

# **ENVIRONMENTAL & ESD INDICATORS**

## **REVIEW OF OPERATING LICENCE**

**Hunter Water Corporation**

**November 2001**

**Hunter Water Corporation  
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# Environmental and ESD Indicators for Hunter Water Corporation

## Supplementary Submission

*The purpose of this submission is three fold.*

*First, the Corporation proposed a set of more than 60 environmental and ESD indicators in its August submission to the Tribunal's review of the operating licence. The Corporation also undertook to involve its community consultative forum in a review of the environmental and ESD indicators proposed in the August submission. This submission reports the outcome of that discussion with the forum.*

*Secondly, this submission reports additional work undertaken to link the selected indicators to nationally accepted directions for indicators.*

*Thirdly, it provides a revised list of indicators, which includes some further indicators consistent with state of the environment reporting.*

## Introduction

Hunter Water Corporation made its initial submission to the IPART review of its operating licence in August 2001. This submission included a set of environmental indicators relevant to our situation and **meaningful** in providing time series data on environmental performance and environmental condition.

In that submission, we highlighted that the Corporation now has a comprehensive suite of environmental regulation governing its activities. In particular, the Environment Protection Authority (EPA) and the Department of Land and Water Conservation (DLWC) have issued licences, supported by legislation, to the Corporation with the specific intention of environmental and water resource protection. The legislation providing the licensing powers of the EPA and DLWC requires them to take into account sustainable management of the environment by applying the principles of ecologically sustainable development.

As a result, the Corporation already monitors a wide range of environmental indicators, particularly to meet the requirements of the EPA discharge licences, the DLWC's water management licence and the existing operating licence standards. **Thus, important environmental and ESD indicators are already monitored.** It is possible to add other environmental data to these but this needs careful assessment of the costs of doing so against the likely benefits to the environment and to the information needs of the local community. In particular, the indicators also need to be important for the organisation to be able to assess its environmental and ESD performance and guide changes in operations. In short, we need to make a careful assessment of what is valuable as an environmental or ESD indicator and what might be just another environmental statistic.

In addition, the Corporation publishes a number of environmental indicators in various formats each year. For example, beach bathing water quality (as part of the EPA's beachwatch program) is published weekly during the bathing season as paid advertisements in local newspapers. Bathing beach water quality is also reported each month to the open session<sup>1</sup> of the meeting of Corporation's Board of Directors. Similarly water quality in the lower Williams River is published monthly in local newspapers. All indicators relating to operating licence standards are reported monthly to open meetings of the Corporation's Board of Directors, posted monthly on the Corporation's website and published annually in the annual environmental report. The annual environmental report also reports on indicators relating to the targets in the Environmental Management Plan such as effluent reuse and odour reduction.

While a range of indicators is monitored, not all are reported publicly, particularly those required by the EPA and DLWC. This is because a large number of parameters are measured at a number of locations. For much of this monitoring, EPA and DLWC have an "exception reporting" regime where data is to be accessible but not reported directly to the regulating agencies unless the results are outside defined exceedance limits. The Water Management Licence makes specific provision for the results of much of the monitoring to be made available to DLWC on-line to reduce the need for paper reporting (itself an environmental consideration). However, some of this monitoring does provide indicators of environmental condition – for example, the Water Management Licence requires extensive monitoring of groundwater conditions at Tomago and Anna Bay. (These important indicators were among the list of indicators proposed in our August submission).

#### ***Environmental/ESD Indicators in the Operating Licence***

*The operating licences for Sydney Water Corporation (SWC) and Sydney Catchment Authority (SCA) include requirements for each these agencies to report on separate lists of environmental and ecologically sustainable development (ESD) indicators. ESD indicators reflect whether or not human activity is ecologically and socially sustainable. It is Hunter Water Corporation's view that environmental indicators are a subset of ESD indicators and that the requirement to have two sets of similarly focused indicators is duplication and unnecessary, unwieldy and confusing to the community.*

*Hunter Water Corporation believes that operating licences should be concise regulatory documents and avoid overlapping or multiple similarly directed provisions. In this context, the Corporation's August submission proposed a single set of environmental/ESD indicators. In addition, the August submission proposed that some of the other separate requirements in the SWC and SCA licences – such as energy management - be incorporated in the indicators rather than being dealt with as separate licence conditions. This supplementary submission maintains this approach and reiterates our proposal for a single, comprehensive set of environmental/ESD indicators.*

## **The August Submission Indicators**

As reported in our August submission, the Corporation drew on the SWC and SCA indicators to develop a set of indicators relevant to its circumstances and to the existing licences issued by EPA and DLWC. These indicators were largely based on information that the Corporation already collects, either voluntarily or under various regulatory arrangements. Not all are currently reported publicly but rather made available to regulatory agencies such as EPA and DLWC. Thus, the proposed set of indicators is pragmatically derived. They cover all key areas of environmental interest, similar to the areas covered by the SWC indicators and have

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<sup>1</sup> At the conclusion of each monthly meeting of the Board of Directors, there is an "open session" that the media and community can attend. Hunter Water publishes the agenda for these "open" sessions in local newspapers and on the Corporation's internet site prior to the meetings. Open session papers are distributed to major media organisations, Hunter Water's customer centres, local public libraries and are retained in the Corporation's own environmental library for public access.

the potential to display **meaningful** time series trends in relation to sustainability and environmental protection.

There has been a lot of good research into what should constitute ESD indicators and into “state of the environment” reporting, both within Australia and internationally. However, one of the Corporation’s concerns is that the outcome of this work may not be reflected in the community’s perception of what an environmental indicator should be, what they should tell us and what purpose they should serve. As a result, a lot of statistical information that purports to be environmental or ESD indicators are little more than environmental statistics.

As discussed below, a strong theme to emerge from the discussion by the Corporation’s consultative forum was the need for the Corporation’s indicators to be linked to established objectives and principles for the selection of environmental indicators.

The Corporation believes that an important feature of indicators reported by a relatively small specialist service organisation such as Hunter Water (in comparison to, say, government environmental agencies) should be related to its specific operations and to demonstrating its progress towards broad ESD and environmental objectives. Our August submission to IPART included a set of environmental indicators considered to be **relevant** to our operating environment and to our community in the lower Hunter. It was considered that this set of indicators would be **meaningful** to the community in providing time series data on environmental performance and environmental condition. These indicators were selected by referring to national guidelines for selecting environmental and ESD indicators and these guidelines are discussed later in this submission.

## **Consultation on the Indicators**

The proposed indicators included in the August submission have now been subjected two forms of consultation:

- discussion by the Corporation’s community consultative forum
- inclusion in the August submission for wider public comment.

- ***Community Consultation Forum***

In the August submission we also undertook to seek input from the Corporation’s **community consultative forum** on environmental indicators for inclusion in the licence. The community consultative forum comprises representatives from business, community, environmental, catchment management and landcare groups from the lower Hunter region. The forum meets quarterly and provides a vehicle for the Corporation to involve a wide range of interest groups in discussion of current and future initiatives. Like the “Open” sessions of the Board meetings, forum meetings are open to the news media and the minutes of forum meetings are included in Open Board papers, which are distributed to the media.

The set of indicators included in the August submission were **discussed at length at the meeting of the forum on 13 September 2001** and a number of constructive views were put forward by the forum members.

The key points put forward by forum members were:

- Indicators must be **meaningful** in an ESD sense – they must be linked to established ESD principles, criteria or ESD/environmental reporting objectives. (Relevant links are discussed later in this submission).
- Forum members agreed that the ESD indicators need to be easily understood by the community and be able to demonstrate trends over time.
- The indicators should contribute information that is useful for the Corporation to assess performance and guide changes in operations.
- There should not be a long list of indicators otherwise they will be of little interest or use to the community. Some members of the forum expressed the view that the list put forward by the Corporation was perhaps a long list. In response, the forum suggested that the list should be retained but that indicators should be prioritised in terms of their importance and that the Corporation should consider producing a smaller number of indicators for publication rather than an extensive list.
- The relevance of the indicators should be explained. This may not be possible in all publication formats but ideally should be done on the **internet site** and in the **annual environmental report**.

Forum members suggested that the purpose for reporting on individual indicators should be explained, ie whether it is for educational purposes, to raise the awareness of the community, as a regulatory commitment or as a transparency measure should be explained for each indicator.

- The indicators should be used to inform the community about specific issues and the ways in which the Corporation is addressing these issues. Different indicators should be featured in various publications, at different events or in relation to a particular issue attracting public attention at the time. Groups of indicators can be combined to help to identify trade-offs (eg improving wastewater quality can come at the expense of greater energy consumption with resultant greenhouse gas and cost consequences). The forum agreed that the “case studies” featuring in the Corporation’s annual environmental report were an excellent vehicle for highlighting specific indicators from time to time and their relevance to environmental protection or ecologically sustainable development.
- A forum member tabled a paper he had produced on the development of environmental indicators for State of the Environment Reporting (Kevin Macdonald, 1995). This paper has been considered in developing the revised set of ESD indicators in this supplementary submission.

Much of the discussion focused on particular indicators in the draft set of indicators (as published in Appendix 3 to the August submission). The forum agreed that these were worthwhile indicators and the discussion highlighted how they could be used to inform the community. By way of example, the forum discussed using the chemical collection and odour indicators to inform the community about sewage treatment processes and issues. Another suggestion involved using cost indicators to highlight the costs of supplying water and sewerage services to individual properties.

- ***The August Submission to IPART***

The Corporation's August submission contained a full list of the indicators proposed at that date along with a comment on the relevance as indicators. In all a list of more than 60 detailed indicators was proposed in the August submission. **The inclusion of the indicators in the Corporation's August submission provided an opportunity for wider public consultation beyond the Corporation's community consultation forum.**

There has been limited response to the indicators proposed in the August submission. The Corporation notes the views of the Total Environment Centre that, in the interests of efficiency and consistency, the indicators should take into account the indicators proposed for national and State levels of state of the environment reporting. As outlined later in this submission, we have revised the indicators proposed in the August submission and added some further measures to achieve consistency with state of the environment reporting.

## **Selecting Indicators**

McDonald's paper notes that there is little point in measuring environmental parameters and collecting on environmental data if the public cannot comprehend what the data are telling them. There is, therefore, a need to draw on principles for selecting indicators.

In preparing that set of indicators in the August submission, we were guided by the need for the indicators to be meaningful to the community, to be cost-effective to collect and report and to linked to known important environmental issues.

### **Environmental/ESD Indicator Selection Criteria**

- serve as a robust indicator of environmental change
- reflect a fundamental or highly valued aspect of the environment
- be applicable to regional environmental issues of national importance
- provide an early warning of potential problems
- be capable of being monitored to provide statistically verifiable and reproducible data that shows trends over time.
- be scientifically credible
- be easy to understand
- be monitored regularly with relative ease
- be cost-effective to monitor and report
- be as aggregative as possible (can be combined with other indicators to produce more general information about the environment)
- have relevance to policy and management needs
- contribute to monitoring of progress towards implementing commitments in nationally significant environmental policies
- where possible and appropriate, facilitate community involvement
- where possible and appropriate, use existing commercial and managerial indicators
- where possible and appropriate, be consistent and comparable with other indicators used in countries and by other States and Territories

It is commonly accepted that environmental indicators should be reliable and readily understood and there are a number of selection criteria for environmental and ESD indicators. The selection criteria used in the National State of the Environment Reporting system of the National Strategy for Ecologically Sustainable Development lists the criteria in the box below with the objective that, for national reporting, indicators should satisfy as many as possible.

These selection criteria are often arranged according to SMART principles to ensure that indicators are:

- Simple
- Measurable
- Accessible
- Reliable
- Timely

These criteria and principles help sort environmental data to arrive at meaningful environmental indicators. We have been mindful of these criteria in developing a revised set of indicators following the discussion by the community consultative forum.

## Links to ESD Objectives and Principles

In the past, economic development, social programs and environmental protection were largely undertaken in isolation from each other. There is now, however, a growing understanding that the systems are interlinked and the social, economic and ecological systems are dependent on each other and interact in complex ways.

In many cases, it is not yet possible to define sustainable levels human activity and its impact on ecosystem function and integrity. Thus it is difficult as yet to measure progress towards sustainability in a meaningful way. This difficulty is compounded by the fact that we are measuring a great many incomparable factors. For example, financial accounting can express complex factors into dollars. However, environmental and social issues are difficult to measure and difficult to compare with each other. This difficulty in measuring and reporting on ESD is not confined to Australia, but is recognised throughout the world.

The OECD held a number of conferences and workshops in 1999 to discuss frameworks to measure and report on sustainable development. The recognition arising from these conferences is a lack of suitable linkages between ecological, economic and social indicators. There was also a recognition that many national and international initiatives on sustainable development indicators have focussed on the ecological and economic interactions and have neglected social aspects.

ESD essentially involves integration of ecological, economic and social objectives into the management of resources with a view to improving total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. These three objectives are interrelated and if one is compromised then the others ultimately will suffer.

To achieve this aim and the integration of these objectives, the following guiding principles for ESD have been developed and accepted nationally. These principles are:

- Decision making processes should effectively integrate both long and short-term economic, environmental and social considerations.
- 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 (this is referred to as the Precautionary Principle).

- The global dimension of environmental impacts of actions and policies should be recognised and considered.
- The need to develop a strong, growing and diversified economy that can enhance the capacity for environmental protection should be recognised.
- The need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised.
- Cost effective and flexible policies should be adopted such as improved valuation, pricing and incentive mechanisms.
- Decisions and actions should provide for broad community involvement on issues that affect them. (National Strategy for Ecologically Sustainable Development)

The community consultative forum discussion referred to these principles and emphasised the need for the indicators that Hunter Water adopts to be consistent with these principles – in particular to ensure that we adopt a list of meaningful and useful indicators and not just a long list of interesting environmental statistics.

### **Links to Established Directions for Indicators**

It is not the role of Hunter Water Corporation, as an urban water provider, to develop environmental and ESD indicators in isolation from other work in this area and “state of the environment” reporting being carried out at State and national levels. To do so would involve extensive environmental and social research and monitoring that is not only beyond our charter but also beyond our capabilities as a service agency.

Further, **much of this work has already been done** and there is no need for Hunter Water to undertake work to develop relevant indicators. At a national level, considerable work has been done in developing a National Strategy for Ecologically Sustainable Development.

As part of this national strategy, a set of indicators is being developed that, properly monitored, will help to track the condition of Australia’s environment and the human activities that affect it. A range of reports was published in 1998 recommending indicators for state of the environment reporting. One of the reports in this series – covering “Human Settlements” - identifies key areas for indicators relevant to urban water agencies. We have reviewed this report and added some further indicators to the set of indicators put forward in our August submission. These additions are discussed under the heading “**Additional Indicators**” later in this submission.

### **Reporting the Indicators**

- ***Consistency with other Reporting Frameworks***

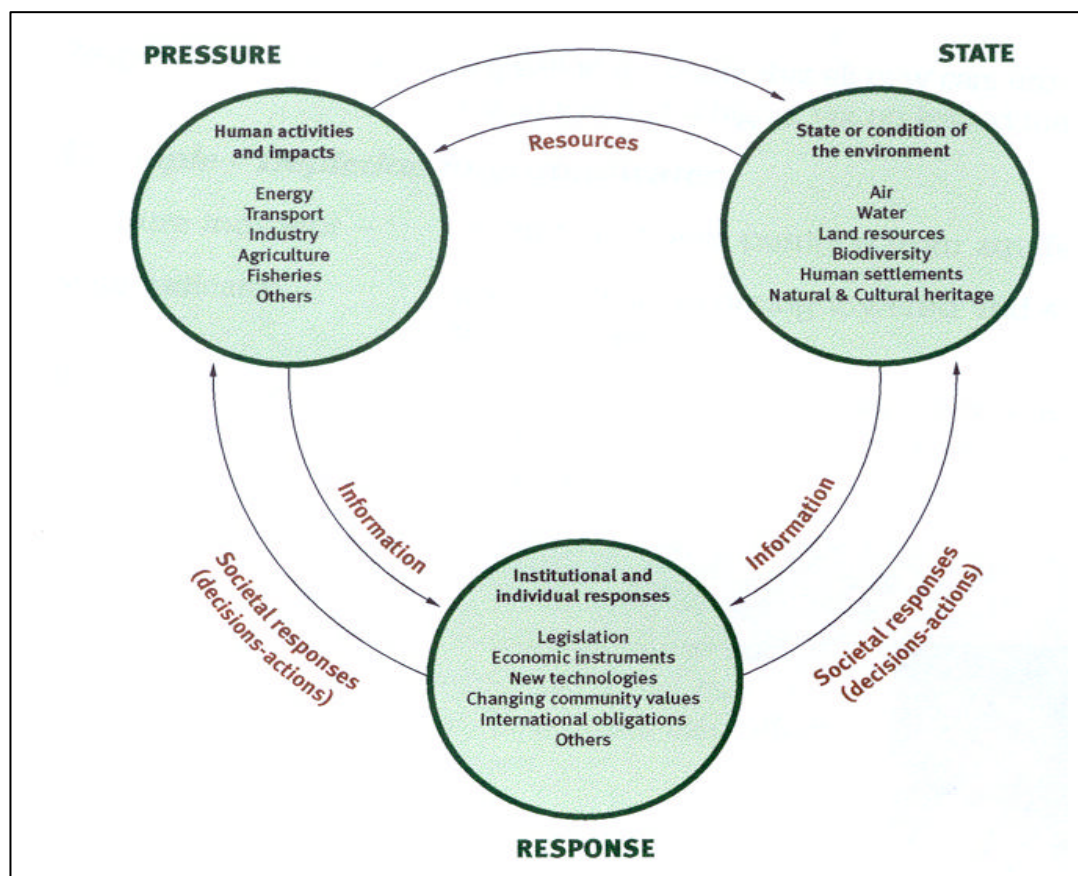
The environment is complex, and discerning trends in it is difficult. Environmental and ESD indicators help track changes in the environment by selecting key attributes - which may be physical, chemical, biological or socio-economic measures - that provide useful information about the whole system. Indicators are used to report on environmental trends without needing to capture the full complexity of the system.

The Commonwealth and State Government have adopted the “*pressure-state-response*” model, developed by the Organisation for Economic Cooperation and Development (OECD), as the most useful and manageable framework for indicator reporting.

The model is designed to show the effect of human activities on the environment. It uses three main types of indicators.

- **Pressure indicators** are indicators of the positive or negative effects of *human activities* on a given environment.
- **Response indicators** are indicators of the *actions taken by people* in response to perceived environmental problems and issues.
- **State (or condition) indicators** are indicators of the *condition of the environment* including the natural variability that occurs with events such as seasons, storms and fires. They register changes in the environment, reflecting the impact of the pressures and/or the effectiveness of the responses.

### The Pressure -State-Response Model



Ref: SOE Advisory Council, 1996

The model is based on the concept of cause and effect. Both pressures and responses affect condition of the environment. Responses also affect the pressures on the environment.

Incorporating the pressure, state and response components with the indicators will help to:

- track changing pressures, conditions and responses
- indicate priorities for environmental management
- test strategic interventions and monitoring their effect
- provide financial and management accountability for environmental initiatives

In this context, the revised set of draft indicators listed in Appendix 1 has been classified into the *pressure-state-response* format. As well as aiding the understanding of the indicators, this classification ensures that they can link more readily to National, State and Local State of the Environment reporting and other indicators reporting.

### Example - Depletion of groundwater

- Pressure indicator** - quantity of water pumped from aquifer  
**State indicator** - water tables becoming lowered and salinised at their seaward end  
**Response indicators** - regulation measures aimed at preventing salt intrusion

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*This example comes from The Australian Local Government Association's **Choosing and Using Environmental Indicators**, 1999. It is worth noting that comparable indicators are included in the groundwater management indicators included those proposed by Hunter Water Corporation in our August submission.*

- **Consultative Forum Discussion**

As discussed earlier, the Corporation's community consultative forum recommended that there should not be an excessively long list of indicators otherwise they will be of little interest or use to the community.

In response, the forum suggested that the list should be retained but that indicators should be prioritised in terms of their importance and that the Corporation should consider producing a smaller number of indicators for publication rather than an extensive list. A list of priority indicators is included as Appendix 2. The basis for selecting these indicators is that these indicators are easy to understand, able to be benchmarked against other similar agencies, consistent with National, State and Local Government State of the Environment reporting frameworks and can be used to monitor and report on important environmental, social and economic aspects of Hunter Water Corporation's business.

### Additional Indicators

In the light of comments made by the community consultative forum, we have reviewed environmental indicators recommended for the National State of the Environment Reporting system for human settlements. In all, there are seven sets of indicators for the national reporting system. However, the "urban settlements" report contains a comprehensive set relevant to an urban agency such as Hunter Water. While the term "urban settlements" might imply that just urban water environments are covered, the indicators proposed cover of water-related environmental indicators for areas such as water resource management, bathing beach quality and aquifer management.

As a result of this review, we have added a number of indicators to the draft set. (See full list in Appendix 1). In so doing, we have been mindful of the consultative forum's comments that the indicator set should not be too large.

The additional indicators include social, environmental and economic indicators, which were sourced from Environment Australia's report on Environmental Indicators for National State of the Environment reporting.

## References

Australian Local Government Association, 1999, **Choosing and Using Environmental Indicators**, Canberra

Environment Australia, 1992, **National Strategy For Ecologically Sustainable Development**, Canberra

Environment Australia, 1998, **Environmental Indicators for National State of the Environment Reporting, Human Settlements**, Australia: State of the Environment Environmental Indicator Report, Canberra

Environment Protection Authority (NSW), 2000, **NSW State of the Environment 2000**, Sydney

Hunter Water Corporation, 2001, **Environmental Report 2000-01**, Newcastle

Hunter Water Corporation, 2001, *Review of the Operating Licence: Hunter Water Corporation: Hunter Water Corporation Submission*, Newcastle, August

McDonald K, 1995, *The Development of Environmental Indicators for State of the Environment Reporting. A Paper for Newcastle Council*, Kevin McDonald & Associates, Environmental Services

State of the Environment Advisory Council, 1996, **Australia: State of the Environment 1996**, CSIRO, Canberra

**Water Management Licence**, Issued by the Water Administration Ministerial Corporation, NSW under Part 9 of the *Water Act, 1912* on 26 December 1998.

**FULL SET OF ESD INDICATORS**

*Please Note: The Shaded Indicators Within The Table Are New Indicators That Have Been Added Since The Hunter Water Consultative Forum Meeting of 13 September 2001 and following the August 2001 submission to IPART.*

<b>FULL SET OF HWC ENVIRONMENTAL/ESD INDICATORS</b>				
<b>Environmental Indicator</b>	<b>Measurement</b>	<b>Primary Purpose of Indicator (Social, Environmental or Economic)</b>	<b>Pressure - State – Response</b>	<b>Comments</b>
Compliance with the Operating Conditions (Section 4), Monitoring and Reporting Conditions (Section 5) and Management Plan (Section 6) of the Water Management Licence (WML) issued under the Water Act.	Annual report on compliance and any reports of non-compliance to the Department of Land and Water Conservation.	Environmental	Response	This indicator is important as it reports on Hunter Water's compliance with the Water Management Licence issued by DLWC. Compliance with this licence ensures we extract water in a sustainable manner.
Environmental releases from Chichester Dam.	Annual flow volume in Chichester River at Chichester Dam when dam is not spilling. To be expressed as a proportion of flow requirements specified in WML cl 4.3 for period when there is no flow over spillway.	Environmental	Response	These environmental releases are important to protect the sensitive ecological processes in the Williams River.
Extraction of water at Chichester Dam	Annual extraction volume as proportion of WML licence limit (cl 4.2)  Graphical five year trend	Environmental	Pressure	This is an important measure as it demonstrates Hunter Water's impact on the river system in relation to the total amount of water we extract from the river at Chichester.

<b>FULL SET OF HWC ENVIRONMENTAL/ESD INDICATORS</b>				
<b>Environmental Indicator</b>	<b>Measurement</b>	<b>Primary Purpose of Indicator (Social, Environmental or Economic)</b>	<b>Pressure - State – Response</b>	<b>Comments</b>
Extraction of water from Tomago aquifer.	Annual extraction volume as proportion of WML licence limit (cl 4.11)  Maximum daily extraction level as proportion of maximum daily limit in cl 4.11  Average daily extraction level as proportion of maximum.  Graphical five year trends	Environmental	Pressure	This indicator is critical in terms of achieving sustainable extraction of water from the Tomago aquifer.
Extraction of water from Anna Bay aquifer.	Annual extraction volume as proportion of WML licence limits (cl 4.16)	Environmental	Pressure	This is also important in terms of achieving sustainable extraction of water from the aquifer.
Mean monthly water table levels at Tomago.	Mean watertable levels as required by WML cl 4.13 compared to 1.0m reference level. Comments on strategies if below 1.0m level. Graphical five year trend.	Environmental	State	This indicator helps to measure the impact water extraction has on the sensitive ecosystems associated with the aquifers.
Mean monthly water table levels at Anna Bay	Mean water table levels in accordance with WML cl 4.16 compared to extraction rate reference levels. Comments on strategies if below 1.0m level. Graphical five year trend.	Environmental	State	This indicator helps to measure the impact water extraction has on the sensitive ecosystems associated with the aquifers.
Movement of salt water interfaces at Anna Bay.	Graphical representation of quarterly movement in salt water interface. WML cl 4.16 (f) and (g).	Environmental	State	This indicator measures the sustainability of water extraction in relation to preventing salt water intrusion into the aquifer.

<b>FULL SET OF HWC ENVIRONMENTAL/ESD INDICATORS</b>				
<b>Environmental Indicator</b>	<b>Measurement</b>	<b>Primary Purpose of Indicator (<i>Social, Environmental or Economic</i>)</b>	<b>Pressure - State – Response</b>	<b>Comments</b>
Extraction of water from the Williams River	Annual extraction volume.	Environmental	Pressure	This indicator is a measure of the total water extracted from the Williams River and is an indicator of the Corporation's potential impact on the river.
Residential sector water use.	Measured as Kilolitres/household/annum (5 year rolling average)	Environmental Social	Pressure	This indicator measures household water consumption. It is important as a critical part of the Corporation's demand management strategy is targeted at sustaining low residential water consumption.
Total Water Supplied	Measured as total kilolitres of water supplied to customers. (5 year rolling average)	Environmental Social	Pressure	This is an important indicator as it measures water extracted from all sources to supply all customers.
Water Restrictions	Number of days/year when water restrictions are imposed on customers.	Social	Pressure	This indicator measures the impact on the community relating to drought management.

<b>FULL SET OF HWC ENVIRONMENTAL/ESD INDICATORS</b>				
<b>Environmental Indicator</b>	<b>Measurement</b>	<b>Primary Purpose of Indicator (Social, Environmental or Economic)</b>	<b>Pressure - State – Response</b>	<b>Comments</b>
Non-revenue water (water loss)	In ML and % of source supply per year. Separate into components. <ul style="list-style-type: none"> <li>– Supply from Sources</li> <li>– Metered consumption</li> <li>– Meter error/discrepancies</li> <li>– Unmetered use and identified losses</li> <li>– Residual (leakage)</li> </ul> Graphical five-year trend representation.	Environmental	Pressure	It is important to include this as an indicator as it measures water that can be lost due to leaks, fire fighting, flushing etc.
Compliance with EPA wastewater treatment plant conditions	Flow weighted compliance as reported for Open Board	Environmental	Response	It is important to measure and report against EPA licences as this is an indicator of Hunter Water Corporation's potential impact on the environment from wastewater treatment works.
Effluent quality	Exceedances for BOD, NFR, Grease & Oil, P and N as produced for Open Board	Environmental	State	In relation to EPA licence requirements, effluent quality is the best indicator of potential environmental impact on waterways from treatment plants.
Sewage Treatment	Number and capacity of wastewater treatment plants by level of treatment.	Environmental	Response	This indicator is used to report on the potential impact of wastewater treatment works by level of treatment (primary, secondary, tertiary).



<b>FULL SET OF HWC ENVIRONMENTAL/ESD INDICATORS</b>				
<b>Environmental Indicator</b>	<b>Measurement</b>	<b>Primary Purpose of Indicator (Social, Environmental or Economic)</b>	<b>Pressure - State – Response</b>	<b>Comments</b>
Bathing beach water quality	Key indicators from EPA annual Beachwatch report	Environmental Social	State	This indicator is important as it is an indirect measure of the Corporation's coastal wastewater treatment performance.
Recycled water	Direct and indirect reuse as currently calculated.  Proportions of total ADF.  Graphical five-year trend representation	Environmental	Response	This indicator is a key component of the Corporation's demand management strategy as it measures the amount of effluent provided to industry and agricultural uses as a replacement for potable water.
Biosolids Reuse	Annual tonnage (dry tonnes) and proportions of dewatered biosolids available for reuse.  - Recycled for agriculture or mine rehabilitation.  - Municipal waste minimisation (eg co-composting, vermiculture)  - Disposed of to landfill.  - Other reuse.  Graphical five-year trend representation.	Environmental	Response	This indicator is important as it measures the amount of biosolids that are beneficially re-used for agriculture, landscaping etc from Hunter Water's wastewater treatment works.
Sewer transport system performance (wet and dry weather surcharges)	Sewer surcharges (no. and no./km main)  Surcharges to private land (no. & proportion of customers affected)	Environmental Social	Response	This indicator measures and reports on surcharges from the sewer transport system. It is an indicator of the impact on both the environment and customers.

<b>FULL SET OF HWC ENVIRONMENTAL/ESD INDICATORS</b>				
<b>Environmental Indicator</b>	<b>Measurement</b>	<b>Primary Purpose of Indicator (<i>Social, Environmental or Economic</i>)</b>	<b>Pressure - State – Response</b>	<b>Comments</b>
Trade waste incidents within the sewerage system	No. & five-year trend representation	Environmental	Response	This indicator provides a measure of the impact of contaminants on the Corporation's sewerage system.
Odours	Treatment plant and transport system complaint nos. and trends	Environmental Social	State	This indicator provides a measure of the impact of odours from Hunter Water's wastewater transport and treatment systems on the local community.
Chemical Collection	Requests for collection. <ul style="list-style-type: none"> <li>From customers (no. &amp; per 100,000 households)</li> <li>From catchment areas</li> </ul> Tonnage of waste collected Graphical five-year trend representation and cumulative visits and tonnages.	Environmental Social	Response	This indicator is used to measure the amount of requests for the collection of environmentally damaging chemicals.
Customer survey perceptions	Overall performance rating  Community acceptance of water supply standard.  Community support for water conservation.  Community acceptance of household sewage disposal service.	Social	State	This indicator is used to measure and report on community perceptions in relation to social, ecological and environmental issues. This survey is conducted every 2 years.

<b>FULL SET OF HWC ENVIRONMENTAL/ESD INDICATORS</b>				
<b>Environmental Indicator</b>	<b>Measurement</b>	<b>Primary Purpose of Indicator (Social, Environmental or Economic)</b>	<b>Pressure - State – Response</b>	<b>Comments</b>
Solid waste management	Indicators included in “Waste Recycling and Purchasing Policy”  Quantity of waste to landfill by HWC and contractors  Proportion of office paper recycled  Proportion of construction waste recycled/reused	Environmental	Response	This indicator will measure and report on the quantity of waste that is recycled and re-used and is important in terms of reducing the Corporation’s impact on landfill.
Environmental training	Proportion of staff receiving refresher training in 3-year cycle.  Proportion of new operations staff receiving environmental induction training.	Environmental Social	Response	This is important to ensure that HWC staff are aware of the Corporation’s responsibilities and are able to minimise Hunter Water’s environmental impact and in some cases help to restore the environment, eg Landcare projects.
Compliance with noise requirement under the Protection of the Environment Operations Act	No of breaches of POEO Act	Environmental Social	Response	This indicator measures the Corporation’s noise impact on the community from any of its activities, eg pump stations, machinery etc.
Energy consumption in buildings	Total kWh (10 year trend)	Environmental Economic	Pressure	It is important to measure and report on energy consumption as this is an important greenhouse issue.

<b>FULL SET OF HWC ENVIRONMENTAL/ESD INDICATORS</b>				
<b>Environmental Indicator</b>	<b>Measurement</b>	<b>Primary Purpose of Indicator (Social, Environmental or Economic)</b>	<b>Pressure - State – Response</b>	<b>Comments</b>
Energy efficiency of water and sewer services <ul style="list-style-type: none"> <li>• Water cycle</li> <li>• Wastewater cycle</li> </ul>	kWh per ML water and per ML sewage. 10 year trend.	Environmental Economic	Pressure	This is also an important indicator in relation to reducing greenhouse gases.
Greenpower co-generation (Hydro-power etc)	kWh generated by HWC	Environmental	Response	This indicator will demonstrate how HWC is pursuing the means to generate “green” power, offsetting energy consumption from traditional sources.
Generation of Greenhouse Gases	Key Greenhouse gases to be measured in tonnes per annum due to electricity consumption.	Environmental	Pressure	It is important to report on the Corporation’s production of greenhouse gas emissions associated with energy consumption.
Costs	Real operating cost per property, per ML of water delivered and per head of population.	Economic	Pressure	Costs have been chosen as an ESD indicator as they form the third part of the ESD triangle, ie the economic part with the others being social and environmental.
<b>Overall Service Delivery</b> <ul style="list-style-type: none"> <li>• Population in area of Operations.</li> </ul>	Number of people residing in HWC area of operations 10 year trend.	Social Environmental	Pressure	Population is a good indicator of the demand that can be placed on water and wastewater services.
<ul style="list-style-type: none"> <li>• Population supplied with water.</li> </ul>	Residential estimate from census.	Social Environmental	Pressure State	Population is a good indicator of the demand that can be placed on water and wastewater services.

<b>FULL SET OF HWC ENVIRONMENTAL/ESD INDICATORS</b>				
<b>Environmental Indicator</b>	<b>Measurement</b>	<b>Primary Purpose of Indicator (Social, Environmental or Economic)</b>	<b>Pressure - State – Response</b>	<b>Comments</b>
<ul style="list-style-type: none"> <li>Number served by treated water supply.</li> </ul>	Residential estimate for areas served by treated water.	Social Environmental	Pressure State	“
<ul style="list-style-type: none"> <li>Population supplied with water and sewer.</li> </ul>	Residential estimate for people connected to water and sewer.	Social Environmental	Pressure State	“
<ul style="list-style-type: none"> <li>Sewered population or population of water supplied population (%)</li> </ul>	Residential estimate for sewerage areas of percentage of residential areas supplied with water.	Social Environmental	Pressure State	“
<b>Price</b> <ul style="list-style-type: none"> <li>Water price per 1000 litres</li> </ul>	Measured in \$ per KL of water supplied to customers.	Economic Social	Response	The SOE indicators include price as a demand management indicator. In this context price changes are assessed side by side with consumption indicators.

PRIORITY SET OF ESD INDICATORS				
Environmental Indicator	Measurement	Primary Purpose of Indicator <i>(Social, Environmental or Economic)</i>	Pressure - State - Response	Comments
Compliance with the Operating Conditions (Section 4), Monitoring and Reporting Conditions (Section 5) and Management Plan (Section 6) of the Water Management Licence (WML) issued under the Water Act.	Annual report on compliance and any reports of non-compliance to the Department of Land and Water Conservation.	Environmental	Response	This indicator is important as it reports on the Corporation's compliance with the Water Management Licence issued by DLWC. Compliance with this licence ensures we extract water in a sustainable manner.
Environmental releases from Chichester Dam.	Annual flow volume in Chichester River at Chichester Dam when dam is not spilling. To be expressed as a proportion of flow requirements specified in WML cl 4.3 for period when there is no flow over spillway.	Environmental	Response	These environmental releases are important to protect the sensitive ecological processes in the Williams River.
Residential sector water use.	Measured as Kilolitres/household/annum (5 year rolling average)	Environmental Social	Pressure State	This indicator measures household water consumption. It is important as a critical part of the Corporation's demand management strategy is targeted at sustaining low residential water consumption.
Total Water Supplied	Measured as total kilolitres of water supplied to customers. (5 year rolling average)	Environmental Social	Pressure State	This is an important indicator as it measures water extracted from all sources to supply all customers.

PRIORITY SET OF ESD INDICATORS				
Environmental Indicator	Measurement	Primary Purpose of Indicator <i>(Social, Environmental or Economic)</i>	Pressure - State-Response	Comments
Non-revenue water (water loss)	In ML and % of source supply per year. Separate into components. <ul style="list-style-type: none"> <li>– Supply from Sources</li> <li>– Metered consumption</li> <li>– Meter error/discrepancies</li> <li>– Unmetered use and identified losses</li> <li>– Residual (leakage)</li> </ul> Graphical five-year trend representation.	Environmental	Pressure	It is important to include this as an indicator as it measures water that can be lost due to leaks, fire fighting, flushing etc.
Compliance with EPA wastewater treatment plant conditions	Flow weighted compliance as reported for Open Board	Environmental	Response	It is important to measure and report against the Corporation's EPA licences as this is an indicator of potential impact on the environment from wastewater treatment works.
Recycled water	Direct and indirect reuse as currently calculated.  Proportions of total ADF.  Graphical five-year trend representation	Environmental	Response	This indicator is a key component of the Corporation's demand management strategy as it measures the amount of effluent provided to industry and agricultural uses as a replacement for potable water.

PRIORITY SET OF ESD INDICATORS				
Environmental Indicator	Measurement	Primary Purpose of Indicator <i>(Social, Environmental or Economic)</i>	Pressure - State-Response	Comments
Biosolids Reuse	<p>Annual tonnage (dry tonnes) and proportions of dewatered biosolids available for reuse.</p> <ul style="list-style-type: none"> <li>- Recycled for agriculture or mine rehabilitation.</li> <li>- Municipal waste minimisation (eg co-composting, vermiculture)</li> <li>- Disposed of to landfill.</li> <li>- Other reuse.</li> </ul> <p>Graphical five-year trend representation.</p>	Environmental	Response	This indicator is important as it measures the amount of biosolids that are beneficially re-used for agriculture, landscaping etc from the Corporation's wastewater treatment works.
Sewer transport system performance (wet and dry weather surcharges)	<p>Sewer surcharges (no. and no./km main)</p> <p>Surcharges to private land (no. &amp; proportion of customers affected)</p>	Environmental Social	Response	This indicator measures and reports on surcharges from the sewer transport system. It is an indicator of the impact on both the environment and customers.
Odours	Treatment plant and transport system complaint nos. and trends	Environmental Social	State	This indicator provides a measure of the impact of odours from the Corporation's wastewater transport and treatment systems on the local community.



PRIORITY SET OF ESD INDICATORS				
Environmental Indicator	Measurement	Primary Purpose of Indicator <i>(Social, Environmental or Economic)</i>	Pressure - State-Response	Comments
Customer survey perceptions	Overall performance rating  Community acceptance of water supply standard.  Community support for water conservation.  Community acceptance of household sewage disposal service.	Social	State	This indicator is used to measure and report on community perceptions in relation to social, ecological and environmental issues. This survey is conducted every 2 years.
Compliance with noise requirement under the Protection of the Environment Operations Act	No of breaches of POEO Act	Social  Environmental	Response	This indicator measures the Corporation's noise impact on the community from any of its activities, eg pump stations, machinery etc.
Energy consumption in buildings	Total kWh (10 year trend)	Environmental  Economic	Pressure  State	It is important to measure and report on energy consumption as this is an important greenhouse issue.
Energy efficiency of water and sewer services  <ul style="list-style-type: none"> <li>• water cycle</li> <li>• wastewater cycle</li> </ul>	kWh per ML water and per ML sewage.  10 year trend.	Environmental  Economic	Pressure  State	This is also an important indicator in relation to reducing greenhouse gases.
Costs	Real operating cost per property, per ML of water delivered and per head of population.	Economic	Pressure	Costs have been chosen as an ESD indicator as they form the third part of the ESD triangle, ie the economic part with the others being social and environmental.

PRIORITY SET OF ESD INDICATORS				
Environmental Indicator	Measurement	Primary Purpose of Indicator <i>(Social, Environmental or Economic)</i>	Pressure - State-Response	Comments
<b>Overall Service Delivery</b> <ul style="list-style-type: none"> <li>Population in area of Operations.</li> <li>Population supplied with water.</li> <li>Number served by treated water supply.</li> <li>Population supplied with water and sewer.</li> <li>Sewered population or population of water supplied population (%)</li> </ul>	Number of people residing in HWC area of operations 10 year trend.	Social Environmental	Pressure	Population is a good indicator of the demand that can be placed in water and wastewater services.
	Residential estimate from census.	Social Environmental	Pressure State	Population is a good indicator of the demand that can be placed in water and wastewater services.
	Residential estimate for areas served by treated water.	Social Environmental	Pressure State	“
	Residential estimate for people connected to water and sewer.	Social Environmental	Pressure State	“
	Residential estimate for sewerage areas of percentage of residential areas supplied with water.	Social Environmental	Pressure State	“
<b>Price</b> <ul style="list-style-type: none"> <li>Water price per 1000 litres</li> </ul>	Measured in \$ per KL of water supplied to customers.	Economic Social	Response	The SOE indicators include price as a demand management indicator. In this context price changes are assessed side by side with consumption indicators.