

**AUSTRALIAN MINING INFORMATION FOR COMMUNITY DECISION-
MAKING: SITE LEVEL WATER DISCLOSURES FOR THE MACQUARIE AND
LACHLAN CATCHMENTS**

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ABSTRACT

Purpose

Evaluating the adequacy of corporate water disclosures has become an increasing focus of social and environmental accounting research. Few previous studies have focused on site-level water disclosures, however, which are of critical importance to community accountability. This paper therefore examines the adequacy of both the regulatory regime and reporting practices of Australian mine sites in the context of the Macquarie and Lachlan catchments of New South Wales.

Design/methodology/approach

The water disclosure requirements placed on the mining industry, as specified by the Department of Planning and Infrastructure's (DPI) sample conditions, are compared to the suggested water reporting indicators of the Global Reporting Initiative (GRI) and Water Accounting Framework for the Minerals Industry (WAFMI). In addition, the reporting practices of nine mining operations are reviewed, and detailed analysis performed of reports of the four operations providing substantive environmental information. Further, John Dryzek's discursive democracy theoretical framework on the quality of a deliberation system has been used to underpin this study to address the extent to which the regulatory regime and reporting practices are sufficient to underpin democratic discourse.

Findings

It is found that while national and NSW legislation places very little direct reporting requirements on mining companies, the disclosure requirements of development consent conditions for new projects and extensions to existing projects are quite significant. Development consent conditions require reporting on all GRI indicators, although not necessarily to the same level of detail specified by the GRI. These conditions also require some, but not all, of the information required by WAFMI. However not all currently operating mines report in detail because older development consent conditions did not include disclosure requirements.

Originality/value

This study shows that government regulations may mean that substantial sustainability information is publicly available, but may not be contained within a company's regular sustainability report. Future researchers, particularly within the mining sector, might therefore consider including site-level information within their dataset in evaluating sustainability reporting quality. We also provide recommendations for regulators to facilitate community access to such information, such as establishing a central repository for site information along the lines of the National Pollutant Inventory.

1.0 Introduction

Water management is one of the world's most pressing issues (Palaniappan and Gleick, 2009; WWAP (World Water Assessment Programme), 2012). Younger and Wolkersdorfer (2004) observe that mining activity often impacts on water in the natural environment and that its effects, which include pollution and water reserve depletion, can last for millennia. Further, while some mines are situated in remote areas, others require water that would otherwise be available for irrigation, the environment or other important actors. Consequently, both local and broader communities have a strong interest in relation to mining water allocation and use.

Theorists such as Dryzek (1990, 1996, 2000) argue that democracy relies on community discourse, which requires information in order to be effective. Following this argument authors such as Hazelton (2013) argue that access to water disclosures might even be considered a human right. Underlining this importance, a number of voluntary environmental reporting frameworks currently exist that are either significantly or wholly concerned with water reporting, including the Global Reporting Initiative, Alliance for Water Stewardship, United Nations CEO Water Mandate, the Water Footprint and the CDP Water Disclosure Project. In Australia, the Minerals Council of Australia has released a water accounting framework for members and the Australian Bureau of Meteorology recently released *Australian Water Accounting Standard 1*, which can be adopted by either catchment managers or organisations.

Research into the practices of water disclosures has become an increasingly significant strand of social and environmental accounting. Many studies have considered the quality of corporate water reporting internationally (Morikawa *et al.*, 2007; Morrison and Schulte, 2009; Barton and Morgan-Knott, 2010; Carbon Disclosure Project, 2010; Morrison and Schulte, 2010; CIMA (Chartered Institute of Management Accountants), 2011) and in Australia (Prior, 2009; Egan and Frost, 2010; The Association of Chartered Certified Accountants, 2010; Carbon Disclosure Project, 2012). Some studies have also focused specifically on water reporting within the mining sector (Mudd, 2008; Mudd, 2009). Overall, the quality of such reporting has been poor, consistent with more general reviews of social and environmental reporting (Gray, 2001; Gray, 2005; Milne and Gray, 2007).

Prior studies have drawn upon the rich legacy of social and environmental accounting disclosure research. Yet water accounting is critically different from many other environmental disclosures due to the issue of water context (Irbaris, 2009; Hazelton, forthcoming). Given the uneven distribution of water resources and demand, equivalent quantities of extractions in different locations may have a dramatically different impact. Therefore a critical component of water information disclosure is geographically based site-level reporting, an activity which has not been addressed by prior studies.

The question this research addresses is the adequacy of site-level mining reporting in an Australian context. Specifically, the paper explores whether the information reported by mining companies concerning water in the Lachlan and Macquarie catchments (situated within the State of New South Wales (NSW)) is sufficient to meet the needs of local

catchment residents. This paper outlines relevant legislation and development consent conditions. It then identifies relevant indicators suggested by various sustainability reporting frameworks and determines the extent to which many mining companies operating in NSW are required to report on these indicators. The indicators are taken primarily from the G3.1 protocols and WAFMI, which is the Water Accounting Framework for the Minerals Industry. WAFMI is a joint effort between the Sustainable Minerals Institute and the Minerals Council of Australia (2012). In addition, the reporting practices of nine mining operations are reviewed, and detailed analysis performed of reports of the four operations providing substantive environmental information.

Dryzek's (2011) deliberative democracy framework is used as a theoretical lens to analyse the democratic context of the afore-mentioned disclosure, in terms of public discussion and decision-making. As previously noted, mis-management of the water supply can significantly impact people's lives. For this reason, communities have– or should have – a say regarding the water use by mining companies (and other large industrial users).

The remainder of this paper is structured as follows. Section 2 provides a review of prior literature relevant to this study. This is followed, in Section 3, by a description of the theoretical framework. The research method is detailed in Section 4. Following this, Section 5 provides an overview of NSW law concerning mining water disclosure. Section 6 describes the sustainability reporting frameworks which are then used as bases of comparison against the DPI's sample conditions and the annual environmental reports of Cases A, B, C and D. Section 7 concludes the paper and suggests areas for future research.

2.0 Literature Review

As a number of meta-analysis studies have shown, sustainability reporting research has a long and rich history (Mathews, 1997; Gray, 2001; Deegan, 2002; Gray, 2002; Gray and Laughlin, 2012). Key themes have included: investigations of the views of sustainability report users (Al-Khater and Naser, 2003; Mitchell and Quinn, 2005; Danastas and Gadenne, 2006; Zain *et al.*, 2006; Cho *et al.*, 2009); explorations of the link between reporting and performance (Clarkson *et al.*, 2008; Vurro and Perrini, 2011); and analysis of the reliability of such disclosure (Deegan and Rankin, 1996; Adams, 2004).

The mining industry has been of particular interest to sustainability reporting researchers. The mining industry has been described as helping to pioneer environmental reporting (Perez and Sanchez, 2009), although there is uncertainty as to whether the industry has done so out of a sense of social responsibility, or to defend its legitimacy. Numerous academic studies examined sustainability reports including environmental, health and safety and other indicators released by mining companies through the lens of legitimacy theory. For example, Coetzee and van Staden (2011) find evidence suggesting that mining companies respond to legitimacy threats from major mining accidents by increasing safety disclosure. Pellegrino and Lodhia (2012) analyse the legitimisation strategies of selected major Australian mining companies and industry bodies used in their annual reports, websites and other communications media. The two mining companies in their sample tended to favour the

strategies of emphasising real changes, changing societal perceptions and manipulating societal perceptions. By contrast, the two mining industry associations in their sample focused on changing societal expectation. Pellegrino and Lodhia suggest that different strategies are employed because companies and industry bodies target different media audiences.

Prior research has also examined how sustainability reporting by mining companies has changed over time. De Villiers and Barnard (2000) find the percentage of mining companies in South Africa making specific environmental disclosures increased between the years 1994 and 1999. Later, Antonites and de Villiers (2003) conducted a follow-up study and identified a downward trend in the following two years, particularly in regards to: environmental impacts and risks; environmental objectives and measurement standards; and whether those objectives were achieved.

Several years later, Jenkins and Yakovleva (2006) presented an examination of the sustainability reporting released by the world's ten largest mining companies between the years 1999 and 2003. They found that these reports were becoming more sophisticated and covering more complex issues, but that there was significant variation in quality. Further, Jenkins and Yakovleva found it was nearly impossible to compare one company against another using these reports, on account of their differing scopes and metrics.

More recently, Perez and Sanchez (2009) undertook a content analysis of sustainability reports published by four mining companies between the years 2001 and 2006. They found that there was generally good disclosure and that, over time, all four companies generally improved their sustainability reports in terms of form, comprehensiveness and depth. While there was steady improvement in the disclosure of 'environmental performance' items, there was little improvement in disclosing 'economic performance' and 'accessibility and assurance' items.

Advances in information technology mean that it is now possible for mining companies to engage in interactive communication with stakeholders using bulletin boards and/or discussion forums. However, Lodhia (2012) finds that while mining companies are willing to use their websites to disseminate information, they generally do not promote interactive communication. When asked about this during interviews, managers attributed the absence of interactive communication mechanisms to the cost of monitoring and maintaining these mechanisms, as well concerns over privacy issues they would raise (Lodhia 2012).

Numerous researchers have argued that the current level of sustainability reporting needs improvement – particularly in the form of mandatory sustainability reporting requirements. Unerman and O'Dwyer (2007) call for mandatory sustainability reporting, arguing that it would increase the credibility of the sustainability reporting process. Adams (2004) and Gray (2005) also argue for mandatory regulations, suggesting that this will reduce the ability of companies to prepared biased and skewed reports. Also, O'Dwyer and Owen (2005) argue that the reporting process could be improved by requiring sustainability assurance statements to be directed not just at management, but also to other stakeholders.

Similar conclusions have been reached in relation to the increasing number of studies conducted in relation to water. Even in relation to large, water-intensive multinationals, studies have noted reporting deficiencies in relation to basic water disclosures such as water use, and poor disclosure practices in relation to water risk assessment and supply chain exposure (Morikawa *et al.*, 2007; Morrison and Schulte, 2009; Barton and Morgan-Knott, 2010; Carbon Disclosure Project, 2010; Morrison and Schulte, 2010; CIMA (Chartered Institute of Management Accountants), 2011). Australian studies have echoed these findings (Prior, 2009; Egan and Frost, 2010; The Association of Chartered Certified Accountants, 2010; Carbon Disclosure Project, 2012) leading to widespread calls for improved corporate water reporting.

The specific issue of water disclosures in the mining sector has been considered in most detail by Yongvanich and Guthrie (2007) and Mudd (2008; 2009). Yongvanich and Guthrie (2007) conducted a content analysis of voluntary social and environmental disclosure from 17 mining companies. Only eight of those companies reported on water. Mudd (2009) investigated the sustainability reports of 25 mining companies to ascertain the extent to which the reports complied with GRI requirements. All but two of the companies provided at least some information concerning water consumption, although only nine provide information concerning where they source their water. Further, although total water discharges is a core GRI indicator, nine of companies did not report this information. Mudd (2008) identifies several problems with reports prepared under the GRI's G3.1 standards. He comments, firstly, that it is rare to see any reporting on EN9, which is a non-mandatory indicator dealing with water sources significantly affected by withdrawals. Second, different companies use different methods to calculate water withdrawn from the environment by source (EN8). Third, companies rarely report on the re-use and recycling of water (EN10), which means that there is insufficient information to properly interpret information provided under EN8. Fourth, the GRI does not require reporting on the quality of water consumed – i.e. was the water used in mining capable of being used as drinking water? Mudd concludes that all that is necessary for proper accountability is for existing data to be used more systematically. He argues GRI EN9 and EN10 should be made compulsory and new indicators for water quality consumed should be introduced, alongside minesite water inventories.

While these prior studies provide valuable insights into mining reporting practices, they do not consider in detail the key issue of water context. As noted above, due to the uneven distribution of water resources and demand, equivalent quantities of extractions in different locations may have a dramatically different impact (Irbaris, 2009; Hazelton, forthcoming), which means that a critical component of water information disclosure is geographically based site-level reporting. The importance of this reporting element is particularly acute in relation to mining operations, as the corporate reporting entity may contain hundreds of different mine sites scattered around the world. Yet to the community living around a particular mine, none of the other corporate activities may be relevant if they do not influence the water extractions or discharges that may materially impact community wellbeing. Ironically, though site level information may not be reported it is generally collected, but consolidation is problematic due to inconsistent site-level formats (Cote *et al.*, 2012).

The present study aims to explore localised mining water-related disclosures as they are an important component of corporate accountability. Indeed, given the contextual dimension of water management, we argue that such localised disclosures are critical to underpin the community debate that should inform governmental water allocation decisions. The theoretical justification for this approach is based on the work of John Dryzek (2011) and is explained in the following section.

3.0 Theoretical Framework

The theoretical framework is derived from the work of John Dryzek, who is described by Smith (2003) as being ‘the earliest and best-known advocate of deliberative democracy from within green politics.’ Blau (2010) observes that Dryzek is ‘important in his own right and as an influential exponent of Habermas’ (Blau, 2010, p. 3) and is noteworthy for his ‘shunning of liberal, state-centred deliberative democracy ...[and addressing] more concrete questions of institutions design than Habermas and most of his followers...’ (Blau, 2010, p. 3)’. Habermas himself has been widely utilised in SEA to inform evaluations of: stakeholder dialogue (e.g. Unerman and Bennett, 2004; Cooper and Owen, 2007); accounting standards (Rasche and Esser, 2006; Gilbert and Rasche, 2007); argumentation models (Shapiro, 1998); and the role of SEA (Lehman, 2001, 2005).

Dryzek has been cited in numerous SEA papers (Young, 2003; Laine, 2005; O'Dwyer, 2005; Gallhofer *et al.*, 2006; Shafer, 2006; Richardson, 2008; Brown, 2009; Milne *et al.*, 2009; Gray, 2010), however, apart from a few exceptions (Leong and Hazelton, 2010; Leong *et al.*, 2011), Dryzekian theory has not been previously used to create an SEA accountability framework. Dryzekian theory has, however, seen greater use in other disciplines. Smith (2003) uses Dryzek’s discursive democracy model when discussing models for environmental issues. Cochran (2002) uses Dryzek’s work on democratisation and transnational democracy to critique David Held’s cosmopolitan democracy. Hayward (1995) draws upon Dryzek’s work to discuss participatory democracy and environmental issues.

In Dryzek’s later work, the term discourse refers to a worldview – a set of assumptions determining how people conceive an issue. Discourses refer not to a process as it does in, say, Habermasian theory (Mendonca, 2008), but rather to the understandings that are given to an issue. As an example, there have been – and still are - multiple discourses surrounding the concept of environment. Some discourses view the environment as an unending resource ripe for exploitation; others conceive of it as sacred and inhabited by ancestor spirits; whilst still others hold the environment to be a dangerous place populated by animals and savages. The existence of multiple discourses means that the same situation – and hence the appropriate response - can be viewed very differently.

Most issues can be understood in different ways, hence are associated with different discourses. Over time, the balance of discourses concerning an issue may change. A minority discourse might grow as it gains acceptance (e.g. the Earth revolves around that Sun and not vice versa). A once dominant discourse might shrink or even disappear (e.g. there is nothing wrong with slavery). Naturally, this process might span years, even decades or centuries.

Even so, altering the balance can create real changes because this balance determines how the wider society conceives of a problem – how urgently the situation must be addressed; how it should be addressed; and indeed, whether the problem exists or not. Dryzek (2011) observes that once a hole in the ozone layer was discovered, the balance of discourses concerning extent to which the ozone layer should be protected at the expense of economic interests shifted in favour of ozone protection. This shift led to an international agreement phasing out CFCs, thus demonstrating how altering the balance can create change. Any such potential of a reporting mechanism to cause change is a mixed blessing, however, as it can be deployed both to advance and impair the public interest.

Ideally a democratic system should promote authentic, inclusive and decisive deliberation of political issues. Such deliberation will maximise the chance of well-reasoned viewpoints being held and optimal decisions taken. The extent to which a democracy is capable of hosting authentic, inclusive and decisive deliberation is called deliberative capacity (Dryzek, 2009).

Authenticity refers to degree to which discourses are presented in manner aimed to ‘induce reflection noncoercively, connect claims to more general principles, and exhibit reciprocity’ (Dryzek, 2009, p. 1382). Participants may attempt to appeal to each other’s emotions using techniques such as rhetoric or story-telling, but the appeal must be non-coercive – i.e. it must not be intended to discourage people from presenting alternative points of view (e.g. branding people who support universal health-care as socialist). Further, the appeal must allow drawing a general point applicable to the issue at hand. Although permitting such appeals risks allowing emotional manipulation, Dryzek deems it necessary as: a) some points of view cannot be properly expressed as a rational argument; and b) rhetoric is often necessary when trying to communicate one’s point of view to those who subscribe to a different discourse.

The simple way to assess authenticity is to consider whether there are any obvious factors limiting it – e.g. some important participants have a reputation for manipulating others or refusal to consider the views of others. For those wanting a more robust measure, Dryzek (2009) suggests the discourse quality index of Steiner *et al.* (2004).

Inclusiveness refers to the extent to which a political system (or element of a political system) permits the full range of discourses and interests to be represented. It is not necessary for the system to allow all *people* to be represented, as that would be too difficult, just for all interests and discourses to be represented (Dryzek and Niemeyer, 2008). Given that it is impossible for a researcher to be certain whether the entire universe of discourses is represented or not, the best that can be done to assess this consideration is to determine whether there are any obvious impediments to inclusiveness.

Decisiveness refers to the extent to which the deliberative process is ultimately capable of influencing collective outcomes. It is the difference between deliberation that leads to action and one which remains merely ‘words’. If one had sufficient resources and believed that responses would be reliable, decisiveness might be assessed by surveying decision-makers about the factors that affect decision making.

John Dryzek (2011) has proposed a schema for analysing deliberative capacity. This schema has been adopted in this research to analyse the extent to which mining water information can influence public debate and decision-making. It is comprised of five components – public space, empowered space, transmission, accountability and meta-deliberation.

Public space refers to deliberation by the public, or in this case, catchment residents. Ideally, catchment residents should have sufficient information to discuss and deliberate whether to allow a mining company to continue to operate. This component involves considering the avenues available for public debate and whether residents have sufficient knowledge to properly deliberate the issue.

Empowered space refers to deliberation by decision-makers. In this situation, the decision-makers are politicians, government agencies and mining company executives. This component requires considering the extent to which these parties are willing to deliberate in an attempt to find an optimal solution. It is also concerned with the extent to which decision-makers are willing to listen to catchment residents, rather than ignore them and implement plans already decided upon.

The third component is **transmission**, which is concerned with the mechanisms for allowing the results of deliberation in public space to be made known to the empowered space. For this paper, transmission component is treated as a part of the public and empowered spaces, rather than its own separate component.

Accountability is the fourth component and it is concerned with mechanisms by which actors in the empowered space explain and justify their action to the public. Examining accountability involves dealing with questions such as: Do the mining companies provide sufficient information to allow themselves to be held accountable? Does the government provide reasons for its decisions?

The final element is **meta-deliberation** which, in this case, involves examining whether there is opportunity for catchment residents and decision-makers to get together to discuss – and if necessary, reform – the rules regarding water usage and disclosure.

The study will identify factors related to these five components and explain how they act to facilitate or constrain deliberation in relation to mining in NSW and water disclosure. Dryzek (2011) provides some examples from other spheres concerning how this process is done. The next section describes the research methods.

4.0 Methods

As previously stated, the question this research addressed was to determine whether the information reported by mining companies concerning water in NSW is sufficient to meet the needs of catchment residents. The Lachlan and Central west catchments of the State were selected as case examples. These catchment areas were chosen as multiple mining operations occur within the areas, and because water resources are fully allocated and under variable conditions of stress. Answering the research question required completing four research steps described below.

4.1 Step 1: Preliminary Examination of Mining Disclosure

The first step was examining the environmental information released by mining companies with sites in the Lachlan and Central West catchment areas.

The names of nine current and proposed mine sites were obtained from documents prepared by the Lachlan and Central West Catchment Authorities. Unfortunately, neither authority provides a comprehensive list of mining sites. It is therefore possible that there are other mine sites that have not been included.

Of the nine mine sites identified, only four had substantial environmental reporting. Four of the remaining sites have yet to reach the stage where annual environmental reports are required and the final site was granted consent conditions before DPI mandated that annual environmental reports be publically available on the internet.

This preliminary examination yielded valuable information concerning applicable NSW legislation and the type of reporting required by mining companies.

4.2 Step 2: Examination of Sustainability Reporting Frameworks

The second step was to examine various sustainability reporting frameworks, searching for indicators of relevance to catchment residents.

The frameworks examined were: the GRI 3.1, the Water Accounting Framework for the Minerals Industry (WAFMI), the Carbon Disclosure Project (2012) Water Information Request and the Bureau of Meteorology's (2010) Australian Water Accounting Standards and the Water Footprint Assessment Manual (Hoekstra *et al.*, 2011).

The GRI (2011) protocols have the following five relevant indicators.

1. EN8, a core indicator which requires reporting the total volume of water withdrawn from the environment, either directly by the organisation or indirectly through intermediaries, categorised by source (groundwater, surface water, etc).
2. EN9, an optional indicator concerned with identifying the extent to which, if any, the organisation's water withdrawals are depleting, or otherwise impacting upon, water sources. Altering a water source may not only jeopardise the organisation's ability to rely on that water source in the future, but also damage the supply of water currently available to others.
3. EN10, an optional indicator requiring the reporting of the total volume of water recycled and reused. This indicator helps understand water efficiency, as recycling and reducing water reduces an organisation's need to withdraw water.
4. EN21, a core indicator which requires an organisation to describe the total volume of water discharged, the quality of this water and the location to which it was discharged. This information is relevant for understanding the environmental impact of water discharges.
5. EN25, an optional indicator requiring identification of the size, protected status and biodiversity of any habitat or water body impacted by water discharges and runoffs.

The following three WAFMI indicators were considered.

1. An Input-Output statement, which requires reporting ‘flows for all input and output [water source] categories for the reporting period, along with the change in storage’ (Sustainable Minerals Institute and Minerals Council of Australia, 2012, p. 7).
2. An Operational efficiencies statement, which requires reporting ‘the total flows into the tasks, volume of reused water, reuse efficiency, the volume of recycled water and recycling efficiency’ (Sustainable Minerals Institute and Minerals Council of Australia, 2012, p. 7).
3. An accuracy statement which ‘lists the percentage of flows that were measured, simulated and estimated’ (Sustainable Minerals Institute and Minerals Council of Australia, 2012, p. 7).

Most of the potential indicators contained with the Carbon Disclosure Project (2012) Water Information Request are already covered by WAFMI and GRI. Those indicators which are not covered by WAFMI and the GRI are more relevant to assessing business impacts, rather than community concerns.

Similarly, the Australian Water Accounting Standards, which requires reporting on water assets and water liabilities, might be useful for managing water or running a business, but it is likely to have little relevance for catchment residents.

Hoekstra *et al.* (2011) suggest that businesses calculate their water footprint, (i.e. their direct and indirect water use), compare it to catchment water use and then determine if the level of activity is sustainable. A water footprint analysis could potentially be useful to catchment residents, although the difficulty in calculating the amount of water available in a catchment may pose some problems. For this reason, the presence of a water footprint analysis is another indicator.

There are other important descriptors of potential water impacts in local catchments which are not found within the afore-mentioned frameworks, but which are still relevant for this study. They are:

1. The total volume of water withdrawals permitted by licences and a comparison with actual water take.
2. Quality of water use after recycling.
3. Water storage capacity.
4. Regulatory breaches.

Step 3: Review of NSW Legislation

The third step was to review relevant NSW legislation, determining mining company reporting obligations and how they compare to the indicators obtained during the previous step.

Step 4: Content Analysis of Mining Information

The fourth step was to review relevant publically available information from mining companies, determining the extent to which it satisfied the indicators identified from the sustainability reporting frameworks during the second step.

Information was extracted by way of a content analysis. Singleton and Straights (2005, p. 371) write: ‘the basic idea of content analysis is to reduce the total content of a communication... to a set of categories that represent some characteristic of research interest.’ In this paper, these categories, called ‘coding categories’, correspond to the indicators identified in the second step. In simple terms, documents were examined to see if they reported on a selection of indicators that might be relevant for catchment residents. The indicators chosen used are detailed in in Section 6.

The content analysis was performed on the following documents:

1. Annual environmental reports from Cases A, B and C. These reports were created to fulfil site-specific reporting requirements imposed by various government departments.
2. Case D’s surface water, groundwater, meteorological and biological monitoring programme was used as its annual environmental report is not available. Case D’s consent conditions were written before DPI required annual environmental reports to be placed on websites.
3. The sustainability of the parent companies for Cases A, B and D. These documents tend report on a parent company’s performance as a whole, although the exception of Case B, information on the individual mine sites is provided.
4. The sustainability report for Case C. This was deemed more appropriate to use than the sustainability report of its parent.
5. Case B’s parent company’s Global Reporting Initiative Data Book. GRI indicators are used to report on the company’s performance as a whole during 2011. Case B’s performance is not separately identified.

Even though the annual environmental reports contain information required by the government, they do not appear to be available in any government register. They only appear to be accessible from the webpages of their respective mine sites. The requirements imposed on mining companies by NSW legislation and project approvals are described in the next section.

5.0 NSW Legislation and DPI sample Conditions Law

Obtaining the licences and approvals necessary for mining requires consultation with numerous government agencies. The NSW State Government departments relevant for this study, as of November 2012, are as follows:

1. **The Department of Planning and Infrastructure (DPI)**, formerly the Department of Planning. This department administers the *Environmental Planning and*

Assessment Act 1979 and *Environmental Planning and Assessment Regulation 2000*. Further, it is responsible for approving development applications significant to the state, which often includes mining projects. (Development applications without state-level significance are approved by local councils). The Minister of Planning and Infrastructure has the authority to attach numerous environmental disclosure, auditing and performance requirements to project approvals, a number of which involve water.

2. **The Environmental Protection Authority (EPA).** As of February 2012, the EPA is responsible for issuing and enforcing environmental licences under the *Protection of the Environment Operations Act 1997*.¹ Environmental licences detail where discharges to water might occur, discharge limits, pollutant concentration limits and monitoring requirements. Environmental licence conditions may mandate the provision of annual reports detailing compliance, complaints and monitoring information. Responsibility for issuing environmental licences previously lay with the Office of Environment and Heritage, an organisation which still exists to provide environmental policy advice and reform, but now no longer has relevance to this study.
3. **The NSW Office of Water (NOW),** part of the Department of Primary Industries, which is in turn part of the NSW Trade and Investment cluster. NOW is responsible for setting water allocations, developing water sharing plans, and approving the extraction and use of water. NOW also administers various pieces of legislation relating to water, the most important to this study being the *Water Management Act 2000*. While the EPA is concerned with the environmental issues relating to water, NOW is focused on ensuring that scarce water is distributed appropriately. Previously, NOW was part of the former Department of Environment, Climate Change and Water.

These three are not the only NSW Government organisations with an interest in mining water use and disclosure, but they are the ones with direct authority over such issues. NSW Trade and Investment, which is responsible for helping to facilitate economic growth, has a Division of Resources and Energy that can set guidelines for rehabilitation plans and subsidence monitoring, as well as have a say in proposed *water management plans*. Further, the Department of Sustainability, Environment, Water, Population and Communities becomes involved when mining activity affects environmental issues for which the Federal Government has responsibility. Despite its name, this agency has no direct interest in the water use of mining companies, as this tends to be a state issue. Neither organisation is directly relevant to this study.

The remainder of this section describes the relevant NSW legislation in greater detail.

¹ Obtaining approval from the DPI to engage in state significant projects, results in the EPA being required to grant the necessary environmental protection licences. During a licence renewal, however, the EPA may vary the environmental licence conditions, as appropriate.

5.1 DPI and the *Environmental Planning and Assessment Act 1979*

Mining activity is typically classified as state-significant development under the *Environmental Planning and Assessment Act 1979*, meaning that such project applications are subject to different looser approval requirements than would otherwise be imposed. However, s 89E prohibits granting approval to projects that would be wholly - but not partially - rejected by an environmental planning instrument. Further, s 89F requires the Director-General of the DPI to make publically available any state-significant development applications and accompanying information, so that the public may lodge objections with the Minister of Planning and Infrastructure.

Regarding environmental reporting, the *Environmental Planning and Assessment Act 1979* states in s 122C:

(1) The Minister [of Planning and Infrastructure] may, by the imposition of conditions on the approval for a project, require monitoring or an environmental audit or audits to be undertaken to the satisfaction of the Minister by the proponent of the project.

(2) A condition requiring monitoring or an environmental audit may be imposed at the time the approval for the project is given or at any other time by notice in writing to the proponent of the project.

(3) Any such condition imposed by notice may be varied or revoked by a similar notice.

Further, s 122D(1) specifies that should the Minister impose monitoring conditions, the Minister may also mandate ‘the analysis, reporting and retention of monitoring data’, as well as require such data to be certified. The *Environmental Planning and Assessment Act 1979* therefore grants the Planning Minister very wide discretion in deciding the type of environmental disclosure required for any given project, as well as the ability to impose, alter or remove conditions, even after granting project approval.

Such wide latitude makes it virtually impossible to state with certainty the requirements that project approvals place on mining companies concerning water. However, the DPI (2012c) has prepared a list of sample and model conditions that are typically attached to development consent decisions for open cut and underground mines. These sample conditions require an applicant to: provide compensatory water supply should the applicant’s activities impact upon a landowner’s water supply; prepare detailed water management plans that include a water balance; and establish an independently chaired community consultative committee in accordance with DPI guidelines, with representatives from the local community and recognised environmental groups.

Water management plan requirements differ between open cut and underground mining. According to the DPI (2012a) sample conditions, open cut water management plans must contain:

1. A site water balance showing how water will be obtained and released.

2. Surface and ground water management plans describing baseline data, potential adverse effects, proposed monitoring programs and how adverse effects will be identified and remedied.
3. A program for developing and validating groundwater models.
4. A response plan for responding to any overuse of water.

By contrast, DPI's (2012b) underground mine sample conditions require the following:

1. An extraction plan detailing the criteria that will be used to assess potential impacts, as well as a plan for predicting and responding to adverse effects caused to privately owned bores. Further, the extraction plan must describe the programs in place to monitor and report on stream flows and changes caused by subsidence impacts, as well as groundwater inflows to underground workings.
2. A surface water management plan which includes a water balance, a description of the water management system, measures to minimise water use, measures to reuse or recycle water and how compliance with discharge limits will be achieved.

Both the open cut and underground mining sample conditions also state that applicants must undertake an annual performance review. This review must provide information concerning: environmental monitoring results and a comparison to relevant statutory requirements, the complaints register, relevant predictions in the environmental impact statement, non-compliance and actions taken to ensure compliance, discrepancies between predicted and actual impacts of the development and measures to improve environmental performance (DPI, 2012a, p. 27; or DPI, 2012b, p. 28).

In addition, both sets of sample conditions mandate that an environmental audit must be undertaken two years after development consent has been granted, then every three years thereafter. These audits must be: conducted by an independent team approved by the DPI Director-General; include consultation with applicable government agencies; assess compliance with environmental performance requirements; determine whether previously approved strategies and programmes are still sound; and recommend how to improve environmental performance.

Finally, the sample conditions require an applicant to make certain documents available on its website. These documents include the environmental impact statement, development consent conditions, current development approvals, summary of environmental monitoring results, a register of complaints and the minutes of all community consultative committee meetings. The website must also contain the strategies, plans and programs referred to in development consent and project approvals, as well as the annual review and audit documents referred to in previous paragraphs.

In addition to complying with development consents, mining companies must also obtain and comply with environmental protection licences, which are discussed in the next section.

5.2 The EPA and the *Protection of the Environment Operations Act 1997*

Under ss 47-48 of the *Protection of the Environment Operations Act 1997*, it is an offence to perform what is known as ‘scheduled activities’ without a licence. Schedule 1 of this same Act provides a list of these activities which include: extractive activities, coal works, mineral processing, mining for coal, mining for minerals and crushing, grinding or separating. Naturally, most mining activity requires an environmental protection licence.

Section 45 lists various factors that the EPA is required to consider when deciding whether to grant a licence, including the likely pollution generated, impact of that pollution and available pollution mitigation measures. Should a licence be granted, Part 3.5 permits the EPA to attach a multitude of possible conditions, including mandatory environmental monitoring, reporting and independent certification of such procedures. The EPA may require licence holders to undertake environmental audits (s 174), however this condition may only be imposed if the EPA suspects that the licence holder has previously harmed the environment by violating the Act and is likely to do so again (s 175). Further, the EPA is authorised to alter the conditions of an existing licence, although proposals to increase allowable pollution limits will firstly require public consultation, unless such consultation has already occurred as part of an environmental assessment under the *Environmental Planning and Assessment Act 1979*.

The EPA has a guide to the licencing process on its website (Department of Environment Climate Change and Water, 2009a, b), which was created when responsibility for this process lay with the Department of Environment, Climate Change and Water. The guidelines require that annual returns (currently to the EPA) provide a statement of compliance with licencing conditions and a summary of both monitoring and complaints (Department of Environment Climate Change and Water, 2009a).

Under s 308(2), the EPA and other relevant agencies are required to keep public registers. These registers must provide details concerning each licence application, the results of these applications, each successful application and subsequent variations to licencing conditions. A register must also contain details concerning each mandatory environmental audit, including a summary of the audit conclusions. Further, there must be information available concerning environment protection notices, penalty notices, civil proceedings and successful prosecutions.

5.3 NOW and the Water Management Act 2000

In many water management areas across NSW, demand for water far exceeds supply. NOW is, in accordance with the *Water Management Act 2000*, responsible for facilitating the sharing of scarce water between users; and to maintain a register of water access licences.

People and organisations seeking to use water for commercial purposes are often legally required to first obtain water access licences. Section 63 of the Water Management Act 2000 states that each water access licence must detail ‘the water management area or water source to which it relates’ and ‘the times, rates or circumstances in which, and the areas or locations

from which, water may be taken.’ Additionally, the amount of water allocated to each licence will vary according to how much water is available. Further, s 66(1) states that ‘an access licence is subject to such conditions as the Minister may from time to time impose’ and that these conditions may be imposed for the protection of the environment.

In some regards, NOW’s administrative functions and the *Water Management Act 2000* are elements least relevant to this study, as water licences do not require reporting. One reason for this is that any information NOW requires is attached as a condition of development consent or project approval.

Nevertheless, the *Water Management Act 2000* provides important information relating to potential conflicts between catchment residents and mining companies over water. In times of severe water shortage, s 49A states that the Minister of Water may, with the agreement of the Minister for Climate Change and the Environment, temporarily suspend water management plans. Section 49A is only to be invoked in times of severe drought; the preferred method of dealing with a lesser water shortage is to reduce the entitlements of all licences, with low security licences receiving a greater reduction than high security licences.

Should a s 49A suspension occur, s 60 states that first priority over water goes to people taking water for domestic purposes, exercising basic landholder rights and providing essential town services. The second priority over water is the needs of the environment. The third priority over water goes to users taking water for stock purposes, electricity generation, running utilities and users with high security regulation river access licences. The fourth priority is given to all other users, which is the category in which the licences held by mining companies fall.

The significance of this legislation is that in times of severe drought, there should be no conflict between mining companies, catchment residents and other users over water, as mining companies are relatively low on the priority list. Further, if there is a conflict over water rights during a time when s 49A is not invoked, the *Water Management Act 2000* provides another option. According to s 79(1), the Minister may forcibly acquire a water access licence ‘if of the opinion that, in the special circumstances of the case, the public interest requires their compulsory acquisition.’

This section has described the relevant legislation and standard practices concerning water use and reporting for mining companies. The next section compares existing NSW Government reporting requirements to a number of sustainability reporting frameworks.

6.0 Sustainability Reporting Frameworks and Case Study

There have been numerous calls for supporting mandatory sustainability reporting regimes (Adams, 2004; Gray, 2005; Unerman and O’Dwyer, 2007). As the previous section has shown, however, development consents and environmental licences in NSW already require significant disclosure concerning water. This section compares these requirements with those from sustainability reporting frameworks, with most of the indicators coming from the GRI and WAFMI.

In order to enhance the analysis, it was decided to examine voluntary and mandatory reports released by the four cases. Examining these reports provides an opportunity to better understand which sample reporting conditions are actually imposed and what form they take.

Research was conducted by examination of the reports, with a view to ascertaining the extent to which each case reported on five G3.1 indicators, three WAFMI indicators and five other indicators. All of these indicators are described later. A spreadsheet was created to note all the indicators and record whether information regarding those indicators was successfully located.

6.1 GRI Framework

The first GRI protocol is EN8. The sample conditions do not specifically require reporting total water withdrawals by source. However, both sets of sample conditions require the preparation and subsequent disclosure of a water balance, listing water sources and security of water supplies. Case A's annual environmental report and its parent's sustainability report both provide the information necessary to satisfy EN8, listing total water withdrawals and water withdrawals attributable to surface water, groundwater, sea water and third party water. Also, in each of its three reports, Case B states total water withdrawals and identifies its withdrawal sources. However, none of these three reports state the level of withdrawal attributable to each source, meaning that the requirements of EN9 are only partially complete.

Both of Case C's reports provide all necessary information. Case D's parent's sustainability lists the total water consumption for the Case D mine site, but does not divide it by source. This report does, however, list the amount of water attributable for each source for the company as a whole. Case D's surface water, groundwater, meteorological and biological monitoring programme does not contain information relating to this indicator. In fact this programme does not contain information relevant to any indicator, hence it will not be mentioned in the following discussion.

The second indicator is EN9. DPI's (2012c) sample conditions do not specifically require reporting this information. None of the cases explicitly state whether or not they considered whether their water use would impact upon water sources. However, the sample conditions do mandate that, as part of the publically available water management plan, procedures must be developed to monitor potential threats to water bodies and privately owned bores. Further, given the implications of potentially damaging water sources, this would surely be a consideration in any initial environmental assessment, which is also a publically available document. Indeed, the project approval licences granted to both Case A and Case B both contain provisions requiring mandatory water releases and/or offsetting baseflow loss. These provisions may well have been implemented to prevent impacts to water sources. Overall, information regarding EN9 is not specifically provided in the companies' annual environmental reports, but it can be surmised from elsewhere.

The third indicator is EN10. There is no specific requirement in the sample conditions that this information be reported; however, the publically available water management plan requires a description of any procedures that would be used to reduce the usage of clean

water. Information relating to recycling and reuse may be reported in fulfilment of that requirement.

Case A's annual environmental report identifies the volume of water recycled, reused and the efficiency ratio of each. However, the parent company sustainability report only displays the percentage and total volume of water reused.

By contrast, Case B provides no information on water recycling or reuse, suggesting that it does not currently reduce fresh water intake in this manner. Its parent's sustainability report and GRI data book contain the required water recycling and reuse data. The most likely explanation for this difference is that water recycling and reuse occurs at other sites belonging to the parent company. Further, the parent company treats water recycling and reuse are treated as a single item, rather than providing a different set of figures for each.

None of the reports associated with Cases C or D provide explicit information about recycling, although the sustainability report of Case D's parent does indicate that its mine sites recycle water, when possible.

The fourth indicator is EN21. As with EN9, there is no specific requirement for organisations to report this information. However, the sample conditions do require the preparation and disclosure of a water balance, which includes details concerning water discharge. Both Case A and its parent provide all the information required by EN21 in their respective reports. Both reports list total water output, total output attributable to each source and the quality of water discharged. Case B's parent provides information concerning water discharges in its sustainability report and fully satisfies the requirements of EN21 in its GRI data book. However, the information presented in these documents related to the parent company as a whole, not Case B specifically. One can glean much of the information relating to EN21 from Case B's annual environmental review, which contains information about water discharges and licenced discharge points. Cases C and D do not discharge water; hence this indicator does not apply to them.

The final indicator is EN25. Once again there is no obligation to report this information, nor is this information specifically identified in the annual environmental reports of Case A and Case B. However, these factors are considered in environmental assessments, meaning that this information can still be obtained. Cases C and D do not discharge water; hence this indicator does not apply to them.

Overall, none of the five GRI indicators are specifically required to be reported under the sample conditions. However, between the requirements to create and report water balances, water management plans and statutory approval and licencing, a significant portion of the information relating to EN8, EN10 and EN21 can be obtained or inferred from annual environmental reviews. The requirement to undertake and make publically available environmental assessments should mean that it is also possible to acquire details concerning EN9 and EN25.

6.2 WAFMI

Three WAFMI indicators were considered.

The first was the Input-Output statement. The sample conditions mandate disclosing a water balance, which contains water inputs and outputs and information about the sources of water. Due to the fact that Case A used WAFMI protocols to prepare its water balance, an input-output statement appears in the reports of both Case A and its parent company. Case B's annual environmental review identifies total water input, water output water sources, but does not differentiate sources. Its parent's sustainability report discloses water withdrawals and releases, does not categorised them by source, nor provide information concerning water storage.

Case C's annual environmental report provides a water balance, but inflows and outflows are not categorised according to source. Case C's sustainability report provides information on water withdrawals only. The sustainability report of Case D's parent provides water input and output figures without categorised them.

The second indicator of WAFMI is the operational efficiencies statement. This information is not specifically required under the sample conditions. Once again, Case A followed the WAFMI protocols. All necessary information is provided in Case A's annual environmental report, but only information concerning water reuse can be found in Case A's parent's sustainability report. There is no mention of water recycling or reuse within Case B's annual environmental reviews, although its parent's sustainability report and GRI data book do contain the necessary data. Case C, in both of its statements, provides only the total amount of water recycled. Case D provides no information.

The third indicator of WAFMI is an accuracy statement. This information is not specifically required to be reported, but part of the water management plan requires detailing the performance measures and monitoring procedures used. This statement is not provided in any of the reports, except for Case A's annual environmental report.

WAFMI does contain another indicator known as a *contextual statement*. This is intended to provide any information important to understanding the previous three indicators. This indicator is so broad that it is pointless attempting to determine if it is required by the sample conditions or reported by the cases.

The above information shows that the sample conditions do not mandate that sufficient information be provided that would satisfy WAFMI reporting, although information provided as part of the water management plan would shed some light on these indicators. It could be that WAFMI requires greater detail than the sample conditions because such detail is needed by managers.

6.3 Other Indicators

This section outlines indicators which are not specified by the G3.1 or WAFMI, but which are considered to be important descriptors of potential water impacts in local catchments. The

first is reporting on the total volume of water withdrawals permitted by licences and a comparison with actual water take. The sample conditions require a description of relevant statutory requirements, including licences, but do not specifically require reporting the extraction limit. In their site-level reports, Case B reports the extraction limits for both surface and groundwater, while Case A reports only the extraction limit for surface water. Licence limits are not provided in the sustainability report of either parent company. Case C reports the extraction limits of each individual licence in its annual environmental report; and the aggregate extract limit of its licences in its sustainability report. Case D provides no information regarding licence extraction limits.

The second indicator is the quality of water use after recycling. This is not specifically required by the sample conditions, nor is it reported upon in any of the annual environmental or sustainability reports.

The third indicator is water storage capacity. The sample conditions state that a water management plan must include details of water storage and both Case A and Case B describe their water storage in their annual environmental reports. Case A's parent's report does little more than state that water storage capacity was upgraded as a response to the drought. Case B's parent's sustainability report and GRI data book do not mention water storage. The reports associated with Cases C and D provide no indication of available capacity.

The fourth indicator is regulatory breaches. The sample conditions mandate that annual environmental reports must list all incidents of non-compliance and state the course of action being taken to prevent the incident from re-occurring. Unsurprisingly, both Case A and Case B provided this information. Case A's parent's sustainability report acknowledges incidents such as a dam overflow. However, the word violation is not used, meaning that readers may not realise that those incidents constitute minor regulatory breaches. Case B's parent's sustainability report does not mention violations at all i.e. whether any occurred is undisclosed in the report. Both of Case C's reports describe non-compliance incidents. Case D's parent's sustainability report states the number of non-compliance incidents, but does not describe the particulars.

The final indicator is whether a water footprint analysis was conducted. The sample conditions require disclosure of various pieces of information concerning water use and pollution, but there is no requirement for a water footprint analysis. Similarly, each of the reports contains information relevant to a water footprint analysis, but none actually provides one.

Information regarding these miscellaneous indicators was much more plentiful in the annual environmental reports, as opposed to the sustainability reports of their parent companies. This is in contrast to the GRI and WAFMI indicators, where both types of reports, generally speaking, had the same level of information.

6.4 Analysis Using Dryzek's Schema

Achieving a good outcome regarding mine water use requires not only a good reporting system, but also a good deliberation system. Even the NSW Minerals Council has argued for the importance of community consultation, stating:

Engaging early and frequently with the community has considerable benefits for both the proponent and the community. It allows for the early identification of important environmental and socio-economic issues that should be assessed, allowing these to be included in the EIS [Environmental Impact Statement]. Most importantly it provide [sic] for communities and developers to meet face to face and work through issues in a constructive manner. (NSW Minerals Council, 2012, p. 20)

Overall, NSW law seems well-crafted to provide information to facilitate deliberation by citizens in their regions. The publically available annual environmental reports, monitoring reports, licencing conditions and audits provide good information which catchment residents can use to understand, discuss and deliberate upon the water activities of mining companies. This is beneficial in terms of public space and accountability. The NSW Government (2012) has stated that it intends to improve available information by establishing an online planning portal, disclosing anticipated time frames for and allowing the public tracking of the decision making process. If implemented, these improvements could also be a source of accountability.

One limitation, however, is that catchment residents may lack the wherewithal to access the information available and the scientific training to properly understand and critically evaluate the information provided. This brings into question the useability of the information by citizens. The NSW Government (2012) has, however, indicated that it will attempt to make information more user-friendly for citizens by requiring planning documents to be accompanied with explanatory materials written in plain English, which could also assist in accountability.

Proper deliberation in both the public and empowered spaces benefits from the wealth of information provided, but it is hindered by the fact that some of the provided information is notoriously difficult to reliably measure i.e. reporting accuracy and validation is an issue, meaning that the information may be misleading and judgements based upon it might turn out to be wrong.

A common issue regarding empowered space – that is certainly not unique to mining – is that there is always a risk that business and/or government may, without good reason, ignore public concerns when making decisions.

It is difficult to ascertain the extent to which mining companies truly consider community concerns, although the NSW Minerals Council (2012, p. 20) has stated that ‘mining companies begin consultation and engagement with the community and stakeholders long before they enter the formal planning system.’ Further, the mere existence of a licencing system means that, even if a mine site were to blatantly ignore community concerns, there would be a limit to its ability to harm the community by extracting, releasing or polluting

water. One would expect there to be very few cases in which organisations are willing to risk engaging in blatantly illegal behaviour.

The other empowered space concerns those who approve development consents. As previously noted, the DPI is responsible for carrying out assessments; and the Minister responsible for issuing approval. There is naturally concern as to whether political donors may be granted undeserved approvals and/or overly-favourable conditions. However, in 2011, the Minister delegated to the Planning Assessment Commission (PAC) the authority to issue development application decisions on his behalf. As a result, controversial assessment decisions tend to be handled by PAC, rather than the Minister. If PAC is as independent as is hoped, then this should make it open to considering concerns by mining companies, communities and other interested parties. However, some have raised concerns about whether sufficient time is allowed for presentation and about the inability to be heard outside of public meetings (NSW Government, 2011).

There are two meta-deliberative spaces of interest here. The first is the requirement for organisations to form community consultative committees. This can also serve as an accountability venue, as the companies would be forced to explain their actions. However, there have been cases in NSW where the community no longer trusts the mining company and no longer sees the value in attending meetings. A communication strategy currently used by the mining industry has been to establish information provision shopfronts in local towns when development applications for new projects are submitted i.e. information provision rather than consultation.

The second meta-deliberative space is the community consultation that accompanies state significant development proposals. This process could provide a valuable way for people to share views and develop an optimal solution. However, the consultation process suffers from the following problems: insufficient time to given to prepare submissions; the cost borne by community members to hire an expert to properly evaluate proposals; and an inability to comment on the proposal once the consultation stage has finished (NSW Government, 2011).

Taken together, the deliberation system appears technically well designed. There are few weaknesses and there will be fewer still if the NSW Government fulfils its promises, could become even better. The main problem facing this deliberative system is one that faces all systems – people on either side may not make good faith efforts to engage in the deliberative process. In other words, rather than trying to understand and reflect upon alternative views in order to develop a working solution, people may instead focus on trying to sway others to their way of thinking.

7.0 Conclusions and Future Research

The purpose of this paper is to determine whether the information reported by mining companies concerning water in NSW is sufficient to meet the needs of catchment residents. A description was firstly provided of both relevant NSW law and the conditions typically attached to the development consents for both open cut and underground mining. In order to

help judge the comprehensiveness of these requirements, they were then compared to the water reporting requirements of the G3.1 and WAFMI.

Overall, we find that, at least in this instance, concerns regarding poor corporate sustainability reporting are being addressed. From a regulatory perspective, rather than specifying what information must be disclosed, NSW legislation provides the Minister of Planning and Infrastructure wide discretion in setting reporting requirements. Further, the sample development consent conditions available from the DPI (2012c) are actually quite substantive, and by virtue of the consent conditions, these reports must be made publically available (although older development consent conditions may not include such disclosure requirements). Between the requirements to create and report water balances, water management plans and statutory approval and licencing, a significant portion of the information relating to GRI protocols EN8, EN10 and EN21 can be obtained or inferred from annual environmental site reviews. The requirement to undertake and make publically available environmental site assessments means that it is also possible to acquire details concerning GRI protocols EN9 and EN25. DPI's sample conditions also require disclosure of a water balance which is similar to WAFMI but, in general, the sample conditions require information less detailed than WAFMI. More generally, obtaining social and environmental information mandated by development consent conditions can avoid a problem confounding mandatory reporting: the difficulty in developing guidelines that can be applied to all industries. In this situation, the problem was avoided as the DPI has standard and best practice project approval conditions that are applied routinely, but then imposes other conditions as needed on a case-by-case basis.

Whilst site-level mine reporting might be more rigorous than previously believed, there remains considerable scope for improvement. A fundamental recommendation is to establish a central repository of searchable site-level information similar to the Australian National Pollutant Inventory and its international equivalents (such as the US Toxic Release Inventory, Canadian National Release Inventory, and UK Pollutant Inventory). This approach would have a number of advantages, including identification of mine sites within a particular region and comparison between mine sites and could be achieved with relatively limited investment. More detailed recommendations include requiring the disclosure of total water extraction limit for each source of water used by a mine site, the amount of water withdrawn from each source annually and the impact on water bodies of withdrawals or discharges and requiring information in a standardised format to facilitate ratio analysis.

An evaluation of the influence of reporting on mining practices was outside the scope of this study. However we note that while issuing licences will not guarantee successful environmental management, licences do serve a valuable function by placing legal limits on water extraction, discharge and pollution. Further, in the event of a severe water shortage, water management plans can be temporary suspended. In such an event, domestic users, town services and the environment all have higher priority to water than industrial users.

This study contributes to the literature by showing that, in certain situations, valuable information can be located outside of a corporate sustainability report. Even though Australia

does not have a mandatory corporate sustainability reporting regime, a significant amount of reporting resembling GRI requirements was nevertheless made publically available in NSW for the catchments researched. This suggests that reviews finding poor quality environmental reporting (Gray, 2001; Gray, 2005; Milne and Gray, 2007) and those concerned with the mining sector (Foster, 1969; Milne and Patten, 2002; Jenkins and Yakovleva, 2006; Yongvanich and Guthrie, 2007; Mudd, 2008; Mudd, 2009; Perez and Sanchez, 2009; Coetzee and van Staden, 2011; Cote *et al.*, 2012; Pellegrino and Lodhia, 2012) might be enriched by considering legislative requirements in relation to particular dimensions of sustainability reporting. In relation to previous studies of water internationally (Morikawa *et al.*, 2007; Morrison and Schulte, 2009; Barton and Morgan-Knott, 2010; Carbon Disclosure Project, 2010; Morrison and Schulte, 2010; CIMA (Chartered Institute of Management Accountants), 2011) and in Australia (Mudd, 2008; Mudd, 2009; Prior, 2009; Egan and Frost, 2010; The Association of Chartered Certified Accountants, 2010; Carbon Disclosure Project, 2012) this study shows that salient water disclosures may be driven by local environmental regulation and address at least some community concerns.

Given our findings, future research might explore the extent to which ‘micro’ sustainability reporting regimes apply in other industries or geographic locations, particularly in relation to socially and environmentally sensitive industries (e.g. gambling and oil and gas). A further question that could be explored is why the legal regime has evolved to the present state (akin the analysis of the development of water accounting undertaken by Chalmers *et al.* (2012)). In addition, the perspective of users of this information is a critical dimension of an effective accountability regime and therefore an important avenue for future research.

Appendix

EN8: Total water withdrawal by source.

Document of Interest	Extent to which Indicator is Reported (or required)
Law/ DPI sample conditions.	Sample conditions require disclosure of a water balance, which lists water withdrawal and details the sources of water. However, there is no requirement to report on the <i>total</i> amount of water withdrawn from each source.
Case A’s Annual Environmental Report.	Indicator fully reported upon. Report lists the water inputs from surface water, groundwater, sea water and third party water, as well as the quality of such water. Further, total water input is provided.
Case A’s Parent’s Sustainability Report 2011.	Indicator fully reported upon. Information provided is exactly the same as that provided by Case A’s Annual Environmental Report.
Case B’s Annual Environmental Report.	The report details total water inputs and lists water sources. However, it does not reveal the amount of water withdrawn from each source.

Case B's Parent's Sustainability Report 2011 and GRI Data Book.	The sustainability report lists only the volume of water withdrawn. The GRI data book provides both total volume of water withdrawn and lists sources of water, but it does not reveal the amount of water withdrawn from each source.
Case C's 2011 Annual Environmental Report.	There is a water balance which lists total water inputs. It shows the amount of water attributable to rainwater, the council and groundwater allocations. Further, no river water allocations were used.
Case C's Parent's Sustainability Report 2011.	Indicator fully reported upon. Information states amount of water attributable to surface water, groundwater and recycled water.
Case D's Surface Water, Groundwater, Meteorological and Biological Monitoring Programme.	Indicator not reported upon.
Case D's Parent's Sustainability Report 2011.	Report lists the total water consumption for mine site, but does not divide it by source. This report does, however, list the amount of water attributable to each source as a company as a whole.

EN9: Water sources significantly affected by withdrawals.

Document of Interest	Extent to which Indicator is Reported (or required)
Law/DPI sample conditions.	Sample conditions mandate the disclosure of plans for monitoring potential threats to water bodies and privately owned bores. However, there is no requirement to state definitively whether any water sources have or will be significantly affected by withdrawals.
Case A's Annual Environmental Report.	No explicit comments available.
Case A's Parent's Sustainability Report 2011.	No explicit comments available.
Case B's Annual Environmental Report.	No explicit comments available.
Case B's Parent's Sustainability Report 2011 and GRI Data Book.	The GRI data source states that the sustainability report reports on this item, but it is difficult to tell this.
Case C's 2011 Annual Environmental Report.	No explicit comments available.
Case C's Parent's Sustainability Report 2011.	No explicit comments available.
Case D's Surface Water, Groundwater, Meteorological and Biological Monitoring Programme.	No explicit comments available.
Case D's Parent's Sustainability Report 2011.	No explicit comments available.

EN10: Percentage and total volume of water recycled and reused

Document of Interest	Extent to which Indicator is Reported (or required)
Law/DPI sample conditions.	Sample conditions require disclosure of the procedures for reducing clean water usage, but not explicit reporting on percentages and total volume.
Case A's Annual Environmental Report	Information fully provided.
Case A's Parent's Sustainability Report 2011	Information provided concerning percentage and total volume of water reused, but no information is provided concerning water recycled.
Case B's Annual Environmental Report.	Report does not mention recycling or reusing water.
Case B's Parent's Sustainability Report 2011 and GRI Data Book	Both GRI data book and sustainability report provide all required information.
Case C's 2011 Annual Environmental Report	Total water recycled is provided, but not the percentage.
Case C's Sustainability Report 2011	Total water recycled is provided, but not the percentage.
Case D's Surface Water, Groundwater, Meteorological and Biological Monitoring Programme	Not provided.
Case D's Parent's Sustainability Report 2011	No explicit comments available, only a mention that recycling occurs within the company.

EN21: Water discharged by quantity and destination

Document of Interest	Extent to which Indicator is Reported (or required)
Law/DPI sample conditions	Water discharges must be reported as part of the water balance, and it may be possible to work out the destination from the provided information. Further, it is necessary to report environmental protection licences and the extent of compliance. These licences list location of discharge and discharge limit.
Case A's Annual Environmental Report	Information fully provided. Report lists the water outputs from surface water, groundwater, sea water, third party and other, as well as the quality of such water. Total water output is also provided.
Case A's Parent's Sustainability Report 2011	Indicator fully reported upon. Information provided is exactly the same as that provided by Case A Annual Environmental Report.
Case B's Annual Environmental Report.	Bits and pieces of this information are scattered throughout the report. The water balance on page 31 reveals total water discharged. Page 33 has a table listing the licenced discharge points. Finally, page 62 lists the chemical properties of discharged water as indicated by Ulan's water monitoring.

Case B's Parent's Sustainability Report 2011 and GRI Data Book	Sustainability report details total water discharge, but does not break it down by destination. The GRI data book provides all necessary information.
Case C's 2011 Annual Environmental Report	N/A, Zero-discharge site.
Case C's Sustainability Report 2011.	N/A, Zero-discharge site.
Case D's Surface Water, Groundwater, Meteorological and Biological Monitoring Programme.	N/A, Zero-discharge site.
Case D's Parent's Sustainability Report 2011.	N/A, Zero-discharge site.

EN 25: Identity, size, protected status, and biodiversity value of water bodies and related habitats significantly affected by the reporting organization's discharges of water and runoff

Document of Interest	Extent to which Indicator is Reported (or required)
Law/DPI sample conditions	Sample conditions require the disclosure of a biodiversity management plan. However, there is no explicit requirement to detail size, protected status, biodiversity value or habitat effects.
Case A's Annual Environmental Report	There is a section devoted to biodiversity, but there are no explicit comments concerning size, protected status, biodiversity value or habitat effects regarding water bodies.
Case A's Parent's Sustainability Report 2011	There is a section devoted to biodiversity, but there are no explicit comments concerning size, protected status, biodiversity value or habitat effects regarding water bodies.
Case B's Annual Environmental Report.	Biodiversity is mentioned within the report, but there are no explicit comments concerning size, protected status, biodiversity value or habitat effects.
Case B's Parent's Sustainability Report 2011 and GRI Data Book.	Biodiversity is mentioned within the report, but there are no explicit comments concerning size, protected status, biodiversity value or habitat effects. The GRI data book states that this indicator is fully reported within the sustainability report.
Case C's 2011 Annual Environmental Report.	N/A, Zero-discharge site.
Case C's Sustainability Report 2011.	N/A, Zero-discharge site.
Case D's Surface Water, Groundwater, Meteorological and Biological Monitoring Programme.	N/A, Zero-discharge site.
Case D's Parent's Sustainability Report 2011.	N/A, Zero-discharge site.

WAFMI: Input-Output Statement

Document of Interest	Extent to which Indicator is Reported (or required)
Law/DPI sample conditions.	All required information should be provided by the water balance, which lists water inputs, output and sources of water.
Case A's Annual Environmental Report.	Water balance summary contains all required information regarding input and output flows and categories. Section 11.2 states that the water balance water balance was prepared in line with WAFMI.
Case A's Parent's Sustainability Report 2011.	Information is present, although it is not called the input-output statement.
Case B's Annual Environmental Report.	The report states total water input and output. It also identifies water sources, but not how much water comes from each source.
Case B's Parent's Sustainability Report 2011 and GRI Data Book.	Withdrawals and releases are provided, but are not categorised by source. Water storage capacity is not mentioned.
Case C's 2011 Annual Environmental Report.	A water balance is provided, but it only states total input and output. Flows are not categorised according to source.
Case C's Sustainability Report 2011.	Information provided on water withdrawn only.
Case D's Surface Water, Groundwater, Meteorological and Biological Monitoring Programme.	No information provided.
Case D's Parent's Sustainability Report 2011.	Water input and output figures are provided, but they are not categorised.

WAFMI: Statement of Operational Efficiencies

Document of Interest	Extent to which Indicator is Reported (or required)
Law/DPI sample conditions.	Some of this information might be provided by the water management plan, which must describe procedures to reduce clean water usage.
Case A's Annual Environmental Report.	All information provided.
Case A's Parent's Sustainability Report 2011.	No, although information is provided concerning the total volume and percentage of water reused.
Case B's Annual Environmental Report.	There is no mention of recycling and/or reusing water.
Case B's Parent's Sustainability Report 2011 and GRI Data Book.	Both GRI data book and sustainability report provide the required information concerning to water reuse and recycling.
Case C's 2011 Annual Environmental Report.	The only information related to this statement that is provided is total water recycled.

Case C's Sustainability Report 2011.	The only information related to this statement that is provided is total water recycled.
Case D's Surface Water, Groundwater, Meteorological and Biological Monitoring Programme.	There is no mention of recycling and/or reusing water.
Case D's Parent's Sustainability Report 2011.	No explicit comments available, only a mention that recycling occurs within the company.

WAFMI: Accuracy Statement

Document of Interest	Extent to which Indicator is Reported (or required)
Law/DPI sample conditions.	Information not required, although the sample conditions do require reporting on performance measures and monitoring procedures.
Case A's Annual Environmental Report.	All information provided.
Case A's Parent's Sustainability Report 2011.	Information not provided.
Case B's Annual Environmental Report.	Not provided.
Case B's Parent's Sustainability Report 2011 and GRI Data Book.	Not provided.
Case C's 2011 Annual Environmental Report.	Not provided.
Case C's Sustainability Report 2011.	Not provided.
Case D's Surface Water, Groundwater, Meteorological and Biological Monitoring Programme.	Not provided.
Case D's Parent's Sustainability Report 2011.	Not provided.

Volume of water withdrawals permitted by licences

Document of Interest	Extent to which Indicator is Reported (or required)
Law/DPI sample conditions.	Licence requirements must be provided.
Case A's Annual Environmental Report.	Information provided for surface water licences, but not for bores.
Case A's Parent's Sustainability Report 2011.	Information not provided.
Case B's Annual Environmental Report.	Each licence is listed, along with the withdrawal limit.
Case B's Parent's Sustainability Report 2011 and GRI Data Book.	Not provided.
Case C's 2011 Annual Environmental Report.	Each licence is listed, along with the extraction limit for each.
Case C's Sustainability Report 2011.	States total extraction limit for all licences, but not the individual limits.

Case D's Surface Water, Groundwater, Meteorological and Biological Monitoring Programme.	Not provided.
Case D's Parent's Sustainability Report 2011.	Not provided.

Quality of water after recycling or reuse

Document of Interest	Extent to which Indicator is Reported (or required)
Law/DPI sample conditions.	Not required.
Case A's Annual Environmental Report.	Information not provided.
Case A's Parent's Sustainability Report 2011.	Information not provided.
Case B's Annual Environmental Report.	Information not provided.
Case B's Parent's Sustainability Report 2011 and GRI Data Book.	Information not provided.
Case C's 2011 Annual Environmental Report.	Information not provided.
Case C's Sustainability Report 2011.	Information not provided.
Case D's Surface Water, Groundwater, Meteorological and Biological Monitoring Programme.	Information not provided.
Case D's Parent's Sustainability Report 2011.	Information not provided.

Water storage capacity

Document of Interest	Extent to which Indicator is Reported (or required)
Law/DPI sample conditions.	Sample conditions require creation of a surface water plan that contains details of storage capacity.
Case A's Annual Environmental Report.	Report includes a summary of storage capacities.
Case A's Parent's Sustainability Report 2011.	Report mentions how the drought led to depletion of water storages and how dam storage capacity was upgraded, but does not provide further information.
Case B's Annual Environmental Report.	Report lists different water stores and their capacities.
Case B's Parent's Sustainability Report 2011 and GRI Data Book.	Not provided.
Case C's 2011 Annual Environmental Report.	No indication given concerning water storage capacity.
Case C's Sustainability Report 2011.	No indication given concerning water storage capacity.

Case D's Surface Water, Groundwater, Meteorological and Biological Monitoring Programme.	No indication given concerning water storage capacity.
Case D's Parent's Sustainability Report 2011.	No indication given concerning water storage capacity.

Regulatory breaches

Document of Interest	Extent to which Indicator is Reported (or required)
Law/DPI sample conditions	Sample conditions require reporting of all incidents of non-compliance and actions being taken to prevent the incident from re-occurring.
Case A's Annual Environmental Report.	Information provided.
Case A's Parent's Sustainability Report 2011.	The report does acknowledge incidents such as a dam overflow. However, the word violation is not used, meaning that readers may not realise that those incidents constitute minor regulatory breaches.
Case B's Annual Environmental Report.	Information provided.
Case B's Parent's Sustainability Report 2011 and GRI Data Book.	Not addressed.
Case C's 2011 Annual Environmental Report.	Report acknowledges and describes non-compliance.
Case C's Sustainability Report 2011.	Report acknowledges and describes non-compliance.
Case D's Surface Water, Groundwater, Meteorological and Biological Monitoring Programme.	Not addressed.
Case D's Parent's Sustainability Report 2011.	Number of non-compliance incidents provided, but no details.

Water footprint analysis

Document of Interest	Extent to which Indicator is Reported (or required)
Law/DPI sample conditions.	Sample conditions require disclosure of various pieces of information concerning water use and pollution, but there is no requirement for a water footprint analysis.
Case A's Annual Environmental Report.	Various pieces of information concerning water use and pollution, but there is no water footprint analysis.
Case A's Parent's Sustainability Report 2011.	Various pieces of information concerning water use and pollution, but there is no water footprint analysis.
Case B's Annual Environmental Report.	Information is provided concerning water use and pollution, but there is no specific water footprint analysis.
Case B's Parent's Sustainability Report 2011 and GRI Data Book.	Information is provided concerning water use and pollution, but there is no specific water footprint analysis.

Case C's 2011 Annual Environmental Report.	Various pieces of information concerning water use and pollution, but there is no water footprint analysis.
Case C's Sustainability Report 2011.	Various pieces of information concerning water use and pollution, but there is no water footprint analysis.
Case D's Surface Water, Groundwater, Meteorological and Biological Monitoring Programme.	No information
Case D's Parent's Sustainability Report 2011.	Various pieces of information concerning water use and pollution, but there is no water footprint analysis.

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