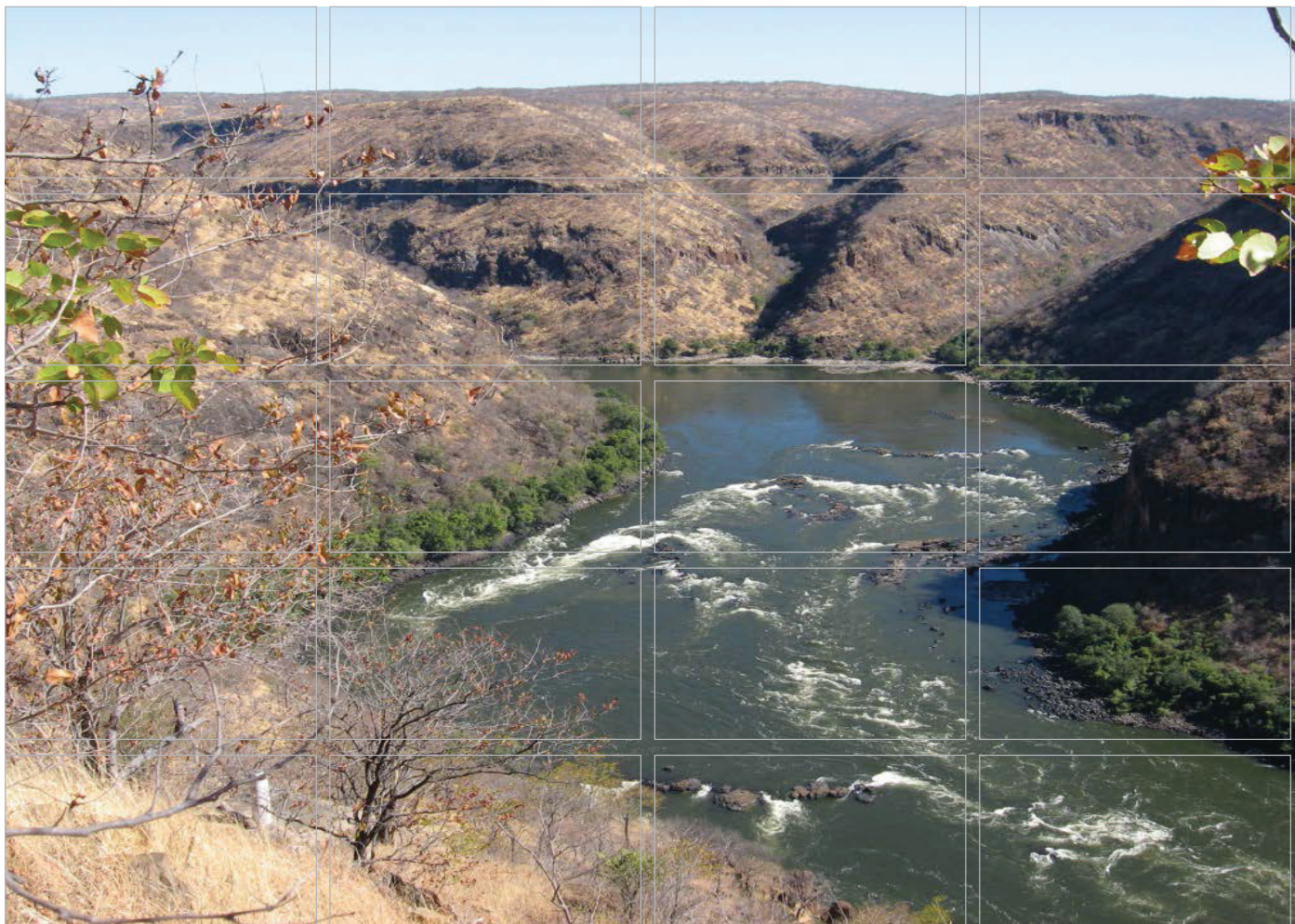




ZAMBEZI RIVER AUTHORITY



## *Draft Scoping Report*

**Environmental and Social Impact Assessment of the  
proposed Batoka Gorge Hydro-Electric Scheme (Zambia  
and Zimbabwe) on the Zambezi River**

Zambezi River Authority

October 2015



Zambezi River Authority

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

## Draft Scoping Report

October 2015

Reference 0239269

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For and on behalf of  
Environmental Resources Management

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Date: October 2015

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## ACRONYMS

amsl	above mean sea level
AoI	Area of Influence
BID	Background Information Document
BJVC	Batoka Joint Venture Consultants
CAPCO	Central African Power Corporation
CBO	Community Based Organizations
CBNRM	Community Based Natural Resource Management
CEC	Copperbelt Energy Corporation
COMESA	Common Market for Eastern and Southern Africa
CRR	Comments and Response Report
DLM	Department of Land Management
DSR	Draft Scoping Review
EA	Environmental Assessment
EFR	Environmental Flow Requirements
EHS	Environment Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statements
EMA	Environmental Management Agency
EMB	Environmental Management Board
EMPs	Environmental Management Plan
EPFIs	Equator Principles Financial Institutions
EPPCA	Environmental Protection and Pollution Control Act
ERB	Energy Regulation Board
ERM	Environmental Resources Management Southern Africa (Pty) Ltd.
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
DC	District Commissioner
DDCC	Development Coordinating Committee
DoE	Department of Energy
DRC	Democratic Republic of Congo
DSM	Demand Side Management
DSS	Decision Support System
DWA	Department of Water Affairs
EAMCU	Environmental Affairs Management and Co-ordination Unit
ECZ	Environmental Council of Zambia
EF	Environmental and Social Flow
EMA	Environmental Management Act
ENRMD	Environment and Natural Resources Management Department
EPCCA	Environmental Protection and Pollution Control Act
ERB	Energy Regulation Board of Zambia
ERM	Environmental Resources Management Southern Africa (Pty) Ltd.
ESIA	Environmental and Social Impact Assessment
FSL	Full Supply Level
GDP	Gross Domestic Product

GW	Gigawatt hours
GWh/y	Gigawatt hours per year
HES	Hydro-Electric Scheme
HIV	Human Immunodeficiency Virus
HPP	Hydropower Project
HRAU	Human Resources and Administration Unit
HRDC	Hwange Rural District Council
I&APs	Interested and Affected Parties
IA	Impact Assessment
IFC	International Finance Corporation
IGMOU	Inter-governmental Memorandum of understanding
IHA	International Hydropower Association
IPP	Independent Power Producer
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
IUCN	International Union for the Conservation of Nature
JICA	Japan International Cooperation Agency
KAZA TFCA	Kavango-Zambezi Transfrontier Conservation Area
Km	kilometre
LHPC	Lunsemfwa Hydro Power Company
m	metres
MEWD	Ministry of Energy and Water Development
MLGHEEP	Ministry of Local Government, Housing, Early Education and Environmental Protection
Mm <sup>3</sup>	cubic millimetre
MJ	megajoules
MW	megawatts
MTENR	Ministry of Tourism, Environment and Natural Resources
NEC	National Environmental Council
NEP	National Energy Policy
NGOs	Non-Governmental Organisations
NHCC	National Heritage Conservation Commission
NMB	National Museum Board of Zambia
NMMZ	National Museums and Monuments of Zimbabwe
NPWA	Zimbabwe National Parks and Wildlife Agency
NRMCU	Natural Resources Management and Co-ordination Unit
OPPI	Office for Promoting Private Power Investment
pa	Per Annum
PCDP	Public Consultation Disclosure Plan
PPP	Public Participation Process
PV	Photovoltaic
RCC	Roller Compacted Concrete
ROR	Run of River
PES	Present Ecological State
REA	Rural Electrification Authority
SADC	Southern African Development Community
SAP	Sustainability Assessment Protocol
SAPP	Southern African Power Pool



SEP	Stakeholder Engagement Plan
SGs	Sustainability Guidelines
SNDP	Sixth National Development Plan
SP	Studio Pietrangeli Consulting Engineers
STI	Sexually transmitted infection
TB	Tuberculosis
ToR	Terms of Reference
TTIT	Tourism Training Institute Trust
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCD	World Commission on Dams
ZAWA	Zambia Wildlife Authority
ZCCM-IH	ZCCM Investment Holdings Plc
ZDA	Zambia Development Agency
ZEMA	Zambia Environmental Management Agency
ZENT	ZESA Enterprises
ZERA	Zimbabwe Energy Regulatory Authority
ZERC	Zimbabwe Electricity Regulatory Commission
ZESA	Zimbabwe Electricity Supply Authority
ZESCO	ZESCO Limited
ZETDC	Zimbabwe Electricity Transmission and Distribution Company
Zim Asset	Zimbabwe Agenda for Sustainable Socio-Economic Transformation
ZimStat	Zimbabwe National Statistics Agency
ZimVAC	Zimbabwe Vulnerability Assessment Committee
ZINWA	Zimbabwe National Water Authority
ZPC	Zimbabwe Power Company
ZRA	Zambezi River Authority
ZTB	Zambia Tourism Board

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## ***EXECUTIVE SUMMARY***

### ***INTRODUCTION AND BACKGROUND***

The proposed project, the Batoka Gorge Hydro-Electric Scheme (hereafter referred to as the Batoka HES), lies on the Zambezi River, approximately 50 kilometres (km) downstream of the Victoria Falls. This proposed bilateral hydropower project between Zambia and Zimbabwe includes the construction of a proposed 181 metres (m) high gravity arch dam that would provide a total capacity of between 1,6000 and 3,000 megawatts (MW) (to be shared equally between Zambia and Zimbabwe), and annual energy production of 11,100 Gigawatt hours per year (GWh/y).

Although geological investigations in the Batoka Gorge commenced prior to the construction of the Victoria Falls Bridge (before 1904), more extensive work with regards to the Batoka HES in particular, began in 1972. This related to early investigations undertaken by Sir Alexander Gibb & Partners, on behalf of the then Central African Power Corporation (CAPCO), in order to identify suitable sites on the Zambezi River for the development of Hydropower schemes.

While engineering and geological investigations were undertaken in the Batoka Gorge during this study, the site was some 12 km downstream from the site now identified as the most suitable location for the Batoka HES development.

Since 1972, three more phases of site/geological investigations have been undertaken at the preferred Batoka site (12 km upstream of that defined in 1972). These investigations were conducted in 1981/82, 1983 and 1989 respectively, in order to supplement information acquired during previous studies, and to proceed to the final design of the dam and its associated infrastructure. Amongst other findings, the results of these investigations revealed that the Batoka Gorge substrate conditions represent a feasible location for such a project, with surrounding rock masses that are generally considered to be strong, hard and of low permeability (BJVC, 1993).

In 1981, the Zimbabwean Natural Resources Board commissioned the Department of Land Management (DLM) to undertake an Environmental Impact Assessment (EIA) of future dams at the Batoka Gorge and Mupata Gorge sites. The EIA report concluded that the Batoka HES would flood a comparatively small area, with "negligible" environmental impacts, although the study concluded that the scheme would have a direct negative impact on the white river rafting industry conducted below the Victoria Falls. Although it was determined that the study did not address upstream and downstream effects adequately, given the limited Terms of Reference (ToR), a team of consultants commissioned in early 1990 by the Industry and Energy Department of the World Bank judged that the EIA report was reliable and

professionally conducted, as reported at an International Union for the Conservation of Nature (IUCN) workshop, held in Victoria Falls in 1992.

In 1992, the ZRA commissioned the Batoka Joint Venture Consultants (BJVC) to carry out a feasibility study for the Batoka HES. Although this report looked at two alternative sites, in addition to the 1981/82 site, neither was found to be better than the site identified in the 1981 report (BJVC, 1993). As such, the above-mentioned feasibility study concentrated on this site, with 18 different configurations for development being considered, costed and compared (BJVC, 1993). The findings identified that a Roller Compacted Concrete (RCC) gravity arch dam with two underground power stations (one on the Zambian bank of the river and another on the Zimbabwean bank), each with four turbines fed by two penstocks, with a combined total capacity of 1,600 MW, was the optimal project sizing for the site. Furthermore, the proposed dam would provide 1,680 Mm<sup>3</sup> of storage. This relatively small storage capacity (compared to Lake Kariba's capacity of ±180,000 cubic millimetre (Mm<sup>3</sup>)) means that the plant would be intended to operate as a 'Run of River' (RoR) scheme, allowing more effective use of the storage in Lake Kariba and maximising secure power delivery at the greater system level. Annual energy production of the proposed scheme was expected to be in the order of 9,000 GWh.

A recommendation was made in the 1993 Feasibility Report for further studies to be undertaken to evaluate the overall environmental impact of the proposed project. In accordance with this recommendation, a number of additional Environmental Impact Studies were undertaken for the Batoka HES in 1998. The main objective of these studies was to assess various environmental issues that were not adequately addressed during the earlier feasibility study, as they were considered to fall outside of the scope of the original work. The nine aspects that were assessed in further detail, as part of the 1998 study, included the following:

- Vegetation studies;
- Wildlife studies;
- Water quality and limnology;
- Fish and fisheries;
- Tourism studies;
- Archaeology and paleontology;
- Social and cultural studies;
- Downstream impacts; and
- Land use studies.

The most notable negative impacts identified in the 1998 report were related to the loss of vegetation (eg inundation of rare species), wildlife, specifically avifauna (eg falcon nesting sites), tourism (eg white-water rafting), and socio-cultural and land use issues (eg in-migration). However, potential mitigation measures were also proposed to reduce the impact of the Batoka HES on these aspects, and a list of potential positive benefits of the development, was provided. The report did not constitute a comprehensive EIA, as only the



environmental issues additional to the 1993 study were assessed. As such, the 1998 report should be read in conjunction with the 1993 Feasibility Report.

Given the wealth of studies undertaken for the proposed Batoka HES, the ZRA has since appointed Studio Pietrangeli (SP) Consulting Engineers to update the engineering feasibility study for the proposed scheme, and in parallel, has appointed ERM to carry out an Environmental and Social Impact Assessment (ESIA) of the proposed Batoka HES. The ESIA is to make extensive use of the 1993 and 1998 studies, but updated using current information available.

### ***PROJECT PROPONENT***

The Zambezi River Authority (ZRA), a corporation jointly and equally owned by the governments of Zambia and Zimbabwe, is considering developing the Batoka Gorge Hydro-Electric Scheme, and is the project proponent for the proposed Batoka HES.

### ***PURPOSE OF THE REPORT***

The ESIA process is being conducted in accordance with the Zambian Environmental Management Act (Act No. 12 of 2011) and Environmental Impact Assessment (EIA) Regulations. In Zimbabwe, the process is being conducted in line with the following legislation: the Environmental Management Act 20:27 of 2002; Statutory Instrument 7 of 2007: Environmental Management (Environmental Impact Assessments and Ecosystems Protection) Regulations; the Environmental Impact Assessment Policy of 1997; as well as the Environmental Impact Assessment Guidelines of 1997. The study will also conform to the World Bank Safeguard Policies and the International Finance Corporation performance standards.

The environmental scoping study (*this report* – otherwise known as the Terms of Reference for the study, and a requirement specifically of the Zambian Environmental Management Act of 2011) is the second phase of the overall ESIA process. The purpose of the scoping study is to identify the environmental consequences of the proposed project, and to consider input from stakeholders. The study aims to provide the relevant authorities with enough information to make a decision regarding the project, or the need for further biophysical or socio-economic studies. The main objectives of this study are therefore to:

- present the ESIA process and the relevant national legislation and international obligations that will be adhered to;
- present a description of the proposed project;
- present the alternatives assessed and the rationale behind the preferred alternative;
- present the biophysical and socioeconomic conditions of the study area;

- present the issues raised during the initial public consultation process;
- identify the environmental and social issues related with this project, on which the ESIA Study shall be focused; and
- Present an outline of the terms of reference for the various specialist studies that will address the identified environmental and social issues.

The Scoping Report does not present the assessment of the environmental impacts or other definitive answers; these shall be presented in the ESIA Report.

### *PROJECT RATIONALE*

Despite Zambia and Zimbabwe's vast renewable and non-renewable energy sources, little of these have been utilised to improve the attractiveness of the energy sector and transfer the benefits for industrial expansion, employment creation and poverty reduction in both countries. The energy market structure and consumption shows that traditional wood fuels (biomass), such as firewood and charcoal sourced from natural woodlands and agricultural lands dominate the energy market.

Investment in energy is a prerequisite to achieving commercial and industrial development in Zambia and Zimbabwe. The use of solar power is favourable in providing rural and urban areas with access to power; however, if both countries are to achieve those targets and goals detailed in their Vision 2030 and Vision 2040, and other complimentary plans (such as the System Development Plans), these countries will require private sector investment in energy technology that is efficient, sustainable and reliable. The generation of energy through hydropower is a proven technology that is sustainable and which is actively being promoted at a national level in both Zambia and Zimbabwe. With a vast hydropower energy potential, hydropower is considered the most feasible and reasonable electrification option for both countries.

Preliminary investigations, geographical exploration as well as the 1993 and 1998 ESIA studies have concluded that the Batoka HES project with a proposed installed capacity of 1,600 MW is the least cost solution and has the least adverse environmental impacts. The site for the proposed scheme has been chosen as the most viable compared to the other sites investigated and has been ranked as the first major hydro-electric development on the Zambezi River since the construction of the Kariba Dam (IUCN, 1992).

The objective of the Batoka HES is to increase power generation capacity in both Zambia and Zimbabwe, reduce power outages and reduce reliance on coal fired power stations. Once completed, the Batoka HES project will contribute significantly to the electricity supply of both countries, and also serve to distribute power to southern African countries, thanks to several planned projects under the coordination of the Southern African Power Pool (SAPP) aimed at increasing transfer limits through boundary connections.

## **PROJECT DESCRIPTION**

The proposed Batoka HES is to be located at 17° 55' 38.55" S and 26° 6' 28.38" E <sup>(1)</sup>, 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 50 km downstream of the Victoria Falls (see *Figure 0.1* and *Figure 0.2*).

In Zimbabwe, the proposed scheme falls within the province of Matabeleland North and in the Hwange Rural District. It includes the wards of Matetsi, Chidobe, Katchecheti, Nemanhanga, Mbizha, Jambezi, Sidinda, Mashala and Simangani. The traditional authorities in the area of impact in Zimbabwe include chief Shana, Bishop Matata Sibanda (who is Acting Chief for Mvutu who has recently deceased) and Chief Hwange. In Zambia, the main area of direct impact falls under the Southern Province in the Kazungula District, most notably the wards of Mukuni Ward and Katapazi, which fall under Chief Mukuni's jurisdiction. However, impacts will also be felt in Livingstone District, Zimba District and Choma District and downstream impacts are likely to be experienced in the District of Kalomo.

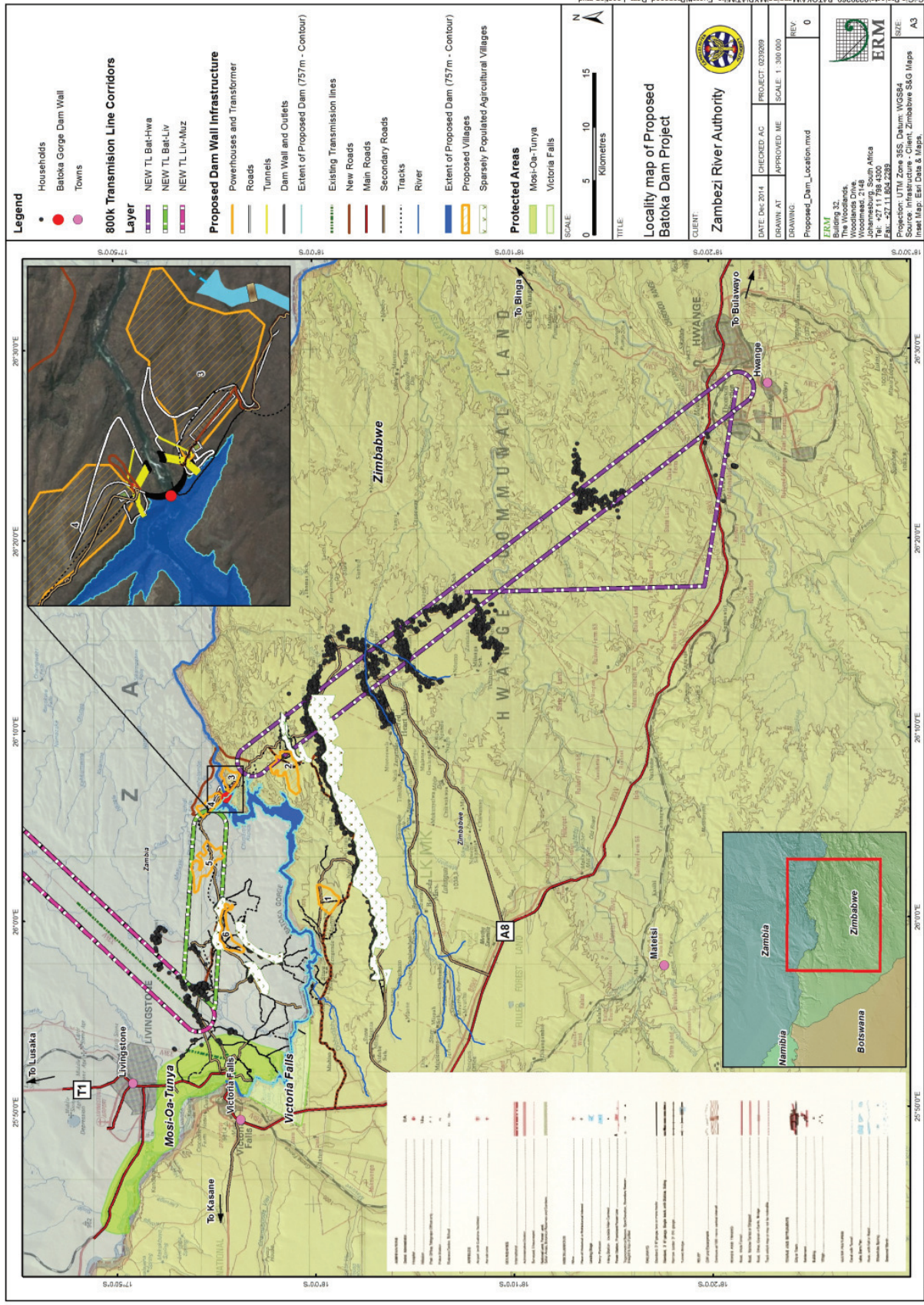
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(1) More accurate coordinates (in ITRF2008 Geographic) are provided by SP (2015) for the proposed site on both the Zambian and Zimbabwean banks of the river.  
UTM Coordinates are 8017623.076 (Y) and 405516.5006 (X)



Figure 0.1

Proposed Dam Site Location (1)





Proposed Dam Site Location (2)





## *PROJECT COMPONENTS*

The following constitute the key components of the Batoka HES project:

- Dam wall and impoundment, also including a spillway;
- Power houses;
- Transmission lines in Zambia and Zimbabwe;
- Access roads in Zambia and Zimbabwe; and
- Permanent villages and other ancillary infrastructure (such as quarries, spoils area, construction camps and batching areas).

The following sections reference the dam design that was proposed in the 1993 Batoka Gorge Hydro Electric Scheme Feasibility Study (BJCV, 1993, but which has now been updated, as outlined in Studio Pietrangeli's (SP) March 2015 Phase II Option Assessment Report.

### *Dam Wall and Impoundment*

The proposed Batoka HES has been proposed in the central portion of the Zambezi River Basin, at a site 50 km downstream of Victoria Falls and will extend across the international boundary between Zambia and Zimbabwe. The proposed high gravity arch dam wall will be 181 m in height (1993). The full supply level (FSL) of the reservoir is tentatively set at 757 m above mean sea level (amsl). After impoundment to the Full Supply Level (FSL), the reservoir surface area will cover approximately 25.6 km<sup>2</sup> (*Figure 0.2*). The FSL of 757 m has been tentatively selected so as to ensure the backwaters from the resulting impoundment do not reach the base of the Victoria Falls or flood the outlets of the existing Victoria Falls Power Station, located in the region of Silent Pool. An analysis of the optimum dam height will be carried out by SP during this feasibility phase.

SP (2015) is proposing a "compact" layout for the arch gravity dam (waterways and powerhouse) obtained through a separated spillway on the right abutment the design of the dam. SP have moved the spillway from the body of the dam, to a saddle on the right abutment located approximately 2 km from the dam site. This means that the waterways are greatly shortened, replacing the long power tunnels with short penstock in the dam body.

The spillway has the advantage of safety during operation (as it avoids any risk of under-cutting at the dam wall), it avoids the need for artificial works (plunge pool and other protection/dissipating structures) aimed at minimising erosion in proximity of the dam and Power Houses. Furthermore, the total excavated volume of the spillway during construction may be used as quarry materials and used as aggregate for use in the arch gravity dam wall, minimising the requirement for rock quarries and/or borrow pits.

## Power Houses and Switchyards

In the 1993 Feasibility Study it was planned that two power houses, each with an installed capacity of 800 MW, would be constructed on each river bank, with a total capacity of the scheme being approximately 1600 MW. However, the 2015 SP study undertook an analysis on the optimum installed power, which considered that capacity that minimises the unit generation cost, that maximizes the Internal Rate of Return (IRR), and which ensured the optimum installed power was acceptable from an environmental flow point of view. Based on the results of the SP (2015) review, the optimum installed capacity that maximises the IRR and minimizes the unit generation costs is 2,400MW. As the proposed plant will operate as a run-of-river scheme, the environmental constraints do not affect the selection of the optimum installed power.

Two independent power houses are proposed at the dam toe, which has the advantage of obtaining a very compact layout of the dam, power waterways and power house. The power houses are outdoor and accessible from both the right and from the left banks.

Due to the small storage capacity of the planned reservoir (~1,392 Mm<sup>3</sup> at FSL), the Batoka HES will be operated as a run-of-river project with storage only sufficient to allow daily and weekly peaking but not for monthly or seasonal flow regulation. Further details of the Batoka HES, as per the 2015 Option Assessment Report (SP, 2015) are provided in *Table 0.1* below.

Two switchyards are located on each bank of the river, at elevation 800 m. Switchyards are connected by 400 kV overhead lines from the main transformers, housed behind the power houses.

**Table 0.1**      **Batoka HES Project Description**

Project Description	
<b>Reservoir</b>	
Catchment Area	508, 000 km <sup>2</sup>
Average Annual Runoff (m <sup>3</sup> /s)	1,070
Minimum Operating Level (MOL)	746 m asl
Full Supply Level (FSL)	757 m asl
Surface Area @ FSL	23 km <sup>2</sup>
Total Storage	1,392 Mm <sup>3</sup>
<b>Dam</b>	
Type	Arch-Gravity
Crest el.	766 m asl
Foundation min. el.	585 m
Max Height (u/s)	181 m
Crest length	720 m
<b>Spillway</b>	
Type	Gated
Spillway width	118 m
No. of Bays	7

Project Description	
Sill elevation (masl)	743.5 m
Energy dissipater	Plunge pool
Power House	
Type	Outdoor
Number	2
Turbine number and type	12/Francis, each of 200MW of installed capacity
Installed Power	2,400 MW
Annual Energy Production	10,215 GWh/y

Source: SP, 2015. Option Assessment Report

The proposed layout of the Batoka HES is provided in *Figure 0.3*.

### ***Transmission Lines***

It is proposed that in Zimbabwe, the transmission lines will comprise 2 x 70 km 330 kV lines, running in parallel, and sharing a common right-of-way, to the existing Hwange 330 kV substation. The 330kV transmission lines will have a way-leave of 50 meters (25m on either side).

In Zambia, two 330 kV transmission line routes are proposed, each comprising two outgoing lines. The first routing is from Batoka, terminating at a proposed new 330 kV ZESCO substation to be constructed in Livingstone; this route will be 21 km long. The second line will run in parallel to the existing 220 kV line, terminating at the Muzuma substation in Choma, a distance of approximately 160 km.

### ***Access Roads***

The upgrading of existing roads and construction of new roads to access each bank from the main roads linking Livingstone to Lusaka (Zambia) and Victoria Falls to Bulawayo (Zimbabwe) will be required. In the 1993 Feasibility Study, this included the rehabilitation of 9 km of road and the construction of 22 km of new road in Zambia, and the rehabilitation and upgrading of 40 km of road and the construction of 14 km of new road in Zimbabwe, respectively.

The major modification to the 1993 study concerns the type of intervention. Instead of building new roads, SP (2015) advocate the upgrade of the existing roads as much as possible.

### ***Permanent Villages and Other Ancillary Infrastructure***

Permanent villages will be located on each side of the river. Six alternatives for the locations of these permanent villages were proposed. The location of each proposed permanent village was finalised after environmental and social baseline studies, and the alternative suggested was based primarily so as to reduce the likelihood or extent of resettlement required, and on impacts to identified sites of cultural heritage importance.

Construction camps will house approximately 3,000 staff in total (including security and support staff), but this will be only after two years, where initially 500 construction workers will be involved with the construction of access roads, infrastructure and the camps. Thereafter 3,000 staff in total will be required for the rest of the construction phase (up to six or seven years).

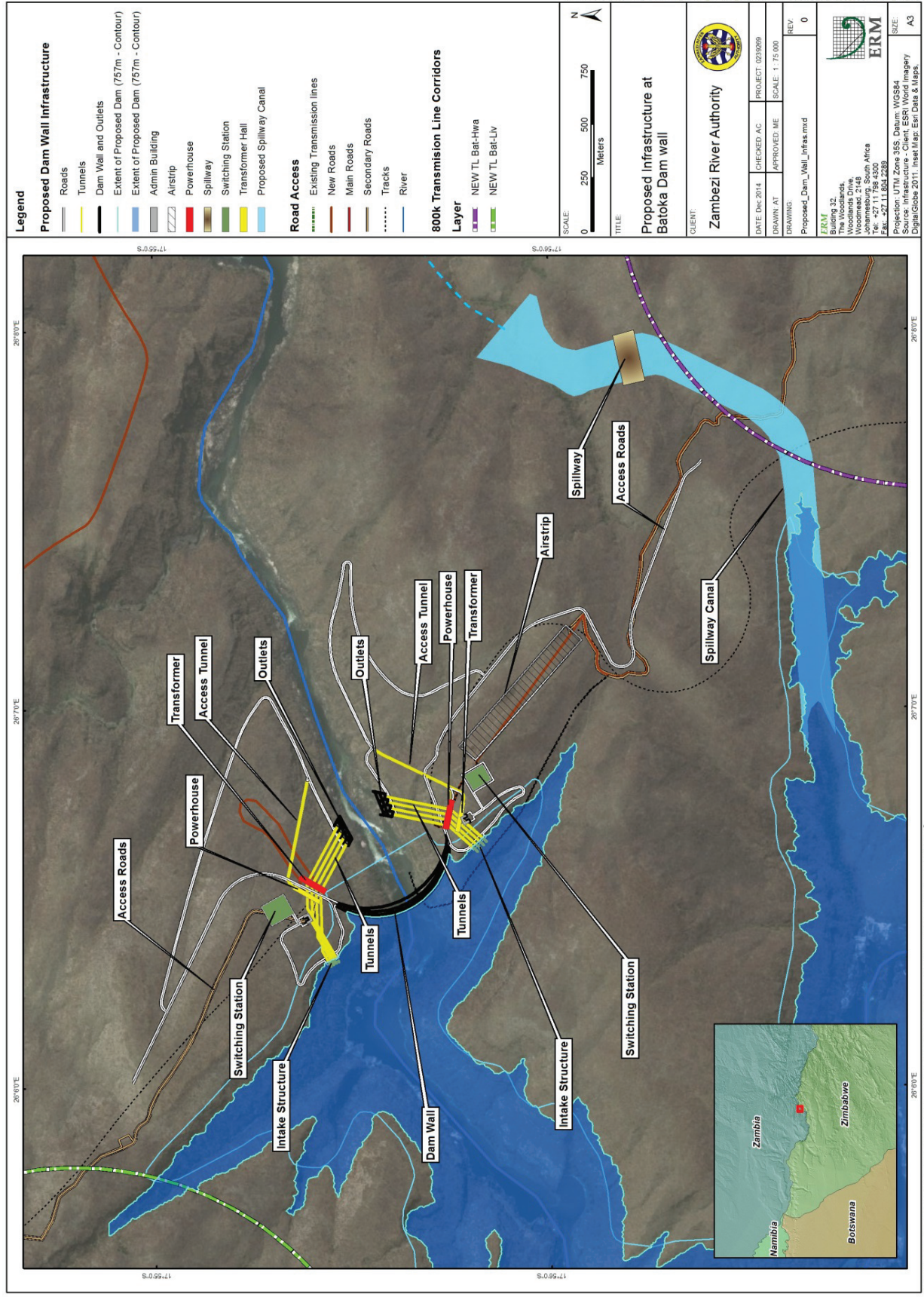
It is proposed that the construction camps will be converted into permanent villages during the operational phase of the dam, for housing staff, their families, and support services personnel (customs, police etc.). The 1993 feasibility study predicted approximately 9,000 people to be housed (assuming 4,500 on each side of the river).

Quarries, spoils areas, construction and batching camps will also be required in Zambia and Zimbabwe (see *Figure 3.5*).

The construction of the spillway and material stemming from this have been identified as suitable sources of aggregates to be used in the construction of the dam wall, which will reduce the volumes of quarrying and spoils areas required.



Figure 0.3 Proposed Layout of the Batoka HES





The baseline presented in this Scoping report is based primarily on a review of available secondary information and will be updated during the Impact Assessment (IA) phase once detailed baseline surveys have been conducted, and will be reported in detail in the ESIA report.

It is important to gain an understanding of the physical, biological and socio-economic attributes of the Project Area and surrounds, as this will allow for a better understanding of the environment in which the project is being considered. Consideration of the receiving environment is a prerequisite for the identification of potential environmental and social impacts, and for the applicable mitigation of such impacts.

*Box 0.1 to Box 0.3* below outlines the key aspects of the biophysical and socio-economic baseline environments that need to be considered by the Project.

### **Box 0.1**      *Key Aspects of the Physical Environmental Baseline*

#### **Climate**

Temperature variation across the Basin across seasons is not high (i.e. estimated to be in the region of 4 °C). Average annual rainfall in the Basin is approximately 950 mm/year, although this average is unevenly distributed with the northern and eastern portions of the Basin receiving the highest proportion of rainfall. The Zambezi River Basin experiences robust seasonality with regards to precipitation, with a dry season from June to August, and a wet season from December to February.

#### **Geology**

The Zambezi River flows through a deep gorge eroded in basalts. There are 13 basalt flows which constitute the dam site, between 350 and 850 m amsl. Weathering and alteration have had little overall effect on the rock matrix and generally the rock mass may be considered to be strong, hard and of low permeability.

#### **Soils**

Most of the soils in the project area are regosols, characterized by deep and highly pervious fine to medium-grained sands formed on Aeolian Kalahari deposits.

#### **Hydrology**

The major contribution to the flows at the Batoka dam site derive from the upstream sub-catchments including: Kabompo, Lungwe Bungu, and especially the Upper Zambezi sub-catchments (located in the Northern highlands), together with Luanginga sub-catchment. This natural variability of Zambezi River flows is highly modified by large dams, particularly by Kariba and Cahora Bassa dams on the main stem, as well as Itzhi- Tezhi and Kafue Gorge Upper dams on the Kafue River tributary. These dams have altered the hydrological conditions of the Zambezi River, especially the timing, magnitude, duration, and frequency of seasonal flood pulses. Multi-year droughts are also observed in the Basin, with implications for river flows and hydropower production. Climate change studies indicate that the Zambezi will experience drier and more prolonged drought periods, and more extreme floods.

**Flora**

- The project falls within the Sudano-Zambezian phytogeographic Region. This area is florally rich and characterised by a range of species with a very wide range of distribution which extends beyond southern Africa. It also contains many endemic species.
- Arid savannas, generally with eutrophic soils, extend to the drier hotter lowland valleys whereas the moist savannas are associated with leach soils of the central African plateau.
- There are five main vegetation types with the principal determinants being characterised as distance from the river and slope as follows:
  - i. Zambezi riparian vegetation, which is confined to a narrow band (50 metres) between the upper flood level of the Zambezi River and the elevation at which soil moisture becomes insufficient to support the high proportion of broad-leaved evergreen trees;
  - ii. *Colophospermum* mopane woodland on the upper gentler slopes of the gorge, the gorge rim and immediate catchment area;
  - iii. *Commiphora*/mixed species woodland on steep, dry scree slopes (25 °-30 °) extending from the riverine fringe to the base of the basalt cliffs, above the Zambezi riparian vegetation;
  - iv. Tributary riparian vegetation from the Zambezi riparian fringe, up several tributary side gorges and well developed in the shades of the cliffs and along perennial; streams such as the Daoma and Songwe; and
  - v. *Acacia nigrescens*/open scree woodland, found along the same topographic unit as the *Commiphora*/mixed species woodland, but usually on slopes with a southern/eastern aspect.
- Modification of vegetation in the area has occurred through deforestation as a result of logging and due to grazing and browsing mainly by elephants.

**Fauna**

- The proposed project lies within the sphere of influence of the Kavango- Zambezi Transfrontier Conservation Area (KAZA TFCA).
- Wildlife studies conducted in the 1998 study revealed little wildlife on both banks of the river, apart from small game. Previous ESIA studies have established that due to the rugged terrain of the Batoka Gorge, the species diversity of resident mammals is relatively low.
- Within the gorge are large mammals adapted to rocky terrain such as vervet monkeys, chacma baboons and klipspringers. Larger mammals including kudu and buffalo are occasionally seen within the gorge along the Zambezi shoreline where access is possible through minor side-gorges. Some large predators such as leopard and hyena are also occasionally spotted and lion are known to pass through the area. Various bat species have also been found within the numerous crevices and overhangs of the Gorge.
- Elephants frequently move through the greater area and there is abundant evidence of their presence in the form of broken trees, paths and faeces.
- The Batoka Gorge is listed as an Important Bird Area (IBA) of continental significance based on the presence of breeding Taita Falcons, a threatened (Vulnerable) and range restricted species. This bird survives in small populations but populations have experienced a recent decline. If this trend continues, the species may be endangered in the near future.
- The Batoka Gorge also contains an important breeding population of the White collared or Rock Pratincole, and Black Stork, both of which are not threatened species but are regionally important populations. There is also a high diversity of raptors which include a variety of vulnerable and near threatened species.

**Protected Areas**

- Protected sites in the project area include the Victoria Falls or *Mosi-oa-Tunya* (the smoke that thunders), a UNESCO world heritage site on the Zambezi River.

**Jurisdiction of the Project Affected Area**

- In Zimbabwe, the proposed scheme falls within the province of Matabeleland North and in the Hwange Rural District. In Zambia, the main area of direct impact falls under the Southern Province in the Kazungula District. However, impacts will also be felt in Livingstone District, Zimba District and Choma District and downstream impacts are likely to be experienced in the District of Kalomo.

**Demographics**

- On the Zimbabwean bank of the Zambezi, the Valley Tonga is still represented by the Dombe clusters in the villages located within the project area. A Shona-speaking offshoot of the Great Zimbabwe culture the Nambya are still a prominent ethnic group. There are also large populations of Ndebele. Accordingly the languages spoken include Shona, Nambya, Ndebele and English.
- On the Zambian side, the Toka-Leya are the predominant ethnic group, consequently, the predominant language spoken in the region is Toka-Leya.

**Livelihoods**

- Crops grown in the project area in both countries were observed to include sorghum, maize and vegetables; however, agriculture is noted to be limited by infertile land and the rocky terrain.
- Human animal conflict is a problem on both the Zambian and Zimbabwean side of the river and hampers agricultural and livestock activities; wild animals in the area (eg elephants, hyena etc) have killed and eaten livestock and trampled crop gardens.
- Household economies in both Zambia and Zimbabwe are characterised by dryland cropping, livestock rearing (notably cattle, but also goats), collection and sale of grass (for the construction of roofs for homesteads), curios and some wage labour.
- The biggest source of wage income for the communities in the Project area is the sale of curios and engagement in the tourist industry.
- Fishing in the gorge by locals on both sides of the river does take place with the preferred method of fishing being hand nets and rod lines. Whilst most catch is for consumption purposes, some is sold in Victoria Falls and Livingstone. Fish catches are highest during high flow, and more fishermen are engaged in fishing at this time.

**Tourism**

- Tourism is a key income source in the Project area and there are few other income generating opportunities in the area. Activities offered to tourists that make use of the Zambezi River and / or Batoka Gorge include white water rafting, Jet Extreme Boating, birding, angling, hiking and scenic flights.
- Rafting downstream of the Victoria Falls is considered to be one of the best white water rafting experiences in the world because of the number of high grade rapids in succession over a short stretch of river as well as the wild, untouched nature of the Zambezi River.

**Health**

- Victoria Falls and Livingstone both have government hospitals. There is also Lukosi Rural Hospital, a missionary hospital (St Patricks) and a private hospital (at Hwange Colliery) in Hwange in Zimbabwe. Some rural settlements also have clinics.
- In the Zimbabwean project area, health facilities include Chisuma clinic, Jambezi clinic, Ndlovu Clinic and the Sacred Heart Mission. These serve a catchment area of up to 32km.
- In the Zambian Project area, there is a rural health centre in Mukuni, which serves a catchment area of up to 30km and a catchment population of over 10,000.
- Health facilities often lack modern equipment and are constrained by limited staff numbers. In the communities, people tend to use the community clinics and only access the hospitals when they have more serious health problems that cannot be treated by the clinics.
- Health of communities is poor, with the main health issues noted being malnutrition, malaria, helminthiasis and diseases associated with poor sanitation.

### **Infrastructure**

- Houses in rural settlements on both sides of the river were mainly constructed from mud walls and grass thatched roofs. However, a few houses were observed to be made from bricks and asbestos roofs, especially those located close to the chief's residences.
- Infrastructure in the rural communities consists of churches, primary schools, clinics, boreholes and wells and cattle dips, as well as kraals. In Zimbabwe, a number of shops were also noted, mainly selling foodstuffs. The area also has a number of business centres, such as Jambezi rural centre, which accommodates a cluster of retail outlets.
- Public transport is virtually non-existent and the majority of community members either walk or rely on private taxis.

### **Cultural and Heritage**

- There are 63 sites of archaeological interest currently known in and around the proposed Batoka Gorge HES.
- Most sites in Zambia and Zimbabwe derive from the Stone Age and are associated with the extensive colluvial and perched alluvial deposits that line the crest of the gorge and along the waterways.
- There are probably locally important sites used for ritual activity, especially rainmaking. Known as malende, they are often associated with large trees such as baobabs, but also river pools, hot springs, mountains and waterfalls.
- To date no fossil remains have been recovered in the area, but as the 1998 report clearly states, the possibility is there. The sandstone lenses with the basalt flows have been found elsewhere to contain important dinosaur remains.
- One site given prominence in the BJVC (1993) report, is the Chemapato Hill site, which is an isolated hillock on the Zimbabwean side of the Batoka Gorge. The sacred nature of the hill and its artefacts and their importance to the nearby residents of Chimusa village is highlighted in this report.
- The 1993 and 1998 studies reaffirmed the observation that most heritage sites lie above the level of water of the proposed Batoka HES, and are thus not likely threatened by the construction of the Batoka Gorge HES.

## ***INSTITUTIONAL AND LEGISLATIVE FRAMEWORK***

### ***Zambia***

The Ministry of Lands, Natural Resources and Environmental Protection is charged with the critical responsibility of land administration, natural resource management and environmental protection on behalf of the people of Zambia. The Zambia Environmental Management Agency (ZEMA) falls under the Ministry of Lands, Natural Resources and Environmental Protection. ZEMA is the umbrella environmental institution in Zambia and the main lead agency on matters pertaining to environmental impact assessments (EIA). It is empowered by the Environmental Management Act (No. 12 of 2011) (EMA) to identify projects, plans and policies for which an EIA is necessary.

The Environmental Impact Assessment Regulations, which provide the framework for conducting and reviewing environmental impact assessments for any project, fall under the EPPCA (Statutory Instruments No. 28 of 1997). The Regulations enacted under the EPPCA are still in force until the Minister enacts new Regulations under the Zambian EMA (Act, No 12 of 2011).

## *Zimbabwe*

The ministry with overall responsibility for environmental management in Zimbabwe is the Ministry of Environment, Water and Climate.

Environmental management is regulated by three related agencies in the Ministry of Environment, Water and Climate; namely the National Environmental Council (NEC), the Environmental Management Agency (EMA) and the Environmental Management Board (EMB).

The Zimbabwean Environmental Management Act (the Act) (Chapter 20:27), No. 13 of 2002, was enacted in 2002 as amended on March 25, 2006 and April 17, 2011. The provisions of the Zimbabwean EMA that relate to EIAs in particular are set out in Section 97 of the Act.

The Environmental Management (Environmental Impact Assessments and Ecosystems Protection) Regulations (EIA Regulations) deal with the regulation of the EIA process and the protection of ecosystems. Section 10 (4 to 7) of the EIA Regulations state the following:

- Before any EIA report is furnished to the Director-General, the developer shall carry out wide consultations with stakeholders.
- During review of the prospectus and EIA report, the Director-General shall verify whether full stakeholder participation was undertaken when the EIA report was prepared. <sup>(1)</sup>
- Expenses associated with the stakeholder consultation process should be borne by the developer.
- The Director-General may advertise in the print and electronic media when a prospectus or EIA report is being reviewed.

Zimbabwe and Zambia are signatory to a number of international conventions and agreements relating to industry, environmental management and energy. In certain cases these have influenced policy, guidelines and regulations. These conventions must be complied with during the planning, construction and operations phases of the proposed development.

### *International and Regional Guidelines and Standards*

There a number of international environmental and social guidelines and standards applicable to the Batoka HES Project, especially with regards to International Finance Institutions (IFIs). These include the following:

- World Bank Safeguard Policies;
- The International Finance Corporation (IFC) Performance Standards;

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(1) Note: Proof of stakeholder consultation must be included in the EIA report (these include letters confirming public consultation from relevant Government Agencies). Obtaining proof of consultation from the relevant Government Agencies can be time consuming (and in some cases these Agencies request payment).



- World Commission on Dams (WCD) Guidelines and Recommendations; and
- The International Hydropower Association (IHA) Sustainability Guidelines and Sustainability Assessment Protocols.

### *PUBLIC PARTICIPATION PROCESS*

The public participation process (PPP) has been designed to comply with the regulatory requirements set out in Zimbabwe and Zambia as well as international good practise and the policies of the International Finance Corporation and World Bank Group.

Public participation in an ESIA is not only a statutory requirement, but a process that is designed to provide Interested and Affected Parties (I&APs) with an opportunity to evaluate all aspects of the proposed Project, with the objective of improving the Project by maximising its benefits while minimising its adverse effects. I&APs represent relevant interests and sectors of society and the various relevant organs of state. Through informed and transparent public participation effective social and environmental management/mitigation measures can be established and implemented should the Project be authorised.

The ESIA is currently in a stage of feedback on the Draft Scoping Report. It is important to note that a parallel Resettlement Action Plan (RAP) is being prepared and a separate PPP will be adopted for this study. Issues and comments raised through the RAP will feed into this PPP report.

The PPP has been designed to achieve the following objectives:

- To ensure that I&APs are well informed about the proposed Project;
- To provide a broad set of I&APs sufficient opportunity to engage and provide input and suggestions on the proposed Project;
- To verify that I&APs' issues have been accurately recorded;
- To draw on local knowledge in the process of identifying environmental and social issues associated with the proposed Project, and to involve I&APs in identifying ways in which these can be addressed; and
- To comply with the legal requirements.

The PPP has been designed in four phases, namely:

- Screening/Key Stakeholder Engagement Phase
  - Introduces the proposed Project and its processes to key I&APs;
  - Obtains the blessing of these key stakeholders to consult with communities at large;

- Identifies appropriate, effective and desired means of engagement.
- Scoping Phase
  - Officially initiates and notifies the public of the formal ESIA process;
  - Invites prospective I&APs to register as I&APs;
  - Engages with I&APs to identify issues of concern, suggestions and comments about the proposed Project;
  - Makes suggestions for enhanced Project benefits and reasonable alternatives;
  - Verifies that issues raised by I&APs have been accurately recorded through a Draft Scoping Report; and
  - Defines the Terms of Reference for the ESIA specialist studies to be undertaken in the impact assessment phase.
- Impact Assessment Phase
  - This phase allows I&APs to provide informed comment on the findings of the specialist assessments and proposed mitigation measures. It also allows for a further confirmation on issues identified.
- Decision Making Phase
  - This phase of the study will allow for information sharing around the environmental authorisation decision that is taken in line with the legislative requirements.

### *Stakeholder Identification*

One of the key principles informing the PPP is that it should be an inclusive process and that ample opportunity is afforded for stakeholders to register to participate in the process.

I&APs were invited to become part of the process in two ways:

- Through notification activities, which were designed to ensure that the broader public were informed of the process and invited to be involved; and
- Through ERM proactively registering I&APs identified as potentially interested or affected through the development of a stakeholder database in advance of the notification activities and directly informing these parties of the opportunity to comment and participate.

Media notices were placed in newspapers to notify the general public about the Project and request registration and participation. Proactive registration took place via the distribution of invitation letters and background information documents (BIDs) by email, post or hand delivery to those people identified upfront in the Scoping Phase as I&APs. Traditional authorities and village headmen were notified directly via preliminary meetings and provided with flyers and posters to encourage the participation of their communities.

Following the completion of the initial round of consultations parties from Zambia and Zimbabwe that have been registered on the stakeholder database include:

- **Government:** Stakeholders from selected National, Provincial, District and Local Departments as well as relevant Ward Councillors and elected political representatives.
- **Traditional Leadership:** areas governed by Traditional Leaders, Village Heads and Village Headmen
- **Tourism stakeholders:** stakeholders having an economic interest in the Project area as a result of tourism activities.
- **Community/development organisations:** stakeholders involved in community development and social improvement Projects in the area
- **Interest Groups:** organisations with an environmental or other interest in the Project
- **Affected communities:** both directly and indirectly affected by the proposed Project. On the commencement of the resettlement work, this will be expanded to include affected individuals within communities.

#### *Activities Undertaken During the Scoping Phase To Date*

Table 0.2 below provides details of the PPP activities undertaken during the Scoping Phase of the ESIA to date. Where activities have already been completed, annexes of supporting material are indicated.

**Table 0.2**      *Public Participation Activities Undertaken to Date*

Activity	Details	Reference in Scoping Report
<b>Pre-Scoping/Key Stakeholder Phase</b>		
Site visit for orientation and identification of affected area, stakeholders and logistical considerations	A site visit was undertaken to inform the scope of work for this Project. This was undertaken between 9 <sup>th</sup> and 13 <sup>th</sup> June 2014.	
Meetings with key I&APs to determine stakeholder engagement approach	Meetings with local authorities and traditional authorities. Introduction of the proposed Project and its processes. The key purpose of these meetings was to refine the stakeholder engagement plan. These meetings took place between 29 <sup>th</sup> July and 8 <sup>th</sup> August 2014.	<i>Annex F</i> I&AP meeting minutes
Meetings with key I&APs to expand on approach and assist with logistics for community meetings	Further meetings were held with the traditional authorities in order to set dates and venues for community meetings and ensure that their permission for these meetings was provided. These meetings were undertaken between 17 <sup>th</sup> and 23 <sup>rd</sup> September 2014.	
<b>Scoping Phase</b>		

Activity	Details	Reference in Scoping Report
Identification of I&APs	I&AP database was compiled which includes interested and affected parties from various sectors of society and the regulatory environment including directly and indirectly affected communities in and around the proposed Project area. This was expanded on following the first round of PPP and will continue to be updated throughout the PPP process.	<i>Annex D</i> I&AP database
Distribution of proposed Project announcement letter and Background Information Document (BID)	BID and announcement documentation emailed and posted to pre-registered I&APs. (Registration period: 1st Oct to 30th Oct in Zambia; 18th Sept to 19th Oct in Zimbabwe)	<i>Annex E</i> BID, letters, registration and comment sheet, media notices, flyers and site notices
Placing of media notices	Adverts were placed in the <i>Herald</i> (18 <sup>th</sup> September 2014 - Zimbabwe) and <i>Chronicle</i> (18th September 2014 and 22 <sup>nd</sup> December 2014 - Zimbabwe) and <i>Times of Zambia</i> (1 <sup>st</sup> October 2014 - Zambia) and <i>The Post</i> (19 <sup>th</sup> December 2014 - Zambia) newspapers. These media notices also advertised the public open days in Harare, Lusaka, Victoria Falls and Livingstone	<i>Annex E</i> BID, letters, registration and comment sheet, media notices, flyers and site notices
Distribution of site notices and flyers for community meetings	In agreement with the traditional authorities, headmen and village headmen, flyers were distributed via these representatives and site notices printed also for their placement at suitable venues. Community meetings were advertised in this manner. These were distributed on 20 <sup>th</sup> September 2014 in Zimbabwe and on 22 <sup>nd</sup> September 2014 in Zambia (Chief Musokatwane only as Chief Mukuni requested that these external notification means not be utilised for his communities as he wanted to notify them directly)	<i>Annex E</i> BID, letters, registration and comment sheet, media notices, flyers and site notices
I&AP meetings	A full schedule of PPP engagements is provided in <i>Table 6.2</i> below. At the request of stakeholders an additional meeting in Victoria Falls and Livingstone with technical team members was held on 22 <sup>nd</sup> and 23 <sup>rd</sup> January 2015 respectively. An interpreter was provided for all community meetings.	<i>Annex C</i> Attendance registers
Obtained comments from I&APs	Comments, issues of concern and suggestions received from I&APs were captured in the Comment and Response Report.	<i>Annex B</i> Comment and Response Report
Draft Scoping Report	A DSR was compiled on the basis of comments received. This included a component detailing the public participation activities undertaken to date.	Not applicable
Announcement of DSR	DSR announcement letter sent to all I&APs on the database along with a copy of the comments and response report and non-technical summary of the Draft Scoping	<i>Annex G</i> DSR Public Participation Material

Activity	Details	Reference in Scoping Report
	Report.	
Making DSR available to I&APs	<p>DSR and/or accompanying/summary documents were placed at the following public places within the proposed Project area:</p> <p><b>Zimbabwe</b>  Hwange Rural District Council Office  District Administrators Office in Hwange  Jambezi Clinic  Chisuma Clinic  Harare Black Crystal Office  Provincial Administrators Office  Victoria Falls Municipal Office  Victoria Falls Environment Africa Office</p> <p><b>Zambia</b>  Livingstone City Council  Livingstone District Office  Kazungula District Council  Kazungula District Office  Lusaka Kaizen Consulting Office  District Commissioners offices in Zimba, Kalomo and Choma  District Council Offices in Zimba, Kalomo and Choma  National Assembly Offices Zimba, Kalomo and Choma  Chiefs Palaces ( Sipatunyana, Simwatachela &amp; Chikanta)</p>	<i>Annex G</i> DSR Public Participation Material

### ***Activities Proposed for the Way Forward***

#### ***Scoping Phase***

Feedback on the results of the Scoping Phase of the Project will take place so that issues identified to date can be confirmed and expanded on. The report will also be made available for a 30 day comment period, after which comments received will be included into the Final Scoping Report which will be submitted to EMA and ZEMA. In addition the Comments and Response Report will be updated with all comments received.

#### ***Impact Assessment***

During the impact assessment phase of the Project, the primary aim of the PPP will be to engage I&APs with regard to the results of the studies and the proposed management measures. A public comments period of 30 days for comment on the Draft ESIA and ESMP is currently proposed. Stakeholders will be notified via email, sms, mail, hand delivery and/or fax of the availability of the Draft ESIA and ESMP and engagements that are proposed during this phase.



### *Summary of Issues Identified To Date*

A summary of comments raised by I&APs are included in *Chapter 6, Table 6.4* of the Scoping Report. A full list of comments and associated responses are included in the Comment and Response Report (*Annex B*).

## ***DETERMINATION OF THE POTENTIAL IMPACTS OF THE PROPOSED PROJECT***

### ***Study Area***

To investigate the potential social and environmental impacts as a result of the proposed hydropower project, the following study area provided in *Figure 0.4* is defined. This study area encompasses the regional socio-economic impacts as a result of the proposed scheme, as well as the downstream in-river impacts up to the headwaters of the Kariba Dam. In addition this study area covers the proposed 70 km long Transmission lines to Hwange (and its alternative route) and the 21 km 330 kV line to Livingstone. The study area is extended to cover the second line running in parallel to the existing 220 kV line, terminating at the Muzuma substation in Choma, a distance of approximately 160 km (*Figure 0.5*).

Figure 0.4 Area of Interest for the Proposed Batoka HES

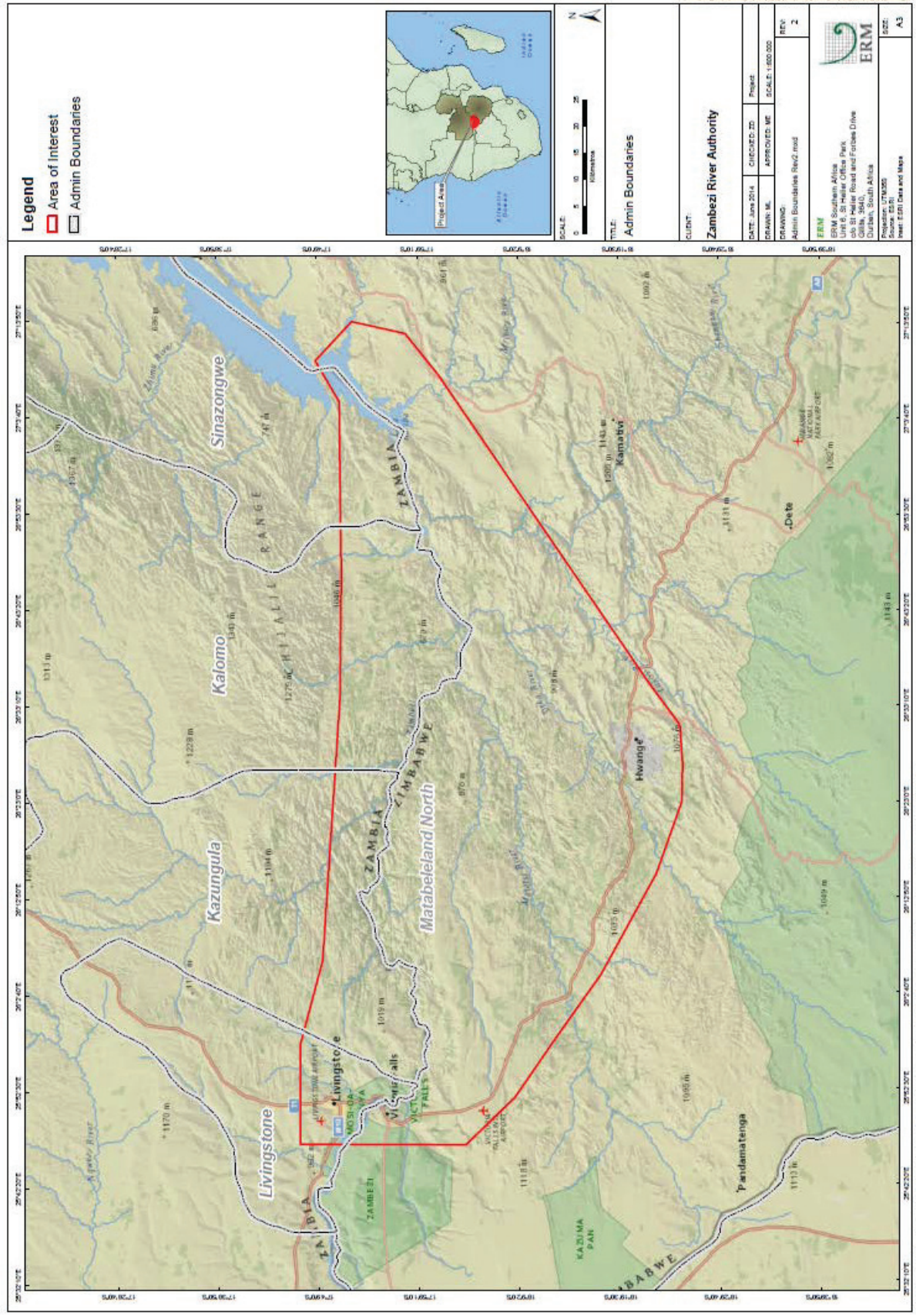
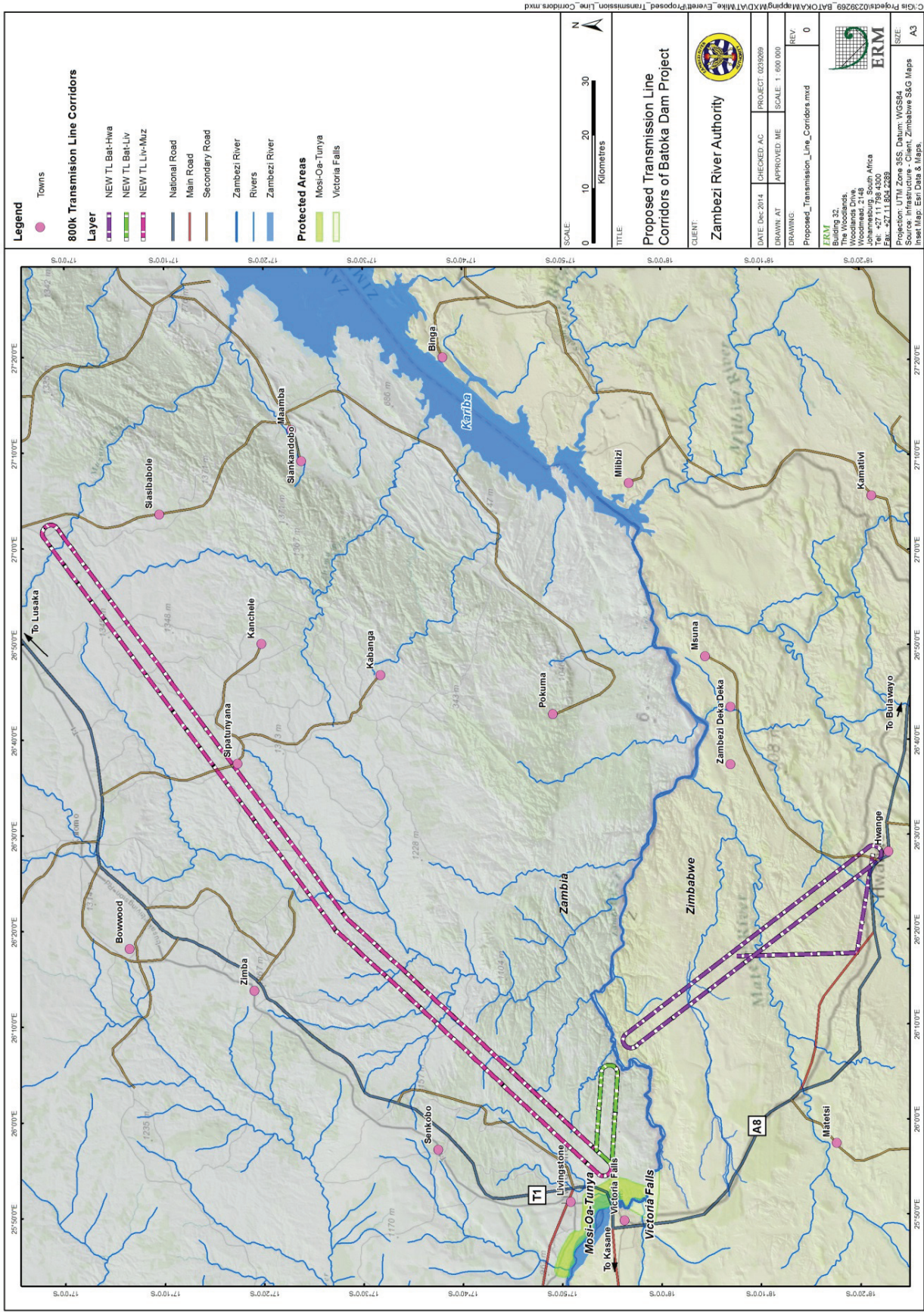




Figure 0.5 Areas to be Investigated for Proposed Transmission Line Corridors



## ***Potential Environmental Impacts***

The key environmental aspects that may be impacted by the proposed Project are provided in *Box 0.4*.

### ***Box 0.4 Key Environmental Aspects that may be Impacted***

#### **Terrestrial and aquatic flora**

- Loss of terrestrial (riparian zone) and flowing aquatic habitat will occur as a result of inundation of the Batoka Gorge and transformation into deep water pelagic habitat.
- The Batoka Gorge is listed as an Important Bird Area (IBA), based on the presence of breeding Taita Falcons, a Vulnerable and range restricted species. Other criteria for this classification as an IBA are that the Batoka Gorge also contains an important breeding population of the Rock Pratincole and Black Stork, both of which are not threatened species but are regionally important populations. There is also a high diversity of raptors which include a variety of vulnerable and near threatened species. Habitat loss through inundation may impact on all these species.
- The Batoka Gorge is known to support a high abundance and diversity of bats which includes two near threatened species, namely Large-eared Free-tailed Bat (*Otomops martiensseni*) and Wood's Slit-faced Bat (*Nycteris woodi*), but little is known about the ecology of bat populations there (Clare Mateke, Livingstone Museum).
- Limited populations of large fauna do exist in the greater area and occurrence of human wildlife conflict has been raised by stakeholders in the area. An influx of people to the area could increase the occurrence of this conflict.
- De-bushing for way-leaves required for the construction of Transmission lines will result in vegetation clearance, possible habitat fragmentation, and will make access into new areas previously relatively inaccessible, easier - resulting in the potential for further deforestation, hunting etc.

#### **Environmental flows and associated impacts to downstream water quality and aquatic ecology**

- Should the Batoka HES operate as a 'run-of-river' scheme, the impacts on downstream river ecology will not be significant. Should the HES operate more as a peaking scheme, changes in river ecology downstream of the impoundment may become more apparent.
- Water quality, both within the impoundment and downstream, including temperature and dissolved oxygen impacts downstream of the dam wall.

#### **Fish and fisheries**

- The fish populations in the gorge can be regarded as near pristine, due to low anthropogenic effects due to limited access points and little nutrient enrichment. Loss of river habitat will occur as a result of inundation.
- With water impoundment, a few fish species will be threatened. Species that favour fast flowing water will be vulnerable.

#### **Sedimentation and erosion**

- Change in the sedimentation levels in the river downstream of the impoundment.

## ***Potential Social and Socio-economic Impacts***

The key social and socio-economic aspects that may be impacted by the proposed Project are provided in *Box 0.5* and are further described below.



**Resettlement**

- The positioning of the project infrastructure has the potential to cause displacement either economic and/or physical. This was viewed as a key concern for the parties involved namely the affected communities (most notably Kasikiri village) and Hwange Rural District Council in Zimbabwe. The 1993 study reported that resettlement would face strong resistance from the parties involved, especially due to the legacy of resettlement undertaken for Kariba Dam and the limited amount of Hwange Communal Land available for further resettlement or other land use activities.

**Impacts to Tourism Industry**

- The project is likely to significantly reduce white water rafting opportunities on the Zambezi River. Tourism was noted as a key income source in the project area in the previous EIA studies.

**Health**

- Health infrastructure and the health profile of the communities was reported as poor. Influx of workers for construction of the dam may place further strain on health facilities and detrimentally affect health care services and health status.

**Cultural Heritage**

- The 1998 studies concluded that the filling of the dam will create an island out of Chemapato hill which will restrict access to the site. Stakeholders were also concerned about the impact on Victoria Falls as a World Heritage site.

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY**

All potentially significant environmental impacts (physical, biological, socio-economic and cultural and heritage) associated with the proposed Project have been identified in the Scoping Study and (where applicable) will be further investigated and assessed within the ESIA study through specialist studies. Where required, mitigation measures will be proposed.

The ESIA will suitably investigate and address all environmental issues in order to provide competent authorities with sufficient information to make an informed decision regarding the proposed Project.

**ALTERNATIVES**

Queries expressed by some stakeholders (refer to the Comments and Response Report in *Annex B*) include the following:

- *Why hydropower?*
- *Are there any alternatives to hydropower, such as other forms of renewable energy, specifically wind and solar power?*
- *Why is the site selected for the Batoka not further downstream?*

Chapter 8 of the Scoping Report attempts to answer some of these queries. In addition, the most recent alternatives that were considered for the proposed Batoka HES, and provides a motivation for choosing the preferred dam, power houses, waterways, access roads and townships; as well as transmission system scheme are presented.

The following alternatives are as presented in the Studio Pietrangeli (SP) Batoka HES Phase II – Layout: Option Assessment Report E (March 2015).

### ***Why Hydropower?***

Investment in energy is a prerequisite to achieving commercial and industrial development in Zambia and Zimbabwe. The use of solar power is favourable in providing rural and urban areas with access to power; however, if both countries are to achieve those targets and goals detailed in their Vision 2030 and Vision 2040, and other complimentary plans, these countries will require private sector investment in energy technology that is efficient, sustainable and reliable. The generation of energy through hydropower is a proven technology that is sustainable and which is actively being promoted at a national level in both Zambia and Zimbabwe. With a vast hydropower energy potential, hydropower is considered the most feasible and reasonable electrification option for both countries.

### ***Dam Alternatives***

#### ***Dam Location***

The proposed location of the Batoka HES was first selected in 1971 and thereafter moved approximately 12 km up river in 1981 at a section located at chainage +47 km from Victoria Falls. This location was thereafter studied through numerous geological investigations and compared with two other potential locations. The BJVC (1993) Team established that this was the best site/preferred alternative, as there was no other site that would have such strong advantages in terms of geological, topographical, dam volumes and hydrological conditions (theoretical maximum production at the river section) as the identified site. In 2014 the SP Team also analysed the optimum location for the development of hydropower potential of the Zambezi River between Victoria Falls and Lake Kariba, that included the proposed Batoka HES (the same preferred site), as well as Devil's Gorge HPP, located at chainage + 65 km. Again, the preferred alternative was found to be the site located + 47 km from the Falls.

#### ***Dam Height***

A full supply level (FSL) of the reservoir of 762 m was fixed by the average river level at the Victoria Falls power station (BJVC, 1993 and SP 2014). The Victoria Falls power station tailraces are controlled by weirs at their downstream ends which are set at 767.69 m amsl and 770.07 m amsl. While it would be possible to raise the FSL of the Batoka Dam by at least 5 m without significant impacts on the existing power station, a FSL for Batoka HES of 762 m amsl has been provisionally selected to ensure these outlets are not flooded.

A sensitivity analysis of the costs and benefits will be undertaken by SP, however, varying the dam height within a reasonable range, determined to be between the Base Case of 762 m FSL and 740 m FSL (minimum).

### *Dam Type*

The SP (2014) report states that previous feasibility studies compared the two following dam alternatives:

- A roller compacted concrete (RCC) gravity dam; and
- An RCC arch-gravity dam <sup>(1)</sup>.

Although the analysis is still ongoing, based on the findings of the studies, further reviewed by SP, and according to preliminary conclusions the best option appears to be a roller compacted concrete (RCC) arch-gravity dam.

### *Spillway*

Four layout alternatives were looked at by SP (2014). In terms of the preliminary conclusions, the alternative identified as the preferred alternative by SP (2014), a separate spillway would be designed, ie, moving the spillway to a saddle on the right abutment, about 2 km from the dam site, as opposed to overflow over the top of the dam.

### *Underground Powerhouses and Waterways (1,600 MW)*

Four alternative layouts for the powerhouses were considered including:

- Underground Powerhouses and Waterways (1,600 MW)
- Alternative A- Outdoor Powerhouses and Waterways (1,600 MW)
- Alternative B – Outdoor Powerhouses and Waterways (2,400 MW)
- Alternative C - Powerhouses at the Dam Toe and Waterways (3,000 MW)

Although further studies are still on-going, based on preliminary conclusions, the preferred alternatives are the outdoor power houses and waterways.

### *Access Roads*

While there was consideration for the design of new direct tracks from Livingstone, Victoria Falls and/or Batoka, this was decided against by SP for the following reasons:

- The construction would be costly and time-consuming, given the stripping of vegetation required and the geometry of the track;
- The direct tracks would not pass through the existing villages, which would benefit from the new roads (incoming jobs, tourism, trade etc.); and
- The new routes would not differ much from the existing ones, gaining just a few kilometres in length.

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(1) It should be noted that earlier assessments also compared two other alternatives to dam type, namely double curvature arch dam and concrete faced rockfill dam, only the most promising alternatives were assessed in the SP report, 2014.

Therefore, there are insufficient reasons for the construction of alternative roads and the exact routing of the roads will be elaborated as an output of the ESIA study.

### *Permanent Villages*

Permanent villages will be located, on the North bank of the dam (in Zambia) and one on the South bank (in Zimbabwe). In the 1993 Study, the Zambian village was positioned approximately 6 km away from the dam and almost totally below the new access road. The total area covered 210 ha and was set between 860 and 930 m amsl.

As a further option to the two locations already mentioned, four further alternative areas were preliminarily identified as potential alternative locations for the permanent village. Each of these alternatives will be explored during the ESIA phase.

### *Transmission Schemes*

The lines directed to Zimbabwe will lead to Hwange station, while in Zambia, two overhead lines from the Batoka HES (or even three, according to the selected power transmission scheme), will be routed respectively to the new Livingstone Station and to the existing Muzuma Station.

In Zambia, the first alternative foresees the route of one single circuit line to the new Livingstone station, and one single circuit line to Muzuma station; the latter route is composed of an initial 15 km long stretch in a north-west direction to reach the nearest point of the existing 220 kV corridor, then it runs parallel with the existing line up to the Muzuma station.

The second alternative is conceived to route both the outgoing lines from the Batoka station to the future new Livingstone station. The two 330 kV overhead lines will run in parallel, sharing a common right of way, for about 21 km up to the location of the new Livingstone station. From there, by means of a “line-in line-out” scheme, the line to Muzuma will follow the same route as the existing 220 kV line, ending at the Muzuma station; a total length of 160 km (ie 180 km from Batoka site).

In Zimbabwe, it is proposed that the transmission lines comprise 2 x 70 km 330 kV lines, running in parallel, and sharing a common right-of-way, to the existing Hwange 330 kV substation. An alternative has been identified, to take advantage of the existing A8 national road for the future construction and maintenance of the line infrastructure. In view of this, the alternative deviates approximately 30 km from the starting point towards the A8 motorway, and increases the route length by approximately 20 km.

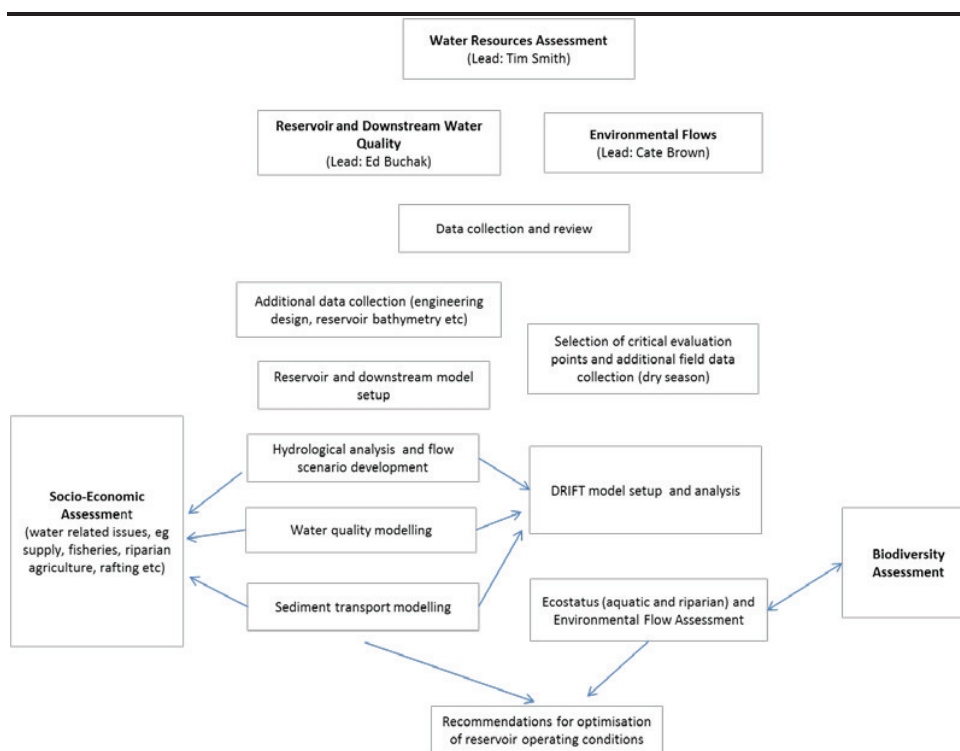
At this stage of the project, transmission line corridors of 3 km in width will be investigated to allow for the investigation of possible environmental and



Transmission line routes, and thereafter further refinement of transmission line positioning within the proposed corridors, will be investigated as part of the overall engineering feasibility and ESIA studies.

## Water Resources

**Figure 0.6**      **Water Resources Assessment Tasks**



The main objective of these linked assessments is to identify any modifications to the proposed reservoir design and/or operating conditions that may be required in order to mitigate significant impacts on important ecological or socio-economic receptors. These results, including any associated Environmental Flow Requirements (EFR), will need to be provided to Studio Pietrangeli as early as possible in their design process in order to allow for energy production simulations to be completed.

All of the hydraulic and hydrologic simulations carried out in support of these activities will necessarily rely on hydrological data and dam operation simulation data and information supplied by ZRA and SP (and reviewed by the ESIA consultant).

#### *Reservoir and Downstream Water Quality*

This component assesses the project's impacts on water quality in the reservoir and downstream in the Zambezi River to the upper end of Lake Kariba. Baseline and post construction conditions will be calculated using two numerical models (CE-QUAL-W2 and BATHTUB) that utilize historical water quality and quantity information, data collected at the site, and engineering design information.

The 1993 and 1998 feasibility study reports included a fairly significant amount of study on the eutrophication potential of the Batoka reservoir. The present study will therefore make maximum use of these earlier studies, whilst updating the results based on the latest available design configuration and baseline water quality data.

#### *Environmental and Social Flows*

The objectives of this task are to select two representative sites on the Zambezi River between Batoka Gorge and the upper end of Lake Kariba; undertake a survey at these sites that accurately describes their present day condition, ecological importance and anthropogenic influence (flow and non-flow related); describe the relationship between flows and condition, and; assess the impact of future changes to the flow regimes based on operational scenarios for Batoka HPP.

### ***Biodiversity***

#### *Vegetation and Habitats*

A draft Area of Influence (AoI) of the project area has been defined, but extends beyond the needs of mapping of vegetation and habitats necessary for this study. A reduced Ecological AoI is therefore proposed that includes the length of the river from the Victoria Falls, past the Batoka Gorge HES construction site and to below the end of the Batoka Gorge. The Ecological AoI must also include the habitats on either side of the proposed reservoir extent plus the areas proposed for the transmission lines, construction camps and town development. Data will be sourced on the vegetation and habitats within the Ecological AoI from the United Nations Educational, Scientific and Cultural Organization (UNESCO), Zambian Wildlife Agency (ZAWA) and the Zimbabwe National Parks and Wildlife Agency (NPWA).

Furthermore:

- GIS-based mapping of habitats within the Ecological AoI will be able to identify locations and extent of various vegetation units, based on the

classifications used in the 1998 Additional Studies and prevailing vegetation classifications for the area. This will be assisted by a review of existing information and maps.

- A field assessment of habitats and status of vegetation on the Zambian side of the border will be conducted. The delineation of habitats will use aerial photography followed by field-based ground-truthing to verify the types of habitats and species compositions.
- Field assessment of habitats along the transmission line routes, proposed construction camp and town development sites will be conducted to determine the local sensitivities and the level of impact associated with the proposed development.
- An overview of the levels of transformation of the various habitats will be obtained based on observations in the field and desktop work.
- Assessment of the updated taxonomy and Red List status of the plant species identified in the study area.
- Vegetation biomass of each major vegetation type will be estimated.

### *Fauna*

- Avifauna with Emphasis on Taita Falcons and Rock Pratincole - Detailed field assessments on the status of Taita Falcons and other raptors in the Batoka Gorge were conducted by the Zimbabwe Falcon Club in collaboration with Birdlife Zimbabwe, and repeating field assessments will not lead to new information, however opportunistic observations will be recorded whenever possible. Local ornithologists associated with Birdlife Zimbabwe and Zimbabwe Falcon Club will instead be requested for the following information at a desktop level.
- Current Status of Wildlife - Specialists with local knowledge of the large mammal fauna in the area will be consulted to update the understanding of the current state in collaboration with the Stakeholder Engagement team. Additional data will be sourced at a desktop level.
- Aquatic Ecology - The aquatic ecology requirements will be addressed through the environmental and social flow assessment, which will supplement the data available in existing reports, such as the extensive fish surveys conducted for the Additional Studies in 1998.

### *Socio-economic Specialist Study*

ERM proposes to update the social baseline for the ESIA by the collection and review of more up to date secondary sources supplemented by the collection of primary data through the use of a variety of methods and participants, including focus groups with affected communities and interested parties eg tour operators and interviews with 'key informants' such as traditional authorities, district administrators and teachers, health personnel and conservers of cultural heritage.

In order to prevent duplication of effort and prevent stakeholder fatigue, the social baseline team will coordinate data gathering activities (through the means detailed above) with activities planned as part of the development of

the Resettlement Action Plan (RAP) and Resettlement Policy Framework, if at all possible.

Due to the lack of accurate information regarding the exact location of settlements, a ground truthing exercise will be undertaken during field activities using GPS technology so that they can be plotted on maps to be included in the social baseline. The project affected area has been defined to include downstream water users (up to Kariba Dam) and discussions with key stakeholders during the initial stages of the stakeholder engagement programme, along with the groundtruthing exercise detailed above, will seek to refine the project team's understanding of the affected communities.

### ***Health Impact Specialist Study***

A health impact assessment will be undertaken to understand the health impacts and benefits associated with the Project. The aim of the study will be to understand the local (community level), district, province and where appropriate national level health conditions. The assessment will cover access to and quality of health services as well as changes in the disease profile at the provincial, district and local level. The team will then review the project description, health baseline and impacts identified within other strands of the ESIA and other specialist studies as appropriate to determine the potential health impacts and develop mitigation measures.

### ***Cost-benefit Analysis of the Proposed Batoka HES Project***

An economic analysis will be undertaken by an economist at a desk-top level but supported by on-site baseline data collection to develop a better understanding of the economic benefits and losses associated with the proposed Batoka HES Project.

### ***Resettlement***

#### ***Resettlement Action Plan for the Dam Footprint***

The Resettlement Action Plan will be undertaken to meet the requirements of the regulatory authorities of Zambia and Zimbabwe and international good practise. The Proposed Scope of Work is included in *Table 0.3*.

#### ***Resettlement Policy Framework for the Transmission Lines and Access Roads***

Given uncertainty regarding the alignment of the transmission lines and access roads on both the Zambian and Zimbabwean sides, it is intended that a Resettlement Policy Framework (RPF) be prepared to guide future resettlement activities. Launching into a comprehensive resettlement planning process before the alignment of these lines is defined could result in the incurrance of unnecessary costs and raised expectations of the households which may not be impacted on. It is proposed that the Resettlement Policy Framework will however also include activities to inform the Engineering Team of opportunities to minimise physical and economic displacement



through transmission line alignment. The scope of work for the RPF tasks is presented in *Table 0.4*.

There are several overlaps between activities proposed as part of this process and those of the RAP for the dam, socio-economic studies and stakeholder engagement. Fieldwork and discussions with key stakeholders will be combined wherever possible to minimise stakeholder fatigue.

Table 0.3 Proposed Scope of Work for the RAP for the Batoka Gorge Dam Footprint Area

Stage	Objective	Activities	Deliverables
Scope definition	This input on the Inception Report has been prepared on the basis of information made readily available to the project team to date as well as site observations. There is a need to expand on the project team's understanding of the project footprint and specifically the location of the dam associated infrastructure. This will require more detailed discussion with the engineering team.	<ul style="list-style-type: none"> <li>Further discussions with ZRA and the Engineering Team at the Inception Phase Meeting</li> <li>Hold discussions with key stakeholders including traditional authorities, District and Local authorities. This task will be undertaken with the stakeholder engagement team</li> <li>Identification of likely affected people through the review of aerial photography/satellite imagery, discussions with key stakeholders and further site orientation</li> </ul>	<ul style="list-style-type: none"> <li>Updated scope of work</li> <li>Minutes from key stakeholder discussions</li> <li>Proposed stakeholder engagement strategy (to be developed in consultation with the stakeholder engagement team to avoid over-consultation)</li> <li>Stakeholder database that will be expanded on for the duration of the project</li> </ul>
Grievance mechanism development	A suitable grievance mechanism needs to be in place from the commencement of the RAP process so that concerns can be appropriately addressed and recorded. During initial consultations, all stakeholders need to be informed of the grievance reporting process. There is a need to establish and hold inaugural meetings with the engagement forums for the project. These are to include a Resettlement Advisory Committee and Affected Peoples Forum. The establishment of these bodies will facilitate effective communication and agreement throughout the RAP process. In addition, it will be necessary to confirm availability of project team resources and source fieldworkers (if this is required)	<ul style="list-style-type: none"> <li>Develop grievance mechanism</li> <li>Client review</li> <li>Ensure adequate resources in place for the management of the process</li> <li>Establish the following Committees/hold inaugural meetings and define and agree roles: <ul style="list-style-type: none"> <li>Affected Peoples Forum</li> <li>Resettlement Advisory Committee: comprising government officials and other stakeholders previously exposed to resettlement processes in Zimbabwe and Zambia and able to advise in this regard</li> <li>The Affected Peoples Forum will initially comprise community representatives and will be expanded following the census and asset inventory to either include all economically displaced households and/or representatives thereof</li> <li>Host community consultation structures can also only be identified once a preferred host site has been identified (if appropriate)</li> <li>Prepare and agree initial database and GIS specifications</li> <li>Identify and secure field team</li> </ul> </li> <li>Hold meetings with traditional leadership in preparation for the registration and verification process</li> <li>Prepare questionnaires for the collection of socio-economic data and asset verification</li> <li>Prepare materials to notify the communities of the registration process</li> <li>Release notification material</li> <li>Hold the registration process</li> <li>Train fieldworkers and supervise throughout the fieldwork</li> </ul>	<ul style="list-style-type: none"> <li>Grievance mechanism</li> <li>Minutes from inaugural meetings</li> <li>Terms of Reference for each member of committees</li> <li>Minutes from meetings with traditional leadership</li> <li>Questionnaires</li> <li>Notification material</li> <li>Training manuals</li> </ul>
Census	The primary objective of the census is to ensure that all affected people are identified and their assets to be lost quantified. The identification of the households that are to lose assets as a result of the proposed project will require a registration process in the presence of the community representatives. This process will be widely advertised amongst the affected communities. A questionnaire will be prepared by the project team for the gathering of household		

Stage	Objective	Activities	Deliverables
	<p>Information. Fieldworkers will be appropriately trained for the administration of the questionnaire and supervision by the RAP team provided. It is envisaged that the socio-economic fieldwork can be undertaken concurrently.</p> <p>The census will need to be introduced to all stakeholders before it commences. Traditional leadership meetings will also be required.</p>		
Development of the census database	Develop a database for the recording of all collected data. Link this to a GIS system.	<ul style="list-style-type: none"> <li>Create a database of all affected people</li> <li>Link this to a GIS package so that information can also be visually represented</li> </ul>	<ul style="list-style-type: none"> <li>Database and GIS files</li> </ul>
Cut-off date implementation	A cut-off date needs to be communicated and implemented immediately following the verification process so as to minimise opportunistic behaviour. This will be a cut-off date for eligibility only; not assets or livelihoods.	<ul style="list-style-type: none"> <li>Broadly communicate the cut-off date as follows: <ul style="list-style-type: none"> <li>Traditional leadership (with meetings detailed above)</li> <li>Affected peoples Forums (with meetings detailed above)</li> <li>To the broader project community through advertisements in local papers and flyer distributions via schools and other key community focal points.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Minutes from meetings</li> <li>Material prepared for the notification of the cut-off date</li> </ul>
Alternative host site identification	<p>This activity will be appropriate if physical displacement is envisaged and/or land replacement is an option selected as an entitlement for economic displacement.</p> <p>Alternative host site options will need to be identified through consultations with the resettlement structures and the client.</p>	<ul style="list-style-type: none"> <li>Host site alternatives to be identified through a process of consultation with: <ul style="list-style-type: none"> <li>Traditional authorities</li> <li>Landowners in the area</li> <li>Affected Peoples Forum</li> <li>Advisory Committee</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Minutes from meetings</li> </ul>
Entitlement determination	<p>Principles for compensation/ replacement land need to be defined and agreed to with all consultation bodies. For this reason an entitlement matrix will be prepared.</p>	<ul style="list-style-type: none"> <li>Create an entitlement matrix and populate information on asset categories, categories of displaced people and compensation types</li> <li>Discuss and agree with all consultation structures including: <ul style="list-style-type: none"> <li>Traditional authorities</li> <li>Advisory Committee</li> <li>Affected Peoples Forum</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Signed off entitlement matrix</li> <li>Minutes from meetings</li> </ul>
Livelihood restoration planning	Given that entitlements may not result in a like-for-like replacement for assets, it is critical that investigations are undertaken into the improvement and/or securing of livelihoods through a livelihood restoration programme	<ul style="list-style-type: none"> <li>Review previous land use baseline definition</li> <li>Hold discussions with key stakeholders involved in livelihood activities including traditional authorities and fisherman</li> <li>Research livelihood opportunities on the basis of entitlements</li> <li>Discuss livelihood restoration options at the forum detailed above and agree thereon</li> <li>Identify possible livelihood restoration partners and agree roles</li> <li>Draft terms of reference for the role-players</li> </ul>	<ul style="list-style-type: none"> <li>Minutes from meetings</li> <li>Terms of reference for the respective livelihood restoration partners</li> </ul>
Define compensation rates	Compensation rates (where monetary exchanges are required) need to be researched	<ul style="list-style-type: none"> <li>Set compensation guidelines</li> <li>Agree compensation rates with relevant</li> </ul>	<ul style="list-style-type: none"> <li>Compensation rates agreed to</li> <li>Asset values per individual reflected on</li> </ul>

Stage	Objective	Activities	Deliverables
	and base units compiled and communicated to all stakeholders.	<ul style="list-style-type: none"> <li>structures: <ul style="list-style-type: none"> <li>Traditional authorities</li> <li>Advisory Committee</li> <li>Affected Peoples Forum</li> </ul> </li> <li>Determine asset values on the basis of the guidelines</li> </ul>	the database
Design monitoring and implementation plans	The effectiveness of the resettlement process will need to be monitored to determine if there is a need for any intervention	<ul style="list-style-type: none"> <li>Develop a monitoring and implementation plan as part of the RAP. This can be tested in the feedback on the RAP Report (see below).</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring and implementation plan</li> </ul>
RAP Preparation		<ul style="list-style-type: none"> <li>Prepare RAP</li> <li>Client review</li> <li>Feedback to all stakeholders:</li> <li>Traditional authorities</li> <li>Advisory Committee</li> <li>Affected Peoples Forum</li> <li>Finalisation of RAP following consultation</li> </ul>	<ul style="list-style-type: none"> <li>Draft and Final RAP</li> </ul>

**Table 0.4** *Scope of work for the Resettlement Policy Framework for the Transmission Lines and Access Roads*

Stage	Activities	Deliverables
Project area definition and identification of possibly affected people	<ul style="list-style-type: none"> <li>• Further discussions with ZRA and the Engineering Team at the Inception Phase Meeting</li> <li>• Further socio-economic and stakeholder engagement work required to identify the possibly affected communities in the area and key stakeholders (District/Local/Traditional authorities)</li> </ul>	Map indicating project infrastructure and project affected communities
Discussions with key stakeholders and refinement of stakeholder database	To be undertaken as part of the stakeholder engagement plan	As per stakeholder engagement plan
Legislative review	To be undertaken as part of the legal review for the ESIA	To be undertaken as part of the legal review for the ESIA
Asset identification	<ul style="list-style-type: none"> <li>• Review existing imagery and identify structures and extent of fields wherever possible</li> <li>• Groundtruth this as part of the socio-economic study</li> </ul>	<ul style="list-style-type: none"> <li>• Estimated number of structures within the transmission line servitudes</li> <li>• Estimated extent of fields</li> </ul>
Development of the compensation framework	<ul style="list-style-type: none"> <li>• Reflect on entitlement matrix prepared for the dam RAP identifying: <ul style="list-style-type: none"> <li>○ Assets requiring replacement</li> <li>○ Land acquisition procedures</li> <li>○ Compensation rates</li> <li>○ Eligibility</li> <li>○ Valuation process</li> <li>○ Livelihood restoration</li> </ul> </li> <li>• Present the entitlement matrix to key stakeholders and get their comment thereon.</li> </ul>	<ul style="list-style-type: none"> <li>• Compensation framework</li> <li>• Minutes from meetings with key stakeholders</li> </ul>
Development of the RAP related stakeholder engagement strategy	<ul style="list-style-type: none"> <li>• On the basis of discussions held with key stakeholders, the stakeholder engagement process and the outcome of the socio-economic surveys, develop a plan for stakeholder engagement as part of the RAP process going forward</li> </ul>	<ul style="list-style-type: none"> <li>• Proposed stakeholder engagement plan for the transmission line RAPs</li> </ul>
Grievance mechanism development	This will be developed as a part of the dam RAP. Will need to be reviewed for appropriateness and discussed with key stakeholders	<ul style="list-style-type: none"> <li>• Proposed grievance mechanism for the transmission line RAPs</li> </ul>
RAP planning and programme phases to be advised on	<ul style="list-style-type: none"> <li>• Plan for further resettlement planning to be developed and programmed</li> </ul>	<ul style="list-style-type: none"> <li>• Plan and programme for further resettlement planning</li> </ul>



## *Cultural Heritage*

### *Zimbabwean Scope of Work to Address Identified Gaps*

- In order to move forward several gaps need to be filled, while some of the information needs to be checked in the field before informed decisions can be offered:
  - There is a need to revisit all of the already recorded sites to verify their location and collect additional information on context and content of the sites.
  - There is a need for additional field work to cover several major gaps in the general overview of the extent of the project.
  - Where there are auxiliary projects their actual footprint needs to be investigated thoroughly.

This is particularly important where there are alternative sites which have not been finalised in the technical proposals. By integrating this research at this point it may assist in making decisions as to the best option – it will avoid future conflicts.

- With this information the existing mitigation procedures offered in the 1998 and to a lesser extent 1993 report, should be reviewed.
- A full heritage report, together with maps and photographs as well as mitigation suggestions should be supplied to NMMZ in accordance to the law and the relevant letters of acknowledgement and authorisation must be sought to be held on file.
- There is a need to locate and document the sites of intangible cultural significance. This is best achieved in conjunction with the sociologists working on the project.
- Obtain any additional information on the site on Chemapato Hill.
- A chance finds procedure will be prepared and included as part of the ESMP.

### *Zambian Scope of Work to Address Identified Gaps*

In order to address the identified gaps, a site field trip will be undertaken in the Project area. This will include interviews with key stakeholders and identifying any sites not yet identified (especially along the transmission lines), as well as updating data on existing sites through visiting sites already identified and verifying their locations. GPS locations and photographs of the material present will be taken, as well as descriptions of the contexts in which it is found. Sites of intangible cultural significance will also be identified. The trip will also encompass a visit to the National Heritage and Conservation Commission and National Museums Board in Lusaka to verify what cultural sites are on record in Zambia.

Data collected will be reviewed and analysed. The existing mitigation procedures noted in the previous studies will be reviewed to assess their validity and will be used to support the development of mitigation measures for the ESIA to be developed as part of the Project.

## Stakeholder Engagement

A Stakeholder Engagement Plan (SEP) has been prepared for the Batoka Gorge ESIA with a specific focus on the engagement required during the Scoping Phase of the Study, but also highlighting requirements for the remaining phases. The approaches to be adopted during Scoping will be tested and effectiveness assessed for subsequent stages of engagement.

The draft SEP developed at this stage of the Project is provided in *Annex A*.

## EXPERTISE REQUIRED

Environmental Resources Management Southern Africa (Pty) Ltd. (ERM) has been appointed by the Project Proponent to undertake the Environmental Scoping and Impact Assessment Study for the proposed Project.

ERM as a consulting firm, and more specifically the project team selected on this project, possesses all the relevant expertise and experience to undertake this ESIA.

ERM also sub-contracted Black Crystal Consulting Private Limited (EMA Reg. No. 000225/2014) to assist with aspects of the ESIA study in Zimbabwe, and Kaizen Consulting International, to assist with aspects of the ESIA study in Zambia.

The ERM project team associated with the Batoka HES is as follows:

**Table 10.5** *Names and Qualifications of the Senior ESIA Consultants*

Organisation	Name	Qualification	Role on the ESIA Team
Environmental Resources Management	Mr M Everett	BSc and MSc (Hydrology)	Project Director
	Mrs Z Daniel	BA and MSc (Environmental Assessment and Evaluation)	Project Manager
	Mr T Smith	BSc and MSc (Engineering Hydrology)	Water Resources Lead
	Mr A Cauldwell	MSc and BSc (Hons.), Wildlife Management, PrSciNat Ecology	Biological Lead
	Ms N Mol	BSc (Hons) (Environmental and Geographical Science)	Social, Stakeholder Engagement and Resettlement Lead
	Mr D Shandler	MA, BA Hons, BA	Public Consultation Facilitator
Southern Waters	Dr C Brown	PhD., M.Sc., B.Sc. (Zoology and Biochemistry) B.Sc. Hons. (Zoology)	Environmental Flow Team Lead
Black Crystal Consulting	Peta Jane Spong	BSc Hons (Environmental Water Management) BSc (Zoology and Geography)	Zimbabwe Team Coordinator

Organisation	Name	Qualification	Role on the ESIA Team
	Ms S.L. Childes	BSc Hons (Botany and Zoology) MSc (Ecology)	Ecology specialist
	Tasara F. Marondedze	BSc Hon Sociology	Social and resettlement specialist
	Mr R Burrett	BSc Hons (Archaeology and Geography) MSc (Archaeology)	Archaeology specialist
Kaizen Consulting International	Jacob Chishiba	MSc (Environmental Management and Policy)	Zambia Team Coordinator
	Konnie Josphat	BSc	Social specialist
	Mundumuko Sinvula	BAEd, MA (History)	Archaeology specialist