2

Addressing Sustainability

This chapter discusses the sustainability issues relevant to the Project and provides a preliminary sustainability assessment framework through which these issues would be addressed. An overview of the statutory and historical context of sustainability is provided followed by discussion of the sustainability assessment framework developed for the Project. This includes reference to the preliminary sustainability assessment model. The process for developing the framework is also demonstrated.

2.1 Historical and statutory context

A widely recognised definition of sustainable development is

> …development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development 1987).

In Australia, the *National Strategy for Ecologically Sustainable Development* (Council of Australian Governments 1992) expands the term sustainable development to ecologically sustainable development (ESD) which is defined as

> ...development that improves the total quality of life both now and in the future in a way that maintains the ecological processes on which life depends.

The concept of ESD recognises that social well-being and economic equity are invariably linked to ecosystem health.

The concept of ESD is also referenced at a statutory level. Section 3A of the EPBC Act refers to ESD in the context of the need to integrate social, economic and environmental considerations into decision-making processes. At the State level, Section 5(a)(iiv) of the EP&A Act states that ESD is a primary objective of the NSW planning process. This is further reflected in Schedule 2

to the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation). The objectives of other NSW legislation such as the *Protection of the Environment Administration Act 1991* and the *Protection of the Environment Operations Act 1997* (POEO Act) include the fulfilment of ESD principles.

The integration of the principles of ESD into the Australian utility industry is by no means a new concept. By 2006 the *National Water Initiative* (NWI) had been released and signed by the Council of Australian Governments (CoAG) and a Commission setup to regulate its implementation. Among other objectives, the NWI aims to incorporate the principles of ESD into the Australian water utility industry. Section 2 of the NWI (Council of Australian Governments 2004) states that there is a need to

> ...ensure that water is allocated and used to achieve socially and economically beneficial outcomes in a manner that is environmentally sustainable.

Subsequent to the release of the NWI the NSW implementation plan for the NWI was released which nominated deliverables for NSW utility companies (including HWC) and consequently led to the incorporation of the principles of ESD into their operations. For example, HWC's *Corporate Environmental Management Plan 2008-2013* (Hunter Water Corporation 2007a) includes statements about ESD such as

> ...ESD essentially involves the integration of ecological, economic and social objectives into the management of operations and resources.

Table 2.1 provides an overview of the international and domestic policy and legislative framework underpinning the principles of ESD.

TABLE 2.1 OVERVIEW OF ESD AND INTERNATIONAL AND DOMESTIC LEGISLATIVE CONTEXTS

PRINCIPLE / INSTRUMENT	DEFINITION	INTERNATIONAL CONTEXT	DOMESTIC CONTEXT
Intra- and inter-generational equity	To ensure that economic equity, social well-being and environmental protection are secured for present and future generations	Our Common Future 1987	*National Strategy for Ecologically Sustainable Development*
The precautionary principle	Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation	Principle 15 of the Rio Declaration 1992	Section 3A, EPBC Act Schedule 2, EP&A Regulation
Conservation of biodiversity and ecological integrity	To protect and conserve biodiversity and promote the sustainable use of biological resources	Earth Charter 2000 Principle 4 of the Rio Declaration 1992 Agenda 21 and the Convention on Biological Diversity 1992	Section 3A of the EPBC Act Schedule 2, EP&A Regulation Section 3 of *Threatened Species Conservation Act 1995* (TSC Act)
Improved valuation and pricing of environmental resources	The need to include environmental factors in the valuation of assets and services	Principle 16 of the Rio Declaration 1992	Section 3A, EPBC Act Schedule 2, EP&A Regulation

PRINCIPLE / INSTRUMENT	DEFINITION	INTERNATIONAL CONTEXT	DOMESTIC CONTEXT
Stakeholder participation	Stakeholders should have the right to participate effectively during decision-making processes regarding activities that may have a significant effect on the environment Stakeholders are defined as entities or individuals that can reasonably be expected to be affected by a proposal (Global Reporting Initiative 2006)	Section 26 of the Johannesburg Declaration on Sustainable Development 2002 Article 12(40) of the Draft Covenant on Environment and Development	*National Strategy for Ecologically Sustainable Development* *A National Plan for Water Security* (Dept of the Prime Minister and Cabinet 2007) HWC's *Community and Environment Policy* (2007b)

2.2 Sustainability assessment framework

Sustainability issues have been considered in the planning and design of the Tillegra Dam project through development of a sustainability assessment framework. The framework has been used to assess how the Project can realise its sustainability goals from the planning and design phase through to the construction and operation phases.

The key components of the framework including the steps taken to develop the sustainability assessment model are described as follows. The sustainability assessment framework is summarised in Figure 2.1.

2.2.1 Review of sustainability literature

To ensure that sustainability issues relevant to the Project were considered, a review of sustainability literature and relevant HWC documents was undertaken. The sustainability literature review included an analysis of:

- international and domestic ESD policy and law
- relevant journal articles
- environmental assessment reports for other infrastructure projects.

The analysis of HWC's sustainability documents included a review of:

- past operating licence ESD indicators
- the *Environmental and ESD Indicators Report 2005-2006* (Hunter Water Corporation 2006a)
- the *Community and Environment Policy 2007* (Hunter Water Corporation 2007b)
- the *Monitoring and Reporting Protocol 2007* (Hunter Water Corporation 2007c).

2.2.2 Internal workshops

Following the literature review, a number of workshops were held. These were attended by relevant Project staff with experience and expertise in the field of sustainability. Workshop discussions focused on:

- climate change issues relevant to the Project
- an appropriate approach to the carbon neutral strategy
- a structure for the sustainability assessment model for the Project.

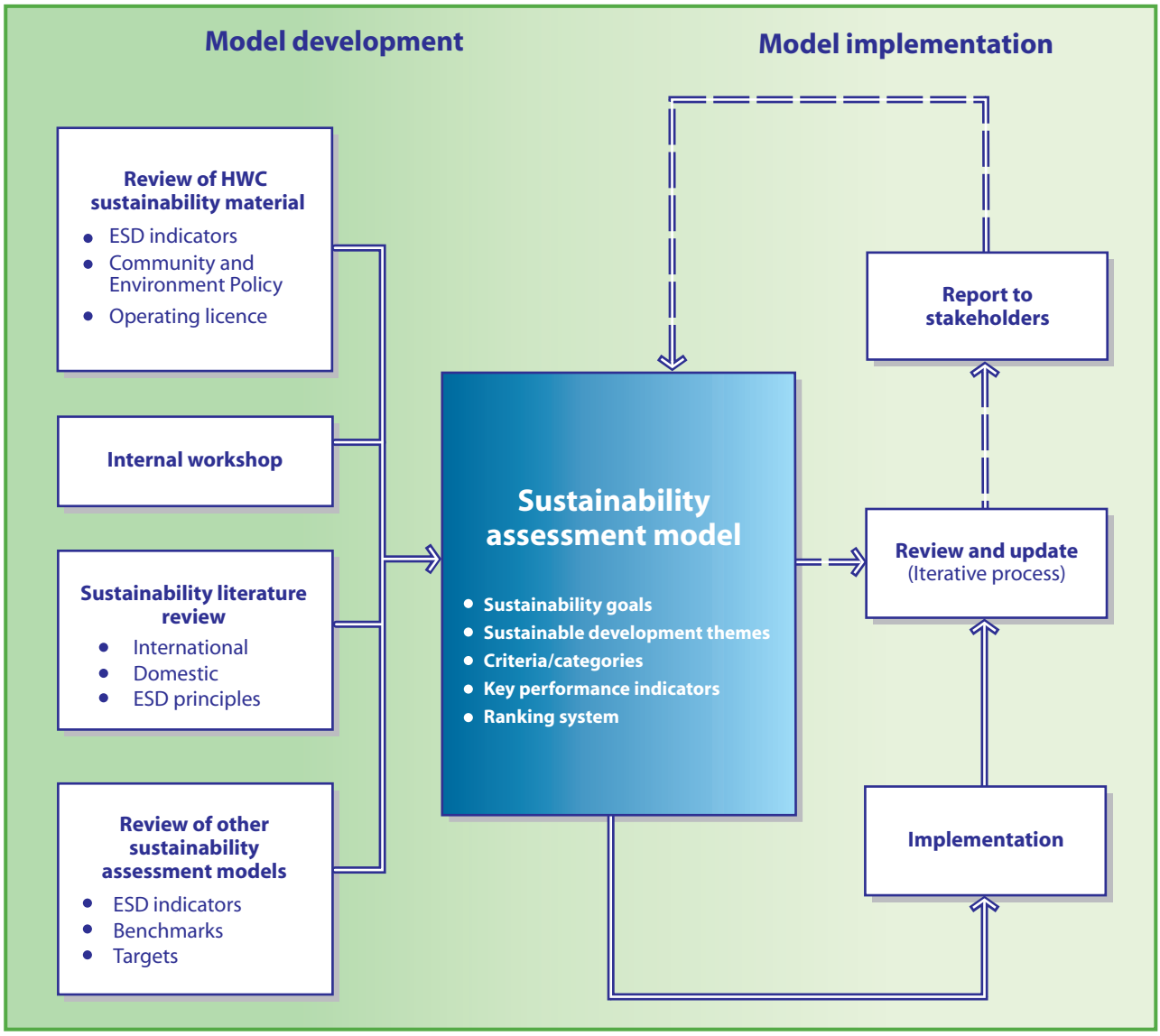

FIGURE 2.1 OVERVIEW OF THE SUSTAINABILITY ASSESSMENT FRAMEWORK FOR THE PROJECT AND THE PROPOSED SUSTAINABILITY ASSESSMENT MODEL

2.2.3 Review of other sustainability assessment models

Following the sustainability literature review and the workshops, it was determined that the sustainability performance of the Project could be most comprehensively addressed through the establishment of a sustainability assessment model.

A number of international and national sustainability assessment models have been developed to assess both organisation and Project sustainability. These are outlined in Sections 2.2.4 and 2.2.5 A review of a number of these models was undertaken to assist in the development of the preliminary sustainability assessment model for the Project.

2.2.4 International models

United Nations Commission on Sustainable Development

In 2001 the United Nations Commission on Sustainable Development (UNCSD) published the *Indicators of Sustainable Development: Guidelines and Methodologies* report. The report was developed

using sustainability issues identified in international instruments such as Agenda 21 and has been used to inform nations on measuring sustainable development in a domestic context. A total of 58 indicators are recommended for use in the report.

Civil Engineering Environmental Quality Assessment and Award Scheme UK

Launched in the UK in 2003, the *Civil Engineering Environmental Quality Assessment and Award Scheme* (CEEQUAL) is an awards scheme system which can be used to assess the environmental performance of any civil engineering project. The CEEQUAL Award is given through the UK Institution of Civil Engineers to projects assessed against specific environmental criteria. Intended to complement statutory obligations, CEEQUAL uses a credit based self assessment framework. The framework is supported by a list of questions and a scoring spreadsheet that can be used by a trained CEEQUAL assessor and validated by an external verifier. The framework comprises the following categories:

- project management
- land use
- landscape
- ecology and biodiversity
- archaeology and cultural heritage
- impacts on water resources
- energy
- material use
- waste management
- transport
- nuisance and neighbours
- community relations and joy in use.

A number of these categories have been incorporated into the sustainability assessment model for the Tillegra Dam project.

FIDIC Project Sustainability Management Guidelines

The International Federation of Consulting Engineers (FIDIC) is an industry association based in Switzerland comprising member organisations which represent and promote the interests of technology-based intellectual services for the built and natural environments. FIDIC's Project *Sustainability Management (PSM) Guidelines 2004* provide a framework through which to assess the sustainability goals of a project and measure progress.

The framework provides a set of indicators and goals that reflect the objectives of *Agenda 21*. The majority of indicators appear to be sourced from the *Global Reporting Initiative 2006*. The framework aims to be adaptable to project specifics and provides a self-assessment tool to rank performance. Ranking is from low to high with low being compliance with legislative and regulatory requirements and high effectively setting the benchmark for future project sustainability performance.

Computer Aided Sustainability Evaluation Tool

The *Computer Aided Sustainability Evaluation Tool* (CASET) is a computer-based decision support tool which has been designed to assist the Hong Kong Government in evaluating sustainability implications of policies and projects. CASET supports Hong Kong's Sustainable Development System that uses guiding principles to achieve sustainable development, including environmental quality

and economy. CASET consolidates a list of indicators that support the Sustainable Development System and can be used to assess the sustainability of proposals.

A project can effectively be 'tested' by answering a series of questions prompted by the computer system. Datasets relevant to the sustainability indicators are held within a geographic information system (GIS). CASET allows for a prior appraisal type approach rather than a tracking approach, as is typically the case in other models. An analysis of CASET has been useful in identifying proactive (or leading) type indicators for use in the Project sustainability assessment model.

Global Reporting Initiative

The *Global Reporting Initiative* is a multi-stakeholder, international organisation that has developed a Sustainability Reporting Framework and accompanying guidelines to allow organisations to report on their environmental, economic and social performance. The guidelines (currently known as G3) contain principles and guidance as well as indicators to use as a basis for reporting. Indicators are divided into economic, social and environmental performance. The indicators are widely used, such as in the PSM model, and a number of these indicators have been adapted for the sustainability assessment model developed for the Tillegra Dam project.

World Commission on Dams

The World Commission on Dams (WCD) was set up in 1998 by the World Bank and the World Conservation Union (IUCN). Although the Commission has disbanded, the WCD established the most comprehensive guidelines for dam building. The WCD final report (WCD 2000) on dams and development describes an innovative framework for dam projects that is intended to protect dam-affected people and the environment, and ensure that the benefits from dams are more equitably distributed.

Although not explicitly stated, the WCD final report suggests a number of indicators that could be used to assess project sustainability in dam infrastructure. These indicators include:

- public safety
- gender equality
- economic viability
- ecosystem restoration
- employment.

These indicators have been integrated into the sustainability assessment model for the Tillegra Dam project.

2.2.5 Australian models

UDIA EnviroDevelopment

In 2006, the Queensland Division of the Urban Development Institute of Australia (UDIA) launched a voluntary branding scheme to independently certify developments which achieve high quality sustainability outcomes based on sound scientific benchmarks and principles. The purpose of the scheme is to make ESD a primary concern in various developments in Queensland including civil infrastructure. National implementation of EnviroDevelopment is anticipated in the future.

EnviroDevelopment comprises six separate and independent certification elements: water, energy, ecosystem, community, materials and waste. Each element has a specific logo enabling a developer to use them in promotional branding of the development.

The EnviroDevelopment standards are designed to be flexible to encourage innovation, and to consider project specific characteristics. EnviroDevelopment standards are set higher than standard practice and must be able to stand up to public scrutiny. These attributes of EnviroDevelopment have been considered in the Project sustainability assessment model, particularly the flexibility of the model which enables changes to be incorporated as the Project develops.

Australian Green Infrastructure Council

The Australian Green Infrastructure Council (AGIC) was recently launched with the objective of assisting the delivery and operation of sustainable infrastructure in Australia. The AGIC proposes 15 sustainability categories to assess project sustainability. The approach used in the Project sustainability assessment model is generally consistent with the approach proposed by AGIC.

Hunter Water Corporation ESD Indicators

HWC's *Monitoring and Reporting Protocol* (Hunter Water Corporation 2007c) describes updated system performance standards from the 2002-2007 Operating Licence. These standards were updated following a review of the Operating Licence by the Independent Pricing and Regulatory Tribunal (IPART) of NSW in 2006 and early 2007. The Protocol allows HWC to record, compile, monitor, measure and report against a set of indicators that are described in clauses 4.7.2, 5.5.2 and 7.1.2 of the Protocol. The Protocol aims to foster effective communication between IPART and HWC. In addition to the list of indicators found in the Protocol, HWC's Environmental and ESD Indicators Report (Hunter Water Corporation 2006a) provides a list of indicators that HWC uses to measure their operational performance.

Indicators from the *Environmental and ESD Indicators Report* and *Monitoring and Reporting Protocol* relevant to the Project that have been adapted to the sustainability assessment model for the Tillegra Dam project include:

- catchment health and management
- environmental releases
- total number of trees planted
- electricity consumption from renewable resources
- net greenhouse gas emissions
- electricity consumption from renewable resources
- electrical energy efficiency of water assets
- water quality
- total urban water supplied
- noise
- total revenue from the Project
- non-revenue water (water loss).

2.3 Sustainability assessment model for the Project

Following a review of the existing sustainability models (as referred to in Sections 2.2.3, 2.2.4 and 2.2.5) a unique sustainability assessment model has been developed for the Project. The model comprises four key components:

1 sustainability goals

2 sustainable development themes

3 criteria/categories

4 key performance indicators.

Each of these is described in more detail in the following sections.

2.3.1 Sustainability goals

In the context of the Project, the core definitions of ESD have been incorporated into the development of two primary sustainability goals for the Project:

- to provide an equitable, reliable and efficient water body for present and future generations while protecting the environment and neutralising contributions to climate change
- to leave a positive economic, social and environmental legacy to the community.

2.3.2 Sustainable development themes

The sustainability themes were developed based on the recognised ESD principles and instruments, namely:

- intra- and inter-generational equity
- the precautionary principle
- conservation of biodiversity and ecological integrity
- improved valuation and pricing mechanisms
- stakeholder participation.

2.3.3 Sustainability categories

Sustainability categories allow for the grouping or aggregation of the sustainability indicators for manageability and clarity. The categories identified for the model include:

- project management
- employees and contractors
- water
- community and stakeholders
- energy and greenhouse gas emissions
- service responsibilities
- materials and waste
- economic performance
- land use
- ecology and biodiversity
- community hazards and nuisance
- cultural heritage.

2.3.4 Sustainability indicators

Performance indicators have been identified to determine and allow stakeholders to more objectively assess the Project's ability to achieve the desired sustainable goals. These indicators are specifically recognised in HWC's *Community and Environment Policy* (Hunter Water Corporation 2007b) as integral to the continued improvement of HWC.

As recommended in the *Sustainability Reporting Guidelines* (Global Reporting Initiative 2006), a preliminary boundary setting exercise was undertaken to identify relevant sustainability issues to the Project and determine issues that HWC could be expected to have reasonable control and influence over. The boundary setting exercise was complemented by the analysis of other sustainability assessment model indicators and a literature review. It was considered important that the indicators chosen met the following criteria:

- simple and robust
- proactive (leading)
- able to track progress and changes (lagging)
- sensitive to change and adaptive
- measurable
- scientifically or analytically valid
- easily understood.

From the analysis, literature review and boundary setting exercise, a list of preliminary indicators likely to be of relevance during design, construction and operation of the Project was developed. This list was developed within the context of a dynamic and evolving process (ie if approved, the Project is still to progress through the detail design and construction stages).

The list was then refined to establish a list of 'key indicators'. Key indicators were defined as indicators that best reflect sustainability issues that can be most readily measured. The key indicators for the initial stage of the Project are largely 'leading' indicators, that is data and information available to allow a preliminary assessment of sustainability performance. These are provided in Table 2.2.

The following icons are used in the table to identify the sustainable development theme(s) that a particular indicator addresses:

ecological integrity

precautionary principle

stakeholder participation

intra-and inter-generational equity

improved pricing mechanism

TABLE 2.2 PRELIMINARY KEY SUSTAINABILITY INDICATORS

CATEGORY	THEME	INDICATOR	SOURCE	MEASUREMENT
ENVIRONMENTAL				
Ecology and biodiversity		Ecological community health	Azapagic 2004	descriptive
		Total number of trees planted	Azapagic 2004	number/yr and descriptive
		Catchment health and management	Hunter Water Corporation 2006a	annual HWC Catchment Management Report
		Environmental releases from Tillegra Dam Energy and emissions	Hunter Water Corporation 2007c – OL WML-2	megalitres and descriptive
Energy and emissions		Potential climate change impacts on Project	Global Reporting Initiative 2006 – EC2	descriptive
		Net greenhouse gas emissions	Hunter Water Corporation 2007c – NWI-E9	net tonnes CO_2
		Greenhouse gas emissions reductions achieved	Global Reporting Initiative 2006 – EN18	net tonnes CO_2
		Electricity consumption from renewable resources	Hunter Water Corporation 2007c – OL EC-4	kWh
		Electrical energy efficiency of water assets	Hunter Water Corporation 2007c – OL EC-2	kWh/ML water supplied
Water		Water quality	Hunter Water Corporation 2007c – NWI-H1	water quality guidelines/routine samples
		Total water use	Global Reporting Initiative 2006 – EN8	m^3/yr

CATEGORY	THEME	INDICATOR	SOURCE	MEASUREMENT
Materials and waste	$ ☺ ❀	Total weight of waste by type and disposal method	Global Reporting Initiative 2006 – EN22	descriptive/net tonnes
	$ ☺ ❀	Proportion of recycled materials	Global Reporting Initiative 2006 – EN2	net tonnes
	$ ☺ ❀	Total material resource consumption	Global Reporting Initiative 2006 – EN1	descriptive/net tonnes
	$ ☺	Product durability	Azapagic 2004	descriptive
ECONOMIC				
Economic performance	$ ☺	Total revenue from Project	Hunter Water Corporation 2007c – NWI-F3	$000
	$	Operating cost	Hunter Water Corporation 2007c – NWI-F6	$000
	✋ $	Tourism economy	Hass *et al* 2002	$000/descriptive
	☺	Indirect economic impacts	Global Reporting Initiative 2006 – EC9	descriptive
Land use	$ ☺	Increased development potential	workshop process/Project specific	descriptive
Water	$ ☺	Non-revenue water (water loss)	Hunter Water Corporation 2007c – OL WL-1	litres/day/kL
SOCIAL				
Community hazards and nuisance	⌛ ✋	Noise	Hunter Water Corporation 2007c – OL NOI-1	total number of complaints
Community and stakeholders	✋	Community and stakeholders Openness and transparency to stakeholders	workshop process/Project specific	descriptive
	✋ ☺	Improved recreational facilities	workshop process/Project specific	descriptive
Cultural heritage	✋ ☺	Protection of non-Aboriginal heritage	Woodcock 2000	descriptive
	✋ ☺	Protection of Aboriginal archaeological and ethnographic sites	Woodcock 2000	descriptive

CATEGORY	THEME	INDICATOR	SOURCE	MEASUREMENT
Water	$ ☺	Total urban water supplied	Hunter Water Coorporation 2007c – NWI-W8	megalitres
	$ ☺	Total extraction of water from Tillegra Dam	Hunter Water Corporation 2007c	megalitres
Employees and contractors	$ ☺ ✋	Employment and local hiring	workshop process/Project specific	descriptive
	⌛ $ ✋	Labour practices (on Project)	Azapagic 2004	descriptive
	⌛ $ ✋	Environmental performance of suppliers and contractors	Azapagic 2004	summary of assessments/descriptive
	⌛ ☺ ✋	Public safety	Ness et al 2007, World Commission on Dams 2000	descriptive
CORPORATE GOVERNANCE				
Project management	⌛ ✋	Meeting Project schedule	workshop process/Project specific	number of delays/descriptive
	⌛ ✋	Recognition of relevant legal obligations	Ugwu and Haupt 2007	descriptive
Service responsibilities	⌛ ✋	Completion of risk assessments	workshop process/Project specific	descriptive
	⌛ ✋	OH&S manual and training	workshop process/Project specific	number of OH&S incidents/yr

A large proportion of the preliminary key indicators were selected from the Global Reporting Initiative (GRI) due to its international reputation as a best practice sustainability reporting system and from HWC's Environmental and ESD Indicators Report (Hunter Water Corporation 2006a). The source of the key indicators (including the code number for both GRI and HWC indicators) is referenced in Table 2.2.

The key indicators are measured using both quantitative and qualitative measures, with data availability influencing the type of measurement. It should be noted that the indicator selection process is an ongoing, iterative process and that the indicators discussed in the EA Report would likely vary following further evaluation and refinement during the construction and operation phases of the Project.

2.3.5 Implementation

It is important that the sustainability assessment model developed for the Project is accompanied by an implementation process. There are a number of components for this implementation including:

- HWC to integrate and co-ordinate the sustainability assessment model within other aspects of its current business, such as within HWC's existing (environmental management system (EMS)
- assigning responsibility of implementing the model to senior management within HWC
- reporting to relevant internal and external stakeholders on implementation progress
- the need to involve an auditor or assessor for transparency and robustness.

2.3.6 Monitoring progress

Monitoring is an important component of the sustainability assessment model as it allows stakeholders to measure the progress of the sustainability goals of the Project. The literature suggests between a one and four year resolution for measuring sustainability indicators (Mayer 2008). The availability of sustainability data for measurement can also vary due to ecological, anthropogenic or project timeframe variables. It is therefore important for HWC to prepare a monitoring program that reflects the spatial and temporal scales of the chosen sustainability indicators and that the indicators become part of the way HWC progresses the Project and are not separate to the organisation.

The key indicators that are relevant during the construction and operation phases of the Project would be reviewed and reported annually. Following construction, all indicators would be reviewed and reported every five years in addition to coinciding with the reporting requirements that form part of HWC's annual catchment report as well as part of the final construction verification report.