



BURNSIDE

Bujagali Energy Limited

Bujagali Hydropower Project Social and Environmental Assessment Report Executive Summary

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3.0 Existing Social and Environmental Conditions

3.1 Project Setting

The Bujagali HPP is located on the Victoria Nile in south-eastern Uganda. The Victoria Nile is the start of the longest branch of the Nile, known as the White Nile. The source of the Nile is Lake Victoria, Africa's largest water body and the second largest lake on Earth.

The Lake lies within an elevated plateau in the western part of Africa's Great Rift Valley, and straddles the equator. The location of the HPP itself is about 1,100 m above sea level and a few degrees north of the equator.

The discharge of Lake Victoria was dammed in 1954 by construction of the Owen Falls (now Nalubaale) hydro dam. In 2000, a second discharge point from the Lake was created by the construction of a second dam and power plant next to the Nalubaale dam. The Second dam and power plant, originally known as the Owen Falls Extension but later renamed Kiira, went into service in 2000. Page 2 of Figure ES-4 shows the side-by-side layout of the two facilities.

The reach of the Victoria Nile that flows between Nalubaale/Kiira and the Bujagali HPP site is located within a deeply incised, steeply sloped valley, and drops in a series of rapids. In recent years, rapids within this reach, as well as those downstream of the dam site, have been used for white water rafting, and several companies have been established that offer rafting tours to mostly foreign tourists. The river is also used for small scale fisheries and as a source of water for local villagers, and its many islands and rapids hold significant cultural/religious values for local persons and communities.

Jinja town, located on the east side of the river near Nalubaale is the closest large community. The city developed starting in the 1950's when power for industry became available from the Owen Falls project, and is now the second largest city in Uganda. Kampala, the largest city in the country, is located about 70 km to the west of Jinja.

The majority of the study area for the Bujagali hydropower facility is rural, with estate and small-scale or subsistence agriculture being the predominant land uses. Agricultural activity is primarily a labour-intensive, intercropping system with both cash and subsistence crops following the seasonal changes.

3.2 Biophysical Conditions

Within the project area, the Victoria Nile varies in width from 200 to 600 m, and drops over 20 m in a series of rapids between the Nalubaale power station and

Dumbbell Island. The area has moderate potential earthquake risk for hydropower development thus requiring the project be designed to withstand the Maximum Design Earthquake (MDE) and Operating Basis Earthquake levels.

Since 1954, water flow in the mainstem Victoria Nile has been controlled by the Nalubaale and (since 2000) Kiira power stations. Water flows from the dams have been designed to match the natural outflows from the lake that existed prior to the dams' construction according to the "Agreed Curve." BEL also adopted the Agreed Curve for its design and implementation of the Bujagali Hydropower facility. (This same approach was adopted previously by AESNP.)

Water quality in the river is believed to be acceptable for drinking, and good for aquatic life. There has been little change in water quality values from 2000 to 2006, other than slight increases in nutrients. The quality of borehole groundwater in the area meets World Health Organisation (1993) guidelines.

The northern region of Lake Victoria has an equatorial type of climate. Two rainy seasons can be distinguished from March-May and October-November. Most of Uganda receives between 1,000 and 1,500 mm precipitation. Mean daily temperature varies between 22°C in July and 24°C in February. The mean minimum varies from 17°C in April, with mean maximum varying from 26°C in June to 35°C in February (Bitarakwate *et al.*, 1967). The local meteorology is characterised by a very high frequency of southerly winds. Prevailing southerly winds occur for over 30 percent of the year. Winds from the west-northwest to the east are very infrequent.

The Victoria Nile supports a diversity of aquatic life including plants, phyto and zooplankton, micro and macro-invertebrates, and fish. Key aquatic species to consider from a human-health perspective as vectors of tropical diseases include snails transmitting schistosomiasis; river blindness (Onchocerciasis) transmitting *Simulium damnosum* flies; sleeping sickness (trypanosomiasis) transmitting Tsetse flies; and, female mosquitoes belonging to the genus *Anopheles*, which transmit malaria.

The Victoria Nile originally had a very rich assemblage of fish dominated by riverine species. Significant changes to the environment include the physical barrier to fish movement between the Victoria Nile and Lake Victoria introduced by the Nalubaale dam, and the introduction of Nile perch and Nile tilapia. Viable populations of many fish species continue to exist in the Victoria Nile despite the construction of the Nalubaale dam over 50 years ago. Nine keystone species from a fisheries and conservation perspective, have been identified in the upper Victoria Nile, the majority of which are classified as able to inhabit both lake and river habitats. This is likely due to the variety of micro-habitats offered in this section of the river – from deep, slow-flowing backwaters and 'pond' areas with silty sediments through to rapids with rocky substrates.

The lands within and surrounding the project area are intensively settled and cultivated. The vegetation generally forms an agro-ecosystem with bananas, coffee, maize and vanilla as the main crops. The remnant natural vegetation is characterised as moist semi-deciduous forests. The 2006 vegetation survey identified 298 species in total. Of those identified *M. excelsa* (Mvule) is categorised as “Low Risk/ Near Threatened” in reports published by the International Union for the Conservation of Nature. Other restricted range species include *Ficus cordata* and *Ficus ottonifolia* that have been recorded in only one floral region out of the four that occur in Uganda.

Most of the project area including the islands contains little native vegetation due to intensive agricultural activities. The main crops grown in the area are coffee, maize, sorghum, cassava, sweet potatoes, cabbages, yams, sugar cane and vanilla. Fruits include bananas, mangoes, jackfruit, avocados and pineapples. Eucalyptus is planted for building poles and firewood in Naminya, Malindi and Namizi. The weeds in agricultural areas, some of which are used for medicinal purposes, include woody and non-woody plants

The banks and islands of the Nile in the upstream part of the study area (Bujagali Falls and upstream) are within the Jinja Wildlife Sanctuary which includes the entire Municipality of Jinja as well as the Victoria Nile between Lake Victoria and Bujagali Falls. While the Sanctuary was established in 1953, development along the river has not been restricted and there is no management plan or management activities associated with the Sanctuary. Proposals for activities which may result in the destruction of habitat within a wildlife sanctuary must incorporate suitable mitigation measures, and this principal has been adopted for the HPP.

Kimaka Central Forest Reserve (CFR) is the only protected forest in close vicinity of the project area.

3.3 Socio-economic and Cultural Conditions

There is widespread poverty in Uganda, and the country is consistently ranked one of the poorest nations in the world. Approximately 85 percent of the population in Uganda reside in rural areas and depend mainly on agriculture for their livelihood. Literacy rates are low.

Agricultural activity is primarily a labour-intensive, intercropping system with both cash and subsistence crops following the seasonal changes. The main cash crops are coffee and sugar cane, coupled with more recent cropping of vanilla. Subsistence food crops include bananas, cassava, sweet potatoes, maize, beans, millet, and yams.

The City of Kampala is Uganda’s political and commercial centre. The Town of Jinja, Uganda’s second largest urban centre, serves as the administrative centre for Jinja

District and is the District's prime economic hub, housing industries such as textiles, beer, plastics, food processing, and flour milling.

Within the project area, there are several ethnic groups, mostly of Bantu origins. Busoga is the Kingdom the Basoga people, one of the largest of the five traditional kingdoms in present-day Uganda. The World Bank Group does not consider either group in the area of the project to be indigenous according to the definitions in its safeguard policy and performance standard on that topic.

Historically, the Basoga inhabited the areas of southern Uganda east of the Nile. Buganda is the Kingdom of the Baganda people, who historically inhabited the areas west of the Nile. This is still largely the case, although Basogans and Bangandans live on both banks of the river, today. Although the Busoga and Buganda languages vary, they are similar to one another and mutually understandable. Many people still practice traditional religions, although they are often practised in concert with Christianity and Islam. Several people have *amasabo* (roughly translated as shrines) on their properties where they can pay respect to their ancestors and commune with spirits.

Between Nalubaale and Dumbbell Island, there are groups of islands, some of which have become intensively farmed during the last few years. The rapids have been used to develop a tourist destination for white water rafting since the late 1990's, and the islands and rapids have significant cultural/religious value for local people. They also are reported to have been used for grave sites by local people.

Malaria and respiratory infections account for about half of all outpatient diagnoses in Uganda. The prevalence of HIV/AIDS is high, with HIV/AIDS-related illness accounting for over 30 percent of all hospital admissions, and increasing. In an effort to address the spread of HIV/AIDS, widespread public education campaigns have been established and condoms are readily available.

3.4 Recent Activities in the Project Area

The early stages of development, and subsequent abandonment, of the Bujagali Project by AESNP had effects on the local social baseline conditions that persist. Prior to its departure, AESNP aggressively pursued its resettlement programme which included the physical relocation of people from lands to be used by the project on both banks of the river Nile. While certain of those lands are currently guarded and fenced (west bank) and monitored, others are still being used for short-term agricultural activities (east bank) on the understanding that they will no longer be available for such uses when the project is re-started.

Since AESNP's departure in 2003, the Government of Uganda has maintained a presence in the project area through a small group of UETCL employees working as

the Bujagali Implementation Unit (BIU). The BIU has maintained contact with local people, monitored their issues and concerns, and done its best in the face of very limited funding and resources to at least be aware of the local socio-economic conditions. In the absence of a private sector sponsor with the necessary permits and financing to pursue the project actively, the BIU's activities on behalf of the GoU have helped maintain a certain presence and contact with local people while the project was re-bid and re-started.

As a result of the project hiatus, certain of AESNP's commitments to regulators and the communities under its resettlement and community development plans were not completed. In recognition of these issues and their currency with affected stakeholders, BEL has undertaken to document the situation, and in selected instances began immediate action programmes to respond. Those BEL actions, as well as its commitments to its own resettlement and community development activities, are presented to the level of detail consistent with the present status of the project in the SEA documentation. The ongoing, increasingly detailed plans and activities will be documented on a regular basis in the project's Social and Environmental Action Plan (SEAP). The revisions to the SEAP will be consulted upon with affected stakeholders and publicly disclosed as they are prepared on a regular basis.

4.0 Project Need and Alternatives

Historical and ongoing analyses of the power supply options for Uganda confirm that the Bujagali HPP is needed, and that it is the preferred and least cost solution to addressing the long standing power shortages in Uganda. A summary of the need and rationale for the HPP, and the extensive analyses of alternatives that has been completed as part of the design of the HPP, follow.

4.1 Need and Rationale for the Project

Uganda has suffered for many years from shortages of electricity and this situation has been exacerbated in recent times due to the drought in the region that has contributed to the lower level of Lake Victoria.

Throughout the 1990s the electricity demand was greater than generating capacity, and therefore load shedding was required to balance the system. In 2000 the increased capacity provided by the commissioning of the first two 40 MW units at Kiira power station relieved the load shedding. However, the drop in water levels in Lake Victoria due to the drought and to increased flows through the two dams has led to reductions in the availability of water for power generation, forcing more severe load shedding.

The demand for electricity has steadily increased in step with the strengthening and expansion of the economy, and it is possible that a shortage of capacity could occur even with the Bujagali project in service.

To address the short term load shedding the government is implementing a costly emergency thermal generation program using high-speed reciprocating engines fuelled with diesel oil to generate 100 MW of power. This power will be costly due to the need to import relatively expensive diesel fuel, and the high operating cost of high-speed units. Therefore, the high-speed units are only planned to operate until 2010 when more economical, renewable and clean power becomes available from the Bujagali HPP.

Even so, the Bujagali HPP will not address the full shortfall of energy, thus the GoU is pursuing additional generation from medium-speed reciprocating engines fueled with heavy fuel oil (100 MW), cogeneration at sugar works (15 MW), and mini hydro (41 MW).

4.2 Alternative Power Generation Technologies

The alternatives to developing Bujagali are to do nothing, or to develop an alternative source or sources of power. The do nothing alternative would mean that the up to 250 MW to be provided by Bujagali would be supplied by extending indefinitely the operation of the expensive high-speed emergency thermals, and by increased load

shedding. This would have a long term significant effect on the economy and the people of Uganda.

Given the large, and growing, gap between electricity supply and demand in Uganda, a number of electricity generation alternatives studies over various planning horizons has been completed and options examined and prioritised for the country. The generation alternatives for the next 20 years in Uganda include:

- Wind-generated electricity;
- Geothermal electricity;
- Solar-generated electricity;
- Small scale hydroelectric development;
- Co-generation facilities;
- Biomass-generated electricity;
- Thermal power plants;
- Large scale hydroelectric development; and,
- Demand management measures which reduce the need for the above-noted types of projects and bring more efficiency to the national system.

The general conclusions from the evaluation of these generation alternatives is that large-scale hydroelectric development remains the most economical way forward for the country in the short-medium term. The Victoria Nile is the primary hydrological resource available in Uganda to meet the growing electricity demand in the country.

An ongoing study by Power Planning Associates is reassessing the various alternative power generation technologies currently available to Uganda. Preliminary unpublished results from that study which is expected to be published in Q1 2007, confirms that large-scale hydroelectric development provides the least cost option for the country in the short-medium term.

4.3 Alternative Hydropower Development Sites

Six potential hydropower sites along the Victoria Nile have been examined in some detail by a number of studies in recent decades. One of those sites (at Kalagala Falls downstream of Bujagali) is no longer an option as the Government of Uganda has committed to the preservation of the falls and its environs as an 'offset' for social and environmental impacts incurred with the development of the Bujagali project. Overall, two projects – Bujagali and Karuma – emerge as the preferred hydropower options for Uganda based on a range of criteria and a variety of comparative methodologies.

The above-mentioned report in preparation by Power Planning Associates for the World Bank Group is an Economic and Financial Evaluation Study to determine the viability of the Bujagali HPP, including a comparison with the Karuma project. The

preliminary results from that study indicate that Bujagali is the least cost option compared to Karuma by a significant margin.

Another recent report prepared as part of the Nile Basin Initiative examined the “Strategic/Sectoral, Social and Environmental Assessment of Power Development Options in The Nile Equatorial Lakes Region” (SSEA). One objective of the study was better definition of the actions that must, in the advancement and approval of new generation and transmission projects, be taken to improve electricity supply, in terms of reliability of supply, cost, environmental and social acceptability, and regional integration.

The SSEA report states that, of all the electricity supply options studies and evaluated across the ten countries that are within the Nile Equatorial Lakes Region, Bujagali was one of three projects that “should be implemented as soon as possible,” as Uganda is suffering from serious power outages. It identified Bujagali as a project that could be installed in the short to mid-term, at low cost and with acceptable environmental and social impacts.

4.4 Evaluation of Alternative Hydropower Configurations

Alternative project configurations at, and around, the Bujagali HPP site have also been investigated. The objective was to compare and evaluate possible options to provide the rationale for selection of the preferred design approach. Key considerations in the comparison are the potential power output of the different options, their financial costs and their relative environmental and socio-economic implications.

An initial 1998/1999 assessment considered five configurations for the dam. In addition, two further configurations were identified, one a diversion canal at Bujagali to avoid the inundation of Bujagali Falls and the other a dam and reservoir configuration at Busowoko Falls with a lower full supply level, again to preserve the falls and the river downstream to Dumbbell Island.

Further reviews of alternative configurations at Bujagali were carried out in 1999/2000 and again in 2005/2006. They included two additional options at Busowoko Falls and further consideration of the differences in environmental impact between the two options at Dumbbell Island. The review concluded that the now-preferred option at Dumbbell Island is more favourable not only on technical and economic grounds, but also from an environmental and social perspective. These analyses re-confirm the hydropower facility configuration that BEL is now seeking approval for.

7.0 Impact Identification and Management

This SEA adopts a project life cycle assessment format. It focuses on the development of specific management initiatives for all phases of the project to ensure that: i) the people closest to the project receive the projected benefits; ii) potentially negative environmental and socio-economic impacts are minimised; and iii) potentially negative health and safety impacts are kept to a minimum. To optimise the life cycle assessment, linkages between potential impacts (i.e., key environmental issues), mitigation measures (i.e. management actions), net effects (i.e. residual effects), and monitoring programmes (i.e. management decision tools) are explicitly made.

This section summarizes:

- Compliance screening of the project against Government of Uganda Legislation, International Treaties and Conventions Ratified by Uganda, and project applicable safeguard policies, performance standards and guidelines;
- Identification and analysis of community benefits and economic and developmental benefits; and,
- Identification and analysis of key project issues, and net effects analysis.

7.1 Compliance Screening

A screening exercise, the details of which are presented in the SEA Report, confirms that the project complies with:

- GoU statutes and regulations;
- Relevant international environmental treaties and conventions; and,
- Project applicable standards as determined from the concordance analysis of the social and environmental policies, performance standards and guidelines applicable to the project.

7.2 Project Benefits and Community Development

7.2.1 Project Benefits

The HPP will generate a number of economic and developmental benefits at both the macro-economic level and the local level, and is expected to make a major contribution towards the GoU goal of poverty eradication. The key macro-economic benefits that are expected include:

- Reducing electricity rationing and the associated costs of alternative self-generation;
- Create conditions to attract direct foreign investment to Uganda;

- Increase productivity and lower costs for government, education, health, business and industry;
- Facilitate rural electrification; and,
- Minimise cost of electricity for consumers.

Overall, it has been estimated in some reports that every month that the Bujagali project is delayed costs the economy approximately 10 to 15 million dollars. The project is also expected to help reduce noise and air emissions generated by the numerous small generators that are used to provide electricity during blackout periods.

Local economic benefits from the project are those which accrue to employees and the wider community over and above the benefits accruing from alternative income-generating activities. These include:

- Direct employment of Ugandans during construction (600 to 1,100 persons) and operation (50 persons) of the project;
- Induced employment (an estimated 9,000 to 16,500 jobs during construction and 250 during operations) and increased trade in service industries, particularly during the dam construction period; and,
- Benefits from indirect employment and trade, in industries and commercial activities, which become established as a result of the greater availability of electricity.

7.2.2 Community Development Program

BEL has developed a Community Development Action Plan (CDAP) which sets out proposed actions that will benefit the wider communities in the project area, beyond those individuals and households who have been or will be directly affected, such as by loss of land, crops or other assets.

The area that will benefit from the CDAP consists mainly of the eight directly-affected villages: four on the West Bank (Mukono District): Naminya, Buloba, Malindi, Kikubamutwe; and, on four the East Bank (Jinja District): Bujagali, Ivunamba, Kyabirwa and Namizi.

The following criteria were considered when the CDAP was developed:

- Programmes should be based on local conditions and the needs of directly affected communities, identified using culturally appropriate means of consultation;
- Programmes are to be sustainable; and,
- Partnerships are to be established with credible local NGOs.

The objectives of the CDAP are as follows:

- To improve opportunities for higher incomes or living standards of Project-Affected Persons and the affected area as a whole;
- To improve quality of life in the affected area; and,
- To provide a safety mechanism for vulnerable persons.

BEL proposes to support long-term sustainable development initiatives, rather than to generate them. The CDAP was developed, based on the following strategy:

- Construction of the hydropower facility will provide direct sources of employment to directly-affected persons;
- Local communities should benefit from indirect employment opportunities;
- Water supply within the directly affected communities will be improved;
- Improved marketing of farm produce can improve farm incomes;
- New sources of non-agricultural income are needed for women and young people, given the current land scarcity;
- Financial services and training to directly-affected persons is required in order that sudden access to cash compensation is handled wisely;
- Better access to credit is critical for development of small-scale businesses;
- Recreational facilities are important for a good quality of life; and,
- A social safety mechanism is needed for those Project-Affected Persons who may have difficulties due to the displacement/compensation/resettlement process.

The key areas where benefits are expected include:

- Health care facilities;
- Employment opportunities;
- Water supply;
- Electricity;
- Fisheries;
- Training and financial services;
- Education;
- Tourism; and,
- Community resources.

7.3 Key Project Issues and Net Effects Analysis

Table ES-3 highlights the key project issues, as well as the corresponding avoidance, protective and mitigative measures relevant to the construction and operational phases of this project.

Table ES-3: Summary of Project Effects, and Impact Mitigation and Effects Monitoring Activities

Project Issue	Summary of Mitigation and Net Effects
Resettlement and Land Compensation	<p>Corrective actions will be undertaken to ensure those resettled by the previous project sponsor are no worse off as a result of the project. Land required for the construction and operation of the hydropower facility totals 238 ha. Landowners were either resettled or provided cash compensation for loss of land by the previous project sponsor. Eighty-five households were displaced. An assessment survey of the resettled villagers was undertaken by BEL as part of this SEA process to confirm whether any unresolved issues remained. BEL has initiated an Assessment of Past Resettlement Activities and Action Plan (APRAP) to resolve these remaining issues. Immediate corrective activities being undertaken by BEL include: provision of new water supply hand pumps at 17 existing bore hole locations in the surrounding communities; improvements to education facilities in the 8 affected communities; and, improvements to the health facilities at the Naminya resettlement site.</p>
Effects on Land	<p>There will be permanent and temporary loss of agricultural land. Temporary land take areas will be reinstated to a condition that will make it possible for the land to be used for agriculture, forestry or industry.</p> <p>To minimise impacts to terrestrial habitat, BEL will:</p> <ul style="list-style-type: none"> • Do enrichment planting to regenerate forest vegetation on island land not inundated but previously logged or cleared for agriculture, as well as land along the mainland shore. • Plant native and medicinal tree species in areas of the riparian strip that are currently bare or planted with cash and/or subsistence crops, in order to control erosion and to provide (in the long term) roosting sites for birds and bats. <p>The portion of the quarry that will remain above water level, i.e. form the new riverbank, will be profiled and planted such that it has a similar landscape to equivalent areas above the water line prior to construction, and blends in with the profile of undisturbed areas.</p>
Effects on Hydrology	<p>The HPP is not expected to significantly alter or affect the hydrology of Lake Victoria or the Victoria Nile. The quantity and timing of water released from Lake Victoria will continue to be controlled by the operation of the Nalubaale and Kiira facilities. Because the reservoir for the HPP is small it can only hold back a few hours of flow, and therefore it will essentially pass-through whatever flows are released by Nalubaale and Kiira.</p> <p>The only significant concern related to hydrology is concern for public safety from fluctuating water levels immediately downstream of the dam. Further analyses, and a stakeholder engagement program, are proposed to address those concerns through a management plan to be developed. Fluctuations further downstream are not expected to be problematic, and not expected to be significant in Lake Kyoga or beyond.</p>

Project Issue	Summary of Mitigation and Net Effects
Effects on Water and Aquatic Life	<p>The project is not expected to have any significant long term detrimental impacts on water quality or aquatic life.</p> <p>During construction there will in an increase in suspended solids resulting from coffer dam and other construction activities. These effects will be minimised by avoiding disturbance of soils during the clearing activities. Site drainage systems will include sedimentation basins to trap sediments in runoff prior to release to the river.</p> <p>Indigenous aquatic grasses will be planted to control erosion that might occur as a result of the fluctuating water levels during the initial operation period. In the long term the banks are expected to stabilize and no significant erosion is expected.</p> <p>Trees and shrubs will be harvested prior to the reservoir being filled, to minimise water quality effects associated with rotting vegetation, and to prevent fouling of fishing gears.</p> <p>It is expected that fish stocks will naturally increase in the reservoir compared to the existing condition. For Nile tilapia habitat enhancement will be carried out as part of the quarry and river bank restoration. Stocking is not expected to be needed.</p> <p>The abundance of "Haplochromines" fish are also expected to increase as a result of the conversion of faster-flowing habitats to the slower-flowing habitats that are preferred by these species</p> <p>Entrapment and entrainment of aquatic organisms is not expected to have a significant effect on fish or other populations. Fish screens will be installed on the water intakes reduce the rate of entrainment by fish. Access points will be provide to the river to ensure there is access to the river by local persons for washing, fishing or other purposes during the construction period.</p>
Air Quality and Greenhouse Gases	<p>The project will not involve significant emissions of pollutants to air. Dust will be generated during construction but is not expected to result in any significant offsite impacts. Industry good practice will be used to limit dust, including grassing stockpiles to prevent wind raised dust, using wetting agents on roads, and using covering loads of friable materials on trucks using public roads. Vehicles and motors will be regularly maintained to minimise exhaust emissions and black smoke.</p> <p>Bujagali will generate about 250 times less greenhouse gas emissions compared to generating the same amount of electricity from burning of fossil fuels.</p>
Noise	<p>Noise generated during construction is not expected to have any significant off-site nuisance effects. The main offsite noise will be short term noise related to blasting during quarrying. A notification procedure will be developed to ensure surrounding communities are informed about the procedures and timing of blasting.</p>

Project Issue	Summary of Mitigation and Net Effects
Access Roads and Traffic	<p>An existing two-lane, paved, public highway provides access to the site. The existing roads are of sufficient capacity to accommodate project related traffic. A Traffic Management Plan (TMP) will address all aspects of project related traffic including speeding, maximum loads on trucks, abnormal loads; and, management of connection points between access roads and main public highways. Consultations are planned with community leaders to identify measure to ensure safety for pedestrians, including school children, that use the road as a walkway.</p>
Environment Protection Areas	<p>The project will result in disturbance and loss of land that falls within the Jinja Wildlife Sanctuary. Consultations with the management authority for the Sanctuary indicate that planned enhancement planting will offset the losses. The sponsor will assist in the further development of the Kalagala Falls and Nile Bank CFRs to help offset impacts on Bujagali Falls and Jinja Wildlife Sanctuary.</p>
Tourism, White Water Rafting and Aesthetics	<p>The project will result in flooding of Bujagali Falls and associated rapids. Consultations with WWR operators indicate that the operators are generally well-advanced in their preparations to re-orient their operations downstream and expand operations beyond rafting. To facilitate the move BEL will provide new raft launching facilities downstream of the dam, the specific locations to be agreed upon with the operators. BEL is involved in ongoing consultations with the WWR operators as to how it can further offset the impacts on their activities, and support the relocation process.</p> <p>BEL will construct a visitor's centre at the HPP and a cultural centre near Bujagali Falls, and work with Jinja Tourism Development Association (JITDA) on sustainable tourism activities for the new reservoir recreationally.</p>
Effects on Cultural Property	<p>Dwelling sites of spirits important to the local community are being addressed through transfer and resettlement ceremonies. Ceremonies for the Bujagali Rapids have been carried out, although additional activities are being discussed with the Busoga Kingdom.</p> <p>The project will result in flooding of household graves and amasabo (shrines). Where possible these have been relocated as part of the resettlement programme or through compensation payments. Remembrance services to commemorate those buried in the area will be completed. A structure or monument may be erected, either at site of remembrance or elsewhere, in accordance with wishes expressed by local communities.</p>
Community Health, Safety and Security	<p>BEL has developed public health related programs to combat spread of HIV/AIDS and other sexually transmitted diseases (STDs) and vector-borne diseases such as malaria amongst workers and the local communities. An emergency program is being developed specifying actions to be taken in the event of an outbreak of Ebola, or other highly infection disease. Improvements to health care in local communities is being addressed in the CDAP.</p>

Project Issue	Summary of Mitigation and Net Effects
Dam Safety – Risk Assessment	<p>An independent Panel of Experts will be commissioned to review and advise BEL on matters relative to dam design and safety. The Bujagali Dam Safety Panel (BDSP) is expected to consist of three technical experts who will provide advice through final design, construction, initial filling, and start-up phases of the dam. The BDSP is also expected to examine the potential safety implications raised by NGOs regarding the upstream Nalubaale facility.</p>
Labour and Working Conditions	<p>The potential risks have been identified which have a regional prevalence and which have arisen from analysis of similar projects include:</p> <ul style="list-style-type: none"> • Worker health and safety; • Forced labour and freedom of association; • Payment of minimum wage; and, • HIV impact. <p>BEL is committed to implementing various processes, business commitments and measures to address the various labour risks identified and additional issues required in lender policies.</p> <p>The contract and terms of reference to be agreed between BEL and the EPC contractor (which will employ the majority of construction workers) will specify labour and occupational health and safety commitments to be observed by the contractor and sub-contractors, as well as responsibilities for monitoring the implementation of these commitments, which will lie primarily with the EPC contractor. BEL is committed to establishing its own procedures and reviewing the EPC contractor's procedures, and assessing the performance of both parties on these issues, including ensuring that sub-contractors' contracts commit them to compliance with relevant labour and health and safety legislation and guidelines.</p>
Associated Facilities	<p>A separate SEA has been completed for the Bujagali Interconnection Project (IP). That SEA addresses the following key issues:</p> <ul style="list-style-type: none"> • Resettlement and Compensation for the projected affected persons; • Impacts on Central Forest Reserve Lands; • Impacts on Lubigi Swamp and other wetlands; • Impacts on public health, including HIV/AIDS and Electric and Magnetic Fields (EMFs); • Aesthetics; • Labour Force Management; • General construction related issues; and, • Cumulative effects <p>That SEA has been prepared in parallel with the SEA for the HPP, and in line the HPP SEA included extensive stakeholder consultations.</p>

Project Issue	Summary of Mitigation and Net Effects
Other Construction Related Issues	<p>A number of construction-related issues were identified that are common to many large-scale construction projects, and for which potential effects are well-known and effective mitigation available. The issues identified are:</p> <ul style="list-style-type: none"> • Public and Worker Health and Safety; • Management of Hazardous and Contaminating Material; • Management of Solid Waste; • Soils and Agriculture; • Air quality; and, • Archaeological Sites. <p>The EPC Contractor will be responsible for measures to mitigate and manage the potential effects related to construction activities. These measures will be specified in the Contractor's plans, which will be incorporated into the SEAP.</p>
Other Operations Related Issues	<p>A number of operational-related issues were identified that are common to most large-scale hydro projects and for which the potential effects are well documented and effective management measures available. These issues identified are:</p> <ul style="list-style-type: none"> • Public and worker health and safety; • Management of hazardous and contaminating material; and, • Management of solid waste. <p>BEL, as operator of the facility, will be responsible for the implementation of measures to protect, mitigate, and manage the potential effects related to the operation of the hydropower facility. Project specific plans and programmes to be developed by BEL for the operations phase will be incorporated into the SEAP.</p>

7.4 Cumulative Effects

The potential cumulative effects of the Bujagali hydroelectric project have been evaluated in the context of other existing and proposed hydroelectric projects on the mainstem Victoria Nile in Uganda. The timeframe is on the order of 20 years, though conceptually, the timeframe extends to the end of the operational life of the projects under review, more on the order of 50 years, at least.

The projects assessed are Nalubaale (Owen Falls), Kiira (Owen Falls Extension), Bujagali, and Karuma. A Kalagala scheme is not included as the Kalagala offset agreed by the Government of Uganda to offset the residual impacts of the Bujagali project precludes such development there.

Overall, the significant and positive cumulative effects of Bujagali have been determined to include:

- Developmental benefits at the local, regional and national levels, including Economic benefits associated both with:
 - the project's construction (short term), and;
 - the operation of the project (medium and long term).
- Increased supply of electricity, including poverty alleviation benefits to the extent that the new electricity be accessible to those living with poverty;
- Compensation to people economically affected or physically relocated by the project; and,
- Employment and small business opportunities for Ugandans in the short, medium and long terms.

Project cumulative impacts of a negative nature are considered to be of minor significance. These include:

- Relocation of people with compensation to accommodate the project's construction, facilities and operations;
- Aesthetic impacts from the presence of another dam with the potential for knock-on tourism impacts (potentially positive, as well, however);
- Some disruption of the natural flow regime over an ~8-km stretch of the river Nile downstream of and as a result of Nalubaale and Kiira (see Section 7.5.3):
 - with associated impacts on aquatic organisms and communities (also potentially positive if productivity of reservoir increased);
 - and river users (fishers) – also potentially positive if increased productivity in reservoir is reflected in fishers' catches, and;
- Losses of wildlife populations and habitats, as well as agricultural lands, due to inundation of terrestrial habitats.

It is unknown, based on currently available data and information, whether cumulative effects on health and educational services or on cultural/spiritual sites might be identified. It seems unlikely that there are cumulative effects on white water rafting, as these activities are not believed to have been commercially available at the time of Kiira's approval. The cumulative effects of transmission system infrastructure associated with the Bujagali hydroelectric project are addressed in the companion SEA.

Other cumulative effects of the Bujagali HPP could include:

- Disruption of fish migrations in the river Nile in the vicinity of the project, given Nalubaale's impacts on fish movements between Lake Victoria and the river Nile since 1954;
- Insignificant changes in the levels of Lake Kyoga and in flows downstream of it (Section 7.5.3); and,
- Reduced operational need to increase flows through Nalubaale and Kiira due to efficiencies from Bujagali HPP (a positive cumulative effect, should it occur).

With respect to cumulative effects with other non-hydroelectric projects in the Ugandan energy sector, there could be a reduced need to dispatch thermal and emergency sources of electricity to the Ugandan grid and by individual consumers (generators) with cost savings, air emissions reductions, and likely human health benefits (another positive effect). Another such effect could be some reduced demand for other fuels (including firewood) where access to electricity is available and cost-competitive.

There are no changes (including cumulative effects) anticipated in the 'Agreed Curve' hydrological regime for the river Nile.

BEL intends to consult with key stakeholders in Uganda and elsewhere, as appropriate, on the preliminary conclusions reached in the cumulative effects analysis and report on the results and any associated mitigation or monitoring implications, as appropriate, in the SEAP update documentation to be released on a regular basis.

In addition, the final version of the Strategic/Sectoral, Social and Environmental Assessment of Power Development Options in the Nile Equatorial Lakes Region commissioned by the Nile Basin Initiative is expected to become available after the disclosure of this SEA report. The update of this cumulative effects analysis of preliminary conclusions will include any implications for this analysis from the final version of that report, as well as modifications resulting from consultations with key stakeholders.

8.0 Social and Environmental Action Plan

The SEA provides a framework for the Social and Environmental Action Plan (SEAP) that will be developed for the project. At the time the SEA was written, certain detailed planning and design activities relevant to the SEAP were still to be completed. Thus, the SEAP is described at the level of detail available at the time of writing. When the detailed activities are completed, they will be integrated within the framework of the SEAP and an update will be prepared and released by BEL. Currently, the SEAP framework addresses the following key components:

- Social and environmental management policies and systems;
- Mitigation plans, procedures, and programmes;
- Monitoring activities;
- Implementation schedules and cost estimates; and,
- Plans for integrating the SEAP within the overall development plan for the project.

8.1 Environmental Management

BEL is the project sponsor and will have overall responsibility for design and building of the hydropower facility. BEL will own and operate the hydropower facility for a 30 year period, after which time ownership will be transferred to the GoU. BEL is in the process of selecting a contracting consortium, which will construct the hydropower facility on an Engineer, Procure and Construct (EPC) basis.

As project sponsor, the ultimate responsibility for the project's compliance with Ugandan and international lender legislation and guidelines for environmental and social performance will lie with BEL. However, day-to-day responsibility for implementing environmental and social mitigation, compensation and monitoring actions will in many cases be devolved to the EPC Contractor or to third parties.

The SEAP addresses both the construction and operational phases of the hydropower facility for a 30 year period, until UEGCL, or its successor, assumes ownership and responsibility of the hydropower facility.

BEL is committed to the creation and implementation of programmes to reduce the probability of occurrence of deleterious environmental incidents. Contingency plans will be developed for dealing with such adverse incidents, if they occur.

BEL will expect the same level of environmental performance from its agents, suppliers, and sub-contractors and will stipulate this in any legally binding agreements it enters with these parties.

8.2 Relationship of the SEAP to Other Project Plans

The SEAP is an umbrella plan that is comprised of several components that are to be integrated and implemented by BEL and the EPC Contractor with regard to the Bujagali Hydropower Facility. These components are shown in Figure ES-6.

While this SEA includes working versions of three of the Sponsor's Action Plans (namely the PCDP, the APRAP and the CDAP), those which are the responsibility of the EPC Contractor, and those of the sponsor not included herein will be developed after the EPC Contractor has been appointed at the appropriate level of detail for that stage of project development. The overall objective is to have final versions ready as needed for their implementation. Consultations and disclosure of the various plans will occur throughout the process of their development and implementation.

8.3 Implementation of the Social and Environmental Action Plan

8.3.1 BEL's Commitments and Resourcing

In order to discharge its commitments with respect to management of biophysical impacts of the project, BEL will designate a suitably qualified and experienced Environmental Manager.

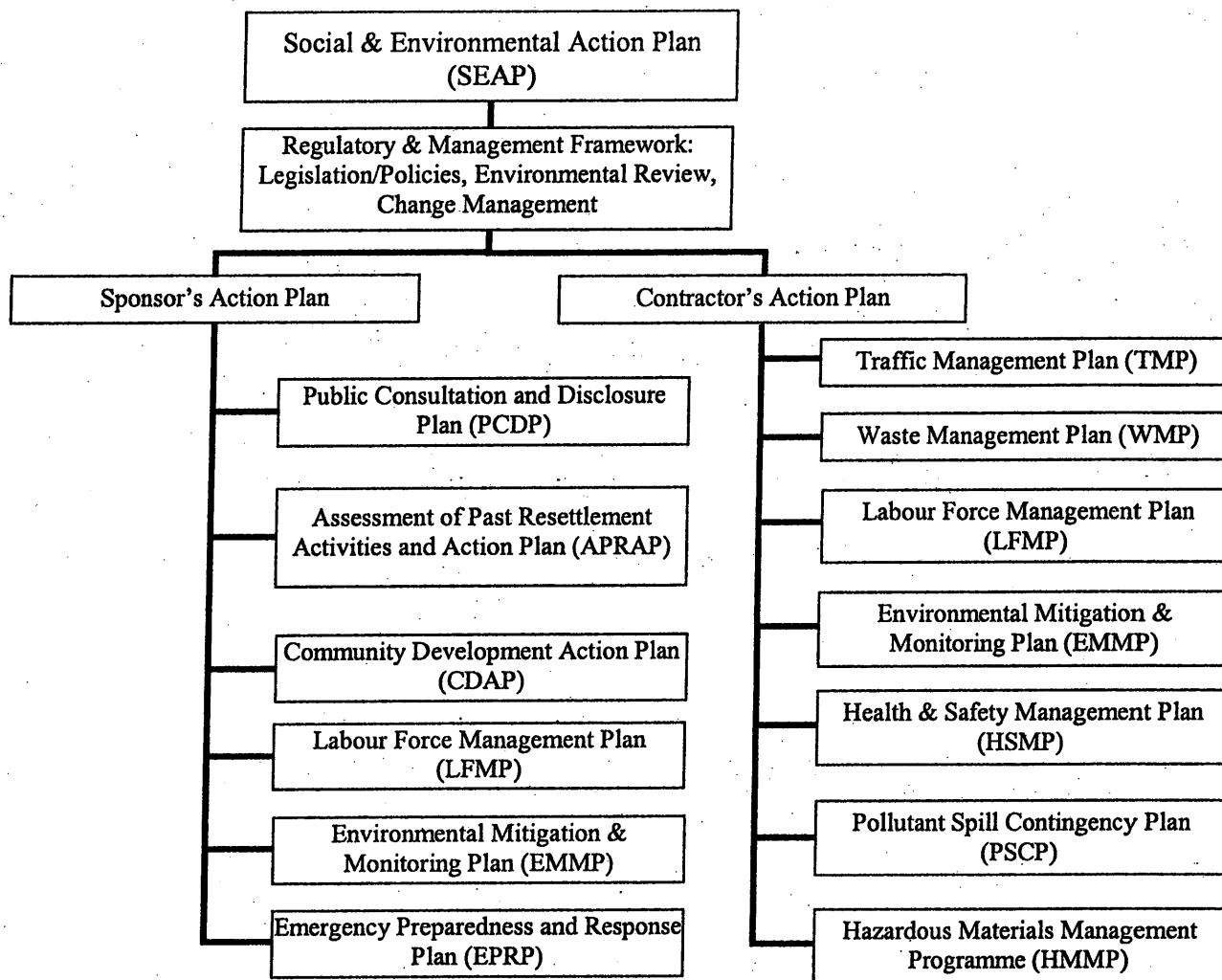
The Environmental Manager shall report directly to BEL's Implementation Manager, and will be provided with sufficient support staff and facilities to allow all of BEL's environmental commitments to be discharged appropriately. The Environmental Manager and his team will be members of the overall Implementation Team for the project.

8.3.2 EPC Contractor's Commitments and Resourcing

The EPC Contractor will designate an appropriately experienced and qualified Site Environmental Officer (SEO), who will be responsible for implementation of the measures set out in the Contractor's EMMP.

The Environmental Field Inspectors will be appointed during the mobilisation phase, and will be local staff with relevant environmental/engineering experience, who are fluent in local languages. The number of field inspectors may be adjusted according to the environmental issues on-site.

The SEO will have overall responsibility for the activities of the Contractor's Environmental department. On a day-to-day basis the emphasis of his work will be upon liaison with BEL's Environmental Manager, and with relevant authorities, local residents and NGOs on environmental issues (i.e. external liaison). The responsibility for day-to-day management of the field team will be devolved to the Environmental



Project Name: BUJAGALI HYDROPOWER PROJECT SEA	Date: December, 2006	10045-H-ES-6	Figure ES-6
Prepared for: BUJAGALI ENERGY LIMITED	SEAP COMPONENT PLANS		

Field Co-ordinator. The field team will comprise Field Inspectors, supported by drivers and labourers. The Field Inspectors will maintain a permanent presence on-site, carrying out routine checks of operating procedures and environmental monitoring.

8.3.3 Reporting Lines and Decision-Making

On a quarterly basis, the SEO will provide the Environmental Manager with a report containing monitoring results (and a summary of these), a synopsis of environmental issues encountered, and the efficacy of solutions to these issues. The Environmental Manager will use these as the basis for BEL's quarterly environmental reports. BEL's quarterly reports will also include commentary on the implementation and efficacy of environmental mitigation actions implemented by BEL.

The Environmental Manager will develop annual environmental reports suitable for submission to NEMA (as a requirement of the Ugandan Environmental Impact Assessment Regulations) and to other stakeholders as appropriate. This will provide an opportunity for NEMA and stakeholders to comment both on the impacts of the project itself and the efficacy of the SEAP. Where necessary, the SEAP will be updated.

8.3.4 Social and Environmental Auditing and Reporting

Auditing of the environmental compliance of the project will be carried out at two levels: internal and external.

BEL will carry out annual internal audits of its compliance with the requirements of the SEAP, and any other environmental requirements, such as those imposed by NEMA and/or the international lenders. The responsibility for implementing these audits will lie with the Environmental Manager, who may elect to employ external consultants.

External audits of the EPC Contractor's environmental compliance will be carried by BEL, and potentially by representatives of NEMA and the international lenders.

8.3.5 Social and Environmental Oversight

The project will have ongoing accountability to, and will be monitored by, both the lenders and NEMA (the latter via the District Environmental Officers for Jinja and Mukono). However, in order to ensure that issues are identified early, and resolved in an equitable fashion, BEL undertakes to support independent oversight of the project at several levels, as follows:

Social and Environmental Panel of Experts

It is a requirement of lender policies that the Project Sponsor engages a Social and Environmental Panel of Experts (PoE), to provide ongoing oversight of compliance with the relevant Safeguard Policies and Performance Standards. BEL is in the process of engaging the PoE for the Bujagali project.

Dam Safety Review Panel

Under World Bank Group policies, BEL is required to assemble a Dam Safety Review Panel (DSRP) acceptable to the World Bank Group. At financial close, BEL will develop a Terms of Reference and assemble a 3-member DSRP, the main functions of which will be to review and advise BEL on dam safety matters and other critical aspects of the dam, its structures, catchment area, reservoir surroundings and downstream areas. BEL may request the panel to provide expert review of associated issues such as the safety of the power generation facilities, river diversions during construction, the implications on safety of the upstream dams – Nalubaale and Kiira, and potential effects of a failure at either of these facilities on the Bujagali Dam.

Environmental Monitoring Committee

At the time of writing, an EU country was considering supporting an independent Environmental Monitoring Committee which would provide social and environmental oversight of the Bujagali HPP as part of its bilateral aid to Uganda. This Committee would support NEMA and would be independent of the sponsor group. Thus, the implementation of this Committee, if it eventuates, would be the responsibility of GoU.

8.3.6 Change Management

During the implementation of the project, change may be required to address unforeseen or unexpected conditions or situations. A change management process will be applied to ensure environmental and social issues are addressed as part of any significant changes to project procedures, processes, design or activities. Both BEL and the EPC Contractor will be responsible for managing changes within their respective areas of responsibility.

8.4 Responsibilities and Costs for Environmental Mitigation Measures

Table ES-4 below outlines the overall package of environmental mitigation measures that will be implemented in relation to the Bujagali hydropower facility. The table also assigns general responsibilities for implementing each group of mitigation measures. A detailed implementation schedule will be developed once the EPC Contractor is selected, and it will be submitted as an SEA update.

Consistent with the Bujagali Project's contracting strategy of integrating environmental protection and mitigation activities into the EPC Contractor's Scope of

Work, the specifications for many of the activities were included in the bid package upon which the EPC Contractor is developing its base rates. Therefore, since many of the costs associated with environmental protection and mitigation activities are included in the EPC Contractor's base rates, it is not possible to present a detailed accounting of all the monies devoted to the project's construction phase environmental protection and mitigation activities. These costs are therefore described as 'Within EPC contract price' in the table.

Table ES-4: Responsibilities, Timing and Budgets for Social and Environmental Actions

Issue	Action/s	Timing	Responsibility	Estimated Cost (USD)
Staffing for SEAP Implementation	Recruit SEAP Implementation Team	Months 1-3 after Financial Close	BEL - Implementation Manager	1,125,000
Social and Environmental Oversight – International Lenders	Appoint S&E Panel of Experts	Prior to Financial Close	BEL - Implementation Manager	300,000
Dam Safety	Appoint DSRP	Prior to Financial Close	BEL - Implementation Manager	450,000
Resettlement Corrective Actions	Implement APRAP	Year 1 after Financial Close	BEL – Social Unit	497,000
Community Development	Implement CDAP	Throughout Construction Phase	BEL - Social Unit	3,817,000
Public Consultation/Community Liaison	Implement PCDP	Throughout Construction Phase	BEL - Community Liaison Manager	Included in salary for SEAP implementation team
Labour Force Management	Develop Sponsor's LFMP	Months 1-3 after Financial Close	BEL – H&S/HR Managers	20,000
Labour Force Management	Develop EPC Contractor's LFMP	Months 1-3 after appointment	EPC Contractor	Within EPC contract price
Mitigation of biophysical impacts – not construction-related	Implement Sponsor's EMMP	Preconstruction	BEL (Environmental Manager)	321,000
		Construction Phase	BEL (Environmental Manager)	1,476,200
		Operations Phase (first 2 years)	BEL (Environmental Manager)	361,880
Mitigation of biophysical impacts –construction-related	Implement Contractor's EMMP	Throughout Construction Phase	EPC Contractor (SEO)	Within EPC contract price

Issue	Action/s	Timing	Responsibility	Estimated Cost (USD)
Institutional Strengthening (Plant and Environmental Management within UEGCL)	Assess need prior to handover to UEGCL.	Years 29 and 30 of BEL's concession.	BEL	TBD (funded from Bujagali HPP operating budget)

8.5 Responsibilities for Environmental Monitoring Measures

The SEAP describes the overall package of environmental monitoring that will be carried out in relation to the Bujagali hydropower facility. The EMMP also assigns responsibilities for each monitoring activity, and proposes parties who are capable of carrying out the monitoring, on behalf of the responsible body.

It should be noted that, consistent with the strategy of integrating social and environmental protection and mitigation activities into the EPC Contractor's Scope of Work, the specifications for many of the construction-related monitoring activities were included in the bid package upon which the EPC Contractor is developing its base rates. Therefore it is not possible to present a detailed accounting of all the monies devoted to the project's environmental monitoring activities during the construction phase.

8.6 Institutional Strengthening

Several governmental agencies at both the local and national levels will be responsible for ongoing monitoring of construction and operational conditions and activities. In general, BEL will consult with the applicable agencies to establish the extent of each agency's 'in house' capability for managing such activities, and identify any shortfalls.

Preliminary information about the institutional strengthening needs of the key government agencies involved, based on preliminary consultations during the SEA process, is provided in the SEA documentation.

