risk in terms of liability is not currently well researched or understood in the Australian urban water context, however.[23] Understanding legal responsibility for harm involves identifying the legal person who is allocated the responsibility for manifestation of the harm. This may be a real person, a corporation or another body with legal identity.

Legal understandings of risk in relation to urban water

Harm prevention

Regulatory frameworks

Regulatory frameworks are commonly used to proactively manage risk and avoid harm occurring. Some specific strategies that Australian urban water regulatory frameworks use to do this are presented in Figure 3.1 on the next page.

[20] Raz, J 1979, *The authority of law,* Clarendon Press, Oxford p.176 suggests that Law has three primary functions. First, it facilitates private arrangements and enables government functions to occur. Second, it adjudicates disputes between and within the private, public and not-for-profit sectors. Third, it has a regulative function in that it aims to prevent undesirable behaviours and encourage desirable behaviours across all sectors. To this end, it authorises certain behaviours and prohibits others, or defines rights that can be enforced against the world. In addition to these functions, Law also plays a role in expressing our shared moral, ethical and social values.

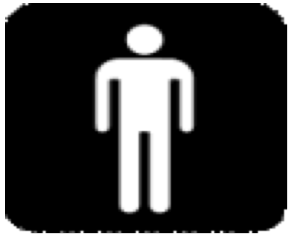
[21] This approach can be found in the licensing of water suppliers in the Water Industry Competition Act 2006 (NSW).

[22] The precautionary principle is commonly contained in environmental laws, such as the Environment Protection Act 1970 *(Vic)*.

[23] Limited research has been undertaken in this arena. For example, a review has been conducted into the potential exposure of water utilities to legal liabilities in the supply of recycled wastewater. However, this analysis only extended to government-owned entities and was confined to the State of Victoria: see Jackson, H 2005, 'Potential exposure to legal liabilities for the supply of recycled water and biosolids', *Environment and Planning Law Journal*, vol. 22, no. 6, pp. 418-430. There have been significant changes in consumer law and water law in Australia in the decade since this work was undertaken. Other more recent literature does consider potential legal liabilities of water suppliers but only in outline terms. See the work of Warnken, J., N. Johnston and C. Guilding (2009). Exploring the regulatory framework and governance of decentralised water management systems: a strata and community title perspective. Waterlines Report Series Canberra, National Water Commission. and also McKay, J, & Moeller, A 2000, 'Is it time for a new model of water quality laws?', *Environmental and Planning Law Journal***,** vol. 17, no. 3, pp. 165-175.

Figure 3.1: Urban water regulatory strategies

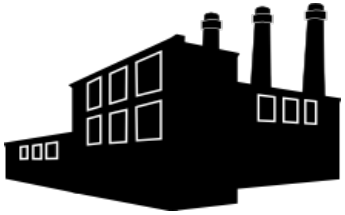
Controlling who provides water services e.g. requiring a licence to operate



Controlling the quality of water provided e.g. mandatory standards in regulations

Controlling the price and quality of service supplied e.g. through customer codes

Controlling how the water is treated e.g.by requiring a licence for treatment plants



Controlling where the water comes from e.g. laws banning the public from catchments

Controlling where water flows e.g. by providing for the building of flood prevention infrastructure

Banning the release of contaminated water to the environment e.g. through pollution offences

Controlling where we build e.g. planning restrictions in flood zones

Controlling what we build e.g. building codes

An example of such a strategy could be ensuring that potentially hazardous activities are only undertaken by suitably qualified persons acting in an agreed, safe manner. Such high-level harm prevention strategies can be implemented in a number of different ways, utilising various regulatory tools or methods.[24]

Some specific tools used in Australia to implement harm prevention strategies in the urban water sector are illustrated in Figure 3.2 on page 26. Those tools that require the enactment of laws to be effective are only available to governments, of course. An example would be the enactment of a law that restricts certain high risk activities to particular approved entities. However, many of the tools are available both to governments and to non-governmental entities such as businesses and individuals. For instance, a contract can be used to transfer the responsibility for undertaking a risky activity to a third party who is suitably experienced and resourced to enable the activity to be undertaken in a safe manner.

Australian regulatory frameworks deal extensively with the management of the potential risks of harm that urban water may present. Harms, however, may fall into four categories. These harms may be to:

1. The health of the public;
2. The health of the environment;
3. Property; or
4. The interests of consumers.

The frameworks consist of both high-level risk governance strategies and specific risk management tools. In many cases, the harm prevention mechanisms in these regulatory frameworks will be sufficient to ensure that actual harm does not occur.

Background law

The general background law also plays an important role in harm prevention. For example, the existence of the law of negligence may incentivise entities that are undertaking potentially dangerous activities to undertake them in a safe manner so as to avoid the potential of future legal action by those that could be harmed by the activity.

Allocation of manifested harms

Background law

However, even the best efforts at proactive risk management may, on occasion, fail. If this happens and actual harm manifests, then a process of liability allocation takes place. The general law, such as that of tort or contract, plays an important role in allocating the legal risks of many types of harm, should they occur. An example would be providing general rules about when an entity will be legally liable for actions that it takes without due care that cause harm to another.[25]

Regulatory frameworks

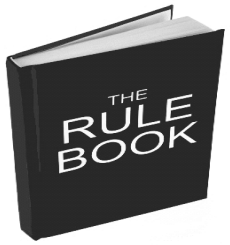
Regulatory frameworks also have a crucial role to play in allocating the consequences of specific risks of harm manifesting, such as providing that a particular entity will be legally responsible should a specified event occur.[26] The legal questions to be answered at this stage are who is liable, to whom, and for what. When looked at by the law in this way, manifested risk is often framed in terms of the 'risk of harm'.

[24] A full discussion of the various tools, or methods, available to governments when exercising their regulatory functions is provided in Freiberg, A 2010, *The tools of regulation,* The Federation Press, Sydney.
[25] The background law will always allocate the responsibility to someone, with the consequence that there is never a legal vacuum. However, identifying this allocation of responsibility may, on occasion, be difficult.
[26] For example, s.157 of the Water Act 1989 (Vic) provides when a public water authority will be legally liable for damage caused by water escaping from its works.

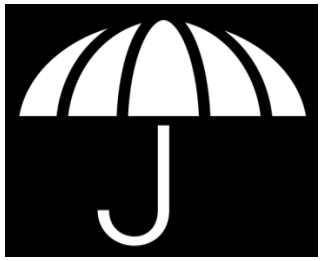
Figure 3.2: Urban water regulatory tools

Enter into a contract e.g. to provide for an activity to be undertaken, to set a standard and to allocate responsibility

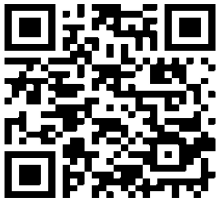
Make a legal rule e.g. authorising an activity, banning an activity, setting a standard for behaviour or allocating responsibility



Take out insurance against harm occurring



Provide non-legal guidelines/codes e.g. setting a standard or demonstrating best practice



Provide an economic incentive to act in a certain way

Grant a licence/approval which may have conditions attached

Provide for independent certification of an activity/organisation

Require reporting of performance to the public

The current model of legal risk allocation

Legal risk management can therefore be conceived of as a combination of both harm prevention strategies and techniques, and the rules which allocate responsibility or liability for harm once it has occurred. Both of these dimensions - proactive risk management and the allocation of manifested harm - need to be considered when analysing the potential legal issues that may arise from the adoption of new technologies (Anderson et al. 2014).[27]

Figure 3.3 below sets out our conceptual framework through which to understand legal risk in relation to urban water.

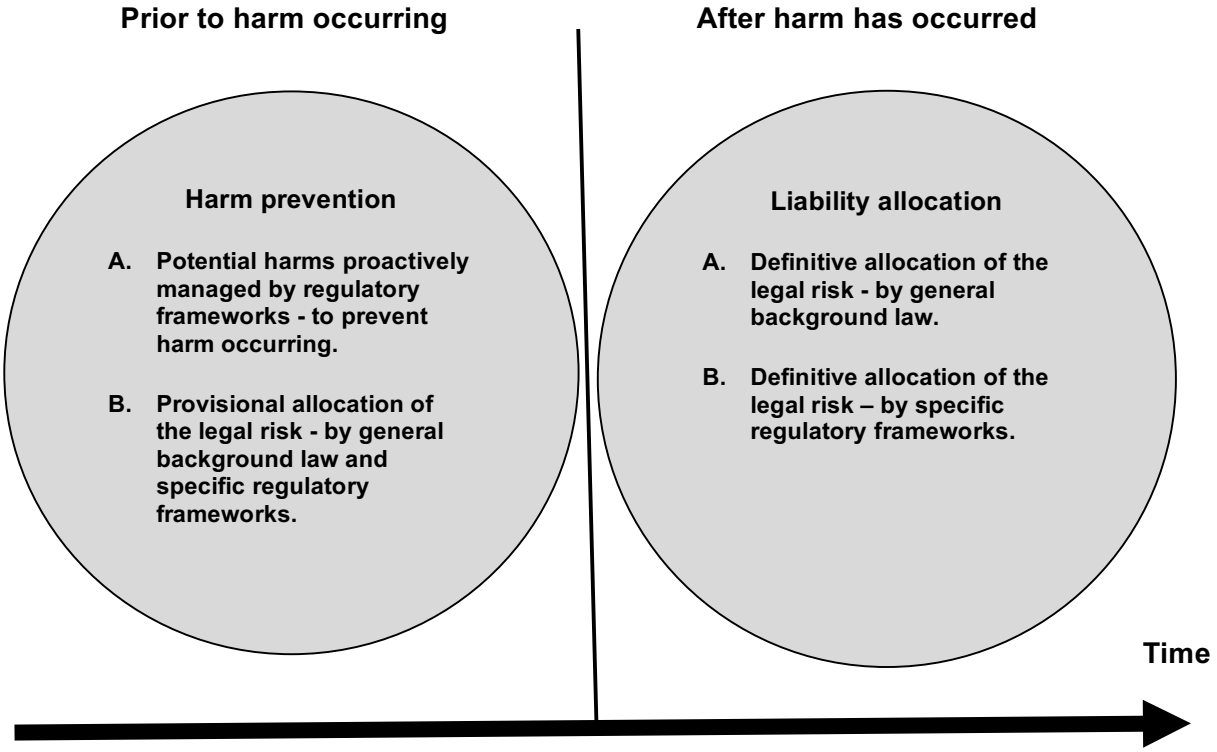


Figure 3.3: How legal and regulatory frameworks deal with harm

In concept, this framework could be applied in order to analyse how citizens may fare under new water sensitive practices if harm were to occur. A detailed analysis could be undertaken of the exact ways in which the specific regulatory frameworks and general background law of a particular jurisdiction proactively manage urban water risk and allocate the consequences of manifested harm. This would involve reviewing the specific primary and secondary legislation related to the water industry in that jurisdiction and, amongst other things, the general laws of negligence, nuisance, consumer law and criminal law.

However, a better starting point may be to acknowledge that in Australia, the legally centred public water service providers are currently allocated a certain degree of responsibility for harm prevention and liability for harm. Broadly speaking, this allocation, which is the current model of legal risk allocation in relation to urban water, is one that the public appears to be largely happy with.

If the service provider is changed, as it would be in legally decentred service provision, it should not be assumed that legal responsibility for harm prevention and liability for harm would fall in the same

[27] A recent report by the Rand Corporation examined both of these questions when analysing the need for new regulatory regimes for autonomous vehicles, considering both the frameworks available to manage and prevent these vehicles causing harm, and the legal liabilities that would arise should such vehicles be involved in accidents: see Anderson, JM, Kalra, N, Stanley, KD, Sorensen, P, Samaras, C, & Oluwatola, OA 2014, *Autonomous vehicle technology: a guide for policymakers,* RAND Corporation, Santa Monica, California.

way. Nor should it be assumed that the resulting allocation of legal risk would be preferable or acceptable to the public.

What societal level categories of harm we are concerned with?

Our mapping of the Australian urban water management regulatory space (McCallum 2014) indicates that many, but not all, of the goals of contemporary urban water regulation relate to the avoidance of the risks of harm of one sort or another. Indeed, it is possible to understand the increase in regulation of the sector over time, at least in part, as an increase in the number of societal level risks of harm that we as a country are seeking to avoid. Figure 3.4 on the following page presents an amended form of Brown, Keath and Wong's (2009) urban transitions typography, showing the cumulative issues that regulatory frameworks in Australian cities have sought to address. This Figure articulates each of the harms that we have progressively sought to control. What is clear in this Figure is that as the relationship between the city and water has evolved over time, the number of risks of harm controlled for by governments has expanded.

These observations suggest that existing regulatory frameworks and water management practices seek to control four broad categories of harm. These relate to:

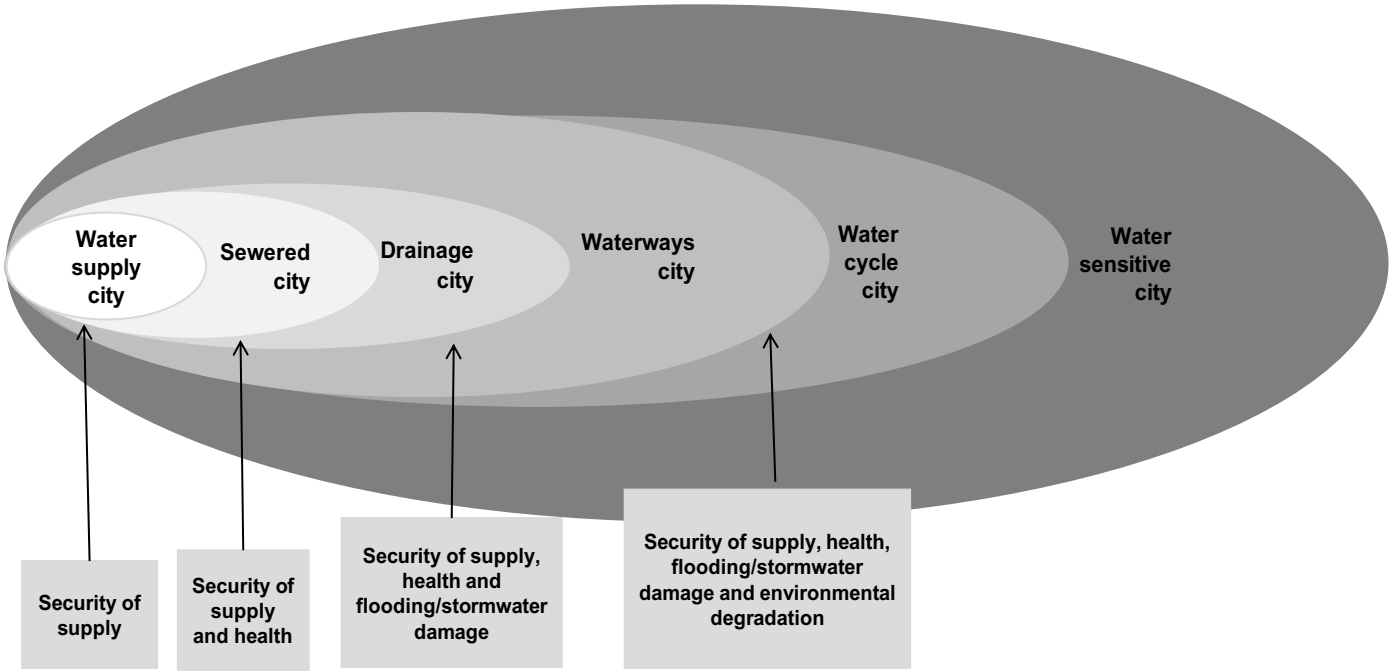
1. Public health;
2. Flooding and stormwater damage;
3. Environmental health; and
4. Security of supply.

Emerging thought on water use in our cities has also added a new tranche of complex issues to discussions about appropriate urban water practices, including liveability, sustainability and resilience (Newman 2001, Brown, Keath et al. 2009). Each of these more recent ideas has brought with it an expanded set of objectives. For example, the idea of urban liveability suggests that water management could and should play a role in making our cities more pleasant and healthy places to live and work. This expands the objectives of public health regulation into new areas, such as promoting the irrigation of public open space and reducing the impact of urban heat islands. These ideas have also been borne out of a concern to achieve a future ideal - that of improved water sensitive practices and infrastructures. The consequence of this is that the left-hand side of the Figure below covers our history of progressively achieving a secure and healthy water supply, and better wastewater management and environmental standards; whereas the right-hand side covers a series of policy ideals - a state of nature to be pursued in an ideal future. All of these past historical observations on one hand, and ideals on the other, may be framed in the language of risk. It is not clear, however, that there are any new harms envisaged. The use of the word risk is a powerful piece of political and policy rhetoric which attracts attention. But we suggest that the legal ramifications of moves towards decentred operations are less colourful.

Put simply, there are no new harms. It is more likely that there are a set of new concerns which extend and enlarge the content of the four existing categories of harm.[28] And clearly, any new hydro-social contract will need to control for each of these four broad categories of harm in ways that are acceptable to the public.

[28] In time, issues of liveability, sustainability and resilience may influence the ways in which regulatory frameworks respond to these harms. An example would be urban heat islands which are said to reduce the liveability of cities. The risks of harm posed by this phenomenon are to human health, but current regulatory frameworks do not control these well. However, a growing societal recognition of the impact of urban heat islands may result in a demand for regulation to address these impacts. Another example might be with the wider recognition and championing of the aesthetic, recreational, cultural and spiritual values to society of healthy water courses and aquatic environments. As these are more widely recognised in future, these values will continue to be protected through further strengthening environmental protection frameworks.

Figure 3.4: The cumulative harms urban water regulatory frameworks seek to manage (adapted from Brown, Keath and Wong (2009))



Chapter 4 – How might decentred innovation cause harm, and with what consequences?

This research is focused particularly on the legal mode of decentring. However, as observed in Chapter 2, decentred innovations are often simultaneously decentred across several other modes and may also involve the use of a local water source, local water treatment and local water supply to a discrete development.

These decentred innovations are often conceived of as mechanisms to avoid harm and control hazards. Stormwater capture and treatment technologies, for instance, provide a solution to the problems that urbanisation causes in relation to stormwater run-off quantity and quality. However, decentred innovations might also be a source of potential harm if the technology malfunctions or the system operates in a harmful manner.

This risk of malfunction or failure is present in all highly engineered water systems (The National Academies of Sciences, Engineering and Medicine 2015). Indeed, there is a good case to be made that, for a number of reasons, things may go wrong more often with decentred innovations compared to current centred arrangements. These reasons would apply whichever type of legal entity was responsible for owning and operating the decentred innovation. There are five concerns at stake here:

1. **Lack of operational expertise**

   Decentred approaches to service delivery will need to be operated and maintained adequately in the medium to long term and this may be a potential weakness (Biggs, Ryan et al. 2009, Moglia, Cook et al. 2009). This is particularly the case because these systems tend to have high maintenance requirements (Nelson 2008). Maintenance issues, and the ongoing operational risks these pose, tend to receive less attention from industry compared to the initial management of risks arising from the choice of treatment technologies and processes (Yarra Valley Water 2013).

2. **Dilution of operational expertise**

   Decentred innovation implies that there will be a greater number of water supply schemes than is currently the case. At least in the short term, this may well lead to a finite number of experienced operational staff being responsible for greater number of schemes, such that operational expertise could potentially be diluted.

3. **Dilution of oversight by regulator**

   Having a greater number of supply entities and supply schemes to oversee is a significant change, which means that regulatory oversight may be stretched, at least in the short term. For example, the appropriate regulator(s) may not have adequate resources to conduct detailed reviews of complex risk management plans for a far greater number of supply schemes. This may cause a reduction in the effectiveness of proactive risk management to prevent harm from occurring.

4. **Lack of adequate regulation to prevent harm from occurring**

   As these schemes are new, there are likely to be a number of gaps in current regulatory frameworks in relation to such innovations. This may result in less than optimum proactive risk management occurring.

5. **Numerical likelihood of harm increases with more schemes**

   Decentred service provision may also increase the chance of things going wrong purely on the basis that one historically time-tested and strongly integrated system may be easier to control to assure high quality, compared to multiple decentred smaller systems operating in a fragmented manner. The concern here is thus a systems control issue. Successful real world systems all

require inbuilt flexibilities and redundancies to some extent. Therefore, it is an important empirical question whether decentred systems operate to the same level of reliability as more centred systems in the event a malfunction inevitably occurs.

What would be the consequences of this harm occurring?

If decentred innovations do fail, then the consequences are likely to involve harm to individuals. For example, people may get sick, suffer damage to their property, or incur costs that they would not otherwise have incurred. These individuals may choose to pursue redress through legal avenues or non-legal avenues.

The formal legal avenue that an individual can pursue to enforce that individual's legal rights is called a 'cause of action'. Such causes of actions can arise from legislation (or 'statutes') or from the common law (the judge-made law which is derived from principles established in earlier legal cases). In our legal analysis in Appendix 2, we term these 'common law actions' and 'statutory actions'. Each type of formal legal action will have its own rules about who can make use of it, the requirements that need to be fulfilled to establish the action, and the type of legal remedy the person can receive if the claim is made out. The primary remedy for a private cause of action is damages. The standard of proof required to be shown to the court in a private cause of action is for the case to be made out on the 'balance of probabilities'.[29]

Box 4: State sanctions and private causes of action

There is a basic dichotomy made between two types of legal liabilities: state sanctions and private causes of action. State sanctions are legal avenues which are only open to a government body to pursue. Examples would be the prosecution of a crime; an action to enforce a breach of a statutory provision to which a civil financial penalty attaches; or an action to revoke a privilege granted by government, such as a licence. In contrast, private causes of action are legal claims that are open to any entity to pursue, provided they can sustain the necessary elements of the action. Examples include a claim in negligence or a claim for breach of a contract.

Our risk analysis only examines the private causes of action that an individual may be able to bring. There may be additional legal actions (for example, statutory crimes) which state bodies, such as a government minister or regulator, may be able to pursue on the same facts. For instance, state level environmental legislation across Australia contains a number a statutory offences relating to environmental pollution and public health, while occupational health and safety legislation will also contain a number of statutory offences that could be relevant. However, these state sanctions have not been considered in our analysis. Fines and other criminal sanctions are aimed at punishment and future deterrence, not at recovery of loss by those harmed. It is the aspect of recovery by those harmed that is the focus of our analysis.

A legal cause of action needs to be made out against a particular entity. This will be the entity on which legal liability for the manifested harm falls. We are interested in exploring the allocation of legal liability for manifested harm that results from failures in decentred innovations, when legal responsibility for service provision is decentred to private companies and bodies corporate. Does it make a difference, either legally or practically, who the service provider is? The research question for our risk analysis was whether individuals would be worse off, in terms of their ability to recover damages through the legal system, in the event that something goes wrong with the supply of water in a legally decentred model of water service provision.

[29] This contrasts with the criminal law standard of proof, which requires the case to be made out 'beyond all reasonable doubt'.

A key form that legal liability or responsibility for harm takes in Australia is a duty to pay money imposed on the person deemed responsible for the occurrence of the harm.[30] This money may be paid to those who have been harmed in the form of legal damages, or it may be paid to the government by way of a fine or penalty. However, alongside the largely financial consequences of being legally responsible sit other important, non-legal consequences, such as reputational damage. These non-legal consequences are a key concern for institutions in the water industry (Pollard, Strutt et al. 2004) and are the focus of organisational-level risk management frameworks (Dobbie, Brookes et al. 2014). Significant water contamination crises - such as the Sydney Water cryptosporidium outbreak in the late 1990s, the water crisis in the early 2000s in Walkerton, Canada, and the still unfolding crisis in Flint, Michigan - highlight the enormous reputational damage that can flow from such an incident. This damage may spread through the whole water industry. Arguably, however, the greatest reputational risk probably falls on governments, as the public expect drinking water which is adequate, affordable and, most importantly, safe.

There are also other informal avenues of redress which can act in concert with formal legal risk allocation and which provide a number of additional mechanisms by which a person harmed can seek redress. These include internal complaint mechanisms that operate within the organisation, complaints to politicians, and complaints to an industry ombudsman. Industry ombudsman schemes, which enable small consumer disputes with existing water service providers to be resolved in a quick and affordable way, are a feature of the current risk allocation model across a number of Australian states.[31] These avenues are more oriented towards consumer matters and have not been considered in our legal analysis. They are addressed in Chapter 6, however, as potential new models of risk allocation.

How did we investigate the consequences of such harm occurring?

The innovation scenarios

We investigated our research question by analysing the legal allocation of certain risks of harm involved in the operation of innovative water supply solutions in two hypothetical innovation scenarios. Our focus was on the harms that may occur after the decentred innovations had been designed and constructed; that is, in their ongoing operational phase. We chose to adopt this focus because it is at this point that the ongoing legal ownership and operational responsibility of the decentred innovations is likely to be most significant.[32]

The innovation scenarios were carefully constructed to represent state-of-the-art water supply solutions that are either operating, or have been proposed for development, in Australia. The innovation scenarios were informed by desk-top research and by informal consultation with stakeholders and other researchers.[33] Whilst they are intended to offer enough detail to enable a rich analysis to be undertaken, they are not meant to reflect the specifics of any particular real world project.

Innovation scenario 1 involves a new suburb on the urban fringe, in which one legal entity is responsible for all water supply to the suburb. We have called this suburb ‘Enviroburb’. In Enviroburb, stormwater is recycled for potable use. Innovation scenario 2 involves a substantial high-rise

[30] Therefore, the legal consequence of causing injury to a person or damage to a property manifests as a financial consequence. While the law has the ability to impose other sanctions ranging from incarceration down to a simple formal apology, these are less common.

[31] In Victoria, the existing public water corporations are required to be members of the Energy and Water Ombudsman Victoria scheme (EWOV) pursuant to s.122ZG of the Water Act 1989 (Vic). In Western Australia, all licenced water service providers must be part of the Energy and Water Ombudsman scheme pursuant to Part 4 of the Water Services Act 2012 (WA). Lastly, in Queensland, all water retailers and distributors in South East Queensland are required to be part of the Energy and Water Ombudsman Queensland scheme (EWOQ): see the Energy and Water Ombudsman Queensland Act 2006 (Qld).

[32] Differences in organisational capacity, resources and incentives between the different types of legal entity that may own and operate such systems may also mean that any operational and maintenance issues that do arise may play out differently depending on the owner and operator of the scheme. However, the analysis does not make any assumptions about whether maintenance problems would, in reality, be more likely or unlikely under any particular legal ownership model.

[33] Sources used for desk-top research include case studies on innovative water projects in urban areas in Australia and the US; a survey of Australian media for references to ‘stormwater’ and ‘wastewater’ conducted over a period of 12 months; and a review of literature and case law within Australia and Canada on the human health impacts of water contamination. In addition, the websites of various government, business and research bodies were also consulted. The innovation scenarios were also tested in two stakeholder consultation workshops in Queensland and Victoria.

development where again, one legal entity is responsible for all water supply. We have called this suburb ‘Sustainability Towers’. In Sustainability Towers, wastewater is recycled and supplied for non-potable (non-drinking) uses.

The incidents of harm

In each innovation scenario two fictional incidents were constructed to represent credible events that might occur and would result in harm being caused to individuals. These incidents arise because of a maintenance failure of one kind or another. In Enviroburb, an incident occurs during which a dead possum contaminates the drinking water, which results in people becoming sick. A further incident involves the malfunction of a combined household/precinct-level stormwater system, which results in a number of homes being damaged by flooding. In Sustainability Towers, an incident occurs where there is cross contamination between sewage and recycled water pipes, which causes a smelly sewage spill, and in turn, results in several local businesses losing commercial trade. A further incident occurs when the recycled water supply is disconnected and apartment owners are unable to irrigate their roof gardens, causing them financial loss. Overall, then, these four incidents result in harm to people, their property or their economic interests.

Legal analysis

In respect of each innovation scenario, Figure 4.1 on the following page identifies the key dimensions of decentring that are relevant, the incidents that occur, and the risks of harm that are involved. Further details about the hypothetical innovation scenarios and incidents of harm we developed are contained in Appendix 1.

In our analysis, we considered what difference it makes to the ability of those harmed to recover legally if the supplier is a new, non-public entity (such as private company or a body corporate) as opposed to a traditional public water utility. For each incident, we analysed the private causes of action that could potentially be brought against the water supplier by people who have been harmed. We also analysed whether there would be any particular difficulties of a legal or practical nature in bringing such an action against a publicly-owned utility, a private company or a body corporate. The legal analysis considered the legal position in three Australian states: Victoria, Queensland and Western Australia. These were considered likely to be broadly typical of the situation across Australia.

Appendix 2 is a technical appendix containing details of the cause of action analysis. The key findings from the analysis are presented and discussed in Chapter 5.

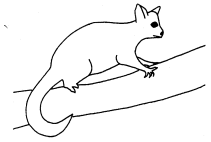
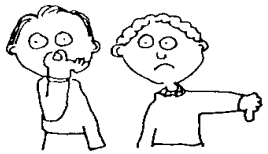
	Decentred innovation		Incidents of harm	
Innovation scenario 1	**Enviroburb = new greenfield suburb** 	**Stormwater supplied for drinking** 	**Incident A = public health incident caused by a dead possum getting into water supply system** 	**Incident B = flooding due to a malfunction of integrated household tank/precinct level stormwater retention system** 
Innovation scenario 2	**Sustainability Towers = new urban precinct** 	**Recycled wastewater for non potable use** 	**Incident C = environmental contamination caused by cross connection between recycled water and raw sewage** 	**Incident D = recycled water disconnected as system too expensive to maintain** 

Figure 4.1: The innovation scenarios and incidents of harm

Chapter 5 - Analysis and discussion

Findings from the legal analysis

The current legal risk allocation

On the facts of each incident, a person harmed by the actions of a water service provider could theoretically pursue a number of potential legal private causes of action to recover damages to compensate for the harm suffered. These are identified in Table 5.1.

Table 5.1: Potential private causes of action for each incident

Potential action	Incident A (drinking water contamination)	Incident B (flooding)	Incident C (environmental contamination)	Incident D (recycled water supply interruption)
Breach of contract	√	-	-	√
Negligence	√	√	√	-
Nuisance – common law	-	√	√	-
Nuisance – statutory	-	√	√	-
Trespass to land	-	√	-	-
Breach of statutory duty	√	-	-	√
Breach of consumer guarantee - services	√	-	-	√
Breach of consumer guarantee - works	√	-	-	√
Statutory liability - goods with safety defect	√	-	-	√

The consequences of bringing a successful action that is upheld by the court would be that the water service provider, or its insurer, would need to pay damages to the person harmed. This represents an allocation of the consequences of harm to the water service provider and away from the harmed person.

Table 5.1 shows the actions which could be brought by individuals, but in a theoretical sense. In reality, there are many gaps and inconsistencies even in the way legal risk is currently allocated. Because this traditional centred water servicing arrangement is the counterfactual arrangement against which we judge the legal veracity of water sensitive innovations, it is worthwhile articulating these imperfections.

General technical limitations

Each cause of action has its own specific and often highly technical requirements that need to be established. Whether these requirements would actually be sustained on the facts of each incident is uncertain. A detailed discussion of each potential private cause of action, along with an assessment of whether it may be successful against each of the three possible service providers, is provided in Appendix 2.

Box 5 identifies some of the limitations of the private causes of action which may prevent those harmed being able to claim under that cause of action.

Box 5: Limitations on particular causes of action

Breach of contract:

- Requires a direct contractual relationship between the person harmed and the service provider. Not available to family members or visitors.
- Requires a specific and identifiable contract term to have been breached.
- Contract terms can limit the liability of the service provider.

Negligence:

- Requires the service provider to owe a duty of care to the person harmed.
- The service provider must have been negligent (i.e. at fault).
- Proof must be provided that the breach of the duty caused the harm.
- Contract terms can limit the liability of the service provider.

Nuisance:

- Only those in actual occupation of land can claim. Not available to visitors.

Trespass to land:

- Service provider must have been at fault.
- Only a person in actual possession of land may claim. Not available to landlords.

Breach of statutory duty:

- Requires a clear and precise statutory provision to have been breached. Statutory duty must be owed to a small, defined group of persons.

Australian Consumer Law (ACL) actions:

- Requires a supply of goods or services, not a failure to supply at all.
- Only a consumer can bring an action for breach of the statutory guarantees. Not available to a family member or visitor.

These problems arise whether the service provider is legally decentred or not. Some of these difficulties relate to who is entitled to bring a claim under a particular cause of action. This means that the number of potential claimants is often significantly smaller than the number of persons harmed. A further set of difficulties involves whether there is, in fact, sufficient evidence to establish that all the elements of an action are satisfied. For example, is there actually enough evidence to demonstrate that water contamination at a particular place on a certain day caused sickness several days later? These difficulties can be highly technical and are often results of the historical development of each cause of action.

Specific limitations – public water service providers

In addition, some of the causes of action will be hard to establish against a legally centred supplier. These include:

1. Breach of contract – typically, public water utilities do not have individual contracts with their customers in relation to drinking water supply.[34] Rather, their contractual relationship is contained in a 'deemed statutory contract' which is implied by, or inferred from, the terms of the applicable water legislation and related customer codes and charters. The precise terms of this contract are likely to be unclear. This lack of clarity would make bringing a successful breach of contract claim extremely difficult.

2. Breach of the Australian Consumer Law (ACL) statutory guarantees in relation to the provision of consumer services – a recent tribunal decision has cast some doubt on whether a public water utility would be treated as providing services for the purposes of the ACL.[35]

3. Statutory nuisance - the liability of Victorian public water service providers for flooding damage caused by their works is limited to occasions when they act negligently or intentionally.[36] This requires the public water service provider to demonstrate a greater level of fault than a legally decentred service provider would need to.

4. Statutory limitations on liability – in both Queensland and Victoria, there are certain statutory limitations imposed on the liability of public water service providers for damage caused by flooding from their works.

Overall then, these limitations mean that it would be neither a simple nor a straightforward task to take a private law action against a public water body if harm occurred. So, to what extent does this matter? Is it really a problem? These gaps and inconsistencies are certainly a problem in a legal sense, but probably matter less in the real world of current operations. This is because in the practical world of public utilities and political influence, the base assumption would usually be that the public utility must logically assume the responsibility for any harm caused. In other words, public expectations and democratic political power would trump these legal uncertainties.

Legal decentring will impact on legal risk allocation

Under a situation where the water provider is legally decentred and harm occurs, however, no such logical expectation or assumption of public sector responsibility is warranted.

Change to broad legal risk allocation

Our legal analysis above demonstrates that despite some gaps, there is, broadly speaking, a public allocation of legal responsibility under the conventional, centred legal model for publicly-owned service providers. In these circumstances, the public service provider is allocated certain consequences of harm. In contrast, if there is legal decentring as part of new innovative practices, there will be a private and/or community allocation of legal risk. The legally decentred service provider would then be allocated certain consequences of harm.

Specific changes to risk allocation – particular causes of action

Beyond this, the legal analysis also demonstrated that the availability of certain causes of action will be particularly impacted by legal decentring. We noted above that some causes of action are hard to establish against a conventional, legally centred service provider. There are also other causes of action which would be hard to establish against a community-owned body corporate service provider. These include:

[34] The situation tends to be different in relation to recycled water supply for non-potable uses.
[35] *Thompson v South East Water [2015] VCAT 612.*
[36] See s.157 Water Act 1989 (Vic). In Victoria, common law nuisance has been replaced by specific statutory nuisance provisions in the Water Act 1989 (Vic).

1. Breach of contract - there may not be a detailed water supply contract between the body corporate and a homeowner. Instead, the terms of the water supply arrangement may be contained in the deed between these parties that governs their entire homeowner/body-corporate relationship. If the precise terms of the supply are unclear, this would make a breach of contract claim hard to establish. In addition, anecdotal evidence suggests that it is current practice for bodies corporate to not charge homeowners for water supply, this would limit the type of losses that could be recovered if the water was not supplied.

2. ACL actions - it is likely that a body corporate would not be operating in trade or commerce. This would mean that ACL actions would be unavailable against the body corporate.

3. Negligence - fault in negligence varies depending upon the size and financial resources of the entity potentially at fault. A smaller, less financially robust entity, such as a body corporate, would need to take fewer measures to fulfil its duty of care than a large public water utility would need to. This may make it harder to establish that the body corporate was negligent.

Other points are also relevant here. Paradoxically, whilst public bodies enjoy several immunities, this is not the case for private bodies. So in theory, the greatest number of potential causes of action would be available against a private water service provider. However, in the real world of commercial operations, a private water service provider would have a significant commercial incentive to limit its liability to its customers in all causes of action via its contract with its customers. Indeed, it would be expected that a private water service provider would do so unless specifically prevented by consumer laws.[37]

Discussion

There are significant practical difficulties with private causes of action

Legal decentring changes the allocation of legal risk. However, it does so from a rather uneven starting point and in inconsistent and hard to understand ways. Moreover, there will be a number of real, practical problems that members of the public will face if they seek to rely on private causes of action to recover compensation for harm. These inherent difficulties with the process of bringing a private action apply whether the action is brought against a legally centred or decentred service provider. Difficulties can arise at the point a person seeks to bring a private action, and also later at the point the person actually tries to enforce a successful action and recover actual damages for the harm suffered.

Problems with bringing private law actions

Cost and time of bringing a private action

> 'I found a barrister who would act for me with experience in water law and he suggested it would be $10,000 to $15,000. I'm disputing a $40 charge. So in the end I had to read all the legislation myself and present an argument to VCAT [Victorian Civil and Administrative Tribunal] myself.' (Productivity Commission 2011, p.231).

A wide ranging inquiry into urban water in Australia by the federal government's independent advisory body, the Productivity Commission, found that consumers who wished to bring legal claims against water service providers faced immense problems with obtaining affordable access to justice (Productivity Commission 2011). This reflects the fact that court-centred, adversarial, fault-based systems of recovery are often costly and time consuming to pursue and, because of this, are potentially unjust as well as economically inefficient as mechanisms for recovery (Atiyah 1997). There are a number of related reasons as to why this is so:

1. Even a person who has been badly harmed might not bring any sort of private law action against the entity responsible, as many people have very limited knowledge and

[37] Flow Systems, a private water supplier in New South Wales, includes a similar term in its supply contracts with small residential customers. See www.flowsystems.com.au/governance/CustomerContract.pdf, accessed on 3 May 2016.

understanding of their legal rights and potential legal avenues of redress (Productivity Commission 2014).[38]

2. Also, because of the time and cost involved in bringing a private law action, there will often be enormous pressure to settle the claim out of court. Indeed, it is likely that an extremely high percentage of commercial disputes (perhaps well over 99%) do not end up being decided through a final judgement from a court.[39] Having said this, however, out-of-court settlements are often much lower than court awards of damages (Rogers 1992).

3. Bringing a legal action is also very intimidating, not least because it will be very costly for the person who brought it if it is unsuccessful. These problems have a particular impact on those who are less well off (Productivity Commission 2014).

4. Private causes of action have been identified as being particularly inadequate as a mechanism for compensating people who suffer from catastrophic personal injury, as the level of recovery can vary enormously and often in an arbitrary fashion depending on how different facets of the legal system play out (Productivity Commission 2011).

Difficulty of establishing causation for water contamination

Identifying the factual cause of a water contamination incident is exceedingly challenging. Difficulties can arise because there are scientific limits to water testing techniques applied sometime after the contamination event. This is likely to make establishing the fact that water contamination caused specific harm extremely difficult. An additional challenge was highlighted by the inquiry into the Sydney cryptosporidium outbreak in the late 1990s, which involved the practical challenge of diagnosing gastroenteritis from a faecal sample (New South Wales Premier's Department 1998). As a consequence, leading international water quality experts remark that it has been 'very difficult, and in some cases impossible, even with dedicated resources and sophisticated monitoring techniques, to establish the detailed cause of a waterborne disease outbreak after it has occurred' (Hrudey and Hrudey 2014, p.204).

Problems with discharging private law actions

Even if a private cause of action is able to be successfully established, the person harmed may not necessarily end up with the amount of compensation to which they are legally entitled.

Small entities may have few assets

A successful private law claim will be of limited benefit if the entity that has been found to be at fault has no assets available to pay the claim. Smaller, less financially robust entities are more likely to not have sufficient assets to meet their legal liabilities than larger entities. The chance of this happening is greater if the amount awarded in damages is higher; yet it will be in precisely these circumstances that the harm suffered is also greatest.

[38] Consistently with this, in a survey carried out by the Australia Institute in 2012, only 1 in 4 respondents indicated that they had sought legal advice for a legal problem: see Denniss, R., J. Fear and E. Millane (2012). Justice for all: Giving Australians greater access to the legal system. Instiutute Paper No.8. Canberra, The Australia Institute, Productivity Commission (2014). Access to Justice Arrangements. Inquiry Report. Canberra. Productivity Commission 2014, *Access to justice arrangements*, Inquiry Report No. 72*,* Canberra.

[39] In 1989, it was estimated that only 5.7% of commercial disputes actually resulted in court actions being commenced (Fulton 1989). The figure is likely to be even lower today as the subsequent decades have seen a strong rise in the use by business of alternative dispute resolution methods to resolve commercial disputes. Furthermore, it should be acknowledged that the vast majority of commenced actions will also settle before final judgement is given by the court. Recent data from the Law Council of South Australia, for instance, indicates that only about 5% of commenced civil actions actually proceed to trial (Productivity Commission 2014). In other words, the proportion of commercial disputes which lead to private law actions and then proceed through court and end with a final court judgement may be less than a fraction of one percent (i.e. 5% of 5.7%).

Expected insurance funds may not actually be available or adequate

It is likely that legally decentred water service providers would be required to have insurance in place to provide funds in order to meet their legal liabilities.[40] However, these anticipated amounts may not actually be available. For example, the service provider may be in liquidation or may not have renewed the required insurance.

Moreover, concerns have been raised that the current required levels of public liability insurance for bodies corporate may not in fact be high enough to meet multiple claims (Warnken, Johnston et al. 2009, Consumer Affairs Victoria 2016).

The difficulties in claiming by private action may be magnified with legally decentred water service provision

Chapter 2 identified that legal decentring in urban water supply has a number of consequences. These consequences can flow from a change in the legal form of the supply entity or from the fact that legal decentring is likely to reduce the size of (at least some) supply entities. These changes may well mean that a person harmed by the actions of a water service provider may have to rely more heavily on the flawed recovery mechanism of private causes of action to recover if harm is suffered or may face particular additional difficulties in bringing an action.

A change in legal form:

May change the organisational culture around settling claims/making good

Legally decentred service providers may not have the same culture of public service as current legally centred service providers do, with the result that they may be more incentivised to fight rather than settle claims. Although private companies are often subject to strong commercial pressures to settle claims quickly and with minimum publicity, to avoid reputational damage, their primary legal duty will be to shareholders and not to customers or citizens more generally. Therefore, legally decentred service providers may not be subject to the same kinds of political pressures to settle claims and put harms right that a legally centred, publicly-owned service provider would be subject to.

May change the organisational culture and make harm more likely

Having a professional organisational culture around preventative risk management and employees with a keen sense of personal responsibility for safe water provision have been identified as keys to preventing and adequately managing water contamination incidents (Hrudey and Hrudey 2014). In contrast, having an inappropriate culture can lead to decisions being made that exacerbate or compound problems. Legally decentred service providers may not have the same culture of public service as current legally centred service providers do.

Bodies corporate are not well suited to legal action

Complex litigation can cause particular and unique difficulties for bodies corporate. Firstly, they may not have the power to levy members in order to raise funds to pay for the legal action in the first place (Consumer Affairs Victoria 2016). Unpleasantness is also likely to arise if neighbours are placed in the position of having to sue other neighbours through the body corporate vehicle in order to recover for significant harm suffered.

[40] Bodies corporate in Victoria and Queensland are required to have $10 million of public liability insurance: see s.60 of the Owners Corporation Act 2006 (Vic); s.187 of the Body Corporate and Community Management (Standard Module) Regulation 2008. Those in Western Australia are required to have $5 million in place: see s.53C of the Strata Title Act 1985 (WA). Australia's most developed regime for licensing private water service providers, the Water Industry Competition Act 2006 (NSW), also requires these entities to have suitable insurance in place.

Reduction in size of water service providers:

Insufficient assets to meet liabilities

As discussed above, smaller entities may not have sufficient assets or insurance in place to meet their legal liabilities. Anecdotal evidence from some Australian industry practitioners suggests that there is a high rate of bankruptcy amongst small water service providers.

Fragmentation of responsibility within the water industry

As discussed in Chapter 2, if there are a greater number of smaller water service providers with less competency and capability than existing public water service providers, it may be expected that there will be more subcontracting of responsibility to other entities which do have these skills. For example, there may well be arrangements involving supply at one location by a combination of both a public water service provider and a private water service provider, with some ownership of assets and allocation of responsibilities to a body corporate.[41] This may lead to a more fragmented water industry and may increase the complexity of bringing a private cause of action, as it may raise the number of potential entities a claim could be made against (for example, maintenance subcontractors, independent water quality testers, or auditors of risk management plans). If a small service provider goes bankrupt, it would also be necessary to seek to recover against another party.

Conclusions

Decentred innovation may necessitate a review of legal risk allocation

Spatially decentred innovation can exist without legally decentring. Under such innovation, changed processes or operations may be initiated. In this case, there are unlikely to be new harms created. Public health, flooding, environmental health and supply security remain as the primary domains in which we would understand harm. However, new innovative processes, operational mechanisms and management arrangements may well result in new mechanisms for harms. And whilst the public allocation of legal responsibility in the conventional, centred legal model is partial and inconsistent, it is an allocation of legal risk that the public seems to broadly accept. Why is this so? One reason is likely to be because our existing legally centred service providers have tended to be good at proactive risk management and incidents of harm have been relatively rare. Another may be that publicly-owned service providers may be good at addressing harm through non-legal avenues, and this reduces the impact of the significant flaws inherent in using private legal action as a recovery mechanism. A further reason may be the powerful influence of the political process which oversees public bodies in a democratic system.

Overall, then, decentred innovation in urban water supply may well lead to an increase in the occurrence of incidents which could result in members of the public suffering**.** To the extent that this may be the case, we conclude that it is important to consider if the current risk allocation system is in fact adequate to protect members of the public from harm under more widespread spatial decentring of water services and, if not, what may be done to strengthen this.

Legal decentring makes this even more important

This question becomes even more important if legally decentred service provision runs in parallel with spatial decentring. If legal decentring of water service provision occurs, there will inevitably be a change in the current legal risk allocation and a private and/or community allocation of legal risk, with the legally decentred service provider allocated certain consequences of harm. Again, however, this allocation is likely to be partial and inconsistent. While in theory, there may be more potential causes of action against a legally decentred private water supplier, this may be of no practical benefit to those harmed if the private sector water service provider is able to limit these via contracts, or if new decentred providers are simply too small and have insufficient assets to cover the harms.

[41] These types of arrangements seem to be proposed by Flow Systems, a leading private water supplier for precincts in New South Wales. See http://flowsystems.com.au/communities/central-park-water/ accessed 9 May 2016.

Legal decentring is also likely to magnify the real practical problems that members of the public will face if they seek to rely on private causes of action to recover compensation for harm suffered. As a consequence, we conclude that changes to legal risk allocation through legally decentred innovation should be made cautiously, and only with a full appreciation of the implications of such changes for service users, the water industry, governments and the wider public. This awareness will enable public debate to be adequately informed and suitable mechanisms to be developed to protect individuals from potential adverse changes. This report is intended to inform this awareness.

If there are compelling policy reasons for pursuing a significantly greater degree of legally decentred service provision than currently exists in Australian cities, then our analysis suggests two actions ought to be undertaken by governments. First, any such policy changes would need considerable communication with the public in order to be regarded as democratically legitimate. Citizens would require information about what the changes may mean to them in practical terms. This would include any changes regarding their responsibilities for risk management and harm prevention as well as any altered arrangements in the event that loss or harm is suffered. This is particularly the case in relation to the safety of public water supply and the rights of individuals as consumers in their relationship with new suppliers. Secondly, governments would need to ensure that suitable models are explored to reallocate the risks of harm in ways that are acceptable to the broader public interest. It is to this matter that we now turn in Chapter 6.

Chapter 6 - New models for legal risk allocation

Introduction

The discussion in Chapter 5 raised the real possibility that our current model of legal risk allocation for urban water service delivery may not be an optimal one as Australian cities move forward in their transition to WSCs. The model may not have adequate regulatory measures in place to prevent harm from occurring in the first instance. Additionally, if harm does occur, the current model is heavily reliant on those harmed seeking recovery through an imperfect recovery mechanism based predominantly on private causes of action. Yet as we discussed in Chapter 4, there are compelling reasons to anticipate that decentred innovation could lead to more incidents of harm occurring.

If decentred innovation also involves, and perhaps requires, legal decentring and the involvement of new private or community-owned water service providers in urban water, the current risk allocation model looks even less robust. The same issues arise concerning the adequacy of harm prevention mechanisms and the difficulties with recovery through private law mechanisms. However, legal decentring also introduces additional concerns about the technical capabilities and the financial robustness of the potential new water service providers.

As a result, governments interested in transitioning their cities to WSCs need to explore policy options that could reallocate the potential risks of harm involved in decentred innovation in ways that may be more acceptable to the broader public interest. Indeed, the CRCWSC's Project A3.2 Better Regulatory Frameworks was specifically tasked with investigating new models for risk assessment and diversification, and then refining these in consultation with stakeholders. This Chapter outlines some potential policy, regulatory and legal options that may achieve such a reallocation. These options were developed in consultation with industry stakeholders. The final section of this Chapter then evaluates, in broad terms, the benefits, costs and risks of each of the identified policy options. The chapter concludes with a commentary on how we are likely to move towards a new risk model.

Developing new risk allocation options

Decentred innovation in Australia's water sector will inevitably see risks being experienced in new ways. In some cases, it will also see risks being reallocated. It is highly desirable that this is done in a manner which is carefully planned and in the public interest rather than one founded on policy naivety and ad hoc experimentation. The question is, therefore: how could risks be reallocated under decentred innovation?

There are three main ways in which this could occur. As shown in Figure 6.1 on the following page, harms could be prevented from occurring through stronger 'up-front' regulation. Alternatively, and in the event that harm does occur, the allocation of liabilities for this harm could be altered from the arrangement currently operating. Additionally, some informal mechanisms for recovering from these harms after they occur could also be considered. Each of these deserves discussion because each has strengths and weaknesses.

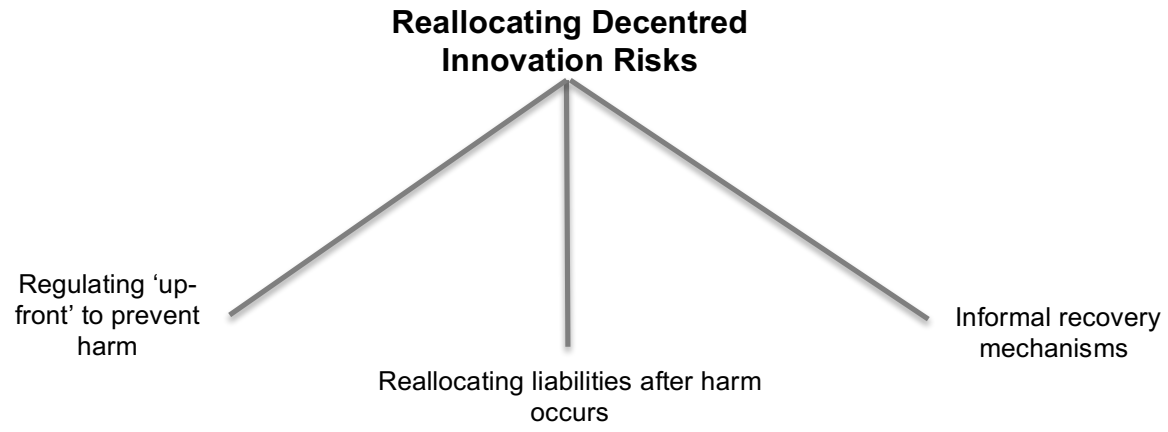


Figure 6.1: Mechanisms to reallocate risk

Table 6.1 on the following two pages sets out a range of policy options for each of these three directions. Ten options in total are presented, along with their key benefits, risks and costs.

Key themes in the policy options

Harm prevention

As we demonstrated in Chapter 3 of this report, a key part of the current model of legal risk allocation consists of the way that specific regulatory frameworks and the general background law both operate to prevent harm from occurring by assessing and managing the risks of harm. Therefore, a key policy option would be to strengthen the current regulatory frameworks around urban water management to ensure that they are suitable for decentred innovation. For example, this could be achieved by requiring that all service providers are licensed, in order to establish competency. However, to be effective, any new or revised regulatory arrangements will need to be supported by an adequately resourced regulator who is also granted appropriate compliance powers.

Liability allocation

Allocated and pooled liability

The usual legal arrangement is that, should harm occur, a particular entity will be held legally responsible for the consequences of that harm and will be required to pay damages to the person harmed. As we saw in Chapter 5, the entity held legally responsible is often the entity that was at fault for causing the harm. However, the law may on occasion make a non-fault based allocation. This is common in product safety laws, for instance.

A less common legal arrangement is for the law to specifically remove the allocation of legal responsibility should a particular type of harm occur and replace this with a legal right which is provided to the person harmed to claim compensation from a central fund. This fund may be supported by government contributions or contributions from the class of potential harm causers (in the form of a levy or compulsory insurance). This type of arrangement is a 'no fault compensation' scheme. No fault compensation schemes represent a pooling of the risk between many entities. The pool might consist of the total number of entities who are likely harm causers, or it may consist of the whole of society if a government acts as the risk pooler. These arrangements are reasonably common in relation to transport and workplace accidents.

Table 6.1: Policy options to reallocate the decentred innovation risk

Policy Option	Evaluation of Benefits	Evaluation of Costs/Risks
Harm prevention		
1. Regulation to prevent harm from occurring	• Better to stop harm occurring in first place • Could bolster support for WSCs and increase confidence in water service providers	• Admin costs of regulatory scheme • New laws required • If not done carefully could stifle innovation
Liability allocation		
Government as risk taker		
2. Government ownership	• Government can manage risk and make good on harm suffered	• Innovation stifled • May require new laws in some states • Problems with the formal legal recovery mechanism remain
3. Public supplier step-in	• Government can make good on harm suffered	• May require new laws • Problems with the formal legal recovery mechanism remain • Moral hazard for the legally decentred water service provider • Politically unappealing; all downside no upside. No control of harm prevention
4. Statutory indemnity	• Government can make good on harm suffered	• New laws required • Problems with the formal legal recovery mechanism remain • Moral hazard for the legally decentred water service provider • Politically unappealing; all downside no upside. No control of harm prevention

Pooled risk		
5. No fault compensation scheme	• Addresses problem of establishing fault • Pooled scheme can make good	• Costly to administer • Requires new laws • Politically hard to justify • The causation problem remains
Individuals as risk taker		
6. Informed community consent	• May encourage innovation	• Social justice concerns • Individuals may not be able to insure their risk • Consent may not be properly informed
7. Financial robustness regulation	• Performance bond – make good from bond • Annual fee – make good form amounts in fee • Insurance – make good from insurance	• Performance bond/annual fee – admin costs potentially high, may require new laws, may stifle innovation, and have not performed well in other sectors • Insurance – may not be adequate or may not actually be taken out • All - problems with the formal legal recovery mechanism remain
Informal recovery mechanisms		
8. Alternative dispute resolution	• Quicker and cheaper than court action	• Remedies limited • Admin costs potentially high • Causation problem remains • Bodies may not have correct expertise for all types of dispute
9. Government compensation	• No need for new regulatory scheme • Can be tailored to harm	• Ad hoc and only usual for catastrophic damage

Who takes the risk?

Normative questions about who should be allocated a risk of harm are often answered in pragmatic terms by asking who is best able to bear the risk, as there must be an institutional reality to back up any potential legal risk allocation. As we noted in Chapter 5, it is not the same for a small entity to take a legal risk as it is for a large entity. The former may not have the resources to properly manage a risk or even pay damages if the risk manifests, whereas the latter can, in practical terms, take on these risks of harm.

It is also common for governments to assume at least some risks of harm. Governments may do this through various mechanisms, such as through ownership of an entity which is allocated a legal risk; by developing legal rules which provide that the government is allocated a specific risk in defined circumstances, for instance if a private or community provider fails ('public supplier step-in'); or by provision of a statutory indemnity to those harmed. Currently in Australia, much of the risk of urban water service delivery is effectively allocated to governments through their ownership of the water service providers. Theoretically, the government risk taker could be at any level of government. However, as urban water has historically been either a State, Territory or local government responsibility in Australia, it is probable that the governments with a pre-existing mandate for urban water would most likely act as risk taker.

However, it may be that the level of innovation in service delivery required to transition to a WSC is simply not going to be possible without a fundamental change in the current risk allocation. This may even involve members of the public bearing more of the risk of failure of water service delivery, and the financial consequences of such failure, than is currently the case. This is likely to require significant changes to the risk tolerance of individuals, perhaps through education and information provision. Such a change may also necessitate the development of measures to mitigate the risks that individuals might bear. New supply entities, for example, might be regulated to ensure that they are both competent and financially robust.

Informal recovery mechanisms

Informal justice solutions, such as industry ombudsman schemes, can provide a quick and low-cost alternative way of seeking redress for harm suffered when compared to adversarial court action. As we noted earlier, these are already part of the current model for legal risk allocation. Another informal mechanism is the ad hoc provision of government compensation to those harmed.

Evaluation of the potential policy options

Harm prevention regulation (Option 1)

There are many potential ways in which existing urban water regulation might be strengthened, extended or tailored to support appropriate harm prevention in respect of decentred innovation. Some possibilities that governments may wish to explore include:

a) **Compulsory licensing** - All water service providers could require a licence, to ensure they meet certain criteria in relation to size, technical competency and financial robustness.

b) **Limit the role of bodies corporate** - This report has observed that body corporate-owned and operated schemes raise a number of particular issues. There may well be a strong case for governments to regulate so as to restrict the ability of bodies corporate to operate as water service providers because of the legal difficulties likely to arise in the event of a harm occurring. Thus, other options for robust community participation in water service provision (for example, local councils) may be preferred.

c) **Required subcontracting** - Entities which cannot establish size, technical competency and financial robustness could be required to subcontract certain tasks to another entity that can meet these criteria

and who would be made legally responsible for the operation of the first entity's supply scheme (Institute for Sustainable Futures and Stone Environmental Inc.). This option may mitigate some problems in the current risk allocation model but would effectively transfer the risk to a third party who, again, may or may not turn out to be competent or able to meet its legal liabilities. This would also increase the complexity of the legal arrangements, which is itself undesirable.

Any new regulation is likely to involve some costs in terms of the administration of the scheme and would involve making new legal rules. However, if done well, such regulation offers the promise of preventing harm from occurring, and it could bolster support for WSCs and increase confidence in legally decentred water service providers. If not done carefully, however, such regulation could stifle innovation.

Liability allocation changes

Government as risk taker

Government ownership (Option 2)

Large, legally centred water utilities occasionally find it hard to get maintenance and operations right. Perhaps it is not feasible to expect that new actors, who may be less experienced and less well-resourced, will do this any better. It may be that attempting to encourage new legal entities to do what we currently entrust to credible, experienced and properly-resourced public institutions is an inherently risky venture. Therefore, one policy option would be to have spatial decentring but avoid or severely restrict legal decentring altogether by mandating the public supply of all urban water to consumers. This option would require legal rules to prohibit legal decentring. However, by preventing new business models developing, such a move may stifle innovation. To mitigate the effects of this, it would need to be supported by other measures that encourage innovation within public ownership. This policy option would also leave unchanged the problems with the current mechanism for recovery. For example, causation would still need to be established in many private legal actions, yet this is likely to be extremely difficult in water contamination incidents.

Public supplier step in (Option 3)

A further policy option would be to allow legally decentred water service provision, but to establish an arrangement whereby if the legally decentred service provider is unable to meet its supply commitments, another entity, known as a 'retailer of last resort', takes over these commitments. The retailer of last resort would, at least initially, be likely to be the local publicly-owned water utility. These arrangements are relatively common in the electricity sector and a retailer of last resort provision is in place in New South Wales, although it remains untested in practice.[42] However, it has been suggested that step-in arrangements may prove harder to implement in the water sector due to the more site-specific nature of water supply arrangements compared to electricity (Gray and Gardner 2008). Indeed, the New South Wales government is aware that a broader 'network provider of last resort' arrangements may be required for the water sector, but that developing this raises complex and as yet unresolved policy issues, particularly around how such an arrangement would be funded (NSW Department of Finance and Services 2011).

This policy option raises the risk of moral hazard, however. Moral hazard occurs when the availability of some type of insurance or guarantee has a negative impact on an entity's incentive to take care (Rowell and Connelly 2012). As a result, the legally decentred service provider may take less care than it would if the step-in guarantee was not available. This policy option may also be politically unappealing, because if the retailer of last resort is a government-owned entity, the government takes the risk of poor performance but is unable to control the

[42] See Division 3 of the Water Industry Competition Act 2006 (NSW).

performance of the legally decentred supply entity. This option may also require laws to be put in place to facilitate the step-in and would likewise not address the problems with the current mechanism for recovery.

Statutory indemnity (Option 4)

Yet another policy option would be to allow legally decentred water service provision, but for the government to legislate to provide a specific indemnity to persons harmed in certain circumstances in the operation of decentred innovations. Once more, this raises some significant issues of moral hazard and would again seem politically unappealing, as it involves governments carrying the whole burden of the innovation risk without being able to control for harm prevention. Additionally, it would also require new laws to be established and would not solve the problems associated with recovery through private causes of action.

Pooled risk

No fault compensation scheme (Option 5)

A completely different policy option, at least in concept, could be the use of risk pooling to reallocate the risk of harm from decentred innovation by providing those harmed by such innovations with the right to seek compensation directly from a statutory no fault compensation scheme. This statutory entitlement would need to be funded, for example, by way of a levy imposed on the urban water industry. This would avoid the difficulty of having to establish fault in respect of harm suffered.

An advantage of this policy option is that it could operate to correct deficiencies in the legal risk allocation model for both legally centred and decentred water service providers. However, it would involve significant administration costs, require new laws, and again raise some questions about moral hazard.

Moreover, whilst these types of schemes have been used for a number of decades in certain discrete policy areas, such a transport and workplace accidents, even their adoption in these limited fields has been beset by considerable controversy and national inconsistency. It would be quite difficult politically to justify establishing such a scheme for urban water harms, because whilst there may be a strong technical rationale for WSC innovation, it lacks both a compelling political rationale and public policy priority. A no fault scheme would also need to contend with the not insignificant difficulty of establishing causation in water contamination incidents.

Individuals as risk takers

Informed consent (Option 6)

One further possible policy option for risk reallocation is to transfer more risk to individuals as consumers, homeowners and members of the public. To ensure the political legitimacy of such a risk reallocation, it would be wise for governments to achieve the informed consent of the community for such a move. However, establishing that true consent has been given may be hard. Consent to increased individual risk could not be implied by a community's acceptance of a legally decentred service provider if that acceptance was motivated primarily by pragmatic reasons. For example, decentred water supply may make access to housing at the precinct more affordable. Moreover, if legally decentred service provision occurred more often in lower socioeconomic areas, this may raise concerns about equity across the urban area if there was not one servicing arrangement for all citizens. A further concern is that individuals may be allocated a risk which they are unable to insure, or to insure at an affordable price. The catastrophic floods in Queensland and New South Wales in 2011/12 demonstrated that suitable insurance for householders will not necessarily be available (Carter 2012).

Financial robustness regulation (Option 7)

There are at least two separate ways in which regulation could be introduced to address deficiencies in the financial robustness of a legally decentred service provider. Governments could either require legally decentred service providers to take out adequate insurance to meet their liabilities, or require them to pay a sum of money (either as an annual fee or a bond) to be used in certain events, such as service provider insolvency. As noted in Chapter 5, there are already a number of legal provisions in place requiring water service providers and bodies corporate to hold specified amounts of insurance, although there are some questions about whether the required amounts are sufficiently high and how compliance with these requirements is monitored. New laws are likely to be needed to require water service providers to pay a bond, and this would require new administrative arrangements to be developed to assess suitable bond amounts, default events and to hold the bond monies. In recent times, bonds have been used in the mining sector in Australia to provide a sum of money to enable rehabilitation works to be carried out if a miner is unable to meet its legal liabilities. However, they have been problematic due to their high costs and perceived inflexibility (Latimer 2012). The costs of an annual fee or a bond may well stifle innovation.

Non-traditional recovery mechanisms

Alternative dispute resolution (Option 8)

As noted above, industry ombudsman schemes have been used for some time in the urban water sector in relation to 'consumer' harms. A real benefit of these schemes is that they tend to be free for consumers to access and are quick to use. However, there are some inherent limitations to such schemes, as they are often only provided with limited budgets and limited remits, and are best suited to dealing with high-volume consumer disputes which raise no complicated legal issues. For example, the jurisdiction of these schemes is often restricted to supply of services and related matters such as billing, disconnections and the exercise of statutory powers to enter land.[43] They also have an extremely limited ability to provide remedies, with the only remedy usually being a negotiated settlement with the water service provider. Even if the jurisdiction of such schemes was extended, they may simply not have the expertise or experience to consider the full range of legal disputes decentred innovation may give rise to. Nor could such schemes resolve the issues with causation and establishing fault which we identified in Chapter 5.

However, there is a strong case for extending the coverage of ombudsman schemes to encompass small consumer disputes with all types of water service providers. This is currently not the case in Queensland, where only water service providers in South East Queensland can access the ombudsman scheme.[44] Nor would the current Victorian ombudsman scheme be able to encompass disputes with private or community-owned water service providers, unless there was regulatory change. Indeed, the Victorian Ombudsman has noted that there is an emerging problem with Victorian decentred energy providers (who often operate embedded networks) being outside of the ombudsman scheme, with the result that their customers are potentially disadvantaged (Gebert 2016).

[43] For example, see s.3 of the Victorian Energy and Water Ombudsman Charter which sets out the Ombudsman functions, www.ewov.com.au/data/assests/pdf_file/0017/4517/EWOV-Charter.pdf accessed 12 May 2016. Although, by way of contrast, the jurisdiction of the Queensland Energy and Water Ombudsman is drawn in much broader terms: see s.11 of the Energy and Water Ombudsman Act 2006 (Qld).

[44] See www.ewoq.com.au/about_ewoq/ accessed on 12 May 2016.

Government compensation (Option 9)

A final policy option is the provision of direct government compensation to those harmed. In theory, such compensation could come from any level of government that felt a political need to make good a harm and provide compensation, and a benefit of this option is that it can be tailored to address the specific loss at hand. While governments have certainly made such payments in the past, this has often only occurred when there was real political compulsion to do so (for example when the harm was significant, no other recovery mechanism was available, and the potential for political embarrassment due to inaction was great). Therefore, after the devastating Queensland floods of 2011, the Commonwealth Government imposed a national levy to provide compensation to those who suffered significant property damage which was not personally insured or able to be provided for by the Queensland Government. Nevertheless, one significant disadvantage of this option is its ad hoc and reactive nature. As a consequence, reliance on this option would result in considerable uncertainty and a high chance that governments would not compensate for future harms, except in the most extreme circumstances.

Chapter 7 – Conclusions

The prospect of our cities becoming more water sensitive is exciting but will equally involve significant changes in our existing arrangements around urban water, sewerage and drainage servicing. Many of these changes are likely to involve some degree of decentring of urban water management. This report has considered two crucial notions which are prerequisites to thinking about water sensitive innovation risk: the meaning of decentralised water operations and the meaning of risk itself. These two concepts provided a foundation for considering new models for future WSC innovation risk.

Our research has concluded that:

1. The future allocation of risks as innovation takes place towards WSC matters. Unsuitable or uncertain risk allocations will undermine any transition towards improved practices.

2. There are at least eight different ways or modes through which decentring of water activities can occur. The language of decentralisation has tended to conflate these, obscuring rather than illuminating the policy and legal challenges faced with new WSC practices. To provide clarity, we have suggested terminology describing each of the ways in which WSC activities may be decentred: at the level of the water sector as a whole; at the policy level; in legal terms; when investment decisions are made; in terms of management responsibility; in terms of service planning; in terms of technical control; and at the level of physical infrastructure. In particular, spatial decentring was seen as quite distinct from legal decentring, and this study focused specifically on the issue of legal decentring.

3. While there is already a significant amount of private sector involvement in urban water management across Australia, this tends to occur behind the veil of the public water supplier. To date, a direct relationship between a private or community entity and water consumers has been rare. Legal decentring represents an important change to current practice in Australia by being directly customer facing.

4. A significant amount of work has been undertaken analysing risk in relation to urban water innovation, but this work has primarily been conducted from the perspective of harm prevention. An alternative perspective on risk has been adopted in this report, focusing on the legal consequences of harm once it has occurred. This perspective has been both under-acknowledged in WSC activities to date and little researched. It is nonetheless important to consider what would happen if something went wrong with a decentred innovation. The possibility of failure is always present in any system innovation, and to not carefully consider this going forward would be naive.

5. We currently seek to control four categories of harm: public health, flooding, environmental health and security of supply. And whilst it is likely that there may be a set of new concerns with WSC innovative practices, there are unlikely to be any new harms. Our existing categories of harm will simply be extended and enlarged. Clearly, any new hydro-social contract will also need to control for each of these four broad categories of harm in ways that are acceptable to the public.

6. This study was particularly interested in analysing the potential legal consequences of future harms under two legally decentred scenarios. In the first scenario, a new greenfield suburb where stormwater was supplied for potable use was considered from the perspective of public health risks and flooding. In the second scenario, a high-rise precinct with wastewater supplied for non-potable use was considered from the perspective of environmental risks and supply security risks. All four hypothetical incidents were seen as credible decentred innovations and proved to be an effective device to identify and explore the impact on the ability of those harmed to recover meaningful compensation. The traditional publicly-owned entity, a new private company and a new body corporate were each considered in this analysis.

7. Our analysis of decentred WSC innovations suggested that legal decentring (and to a smaller extent, spatial decentring) may both lead to an increased chance of harm arising compared to existing centred operations. Additionally, in the instance that harms did arise, considerable difficulties were envisaged for recovering damages for all legally decentred incidents compared to Australia's existing legally centred public arrangements. This suggests that a detailed review of the legal risk allocation model is even more important if the policy of legal decentring is pursued.

8. Interestingly, our analysis of the current legal risk allocation model in relation to urban water, which allocates risk between service providers, consumers and the wider Australian public, revealed that it was somewhat imperfect. The reality is that without regulatory change, there are significant practical difficulties faced by anyone seeking to recover damages for harm suffered. The real world impact of these practical difficulties, though, has been limited historically, because urban water in Australia has been provided by large, government-owned utilities. These entities have generally been good both at preventative risk management and at making good on harm suffered.

9. The notion of legal decentring is an important strand of the decentred WSC and opens up the possibility of new business models developing for urban water service provision in Australia. It is not clear, however, what institutional form either private sector involvement or community involvement in service delivery may take. What is clear, however, is that neither current Australian legal and regulatory frameworks nor the risk allocation models inherent in these regimes would appropriately support WSC innovation if this was legally decentred.

10. Looking forward, there are several potential policy options that governments could adopt in order to reallocate the risks of water sensitive innovations and mitigate, or manage, possible adverse legal consequences of innovative water supply arrangements. Better harm prevention, a reallocation of liabilities for harm, and informal recovery mechanisms were suggested here. We concluded that different options were likely to be better suited to different States and Territories, and that with differing definitions of what makes up a WSC and of which innovations have highest local priority, it would not be sensible to specify a single, overarching risk reallocation model to be adopted throughout Australia to encourage the pursuit of WSCs. Suitable models are likely to be heterogeneous and reflect the differing political, historical, legal and institutional features of the individual States and Territories.

Appendix 1 – Innovation scenarios and incidents of harm

Innovation scenarios

Key dimensions of decentred innovation

The innovation scenarios were constructed to reflect a number of key dimensions that appear to be significant variables in decentred innovations:

1. Water source - our focus was on projects that exploit alternative water sources, such as stormwater and recycled wastewater. These projects represent a particular break with past practices. By using water sources that are more local to the end-user, alternative water source solutions are spatially decentred compared to conventional, centred water supply solutions. Each innovation scenario involved the use of one or more alternative water sources.

2. Water use – whether the water supplied will be used for drinking or reserved for non-potable purposes (such as irrigation and toilet flushing) has important implications for the type of harm that the supplied water may be able to cause. One innovation scenario involves the use of an alternative water source for drinking and the other innovation scenario does not.

3. Type of community – due to economic factors, innovative supply projects in urban areas currently tend to be taking place in new developments of a reasonable scale. It is also at this intermediate scale of development that the largest number of potential arrangements for legal decentring are being seen to occur (Yu, Brown et al. 2011). Empirically, two significant clusters of projects can be observed: inner urban developments of one or more multi-storey buildings, which we term 'vertical precincts'; and lower level estates on the urban perimeter, which we term 'horizontal precincts'.[45] One innovation scenario involves a vertical precinct and the other innovation scenario involves a horizontal precinct.

Assumptions

The innovation scenarios are all located in the fictional city of Merth, which is located in Big State, Australia. Merth has 2 million inhabitants and is growing fast. Merth is facing long term water supply constraints and its waterways have been degraded by previous urbanisation.

The innovation scenarios are governed by the laws of Big State. We have assumed that these laws proactively allocate the public interest, and share the key features of the laws of Victoria, Western Australia and Queensland. Where the legal position is specific to one state, this is identified. However, we have assumed Victoria has in place a basic regime to licence entities that are not the existing publicly-owned water utilities to supply water to the public. This is not currently the case. We have also assumed there are no specific legislative or regulatory barriers in place to undertaking the decentred innovations described in the innovation scenarios and that the water suppliers hold all necessary authorities required to operate the schemes and supply water to the public.

[45] Vertical precincts tend to involve one or more high-rise towers, often with commercial/retail space at the lower levels. These precincts often arise in urban in-fill areas, such as redevelopments of old industrial sites, and are often close to the established urban area. In contrast, horizontal precincts are often on the geographical perimeter of the urban area and tend to be on greenfield sites. These horizontal precincts typically involve single or double storey self-contained houses. They may also contain some retail outlets and community services, such as schools.

In reality, suitable ownership and management models for a complex decentred innovation scheme, particularly in a brownfield location, are likely to be more complicated (Warnken, Johnston et al. 2009).[46] However, such complexity would not aid this analysis. Subcontracting for the maintenance and operation of water infrastructure is common in the Australian water industry and, in reality, as a body corporate would be unlikely to have the resources to undertake operations and maintenance, the subcontracting of these elements by a body corporate would be likely. However, to keep the analysis simple, the innovation scenarios assume no subcontracting takes place.

We have also assumed that all residents in Sustainability Towers have a separate water meter and their own direct contractual relationship with their water provider. Again, these arrangements are likely to be more complex in reality.

The main legal entities considered in the innovation scenarios are:

1. City Water - a large, publicly-owned utility established under state legislation that supplies both water and sewerage across the entire city of Merth.

2. Private Water - a small corporation whose business is delivering water services in a sustainable way to communities across Australia. Private Water is set up as an Australian corporation.

3. Community Water - a body corporate established under state legislation. Community Water was set up by the precinct developer for the precinct.

Enviroburb[47]

Enviroburb is a new residential subdivision of separate houses in a growth area to the north of Merth. Enviroburb has 10,000 inhabitants. Enviroburb is in an area subject to flooding and before development was farmland not serviced by water and sewerage infrastructure.

The stormwater falling on the roofs and roads of EnviroBurb is harvested to control flooding, reduce environmental pollution and to provide a source of water, including for drinking, for the precinct. There are rainwater tanks installed at each house which collect water from the roof of the house. The tanks are centrally controlled by remote technology to empty before a large rainfall event in order to provide flood control to the precinct. The water from these tanks runs through pipes into wetlands and eventually into a central ornamental lake. Stormwater from the roads runs into swales, then into wetlands and eventually also into the central ornamental lake. The lake forms a focal point for the precinct and also performs a water treatment function. Water from the lake is processed in a drinking water treatment plant, stored in tanks and then piped back to the individual properties as drinking water.

We consider the situation when City Water, Private Water and Community Water own, operate and maintain the water and sewerage infrastructure (which includes the pipes, drinking water treatment plants and remote technology) and supply water and sewerage services to the precinct.

[46] For example, Warnken, Johnstone and Guilding (2009) suggest that in such locations it may be most appropriate for a system to be owned by a body corporate but be operated by a private water supplier, which may also be an equipment manufacturer.
[47] Enviroburb is loosely inspired by both the Kalkallo precinct in Melbourne and the Fitzgibbon Chase precinct in Brisbane.

Sustainability Towers[48]

Sustainability Towers is a new residential development that contains apartments spread across four large towers. Sustainability Towers has 10,000 inhabitants. The site was used for industrial purposes in the past and is located close to Merth's CBD, on the edge of Merth harbour. Before development, the site did not have enough water and sewerage infrastructure to meet the additional demand posed by Sustainability Towers.

The wastewater produced by the apartments in Sustainability Towers is treated in an on-site recycled water treatment plant. This reduced the need to upgrade the sewerage system to Sustainability Towers and provides an additional source of water to the development. The treated wastewater is collected in large storage tanks underneath the buildings and is used to irrigate the open space around the development and inside the buildings' air conditioning cooling towers, and is also provided to residents through a third pipe system for toilet flushing. Rainwater is captured from the roof and added to the treated wastewater in the underground tanks. Any additional rainwater is discharged to the stormwater system which flows into the harbour.

Community Water owns the internal pipes within the buildings that take water and sewerage from the individual apartments to a main collection point and it subcontracts all the facilities management of the building to FM Ptd Ltd.

We consider the situation when City Water, Private Water and Community Water operate the remaining water and sewerage infrastructure (which includes the recycled water treatment plant and other pipes) and supply water and sewerage services to the precinct.

Incidents of harm

Categories of harm

We chose to look at the risks of harm to the wider public interest in decentred innovations rather than specific risks to the objectives of particular individuals or organisations. As explained in Chapter 3, these wider societal or public interest risks are those risks of harm to public health, environmental health, water supply and flooding that have historically been the focus of our urban water regulatory systems. Nevertheless, the way in which these risks eventuate is likely to involve harm to one or more actual persons or organisations.

In each innovation scenario, two fictional incidents were constructed to represent credible events that may occur in each scenario and would result in harm being caused to individuals in the supply of water services. The potential allocation of the legal risk of this manifested harm was then analysed.

In innovation scenario 1, which involves the horizontal precinct with stormwater supplied for potable use, there was an incident involving drinking water contamination and an incident involving property damage due to flooding.

In innovation scenario 2, which involves the vertical precinct with wastewater supplied for non-potable use, there was an incident involving financial loss caused by the stench arising from environmental contamination by sewage and an incident involving supply interruption that had financial implications for the customers of the water service provider.

[48] Sustainability Towers is loosely inspired by the Central Park precinct in Sydney and by the building at 700 Bourke Street, Melbourne.

Incident A - water contamination at Enviroburb

A possum gets into the tank that holds the treated drinking water before the water is distributed to the precinct. Water is treated prior to entry into the holding tank but not after it is released from here into the distribution system. The tank was well manufactured but over time a small hole has developed near an inlet valve. The possum dies.

It is Christmas and the usual chief plant operator is on leave. The replacement is not sufficiently familiar with the site to think of checking the surroundings of the tank for animal entry. As a result, the water in the tank develops dangerously high levels of microorganisms.[49]

Residents at Enviroburb start to complain that the water tastes odd and many report diarrhoea, stomach cramps and vomiting. In total 1,000 people report becoming sick and half of these have to take time off work and incur some medical costs. Most of these costs are minor and related to over-the-counter medication. However, three people are hospitalised and there is one death. Bottled water needs to be supplied for three weeks to all residents and there are significant costs incurred in water testing, monitoring and cleaning the plant.

Incident B - flooding at Enviroburb

After 5 years, approximately 2,000 properties have pumps from their rainwater tanks that are no longer functioning. Maintenance oversights occurred as a result of the water provider, due to cost constraints, deciding to undertake maintenance at six-monthly intervals rather than the recommended quarterly intervals.

A big storm occurs but the remote technology does not empty the disconnected tanks in advance. As a result, less water is captured by the rainwater tanks than the system was designed for and the additional water flows into the wetlands and ornamental lake, and then overflows.

The overflowing water floods into the surrounding properties. 100 homes and 5 local businesses suffer property damage due to the flood waters and incur significant clean-up costs. Insurance premiums for flooding for the entire precinct increase by $50 the following year and the estimated value of the properties flooded reduces by approximately 5%.

Incident C - environmental contamination at Sustainability Towers

During routine maintenance work, a cross connection is made between a wastewater pipe and a stormwater overflow pipe. Raw sewage flows untreated into the harbour for a number of weeks before the issue is identified. This results in water contamination of the harbour.

Residents with apartments facing the harbour complain about a stench that makes it unpleasant to go outside. Fish in the harbour start to die. A local hotel with a harbour-side restaurant experiences a loss of clientele due to the less-than-pleasant ambience. Another business offering fishing tours in the harbour also suffers a significant loss in clientele.

[49] This incident is loosely inspired by the water contamination incident that occurred in 2008 in Northampton in the UK which is described by Hrudey, S, & Hrudey, E 2014, *Ensuring safe drinking water: learning from frontline experience with contamination*, American Water Works Association, Denver, Colorado.

Incident D – recycled water supply interruption at Sustainability Towers

A piece of key equipment in the recycled water treatment plant fails. Replacing this equipment will be extremely expensive and the system owner decides that there is no business case for doing this given the costs that residents pay for recycled water. The recycled water treatment plant and third pipe system is switched off.

Wastewater is now discharged to the sewerage system. The residents of apartments across the development no longer have cheap recycled water available. They need to use more expensive potable water internally in their apartments and are faced with higher water bills.

Also, due to water restrictions, residents can no longer adequately water their outside areas. The 50 top floor apartments had large and luscious outdoor roof gardens, but the plants in these roof gardens die and the roof gardens look unattractive. As a result, the value of these 50 apartments decreases.

Appendix 2 – Legal analysis of potential private causes of action

This is a technical appendix which provides further detail regarding our legal analysis of the various potential causes of action that could arise from the four fictional incidents of harm. The appendix is intended for those with both an interest, and background, in practical legal issues.

Common law actions

There a number of separate common law actions that may be available to those harmed in the hypothetical incidents. One type of action is a claim for breach of contract. A breach of contract claim is based directly on the relationship, in contract, between the injured party and the water supplier. These claims require a direct contractual relationship between the parties to be established. Other actions could arise from the law of torts, which is a branch of the law which provides that in certain circumstances, those harmed by the actions of others are able to recover damages for the harm suffered.

Breach of contract – incidents A and D

A breach of contract claim can be brought when there is a legally binding contract between two entities and one entity does not do something that it is required to do in the contract. Damages for breach of contract require that the injured party be put in the same place as if the contract had been successfully performed.

Nature of the contractual relationship

The precise nature of the contractual relationship between the water service provider and the customer will differ depending on what the legal status of the water supplier is:

1. City Water and customer – the typical arrangement is for public water utilities to have a deemed statutory contract with their customers for the supply of drinking water. The precise terms of this contract are rather uncertain. However, it is usual for there to be an express contract in place for the supply of recycled water.

2. Private Water and customer– the typical arrangement would be for there to be a detailed contract between the parties, on standard terms developed by the water supplier. The terms of this contract may be constrained by consumer protection laws.[50]

3. Community Water and homeowner – the typical arrangement is likely to involve a homeowner entering into a deed with the body corporate when the homeowner originally buys into the development. The deed is a type of contract. There may not be a separate water supply contract between the parties as supplier and customer, and there may not be any separate charge made for this supply.

Where the precise terms of the contractual relationship between the parties is hard to establish (as is the case with City Water and potentially Community Water) it will be difficult to establish breach of any specific contractual term.

[50] For example, in New South Wales the law requires licensed private water suppliers to have a standard customer contract with their small retail customers: see the Water Industry Competition (General Regulation) 2008.

Incident A (drinking water contamination)

It seems highly unlikely there is any term in the deemed statutory contract between City Water and its customers which requires supply to any particular quality standard. It would be a reasonable assumption that Private Water's standard water supply contract would contain a term requiring it to supply its customers with drinking water which meets the national water quality standards (the Australian Drinking Water Guidelines).[51] It also seems probable that homeowners would have a term in their deed requiring Community Water to supply drinking water which meets the national water quality standards (the Australian Drinking Water Guidelines). Failure to supply water which meets these standards would be a breach of contract. The water supplier, or its insurer, would bear the costs of harm.

Incident D (recycled water supply interruption)

It seems reasonable to assume that customers would have a term in their contract with their water supplier requiring that the customer be supplied with an adequate quantity of recycled water at a certain unit price.[52] Failure to supply recycled water would be a breach of contract. The water supplier, or its insurer, would bear the costs of harm.

Damages for breach of contract require that the injured party, the customer, be put in the same place as if the contract had been successfully performed. The damages in this case would consist of:

1. The difference between the higher cost now paid by the resident for water used internally in each apartment and the previous cost of internally used recycled water; and

2. The loss in the property value of the 50 top floor apartments due to the expired and unattractive green roof gardens.

General difficulties with breach of contract actions

1. **Requires a contractual relationship** - only those that are parties to the contract can recover damages for a breach of contract. Therefore, in incident A, family members or visitors who get sick could not recover. In incident D, all residents will be able to claim for the higher costs of their water bills. However, only apartment owning residents will be able to claim for the loss in value of their apartment.

2. **Mitigation obligation** - those injured will need to establish they have not increased their losses by failing to take reasonable 'mitigating' actions that may have reduced their loss. For example, in incident D it may be considered reasonable that residents mulch their roof gardens so as to not hasten their demise in times of water shortage.

3. **Contractual limitations on liability** - there may be express provisions in the contract which limit the liability of the water supplier for breach. For example, there may be a provision limiting damages to the cost of resupply.[53]

[51] Flow Systems, a private water supplier in New South Wales, includes a similar term in its supply contracts with small residential customers. See www.flowsystems.com.au/governance/CustomerContract.pdf, accessed on 3 May 2016.
[52] In Melbourne, where it is common in certain growth areas for public water service providers to supply recycled water to domestic customers for non-potable purposes, there are standard form contracts in place with these residents in respect of the recycled water supply. This contrasts with the reliance on the statutory deemed contract for drinking water supply.
[53] Flow Systems, a private water supplier in New South Wales, includes a similar term in its supply contracts with small residential customers. See www.flowsystems.com.au/governance/CustomerContract.pdf, accessed on 3 May 2016.

Negligence – incidents A, B and C

A potential cause of action in incidents A, B and C would be the tort of negligence. A negligence action requires four elements to be established:

1. The water supplier must owe the injured person a duty of care;

2. The water supplier must have breached the duty;

3. The breach must have caused the injured person harm; and

4. The harm that occurred must not have been too remote.

Incident A (drinking water contamination)

A negligence claim might well be made out in the drinking water contamination incident because the water supplier would almost certainly have owed the people who lived in Enviroburb a duty of care. By having a person in charge of the plant over Christmas who had not received training in the identification and remediation of plant malfunctions, the water supplier may well have breached its duty of care. The breach harmed individuals. In this case the water supplier, or its insurer, would bear the costs of the harm.

Incident B (flooding)

A negligence claim could be made out if those affected by the flooding can show that the water supplier owed surrounding properties a duty of care. It would seem reasonable that such a duty was owed. By failing to maintain the tanks, the water supplier will almost certainly have breached its duty of care and the breach appears to have caused the flooding. In this case the water supplier, or its insurer, would bear the costs of the harm.

Incident C (environmental contamination)

It seems likely that the water supplier owed the surrounding businesses and residents a duty of care. By installing the water pipes incorrectly, the water supplier will almost certainly have breached its duty of care. The breach appears to have caused the contamination and therefore the harm to the harbour properties and others. In this case the water supplier, or its insurer, would bear the costs of the harm.

General difficulties with negligence actions

1. **Exclusion of liability** - a suitably worded statutory provision or term drafted in a contract can exclude liability in tort. To this extent, these comments are also relevant to the tort causes of action considered below. See the comments later in this Appendix about statutory exclusions of liability for public water service providers. Contractual exclusion of liability clauses must be express and would therefore not form part of the statutory deemed contract between City Water and its customers. However, it would be in the commercial interests of Private Water to exclude or limit liability in its contract with customers, unless prevented from doing so by legislation or the terms of its licence.[54] It may also be in the interests of Community Water to exclude or limit liability in its deed with residents.

2. **Fault requirement may vary depending on the financial resources of an entity** - for the tort of negligence to be made out it is not sufficient for a person to be harmed by the actions of a water supplier. It is also necessary for the water supplier's act to be negligent. Moreover, the greater the burden that

[54] Flow Systems, a private water supplier in New South Wales, includes a similar term in its supply contracts with small residential customers. See www.flowsystems.com.au/governance/CustomerContract.pdf, accessed on 3 May 2016.

taking precautions against harm would impose on a water supplier, the less energy the water supplier will be required to expend to avoid being negligent. The financial burden on a water supplier is assessed relative to that entity's financial resources. Accordingly, the more modest the entity's financial resources, the less likely that it will be in breach if it fails to take particular precautions, especially if these precautions are costly. It is likely that Community Water would have significantly fewer resources than either City Water or Private Water. As a consequence, Community Water would need to take fewer precautions to satisfy its duty of care.

3. **Factual causation difficulties** - factual causation must be established in a negligence action. This means that evidence needs to be presented that proves, on the balance of probabilities, that the harm to the individual was caused by the breach in question. This may be hard to establish. In previous water contamination incidents, it has been 'very difficult, and in some cases impossible, even with dedicated resources and sophisticated monitoring techniques, to establish the detailed cause of a waterborne disease outbreak after it has occurred.' (Hrudey and Hrudey 2014, p.204). This reflects the scientific limits to water testing techniques applied sometime after the contamination event.

Nuisance – incidents B and C

Another potential action in incidents B and C might be the tort of private nuisance. The tort of private nuisance is committed where there is an unreasonable interference with a person's use and enjoyment of land. A person will be liable in nuisance if they have either played some role in the creation of the nuisance or have failed to remedy the state of affairs brought about by others.

Incident B (flooding)

The common law of nuisance applies in Western Australia and Queensland. However, in Victoria, the common law of nuisance in relation to flooding has been replaced by the statutory provisions in the Water Act 1989 (Vic). These statutory provisions are discussed later in this Appendix.

Physical damage to land or something on the land counts as interference with the land and, provided it is not trivial, it will almost certainly be unreasonable.[55] It is very likely that the tort of nuisance will be made out in relation to the flood waters damaging land. As the water supplier has been vested with the management and control of the water tanks in Enviroburb, the water supplier has had a part in the creation of the nuisance and would likely to be liable in nuisance. Both tenants and landlords could sue the water supplier. In this case the water supplier, or its insurer, would bear the costs of the harm.

Incident C (environmental contamination)

It is likely that the stench caused by the sewage spill into the harbour would constitute unreasonable interference with the enjoyment of nearby property. Both tenants and landlords are able to sue under the tort of private nuisance. This means that both residents of apartments in the vicinity of the harbour and local businesses may be able to take an action in nuisance. As the water supplier has been vested with the management and control of the wastewater and stormwater pipes, it will have played a role in the creation of the nuisance and would probably be liable. In this case the water supplier, or its insurer, would bear the costs of the harm.

[55] *Gartner v Kidman (1962) 108 CLR 12* describes nuisance as "an unlawful interference with a person's use or enjoyment of land or some right over or in connexion with it." Liability in that case applied where the owner of the higher land, through their actions, caused the volume of water flowing onto the lower land to increase.

General difficulties with nuisance actions

Occupier restriction - to sustain an action in nuisance against the water supplier, the water supplier must be in actual occupation of land. This would need to be factually established but would seem to be met in these incidents.

Trespass to land – incident B

Another possible action available in incident B (flooding at Enviroburb) might be the tort of trespass to land. A trespass to land is an intentional or negligent act that interferes with a person's 'exclusive possession' of land. Directly causing any physical matter to come into contact with land in the 'exclusive possession' of another is trespass. Trespass to land does not require the plaintiff to demonstrate that damage occurred. It is enough to demonstrate that trespass occurred. The water supplier is responsible for the management and maintenance of the tanks, and a failure to do this caused water to flow onto the residents' land. This is a trespass to land and the water supplier would be liable for the damage caused. In this case the water supplier, or its insurer, would bear the costs of the harm.

General difficulties with trespass to land actions

1. **Exclusive possession limitation** - only persons entitled to 'exclusive possession' of land may sue in trespass. This means that if a landowner has leased land to someone else, the landlord would not be able to sue under this action. If a property subject to flooding damage was tenanted and the tenant did not wish to take legal action it would not be possible for the landlord to do so.

2. **Requirement to establish direct cause** - the injured person must show that the interference with the land was a direct result of the water supplier's act. In this scenario, the injured person would need to show that the flooding was a direct result of the defendant's failure to maintain the tanks.

3. **Fault requirement may vary depending on the financial resources of an entity** - for the tort of trespass to land to be made out, it is not sufficient for a person to be harmed by the actions of a water supplier. It is also necessary for the water supplier's act to have been intentional or negligent.

Breach of statutory duty – incidents A and B

Yet another potential cause of action in incidents A and B would be the tort of breach of statutory duty. This action is available where a provision in a statue contains detailed steps that must be followed in order to fulfil the obligation and these are not followed. The statutory provision must also be one that only affects a small, defined group of individuals.

Incident A (drinking water contamination)

It is highly unlikely that such an action would be able to be sustained in relation to the statutory provisions relating to drinking water provision across the three states, as they are not sufficiently precise in terms of their requirements, nor are they owed to a sufficiently discrete category of persons.[56]

[56] Indeed, only in Queensland is there even a statutory obligation to provide safe drinking water: see s.57E of the Public Health Act 2005 (Qld). The English case of *Read v Croydon Corporation [1938] 4 ALL ER 631*, which found that there was a statutory duty on a service provider to provide pure water, can be seen as an anomaly in this regard and is not followed in modern approaches to the action.

Incident B (flooding)

It is also highly unlikely that such an action would be able to be sustained as the statutory provisions relating to flood prevention across the three states are not sufficiently precise in terms of their requirements, nor are they owed to a sufficiently discrete category of persons.

Statutory actions

There are two potential types of statutory action that are relevant to the facts of our hypothetical incidents of harm: ACL actions and, in Victoria only, actions under the Water Act 1989 (Vic) as an alternative to common law nuisance actions in relation to flooding.

ACL actions - generally

About the ACL

The ACL is a statutory regime that has been adopted in all States and Territories in Australia, which provides a number of separate statutory causes of action to consumers who have been harmed in a consumer transaction.[57] There are several separate statutory causes of action under the ACL that may be relevant and each separate cause of action has its own individual requirements.

It would seem highly questionable that the relevant provisions in the ACL would apply to a body corporate such as Community Water, because they require the provision of either goods or services in 'trade or commerce'. Whether supply of water by a body corporate solely for owners at the precinct would satisfy this requirement has not been established. However, the fact that in some jurisdictions, bodies corporate are specifically prohibited from operating a business, may suggest that it would not.[58]

Goods and services

The ACL covers the provision of both goods and services. Commonly, the provision of water is understood and conceived of as the provision of a water supply service.

The ACL does not provide definitive guidance on whether the supply of the substance 'water' could also be conceived of as the supply of a good. However, an analogy can be drawn with the categorisation of gas and electricity as goods for the purposes of the ACL. Moreover, earlier consumer legislation in Victoria specifically defined goods to include water.[59] Accordingly, a strong case could be made that water is a good for the purposes of the ACL.

Interestingly, the consumer guarantee provisions in the ACL specifically exclude supplies of other utilities - such as gas, electricity and telecommunications - on policy grounds.[60] However, no similar exclusion applies to water.

Incident D

The ACL is concerned with the quality of the service being supplied rather than the total lack of service provision. In incident D (supply interruption of recycled water at Sustainability Towers), as recycled water is no longer being supplied at all the ACL does not appear to be applicable.

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[57] The ACL forms Schedule 2 to the Competition and Consumer Act 2010 (Cth).
[58] See s.96 of the Body Corporate and Community Management Act 1997 (Qld) and s.13 of the Owners' Corporation Act 2006 (Vic).
[59] See the Fair Trading Act 1999 (Vic), now superseded as discussed in *Thompson v South East Water Corporation [2015] VCAT 612*.
[60] s.65 of the ACL. See p.193 of the Explanatory Memorandum for the Trade Practices Amendment (Australian Consumer Law) Bill 2009 for an explanation of the policy intent behind this exclusion.

Breach of ACL statutory consumer guarantees re: service provision

Nature of the guarantees

The supplier of a consumer service is taken to have made a number of implied guarantees to the consumer, and if these guarantees are breached the consumer can bring a statutory action under the terms of the ACL.[61] These consumer guarantees cannot be excluded by contract.[62] These guarantees include:

1. A guarantee that the services were provided with due care and skill.[63] This is similar to the common law standard of care in negligence; and

2. A guarantee that the services supplied are fit for purpose.[64] The services supplied must be reasonably fit for any purpose that the consumer expressly or impliedly makes known to the supplier.

Incident A (drinking water contamination)

An action could be sustained that the supply of contaminated drinking water by the water provider breaches both the guarantee as to due skill and care and that relating to fitness for purpose. If water is supplied for drinking purposes it would need to be fit for the purpose of drinking. If the services fail to meet the guarantee, the consumer may seek a refund or replacement. However, of more significance to this analysis is the fact that the consumer may also recover damages for any reasonably foreseeable loss or damage suffered because of the failure to comply with the guarantee.[65] The water provider as the supplier of the services, or its insurer, would bear the costs of the harm.[66]

Difficulties with this action

1. **Only the consumer can bring the action** - this may mean that a third party who suffers from ingesting the water may not be able to claim a remedy.

2. **Causation difficulties** - a breach of the guarantee must actually be demonstrated and this may be extremely hard to do in practice. For example, providing evidence that the actual water consumed on a particular day did not meet the consumer guarantee is likely to be difficult.

3. **May not be available against City Water** - a recent unreported decision by the Victorian Civil and Administrative Tribunal has cast doubt on whether water supply by a public water utility such as City Water would be treated as a service for the purposes of the ACL.[67]

[61] Chapter 3, Part 3.2 of the ACL.
[62] s.64 of the ACL.
[63] s.60 of the ACL.
[64] s.61 of the ACL.
[65] s.259(4) of the ACL
[66] s.267(3)(b) of the ACL.
[67] *Thompson v South East Water Corporation [2015] VCAT 612.* The Tribunal was influenced by the fact that charges made for water supplies by South East Water were termed 'levies', leading it to find that South East Water was not conducting a business and was not therefore subject to the ACL. This decision seems rather at odds with how water authorities in Victoria tend to view themselves, and a Tribunal decision would not be binding on higher courts.

Breach of ACL statutory consumer guarantees re: goods provision

Nature of the guarantee

The supplier of consumer goods is taken to have made a number of implied guarantees to the consumer and if these guarantees are breached the consumer can bring a statutory action under the terms of the ACL.

These guarantees include a guarantee that goods are of acceptable quality.[68] Goods are of 'acceptable quality*'* if they are: '(a) fit for all the purposes for which goods of that kind are commonly supplied; and…(d) safe'. This does not mean that the goods have to be 100% defect free.

Incident A (drinking water contamination)

If water is supplied for drinking purposes, then it would need to be fit for the purpose of drinking. It would also need to be safe to drink. An action could be sustained that the supply of contaminated drinking water by the water provider breaches the guarantee as to acceptable quality. If the goods fail to meet the guarantee, the consumer may seek a refund or replacement. However, of more significance to this analysis is the fact that the consumer may also recover damages for any reasonably foreseeable loss or damage suffered because of the failure to comply with the guarantee.[69] Both the supplier and the manufacturer could bear the costs of harm. Where the supplier is not also the manufacturer, the supplier can seek an indemnity for these costs against the manufacturer.[70]

Difficulties with this action

1. **Only the consumer can bring the action** - this may mean that a third party who suffers from ingesting the water may not be able to claim a remedy.

2. **Causation difficulties** - a breach of the guarantee must actually be demonstrated and this may be extremely hard to do in practice. For example, providing evidence that the actual water consumed on a particular day did not meet the consumer guarantee is likely to difficult.

ACL statutory liability for supply of a good with a safety defect

Nature of the action

A manufacturer of goods is liable to compensate an individual who is injured by a safety defect in the goods.[71] A manufacturer includes a person who 'extracts, produces, processes or assembles goods'.[72] It seems at least arguable that this definition is wide enough to cover the operator of a water treatment facility.

A safety defect is one where the safety of the goods is not as persons are generally entitled to expect.[73] The individual does not need to have been the person who bought the goods from the manufacturer and no element of fault needs to be established. This cause of action cannot be excluded by contract. [74] A regulator may also bring an action on behalf of an injured person, which may make enforcement of this action by an injured person

[68] s.54 of the ACL.
[69] s.272 (1)(a)) of the ACL.
[70] s.274 of the ACL.
[71] s.138 of the ACL.
[72] s.7 of the ACL.
[73] s.9 of the ACL.
[74] s.150 of the ACL.

easier.[75] A claim is also available for persons who suffer a loss because of someone else being injured or dying as a result of a safety defect.[76]

Incident A (drinking water contamination)

Drinking water containing very high levels of pathogens would appear to contain a significant safety defect. This action could be brought by those injured or by relatives of the person who dies as a result of the contamination event.

Difficulties with this action

Causation difficulties - there may be practical difficulties in establishing that the water had a safety defect if a sample of the water consumed is not available.

Breach of Section 16 of the Water Act 1989 (Vic)

Nature of the action

Section 16 of the Water Act 1989 (Vic) creates a new statutory cause of action in respect of injury, damage or loss caused by the flow of water from one person's land to another person's land. Section 16 extinguishes any other liability which would otherwise have applied.[77] Under s.16, the person who caused the flow is liable to pay damages to that other person in respect of the injury, damage or loss suffered. The water supplier, or their insurer, bears the cost of harm if the statutory cause of action can be made out.

Incident B (flooding)

This cause of action would appear to be available to those whose land is affected by the flooding. Private Water or Community Water, or their insurer, would bear the costs of these actions.

Difficulties with this action

There may be potential difficulty with the need to show that the flow of water was unreasonable. Section 20 sets out the matters to be taken into account to determine whether the flow was reasonable or not.

Breach of Section 157 of the Water Act 1989 (Vic)

Nature of the action

Section 157(1) of the Water Act 1989 (Vic) creates a statutory cause of action against public water authorities who act intentionally or negligently in the exercise of specific statutory functions, and as a consequence a flow of water occurs from their works onto any other land which causes injury to a person, damage to property, or economic loss. If the action is made out the water authority is liable to pay damages to that other person. Section 157(2) states that the presumption is that the flow occurred as a result of intentional or negligent conduct, unless the water authority can prove otherwise on the balance of probabilities.

[75] s.149 of the ACl.
[76] s.139 of the ACL.
[77] *Spagnolo& Anor v Body Corporate Strata Plan 418979Q & Anor [2007] VSC 423.*

Incident B (flooding)

An authority is defined as one of the publically-owned water corporations. City Water is an authority. The cause of action would seem to be available to those residents who have suffered injury, damage to property or economic loss due to the flooding. City Water, or their insurer, bears the cost of harm.

Difficulties with this action

Requires fault - the conduct that caused the flooding must have been intentional or negligent. It is not enough that the flooding has simply occurred.

Statutory limitations on the liability of water service providers

Queensland

There is a statutory provision in Queensland, contained in Section 49 of the Water Supply (Safety and Reliability) Act 2008 (Qld), which appears to potentially limit the liability of recognised water service providers in certain circumstances. However, the way the provision is drafted makes it hard to envisage exactly when this protection would actually be triggered and there is no case law on this point.

The provision would not provide protection against a negligence action, as this possibility is specifically excluded. However, the provision could conceivably provide protection against a nuisance action in the limited circumstances where the impact of flooding constitutes unreasonable interference with another's land, but the actions undertaken by a water service provider that led to the flooding were reasonable and the flooding was beyond its control. This is likely to be a highly technical argument to run. If available, the protection afforded by the provision would definitely cover State Water and is likely to also cover Private Water and potentially also Community Water.

Victoria

In Victoria, there are provisions in Section 83 of the Wrongs Act 1958 (Vic) which potentially limit the liability of public authorities in negligence. The public water service providers in Victoria are public authorities for these purposes. Liability is limited because the question of whether the public water service provider owes a duty of care to another, and whether the duty of care has been satisfied, are to be assessed by reference to the financial resources the public water service provider has to fulfil its statutory functions.

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