

**Proposed Batoka Gorge Hydro-Electric Scheme
(Zambia and Zimbabwe) on the Zambezi River**

**VOLUME II Operational Environmental and Social
Management Plan (OESMP) (V5.0)**

Zambezi River Authority (ZRA)

October 2021

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Zambezi River Authority

Proposed Batoka Gorge Hydro-Electric Scheme (Zambia and Zimbabwe) on the Zambezi River

VOLUME II Operational Environmental and Social Management Plan (OESMP) (V5.0)

October 2021

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Ltd. (ERM)

For and on behalf of
Environmental Resources Management

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Date: October 2021

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ABBREVIATIONS AND ACRONYMS

BGHES	Batoka Gorge Hydro-Electric Scheme
BJVC	Batoka Joint Venture Consultants
CDP	Community Development Plan
CESMP	Construction Environmental and Social Management Plan
EHS	Environment Health and Safety
EIA	Environmental Impact Assessment (generic term)
ELC	Environmental Liaison Committee
EMA	Zimbabwean Environmental Management Agency
EMP	Environmental Management Plan (generic term)
EPPCA	Environmental Protection and Pollution Control Act
ERB	Energy Regulatory Board
ERM	Environmental Resources Management Southern Africa (Pty) Ltd.
ESIA	Environmental and Social Impact Assessment (as applied in this document)
ESMP	Environmental and Social Management Plan (as applied in this document)
ESMS	Environmental and Social Management System
ESS	Environmental and Social Safeguards
FSL	Full Supply Level
GWh	Gigawatt Hour
HIV / AIDS	Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome
HSE	Health, Safety and Environment
IFC	International Finance Corporation
IHA	International Hydropower Association
L&FS	Life & Fire Safety
LRP	Livelihood Restoration Plan
MRR	Maximum Ramping Rate
OESMP	Operation Environmental and Social Management Plan
OP	Operational Procedure
PIIM	Project Induced In-Mitigation
PPE	Personal Protective Equipment
PS	Performance Standard
RAP	Resettlement Action Plan
SADC	Southern African Development Community
SASS5	South African Scoring System version 5
SHEQ	Safety, Health, Environment and Quality
SOPs	Standard Operating Procedures
SP	Studio Pietrangeli Consulting Engineers
SPV	Special Purpose Vehicle
TDG	Total Dissolved Gas
VFNP	Victoria Falls National Park
WARMA	Water Resources Management Authority
WB	World Bank

WHO	World Health Organisation
ZAMCOM	Zambezi Watercourse Commission
ZEMA	Zambia Environmental Management Agency
ZRA	Zambezi River Authority

EXECUTIVE SUMMARY

This report represents the Operational Environmental and Social Management Plan (OESMP) for the proposed Batoka Gorge Hydro-Electric Scheme (hereafter referred to as 'the BGHES' or the 'proposed Project'). The OESMP provides measures for holistic environmental and social management, monitoring and reporting for all Project components (i.e. – the dam wall and impoundment, including spillway; surface power houses; Project townships; Access Roads and Transmission Lines) during the operational phase of the Project.

Environmental and social management and monitoring for the preceding preconstruction and construction phases are included in a separate Construction Environmental and Social Management Plans (CESMPs). Separate CESMPs have been compiled for 1) Access Roads in Zambia and Zimbabwe; 2) Transmission Lines in Zambia and Zimbabwe; and 3) dam wall and impoundment, including a spillway; Surface power houses, one on each side of the river; and project townships (in both Zambia and Zimbabwe) and other ancillary infrastructure (such as quarries, spoils area and batching areas). For a holistic understanding of Project environmental and social management commitments for during the construction phase, all CESMPs should be considered in conjunction with one another.

The development of this OESMP has been guided by the overall ZRA vision, mission, values and social corporate policy; the World Bank Group Environmental and Social Safeguard Policies; International Finance Corporation (IFC) Performance Standards; International Finance Corporation (IFC) Environmental, Health and Safety (EHS) Guidelines; and African Development Bank Group's Integrated Safeguard System and Operational Safeguards.

This OESMP is reasonable and achievable in the local context (i.e. – it does not commit the Project to measures that are not achievable / possible in Zambia and Zimbabwe). It consists of the set of management, mitigation, and monitoring measures to be taken during implementation of Project activities, so as to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels, and provides measures to enhance or realise positive impacts. The OESMP details the specific actions for implementation of the agreed controls and mitigation measures as set out in the ESIA. It also includes responsibilities, timings, monitoring measures and clearly sets out an audit and review program. A main aim of the audit and review program is to facilitate compliance (e.g. by Contractors) with the agreed commitments and any permit conditions.

This OESMP includes management measures to mitigate impacts to an as low as reasonably practicable (ALARP) level for the following BGHES Project impacts:

Biophysical Impacts

- Impacts upstream of the BGHES (specifically to rafting activities and the Victoria Falls Power Station).

- Impacts to reservoir water quality (which could in turn have a detrimental impact on ecological habitats, fisheries and other water users in the area).
- Impacts to downstream river conditions (associated with potential changes to the natural flow regimes).
- Impacts on the BGHES related to changing upstream conditions (climate change effects and upstream water abstractions).
- Impacts to seismicity as a result of the proposed BGHES..
- Impacts to avifaunal communities.
- Alterations to fish communities and their utilisation.
- Impacts to crocodiles and other aquatic fauna.
- Habitat degradation resulting from altered flow regimes.
- Eutrophication and associated floating aquatic weed infestation.
- Impacts to fauna through road kills and/or indiscriminate killings.
- Habitat degradation resulting from increased access and human influx.

Social Impacts

- Impacts associated with displacement (fishing activities and downstream river users).
- Positive economic benefits for the national economy.
- Social benefits resulting from local employment opportunities.
- Negative economic impacts associated with displacement of river / non-river based tourism activities and regional impacts to Victoria Falls and Livingstone.
- Impacts associated with unmet expectations.
- Impacts related to in-migration.
- Health and safety impacts (increased incidence of communicable diseases; increased incidence of malaria and other vector borne diseases; increased risk of traffic accidents; disturbance due to dust and noise; impact to community security; and worker health and safety).
- Changes to socio-cultural heritage and heritage resources due to destruction or disturbance to sites of heritage value and impacts to living cultural heritage.

This OESMP is a dynamic document implying that information gained during all prior and the operational phase of the Project could lead to changes in this OESMP. This OESMP has been compiled prior to the implementation of any activities on site and thus falls within the Planning phase of the Project. Further stages of management including doing, checking and acting are required for the implementation of an effective Environmental and Social Management System (ESMS). The ESMS entails a methodological approach to managing environmental and social risks and impacts in a structured way on an ongoing basis.

The ZRA is ultimately responsible for adherence to the management measures detailed in this OESMP, all conditions of approval of the Project and/or any aspect thereof by any authority.

1

OVERVIEW

1.1

INTRODUCTION

This report represents the Operational Environmental and Social Management Plan (OESMP) for the proposed Batoka Gorge Hydro-Electric Scheme (hereafter referred to as 'the BGHES' or the 'proposed Project'). The OESMP provides measures for holistic environmental and social management, monitoring and reporting for all Project components (i.e. – the dam wall and impoundment, including spillway; surface power houses; Project townships; Access Roads and Transmission Lines) during the operational phase of the Project.

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The decommissioning of the BGHES is not included in this OESMP, as it is assumed that it will be drafted in accordance with existing legislation at the time of decommissioning.

1.2

ZAMBEZI RIVER AUTHORITY (ZRA) VISION, MISSION, VALUES AND POLICY

The development of this OESMP has been guided by the overall ZRA vision, mission, values and social corporate policy (refer to the boxes below). These are high-level corporate statements of intent and establish the principles to be followed in the management of environmental and social issues. The ZRA's vision, mission, values and social corporate policy therefore constitute the framework against which all related activities should be judged.

ZRA VISION, MISSION AND VALUES

Vision – to be a dynamic and vibrant organisation, inspired by the passion to harness and manage the Zambezi waters for socio-economic development.

Mission – the ZRA commits themselves to satisfying all stakeholders through purposefully and sustainably exploiting the natural advantages offered by the Zambezi River.

Values – fairness, transparency, integrity, respect, health and safety and professionalism.

ZRA CORPORATE SOCIAL RESPONSIBILITY

As part of its Corporate Social Responsibility, ZRA has a social contract with the society in which it is operating. As a corporate citizen, ZRA defines this social contract by giving back to the community in which it operates and resides. As an institution, the ZRA believes that a satisfied human resource translates into multiplied productivity. The Authority has therefore a policy to integrate social and environmental concerns in its business operations and also in its interaction with the stakeholders (both internal and external) and on a voluntary basis. As such, the Authority is cognizant of its stakeholders' welfare through enhanced health, social and economic programmes which benefit all stakeholders.

The OESMP supports the commitments made by the ZRA.

1.3

SITE LOCATION AND PROJECT DESCRIPTION

The proposed BGHES is to be located at 17° 55' 38.55" S and 26° 6' 28.38" E ⁽¹⁾, in the central portion of the Zambezi River Basin, and will extend across the international boundary between Zambia and Zimbabwe. It will be situated upstream of the existing Kariba Dam hydroelectric scheme on the Zambezi River and approximately 47 km downstream of the Victoria Falls (see *Figure 1.1* and *Figure 1.2*).

This proposed bilateral hydropower project between Zambia and Zimbabwe includes the construction of a proposed 175 metres (m) high gravity arch dam that would provide a total capacity of 2,400 megawatts (MW) (to be shared equally between Zambia and Zimbabwe), and annual energy production of 10,215 Gigawatt hours per year (GWh/y).

In Zambia, the proposed BGHES falls within the Southern Province and in the districts of Kazungula, Zimba, Kalomo and Choma. Kazungula District, and in particular the ward of Mukuni, which falls in the Katombola Constituency and is under the jurisdiction of Chief Mukuni, will be most directly affected due to the placement of the dam infrastructure, access roads and staff township. The proposed transmission line alignment impacts on Kazungula District, as well as Zimba District, (namely Zimba ward), which is under the jurisdiction of Chief Sipatunyana, Kalomo District (especially Chawila ward), also under Chief Sipatunya and Choma District (in the ward of Singani). In Choma, it is Chief Singani who holds influence in the area of interest. The SAoI also covers Livingstone District, as impacts are also likely to be experienced here.

In Zimbabwe, the proposed scheme falls within the province of Matabeleland North and in the Hwange District. It includes the wards of Matetsi, Chidobe, Katchecheti, Nemanhanga, Mbizha, Jambezi, Sidinda, Mashala and Chinkandukubi. The affected chiefdoms are Hwange, Mvutu and Shana.

(1) More accurate coordinates (in ITRF2008 Geographic) are provided by SP (2015) for the proposed site on both the Zambian and Zimbabwean banks of the river.

UTM Coordinates are 8017623.076 (Y) and 405516.5006 (X)

The proposed dam site is provided in *Figure 1.1*, (which is based on the map of the Surveyor-General, Zimbabwe Rhodesia, Batoka Gorge 1726 C3, Edition 2, Scale 1:50 000) and *Figure 1.2*.

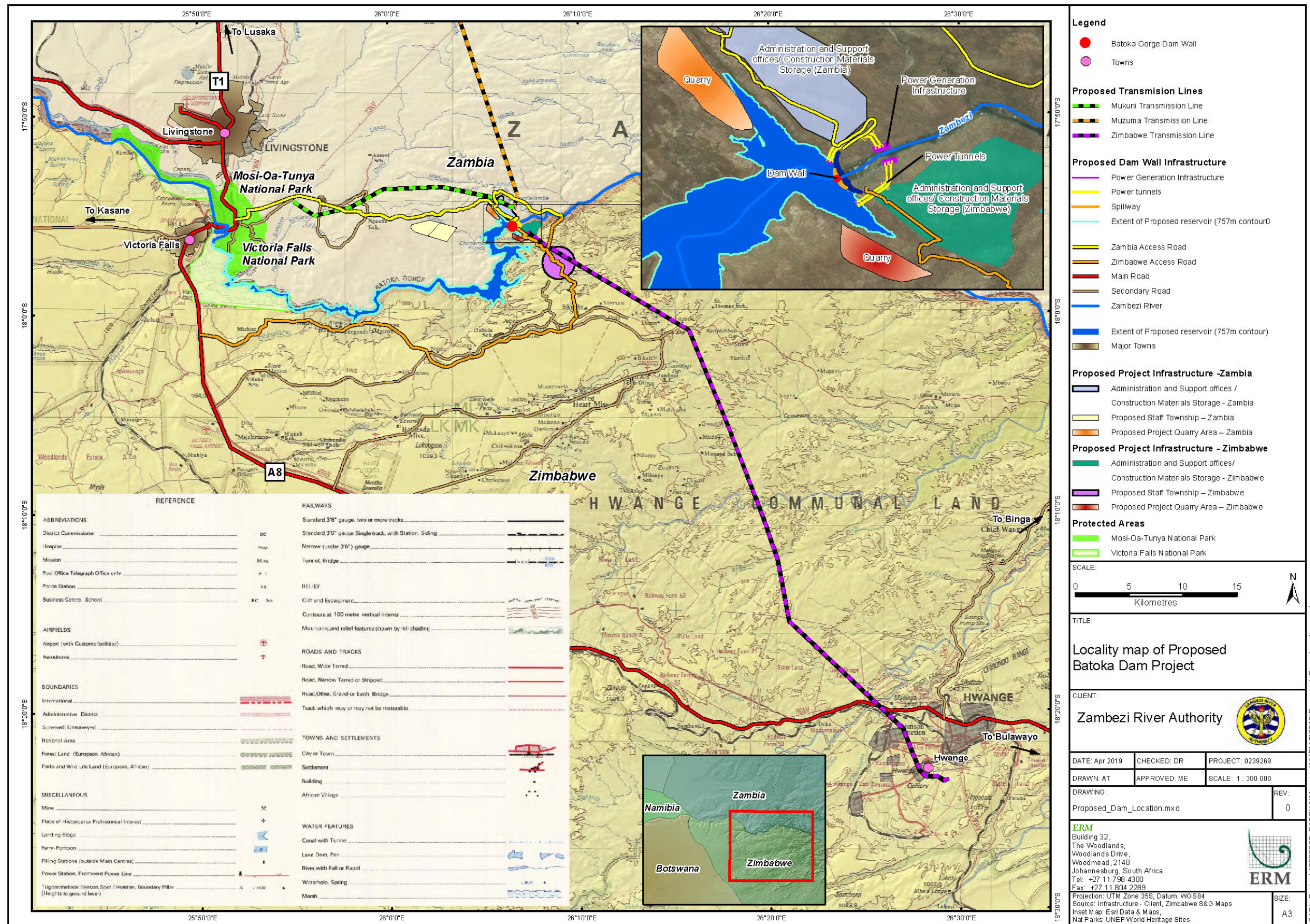
1.4 KEY COMPONENTS OF THE PROPOSED BGHES

The proposed BGHES includes the following key components:

- Dam wall and impoundment, including a spillway;
- Surface power houses, one on each side of the river;
- Transmission lines in Zambia and Zimbabwe;
- Access roads in Zambia and Zimbabwe; and
- Project townships (in both Zambia and Zimbabwe).

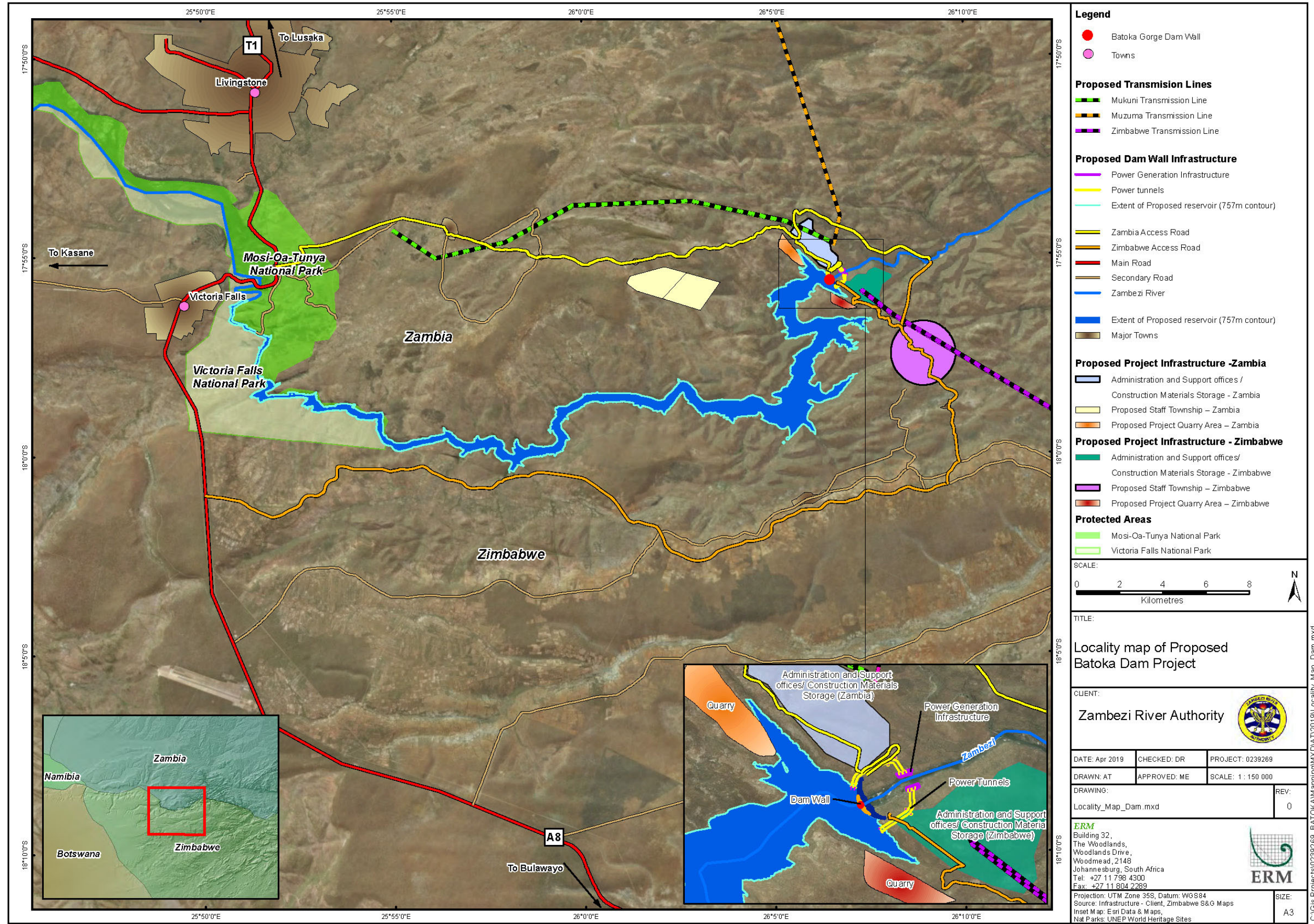
These components are based on the dam design that was proposed in the 1993 Batoka Gorge HES Feasibility Study (BJCV, 1993) and the updated design described in Studio Pietrangeli's (SP) October 2018 Phase II Option Assessment Report (Rev. F), and subsequent October 2019 Phase III Feasibility Report (Rev. D) developed by SP for the BGHES Project.

Figure 1.1 Proposed Dam Site Location (1)



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Figure 1.2 Proposed Dam Site Location (2)



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1.5

PURPOSE AND OBJECTIVES OF THIS OESMP

This OESMP has been prepared to cover the activities associated with the operation of the BGHES. The purpose of this OESMP is to outline appropriate management strategies and actions in order to meet acceptable levels of environmental and social performance. The purpose is also to provide a basis for an on-site environmental and social manual for staff, maintenance personnel, contractors and consultants with responsibilities for the Project.

The objective of this OESMP is to provide:

- Environmental and social management procedures and mitigation measures for the control of impacts of the Project to ensure that environmental and social requirements are specified and complied with;
- Measures to enhance positive impacts;
- Environmental and social monitoring requirements and review procedures for the Project activities;
- Government authorities, stakeholders and proponents with a common focus for authorisations and compliance with relevant policies, approvals, licences, agreements, legislation and other requirements; and
- The community with a tool to ensure that the environmental and social management of the Project is acceptable.

The Zambezi River Authority (ZRA) will have ultimate responsibility for implementing this OESMP.

1.6

STRUCTURE OF THIS OESMP

This OESMP provides:

- The policy, legislation, guidelines and standards against which environmental and social aspects need to be managed;
- The institutional arrangements required for governance, implementation, monitoring and reporting;
- A description of the range of management specifications required for the management of environmental, social, and health and safety aspects as a result of operation and maintenance works;
- The specific monitoring specifications for the operational phase of the Project.

2.1 OVERVIEW

This OESMP details the required mitigation measures, and is partly prescriptive, identifying specific people or organisations to undertake specific tasks in order to ensure that impacts on the environment are minimised during the operational phase of the Project. It is a dynamic document implying that information gained during all prior and the operational phase of the Project could lead to changes in this OESMP. This OESMP has been compiled prior to the implementation of any activities on site and thus falls within the Planning phase of the Project. Further stages of management including doing, checking and acting are required for the implementation of an effective Environmental and Social Management System (ESMS).

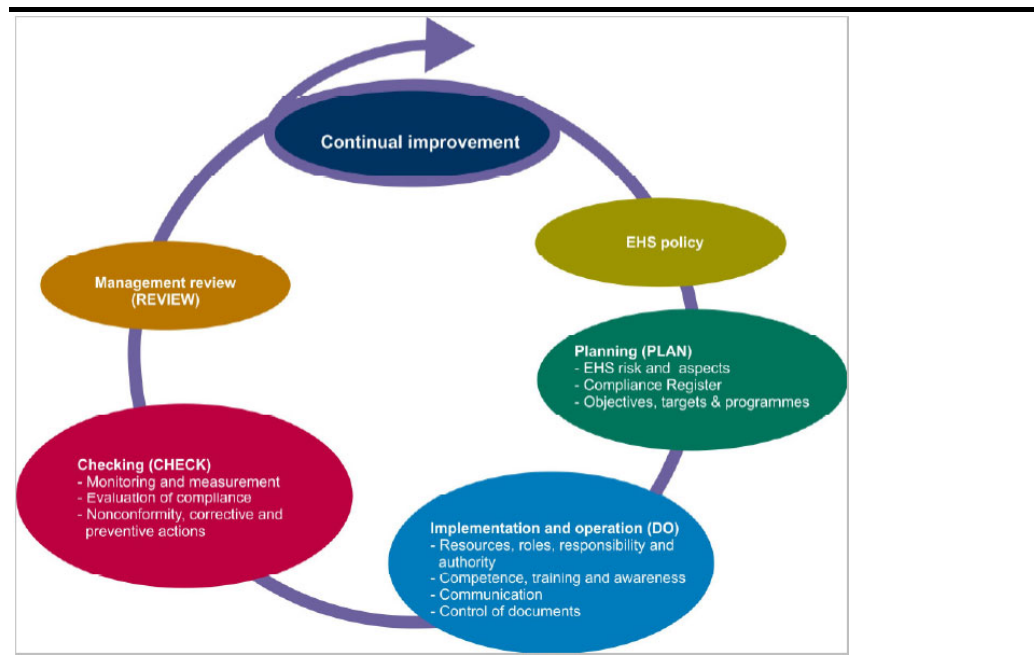
2.2 ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

An effective ESMS is a dynamic and continuous process initiated and supported by a client/proponent, and involves engagement between the client, its workers, local communities directly affected by the project (the Affected Communities) and, where appropriate, other stakeholders (see *Figure 2.1*). Drawing on the elements of the established business management process of “plan, do, check, and act”, the ESMS entails a methodological approach to managing environmental and social risks and impacts in a structured way on an ongoing basis. A good ESMS appropriate to the nature and scale of the project promotes sound and sustainable environmental and social performance, and can lead to improved financial, social, and environmental outcomes.

The main elements of this approach comprise the following:

- **Planning:** Establishing actionable steps and key performance indicators, necessary to deliver results in compliance with regulations and obligations.
- **Doing:** Implementation of actionable steps, and assigning responsibilities for undertaking or implementing these requirements.
- **Checking:** Monitoring and measuring performance against key performance indicators, and other requirements, and reporting of the results.
- **Acting:** Taking actions to continually improve performance of this OESMP through the training of personnel and auditing of results.

Figure 2.1 Elements of an Environmental and Social Management System



2.3 CHANGE MANAGEMENT

As Project design is finalised, design changes may occur that need to be accommodated by the ZRA and its associated contractors. Similarly, the organisational structure and roles and responsibilities included in this OESMP may also change as the Project progresses.

This OESMP will require a mechanism to manage change. At times these changes may be material, potentially influencing the original findings of the ESIA, and hence, the basis for its approval. Such a mechanism to manage change, or a change management system, must ensure that changes to the scope of the Project are subjected to a robust social and environmental assessment process. Any changes to Project scope will be evaluated for their degree of significance, and will be incorporated into the appropriate ZRA documentation as follows:

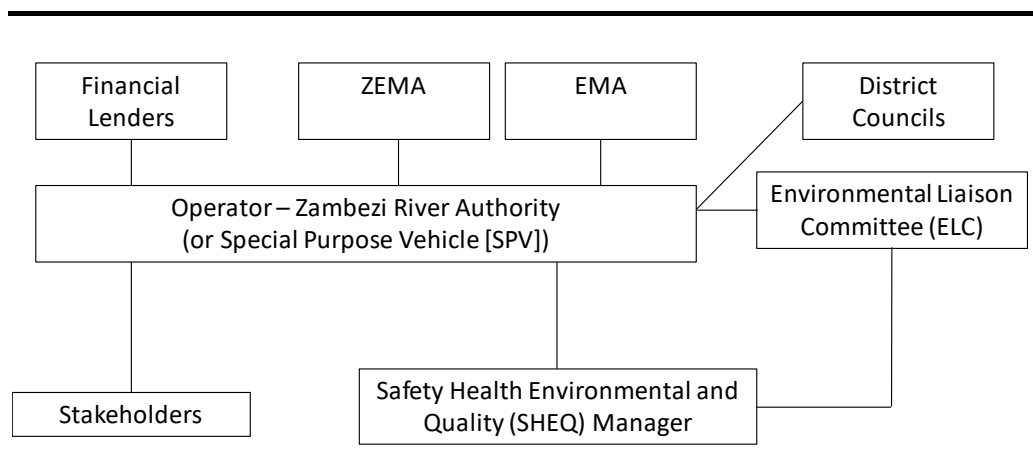
- Minor changes will be reflected in updates to this OESMP; and
- Substantive design / technology changes that might potentially alter the ESIA findings (i.e. those that result in changes to the predicted significance of environmental and social impacts) will be subject to re-assessment, further stakeholder consultation, supplementary reporting and revision of this OESMP. Typically, such substantive changes will be submitted as an addendum to this OESMP.

The key role-players for the purposes of environmental and social management on the site include but are not limited to:

- The Operator (ZRA or Special Purpose Vehicle (SPV));
- Environmental Liaison Committee (ELC);
- The Safety Health Environmental and Quality (SHEQ) Manager;
- Representatives of the relevant Zambian and Zimbabwean Authorities; and
- Any lenders that provide funding for the Project.

Details of the responsibilities of each of the key role-players have been provided in Section 2.4.1 to Section 2.4.3 below. Lines of communication and reporting between the various parties are illustrated in Figure 2.2 below.

Figure 2.2 *Lines of Communication and Reporting*



2.4.1

The Operator

For the purpose of this document, “the Operator” and its appointed facilitators refers to those to whom permission has been granted to proceed with the proposed BGHES (i.e. – the ZRA or SPV ⁽¹⁾) and who is thus ultimately responsible for compliance with all conditions of approval of the Project or any aspect thereof by any authority.

ZRA was formed by the Zambezi River Authority Act of 1987 (Act No. 17 and 19 Zambia and Zimbabwe respectively) and is governed by a Council of Ministers consisting of four members: two are Ministers in the Government of the Republic of Zambia; and two are Ministers in the Government of Zimbabwe.

(1) The Developer (ZRA) may proceed with the Project independently or through a Special Purpose Vehicle (SPV) that would consist of the ZRA and other Government Departments.

The Ministers are those holding portfolios of Energy and Finance in the respective countries.

The functions of ZRA are set out in the schedule to the Act, and are as follows ⁽¹⁾:

- Operate, monitor and maintain the Kariba Complex ("Kariba Complex means: the Kariba Dam and reservoir, all telemetering stations relating to the Kariba Dam, any other installations owned by the Authority");
- In consultation with the National Electricity Undertakings, investigate the desirability of new dams on the Zambezi River and make recommendations thereon to the Council;
- Subject to the approval of the Council, construct, operate, monitor and maintain any other dams on the Zambezi River;
- Collect, accumulate and process hydrological and environmental data of the Zambezi River for the better performance of its functions and for any other purpose beneficial to the Contracting States;
- In consultation with the National Electricity Undertakings, regulate the water level in the Kariba reservoir and in any other reservoir owned by the Authority;
- Make such recommendations to the Council as to ensure the effective and efficient use of the waters and other resources of the Zambezi;
- Liaise with the National Electricity Undertakings in the performance of its functions that may affect the generation and transmission of electricity to the Contracting States;
- Subject to provisions of Article 13 of the Act, recruit, employ and provide for the training of such staff as may be necessary for the performance of its functions under the Agreement;
- Submit development plans and programmes to the Council for approval;
- Give effect to such directions, as may from to time, be given by the Council; and
- Carry out such other functions as are provided for the Agreement or are incidental or conducive to the better performance of its functions.

The Project Proponent's physical address and contact details are provided below:

Project Proponent	Physical address	Postal address
Chief Executive Officer Zambezi River Authority	Kariba House 32 Cha Cha Cha Road Lusaka, Zambia	P.O. Box 30233 Lusaka, Zambia

The application and implementation of this OESMP shall be the responsibility of the ZRA. The ZRA is to appoint a Safety Health Environmental and Quality (SHEQ) Manager to ensure that relevant requirements of this OESMP are implemented, and that the site is suitably managed.

(1) ZRA, 2014, Functions, <http://www.zaraho.org.zm/functions.html>

Should the ZRA sub-contract the running of the BGHES to a third party, this OESMP must be part of the contract and must be binding.

With respect to the operational phase of the BGHES, the Operator is to:

- Implement the recommendations outlined in this OESMP;
- Implement as many recommendations as possible that will lessen the total environmental impact of the proposed BGHES during the operational phase.
- Ensure that all relevant approvals and permits have been obtained prior to the start of the operational phase of the BGHES.
- Ensure that this OESMP has been approved by the Zambian Environmental Management Agency (ZEMA) and the Zimbabwean Environmental management Agency (EMA) prior to the start of operational activities on the site.
- Ensure that the ZEMA and the EMA have been notified of the date on which operational activities will be starting, prior to commencement of the activity.
- Ensure that all conditions of approval have been complied with.
- Appoint a suitably qualified or experienced external environmental specialist to conduct operational environmental audits.
- Implement this OESMP and associated Management Plans during the operational phase.
- Ensure that all contractors', employees, suppliers, agents etc. are fully aware of the environmental and social requirements detailed in this OESMP.
- Liaise closely with the SHEQ Manager and ensure that the works on the site are conducted in an environmentally and socially controlled manner.
- Inform the SHEQ Manager should environmental and social conditions on the site deteriorate, e.g. dumping, pollution, littering and damage to vegetation, community grievance.
- Carry out instructions on request of the SHEQ Manager, required to comply with this OESMP.

Safety Health Environmental and Quality (SHEQ) Manager

A suitably qualified and trained individual appointed by the ZRA prior to the operation of the BGHES, will fulfil the role of the SHEQ Manager. The primary

roles and responsibilities of the SHEQ Manager (amongst other health and safety and quality responsibilities) will be:

- Oversee the implementation of this OESMP on site;
- To visit the site of all Project components on a monthly basis and advise on areas of environmental management, or compliance with this OESMP, requiring attention;
- To visit the site of all Project components more regularly during the first 3 months of operation, during which more frequent monitoring may be required for the establishment of certain programmes or aspects of environmental management;
- To be called to site in the case of any emergency situation which may impact on the local environment;
- To liaise with various specialists and the district authorities if required, regarding issues relating to environmental management;
- To report on compliance with this OESMP specifications;
- To facilitate environmental audits and ensure that they are undertaken, as required;
- To compile a monthly audit report;
- To keep a comprehensive record of environmental management, issues of non-compliance and minutes of meetings for audit purposes; and
- To undertake any other tasks outlined in this document, on the behalf of ZRA.
- The SHEQ Manager to appoint a team of Environmental Control Officers (ECOs) to assist in compliance auditing, training, reporting, etc.

Community Relations

The ZRA should continue to engage with stakeholders throughout the Project in accordance with the Grievance Procedures in *Annex A*. The objectives of communication and liaison with local communities are the following:

- To provide residents in the vicinity of the Project and other interested stakeholders with regular information on the progress of work and its implications.
- To monitor implementation of mitigation measures and the impact of the Project on communities via direct monitoring and feedback from those affected, in order to ensure the mitigation objectives are achieved.
- To manage any disputes between the ZRA and local communities.

2.4.2 *Environmental Liaison Committee (ELC)*

The Operator shall also form an Environmental Liaison Committee (ELC) to advise on the implementation of this OESMP.

If the ELC is formed, many of the responsibilities of the Operator shall be delegated to the ELC. The ELC should consist of at the very least the following:

- Representative of the Operator;
- SHEQ Manager;
- Representative of the relevant district authorities.

Other members may include an external Officers or representatives from community based organisations or environmental groups.

The ELC is a representative body of various key role players involved in development and environment-related organisations, which have a particular interest in the BGHES. Members of this committee will not remain constant, and may vary over time.

The ELC will play an advisory role, and provide a forum for democratic decisions regarding this OESMP implementation during the operational phase of the development, as well as periodically reviewing the OESMP in terms of its applicability to management requirements on site. They are to meet periodically to receive a report back on environmental management. This frequency may need to be reviewed following the first year of operation, but should not be less than twice a year.

All members of the ELC will be expected to attend the meetings, and are to provide the chairperson of the committee with a written apology if unable to attend. In such a case, the member will receive minutes of the meeting, and may be expected to respond to certain issues.

2.4.3 *Independent Environmental Auditor*

Since provision has been made for the SHEQ Manager to be an internal ZRA appointment, the ZRA must employ an *independent* Environmental Professional with postgraduate degree in environmental studies and a minimum of five years relevant experience to act as the independent Environmental Auditor for the site. The Environmental Auditor is to be employed upon completion of the first year of operation, and is to perform an annual formal audit on the OESMP, and its implementation by the relevant parties for the duration for the operational phase of the project.

The Environmental Auditors report will be submitted to the Operator and to the ZEMA, the EMA and the relevant District Councils if required.

2.4.4 *Dispute Resolution*

Any disputes or disagreements between role players on the site (with regard to environmental and social management) will firstly be referred to the Operator (ZRA, and more specifically the SHEQ Manager) during operation. If no

resolution on the matter is reached, then the matter should be referred to the EMA or the ZEMA.

2.5 *FURTHER DOCUMENTATION*

The ZRA as the Operator of the BGHES will be required to prepare Standard Operating Procedures and work instructions for the life of the Operational Phase of the Project. These are required to provide the greatest possible assurance in the safety and appropriate management of the operational phase of the Project. Procedures for the BGHES may include dam inspection, dam performance monitoring and maintenance.

2.6 *TRAINING FOR IMPLEMENTATION OF THIS OESMP*

A main element of the ESMS (refer to *Section 2.2*) is to take actions to continuously improve the performance of this OESMP through training of personnel. In addition to the training of Contractors on the requirements of this OESMP, it is incumbent for the ZRA to convey the sentiments of the OESMP to all ZRA personnel responsible with the implementation of this OESMP. Accordingly, the ZRA will contract a suitably qualified environmental and social specialist to develop and execute training on capacity strengthening for those ZRA staff that are responsible for implementation of this OESMP.

Training courses will cover:

- Details on implementing and monitoring the Environmental and Social Management System (ESMS).
- Details on the environmental and social responsibilities of the ZRA and other key role players.
- Lines of communication and reporting between various parties during the life of the Project.
- Environmental (including social) permitting / licensing requirements for the Project.
- An overview of the Project related activities that will result in environmental and social impacts if not managed.
- The objective and details of standard operating procedures, including the approval process for these.
- The environmental and social management actions that need to be undertaken during all phases of the Project, responsibilities for implementing these actions and the timing / frequency of these actions.
- Monitoring / auditing requirements that need to be undertaken during all phases of the Project, responsibilities for monitoring /auditing and the timing / frequency of monitoring /auditing activities.
- Environmental and social reporting and documentation requirements for government / authority reporting; lender reporting; internal reporting and community reporting.

The ZRA will ensure that a document exists that clearly lists who will require training, the frequency of training and the procedure to document training activities.

Courses shall be run during normal working hours at a suitable venue provided by the ZRA. All attendees shall remain for the duration of the course and sign an attendance register on completion that clearly indicates participant's names.

This *Chapter* presents a summary of the following national and international legal requirements and standards relevant to the CESMPs and OESMP (cumulatively referred to in this *Chapter* as the ESMPs) associated with the greater BGHES:

- Zambian Legal Requirements and Standards (refer to *Table 3.1*)
- Zimbabwean Legal Requirements and Standards (refer to *Table 3.2*)
- International Guidelines and Standards (refer to *Table 3.3*), including –
 1. World Bank Group Environmental and Social Safeguard Policies
 2. International Finance Corporation (IFC) Performance Standards
 3. International Finance Corporation (IFC) Environmental, Health and Safety (EHS) Guidelines
 4. African Development Bank Group’s Integrated Safeguard System and Operational Safeguards

It should be noted that the IFC EHS Guidelines do not only address the EHS expectations of the IFC, but also that of the World Bank group’s.

This *Chapter* provides a brief summary of these various legal requirements, standards and guidelines and describes the applicability of these to the ESMPs.

3.1

ZAMBIAN LEGAL REQUIREMENTS AND STANDARDS APPLICABLE TO THIS ESMP

Table 3.1 *Zambian Legal Requirements and Standards Applicable to this ESMP*

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
General Environmental Management	The Zambian Environmental Management Act (No. 12 of 2011)	<p>Section 4 mentions that every person living in Zambia has the right to a clean, safe and healthy environment and should a person be threatened or is likely to be threatened as a result of an act or omission of any other person, that person may bring an action against the person whose act or omission is likely to cause harm to human health or the environment.</p> <p>Moreover, Section 5 states that every person has a duty to safeguard and enhance the environment.</p> <p>The ESMPs have been prepared in support of the EIA Regulations.</p>
	The Environmental Impact Assessment (EIA) Regulations, which fall under the EPPCA (Statutory Instruments No. 28 of 1997)	<p>These Regulations provide the framework for conducting an Environmental Impact Assessment (EIA) and requires that an Environmental Management Plan (EMP) be developed that is in support of the EIA.</p> <p>In this respect the ESMPs have been developed.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Permits	The Environmental Management (Licensing) Regulations (S.I. No. 112 of 2013)	<p>The Regulations were published under the Zambian Environmental Management Act (Act 12 of 2011) and provide for licensing and management requirements for -</p> <ul style="list-style-type: none"> • <u>Air Pollution Monitoring Permits</u> - under the Air Pollution Control (Licensing and Emission Standards) Regulations, 1996 • <u>Water Effluent Discharge Permits</u> - under the Water Pollution Control (Effluent and Wastewater) Regulations, 1993 • <u>Waste Management Licenses</u> - under the Waste Management (Transporters of Waste/Operation of Waste Disposal Sites) Regulations, 1993 and Hazardous Waste Management Regulations, 2001 • <u>Pesticides and Toxic Substances Licences</u> - under the Pesticides and Toxic Substances Regulations, 1994 <p>These specific permits/licenses will need to be considered as part of final Project Design.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Water	Water Resources Management Act (No. 21 of 2011)	<p>The Environmental and Social Impact Assessment needs to consider all project activities that may result in effluent discharge. The Environmental and Social Management Plan should include measures to manage such discharge and should include provisions to ensure that no person discharges or disposes of –</p> <ul style="list-style-type: none"> • any organic or inorganic matter, including water containing such matter, into a water resource, whether directly or through drainage or seepage, so as to cause pollution of the water resource; or • any effluent or waste water which has been produced by, or results from, the use of water for any purpose, into a water resource, whether directly or through drainage or seepage. <p>Please note that dilution of effluents using water is an activity that requires a licence. The licensing process is beyond the scope of this report.</p> <p>Management measures in relation to water resources have been considered in the ESMPs, particularly to the Zambezi River downstream of the proposed dam wall. Moreover, water permits ought to be obtained from the Water Resources Management Authority (WARMA) in accordance with Act 21 of 2011: Statutory Instrument (SI) 18 of 2018.</p>
	The Zambia Environmental Management Act (No. 12 of 2011)	Division 2, Sections 45 to 48 of the Act make considerations for water resources. More specifically, Section 46 states that a person shall not discharge or apply any poisonous, toxic, eco-toxic, obnoxious or obstructing matter, radiation or other pollutant, or permit any person to dump or discharge such matter or pollutant into the aquatic environment in contravention of water pollution control standards.
	Water Supply and Sanitation Act (No. 28 of 1997)	<p>The Environmental and Social Impact Assessment needs to consider the need for a clean potable water supply. The ESMPs should include measures to ensure sanitary conditions relating to the use of such water.</p> <p>Please note that all water service providers need to be licence and therefore before sourcing water from such a provider check that they are in possession of a licence.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Terrestrial Ecology	Zambian Wildlife Act (No. 14 of 2015)	<p>Part VI (Game Animals and Protected Animals) includes provisions for game and protected animals. More specifically Section 31 of Part VI states that any person who hunts any game or protected animal, except under or in accordance with the conditions of a valid license issued under Part VII of this Act, shall be guilty of an offence. This is further reiterated in Section 67 of the Act.</p> <p>The Environmental and Social Impact Assessment needs to consider the impacts on flora and fauna within national parks, conservation and protected wildlife areas. The ESMPs present measures to manage such impacts on fauna and flora.</p>
	The Zambian Environmental Management Act (No. 12 of 2011)	<p>Section 77 (2) of Division 8 of the Act states that no person shall place any invasive alien species into any element or segment of the environment. Moreover, Section 78 states that an occupier of any land shall take such measures as are prescribed and are reasonably necessary for the eradication or prevention of the spread of invasive alien species.</p> <p>The control of alien species has been considered in the ESMPs.</p>
	Forests Act (No. 4 of 2015)	<p>The Environmental and Social Impact Assessment needs to consider the possible impacts upon national or local forests and protected tree species. The ESMPs include measures that minimises impacts to trees within such areas and that protected tree species, no matter their location, are not negatively impacted upon.</p>
Aquatic Ecology	National Policy on Wetlands Conservation (September 2001)	<p>This Policy was formulated in response to the fragmented sectoral policies and Acts. It aims to provide a holistic programme of action to promote the conservation and wise use of wetland ecosystems. It acknowledges the importance of wetland ecosystems in Zambia in providing major fisheries and as important habitats for various wildlife species.</p> <p>The management of surface water quality, aquatic environments (including aquatic vegetation) and terrestrial ecology (including fauna utilising wetland habits) is provided in the ESMPs. These have considered the provisions of this National Policy.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
	Fisheries Act (No. 22 of 2011)	The Environmental and Social Impact Assessment needs to consider impacts upon the fishing industry and ensure that such persons are involved in consultations. The ESMPs include measures to manage impacts upon such persons as far as is reasonably possible and a livelihood restoration plan, which will be compiled as part of the Project Resettlement Action Plan (RAP), will also ensure the minimization of impacts.
Noise	Part IV of Zambian Environmental Management Act (No. 12 of 2011)	Section 68 of Division 6 (Part IV) of the Act states that no person shall emit noise in excess of the noise emission standards established. The management of noise has been addressed as part of the ESMPs.
Air Quality	Part IV of Zambian Environmental Management Act (No. 12 of 2011)	Section 52 of Division 3 (Part IV) of the Act states that ambient air quality standards and guidelines shall be established under this Division and published.
	Section 37, 46 and 96 of Air Pollution Control (Licensing and Emission Standards) Regulations (S.I. No. 141 of 1996)	<p>This regulation provides a table of guideline limits for ambient air quality pollutants including Sulphur Dioxide, Total Suspended Particulate, Particulate Matter, Carbon Monoxide, Ambient Lead and Dust Fall.</p> <p>The ESMPs have considered these regulations and associated ambient air quality standards.</p>
Explosives	Explosives Act (No. 10 of 1974) Regulations are in draft stage.	<p>Section 3 of the Act states that the Act shall apply (amongst others) to the storage, use, possession and transportation of explosives.</p> <p>Part I of the Act provides general measures for the storage, handling and use of explosives. Part III includes provisions for the transportation of explosives by waterway, road, rail or air; and Part IV includes provisions for the transportation of explosives around the work site. Part V includes provisions for the storage of explosives at the work site and Part VIII includes requirements for the use of explosives.</p> <p>The development of measures included in the ESMPs and detailed design around blasting management for BGHES has and will take these requirements into consideration.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Health	Factories Act (Chapter 441 of the Laws of Zambia) (as amended by S.I. No. 165 of 1989, No. 75 of 1990, and No. 13 of 1994)	<p>The Factories Act is intended to make further and improved provision for the regulation of the conditions of employment and regards the safety, health and welfare of persons employed therein.</p> <p>Part V (Health: General Provisions) of the Act includes provisions around cleanliness, overcrowding, ventilation, lighting and sanitary requirements for employees and Part VI (Safety: General Provisions) includes provisions for the use of machinery, training, facilities, precautions for the use of explosives, emergency drill training requirements for employees.</p> <p>Moreover, Part IX includes provisions for the welfare of employees, including provisions for drinking water, washing facilities, accommodation and change rooms, first aid and resting facilities. Section 71 of Part X includes requirements for provision of Personal Protective Equipment (PPE) and additional health and safety and welfare measures.</p> <p>The ESMPs have considered the provisions included in this Act.</p>
	Public Health Act (No. 22 of 1995)	This Act provides for the prevention of diseases, drainage, latrine and disposal of sewerage and treatment systems. The ESMPs have considered sewerage disposal activities and associated methods.

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Energy	Energy Regulation Act (No. 16 of 1995)	<p>Provides for the control in the pricing and quality of energy products in the country.</p> <p>No direct issues to be complied with; however, the Energy Regulator Board (ERB) is a key stakeholder and therefore needs to be included in consultations relating to the ESIA and the ESMPs. The ERB has the mandate of regulating the energy sector in line with the provisions of the Energy Regulation Act of 2003. The ERB has the responsibility of ensuring that power generating utilities earn a reasonable rate of return on their investments that is necessary to provide a quality service at affordable prices to the consumer.</p> <p>In order to carry out this role, the ERB, among other functions, ensures that all energy utilities in the sector are licensed, monitors levels and structures of competition, and investigates and remedies consumer complaints.</p> <p>The unit price of the electricity generated by the proposed BGHES will be regulated by the ERB.</p>
	The Petroleum Act (No. 28 of 1930)	The ESMPs consider the possible use of petroleum products and include measures to ensure that such products are handled, stored and transported in accordance with this Act.
	The Electricity Act (No. 15 of 1995)	The ongoing technical operation/maintenance of overhead transmission line will need to consider the requirements of this Act.
Health	Public Health Act (No. 22 of 1995)	<p>Provides for the prevention of diseases, drainage, latrine and disposal of sewerage and treatment systems.</p> <p>The ESMPs have considered sewerage disposal activities and associated methods.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
	The Occupational Health and Safety Act (Act No. 36 of 2010)	<p>This Act provides for the establishment of health and safety committees at workplaces and for the health, safety and welfare of persons at work. Moreover, the Act provide for the protection of persons, other than persons at work, against risks to health or safety arising from, or in connection with, the activities of persons at work.</p> <p>The ESMPs have considered occupational health and safety aspects and associated mitigation thereof.</p>
Roads and Traffic Safety	Roads and Road Traffic Act (Cap 464)	<p>Part III and IV of this Act include provisions for the registration and licensing of motor vehicles and trailers. Such provisions include ownership details, vehicle/trailer specifications, etc. Moreover, Part V includes the requirements for the licensing of drivers of motor vehicles and Part VII includes the provisions for third part insurance.</p> <p>The Act stipulates that no person shall drive a motor vehicle on a road unless he is the holder of a valid licence issued to him in respect of motor vehicles of the class concerned. The Act provides the minimum age limits associated with driving of vehicles on roads. Part VI includes the provisions for motor vehicle insurance against third party. Part XI includes the provisions for road safety and driving offences (speed limits, reckless driving, driving under the influence, driving behaviours, vehicle emissions, littering etc.).</p> <p>The provisions of this Act have been included in the ESMPs.</p>
Land Use Planning Issues	The Urban and Regional Planning Act (No. 3 of 2015)	The ESMPs ensure that project activities are in adherence with such developed plans as far as is reasonably possible.
	Lands Conversion of Titles Act	The ESMPs include provisions for the development and implementation of a RAP that take into account the provisions of these Acts.
	Lands and Deeds Registry Act (No. 38 of 1994)	
	Lands Act (No. 29 of 1995)	<p>The Act guarantees peoples' right to land while enhancing development. The Act recognises the holding of land under customary tenure and the Chief's role has been legally recognised, such that land cannot be converted or alienated without approval of the chief.</p> <p>The ESMPs include provisions for the development and implementation of a RAP that should take into account the provisions of this Act.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
	Land Acquisition Act (No. 2 of 1970)	The Act sets out regulations for compulsory acquisition of land and property and compensation for such acquisition. The ESMPs include provisions for the development and implementation of a RAP that should take into account the provisions of this Act.
	Agricultural Lands Act (No. 57 of 1960)	The ESMPs consider impacts upon on all agricultural land and ensures that the Minister is consulted as well as affected farmers.
	The Local Government Act (No. 19 of 1992)	The ESMPs consider impacts upon local or district council areas and the Council's jurisdiction over these areas.
Cultural Heritage	National Heritage and Conservation Act (Act No. 23 of 1989)	Part V of this Act (Conservation of Heritage) states that (Section 35) any person who wishes to destroy, demolish, alter or remove from its original site any monument, relic or ancient heritage shall apply for permission to the Commission. Moreover, Section 37 states that any person who desires to excavate any ancient heritage or collect relics shall apply to the Commission for permission. In accordance with Section 42, any person who discovers a potential ancient heritage or relic shall report the find to the commissions and suspend operations in the immediate vicinity to the discovery. The ESMPs have considered the provisions of this Act.
Employment and Compensation	Citizens Economic Empowerment Act (No. 9 of 2006)	Provides for the encouragement and support of citizens of Zambia to get involved in business activities for wealth creation and support of livelihoods. More specifically, Part II of the Act provides measures for economic empowerment including (amongst others) the prohibition of discrimination, skills development, education and training, preferential procurement, regional development, codes of good practice and mechanisms for measuring progress. The ESMPs provide measures to ensure that the proposed BGHES provides opportunities to Zambian citizens.
	The Employment Act (No. 57 of 1965)	The ESMPs include measures to ensure that all employees are appointed in accordance with the Act and that labour conditions provide for a safe and healthy environment.

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
	Compensation Act (No. 19 of 1973)	The ESMPs include measures that provide for the contribution to the Fund for disabled workers as required.
	Employment Code Act No. 3 of 2019	The ESMPs have considered the relevant requirements pertaining to employment included in this Act.
Mining - Quarries	Mines and Minerals Development Act (No. 11 of 2015)	The ESMPs include measures for quarrying related activities. Please note that such activities will require licenses; however, the associated process is beyond the scope of this report.
Tourism	Tourism and Hospitality Act (No. 23 of 2007)	The ESMPs include measures for the management of impacts to the tourism industry as far as is reasonably possible.

3.2 ZIMBABWEAN LEGAL REQUIREMENTS AND STANDARDS APPLICABLE TO THIS ESMP

Table 3.2 Zimbabwean Legal Requirements and Standards Applicable to this ESMP

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
General Management Requirements	Constitution of Zimbabwe Amendment Act (No. 20 of 2013), Section 73 (Environmental Rights)	According to Section 73 of the Constitution of Zimbabwe, every person has a right to an environment that is not harmful to their health or well-being and to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures. Other than Section 73, the current Constitution has no specific clause that provides for the protection of the environment. The objective of the ESMPs is to ensure the protection of the environment and associated key natural socio-environmental resources.

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
	<p>The Environmental Management Act (the Act) (Chapter 20:27), (No. 13 of 2002)</p>	<p>This Act aims to provide for the sustainable management of natural resources and protection of the environment; [and] the prevention of pollution and environmental degradation.</p> <p>Section 4 the Act affords all citizens of Zimbabwe the right to live in a clean environment that is not harmful to their health; access to environmental information; the right to protect the environment for the benefit of present and future generations; and the right to participate in the implementation of legislation and policies that prevent pollution and environmental degradation and promote the sustainable management and use of natural resources, as well as justifiable economic and social development.</p> <p>The Act also includes provisions for aspects including (amongst others) water, air, waste, hazardous wastes, noise, toxic substances, wetlands and control of invasive plant species. These provisions will be discussed in the relevant sections below.</p> <p>The ESMPs have taken these provisions into account.</p>
	<p>Environmental Management (Environmental Impact Assessments and Ecosystems Protection) Regulations (S.I. No. 7 of 2007)</p>	<p>The Environmental Management Regulations deal with the regulation of the EIA process and the protection of ecosystems.</p> <p>In this respect, ESIA's and associated ESMPs has been developed. The Project will not go ahead until approval is obtained from the ZEMA and the EMA.</p>
	<p>Environmental Impact Assessment Policy of 1997</p>	<p>The goal of the policy is to encourage environmentally responsible investment and development in Zimbabwe. The policy views the EIA process as key to achieving this goal. To support the 1997 Environmental Impact Assessment Policy, the Ministry published EIA Guidelines to facilitate the implementation of the EIA process. These guidelines are presented as 10 Volumes. Volume 1 of the guidelines provides guidance on aspects of environmental management. Volumes 2 to 10 provide guidance on sector-specific EIAs (including hydropower and transmission lines), and (amongst others) provides measures for managing impacts.</p> <p>The ESMPs have taken the provisions included in these guidelines into account.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Water	Water Act of 2003 (Chapter 20:24)	<p>Section 67 of the Act states that water resource management needs to be consistent with environmental approaches and due consideration should be given to the protection, conservation and sustenance of the environment; and the right of access by members of the public to places of leisure or natural beauty related to water or water bodies.</p> <p>According to Section 69, a person who intends to discharge or dispose into a watercourse shall apply for a permit and pay such charges, for the use of the water, as may be prescribed. It is the understanding of this process that a water permit will not be necessary for this Project.</p> <p>Part IX includes provisions on the safety of dams. Namely, Section 109 and 110 include requirements around procedures for emergency for any sudden or unprecedented flood or alarming or unusual circumstance or occurrence, whether anticipated or existing, which may adversely affect the dam.</p> <p>Such management measures have been considered in the ESMPs.</p>
	The Environmental Management Act (the Act) (Chapter 20:27) (No. 13 of 2002)	<p>Section 57 of the Act mentions that any person, who discharges or applies any poison or toxic, noxious or obstructing matter, radioactive waste or other pollutants or permits any person to dump or discharge such matter into the aquatic environment in contravention of water pollution control standards shall be guilty of an offence.</p> <p>This provision has been duly noted in the ESMPs.</p>
Terrestrial Ecology	Forest Act, 1948 (Chapter 19:05)	<p>Provides for demarcating and conserving forests and nature reserves.</p> <p>More specifically, Part VI (conservation of timber resources) governs the removal of indigenous trees. Prior to the removal of indigenous trees, notice of intention must be provided to the appropriate Commission.</p> <p>Management/mitigation commitments for the protection of terrestrial flora are included in the ESMPs.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
	Parks and Wildlife Conservation Act of 1975 (Chapter 20:14)	<p>Provides for the conservation and control of wildlife, fish and plants; and designates specially protected animals and indigenous plants.</p> <p>More specifically, Part IX (specially protected animals) (Section 45) and Part XII includes provisions around the hunting, removal of animals and animal products.</p> <p>Part X and Part XI of the Act include provisions for protected plants specified in the Seventh Schedule (insertion by Act 19 of 2001 with effect from the 1st June 2002) and provisions for the control of picking of indigenous plants.</p> <p>The ESMPs have been compiled in light of the requirements of this Act.</p>
	The Environmental Management Act (the Act) (Chapter 20:27) (No. 13 of 2002)	<p>Part XIII of the Act includes provisions for the control of alien plant species. Essentially, every person has the responsibility to clear or cause to be cleared any invasive alien species growing or occurring on the land in respect of which he is responsible.</p> <p>The ESMPs have been compiled in light of the requirements of this Act.</p>
	Communal Land and Forest Produce Act of 1988 (Chapter 19:04)	<p>The ESMPs consider impacts to natural resources (such as trees) on communal lands, as the local communities have use rights with regard to the use of such resources. Impacts / loss of natural resources used by local communities will be assessed as part of the RAP process.</p>
Aquatic Environment	GN 380 of 2013 (Protection of Wetlands) per Section 113 of the Environmental Management Act (the Act) (Chapter 20:27) (No. 13 of 2002)	<p>This Section of the Act includes provisions for the protection of wetlands in Zimbabwe. Such controls include the preservation of beds, banks; controlling stormwater; restrictions of removing clays and deposits from wetlands; reducing pollution of any kind to wetlands and restoration of wetlands.</p> <p>Measures associated with the management of surface water quality, aquatic environments (including aquatic vegetation) and terrestrial ecology (including fauna utilising wetland habits) are provided in the ESMPs.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Air	Air Pollution Control Regulations (S.I. No. 72 of 2009) of the Environmental Management Act of 2002	<p>Provides for prevention, control and abatement of air pollution to ensure clean and healthy ambient air.</p> <p>The ESIA's have considered possible emission sources associated with proposed Project activities. This may relate to, for example, motor vehicles and generators used during construction activities. As such, air pollution control measures have been included in the ESMPs.</p>
	The Environmental Management Act (the Act) (Chapter 20:27) (No. 13 of 2002)	Section 63 of the Act mentions that ambient air quality standards need to be established.
	Draft Air Quality and Emission Standards (draft number EN 005 - D977/2) of the Environmental Management Act of 2002	These have not been enacted; however, Section 4 of these draft standards provides ambient air quality in Zimbabwe. Moreover, Section 7 provides limit values for vehicle emissions.
Noise	The Environmental Management Act (the Act) (Chapter 20:27) (No. 13 of 2002)	<p>Sections 79 to 81 (in Part IX of the Act) provide requirements around noise management. More specifically, the Act mentions the need for standards to be established for the emissions of noise and vibration pollution. Section 80 mentions that any person who emits noise in excess of the noise emission standards prescribed in terms of section seventy-nine shall be guilty of an offence.</p> <p>No reference to noise standards could be sourced and it appears as if these do not yet exist.</p> <p>The ESMPs include noise mitigation measures.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Waste	Effluent and Solid Waste Disposal Regulations (S.I. No. 6 of 2007) of the Environmental Management Act of 2002	<p>This regulation concerns the disposal of effluent and solid wastes. Persons are prohibited from disposing waste into public watercourses without initially acquiring permission. Moreover, a generator of waste (other than domestic households) is now required to produce a Waste Management Plan on an annual basis. The plan should deal with sound environment management of wastes and include information on: quantity of waste; components of waste, goals for the reduction of the quantity and pollutant discharges of the waste; transportation and disposal of waste; and adoption of environmentally sound management of wastes.</p> <p>The ESMPs consider activities that will result in disposal of waste into water sources. Such activities may require a license; however, the details of obtaining such a license are beyond the scope of this report.</p>
	Hazardous Waste Management Regulations (S.I. No. 10 of 2007) of the Environmental Management Act of 2002	<p>Provides for the licensing for generation, storage, use, recycling, treatment, transportation or disposal of hazardous waste. Generators of hazardous waste are also required to prepare waste management plans and targets. Regulates waste collection and management by local authorities. In addition, regulates the importation and exportation of hazardous waste and waste oils.</p> <p>According to this regulation, generators of hazardous waste are required to prepare waste management plans.</p> <p>Waste management has been taken into consideration in the ESMPs.</p>
	Plastic Bottles and Plastic Packaging Regulations (S.I. No. 98 of 2010)	<p>This regulation encourages a reduction in the use of certain types of plastics. According to Article 3(1), it is prohibited to produce, import or distribute plastic packaging with a thickness of less than 30 microns.</p> <p>The ESMPs encourage minimisation of waste generation and maximisation of reuse and recycling of waste products.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
	The Environmental Management Act (the Act) (Chapter 20:27) (No. 13 of 2002)	<p>Section 69 of Part IX of the Act mentions that no person shall discharge or dispose of any wastes, whether generated within or outside Zimbabwe, in such a manner as to cause pollution to the environment or ill health to any person. Moreover, Section 69 includes provisions for the transport and disposal of waste.</p> <p>Section 73 of the Act prohibits the discharge of hazardous substances, chemicals and materials or oil into the environment.</p> <p>The appropriate management of waste has been included in the ESMPs.</p>
Explosives	Explosives Act (Chapter 10:08) and Explosives (Amendment) Regulations (S.I. No. 139 of 1995)	<p>Part IV of the Regulations includes provisions for the storage of explosives. No person shall keep explosives in or on any premises unless the premises are licensed. Moreover, Part V of the Regulations govern the use of explosives. Part VI provides restrictions and provisions for the transport of explosives.</p> <p>The ESMPs presents blasting management measures. The development of these measures have taken these Regulations into consideration.</p> <p>Licenses for the use and storage of explosives may need to be obtained. The licensing process is beyond the scope of the ESMPs.</p>
	Statutory Instrument No. 109 of 1990 (Mining (Management and Safety) Regulations of the Mines and Minerals Act of 1961	The Regulation provides requirements for the surface protection and protection of working places associated with mining works. Mining can be defined as a process of extracting or obtaining minerals, and any process directly (or indirectly) connected therewith. Accordingly, the requirements included in this Regulation will be of relevance to the Project Quarries.

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Hazardous Substances	Statutory Instrument No. 268 of 2018 of the Environmental Management Act of 2002 (Hazardous Substances, Pesticides and other Toxic Substances)	<p>The Regulation provides for the labelling, packaging, repackaging and sale of hazardous substances or articles containing hazardous substances in Zimbabwe.</p> <p>The Regulations prescribe conditions that employers have to observe in the handling of hazardous substances at the workplace, conditions for transporting hazardous substances, and procedures to be followed when there is an accidental spillage of hazardous substances.</p> <p>The Agency is empowered to issue spot fines to any person who violates the law. In addition, any person whose substances affect the environment is liable to pay for the cost of restoring the environment (i.e. the polluter pays principle). The offender is also liable to pay compensation for any damage that the offence caused to any person.</p> <p>The provisions of this Regulation have been considered in the ESMPs.</p>
	Factories and Works Act (Chapter 14:08)	<p>This Act provides for the registration and control of factories, the regulation of conditions of work in factories, supervision of the use of machinery and precautions against accidental injury to persons employed on structural work.</p> <p>The provisions of this Act have been considered in the ESMPs with respect to the management of occupational health and safety of workers.</p>
Health	Factories and Works (Registration and Control of Factories) Regulations, 1976 of the Factories and Works Act	<p>These regulations provide for the registration and control of factories and provide occupational requirements associated design for factories.</p> <p>The provisions of this Act have been considered in the ESMPs with respect to the management of occupational health and safety of workers.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
	Public Health Act (Chapter 15:09)	<p>The ESMPs include measures such as the obligation to:</p> <ul style="list-style-type: none"> • Notify the health authorities of an infectious disease and/ or any formidable epidemic disease outbreak among on-site residents. • Ensure that persons involved with the handling of food do not suffer from known infectious diseases. • Ensure that residences where persons suffering from an infectious disease are efficiently disinfected before allowing access thereto. • Ensure that all food made available on-site is prepared and kept in a sanitary manner.
	Plant Pests and Diseases Act of 1959 (Chapter 19:08)	The ESMPs include steps necessary for prevention of the spread of pests.
	Pneumoconiosis Act (Chapter 15:08)	<p>This Act provides for the control and administration of persons employed in dusty occupations; and to provide for matters incidental to or connected with the foregoing. Part V of the Act requires that workers employed in dusty occupations have a current medical certificate. Part VI of this Act requires registration of employees working in dusty occupations in Zimbabwe. This register needs to include the date of engagement; the date of discharge; the nature of the worker's duties; the wages and allowances paid to the worker from time to time; the date of the last medical examination performed under this Act; the number and date of expiry of the current certificate. Part VI includes general provisions relating to worker benefits.</p> <p>The provisions of this Act have been considered in the ESMPs with respect to the management of occupational health and safety of workers.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
	Mining (Management & Safety) Regulations (S.I 109 of 1990) of the Mines and Minerals Act 1961	<p>The regulation provides an interpretation of mining to be (amongst others), the extracting of any mineral by any mode or method. Part II and II of the regulation provide conditions for the protection of mines and safety requirements for mines.</p> <p>The provisions of this Regulation have been considered in the ESMPs.</p>
	Mining (Health & Sanitation) Regulations (S.I. 185 of 1995) of the Mines and Minerals Act 1961	<p>Part I of this Regulation provides general health and sanitation requirements for mines in Zimbabwe, including (amongst others) the disposal of refuse; provisions for latrines; medical care and treatment of employees; and sanitation provisions. Part II of the Regulation includes (amongst others) provisions for accommodation of employees and other health aspects for employees.</p> <p>The provisions of this Regulation have been considered in the ESMPs.</p>
Road and Traffic	Road Motor Transportation Act of 1997	<p>The proposed Batoka Dam Project will require the transport of materials and machinery into the Project Area. Part III (Section 7 to 16) of the Road Motor Transportation Act details the requirements for goods vehicles on all roads and that these vehicles/drivers need to hold an operator's license. The operator's license application needs to be assigned for a specific route. Part IV of the Act provides the requirements for the operation of foreign vehicles on Zimbabwean roads. Requirements include the provision of a foreign license. Part V includes the provisions for the inspection of vehicles and the issuance of a certificate of fitness for vehicles.</p> <p>The provisions of this Act have been considered in the ESMPs.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
	Road Traffic Act (Chapter 13:11)	<p>Part II of this Act includes the provisions for the licensing of drivers of motor vehicles and the requirements for licenses (age limits, medical examinations, etc.). The Act stipulates that no person shall drive a motor vehicle on a road unless he is the holder of a valid licence issued to him in respect of motor vehicles of the class concerned, and complies with the conditions, if any, subject to which the licence was issued. Section 7 of the Act provides the minimum and maximum age limits associated with driving of vehicles on roads.</p> <p>Part III makes provision for the issuing of international driving permits. Section 17 states that any person who is an ordinarily resident in Zimbabwe; and the holder of a driver's licence or foreign drivers licence and who wishes to drive a motor vehicle outside Zimbabwe, must apply for an international driving permit.</p> <p>Part IV through to V (and VA) includes the provisions for motor vehicle insurance against third party. Part VI includes the provisions of traffic signs and police directions and the requirements around conformance.</p> <p>The provisions of this Act have been considered in the ESMPs.</p>
Immigration	Immigration Act (Chapter 4:02)	<p>Part III of this Act includes provisions for the entry of persons to Zimbabwe (<i>viz.</i> compliance with the directions of immigration officers, travel document requirements, entry refusals, etc.). Part V of the Act includes the provisions for departure from Zimbabwe.</p> <p>These provisions have been considered in the ESMPs.</p>
Access Control	Protected Place and Areas Act (Chapter 11:12)	<p>This Act includes the provisions for the control of entry of persons into certain places, for the protection of the premises. The control of access to work areas associated with the BGHES will be undertaken in accordance with the provisions/requirements in this Act.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Cultural and Heritage	National Museums and Monuments Act (Chapter 25:11)	<p>Makes provision for the preservation of ancient, historical and natural monuments, relics and other objects of historical or scientific value or interest. Section 21 of the Act requires that the appropriate board be notified of any ancient monument or relic. Moreover, Section 24 states that no person may excavate any ancient monument or national monument without obtaining written permission from the appropriate Board.</p> <p>The ESMPs include a chance find procedure, which requires the notification of the Trustees of the National Museums and Monuments (“the Board”) upon discovery of any ancient monument or relic, and that no excavation, alteration, or removal of monuments takes place without written consent of the Board.</p>
	Labour Act (Chapter 28:01) as amended by Labour Act (Chapter 28:01) amended 2006 and the Labour Amendment Act (Act 7 of 2005)	<p>An Act to declare and define the fundamental rights of employees. Part II (Sections 4 to 7) provides the fundamental rights of employees, including entitlement to be a member of a trade union, protection against discrimination, the right to fair labour standards and the right to a democratic workplace.</p> <p>Part III of the Act provides provisions safeguarding employees to unfair labour practices and Part IV provides the general conditions of employment (<i>viz.</i> dismissal, retrenchment, wages, sick leave, death, maternity leave etc.).</p> <p>The ESMPs make provision for the rights of employees.</p>
Employment	Indigenisation and Economic Empowerment Act [Chapter 14:33]	<p>Indigenous Zimbabweans can be defined as any person who, before the 18th April, 1980, was disadvantaged by unfair discrimination on the grounds of his or her race, and any descendant of such person, and includes any company, association, syndicate or partnership of which indigenous Zimbabweans form the majority of the members or hold the controlling interest. Indigenisation is a deliberate involvement of indigenous Zimbabweans in the economic activities of the country, to which hitherto they had no access, so as to ensure the equitable ownership of the nation’s resources.</p> <p>The BGHES will need to subscribe to the requirements of this Act. Requirements included in this Act have been considered in the ESMPs.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Land issues	Communal Land Act (Chapter 20:04)	The ESMPs recognise communal land including water use rights and makes provision for due compensation to be given to affected parties.
	Rural District Councils Act of 1989 (Chapter 29:13)	The ESMPs include the obligation to adhere to the By-laws developed by Rural District Councils.
	Regional Town and Country Planning Act (Chapter 29:12)	The ESMPs include mitigation measures to manage the impact upon any land, which is designated as a park, wildlife and/ or forest lands.
	Traditional Leaders Act (Chapter 29:17)	The ESMPs have considered whether any traditional communities will be impacted by project related activities and the roles of these traditional leaders have been acknowledged through the consultation process.
	Rural Land Act (Chapter 20:18)	The ESMPs include provisions for development and implementation of a RAP, which should take into account the provisions of this Act.
	Rural Land Occupiers (Chapter 20:26) (Protection from Eviction) Act of 2002	
Energy	Electricity Act (Chapter 13:19)	This Act includes licensing provisions relating to the generation, transmission, distribution and supply of electricity. The licensing process is beyond the scope of the ESMPs.
	Energy Regulatory Act (Chapter 13:23)	This Act includes licensing provisions relating to the generation, transmission, distribution and supply of electricity. The licensing process is beyond the scope of the ESMPs.
Mining	Mines and Minerals Act of 1961 (Chapter 21:05)	The ESMPs include measures associated with quarrying that are in line with the requirements of this Act. Please note that such activities will require licenses; however, the associated process is beyond the scope of the ESMPs.

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
	Environmental Management (Environmental Impact Assessments and Ecosystems Protection) Regulations (S.I. No. 7 of 2007) of the Environmental Management Act of 2002	The Environmental and Social Impact Assessment should consider the potential extraction, possession, transportation of sand and clay deposits; and the potential for activities to result in veld fires or the degradation of wetlands and/ or public streams. The Environmental and Social Management Plan needs to include provisions to manage impact related hereto. Please note that the extraction, possession, transportation of sand and clay deposits for commercial purposes will require a license. The licensing process is beyond the scope of the ESMPs.
Tourism	Tourism Act (Chapter 14:20)	The ESMPs include measures for the management of impacts to the tourism industry as far as is reasonably possible.

3.3 INTERNATIONAL GUIDELINES AND STANDARDS APPLICABLE TO THIS ESMP

Table 3.3 International Guidelines and Standards Applicable to this ESMP

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
WORLD BANK GROUP ENVIRONMENTAL AND SOCIAL SAFEGUARD POLICIES		
General Environmental Management	ESS1 Assessment and Management of Environmental and Social Risks and Impacts	This ESS amongst other requirements requires that environmental assessments prevent, minimise, mitigate, or compensate for adverse environmental impacts and enhance positive impacts, and that it must include a process of mitigating and managing adverse environmental impacts throughout project implementation. The ESMPs have been prepared to cover the activities associated with the BGHES. The purpose of the ESMPs are to outline appropriate management strategies and actions in order to meet acceptable levels of environmental and social performance for the proposed Project.

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Resettlement	ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	<p>Triggered in situations involving involuntary taking of land and involuntary restrictions of access to legally designated parks and protected areas. The policy aims to avoid involuntary resettlement to the extent feasible, or to minimise and mitigate its adverse social and economic impacts.</p> <p>The policy also promotes participation of displaced people in resettlement planning and implementation, and its key economic objective is to assist displaced persons in their efforts to improve or at least restore their incomes and standards of living after displacement. The policy also prescribes compensation and other resettlement measures to achieve its objectives and requires that borrowers prepare adequate resettlement planning instruments prior to Bank appraisal of proposed projects.</p> <p>The ESMPs include actions necessary to satisfy resettlement requirements. Such actions will include the drafting of RAPs to guide the entire resettlement process.</p>
Cultural Heritage	ESS8: Cultural Heritage	<p>Addresses physical cultural resources, which are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above or below ground, or under water. Their cultural interest may be at the local, provincial or national level, or within the international community. Any project involving significant excavations, demolition, movement of earth, flooding, or other environmental changes are to take cognisance of this Standard in the EA.</p> <p>This ESS has been considered in the ESMPs.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Biodiversity	ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	<p>Recognizes that protection and conservation of biodiversity and sustainably managing living natural resources are fundamental to sustainable development and it recognizes the importance of maintaining core ecological functions of habitats, including forests, and the biodiversity they support. ESS6 also addresses sustainable management of primary production and harvesting of living natural resources, and recognizes the need to consider the livelihood of project-affected parties, including Indigenous Peoples, who's access to, or use of, biodiversity or living natural resources may be affected by a project.</p> <p>The ESIA's have considered all protected area and areas of ecological significance. The ESMPs include provisions on how to conduct activities in a manner that will least impact upon such areas as far as is reasonably possible.</p>
Dam Safety	World Bank Group Operational Policies - Operational Procedure (OP) 4.37: Safety of Dams	<p>This OP requires that experienced and competent professionals design and supervise construction, and that the borrower adopts and implements dam safety measures through the project cycle.</p> <p>Aspects of dam safety have been considered in the ESMPs.</p>
International Waterways	World Bank Group Operational Policies - Operational Procedure (OP) 7.50: Projects on International Waterways	<p>This OP applies to any river or body of surface water that flows through two or more states, whether these states are World Bank members or not.</p> <p>OP 7.50 is triggered by the BGHES and according to the ZRA notification has been made in accordance with provisions of Southern African Development Community (SADC) Protocol / Zambezi Watercourse Commission (ZAMCOM) Agreement and meeting the requirements of OP 7.50.</p>
INTERNATIONAL FINANCE CORPORATION (IFC) PERFORMANCE STANDARDS AND GUIDELINES		
Management of Social and Environmental Risks	Performance Standard (PS) 1 - Assessment and Management of Environmental and Social Risks and Impacts	<p>This PS underscores the importance of managing social and environmental performance throughout the life of a project (any business activity that is subject to assessment and management).</p> <p>The ESMPs have been prepared to cover the activities associated with the BGHES. The purpose of the ESMPs are to outline appropriate management strategies and actions in order to meet acceptable levels of environmental and social performance for the proposed Project.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Worker Health and Safety	Performance Standard (PS) 2 - Labour and Working Conditions	<p>This PS recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers.</p> <p>This PS has been considered in the ESMPs.</p>
	IFC General EHS Guideline 2. Occupational Health and Safety	<p>Provides guidelines on occupational health and safety related matters including:</p> <ul style="list-style-type: none"> • General Facility Design and Operation • Communication and Training • Physical Hazards • Chemical Hazards • Biological Hazards • Radiological Hazards • Personal Protective Equipment (PPE) • Special Hazard Environments • Monitoring <p>These guidelines have been considered in the ESMPs.</p>
	IFC General EHS Guidelines 4. Construction and Decommissioning	<p>Provides a guideline (4.1) on occupational health and safety matters related to construction and decommissioning activities. This has been considered in the ESMPs.</p>
Pollution Prevention	Performance Standard (PS) 3 - Resource Efficiency and Pollution Prevention Performance Standard	<p>This PS recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels.</p> <p>The provisions included in this PS have been considered in the ESMPs.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
	IFC General EHS Guideline 1. Environmental	<p>Provides guidelines on environmental conservation matters including:</p> <ul style="list-style-type: none"> • Air Emissions and Ambient Air Quality • Energy Conservation • Wastewater and Ambient Water Quality • Water Conservation • Hazardous Materials Management • Waste Management • Noise • Contaminated Land <p>These guidelines have been considered where relevant in the ESMPs.</p>
Community Health and Safety	Performance Standard (PS) 4 - Community Health, Safety and Security	<p>This PS recognizes that project activities, equipment, and infrastructure often bring benefits to communities including employment, services, and opportunities for economic development.</p> <p>The provisions included in this PS have been considered in the ESMPs.</p>
	IFC General EHS Guideline 3. Community Health and Safety	<p>Provides guidelines on community health and safety matters including:</p> <ul style="list-style-type: none"> • Water Quality and Availability • Structural Safety of Project Infrastructure • Life and Fire Safety (L&FS) • Traffic Safety • Transport of Hazardous Materials • Disease Prevention • Emergency Preparedness and Response <p>These EHS guidelines address aspects of project activities taking place outside of the traditional project boundaries and deal with communal issues (amongst others) around water quality and availability, traffic safety, transport of hazardous chemicals, disease prevention and emergency preparedness and response.</p> <p>These guidelines have been considered where relevant in the ESMPs.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Air Quality	IFC Environmental, Health and Safety (EHS) Guidelines - 1.1 Environmental Air Emissions and Ambient Air Quality	<p>Includes the general principles of assessing impacts to air quality. In addition to the air quality standards set out, emission limits and guidelines for specific technologies and operations are also specified.</p> <p>The guidelines included in this EHS Guideline have been considered in the ESMPs.</p>
Water	IFC Environmental, Health and Safety (EHS) Guidelines - 1.3 Wastewater and Ambient Water Quality	<p>This EHS guideline specifies that discharges should not result in contaminant concentrations in excess of local ambient water quality criteria or, in the absence of local criteria, other sources of ambient water quality.</p> <p>Water quality management measures have been provided in the ESMPs.</p>
Noise	IFC Environmental, Health and Safety (EHS) Guidelines - 1.7 Noise	<p>This is an internationally recognised guideline document containing information for the assessment and management of noise. It also presents noise level criterion values applicable to sites such as the proposed Project. The guidelines make reference to noise from facilities and stationary noise sources, and are commonly applied as design standards for industrial facilities, and whilst this may imply they relate to some threshold of noise effects in a general sense, the IFC has indicated that they are not directly applicable to transport or mobile noise sources. Measurements are to be taken at noise receptors located outside the project property boundary.</p> <p>The guidelines included in this EHS Guideline have been considered in the ESMPs.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Resettlement	Performance Standard (PS) 5 - Land Acquisition and Involuntary Resettlement outlines that involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or means of livelihood) as a result of project-related land acquisition	<p>The stated purposes of this standard are:</p> <ul style="list-style-type: none"> • To avoid, and when avoidance is not possible, minimize displacement by exploring alternative project designs. • To avoid forced eviction. • To anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost⁴ and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected. • To improve, or restore, the livelihoods and standards of living of displaced persons. • To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites. <p>The ESMPs recognize the need for Project specific RAP(s) to address resettlement mitigation.</p>
Biodiversity Conservation	Performance Standard (PS) 6 - Biodiversity Conservation and Sustainable Management of Living Natural Resources	<p>This PS recognizes that protecting and conserving biodiversity (the variety of life in all its forms, including genetic, species and ecosystem diversity) and its ability to change and evolve, is fundamental to sustainable development.</p> <p>The provisions included in this PS have been considered in the ESMPs.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Indigenous People	<p>Performance Standard (PS) 7 Indigenous Peoples recognizes that Indigenous Peoples, as social groups with identities that are distinct from dominant groups in national societies, are often among the most marginalized and vulnerable segments of the population.</p>	<p>This Performance Standard applies to communities or groups of Indigenous Peoples who maintain a collective attachment, i.e., whose identity as a group or community is linked to distinct habitats or ancestral territories and the natural resources therein. It may also apply to communities or groups that have lost collective attachment to distinct habitats or ancestral territories in the project area, occurring within the concerned group members' lifetime, because of forced severance, conflict, government resettlement programs, dispossession of their lands, natural disasters, or incorporation of such territories into an urban area.</p> <p>Indigenous people may be impacted on as a result of the project if they are likely to be affected by physical or economic displacement. This will be ascertained further upon the commencement of the RAP.</p> <p>Stakeholder consultation to date has been sensitive to the vulnerability of the affected communities and the requirements of PS7 will be carried forward into the RAP(s).</p> <p>The IFC Guide to Human Rights Impact Assessment and Management will also require consideration if there is an impact on Indigenous People.</p>
Heritage	<p>Performance Standard (PS) 8 - Cultural Heritage</p>	<p>This PS recognises the importance of cultural heritage for current and future generations.</p> <p>The ESIA undertaken included a specialist cultural heritage surveys in Zambia and Zimbabwe. The ESMPs include actions necessary to ensure the safeguarding of all cultural heritage potentially impacted by project activities.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
AFRICAN DEVELOPMENT BANK GROUP'S INTEGRATED SAFEGUARD SYSTEM AND OPERATIONAL SAFEGUARDS		
Environmental and Social Assessment	African Development Bank Operational Safeguard (OS) 1 – Environmental and Social Assessment	<p>This OS provides mainstream environmental and social considerations. An objective of this OS is to avoid or, if avoidance is not possible, minimise, mitigate and compensate for adverse impacts on the environment and on affected communities.</p> <p>The ESMPs have been prepared to cover the activities associated with the BGHES and includes measures associated with post-construction revegetation and construction. The purpose of the ESMPs are to outline appropriate management strategies and actions in order to meet acceptable levels of environmental and social performance for the proposed Project.</p>
Resettlement	African Development Bank Operational Safeguard (OS) 2 – Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation	<p>It relates to Bank-financed projects that cause the involuntary resettlement of people. It seeks to ensure that when people must be displaced they are treated fairly, equitably, and in a socially and culturally sensitive manner; that they receive compensation and resettlement assistance so that their standards of living, income-earning capacity, production levels and overall means of livelihood are improved; and that they share in the benefits of the project that involves their resettlement.</p> <p>The ESMPs recognize the need for Project specific RAP(s) to address resettlement mitigation.</p>
Biodiversity	African Development Bank Operational Safeguard (OS) 3 – Biodiversity, Renewable Resources and Ecosystem Services	<p>This OS outlines the requirements for borrowers or clients to (i) identify and implement opportunities to conserve and sustainably use biodiversity and natural habitats, and (ii) observe, implement, and respond to requirements for the conservation and sustainable management of priority ecosystem services.</p> <p>The protection of biodiversity has been considered in the ESMPs.</p>
Pollution Prevention and Control	African Development Bank Operational Safeguard (OS) 4 – Pollution Prevention and Control, Hazardous Materials and Resource Efficiency	<p>This OS outlines the main pollution prevention and control requirements for borrowers or clients to achieve high-quality environmental performance, and efficient and sustainable use of natural resources, over the life of a project. More specifically, the OS outlines requirements for borrowers to reduce pollutants resulting from the project – including hazardous and non-hazardous waste – so that they do not pose harmful risks to human health and the environment.</p> <p>The provisions included in this OS have been considered in the ESMPs.</p>

Aspect	Legislation, Standard and/or Guideline Document	Applicability to the Batoka Gorge Hydro- Power Project ESMP
Labour Health and Safety	African Development Bank Operational Safeguard (OS) 5 - Labour Conditions, Health and Safety	<p>This OS outlines the main requirements for borrowers or clients to protect the rights of workers and provide for their basic needs.</p> <p>The provisions included in this OS have been considered in the ESMPs.</p>
OTHER		
	The Southern African Power Pool (SAPP) Environmental and Social Impact Assessment Guidelines for Hydroelectric Projects and Transmission Infrastructure in the SAPP region	<p>The guidelines provide further guidance on the ESIA process to be undertaken, specifically regarding the components and format of an ESIA, and the stakeholder engagement required to be undertaken.</p> <p>These guidelines have been considered in the ESMPs.</p>
	International Hydropower Association's (IHA) Sustainability Guidelines (SGs)	<p>The IHA Sustainability Guidelines promote greater consideration of environment, social, and economic sustainability in the assessment of new hydropower projects to assist with the evaluation and management of often competing environmental, social and economic issues that arise in the assessment, operation and management of hydropower projects. The Sustainability Guidelines suggest a number of environmental and social strategies to optimise environmental and social outcomes for Hydropower Schemes.</p> <p>These guidelines have been considered in the ESMPs.</p>

3.4 PROJECT STANDARDS

3.4.1 Introduction

Where applicable, the national legislative requirements for Zambia and Zimbabwe & international guidelines and standards are considered in this ESMP; however, of particular importance to this ESMP are the Project standards for water quality; air quality and noise. These are discussed in more detail below.

3.4.2 Water Quality

Zambia

IFC EHS Guideline 1.3 specifies that discharges should not result in contaminant concentrations in excess of local ambient water quality criteria or, in the absence of local criteria, other sources of ambient water quality. Receiving water use and assimilative capacity, taking other sources of discharges to the receiving water into consideration, should also influence the acceptable pollution loadings and effluent discharge quality.

As Zambia has water quality criteria / standards for effluent discharge into environment, these have been used.

Sections 23, 34 and 96 of the Zambian Water Pollution Control (Effluent and Waste Water) Regulations (S.I. No. 133 of 1996) states that all permitted effluent discharges into the natural environment will need to conform to the conditions and standards for chemical and physical parameters contained in *Table 3.4*.

Table 3.4 Standards (Limits) for Effluent Discharge into the Natural Environment

No.	Parameter	Concentration (as mg/l)	Note
Physical Parameters			
1	Temperature (at point of entry)	40 °C	-
2	Colour	20 hazen units	-
3	Odour and taste	-	Must not cause any deterioration in taste or odour as compared with natural state.
4	Turbidity (Nephelometer turbidity units scale)	15	-
5	Total suspended solids	100	Must not cause formation of sludge or scum in receiving water.
6	Settleable matter	0.5	Sedimentation in two hours (Imhoff funnel). Must not cause formation of sludge in receiving water.
7	Total dissolved solids	3,000	Evaporation < 105 °C and gravimetric method. The TDS of wastewater must not adversely affect surface.
8	Conductivity	4,300 US/electronic method	-
Bacteriological			
9	Total coliform/100 ml	25,000	Membrane filtration method

No.	Parameter	Concentration (as mg/l)	Note
10	Faecal coliform/100 ml	5,000	
11	Algae/100 ml	1,000 cells	-
Chemical			
12	pH	6.0 - 9.0	0-14 scale (electrometric method)
13	Dissolved oxygen	5	Using modified winkler method and membrane electrode method. Note, after complete mixing extreme temperature may result in lower values.
14	Chemical oxygen demand (COD)	-	-
15	Biochemical oxygen demand (BOD)	50	Using modified winkler method and membrane electrode method. Mean value over a 24-hour period.
16	Nitrates NO ₃ as nitrogen	> 50 in water courses and > 20 in lakes	Using a spectrometric method and electrometric method. The nitrates burden must be reduced as far as possible according to circumstances.
17	Nitrite NO ₂ as nitrogen	2.0	-
18	Organic nitrogen	5.0	The % of nutrient elements for degradation of BOD should be 0.4-1% for phosphorous. Different for processes for using algae.
19	Ammonia and ammonium	10	Using the nesslerization method and electrometric method. The concentration is dependent on temperature, pH and salinity.
20	Cyanides	0.2	Using the spectrophotometric method.
21	Phosphorous (total) (P ₀₄ as P/L)	1.0 to 6.0	Using the colorimetric method. In the catchment area of lakes: 1.0 mg/L; located outside the catchment area: reduce the load of P as low as possible (P ₀₄ =6 mg/L)
22	Sulphates	1,500	Using the turbidimetric method.
23	Sulfite	1.0	Using the iodometric method. Note that presence of Oxygen Changes S ₀₃ to S ₀₄ .
24	Sulphide	0.1	Using the iodometric and electrometric method. Note that concentration is dependent on temperature, pH and dissolved O ₂ .
25	Chlorides (silver nitrates and mercuric nitrate)	800	-
26	Active chloride	0.5	Using the iodometric method.
27	Active bromine	0.1	-
28	Fluorides	2.0	Using the electrometric method and colorimetric method with distillation.
Metals			
29	Aluminium compounds	2.5	Using the atomic absorption method.
30	Antimony	0.05	
31	Arsenic compounds	0.5	
32	Barium compounds (water soluble concentration)	0.5	
33	Beryllium salts and compounds	0.5	
34	Boron compounds	0.5	
35	Cadmium compounds	0.5	Using the atomic absorption method.
36	Chromium Hexavalent, trivalent	0.1	

No.	Parameter	Concentration (as mg/l)	Note
37	Cobalt compounds	1.0	
38	Copper compounds	1.5	
39	Iron compounds	2.0	
40	Lead compounds	0.5	
41	Magnesium	500	Using the atomic absorption method and flame photometric method.
42	Manganese	1.0	Using the atomic absorption method.
43	Mercury	0.002	
44	Molybdenum	5.0	
45	Nickel	0.5	
46	Selenium	0.02	
47	Silver	0.1	
48	Thallium	0.5	
49	Tin compounds	2.0	
50	Vanadium compounds	1.0	
51	Zinc compounds	10.0	
Organics			
52	Total hydrocarbons	10.0	Using the chromatographic method.
53	Oils (mineral and crude)	5.0	Using the chromatographic method and gravimetric method.
54	Phenols (steam distillable)	0.2	Using the colorimetric method.
	Phenols (non-steam distilled)	0.05	
55	Fats and saponifiable oils	20.0	Gravimetric method and chromatographic method
56	Detergents (atomic)	2.0	Using the atomic absorption spectrophotometric method. Detergents should contain at least biodegradable compounds.
57	Pesticides and PCB's (total)	0.5	Using the chromatographic method.
58	Trihaloforms	0.5	
Radioactive Materials			
	Radioactive materials as specified by the international atomic energy agency	No discharge permitted	-

Zimbabwe

Sections 57 to 59 of the Environmental Management Act (Chapter 20:27), (No. 13 of 2002) states that environmental quality standards need to be established for water pollution. No reference to water quality standards could be sourced and it appears as if these do not yet exist.

The IFC EHS Guideline 1.3 states that in the absence of local ambient water quality criteria, other sources of ambient water quality will apply. As Zambia has water quality criteria / standards for effluent discharge into environment, these will be adopted as the effluent discharge standards for the BGHES in Zimbabwe.

3.4.3

Air Quality

Zambia

The IFC recommend that the air quality guidelines as set out by the World Health Organisation (WHO) be utilised in such an assessment. The WHO standards are divided into a number of stages, which have interim targets and a final guideline target. The WHO guidelines are recognised to be particularly conservative, as they make no consideration of the economic burden of achieving the stipulated guidelines. The WHO final guideline target is aspirational, and as such, this target should be progressively worked towards.

As such, in the majority of cases, the IFC EHS General Guidelines are substantially more stringent than the Zambian Air Quality Standards.

On the basis of the above, and using a pragmatic approach, the Zambian Air Quality Standards have been used. Section 37, 46 and 96 of Air Pollution Control (Licensing and Emission Standards) Regulations (S.I. No. 141 of 1996) states that industrial or business activities undertaken by an operator shall be within the limits presented in *Table 3.5*. These limits strive to safeguard the general health, safety or welfare of persons, animal life, plant life or property affected by the works, industrial or business activities.

Table 3.5 *Table of Guideline Limits for Ambient Air at Source*

Parameter	Reference Time		Guideline Limit
Sulphur Dioxide (SO₂)	10 minutes		500 µg/m ³
	1 hour		350 µg/m ³
Sulphur Dioxide (SO₂) in combination with total suspended particles (TSP) ^{*1} and (PM ₁₀)	SO ₂	24 hours	125 µg/m ³
		6 months	50 µg/m ³
	TSP	24 hours	120 µg/m ³
		6 months	50 µg/m ³
	PM ₁₀	24 hours	70 µg/m ³
Respirable Particulate Matter (PM₁₀^{*2})	PM ₁₀	24 hours	70 µg/m ³
Oxides of Nitrogen (NO_x)	1 hour		400 µg/m ³
	24 hours		150 µg/m ³
Carbon Monoxide (CO)	15 minutes		100 µg/m ³
	30 minutes		60 µg/m ³
	1 hour		30 µg/m ³
	8 hours		10 µg/m ³
Ambient Lead (Pb)	3 months		1.5 µg/m ³
	12 months		1.0 µg/m ³
Dust Fall	30 days		7.5 tonnes /km ²

*1. Total suspended particles (TSP) are particles with diameter less than 45 micrometers (mm).

*2. Respirable particles (PM₁₀) are particles with diameter less than 10 micrometers (mm). These can penetrate to the ancilliated regions of the deep lung.

Note: Reference time are the 98th percentile averaging times.

Zimbabwe

The Zimbabwean Standards and Enforcement Committee of the EMA are in the process of drafting Air Quality and Emission Standards (draft number EN 005 - D977/2) of the Environmental Management Act of 2002. These have not been enacted.

In the absence of specific national air quality standards, the IFC recommended air quality guidelines as set out by the World Health Organisation (WHO) will be used. The WHO standards are divided into a number of stages, which have interim targets and a final guideline target (refer to Table 3.6).

Table 3.6 IFC/WHO Air Quality Guidelines at Source

IFC EHS General Guidelines		
Pollutant	Averaging period	Criterion ($\mu\text{g}/\text{m}^3$)
SO ₂	annual mean	40
SO ₂	24 hour maximum	125 (Interim target 1) 50 (Interim target 2) 20 (Guideline)
SO ₂	10 minute maximum	500 (Guideline)
NO ₂	annual mean	40 (Guideline)
NO ₂	1 hour maximum	200 (Guideline)
PM ₁₀	annual mean	70 (Interim target 1) 50 (Interim target 2) 30 (Interim target 3) 20 (Guideline)
PM ₁₀	24 hour maximum	150 (Interim target 1) 100 (Interim target 2) 75 (Interim target 3) 50 (Guideline)
PM _{2.5}	annual mean	35 (Interim target 1) 25 (Interim target 1) 15 (Interim target 3) 10 (Guideline)
PM _{2.5}	24 hour maximum	75 (Interim target 1) 50 (Interim target 2) 37.5 (Interim target 3) 25 (Guideline)

3.4.4

Noise

Zambia

Section 68 of Division 6 (Part IV) of the Zambian Environmental Management Act (No. 12 of 2011) states that no person shall emit noise in excess of the noise emission standards established. To ERM's knowledge, there are no noise standards yet; accordingly, the World Health Organisation, World Bank or donor country standards apply.

Accordingly, with reference to the IFC and World Bank Guidelines, noise emissions should not exceed the limits presented in *Table 3.7* at the nearest Noise Sensitive receptor (NSR) locations offsite. In addition to the absolute

values provided in *Table 3.7*, the IFC also requires that noise increase above existing (background) levels should not exceed 3 dB.

Table 3.7 *IFC Noise Level Guidelines*

Receptor	One Hour L _{Aeq} (dB(A))	
	Daytime (07:00 - 22:00)	Night (22:00 - 07:00)
Residential; institutional; educational	55	45
Industrial; commercial	70	70

L_{Aeq} = A-weighted equivalent sound levels over a measurement period, dB(A) = A-weighted decibel

Zimbabwe

Sections 79 to 81 in Part IX of the Environmental Management Act (Chapter 20:27) (No. 13 of 2002) provide requirements around noise management. More specifically, the Act mentions the need for standards to be established for the emissions of noise and vibration pollution. No reference to noise standards could be sourced and it appears as if these do not yet exist.

In the absence of specific national noise standards, the IFC and World Bank Guidelines standards included for Zambia will apply (refer to *Table 3.7*).

4.1 SCOPE

This *Chapter* details the required mitigation measures, and is prescriptive, identifying specific people or organisations to undertake specific tasks in order to ensure that impacts on the receiving biophysical and socio-economic environments are minimised during the operation of the BGHES. This OESMP is applicable to all work activities during the operational phase. It is a dynamic document implying that information gained during pre-construction, site establishment and the construction works including monitoring of the BGHES could lead to changes in this OESMP.

4.2 ACTIVITIES TO BE UNDERTAKEN DURING THE OPERATIONAL PHASE OF THE PROJECT

The following activities are proposed during the Operational Phase of the Project:

4.2.1 *Operation of the Dam following Inundation*

- Water intake into the powerhouses;
- Power generation via turbine and generator operation;
- Environmental flow releases into the river if required in addition to releases from the powerhouses;
- Management of sedimentation in the dam;
- Management of eutrophication in the dam;
- Modifying the Full Supply Level during the low flow season; and
- Ongoing monitoring for dam failure.

4.2.2 *Operation of the Permanent Townships*

- Operation and maintenance of facilities – police, customs, health, education, utilities, post office and local government;
- Provision of accommodation;
- Road maintenance; and
- Waste collection.

4.2.3 *Community Development Initiatives*

- These remain to be decided on as per detailed in the CESMP.

4.2.4 *Use of Roads*

- Cross border movements via border crossing associated with the BGHES;
- Road usage by operations staff and general public;

- Dust abatement when required; and
- Noise abatement as required.

4.2.5 *Transmission of Power*

- Operation and maintenance of powerhouses and switchyards.

4.2.6 *Transmission Line Maintenance*

- Maintenance of vegetation and access road; and
- Line repairs where required.

4.2.7 *Unforeseen Events*

- Traffic incidents;
- Dam wall failure;
- Water contamination; and
- Flooding.

Standard Operating Procedures (SOPs) will be required for the Operational Phase of the Project. These are detailed instructions to achieve uniformity in operational activities.

4.3 *POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS*

The Project activities included in *Section 4.2* have the potential to result in the following environmental and social impacts:

Biophysical Impacts

- Impacts upstream of the BGHES (specifically to rafting activities and the Victoria Falls Power Station)
- Impacts to reservoir water quality (which could in turn have a detrimental impact on ecological habitats, fisheries and other water users in the area)
- Impacts to downstream river conditions (associated with potential changes to the natural flow regimes)
- Impacts on the BGHES related to changing upstream conditions (climate change effects and upstream water abstractions)
- Impacts to seismicity as a result of the proposed BGHES.
- Impacts to avifaunal communities
- Alterations to fish communities and their utilisation
- Impacts to crocodiles and other aquatic fauna
- Habitat degradation resulting from altered flow regimes
- Eutrophication and associated floating aquatic weed infestation
- Impacts to fauna through road kills and/or indiscriminate killings
- Habitat degradation resulting from increased access and human influx

Social Impacts

- Impacts associated with displacement (fishing activities and downstream river users).
- Positive economic benefits for the national economy.
- Social benefits resulting from local employment opportunities.
- Negative economic impacts associated with displacement of river / non-river based tourism activities and regional impacts to Victoria Falls and Livingstone.
- Impacts associated with unmet expectations
- Impacts related to in-migration
- Health and safety impacts (increased incidence of communicable diseases; increased incidence of malaria and other vector borne diseases; increased risk of traffic accidents; disturbance due to dust and noise; impact to community security; and worker health and safety)
- Changes to socio-cultural heritage and heritage resources due to destruction or disturbance to sites of heritage value and impacts to living cultural heritage.

4.4

MANAGEMENT SPECIFICATIONS

Table 4.1 presents the management specifications for the operational phase of the Project. These specifications address the following requirements:

- Aspect (i.e. – what is being managed)
- Activity generating impact;
- Mitigation/management action;
- Measure of effectiveness;
- Responsibility for implementing action;
- Frequency of management; and
- Reporting requirements.

Further to this, requirements for monitoring and performance assessment are detailed in *Chapter 5*.

The mitigation / management actions are presented on the basis of the current Project description and understanding of proposed Project activities. Given that the Project is currently in the pre-feasibility stage, it is envisaged that this OESMP will require updating prior to the commencement of the operational phase of the BGHES and following the feasibility and detailed design phase of the Project. Regulatory authorities in Zimbabwe and Zambia will need to be notified of the updates as and when they occur together with their content.

Table 4.1 Operational Management Specifications

Aspect	Activity	No.	Mitigation/Management Action	Measure of Effectiveness	Responsibility	Frequency	Reporting Requirements
Environmental Management	Appointment of a SHEQ Manager	1.	An external, qualified and competent SHEQ Manager must be appointed with sufficient authorisation to ensure protection of the environment is prioritised. He/she must ensure that mitigation listed in this OESMP is implemented to minimise environmental impacts.	SHEQ Manager Appointment	Operator	Prior to the commencement of the operation phase	Noted in audit reports when relevant
Surface water	General	2.	All drainage channels, flow control structures and culverts will be maintained and, where necessary, upgraded to be able to withstand flood events based upon international best practices.	Method statement	Operator	Throughout operation	Noted in audit reports when relevant
		3.	The Operator will periodically inspect road drainage systems, maintain these, clear them of debris and design flood calculations will be checked and re-assessed if visual evidence suggests that peak flows may have been underestimated.	Record of findings	Operator	Throughout operation	Noted in audit reports when relevant
		4.	Stormwater infrastructure supporting road infrastructure will be regularly maintained and, where necessary, upgraded to avoid the transport of contaminants and sedimentation into aquatic systems.	Detailed project planning designs; Site audit reports	Operator/ SHEQ Manager	Throughout operation	Noted in audit reports when relevant
BGHES reservoir management	Pollution control	5.	Pollution sources upstream of the BGHES reservoir in Livingstone and Victoria Falls will be minimised and controlled wherever possible. Work with local government to initiate and promote a formal waste oil collection and recycling programme for the tourism and industrial sectors in both urban centres.	Water quality monitoring results	Operator/SHEQ Manager	Throughout operation	Noted in audit reports when relevant
	Filling and flushing of the reservoir	6.	There will be a gradual filling together with extensive flushing of the reservoir to reduce the quantities of vegetation flooded at any one time and slow the release of nutrients into the water. Subsequent to flooding, floating vegetation (e.g. water hyacinth) will be cleared during the first few years of reservoir formation. Biological control of floating aquatic weeds will need to be implemented.	Water quality monitoring results	Operator/SHEQ Manager	Throughout operation	Noted in audit reports when relevant
	Reservoir water quality	7.	A routine programme of water quality monitoring in the reservoir must be established and implemented.	Water quality monitoring results	Operator/SHEQ Manager	Throughout operation	Noted in audit reports when relevant
	Infrastructure maintenance	8.	An early warning system will be implemented to ensure that should the dam wall be seen to be failing, downstream communities need to be informed so that they can vacate the area of concern. In addition, regular dam safety inspections will be conducted. Piezometers will be installed in the dam wall and a dam failure management plan is in place. Emergency planning and mitigation measures will be developed and implemented should the water level become too high. These will include: <ul style="list-style-type: none"> Emergency pumps to assist the lowering of the water level in the dams. An alternate dam dewatering outlet once a certain threshold limit has been reached to release water into the environment. Protocols surrounding human and machinery not being allowed within certain areas that may be in jeopardy. 	Development of early warning system Non-failure of dam	Operator/SHEQ Manager / Engineer	Throughout operation	Noted in audit reports when relevant
	Reservoir sediment management	9.	The Operator will develop and implement a sediment management method statement as a means to minimise adverse impacts from altered flow regimes. A sediment management method statement would consist of: <ul style="list-style-type: none"> Monitoring sediment in the reservoir, including quantitative and qualitative analysis of sediment to verify properties and pollution levels; Minimising sediment deposition in reservoirs where possible by sluicing or density current venting; Removing accumulated deposits where possible by drawdown flushing (drawing the water level down during high-flow seasons), and excavation of sediments; and Catchment management programmes to reduce sediment inflow to the reservoir where possible as part of a basin-wide plan. 	Sediment management method statement	Operator/SHEQ Manager/Engineer	Throughout operation	Noted in audit reports when relevant

Aspect	Activity	No.	Mitigation/Management Action	Measure of Effectiveness	Responsibility	Frequency	Reporting Requirements																																																																																											
	Operating rules	10.	A detailed survey needs to be carried out during Project design of the pumping station and submersible pump intake levels for the abstractions that occur between the proposed BGHES and the headwaters of Lake Kariba. In the event that these levels fall below the predicted water level corresponding to the final chosen minimum flow condition, compensation (financial or in-kind) will be provided for abstractors to modify their pumping stations accordingly.	Downstream monitoring results for water levels. Compensation agreements if required.	Operator/SHEQ Manager/Engineer/Hydrology Specialist	Throughout operation	Noted in audit reports when relevant																																																																																											
		11.	The proposed BGHES will only operate as a hydro-peaking scheme during the wet season (Feb-Aug) in accordance with the operating rules established by scenario AddPM04 (i.e. - DRY Season (Sep-Jan): Baseline flows; no sediment flushing & WET Season (Feb-Aug): QMin with one 6-hour peak a day). Furthermore, an off peak flow condition will be adopted during the wet season of QMin as per the flow statistics presented below <table border="1"> <thead> <tr> <th></th> <th>Dry</th> <th>Wet</th> <th>Wet</th> <th>Wet</th> <th>Wet</th> <th>Wet</th> <th>Wet/Dry (1)</th> <th>Wet/Dry (2)</th> <th>Dry</th> <th>Dry</th> <th>Dry</th> <th>Dry</th> </tr> <tr> <th></th> <th>Jan</th> <th>Feb</th> <th>Mar</th> <th>Apr</th> <th>May</th> <th>Jun</th> <th>Jul</th> <th>Aug</th> <th>Sep</th> <th>Oct</th> <th>Nov</th> <th>Dec</th> </tr> </thead> <tbody> <tr> <td>Q_{avg} (m³/s)</td> <td>660</td> <td>1130</td> <td>2112</td> <td>2958</td> <td>2545</td> <td>1585</td> <td>814</td> <td>484</td> <td>345</td> <td>264</td> <td>265</td> <td>404</td> </tr> <tr> <td>Q_{min} (m³/s)</td> <td>319</td> <td>443</td> <td>602</td> <td>784</td> <td>871</td> <td>447</td> <td>281</td> <td>220</td> <td>161</td> <td>116</td> <td>118</td> <td>199</td> </tr> <tr> <td>Q5 (m³/s)</td> <td>441</td> <td>628</td> <td>861</td> <td>1122</td> <td>1089</td> <td>637</td> <td>394</td> <td>294</td> <td>218</td> <td>169</td> <td>162</td> <td>261</td> </tr> <tr> <td>Q10 (m³/s)</td> <td>467</td> <td>666</td> <td>893</td> <td>1230</td> <td>1328</td> <td>899</td> <td>468</td> <td>333</td> <td>247</td> <td>179</td> <td>182</td> <td>276</td> </tr> <tr> <td>Q20 (m³/s)</td> <td>503</td> <td>747</td> <td>1048</td> <td>1529</td> <td>1700</td> <td>1158</td> <td>569</td> <td>370</td> <td>265</td> <td>204</td> <td>207</td> <td>308</td> </tr> </tbody> </table> <p>¹ Whether July was treated as dry or wet month depended on the scenario ² Whether August is treated as dry or wet month depended on the scenario.</p>		Dry	Wet	Wet	Wet	Wet	Wet	Wet/Dry (1)	Wet/Dry (2)	Dry	Dry	Dry	Dry		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Q _{avg} (m ³ /s)	660	1130	2112	2958	2545	1585	814	484	345	264	265	404	Q _{min} (m ³ /s)	319	443	602	784	871	447	281	220	161	116	118	199	Q5 (m ³ /s)	441	628	861	1122	1089	637	394	294	218	169	162	261	Q10 (m ³ /s)	467	666	893	1230	1328	899	468	333	247	179	182	276	Q20 (m ³ /s)	503	747	1048	1529	1700	1158	569	370	265	204	207	308	Downstream monitoring results and dam release records	Operator/Engineer/SHEQ Manager	Throughout operation	Noted in audit reports when relevant
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12.	Minimum flow release conditions would still be required during the period of initial reservoir filling following construction. If flows are above the monthly 20th percentile values the surplus will be stored, and the remaining volume of water will be released with no peaking or sediment flushing during the period of initial filling.	Downstream monitoring results and dam release records	Operator/Engineer/SHEQ Manager	Throughout operation	Noted in audit reports when relevant																																																																																													
13.	There will be a gradual (smoothed) transition between wet and dry season minimum flow conditions, using the excess inflow volumes during off-peak hours in the wet season months (i.e. beyond what is needed to replenish the reservoir to FSL each day) to progressively increase minimum flow releases from the reservoir between February and April (i.e. until the peak floods occur and the spillway is fully operational), and thereafter reduce them between May and July.	Downstream monitoring results and dam release records	Operator/Engineer/SHEQ Manager	Throughout operation	Noted in audit reports when relevant																																																																																													
14.	During hydro-peaking, the rate of change of flow releases (the so-called 'ramping rate') will be restricted such that there is a correspondingly gradual change in downstream water levels. The precise rate of change that is achievable for the BGHES would need to be determined during detailed design, and will be dependent on a number of factors including design considerations and equipment specifications. A maximum ramping rate (MRR) of around 250-300 m ³ /hour would equate to a change in river level of approximately 1 m/hour (note - this is within the gorge itself; the rate of change in the wider river valley downstream of the Lower Gorge would be considerably less), which should be gradual enough for river users to respond to.	Downstream monitoring results and dam release records	Operator/Engineer/SHEQ Manager	Throughout operation	Noted in audit reports when relevant																																																																																													
15.	The final MRR applied would also need to be accompanied by the development and routine dissemination to all downstream river users of a 'Dam Flow Release Schedule' that would detail the timing and predicted magnitude of flow and water level effects at various strategic points downstream of the dam. An early warning system will also be considered, particularly for any non-routine flood releases	Downstream monitoring results and dam release records	Operator/Engineer/SHEQ Manager	Throughout operation	Noted in audit reports when relevant																																																																																													
		16.	The Operator will review and where necessary adapt dam operating procedures to mitigate any observed impacts on ecological habitat status from the water and fish monitoring results.	Modified operating procedures	Operator/Engineer/SHEQ Manager/Aquatic Specialist	Throughout operation	Modified SOPs																																																																																											
Biodiversity	General	17.	A Biodiversity Protection Statement is required to guide the conservation of plants and animals during construction, and is to be applicable for all staff and contractors involved in the project. The following activities will be prohibited for ZRA personnel, dam operational staff and contractors within and surrounding the Project Area, both during and outside work hours: <ul style="list-style-type: none"> Any forms of hunting of wildlife by staff and contractors. 	Awareness training records, Biodiversity Protection Statement	Operator/SHEQ Manager	Throughout operation	Noted in audit reports when relevant																																																																																											

Aspect	Activity	No.	Mitigation/Management Action	Measure of Effectiveness	Responsibility	Frequency	Reporting Requirements
			<ul style="list-style-type: none"> • Purchase, sale or transport of any bush meat products or parts of animals (horns, shells, etc.) from local communities or passing traders. • Collection of any animals or animal products for consumption, medicinal or other use. • Camp residents keeping pets, either introduced species such as cats or dogs, or native wildlife. • The intentional killing of any animals including snakes, lizards, birds or other animals. Awareness of the Animal Rescue Method Statement will be promoted as a means of addressing the presence of animals at risk or presenting a risk to the implementation of activities (refer to item 40). • Camp residents purchasing local wildlife or wildlife products for any reason. • Sellers of wildlife must not to be allowed on any of the project sites. Such people should be reported to local authorities or wildlife agencies as appropriate. • Contamination or disposal of waste in the aquatic environments. <p>ZRA must include such information as part of the site induction process so that all workers are aware of these prohibitions, as well as including it in environmentally related information campaigns such as a quarterly newsletter.</p>				
		18.	<p>The Operator will be responsible for the controlled burning of vegetation in the servitude of the transmission lines to prevent wild fire. The Operator must adhere to relevant national burning requirements.</p> <p>No uncontrolled fires will be permitted within the Project area, unless it is part of a management plan</p>	<p>No observed wildfires Reduction in outbreaks of wildfires</p>	Operator/SHEQ Manager	Throughout operation	Noted in audit reports when relevant
	Ongoing management and clearance of flora	19.	The Operator will continue to remove of alien invasive plant species, cultivating native plant species and avoiding vegetation clearance in riparian areas. Flora management measures, as per the Biological Management Method Statement, should not eliminate all flora, leaving barren ground.	<p>Visual observation of flora density Routine inspection</p>	Operator/SHEQ Manager	Throughout operation	Noted in audit reports when relevant
	Wildlife management	20.	<p>ZRA will develop an animal rescue procedure for during the operational phase of the Project and implement this for dealing with faunal species found to be at risk from or posing a threat to Project operations. Such animals will be safely translocated to safe areas of similar habitat type where the animals can be released without harm to Project operations, surrounding communities or harm to that animal.</p> <p>Personnel will be identified and professionally trained to handle dangerous wildlife and venomous snakes, with particular emphasis on species likely to be encountered in and around the Project Area. The Victoria Falls Wildlife Trust currently provide such services but cannot always be readily available in remote areas. Appropriate, collaboration agreements for a similar service will be required on the Zambian side. Key aspects of agreements include:</p> <ul style="list-style-type: none"> • Staff to be provided with training in the safe handling of venomous snakes on site; • Veterinary support will be available on call with contact numbers appropriately advertised and communicated; • Procedures in the event of encountering dangerous fauna will be developed and appropriately disseminated. 	Animal rescue procedure	Operator/SHEQ Manager/Biodiversity Specialist	Throughout operation	Noted in audit reports when relevant
	Poaching prevention	21.	With increased personnel, the likelihood of poaching and trapping will also increase. Measures to prevent poaching will be continuously be investigated and implemented where practical	<p>Poaching Procedure Low to no reported incidence of poaching</p>	Operator/SHEQ Manager/Biodiversity Specialist	Throughout operation	Noted in audit reports when relevant
	Traffic: Roadkill/injury to fauna	22.	<p>Speed limits introduced during the construction phase will continuously be enforced during the operational phase to ensure injury and death to fauna is kept to a minimum. Speed limits for both surfaced and non-surfaced roads must be predetermined as per internal policies and national road traffic standards.</p> <p>Enforcement of the speed limits will be implemented through a disciplinary process/ and or fines system</p>	Visual observations, decrease in road kill accidents	Operator/SHEQ Manager	Throughout operation	Noted in audit reports when relevant
	Management of Alien Species	23.	Areas disturbed by operational activities (i.e. the road servitudes) will be continuously monitored for the presence of alien plant species. Any alien species detected will be removed per the procedures and target level controls included in the Biological Management Method Statement.	<p>Visual observations, photographic records and inspection records</p>	Operator/SHEQ Manager/Biodiversity Specialist	Throughout operation	Noted in audit reports when relevant

Aspect	Activity	No.	Mitigation/Management Action	Measure of Effectiveness	Responsibility	Frequency	Reporting Requirements
	Maintenance of "no go" areas	24.	Within the Project area, no go areas / areas of refuge for faunal species, will continue to be demarcated (Biological Management Method Statement)	Low to no reported access into no go areas	Operator/SHEQ Manager/Biodiversity Specialist	Throughout operation	Noted in audit reports when relevant
	Avifauna and bat electrocutions and collisions	25.	The Operator, along with a biodiversity specialist will enclose/ or cover electrified components where possible. Ensure that visibility enhancing objects have been installed to prevent collision with infrastructure. The Operator will schedule seasonal maintenance of the transmission lines to prevent nesting and breeding on infrastructure. Buoy markers are to be installed on electrified infrastructure to enhance visibility and prevent electrification of avifauna and bats	Low to no bird and bat electrocutions and collisions	Operator/SHEQ Manager/Biodiversity Specialist	Throughout operation	Noted in audit reports when relevant
Ecosystem Services	Livelihood restoration	26.	Capacity will be established in Zambia and Zimbabwe for scientific development and management of the fisheries resource in the Batoka Reservoir. <ul style="list-style-type: none"> Kapenta (<i>Limnothrissa miodon</i>) will be introduced to utilise the pelagic habitat that will be created and replace the diversity of riverine fish species unable to adapt to the changing conditions. Tiger fish (<i>Hydrocynus vittatus</i>) fingerlings will be introduced as insufficient breeding habitat will be available to maintain a stable fish predator-prey relationship. Young eels will be introduced to complement the fish diversity. Fisheries management will be adapted from the lessons learnt on Kariba and applied to the Batoka Reservoir to maximise the productivity of the resource. Regulatory and control mechanisms to prevent overfishing will be developed based on monitoring of fish populations and catch effort	Specialist report on fisheries management	Operator/SHEQ Manager/Aquatic Specialist	Prior to operation and ongoing	Noted in audit reports when relevant
		27.	As part of the livelihood restoration programme, the Operator will provide support to households and / or local enterprises in terms of how they can use the fisheries to support engagement with the tourism trade.	Livelihood Restoration and Improvement Plan; ongoing monitoring, proof of support Livelihood Restoration and Improvement Plan, ongoing monitoring, Proof of support	Operator/Livelihood Specialist	Prior to operation and ongoing	Monitoring defined in the RAP
	Downstream agriculture	28.	Detailed surveys will be undertaken of the agricultural activities downstream so that if there are impacts as a result of flooding, these can be appropriately compensated for. An understanding of the seasonality of the subsistence agricultural activities and harvesting and growing timeframes will need to be developed so as to ensure that the duration of livelihood loss is considered in the calculation of compensation.	Detailed surveys	Operator/Engineer/SHEQ Manager/Livelihood Specialist	Throughout operation	Noted in audit reports when relevant
Social	Economic displacement	29.	The Operator will provide support to the existing lodges located along the Gorge to enable them to embark on a marketing campaign that will attract visitors coming to the area despite the altered landscape and diversify their income stream wherever possible.	Livelihood Restoration and Improvement Plan, ongoing monitoring, Proof of support	Operator/SHEQ Manager	Prior to operation	Noted in audit reports when relevant
		30.	The Operator will assist in developing and promoting new tourism activities in Livingstone and Victoria Falls.	Livelihood Restoration and Improvement Plan, ongoing monitoring, Proof of support	Operator/SHEQ Manager	Prior to operation	Noted in audit reports when relevant
		31.	The operating at the dam will be seasonally adjusted as follows: <ul style="list-style-type: none"> Reduce the dry season (in rafting terms, from August to January) operational level to 730 masl, thereby freeing a reach of river for rafting during this period that extends all the way from the Falls downstream to around rapids 9 and 10, which is the current limit of half-day rafting trips on the river; and Increase the operating level during the high-flow season to 757 masl under normal flow conditions in the river, and to 762 masl under high flow conditions, defined as the flow above which the Victoria Falls Power Station would normally begin to flood, which occurs at an approximate flow rate of 3,000 m³/s. 	Detailed design Records of discussion with stakeholders	Operator/Engineer/SHEQ Manager	Prior to construction and ongoing throughout operation	Detailed design and audit reports
	Transition to operation: Employment	32.	The Operator will establish a worker support program to assist those workers whose employment will be terminated once the construction phase of each component is completed. Provision of support will need to be aligned with the construction schedule.	Records of number of workers assisted	Operator/SHEQ Manager	Established to align with the construction schedule	Noted in audit reports when relevant
	Transition to operation: Staff townships	33.	The Operator will establish a transition/handover plan to integrate staff townships into the local districts where they are located.	Documented meeting minutes and agreements with local authorities	Operator/SHEQ Manager	Established to align with the	Noted in audit reports when relevant

Aspect	Activity	No.	Mitigation/Management Action	Measure of Effectiveness	Responsibility	Frequency	Reporting Requirements
						construction schedule	
	Transition to operation: Community Development	34.	The Operator will review the Community Development Plan for Project areas, with a view to building on the achievements during the construction phase and charting the way forward during operations	Revised CDP	Operator/SHEQ Manager	Revise prior to the operations phase, and revisit annually	Noted in audit reports when relevant
	Power house operation (turbines, generators, cranes etc.):Community Health and Safety	35.	If complaints are received via the grievance mechanism relating to noise and air quality impacts associated with operational infrastructure, then a monitoring programme and mitigation measures will be developed, implemented and reported on.	Noise and/or air quality monitoring programme	Operator/Engineer/SHEQ Manager	Throughout operation	Noted in audit reports when relevant
Solid Waste	Generation and disposal at site	36.	The Operator and SHEQ Manager will be responsible for the establishment and implementation of a waste control system (Solid Waste Management Method Statement). The Operator will keep detailed records of all waste removed from site, together with proof of recycling or legal disposal at a registered landfill site (disposal certificates).	SHEQ audit report and records of waste and/or disposal certificates	Operator/SHEQ Manager	Throughout operation	Noted in audit reports when relevant
		37.	No refuse or waste material will be disposed of by burying or burning unless previously licensed by ZEMA/EMA.	SHEQ audit report and records of waste and/or disposal certificates	Operator/SHEQ Manager	Throughout operation	Noted in audit reports when relevant
	General Waste: Disposal	38.	Litter and waste materials (excluding hazardous waste materials) will be disposed of into scavenger- and weather-proof bins. The Operator will provide sufficient bins with lids on Site to store the waste produced on a daily basis. In order to facilitate recycling there will be a number of bins at each location, and such bins will be clearly marked according to the category of waste being recycled (e.g. paper, metals, plastics, glass etc.). Bins will not be allowed to become overfull and will be emptied a minimum of once daily.	SHEQ audit report	Operator/SHEQ Manager	Throughout operation	Noted in audit reports when relevant
		39.	Waste will be temporarily stored on Site in a central waste area that is weatherproof and scavenger-proof, and which the SHEQ Manager has approved. The Operator shall then remove the refuse collected from the working areas, from Site at least once a week. Any refuse not being re-cycled must be disposed of at a waste disposal facility.	SHEQ audit report and records of waste and/or disposal certificates	Operator/SHEQ Manager	Throughout operation	Noted in audit reports when relevant
		40.	The Operator will ensure that waste and surplus food, food packaging and organic waste are not deposited by employees anywhere on the site except in refuse bins.	SHEQ audit report	Operator/SHEQ Manager	Throughout operation	Noted in audit reports when relevant
	Hazardous waste storage	41.	Petroleum, chemical, harmful and hazardous waste is to be stored in an enclosed and banded area. The location of these sites is to be approved by the SHEQ Manager. This waste shall be disposed of at a registered hazardous waste disposal site. The Operator shall submit copies of receipts from such waste disposal sites to the SHEQ Manager as proof of proper disposal. Storage and disposal etc., is also controlled through other relevant legislation which must be complied with Zambian Occupational Health and Safety Act and Zimbabwean Occupational Safety and Health Bill.	SHEQ audit report and records of waste and/or disposal certificates	Operator/SHEQ Manager	Throughout operation	Noted in audit reports when relevant
General Environmental Management	All project infrastructure and operational activities	42.	An external, qualified and competent SHEQ must be appointed with sufficient authorisation to ensure protection of the environment is prioritised. He/she must ensure that mitigation listed in the ESMP is implemented to minimise environmental impacts.	SHEQ Appointment	Operator/ESM	Prior to the commencement of the operation phase	Noted in audit reports when relevant.

Aspect	Activity	No.	Mitigation/Management Action	Measure of Effectiveness	Responsibility	Frequency	Reporting Requirements
		43.	<p>The measures detailed in the following Method Statements which were developed during the Construction Phase of the Project need to be reviewed and revised for the Operational Phase:</p> <ul style="list-style-type: none"> • Solid Waste Management Method Statement • Hazardous Substances Method Statement • Contaminated Water Method Statement • Environmental Incident Reporting • Water Resources Method Statement • Erosion and Sediment Management Method Statement • Environmental Awareness Training Method Statement • Biodiversity Management Method Statement • Animal Rescue Method Statement • HIV/AIDS Management Method Statement • Tuberculosis and Malaria Management Method Statement • Occupational Health and Safety Method Statement • Community Health and Safety Method Statement • Traffic Management Method Statement • Local Employment Method Statement • Labour Force Management Method Statement • Local Content Method Statement • Contractor Audit and Supply Chain Management Method Statement • Project Induced In-migration (PIIM) Management Method Statement • Security Management Method Statement 	Compliance with Method Statements	Operator/ESM/SHEQ	Throughout operation	Noted in audit reports when relevant
Training	Environmental awareness	44.	The Environmental Awareness Training Programme will not be limited to staff and contractors, but will include an outreach programme to prominent individuals and community organisations such as schools, youth groups, women's groups. Active steps being taken by ZRA to protect the environment and collaborate with local communities need to be publicised and promoted and maintained during the operational phase.	Awareness training records	Operator/SHEQ Manager	Throughout operation	Noted in audit reports when relevant
		45.	<p>A training and awareness programme will be developed and implemented to ensure that all the relevant staff, contractors and visitors have the necessary knowledge regarding contamination prevention and management at BGHES. It is recommended that the training include chemical environmental and safety, spill response and first aid training and spill response training.</p> <p>Key personnel will be identified to receive hazard analysis training, while high-risk spill hazards will be monitored on a frequency determined in the appropriate management procedures for the identified hazards.</p>	<p>Compliance with applicable Zambian and Zimbabwean legislative requirements.</p> <p>Compliance with GIIP standards and guidelines (WB / IFC EHS Guideline) as appropriate.</p> <p>Training register</p>	Operator/SHEQ Manager	Throughout operation	Noted in audit reports when relevant

The following monitoring programmes have been identified through the ESIA work undertaken to date. These, however, remain subject to change on the basis of further planning and design work still to be undertaken and will require development, updating and review of their effectiveness on an on-going basis throughout the Operational Phase of the Project. Those required for development during the Construction Phase of the Project are detailed in the relevant CESMPs and applicability to operational conditions is noted below.

The overall objectives of monitoring are to:

- Ensure regulatory requirements are met;
- Verify predictions made in the ESIA by obtaining real time measurements;
- Verify that mitigation measures are effective; and
- Provide early warning of potential unplanned for or unmitigated impacts.

Monitoring will be carried out by ZRA and its Contractors pursuant to their contractual obligations to undertake inspections, monitoring and reporting. The following four types of inspections and monitoring will be employed.

- **Inspections** planned and conducted on a regular basis to ensure that mitigation measures and commitments are properly maintained and implemented, and that specific management procedures are being followed (e.g. practices related to temporary waste storage and transport).
- **Receptor monitoring** undertaken to verify predictions made in the ESIA and to confirm that the activities at the site are not resulting in unacceptable impacts on people, wildlife or a deterioration in the quality of habitats, Zambezi River system or infrastructure (e.g. monitoring mammal movements, monitoring aquatic ecology of the Zambezi River system and assessing disturbance to affected communities through a grievance mechanism); and periodic surveys of affected people/communities to assess compliance with social management measures (i.e. RAP/LRP, Local Employment Strategy, CDP, etc.).
- **Compliance monitoring** involving periodic sampling or continuous recording of specific environmental quality indicators or discharge levels to ensure compliance of discharges and emissions with Project standards (e.g. wastewater discharges and noise monitoring).
- **Auditing** to assess compliance of the Project activities with both regulatory and site management system requirements. Annual external environmental and social management auditing and progress reporting will also be undertaken.

The results of the inspection and monitoring activities will be reported to ZRA on a weekly basis, or as required.

5.1 MONITORING PROGRAMMES DEVELOPED AND IMPLEMENTED DURING CONSTRUCTION, APPLICABLE FOR OPERATION

The following monitoring programmes will continue from the Construction Phase of the Project into the Operation Phase:

- Taita Falcon Monitoring Programme;
- Rock Pratincole Monitoring Programme;
- Wildlife Monitoring Programme;
- Monitoring of Fisheries Programme;
- Downstream Monitoring Programme;
- Post Resettlement Monitoring and Evaluation;
- Monitoring and Evaluation of in-migration;
- Outbreak of world pandemics through WHO alerts;
- Monitoring of Community Development Programme effectiveness; and
- Tourism Monitoring; and
- Emergency Prevention, Preparedness and Response.

5.2 OPERATIONAL MONITORING

In addition, the following additional monitoring is proposed as part of the Operational Phase:

5.2.1 Monitoring of Water Quality

It is necessary to implement a routine programme of water quality monitoring in the reservoir with both physical and biological indicators included. The latter should include the sampling and analysis of fish tissue for the potential accumulation of toxic pollutants.

Routine monitoring of dam outflows will also be undertaken as well as downstream water quality to determine compliance with the ambient water quality standards and impacts on downstream ecological habitat status.

Monitoring downstream will be undertaken at EFA Sites 1 and 2. This will be undertaken on a monthly basis for the parameters detailed in Annex B.

The Total Dissolved Gas (TDG) concentrations will be monitored on at least a daily basis during spillway operation, both upstream and downstream of the spillway and for a distance of one or two kilometres downstream (to evaluate the dissipation curve), in parallel with systematic programme of fish and fish behaviour monitoring. Based upon the results of this monitoring, an adaptive mitigation strategy should be considered that may include a combination of operational measures, such as reducing spill rates (e.g. extending flood

discharge time by reducing water levels in advance of peak) and alternative energy dissipation methods (surface or sub-surface).

Dam flow release monitoring will be undertaken on an hourly basis.

Refer to *Table 5.1* for detailed monitoring plan for water quality.

5.2.2 *Monitoring Electrocutation and Collision Impacts to Birds*

Impacts to important bird species, primarily raptors and vultures, needs to be monitored through the following two key approaches:

Monitoring the Presence of Bird Carcasses as a result of Collisions and/or Electrocutations from Contact with Transmission Lines

A simple Bird Electrocutation and Collision Monitoring Plan will be compiled and approved by the local Birdlife organisations in both Zimbabwe and Zambia. That plan is to include the following components:

- The transmission line routes are to be separated into three risk categories, such as high risk (in the proximity of protected areas), medium risk (routes passing through natural habitats away from protected areas, and low risk (portions passing through modified habitats with extensive cultivation and/or settlement).
- Transmission line routes need to be searched on a regular basis and all bird carcasses recorded. Bird carcasses are to be identified to the extent possible, where identifications are uncertain, photographs (and possibly samples) are to be taken and Birdlife Zimbabwe and Birdlife Zambia requested to assist with identification.
- The intensity of searching is to be guided by the risk level, with areas of higher risk searched more frequently.
- Team members conducting the searches will have the minimum skills, available equipment and resources as approved by Birdlife.
- Data consolidation, analysis and reporting procedures must be specified in the plan.
- Procedures to feed monitoring results and mitigation adaptation back to the authorities responsible for transmission line operation.

Population Status of Key Bird Species at Risk of Population Decline

Onsite monitoring may not be sufficient to demonstrate the impact to wide-ranging vultures and other raptors that have experienced a dramatic decline. ZRA must therefore maintain ongoing contact with ornithological

organisations and will be receptive to responding to concerns relating to the broader loss of these species in the areas influenced by transmission lines.

Refer to *Table 5.1* for detailed monitoring plan for bird collision and electrocution.

5.2.3 *Fish Monitoring Programme*

A Fish Management and Monitoring Plan needs to be implemented in order to optimise the development of a fisheries resource that will compensate for the fish resource that is displaced through alteration of the aquatic habitat, and provide a sustainable resource for local communities.

A summary of the specific objectives include:

- Maintenance of the fish diversity and population health in the downstream aquatic habitats.
- Maintenance of the downstream habitat integrity both from a quality and quantity perspective with specific reference to in-stream and riparian components.
- Maintenance of gene flow patterns and requirements (both in an up- and downstream direction).
- Optimise of the fisheries potential of the reservoir in a sustainable manner.
- Prevent the invasion of invasive floating weeds to the reservoir and downstream from it.

Refer to *Table 5.1* for detailed monitoring plan for fish monitoring.

5.3 *SOCIAL MONITORING PROGRAMMES*

The following social monitoring programmes are suggested:

- Post resettlement and livelihood restoration monitoring and evaluation (with attention paid to monitoring identified vulnerable segments of the Project-affected communities);
- Monitoring and evaluation of in-migration / out-migration;
- Monitor operational activities to ensure that the community is not negatively affected by the operational workforce and that any contractors abides by the rules;
- Outbreak of world pandemics through WHO alerts;

- Monitoring of Community Development Programme effectiveness;
- Monitoring will include an annual tourism survey that focuses on collecting information from tourists as well as activity operators. The annual tourism survey will focus on data relating to tourist demographics and behaviour. Activity operator surveys will provide detailed information and opinion on trends in sales and on the current economic climate in terms of the demand for various activities in the study area;
- Park statistics (Victoria Falls National Park/Rainforest Park and Mosi-oa-Tunya National Park) will be monitored as these provide an indication of tourism trends;
- Regular, survey-based estimates of household income and employment in all sectors, including tourism and downstream water users will be collected throughout the study area. This should be monitored as an aggregate of household employment and income in order to monitor overall trends in prosperity of the area. Simply monitoring average household income does not account for people leaving or being attracted to the area; and
- Online travel sites, such as Trip Advisor, should also be monitored. These sites contain a wealth of information relating to tourist experiences and opinions. Tourists use these sites to rate their holiday experiences. Tourists are able to rate the location, accommodation and activities on offer and these ratings should be continuously recorded in order to monitor the trends.

Refer to *Table 5.1* for detailed monitoring plan for social monitoring.

5.4 *MANAGEMENT OF NON-COMPLIANCE*

Non-compliance includes failure to adhere to all elements included in the ESMP. The SHEQ Manager will monitor compliance with this ESMP on an ongoing basis throughout the lifecycle of the BGHES Project.

The SHEQ Manager may determine whether any additional monitoring activities are required to monitor compliance with this ESMP.

Should the SHEQ Manager determine that non-compliance may have occurred, he/she will conduct a review to determine whether the non-compliance is valid. If it is valid, then the SHEQ Manager will undertake an inquiry and determine if the non-compliance is serious and/or continuing. The SHEQ Manager will impose remedial and disciplinary measures to rectify the non-compliance.

Insights obtained from non-compliance will be used to inform whether re-training of employees is required and / or whether additional management and monitoring measures are required.

5.5

MONITORING PLAN

A specific monitoring plan to monitor both the implementation and effectiveness of this OESMP is provided in *Table 5.1* below.

Table 5.1 Monitoring Plan to Ensure the Implementation and Effectiveness of the Operational Management Plan

MONITORING AND INSPECTION METHODOLOGY	FREQUENCY	LOCATION OF MONITORING STATIONS	REPORTING SCHEDULE	RESPONSIBLE PARTY	OUTPUT	PERFORMANCE INDICATOR
Water						
<p>Monitoring of surface water quality will take place in rivers, streams and dams located within 1 km downstream of Project activities including downstream of the dam wall, staff townships and any areas where hazardous substances will be handled, e.g.: refueling stations, vehicle workshops.</p> <p>Surface water samples will be collected twice annually, once during the wet season and once during the dry season, in areas where Project activities are taking place and for one year thereafter. Samples will be analysed for a suite of analyses (refer to Annex B).</p>	Twice annually	In rivers, streams and dams located within 1 km downstream of Project activities, dam wall, staff townships and any areas where hazardous substances will be handled	Following each round of monitoring	Operator/SHEQ Manager	Water Quality Monitoring Reports	Water quality results compliant to performance criteria.
Biodiversity						
<p>Essential monitoring requirements for aquatic biodiversity during operations include:</p> <ul style="list-style-type: none"> <u>Visual assessment:</u> To identify visible impacts, with specific reference to impacts from surrounding activities and any effects resulting from operational activities occurring downstream. Factors to be noted during site-specific visual assessments should include: stream morphology; instream and riparian habitat diversity; stream continuity; erosion potential; depth flow and substrate characteristics; signs of physical disturbance and pollution of the area; and other life forms reliant on aquatic ecosystems. <u>Water quality (physico-chemical water quality data):</u> Monitoring of biota specific water quality variables (Electrical Conductivity, Dissolved Oxygen, pH and temperature parameters). On-site testing of biota specific water quality variables will take place. <u>Diatom community integrity:</u> Assessment of diatom community integrity in the aquatic systems receiving dredge pond decant, as well as appropriate reference sites. Diatoms are used as indicators of river and wetland health as they provide a rapid response to specific physico-chemical conditions in the water and are often the first indication of change. <u>Macro-invertebrate community integrity:</u> Assessment of macro-invertebrate community integrity in the dam as well as systems receiving outflow from it. All work is to be done by an accredited SASS5 practitioner Spatial and temporal trends in data must be monitored. 	<ul style="list-style-type: none"> <u>Water quality monitoring:</u> Monthly during the operational phase for limited parameters and twice annually for external monitoring (see above) <u>Diatom community integrity monitoring:</u> Annual basis to monitor the integrity of the instream community. <u>Macro-invertebrate community integrity monitoring:</u> Recommended to be performed on an annual basis. 	Monitoring sites be determined by field specialists	Reporting should follow after diatom and macro-invertebrate monitoring has taken place.	Operator/SHEQ Manager/Aquatic Ecologist	Biodiversity Monitoring Report	No deterioration in aquatic present ecological state attributed to operation of the BGHES
<p><u>Road Kill Monitoring</u> Monitoring of faunal road kills along proposed access and haul roads during construction. The protocols developed by the Department of National Parks and Wildlife -Zambia and Zimbabwe Parks and Wildlife Management Authority for monitoring</p>	High risk roads will be searched for road kills on a twice-weekly basis, medium risk roads will be searched on a weekly basis, while monitoring of low risk roads will depend on reporting of road kill incidents.	Roads developed for the BGHES will be separated into three categories, such as high risk (in the proximity of protected areas), medium risk (routes passing through natural habitats away from protected areas, and low	Monthly Monitoring results are to be used to guide development of mitigation adaptation back to the responsible authorities (such as speed bumps in	Developer SHEQ Manager Department of National Parks and Wildlife -Zambia	Data consolidation, analysis and reporting procedures will	Road kills of wildlife log maintained and up to date

MONITORING AND INSPECTION METHODOLOGY	FREQUENCY	LOCATION OF MONITORING STATIONS	REPORTING SCHEDULE	RESPONSIBLE PARTY	OUTPUT	PERFORMANCE INDICATOR
road kills of wild fauna will be continued. Parameters measured include date, species, location, gender, approximate age and freshness of the carcass.		risk (portions passing through modified habitats with extensive cultivation and/or settlement).	highly sensitive areas, lowering of speed limits and increased speed enforcement).	Zimbabwe Parks and Wildlife Management Authority	need to be developed.	
<p><u>Monitoring Collisions and/or Electrocutation of Birds from contact with Transmission Lines</u></p> <p>A simple Bird Electrocutation and Collision Monitoring Plan will be compiled and approved by the local Birdlife organisations in both Zimbabwe and Zambia. Transmission line routes need to be searched on a regular basis and all bird carcasses recorded. Bird carcasses are to be identified to the extent possible, where identifications are uncertain, photographs (and possibly samples) are to be taken and Birdlife Zimbabwe and Birdlife Zambia requested to assist with identification.</p> <p>Team members conducting the searches will have the minimum skills, available equipment and resources as approved by Birdlife. Procedures to feed monitoring results and mitigation adaptation back to the authorities responsible for transmission line operation.</p> <p>Onsite monitoring may not be sufficient to demonstrate the impact to wide-ranging vultures and other raptors that have experienced a dramatic decline. ZRA must therefore maintain ongoing contact with ornithological organisations and will be receptive to responding to concerns relating to the broader loss of these species in the areas influenced by transmission lines.</p>	<ul style="list-style-type: none"> Transmission line routes need to be searched on a regular basis and all bird carcasses recorded. Bird carcasses are to be identified to the extent possible, where identifications are uncertain, photographs (and possibly samples) are to be taken and Birdlife Zimbabwe or Birdlife Zambia requested to assist with identification. The intensity of searching is to be guided by the risk level, with areas of higher risk searched more frequently. 	The transmission line routes are to be separated into three risk categories, such as high risk (in the proximity of protected areas), medium risk (routes passing through natural habitats away from protected areas, and low risk (portions passing through modified habitats with extensive cultivation and/or settlement).	Six monthly	ZRA Birdlife Zimbabwe and Birdlife Zambia	Data consolidation, analysis and reporting procedures must be specified in the plan	Monitoring plan
<p><u>Population Status of Key Bird Species at Risk of Population Decline</u></p> <p>Onsite monitoring may not be sufficient to demonstrate the impact to wide-ranging vultures and other raptors that have experienced a dramatic decline. ZRA must therefore maintain ongoing contact with ornithological organisations and will be receptive to responding to concerns relating to the broader loss of these species in the areas influenced by transmission lines.</p>	Approximately 6 month interval	n/a	Approximately 6 month interval	Conservation NGO's will report to Operator, ZESCO and ZEC	Outputs to be determined by nature of the data shared	Evidence of communication
<p><u>Fish Monitoring Programme</u></p> <p>A Fish Management and Monitoring Plan needs to be implemented in order to optimise the development of a fisheries resource that will compensate for the fish resource that is displaced through alteration of the aquatic habitat, and provide a sustainable resource for local communities. A summary of the specific monitoring objectives includes:</p> <ul style="list-style-type: none"> Maintenance of the fish diversity and population health in the downstream aquatic habitats. Maintenance of the downstream habitat integrity both from a quality and quantity perspective with specific reference to in-stream and riparian components. 	Ongoing monitoring of fish populations, fishing activity and fish catch data	To be determined by fisheries management authority	Reports to be compiled every six months	Joint Fisheries Management Authority	Reports every six months presenting the status of fish populations	Reports and operational performance of the Joint Fisheries Management Authority

MONITORING AND INSPECTION METHODOLOGY	FREQUENCY	LOCATION OF MONITORING STATIONS	REPORTING SCHEDULE	RESPONSIBLE PARTY	OUTPUT	PERFORMANCE INDICATOR
<ul style="list-style-type: none"> Maintenance of gene flow patterns and requirements (both in an up- and downstream direction). Optimise of the fisheries potential of the reservoir in a sustainable manner. 						
Land Acquisition and Resettlement						
Review of land/livelihood related grievances submitted including analysis of trends, which may require program adjustments.	Ongoing through the grievance mechanism		Reports to be compiled every six months	Operator/SHEQ Manager	Monitoring report	Livelihood restoration measures initiated and completed.
Community Development						
Monitor progress and effectiveness of Community Development Plan, and capacity of role-players to take over program responsibilities	Reports to be compiled every six months		Every six months	Operator/SHEQ Manager	Monitoring report	To be developed and confirmed as part of preparing Community Development Plan
Project-induced In-migration						
Monitor progress and effectiveness of implementing the Project-induced In-migration (PIIM) Management Method Statement	Reports to be compiled every six months		Every six months	Operator/SHEQ Manager	Monitoring report	To be developed and confirmed as part of preparing PIIM Plan
Community Health and Safety						
<ul style="list-style-type: none"> Monitor progress and effectiveness of implementing Community Health and Safety Method Statement Monitor outbreak of world pandemics through WHO alerts Monitor operational activities to ensure that communities are not negatively affected. 	Reports to be compiled every six months		Every six months	Operator/SHEQ Manager	Monitoring report	To be developed and confirmed as part of preparing Community Health and Safety Plan
Economic Impact						
<ul style="list-style-type: none"> Undertake regular economic survey in Project-affected communities and compare against pre-project baseline Conduct annual tourism survey Monitor national park statistics Monitor Trip Advisory 	Annual progress reporting		Annually	Operator/SHEQ Manager	Monitoring report	To be developed and confirmed as part of economic impact monitoring

Audits will be carried out internally by the Operator to ensure compliance with regulatory requirements as well as its own HSE standards and policies. The frequency of audits will be risk based and will vary with the stage of the Project (more frequent in the early stages of the Project) and will depend on the results of previous audits. Audits to be conducted will also cover contractors' self-reported monitoring and inspection activities. The audit shall be performed by qualified staff and the results shall be communicated to the external SHEQ Manager.

The audit will include a review of compliance with the requirements of this OESMP and include, at minimum, the following:

- Completeness of HSE documentation, including planning documents and inspection records;
- Conformance with monitoring requirements;
- Efficacy of activities to address any non-conformance with monitoring requirements; and
- Training activities and record keeping.

The following is recommended for the frequency of auditing activities:

- Inspections to be undertaken by the SHEQ Manager on a monthly basis as a minimum;
- Annual external audits to be undertaken and results disclosed to the regulatory authorities and ELC; and
- Any auditing frequency requirements prescribed by the regulatory authorities of Zambia and Zimbabwe.

The ZEMA and EMA hold the general responsibility for approval of the BGHES's environmental license application and verifying that applicable environmental and social commitments included in this OESMP are adhered to during Project implementation. The ZEMA and EMA will remain directly involved in the Project as responsible monitoring agents, and will evaluate auditing and compliance documentation submitted to them.

This *Section* includes an estimate of the costs of implementing the BGHES management measures included in the CESMPs and OESMP and associated monitoring, including all capital, recurrent operating and training cost estimates.

It is important to note that -

- The cost estimate presented in this *Section* is split into the cost for the construction phase of the BGHES (which includes any pre-construction management measures), assuming a 7 year construction period, and the Net Present Value (NPV) cost estimate for a single year of operation.
- The costs estimates associated with physical and economic displacement must be regarded as high-level estimates for now. These cost estimates are based on previous benchmark resettlement costing estimates previously undertaken by ERM for a number of resettlement projects in Africa, and is informed by the limited fieldwork undertaken for development of the Project RPFs. Actual costs for resettlement will need to be confirmed during detailed resettlement action planning.
- The cost estimates provided in this *Section* do not provide estimates for implementing management measures (including compensation) for impacts to the tourism industry. Such costs estimates would need to be provided through an updated tourism study.
- The cost estimate does not make provision for biodiversity offset. The feasibility of available options for an offset, including consideration of a compensatory offset needs to be investigated. The IFC PS6 (paragraph 10) requires external specialist input into the offset design and implementation, but is beyond the scope of this ESIA.

The total estimated cost for implementation of environmental and social management commitments (including monitoring) is estimated at **US\$ 30,555,000** for during the construction phase and **US\$ 1,258,000** per year for during the operational phase (assumed at NPV) (refer to *Table.6.1*).

Table.6.1 *Costs of Social and Environmental Management*

Management Aspect	Estimated Cost (US\$) for during the Construction Phase ⁽¹⁾	Estimated Annual Cost (US\$) for during the Operational Phase ⁽²⁾
<u>Air Quality Management</u>	155 000	5 000
Implementation of management measures (<i>watering, covering of stockpiles etc.</i>)	105 000	0
Monitoring, auditing and reporting	50 000	5 000
Training	0	0
<u>Noise and Vibration Management</u>	220 000	15 000
Implementation of management measures (<i>silencing devices, communication of blasting schedule to communities, etc.</i>)	150 000	0
Monitoring, auditing and reporting	60 000	10 000
Training	10 000	5 000
<u>Soil Erosion Management</u>	610 000	40 000
Implementation of management measures (<i>installation of sediment basins, stabilization of cleared areas, erosion control systems, etc.</i>)	560 000	30 000
Monitoring, auditing and reporting	50 000	10 000
Training	0	0
<u>Surface Water and Groundwater Management</u>	210 000	15 000
Implementation of management measures	100 000	0
Monitoring, auditing and reporting	100 000	10 000
Training	10 000	5 000
<u>Dangerous Good and Hazardous Substances Management</u>	280 000	40 000
Implementation of management measures (<i>storage of corrosive / hazardous substances, clean-up procedures for spills, purchase and maintenance of spill kits, etc.</i>)	250 000	30 000
Monitoring, auditing and reporting	15 000	5 000
Training	15 000	5 000
<u>Waste Management</u>	875 000	150 000
Implementation of management measures (<i>development of waste inventory, systems to ensure sorting and segregation of wastes, waste storage receptacles, etc.</i>)	800 000	100 000
Monitoring, auditing and reporting	50 000	40 000
Training	25 000	10 000
<u>Terrestrial Ecology Management</u>	1 190 000	95 000
Implementation of management measures (<i>avifauna, loss of habitat, transmission lines</i>)	1 000 000	50 000

Management Aspect	Estimated Cost (US\$) for during the Construction Phase ⁽¹⁾	Estimated Annual Cost (US\$) for during the Operational Phase ⁽²⁾
Monitoring, auditing and reporting	130 000	25 000
Training	60 000	20 000
<u>Aquatic Ecology Management</u>	685 000	115 000
Implementation of management measures (<i>fisheries management, eutrophication and aquatic weed control</i>)	500 000	80 000
Monitoring, auditing and reporting	150 000	30 000
Training	35 000	5 000
<u>Revegetation and Rehabilitation Management</u>	470 000	70 000
Implementation of management measures (<i>rehabilitation, alien plant control</i>)	400 000	60 000
Monitoring, auditing and reporting	50 000	5 000
Training	20 000	5 000
<u>Physical and Economic Displacement Management</u>	23 675 000	160 000
Implementation of management measures (<i>Resettlement Action Planning and Implementation, compensation agreements, payment of compensation, restoration of livelihoods and ecosystem services</i>)	23 500 000	100 000
Monitoring, auditing and reporting	140 000	50 000
Training	35 000	10 000
<u>Cultural Heritage Management (excluding grave relocation)</u>	95 000	22 000
Implementation of management measures (<i>pre-construction surveys, water reconnaissance, development of chance find procedure and cultural heritage management method statement</i>)	80 000	20 000
Monitoring, auditing and reporting	10 000	0
Training	5 000	2 000
<u>Community Health and Safety Management</u>	630 000	130 000
Implementation of management measures (<i>PIIM Management Method Statement, recruitment strategy, traffic and road accidents management, community investment funds to public health and education (through existing structures), disease prevention planning, health baseline study, engagement with communities</i>)	500 000	100 000
Monitoring, auditing and reporting	100 000	20 000
Training	30 000	10 000
<u>Traffic Management</u>	Included in Community Health and Safety Costs	
<u>Occupational Health and Safety Management</u>	1 000 130 000	68 000
Implementation of management measures (<i>Occupational Health and Safety Method Statement, catering management, site safety, hygiene</i>)	1 000 000 000	50 000
Monitoring, auditing and reporting	100 000	10 000

Management Aspect	Estimated Cost (US\$) for during the Construction Phase ⁽¹⁾	Estimated Annual Cost (US\$) for during the Operational Phase ⁽²⁾
Training	30 000	8000
Local Employment Management	590 000	135 000
Implementation of management measures (<i>local employment method statement, skills audit, recruitment and retention program and policy, employment advertising</i>)	400 000	100 000
Monitoring, auditing and reporting	40 000	10 000
Training (including capacity building & transitional planning)	150 000	25 000
In-migration Management	Included in Community Health and Safety Costs	
Community Development Management (excluding the cost of CSI initiatives)	210 000	50 000
Implementation of management measures (<i>engagement with local stakeholders re provision of services, support of existing women/youth/vulnerable groups programmes</i>)	100 000	30 000
Monitoring, auditing and reporting	30 000	10 000
Training	80 000	10 000
On-going Stakeholder Engagement / Grievance Management	460 000	68 000
Implementation of management measures (<i>public participation, management of grievances</i>)	400 000	50 000
Monitoring, auditing and reporting	40 000	10 000
Training	20 000	8 000
Other Social Monitoring (monitoring of downstream water users)	200 000	80 000
Monitoring, auditing and reporting	200 000	80 000
Dam Safety	Cots to be included as part of engineering studies	
TOTAL	30 555 000	1 258 000

⁽¹⁾ Assumes a period of 7 years for the construction phase.

⁽²⁾ Annual operational costs are assumed at the Net Present Value (NPV).

Annex A

Grievance Procedure

Table 1.1 **Definition of Key Terms**

Term	Definition
Affected Party(ies)	Stakeholders who are affected by the company or operation, both positively and negatively. Within this it is possible to distinguish between those that are directly affected and indirectly affected by the company or operation.
Environmental and Social Impact Assessment	Process of evaluating and addressing potential social and environmental impacts resulting from ZRA’s Project and identifying any mitigation or corrective measures that will enable the project to meet the requirements of the World Bank Operational Standards, IFC Performance Standards and applicable Zambian and Zimbabwean laws and regulations.
Grievance	An issue, concern, problem, or claim (perceived or actual) that an individual or community group wants a company or contractor to address and resolve.
Grievance Database	System for logging and monitoring all grievances received, including any records of communication/consultation and details of grievance settlement.
Facilities / Operation(s)	A location or activity that is operated by ZRA or its contractors for the purpose of the Project. Locations could include the dam, construction camps, permanent villages, power houses, switchyard, access roads transmission lines, and offices including corporate head offices etc.
Records of communication / consultation	Records of communication / consultation may include key e-mails, letters, newsletters, memorandums, complaints, opportunities for improvement, records of distribution/attendance, records of formal and informal meetings and records of commitments.
Stakeholder	Persons or groups that are directly or indirectly affected by a project as well as those that may have interests in a project and/or the ability to influence its outcome, either positively or negatively. This can refer to shareholders, lenders, employees, communities, industry, governments and international third parties.
Stakeholder engagement	An umbrella term encompassing a range of activities and interactions between ZRA and stakeholders (two way communication) over the life of a project that are designated to promote transparent, accountable, positive, and mutually beneficial working relationships.
Vulnerable Groups	Individuals or groups within the project area of influence who could experience adverse impacts more severely than others based on their vulnerable or disadvantaged status. This vulnerability may be due to an individual's or group's ethnicity, gender, language, religion, political views, dependence on natural resources, sickness or disability or other factors.

1 GRIEVANCE REDRESS MECHANISM

1.1 INTRODUCTION

The Zambezi River Authority (ZRA) is a statutory body and was established in 1987. It is jointly and equally owned by the Governments of Zambia and Zimbabwe. It is responsible for overseeing the development of the Zambezi River, which runs through the two countries. The ZRA, alongside the Governments of Zimbabwe and Zambia, is proposing to develop the Batoka Gorge Hydro-Electric Scheme (BGHES) on the Zambezi River at Batoka Gorge.

The BGHES will provide up to 2,400 MW. It will help the Governments of Zambia and Zimbabwe to address power shortages being faced by the two countries and the region as a whole.

The proposed BGHES is anticipated to impact both directly and indirectly, positively and negatively on communities in the Project area and upstream and downstream of the proposed scheme. These impacts can potentially affect the lives of people living and working in these communities, thus giving rise to grievances. These potential grievances may relate to any aspect of the Project. They might be felt and expressed by a variety of parties including individuals, groups, communities, entities, or other parties affected or likely to be affected by the social or environmental impacts of the Project.

1.2 PURPOSE

The purpose of this Grievance Redress Mechanism is to outline the Zambezi River Authority's (ZRA) approach to accepting, assessing, resolving and monitoring grievances from those affected by ZRA's, and its Contractors', activities in relation to the BGHES. The aim is to identify and manage grievances from individual stakeholders or stakeholder groups. Timely redress or resolution of such grievances is vital to ensure successful implementation of the project

Grievances can encompass minor concerns as well as serious or long-term issues. They might be felt and expressed by a variety of parties including individuals, groups, communities, entities, or other parties affected or likely to be affected by the social or environmental impacts of the Project. It is essential to have a robust and credible mechanism to systematically handle and resolve any complaints that might arise in order that they do not escalate and present a risk to operations or the reputation of the company (nationally or internationally). If well-handled, an effective grievance redress mechanism can help foster positive relationships and build trust with stakeholders.

This Grievance Redress Mechanism has been considered in parallel to the Stakeholder Engagement Plan (SEP) (refer to *Annex B* of the main ESIA

document) due to the inter-relationship between these two planning mechanisms. It has been designed to meet the legal requirements of both Zambia and Zimbabwe and the requirements of the International Finance Corporation (IFC) in relation to grievance management.

The mechanism for addressing employee grievances is not addressed through this mechanism, which is solely to manage the interface with external stakeholders.

1.3 *SCOPE*

This Grievance Redress Mechanism will be applied to stakeholder complaints and grievances, perceived or actual, which relate to the activities of the ZRA and its Contractors' undertaken in relation to the BGHES.

A complaint or grievance is an issue, concern, problem, or claim (perceived or actual) that an individual stakeholder or community group has related to ZRA and its contractors' operations and activities. The mechanism does not impede access to judicial or administrative resolutions.

1.4 *APPLICATION*

This Grievance Redress Mechanism provides guidance to all ZRA employees and Contractors on receiving, registering, assessing and resolving community complaints or grievances emanating from ZRA's operations and activities in relation to the BGHES. The fundamental objective of this mechanism is to:

- Provide a predictable, transparent, and credible process to all parties for resolving grievances, resulting in outcomes that are seen as fair, effective, and lasting;
- Build trust as an integral component of broader community relations activities; and
- Enable more systematic identification of emerging issues and trends, facilitating corrective action and pre-emptive engagement.

To maximise the effectiveness of the Grievance Redress Mechanism, ZRA shall uphold the following values during implementation and operation of the system:

- Commitment to fairness in both process and outcomes;
- Freedom from reprisal for all involved parties – within ZRA and in the external stakeholder group;
- Clear operating rules, and accountability;

- Validity of all complaints submitted;
- Culturally accessible and applicable;
- Accessible to vulnerable groups of stakeholders; and
- Confidentiality if requested.

1.5 NOTIFICATION

ZRA (Chief Executive) will proactively inform affected communities and the wider stakeholder group of the details of the Grievance Redress Mechanism. This will include information about where people can go and who they can talk to if they have a grievance. This information shall be widely and regularly publicised, throughout the duration of the public consultation exercise, through meetings and the distribution of fliers.

ZRA will provide the information in a format and languages that are readily understandable by the local population and/or orally in areas where literacy levels are low during routine stakeholder engagement.

1.6 ROLES, RESPONSIBILITIES AND RESOURCES

Implementation of the Grievance Redress Mechanism for the BGHES will be the ultimate responsibility of the Grievance Manager. The Grievance Manager will be supported by a wider team. The various roles of the ZRA Grievance Management Team are detailed below:

Grievance Manager

The Grievance Manager will:

- Implement the Grievance Redress Mechanism procedure and management system providing guidance on solutions to complaints and grievances in consultation with the relevant departments and ensure consistency of redress for all grievances received in relation to the BGHES.
- Promote the Grievance Redress Mechanism to maintain momentum and ensure company wide and community commitment to, and understanding of, its implementation and operation.
- Involvement in the investigation of grievances and the agreement of redress as well as overseeing interaction between various ZRA Departments and contractors as well as the senior managers as required.

All ZRA Departments and Contractors

ZRA Departments and Contractors will:

- Receive and acknowledge any issue, concern, complaint or grievance from the community, verbally or in writing. They will record the issue and report it to the Grievance Manager in compliance with the Grievance Redress Mechanism procedure.
- Involvement in the investigation of grievances as required depending on the nature and severity of the grievance and as directed by the Grievance Management team.

ZRA Chief Executive

The ZRA Chief Executive will:

- Ensure that this Grievance Redress Mechanism procedure is applied through all ZRA and Contractor departments and levels that are undertaking activities related to the BGHES.
- Apply necessary controls to minimise risks that could result in stakeholder grievances.
- Contribute to the resolution and sign off of any grievances which have international repercussions.

The following resources will also need to be in place:

- An auditable system for receipt, recording and tracking of the process (for example a grievance log, database etc.) shall be in place.
- Dedicated budget for resourcing management of Grievance Redress Mechanism and addressing grievances through financial or in-kind compensation as and when needed.

1.7

THE GRIEVANCE PROCESS

A Grievance Redress Mechanism must be a simple process whereby stakeholders can submit their complaints free of charge and, if necessary, anonymously or via third parties. It should allow complaints to be submitted in more than one format.

The following steps outline the process that may be followed to resolve a grievance. This process is presented in a diagram in *Figure 1.1* and all grievance forms are contained in *Appendix A*.

Figure 1.1 Grievance Process

Process	Description	Time
<p>1. Receive and Log Grievance</p>	<ul style="list-style-type: none"> • Face to face meeting with Stakeholder • Phone, fax, letter or email • Recorded by ZRA staff • Completion and submission of grievance form • Record grievance in Grievance Form and log on Grievance Database 	1 day
<p>2. Acknowledge Grievance</p>	<ul style="list-style-type: none"> • Receipt of grievance acknowledged through appropriate communication medium, but to be recorded in writing 	5 days
<p>3. Assess and Investigate</p>	<ul style="list-style-type: none"> • ZRA to assess and assign grievance significance • Consult with relevant parties • May require site visits and discussions with other stakeholders 	7 days
<p>4. Grievance Resolution</p>	<p>Identify further action required Response provided to complainant including, if necessary an indication of additional time and resources required to resolve grievance</p>	28 days after receipt of grievance
<p>5. Sign-off</p>	<ul style="list-style-type: none"> • Confirm with complainant that grievance can be closed, or determine what follow-up is necessary. • If the grievance is to be closed, grievance sign-off is required 	37 days after receipt of grievance
<p>6. Monitor</p>	<ul style="list-style-type: none"> • Record final sign-off of grievance according to significance • If grievance cannot be closed return to step 2 to re-assess or recommend whether third-party arbitration is necessary 	37 days – 3 months, dependent on significance

The process of reporting a grievance should be easily accessible and un-intimidating to any stakeholder. The preferable channels for reporting grievances can be discussed with the community as part of community engagement.

Following the establishment of the channels above, the method for addressing grievances is systematic and is divided into six key steps. These are as follows:

- Step 1: Receive and log grievance;
- Step 2: Acknowledge grievance;
- Step 3: Assess and Investigate;
- Step 4: Grievance Resolution;
- Step 5: Sign-off on grievance; and
- Step 6: Monitor.

1.7.1 *Step 1: Receive and Log Grievance*

Grievances can be submitted in writing, telephonically or presented verbally to the Grievance Manager using the following details:

Name: The Project Manager – BGHES

Phone number: +260 211 228401/2, +260 211 227970/1 or +260 211 238665

Email: zaraho@coppernet.zm and Batoka@zaraho.org.zm

Address: Kariba House, 32 Cha Cha Cha Road, P.O Box 30233, Lusaka, Zambia.

The grievance is received by the ZRA or a Contractor representative and is forwarded to the Grievance Manager.

All grievances shall be logged using the Stakeholder Grievance Form (*Appendix A*). ZRA will log, document and track all grievances received within the secure ZRA grievance database system (refer to *Appendix B* for an example of a grievance database). Grievances shall be assigned a case number and records of communication/consultation shall all be attached with the relevant entry and filed. The database shall be monitored regularly for recurring grievances so that appropriate mitigation can be developed. Refer to *Box 1.1* for tips on receiving grievances. As a minimum the following information shall be recorded:

- Case number;
- Complainant's name and contact details; ⁽¹⁾
- Date of complaint;
- Details of complaint;
- History of other complaints / queries / questions (if known);
- Resolutions discussed and agreed with the party(ies) in question;
- Actions implemented (including dates); and
- Outcome of the actions implemented.

(1) Name and contact details are necessary for interaction around the resolution of the grievance. Anonymous submissions will be permitted, but the party submitting should understand that direct response will not be possible.

Box 1.1

Tips for Receiving a Grievance

- Regardless of who receives the grievance, it needs to be forwarded to Grievance Manager for attention.
- The grievance redress mechanism should make it possible to lodge a grievance in any appropriate format (written, verbal, telephonic, email, post etc.). Consideration should be given to capturing concerns raised informally or indirectly (e.g., through perception studies, media reports, social media, etc.).
- It is important that the process is easily accessible and not intimidating to stakeholders.
- Regardless of the form of the complaints, all need to be addressed with the same sincerity and seriousness.
- The Grievance Manager will be required to be in touch with the complainant at least once per month to provide feedback on the grievance.

1.7.2

Step 2: Acknowledging Receipt of a Grievance

ZRA shall acknowledge receipt of any grievance as soon as possible, but up to seven days from the date it was submitted and shall inform the complainant about the timeframe in which a response can be expected. A Grievance Receipt Form (*Appendix A*) shall be signed and a copy provided to the complainant. Refer to *Box 1.2* for tips on acknowledging grievances.

Box 1.2

Tips for Acknowledging a Grievance

- Literacy levels should be taken into consideration when providing the complainant with the acknowledgment of receipt, and verbal acknowledgement should accompany a written acknowledgement.
- Where appropriate acknowledgement should be provided through the Grievance Manager.

1.7.3

Step 3: Assess and Investigate Grievance

The following steps shall be performed in a timely manner to avoid delaying resolution of a grievance:

1. Obtain as much information as possible from the person who received the complaint, as well as from the complainant to gain a first-hand understanding of the grievance.
2. Undertake a site visit, if required, to clarify the parties and issues involved. Gather the views of other stakeholders including ZRA employees, if necessary and identify initial options for settlement that parties have considered.
3. Determine whether the grievance is eligible.
 - Eligible grievances include all those that are directly or indirectly related to ZRA's BGHES Project and that fall within the scope of the Grievance Redress Mechanism as outlined above.
 - Ineligible Complaints may include those that are clearly not related to ZRA BGHES Project or its contractors' activities, whose issues fall outside the scope of the Grievance Redress Mechanism

procedure or where other ZRA or community procedures would be more appropriate to address the grievance.

4. If the grievance is deemed ineligible it can be rejected however a full explanation as to the reasons for this must be given to the complainant and recorded in the Grievance Database.
5. If the grievance is eligible, determine its severity level using the significance criteria in *Box 1.3*. This will help to determine whether the grievance can be resolved immediately or requires further investigation and whether senior management will need to be informed of the grievance.
6. If the grievance concerns physical damage, (e.g. crop, house, community asset) take a photograph of the damage and record the exact location as accurately as possible.
7. Inform the complainant of the expected timeframe for resolution of the grievance.
8. Enter the findings of the investigation in the Grievance Database.

ZRA will aim to resolve any grievances within 30 days from the date that it was received. This timeframe can be extended to 60 days for more complex grievances (e.g. level 4 grievances), if required. (Please see point 6 on assessing grievance significance).

Box 1.3 **Significance Rating Criteria**

Significance Level	Type of Grievance	Responsibilities
Level 1	A grievance that is isolated or 'one-off' and essentially local in nature and restricted to one complainant. Note: Some one-off grievances may be significant enough to be assessed as a Level 4 grievance e.g. when a national or international law is broken (see Level 4 below)	Grievance Manager
Level 2	A grievance that extends to the local community or region and has occurred more than once, which is judged to have the potential to cause disruption to ZRA operations or to generate negative comment from local media or other local stakeholders	Project Executive
Level 3	A grievance which is widespread and repeated or has resulted in long term damage and/or has led to negative comment from local media, or is judged to have the potential to generate negative media and local stakeholder comments (e.g. damage to a sacred site or flooding of local school)	Project Executive
Level 4	A one-off complaint, or one which is widespread or repeated and , in addition , has resulted in a serious breach of ZRA policies, Zambian or Zimbabwean or International Law and/or has led to negative national/international media attention, or is judged to have the potential to generate negative comment from the media or other key stakeholders (e.g. failure to pay compensation where appropriate, e.g. resettlement)	ZRA Chief Executive

1.7.4 **Step 4: Grievance Resolution**

All grievances shall be dealt with on a case by case basis. However, all will require further discussions with complainants and community members that seek to jointly identify and select measures for grievance settlement. This will

help to increase ownership of solutions and to mitigate perceptions that resolutions unfairly benefit ZRA.

- An incident investigation team may be tasked with seeking resolution to the grievance. This may entail a dialog or series of dialogs between affected parties to find a solution to the grievance. Alternatively, it may entail investigating the underlying cause of the grievance and action any changes required to internal systems to prevent a recurrence of a similar grievance.
- An Incident Investigation Report will be completed within 28 days (considered good practice).
- During the 28 days of dialog or investigation, the Grievance Manager will co-ordinate conflict resolution activities necessary to contain and resolve any actual or potential conflicts arising from the reported grievance, refer to *Box 1.2* for tips for resolving grievances. If the case is complex and the stated resolution timeframe cannot be met, an interim response will be provided (oral or written) that informs the stakeholder of the delay, explains the reasons, and offers a revised date for next steps.

Where possible, grievances will be addressed directly by ZRA. The resolution proposal shall be respectful and considered, including rationale for the decision and any data used in reaching it. If wider consultation is necessary, grievances will be forwarded to a third party. This third party should be neutral, well-respected, and agreed upon by both ZRA and the affected parties. These may include public defenders, legal advisors, local or international NGOs, or technical experts. In cases where further arbitration is necessary, appropriate government involvement will be requested.

As a last resort, aggrieved parties have a right to take legal action. This is a more formal rights based approach that shall only be taken if all other approaches have failed or when there are serious conflicts about facts and data. The final decision will be taken by the arbitrator or courts based on compliance with laws, policies, standards, rules, regulations, procedures, past agreements or common practice.

- Grievance verification is especially important when the grievance is about another stakeholder or group of stakeholders. For example the community may make claims against a contractor that need to be investigated before acted upon.
- A regular forum to discuss grievances could be in the form of a monthly meeting where general and Risk Level 1 grievances are discussed. This forum can be constituted more frequently or as is needed especially in the case of Risk Level 2 and 3 grievances. This is particularly relevant to phases of the project that are likely to result in the highest degree of impact (e.g., construction).
- It is important to be transparent about the mechanism to resolve the issue. The appropriate level of action may require further consultation. Also, the issue may be symptomatic of a bigger issue. When this arises, both the symptom and the cause need to be addressed and resolved. For example, a complaint about job seekers setting up informal housing near the site may be raised as an issue related to informal housing but may also be symptomatic of an issue around influx of people and associated negative impacts.
- There are instances where grievances cannot be resolved in 28 days. In these cases, monthly updates must be given to the stakeholders who raised the grievance to provide them a report on progress.

1.7.5***Step 5: Sign-off on Grievance***

- The Grievance Manager will seek sign-off from the complainant(s) that the grievance has been resolved.
- In instances where the stakeholder is not satisfied with actions taken, the grievance will either:
 1. Be escalated to senior management and a decision will be taken either to implement supplementary actions or to consider initiating an appeal process;
OR
 2. The Grievance Manager will approach a neutral or third party to assist in mediating and resolving the grievance;
OR
 3. The Grievance Manager will approach the host country's judiciary to further address the grievance.
- Following this process, the Grievance Manager will again approach the stakeholder to obtain sign-off on actions implemented.
- The staff member who signs off the complaint should have sufficient knowledge about the topic to provide assurance.
- Once sign-off has occurred, this should be recorded in the Grievance Log.

1.7.6***Step 6: Monitoring and Reporting***

ZRA management will monitor grievances routinely as part of the broader management of the Project. This entails good record keeping of complaints raised throughout the life of the construction and operation of the Project. On receipt of grievances, electronic notification to management must be

distributed. Grievance records must be made available to management at all times.

Monthly internal reports will be compiled by the Grievance Manager and distributed to the management team. These grievance reports will include:

- The number of grievances logged in the proceeding period by level and type.
- The number of stakeholders that have come back after 30 days stating they are not satisfied with the resolution.
- The number of grievances unresolved after 60 days by level and type.
- The number of grievances resolved between ZRA and complainant, without accessing legal or third party mediators, by level and type.
- The number of grievances of the same or similar issue.
- ZRAs' responses to the concerns raised by the various stakeholders.
- The measures taken to incorporate these responses into project design and implementation.

These reports and other records will be made available for external review if required.

An appropriate grievance report should be part of ZRA's annual reporting. Annual reports will be made available to the public. A hard copy will be located at the ZRA offices, and an electronic copy will be made available online.

Appendix A

Stakeholder Grievance Forms

STAKEHOLDER GRIEVANCE LOG

To be completed by ZRA personnel (if grievance being submitted in person) or person submitting complaint

Grievance Record		
Reference No: (for official use)		
Anonymous:	Yes	No
Full Name:		
Contact Information: Please mark how you wish to be contacted (letter, telephone, e-mail).	<input type="checkbox"/> Address/village/traditional authority and ward: _____ _____ _____ _____ <input type="checkbox"/> Telephone: _____ <input type="checkbox"/> E-mail: _____	
Preferred Language for communication		
Description of Incident or Grievance:	What happened? Where did it happen? Who did it happen to? What is the result of the problem?	
Date of Incident/Grievance		
	<input type="checkbox"/> One time incident/grievance (date _____) <input type="checkbox"/> Happened more than once (how many times? ____) <input type="checkbox"/> On-going (currently experiencing problem)	
What would you like to see happen to resolve the problem?		
Additional Comments:		

GRIEVANCE RECORD - TO BE USED AS PART OF THE DATABASE

Grievance Record			
Grievance Number:	Date Submitted:	Target Date for Resolution:	
Name:			
Address and Contact Details			
Grievance Received By:			
Name of Grievance Coordinator:			
Description of Grievance:			
Assessment of Grievance Level:		Notification to CEO or other senior management?	Y/N
Actions to Resolve Grievance			
Delegation to:			
Action	Who	When	Completed Y/N/Date
Response/Resolution:			
Strategy to Communicate Response:			
Sign-Off:			
Date:			
Conclusion			
Is complainant satisfied?	Y/N	Comments from Grievance Coordinator	
Grievance Closed?	Y/N	Grievance Resubmitted?	Y/N
Signature of CEO:		Date:	
Date:		New Grievance Number:	

**GRIEVANCE RECEIPT FORM – TO BE USED TO ACKNOWLEDGE GRIEVANCES
SUBMITTED**

Grievance Receipt Form		
Grievance Number:	Date Submitted:	Target date for initial meeting to address grievance:
Name:		
Address and Contact Details		
Grievance Received By:		
Name of Grievance Coordinator:		
Contact details of Grievance Coordinator	Telephone:	
	Email:	
	Address:	

Annex B

Grievance Tracker

Annex B

Water Quality Monitoring

Table1

Water Quality Monitoring Plan

Reservoir and downstream Zambezi River (Figure 1 attached)	Receiving waters downstream of major work sites	
Laboratory (monthly)	Laboratory (monthly)	In-situ (weekly)
<ul style="list-style-type: none"> • pH, • Temperature (in-situ) • Dissolved oxygen • Total Suspended Solids • Electrical conductivity (EC) • Biological Oxygen Demand (BOD) • Chemical Oxygen Demand (COD) • Oil and Grease • Total coliform bacteria • Total dissolved gas (TDG) • Secchi depth and chlorophyll (for lake samples) • Total P, Ammonia-N, nitrate-N, nitrite-N • Total P, orthophosphate • Alkalinity, calcium, magnesium, sodium, potassium, chloride, sulphate • Non volatile metals*** (aluminium, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, titanium, zinc, vanadium) • Volatile metals*** (arsenic, mercury) • Pesticides (glyphosate, 2,4-D, aldrin, dieldrin, endrin, heptachlor, PCB, DDT, metoxychlor, endosulfan) 	<ul style="list-style-type: none"> • pH • Biological Oxygen Demand (BOD) • Chemical Oxygen Demand (COD) • Total nitrogen • Total phosphorus • Oil and grease • Total suspended solids • Total coliform bacteria 	<ul style="list-style-type: none"> • pH • Temperature • Dissolved oxygen • ORP • Turbidity • Electrical conductivity
<p>Key: * Based upon ZRA Water Quality Guidelines (1st Edition, 2003) plus additional parameters from ESIA baseline, existing ZRA sampling programmes, etc; ** Based upon IFC wastewater discharge standards (2007); *** Preferably also sample in suspended and bed sediment load (particularly in lake samples).</p>		

Figure.1 Monitoring Points for Water Quality

