

HSAP SECTION IV PROJECT OPERATION

OVERVIEW OF SECTION IV ASPECTS

- River Basin & Transboundary Issues (IV-1):** This aspect addresses the degree of involvement and influence of the project in seeking efficiency and sustainability of water resource utilization within the large river basin in which it the project is located, which may cross jurisdictional boundaries. The intent is that water resource utilization at the river basin scale is planned and optimized with respect to social and environmental values, and conflicts are avoided.
- Hydrological Resource Availability & Management (IV-2):** This aspect addresses the level of understanding of the hydrological resource availability and reliability to the project, and the planning for short- and long-term management of this resource. The intent is that hydrological resource availability and reliability to the project are understood and optimally planned for in the short- and long-term, taking into account climate change and taking into account existing and likely future demands on the hydrological resource that could directly affect the project.
- Additional Benefits & Economic Viability (IV-3):** This aspect addresses the additional benefits that can arise from a hydropower project, and the net economic viability of the project from a regional perspective. The intent is that there is a net benefit from the project once all economic, social and environmental costs and benefits are factored in, and that opportunities for additional benefits are recognised and pursued where practicable.
- Financial Viability (IV-4):** This aspect addresses the ability of a project to generate the required financial returns to meet project funding requirements, including funding of measures aimed at ensuring project sustainability. The intent is that projects operates on a sound financial basis that supports financing, covers all project costs including sustainability commitments, ensures a level of profitability, and enables a return to shareholders/investors.
- Corporate Governance (IV-5):** This aspect addresses corporate governance of the developer with respect to ethical business practices, risk management, corruption risks, business administration, policies and processes, corporate social responsibility, stakeholder relations, and compliance. The intent is that the developer has sound business structures, policies and practices, and addresses transparency, integrity and accountability issues.
- Procurement (IV-6):** This aspect addresses the procurement of civil works, good and services. The intent is that procurement processes are equitable, transparent and accountable; support successful achievement of project timeline, quality and budgetary milestones; support developer and contractor environmental, social and ethical performance; and promote opportunities for local industries.
- Markets, Innovation & Research (IV-7):** This aspect addresses the degree to which the project owner/operator is aware of market trends which may influence the long-term viability of the hydropower project, and the investment being made into innovation and research to optimize strategic positioning of the project into the future. The intent is that the project is aware of and able to adapt to changes which will influence its market viability.
- Asset Reliability & Efficiency (IV-8):** This aspect addresses the reliability and efficiency of the hydropower station and network assets. The intent is that assets are maintained to deliver optimal performance in the short- and long-term in accordance with the overall market strategy of the owner/operator.
- Social Management Plan (IV-9):** This aspect addresses the management of social issues associated with development and operation of the hydropower project, including original social commitments made when the project was approved as well as current social commitments. The intent is that social impacts are managed for avoidance, minimisation, mitigation, or compensation of negative impacts, and enhancement measures for positive impacts are pursued where practicable.
- Project Affected Community (IV-10):** This aspect addresses the relationships between the project owner / operator and the project affected community, and the ongoing acceptance by the project affected community groups for the hydropower project. The intent is that human rights are respected, and that the project affected community is accepting of the project and confident in the project avoidance, mitigation, compensation and management plans.
- Indigenous Peoples (IV-11):** This aspect addresses the issues, risks and opportunities of the project with respect to indigenous peoples, recognising that as social groups with identities distinct from dominant groups in national societies that they are often the most marginalized and vulnerable segments of the population. The intent is that the project respects the dignity, human rights, aspirations, culture, knowledge, practices and natural resource-based livelihoods of indigenous peoples.
- Benefit Sharing (IV-12):** This aspect addresses the sharing of project benefits amongst project affected communities. The intent is that the project clearly generates benefits for the project affected community and that these are enjoyed over the life of the project.
- Labour & Working Conditions (IV-13):** This aspect addresses labour and working conditions, including employee opportunity, equity, diversity, health and safety. The intent is that workers are treated fairly and protected, and equal opportunities provided, in accordance with national and international standards and expectations on labour and working conditions.
- Cultural Heritage (IV-14):** This aspect addresses the protection and conservation of cultural heritage that may have been damaged or lost through the physical landscape changes brought about by hydropower project construction and operation, as well as

HSAP SECTION IV PROJECT OPERATION

through associated infrastructure impacts (e.g. new roads, transmission lines). The intent is that cultural heritage is identified, recorded, and high value artefacts protected.

Public Health (IV-15): This aspect addresses public health risks and opportunities associated with hydropower project operations. The intent is that public health risks are avoided, minimized and managed, and a good standard of public health services are available for the project affected community.

Asset & Community Safety (IV-16): This aspect addresses asset and community safety in relation to hydropower project operation. The intent is that life, property and the environment are protected from the consequences of dam failure and other safety risks.

Environmental Management Plan (IV-17): This aspect addresses the management of environmental issues associated with development and operation of the hydropower project, including original environmental commitments made when the project was approved as well as current environmental commitments. The intent is that environmental impacts are managed for avoidance, minimisation, mitigation, or compensation of negative impacts, and enhancement measures for positive impacts are pursued where practicable.

Catchment Management (IV-18): This aspect addresses the health of the project catchment and the present and future catchment land uses which may have implications for hydropower operations (e.g. water quality, land clearing, erosion, future water abstraction activities), as well as management actions of the developer that can affect environmental, social and economic values in the catchment (e.g. creating biodiversity reserves, land access rights, educational facilities). The intent is that project catchment management measures promote positive environmental, social and economic outcomes, taking into consideration the specific role and responsibility of the proponent.

Reservoir Management (IV-19): This aspect addresses the management of environmental, social and economic issues within and around the reservoir area during project operation. The intent is that the reservoir is managed to achieve a balance among biodiversity, habitat and ecosystem services and social and economic objectives, including power and other multi-purpose outcomes of the hydropower facility.

Environmental Flows & Downstream Sustainability (IV-20): This aspect addresses the delivery of environmental flows in relation to environmental, social and economic impacts and benefits downstream of the hydropower project. The intent is that downstream flow regimes are delivered to achieve a good fit between biodiversity, habitat, ecosystem services, social and economic objectives, including power and other multi-purpose outcomes of the hydropower facility, taking into account regional and system-wide plans for hydropower and water resources development.

Biodiversity & Invasive Species (IV-21): This aspect 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 hydropower project. The intent is that biodiversity and high conservation value areas are managed for avoidance, minimisation, mitigation or compensation of negative impacts, and opportunities for enhancement are pursued where practicable.

Erosion & Sedimentation (IV-22): This aspect addresses the management of potential impacts arising from sedimentation and erosion associated with hydropower project operations. The intent is that reservoir and downstream impacts related to sedimentation and erosion are managed for avoidance, minimisation, mitigation or compensation of negative impacts, and opportunities for enhancement are pursued where practicable.

Water Quality (IV-23): This aspect addresses how water quality issues in relation to hydropower project operation are addressed. The intent is that water quality issues are understood and addressed.

SECTION IV ASPECT RELEVANCE GUIDE:

CRITERIA	ASPECTS THAT DO NOT NEED TO BE ASSESSED
Project on a small tributary stream with no transboundary issues	River Basin & Transboundary Issues
No reservoir storage	Reservoir Management
Another project immediately upstream	Catchment Management
Another project reservoir immediately downstream	Environmental Flows (provided that there are only short dewatered reaches downstream of diversion dams with no particular values)
SIA shows no cultural heritage issues	Cultural Heritage
SIA shows no project affected community	Project Affected Community, Indigenous Peoples, Benefit Sharing
SIA shows no indigenous peoples	Indigenous Peoples

IV-1 RIVER BASIN & TRANSBOUNDARY ISSUES - SECTION IV PROJECT OPERATION

This aspect addresses the degree of involvement and influence of the project in seeking efficiency and sustainability of water resource utilization within the large river basin in which it the project is located, which may cross jurisdictional boundaries. The intent is that water resource utilization at the river basin scale is planned and optimized with respect to social and environmental values, and conflicts are avoided.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is not relevant for small projects on tributary streams, or for which the catchment, project-related activities, and downstream effects do not cross jurisdictional borders.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: The smaller the project, the more unlikely that it will have the resources to contribute to integrated river basin development planning. However, multiple small projects are very problematic from an integrated river basin management perspective, and so this aspect should not be discounted for small projects.

<i>Process Attributes</i>	5	4	3	2	1
Assessment	<ul style="list-style-type: none"> Understanding of delineation of the river basin, and the jurisdictional and transboundary arrangements within that basin 				
	Excellent	Very Good	Good	Poor	Very Poor
Assessment	<ul style="list-style-type: none"> Understanding of existing and likely future water resource uses and services at the river basin scale, and the potential for efficiencies, strategic planning and conflicts¹ 				
	Excellent	Very Good	Good	Poor	Very Poor
Management	<ul style="list-style-type: none"> Contribution of developer to integrated river basin development planning 				
	Pro-active and highly involved	Highly involved	Involved	Minimal involvement	No involvement
	<ul style="list-style-type: none"> Quality of the planning process for development of transboundary agreements where relevant [see Management guidance note] 				
Consultation	Excellent	Very Good	Good	Poor	Very Poor
	<ul style="list-style-type: none"> Involvement in consultation with stakeholders on river basin development and integrated water resource management planning 				
Consultation	Early stage, pro-active, highly involved, highly inclusive	Early stage, highly engaged	Involved	Minimal involvement	No involvement
	<ul style="list-style-type: none"> Involvement in consultation with stakeholders on river basin development and integrated water resource management planning 				
Performance Attributes	5	4	3	2	1
Stakeholder Support	<ul style="list-style-type: none"> Stakeholder support for river basin and transboundary agreements where relevant 				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	Not relevant at project preparation stage				
Conformance with Plans	Not relevant at project preparation stage				
Effectiveness	<ul style="list-style-type: none"> Success in ongoing improvements in strategic river basin development and integrated water resource management 				
	Very High	High	Good	Minimal	None
	<ul style="list-style-type: none"> Success in ongoing transboundary cooperation in project development 				
Effectiveness	Very high, agreements in place based on good faith amongst riparian states with no gaps	High, agreements in place based on good faith amongst riparian states with some non-critical gaps	Good, agreements in place but with a number of gaps	Minimal, agreements not yet in place or in place with many critical gaps	None, no agreements in place
	<ul style="list-style-type: none"> Success in ongoing transboundary cooperation in project development 				

AUDITING GUIDANCE NOTES:

1. Strategic planning of water resources at the river basin scale is considered here with respect to multiple objectives, not only maximizing the potential for hydropower generation but also preserving social and environmental values. Objectives would include to protect high value areas, promote strategic development and to optimize water resource utilization at the river basin scale.

EXAMPLES OF EVIDENCE: - River basin level analyses, - Interviews with relevant water resource organizations, - Transboundary agreements, - Records of meetings

IV-2 HYDROLOGICAL RESOURCE AVAILABILITY & MANAGEMENT - SECTION IV PROJECT OPERATION

This aspect addresses the level of understanding of the hydrological resource availability and reliability to the project, and the planning for short- and long-term management of this resource. The intent is that hydrological resource availability and reliability to the project are understood and optimally planned for in the short- and long-term, taking into account climate change and taking into account existing and likely future demands on the hydrological resource that could directly affect the project.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is always relevant.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: Understanding of climate change risks will depend on the quality of local scale climate modeling, which may not be very well developed for the region. Projects without reservoir storage will have little capacity to “manage” the hydrological resource. Projects within a cascade system need to liaise with other projects in that cascade to optimally utilize the hydrological resource.

Process Attributes	5	4	3	2	1
Assessment	<ul style="list-style-type: none"> Understanding of the hydrological resource availability to the project¹ including climate change risks [see Assessment guidance note] 				
	Excellent, good understanding of climate change risks	Very good, good understanding of climate change risks	Good, some understanding of climate change risks	Poor, little understanding of climate change risks	Very poor, no understanding of climate change risks
	<ul style="list-style-type: none"> Understanding of the existing and likely future demands on the water resource to the project², including assessment of risk 				
	Excellent	Very Good	Good	Poor	Very Poor
Management	<ul style="list-style-type: none"> Understanding of the opportunities and constraints of the power system³ and markets in relation to management of the hydrological resource 				
	Excellent	Very Good	Good	Poor	Very Poor
	<ul style="list-style-type: none"> Quality of the short- and long-term hydrological management planning for the project, including management of risks [see Management guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Consultation	<ul style="list-style-type: none"> Planning for water utilization efficiencies through simulation and optimisation⁴ 				
	Excellent	Very Good	Good	Poor	Very Poor
Performance Attributes	<ul style="list-style-type: none"> Quality of the consultation process with respect to hydrological resource management planning [see Consultation guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Stakeholder Support	<ul style="list-style-type: none"> Support of relevant stakeholders for hydrological management plans [see Stakeholder Support guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	<ul style="list-style-type: none"> Level of compliance with any licence conditions relating to management of the hydrological resource [see Compliance guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	<ul style="list-style-type: none"> Conformance with hydrological management plans [see Conformance with Plans guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	<ul style="list-style-type: none"> Optimal use by the project of the hydrological resource 				
	Highly likely over the short- and long-term	Likely over the short- and long-term	Likely over the short-term	Unlikely	Highly unlikely
	<ul style="list-style-type: none"> Likelihood of the project to adapt to identified risks of changes in the hydrological availability over the short- and long-term 				
	Very High	High	Good	Minimal	None

AUDITING GUIDANCE NOTES:

1. A good hydrological analysis would show that:

- All available data has been analysed using appropriate statistical indicators (e.g. precipitation, temperature, evaporation, flow rates, flood flows on a range of time steps such as daily, monthly, seasonal, annual);

IV-2 HYDROLOGICAL RESOURCE AVAILABILITY & MANAGEMENT - SECTION IV PROJECT OPERATION

- Data includes actual field measurements over at least 3 years capturing seasonality and spatial variability over the project catchment area;
- The quality of the data has been assessed and factored into the analysis;
- Modelling has been utilized to extend data sets and enable forecasting;
- There is some understanding of the levels of uncertainty in the data; and
- Analysis is updated taking into account emerging information.

Hydrological analyses can be improved through means such as more lengthy data sets, more detailed coverage of the catchment, more extensive analyses of the data, more extensive use of modeling, sophisticated methodologies to address levels of uncertainty, and use of short-and long-term scenario-based modeling.

2. Demands on water use could include other water resource project developments, development of water-reliant land uses e.g. agriculture or industrial, population growth, and likely requirements for environmental flow releases to the downstream environment (See aspect II-23 Environmental Flows & Downstream Sustainability).
3. Power system opportunities and constraints will relate to patterns of demand for energy (e.g. base vs. peak load), influence of power prices and competition, and transmission issues.
4. Optimal means best fit within the constraints relating to social and environmental issues and multiple users. Simulation and optimisation models allow an understanding of the interaction of inflows with other considerations, and can also be used to evaluate opportunities to improve efficiency in the system(s). In systems where a project is in a cascade, models can ensure efficiency in water utilization. Where hydro interacts with other generation sources (e.g. thermal, nuclear, wind), the use of such models can minimise the use of other more costly generation and can be used to better manage and operate the other generation sources in the system.

EXAMPLES OF EVIDENCE: - Hydrological analyses, - Analyses of water resource demands affecting the project, - Analyses of power system and market opportunities and constraints, - Simulation and optimization model scenarios and outputs, - Hydrological management plan for the project, - Interviews with hydrologists

IV-3 ADDITIONAL BENEFITS & ECONOMIC VIABILITY - SECTION IV PROJECT OPERATION

This aspect addresses the additional benefits that can arise from a hydropower project, and the net economic viability of the project from a regional perspective. The intent is that there is a net benefit from the project once all economic, social and environmental costs and benefits are factored in, and that opportunities for additional benefits are recognised and pursued where practicable.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is always relevant.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: The opportunities to leverage regional development through the project are likely to diminish in relation to project scale and if the project is hydropower only versus multi-purpose hydropower.

Process Attributes	5	4	3	2	1
Assessment	<ul style="list-style-type: none"> Understanding of the existing regional socio-economic baseline, regional economic activity and infrastructure, and related constraints and opportunities 				
	Excellent	Very Good	Good	Poor	Very Poor
	<ul style="list-style-type: none"> Understanding of the opportunities to leverage regional development through the project to support broader economic development objectives¹ 				
	Excellent	Very Good	Good	Poor	Very Poor
Management Planning	<ul style="list-style-type: none"> Analysis of economic viability of the project through cost-benefit analysis which includes social, environmental and economic aspects 				
	Excellent	Very Good	Good	Poor	Very Poor
Consultation Process	<ul style="list-style-type: none"> Quality of the planning process to optimize delivery of project benefits [see Management guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Performance Attributes	<ul style="list-style-type: none"> Quality of the consultation process [see Consultation guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Stakeholder Support	<ul style="list-style-type: none"> Level of stakeholder support for analysis and planning for additional benefits [see Stakeholder Support guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	Not relevant at project preparation stage				
Conformance with Plans	Not relevant at project preparation stage				
Effectiveness	<ul style="list-style-type: none"> Optimisation of opportunities to deliver additional benefits to directly affected stakeholders and the broader community 				
	Fully optimised ² with no gaps	Close to fully optimised with very few non-critical gaps	Well-optimised with a number of non-critical gaps	Somewhat optimised with critical gaps	Not optimised
	<ul style="list-style-type: none"> Success in achieving net project benefits based on cost-benefit analysis, factoring in social and environmental considerations 				
	Very High	High	Good	Minimal	None

AUDITING GUIDANCE NOTES:

- Regional development can be leveraged by the following aspects:
 - capacity building, training and specific clauses for local employment opportunities
 - additional infrastructure (e.g. bridges, access roads, boat ramps)
 - additional services (improved health and education services thanks to electrification)
 - supporting other water usages such as irrigation, navigation, flood/drought control, integrated water resource management, aquaculture, leisure industry (i.e. outfitters, camping), increased water availability for industrial and municipal water supply, ground water protection.
- Fully optimised means a best fit has been found across all considerations based on a consultative process.

EXAMPLES OF EVIDENCE: - Cost/benefit analysis, - Independent analysis, - Interviews with stakeholders, - Independent assessments of poverty, living standards, food security, access to electricity and access to resources, - Stakeholder interviews

IV-4 FINANCIAL VIABILITY - SECTION IV PROJECT OPERATION

This aspect addresses the ability of a project to generate the required financial returns to meet project funding requirements, including funding of measures aimed at ensuring project sustainability. The intent is that projects operates on a sound financial basis that supports financing, covers all project costs including sustainability commitments, ensures a level of profitability, and enables a return to shareholders/investors.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is always relevant.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: There are many different approaches to project finance, depending on whether the project is private or public sector or a combination, and to what degree and from what sources loans are required. For hydropower projects that are undertaken by publicly owned utilities, the focus is usually on the financial viability of the utility (rather than on the project per se), including meeting benchmarked financial performance indicators.

Process Attributes	5	4	3	2	1
Assessment	<ul style="list-style-type: none"> Use of financial modelling¹ 				
	Sophisticated models with extensive scenario testing	Recognised models with extensive scenario testing	Recognised models with some scenario testing	Models with limited capabilities, some of scenario testing	Models with limited capabilities, little scenario testing
	<ul style="list-style-type: none"> Understanding of project costs with respect to obligations, trends, uncertainties, risks and opportunities² 				
	Excellent	Very Good	Good	Poor	Very Poor
	<ul style="list-style-type: none"> Understanding of project revenue streams with respect to obligations, trends, uncertainties, risks and opportunities³ 				
	Excellent	Very Good	Good	Poor	Very Poor
	<ul style="list-style-type: none"> Understanding of requirements in relation to project financing 				
Excellent	Very Good	Good	Poor	Very Poor	
Management Planning	<ul style="list-style-type: none"> Quality of the short- and long-term financial management planning process for the project, including management of risks [see Management guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
	<ul style="list-style-type: none"> Production of financial reports 				
	Posted on website within 6 months of end of financial year, annually audited by leading audit company	Posted on website within 6 months of end of financial year, annually audited	Publicly available on request, annually audited	Produced annually, not publicly available, not audited	Not produced
Consultation	<ul style="list-style-type: none"> Consultation with directly relevant stakeholders in relation to conditions and risks for project costs, revenue streams and financing 				
	Frequent for all components	Regular for all components	Some for all components	Minimal	None
Performance Attributes	5	4	3	2	1
Stakeholder Support	<ul style="list-style-type: none"> Support of relevant stakeholders for financial management arrangements [see Stakeholder Support guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	<ul style="list-style-type: none"> Level of compliance [see Compliance guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	<ul style="list-style-type: none"> Conformance with financial management plans [see Conformance with Plans guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	<ul style="list-style-type: none"> Success in meeting financial targets including in relation to sustainability measures 				
	Very high for all targets	High for all targets	High for most targets	Minimal	No likelihood
	<ul style="list-style-type: none"> Debt Service Coverage Ratio⁴ 				
	Very robust	Robust	Commercially viable	Marginal viability	Not commercially viable

AUDITING GUIDANCE NOTES:

1. Financial modeling at the most minimum has as inputs the project costs and revenue streams, and as outputs the financial returns. It can be used to examine the implications of various market conditions, trends and risks on the financial viability of the project. It can also be used to test the implications of various financing arrangements.

IV-4 FINANCIAL VIABILITY - SECTION IV PROJECT OPERATION

2. Considerations relating to project costs include equipment, supplies, labour, tax, land/water resource rights, and social and environmental issue mitigation and management costs. Associated risks may include inflation, supply chain disruptions, contractual arrangements, life of resource concessions, project delays, and uncertainties in relation to social and environmental issues and mitigation/management requirements. Opportunities relate to cost-savings, for example which may arise due to siting and design choices.
3. Considerations relating to resource streams include understanding of the electricity market, the investment drivers for new market entrants e.g. access to carbon finance, and the Power Purchase Agreement. Associated risks may include long-term viability of the market; security of revenue lines e.g. with respect to transmission, other competitors, or industry trends; and security of the project inflows (see Aspect II-3 Hydrological Resource Availability & Management). Opportunities relate to electricity sales strategies (trading, base vs peak load delivery, ancillary services), and non-energy services such as irrigation, water supply, flood control and navigation.
4. Debt Service Coverage Ratio measures the developer's ability to produce enough cash to cover its debt

EXAMPLES OF EVIDENCE: - Financial modeling reports, - Finance risk analysis, - Assessment of favorability of long and short-term conditions of finance, - Annual Financial Report, - Financial monitoring reports

IV-5 CORPORATE GOVERNANCE - SECTION IV PROJECT OPERATION

This aspect addresses corporate governance of the developer with respect to ethical business practices, risk management, corruption risks, business administration, policies and processes, corporate social responsibility, stakeholder relations, and compliance. The intent is that the developer has sound business structures, policies and practices, and addresses transparency, integrity and accountability issues.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is always relevant.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: This aspect applies to both private and public sector projects, on the assumption that government business enterprises have similar governance requirements to corporations, but with more emphasis on stakeholders than shareholders. Small projects with small companies may have simple business structures but should still have all of the elements addressed in this aspect.

<i>Process Attributes</i>	5	4	3	2	1
Assessment	<ul style="list-style-type: none"> Understanding of important elements of corporate governance¹ 				
	Excellent	Very Good	Good	Poor	Very Poor
Assessment	<ul style="list-style-type: none"> Understanding of project operation risks including corruption risks² 				
	Excellent	Very Good	Good	Poor	Very Poor
Management	<ul style="list-style-type: none"> Comprehensiveness of vision, values, policies, systems and business structures with respect to the important elements of corporate governance, including code of ethics³ 				
	Comprehensive, no gaps	Very few minor gaps	Some minor gaps	Some major gaps	Many major gaps
	<ul style="list-style-type: none"> Review of vision, values, policies, systems and business structures⁴ 				
	Closely monitored, and continuously reviewed and updated	Periodic and frequent	Periodic but infrequent	Irregular	None
	<ul style="list-style-type: none"> Quality of management planning process for compliance [see Management guidance note] 				
	Excellent, Compliance Plan prepared, subject to independent transparent review	Very Good, Compliance Plan prepared	Good	Poor	Very Poor
	<ul style="list-style-type: none"> Quality of management planning process for project risk including corruption risks [see Management guidance note] 				
Consultation	Excellent	Very Good	Good	Poor	Very Poor
	<ul style="list-style-type: none"> Transparency with respect to compliance reporting 				
	Very high	High	Some	Minimal	None
<i>Performance Attributes</i>	5	4	3	2	1
Stakeholder Support	<ul style="list-style-type: none"> Support for vision, values, policies, systems and business structures [see Stakeholder Support guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Stakeholder Support	<ul style="list-style-type: none"> Level of public credibility in terms of sustainable and ethical business practices 				
	Very high	High	Some	Minimal	None
Compliance	<ul style="list-style-type: none"> Compliance with regulations [see Compliance guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	<ul style="list-style-type: none"> Conformance with vision, values, policies and systems [see Conformance with Plans guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
	<ul style="list-style-type: none"> Conformance with risk management plans [see Conformance with Plans guidance note] 				
	<ul style="list-style-type: none"> Robustness of business systems and structures 				
	Very High	High	Good	Minimal	None

IV-5 CORPORATE GOVERNANCE - SECTION IV PROJECT OPERATION

Effectiveness	• Success in mitigation of corruption risks				
	Very High	High	Good	Minimal	None

AUDITING GUIDANCE NOTES:

1. Commonly accepted principles of corporate governance include the following elements:
 - Rights and equitable treatment of shareholders - the developer should respect the rights of shareholders and help shareholders to exercise those rights;
 - Interests of other stakeholders – the project developer should recognize their legal and other obligations to stakeholders;
 - Role and responsibilities of the developer – the project developer's Board needs a range of skills and understanding to be able to deal with various business issues and have the ability to review and challenge management performance;
 - Integrity and ethical behavior – ethical and responsible decision-making is not only important for public relations, but it is also a necessary element in risk management and avoiding lawsuits;
 - Disclosure and transparency – relates to basic facts and figures as well as the mechanisms and processes.
2. Project corruption risks at the operation stage include commitments not kept, under-funding of environment and social mitigation obligations (no money plea), corruption in O&M procurements, insurance fraud on equipment and performance guarantees.
3. A business code of ethics or code of conduct should specify the business commitments to disclosure of political and philanthropic contributions, rejection of facilitation payments, and clear guidelines for giving and receiving gifts, hospitality and expenses.
4. In some cases, businesses will develop a Governance Improvement Plan, to identify areas of focus for the Board in order to develop and sustain strong governance.

EXAMPLES OF EVIDENCE: - Corporate vision and values, - Corporate policies, - Business structure and board of directors, - Board committees, - Business risk management processes, - Corporate ethics policy or code of conduct, - Document setting out the developer's policy to address bribery and other corrupt practices, including relationships with external partners, - Corporate annual reporting, - Project corruption risk assessment, - Independent review of corporate governance, - Project Compliance Plan, - Governance Improvement Plan

IV-6 PROCUREMENT - SECTION IV PROJECT OPERATION

This aspect addresses the procurement of civil works, good and services. The intent is that procurement processes are equitable, transparent and accountable; support successful achievement of project timeline, quality and budgetary milestones; support developer and contractor environmental, social and ethical performance; and promote opportunities for local industries.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is always relevant.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: Scale of the project, and the degree to which contractors are used, will considerably influence the complexity of the procurement aspect. Some lenders may have different procurement requirements depending on whether it is a public or private sector project.

Process Attributes	5	4	3	2	1
Assessment	• Understanding of the major supply needs for civil works, goods and services ¹				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of local supply sources and capacity relevant to all project streams, and the potential for capacity utilization and development				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of relevant legislation and standards relating to procurement, including those of financing agencies				
	Excellent	Very Good	Good	Poor	Very Poor
Management	• Understanding of supply chain and corruption risks ²				
	Excellent	Very Good	Good	Poor	Very Poor
	• Quality of the procurement management process [see Management guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
	• Comprehensiveness of the procurement management measures ³				
	All components included in detail	All components included	Most components included	Some components included	Very few components included
Consultation	• Use of sustainability criteria in the procurement screening / prequalification process ⁴				
	Fully based on sustainability criteria	Partially based on sustainability criteria	Based on some sustainability criteria	Based on minimum considerations not including sustainability criteria	No procurement screening process
	• Transparency and competitiveness of the bidding process and in awarding of contracts				
	Very High	High	Medium	Low	Very Low
	• Encouragement of contractors to have their own human rights and ethics policies and procedures				
	Excellent	Very Good	Good	Poor	Very Poor
Performance Attributes	• Designated points of communication for potential bidders and contractors with project managers				
	Clearly designated across all project streams	Clearly designated across most project streams	Some designation across some project streams	Little designation across some project streams	No designation
Stakeholder Support	• Support of stakeholders for procurement processes [see Stakeholder Support guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	• Compliance with legal requirements [see Compliance guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	• Conformance with procurement management plans [see Conformance with Plans guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
	• Effectiveness of procurement process				
	Fair, transparent and timely across all project streams	Fair, transparent and timely across most project streams	Fair, transparent and timely across some project streams	Fair, transparent and timely across few project streams	Fair, transparent and timely across no project streams
	• Success in mitigation of supply chain risks				

IV-6 PROCUREMENT - SECTION IV PROJECT OPERATION

Effectiveness	Very High	High	Good	Minimal	None
	<ul style="list-style-type: none"> Involvement and development of opportunities for local suppliers 				
	Active and extensive development of opportunities for local suppliers	Some development of opportunities for local suppliers	Where appropriate, preference given to involvement of local suppliers but no development of opportunities	Little involvement of local suppliers	No involvement of local suppliers

AUDITING GUIDANCE NOTES:

1. Major supply needs relate to economic, financial, technical, environmental and social consultancies; contractors for any project construction works (e.g. maintenance, refurbishments or upgrades); and significant supply of major goods in relation to power station operation.
2. Supply chain risks relate to inability to meet the contract provisions with respect to cost, time, quality, specifications and anti-corruption
3. Comprehensive procurement management measures encompass the following range of considerations:
 - o Prequalification process to screen potential bidders.
 - o Bidding process - open competitive bidding (clearly stated reasons if this is not the case); transparent and equitably available information about tender opportunities; bidding documentation states selection criteria, evaluation and award decision process; bidders have sufficient time for bid preparation and for pre-qualification requirements when these apply.
 - o Awarding of contracts – transparency on the award decision and its justification; opportunity for aggrieved competitors to challenge award decisions.
 - o Contract specifications – clarity on terms and conditions of the contract, management of variations, penalty clauses, contract implementation, role of intermediaries and agents, dispute-settlement mechanisms and procedures.
 - o Management responsibilities - responsibility for demand assessment, preparation, selection, contracting, supervision and control of a project assigned to separate bodies; safeguards such as committees at decision-making points and rotation of staff in sensitive positions; well trained and adequately remunerated staff responsible for procurement.
 - o Monitoring - internal and external control and auditing bodies; independent audits; publicly accessible reports; high level monitoring of contract 'change' orders that alter the price or description of work beyond a cumulative threshold (e.g. 15 % of contract value); triggers for additional control activities if there are unreasonable delays in project execution; participation of civil society organisations promoted as independent monitors of both the tender and execution of projects.
 - o Anti-corruption measures - ensuring contracts are above a low threshold, requiring the contracting authority and its employees to commit to a strict anti-corruption policy, development of a project integrity pact, providing mechanisms to report corruption and protect whistleblowers. Confidentiality should be limited to legally protected information.
4. Screening criteria might encompass at a minimum quality, reputation, cost, and contractor prior performance on meeting contractual obligations to time, cost and specifications. Screening based on sustainability criteria would also encompass social, environmental, ethics, human rights, health and safety performance, and take into account giving preference and support to local suppliers where they meet other criteria. Screening to address anti-corruption would specify that companies tendering must have a code of conduct addressing anti-corruption.

EXAMPLES OF EVIDENCE: - Project Procurement Plan, - Tender requirements / specifications, - Bidding documents, - Supplier screening criteria, - Evaluation of supplier performance, - Purchasing policy / procedures, - Monitoring and review reports

IV-7 MARKETS, INNOVATION & RESEARCH - SECTION IV PROJECT OPERATION

This aspect addresses the degree to which the project owner/operator is aware of market trends which may influence the long-term viability of the hydropower project, and the investment being made into innovation and research to optimize strategic positioning of the project into the future. The intent is that the project is aware of and able to adapt to changes which will influence its market viability.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is always relevant.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: This aspect applies regardless of whether the hydropower project operates in a competitive electricity market, as it will always be necessary to scan ahead to see what contextual changes may affect the project or what opportunities are emerging.

<i>Process Attributes</i>	5	4	3	2	1
Assessment	• Understanding of present and likely future market conditions and influences on these				
	Excellent	Very Good	Good	Poor	Very Poor
Assessment	• Understanding of research and innovation pathways relevant to positioning of the hydropower project in future markets ¹				
	Excellent	Very Good	Good	Poor	Very Poor
Management	• Quality of the management process to introduce new initiatives in response to market demands [see Management guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Management	• Quality of the management processes for research and innovation [see Management guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Consultation	• Quality of the consultation process in relation to markets, innovation and research [see Consultation guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
<i>Performance Attributes</i>	5	4	3	2	1
Stakeholder Support	• Support of stakeholders for market adaptation and innovation and research management processes [see Stakeholder Support guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	• Compliance with market requirements [see Compliance guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	• Conformance with market, research and innovation management plans [see Conformance with Plans guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	• Level of confidence in ability to respond to medium- and long-term market variability				
	Very High	High	Good	Minimal	None
	• Identification and application of new solutions to improve performance				
	Frequent	Some	Occasional	Minimal	None
Effectiveness	• Introduction of new initiatives in response to market demands				
	Introduced in all instances where required	Introduced in almost all instances where required	Introduced in most instances where required	Introduced in some instances where required	Not introduced

AUDITING GUIDANCE NOTES:

1. Examples of market response strategies include developing wind farms to take advantage of renewable energy certificates and the natural synergies between hydropower and wind; development or upgrade of transmission lines to enter new markets; changing customer, pricing and contract strategies; refurbishments and upgrades; changing operational patterns to meet higher priced electricity demand, etc.

EXAMPLES OF EVIDENCE: - Market research, - Research and development program, - Evidence of application of new solutions, - Awards and external recognition for innovation and/or research and development program, - Examples of new products, - Examples of expansion into new markets, - Examples of response to market demands

IV-8 ASSET RELIABILITY & EFFICIENCY - SECTION IV PROJECT OPERATION

This aspect addresses the reliability and efficiency of the hydropower station and network assets. The intent is that assets are maintained to deliver optimal performance in the short- and long-term in accordance with the overall market strategy of the owner/operator.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is always relevant.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: None.

<i>Process Attributes</i>	5	4	3	2	1
Assessment	• Understanding of power station and network asset efficiency and reliability				
	Excellent	Very Good	Good	Poor	Very Poor
Assessment	• Understanding of power station and network asset efficiency constraints ¹				
	Excellent	Very Good	Good	Poor	Very Poor
Management	• Quality of the asset efficiency and reliability management process [see Management guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Consultation	• Quality of consultation between power station operators, technicians and managers in relation to asset efficiency and reliability				
	Excellent	Very Good	Good	Poor	Very Poor
<i>Performance Attributes</i>	5	4	3	2	1
Stakeholder Support	• Support of stakeholders for asset management processes [see Stakeholder Support guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	• Compliance with legal requirements [see Compliance guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	• Conformance with asset management plans [see Conformance with Plans guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	• Power station and network asset efficiency				
	Very High	High	Good	Minimal	None
	• Power station and network reliability performance				
	Very High	High	Good	Minimal	None
Effectiveness	• Confidence in future asset reliability and efficiency				
	Very High	High	Good	Minimal	None

AUDITING GUIDANCE NOTES:

1. Constraints refers to any limits on the efficiency of operations relating to assets, e.g. inefficient or undersized transmission lines, inefficient or poorly functioning transformers, inefficient turbines.

EXAMPLES OF EVIDENCE: - Record of asset performance, - Power station asset management strategies and program, - Asset performance guarantees, - Asset reliability assessment and monitoring program, - Program of asset upgrades, - Information on asset efficiency, - Information on comparative equipment and system performance, - Information on practicability of constraint removal, - Information on the operational efficiency of the individual power station or groups of power stations in the context of the broader system and relevant market arrangements, - Operational efficiency identification, measurement and assessment process

IV-9 SOCIAL MANAGEMENT PLAN - SECTION IV PROJECT OPERATION

This aspect addresses the management of social issues associated with development and operation of the hydropower project, including original social commitments made when the project was approved as well as current social commitments. The intent is that social impacts are managed for avoidance, minimisation, mitigation, or compensation of negative impacts, and enhancement measures for positive impacts are pursued where practicable.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is always relevant.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: None.

Process Attributes	5	4	3	2	1
Assessment	<ul style="list-style-type: none"> Ongoing monitoring of social impacts and issues in relation to original project development and ongoing project operation¹ [see Assessment guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
	<ul style="list-style-type: none"> Integration of local and traditional knowledge 				
	Excellent	Very Good	Good	Poor	Very Poor
Management	<ul style="list-style-type: none"> Consideration of cumulative impacts and legacy issues 				
	In depth consideration of both components	Good consideration of both components	Some consideration of both components	Minimal consideration of either component	No consideration of either component
	<ul style="list-style-type: none"> Quality of the social management planning (SMP) process [see Management guidance note] 				
Consultation	Excellent	Very Good	Good	Poor	Very Poor
	<ul style="list-style-type: none"> Quality of the social impact management consultation process [see Consultation guidance note] 				
Performance Attributes	5	4	3	2	1
Stakeholder Support	<ul style="list-style-type: none"> Level of stakeholder support the social impact management process [see Stakeholder Support guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	<ul style="list-style-type: none"> Level of compliance with licence conditions relating to social impact management and monitoring [see Compliance guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	<ul style="list-style-type: none"> Conformance with social management plans [see Conformance with Plans guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	<ul style="list-style-type: none"> Degree to which negative project social impacts are identified, avoided, mitigated and/or compensated 				
	All major and minor negative impacts with no gaps	All major and minor negative impacts with very few non-critical gaps	Major negative impacts with a number of non-critical gaps	Major negative impacts with some critical gaps	Major negative impacts with many critical gaps
	<ul style="list-style-type: none"> Success in achieving positive project social impacts 				
	Very High	High	Good	Minimal	None

AUDITING GUIDANCE NOTES:

- The International Association of Impact Assessment identifies social impacts as changes to one or more of the following:
 - people's way of life – that is, how they live, work, play and interact with one another on a day-to-day basis;
 - their culture – that is, their shared beliefs, customs, values and language or dialect;
 - their community – its cohesion, stability, character, services and facilities;
 - their political systems – the extent to which people are able to participate in decisions that affect their lives, the level of democratisation that is taking place, and the resources provided for this purpose;
 - their environment – the quality of the air and water people use; the availability and quality of the food they eat; the level of hazard or risk, dust and noise they are exposed to; the adequacy of sanitation, their physical safety, and their access to and control over resources;
 - their health and wellbeing – health is a state of complete physical, mental, social and spiritual wellbeing and not merely the absence of disease or infirmity;
 - their personal and property rights – particularly whether people are economically affected, or experience personal disadvantage which may include a violation of their civil liberties; and

IV-9 SOCIAL MANAGEMENT PLAN - SECTION IV PROJECT OPERATION

- their fears and aspirations – their perceptions about their safety, their fears about the future of their community, and their aspirations for their future and the future of their children.

EXAMPLES OF EVIDENCE: - SIA and associated reports, - Social management plans, - Records of consultation in association with the SIA/SMP, - independent reviews, - Ongoing monitoring of social baseline, - Review and monitoring of social commitments

IV-10 PROJECT AFFECTED COMMUNITY - SECTION IV PROJECT OPERATION

This aspect addresses the relationships between the project owner / operator and the project affected community¹, and the ongoing acceptance by the project affected community groups² for the hydropower project. The intent is that human rights are respected, and that the project affected community is accepting of the project and confident in the project avoidance, mitigation, compensation and management plans.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is not relevant if the Social Impact Assessment shows that there is no project affected community.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: Definition of community groups will be influenced by the project context, relevant policies, and any issues that emerge in the Social Impact Assessment.

Process Attributes	5	4	3	2	1
Assessment	• Understanding of the project affected community and community groups				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of relevant human rights issues				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of the consultation engagement mechanisms that may be most suitable for different community groups				
	Excellent	Very Good	Good	Poor	Very Poor
Management	• Understanding of any special needs or assistance ³ that may be required for community groups through project operation				
	Excellent	Very Good	Good	Poor	Very Poor
	• Quality of the community engagement planning process including community groups with special needs [see Management guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
	• Quality of the management planning process to address human rights issues [see Management guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Consultation	• Owner / operator community relations staff				
	Continuous with very low turnover	Continuous with some turnover	Mostly continuous with some time gaps and some turnover	Intermittent over time	None
	• Community representative structures for engagement about the project				
	Formed for most of the community groups	Formed for many of the community groups	Formed for some of the community groups	At least one formed	None
	• Quality of the consultation process [see Consultation guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Performance Attributes	• Engagement with project affected community				
	Frequent and two-way, stakeholder involvement in decision-making	Regular and two-way	Regular, often one-way (for project to inform)	Some	None
	• Degree to which consultation process is respectful of rights, culturally sensitive, supportive to those requiring assistance, free, prior and informed				
	Excellent	Very Good	Good	Poor	Very Poor
Stakeholder Support	• Level of stakeholder support [see Stakeholder Support guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	• Compliance with legislation or any publicly stated commitments relating to human rights ⁴ [see Compliance guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	• Conformance with plans regarding engagement with project affected communities and addressing human rights [see Conformance with Plans guidance note]				

IV-10 PROJECT AFFECTED COMMUNITY - SECTION IV PROJECT OPERATION

	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	• Expressions of support by project-affected community groups				
	Unsolicited, numerous and diverse across many community groups	Multiple and diverse across a number of community groups	Some, diverse across community groups	Few with low diversity across community groups	None
	• Longevity of engagement mechanisms				
	Very High	High	Good	Minimal	None
	• Community partnerships				
	Several community partnerships established and formalised	One or more community partnerships established	Progress towards establishment of a community partnership	Little progress towards establishment of community partnerships	None
	• Performance on human rights issues				
	Strong performance independently analysed	Good performance with minor gaps, independently analysed	Good performance with minor gaps, internal analysis	Some critical gaps in performance	Many critical gaps in performance

AUDITING GUIDANCE NOTES:

1. The project affected community is an interacting population of various kinds of individuals living in the region that is directly affected by the hydropower project preparation, implementation and/or operation. These may be within the catchment, reservoir area, downstream, or in the periphery where project-associated activities occur.
2. Community groups are groups of people with common characteristics or interest living together within the larger society. There are many different ways to view these groups, and these will need to be defined in meaningful ways for the project. These may include, by way of example, urban dwellers, rural dwellers, indigenous peoples, ethnic minorities, people of a common profession or religion, disabled, elderly, illiterate, women, men, children, etc. Particular attention needs to be paid to community groups that might be considered vulnerable with respect to the degree to which they are marginalized or impoverished, and their capacity and means to absorb change
3. Forms of assistance may include, for example, translation of documents, interpreters, forms of communication, assistance to attend meetings, personal visits, physical infrastructure installations, etc.
4. For example, a commitment to adhere to any international conventions or declarations such as the UN Convention on Human Rights.

EXAMPLES OF EVIDENCE: - Analyses, - Plans, - Records of meetings, - Documentation of agreements, - Surveys and polls, Review and monitoring reports

IV-11 INDIGENOUS PEOPLES - SECTION IV PROJECT OPERATION

This aspect addresses the issues, risks and opportunities of the project with respect to indigenous peoples, recognising that as social groups with identities distinct from dominant groups in national societies that they are often the most marginalized and vulnerable segments of the population. The intent is that the project respects the dignity, human rights, aspirations, culture, knowledge, practices and natural resource-based livelihoods of indigenous peoples.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is not relevant if the Social Impact Assessment shows that there are no indigenous peoples affected by the project.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: National policies will differ with respect to their recognition of indigenous peoples and their rights.

Process Attributes	5	4	3	2	1
Assessment	• Understanding of the representation of indigenous peoples groups in the project affected community ¹				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of indigenous peoples rights with respect to the project ²				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of risks and vulnerabilities of indigenous peoples with respect to the project ³				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of communication and engagement approaches appropriate to the indigenous peoples				
Management	Excellent	Very Good	Good	Poor	Very Poor
	• Level of understanding by indigenous peoples of the project				
	Excellent	Very Good	Good	Poor	Very Poor
	• Quality of the management planning process with respect to indigenous peoples issues, risks and opportunities [see Management guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
	• Quality of the consultation process with indigenous peoples [see Consultation guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Consultation	• Engagement with indigenous peoples communities				
	Frequent and two-way, community involvement in decision-making	Regular and two-way	Regular, often one-way (for project to inform)	Some	None
	• Degree to which consultation process is respectful of rights, culturally sensitive, supportive to those requiring assistance, free, prior and informed				
	Excellent	Very Good	Good	Poor	Very Poor
Performance Attributes	5	4	3	2	1
Stakeholder Support	• Level of stakeholder support [see Stakeholder Support guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	• Compliance with any relevant legal requirements or public stated business commitments [see Compliance guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	• Conformance with management plans with respect to indigenous peoples issues, risks and opportunities [see Conformance with Plans guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	• Degree to which negative project impacts to indigenous peoples and their associated culture, knowledge and practices are identified, avoided, mitigated and/or compensated				
	All major and minor negative impacts with no gaps	All major and minor negative impacts with very few non-critical gaps	Major negative impacts with a number of non-critical gaps	Major negative impacts with some critical gaps	Major negative impacts with many critical gaps
	• Success in delivery of positive project social impacts for indigenous peoples				
	Very High	High	Good	Minimal	None

IV-11 INDIGENOUS PEOPLES - SECTION IV PROJECT OPERATION

• Longevity of engagement mechanisms with indigenous peoples				
Very High	High	Good	Minimal	None
• Performance on human rights issues with respect to indigenous peoples				
Strong performance independently analysed	Good performance with minor gaps, independently analysed	Good performance with minor gaps, internal analysis	Some critical gaps in performance	Many critical gaps in performance

AUDITING GUIDANCE NOTES:

1. There is no universally accepted definition of “indigenous peoples”. The definition used in this Protocol is as defined as per IFC Performance Standard 7, and refers to “a distinct social and cultural group possessing the following characteristics in varying degrees:
 - o Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
 - o Collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories;
 - o Customary cultural, economic, social or political institutions that are separate from those of the dominant society or culture;
 - o An indigenous language, often different from the official language of the country or region”.

Indigenous peoples groups would need to be defined as meaningful for the project, and may relate to villages, family groups or households.
2. Indigenous peoples rights are articulated in International Labour Organisation ILO 169, and in the UN Declaration on Rights of Indigenous Peoples. Indigenous peoples' rights may be individual and/or collective rights and belong concurrently to individuals and groups. Rights may address the tangible (land, water and resources) and/or the intangible (traditional knowledge understandings and practices, spirituality and artistic teachings and representations of these). While national and international instruments recognise the rights of indigenous peoples, the content of these rights is generally determined by the laws and customs governing the relationship of an Indigenous group to their traditional country, region and to other groups with whom they have contact.
3. “The economic, social and legal status [of indigenous peoples] often limits their capacity to defend their interests in, and rights to, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. They are particularly vulnerable if their lands and resources are transformed, encroached upon by outsiders, or significantly degraded. Their languages, cultures, religions, spiritual beliefs, and institutions may also be under threat. These characteristics expose indigenous peoples to different types of risks and severity of impacts, including loss of identity, culture, and natural resource-based livelihoods, as well as exposure to impoverishment and disease” (IFC Performance Standard 7).

EXAMPLES OF EVIDENCE: - Analytical reports, - Interviews, - Management plans, - Records of meetings, - Correspondence, - Independent reviews and analyses, - Monitoring reports

IV-12 BENEFIT SHARING - SECTION IV PROJECT OPERATION

This aspect addresses the sharing of project benefits amongst project affected communities. The intent is that the project clearly generates benefits for the project affected community and that these are enjoyed over the life of the project.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is not relevant if the Social Impact Assessment shows that there is no project affected community.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: There are no particular considerations relevant to project context or scale.

Process Attributes	5	4	3	2	1
Assessment	• Understanding of the purpose and intent of project benefit sharing strategies ¹				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of the socio-economic baseline, institutional capacities and development objectives in the project region				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of benefit sharing mechanisms relevant to the project ²				
	Excellent	Very Good	Good	Poor	Very Poor
Management	• Quality of the benefit sharing planning process [see Management guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Consultation	• Quality of the benefit sharing consultation process [see Consultation guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Performance Attributes	5	4	3	2	1
Stakeholder Support	• Stakeholder support for benefit sharing plans [see Stakeholder Support guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	Not relevant at project preparation stage				
Conformance with Plans	• Conformance with benefit sharing plans [see Conformance with Plans guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	• Timely delivery of commitments to benefits for project affected communities				
	All receive significant benefits	Nearly all receive significant benefits	All receive some form of benefit	Some receive some form of benefit	None receive any form of benefit

AUDITING GUIDANCE NOTES:

- Through project benefit sharing there is the potential to improve livelihoods of host communities and the broader region, and through benefit sharing strategies it can clearly be demonstrated that the project adds value to project affected communities. This is different than additional benefits, which focuses on leveraging opportunities from the project for regional development such as through infrastructure and additional services.
- Potential benefit sharing mechanisms include:
 - Equitable access to electricity services – project affected communities are among the first to be able to access the benefits of electricity services from the project, subject to contextual constraints (e.g. power safety, preference);
 - Non-monetary entitlements to enhance resource access – project affected communities receive enhanced local access to natural resources; and
 - Revenue sharing – project affected communities share the direct monetary benefits of hydropower according to a formula and approach defined in regulations; this goes beyond a one-time compensation payment or short-term resettlement support.

EXAMPLES OF EVIDENCE: - Analytical reports, - Benefit sharing plan, - Independent assessments, - Stakeholder interviews, Review and monitoring reports

IV-13 LABOUR & WORKING CONDITIONS - SECTION IV PROJECT OPERATION

This aspect addresses labour and working conditions, including employee opportunity, equity, diversity, health and safety. The intent is that workers are treated fairly and protected, and equal opportunities provided, in accordance with national and international standards and expectations on labour and working conditions.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is always relevant.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: In cases where the labour workforce is imported, there may be elevated risk of labour conflicts and workforce safety incidents, particularly if there are language issues. Employee diversity will be influenced by the labour available for employment.

Process Attributes	5	4	3	2	1
Assessment	• Understanding of labour and working conditions needs, issues and risk identification relevant to the hydropower project				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of policies, laws and standards relevant to labour and working conditions ¹				
Management	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of occupational health and safety risks and mitigation/ management measures				
	Excellent	Very Good	Good	Poor	Very Poor
Management	• Quality of the labour management planning process [see Management guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
	• Comprehensiveness of the labour management planning ²				
Consultation Process	All components included in detail	All components included	Most components included	Some components included	No Plan
	• Quality of the consultation process [see Consultation guidance note]				
Consultation Process	Excellent	Very Good	Good	Poor	Very Poor
	Performance Attributes				
Stakeholder Support	• Engagement and relationships with labour representatives				
	Excellent	Very Good	Good	Poor	Very Poor
	• Staff / workforce satisfaction levels				
Conformance with Plans	Excellent	Very Good	Good	Poor	Very Poor
	• Level of conformance with plans [see Conformance with Plans guidance note]				
Compliance	• Level of compliance [see Compliance guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	• Risk of labour conflicts				
	Fully minimised with no gaps	Close to minimised with very few non-critical gaps	Significantly minimised with a number of non-critical gaps	Somewhat minimised with critical gaps	Not minimised
	• Risk of employee and workforce safety incidents				
	Fully minimised with no gaps	Close to minimised with very few non-critical gaps	Significantly minimised with a number of non-critical gaps	Somewhat minimised with critical gaps	Not minimised
	• Employee and workforce occupational health and safety performance				
	Very high	High	Good	Low	Very Low
• Employee and workforce equity, opportunity and diversity					
Very high	High	Good	Low	Very Low	

AUDITING GUIDANCE NOTES:

- e.g. International Labour Organisation (ILO) conventions, International Finance Corporation Performance Standard 2 Labour and Working Conditions.

IV-13 LABOUR & WORKING CONDITIONS - SECTION IV PROJECT OPERATION

2. Key components of a labour management system would include human resources policies, staff and workforce planning, occupational health and safety, equal opportunity, staff development and training, grievance and dispute mechanisms, and (where appropriate) collective bargaining mechanisms.

EXAMPLES OF EVIDENCE: - Staff satisfaction surveys, - Corporate policies and programs e.g. on equity, occupational health and safety, workforce planning; - Employee and management policies, - Labour management plans, - Review and monitoring reports

IV-14 CULTURAL HERITAGE - SECTION IV PROJECT OPERATION

This aspect addresses the protection and conservation of cultural heritage¹ that may have been damaged or lost through the physical landscape changes brought about by hydropower project construction and operation, as well as through associated infrastructure impacts (e.g. new roads, transmission lines). The intent is that cultural heritage is identified, recorded, and high value artefacts protected.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is not relevant if the Social Impact Assessment shows that there is no cultural heritage affected by the proposed project.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: National legislation and policies are very relevant to this aspect. Project context and scale will significantly influence the degree to which cultural heritage artefacts can be protected, recovered or preserved.

<i>Process Attributes</i>	5	4	3	2	1
Assessment	• Understanding of local, national, regional and international legislation, policies, agreements and conventions relating to protection of cultural heritage				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of the significance and value to stakeholders of the cultural heritage artefacts				
	Excellent	Very Good	Good	Poor	Very Poor
Management	• Quality of the cultural heritage management planning process [see Management guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
	• Expertise utilized in the cultural heritage management planning process				
	National or international experts, indigenous and local knowledge extensively drawn on	National experts, some indigenous and local knowledge	Some indigenous and local knowledge	Local knowledge	Limited expertise
	• Diversity of approaches in cultural heritage management planning strategies ²				
	High	Good	Some	Limited	None
Consultation	• Quality of the consultation process [see Consultation guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
<i>Performance Attributes</i>	5	4	3	2	1
Stakeholder Support	• Level of stakeholder support [see Stakeholder Support guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	• Level of conformance with plans [see Conformance with Plans guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	• Level of compliance [see Compliance guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	• Recording, protection and conservation of cultural heritage artefacts of high significance and value				
	All	Most	Many	Some	None
	• Degree to which negative project impacts to cultural heritage are identified, avoided, mitigated and/or compensated				
	All major and minor negative impacts with no gaps	All major and minor negative impacts with very few non-critical gaps	Major negative impacts with a number of non-critical gaps	Major negative impacts with some critical gaps	Major negative impacts with many critical gaps
	• Success in delivery of positive project impacts to cultural heritage				
	Very High	High	Good	Minimal	None

AUDITING GUIDANCE NOTES:

1. This aspect relates only to physical cultural heritage. Non-physical cultural heritage such as traditions, festivals and rituals can also be impacted through hydropower project impacts to local communities and should be assessed as part of the social impact assessment aspect.

IV-14 CULTURAL HERITAGE - SECTION IV PROJECT OPERATION

2. A diversity of management approaches could include protection, conservation, restoration, documentation and record-keeping. Protection, conservation and restoration could be *in situ* or relocated.

EXAMPLES OF EVIDENCE: - Heritage impact statements, - Conservation plans, - Heritage plans and agreements, - Review and monitoring reports, - Stakeholder interviews

IV-15 PUBLIC HEALTH - SECTION IV PROJECT OPERATION

This aspect addresses public health risks and opportunities associated with hydropower project operations. The intent is that public health risks are avoided, minimized and managed, and a good standard of public health services are available for the project affected community.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is always relevant.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: If the project has no reservoir, the risks of water-borne disease are considerably reduced and management measures relating to water management are not relevant. Small hydropower projects may have less capacity to provide public health opportunities. The degree of relevance of this aspect may vary greatly depending on the longevity of project operations at the time the assessment is conducted; for example for a long-lived project health issues associated with construction or resettlement may be long past, and health management fully in the hands of relevant authorities.

Process Attributes	5	4	3	2	1
Assessment	• Understanding of public health issues and risks associated with the hydropower project ¹				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of the public health system capacities and relevant national regulations				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of public health opportunities associated with the hydropower project ²				
	Excellent	Very Good	Good	Poor	Very Poor
Management	• Quality of the public health management planning process [see Management guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
	• Comprehensiveness of the public health management planning with respect to risks and opportunities ³				
	All components included in detail	All components included	Most components included	Some components included	No Plan
	• Integration of public health planning considerations with public health system, including a hand-over strategy				
	Excellent	Very Good	Good	Poor	Very Poor
Consultation	• Quality of the consultation process regarding public health assessment and planning [see Consultation guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
	• Integration of local and indigenous knowledge into assessment and management consultation processes				
	Excellent	Very Good	Good	Poor	Very Poor
Performance Attributes	5	4	3	2	1
Stakeholder Support	• Level of stakeholder support for public health management plans [see Stakeholder Support guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	• Level of conformance with public health plans [see Conformance with Plans guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	• Level of compliance with public health legislation and relevant permit conditions [see Compliance guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	• Degree to which negative project impacts to public health are identified, avoided, mitigated and/or compensated				
	All major and minor negative impacts with no gaps	All major and minor negative impacts with very few non-critical gaps	Major negative impacts with a number of non-critical gaps	Major negative impacts with some critical gaps	Major negative impacts with many critical gaps
	• Success in positive project impacts to public health being realised				
	Very High	High	Good	Minimal	None
	• Degree of accessibility of public health facilities by project affected communities				
	Very High	High	Good	Minimal	None
• If relevant, success in implementing any hand over strategy for management of public health issues to relevant authorities					

IV-15 PUBLIC HEALTH - SECTION IV PROJECT OPERATION

	Very High	High	Good	Minimal	None
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AUDITING GUIDANCE NOTES:

1. Assessment considerations include risks due to introduction of the construction workforce (e.g. HIV, Aids); risks of vector borne diseases (e.g. malaria, schistosomiasis); communicable and non-communicable diseases, malnutrition, psychological disorders, social well-being; maternal and child health; accessibility to health services (financial, technical, cultural) with special regard to gender and ethnicity; access to and use of traditional medicines; possible loss or contamination of traditional resources (plants) and access to traditional fisheries; increased health risks for resettled individuals which may relate to stress; anaerobic decay processes in large reservoirs can increase levels of contaminants such as mercury in fish through bio-accumulation; and health needs, issues and risks for different community groups.
2. Examples of creation of public health opportunities include:
 - o Improved health services through provision of electricity, water supply, and sanitation;
 - o directly developing or upgrading public health facilities in the project affected area;
 - o provision of equipment (medical and non-medical, including buildings and vehicles);
 - o training and/or capacity building for public health servants;
 - o health education for project-affected communities;
 - o disease prevention education and awareness campaigns, monitoring of vectors and disease outbreaks, vector control, and clinical treatment of disease cases;
 - o practical measures such as control of floating aquatic weeds near populated areas to reduce mosquito-borne disease risks, and mechanical or chemical treatment of shallow reservoir areas to reduce proliferation of insects that carry waterborne diseases.
3. Management measures include:
 - o efficient and ready access to medical supplies and immunisations for outbreaks;
 - o educational awareness schemes and disease prevention trainings;
 - o clear warnings and instructions in relevant languages on potentially hazardous materials;
 - o regular testing of water quality at multiple sites.

EXAMPLES OF EVIDENCE: - Public health risk assessment, - Assessment of public health enhancement opportunities, - Public health management plans, - Review and monitoring reports, - Stakeholder interviews

IV-16 ASSET & COMMUNITY SAFETY - SECTION IV PROJECT OPERATION

This aspect addresses asset and community safety in relation to hydropower project operation. The intent is that life, property and the environment are protected from the consequences of dam failure and other safety risks.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is always relevant.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: Safety risks increase where there are multiple languages or illiteracy amongst stakeholders involved, and where the project interacts closely with project affected communities.

<i>Process Attributes</i>	5	4	3	2	1
Assessment	• Identification and prioritization of asset and community safety risks ¹				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of relevant safety standards				
Assessment	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of safety management and risk mitigation strategies ²				
	Excellent	Very Good	Good	Poor	Very Poor
Management	• Quality of the asset and community safety management process [see Management guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
	• Comprehensiveness of the safety management plans with respect to addressing risks and utilizing management and mitigation strategies				
Management	All components included in detail	All components included	Most components included	Some components included	No Plan
	• Quality of the consultation process related to asset and community safety [see Consultation guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Performance Attributes	5	4	3	2	1
Stakeholder Support	• Level of stakeholder support for asset and community safety processes [see Stakeholder Support guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	• Level of conformance with plans [see Conformance with Plans guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	• Level of compliance [see Compliance guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	• Performance on safety management and emergency response trials				
	Excellent	Very Good	Good	Poor	Very Poor
	• Likelihood of excellent asset and community safety record				
	Very High	High	Good	Minimal	None

AUDITING GUIDANCE NOTES:

1. Asset and community safety risks includes seismic, geotechnical, dam failure, electric shock, drowning, road accidents, accidents arising from community interactions with project activities, etc.
2. Asset and community safety management and mitigation strategies includes fencing, signage, "housekeeping", exclusion zones, protective clothing, Emergency Preparedness Plans, monitoring, inspections, training, incident recording and response, designation of safety officers, etc.

EXAMPLES OF EVIDENCE: - Safety management plans, - Emergency preparedness plans, - Safety monitoring reports and records, - Performance on safety management and emergency response trials, - Review and monitoring reports

IV-17 ENVIRONMENTAL MANAGEMENT PLAN - SECTION IV PROJECT OPERATION

This aspect addresses the management of environmental issues associated with development and operation of the hydropower project, including original environmental commitments made when the project was approved as well as current environmental commitments. The intent is that environmental impacts are managed for avoidance, minimisation, mitigation, or compensation of negative impacts, and enhancement measures for positive impacts are pursued where practicable.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is always relevant.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: None.

Process Attributes	5	4	3	2	1
Assessment	<ul style="list-style-type: none"> Ongoing monitoring of environmental impacts and issues in relation to original project development and ongoing project operation¹ [see Assessment guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
	<ul style="list-style-type: none"> Integration of local and traditional knowledge 				
	Excellent	Very Good	Good	Poor	Very Poor
Assessment	<ul style="list-style-type: none"> Consideration of cumulative impacts and legacy issues 				
	In depth consideration of both components	Good consideration of both components	Some consideration of both components	Minimal consideration of either component	No consideration of either component
	<ul style="list-style-type: none"> Quality of the environmental management planning (EMP) process [see Management guidance note] 				
Management	Excellent	Very Good	Good	Poor	Very Poor
	<ul style="list-style-type: none"> Quality of the environmental impact management consultation process [see Consultation guidance note] 				
Consultation	Excellent	Very Good	Good	Poor	Very Poor
	<ul style="list-style-type: none"> Quality of the environmental impact management consultation process [see Consultation guidance note] 				
Performance Attributes	5	4	3	2	1
Stakeholder Support	<ul style="list-style-type: none"> Level of stakeholder support the environmental impact management process [see Stakeholder Support guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	<ul style="list-style-type: none"> Level of compliance with licence conditions relating to environmental impact management and monitoring [see Compliance guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	<ul style="list-style-type: none"> Conformance with environmental management plans [see Conformance with Plans guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	<ul style="list-style-type: none"> Degree to which negative project environmental impacts are identified, avoided, mitigated and/or compensated 				
	All major and minor negative impacts with no gaps	All major and minor negative impacts with very few non-critical gaps	Major negative impacts with a number of non-critical gaps	Major negative impacts with some critical gaps	Major negative impacts with many critical gaps
	<ul style="list-style-type: none"> Success in achieving positive project environmental impacts 				
	Very High	High	Good	Minimal	None

AUDITING GUIDANCE NOTES:

1. Environmental issues assessed should include biodiversity, weeds, pest species, migration of aquatic species, wetlands of significance, threatened species, critical habitats, erosion, sedimentation, water quality, air quality, noise and dust. These should be considered for both project implementation and operation.

EXAMPLES OF EVIDENCE: - EIA and associated reports, - Environmental management plan, - Records of consultation in association with the EIA/EMP, - independent reviews, - Monitoring reports

IV-18 CATCHMENT MANAGEMENT - SECTION IV PROJECT OPERATION

This aspect addresses the health of the project catchment and the present and future catchment land uses which may have implications for hydropower operations (e.g. water quality, land clearing, erosion, future water abstraction activities), as well as management actions of the developer that can affect environmental, social and economic values in the catchment (e.g. creating biodiversity reserves, land access rights, educational facilities). The intent is that project catchment management measures promote positive environmental, social and economic outcomes, taking into consideration the specific role and responsibility of the proponent.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is not relevant if there is another project immediately upstream.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: Projects with very small undeveloped catchments may not have catchment management plans nor catchment management committees, but should still have assessment and monitoring of catchment condition and issues. Undeveloped catchments may be most at risk of future developments due to increased activity around the project.

Process Attributes	5	4	3	2	1
Assessment	<ul style="list-style-type: none"> Understanding of present and likely future catchment uses and users, and the interactions and influences of the project with these 				
	Excellent	Very Good	Good	Poor	Very Poor
Assessment	<ul style="list-style-type: none"> Understanding of the range of management measures that the developer could utilize to address the issues and opportunities¹ 				
	Excellent	Very Good	Good	Poor	Very Poor
Management	<ul style="list-style-type: none"> Quality of the management planning process with respect to catchment management [see Management guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
	<ul style="list-style-type: none"> Diversity of management approaches considered in the catchment management planning process 				
	Very High	High	Some	Minimal	None
Management	<ul style="list-style-type: none"> Integration of catchment management planning with broader regional objectives 				
	Excellent	Very Good	Good	Poor	Very Poor
	<ul style="list-style-type: none"> Quality of the consultation process with respect to catchment management planning [see Consultation guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Consultation	<ul style="list-style-type: none"> Catchment management committee 				
	Long-term, fully representative of catchment interests	Long-term, mostly representative of catchment interests	Long-term, partially representative of catchment interests	Temporary, partially representative of catchment interests	None
	<ul style="list-style-type: none"> Level of stakeholder support for catchment management planning process and plans [see Stakeholder Support guidance note] 				
Performance Attributes	5	4	3	2	1
Stakeholder Support	<ul style="list-style-type: none"> Level of stakeholder support for catchment management planning process and plans [see Stakeholder Support guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	<ul style="list-style-type: none"> Conformance with catchment management plans [see Conformance with Plans guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	Not relevant at project operation stage				
Effectiveness	<ul style="list-style-type: none"> Degree to which negative project impacts to catchment users and uses are identified, avoided, mitigated and/or compensated 				
	All major and minor negative impacts with no gaps	All major and minor negative impacts with very few non-critical gaps	Major negative impacts with a number of non-critical gaps	Major negative impacts with some critical gaps	Major negative impacts with many critical gaps
	<ul style="list-style-type: none"> Success in enhancement of catchment condition 				
	Very High	High	Good	Minimal	None

IV-18 CATCHMENT MANAGEMENT - SECTION IV PROJECT OPERATION

AUDITING GUIDANCE NOTES:

1. Catchment management measures include but are not limited to forming or joining a catchment management committee, creation of protected areas, creating rights of access to land and water resources for particular community groups, developing educational facilities, working with catchment residents to address land use practices, project revenue investment programs for the catchment, capacity building programs such as management opportunities for locals e.g. with respect to managing reserves, tourist facilities, side industries, projects, etc.

EXAMPLES OF EVIDENCE: - Design plans for land restoration and rehabilitation, - Catchment management agreements or planning, - High-value terrestrial habitat retention or protection programs, - Minutes of catchment management committee meetings, - Progress reports

IV-19 RESERVOIR MANAGEMENT - SECTION IV PROJECT OPERATION

This aspect addresses the management of environmental, social and economic issues within and around the reservoir area during project operation. The intent is that the reservoir is managed to achieve a balance among biodiversity, habitat and ecosystem services and social and economic objectives, including power and other multi-purpose outcomes of the hydropower facility.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is not relevant if the project has no reservoir storage.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: Risk of significant greenhouse gas emissions from reservoirs is greatest for reservoirs in tropical climates. Reservoir management requirements may be dictated by regulatory authorities depending on project context.

Process Attributes	5	4	3	2	1			
Assessment	• Understanding of the issues critical to ongoing sustainable reservoir management ¹							
	Excellent	Very Good	Good	Poor	Very Poor			
	• Understanding of the risks of high greenhouse gas emissions ²							
	Excellent	Very Good	Good	Poor	Very Poor			
	• Understanding of the range of management measures that the developer could utilize to address the issues and opportunities							
	Excellent	Very Good	Good	Poor	Very Poor			
Management	• Quality of the management processes with respect to reservoir management [see Management guidance note]							
	Excellent	Very Good	Good	Poor	Very Poor			
	• Comprehensiveness of the reservoir management planning with respect to critical issues							
	All components included	All components included with very few non-critical gaps	Most components included with a number of non-critical gaps	Many critical components not included	No Plan			
	• Planned measures to address greenhouse gas emissions where of high risk ³							
	Comprehensive	Good	Some	Minimal	None			
Consultation	• Integration of reservoir management planning with downstream flow objectives							
	Excellent	Very Good	Good	Poor	Very Poor			
	• Quality of the consultation process with respect to reservoir management planning [see Consultation guidance note]							
Excellent					Very Good	Good	Poor	Very Poor
Performance Attributes	5	4	3	2	1			
Stakeholder Support	• Level of stakeholder support for reservoir management planning process and plans [see Stakeholder Support guidance note]							
	Excellent	Very Good	Good	Poor	Very Poor			
Conformance with Plans	• Conformance with reservoir management plans [see Conformance with Plans guidance note]							
	Excellent	Very Good	Good	Poor	Very Poor			
Compliance	• Compliance with any licence conditions relating to reservoir management [see Compliance guidance note]							
	Excellent	Very Good	Good	Poor	Very Poor			
Effectiveness	• Success in reservoir management to provide for multiple use benefits							
	Very High	High	Good	Minimal	None			
	• Change in greenhouse gas emissions caused by reservoir creation (i.e. net GHG emissions) over the project life							
Reduction or no change	Very minor increase (<10%)	Minor increase (10-20%)	Moderate increase (20-50%)	Significant increase (>50%)				

AUDITING GUIDANCE NOTES:

1. Important considerations relevant to the reservoir area at the project operation stage include optimising power generation, integrating multiple uses, commercial uses, rights of access, safety, flood management, aesthetics, public health, invasive species.

IV-19 RESERVOIR MANAGEMENT - SECTION IV PROJECT OPERATION

2. Relatively high risks of greenhouse gas emissions would be in cases where there are high reservoir water retention times, high carbon and nutrient loading, high water temperatures, and relatively high shoreline length compared to reservoir surface area (e.g. shoreline is very convoluted with many inlets).
3. At the project operation stage, measures mostly relate to management of reservoir water retention times.

EXAMPLES OF EVIDENCE: - Reservoir design documents, - Model output for reservoir operations, - Documented environmental, social, and economic objectives for reservoir management, - Reservoir manage planning documents, - Analyses of potential for greenhouse gas emissions and measures to address these, - Analyses of multiple use benefit opportunities with reservoir management, - Progress reports.

IV-20 ENVIRONMENTAL FLOWS & DOWNSTREAM SUSTAINABILITY - SECTION IV PROJECT OPERATION

This aspect addresses the delivery of environmental flows¹ in relation to environmental, social and economic impacts and benefits downstream of the hydropower project. The intent is that downstream flow regimes are delivered achieve a good fit between biodiversity, habitat, ecosystem services, social and economic objectives, including power and other multi-purpose outcomes of the hydropower facility, taking into account regional and system-wide plans for hydropower and water resources development.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is not relevant if the power station discharges immediately into the reservoir of another downstream project, and dewatered stream reaches downstream of diversion dams are short with no social or environmental values to be protected.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: Where there is no or little reservoir storage, the owner/operator may have very little capacity to control downstream flows, but there still may be provision to maintain a minimum flow. Complex projects with multiple dams may require environmental flow assessments for all affected rivers, but priority may be put on those affected waterways which have the most significant hydrological change or those recognized to have the most downstream values.

<i>Process Attributes</i>	5	4	3	2	1
Assessment	• Understanding of the downstream baseline condition ²				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of relationship between alterations to the hydrology and environmental, social and economic objectives in the downstream river system ³				
	Excellent	Very Good	Good	Poor	Very Poor
Management	• Understanding of the environmental flow release mechanisms that could be employed by a hydropower project ⁴				
	Excellent	Very Good	Good	Poor	Very Poor
	• Articulation of flow-related objectives and flow requirements				
	Clear and detailed for all	Clear for most	Basic definition of objectives	Poor	Very poor
Management	• Quality of the planning process to provide a fit of flow requirements between all objectives in relation to threshold levels of sustainability ⁵				
	Best fit, above threshold levels	Good fit at threshold levels	Balance amongst key objectives at threshold levels	Poor	Very poor
	• Integration of stakeholder input into definition of flow related objectives and flow design, and monitoring of effectiveness against established objectives				
Consultation	Excellent	Very Good	Good	Poor	Very Poor
	• Quality of the consultation process [see Consultation guidance note]				
	Excellent, specialist expertise on hydro-biological issues provided to stakeholders	Very Good	Good	Poor	Very Poor
Performance Attributes	5	4	3	2	1
Stakeholder Support	• Level of stakeholder support in relation to environmental flows [see Stakeholder Support guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	• Level of conformance with plans for environmental flows [see Conformance with Plans guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	• Level of compliance with any licence or public commitments to environmental flows [see Compliance guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	• Agreed objectives being met by downstream flow requirements				
	All	Nearly all	Most	Some	None
	• Level of commitment to environmental flow delivery				
	Public, formal, legally	Public	Internal	Uncertain	None

IV-20 ENVIRONMENTAL FLOWS & DOWNSTREAM SUSTAINABILITY - SECTION IV PROJECT OPERATION

enforceable			
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AUDITING GUIDANCE NOTES:

1. Environmental flows refers to the patterns of flow of water in a river or lake that sustains healthy ecosystems and the goods and services that humans derive from them. They might in some places be referred to as compensation flows.
2. Baseline condition encompasses hydrology, ecological systems, habitats and services, and socio-economic uses and values throughout the zone of influence of the power station.
3. Altered flow regimes create a host of potential effects, depending on the specific context and degree of change - fish cues for migration, connectivity of habitat and quality of habitat refuges, habitat area available for macroinvertebrates and fish, changes to habitat quality through altered riparian zones, increased erosion or sedimentation, and delivery of organic materials and nutrients. Altered flow regimes from natural patterns can disadvantage native species to the advantage of introduced species. The retention of flood flows in the reservoir can affect the natural productivity and stability of riparian zones, floodplains and deltas. In estuarine systems, altered flows can change the extent of salt-water intrusion due to changed freshwater inflow patterns to the estuary. The ecosystem impacts from altered flow regimes can lead to or are accompanied by impacts on the local communities and economies. Loss of silt and nutrient delivery to floodplains can have major implications for agriculture, as can loss of water in diverted river systems, and impacts to fishery productivity can significantly affect local economies.
4. Managed flow regimes to enhance environmental or social values can comprise maintenance of a minimum flow in the river, capping of maximum flow releases, constraints on draw-down or ramp-up rates, and periodic flushing flows. The characteristics of the project design would influence whether the mechanics of how these flows are released. Agreed environmental flow regimes may include some or all of these considerations, and may be specified for year-round or by season.
5. Threshold levels of sustainability refers to those objectives that require a specific minimum flow level to remain viable.

EXAMPLES OF EVIDENCE: - Documented environmental, social, and economic objectives for downstream flows, - Surveys or other measures of stakeholder opinion, - Investigations and scientific reports, - Commitments to flow release, - Records of meetings, - Monitoring reports, - Independent reviews

IV-21 BIODIVERSITY & INVASIVE SPECIES - SECTION IV PROJECT OPERATION

This aspect 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 hydropower project. The intent is that biodiversity and high conservation value areas are managed for avoidance, minimisation, mitigation or compensation of negative impacts, and opportunities for enhancement are pursued where practicable.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is always relevant.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: Countries usually have their own listings for protected species and habitats. Risk of invasive species needs careful assessment in all situations. Small projects may have less capacity to make positive enhancements to biodiversity.

Process Attributes	5	4	3	2	1
Assessment	• Understanding of the biodiversity characteristics and risks relating to project activities ¹				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of the risks of invasive species ²				
	Excellent	Very Good	Good	Poor	Very Poor
	• Understanding of the range of management measures that could be employed to address biodiversity and invasive species issues ³				
	Excellent	Very Good	Good	Poor	Very Poor
	• Expertise utilized in the biodiversity and invasive species assessment process				
	National or international experts, indigenous and local knowledge extensively drawn on	National experts, some indigenous and local knowledge	Some indigenous and local knowledge	Local knowledge	Limited expertise
Management	• Quality of the management planning process to address biodiversity and invasive species issues [see Management guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
	• Expertise utilized in the management planning process to address biodiversity and invasive species issues				
	National or international experts, indigenous and local knowledge extensively drawn on	National experts, some indigenous and local knowledge	Some indigenous and local knowledge	Local knowledge	Limited expertise
	• Diversity of approaches in the biodiversity and invasive species management planning strategies				
	High	Good	Some	Limited	None
Consultation	• Quality of the consultation process to address biodiversity and invasive species issues [see Consultation guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Performance Attributes	5	4	3	2	1
Stakeholder Support	• Level of stakeholder support for biodiversity and invasive species assessment, management and consultation processes [see Stakeholder Support guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	• Level of conformance with plans for biodiversity and invasive species [see Conformance with Plans guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	• Level of compliance with permit conditions for biodiversity and invasive species [see Compliance guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	• Degree to which negative project impacts to biodiversity are identified, avoided, mitigated and/or compensated				
	All major and minor negative impacts with no gaps	All major and minor negative impacts with very few non-critical gaps	Major negative impacts with a number of non-critical gaps	Major negative impacts with some critical gaps	Major negative impacts with many critical gaps
	• Success in avoidance of invasive species issues				

IV-21 BIODIVERSITY & INVASIVE SPECIES - SECTION IV PROJECT OPERATION

	Very High	High	Good	Minimal	None
	• Success in positive project impacts to biodiversity being realised				
	Very High	High	Good	Minimal	None

AUDITING GUIDANCE NOTES:

1. Biodiversity and invasive species considerations relate to both flora and fauna. The area of consideration would include the catchment, reservoir and downstream areas as well as any project construction areas and associated infrastructure. Assessment components include:
 - o terrestrial and aquatic species and their life cycle developments and associated habitat, movement and feeding needs;
 - o interactions amongst the different species and populations within those species, and the pressures that would be put on these by the land use changes brought about by project development and operation;
 - o threatened or at risk species and their survival requirements;
 - o migratory species, both aquatic and terrestrial and with respect to both upstream and downstream migration - the habitat connectivity requirements of these species, the cues (e.g. flow, temperature, water quality) that trigger migration; and
 - o critical habitat areas.
2. Invasive species risks include:
 - o Weeds, algal blooms;
 - o Proliferation of certain terrestrial or aquatic fauna with no natural predators;
 - o Proliferation of insect-related issues such as mosquitos;
 - o Facilitated passage of invasive species into uninfested waterways through water transfers around the hydro system;
 - o Associated public health issues.
3. Various management approaches to address biodiversity and invasive species issues include:
 - o To protect or enhance biodiversity: catchment protection, creation of reserves, habitat conservation, species management plans, translocations, habitat rehabilitation, new habitat creation, managed flow releases.
 - o To address passage of aquatic species: fish ladders, fish elevators, catch and release programs, fish hatcheries, re-stocking programs, mechanisms for diversion away from turbines for downstream passage, assisted cues (water chemistry, operational conditions), and choice of turbine design.
 - o To address invasive species include physical barriers to pest species passage, pollution control, physical removal or containment, chemical treatment, reservoir water residence times, and managed flow releases.

EXAMPLES OF EVIDENCE: - Research and database on biodiversity and threatened species and on pest and invasive species, - Interviews with regulators, - Independent assessment by appropriately qualified individuals or groups, - Monitoring reports, - Review reports, - Progress reports

IV-22 EROSION & SEDIMENTATION - SECTION IV PROJECT OPERATION

This aspect addresses the management of potential impacts arising from sedimentation and erosion associated with hydropower project operations. The intent is that reservoir and downstream impacts related to sedimentation and erosion are managed for avoidance, minimisation, mitigation or compensation of negative impacts, and opportunities for enhancement are pursued where practicable.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is always relevant.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: Erosion and sedimentation risk is highly influenced by the geographic setting and the surrounding land uses. In some settings, sedimentation of hydropower projects is a major problem even if there is not reservoir storage. Transboundary issues can be highly relevant here, in that sediment and erosion effects can arise or be felt over great distances, particularly with large projects on mainstem rivers.

Process Attributes	5	4	3	2	1
Assessment	• Understanding of erosion and sedimentation issues relating to the project ¹				
	Excellent	Very Good	Good	Poor	Very Poor
Assessment	• Understanding of management strategies to address erosion and sedimentation issues ²				
	Excellent	Very Good	Good	Poor	Very Poor
Management	• Quality of the management planning process to address erosion and sedimentation issues [see Management guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Management	• Diversity of approaches in erosion and sedimentation management planning strategies				
	High	Good	Some	Limited	None
Consultation	• Quality of the consultation process to address erosion and sedimentation issues [see Consultation guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Performance Attributes	5	4	3	2	1
Stakeholder Support	• Level of stakeholder support for erosion and sedimentation management plans [see Stakeholder Support guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	• Level of conformance with plans for erosion and sedimentation management [see Conformance with Plans guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	• Level of compliance with permit conditions for erosion and sedimentation management [see Compliance guidance note]				
	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	• Degree to which negative project impacts to erosion and sedimentation are identified, avoided, mitigated and/or compensated				
	All major and minor negative impacts with no gaps	All major and minor negative impacts with very few non-critical gaps	Major negative impacts with a number of non-critical gaps	Major negative impacts with some critical gaps	Major negative impacts with many critical gaps
	• Success in avoidance of erosion and sedimentation issues				
	Very High	High	Good	Minimal	None
Effectiveness	• Success in positive project impacts to local erosion and sedimentation issues being realised				
	Very High	High	Good	Minimal	None

AUDITING GUIDANCE NOTES:

1. Erosion and sedimentation issues for hydropower projects can relate to:
 - o Catchment sediment yields - sediment accumulation can reduce the effective water storage area of hydropower reservoirs over time.
 - o Reservoir - erosion issues can occur depending on the lake level operating regime, the retention of stabilizing vegetation, the control of recreational activities on the lake, and other factors such as wind-induced wave action or rapid drawn-downs.

IV-22 EROSION & SEDIMENTATION - SECTION IV PROJECT OPERATION

- Downstream river systems - trapping of the river's natural sediment load within the storage deprives sediments to the downstream river system. Where diversions out of river systems have occurred, downstream channels can become blocked up with sediments, allowing vegetative species can encroach on the river channel, which can exacerbate the impacts of floods. Downstream of power stations, reduced sediment loads and often higher than natural base flows can lead to erosion of the existing channel sediments and consequent destabilization of riparian vegetation through a range of mechanisms, e.g. rapidly fluctuating discharges, rapid water level draw-downs, or continuous discharges at a single flow. Erosion and sedimentation cause fundamental changes to habitat, and so have implications for biodiversity in the reservoir and downstream river systems. Dependent on the location and extent of influence of the project, coastal and deltaic erosion issues could also arise.
2. Various management approaches to address erosion and sedimentation issues include:
- To address reservoir sediment accumulation: at the catchment level, cooperation with local communities and regulatory authorities to improve catchment management practices; specific catchment controls on road construction, mining, agriculture or other land uses; catchment vegetative cover protected through reservation; catchment terracing; upstream check structures; catchment reforestation can be employed in the catchment. Within the reservoir, sediment by-pass systems for floodwaters; gated structures for sediment flushing; sediment trapping and filtration systems; direct dredging.
 - To address shoreline erosion in reservoirs: water management measures (e.g. ramp-down rules, constraints on time spent at particular operating levels, operating to maintain the stabilising characteristics of existing or planted vegetation); direct intervention techniques (e.g. rip-rap, bank protection works, planting stabilising vegetation).
 - To address shoreline erosion in downstream river systems: water management and direct intervention approaches listed above; utilization of re-regulation storages to dampen rapidly fluctuating flow releases from power stations and attenuate the downstream flows.
 - To address sediment accumulation in downstream river systems: careful removal of sediment retaining weed species, such as willows, and replanting with more appropriate species; sediment flushing of the river channel itself through controlled releases if shown to be effective.

EXAMPLES OF EVIDENCE: - Sedimentation and erosion rates and characteristics data, - Mapping of catchment sediment sources and yields, - Analytical reports, - Sedimentation and erosion risk management planning, - Bathymetric survey of reservoir area, - Interviews with stakeholders and regulators, - Monitoring reports, - Review reports, - Progress reports

IV-23 WATER QUALITY - SECTION IV PROJECT OPERATION

This aspect addresses how water quality issues in relation to hydropower project operations are addressed. The intent is that water quality issues are understood and addressed.

CRITERIA FOR ASPECT TO BE CONSIDERED NOT RELEVANT: This aspect is always relevant.

CONSIDERATIONS RELEVANT TO PROJECT CONTEXT OR SCALE: Water quality issues can be most complex where there are multiple other land uses. Reservoir shape is very relevant to water quality risks developing in the reservoir. Small hydropower projects are less susceptible but not immune to water quality risks arising from the project itself.

<i>Process Attributes</i>	5	4	3	2	1
Assessment	<ul style="list-style-type: none"> Understanding of water quality issues relating to the project¹ 				
	Excellent	Very Good	Good	Poor	Very Poor
Assessment	<ul style="list-style-type: none"> Understanding of management strategies to address water quality issues² 				
	Excellent	Very Good	Good	Poor	Very Poor
Management	<ul style="list-style-type: none"> Quality of the management planning process to address water quality issues [see Management guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Management	<ul style="list-style-type: none"> Diversity of approaches in water quality management planning strategies 				
	High	Good	Some	Limited	None
Consultation	<ul style="list-style-type: none"> Quality of the consultation process to address water quality issues [see Consultation guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
<i>Performance Attributes</i>	5	4	3	2	1
Stakeholder Support	<ul style="list-style-type: none"> Level of stakeholder support for water quality management plans [see Stakeholder Support guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Conformance with Plans	<ul style="list-style-type: none"> Level of conformance with plans for water quality management [see Conformance with Plans guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Compliance	<ul style="list-style-type: none"> Level of compliance with permit conditions for water quality management [see Compliance guidance note] 				
	Excellent	Very Good	Good	Poor	Very Poor
Effectiveness	<ul style="list-style-type: none"> Degree to which negative project impacts to water quality are identified, avoided, mitigated and/or compensated 				
	All major and minor negative impacts with no gaps	All major and minor negative impacts with very few non-critical gaps	Major negative impacts with a number of non-critical gaps	Major negative impacts with some critical gaps	Major negative impacts with many critical gaps
	<ul style="list-style-type: none"> Success in avoidance of water quality issues 				
	Very High	High	Good	Minimal	None
Effectiveness	<ul style="list-style-type: none"> Success in positive project impacts to local water quality issues being realised 				
	Very High	High	Good	Minimal	None

AUDITING GUIDANCE NOTES:

- Water quality issues for hydropower projects can relate to reduced oxygenation, temperature, stratification potential, pollutant inflow, propensity for disease proliferation, nutrient capture, algal bloom potential and the release of toxicants from inundated sediments. The residence time of water within a reservoir is a major influence on the scale of these changes, along with bathymetry, climate and catchment activities. More specifically, risks that should be assessed include:
 - o Flooding of biomass, especially forests, results in underwater decay which can result in de-oxygenated water.
 - o In deep lakes that tend to stratify, colder de-oxygenated water at depths in the lake can release metals from the sediments e.g. methylmercury.
 - o Deep intakes can result in deoxygenated and hydrogen sulphide rich releases out of the power station tailrace into the downstream river system.
 - o Particularly high hydropower dams can have problems with gas supersaturation resulting in fish deaths.
 - o In shallow lakes, water quality problems can result from wind-induced sediment re-suspension, eutrophication and algal blooms.

IV-23 WATER QUALITY - SECTION IV PROJECT OPERATION

- Water temperatures in the discharged water can differ significantly from ambient temperatures, and can also fluctuate over short time scales depending on operating patterns. Biological impacts can ensue, as temperature has a major influence on biological health and can be instrumental in providing migrational cues for some species.
 - Turbidity can occur due to erosion of riverbanks, incoming sediments, and re-suspension of bottom sediments in shallow lakes.
 - Activities within the catchment beyond the direct control of the proponent can cause water quality problems when compounded with the power station operations.
2. Various management approaches to address erosion and sedimentation issues include:
- To avoid release of cold anoxic waters from deep reservoirs: selective or multi-level offtakes; seasonal management of lake levels; air injection facilities and aerating turbines.
 - To avoid downstream gas supersaturation: stilling basins, spillway design, structures that favour degassing.
 - To address consumption of oxygen in reservoirs: vegetation clearing prior to inundation to limit organic decomposition in the reservoir; reducing water residence time through operating patterns; in shallow lakes, baffles to direct circulation and ensure adequate water flow-through and mixing.
 - To address reservoir sediment resuspension and erosion: planting of appropriately selected microphyte communities (aquatic vegetation); in shallow lakes baffles to inhibit wind-induced resuspension, and/or raising minimum operating levels in the reservoir.
 - To address water pollution inflows to the reservoir: catchment management measures; collection/treatment of pollutant-laden inflows; water pollution control measures such as sewage treatment plants or control of industrial emissions.

EXAMPLES OF EVIDENCE: - Water quality data, - Analytical reports, - Monitoring reports