



Hydropower Sustainability Assessment Protocol

Pilot Assessment

Trevallyn Hydropower Development

Tasmania, Australia



4th April 2012

Client: Hydro Tasmania

Project sponsor: Hydro Tasmania

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Date: 04/04/2012

Project stage: Operation

Project size: 96 MW

Project type: Run-of-river



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1 Executive Summary

This report presents an assessment conducted in accordance with the Operation Assessment Tool of the Hydropower Sustainability Assessment Protocol. The assessment is conducted for the 96 MW Trevallyn Power Development (hereafter referred to as 'Trevallyn'), which is located in the state of Tasmania in Australia. Hydro Tasmania is the owner and operator of the power development, but it is recognised that responsibilities for some of the Protocol topics go beyond Hydro Tasmania alone (e.g. public health, water quality, biodiversity).

Hydro Tasmania's governance and management is generally of a high international standard, and Trevallyn and its impacts are well-managed. Hydro Tasmania as a company responds well to most opportunities to engage with partners to minimise impacts. The development operates in an extensive and very stringent regulatory environment in which federal-, state- and council-level authorities all have requirements for multiple aspects of operations, performance, preparedness, governance and community relations, to mention a few.

Trevallyn is a mature and well-established development, and was built over 65 years ago. The age of the development means that Topic O-8 Projects Benefits and Topic O-9 Project-Affected Communities & Livelihoods are not relevant, because these topics look specifically at how the operating facility addressed issues raised prior to the station's commencement of operations, when it was a "project" under development. Ongoing issues relating to benefits and affected communities are assessed throughout other topics in the Protocol. Topic O-10 Resettlement was also found to be not relevant as members of the community were not required to be relocated when the project was built.

The report presents an assessment of Trevallyn, and does not assess wider Hydro Tasmania performance. In several Protocol topics, the corporate-level performance of Hydro Tasmania is relevant, but the assessment team has sought evidence that this extends to Trevallyn itself. In addition, as the farthest downstream asset in the complex system of reservoirs, diversions and power plants of the Great Lake – South Esk system, for some topics the assessment team has had to evaluate performance using broader operational details. We have tried to be clear about this in the detailed topic evaluations.

There are, however, a few exceptions to this (notably surrounding monitoring issues) which are reflected in the scoring of a number of Topics.

Trevallyn meets at least Basic Good Practice (a score of 3) for all but one topic. The exception is O-15, Biodiversity & Invasive Species (score of 2), owing to the cessation of monitoring of the effectiveness of a measure taken partly with the objective of improving conditions for biodiversity downstream of the dam.

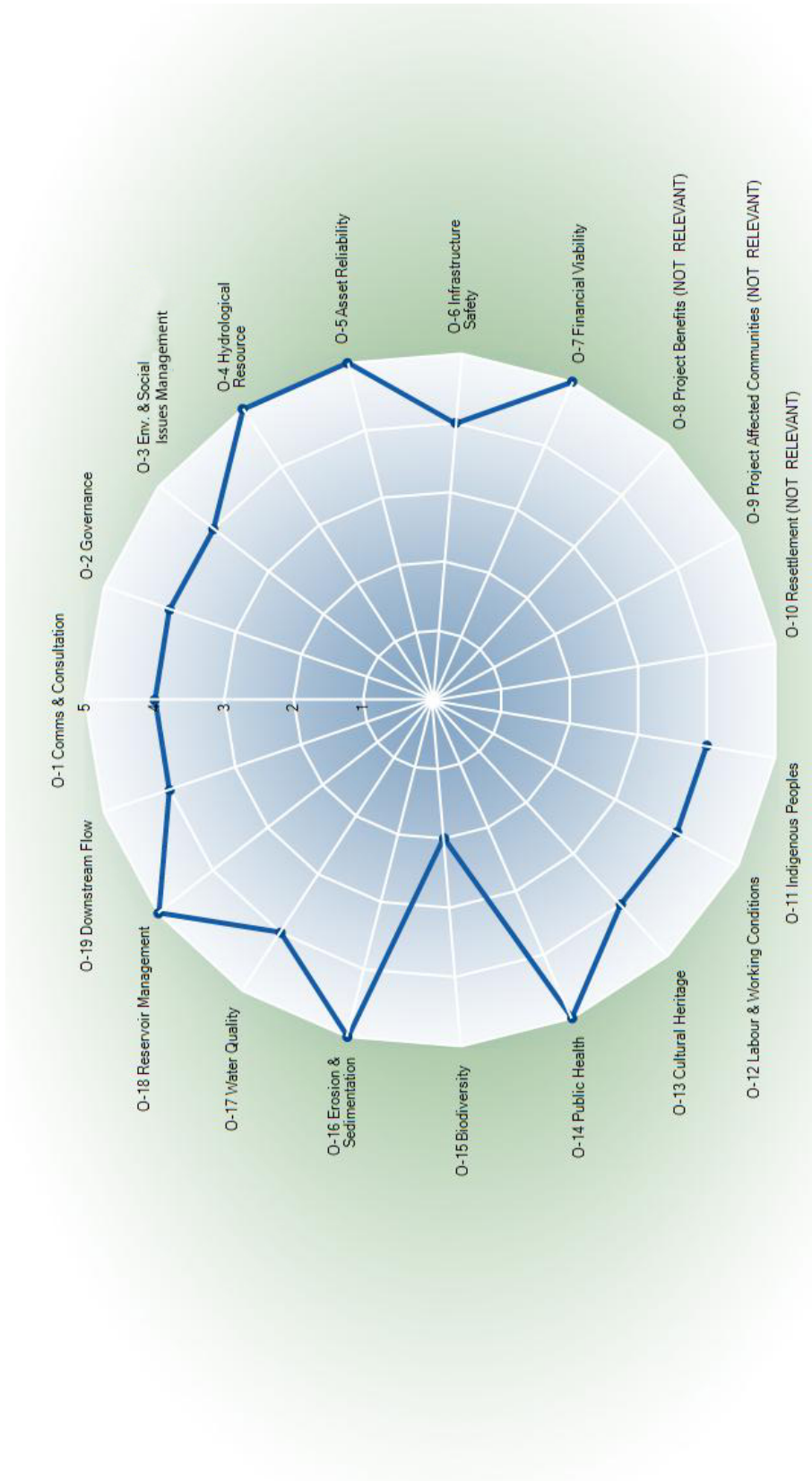
Trevallyn meets Proven Best Practice on six topics: O-4, Hydrological Resource; O-5, Asset Reliability and Efficiency; O-7, Financial Viability; O-14, Public Health; O-16, Erosion & Sedimentation; and O-18, Reservoir Management. It performs with one significant gap from Proven Best Practice, a score of 4, on a further nine topics: O-1, Communication & Consultation; O-2, Governance; O-3, Environmental & Social Issues

Management; O-6, Infrastructure Safety; O-11, Indigenous Peoples; O-12, Labour & Working Conditions; O-13, Cultural Heritage; O-17, Water Quality and; O-19, Downstream Flow Regime. The significant gaps against Proven Best Practice often concern various aspects of monitoring and/or acting on broad opportunities that exist to work even more extensively with other stakeholders in order to minimise impacts or address concerns.

As the Protocol explains, the level of Basic Good Practice (score of 3) is a good and responsible level of performance, and defined as “projects in all contexts should be working toward such practice”. Trevallyn scores above this level on all but one of the assessed Topics. This is a very good level of performance. However, Hydro Tasmania’s generally very high standards at the corporate level have not been extended to Trevallyn in all areas. This is despite the fact that Trevallyn poses a significant reputational risk to the company, owing to its proximity to Tasmania’s second largest city, Launceston. For example, although stakeholder engagement is extensive at a corporate level, and although there has been an extensive and steadily-improving process of ongoing stakeholder engagement in Launceston, there remain concerns in the community that Trevallyn is sometimes more reactive than proactive in terms of community concerns.

In a number of topics where Trevallyn does not meet Proven Best Practice (score of 5), this results from a conscious business decision or a lower relevance of the topic to Trevallyn’s particular context. The spider diagram on the following page summarises the assessment of Trevallyn.

2 Sustainability profile



3 The Hydropower Sustainability Assessment Protocol

3.1 Introduction to the Protocol

The Hydropower Sustainability Assessment Protocol is a sustainability assessment framework for hydropower development and operation. It enables the production of a sustainability profile for a project through the assessment of performance within important sustainability topics.

To reflect the different stages of hydropower development, the Protocol includes four assessment tools that have been designed to be used as standalone documents.¹ Through an evaluation of basic and advanced expectations, the Early Stage tool may be used for risk assessment and for dialogue prior to advancing into detailed planning. The remaining three assessment tools, Preparation, Implementation and Operation, set out a graded spectrum of practice calibrated against statements of basic good practice and proven best practice. The graded performance within each sustainability topic also provides the opportunity to promote structured, continuous improvement.

Assessments rely on objective evidence to support a score for each topic, that is factual, reproducible, objective and verifiable. The Protocol will be most effective when it is embedded into business systems and processes. Assessment results may be used to inform decisions, to prioritise future work and/or to assist in external dialogue.

A wide application of the Protocol is desired; it should be applied in a collaborative way, to ensure the best availability of information and points of view. The development and evaluation of a hydropower project will involve many actors with different roles and responsibilities. It is recognised that both development and operation may involve public entities, private companies or combined partnerships, and responsibilities may change as the project progresses through its life cycle.

3.2 The Operation Assessment Tool

The Trevallyn assessment has been conducted using the Operations assessment tool, consisting of 19 individual topics. As the name indicates, this tool assesses the operational phase of a project/facility. It can be used to find out whether or not the facility is operating on a sustainable basis, and also helps in identifying areas of potential improvement, thereby guiding management.

The 19 topics assessed under this stage are:

O-1 Communications & Consultation	O-11 Indigenous Peoples
O-2 Governance	O-12 Labour & Working Conditions
O-3 Environmental & Social Issues Management	O-13 Cultural Heritage
O-4 Hydrological Resource	O-14 Public Health
O-5 Asset Reliability & Efficiency	O-15 Biodiversity & Invasive Species
O-6 Infrastructure Safety	O-16 Erosion & Sedimentation
O-7 Financial Viability	O-17 Water Quality
O-8 Project Benefits	O-18 Reservoir Management
O-9 Project-Affected Communities & Livelihoods	O-19 Downstream Flow Regimes
O-10 Resettlement	

¹ The Protocol assessment tools can be downloaded from www.hydrosustainability.org.

The approach of the Operations assessment tool is similar to that of ISO 14001, in that the existing condition is taken as the baseline, and risks are assessed against that condition. It does, however, differ in the way that the Protocol assesses performance, not just attention to a subject.

3.3 Pilot Assessment

This assessment pilots the use of the Hydropower Sustainability Assessment Protocol. The Protocol's Terms & Conditions of Use² specify that to be an Official assessment, the assessment must be led by an accredited assessor. The assessor accreditation course has not yet been finalised and so, in the interim, and as agreed by the Protocol's Governance Committee, this assessment will be referred to as a pilot assessment.

4 Assessment Objectives

There were four agreed objectives for this assessment:

1. To evaluate the sustainability of operations of Trevallyn using a structured and internationally consistent assessment methodology, and identify opportunities for improvement.
2. To produce a Protocol sustainability assessment report and profile that can be made publicly available by the Protocol Management Entity for interested stakeholders to see the methodology and product of a Protocol assessment.
3. To provide a capacity building opportunity for the Protocol governance committee (the Hydropower Sustainability Assessment Council) and IHA staff in application of the Protocol.
4. To provide a capacity building opportunity for Hydro Tasmania and Entura staff in application of the Protocol.

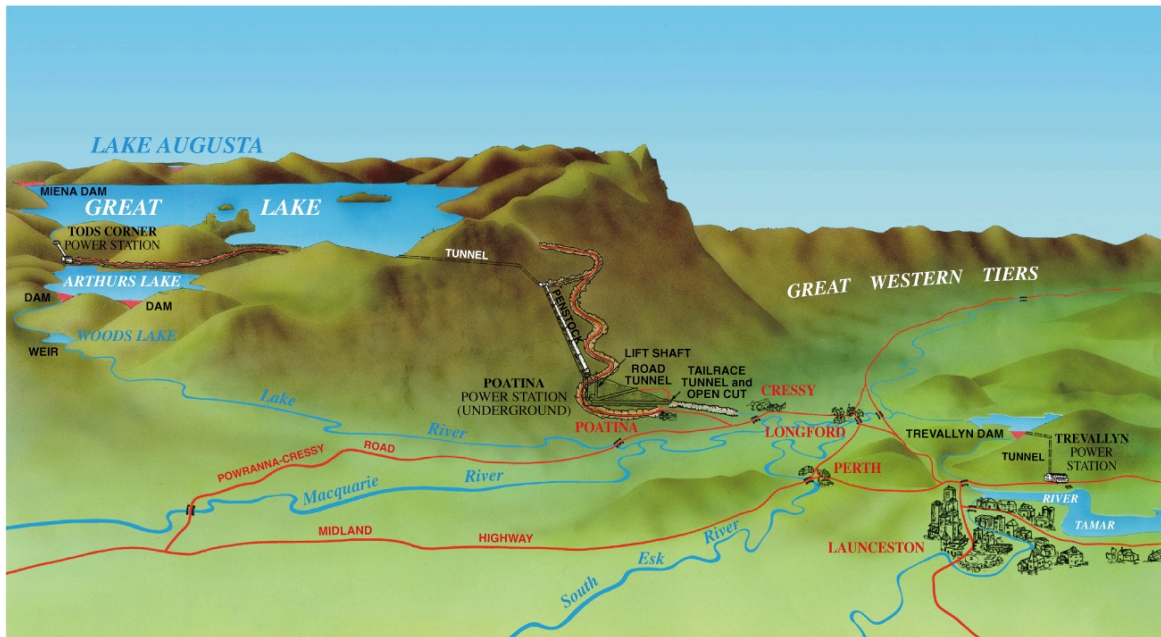
The capacity building objective is important to appreciate. This is a new tool for the hydropower sector, and this application for Trevallyn is one of the first uses of the tool. Consequently there were a large number of assessment participants, listed in Appendix A, many of them based overseas. These included a number of observers from the Hydropower Sustainability Assessment Council, the independent governance body for the Protocol.

5 Project Description

5.1 The Facility

Trevallyn, which is located five kilometres from the centre of Launceston (the major town in northern Tasmania), was commissioned in 1955. Trevallyn is a run-of-river station making use of daily flows down the South Esk River. The power station receives water from the entire South Esk catchment, and also from the Great Lake region in the Central Highlands via discharges from the Poatina Power Station. Trevallyn Dam on the South Esk River diverts water through a 3.2 kilometre tunnel to the power station. Water is discharged into the Tamar River at sea level by an open tailrace channel. The Tamar River is estuarine at this point, subject to strong tidal influences, and discharges to the north coast of Tasmania.

² Protocol Terms & Conditions of Use can be downloaded from www.hydrosustainability.org



Schematic showing the Great Lake – South Esk power development

Some more information about the Hydro Tasmania system, and where Trevallyn sits within it, can be found in the Power of Nature document by going to: - www.hydro.com.au/power-of-nature

Technical Details for Trevallyn

Scheme	South Esk Catchment
Year commissioned	1955
Power station structure	Surface, 72 m long x 14 m wide sized to house four generating sets with assembly bay. A two storey services block including control wing and workshop is annexed to the machine and assembly bay.
Static head	126.49 m
Generating set	Four vertical shaft generating sets, two comprising a 20.9 MW Francis turbine directly coupled to a 3-phase, 50Hz, 25 MVA synchronous generator and with provisions for synchronous compensator operation and two comprising a 27 MW Francis turbine directly coupled to 3-phase 50Hz, 30.6 MVA synchronous generator. Synchronous speed = 375 rpm. Rated voltage = 11 kV.
Turbine manufacturer	English Electric Generator manufacturer
Rated head	115 m

Rated output	96 MW
Rated discharge (at full generation capacity)	100 m ³ /s

5.2 The Owner

Hydro Tasmania is Australia's largest producer of renewable energy. Owned by the Government of Tasmania, Hydro Tasmania is the main provider of electricity to Tasmania, an island state of Australia, and the largest water manager in Australia.

Hydro Tasmania has developed and operated hydropower facilities since 1916. Its hydro-electric system is made up of 30 hydropower stations, numerous regulated lakes and over 50 large dams with an installed total generating capacity of 2 281 MW, generating a total of 8 184 GWh in the 2010 financial year. Generation operations are centrally controlled through an integrated system throughout the State. Some of the energy is exported into the National Electricity Market (NEM) via the undersea Basslink cable. Through key roles and initiatives with the International Hydropower Association (IHA), Hydro Tasmania has had a long history of leadership in the international arena in the area of environmental and sustainability performance for hydropower projects. Hydro Tasmania is a corporate member of IHA, was the originator of the IHA Sustainability Assessment Protocol, and led its development and continuous improvement through testing with global hydropower companies through the first six versions up to 2006.

6 Assessment Process

6.1 Stages

A Protocol assessment process consists of four stages: establishment, planning, on-site assessment and reporting and finalisation.

The establishment of the Trevallyn Protocol assessment was in July 2011 based on a proposal by Hydro Tasmania to the International Hydropower Association (IHA) to undertake an internal assessment of the station. IHA asked if they could conduct the assessment at their own cost as part of a capacity-building initiative, including bringing observers from the Hydropower Sustainability Assessment Council, to which Hydro Tasmania agreed.

Hydro Tasmania undertook planning for the assessment between the period August-September 2011, involving a full-day workshop to identify potential interviewees and evidence, and a number of planning meetings.

The on-site assessment took place between 2nd and 7th October 2011. It involved an assessment team of three assessors, plus seven international observers.

Some follow-up information was provided to the assessors, in response to their requests, and a draft version of this report delivered in October 2011. Following the receipt of Hydro Tasmania's comments on the draft report, this final report was delivered on 4th April 2012.

6.2 Scoring

6.2.1 The scoring levels

Each topic is scored from Level 1 to 5, with 5 being the highest score attainable for a topic. The Level 3 and Level 5 statements provide meaningful and recognisable levels of performance against which the other scores are calibrated.

Level 3 describes *basic good practice* on a particular sustainability topic. Level 3 statements have been designed with the idea that projects in all contexts should be working toward such practice, even in regions with minimal resources or capacities or with projects of smaller scales and complexities.

Level 5 describes *proven best practice* on a particular sustainability issue that is demonstrable in multiple country contexts.

The Level 3 and Level 5 statements are set out in the Protocol assessment tools, and are reviewed in depth by the assessment team as part of the methodology. The Level 5 statements provide what is required in addition to that described in the Level 3 statement, and are meant to be read in conjunction with and in addition to the Level 3 statements. The other scoring levels are represented by standard statements which use basic good and proven best practice as reference points:

Level 1 - There are significant gaps relative to basic good practice.

Level 2 - Most relevant elements of basic good practice have been undertaken, but there is one significant gap.

Level 4 - All elements of basic good practice have been undertaken and in one or more cases exceeded, but there is one significant gap in the requirements for proven best practice.

6.2.2 Methodology for assigning scores

The following steps are involved in the assignment of a score for each Protocol topic:

1. The assessor evaluates if the scoring statements for each of the criteria specified at Level 3 are met by the project.
2. If there is a significant gap relative to the Level 3 statements (all or part of a criterion is not fulfilled), then a score of 2 is assigned to the topic.
3. If there is more than one significant gap relative to the Level 3 statements, then a score of 1 is assigned to the topic.
4. If all of the Level 3 statements are met, then the assessor evaluates if the scoring statements for each of the criteria specified at Level 5 are met by the project.
5. If there is one significant gap relative to the Level 5 statements, then a score of 4 is assigned to the topic. If there is more than one significant gap relative to the level 5 statements, then a score of 3 is assigned to the topic.
6. If all of the Level 5 statements are met, then a score of 5 is assigned to the topic.

"Significant" means important in effect or consequence, or relatively large. If there are minor gaps, these will not affect the score. That is to say, if there are minor gaps in meeting the requirements specified in the Level 3 statements, a score of 3 is still assigned. The significance of any gap is tested by the assessor through inquiry about the importance or magnitude of the effect or consequence of that gap.

6.2.3 Evidence

A Protocol assessment is an evidence-based process, to ensure objectivity and replicability of the findings. Evidence is provided and reviewed in three forms: visual (through a site visit), documentary (through review of reports and the internet), and verbal (through interviews). The sources of evidence for this assessment are clearly listed in the appendices. Appendix B provides the assessment schedule during the on-site visit of the assessment team; Appendix C provides a list of who was interviewed and their role and affiliations, and Appendix D provides a list of the documentary evidence considered by the assessment team. Finally, Appendix E provides the photographic evidence cited.

It should be noted that in the topic-by-topic write-ups in Section 8 the relevant evidence is cited as numbers. These numbers align with the document numbers provided in Appendix D. Appendices C and D also indicate the specific Protocol topics for which the interviewees provided verbal evidence.

7 Assessment Experience

This section addresses limitations and reflections of this particular assessment.

Given the high level of familiarity with the Protocol within Hydro Tasmania, the assessment was very well supported with a comprehensive and readily available body of evidence, some of it well in advance of the team's arrival in Tasmania. Any request for more evidence was immediately dealt with in a very efficient manner.

The assessment team was given the opportunity to interview a variety of different internal and external stakeholders, and not only those supportive of Hydro Tasmania and Trevallyn operations. The discussions were open and rewarding, and the team was given opportunities to hear contrasting views on most issues. The team has seen and heard relevant evidence more than sufficient to review performance and score all relevant topics.

Hydro Tasmania and the Single Point of Contact showed their familiarity with the Protocol by providing key evidence in advance that supported the start of a meaningful assessment process for the team.

The capacity-building experience for the assessors, IHA staff, the Protocol's governance council, and Hydro Tasmania staff was an explicit objective of this particular assessment, and delivery on this objective was considered highly successful. The availability of planning examples from the Trevallyn assessment to the Protocol training process, and use of experience of the assessors as a basis for the assessor accreditation training courses, will be important contributions of this assessment, as will the availability of the report publicly to serve as the first public example of the results of a Protocol assessment.

8 Topic Evaluations

This section evaluates each of the Protocol's topics in turn. The detailed topic evaluations are made with respect to the scoring criteria set out for each topic in the Operations assessment tool.

8.1 Communications & Consultation (O-1)

This topic addresses ongoing engagement with project stakeholders; both within the company as well as between the company and external stakeholders (e.g. affected communities, governments, key institutions, partners, contractors, catchment residents, etc). The intent is that stakeholders are identified and engaged in the issues of interest to them, and communication and consultation processes maintain good stakeholder relations throughout the project life.

8.1.1 Relevant evidence

1-11, 21, 22, 27, 40, 41, 88-100

8.1.2 Relevant Background Information

Hydro Tasmania is a multi-facility hydropower operator with a long history which is closely tied with the development of the state of Tasmania. The business is owned by the state government. Development of new facilities stopped after major conflicts, and Hydro Tasmania now manages a portfolio of older facilities such as Trevallyn and has branched out into consulting, retail, trading with mainland Australia through the Basslink cable, and wind farms. Its communications and consultation approach, both at the corporate/state level and at the level of individual facilities such as Trevallyn, is generally seen as more inclusive and accessible than it used to be. As Trevallyn is located practically within the second largest city in Tasmania, it invariably attracts public attention.

8.1.3 Detailed topic evaluation

Criteria	Detailed topic evaluation	Met?
Assessment	<u>Analysis against basic good practice</u> Hydro Tasmania regularly identifies, both at the state/corporate level and at the regional/project level, its stakeholders and their interests. The effectiveness is monitored through surveys.	Y
	<u>Analysis against proven best practice</u> Stakeholder mapping takes broad considerations into account. Hydro Tasmania has commissioned external reports from the Australian Centre for CSR to assist in the identification of stakeholders.	Y
Management	<u>Analysis against basic good practice</u> Appropriate consultation and communication processes have been undertaken for specific issues that are relevant to stakeholders, such as basin water management plans, reservoir management, Cataract Gorge e-flows, and construction impacts on local residents during the Trevallyn upgrade. Opportunities also exist to feed back to Hydro Tasmania on various issues on a continuous basis. Hydro Tasmania has received external independent assurance	Y

	against the AA 1000 Stakeholder Engagement Standard.	
	<u>Analysis against proven best practice</u> Communication and consultation plans and processes could be more varied and sensitive to the expectations and the background of various stakeholder groups. Hydro Tasmania is also, though open for suggestions (directly and through platforms such as NRM North and Tamar Estuary and Esk River group, TEER), not systematically anticipating and responding to emerging stakeholder interests at the project level.	N
Stakeholder Engagement	<u>Analysis against basic good practice</u> Stakeholders generally remarked that Hydro Tasmania has become much better at engaging with them, through two-day engagement and processes for raising issues and obtaining feedback, and expressed satisfaction at the earnestness and openness of the business to discuss issues.	Y
	<u>Analysis against proven best practice</u> The review process for Cataract Gorge e-flows (the issue most relevant for local stakeholders) was seen as inclusive and participatory; negotiations were undertaken in good faith; and feedback on how issues raised have been taken into consideration was thorough and timely.	Y
Conformance Compliance	<u>Analysis against basic good practice</u> Both regulatory and corporate communication and consultation requirements and commitments are being met.	Y
	<u>Analysis against proven best practice</u> Both regulatory and corporate communication and consultation requirements and commitments are being met.	Y

		Significant Gaps
Analysis of significant gaps against basic good practice	Basic good practice criteria are fully met with no significant gaps.	0
Analysis of significant gaps against proven best practice	There is one significant gap against the proven best practice criteria: Communication and consultation plans and processes could be more varied and sensitive to the expectations and the background of various stakeholder groups.	1
SCORE		4

8.1.4 Scoring Summary

Hydro Tasmania in general and the Trevallyn project in particular show a high degree of awareness of stakeholder engagement issues. Given that Trevallyn attracts more attention from local stakeholders than other facilities, with specific views as to the operational

objectives and priorities, and that some views are difficult to reconcile with each other or the objectives of the business, a more proactive and varied communications and consultation approach tailored to the different constituencies could be more effective.

This results in one significant gap against Proven Best Practice, a score of 4.

8.2 Governance (O-2)

This topic addresses corporate and external governance considerations for the operating hydropower facility. The intent is that the owner/operator has sound corporate business structures, policies and practices; addresses transparency, integrity and accountability issues; can manage external governance issues (e.g. institutional capacity shortfalls, political risks including transboundary issues, public sector corruption risks); and can ensure compliance.

8.2.1 Relevant evidence

62-78, 88-89, 92, 97, 131, 161-168

8.2.2 Relevant Background Information

As a publicly owned, multi-facility, diversified business operating in an environment with high expectations as to corporate performance and social responsibility, Hydro Tasmania has complex structures and processes. These provide the framework within which the Trevallyn project is operated.

8.2.3 Detailed topic evaluation

Criteria	Detailed topic evaluation	Met?
Assessment	<u>Analysis against basic good practice</u> Hydro Tasmania operates in a stable and well-understood political environment; both public sector and corporate governance issues are monitored on an on-going basis and through a variety of mechanisms; and emerging issues are assessed for relevance against corporate objectives.	Y
	<u>Analysis against proven best practice</u> There are no significant opportunities for improvement in the assessment of governance issues.	Y
Management	<u>Analysis against basic good practice</u> The business and its operating power stations, including Trevallyn, have developed a broad range of policies and processes to systematically manage itself and its relations with the public sector. Internal and external risks, social and environmental responsibility, and ethical business practices are dealt with in a structured and appropriate manner. A Sustainability Code and a Code of Ethics – which includes whistle-blowing provisions – are guiding employees. Sustainability is internalised in the business strategy.	Y
	<u>Analysis against proven best practice</u> Hydro Tasmania is engaging suppliers in order to encourage good sustainability practices, through e.g. including sustainability its supplier rating process and requiring suppliers to adhere to Hydro Tasmania’s sustainability code in	N

	its standard contract. Hydro Tasmania could be more thorough with respect to checking contractor policies, management systems and practices against corporate policies relating to sustainability. A significant gap is that anti-corruption requirements are not specifically specified in standard contracts or in tender screening processes.	
Stakeholder Engagement	<u>Analysis against basic good practice</u> Hydro Tasmania interacts with a range of stakeholders who are affected or believe to be affected by project operations, or by the business as such, to understand their interests and perspectives. Significant project and corporate information is made publicly available and easily accessible.	Y
	<u>Analysis against proven best practice</u> Hydro Tasmania makes most significant project reports (except for those with commercially confidential information) and supporting materials publicly available. Its Corporate Sustainability Report is integrated with the Annual Report, is of excellent quality (as also recognised by several awards received) and includes (positive) results of surveys on stakeholder engagement.	Y
Conformance Compliance	<u>Analysis against basic good practice</u> The business maintains a system to internally and externally report on, follow-up on and rectify non-compliances.	Y
	<u>Analysis against proven best practice</u> In the current compliance report, no non-compliances were registered for Trevallyn and none were reported by regulators.	Y
Outcomes	<u>Analysis against basic good practice</u> Hydro Tasmania appears to have a robust and comprehensive corporate governance structure and a well-developed engagement with the public sector, which in turn is functional and stable.	Y
	<u>Analysis against proven best practice</u> There is no evidence of unresolved corporate and external governance issues.	Y

		Significant Gaps
Analysis of significant gaps against basic good practice	Basic good practice criteria are fully met with no significant gaps.	0
Analysis of significant gaps against proven best	There is one significant gap against the proven best practice criteria: Hydro Tasmania is not requiring suppliers, through clauses in standard contracts or in tender screening, to have sustainability and anti-corruption policies consistent with its own policies.	1

practice		
SCORE		4

8.2.4 Scoring Summary

Hydro Tasmania has a well-developed and comprehensive system of governance policies and processes. As an operator of existing hydropower assets, major procurement may be infrequent; nevertheless the business could do more to require suppliers to follow Hydro Tasmania's own sustainability and anti-corruption policies.

This results in one significant gap against Proven Best Practice, a score of 4.

8.3 Environmental & Social Issues Management (O-3)

This topic addresses the plans and processes for environmental and social issues management. The intent is that negative environmental and social impacts associated with the hydropower facility are managed; avoidance, minimisation, mitigation, compensation and enhancement measures are implemented; and environmental and social commitments are fulfilled.

8.3.1 Relevant evidence

2, 12, 27-30, 34, 44, 60, 66, 97, 134-140, 155, 162, 171, 178, 211, 214-221, 230, 242, 244.

8.3.2 Relevant Background Information

Hydro Tasmania's Environmental and Sustainability Management System (ESMS) and occupational health and safety management systems, and broader review processes are of relevance to this topic. In addition, a number of other organisations including Launceston City Council (the owners of Cataract Gorge), the Parks and Wildlife Authority, and NRM North have responsibilities and undertake processes (some in partnership with Hydro Tasmania) that address broader environmental management in Trevallyn's area of influence.

8.3.3 Detailed topic evaluation

Criteria	Detailed topic evaluation	Met?
Assessment	<p><u>Analysis against basic good practice</u></p> <p>Systematic processes are in place to identify issues, including the annually-updated hazards and impacts register ER-201 (part of the Hydro Tasmania's Environmental and Sustainability Management System), regular review of progress against Hydro Tasmania's Environmental Plan, the Water Management Review process (carried out in the early 2000's), and active involvement in TEER. In addition systematic processes concerning occupational health and safety are in place (see O-12).</p> <p>Monitoring programmes are in place for identified issues, including company-wide reporting on environmental incidents as part of monthly environmental reports provided to the Executive Leadership Team (the latest report for August 2011 does not report any incidents at Trevallyn), Hydro Tasmania's Waterway Health Monitoring Programme, a suite of routine monitoring data required as a condition of Trevallyn's water license (reported to the Department of Primary Industries, Parks, Water and Environment), and Occupational Health and</p>	Y

	Safety (OH&S) incident and actions monitoring.	
	<p><u>Analysis against proven best practice</u> Processes to identify ongoing and emerging issues are in place, for example the water management review, the review of environmental flows in Cataract Gorge, and Hydro Tasmania's Environmental Plan which sets out strategic environmental improvements that are reported on a periodic basis to the Executive and Board Sustainability Committees.</p> <p>These processes, when combined with Launceston City Council's responsibilities in Cataract Gorge, take broader considerations into account, for example a broad range of relevant issues are addressed, as demonstrated by the Cataract Gorge Conservation Management Plan. This plan addresses heritage values, but does not address biodiversity values (see O-15).</p>	Y
Management	<p><u>Analysis against basic good practice</u> An environmental and social management system is in place, in the form of Hydro Tasmania's Environmental and Sustainability Management System, which includes reference to Trevallyn's direct impacts. This consists of 19 procedures, and sets out the responsibilities of a range of functions, which are met using appropriate expertise. This includes some identified social issues in the aquatic risk register and cultural heritage. Other social issues are addressed by an OH&S management system and labour management procedures (see O-12).</p> <p>The ESMS uses a range of appropriate company-internal expertise, but the company also utilises external consultants and advisors. In addition, detailed training procedures and plans are set out in the ESMS.</p>	Y
	<p><u>Analysis against proven best practice</u> The ESMS is certified to the ISO-14001:2004 standard of environmental management systems, by NCS International in September 2011.</p> <p>Processes are in place at Hydro Tasmania's corporate level to anticipate and respond to emerging risks and opportunities. For example, the Manager Sustainability & Safety reports every six months to the Board Environment and Sustainability Committee, providing a means to highlight wider risks and opportunities, and corporate environmental and social (and governance) risks are incorporated into the Integrated Business Risk Management Framework operated at a corporate level. These processes should prompt identification of Hydro Tasmania's risks and opportunities related to Trevallyn. In addition, Trevallyn's risks and opportunities are addressed by processes such as the Water Management Review and TEER. Management actions arising that are Hydro Tasmania's responsibility are put into practice by amendment of the Storage Operating Rules, based on advice by the Strategic Water Management Committee.</p>	Y

	In addition to these processes, Launceston City Council's activities in environmental management and heritage in Cataract Gorge anticipate emerging risks and opportunities, demonstrated by the development of a Conservation Management Plan for heritage.	
Stakeholder Engagement	<p><u>Analysis against basic good practice</u> Hydro Tasmania works with an extensive range of stakeholders on the operation of Trevallyn, and there is broad agreement amongst the stakeholders interviewed that Hydro Tasmania's approach is extensive and satisfactory, and their relationship with regulators is good. Hydro Tasmania has, in the words of one company-external informant, 'made a vast improvement in listening to stakeholders'.</p> <p>Hydro Tasmania works closely with stakeholders for example on the Tamar Estuary and Esk River Working Group (TEER) as a founding member with NRM North, the Cataract Gorge Advisory Committee, and with Friends of Trevallyn. Feedback has been provided to stakeholders for example in the Community Consultation report of the Water Management Review, on the results of the Cataract Gorge review on Hydro Tasmania's website, and Hydro Tasmania keeps an extensive electronic mailing list. However it is not clear that feedback is provided on specific views and (in some cases formally written) submissions. This is a minor gap.</p>	Y
	<p><u>Analysis against proven best practice</u> Feedback has been thorough and timely.</p>	Y
Conformance Compliance	<p><u>Analysis against basic good practice</u> ER401, the Legal Compliance Register, sets out a very extensive and comprehensive list of legal requirements, and updates on environmental legislation are included in monthly environmental reports. This assessment has not found any evidence that Trevallyn does not comply with legal requirements in social and environmental management, and interviews with DPIPWE indicate that they are in compliance with regulations and meet the requirements of the water license for Trevallyn.</p> <p>Environmental objectives set out in Hydro Tasmania's environmental policy are broadly on-track with respect to Trevallyn. Hydro Tasmania's Environmental Plan set out a series of strategic environmental priorities in July 2010, and an update of the document from May 2011 indicates which specific improvements are complete, on-track or off-track. There are some improvements that are of relevance to Trevallyn that are off-track, but they are not major non-conformances (see analysis against proven best practice below).</p>	Y
	<p><u>Analysis against proven best practice</u> There are no non-compliances, but there are some non-conformances. The Environmental Plan sets out two commitments that are of relevance to Trevallyn that are off-</p>	N

	track: Environmental Incident Simulation Exercise at Trevallyn to reduce impacts in the event of emergencies; and identify preferred contractors with the use of a register to reduce environmental impacts by contractors.	
Outcomes	<p><u>Analysis against basic good practice</u> Negative impacts of Trevallyn are generally avoided, minimised and mitigated. The Production Manager and Environmental Field Adviser report that the environmental performance of Trevallyn is largely satisfactory, with mainly oil storage problems and dealing with the age of the power station building. In recent years, Hydro Tasmania has been very active in minimising and mitigating earlier impacts of the development, for example by increasing downstream flows. There is a risk to the public using the gorge for recreational purposes when the reservoir is drawn-down or during spill events (but this is addressed by topic O-6). There is a significant gap concerning biodiversity (but this is addressed by topic O-15).</p>	Y
	<p><u>Analysis against proven best practice</u> Negative impacts associated with operations are minimised and mitigated (but see O-15). The impact of the project on downstream flows in Cataract Gorge may be said to have been partially compensated by the increase in flow following the water management review for example, and by the previous support provided for the footbridge at Duck Reach.</p>	Y

		Significant Gaps
Analysis of significant gaps against basic good practice	Basic good practice criteria are fully met with no significant gaps.	0
Analysis of significant gaps against proven best practice	Proven best practice is not met, because there are commitments set out in Hydro Tasmania's Environmental Plan that have not been fulfilled.	1
SCORE		4

8.3.4 Scoring Summary

Negative environmental and social impacts associated with Trevallyn are managed, and measures for avoidance and mitigation are implemented, through Hydro Tasmania's comprehensive Environmental and Sustainability Management System which is certified to international standards, OH&S management, and a series of wider processes to address broader risks and opportunities undertaken by Hydro Tasmania, Launceston City Council, and other partners. Hydro Tasmania plans to integrate OH&S management into the ESMS

which is anticipated to bring efficiencies and benefit both OHS performance and environmental performance.

However, proven best practice is not met, because certain commitments set out in Hydro Tasmania’s Environmental Plan are yet to be implemented. This is a gap against the Protocol criterion of conformance/compliance.

This results in one significant gap against Proven Best Practice, a score of 4.

8.4 Hydrological Resource (O-4)

This topic addresses the level of understanding of the hydrological resource availability and reliability to the operating hydropower facility. The intent is that power generation planning and operations take into account a good understanding of the hydrological resource availability and reliability in the short- and long-term, taking into account other needs, issues or requirements for the inflows and outflows as well as likely future trends (including climate change) that could affect the facility.

8.4.1 Relevant evidence

2, 5, 6, 8-10, 51, 52, 115, 125, 138, 142-160, 169-171, 179, 183-186, 202, 211, 212

8.4.2 Relevant Background Information

The assessment of the hydrological resource at Trevallyn is not conducted at the project level. It is natural that all the assets are assessed and modelled at the catchment level. This has some repercussions for the scoring work.

8.4.3 Detailed topic evaluation

Criteria	Detailed topic evaluation	Met?
Assessment	<u>Analysis against basic good practice</u> Hydro Tasmania has a solid and comprehensive hydrological model and the requirement on the modelling exercise is robust given that the power trading as well as generation are based on live updating of the hydrological resource. The water management review is a (planned) recurrent tool which puts the in-house assessments in a broader context.	Y
	<u>Analysis against proven best practice</u> Hydro Tasmania conducts robust standard hydrological trend analyses and routinely adapts their operational expectations on the basis of these. Long-term down-scaled climate-change modelling for Tasmania has been utilised for long-term forecasting and adaptation planning. Regular follow-up of the trend analyses are carried out.	Y
Management	<u>Analysis against basic good practice</u> The comprehensive hydrological model informs generation planning and power trading. The hydrological model in combination with reservoir operational rules which are defined with social and environmental targets and limitations in mind govern the operation of the system.	Y
	<u>Analysis against proven best practice</u> In addition to basic good practice above, water management is based on an elaborate water-pricing system designed to optimise generation decisions. The hydrological trend analyses and climate modelling	Y

	guarantees flexibility to adapt to future medium- and long-term changes.	
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		Significant Gaps
Analysis of significant gaps against basic good practice	Basic good practice criteria are fully met with no significant gaps.	0
Analysis of significant gaps against proven best practice	Proven best practice criteria are fully met with no significant gaps.	0
SCORE		5

8.4.4 Scoring Summary

The sophisticated modelling of the water resource and its relationship to generation needs, market situation as well as the pricing of water for each available storage yields a very comprehensive coverage of the scoring criteria for this topic. Comprehensive water management reviews are undertaken, and the company makes use of standard trend analyses and state-of-the-art downscaled climate models run specifically for Tasmania in order to facilitate adaptation to predicted medium- and long-term changes in the climate.

This results in Proven Best Practice with no significant gaps, a score of 5.

8.5 Asset Reliability & Efficiency (0-5)

This topic addresses the reliability and efficiency of the hydropower facility and associated network assets. The intent is that assets are maintained to deliver optimal performance in the short- and long-term in accordance with the overall electricity generation and supply strategy of the owner/operator.

8.5.1 Relevant evidence

13-19, 101-114

8.5.2 Relevant Background Information

The Trevallyn project was built in the 1950's and went through a major upgrade in the past decade. Management of the project assets is part of a much broader system to manage multiple generation and water infrastructure assets that Hydro Tasmania owns and operates.

8.5.3 Detailed topic evaluation

Criteria	Detailed topic evaluation	Met?
Assessment	<u>Analysis against basic good practice</u> Hydro Tasmania undertakes systematic routine monitoring of asset condition, availability and reliability, and identifies asset maintenance and management issues through its comprehensive Facilities Maintenance Management System (FMMS).	Y

	<p><u>Analysis against proven best practice</u> Asset maintenance, replacement and upgrading requirements are assessed on the basis of safety and revenue risks. Emerging market and technological opportunities and risks (such as the changing energy market as a result of Basslink and increasing wind power, opportunities to provide Frequency Control Ancillary Services, and newly available technologies to reduce oil risks) are taken into account.</p>	Y
Management	<p><u>Analysis against basic good practice</u> Asset maintenance is undertaken according to short- and long-term rolling plans (from 6-week scheduling of routine maintenance, to a 10-year asset management plan, up to 30 years ahead for corporate planning), and integrated through the Facilities Maintenance Management System (FMMS), which documents and tracks maintenance to a high level of detail.</p>	Y
	<p><u>Analysis against proven best practice</u> The long-term program for efficiency improvements and asset upgrades is funded and being implemented; an AUD 32 million upgrade at Trevallyn was undertaken 5 years ago.</p>	Y
Conformance Compliance	<p><u>Analysis against basic good practice</u> Where safety or revenue risks are identified, such as in the recent case of a relief valve at Trevallyn, parts are ordered and are in the process of being installed, or repairs are performed. There was no evidence for major non-compliances or non-conformances, or for not meeting any asset-related commitments.</p>	Y
	<p><u>Analysis against proven best practice</u> Except for minor delays in scheduled maintenance which result from optimising available staff and materials against an overall work schedule, and have no bearing on asset performance, there are no non-compliances or non-conformances.</p>	Y
Outcomes	<p><u>Analysis against basic good practice</u> Data for Trevallyn show high factors of reliability and availability, which is particularly relevant in view of the black start capabilities of Trevallyn in the Tasmanian system.</p>	Y
	<p><u>Analysis against proven best practice</u> Asset reliability and efficiency performance is fully in line with the objectives of Hydro Tasmania.</p>	Y

		Significant Gaps
Analysis of significant gaps against basic good practice	Basic good practice criteria are fully met with no significant gaps.	0

Analysis of significant gaps against proven best practice	Proven best practice criteria are fully met with no significant gaps.	0
SCORE		5

8.5.4 Scoring Summary

As an owner of aging assets, Hydro Tasmania places great emphasis on their sustainability. Its long-term asset management system is modern and comprehensive, emphasising safety, reliability and value-for-money. Even though it is not one of the most valuable stations in the system, Trevallyn is receiving fully adequate attention and support.

This results in Proven Best Practice with no significant gaps, a score of 5.

8.6 Infrastructure Safety (O-6)

This topic addresses management of dam and other infrastructure safety. The intent is that life, property and the environment are protected from the consequences of dam failure and other infrastructure safety risks.

8.6.1 Relevant evidence

6-7, 11, 59, 115-129, 175

8.6.2 Relevant Background Information

Dam and other infrastructure safety issues for Hydro Tasmania's multiple facilities are managed with significant external supervision, for example through the dam safety regulator in the state government's Department of Primary Industries, Water and Environment, technical expert input, and through coordination with other public agencies. At the project level this includes coordination with the municipal government of Launceston, the municipality downstream of Trevallyn. Floods in the South Esk catchment can pass through Hydro Tasmania's facilities that have little storage and flood control capacity, and affect Cataract Gorge and low-lying suburbs of Launceston. The municipality of Launceston's Flood Authority has primary responsibility for downstream emergency preparedness and response.

8.6.3 Detailed topic evaluation

Criteria	Detailed topic evaluation	Met?
Assessment	<p><u>Analysis against basic good practice</u></p> <p>Trevallyn is categorised as an "extreme hazard dam", given the population and property at risk below the dam. Since the commissioning of the dam, there have been several updated assessments regarding failure modes, flood hydrology and inundation maps, including external and regulatory expertise. As a result of, and in order to further improve, routine dam monitoring and safety, significant investments into instrumentation and drainage were undertaken. The Launceston Flood Authority, which is responsible for flood preparedness in the Upper Tamar estuary, has also assessed the flood risks for low-lying areas of Launceston. Ongoing flood risk assessments are prepared and warnings issued by the Bureau of Meteorology, which partly relies on data shared</p>	Y

	by Hydro Tasmania.	
	<p><u>Analysis against proven best practice</u> In its assessment of safety issues, Hydro Tasmania responds to new regulatory requirements, guidelines and technological opportunities. For example, as a result of new ANCOLD flood risk management guidelines, the spillway capacities of all of Hydro Tasmania's dams were reviewed and in some cases, increased. (This was not necessary for Trevallyn.) In some cases Hydro Tasmania has also provided expertise on safety for other dam owners and regulators in Tasmania.</p>	Y
Management	<p><u>Analysis against basic good practice</u> Responsibility for safety in the immediate project area (reservoir, gorge, tailrace) is shared between Hydro Tasmania, state agencies and local authorities. Responsibility for flood management downstream of Trevallyn dam is with the Launceston City Council, with Hydro Tasmania providing information. Representatives of the State Government's DPIPWE have stated that the different organisations are well coordinated. Management plans have been prepared by Hydro Tasmania, and training programs and emergency response simulations have been undertaken. Although the reservoir capacity is small in comparison to a major flood, Hydro Tasmania will adapt the operation of the cascade above Trevallyn to the extent possible, and empty the Trevallyn reservoir, and thus provide at least a delay in the flood surge when floods are expected. The physical investments at the dam appear appropriate given the inherent safety of the concrete gravity structure.</p>	Y
	<p><u>Analysis against proven best practice</u> People have been trapped on rocks in Cataract Gorge during flood spills. This risk has been identified and a response, such as a flood warning system below the dam through a pulse release prior to spill, with the release being made at the Launceston City Council's direction, was reported to be close to implementation.</p>	Y
Conformance Compliance	<p><u>Analysis against basic good practice</u> Hydro Tasmania's and regulatory processes and objectives relating to safety are being met with no major non-compliances or non-conformances, and safety-related commitments such as the installation of improved monitoring equipment have been met.</p>	Y
	<p><u>Analysis against proven best practice</u> In addition, there are no non-compliances or non-conformances with respect to Hydro Tasmania's facilities and their operations.</p>	Y
Outcomes	<p><u>Analysis against basic good practice</u> Due to its location, Trevallyn will remain an extreme hazard facility as defined by the regulator. While recent upgrades have contributed to avoiding, minimising and mitigating safety risks, Hydro Tasmania recognizes that further action will be</p>	Y

	required.	
	<u>Analysis against proven best practice</u> Safety risks associated with Hydro Tasmania's operations have been avoided, minimised and mitigated with one identified gap (a risk for people in the gorge not being aware of spills and releases), which has not yet been resolved.	N

		Significant Gaps
Analysis of significant gaps against basic good practice	Basic good practice criteria are fully met with no significant gaps.	0
Analysis of significant gaps against proven best practice	There is one significant gap against the proven best practice criteria: There is a need to finalise and implement a safety regime to address people trapped in the gorge during times of spill over and release from Trevallyn Dam.	1
SCORE		4

8.6.4 Scoring Summary

Hydro Tasmania maintains a comprehensive and consistent system for safely managing its infrastructure. There is one gap however in the handling of spills and releases from Trevallyn dam. This gap has been identified and discussed with the municipal authorities. Reportedly an appropriate warning mechanism has been agreed upon, but not yet implemented.

This results in one significant gap against Proven Best Practice, a score of 4.

8.7 Financial Viability (O-7)

This topic addresses financial management of the operating hydropower facility, including funding of measures aimed at ensuring project sustainability, and the ability of the project to generate the required financial returns to meet funding requirements as well as to optimise its financial opportunities. The intent is that the operations of the hydropower facility are proceeding on a sound financial basis that covers all funding requirements including social and environmental measures and commitments, and that it is aware of and responding to market trends which may influence its long-term viability.

8.7.1 Relevant evidence

16, 20, 26, 78, 109, 131-133, 238, 239

8.7.2 Relevant Background Information

Trevallyn is part of an integrated operating system of all power stations in Tasmania, which makes it difficult to assess its financial performance separately (roughly, it provides 4% or AUD 20 million in revenues against AUD 400,000 – 500,000 in routine O&M expenditures). It is subject to the same financial management processes as all operating units of Hydro Tasmania. The financial performance of the overall system is dependent on rainfall and has

therefore suffered during the long drought in the past decade; however it is currently good, with record profits recorded for the past fiscal year.

8.7.3 Detailed topic evaluation

Criteria	Detailed topic evaluation	Met?
Assessment	<p><u>Analysis against basic good practice</u> The routine expenditures of the Trevallyn facility are being effectively monitored as part of the overall budgeting and financial management process of the business.</p>	Y
	<p><u>Analysis against proven best practice</u> At the corporate level, the financial position of the overall hydropower system is constantly assessed against short-term and longer-term factors and trends that might influence future demand for electricity, water and ancillary services. A Strategic Policy branch analyses implications of trends potentially affecting the business, such as the introduction of a carbon tax.</p>	Y
Management	<p><u>Analysis against basic good practice</u> The business allocates finance for regular Operation & Maintenance as well as major capital expenditures through several processes. Major expenditures such as the recent upgrade are approved on the basis of business cases, by the Capital Investment Allocation Team (CIAT), on the basis of expected Return on Investment. Expenditure is tracked against budget. Revenues are not assigned to particular facilities, though the business knows which facilities are providing the most revenue and value to the system. The expansion of the business into wind power, retailing, consulting and the operational complexities arising from the physical link to the mainland and trading operations require new financial processes at the corporate level which are being addressed.</p>	Y
	<p><u>Analysis against proven best practice</u> Hydro Tasmania has a sophisticated system in place to benefit from market opportunities arising from the physical link to the mainland markets, not just in terms of short-term dispatch and trading, but also in terms of longer-term optimisation of assets. One example of pursuing a financial opportunity is that, because of increased efficiency in water use, the recent Trevallyn upgrade could generate tradable Renewable Energy Certificates (RECs). There is also a sufficient buffer in place if financial contingencies arose for environmental and social management measures.</p>	Y
Conformance Compliance	<p><u>Analysis against basic good practice</u> Hydro Tasmania's financial management is subject to internal and external auditing and reporting to the shareholder (Tasmanian Government). Financial management processes are appropriate, and no major non-compliances or non-conformances of relevance to the hydropower-generation side of the business, and to Trevallyn in particular, were evident. Funding commitments have been met, including for major</p>	Y

	capex projects. While there were cost overruns for the recent Trevallyn upgrade, the business has tightened its capex procedures as a consequence, and improved the CIAT approval process.	
	<u>Analysis against proven best practice</u> There are no non-compliances or non-conformances relevant to Trevallyn.	Y
Outcomes	<u>Analysis against basic good practice</u> The Trevallyn facility and Hydro Tasmania, to which it belongs, can manage financial issues under a range of scenarios, can service its debt, and can pay for all plans and commitments including social and environmental.	Y
	<u>Analysis against proven best practice</u> Hydro Tasmania can manage financial issues under a range of scenarios (even under drought conditions and reduced revenue), and is constantly optimising its market position with respect to supply and demand for electricity, water and ancillary services.	Y

		Significant Gaps
Analysis of significant gaps against <i>basic good practice</i>	Basic good practice criteria are fully met with no significant gaps.	0
Analysis of significant gaps against <i>proven best practice</i>	Proven best practice criteria are fully met with no significant gaps.	0
SCORE		5

8.7.4 Scoring Summary

Hydro Tasmania has a well-established financial management system and a forward-looking business strategy. Under all reasonable assumptions, the financial sustainability of Trevallyn is assured.

This results in Proven Best Practice with no significant gaps, a score of 5.

8.8 Project Benefits (O-8)

This topic addresses the benefits that were committed to alongside development of the hydropower facility, in cases where these commitments are well-documented against a pre-project baseline. The intent is that commitments to additional benefits and benefit sharing strategies made during development of the hydropower facility are fulfilled, and that communities affected by the hydropower development have benefitted. In the case of older projects where there is an absence of well-documented commitments to project benefits made at the time of project approval or an absence of data on the pre-project baseline

against which to compare post-project, this topic is not relevant; in this case, issues in relation to project benefits should be taken into consideration under topic O-3 Environmental & Social Issues Management.

8.8.1 Relevant evidence

232, 233, 234, 235, 236, 237

8.8.2 Detailed topic evaluation

The term “project” in this topic refers to the pre-commissioning stage, when Trevallyn was being developed. Archival documents were reviewed in order to determine if commitments had been made prior to project commencement. Documents included: project planning and communication from 1949 onwards, 50 years of communication between Launceston Council and Hydro Tasmania regarding Cataract Gorge, and various minor legal claims that arose during project implementation.

The review did not reveal any documented commitments to project benefits made at the time of the project. As such this topic is considered ‘not relevant’ as per the way it is assessed in the Protocol. Trevallyn obviously delivers a score of benefits but, as stated above, for the purposes of the Protocol assessment, these are assessed under topic O-3 Environmental & Social Issues Management.

8.9 Project Affected Communities & Livelihoods (O-9)

This topic addresses how impacts of development of the hydropower facility on project affected communities have been addressed, in cases where these commitments are well-documented against a pre-project baseline. The intent is that livelihoods and living standards impacted by the project have been improved relative to pre-project conditions for project affected communities with the aim of self-sufficiency in the long-term, and that commitments to project affected communities have been fully fulfilled. In the case of older projects where there is an absence of well-documented commitments to project-affected communities made at the time of project approval or an absence of data on the pre-project baseline against which to compare post-project, this topic is not relevant; in this case, issues in relation to project affected communities should be taken into consideration under topic O-3 Environmental & Social Issues Management.

8.9.1 Relevant evidence

232, 233, 234, 235, 236, 237

8.9.2 Detailed topic evaluation

The term “project” in this topic refers to the pre-commissioning stage, when Trevallyn was being developed. Archival documents were reviewed in order to determine if commitments had been made prior to project commencement. Documents included: project planning and communication from 1949 onwards, 50 years of communication between Launceston Council and Hydro Tasmania regarding Cataract Gorge, and various minor legal claims that arose during project implementation.

The review did not reveal any documented impacts on the livelihood or living standards of the communities close to Trevallyn, or any commitments made to improve livelihood or living standards. As such this topic is considered ‘not relevant’ as per the way it is assessed in the Protocol. This is not to say that Trevallyn does not affect communities, as clearly there is a

very large affected community at the operating stage. But, as stated above, for the purposes of the Protocol assessment, issues arising from Trevallyn operations that affect relevant Communities and Livelihoods are assessed under topic O-3 Environmental & Social Issues Management.

8.10 Resettlement (O-10)

This topic addresses how the physical displacement arising from development of the hydropower facility has been addressed, in cases where resettlement occurred and commitments are well-documented against a pre-project baseline. The intent is that the dignity and human rights of those physically displaced have been respected; that these matters have been dealt with in a fair and equitable manner; that livelihoods and standards of living for resettles and host communities have been improved; and that commitments made to resettles and host communities have been fully fulfilled. In the case of older projects where there is an absence of well-documented commitments in relation to resettlement made at the time of project approval or an absence of data on the pre-project baseline against which to compare post-project, this topic is not relevant; in this case, issues in relation to resettlement should be taken into consideration under topic O-3 Environmental & Social Issues Management.

8.10.1 Relevant evidence

232, 233, 234, 235, 236, 237

8.10.2 Detailed topic evaluation

Archival documents were reviewed in order to determine if the development of the Trevallyn Dam and Power Station required any resettlement. Documents included: project planning and communication from 1949 onwards, 50 years of communication between Launceston Council and Hydro Tasmania regarding Cataract Gorge, and various minor legal claims that arose during project implementation.

The review verified that there was no resettlement as a result of the project, so this topic is considered 'not relevant'.

8.11 Indigenous Peoples (O-11)

This topic addresses the rights, risks and opportunities of indigenous peoples with respect to the hydropower facility, recognising that as social groups with identities distinct from dominant groups in national societies, they are often the most marginalised and vulnerable segments of the population. The intent is that the operating facility respects the dignity, human rights, aspirations, culture, lands, knowledge, practices and natural resource-based livelihoods of indigenous peoples in an ongoing manner throughout the project life.

8.11.1 Relevant evidence

178, 194, 240, 242.

8.11.2 Relevant Background Information

O-11 is relevant to Trevallyn owing to the presence of sites of Aboriginal cultural heritage in the vicinity of the site, and because part of the local population is of Aboriginal descent. There are 23 sites of interest in and around the area, consisting of isolated artefacts and artefact scatters (worked stone and stone tools, and a rock shelter).

The valley of the South Esk River was part of the territory of the Lettermairrener people, who in turn were part of a larger group, known today as the North Midlands tribe. The Cataract Gorge environmental review background report refers to a book, 'Aboriginal Connections with Launceston Places' (Breen and Summers 2006), which includes reflections from local people of Aboriginal descent on their feelings for the gorge.

8.11.3 Detailed topic evaluation

Criteria	Detailed topic evaluation	Met?
Assessment	<p><u>Analysis against basic good practice</u> The value of Cataract Gorge for Aboriginal heritage was assessed and documented by Hydro Tasmania as part of the Cataract Gorge environmental review, and also by Launceston City Council as evidenced by the Cataract Gorge Conservation Management Plan 2008. No management measures beyond the Hydro Tasmania's chance finds procedure for cultural heritage are considered warranted with respect to Trevallyn's operations. Hydro Tasmania has not carried out a more extensive assessment which would include the shoreline of Lake Trevallyn for example, but it is not considered a significant gap.</p>	Y
	<p><u>Analysis against proven best practice</u> Identification of issues affecting Aboriginal people is managed through Hydro Tasmania's company-wide Memorandum of Understanding with TALSC (the Tasmanian Aboriginal Land and Sea Council). TALSC responded to a survey carried out as part of the Cataract Gorge review. A broader range of organisations representing Aboriginal people were consulted during the preparation of the Cataract Gorge Conservation Management Plan and a questionnaire survey undertaken. These processes meet the Protocol requirement that identification of issues has taken place with free, prior and informed participation. However, the plan recommends that further consultation is undertaken, owing to the limitations on time during the preparation of the plan.</p>	Y
Management	<p><u>Analysis against basic good practice</u> The chance finds procedure (EP14 - Cultural Heritage procedure included in the company-wide Environmental and Sustainability Management System) is an appropriate management measure to collect and process artefacts in the event of a chance find. This includes reporting the find to the Environment and Heritage Manager and subsequently Aboriginal Heritage Tasmania, the local statutory body. Hydro Tasmania agreed a Memorandum of Understanding with the Tasmanian Aboriginal Land and Sea Council (TALSC) in 2007, and communicated this publicly in Hydro Tasmania's cultural heritage programme newsletter, which is distributed to external stakeholders and available on Hydro Tasmania's external website. However the agreement itself has not been publicly disclosed. This is a minor gap.</p>	Y
	<p><u>Analysis against proven best practice</u> Processes to anticipate and respond to emerging risks and opportunities should be met by the Hydro Tasmania-TALSC</p>	N

	MoU, Hydro Tasmania's cultural heritage programme and Launceston City Council's responsibilities in Cataract Gorge, although we have no evidence that this is occurring. TALSC is under the impression that the Hydro Tasmania-TALSC MoU had lapsed, which indicates that participation is not effective, and it is not responding to risks and opportunities. This is a significant gap against proven best practice.	
Stakeholder Engagement	<u>Analysis against basic good practice</u> Hydro Tasmania signed a formal Memorandum of Understanding with the Tasmanian Aboriginal Land and Sea Council (TALSC) in 2007, which concerns Hydro Tasmania's overall operations. The officer we interviewed at TALSC believed that the agreement had lapsed: the process may be said to be 'in place', but clearly this requires clarification with TALSC. Hydro Tasmania also has links with the Tasmanian Aboriginal Centre, though they are not formalised. These organisations are consulted with as part of Hydro Tasmania's broader stakeholder consultation processes, for example as part of the Water Management Review and the Cataract Gorge stakeholder survey.	Y
	<u>Analysis against proven best practice</u> Launceston City Council provided feedback on Cataract Gorge Conservation Management Plan to the public at large through facilitated sessions in 2008. There are no directly affected people that could be involved in decision-making.	Y
Conformance Compliance	<u>Analysis against basic good practice</u> Processes and objectives concerning Trevallyn's impacts on aboriginal heritage are in place, and there are no non-compliances.	Y
	<u>Analysis against proven best practice</u> There are no non-conformances or non-compliances.	Y
Outcomes	<u>Analysis against basic good practice</u> In the broadest terms, the rights of Aboriginal people are respected by Hydro Tasmania in its operation of Trevallyn.	Y
	<u>Analysis against proven best practice</u> No opportunities have been identified by Hydro Tasmania beyond this direct risk of chance finds. The Cataract Gorge Conservation Management Plan sets out recommendations, but these concern Launceston City Council responsibilities, rather than opportunities for Trevallyn.	Y
		Significant Gaps
Analysis of significant gaps against basic good practice	Basic good practice criteria are fully met with no significant gaps.	0

Analysis of significant gaps against proven best practice	There is one significant gap, concerning the criterion of management. The Hydro Tasmania-TALSC MoU processes should anticipate and respond to emerging risks and opportunities, but there is a lack of recognition and acknowledgement of this MoU by TALSC.	1
SCORE		4

8.11.4 Scoring Summary

Hydro Tasmania's operation of Trevallyn is carried out with respect for Aboriginal people, and Launceston City Council's broader management of Cataract Gorge addresses Aboriginal heritage in detail. One significant gap against proven best practice, concerning management and the TALSC MoU can be easily addressed. Minor gaps concern the absence of any assessment of Aboriginal artefact sites around Lake Trevallyn, and ensuring that the TALSC MoU itself is publicly disclosed.

This results in one significant gap against Proven Best Practice, a score of 4.

8.12 Labour & Working Conditions (O-12)

This topic addresses labour and working conditions, including employee and contractor opportunity, equity, diversity, health and safety. The intent is that workers are treated fairly and protected.

8.12.1 Relevant evidence

23-25, 72-74, 79-87, 163, 222-229 and photos 19-30.

8.12.2 Relevant Background Information

Hydro Tasmania is a state-owned organisation, and operates in a context of detailed legal requirements concerning labour and working conditions.

8.12.3 Detailed topic evaluation

Criteria	Detailed topic evaluation	Met?
Assessment	<p><u>Analysis against basic good practice</u> Labour management at Trevallyn is part of Hydro Tasmania's company-level labour management (see 'Management'). Human resource and labour management requirements are assessed and monitored according to the management structure, system of performance review, and team meetings. There is also an annual Hydro Tasmania employee survey for issues to be raised, and this can be analysed at the facility level. Occupational Health and Safety (OH&S) risks throughout Hydro Tasmania's operations are assessed and managed using an OH&S policy and system. The system manual is named 'Hydrosafe' and is provided in an accessible form on Hydro Tasmania's intranet. This includes a Workplace Hazard Register for Trevallyn. OHS risks are continuously assessed using an incident reporting system, and monthly and annual reviews carried out by a safety team appointed at the executive level.</p>	Y
	<p><u>Analysis against proven best practice</u> Hydro Tasmania is aware of wider international standards and is planning to seek certification of its OH&S system to international standards. Hydro Tasmania's Human Resources</p>	Y

	<p>Strategic Priorities 2011-12 may be considered to address broader issues, risks and opportunities. Human resources staff use the company's legal team and senior staff members to advise on upcoming risks and opportunities posed by legislation. More practically, the Safety and Environmental Field Advisers for the northern region refer to their practice of impact studies concerning new legislation.</p>	
Management	<p><u>Analysis against basic good practice</u> Human resource and labour management policies, plans and processes are extensive and fully listed on Hydro Tasmania's intranet site. They include all labour management planning components as well as a Code of Ethics, Enterprise Partnership Agreement, quarterly Personal Development Reviews (PDR), annual salary review process, the OH&S policy and system, and Safe Work Practices Manual. These are applied at the corporate level including Trevallyn.</p> <p>The Code of Ethics states that Hydro Tasmania's commitment to its employees is reflected in equal opportunity, anti-discrimination, reasonable working hours, remuneration and benefits, privacy, learning and development, and safety policies and procedures, and that Hydro Tasmania 'works with suppliers who demonstrate ethical standards'. The Enterprise Partnership Agreement is an agreement between Hydro Tasmania and its employees, complying with the Fair Work Act 2009, and it was negotiated with four employee unions as representatives of the employees.</p> <p>Employees are required to sit a 'Safetrack' course on equal opportunities every two years and operations staff receive an induction lasting 15 days.</p> <p>Incidents occurring at Trevallyn are reported using an incident reporting system, which is implemented for Trevallyn by Hydro Tasmania's Safety Adviser and Environmental Field Adviser for the northern region. Incidents are reported to the Production Manager for Trevallyn, who carries the responsibility to take action, and also follows a Safety Improvement Plan. A weekly presentation on safety is provided at the 'toolbox' meetings of all employees at Trevallyn, the Safe Work Practices Manual is highly detailed including permit to work procedures, and employees receive tailored training, annual audits and detailed inductions.</p> <p>Whilst contractor safety is addressed in the Contractor Safety Management procedure which is part of the OH&S system, it is unclear how or whether the commitment to contractor ethical standards is implemented. This is considered a minor gap.</p>	Y
	<p><u>Analysis against proven best practice</u> Processes that are in place to anticipate and respond to emerging risks and opportunities include the monthly and annual reviews of OH&S performance, and the Human Resources Strategic Priorities 2011-12 document. On a practical level, an Employee Assistance Programme is offered</p>	Y

	to employees, providing confidential counselling sessions if they wish, and managers are provided with a 'Managing People Essentials Program'.	
Stakeholder Engagement	<p><u>Analysis against basic good practice</u> Employees are engaged through unions during negotiations on the Enterprise Partnership Agreement, and individual employees are consulted with during their Performance and Development Reviews. Staff concerned with human resources management report that formal grievances are rare, and occur mainly as a result of change management or restructuring. Workplace Support Officers are designated to provide the opportunity for all staff to raise any concerns. All employees have access via the intranet to a listing of their entitlements, including links to National Employment Standards, Australia Fair Pay and Conditions Standard, and the Fair Work Australia website.</p>	Y
	<p><u>Analysis against proven best practice</u> The results of the annual employee survey is widely communicated by many internal mechanisms (intranet, newsletter, team meetings) and in fact managers are obliged to distribute and discuss it with their teams and report back upwards on what is to be done about issues raised. In addition, the Enterprise Partnership Agreement process is a very formalised process that provides feedback on issues raised in a timely and thorough manner.</p>	Y
Conformance Compliance	<p><u>Analysis against basic good practice</u> The Hydrosafe OH&S management system includes detailed objectives and commitments, and they appear to be on-track, although there is some difficulty in enforcing OH&S requirements on contractors. There is no evidence to suggest that any OH&S or labour requirements are not legally compliant.</p>	Y
	<p><u>Analysis against proven best practice</u> There are no non-compliances or non-conformances.</p>	Y
Outcomes	<p><u>Analysis against basic good practice</u> There are no identified inconsistencies of labour management policies, plans and practices with internationally-recognised labour rights. The OH&S system is aligned to OHSAS 18001:2007 OHS Management Systems and OHSAS 18002:2008 OHS management Systems - Guidelines for Implementation, although it is not certified. Hydro Tasmania plans to integrate OH&S management into their ESMS and obtain international certification to ISO 18001. In addition, the Code of Ethics states that Hydro Tasmania 'supports the principles expressed in internationally-proclaimed human rights' (referring to a number of international agreements).</p> <p>Review of OH&S statistics for August 2011 provides sufficient evidence that OH&S objectives are on track to be met, and no incidents at all were reported from Trevallyn for this particular month, though some interviewees noted that reporting of incidents from the operational level could be improved.</p> <p>On-site inspection at the power station and dam shows that safety signage and use of personal protective equipment is</p>	Y

	used. The standard of maintenance and cleanliness at the power station potentially presents a safety hazard, which is identified as a minor gap. Extensive oil fog was observed on the upper and lower floors, presenting a risk of slipping and indicating that oils are present in the air. This has been recognised as a hazard in the Trevallyn Hazard Register as oil from the jacking and lube pumps on the alternator floor, though the control measures in the register appear inadequate ('two-person where practicable; remotes tracking procedure').	
	<u>Analysis against proven best practice</u> Hydro Tasmania has a strong safety culture and very good working conditions, though neither are underpinned by certification to national or international standards. Whilst labour management policies, plans and practices appear to be consistent with internationally-recognised labour rights, there is no documented analysis of this available to meet the requirements of this scoring criterion.	N

		Significant Gaps
Analysis of significant gaps against basic good practice	Basic good practice criteria are fully met with no significant gaps.	0
Analysis of significant gaps against proven best practice	There is one significant gap against proven best practice criteria: There is an absence of documentation to verify that labour management practices are consistent with internationally-recognised labour rights.	1
SCORE		4

8.12.4 Scoring Summary

Trevallyn employees are treated fairly and benefit from a high standard of labour conditions. Hydro Tasmania has extensive human resources management, with all employment issues addressed comprehensively, and a strong safety culture. There is one significant gap in relation to proven best practice: there is no documented analysis of consistency with internationally-recognised labour rights available to meet the requirements of this scoring criterion. This results in a score of 4.

Minor gaps concern the need to demonstrate how the Code of Ethics commitment to ensure contractors meet ethical standards is met, and the standard of maintenance and cleanliness at the power station (for example, slippery floors and storage of materials in several inappropriate locations).

This results in one significant gap against Proven Best Practice, a score of 4.

8.13 Cultural Heritage (O-13)

This topic addresses cultural heritage, with specific reference to physical cultural resources, associated with the hydropower facility. The intent is that physical cultural resources are

identified, their importance is understood, and measures are in place to address those identified to be of high importance.

8.13.1 Relevant evidence

46, 53, 56-58, 178, 193-201, 240, 242 and photos 3, 7, 31 and 32.

8.13.2 Relevant Background Information

Physical cultural resources include the possible presence of cultural artefacts, including Aboriginal cultural artefacts, in the project's area of influence (see O-11), the heritage values of the power station itself, and the derelict Duck Reach Power Station, downstream of Lake Trevallyn in Cataract Gorge. The latter is owned by Launceston City Council, was originally commissioned in 1893, and was decommissioned upon the commissioning of Trevallyn. Interest in its historical value has emerged in recent years.

8.13.3 Detailed topic evaluation

Criteria	Detailed topic evaluation	Met?
Assessment	<p><u>Analysis against basic good practice</u> The physical cultural resources mentioned in 'Relevant Background Information above have been identified. Hydro Tasmania has commissioned an independent inventory of heritage values of all of its assets and prioritised requirements, with no particular issues arising for Trevallyn, and the statutory body Heritage Tasmania has no formal interest in any sites associated with Trevallyn. Duck Reach Power Station is identified by the local community, recognised by the Australian Institution of Engineers, and is referred to on the tourism-promotion website discovertasmania.com.</p> <p>Trevallyn's operations do not have an impact on the cultural heritage values of Duck Reach Power Station. The only management measure required is a chance finds procedure (see 'Management' below), the effectiveness of which is monitored through Hydro Tasmania's Environmental and Sustainability Management System.</p>	Y
	<p><u>Analysis against proven best practice</u> The development of Duck Reach Power Station for its cultural heritage value is an opportunity which has been identified by Launceston City Council and the local community. More broadly, Hydro Tasmania's cultural heritage programme regularly monitors emerging issues and opportunities at a corporate level and is capable of identifying risks and opportunities.</p>	Y
Management	<p><u>Analysis against basic good practice</u> Hydro Tasmania's EP-14 procedure for handling and reporting chance finds of artefacts during operations is applied in Trevallyn's case. Hydro Tasmania's Cultural Heritage programme, and discussions amongst Trevallyn's stakeholders would determine whether further management measures are required, but no other management measures are required to meet basic good practice.</p>	Y
	<p><u>Analysis against proven best practice</u> The development of Duck Reach Power Station is an emerging opportunity. Hydro Tasmania's corporate-level</p>	Y

	Cultural Heritage programme is a process to anticipate and respond to emerging risks and opportunities, but understandably it is focused on Hydro Tasmania-owned assets and impacts. Launceston City Council's cultural heritage management includes processes to identify risks and opportunities, for example Duck Reach is referred to in depth in the Cataract Gorge Conservation Management Plan.	
Conformance Compliance	<u>Analysis against basic good practice</u> Corporate objectives to put in place a cultural heritage finds procedure within the ESMS, to develop and maintain the built heritage register, and to deliver staff cultural heritage training and awareness, have been met.	Y
	<u>Analysis against proven best practice</u> Trevallyn has no non-conformances or non-compliances concerning cultural heritage.	Y
Outcomes	<u>Analysis against basic good practice</u> The operation of Trevallyn does not have any negative impacts on cultural heritage.	Y
	<u>Analysis against proven best practice</u> Opportunities beyond the direct impacts of the facility concern the maintenance of Duck Reach Power Station for its heritage and tourism value. Hydro Tasmania has previously addressed these opportunities for example by providing financial support for a footbridge. In addition, an opportunity to redevelop the site as a mini-hydro has been identified by the local community, for which Hydro Tasmania has provided some feasibility analysis. A more realistic opportunity is to maintain the power station building for its heritage and tourism value. This is identified in the Cataract Gorge Conservation Management Plan (for example recommendations include removing graffiti inside the building). Launceston City Council has not implemented these recommendations, and Hydro Tasmania does not consider them as opportunities. This is a significant gap.	N

		Significant Gaps
Analysis of significant gaps against basic good practice	Basic good practice criteria are fully met with no significant gaps.	0
Analysis of significant gaps against proven best practice	There is one significant gap against proven best practice, concerning the criterion of outcomes: no authority is implementing identified opportunities to maintain the heritage value of Duck Reach Power Station.	1
SCORE		4

8.13.4 Scoring Summary

Physical cultural resources have been identified, their importance understood, and appropriate measures are in place. The operation of Trevallyn has no negative impacts on cultural heritage, and Hydro Tasmania's chance finds procedure is sufficient to manage finds of historical and Aboriginal artefacts in the project's area of influence, meeting basic good practice. An identified opportunity to maintain the heritage value of Duck Reach Power Station is not on track to be achieved, which is a significant gap compared to proven best practice.

This results in one significant gap against Proven Best Practice, a score of 4.

8.14 Public Health (O-14)

This topic addresses public health issues associated with the operating hydropower facility. The intent is that the operating facility has not created or exacerbated any public health issues; that ongoing or emerging public health issues associated with the facility are identified and addressed as required; and commitments to implement measures to address public health are fulfilled.

8.14.1 Relevant evidence

30, 38-39, 58, 178, 230.

8.14.2 Relevant Background Information

Trevallyn operates in a developed country with a mature public health system, provided by the State government's Department of Health & Human Services (DHHS).

8.14.3 Detailed topic evaluation

Criteria	Detailed topic evaluation	Met?
Assessment	<p><u>Analysis against basic good practice</u> Public health issues arising from the operation of Trevallyn may arise from specific spillages of chemicals and oils from the facilities, fire risk at the facilities, and from the effects of lake levels and downstream flows on water quality. All of these are identified in the hazard register of the ESMS with reference to the entirety of Hydro Tasmania operations, not with specific reference to Trevallyn.</p> <p>The environmental report of the South Esk water management review has an extensive section on water quality, it does not provide information on public health concerns arising from water quality specifically for Trevallyn. Concerns raised by stakeholders during the water management review included algal blooms induced by high levels of nutrients from wastewater plant discharges into the gorge (concerns were 'very high'). Nutrient levels, E.coli, and risk of algal blooms is closely monitored through agreed approaches coordinated by NRM North and TEER.</p> <p>Some interviewees queried whether sediments in Tamar Estuary can carry public health risks, as they may be contaminated with acid sulphates, heavy metals and bacteria from upstream. However, it is not clear if this is a serious concern.</p>	Y

	In general, Trevallyn's implications for public health issues are adequately assessed, and no management measures are required to mitigate Trevallyn's impact.	
	<u>Analysis against proven best practice</u> The State government's DHHS and public health system has a high capacity to serve public health needs, and takes into account access to services and health needs, risks and opportunities for different community groups.	Y
Management	<u>Analysis against basic good practice</u> The ESMS includes procedures, guidelines and checklists for chemicals management and oil management. Incident reporting is in place to pick up any issues and prompt the required actions to be taken. Other than this, there are no management measures required to mitigate Trevallyn impact on public health, and no specific measures set out in Hydro Tasmania's environmental plan. Launceston City Council has the responsibility to erect warning signs in the case of lowered water quality in the gorge. Hydro Tasmania has been called on from time to time to 'flush out' the gorge in summer months, particularly as a result of Black Stone Heights nutrient discharges.	Y
	<u>Analysis against proven best practice</u> Processes are in place to respond to emerging public health risks and opportunities, including the responsibilities of the environmental field adviser in responding to incidents, and the incident reporting system, and the broader responsibilities of Launceston City Council and DHHS.	Y
Conformance Compliance	<u>Analysis against basic good practice</u> Objectives, in so far as they have been set, are on track and there are no significant non-compliances or non-conformances.	Y
	<u>Analysis against proven best practice</u> There are no non-conformances or non-compliances.	Y
Outcomes	<u>Analysis against basic good practice</u> Adverse public health impacts arising from Trevallyn operations are avoided, and there are no gaps.	Y
	<u>Analysis against proven best practice</u> Trevallyn has improved water quality beyond its own impacts, by releasing flows to 'flush out' water contaminated with effluent from the Black Stone Heights Wastewater Treatment Plant in summer months, and thereby avoid public health impacts of E. coli. The position of Launceston City Council is that there is a need for the council to work more with Ben Lomond on water quality.	Y

		Significant Gaps
Analysis of significant gaps against basic good	Basic good practice criteria are fully met with no significant gaps.	0

practice		
Analysis of significant gaps against proven best practice	Proven best practice criteria are fully met with no significant gaps.	0
SCORE		5

8.14.4 Scoring Summary

Trevallyn fully meets proven best practice: it has not created or exacerbated any public health issues, ongoing and emerging public health issues are identified and addressed as required, and commitments have been fulfilled. There are no significant public health issues associated with Trevallyn, and it has contributed to improved water quality beyond its own impacts.

This results in Proven Best Practice with no significant gaps, a score of 5.

8.15 Biodiversity & Invasive Species (O-15)

This topic addresses ecosystem values, habitat and specific issues such as threatened species and fish passage in the catchment, reservoir and downstream areas, as well as potential impacts arising from pest and invasive species associated with the operating hydropower facility. The intent is that there are healthy, functional and viable aquatic and terrestrial ecosystems in the area that are sustainable over the long-term; that biodiversity impacts arising from the operating hydropower facility are managed responsibly; that ongoing or emerging biodiversity issues are identified and addressed as required; and that commitments to implement biodiversity and invasive species measures are fulfilled.

8.15.1 Relevant evidence

30, 137, 139, 171-174, 176-178, 180- 187, 231, 242, 243, 244 and photos 8, 33 and 34.

8.15.2 Relevant Background Information

Tasmania is one of the most bio diverse islands in the world, with a high degree of species endemism. It faces considerable conservation challenges resulting from historical habitat destruction and the introduction of invasive species. More than 670 species are listed as threatened by Tasmanian authorities.

The Water Management Review identified a total of 244 endangered, vulnerable, rare and presumed extinct fauna and flora species in the South Esk River catchment. Identified issues of relevance to Trevallyn included a threatened snail species *Beddomeia launcestonensis* that is endemic to Cataract Gorge, the threatened diadromous Australian Grayling (*Prototroctes maraena*), and threatened aquatic flora species. However, the river ecosystem is not of high conservation importance relative to other sites in Tasmania (AUSRIVAS monitoring results were 'significantly impaired' in 2003-04, and 'severely impaired' in 2004-05) as can be expected of a regulated river.

8.15.3 Detailed topic evaluation

Criteria	Detailed topic evaluation	Met?
Assessment	<u>Analysis against basic good practice</u>	N

	<p>Ongoing biodiversity issues have been identified through the Water Management Review process conducted in the early 2000's for the South Esk catchment (including both Cataract Gorge and Lake Trevallyn), and through a series of scientific studies associated with the Cataract Gorge environmental flows review. The commitment to increase flows, resulting from the Water Management Review, was made partly to benefit aquatic biota including the endemic snail.</p> <p>Monitoring of the effectiveness of measures is carried out for some of the identified biodiversity issues, but not all. The number of elvers successfully navigating the improved elver ladder at the dam is monitored (concerning diadromous eels, <i>Anguilla australis</i> and <i>A. reinhardtii</i>, which are abundant and not threatened; elvers are also physically translocated to upstream rivers from the power station tailrace). Hydro Tasmania sampled macroinvertebrates in the gorge following the increase in flows in the early 2000's, to deliver AUSRIVAS indicators.</p> <p>However the 2004/05 report on the Cataract Gorge Monitoring Programme concludes that it is extremely difficult to report biological trends because of a lack of temporal and spatial replication of the monitoring (particularly because most of the gorge substrate is not suitable for kick-sampling to gather AUSRIVAS data, which is more suited to gravel/sand substrates), and this monitoring has ceased in recent years.</p> <p>Hydro Tasmania commissioned a report in 2006 on the gorge monitoring programme. This recommended extending monitoring to include the endemic snail, a broader sample of benthic macroinvertebrates, and benthic algae. It also recommended that the purpose of the monitoring should shift from assessing the effect of the 1.5 m³/sec allocation towards surveillance. The recommendations are yet to be actioned by any authority.</p> <p>Recent studies and surveys to assess impacts on aquatic biota that may result from a proposed further increase in flows (to 2.5 m³/sec) and diurnal variation in flow have concluded that there are minimal risks to aquatic biota and no change in habitat availability for the endemic snail. However, the present flow regime of 1.5 m³/sec was determined partly to meet environmental objectives, including conservation of aquatic biota and the endemics snail, but regular monitoring of the effectiveness of the measure for aquatic biota or the snail species was limited and not continued after 2006. This is a significant gap.</p>	
<p>Management</p>	<p><u>Analysis against basic good practice</u> Management measures in place to manage issues identified by the WMR include an improved elver ladder at the dam, and elvers and lamprey collection in the tailrace, and an increase in the environmental flow in Cataract Gorge to 1.5 m³/sec. The</p>	<p>Y</p>

	<p>latter is cited as a measure to benefit aquatic biota, including the endemic snail, but was taken on very limited scientific evidence, and it was also taken in order to realise recreational, amenity and water-quality benefits. In addition, terrestrial weeds on the Weeds of National Significance register are managed on Hydro Tasmania land. The status of the Australian Grayling is not clear and it appears that there would be no scientific basis on which to adopt measures to assist their migration.</p> <p>Studies on the endemic snail, aquatic biota in general, and fish species, carried out as part of the Cataract Gorge review, did not identify any measures. Conclusions included that an increase in flow would present minimal risk to aquatic biota, and no change in habitat availability or suitability for the snail, would be of marginal significance for non-climbing native fish, but that it is difficult to predict implications for climbing migratory species with confidence. A study on threatened flora recommended collection and reintroduction of <i>Lycopus australis</i>, decommissioning of used weirs to increase habitat availability, willow control, and monitoring of <i>Lycopus australis</i>. Accordingly HydroTasmania has sought and obtained a Permit to Take Threatened Plants from DPIPWE, to allow for impacts on seven species listed on schedules of the Tasmanian Threatened Species Act. The permit requires that the area between the new environmental flow and the flood levels be resurveyed to determine whether reestablishment of the species has occurred, and DPIPWE recommends that Hydro Tasmania considers consulting with land managers and relevant stakeholders to develop a management plan that addresses ongoing threatened flora and invasive species in the gorge. It is too early for these measures to have been put in place.</p> <p>Measures are in place to manage identified biodiversity issues. In the case of some identified issues in Cataract Gorge, specific measures are indeterminable, and these are not significant gaps.</p>	
<p>Conformance Compliance</p>	<p><u>Analysis against basic good practice</u> Informants from DPIPWE, whose statutory responsibilities include threatened and invasive species, confirm that Hydro Tasmania is in compliance with all regulatory requirements. In addition, Trevallyn has met its own corporate commitments emerging from the Water Management Review: concerning elver passage and increase of flows to 1.5 m³/s to meet environmental flow requirements. There do not appear to be any significant non-conformances or non-compliances</p>	<p>Y</p>
<p>Outcomes</p>	<p><u>Analysis against basic good practice</u> Impacts on eel and lamprey populations are mitigated through the elver ladder and translocation operations. There is a paucity of monitoring information on biodiversity and invasive species in the lake and gorge, and very little scientific understanding of local ecology, so virtually no basis on which to conclude that broader biodiversity impacts are avoided or</p>	<p>Y</p>

	<p>mitigated. It may be the case that adverse impacts in Cataract Gorge have been reduced as a result of the increase in flows following the water management review, but there is no scientific or monitoring evidence for this.</p> <p>Equally there is no evidence that Trevallyn’s activities have an ongoing impact on biodiversity other than eels and lamprey, and for this reason, we consider this criterion to be met.</p>	
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		Significant Gaps
Analysis of significant gaps against basic good practice	There is one significant gap in relation to basic good practice: there has been no effective monitoring of biodiversity to determine if management measures are effective.	1
Analysis of significant gaps against proven best practice	NA	NA
SCORE		2

8.15.4 Scoring Summary

Trevallyn does not meet basic good practice. None of the authorities involved in Cataract Gorge, or any authority with statutory responsibilities for endangered species, monitor the status of threatened species downstream of the dam in Cataract Gorge, particularly a snail species that is endemic to the gorge, which was cited in public documents as one of the main reasons for increasing flows. The frequency and extent of biological monitoring over 2004-6 in Cataract Gorge was inadequate to provide meaningful results, and the recommendations of a number of consultants concerning monitoring have not been implemented.

There is one significant gap at the level of Basic Good Practice, resulting in a score of 2.

8.16 Erosion & Sedimentation (O-16)

This topic addresses the management of erosion and sedimentation issues associated with the operating hydropower facility. The intent is that erosion and sedimentation caused by the operating hydropower facility is managed responsibly and does not present problems with respect to other social, environmental and economic objectives; that external erosion or sedimentation occurrences which may have impacts on the operating hydropower facility are recognised and managed; and that commitments to implement measures to address erosion and sedimentation are fulfilled.

8.16.1 Relevant evidence

31-32, 36-38, 42-43, 45, 50, 54-55, 61, 139, 203- 212

8.16.2 Relevant Background Information

There is no criteria for Stakeholder Engagement under this topic. However, in the minds of many of Trevallyn’s community stakeholders, this is one of the priority issues and problems,

as they see Trevallyn as one of several relevant actors in terms of the siltation problems experienced in the upper parts of the Tamar estuary, in Launceston town. We have dealt with necessary aspects of responding to this stakeholder interest and expressed opinions under the Management and Outcomes headlines.

8.16.3 Detailed topic evaluation

Criteria	Detailed topic evaluation	Met?
Assessment	<p><u>Analysis against basic good practice</u></p> <p>A long-standing erosion/sedimentation issue identified is that of siltation in the upper Tamar Estuary, the receiving water for flows from Cataract Gorge and Trevallyn Power Station. Numerous independent studies have been commissioned over the years, in various ways supported by Hydro Tasmania when and as appropriate.</p> <p>Hydro Tasmania participates in various multi-stakeholder working groups, notably TEER and NRM North, which now lead the on-going assessments of erosion and the subsequent sediment transport and deposition in the North Esk and South Esk rivers and the Tamar Estuary.</p> <p>Sedimentation in Lake Trevallyn and other lakes and reservoirs in the catchment is periodically assessed.</p> <p>The only potential sediment production relating to Hydro Tasmania's operations in the catchment is that of re-suspension of sediments in high-altitude storages.</p>	Y
	<p><u>Analysis against proven best practice</u></p> <p>Studies have been undertaken on the potential merit of changes to the operating regime of Trevallyn, in order to reduce the need for dredging and other control measures in the upper Tamar Estuary. These have been broad-based and also analysed costs and benefits for multiple stakeholders.</p>	Y
Management	<p><u>Analysis against basic good practice</u></p> <p>Regarding the sediment accumulation in the estuary, the assessments have proven that the problem is not caused by Trevallyn's operations and that operational changes are not going to remediate the problem. Hence there is no need for a management intervention.</p> <p>Hydro Tasmania has demonstrated that there is no significant sediment accumulation in Lake Trevallyn. Hence, there is no need for management intervention.</p>	Y
	<p><u>Analysis against proven best practice</u></p> <p>Tamar Estuary siltation is a high-profile issue in the Launceston area, and Trevallyn/Hydro Tasmania engages with NRM North and TEER regarding how it is continuously assessed and addressed and Hydro Tasmania's approach to dealing with emerging risks and opportunities relating to Tamar estuary siltation is through the partnership in TEER.</p> <p>A sophisticated programme to limit and manage the re-suspension issue in the high-altitude storages is in place.</p>	Y
Conformance Compliance	<p><u>Analysis against basic good practice</u></p> <p>Trevallyn/Hydro Tasmania are meeting all their commitments, statutory and voluntary.</p>	Y
	<p><u>Analysis against proven best practice</u></p> <p>No non-compliances or non-conformances identified</p>	Y
Outcomes	<p><u>Analysis against basic good practice</u></p>	Y

	<p>It is a general perception in the community that the development of Trevallyn has caused much of the sediment problem in the upper Tamar estuary, but multiple scientific studies are very clear, and unanimous, in declaring the sedimentation to be natural and driven mainly by normal estuarine processes, and to some extent by increased sediment loads of the North and South Esk rivers, following land use alterations in the catchments of these rivers.</p> <p>The existence of Trevallyn probably even reduces the sedimentation in the Home Reach area, given the multiple mechanisms of increased runoff due to inter-basin transfers as well as delivering some of the suspended sediments to a point downstream of the Home Reach section of the estuary, through the power station.</p> <p>All other identified erosion/sedimentation issues are avoided or minimised.</p>	
	<p><u>Analysis against proven best practice</u></p> <p>Tamar Estuary siltation concerns are not caused by Trevallyn operations (see above), and numerous analyses have demonstrated that they will not be solved by changes to Trevallyn operations. Sediments in lakes and reservoirs are closely monitored and assessed and do not present any problems for either the facility or the project-affected areas.</p>	Y

		Significant Gaps
Analysis of significant gaps against basic good practice	Basic good practice criteria are fully met with no significant gaps.	0
Analysis of significant gaps against proven best practice	Proven best practice criteria are fully met with no significant gaps.	0
SCORE		5

8.16.4 Scoring summary

This is probably one of the most important issues in regards to external stakeholder interest and pressure on Trevallyn/Hydro Tasmania.

The assessment clearly demonstrates that Hydro Tasmania assesses, and manages all relevant issues at the highest standards. It also participates in special-purpose multi-stakeholder fora (notably NRM North and TEER), that work on these issues.

This results in Proven Best Practice with no significant gaps, a score of 5.

8.17 Water Quality (0-17)

This topic addresses the management of water quality issues associated with the operating hydropower facility. The intent is that water quality in the vicinity of the operating hydropower

facility is not adversely impacted by activities of the operator; that ongoing or emerging water quality issues are identified and addressed as required; and commitments to implement measures to address water quality are fulfilled.

8.17.1 Relevant evidence

31, 33-35, 39, 60, 139-141, 186, 206-207, 211-213, 241, 242 and 244

8.17.2 Relevant Background Information

The reservoir that acts as the intake storage for the Trevallyn power station, Lake Trevallyn, is a small storage. It is also a water body that is managed with strong multi-stakeholder interests in mind. Recreational use is extensive and Hydro Tasmania is often called upon to respond to various community activities with special-purpose water releases or other management interventions.

8.17.3 Detailed topic evaluation

Criteria	Detailed topic evaluation	Met?
Assessment	<u>Analysis against basic good practice</u> Hydro Tasmania carries out some monitoring on its own, but much of the relevant water-quality monitoring is conducted by other agencies including DPIPWE and NRM North. Hydro Tasmania has its Waterway Health Monitoring Programme which adopts a three-tiered approach, whereby monitoring is conducted at different levels of frequency and resolution for the different waterways. These three are “routine”, “investigation” and “detailed”. The “routine” is the standard, but when issues are identified, there is a management response elevating the effort to investigation or even detailed. The major water-quality issues identified relate to nutrients, algae and E.coli; there is an ongoing monitoring arrangement for these coordinated through TEER.	Y
	<u>Analysis against proven best practice</u> The Waterway Health Monitoring Programme is a comprehensive approach to business-wide water-quality assessment, but there are still significant gaps in the water-quality data base. This has been determined in, among others, the Cataract Gorge Environmental Flow Review process.	N
Management	<u>Analysis against basic good practice</u> The identified issues are managed by a variety of different actors. Hydro Tasmania’s management centres on the Strategic Water Management Committee and the aquatic environmental team with its annual review process.	Y
	<u>Analysis against proven best practice</u> Several demonstrated management options have responded with operational limitations on lake levels, flows etc., in order to provide a solution to identified issues. The extensive co-operation with other major actors in the area guarantees the continuity of the work.	Y
Conformance Compliance	<u>Analysis against basic good practice</u> All commitments are being met.	Y
	<u>Analysis against proven best practice</u> All commitments are being met.	Y
Outcomes	<u>Analysis against basic good practice</u>	Y

	There are no negative water quality impacts arising from Trevallyn’s operations. The only relevant issue is the algal blooms, and this situation is well mitigated through the comprehensive monitoring programme.	
	<u>Analysis against proven best practice</u> Water quality in the area of Trevallyn is not of high quality with respect to nutrients, but this is not caused by Hydro Tasmania’s operations. Hydro Tasmania readily responds to community needs and concerns such as flushing releases of water to mitigate impacts from releases from the Black Stone Heights sewage treatment plant, thus contributing to address water quality issues beyond its own impacts.	Y

		Significant Gaps
Analysis of significant gaps against basic good practice	Basic good practice criteria are fully met with no significant gaps.	0
Analysis of significant gaps against proven best practice	There is one identified gap in relation to Proven Best Practice – the shortage of a satisfactory data base for Cataract Gorge.	1
SCORE		4

8.17.4 Scoring Summary

Almost all scoring criteria are met, most often as a result of co-ordination and co-operation with other actors, such as TEER, NRM North, LCC and DPIPWE. The only significant gap was identified in the lack of an established satisfactory water-quality data base for the Cataract Gorge section of the river.

This results in one significant gap against Proven Best Practice, a score of 4.

8.18 Reservoir Management (O-18)

This topic addresses management of environmental, social and economic issues within the reservoir area during hydropower facility operation. The intent is that the reservoir is well managed taking into account power generation operations, environmental and social management requirements, and multi-purpose uses where relevant.

8.18.1 Relevant evidence

1-2, 5, 138, 147-149, 157, 169-170, 206-207, 211-212, photos 11 and 18.

8.18.2 Relevant background information

It is important to be aware that Trevallyn is located at the very bottom of the South Esk/Great Lake hydropower system containing many reservoirs and several power plants. Given this, a topic such as Reservoir Management necessarily needs to be looked at from the entire catchment point of view.

It is also relevant to mention that the next round of the Water Management Review, which is defined to be a recurrent process, is not scheduled. We have, therefore, no way of knowing whether this will remain the operational tool for basin management that it has constituted, but assume that this will be the case, or that Trevallyn/Hydro Tasmania will, itself, replace with a corresponding mechanism if it is not scheduled to happen again in the short- to medium-term future.

8.18.3 Detailed topic evaluation

Criteria	Detailed topic evaluation	Met?
Assessment	<u>Analysis against basic good practice</u> The comprehensive hydrological model referred to under Topic 4 above informs generation planning and power trading and signals any changes that will need management intervention. Detailed monitoring of all identified issues is in place.	Y
	<u>Analysis against proven best practice</u> The assessment of reservoir potential include both risks and opportunities, demonstrated by i.e. the assessments leading to the Low Lake Level Framework as well as the comprehensive climate-change studies.	Y
Management	<u>Analysis against basic good practice</u> The detailed reservoir-operation rules which include identified social and environmental issues with clear targets and limitations, govern the operation of the system. The “Low Lake Level Management Framework”, in combination with the detailed operating rules (<i>Environmental and Social Risk Bands</i>) for the reservoirs, guarantees a more than adequate management.	Y
	<u>Analysis against proven best practice</u> There is a comprehensive approach to anticipating and responding to emerging issues, with the aid of a variety of tools, notably the Water Management Reviews. Recreational opportunities are many and well managed. Some are the responsibility of other actors, but Hydro Tasmania readily assists if and when necessary.	Y
Conformance Compliance	<u>Analysis against basic good practice</u> There are no significant non-conformances or non-compliances	Y
	<u>Analysis against proven best practice</u> No non-conformances or non-compliances were identified.	Y

		Significant Gaps
Analysis of significant gaps against basic good practice	Basic good practice criteria are fully met with no significant gaps.	0
Analysis of significant gaps against	Proven best practice criteria are fully met with no significant gaps.	0

<i>proven best practice</i>		
SCORE		5

8.18.4 Scoring summary

Assessment of reservoir-operation related issues as well as the management responses to these fully satisfy all relevant criteria.

This results in Proven Best Practice with no significant gaps, a score of 5.

8.19 Downstream Flow Regime (O-19)

This topic addresses the flow regimes downstream of the operating hydropower facility infrastructure in relation to environmental, social and economic objectives. The intent is that issues with respect to the operating hydropower facility's downstream flow regimes are identified and addressed and commitments with respect to downstream flow regimes are fulfilled.

8.19.1 Relevant evidence

28, 47-49, 58, 60, 139, 173, 178, 180-186, 188-192, 242 and photos 4-6 and 17.

8.19.2 Relevant Background Information

In the minds of many of Trevallyn's community stakeholders, this is one of the priority issues and problems, given that Cataract Gorge, the stretch of river from Lake Trevallyn to where the river joins the Tamar Estuary in Launceston town, is the foremost recreational area in the municipality, and one of the top-rated tourist destinations in the state of Tasmania.

Hydro Tasmania and relevant government agencies have, in partnerships, responded to this in many different ways, the key recent one being the Cataract Gorge Environmental Flow Review undertaken in 2009.

8.19.3 Detailed topic evaluation

Criteria	Detailed topic evaluation	Met?
Assessment	<p><u>Analysis against basic good practice</u></p> <p>The issue is likely the most well-studied of all those facing the management team at Trevallyn.</p> <p>All downstream reaches are considered in the assessments made, the various (largely conflicting) objectives identified by the different stakeholders are analysed with all three sustainability aspects taken into account.</p> <p>Significant tools utilised for the assessments are the Water Management Review and the Cataract Gorge e-flow assessment.</p> <p>There is monitoring of water releases in general and many detailed identified issues such as: fish; water levels; the effectiveness the releases have in attracting elvers into the elver ladder; Coliform counts in the gorge; and macro-invertebrates.</p> <p>The impact of alternative levels of flow on the threatened snail species has been evaluated. However, regular monitoring of flow-release impacts on the species is lacking (see O-15).</p>	Y
	<u>Analysis against proven best practice</u>	N

	<p>The assessment of downstream flow regimes has taken into account many risks and opportunities, including the opportunity for installation of a mini-hydropower station at the foot of the Trevallyn Dam and for redevelopment of the Duck Reach power station.</p> <p>The assessment has identified flow ranges and variability to achieve different objectives, but in the case of biodiversity objectives, the field studies undertaken are very limited in extent (with snail surveys carried out on 2 consecutive days only, and studies based on models of habitat availability developed in as long ago as 2001). Risks to biodiversity have not been adequately assessed: this is a significant gap at the level of best practice.</p>	
Management	<p><u>Analysis against basic good practice</u> Measures have been put in place to address most identified issues, through voluntary increases in the minimum flow in Cataract Gorge. There is public disclosure of the commitments made.</p>	Y
	<p><u>Analysis against proven best practice</u> Management is in place for most identified issues, both through Hydro Tasmania's own work but also through the partnerships with e.g. NRM North and the LCC. However, regular monitoring of the effects of downstream flows on biodiversity, since the initial increase in flow in 2001, ceased in 2006. There are no plans to monitor following the planned increase and variation in flow arising from the e-flows review (with the exception of threatened flora), ie no process either at the current time or following the implementation of the new regime to anticipate and respond to emerging risks. This is a significant gap against proven best practice.</p>	N
Stakeholder Engagement	<p><u>Analysis against basic good practice</u> No criteria exists at the level of basic good practice for this topic.</p>	N/A
	<p><u>Analysis against proven best practice</u> There has been comprehensive stakeholder engagement in the various processes regarding the aesthetic and recreational aspects of the down-stream flow determination the process. This is well demonstrated in e.g. Hydro Tasmania's web site and the E-flow review documentation. Appropriate two-way engagement has taken place.</p>	Y
Conformance Compliance	<p><u>Analysis against basic good practice</u> There are processes and objectives in place for the management of the downstream flows. All commitments are met and Hydro Tasmania is even about to increase the release further by increasing the present 1.5 m³/s to 2.5 m³/s on a voluntary basis.</p>	Y
	<p><u>Analysis against proven best practice</u> There are no non-compliances or non-conformances.</p>	Y
Outcomes	<p><u>Analysis against basic good practice</u> The studies and options considerations for the downstream flow commitment do take all three sustainability aspects – environmental, social, and economic - into consideration, but one has been the primary determinant – the social one as represented by recreational priorities of the Launceston</p>	Y

	community. Hydro Tasmania has provided information and analysis on the feasibility of redevelopment of Duck Reach power station.	
	<u>Analysis against proven best practice</u> This is a highly complex issue in the case of Cataract Gorge. The community view has been allowed to largely dictate the choice of downstream flow regime. In addition, availability of survey and monitoring information on biodiversity, is insufficient to enable an optimal fit to be identified. This means that the proposed increase in flows to 2.5 m ³ /sec cannot be said to be an optimal fit. This is a significant gap against proven best practice.	N

		Significant Gaps
Analysis of significant gaps against basic good practice	Basic good practice criteria are fully met with no significant gaps.	0
Analysis of significant gaps against proven best practice	There is one significant gap at the level of Proven Best Practice which cuts across three criteria above. We consider this to be one significant gap as it relates to survey and monitoring of the effects of downstream flows on biodiversity.	1
SCORE		4

8.19.4 Scoring Summary

Assessments of the issues surrounding the flow releases from the Trevallyn dam are very comprehensive. However, the lack of comprehensiveness in the attention to biodiversity and endemic species constitutes a significant gap that affects three criteria at the level of Proven Best Practice. We have scored this as one significant gap for this topic because it concerns one underlying issue of the lack of survey and monitoring information.

There is one significant gap at the level of Proven Best Practice, resulting in a score of 4.

9 Appendix A: Assessment Participants

Name	Position, Organisation	Role in Assessment
Dr Bernt Rydgren	Senior consultant, ÅF Infrastructure, Environment, Linköping, Sweden	Lead Assessor
Douglas Smith	Sustainability specialist, IHA HQ, Sutton, UK	Co-Assessor
Dr Jörg Hartmann	WWF International, Water Security Lead, Frankfurt, Germany	Co-Assessor
Simon Howard	Sustainability Specialist, IHA HQ, Sutton, UK	Assessment assistant
Dr Helen Locher	Principal Consultant Sustainability, Hydro Tasmania, Hobart, Australia	Single Point of Contact
Donna Brown	Senior Advisor Sustainability, Hydro Tasmania, Hobart, Australia	Local Support Team
Greg Carson	Greg Carson, Water Operations Advisor, Commercial group, Hydro Tasmania, Hobart, Australia	Local Support Team
Andrew Scanlon	Manager Sustainability & Safety, Corporate Services group, Hydro Tasmania, Hobart, Australia	Client
Mick Knowles	Production Manager, Poatina & Trevallyn Power Station, Technical & Operations group, Hydro Tasmania, Launceston, Australia	Local Support Team
Andrew Jones	Senior Project Manager, Corporate Services group, Hydro Tasmania, Hobart, Australia	Local Support Team
Marie Egerrup	Senior Environmental Scientist, Corporate Services group, Hydro Tasmania, Hobart, Australia	Local Support Team
Eleni Taylor-Wood	Principal Consultant Environmental & Social, Entura, Hobart, Australia	Local Support Team
Abigail Foley	Business Development Manager, Entura, Hobart, Australia	Local Support Team
Bjorn Lunstedt	Environmental & Sustainability System Coordinator, Corporate Services group, Hydro Tasmania, Hobart, Australia	Local Support Team
Michelle Archer	Environmental Advisor, Mighty River Power, Hamilton, New Zealand	Observer
David Harrison	Senior Water Resources Consultant, The Nature Conservancy, Boulder, USA and member of Hydropower Sustainability Assessment Protocol Governance Committee	Observer
Cameron Ironside	Programme Director, IHA HQ, Sutton, UK	Observer
Dr Donal O'Leary	Senior Advisor, Transparency International, Berlin, Germany and member of the Hydropower Sustainability Assessment Protocol Governance Committee	Observer
Dr Jian-hua Meng	Jian-hua Meng, Sustainable Hydropower Specialist, WWF Germany, Berlin, Germany and member of Hydropower Sustainability Assessment Protocol Governance Committee	Observer
Karin Seelos	VP International Affairs Power Generation, Statkraft, Oslo, Norway and member of Hydropower Sustainability Assessment Protocol Governance Committee	Observer

10 Appendix B: Assessment Schedule with Interviews and Interviewees

Note: Where no designation/affiliation is given, interviewee is an employee of either Hydro Tasmania or Entura. Details can be found in Appendix C.

Day	Sunday 02/10/2011	Monday 03/10/2011	Tuesday 04/10/2011	Wednesday 05/10/2011	Thursday 06/10/2011	Friday 07/10/2011
Location	Hobart/Launceston	Launceston	Launceston/Hobart	Hobart	Hobart	Hobart
Interview / Activity 1	9:00-11:00 Travel Hobart-Launceston	8:00-9:00 Coordination Mtg	8:00-9:00 Coordination Mtg	8:00-9:00 Coordination Mtg	8:00-9:00 Coordination Mtg	8:00-9:00 Coordination Mtg
Attendees	- International participants	- Assessment team members	- Assessment team members	- Assessment team members	- Assessment team members	- Assessment team members
Location		- Trevallyn Mtg Room	- Trevallyn Mtg Room	- HT Room 8000L	- HT Room 8000L	- HT Room 8000L
Interview / Activity 2	12:30 Airport pickup	09:00-10:30 Interviews	9:30-10:30 Interviews	9:00-10:00 Interviews	09:00-10:00 Interviews	09:00-10:00 Interviews
Attendees	- Michael Knowles to get Bernt Rydgren, Doug Smith, Simon Howard	- Michael Knowles & Greg Carson: O-1, O-3, O-4, O-5, O-6, O-7, O-12, O-18	- Launceston City Council reps: O-1, O-3, O-4, O-6, O-13, O-14, O-15, O-16, O-17	- Alan Evans, Lara Vandenberg: O-2	- Andrew Scanlon, Marie Egerrup, Bjorn Lunstedt; Greg Carson: O-3	- TALSC – Caleb Pedder: O-11, O-13
Location	- Launceston Airport	- Trevallyn Mtg Room	- Trevallyn Mtg Room	- HT Room 8000L	- HT Room 8000L	- TALSC N.Hobart
Interview / Activity 3	13:30-17:30 Site Visit	11:00-12:30 Interviews	11:00-17:00 Travel Launceston-Hobart	10:15-11:30 Interviews	10:00-11:00 Interviews	09:00-10:00 Interviews
Attendees	- Michael Knowles, Andrew Scanlon	- Andrew Scanlon: O-1, O-3, O-15, O-16, O-17, O-18, O-19	- Helen Locher, Greg Carson	- Yvonne Nosworthy, Bruce Hill, Ashlee Geard: O-12	- Kirsten Kuns, Peter Connolly, Greg Carson: O-4	- Patrick Burke: O-5, O-7, O-13, O-19
Location	- Trevallyn lake & dam, Duck Reach, Cataract Gorge, Tamar Estuary	- Trevallyn Mtg Room	- Poatina, Arthurs, Miena, Derwent	- HT Room 8000L	- HT Room 8000L, tour of trading floor	- HT Room 8000L
Interview / Activity 4		12:45-13:45 Interviews		11:30 - 12:30 Interviews	11:30 - 12:00 Interviews	10:30-11:15 Interviews
Attendees		- NRM North / TEER – James MacKee, Michael Athard: O-1, O-3, O-15, O-16, O-17		- Ian Colvin, Lara Vandenberg: O-1	- David Rayward, Yvonne Marschke: O-2 (procurement)	- Sandra Hogue: O-11, O-13
Location		- Trevallyn Mtg Room		- HT Room 8000L	- HT Room 8000L	- HT Room 8000L

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Interview / Activity 5		14:15-15:00 Site Visit		13:30 - 14:30 Interviews	12:00 - 12:30 Document Review	13:00 - 14:00 Coordination Mtg
Attendees		- Michael Knowles		- Mark Corlett, Cameron Smith, Mick Knowles: O-5	- Archives: O-8, O-9, O-10	- Assessment team members
Location		- Trevallyn Power Station		- HT Room 8000L	- HT Room 8000L	- HT Room 8000L
Interview / Activity 6		15:15-15:45 Interviews		14:00 - 14:30 Phone Interview	13:30 - 15:00 Interviews	14:00-15:30 Close-Out Mtg
Attendees		- Adam Rosevears, Tim Polley: O-3, O-12		- PWS - Adam Smith: O-3	- DPIPWE – Martin Read, John Whittington, Alistair Morton; IFS – John Diggle: O-1, O-2, O-3, O-4, O-15, O-19	- Assessment team, client, Single Point of Contact, local support team, observers
Location		- Trevallyn Mtg Room		- HT Room 8000L	- HT Room 8000L	- HT Room 1001: Hands-On Auditorium
Interview / Activity 7		16:00-16:45 Interviews		14:30 - 15:30 Interviews	15:30 - 16:30 Interviews	
Attendees		- Community reps / local views - Bernard Duke, Lionel Morell, Jim Collier: O-1, O-3, O-13, O-16, O-19		- Angus Swindon: O-6	- Researchers – Eleni Taylor-Wood, David Ikedife, Phil Barker: O-15, O-19	
Location		- Trevallyn Mtg Room		- HT Room 8000L	- HT Room 8000L	
Interview / Activity 8		17:00-17:45 Interviews		16:00 - 17:00 Interviews	16:30 - 17:00 Interviews	
Attendees		- Community reps / local views - Errol Stewart, Peter Neilson: O-1, O-3, O-13, O-16, O-19		- Lance Balcombe: O-7	- Heritage Tasmania - Michael Lynch: O-13	
Location		- Trevallyn Mtg Room		- HT Room 8000L	- HT Room 8000L	

11 Appendix C: Verbal Evidence

11.1 DAY 1 – Monday 3rd October 2011

11.1.1 Interview 1

Michael Knowles, Production Manager, Poatina & Trevallyn Power Stations, Technical & Operations group, Hydro Tasmania

Greg Carson, Water Operations Advisor, Commercial group, Hydro Tasmania

O-1, O-3, O-4, O-5, O-6, O-7, O-12, O-18

11.1.2 Interview 2

Andrew Scanlon, Manager Sustainability & Safety, Corporate Services group, Hydro Tasmania

O-1, O-3, O-15, O-16, O-17, O-18, O-19

11.1.3 Interview 3

James MacKee, CEO, NRM North

Michael Atthard, Scientific & Technical Officer, TEER (Tamar Estuary & Esk River) Program

O-1, O-3, O-14, O-15, O-16, O-17

11.1.4 Interview 4

Adam Rosevears, Safety Advisor Northern Region

Tim Polley, Environmental Field Advisor, Northern Region

O-3, O-12

11.1.5 Interview 5

Bernard Duke, voluntary walk guide with Gorge Guides, passionate about the Gorge and its values

Lionel Morrell, Architect, Lionel Morell Associates, interested in the Duck Reach Power Station, member of the LCC Cataract Gorge Advisory Committee, and also the Cataract Gorge Protection Society (a voluntary group). Has previously been State President of National Heritage Trust in Tasmania

Jim Collier, yachtsman

O-1, O-13, O-16, O-19

11.1.6 Interview 6

Errol Stewart, Tamar Estuary waterfront developer – Seaport marina, cafes, restaurants, accommodation

Peter Neilson, tourism operator - Hovercraft Tasmania Pty Ltd, Cable Hand Gliding Pty Ltd, PJ Neilson & Associates

O-1, O-13, O-16, O-19

11.2 DAY 2 – Tuesday 4th October 2011

11.2.1 Interview 1

Harry Galea, Director Infrastructure Services, Launceston City Council

Andrew Smith, Manager Parks & Recreation, Launceston City Council

O-1, O-3, O-4, O-6, O-7, O-13, O-14, O-15, O-16, O-17, O-18, O-19

11.3 DAY 3 – Wednesday 5th October 2011

11.3.1 Interview 1

Alan Evans, General Manager Corporate Governance & Corporate Secretary, Hydro Tasmania

Lara Vandenberg, Sustainability Programs Manager, Corporate Services group, Hydro Tasmania

O-2

11.3.2 Interview 2

Yvonne Nosworthy, Workforce Needs & Industrial Relations Manager, Corporate Services group, Hydro Tasmania

Bruce Hill, Field OH&S Advisor, Corporate Services group, Hydro Tasmania

Ashlee Geard, Operational Compliance Coordination, Technical & Operations group, Hydro Tasmania

O-12

11.3.3 Interview 3

Ian Colvin, Manager Communications, Corporate Services group, Hydro Tasmania

Lara Vandenberg, Sustainability Programs Manager, Corporate Services group, Hydro Tasmania

O-1

11.3.4 Interview 4

Mark Corlett, Senior Asset Performance & Reliability Engineer, Technical & Operations group, Hydro Tasmania

Michael Knowles, Production Manager, Poatina & Trevallyn Power Stations, Technical & Operations group, Hydro Tasmania

Cameron Smith, Asset Optimisation & Compliance Manager, Technical & Operations group, Hydro Tasmania

O-5

11.3.5 Interview 5

Angus Swindon, Manager Civil & Dam Safety, Technical & Operations group, Hydro Tasmania

O-6

11.3.6 Interview 6

Lance Balcombe, Chief Financial Officer, Finance & Risk group, Hydro Tasmania

O-7

11.4 DAY 4 – Thursday 6th October 2011

11.4.1 Interview 1

Andrew Scanlon, Manager Sustainability & Safety, Corporate Services group, Hydro Tasmania

Marie Egerrup, Senior Environmental Scientist, Corporate Services group, Hydro Tasmania

Bjorn Lunstedt, Environmental & Sustainability System Coordinator, Corporate Services group, Hydro Tasmania

Greg Carson, Water Operations Advisor, Commercial group, Hydro Tasmania

O-3

11.4.2 Interview 2

Kirsten Kuns, Senior Modelling Analyst, Commercial group, Hydro Tasmania

Greg Carson, Water Operations Advisor, Commercial group, Hydro Tasmania

Peter Connolly, Team Leader Generation Control, Commercial group, Hydro Tasmania

O-4

11.4.3 Interview 3

David Rayward, Manager Business Services, Corporate Services group, Hydro Tasmania

Yvonne Marschke, Procurement Manager, Corporate Services group, Hydro Tasmania

O-2

11.4.4 Interview 4

John Whittington, Deputy Secretary for Resource & Information, Department of Primary Industries, Parks, Water & Environment

Martin Read, Manager Water Assessment branch, Department of Primary Industries, Parks, Water & Environment

John Diggle, Director, Inland Fisheries Service

Alistair Morton, Senior Natural Values Assessment Officer, Resource Management & Conservation Division, Department of Primary Industries, Parks, Water & Environment

O-1, O-2, O-3, O-4, O-15, O-19

11.4.5 Interview 5

Phil Barker, Principal, NorthBarker Ecosystems Services

David Ikedife, Specialist Environmental Scientist, Entura

Eleni Taylor-Wood, Principal Consultant Environmental & Social, Entura

O-15, O-19

11.4.6 Interview 6

Michael Lynch, Chair, Tasmanian Heritage Council

O-13

11.5 DAY 5 – Friday 7th October 2011

11.5.1 Interview 1

Patrick Burke, Project Manager, Business Development group, Hydro Tasmania

O-5, O-7, O-13, O-19

11.5.2 Interview 2

Caleb Pedder, Tasmanian Aboriginal Land & Sea Council

O-11, O-13

11.5.3 Interview 3

Sandra Hogue, Environmental Programmes Manager, Hydro Tasmania

O-11, O-13

11.6 Additional interviews

11.6.1 Interview 1

Peter Davies, Professor, University of Tasmania Centre for Environment, School of Zoology, Director, Freshwater Systems. 22 November 2011.

O-15

12 Appendix D: Documentary Evidence

No	Title	Topic(s)
1	Example of standard email sent out by Hydro Tasmania to self-identified stakeholders when Lake Trevallyn is drawn low pre-flood or for maintenance (tabled)	1, 18
2	Trevallyn Lake Storage Operating Rules (tabled)	1, 3, 4, 18
5	Hydro Tasmania website for info on storage levels	1, 4, 18
7	The signage around in the area	1, 6
8	Flood protocol for taking water	1, 4
9	State government – water management planning process for South Esk and Macquarie rivers (example letter in folder, Hydro Tasmania submission on South Esk)	1, 4
10	External website – public availability of lake level data time series	1, 4
11	Trevallyn Power Station Emergency Management Plan	1, 6
13	30 year HT asset management plan	5
14	10 year HT asset management plan	5
16	Water to Wire map – shows condition, risk and role of each asset in the system, and probability of failure, indicated where Trevallyn sits; magnitude of cost is factored into risk level	5, 7
17	Production Facilities Maintenance Management System (FMMS) – exhibited on the internal website – shows asset management system in practice – history of works, costs, date achieved, job list	5
18	FMMS example of library with specific reports e.g. Turbine Relief Valve Asset Management Plan exhibited	5
19	Asset reliability figures exhibited from internal website	5
20	Various financial information relating to Trevallyn budget and expenditure that is commercially sensitive and confidential to Hydro Tasmania	7
23	Performance PDR (example tabled for an individual employee)	12
24	Hydro Tasmania Salary Review Process	12
25	Retirement letter from a female employee recently retired	12
26	Information relating to Trevallyn Power Station forward expenditure that is commercially sensitive and confidential to Hydro Tasmania	7
27	Hydro Tasmania South Esk-Great Lake Water Management Review Community Consultation Report and associated documents	1, 3
28	Cataract Gorge videos on external website	3, 19
29	Gordon River Basslink Review Report and associated reports on external website	3
30	Hydro Tasmania Environmental & Sustainability Management System and components on internal website (exhibited) – includes Sustainability Code, Environmental Policy, aspects and impacts register, legal compliance register, HT Environmental Management Plan 2010-11	3, 14, 15
31	Map of Tasmanian electricity system on internal website (exhibited) used to illustrate parts of system with erosion, sedimentation and/or water quality issues requiring management or remediation measures	16, 17
32	Professor D. N. Foster, University of NSW, water research laboratory, 1986	16
33	Environmental Management & Pollution Control Act	17
34	Hydro Tasmania water licence contains water quality monitoring obligations	3, 17

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35	Hydro Tasmania Oil Management Plan	17
36	O-16: TEER Tamar Catchment WaterCAST Model_Final Report March 2010.pdf (provided on USB)	16
37	Lake Trevallyn Algal Monitoring Analysis June 2011.pdf	16
39	Blue green algae problems in Trevallyn Dam	14, 17
42	Tamar Estuary 2010 Report Card, Ecosystem Health Assessment Program	16
43	www.nrmnorth.org.au/teer note particularly the siltation documents	16
44	Environmental Policy, with ISO 14001 stamp, photographed	3
45	“Colliers’ ship sails in” newspaper article, The Examiner, Thursday April 4th, 2002	16
48	Photos of Home Reach, high tide, during Trevallyn 2-month shut-down, and other photos	19
49	“Five Good Reasons Why Hydro Tasmania should Significantly Increase the Cataract Gorge Flow” – submission to the assessors by Jim Collier, 3 October 2011.	19
50	Jones, B., Cooper, G. & Maynard, D. (year?) Understanding the causes of excessive siltation in the Tamar Estuary, Tasmania: an integrated geochemical and sedimentological study. Progress Report, AINSE Project No. 05084P. 3 pages, undated.	16
51	State Water Management Act 1999	4
52	Water Availability for the South Esk Region. CSIRO Tasmania Sustainable Yields Project. CSIRO National Research Flagships, December 2009	4
53	Transcript of a speech provided to the Heritage Protection Society by Lionel Morrell on 9th November 2010	13
54	1833 maps of Tamar Estuary Home Reach and Cataract Gorge First Basin	16
57	Launceston Walking Trail map	13
58	Launceston City Council Submission to Hydro Tasmania on the Cataract Gorge environmental flow	13, 14, 19
60	Cataract Gorge Conservation Management Plan	3, 17, 19
61	http://www.launceston.tas.gov.au/lcc/index.php?c=163#Siltation – Launceston City Council website information regarding Tamar estuary siltation	16
62	Hydro-Electric Corporation Act 1995 (tabled)	2
63	Government Business Enterprise Act 1995 (tabled)	2
64	Guidelines for Tasmanian Government Businesses – various, e.g.: Director Induction Training Guideline, Director Appointments Guidelines (tabled, also on Tasmanian government Treasury website)	2
65	Hydro Tasmania Governance Framework (tabled, also on Hydro Tasmania internal website)	2
66	Hydro Tasmania Annual Sustainability Report (on external Hydro Tasmania website)	2, 3
67	Hydro Tasmania Corporate Stakeholder Engagement Framework (referred to, not tabled)	2
68	Hydro Tasmania Annual Stakeholder Survey (tabled)	2
69	Tasmanian Annual Government Business Enterprise Scrutiny Committee (public, evidence can be found on the internet)	2
70	Right to Information Act	2
71	Tasmanian Integrity Commission - government website	2
74	Personal Information Protection Act, which is a privacy protection act - government website)	2, 12
75	Electricity Supply Industry Expert Panel Review, see web at: www.electricity.tas.gov.au	2

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76	Corporate Strategy on a Page - on internal website	2
77		
78	Capital Investment business case template – internal website	2, 7
79	Hydro Tasmania Safe Work Practices Manual	12
80	Hydro Tasmania HydroSafe system – internal website with example of Safe Work Permit system	12
81	Hydro Tasmania IQMS Incident Management System	12
82	Hydro Tasmania Safety Improvement Plan 2011-12	12
83	Hydro Tasmania Technical & Operations Training Plan 2010-11 – register of all staff and their training compliance	12
84	Hydro Tasmania Grievance Procedure	12
85	Fair Work Act	12
86	Two enterprise agreements – internal website	12
87	Human Resources section of internal website, example of employee entitlements	12
88	AA1000 Stakeholder Engagement Standard from AccountAbility www.accountability.org/standards/aa1000aps.html	1, 2
89	Hydro Tasmania Stakeholder Engagement Framework, internal website	1, 2
90	Australian Centre for Corporate Social Responsibility (ACCSR) Hydro Tasmania Stakeholder 360° Report 14 August 2009	1
91	Stakeholder network maps	1
92	Hydro Tasmania Stakeholder Engagement Guide	1, 2
93	Hydro Tasmania Poatina Penstock Refurbishment Stakeholder Engagement Framework	1
94	Hydro Tasmania Memorandums of Understanding with key agencies, e.g. Inland Fisheries Service, and Tasmanian Aboriginal Land & Sea Council	1
95	Hydro Tasmania Annual Stakeholder Survey	1
96	Hydro Tasmania Materiality Register – example of issues raised by stakeholders	1
97	Hydro Tasmania Values with respect to communications and stakeholders, internal website	1, 2, 3
98	Media monitors	1
99	Contact Us on external website	1
100	Meadowbank Crest Gate Refurbishment Stakeholder Engagement Plan 4 October 2011	1
102	Hydro Tasmania 10-year Asset Management Plan 2010 – Regulatory report August 2011	5
103	Hydro Tasmania 10-year Asset Management Plan presentation to the electricity regulator 1 July 2011	5
104	W2W Risk Map for Hydro Tasmania as a whole view	5
105	Cura system for asset risk for station/portfolio view – exhibited output	5
106	T&O Statewide Safety & Compliance Risk Register Risk Review Report 5 October 2011	5
107	Scheduling of outages as example of opportunities	5
110	Generation Performance & Electricity Supply Industry Compliance Report 2010/11 – submitted to the Office of the Tasmanian Electricity Regulator (OTTER)	5
111	Asset management regulatory report 2011 internal report to the ELT October 2011	5
112	PPA Primary Protection Asset status report 3 October 2011	5
113	Asset Management & Risk (AS&R) Team monthly report ending 9 Sept 2011	5
114	Asset Events Summary September 2011	5
115	Hydro Tasmania Dam Safety Policy 2006	4, 6
116	Annual Dam Safety Report to the Hydro Tasmania Business Risk Committee	6

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117	Operations & Maintenance manual for Trevallyn Dam	6
118	Dam safety regulator who sits in DPIPWE http://www.dpiw.tas.gov.au/internsf/WebPages/JMUY-7N22DQ?open	6
119	ANCOLD Guideline on Dam Safety Management	6
120	ANCOLD Guidelines on Consequence Assessment	6
121	Hydro Tasmania Portfolio Risk Assessment Risk Profile 2008	6
122	Hydro Tasmania Portfolio Risk Assessment – Engineering Assessment Trevallyn Dam April 2008	6
123	Hydro Tasmania Portfolio Risk Assessment – Consequence Assessment Trevallyn Dam June 2010	6
124	Dam Safety Performance Review Group – meeting papers from two meetings tabled that addressed when work required for Trevallyn Dam was identified	6
125	Hydro Tasmania Dam Safety Emergency Plan	4, 6
126	Hydro Tasmania Review of the Flood Hydrology for Trevallyn Dam 2003	6
127	Hydro Tasmania Dam Seismic Safety Review 1996	6
128	Hydro Tasmania Dam Instrumentation & Drainage Upgrade, Review of the Piezometer Data 2007	6
129	Trevallyn Dam Drainage System Operations & Maintenance Instructions 1995	6
130	AEMO Statement of Opportunity	7
131	Hydro Tasmania Annual Report 2011	2, 7
132	GBE Scrutiny Committee	7
133	Corporate Strategy on a Page	7
134	Environmental Assessment Register May 2011 – Risks, on internal website	3
135	Integrated Business Risk Management – applicability to environmental risk register exhibited	3
136	Hydro Tasmania Sustainability Code, on internal and external website	3
137	Hydro Tasmania Environmental Plan May 2011, on internal website	3, 15
139	ESMS Annual Environmental Management Review Report September 2011	3, 15, 16, 17, 19
140	ESMS Monthly Reports	3, 17
141	Hydro Tasmania Water Quality database, on internal website	17
142	Time series plot of all spill events over Trevallyn Dam over past four years	4
143	TEMSIM (Tasmanian Electricity Market Simulation Model) Projection: Storages, Individual – Jan 2010 – Dec 2012 showing forward scenarios	4
144	Hydro Tasmania flood notification – example email to stakeholders	4
145	Trevallyn scheme lay-out and drawings	4
146	Original approval – Hobart Corporation (Loans) Act 1947	4
147	Hydro Tasmania Special Water Licence under the Water Management Act 1999	4, 18
148	Hydro Tasmania Storage Management Guidelines	4, 18
149	Operating Rules for Arthurs Lake, Poatina Pond, Great Lake, Lake Augusta, Woods Lake, Lagoon of Islands,	4, 18
150	Proposed upstream irrigation developments information from the Tasmanian Irrigation website – Midlands Water Scheme, Whitemore Irrigation Scheme, Lower South Esk Irrigation Scheme, Meander Valley Irrigation Scheme	4
151	Memorandum of Understanding between the Hydro Electric Corporation, the Tasmanian Farmers & Graziers Association and the Department of Primary Industries, Water and Environment	4
152	Storage Dashboard (examples)	4
153	System Studies (examples)	4

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154	Inflows to power stations 2010 Update	4
155	Hydro Tasmania Strategic Water Management Committee Terms of Reference, example meeting agenda and minutes of meeting	3, 4
156	Bureau of Meteorology: Flood Warning Consultative Committee – Tasmania. Agenda and meeting papers, 8 December 2010	4
157	Hydro Tasmania Submission on South Esk Water Management Plan, 10 December 2010	4, 18
158	Upstream flow monitoring (sample time series hydrological plots)	4
159	Climate Futures for Tasmania reports: General Climate Impacts Summary Report, Climate Modelling Summary Report, Climate Modelling Technical Report, December 2010.	4
160	Trevallyn Power Development Asset description	4
161	Hydro Tasmania Procurement Policy	2
162	Hydro Tasmania Sustainability Code	2, 3
163	Hydro Tasmania Code of Ethics	2, 12
164	Hydro Tasmania Procurement Operational Procedures, e.g. sourcing procedure, standard tendering documents	2
165	Hydro Tasmania Supplier Sustainability Self-assessment against Hydro Tasmania Sustainability Code undertaken annually with top 20 suppliers, those with largest spend and largest impact on sustainability performance	2
166	Example of Hydro Tasmania Standard Procurement Contract	2
167	Supplier Assessment of Hydro Tasmania Sustainability with respect to Hydro Tasmania's Procurement processes undertaken annually	2
168	Notice on Hydro Tasmania public website "How we do business with our suppliers", establishes a set of principles	2
169	Various Water Management Plans completed or in progress e.g. Macquarie, South Esk, other rivers cited as well (can be viewed on DPIPWE website)	4, 18
170	Submissions of Hydro Tasmania monitoring data to the government	4, 18
171	Nature Conservation Act	3, 4, 15
172	Threatened Species Protection Act	15
173	State government permit for Hydro Tasmania to remove threatened species in Cataract Gorge	15, 19
174	Australian grayling listing statement www.environment.gov.au/.../australian-grayling/.../australian-grayling-background.rtf	15
175	Launceston Flood Authority http://www.launceston.tas.gov.au/lcc/index.php?c=163#Launceston%20Flood%20Authority	6
176	Weed Management Act	15
177	Hydro Tasmania Pest Fish Management Strategy	15
178	Cataract Gorge Environmental Flow Review Background Report September 2009	3, 11, 13, 14, 15, 19
179	Trevallyn Flow Statistics December 2010	4
180	Cataract Gorge Environmental Flow Impact on Threatened Flora. NorthBarker Ecosystem Services, 30 November 2010	15, 19
181	Cataract Gorge Trial Releases – Fish Assessment 13 August 2010	15, 19
182	Cataract Gorge – Relationship between environmental flow releases and habitat for the Beddomeid snail, <i>Beddomeia launcestonensis</i> . April 2010, report by Peter Davies, Laurie Cook, Brad Smith	15, 19

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183	Cataract Gorge Monitoring Program 2004-05 Annual Report – Monitoring of effectiveness of the Cataract Gorge environmental water allocation	4, 15, 19
184	Cataract Gorge Monitoring Program 2003-04 Annual Report – Monitoring of effectiveness of the Cataract Gorge environmental water allocation	4, 15, 19
185	South Esk – Great Lake Water Management Review – Scientific Report on Cataract Gorge, Research into the environmental flow requirements for Cataract Gorge and habitat requirements and distribution of <i>Beddomeia launcestonensis</i> , August 2003	4, 15, 19
186	Cataract Gorge: Environmental Flow Assessment, Report to Hydro Tasmania. Freshwater Systems, December 2001	4, 15, 19
187	Hydro Tasmania Pest Fish Management Strategy: Revised Report, draft 26 May 2010	15
188	Launceston City Council information on Duck Reach power station on LCC website http://www.launcestoncataractgorge.com.au/interpretationcentre.html	19
189	Hydro Tasmania Memo to Launceston City Council (LCC): Trevallyn Dam and Duck Reach Mini-Hydro Redevelopment Feasibility – draft 19 Sep 2011	19
190	Power Point to LCC: Duck Reach Power Station Feasibility, presented to LCC meeting 27 July 2011	19
191	Hydro Tasmania Internal Memo: Duck Reach Mini-Hydro Redevelopment Feasibility 22 July 2011	19
192	GBE Scrutiny Committee Public Hearing 30 November 2010 Information Paper: 1000 GWh Project Status	19
193	Internal website – cultural heritage program (exhibited)	13
194	TALSC Agreement – Memorandum of Understanding (exhibited). “Aboriginal cultural heritage management: agreed procedures for the Tasmanian Aboriginal Land & Sea Council and Hydro Tasmania”, December 2007	11, 13
195	Hydro Tasmania Procedure in ESMS: EP14 Cultural Heritage Management (indicated on internal website)	13
196	Tasmanian Aboriginal Relics Act 1975	13
198	GIS layer in Hydro Tasmania ESMS “Map Viewer” (link indicated in ESMS, identifies areas of high probability of heritage finds)	13
199	Hydro Tasmania forms for Heritage Impact Assessment, Heritage Impact Assessments Register, Cultural Heritage Programme quarterly newsletters, Historic Heritage Index, various power station conservation management plans, Cultural Heritage Program Plan 2011-12, Cultural Heritage Program 5-year Plan 2011-16 (links shown in ESMS)	13
200	Regional Partnership Agreement – Hydro Tasmania & TALSC 2008 (?)	13
201	Hydro Tasmania Oral History project à “Ticklebelly Tales” book	13
202	Schematic representation of the Great Lake/South Esk scheme.	4
203	South Esk-Great Lake Water Management Review. Technical study 12, Tamar siltation. Progress Report July 2001.	16
204	South Esk-Great Lake Water Management Review. Scientific Report on Tamar Siltation, August 2003.	16
205	Launceston City Council: Report for Upper Tamar River Sediment Evaluation Study.	16
206	Options for Siltation Management. Volume 2, September 2009	16, 17, 18
206	Low Lake Level Management Framework. Internal memo defining management responses and assigning clear roles and responsibilities.	16, 17, 18
207	Low Lake Level Management Protocol and Environmental and Social Risk Bands. Internal Hydro Tasmania web site. Explanatory documentation for evidence 206.	16, 17, 18
208	Prof. Brian Jones: Understanding the causes of excessive siltation in the Tamar Estuary,	16

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210	Tasmania: an integrated geochemical and sedimentological study, 2006.	16
209	Launceston's Hydrodynamic Modelling Study of the Tamar River. Power-Point presentation.	16
210	BMT WBM Pty Ltd: The Tamar Estuary. Review of Foster (1986) Report on Sedimentation Processes. 2008	16
211	Hydro Tasmania South Esk-Great Lake Water Management Review: Environmental Review Document, November 1999.	3, 4, 16, 17, 18
212	Hydro Tasmania's Aquatic Environmental Policy.	4, 16, 17, 18
213	Lakes Environmental Status Methodology - June 2010, on Hydro Tasmanias internal web.	17
214	Aquatic Environment Programme, Environmental Aspects Register	3
215	Environment Monthly Report – August 2011	3
216	EP1 – Environment and Sustainability Management Procedure	3
217	ER401 – Legal Compliance Register (part of ESMS)	3
218	ESMS Guide – How ESMS Meets ISO 14001	3
219	Hydro Tasmania Environmental Policy	3
220	ISO 14001 Certificate – September 2011	3
221	Register of Environment and Sustainability Management System Documents	3
222	Hydro Tasmania OH&S Statistics August 2011	12
223	Hydro Tasmania Contractor Safety Management Procedure	12
224	Hydro Tasmania Personal Protective Equipment Procedure	12
225	Hydro Tasmania Executive Safety Team Terms of Reference	12
226	Hydro Tasmania Occupational Health and Safety Policy, October 2010	12
227	'Questions you may have about the Employee Assistance Program' - document on HR pages of Hydro Tasmania intranet	12
228	Managing People 'Essentials' Program - document on HR pages of Hydro Tasmania intranet	12
229	Workplace Hazard Register, for Trevallyn Power Station	12
230	South Esk Great Lakes Review, Environmental Report	3, 14
231	Review of the Cataract Gorge Monitoring Program, Peter Davies, March 2006	15
232	Hydro Tasmania archives: DX 9-38 Cataract Gorge 1955-1974	8,9,10
233	Hydro Tasmania archives: DX 9-38 Cataract Gorge 1975-	8,9,10
234	Hydro Tasmania archives: 19/7 B Trevallyn Power station 1949-1954	8,9,10
235	Hydro Tasmania archives: 19/7 B Trevallyn Power station 1955-1980	8,9,10
236	Hydro Tasmania archives: 19/7 B Trevallyn Power station 1981-	8,9,10
237	Hydro Tasmania archives: AP 8-4 Trevallyn Legal Claims	8,9,10
238	Information on financial audit processes that is commercially sensitive and internal to Hydro Tasmania	7
239	Information on capital investment assessment processes that is commercially sensitive and internal to Hydro Tasmania	7
240	Tasmanian Heritage Register (http://www.heritage.tas.gov.au/thr.html)	11, 13
241	Development of a Waterway Health Monitoring Strategy for Hydro-Impacted Waterways	17
242	Cataract Gorge Conservation Management Plan, GHD Consultants, presented to Launceston City Council, May 2008	3, 11, 13, 15
243	DPIPWE Permit To Take Threatened Plants, Permit Number TFL 11165, and accompanying letter 'Amended permit to take seven native flora species listed on schedules of the Tasmanian Threatened Species Protection Act 1995' from DPIPWE	15

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	Policy and Conservation Assessment Branch to Hydro Tasmania, 17 October 2011.	
244	NRM North, TEER Fact Sheet No.2, Lake Trevallyn Blue Green Algal Blooms	3, 15, 17

13 Appendix E: Visual Evidence, photos



Photo 1: Assessment team interviews Hydro Tasmania's employees Mick Knowles and Greg Carson



Photo 2: Assessment Team, single point of contact and observers, outside Trevallyn power station.

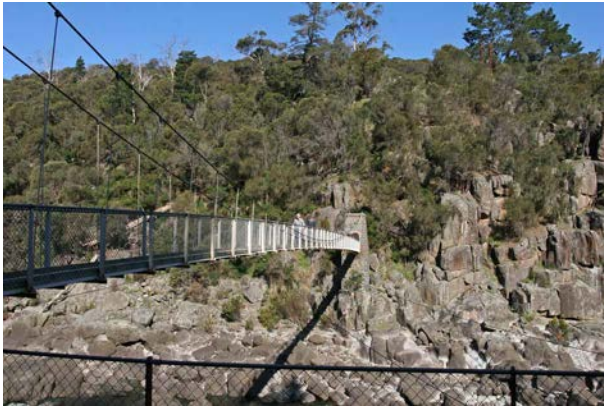


Photo 3: Bridge over Cataract Gorge at Duck Reach power station



Photo 4: Cataract Gorge at Duck Reach power station



Photo 5: Cataract Gorge at First Basin



Photo 6: Downstream from Trevallyn dam



Photo 7: Duck Reach Power Station



Photo 8: Elver Ladder Description



Photo 9: Evidence folders prepared by Hydro Tasmania

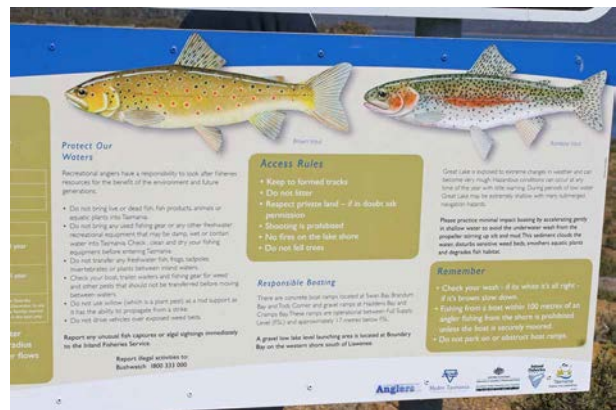


Photo 10: Fish Information boards at the Great Lake



Photo 11: Poatina Intake, Great Lake



Photo 12: Interviews at Hydro Tasmania's HQ in Hobart



Photo 13: Power Station tour



Photo 14: Mick Knowles, production manager, explains Trevallyn operations



Photo 15: Inside Trevallyn Power Station



Photo 16: Upper Cataract Gorge



Photo 17: View north across the lowlands with Poatina re regulation ponds



Photo 19. Waste oil management at Power Station



Photo 20. Solid Waste Control at Power Station



Photo 21. Safety signage at Power Station



Photo 22. Use of Safe Work Practices Manual at Power Station



Photo 23. Fire extinguishers at Power Station



Photo 24. Lost Time Incident reporting on prominent signboard at Power Station

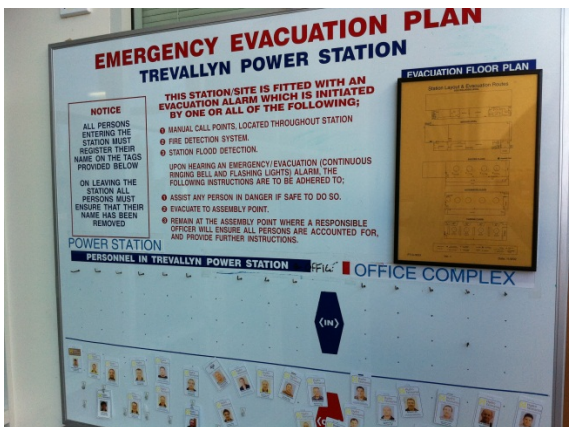


Photo 25. Emergency evacuation plan signage at Power Station



Photo 26. Use of permit to work signage (but note poor condition of floor)



Photo 27. Fire-extinguisher, maintained in working order and with inspection labels, widespread at Power Station



Photo 28. Signage to discourage public entry to dam area



Photo 29. Safety signage at dam site



Photo 30. Notice publicising workplace support officers at HQ



Photo 31. Plaque indicating recognition of Duck Reach by the Institution of Engineers of Australia



Photo 32. Interpretive boards at Duck Reach



Photo 33. Elver ladder at the dam site



Photo 34. Elvers at the Power Station