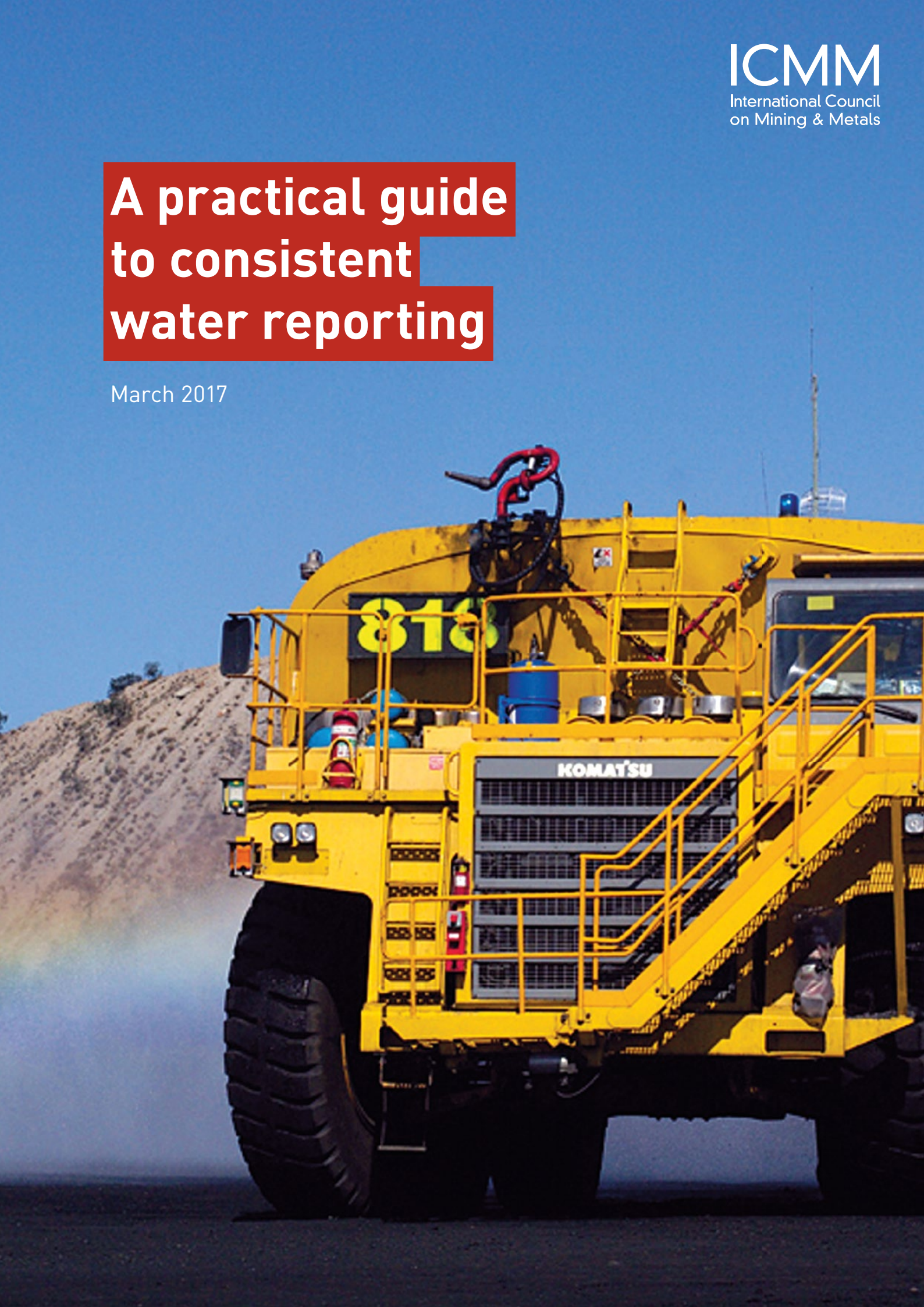
ICMM
International Council on Mining & Metals

A practical guide to consistent water reporting

March 2017



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Foreword

Water is fundamental to life. It is a critical resource not only for all our members' operations but also for other industries, communities and the natural environment. It is therefore one of the most significant issues facing the mining and metals industry. With competition for water continuing to grow, water dependent industries are facing increasingly intense scrutiny, particularly when operating in water stressed areas.

Globally, there is a clear call for greater transparency and disclosure on water use and management from all those who use it. This is especially true for the mining and metals industry considering its high water dependency and potential to impact water resources.[1,2,3]

In general there has been clear progress on water reporting and disclosure through the numerous existing water reporting standards such as CDP, CEO Water Mandate, and the Global Reporting Initiative (GRI). Although our members report on one or more of these[4],the standards do not succinctly articulate or necessarily take into account the industry's specific material water practices, nuances and risks.[5,6]

ICMM recognises that the mining and metals industry needs to do more to meet these disclosure expectations, on aspects such as ensuring comparability among companies within the sector, data on wastewater discharge and recycling, and providing a more comprehensive picture of the risks and opportunities for the industry.

In response, ICMM has developed this guide to support the industry in making consistent, transparent and material water reports, based on key elements of existing disclosure and accounting systems.

This guide is focussed on:

- defining an appropriate set of standardised water reporting metrics for the mining and metals industry
- outlining the minimum disclosure standard for member companies which sets a transparent benchmark for the industry
- providing practical guidance around preparing corporate water summaries and meeting the minimum disclosure standard.

The implementation of the approach outlined in this guide supports the leadership commitment on water stewardship that ICMM announced in January 2017.[7]

Leadership on water stewardship is required from all parts of society and our members are required to apply strong and transparent water governance, manage water in operations effectively and collaborate to achieve shared water benefits.

This includes, amongst other elements, the public reporting of water performance using consistent industry metrics, and to maintain a water balance and understand how it relates to the cumulative impact of other users.

Members will be required to comply with the disclosure standard and associated metrics included in this document from November 2018 to meet the commitments of the position statement.

We encourage the adoption of this approach by the broader industry as a way to provide meaningful information that supports better water use, effective catchment management and to contribute to overall improved water security and sanitation for all.

Tom Butler
CEO. ICMM

Introduction

1.1 Corporate water reporting

1.1.1 What is corporate water reporting?

Corporate water reporting is the external disclosure of information describing a company's water management performance, risk-opportunity exposure and strategic response[8]. This provides an essential information base for informed decision making by a wide range of stakeholders, both internal (eg corporate/operational managers and site operators) and external (eg investors, government/regulators, collective action groups, civil society and communities).

Concerns over global water availability and associated management challenges are increasing[9]. In response, there has been a growing call over recent years for corporate water transparency – which is a key component of water stewardship and fundamental to the sustainable management of a shared resource[10,11]. Hence, corporate water reporting is now standard practice across many sectors and particularly important for those with high exposure to water related risks[12] including amongst others, mining and metals, agriculture, chemicals, oil and gas, pharmaceuticals, water utilities and services.

A number of disclosure systems have been developed by different stakeholder groups to facilitate cross-sector reporting of key water related information. Some of the main water reporting systems are listed below:

- CDP Water[13]
- CEO Water Mandate[8]
- Global Reporting Initiative (GRI)[14].

In general, there is a good level of alignment between the core elements of these main disclosure systems, which produce comprehensive and detailed responses.

1.1.2 Why develop consistent water reporting for the mining and metals industry?

Corporate water disclosure is particularly important for the mining and metals industry, because the sector typically has a high level of water dependency[1,2,3]. For example, the need for dewatering to access ore reserves; or high water supply demands for ore processing, transportation and/or dust suppression purposes. In addition, the locations of mining activities are determined by orebody occurrence rather than choice, hence it is rarely viable to relocate mining activities away from water stressed areas. These factors contribute to the sector having a high overall level of exposure to water risks[1,2,3] and an identified need for greater transparency around reporting water performance and risk management[5,6].

As a result, all International Council on Mining and Metals (ICMM) member companies report to at least one of the main disclosure systems and many report to two or more[4]. However, there remains a lack of consistency in the availability and quality of corporate water information available for external performance monitoring and benchmarking[5,6]. This has been identified as a common issue across multiple sectors and is not unique to the mining and metals industry[12]. Many factors contribute to this situation. Firstly, whilst reporting to the main disclosure systems has strong benefits, the systems, including water metrics, have been developed for cross-sector use and do not fully capture and/or succinctly articulate the industry's key water practices and risks. Secondly, despite strong alignment between the main disclosure systems, differences remain in the choice and definitions of the key water metrics used. Thirdly, the significant challenge presented in concisely capturing the diverse and complex range of water management practices and risk-opportunity exposure levels inherent across a diversified global portfolio in a simple report.

In response, ICMM has consulted with the industry to develop a framework for achieving simple, consistent, transparent and material corporate water reports, using key elements of existing water disclosure and accounting systems – as outlined in this document.

This directly supports the implementation of ICMM's position statement on water stewardship[7] which commits ICMM member companies to publicly report company water performance, material risks, opportunities and management response using consistent industry metrics and recognised approaches.

It also aligns with the first strategic imperative of ICMM's *Water stewardship framework*[15] – to be **transparent** and **accountable** through public reporting of water risks, management activities and performance.

1.1.3 What are the key elements of consistent water reporting for the mining and metals industry?

Supporting the mining and metals industry to achieve consistent, transparent and material water reporting is based on the following four key elements. In addition, the main benefits to this approach are outlined in Table 1.

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- » Mandating the **minimum disclosure standard** for reporting water metrics, risk-opportunity and management response, based on a set of standardised water metrics (as below) and key disclosure components of the CEO Water Mandate and CDP Water systems.
- » Defining an appropriate **set of standardised water reporting metrics** for the mining and metals industry, based on the Water Accounting Framework (WAF)[15] developed by the Minerals Council of Australia (MCA).
- » Providing **practical guidance** around preparing corporate water summaries and meeting the minimum disclosure standard – including a simple approach to data collation, compilation, analysis and reporting for companies who do not have existing systems.
- » Maintaining **flexibility** in the approach used to report to the minimum disclosure standard which may be achieved through:
  1. formalised reporting via disclosure systems such as CEO Water Mandate and/or CDP Water
  2. following company specific approaches which meet the criteria
  3. following the simple approach outlined in this guide.

1.1.4
What is the relationship with other reporting systems?

The water reporting metrics and disclosure statements outlined in the minimum disclosure standard are directly aligned with existing water disclosure systems (CEO Water Mandate and CDP Water) and the WAF. This enables direct mapping of metrics between the main systems, as outlined in Section 2 and Appendix A.

Table 1: Key approach benefits

Approach elements	Key benefits
Mandating the minimum disclosure standard	• To enable the industry to make simple, consistent, transparent and material water reports which meet the expectations of external stakeholders and may be used for performance monitoring, benchmarking purposes and/or stakeholder engagement purposes. • To appropriately describe the industry's key water practices from a sustainability perspective and in the context of water stewardship. • To directly align with existing water disclosure and accounting systems, hence minimising additional reporting requirements associated with achieving consistent water reporting across the industry.
Defining standardised water reporting metrics	
Providing practical guidance	• To continually develop internal understanding and water management capabilities across the industry. • To outline and illustrate the key components which should be considered when preparing comprehensive and/or minimum standard corporate water reports. • To provide a simple approach for identifying, assessing and communicating the key elements of operational water risk from the site to the corporate levels, for companies that do not have, or are looking to update, an existing approach.
Maintaining flexibility in the approach	• To achieve a consistent outcome whilst maintaining a degree of flexibility in the approach, to accommodate the range of water risk profiles and associated management maturity levels inherent across the industry.

1.2
Guide overview

1.2.1
Guide objectives, audience and limitations

The primary objectives of this guide are to:

- outline the minimum disclosure standard for reporting water performance, risk-opportunity exposure and management response
- define a set of standardised water metrics which appropriately describe the industry's key water practices and form the basis for benchmarking
- provide practical guidance to ICMM members around preparing consistent corporate water reports
- provide clarity on water reporting by the mining and metals industry for all industry stakeholders.

The guide has been developed in consultation with ICMM members, external experts and industry stakeholders to develop a reporting approach and outcome which adds

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clarity and value across the sector. The guide is intended for ICMM members, the broader mining industry and all stakeholders with an interest in compiling, understanding and/or using corporate water reports and associated data.

The guidance provided in this document applies to revenue generating mines and smelting facilities; and is not intended to apply to legacy properties, closed sites, construction projects, research facilities or supporting site infrastructure, such as utility or transport corridors.

1.2.2 Guide structure

An overview of the structure of this guide is provided in Table 2.

Table 2: Guide structure overview

Section	Summary	Reference	Guidance
Section 1	An introduction to consistent water reporting for the mining and metals industry.		
Section 2	An overview of **internal** data collation and compilation.	**Standardised water reporting** metrics definitions (Table 3)	• Practical guidance around the **internal** collation of simple, consistent site level datasets which are compiled at the company level and used for reporting purposes. • Example: collating a consistent site level dataset (Appendix B).
Section 3	An overview of preparing **external** corporate water reports.	Mandated **minimum disclosure standard** details (Table 10)	• Practical guidance around the key points to consider when preparing **external** water reports to either a comprehensive or minimum standard level.

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Internal information compilation

Internal information compilation

2.1 Overview

A fundamental component of achieving consistent external water reporting is having an underlying internal company-wide information set that adequately captures the diverse range of operational contexts, water practices, water metrics, risk-opportunity exposures and management responses occuring across a company's operational portfolio.

This may be achieved in a variety of ways. However, this section outlines a simple approach for companies that do not have, or are looking to update, an existing system.

In summary, as illustrated in Figure 1, the simple approach presented is based on:

- internal collation of simple, consistent site level datasets which are compiled into a company-wide dataset (this section)
- A company-wide dataset, which provides the foundation for external corporate water reporting (see Section 3).

This approach includes the definition of a set of standardised water reporting metrics, which have been appropriately defined for the mining and metals industry, based on the MCA's WAF (Section 2.2.3 and Table 3).

However, it should be noted that this company-wide information set is compiled for internal use only. Whilst this provides the foundation for preparing external water reports, there is no expectation or requirement for data to be externally disclosed beyond that needed to meet the minimum disclosure standard (as outlined in Table 10).

2.2 Internal site level Information collation

2.2.1 Introduction

The fundamental building block of a consistent company-wide dataset is the collation of a simple, comparable dataset for each site or operational facility – which describes the site's water performance, risk-opportunity exposure and management response. The site level datasets may then be compiled at the company level and used for a variety of purposes, including external corporate water reporting (as outlined in Section 2.3).

Standardising the metric definitions and data collation at the site level allows clarity in understanding for all stakeholders; and ensures a solid foundation for cross-company and cross-sector benchmarking and/or performance monitoring.

In this illustrative approach, the site level dataset comprises the following components; and an example is provided in Appendix B.

» Site details – including name, location, river basin(s) and commodity (see Section 2.2.2).

» A set of standardised water metrics, appropriately defined for the mining and metals industry (see Section 2.2.3).

» Four main accompanying disclosure statements around site context, risk-opportunity exposure and management response (see Section 2.2.6).

The disclosure statements are made with categorised responses, based on existing risk analysis work using industry standard and/or company specific tools. This approach captures complex site level information in a consistent and comparable way within a company, which may be compiled and used to guide strategy, decision making and external reporting at the company level.

It should be noted that, for simplicity and consistency, the focus of the site level dataset collation is to describe the current state for the reporting period. However, an element of forward projection may be incorporated into the risk-opportunity responses, depending on the assessment method used (see Appendix C). In addition, the reporting metrics collated for the current reporting period may be compared with those of previous periods to understand temporal trends.

2.2.2 Site details

Consistent with the main disclosure systems, the site details collated include site name, location (including country), catchment and commodity. The river basin responses are standardised and may be determined using publicly available mapping tools (as outlined in Tables 6 and 7).

2.2.3 Site level water metrics

2.2.3a Standardised water reporting metrics

The four standardised water metrics collated at the site level are outlined below, detailed in Table 3 and summarised in Figure 2. These metrics describe a site's water performance and, following company-wide compilation, form the basis for external water performance reporting.

» *Withdrawal* which is the volume of water received by the site or operational facility from the water environment and/or a third party supplier.

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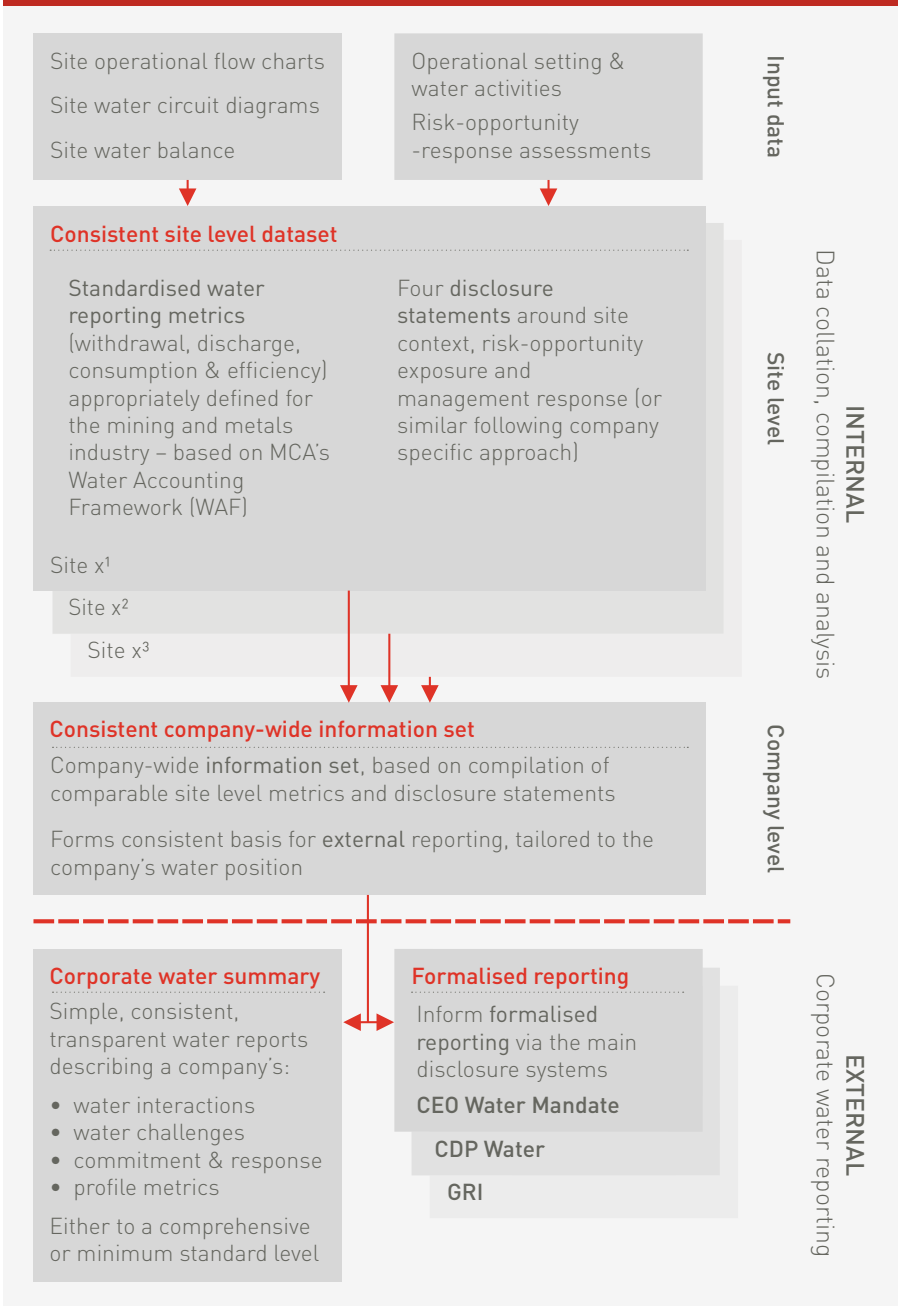
Figure 1: consistent water reporting for the mining & metals industry
Summary of the illustrative approach to internally compiling information for external water reporting



» *Discharge* which is the volume of water removed from the site or operational facility to the water environment and/or a third party supplier.

» *Efficiency* which describes the proportion of water reused and recycled by the site to reduce the overall consumptive water demand.

» *Consumption* which describes the volume of water used by the site and **not** returned to the water environment or a third party.

All of these metrics are directly aligned with the MCA's WAF. The only difference between the standardised metrics presented in this document and those of the WAF is perspective. The WAF has been developed as a mining industry site water management tool based on a site input-output model[17]. Whereas the same basic metrics are used in this approach to describe water performance in the context of sustainability. The direct correspondence between the two systems reduces the potential for confusion; and allows use of the comprehensive WAF guidance documents (eg WAF User Guide[17]) to understand and calculate these metrics. As outlined in the WAF User Guide and illustrated in Appendix B, these metrics are based on common site data including operational flowcharts, site water circuit diagrams and water balances. Key mappings between the two systems are summarised in Table 4.

2.2.3b

Reporting diversions

The standardised water reporting metrics do not include diversions, classified as water that is diverted away from or actively managed by a site but not used for any operational purposes. as outlined in the WAF User Guide. Diversions may include:

- flood waters which are discharged to an external surface water body
- dewatering volumes produced by aquifer interception which are reinjected to groundwater or discharged to surface water.

Whilst this water is not used for operational purposes, it may still present a material risk to the site's operations. Hence where appropriate, significant diversion activities should be captured in the operational context and risk-opportunity disclosure responses.

Internal information compilation continued

2.2.3c

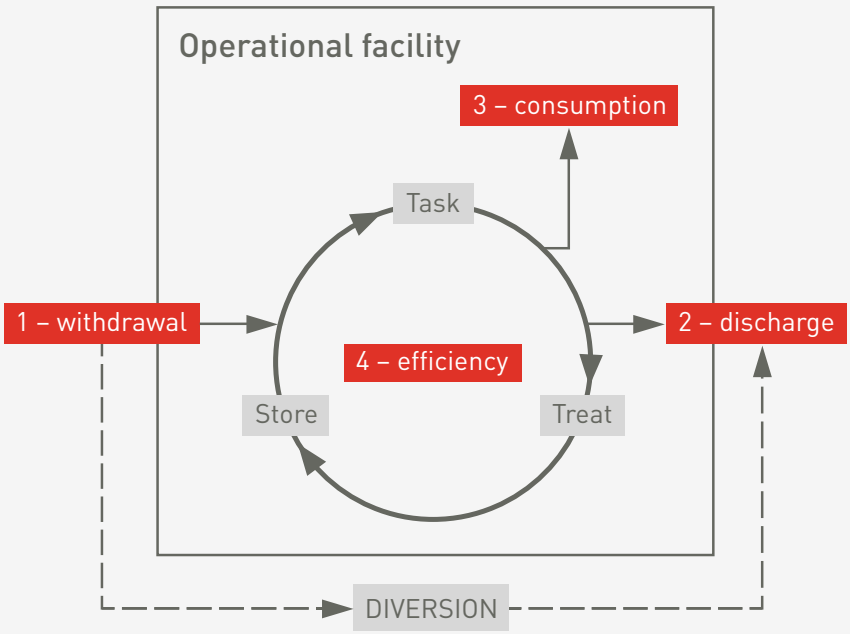
Additional intensity metric

In addition to the set of standardised water reporting metrics outlined above, it is recommended that member companies also calculate an intensity metric for **internal purposes only**.

The intensity metric allows further insight into the total volume of water consumed per tonne/unit of material moved, ore mined, ore processed and/or final product – as appropriate to the operational facility. This may be used for internal performance monitoring and/or benchmarking purposes.

The value of introducing the intensity metric is to enable the industry to internally develop a meaningful intensity metric which, in the mid-term, may be used for external water reporting and/or embodied water calculations.

Figure 2: consistent water reporting for the mining & metals industry
Standardised water reporting metrics – includes withdrawal, discharge and efficiency only.



For a given reporting period (eg a year): withdrawal = Δstorage + consumption + discharge. Directly consistent with the Water Accounting Framework (WAF), developed by the Mineral Council of Australia (MCA). See main report for metrics definitions.

2.2.4

Reporting water quality

The standardised water metrics (excluding efficiency) are reported by the following two quality categories.

» *High quality* typically has high socio-environmental value with multiple beneficial uses and/or receptors both internal and external to the catchment. Examples include: water supply (drinking, agriculture, food production and industry); amenity value; and/or ecosystem function requirements. Hence high quality metrics are of key interest in describing water performance and the sustainable management of a shared resource.

» *Low quality* may typically have lower socio-environmental value as the poorer quality may restrict potential suitably for use by a wide range of other users/receptors, excluding adapted ecosystem function. However, lower quality water may often be used by the mining and metals industry, where available and appropriate, to help meet the consumptive water demand and reduce use of high quality water. Hence low quality metrics are also of key interest in understanding sustainability management, especially in reducing high quality water use.

To enhance industry wide comparability, these two quality categories directly cross-map to the WAF water quality categories, which are determined by consideration of a number of parameters (see the WAF User Guide[17]). Quality category mappings between the two systems are summarised in Table 5.

2.2.5

Water metric benchmarking for the mining and metals industry

It is important to note that **all** of these metrics are heavily dependent on site setting and commodity type, which may have a much stronger influence on these values than site water management practices.

For example, the need to dewater largely depends on the proportion of ore below the watertable; whilst the need to manage significant surface water flows typically depends on the position of an orebody in the landscape and/or annual precipitation. In addition, the ability to enhance site water efficiency largely depends on ore separation/processing procedures, which are

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often determined by commodity type and ore grade. Similarly, it is not possible to use low quality water to meet the site consumptive water demand, and reduce the reliance on high quality water, if no lower quality water is locally available.

Therefore, it is extremely important to consider site context when using these metrics for benchmarking purposes; and the accompanying disclosure statements include a simple context response to maintain a degree of contextual integrity for the site level dataset collated (see Section 2.3.2).

2.2.6
Site context and disclosure statements

2.2.6a
Overview

A key element of achieving consistency is to identify and collate site context, risk-opportunity exposure and associated management response in a comparable and transparent manner. This may be achieved using existing company specific methods where available; or the illustrative approach outlined below.

In summary, the illustrative approach uses four main context and disclosure statements to simply capture this information with categorised responses. Whilst it is recognised that describing complex and varied site level information with categorised responses significantly reduces the level of detail collated; this simple approach is considered effective, because the categorised responses are based on the synthesis of detailed assessment and risk analysis (as outlined in Table 7 and Appendix C; and illustrated in Appendix B). Importantly, this approach captures and communicates the key elements of operational water practice, risk and opportunity from the site to the corporate level in a consistent, comparable and usable manner. Further, the illustrative approach is provided for guidance only, and should not constrain or limit the approach used or the reporting statements made.

2.2.6b
Operational context

As detailed in Table 6, the operational context statement allows for selection of up to four descriptors which appropriately describe:

- the *climatic setting* of the site (following WRI's Water Risk Framework[2]) , as this often correlates with the need to manage significant surface water and/or runoff flows, and may also provide an insight into wider catchment water availability
- key *operational water activities* for the site, including significant diversion activities which may introduce an element of operational complexity and the potential for negative socio-environmental impacts, but are not captured in the water metrics.

2.2.6c
Water risk-opportunity and management response disclosure

As detailed in Table 7 and summarised below, the disclosure statements describe the water risk-opportunity levels and management response associated with a site, directly aligned with The CEO Water Mandate's Corporate Water Disclosure Guidelines[18] and CDP Water 2016 Guidance[19].

» The *catchment stress level* for the catchment(s) or river basin(s) within which the site is situated (categorised: 1 – very low, to 5 – very high, or unknown), to enable identification of sites located within water stressed areas.

» The *water risk level* associated with the site (categorised: 1 – none or very low, to 5 – very high, or unknown), to allow understanding of the materiality of water risk to overall business viability, value and performance; plus identification of the primary and secondary *risk types* (as either: physical, regulatory or reputational; or further divided into sub-groups).

» The *water opportunity level* associated with the site (categorised: 1 – none, to 5 – very high, or unknown), to allow understanding of the potential for water to have a positive impact on business performance or value; plus the material *opportunity type* (as either: operations, brand value or new markets; or further sub-divided into sub-groups).

» The *management response* associated with the site (categorised: 1 – none, to 5 very strong), to provide an insight into the company's approach to water management at the site level; plus identification of the *management response type* (as either: internal actions, external engagement and/or influence governance); plus the *management response compliance level* (categorised: 1 – none or very low, to 5 – very high).

» The *assessment methods* used to make these responses (either: company specific or listed industry standard tools), to allow transparency and context when using the responses for benchmarking purposes.

Internal information compilation continued

Table 3: Standardised water reporting metrics

Objective	Metric	Definition	
Standardised metrics which, following company-wide compilation, form the basis for **external** corporate water reporting	Withdrawal	The volume of water (ML) received by the operational facility, by type (surface water, groundwater, sea water or third party water) and two categories of quality (*high* and *low*).	
	Discharge	The volume of water (ML) removed from the operational facility to the water environment or a third party, by receiving body (surface water, groundwater, seawater or third party) and two categories of quality (*high* and *low*).	
	Consumption	The volume of water (ML) used by the operational facility and **not** returned to the water environment or a third party, by two categories of quality (*high* and *low*) – includes: evaporation (and transpiration); water incorporated into product and/or waste streams (entrainment); and other operational losses.	
	Efficiency	The total volume of both untreated and treated water used in tasks (ML) which has already been worked by the site (ie previously used and recovered) as a percentage (%) of the total volume of all water used in tasks (ML).	
Internal use only	Intensity	The total volume of water consumed per tonne/unit of material moved,ore mined, ore processed and/or final product – as appropriate to the operational facility.	

Table 3 note

For clarity, Figure 2 provides a schematic overview of these metrics within the context of a site input-output model (following MCA's WAF).

See Appendix B for an example of how to develop a WAF account to derive these water reporting metrics

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	Calculation approach	Rationale
	• Based on operational flowcharts, site water circuit diagrams and/or water balance data. • Calculated as MCA WAF *Inputs* (see Table 4). • For detailed guidance see WAF User Guide[16].	Key metrics in defining a site's water dependency and the potential for associated water risks (physical, reputational or regulatory) and opportunities.
	• Based on operational flowcharts, site water circuit diagrams and/or water balance data. • As MCA WAF *Outputs to Surface Water, Groundwater, Seawater and Third Party Supply* only (see Table 4). • For detailed guidance see WAF User Guide.	
	• Based on operational flowcharts, site water circuit diagrams and/or water balance data • As MCA WAF *Outputs (Other)* - see Table 4 • May be calculated by balance (see Figure 2), as for a given period: **Withdrawal = ΔStorage + Discharge + Consumption** • For typically dry or zero-discharge sites, the consumption volume is likely to be similar to the withdrawal volume, and may often be termed new water or make-up water.	A key metric in understanding a site's water dependency, use and associated risks. Also, provides insight into the opportunity to use of lower quality water to meet the site water demand and reduce the consumptive use of high quality water.
	• See Appendix B for further definitions and a worked example • Calculated from the WAF *site system representation* developed using site water circuits and flowcharts • As MCA WAF *reuse efficiency* + MCA WAF *recycle efficiency* • For detailed guidance see WAF User Guide[17].	Important metric for understanding a site's water management practices and ability to enhance sustainability by reducing the withdrawal volume required to meet the site water demand. This metric is especially relevant in water stressed areas, with typically lower water availability and higher competition.
	• Calculated using the total volume of water consumed and tonnes/units of material moved, ore mined, ore processed and/or final product.	This metric is being introduced to enable the industry to internally develop a meaningful intensity metric which, informs performance monitoring and benchmarking, and in the mid-term may be used for external water reporting and/or embodied water calculations.

Internal information compilation continued

Table 4: Relationship with the Water Accounting Framework (WAF) metrics

ICMM water reporting metrics				
Metric	**Source/destination/type**	**Volume of water by quality**		
		High (ML)	**Low (ML)**	**Total (ML)**
Withdrawal	Surface water			
	Groundwater			
	Sea water			
	Third party supply			
	Total withdrawal			
Discharge	Surface water			
	Groundwater			
	Sea water			
	Supply to third party			
	Total discharge			
Consumption	Evaporation			
	Entrainment[i]			
	Other			
	Total consumption			

Table 4 note

For water quality mapping purposes: High (ML) = WAF Cat 1 (ML) + WAF Cat 2 (ML); and Low (ML) = Cat 3 (ML). See Table 5 for additional details.

See Appendix B for an example of how to develop a WAF account to derive consistent ICMM water reporting metrics.

i The **consumption - entrainment** category includes all water incorporated into waste, tailings, concentrate and/or product.

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	MCA WAF Metrics (based on input–output statement)						
	Input – Output	Source/destination	Inputs/outputs	Volume of water by quality: category numbers			
				1 (ML)	2 (ML)	3 (ML)	Total (ML)
	Input	Surface water	Precipitation & runoff				
			Rivers & creeks				
			External surface water storages				
		Groundwater	Aquifer interception				
			Borefields				
			Entrainment				
		Sea water	Estuary				
			Sea/ocean				
		Third party supply	Contract/municipal				
			Waste water				
		Total inputs					
	Output	Surface water	Discharge				
			Environmental flows				
		Groundwater	Seepage				
			Reinjection				
		Sea water	Discharge to estuary				
			Discharge to sea/ocean				
		Supply to third party					
		Total outputs					
		Other	Evaporation				
			Entrainment				
			Other				
		Total other					

Table 6 note

i. Publically available tools for mapping global river basins include those listed in Table 7 and Appendix C for assessing catchment water stress, or the CEO Water Mandate's Interactive Database of the World's River Basins[20].

ii. Response categories from WRI's Water Risk Framework for the Mining Sector[2].

iii. Includes significant water diversion activities as defined in the WAF User Guide[17].

See Appendix B for an example of how to make site level contextual responses.

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Internal information compilation continued

Table 5: Relationship with the Water Accounting Framework (WAF) quality categories

Consistent reporting: water quality categories	MCA WAF water quality categories
High quality	Category 1: high quality water which may require minimal and inexpensive treatment to raise quality to appropriate drinking water standard (eg near potable water quality).
	Category 2: medium quality water which would require a moderate level of treatment to meet appropriate drinking water standard (eg agricultural use).
Low quality	Category 3: low quality water which would require significant treatment to raise quality to appropriate drinking water standards (eg industrial and waste water).

Table 5 note

The MCA WAF water quality categories are based on consideration of a number of parameters, including total dissolved solids, dissolved metals, pH, coliforms, pesticides, herbicides and other metals, chemical and nutrients – as outlined in the WAF User Guide[17].

Table 6: Summary of internal site level context statements

Statement	Approach	Available response	Rationale
Catchment	Select from standard list or drop down menu	Global river basins as mapped in publicly available tools[i]	Maintaining consistency in describing site locations and identifying water stressed areas (see Table 7 and Appendix C).
Climatic Conditions	Select one descriptor from four available responses[ii]	Arid or semi-arid environment	Understanding the annual precipitation category provides important site context which may also be useful in indicating: • the likely need to manage significant surface water and/or runoff flows • the likely water availability potential within the wider catchment.
		Moderate precipitation with distinct dry season	
		Moderate precipitation	
		Very high precipitation and/or frequent major storm events	
Main operational water activities	Select up to three descriptors from available responses	Cooling or drying processes	• Identifying the main operational water activities associated with the site provides essential site context and maintains an element of contextual integrity to the quantitative reporting metrics collated. • All of the site level metrics collated are heavily dependent on site setting and commodity type, which may have a much stronger influence on the metric values than any site water management practices. • Site context should always be considered when using water metrics for benchmarking, site level objective/target setting, and/or performance monitoring purposes.
		Dewatering	
		Discharge	
		Dust suppression	
		Flood control	
		Ore processing	
		Ore separation	
		Ore transportation	
		Reinjection	
		Significant water diversion[iii]	
		Surface water re-alignment	
		Tailings management	
		Waste management	
		Water treatment	

Internal information compilation continued

Table 7: Summary of internal site level risk opportunity and management response disclosure statements

Statement	Description[i]	Available responses[ii]	
Catchment water stress			
Catchment water stress level	Describes the background stress level of the catchment within which the site is situated – where *water stress* is 'the ability, or lack thereof, to meet the human and ecological demand for freshwater'. Water stress components comprise: water availability, quality and accessibility – which include *water scarcity*.	5 – very high 4 – high 3 – moderate 2 – low 1 – very low Unknown	
Catchment stress assessment method	Identifies the assessment approach or tool used to determine the catchment stress level.	• Company specific • WBCSD Global Water Tool • WRI Aqueduct Water Risk Atlas • WWF Water Risk Filter • WFN Water Footprint Assessment Tool	
Site water risks and opportunities			
Site water risk level	Describes the *water risk* level associated with the site – where water risk is the possibility of the site experiencing a water related challenge which may negatively impact business viability, performance or value.	5 – very high 4 – high 3 – moderate 2 – low 1 – very low Unknown	
Primary site water risk type	Describes the primary water risk type associated with the site.	• Physical • Reputational • Regulatory	
Secondary site water risk type	Describes the secondary risk type associated with the site, where appropriate.		
Risk assessment method	Identifies the approach or tool used to assess site water risks.	• Company specific • CDP Water 2016 W3.2c • GEMI Local Water Tool • WBCSD Global Water Tool • WRI Aqueduct Water Risk Atlas • WWF Water Risk Filter • WFN Water Footprint Assessment Tool	
Site water opportunity level	Describes the water opportunity level associated with the site – where *water opportunity* is the possibility of water having a positive impact on business viability, performance or value.	5 – very high 4 – high 3 – moderate 2 – low 1 – very low Unknown	
Material opportunity type	Describes the material water opportunity type associated with the site.		
Opportunity assessment method	Identifies the approach or tool used to assess site water opportunities.	• Company specific • CDP Water 2016 W4.1a	

2

	Response approach	Rationale
	• Based on catchment stress assessment made using industry standard tools and/or company specific methods. • See Appendix B for a site level example and Appendix C for response category intent definitions. • The *unknown* response allows, in the short term, for sites which are not able to determine a stress level.	Allows identification, analysis and reporting of sites located in water stressed areas, which may also be called high risk or hot-spot areas.
		Allows assessment method transparency and associated context for benchmarking purposes.
	• Based on water risk assessment made using: publicly available tools; company specific methods; and/or following CDP Water 2016 W3.2c[19]. • See Appendix B for a site level example; and Appendix C for response category intent definitions. • The *unknown* response allows, in the short term, for sites which are not able to determine a risk level.	Allows understanding of the materiality of the water risks associated with a site to overall business viability and performance.
	• Based on water risk assessment made using: publicly available tools; company specific methods; and/or following CDP Water 2016 W3.2c[19]. • Risk types may be further split into sub-types to enhance granularity and usability (see CDP Water guidance[18]). • See Appendix B for a site level example; and Appendix C for response category intent definitions.	Allows transparency around the type of water risks associated with a site.
		Allows transparency around the method(s) used to assess water risks associated with a site.
	• Based on assessment made using: company specific methods; and/or following CDP Water 2016 W4.1a[19]. • See Appendix B for a site level example; and Appendix C for response category intent definitions. • The *unknown* response allows, in the short term, for sites which are not able to determine an opportunity level.	Allows understanding of the potential for water to have a positive impact on business performance and value.
	• Based on assessment made using: company specific methods; and/or following CDP Water 2016 W4.1a[19]. • Opportunity types may be further split into sub-types to enhance granularity and usability (see CDP Water guidance[18]). • See Appendix B for a site level example; and Appendix C for response category intent definitions.	Allows transparency around the type of water opportunities associated with a site.
		Allows transparency around the method(s) used to assess water opportunities associated with a site.

Internal information compilation continued

Table 7 continued

Statement	Description[i]	Available responses[ii]	
Management response			
Management response level	Describes the management response associated with the site.	5 – very high 4 – high 3 – moderate 2 – low 1 – very low Unknown	
Management response type	Identifies the management response types taken by the site.	• Internal actions • External engagement • Influence governance	
Management response compliance	Where appropriate, describes compliance to the management response (eg performance objectives/targets and/or action plans) set for the site.	5 – very high 4 – high 3 – moderate 2 – low 1 – very low Unknown	

Table 7 note

i. Description definitions from CEO Water Mandate Disclosure Guidelines[18].

ii. See Appendix C for links to publically available assessment tools. Comprehensive overviews of available water assessment tools and their associated outputs are provided by IPIECA[22] and CEO Water Mandate[23].

2.3 Internal company-wide information compilation

2.3.1 Overview

The simple and comparable datasets collated for each site or operational facility (as outlined in Section 2.2) form the building blocks of a company-wide dataset. The site level data are compiled using a simple spreadsheet or database approach which preserves the integrity of the data for each individual site. This is possible due to the use of categorised responses for site level context and disclosure, which are the synthesis of detailed assessment and risk analysis (as outlined in Table 7 and Appendix C; and illustrated in Appendix B). This approach creates a useful company-wide dataset which contains standardised water reporting metrics and associated contextual information for all sites across the company's portfolio.

2.3.2 Potential uses

The company-wide dataset may be used internally for a number of purposes in addition to forming the basis for external corporate water reporting (as outlined in Section 3).

As illustrated in Table 8, the company-wide dataset may be analysed in a number of ways to better understand particular aspects of the company's water position, dependency, usage or risk profile. For example, to understand water performance (e.g. withdrawal, discharge, consumption and efficiency) by a range of contexts or risks – including differing locations, commodity types, operational contexts, catchment stress levels, site water risk levels or management responses. Hence this may be useful for:

- setting corporate strategy, planning and investment evaluation
- water risk-opportunity analysis
- benchmarking and performance monitoring
- understanding internal water practices, behaviours and compliance
- raising awareness and internal communication.

2

	Response approach	Rationale
	• Based on review and appraisal of site water management practices. • See Appendix B for a site level example; and Appendix C for response category intent definitions. • Detailed guidance is provided in ICMM's Guide to Catchment-Based Management.[20]	Provides an insight to the company's approach to water management at the site level.
	• Based on review and appraisal of site water management practices following: WWF Water Stewardship Steps[10]; and/or CDP Water 2016 W3.2c management strategies. • See Appendix B for a site level example; and Appendix C for response category intent definitions.	Allows transparency around the management responses types taken to manage risk and opportunity at the site level.
	• Based on review and appraisal of site water management practices. • See Appendix B for a site level example; and Appendix C for response category intent definitions.	Provides an insight to the company's ability to manage water at the site level.

Table 8: Overview of the company wide information set available for corporate reporting

Dataset available for reporting		Standardised water reporting metrics			
		Withdrawal by source and quality (high & low)	Discharge by source and quality (high & low)	Consumption by quality (high & low)	Efficiency total
EXAMPLE context risk response statements	Location / river basin	Useful internal company-wide dataset, based on meaningful and comparable site level metrics and disclosure statements. Forms a comprehensive and transparent basis for external corporate reporting, tailored to the company's water position.			
	Commodity type				
	Operational context				
	Catchment stress level				
	Site water risk level				
	Water risk types (primary & secondary)				
	Water opportunity level & type				
	Management response				

Table 8 note

This approach uses categorised responses for site level operational context, catchment stress level, site water risk level and local management response to allow compilation and use at the company level.

3

External corporate reporting

External corporate reporting

3.1 Overview

Corporate water reporting is the external disclosure of information describing a company's water dependency, performance, risk-opportunity exposure and associated management response[8]. This may take many forms, including:

- formalised reporting via the main cross-sector disclosure systems – for example CEO Water Mandate, CDP Water and/or GRI
- company specific platforms – for example sustainability reports, annual reports, website summaries, regulatory filings and/or analyst presentations.

However, water is a local management issue where each of the main reporting elements (ie dependency, performance, risk-opportunity and management) may vary significantly from site to site, depending on the local catchment setting and the nature of the site's operations. This is particularly relevant for the mining and metals industry, where a company's global portfolio may comprise a significant number of operations situated in a diverse range of catchment settings, each requiring different water management practices.

Further, the nature of mining activities and the need to access below ground ore means that, unlike a manufacturing facility, a site's water requirements are determined by the setting and characteristics of the individual orebody being mined or processed (eg the need to dewater or divert surface water). Capturing this complexity at the corporate level in a simple, consistent and transparent way that enables stakeholders to understand the material points and make informed decisions, presents a significant challenge.

In response, this section:

- provides practical guidance, with examples, around the key points to consider when preparing corporate summaries for reporting via company specific platforms (eg sustainability reports or website summaries)
- outlines the minimum disclosure standard for member companies to define a transparent cross-industry benchmark
- provides accompanying guidance around using the company-wide dataset to inform reporting, for companies using the simple approach outlined in Section 2.

3.2 Preparing corporate water reports

3.2.1 Corporate water summaries

The key points to consider when preparing a comprehensive corporate water summary are outlined in Table 9. This follows the *Company Water Profile* approach outlined in CEO Water Mandate's Water Disclosure Guidelines[18]. However, other formats may be used to achieve the same intent.

In summary, a *Company Water Profile* describes the company's:

- *interactions with water* – which outlines company water dependency
- *water challenges* – which provides an overview of company water risk-opportunity exposure
- *commitment and response* – which describes a company's management response
- *profile metrics* – which characterise company water performance.

Consistent with all sustainability reporting, these points should be considered within the context of relevance and materiality – where following the GRI definition[24], material topics are those which:

- reflect the company's significant economic, environmental and social impacts
- substantively influence the assessments and decisions of stakeholders.

Further extensive guidance around what to consider and include when preparing water reports is provided in the documentation accompanying each of the main reporting systems[18,19,24].

3.2.2 Minimum disclosure standard for the mining and metals industry

A minimum disclosure standard is outlined for member companies, as detailed in Table 10. This has been defined to set a transparent benchmark for the mining and metals industry; and to align corporate reporting outputs at the minimum level.

The water reporting metrics and disclosure statements outlined in the minimum disclosure standard are directly aligned with the CEO Water Mandate and CDP Water disclosure systems. Hence, reporting to the minimum standard may be achieved in a number of ways, including:

- formalised reporting via CEO Water Mandate and/or CDP Water
- following company specific approaches which meet the criteria (eg Sustainability Reports or website summaries)
- preparing a simple corporate summary (for Sustainability Reports or website summaries).

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Table 9: Points to consider when preparing a comprehensive corporate water summary (following CEO Water Mandate's company water profile)

Main components to describe the company's:	Points to consider as appropriate	
	Narrative[i]	**Supporting metrics (tabular and/or graphical form)**
Interactions with water		
For example, the company's water use and dependency, including operational water uses, the nature of water discharges, the importance of water to the value chain, and water use in products.	**Corporate level** • Overall, how important is water to the company? **Operational level** • What are the main operational water activities? Why? • What are the main consumptive water uses? • What are the main water sources used for withdrawal? • What are the main discharges? Why? • Are there particular associations between the above and commercial specific sectors or commodities within the company? • Are there any material differences in the above with time? If so, what and why? • Any other relevant points or operational insights?	• Present company-wide **withdrawal, discharge and consumption volumes** at an appropriate aggregation level for the company (eg company totals, country totals, river basin totals or commodity totals); **by source and quality types**. • Consider including data for previous years to demonstrate temporal trends.
Water challenges and opportunities		
For example, provides a high-level discussion of the opportunities and challenges that water poses to the business and the materiality to overall business performance and value.	**Corporate level** • Overall, how material is water risk to business value and performance? How is this likely to change in the future? Why? • Are there any material trends in overall risk or opportunity exposure? If so, what and why? **Operational level** • How material are water risks at the site level? Why? How do these relate to specific geographical areas, commercial sectors or commodities within the company? • What are the material risks or challenges facing the company? How do these relate to specific geographical areas, commercial sectors or commodities within the company? • Does the company hold significant operations in water stressed areas? Do these present an elevated risk exposure? Why or why not? How significant is this? • What are the material opportunities available to the company? If none, why? If yes, how do these relate to specific geographical areas, commercial sectors or commodities within the company?	• Present the proportion of sites (as absolute number or as commercial value) located in **water stressed areas**. • Present the proportion of sites (as absolute number or as commercial value) with **elevated water risks**. • Present withdrawal, discharge and consumption volumes for sites in **water stressed areas** and/or with **elevated risks** – either as aggregated totals, as a percentage of the company-wide totals, or at a detail level appropriate for the company. • Present the **overall company water risk profile**, for example as the proportion of sites in each water risk category (very high to very low) – either company aggregated or at a detail level appropriate for the company (eg by commodity, geographical area or river basin). • Consider including data for previous years to demonstrate temporal trends.

Table 9 note

i. Based on CEO Water Mandate Guidelines[18]; CDP Water 2016 Guidance[19]; and Ceres' Framework for 21st Century Water Risk Management[1].

External corporate reporting continued

Table 9: continued

Main components to describe the company's:	Points to consider as appropriate	
	Narrative[i]	Supporting metrics (tabular and/or graphical form)
Water challenges and opportunities		
For example, summarises the steps taken by the company to address water risks, mitigate impacts and seize opportunities	**Corporate level** • What is the highest level of direct responsibility for water within the company? • Does the company integrate water into business strategy? If so, how? Has this had any positive or negative impacts? • What is the company's approach and commitment to water stewardship? How are stewardship values or actions incorporated into the business? • Does the company have a corporate water policy or strategy which provides clear direction for the business? • Does the company set goals, guidelines, internal standards or targets for the company? If so, how and why? Do these deliver value outcomes? • Does the company promote stakeholder engagement? If so, at what level (corporate and/or operational)? With whom (local communities, government, NGOs and collective action groups, other companies or water users, employees)? • Any relevant corporate level case studies **Operational level** • How does the company identify, evaluate and mange material water risk across the company? How effective is this process? • How does the company proactively manage elevated risk exposure in water stressed areas? • How does the company identify and realise available water opportunities? • Does the company require sites to have Local Management Plans? Do these include measurable performance targets? • Any relevant operational case studies – for example which demonstrate: effective risk identification, evaluation and management, external engagement, stewardship outcomes, effective management in water stressed areas, realisation of material water opportunities, and/or positive management outcomes	• Present **efficiency** values, as a company-wide average and an average for sites in water stressed areas, or at a detail level appropriate for the company (e.g. a river basin average for water stressed areas). • Present the proportion of sites (as absolute number or as commercial value) with **water performance targets** – either as a company total or at a detail level appropriate for the company (e.g. split by: externally agreed targets (i.e. stewardship and regulatory including license or permit conditions); internally set targets; or no targets). • Present the company-wide **level of compliance to externally agreed performance targets**, for example as a proportion of sites in each compliance category (very low to very high). • Consider including data for previous years to demonstrate temporal trends.

3.3 Using the company wide data set for reporting

For companies using the approach to internal data compilation outlined in Section 2, the company-wide dataset developed provides a foundation for preparing consistent water reports. As discussed in Section 2.3, the company-wide dataset may be analysed and used in many different ways. Key examples of using the dataset for preparing corporate water summaries are outlined below.

» To identify the material topics to report, through using the data to understand the company's global operational water contexts, water dependency, usage, risk-opportunity profile and management response.

Table 10 note

ICMM member companies will be required to comply with the disclosure standard and associated metrics included in table 10 by November 2018.

3

» To provide transparent information to inform preparation of summary narratives.
» To extract and present water reporting metrics at a detail level appropriate for the company – for example, ranging from company aggregated totals, to river basin totals, to disaggregated site values.
» To identify high risk areas or sectors which may warrant additional, more detailed reporting.
» To directly extract and present the key information required when reporting to the minimum standard.
» To identify sites situated in water stressed areas when reporting via CEO Water Mandate and/or sites associated with significant water risks when reporting via CDP.

Table 10: Minimum disclosure standard for the mining and metals industry

To describe the company's:	Narrative	Supporting metrics (tabular and/or graphical form)
Interactions with water	**Operational level** • What are the main operational water activities? • What are the main consumptive water uses? • What the main water sources used for withdrawal? • What are the main discharges?	• Present total (company-wide) withdrawal volumes by source and quality (high and low). • Present total discharge volumes by destination and quality (high and low). • Present total consumption volumes by type and quality (high and low).
Water challenges and opportunities	**Corporate level** • Overall, how material is water risk to business value and performance? **Operational level** • What are the material risks or challenges facing the company? • Does the company hold significant operations in water stressed areas? • What are the material opportunities available to the company?	• Present the proportion of sites (as absolute number or as commercial value) located in water stressed areas. • Present the overall company water risk profile, for example as a proportion of sites in each water risk category (very high to very low).
Commitment and response	**Corporate level** • Does the company integrate water into business strategy? If so, how? • What is the company's approach and commitments to water stewardship? • Does the company promote stakeholder engagement? If so, at what level (corporate and/or operational)? • With whom (local communities, government, NGOs and collective action groups, other companies or water users, employees)? • Include any relevant corporate level case studies to illustrate the above. **Operational level** • How does the company systematically identify, evaluate and manage material water risk across the company? • How does the company proactively manage elevated risk exposure in water stressed areas? • How does the company identify and realise available water opportunities? • Does the company require sites to set measurable performance targets? • Include any relevant operational case studies to illustrate the above.	• Present efficiency values, as a company-wide average and an average for sites in water stressed areas. • Present the proportion of sites with water performance targets.

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Appendices

Appendix A

Relationship to other disclosure system metrics

	Reporting system		
	ICMM	**MCA Water Accounting Framework (WAF)[a]**	
Reporting context			
	Consistent approach to water reporting for the mining and metals industry.	Industry bespoke water management tool, based on site input-output model.	
Key water metrics			
Notes	See main report Section 2 for definitions and guidance.	Detailed mapping with MCA WAF provided in main report Section 2.	
Withdrawal	The volume of water (ML) received by the operational facility, by type (surface water groundwater, sea water or third party water) and two categories of quality (high and low).	Directly consistent with Inputs.	
Discharge	The volume of water (ML) removed from the operational facility to the water environment or a third party, by receiving body (surface water, groundwater, seawater or third party) and two categories of quality (high and low).	Directly consistent with outputs to surface water, groundwater, seawater and third party supply.	
Consumption	The volume of water (ML) used by the operational facility and not returned to the water environment or a third party, by two categories of quality (high and low) – includes: evaporation; entrainment (ie water incorporated into product and/or waste streams); and other operational losses.	Directly consistent with outputs (other).	
Efficiency	The total volume of both untreated and treated water used in tasks (ML)which has already been worked by the site(ie previously used and recovered) as a percentage (%) of the total volume of all water used in tasks (ML).	Directly consistent with reuse efficiency (same definition) plus recycle efficiency (same definition).	

Table AA note

a) Minerals Council of Australia (MCA) (2014) Water Accounting Framework for the Minerals Industry: User Guide – version 1.3 (http://www.minerals.org.au/file_upload/files/resources/water_accounting/WAF_UserGuide_v1.3_(Jan_2014).pdf).

b) GRI (2014) G4 Sustainability Guidelines: Implementation Manual(https://g4.globalreporting.org/introduction/how-to-use-guidelines/Pages/default.aspx).

c) CEO Water Mandate (September 2014) Corporate Water Disclosure Guidelines: towards a common approach to reporting water issues(http://ceowatermandate.org/files/Disclosure2014.pdf).

d) CDP Water (2016) Guidance for Companies Reporting on Water on Behalf of Investors and Supply Chain Members (https://www.cdp.net/Documents/Guidance/2016/CDP-2016-Water-Reporting-Guidance.pdf).

e) GRI, CDP Water (2015) Linking GRI and CDP(https://www.cdp.net/Documents/Guidance/2015/GRI-G4-CDP-2015-Water-Linkage-Document.pdf).

A

	GRI (G4)[b]	CEO Water Mandate[c]	CDP Water[d]
	Framework for reporting sustainability goals, performance and impacts.	Framework for reporting corporate water disclosure to stakeholders.	Framework for reporting water on behalf of investors and supply chain members.
	Detailed mapping between MCA WAF and GRI provided in MCA WAF User Guide (2014)[a].	CDP Water 2016 Questionnaire updated to better align with CEO Water Mandate[d].	Detailed mapping between GRI G4 and CDP Water 2015 provided in a joint guidance[e].
	Relates to G4-EN8 – the total volume of water drawn from any source (including surface water, groundwater, rainwater, waste water and municipal water).	Basic level reporting relates to: • total water withdrawals located in water stressed areas • percentage of total withdrawals located in water stressed or -scarce areas. Advanced level reporting relates to: • detailed location specific withdrawals by source type (surface water, renewable and non-renewable groundwater, municipal water, recycled water, runoff, salt water and wastewater) for hot-spot areas.	• Relates to W1.2a – total volumes as GRI G4-EN8, by quality (freshwater, brackish/seawater, rainwater, process water, waste water, municipal water, renewable and non-renewable groundwater). • Relates also to detailed site level data where detrimental impacts have been identified (W5.1a).
	Relates to G4-EN22 – the total volume of planned and unplanned water discharges by type (subsurface waters, surface waters, sewers that lead to rivers, oceans, lakes, wetlands, treatment facilities, and groundwater), quality and third party reuse.	Advanced level reporting relates to: • detailed location specific discharges by destination type (groundwater, sewers and surface water) and quality (for hot-spot areas).	• Relates to W1.2b – total discharges as GRI G4-EN22, by destination types (fresh surface water, brackish/ seawater, groundwater, municipal/ industrial treatment plant, wastewater for another organisation). • Also detailed site level data required where detrimental impacts have been identified (W5.2a).
	None	Advanced level reporting relates to: • detailed location specific consumption (for hot-spot areas).	• Relates to W1.2c - the total volume of water used and not returned to its original source (including evaporated, transpired, incorporated into products, crops or wastes, consumed by humans or livestock or otherwise removed from local source). • Also detailed site level data required where detrimental impacts have been identified (W5.3).
	Relates to G4-EN10 – the total volume of water recycled and reused (including rainwater), also expressed as a percentage of the total withdrawals (G4-EN8).	Advanced level reporting relates to: • recycled water identified by withdrawal source type • volume of water recycled to demonstrate internal action to improve efficiency.	None


RioTinto

Appendix B

Example: site level data collation

B.1 Introduction

The purpose of this example is to demonstrate the illustrative approach outlined in the guide for collating consistent site level datasets – including site level metrics, context and disclosure. When following this approach, the consistent site level datasets are compiled to form a company-wide information set which may be used for a number of purposes, including external corporate water disclosure. Importantly, this example illustrates the comprehensive assessment process which informs the simple site level dataset.

This example is based on a gold operation in South Africa. An overview of the approach used is provided in Table B1. The example is based on a diverse range of material compiled from different sources, including an operating site in South Africa and general water management experience across both the South African and global mining industry. Thus the operation presented in this example does not represent any individual site or mining company.

Further, this example demonstrates an internal assessment and data collation process which can contain commercially sensitive information and is not intended for external disclosure. In addition, the illustrative approach presented in this appendix is provided for guidance only and should not constrain or limit the approach used by individual companies, nor be used as a template for ICMM auditing purposes.

Section	Summary	Supporting
B.1 Introduction	A brief introduction outlining the purpose, approach and materials used.	Table B1
B.2 Input: site summary	A brief overview narrative describing the site setting and operational activities, including: • climatic conditions • general catchment setting • operational overview – including a site water flowchart and assessments of site risk and opportunity.	Figure B1 Tables B2–B3
B.3 Method: deriving consistent metrics	B.3.1: Apply the MCA's WAF Developing a simplified WAF account as the basis for deriving consistent ICMM reporting metrics, including: • site framework representation • input-output statement • statement of operational efficiencies.	Figure B2 Tables B4–B7
	B.3.2: ICMM reporting metrics Using the WAF account to derive consistent ICMM reporting metrics.	Tables B5–B6
B.4 Method: making site context and disclosure statements	B.4.1: Site context statements Making simple site context statements associated with the catchment, climatic conditions and main operational water activities.	Table B8
	B.4.2: Site risk-opportunity-response statements Making disclosure statements using publicly available tools, plus site risk and opportunity assessments, including: • baseline catchment stress • site risk • site opportunity • management response	Tables B9–B11
B.5 Output: ICMM consistent site level dataset	An overview of the final site level dataset, which forms the basis for consolidation at the company level.	Table B12

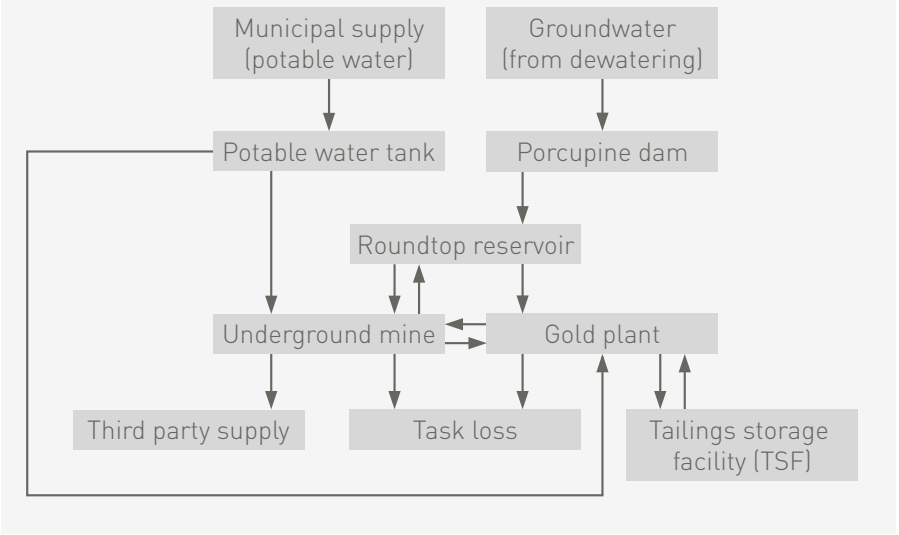
Appendix B continued

B.2

Input: site summary

This example is based on a gold mine situated in South Africa. Key elements of the operational and water context associated with the site are summarised below and illustrated in the simple operational water flowchart presented in Figure B1.

Figure B1: example gold operation – site water flowchart



B.2.1

Climatic conditions

The site is located on an elevated inland plateau with a subtropical highland temperate climate characterised by hot summers (average daily range 14-26°c) and mild winters (average daily range 3-18°c). Rainfall is strongly seasonal and predominately occurs during the summer months (October to April). The long-term average annual precipitation is approximately 700 mm, with a slightly below average total recorded for the 2015 reporting period (685 mm).

Natural runoff levels within the catchment are typically low (estimated at < 50 mm/a), though significantly increased in urban areas. Annual evaporation is approximately 1670 mm/a. The area experiences significant variations in annual rainfall leading to drought periods and flood events. The area is currently experiencing a prolonged drought resulting in water use restrictions in municipal areas.

B.2.2

General catchment setting

The site is situated within the Vaal catchment or river basin, which is one of the largest and most significant in South Africa; and also a major tributary of the expansive Orange transboundary river catchment.

Freshwater resources within the catchment are scare and water stress is increasing due to rising water demands, pollution and climate change. There is a strong trend of urbanisation and the municipal water demand accounts for over 90% of the local demand. Surface water is largely used to meet the water supply demand (>95%) and dams have been installed on many water courses which change the natural flow patterns. Dams of varying sizes are used for municipal, agricultural and domestic supply. Water imports are also made from outside the catchment to meet increasing supply demands.

Large dolomitic aquifers occur within the catchment and provide important base flow to the river system. Whilst not developed on a large scale, groundwater use is important for small scale rural domestic and stock watering supplies.

The area has a strong mining presence with extensive historic workings, active operations and future growth potential – including gold, uranium, platinum, coal and diamonds. Dewatering of the dolomitic aquifer has been, and continues to be, required in some areas to enable mining. Agriculture is the dominant land use within the catchment, with livestock grazing and non-irrigated production of maize and wheat for both domestic and export markets.

Ambient water quality (surface water and groundwater) is typically good, however water quality issues arise in some areas of the catchment due to:

- Acid Rock Drainage (ARD) associated with drainage (decants) from abandoned mine workings
- surface water eutrophication associated with agricultural fertiliser use
- surface water pollution associated with urban development and associated sanitation issues.

B.2.3

Operational overview

B.2.3a

Mining operations

The operation comprises an underground mine and a gold processing plant. Following excavation, the ore is milled and the gold is extracted using conventional gold leach techniques. The final elution is achieved by electrowinning

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and smelting. Tailings are thickened and pumped to a Tailings Storage Facility (TSF).

B.2.3b
Operational water activities

A simplified water flowchart for the site is presented in Figure B1. Water use across the site has been configured to maximise recovery and reuse, minimise losses and reduce the need for additional 'make-up' water (ie the volume of new water required to meet the operational water demand).

Dewatering of adjacent abandoned mine workings is undertaken to maintain safe underground working conditions and the water produced is used to supply process water (*circa* 2,500 mg/L Total Dissolved Solids (TDS)). The dewater is stored in the Porcupine dam and used to top up the Roundtop reservoir.

There is extensive water recovery and reuse between the different on-site facilities, as outlined in Figure B1. In summary, the Roundtop reservoir receives new water from the Porcupine dam and water recovered from the underground mine. Water in the Roundtop reservoir is used to supply the underground mine and the gold plant. The material extracted from the underground mine contains entrained water; and water entrained in backfill material is also returned from the gold plant to the underground mine. A component of the water recovered from the underground mine is also transferred off-site to provide supply for an adjacent operation (third party) – contracted at 120 ML/a until the end of 2018.

Tailings are pumped to the TSF and the decant water is captured and reused to supply the gold plant. Water is not stored in the TSF.

In addition, small volumes of municipal water are used to meet the potable water demand associated with: providing water, sanitation and hygiene (WASH) facilities; cooling the underground workings to maintain safe working conditions; and key elements of the gold elution process which require potable grade water to maintain product quality. The potable water is managed within a separate system. It is stored within the potable water tank and used to directly supply the underground mine and gold plant.

The operation is essentially a zero discharge site, however small amounts of seepage to groundwater from the TSF are expected (and modelled). Water meters are installed to monitor operational flows across the site. There are no water treatment plants or diversions associated with the site (ie where water is actively managed by the operation but not used for supply).

B.2.3c
Site water management

The operation has a mature water management system with an up-to-date water balance which is supported by:

- active monitoring
- daily rainfall measurements
- calibrated hydrogeological models used to estimate runoff, evaporative losses and groundwater seepage.

The site has a Water Management Plan (WMP) which has been developed specifically for the site. This is aligned with both the business' corporate water strategy, and the specific water issues associated with the operational context and setting. The WMP contains site-specific performance targets, including internally set efficiency (water reuse) targets and key water metrics required for external regulatory reporting.

The WMP includes a risk-opportunity register which is reviewed and updated biannually, with both operational and corporate input. The risk register is based on a standard risk assessment approach to identify material risks, associated mitigation measures and potential opportunities. Risk materiality is based on a corporate Risk Standard which determines appropriate risk categories and definitions. These assessments are summarised in Tables B2 and B3.

B.3
Method: deriving consistent metrics

B.3.1
Applying the MCA's Water Accounting Framework (WAF)

The input information presented in the site summary (Section B.2) has been used to develop a simplified WAF account following the guidance presented in the MCA's WAF User Guide v1.3 (January 2014). This forms the basis of deriving ICMM reporting metrics which are an important component of the consistent site dataset (as outlined in Section B.3.2).

B.3.1a
Site framework representation

The framework representation developed for the site is illustrated in Figure B2 and summarised in Table B4. This is a simplified representation of the site water flowchart with an accounting view which identifies all of the water inputs, outputs, stores, tasks and treatment plants associated with the site. It also includes the total flow volumes between each of these components for the reporting period. This forms the basis for constructing the account input-output statement and calculating operational efficiencies.

Appendix B continued

Table B2: Minimum disclosure standard for the mining and metals industry

ICMM site risk assessments							
Risk overview	**Risk type**	**Risk sub-type**	**Potential impact**	**Timeframe**	**Likelihood**	**Impact magnitude**	**Risk rank**
Recently decommissioned workings adjacent to the site are beginning to fill with water which may flood the underground mine if not appropriately controlled.	Physical	Flooding	Plant disruption leading to reduced output	Current	Highly probable (3)	Medium–high (4)	4
Catchment water stress is rising due to increasing demand, pollution and climate change. Also experiencing a prolonged drought period. Causing increasing public sensitivity and awareness around water allocation and access.	Physical	Increased water stress	Plant disruption leading to reduced output	4–6 years	Highly probable (3)	Medium–high (4)	4
	Regulatory	Increased difficulty in obtaining withdrawals/ operations permits	Plant disruption leading to reduced output Delays in permitting	4–6 years	Probable (2)	High (4)	3
	Regulatory	Negative media coverage	Brand damage	Current	Probable (2)	Low–medium (2)	2
High levels of ARD associated with abandoned mine workings are degrading water quality in the wider catchment.	Physical	Pollution of water source	Higher operating costs Delays in permitting	>6 years	Unlikely (1)	Medium (3)	1
	Regulatory	Community opposition	Brand damage Delays in permitting	Current	Probable (2)	Medium (3)	2

Table B2 note

Company specific Risk Standard used to determine:

- impact Magnitude materiality and category definitions (ranked: 1 low; 2 low-med; 3 med; 4 med-high; and 5 high) based on % impact to global revenue
- likelihood definitions (ranked: 1 unlikely; 2 probable; and 3 highly probable)
- risk rankings (ranked: 1 very low (score 1-3); 2 low (score 4-6); 3 medium (score 7-9); 4 high (score 10-12); and 5 very high (score 13-15)).

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	Mitigation	Residual risk rank
	Dewater adjacent abandoned workings, and use water for process supply. • Infrastructure investment. • Engagement with public policy makers. • Engagement with river basin stakeholders.	2
	Further focus on increasing on-site reuse and recycle. Potential for on-site treatment of process water to meet potable supply demand. • Increased capital expenditure. • Increased investment in new technologies.	1
	As above, plus engagement with public policy makers.	1
	Engagement with community.	1
	Participate in catchment clean up. • River basin restoration. • Infrastructure investment (water treatment plant).	1
	As above, plus: • engagement with community • engagement with other river basin stakeholders.	1

B.3.1b

Input-output statement

The input-output statement constructed from analysis of the framework representation is presented in Table B5; and a water balance summary for the reporting period is presented in Table B6. These show that, over the 2015 reporting period, the volume of on-site storage increased by 268 ML. Further, the total losses from the TSF have been derived by balance, as all of the other components of the system have been measured or simulated using calibrated models. This indicates that the total losses from the TSF over the reporting period were 3552 ML/a – where the total losses comprise three components:

- seepage to groundwater – simulated using a calibrated hydrogeological model
- evaporation from the TSF – estimated using a calibrated hydrogeological model
- entrainment in the tailings – derived by balance (and consistent with tailings monitoring).

B.3.1c

Statement of operational efficiencies

The statement of operational efficiencies calculated for the site is outlined in Table B7. This shows that the reuse efficiency of this site was 79% – ie 79% of the water used in tasks across the site had already been worked (previously used and recovered). The recycling efficiency has not been calculated as there was no on-site water treatment.

B.3.2

ICMM Reporting Metrics

The WAF account developed has been used to compile simplified ICMM reporting metrics for the site, as illustrated in Tables B5 and B6.

Appendix B continued

Figure B2: example gold operation – WAF Framework representation

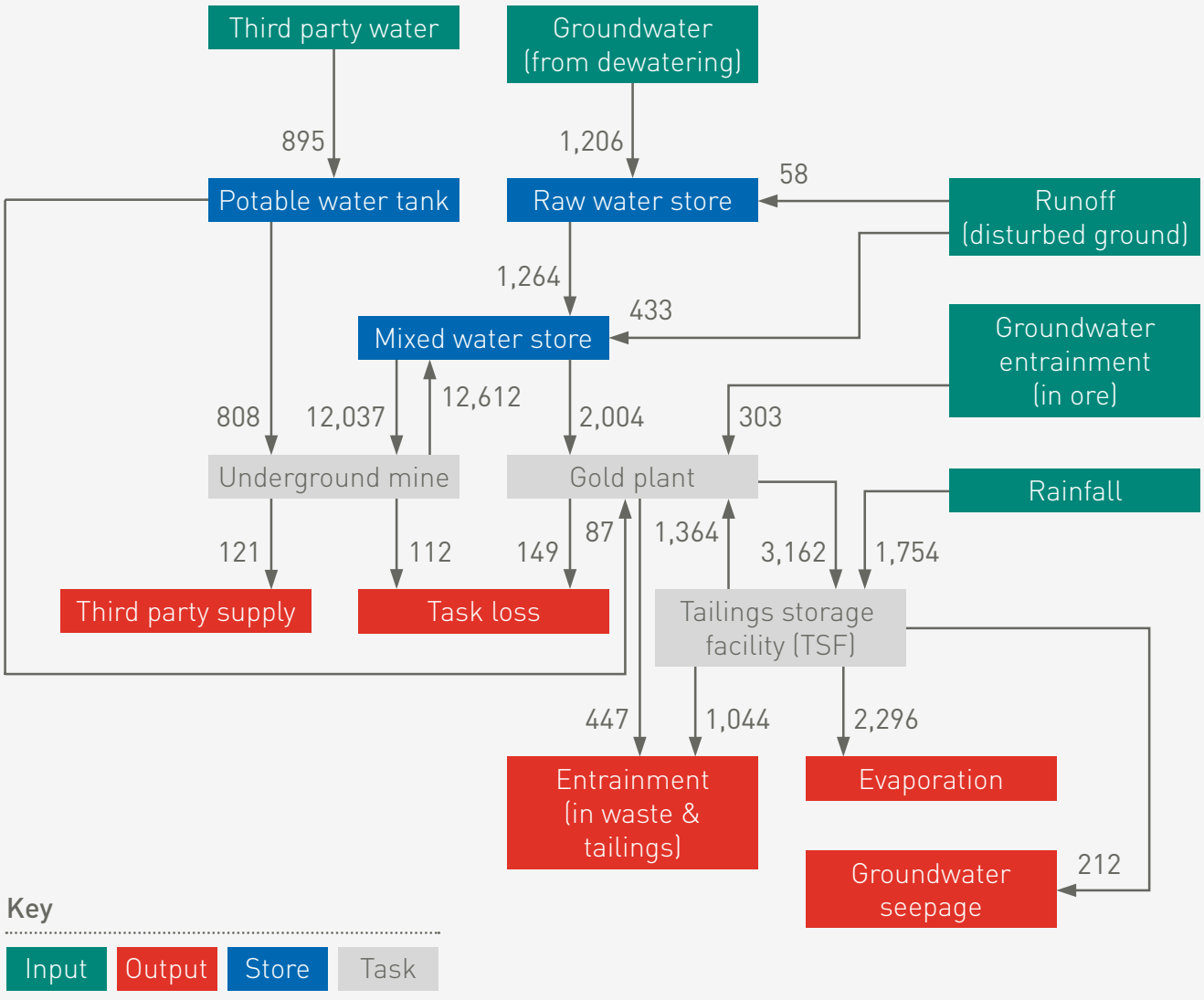

Table B3 note

Company specific Risk Standard used to determine:

- benefit magnitude materiality and category definitions (ranked: 1 low; 2 low-med; 3 med; 4 med-high; and 5 high) based on % impact to global revenue
- likelihood definitions (ranked: 1 unlikely; 2 probable; and 3 highly probable)
- opportunity rankings (ranked: 1 very low (score 1-3); 2 low (score 4-6); 3 medium (score 7-9); 4 high (score 10-12); and 5 very high (score 13-15)).

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Table B3: example gold operation – site risk assessment based on CDP Water 2016 W3.2c

ICMM site opportunity assessments						
Opportunity overview	**Opp. type**	**Strategies to realise**	**Time frame**	**Likelihood**	**Benefit magnitude**	**Opp rank**
Continuing drive to optimise operational reuse of water and reduce losses. Leading to reduced demand for 'make-up' water and associated cost savings.	Improved water efficiency Cost savings Social license to operate	Investigate opportunities to further improve water recovery and reuse across the site. Also increase holistic water management with adjacent operations. • Infrastructure investment.	Current	Highly probable (3)	High (5)	5
Increased climate change resilience realised through holistic water management and use of dewater to meet the process water demand. Also further potential to treat process water to meet the potable demand and reduce reliance on the municipal supply. Highly significant in a period of increasing water stress, public sensitivity and drought.	Improved water efficiency Climate change adaptation Regulatory changes	Use of dewater for process supply, and potential to treat for potable supply. • Increased capital expenditure. • Increased investment in new technologies.	Current	Highly probable (3)	High (5)	5
Opportunity to treat additional water to provide potable supply to local communities.	Improved community relations Increased brand value	Potential for on-site treatment of process water to supply potable water to local communities. • Increased capital expenditure. • Increased investment in new technologies.	4–6 years	Probable (2)	Medium–high (4)	3
Opportunity to engage with community and take collective action to remediate key incidents of ARD associated with abandoned mine workings.	Improved community relations	Actively support river basin initiatives to identify and clean up historic ARD. • Infrastructure investment.	Current	Highly probable (3)	Medium–high (4)	4

Appendix B continued

Table B4: example gold operation – WAF site framework representation summary

WAF framework elements and definitions	Site component	
Inputs (green)		
The volume of water received by the site for use by the site – grouped by source type and quality category.	There are five water inputs to the site: 1. municipal supply water used to meet the potable water demand 2. water derived from dewatering of adjacent workings and used to supply the ('make-up') process water demand (2,500 mg/L TDS) 3. water entrained in the ore feed to the gold plant 4. rainfall input to the TSF (there are no material rainfall inputs to the Porcupine dam or Roundtop reservoir) 5. runoff input to the Porcupine dam and Roundtop reservoir (disturbed ground).	
Outputs (red)		
The volume of water removed from the site after it has been used (ie outflow from a task), treated or stored – grouped by destination and quality category.	There are five water outputs from the site: 1. transfer of recovered water from the underground mine to a third party (4,000 mg/L TDS) 2. seepage of water from the TSF to groundwater. 3. evaporation of water from the TSF. 4. operational loss of water within the underground mine and gold plant. 5. water entrained in: a)the tailings within the TSF (which is neither lost to evaporation or seepage); and b) the waste backfilled in the underground mine.	
Diversions (yellow)		
The volume of water that is diverted away from, or actively managed by, a site but not used for any operational purposes (ie tasked or treated).	There are no water diversions associated with the site.	
Stores (blue)		
Stores are on-site water storage facilities which hold raw, worked or treated water – where raw water is new water which has not been used in a task; worked water has been through a task; and treated water has been treated before use.	There are three water stores on the site: 1. Porcupine dam which receives new (raw) process water 2. Roundtop reservoir which receives new (raw) or 'make-up' process water and reused (worked) water 3. potable water tank which receives (raw) municipal supply water.	
Tasks (grey)		
Tasks are operational activities which use water.	There are three water tasks on the site: 1. the underground mine 2. the gold plant 3. the TSF.	
Treatment plants (purple)		
Plants used to treat water to required quality.	There are no treatment plants associated with the site.	

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	WAF classification		Qualification method
	Source/ destination	WQ category	
	Third party	1	Measured
	Groundwater	2	Measured
	Groundwater	2	Estimated from moisture content monitoring
	Surface water	1	Hydrological model simulation
	Surface water	2	Hydrological model simulation
	Third party	2	Measured volume
	Groundwater	2	Hydrological model simulation
	Other (evaporation)	1	Hydrological model estimate
	Other (task loss)	2	Measured and estimated from site water balance: a. estimated by balance b. estimated from moisture content monitoring
	Other (entrainment)	2	
	Raw water store	2	Measured inputs, outputs and storage levels (which may change with time)
	Mixed water store	2	
	Raw water store	1	
			Measured inputs and outputs (tasks cannot store water)

Table B4 note

See the MCA WAF User Guide v1.3 (January 2014) for detailed definitions, guidance and examples.

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Table B5: example gold operation – ICMM reporting metrics and WAF Input-Output statement

ICMM water reporting metrics				
Metric	**Source/destination/type**	**Volume of water by quality**		
		High (ML)	**Low (ML)**	**Total (ML)**
Withdrawal	Surface water	2,245	0	2,245
	Groundwater	1,509	0	1,509
	Sea water	0	0	0
	Third party supply	895	0	895
	Total withdrawal	4,649	0	4,649
Discharge	Surface water	0	0	0
	Groundwater	212	0	212
	Sea water	0	0	0
	Supply to third party	121	0	121
	Total discharge	333	0	333
Consumption	Evaporation	2,296	0	2,296
	Entrainment	1,491	0	1,491
	Other	261	0	261
	Total consumption	4,048	0	4,048

Table B5 note

For water quality mapping purposes: High (ML) = WAF Cat 1 (ML) + WAF Cat 2 (ML); and Low (ML) = Cat 3 (ML). See Table 5 main text for additional details.

There are no water diversions associated with this site.

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MCA WAF Metrics (based on input–output statement)						
Input – Output	Source/destination	Inputs/outputs	Volume of water by quality: category numbers			
			1 (ML)	2 (ML)	3 (ML)	Total (ML)
Input	Surface water	Precipitation & runoff	1,754	491	0	2,245
		Rivers & creeks	0	0	0	0
		External surface water storages	0	0	0	0
	Groundwater	Aquifer interception	0	1,206	0	1,206
		Borefields	0	0	0	0
		Entrainment	0	303	0	303
	Sea water	Estuary	0	0	0	0
		Sea/ocean	0	0	0	0
	Third party supply	Contract/municipal	895	0	0	895
		Waste water	0	0	0	0
	Total inputs		2,649	2,000	0	4,649
Output	Surface water	Discharge	0	0	0	0
		Environmental flows	0	0	0	0
	Groundwater	Seepage	0	212	0	212
		Reinjection	0	0	0	0
	Sea water	Discharge to estuary	0	0	0	0
		Discharge to sea/ocean	0	0	0	0
	Supply to third party		0	121	0	121
	Total outputs		0	333	0	333
	Other	Evaporation	2,296	0	0	2,296
		Entrainment	0	1,491	0	1,491
		Other	0	261	0	261
	Total other		2,296	2,085	0	4,381

Table B6: example gold operation – water balance summary for the reporting period

ICMM water balance summary 2015	
Component	**ML**
Total withdrawal	4,649
Total discharge	333
Total consumption	4,048
Storage at start	5,000
Storage at end	5,268
Change in storage	268

Appendix B continued

Table B7: example gold operation – water balance summary for the reporting period

WAF operational efficiencies 2015		
Component	**Approach**	**Value**
Total volume to tasks (ML/a)	Sum all the inflows to tasks, including:	
	• to underground (UG) mine from mixed water store (Roundtop reservoir)	12,037
	• to UG mine from potable water tank	808
	• to gold plant from mixed water store	2,004
	• to gold plant from potable water tank	87
	• to gold plant from TSF	1,364
	• to gold plant from GW entrainment in ore feed	303
	• to TSF from gold plant	3,162
	• to TSF from rainfall.	1,754
	Total of all flows to tasks (ML/a)	21,519
Percentage of worked water in mixed water store (ML/a)	Sum all inflows to the mixed water store (Roundtop reservoir), including:	
	• raw water (ie new or unused) water from the raw water store (Porcupine dam)	1,264
	• runoff (raw water) inflow	433
	• worked water recovered from the UG mine.	12,612
	Total inflows to mixed water store(ML/a)	14,309
	Calculate the percentage of worked water in the mixed water store, as:	
	• (total worked water inflows / total inflows) x100.	
	Percentage of worked water in mixed water store (%)	88
Total volume of reused water (ML/a)	Sum all worked water inflows to tasks, including:	
	• to UG mine from mixed water store (as total volume x proportion of worked water in the flow)	10,609
	• to gold plant from mixed water store (as total volume x proportion of worked water in the flow)	1,766
	• to gold plant from TSF	1,364
	• to TSF from gold plant.	3,162
	Total worked water flows to tasks (ML/a)	16,902
Reuse efficiency (%)	Calculate the reuse efficiency, as: $\frac{\text{Sum of worked water flows to tasks}}{\text{Sum of all flows to tasks}} \times 100$	
	• total worked water flows to tasks (ML/a)	16,902
	• total all flows to tasks (ML/a).	21,519
	Reuse efficiency (%)	79

Table B7 note

The recycling efficiency has not been calculated as there are no water treatment plants associated with this site.

Table B8 note

Based on Table 6 of main text.

B

B.4 Method: making site context and disclosure statements

B.4.1 Site context statements

As outlined in Table B8, the input information presented in the site summary (Section B.2) has been used to make a number of simple statements, using standardised responses, which characterise the site's context and setting – including the catchment (or river basin), climatic conditions and main operational water activities.

B.4.2 Site risk-opportunity-response statements

A number of simple disclosure statements have been made to characterise the baseline catchment stress, risk-opportunity exposure and management response associated with the site, as summarised in Table B9. These simple statements are based on detailed analysis and synthesis of the following information:

- site risk and opportunity assessments (presented in Tables B2 and B3)
- the outputs of two publicly available assessment tools – WWF Water Risk Filter (see Table B10) and WRI Aqueduct Water Risk Tool (see Table B11).

Table B8: example gold operation – water balance summary for the reporting period

ICMM site context statements				
Statement	**Approach**	**Available responses**	**Discussion**	**Response made**
Catchment	Select from standard list or drop down menu.	Global river basins as mapped in publicly available tools	Determined using the WWF Water Risk Filter tool.	Orange Catchment, South Africa.
Climatic conditions	Select one descriptor from four available responses.	Arid or semi-arid environment	The long-term average annual precipitation is approximately 700 mm which predominately occurs in the summer months (October to April).	Moderate precipitation with distinct dry season.
		Moderate precipitation with distinct dry season		
		Moderate precipitation		
		Very high precipitation and/or frequent major storm events		
Main Operational Water Activities	Select up to three descriptors from available responses.	Cooling or drying processes	Based on the site summary information outlined in Section B.2, the three main operational water activities associated with the site are: • dewatering of adjacent abandoned workings • ore processing to extract gold • management of the tailings.	1. Dewatering 2. Ore processing 3. Tailings management
		Dewatering		
		Discharge		
		Dust suppression		
		Flood control		
		Ore processing		
		Ore separation		
		Ore transportation		
		Reinjection		
		Significant water diversion		
		Surface water re-alignment		
		Tailings management		
		Waste management		
		Water treatment		

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Table B9: example gold operation – site level risk opportunity and management response disclosure statements

Statement	Description	Available responses	
Catchment water stress			
Catchment stress assessment method	Identifies the assessment approach or tool used to determine the catchment stress level.	• Company specific • WBCSD Global Water Tool • WRI Aqueduct Water Risk Atlas • WWF Water Risk Filter • WFN Water Footprint Assessment Tool	
Catchment water stress level	Describes the background stress level of the catchment within which the site is situated.	Ranked: 1 (very low) to 5 (very high), or unknown	
Site water risks and opportunities			
Risk assessment method	Identifies the approach or tool used to assess site water risks.	• Company specific • CDP Water 2016 W3.2c • GEMI Local Water Tool • WBCSD Global Water Tool • WRI Aqueduct Water Risk Atlas • WWF Water Risk Filter • WFN Water Footprint Assessment Tool	
Site water risk level	Describes the water risk level associated with the site.	Ranked: 1 (very low) to 5 (very high), or unknown	
Primary and secondary site water risk type	Describes the primary water risk type associated with the site.	• Physical • Reputational • Regulatory (or as CDP Water 2016 W3.2c)	
Opportunity assessment method	Identifies the approach or tool used to assess site water opportunities.	• Company specific • CDP Water 2016 W4.1a	
Site water opportunity level	Describes the water opportunity level associated with the site.	Ranked: 1 (very low) to 5 (very high), or unknown	
Material opportunity type	Describes the material water opportunity type associated with the site.	• Operations • Brand value • New market (or as CDP Water W4.1a)	

Table B9 note

Based on Table 7 of main text; see Appendix C for additional guidance and definitions.

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	Response approach	Rationale
	The WRI Aqueduct Water Risk Atlas and WWF Water Risk Filter tools were used to provide an overview assessment of basin risk (physical, regulatory and reputation) – the assessment results are summarised in Tables B10 and B11. The assessment results from the above tools where combined with local knowledge to determine the baseline catchment stress level.	• WWF Water Risk Filter • WRI Aqueduct Water Risk Atlas • Company specific
	The outputs of the assessment tools indicate a low to medium stress level, however local knowledge indicates that water stress is rising in the area due to increasing demand, pollution and climate change. In addition, the area is currently experiencing a prolonged drought period. The baseline catchment stress level has therefore been assessed as high.	4 – high
	A site specific risk assessment is reviewed and updated biannually, based on a simple approach consistent with CDP Water 2016 W3.2c. The risk assessment process is informed by operational knowledge, corporate direction and the overview assessment results from the WRI Aqueduct Water Risk Atlas and WWF Water Risk Filter tools.	• CDP Water 2016 W3.2c
	The site risk assessment identifies six material risks with low residual risk rankings following mitigation (five ranked 1- very low risk, and one ranked 2 – low risk). On balance, the level of risk that the site poses to overall business performance or value has been assessed as low (rank 2) for the following reasons: • although a range of material risks have been identified (including physical, reputational and regulatory) all can be managed and mitigated • the mitigation measures require increased expenditure (CAPEX and OPEX) and operational complexity • the mitigation measures also present opportunities to enhance business value.	1 – low
	The site risk assessment indicates that the two main material risk types are physical and reputational.	• Physical • Reputational
	A site specific opportunity assessment is reviewed and updated biannually, based on a simple approach consistent with CDP Water 2016 W4.1a. The opportunity assessment process is informed by operational knowledge and corporate direction.	Allows transparency around the method(s) used to assess water opportunities associated with a site.
	The site opportunity assessment identifies a number of material opportunities with very high to medium potential value. The overall opportunity potential is assessed as high.	4 – high
	The site opportunity assessment identifies four material opportunities, however improved water efficiency is considered to be the most beneficial as this underpins the site's water strategy (aligned with corporate direction) to: enhance water recovery and reuse;reduce water losses; promote use of alternative water sources (dewater and treatment); and reduce reliance on the municipal supply. This underlying strategy generates many other opportunities, including: climate change resilience; cost savings; protected social licence to operate; regulatory changes; and improved community relations.	Improved water efficiency.

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Table B9: continued

ICMM site risk-opportunity-response statements				
Statement	**Description**	**Available responses**	**Discussion**	**Response made**
Management response				
Management response level	Describes the management response associated with the site.	Ranked: 1 (none) to 5 (very high), or unknown	The site has a Water Management Plan which is aligned to corporate water strategy, tailored to the operational context and local water setting, and includes internally and externally agreed performance targets. The site is assessed to have a very strong management response, based on the example intent definitions provided in Appendix C (Table C2).	5 – very high
Management response type	Identifies the management response types taken by the site.	• Internal actions • External engagement • Influence governance	All three management response types are currently undertaken, including: • internal management to mitigate material risks and realise opportunities • external engagement with communities and catchment stakeholders to address the legacy of ARD from abandoned mine workings • influence governance to enhance the opportunities for holistic water management and sharing between adjacent active and decommissioned mine workings (eg use of dewater from adjacent operations for supply).	• Internal actions • External engagement • Influence governance
Management response compliance	Where appropriate, describes compliance to management response set for the site.	Ranked: 1 (none or very low) to 5 (very high), or unknown.	During the reporting period, the site had a 95% compliance rate with the site specific performance targets outlined in the site Water Management Plan. The site is assessed to show a very high level of compliance, based on the example intent definitions provided in Appendix C (Table C2).	5 – very high

B

Table B10: example gold operation – WWF Water Risk Filter Tool

WWF Water Risk Filter Tool			
Risk type	**Risk indicator**	**Score**	**Answer**
Overall basin water risk		2.3	**LOW**
Physical	Overall	1.4	Very low
	1. Annual scarcity	1	No shortage
	2. Groundwater over abstraction	5	>120%
	3. Climate change – temperature increase	5	Extreme risk
	4. Climate change - rainfall	1	Very low risk
	5. Climate change – sea level	1	Very low risk
	6. Historical drought	3	Moderate
	7. Flood occurrence	1	Very low risk
	8. Present ecological status	4	Large risk
	9. Freshwater biodiversity	2	Low threat
	10. Ecosystem vulnerability	4	High vulnerability
	11. Dependency on hydropower	5	Very high risk
Regulatory	Overall	3.3	Moderate
	12. Government strategy	5	No strategy
	13. Sophistication and clarity of legal framework	3	Intermediate
	14. Municipal functionality	5	Not functioning
	15. Enforcement of legislation	1	Very high compliance
	16. Establishment of catchment management agency (CMA)	5	No CMA
Reputational	Overall	1.2	Low
	17. Cultural and/or religious importance of local water sources	1	Very low risk
	18. History of protest	3	Moderate risk
	19. Access to drinking water	1	Adequate access
	20. Access to improved sanitation	1	Adequate access

Table B10 note

Scores are in risk rank categories: 1 (very limited); 2 (limited); 3 (some); 4 (high); and 5 (very high).

Filter applied for: Extractives Industries I (low grade ore, precious metals, diamonds, copper, nickel, tar sands). See WWF Water Risk Filter website for additional guidance (http://waterriskfilter.panda.org/). Assessment made in October 2016.

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Table B11: example gold operation – WRI Aqueduct Water Risk Atlas

WRI Aqueduct Water Risk Atlas			
Risk type	**Risk indicator**	**Score**	**Answer**
Overall basin water risk		2.2	MEDIUM TO HIGH RISK (2-3)
Physical	Overall	2.1	Medium to high risk (2-3)
	1. Baseline water stress	2	Low to medium risk (1-2)
	2. Inter-annual variability	2	Low to medium risk (1-2)
	3. Seasonal variability	3	Medium to high risk (2-3)
	4. Flood occurrence	3	Medium to high risk (2-3)
	5. Drought occurrence	2	Low to medium risk (1-2)
	6. Upstream storage	2	Low to medium risk (1-2)
	7. Groundwater stress	No data	
Regulatory	Overall	2.1	Medium to high risk (2-3)
	8. Return flow ratio	2	Low to medium risk (1-2)
	9. Upstream protected land	5	Extremely high risk (4-5)
Reputational	Overall	2.5	Medium to high risk (2-3)
	10. Media coverage	3	Medium to high risk (2-3)
	11. Access to water	3	Medium to high risk (2-3)
	12. Threatened amphibians	1	Low risk (<1)

Table B11 note

Indicator scores are converted to risk rank categories: 1 (low risk); 2 (low to medium); 3 (medium to high); 4 (high); and 5 (extremely high).

Filter applied for: Mining (elevates Overall Risk and Physical Risk Quantity from rank 2 (low-medium) to rank 3 (medium-high)). See WRI Aqueduct Water Risk Atlas website for additional guidance (http://www.wri.org/our-work/project/aqueduct). Assessment made in October 2016.

B.5

Output: ICMM consistent site level dataset

The final site level dataset collated for the site is presented in Table B12. This is based on the input information provided in Section B.2 and the detailed assessments undertaken in Section B.3. The site level dataset is a high level summary intended for consolidation at the corporate level to create a consistent company-wide information set – which may be used for a number of purposes, including external corporate water disclosure.

This example demonstrates that the simple site level dataset is based on comprehensive assessment and analysis. Importantly, this approach captures and communicates the key elements of operational water practice, risk and opportunity from the site to the corporate level in a consistent, comparable and usable manner. In addition, the underlying detailed analysis remains available and may be used to better understand any elements of the site's water activities, risk-opportunity exposure and/or assessment methods if required.

B

Table B12: example gold operation – ICMM consistent site level dataset collated

ICMM consistent site level dataset: 2015					
Metrics	Metric	Description	Volume of water by quality		
			High (ML)	Low (ML)	Total (ML)
	Withdrawal	Surface water	2,245		2,245
		Groundwater	1,509		1,509
		Seawater			
		Third party water	895		895
		Total withdrawal	4,649		4,649
	Discharge	Surface water			
		Groundwater	212		212
		Seawater			
		Third party supply	121		121
		Total discharge	333		333
	Consumption	Evaporation	2,296		2,296
		Entrainment	1,491		1,491
		Other	261		261
		Total consumption	4,048		4,048
	Efficiency	Water reuse (%)			79
		Water recycling (%)			0
		Total efficiency (%)			79
Disclosure	Statement	Description	Response		
	Context	Catchment	Orange		
		Climate conditions	Moderate precipitation with distinct dry season		
		Main operational water activities	Dewatering		
			Ore processing		
			Tailings management		
	Catchment stress	Baseline catchment stress	4 – high		
		Assessment method	WWF Water Risk Filter		
			WRI Aqueduct Water Risk Atlas		
			Company specific		
	Site risk	Overall level	2 – low		
		Primary risk type	Physical		
		Secondary risk type	Reputational		
		Assessment method	CDP Water 2016 W3.2c		
	Site opportunity	Overall level	4 – high		
		Main opportunity type	Improved water efficiency		
		Assessment method	CDP Water 2016 W4.1a		
	Management response	Overall level	5 – very high		
		Response type	Internal actions		
			External engagement		
			Influence governance		
		Compliance level	5 – very high		

Appendix C

Illustrative site level disclosure guidance

C.1 Overview

This appendix outlines an illustrative framework for assessing catchment water stress, water risk-opportunity and management response at the site level, which collectively form the basis for making the disclosure responses outlined in Table 7, main text.

This guidance is intended for member companies who do not have, or are looking to update, an existing approach to site level water risk assessment. The assessments may be undertaken in a number of ways (as outlined below) and the outputs mapped to the standardised response categories provided (one to five, very low to very high). This approach maintains an element of consistency, but allows for some flexibility in the assessment method and acknowledges that all companies have different ways of defining and interpreting materiality.

Table C1: summary of statement guidance

Statement	Main summary	Supporting information
Catchment stress	Table C2.1	
Site water risk	Table C2.2	Table C3, – approach following CDP Water 2016 W3.2c
Site water opportunity	Table C2.3	Table C4 – approach following CDP Water 2016 W4.1a
Management response	Table C2.4	

Table C2.1 note

a) CEO Water Mandate (September 2014) Corporate Water Disclosure Guidelines: towards a common approach to reporting water issues(http://ceowatermandate.org/files/Disclosure2014.pdf).

b) WBCSD Global Water Tool(http://www.wbcsd.org/work-program/sector-projects/water/global-water-tool.aspx).

c) WRI Aqueduct Water Risk Atlas(http://www.wri.org/our-work/project/aqueduct).

d) WWF-DEG Water Risk Filter(http://waterriskfilter.panda.org).

e) WFN Water Footprint Assessment Tool(http://waterfootprint.org/en/resources/interactive-tools/water-footprint-assessment-tool).

f) IPIECA (2014) Review of Water Risk Tools(http://www.ipieca.org/publication/review-water-risk-tools-guidance-document-oil-and-gas-industry).

C

Appendix C continued

Table C2.1: catchment stress

Statement: catchment water stress assessment method		
Intent	Identifies the assessment approach(s) or tool(s) used to determine the catchment stress level.	
Rationale	Allows transparency around the assessment method used and associated context for benchmarking purposes.	
Response Categories	Five response categories, as per approaches outlined above.	
Statement: catchment water stress level		
Intent	Describes the baseline stress level of the catchment within which the site is situated – where water stress is 'the ability, or lack therefore, to meet the human and ecological demand for freshwater'[a]. Water stress components comprise: water availability, quality and accessibility – which include water scarcity[a].	
Rationale	Allows for the identification, analysis and reporting of sites located in water stressed areas, which may also be called high risk or hot-spot areas[a]. Baseline water stress provides a common contextual indicator for identifying sites which may be susceptible to elevated water risks due to the ambient water stress level.	
Approach	Determined using one or more of the following methods: • Company specific approach • Publicly available tools – including: 1. WBCSD Global Tool[b] 2. WRI Aqueduct Water Risk Atlas[c] 3. WWF-DEG Water Risk Filter[d] 4. WFN Water Footprint Assessment Tool[e].	
Response Categories	Six response categories with intent definitions which may be mapped to differing assessment tool outputs.	
	5 – very high	Very high level of competition for access to water of suitable quality (indicates a very high risk operating environment).
	4 – high	High level of competition for access to water of suitable quality (indicates high risk operating environment).
	3 – moderate	Moderate level of competition for access to water of suitable quality (indicates moderate risk operating environment).
	2 – low	Low level of competition for access to water of suitable quality (indicates low risk operating environment).
	1 – very low	Very low levels of competition for access to water of suitable quality (indicates very low risk operating environment).
	unknown	Allows, in short term, for sites which are not able to determine a baseline stress level.
Notes	• Approach aligned with CEO Water Mandate Corporate Water Disclosure Guidelines (2014)[a]. • Recognised that different methods produce different outputs – a comprehensive overview of available water risk tools and their associated outputs is provided by IPIECA[f]. Hence recommend considering the outputs of more than one tool when making the assessment. • In the case of a site being located within two or more catchments, the site level assessment should be undertaken with a common sense approach which is consistent with the intent of the guidance. For example, the background stress level for each catchment within which the site is located would be assessed and the results combined to make a simple, representative response which adequately reflects the overall background stress level for the site and the associated risk level posed to business value, performance and reputation. This may be determined as the average of the stress levels of the catchments within which the site is located; or may be determined as the highest of the catchment stress levels – whichever better reflects the contextual setting of the site.	

Appendix C continued

Table C2.2: site water risk

Statement: water risk assessment method		
Intent	Identifies the assessment approach(s) or tool(s) used to determine the water risk level and types.	
Rationale	Allows transparency around the assessment method used and associated context for benchmarking purposes.	
Response Categories	Seven response categories, as per approaches outlined above.	
Statement: site water risk level		
Intent	Describes the water risk level associated with the site – where water risk is the possibility of the site experiencing a water-related challenge which may negatively impact business viability, performance or value[a].	
Rationale	Allows understanding of the materiality of the water risks associated with a site to overall business viability and performance.	
Approach	Determined using one or more of the following methods: • company specific approach • following CDP Water 2016[b] W3.2c approach – outlined in Table C3 • publicly available tools – including: 1. GEMI Local Water Tool[c] 2. WBCSD Global Tool[d] 3. WRI Aqueduct Water Risk Atlas[e] 4. WWF-DEG Water Risk Filter[f] 5. WFN Water Footprint Assessment Tool[g].	
Response Categories	Six response categories with intent definitions which may be mapped to differing assessment tool outputs.	
	5 – very high	Very high risk of material impact to business viability or performance.
	4 – high	High risk of material impact to business viability or performance.
	3 – moderate	Moderate risk of material impact to business viability or performance.
	2 – low	Low risk of material impact to business viability or performance.
	1 – very low	No or very low risk of material impact to business viability or performance.
	unknown	Allows, in short term, for sites which are not able to determine a water risk level.
Notes	• Approach consistent with CEO Water Mandate[a] and CDP Water 2016[b]. • Recognised that different methods produce different outputs – a comprehensive overview of available water risk tools and their associated outputs is provided by IPIECA[h]. Hence recommend considering the outputs of more than one tool when making the assessment. • To maintain consistency for benchmarking purposes, the outputs of the assessment method(s) or tool(s) used should be mapped to the above response categories using the broad intent definitions above. It is recognised that there is an element of subjectivity in this mapping, as different companies define and interpret materiality and risk differently. • Comprehensive reviews of mining related water risks are provided by UNEP[i] and WRI[j].	

C

Table C2.2: continued

Statement: water risk types (primary and secondary)		
Intent	Describes the primary and secondary water risk types associated with the site[a,b].	
Rationale	Allows transparency around the types of water risks associated with the site.	
Response Categories	Can be undertaken using the three high level response categories outlined below (from CDP Water 2016[b]), or further split into the risk sub-types outlined in Table C3.	
	Physical	Having too little water, too much water, water that is unfit for use, or inaccessible water.
	Regulatory	Changing, ineffective, or poorly implemented public water policy and/or regulations.
	Reputational	Stakeholder perceptions that a company does not conduct business in a sustainable or responsible fashion with respect to water.
Notes	• Approach consistent with CEO Water Mandate[a] and CDP Water 2016[b] and WRI's assessment[k].	

Table C2.2 note

a) CEO Water Mandate (September 2014) Corporate Water Disclosure Guidelines: towards a common approach to reporting water issues(http://ceowatermandate.org/files/Disclosure2014.pdf).

b) CDP Water (2016) Guidance for Companies Reporting on Water on Behalf of Investors and Supply Chain Members(https://www.cdp.net/Documents/Guidance/2016/CDP-2016-Water-Reporting-Guidance.pdf).

c) GEMI Local Water Tool(http://gemi.org/localwatertool).

d) WBCSD Global Water Tool(http://www.wbcsd.org/work-program/sector-projects/water/global-water-tool.aspx).

e) WRI Aqueduct Water Risk Atlas(http://www.wri.org/our-work/project/aqueduct).

f) WWF-DEG Water Risk Filter(http://waterriskfilter.panda.org).

g) WFN Water Footprint Assessment Tool(http://waterfootprint.org/en/resources/interactive-tools/water-footprint-assessment-tool).

h) IPIECA (2014) Review of Water Risk Tools(http://www.ipieca.org/publication/review-water-risk-tools-guidance-document-oil-and-gas-industry).

i) UNEP FI (2012) Chief Liquidity Series – Extractive Industries (Issue 3)(http://www.unepfi.org/fileadmin/documents/CLS3.pdf).

j) WRI (2010) Mine the Gap: Connecting Water Risks and Disclosure in the Mining Sector(http://www.wri.org/publication/mine-gap).

k) WRI (2010) Mine the Gap: Connecting Water Risks and Disclosure in the Mining Sector (http://www.wri.org/publication/mine-gap).

Table C2.3 note

a) CEO Water Mandate (September 2014) Corporate Water Disclosure Guidelines: towards a common approach to reporting water issues(http://ceowatermandate.org/files/Disclosure2014.pdf).

b) CDP Water (2016) Guidance for Companies Reporting on Water on Behalf of Investors and Supply Chain Members(https://www.cdp.net/Documents/Guidance/2016/CDP-2016-Water-Reporting-Guidance.pdf).

C

Appendix C continued

Table C2.3: site water opportunity

Statement: site opportunity method		
Intent	Identifies the assessment approach(s) or tool(s) used to determine the water opportunity level and types.	
Rationale	Allows transparency around the assessment method used and associated context for benchmarking purposes.	
Response categories	Three (more more) response categories, as per approaches outlined above.	
Statement: site opportunity method		
Intent	Describes the water opportunity level associated with the site – where water opportunity is the possibility of water having a positive impact on business viability, performance or value[a,b].	
Rationale	Allows understanding of the potential for water to have a positive impact on business performance and value.	
Approach	Determined using one or more of the following methods: • company specific approach • following CDP Water 2016[b] W4.1a approach – outlined in Table C4.	
Response Categories	Six response categories with intent definitions which may be mapped to differing assessment tool outputs.	
	5 – very high	Very high potential for water to materially enhance business performance or value.
	4 – high	High potential for water to materially enhance business performance or value.
	3 – moderate	Moderate potential for water to materially enhance business performance or value.
	2 – low	Low potential for water to materially enhance business performance or value.
	1 – very low	No or very low potential for water to materially enhance business performance or value.
	unknown	Allows, in short term, for sites which are not able to determine a water opportunity level.
Notes	• Approach consistent with CEO Water Mandate[a] and CDP Water 2016[b]. • To maintain consistency for benchmarking purposes, the outputs of the assessment method(s) used should be mapped to the above response categories using the broad intent definitions above. It is recognised that there is an element of subjectivity in this mapping, as different companies define and interpret materiality and opportunity differently.	
Statement: site water opportunity type		
Intent	Describes the material water opportunity types associated with the site[a,b].	
Rationale	Allows transparency around the type of water opportunity associated with a site.	
Response Categories	Can be undertaken using the three high level response categories outlined below (from CEO Water Mandate[a]), or further split into the opportunity sub-types outlined in Table C4 (as CDP Water 2016[b]).	
	Operations	Enhancing operational performance or value – for example, to reduce costs, energy use, water withdrawal, consumption or discharge requirements.
	Brand value	Enhancing the reputation of the company to stakeholders – for example, increased efficiency reduces withdrawal or new technologies improve discharge quality.
	New markets	Creating new market opportunities through products or services – for example, new commodity types or third-party water partnerships.
Notes	• Approach consistent with CEO Water Mandate[a] and CDP Water 2016[b].	

Appendix C continued

Table C2.4: management response

Statement: management response		
Intent	Describes the management response associated with the site.	
Rationale	Provides insight into the company's approach to water management at the site level.	
Approach	Determined using one or both of the following methods: • company specific approach • following the simple approach outlined below.	
Response Categories	Five response categories with intent definitions which may be mapped to differing assessment tool outputs.	
	5 – very high	Very strong management response – for example, the site has a Water Management Plan which is: strongly aligned to corporate water policy/direction; includes externally agreed performance targets and/or actions; and is regularly reviewed and updated.
	4 – high	Strong management response – for example, the site has a Water Management Plan which includes: externally agreed performance targets and/or actions; and is regularly reviewed and updated.
	3 – moderate	Moderate management response – for example, the site has a Water Management Plan in place which includes: internally set performance targets and/or actions; and is regularly reviewed and updated.
	2 – low	Weak management response – for example, the site has a Water Management Plan in place which does not include: performance targets and/or actions; and/or is not regularly reviewed or updated.
	1 – none	Very weak management response – for example, the site does not have a Water Management Plan and/or performance targets/actions.
Notes	• To maintain consistency for benchmarking purposes, the outputs of the assessment method(s) or tool(s) used should be mapped to the above response categories using the broad intent definitions above. It is recognised that there is an element of subjectivity in this mapping, as companies take different approaches to water management at the site level. • A site Water Management Plan is a live document which details operational water use (quality and quantity) and the strategies used to monitor, manage and minimise external impacts throughout the project/operational life cycle, including assigned responsibilities and performance targets. Additional guidance is provided in the Australian Government's Water Management Handbook (2008)[a]. • Performance targets are specific quantitative or qualitative management objectives for water management which may be used to assess water performance. These may include adaptive management targets (eg to maintain the function of an identified ecosystem) or hard metrics (eg to maintain annual discharge below a set volume). These may include regulatory (licensing and permitting) conditions. • Where external engagement is required to develop externally agreed performance targets and/or actions.	

C

Table C2.4: continued

Statement: catchment water stress assessment method		
Intent	Identifies the management response types taken by the site.	
Rationale	Allows transparency around the management response types taken to manage risk and opportunity at the site level.	
Response Categories	Can be undertaken using the three high level response categories outlined below (from WWF Water Stewardship Steps[b]), or further split into the response sub-types outlined in Table C3.	
	Internal actions	These are wide ranging and may include, but are not limited to: setting performance actions and/or targets; infrastructure planning, investment and maintenance; engagement with employees, suppliers or buyers; improving water efficiency or discharge qualities.
	External engagement	For example: participation in collective action groups and/or engagement with external stakeholders (local communities, NGOs, public agencies, other companies or water users in the catchment).
	Influence governance	For example: engaging independently and/or with other companies in policy dialogues to support progressive water legislation (eg policies, laws, regulations and resource allocations) and implementation at various scales.
Notes	• Approach consistent with WWF Water Stewardship[b] and CDP Water 2016[c].	
Statement: site opportunity method		
Intent	Where appropriate, describes the management response compliance level.	
Rationale	Provides insight into the company's ability to manage water at the site level.	
Approach	Determined using one or more of the following methods: • company specific approach • following the simple approach outlined below.	
Response Categories	Five response categories with intent definitions which may be mapped to differing assessment tool outputs.	
	5 – very high	Very high level of compliance with site specific performance targets (eg >80%).
	4 – high	High level of compliance with site specific performance targets (eg >60-80%).
	3 – moderate	Moderate level of compliance with site specific performance targets (eg >40-60%).
	2 – low	Low level of compliance with site specific performance targets (eg >20-40%).
	1 – very low	Very low compliance with site specific performance targets (eg ≤20%).
Notes	• Approach consistent with CEO Water Mandate[d] and CDP Water 2016[c]. • This statement simply provides a measure of the company's compliance to externally agreed or internally set performance targets for a site. However, it does not provide any measure of the effectiveness of these targets to promoting the sustainable and equitable management of a shared resource.	

Table C2.4 note

a) Dept. of Resources, Energy and Tourism, Australian Government (2008) Water Management Handbook (http://www.industry.gov.au/resource/Documents/LPSDP/LPSDP-WaterHandbook.pdf).

b) WWF (2013) Water Stewardship Brief (http://awsassets.panda.org/downloads/ws_briefing_booklet_lr_spreads.pdf).

c) CDP Water (2016) Guidance for Companies Reporting on Water on Behalf of Investors and Supply Chain Members(https://www.cdp.net/Documents/Guidance/2016/CDP-2016-Water-Reporting-Guidance.pdf.

d) CEO Water Mandate (September 2014) Corporate Water Disclosure Guidelines: towards a common approach to reporting water issues(http://ceowatermandate.org/files/Disclosure2014.pdf).

Appendix C continued

Table C3: outline approach to assessing site water risk, following CDP Water 2016 W3.2c

Risk type	Risk sub-type	Potential impact	Timeframe
Physical	• Climate change • Declining water quality • Dependency on hydropower • Drought • Ecosystem vulnerability • Flooding • Inadequate infrastructure • Increased water scarcity • Increased water stress • Pollution of water source • Projected water scarcity • Projected water stress • Rationing of municipal water supply • Seasonal supply variability/inter annual variability	• Brand damage • Constraint to growth • Closure of operations • Decrease in shareholder value • Delays in permitting • Employee health and well-being • Higher operating costs • Fines/penalties • Litigation • Loss of license to operate • Disruption to sales • Plant/production disruption leading to reduced output • Property damage • Reduced demand for product • Reduction in revenue • Supply chain disruption • Transport disruption • Water supply disruption • Other	• Current (up to 1 year) • 1 to 3 years • 4 to 6 years • > 6 years • Unknown
Regulatory	• Changed product standards • Higher water prices • Increased difficulty in obtaining withdrawals/operations permit • Lack of transparency of water rights • Limited or no river basin/catchment management • Mandatory water efficiency, conservation, recycling or process standards • Poor coordination between regulatory bodies • Poor enforcement of water regulation • Regulation of discharge quality/volumes leading to higher compliance costs • Regulatory uncertainty • Statutory water withdrawal limits/ changes to water allocation • Unclear and/or unstable regulations on water allocations and wastewater discharge		
Reputational	• Changes in consumer behaviour • Community opposition • Cultural and religious values • Inadequate access to water, sanitation and hygiene • Litigation • Negative media coverage		

C

Likelihood	Impact Magnitude	Response strategy
• Highly probable • Probable • Unlikely • Unknown	• High • Medium-high • Medium • Low-medium • Low • Unknown	• Alignment of public policy positions with water stewardship goals • Cost increase management through regulated tariff-setting process • Develop flood emergency plans • Engagement with community • Engagement with customers • Engagement with public policy makers • Engagement with other stakeholders in river basin • Engagement with suppliers • Establish site-specific targets • Infrastructure investment • Infrastructure maintenance • Greater due diligence • Increased capital expenditure • Increased investment in new technology • New products, markets • River basin restoration • Re-siting of facilities • Promote best practice and awareness • Supplier diversification • Strengthen links with local community • Tighter supplier performance standards • Use of risk transfer instruments • Water management incentives • Other

Appendix C continued

Table C4: outline approach to assessing site water opportunity, following CDP Water 2016 W4.1a

Potential opportunity	Timeframe	Likelihood	Benefit magnitude	Response strategy
• Carbon management • Climate change adaptation • Collective action • Competitive advantage • Cost savings • Ensuring supply chain resilience • Improved community relations • Improved water efficiency • Increased brand value • Increased shareholder value • Innovation • Regulatory changes • R&D • Sales of new products/services • Social license to operate • Staff retention • Other	• Current (up to 1 year) • 1 to 3 years • 4 to 6 years • > 6 years • Unknown	• Highly probable • Probable • Unlikely • Unknown	• High • Medium-high • Medium • Low-medium • Low • Unknown	• Alignment of public policy positions with water stewardship goals • Cost increase management through regulated tariff-setting process • Develop flood emergency plans • Engagement with community • Engagement with customers • Engagement with public policy makers • Engagement with other stakeholders in river basin • Engagement with suppliers • Establish site-specific targets • Infrastructure investment • Infrastructure maintenance • Greater due diligence • Increased capital expenditure • Increased investment in new technology • New products, markets • River basin restoration • Re-siting of facilities • Promote best practice and awareness • Supplier diversification • Strengthen links with local community • Tighter supplier performance standards • Use of risk transfer instruments • Water management incentives • Other

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ICMM team

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