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MASTER PLAN AND DETAILED DESIGN FOR KABAAL INTERNATIONAL AIRPORT IN HOIMA DISTRICT

ENVIRONMENTAL AND SOCIAL IMPACT STATEMENT FOR THE PROPOSED KABAAL INTERNATIONAL AIRPORT



MASTER PLAN AND DETAILED DESIGN FOR KABAAL INTERNATIONAL AIRPORT IN HOIMA DISTRICT ESIS FOR KABAAL INTERNATIONAL AIRPORT

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Kabaale International Airport**

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EXECUTIVE SUMMARY

Introduction

Oil exploration has been on-going in the Albertine Graben since the 1920's. Commercially viable oil and gas deposits were discovered in the Albertine Graben in Western Uganda (Sensitivity Atlas for the Albertine Graben, 2010). The discoveries are in the area east of Lake Albert and the Nile Delta north of Lake Albert in Hoima, Buliisa and Nwoya Districts.

Oil exploration and production activities so far indicate that the oil potential in this area is promising. For example, out of the 34 oil and gas wells that have been drilled, only 2 have been found without oil. Furthermore, the productivity prospects in the area are reasonably high; for instance the buffalo prospect alone can produce 400 million barrels of oil with estimated revenue 15 times the Uganda's current expenditure. The estimated reserves in the Albertine Graben as a whole are about 2 billion barrels. The size of the reserves is enough to sustain production for 20 years (Sensitivity Atlas for the Albertine Graben, 2010).

It against this background that a Uganda refinery study (MEMD 2010) was carried out to establish the feasibility of constructing a refinery in Uganda to facilitate utilization of the country's oil and gas resources. The study recommended that a refinery be constructed close to the oil fields to avoid lengthy and costly pipelines and to optimize the value accruing out of the resources. The study further recommended, among the required infrastructure, the development of an aircraft runway local to the refinery location, capable of accommodating large cargo airplanes with carrying capacity of 112 - 250 tonnes and with ability to accommodate take-off runs of at least 3,500m.

The Government of Uganda (GoU), represented by the Ministry of Energy and Mineral Development (MEMD) and through the Uganda Civil Aviation Authority (UCAA) as the implementing agency supported by the International Civil Aviation Organization (ICAO), proposes to construct an airport in Hoima District to facilitate the delivery of heavy, long and sensitive equipment to be utilized in the planned oil refinery and other oil related facilities. The GoU seeks to develop an airport that should be able to initially handle international cargo flights, and, later on, other commercial operations serving the Hoima area.

The most suitable location for the refinery was found to be in Kabaale Parish, Buseruka sub-county, Hoima District. Kabaale is located about 30 km from Hoima Town via Buseruka Township, off Hoima-Buliisa road and about the same distance via Kiziranfumbi Township on the Hoima - Fort Portal Road. The MEMD earmarked 29 km² of land in Kabaale to host the refinery and its attendant infrastructure, including the proposed airport.

The UCAA through ICAO therefore commissioned Ramboll Denmark A/S in association with Newplan Limited to undertake the Master Plan Development and Detailed Design for Kabaale International Airport. Newplan Ltd has carried out the Environmental and Social Impact Assessment for the proposed Kabaale International Airport.

This environmental and social Impact statement therefore provides the findings of an Environmental and Social Impact Assessment for the proposed Kabaale International Airport located in Kabaale Parish, Buseruka Sub-County, Hoima District.

Methodology and Scope of the ESIA

A number of methods for baseline studies were applied including; literature review (review of design reports, legislative framework, district and sub-county development plans, and other documentation), field investigations (identification of sensitive receptors, baseline data collection and analysis, stakeholder consultations, biodiversity assessment, archaeology and

cultural heritage assessment, noise assessment, air quality assessment and direct observations.

Impact significance and analysis

Baseline environmental and social conditions were described in detail and valued on a **continuous scale from 'low value' to 'high value', which was assigned to the impact zones and the characteristics thereof.** Values were assigned to elements of the biological environment **such as flora, fauna, etc.** The human environment aspects usually have "high value" due to their intrinsic value in addition to others.

The second step was to describe and evaluate the magnitude of potential project impacts, measured in terms of their extent in time and space (long term/short-term), the vulnerability of the environments affected (sensitivity), the reversibility (permanent or temporary) of the impacts. **The magnitude of impacts was evaluated on a scale from 'high negative' to 'high positive'.**

The third and final step was to combine 'value' (step 1) and 'magnitude of impacts' (step 2) to obtain the 'overall impact assessment' (step 3). This assessment evaluated the significance of an impact on a scale ranging from 'very large negative' to 'very large positive'.

The consultant identified the most sensitive receptors, as well as likely constraints to the development of the airport. Using the impact characteristics such as extent, duration and mitigable, environmental impact analysis was undertaken with emphasis on the most significant impacts. Where potential significant negative impacts were identified, practical and cost effective mitigation measures were proposed for implementation by UCAA.

Report Structure

The report structure consists of nine main chapters which include; introduction; description of the project and technical components; review of policy, legal and institutional framework; analysis of project alternatives; description of existing environmental and social conditions; public consultation activities; evaluation of potential impacts and mitigation measures; environmental management and monitoring plan (EMMP), and conclusion and recommendations.

Project description

The proposed Kabaale airport with a runway length of 3500m and a width of 75m including shoulders will be constructed within the already acquired refinery land of approximately 29 square kilometers. The airport will operate under Visual Flight Rules (VFR). The airport will also comprise a taxiway of width of 25 m and 60 m length including shoulders. A taxi lane will be constructed along the western edge of the apron to facilitate access to stands.

New access roads shall be constructed in order to access the airport facilities. However, some of the roads including the perimeter road, regular access roads to the land side, circulation roads, access road to the apron, will have a larger width than the general road network because it will facilitate the movement and manoeuvring of trucks with wide loads being transported directly from the apron to the refinery construction site or other sites in the 29 km² area.

The airport facilities cover 6 villages including Kyapaloni, Bukona, Nyamasoga, Nyahaira, Kitegwa- Majengo and Kamukeduke villages in Kabaale Parish, Buseruka Sub-County in Hoima District.

About 174.2 acres of land will be required for the airport construction. This land has already been acquired permanently by the Government of Uganda through the Ministry of Energy and Mineral development.

The project will be divided into two phases: phase 1 and phase 2.

Phase I will comprise an airport servicing cargo aircraft and passenger aircraft for the construction and operation of the refinery and oil fields.

Phase II will involve further development of the airport to service increased commercial passenger flights and cargo flights for the fish and flower export industry. These include for instance expansion of passenger and cargo terminals, a new parallel taxiway and expansion of apron.

The key components of the project will include an airside and a land side as is typical of all airports internationally.

- The airside shall comprise a runway, taxiway, apron, air traffic control tower, navigation aids, areas for ground support equipment and cargo handling, airport maintenance vehicles, airport rescue and fire-fighting, fuel farm, terminal, cargo handling services/cargo terminal, passenger terminal.
- The landside will comprise the landside road system, parking area, administration, meteorological office and briefing room, staff housing and commercial areas

The planned project activities

- Planning /pre-construction phase : airport site survey, conducting the ESIA studies
- Construction phase: site clearance, construction of access roads, airport foundation preparation, and building of the various facilities.
- Operation and maintenance; aircraft operations, maintenance of facilities e.g. drainage, sanitation facilities, sewerage system, buildings, and all other airside and landside infrastructure, site inspections, etc.

Policy, Legal and institutional Framework

The Environmental and Social Impact Assessment has been carried out in line with Ugandan as well as International safeguard requirements, policies and standards, including Annex 16 of the ICAO standards. From the Ugandan environment context, the proposed development falls under the category of "major infrastructure development projects" which are listed under the Third Schedule of the National Environment Act (NEA) Cap 153 and annex 3 of the Guideline for Environmental Impact Assessment in Uganda, 1997. Section 10 (b) & (c) of the Third Schedule of the NEA requires that an Environmental Impact Assessment (EIA) be conducted for airports and airfields before their implementation.

Analysis of alternatives

Four alternative locations for the terminal/ apron have been proposed and analyzed in the context of environmental sensitivity, condition of flora, impact on species of conservation importance; social environment, visual impacts, impacts on heritage, technical issues and economic considerations.

Following the analysis, alternative 1 was preferred in with regard to a balanced environmental, social technical and economic evaluation. This is the option that raises the least environmental and social issues, while avoiding areas that create technical constraints and that are likely to jeopardize the safety and reliability of the aircraft and reduce the cost of the project as well.

Baseline conditions of the project area

The project area is located on the eastern side of the Albertine Graben. The Albertine Graben is a Cenozoic rift basin formed and developed on the Precambrian Orogenic belts of the African craton. **Albertine graben is underlain by some of the world's oldest rocks, some of which were formed as long as long as 3 billion years ago.** The Albertine graben is part of the East African rift system and forms the northern most part of its western arm which runs along the western border of Uganda and DRC. The proposed site is underlain by basically two types of rocks; granite gneisses and quartzites or quartzitic sandstones. Weathered phyllites are also present giving rise to grey clayey soils.

The project area is covered by a thin layer of black organic soil, then a layer of medium dense clayey gravel overlying a layer of very stiff to hard yellow to yellowish brown with grey and orange particles of clay.

The project area is traversed by several rivers, streams and wetlands such as R. Kipundu, R. Nyabunyira, R. Kamuteduke, R. Kabakete, R. Nkusi and R. Nyamasoga. Rivers Hohwa and Wambabya are the major rivers that drain the project area. The airport site is easily drained through the existing valley systems. The land side drains towards River Wambabya. The placing of land side facilities east of the runway would mean draining wastewater into a tributary of River Wambabya.

The base noise levels were measured using an AWA5661 sound level meter and they ranged between 33.0-61.9 dBA as per the National Environment (Noise and Control) Regulations, 2003. During construction, this noise will be higher around the airport site and access roads used by the project vehicles.

Air quality was measured using a CEM DT-9881M particulate meter and iBIRD MX6 meter at various points within the KIA site and the surrounding villages within a 2Km radius and within and around Entebbe International Airport to compare air quality at an existing airport. The air quality measurements for both sites indicated that particulate matter PM levels were within permissible limits for PM_{2.5} and not for PM₁₀ in accordance with the WHO air quality guidelines implying that air quality around these areas was already compromised. Gases such as sulphur dioxide, hydrogen sulphide, nitrogen monoxide, carbon monoxide and volatile organic carbons were not detected around Kabaale International Airport site and Entebbe International Airport.

Water quality assessment results indicated that water is of good chemical and physical quality for the measured parameters. The water from the boreholes and the protected spring was clear in appearance, while that from the swamps had some colour. With the exception of samples from a wetland south of the runway and another wetland near the apron with turbidity above the national standards for portable water, the other samples had low turbidity. Both samples from the boreholes had good bacteriological characteristics. However, the sample from Kyapaloni community protected spring showed bacteriological characteristics above permissible limits with regard to faecal coliforms. This indicated that the water is contaminated with faecal matter. This shows possible presence of organisms that can cause illness e.g. typhoid, dysentery, hepatitis A, and cholera. Therefore, water from protected spring and from the boreholes can be used for drinking purposes after boiling.

A wide variety of vegetation ecosystems and species are known to exist in the Albertine region; on the mountain and escarpment slopes and in the valleys and flats. The main vegetation ecosystems include montane forests, tropical forests (including riverine and swamp forests), savannah woodlands and grassland mosaics, papyrus and grassland swamps (NEMA 2010). It is noted already that the wider Kabaale Project area was previously human impacted to varying levels for the various land use patterns that would have been practiced before the

land was acquired by Government for the oil refinery development project. Following the departure of the local community from the wider project area, a natural vegetation cover has grown back. The proposed airport site is dominated by grassland which is about 70% of the area, followed by wetland and fallow, both covering 14% of the area. The ecologically sensitive habitats observed in the proposed airport area were the wetlands

Only one species of conservation concern, *Milicia excelsa*, listed by IUCN (2015) was encountered in the surveyed areas for main airport components. However, also encountered under the surveyed area **was one species of national importance particularly on Uganda's National Forestry Authority (NFA) 'reserved species list', that is, *Maesopsis eminii*.**

Fourteen invasive species were recorded in the area proposed for the main airport components while 1 and 2 species were recorded at the sand deposit area and the area near the quarry site respectively. Of the invasive species recorded, the most notorious are *Acacia hockii*, *Mimosa pigra*, and *Lantana Camara* which occurred in low abundances. Although these are strong invaders, they cover a relatively small area, but with the potential to colonize large parts if left uncontrolled.

The airport site is outside protected areas. However, Bugoma Central Forest Reserve (approx. 3km), Wambabya Central Forest Reserve (approx. 3km), River Hohwa (approx. 3km) and River Wambabya (approx. 5km) and Lake Albert is approximately 11km from the airport site.

It is evident that these natural landscapes in much of the study area have been modified but the remaining ones (wetlands and wet valley bottoms) are sensitive and important for the preservation of the remaining natural habitats.

Because the land set aside for development of Kabaale International Airport is now vacant of settlement, natural vegetation has grown back creating a semi-natural landscape in which wildlife could take advantage to re-colonize and recover different animal communities. The area, in which the airport facility is planned, is therefore largely characterized by post cultivation fallow which in places such as the wet valley bottoms contains a good vegetation cover that has the potential to hold communities of different animal taxa. The species recorded are generally of widely occurring nature. No species of ranges limited to the Albertine rift have therefore been recorded. Among the 112 birds species recorded, 5 species are listed on the East African list of birds to watch. These were: African Cuckoo Hawk *Aviceda cuculoides (R-NT)*, Spot-flanked Barbet *Tricholaema lacrymosa (R-RR)*, White-headed Saw-wing *Psalidoprocne albiceps (R-RR)*, and Grey-capped Warbler *Eminia lepida (R-RR)*, Cardinal Quelea *Quelea cardinalis (R-RR)*. Also worth noting are the birds of prey e.g. African Cuckoo Hawk, Palm-nut Vulture, Lizard Buzzard, Long-crested Eagle. The presence of birds of prey can be used as a good indicator of the other animal taxa that they feed upon. Therefore a healthy population of raptors can be used as a positive indicator of a healthy population of small vertebrates (rodents, shrews, amphibians and reptiles).

Of the 22 mammals species recorded, 10 were of shrews and 12 were of rodents e.g. *Thryonomys swinderianus*, *Aethomys kaiseri* and *Mus bellus* and *Dasmys incomtus* which is a species commonly associated with marshy areas, and was indeed recorded in wetland areas. Based on the results, the Kabaale project site is quite rich in species of small mammals. Its important to note that all species recorded are not listed on the IUCN list of threatened species, and locally in Uganda the species are widely occurring. Information from the communities also indicated presence of medium and large sized mammals such as Bush Duiker, Marsh Mongoose, Savannah Hare, Black and White Colobus. Only one large mammal, African Buffalo was recorded.

Whereas the majority of the species are quite widely occurring and are not listed by IUCN as under immediate threat, two species are listed by IUCN: -

- i. Hippopotamus (*Hippopotamus amphibius*) listed by IUCN as Vulnerable owing to the fact that their populations are decreasing worldwide
- ii. Leopard (*Panthera pardus*) listed by IUCN as Near Threatened owing to the fact that their population is decreasing worldwide.

However, no prime habitat for Hippopotamus in the area and although Leopard may range in the area, the fact that populations of medium sized wild vertebrates are very low would suggest that the project area may not hold any significant population of this species either.

The sand deposit site is surrounded by the Wambabya forest reserve on the one side and agricultural landscapes on the other. The area that has been mined for sand is where it is not open holes for sand is covered with bush comprised of *Penisetum* and other weedy plant species. No evidence of large mammals was recorded in the sand quarry area.

Of the 30 species recorded in the area, 1 species was of regional conservation concern, Yellow-fronted Tinker bird *Pogoniulus chrysoconus* was of conservation importance, i.e. of regional responsibility (R-RR). Two species of raptors (African Harrier Hawk and Lizard Buzzard) were also recorded in the area. Several forest and/or tree dependent species (including Green Hyllia, Red-tailed Greenbul, Yellow-whiskered Greenbul and Black and White Casqued Hornbill) were also recorded emphasizing the forest influence on the biodiversity in this area. The landscape around the sand quarry area is of biodiversity importance especially owing to its proximity to a forest reserve.

Because access was denied by the management of Kolin Construction to the stone quarry facility, a quick look around was conducted in the area across the road opposite the facility. For animal groups, this was a convenient substitute since animals move around and any species recorded on the opposite side of the road would be representative of the biota of the area.

The landscape in this area has vegetation cover that is very much degraded from human activities including tree cutting, grazing and agriculture. There was no evidence of presence of large mammals in this area, but 26 species of birds were recorded and none of the species recorded were of conservation concern, and all species recorded are common widely occurring species of open countryside.

A total of seven amphibian species were recorded e.g. Grassland Ridged Frog, Common African Toad, Kivu Reed Frog, Anchietae's Ridged Frog. Of the 8 eight reptile species recorded, the Runway start & Approach lights had the highest diversity of reptiles with seven species. This diversity is still very low though. This implies that the project areas are a very poor reptile diverse site, most likely due to few to reptile niches available. This could be attributed to the fact that the area had in the past been under subsistence agriculture, is now under fallow - the natural vegetation recovering. The species that had been displaced from the area are just recovering and the few individuals are either those species that were resilient and just hang in there or they are coming in as colonizers.

Some of the species recorded include Red-headed Agama, Slender Chameleon, and Speckled Lipped Skink. All reptile and amphibian species encountered were of Least Concern (LC) category in accordance to IUCN Red list (IUCN 2015).

The socio-cultural environment was determined based on secondary data, consultations, observations and a socioeconomic household survey of the project area. Six (6) villages were included in the study i.e. Kabaale, Katooke, Kigaaga, Kitegwa, Nyakasinini and Nyamasoga.

The proposed airport lies within the oil refinery land in Kabaale Parish, Buseruka Sub-County, Hoima District. Buseruka Sub-County is made up of 32 villages and three Parishes of Kabaale, Nyakabingo and Toonya. Kabaale Parish is composed of 20 villages. Majority (47%) of the population belongs to the Anglican/Protestant faith, followed by Catholics (39%) and Moslems (4%). Other religions take up 10% of the population. The largest ethnic group in the district is the Banyoro and the main language spoken in the district is Runyoro. The Banyoro people belong to the Bunyoro-Kitara kingdom, which is also one of the oldest kingdoms in Uganda.

The kingdom is headed by the Omukama currently Solomon Iguru 1, the 27th king of the Bunyoro Kitara. However, Hoima has an influx of other tribes and cultures such as Bakiga, Alur, Banyankore and Congolese, Banyankore, Bagungu, Bakobya, Lugbara. The diversity of ethnic groups in the project area can be attributed to the many immigrants into the area in the last 20 or more years.

Majority of the people in the project area are married although a few are divorced, single or widowed. The project area has some vulnerable groups: orphans, child mothers, unemployed youths, older persons, female heads of households and people with disabilities who are the majority. These people are in most cases marginalized and never given opportunities to participate and get involved in development work.

The predominant land tenure system in the villages surrounding the airport is customary tenure. Other forms of tenure systems are freehold and leasehold. The land for the proposed airport belongs to the government of Uganda. It is part of the land that was acquired for the oil refinery. In terms of size the land for the refinery is approximately 29km².

Settlements in the project area are generally scattered. They are a mix of permanent, semi-permanent and temporary structures with the majority being of semi-permanent in nature. On the project land, there were a few houses observed that are still occupied by the local people. These are mainly grass thatched houses. Consultations with the local leaders and the local people indicated that most of the houses on the project land were compensated. The few pending cases of about 93 people are waiting for in-kind compensation of their land and or structures. Out of these, 18-20 people went to court due to dissatisfaction with the compensation packages.

Literacy levels in the district stand at 66% which makes it difficult for the district to make any significant strides in development. In the project area, 48.4% of the household heads did not exceed primary level, 32.9% did not attain any education, 14.9% went up to secondary level, 3.1% attained tertiary level of education and 7% attained university education. The low percentage can be attributed to lack of many secondary schools in Buseruka Sub County.

The project has several social amenities including educational facilities, health centers and communication networks. The education institution includes nursery, primary, secondary schools, and tertiary institutions. These include among others, Starlight Nursery and Primary school, High Tech Nursery and Primary School, Kiduuma Secondary School which is about 10 km away. It should be noted that land acquisition for the refinery affected 2 primary schools i.e. Kyapaloni and Nyahaira Primary School, thus reducing the number of schools. The affected schools will be relocated to other areas within the Sub County though the construction has not commenced.

There are 3 Health government units in Buseruka Sub County namely, Toonya Health Centre II, Buseruka Health Centre III and Kabaale Health Centre III. Kabaale Health Centre III is the nearest government health centre.

In terms of diseases, HIV/AIDS is prevalent at about 6.8% for Hoima and 6.5 % at Buseruka Sub-County, Which is lower than the national average of 7.3%. Other diseases include malaria, cough, water related diseases, ulcers, skin diseases, respiratory infections and **STD's**.

Water sources for households in the project area include boreholes, shallow wells, protected springs and unprotected springs. During the rainy season, some households harvest rain water but majority of them lack water tanks for storage of large amounts of water. Consultations with the different stakeholders indicated that there was water scarcity in the project area which even becomes worse in the dry season. To access water, majority (49.7%) trek a of 500-1km to a water point, 23.8% travel less than 500m to the water source, 22.3% travelled

1-3kms to the water source, and 4.2% of the households trek more than 3km to the water source.

With regard to garbage disposal, 44.3% dispose of the solid waste in shallow pits, followed by 29.6% burn it, 16% scatter it in the gardens, 8.4% put it in open dumps and others 6.5% dispose of the waste in the bush, some give to the animals for examples the pigs eat food solid wastes and banana or sweet potato peels are given to cows and goats.

There is no electricity supply in Kabaale Parish and at the project site. Electricity supply stops in Buseruka Trading Centre. Most of the people in the area depend on firewood for cooking and paraffin for lighting. At the Kabaale Health Centre III, the main source of energy is solar and torches. However, firewood has become scarce and many people have resorted to using charcoal which is expensive. At the moment most of the district is not connected to the national grid.

Buseruka Sub County has a road network ranging from trunk roads, feeder roads, access roads and foot paths all interconnected to each other. ***These roads serve different communities in the project area but have one challenge as most of these are narrow, with potholes, and are dusty.*** Water transport is also used on Lake Albert. However, there are no reliable water transport services on the lake. It is majorly done by the private sector. Other transport infrastructure includes airstrips within the Rift Valley. There is also a small private airstrip in Bugambe Sub County used by Bugambe Tea Estate.

The project area is located in areas with the high levels of unemployment with only 2.7% of the households engaged in formal employment. Majority of the youth are unemployed and they spend much of the time in sports betting and gambling.

The project area is rural with the majority (83.8%) of the households in the project area engaging in agriculture (i.e. peasant farmers), 0.9% of the households are involved in fishing. Other people are involved in petty trade, motorcycle/Boda boda riding, casual labour, brewing and selling of alcohol. Women are mainly involved in farming and petty trade.

Because of its location in the Albertine Graben, the project area has a high number of protected areas and hence a high tourism potential. These nearest include Wambabya Central Forest Reserve, Lake Albert, Bugoma Forest, River Wambabya, Bunyoro Kitara Kingdom, among others. Hoima District is well known for its rich cultural heritage, wildlife and natural beauty.

With regard to area security, consultations with the district and sub-county leaders revealed that there is generally no security problem within the project area. Security has been beefed up through the Police and the UPDF nationally. Within Kabaale Parish and Buseruka Sub-County, there are several Police posts in addition to mobile Police Patrols e.g. a police post in Kyapaloni village (within the project site) and at Kabaale Trading Center. Overall, Police and the LC system are well established, functional and in control. Cooperation of project management with security organs in place would be paramount to the security of the airport and the area in general.

The project area has gender issues which include unequal distribution and access to resources, opportunities, benefits and decision-making mandate, among others. Women have however formed groups to have access to credit and saving facilities offered by microfinance banks e.g. FINCA.

The archaeological and cultural heritage resources recorded include archaeological, historical, spiritual and cultural heritage sites. In total, 6 pottery sites, 4 iron smelting/smithing and 4 burial sites were recorded within the airport area from Kyapaloni to Bukona village. These

however, are not significant to cause a stalemate in project progress, except for the burial sites that require relocation in consultation with the local leaders/elders.

Public consultations

A consultation process was undertaken to ensure participation of stakeholders in different stages of the ESIA that is during the Scoping Phase and the detailed ESIA phase. The main recommendations/concerns were safety of the public and workers, protection of natural and human habitat and conservation areas through tree planting, environmentally waste management practices, among others, mitigation against bird strikes, assessment of water challenges, noise nuisance, priority of employment to local people in Buseruka, compensation for affected households that are still utilizing the airport land, influx of people and associated social problems.

Potential significant impacts and mitigation measures

The development of Kabaale airport is viewed as a positive contribution to national and regional development mainly as part of the oil refinery infrastructure. Much as the project results in positive impacts, there is also the risk of negative impacts on the surrounding environment as well as local community which should be minimized to acceptable levels, or avoided altogether where possible, or be mitigated through specific actions.

The project will be associated with both positive and negative impacts on the physical, biological and social environment through its construction, operation and maintenance activities.

The table below shows a summary of the anticipated positive and negative environmental and social impacts and their significance levels on a scale of minimal to large.

Table 0-1 Summary of overall impacts

Impact	Value of affected element	Impact Magnitude	Impact Significance (without mitigation measures)	Impact Significance (with mitigation measures)
	Low/Med/High 	Negative High Medium Little/No Med. High 		
Positive impacts				
Pre-construction phase				
Creation of employment opportunities & increase in income	◆- -	◆-	Small Positive (+)	Medium Positive (+ +)
Construction phase				
Creation of employment opportunities	◆- -	-◆-	Large positive (+++)	Very Large positive (++++)
Business Opportunities	-◆-	-◆-	Large positive (+++)	Very Large positive (++++)
Skills Development	-◆-	-◆-	Medium Positive	Large positive (+++)

Impact	Value of affected element	Impact Magnitude	Impact Significance (without mitigation measures)	Impact Significance (with mitigation measures)
	Low/Med/High	Negative High Medium Little/No Med. Positive High		
			(++)	
Operation and maintenance phase				
Provision of employment	-♦-	-♦-	Large positive (+++)	Very Large positive (++++)
Improvement in transport and communication	-♦-	-♦-	Medium Positive (++)	Large positive (++++)
Freedom to travel and boost in tourism	-♦-	-♦-	Medium Positive (++)	Large positive (++++)
Improved education services and facilities	-♦-	-♦-	Medium Positive (++)	Medium Positive (++)
Negative impacts				
Pre-construction/Planning phase				
Social expectations generated by disclosure of information to the Community	-♦-	-♦-	Small negative (-)	Minimal/no (0)
Construction phase				
Unfulfilled community expectations	-♦-	-♦-	Medium Negative (--)	Small Negative (-)
Occupational health and safety	-♦-	-♦-	Small Negative (-)	Minimal/no (0)
Impact on public health and safety	-♦-	-♦-	Medium Negative (--)	Small Negative (-)
Influx of people	-♦-	-♦-	Medium Negative (--)	Small Negative (-)
Impact on housing and settlements - loss of structures	-♦-	-♦-	Small Negative (-)	Minimal/no (0)
Impact on Agriculture	-♦-	-♦-	Small Negative (-)	Minimal/no (0)
Impact on vulnerable groups	-♦-	-♦-	Small Negative (-)	Minimal/no (0)

Impact	Value of affected element	Impact Magnitude	Impact Significance (without mitigation measures)	Impact Significance (with mitigation measures)
	Low/Med/High	Negative High Medium Little/No Med. Positive High		
Impact on gender	-◆-	-◆-	Medium Negative (--)	Minimal/no (0)
Impacts on cultural property	-◆-	-◆-	Medium Negative (--)	Minimal/no (0)
Loss of flora	-◆-	-◆-	Medium Negative (--)	Small Negative (-)
Effect on regeneration potential of the vegetation	-◆-	-◆-	Small Negative (-)	Minimal/no (0)
Degradation of habitats	-◆-	-◆-	Large Negative (---)	Small Negative (-)
Proliferation of invasive plant species	-◆-	-◆-	Medium Negative (--)	Minimal/no (0)
Impact on birds and mammals	-◆-	-◆-	Medium Negative (--)	Small Negative (-)
Impact on herpetofauna	-◆-	-◆-	Small Negative (-)	Minimal/no (0)
Impact on air quality and Climate Change	-◆-	-◆-	Medium Negative (--)	Small Negative (-)
Noise emission	-◆-	-◆-	Medium Negative (--)	Small Negative (-)
Impacts on water quality and drainage	-◆-	-◆-	Medium Negative (--)	Small Negative (-)
Waste generation and its disposal	-◆-	-◆-	High Negative (--)	Small Negative (-)
Impact on geology and soils	-◆-	-◆-	Large Negative (---)	Small Negative (-)
Impacts of quarries and borrow site activities	-◆-	-◆-	High Negative (--)	Small Negative (-)
Operation and maintenance/ Post construction stage				
Impacts due to population influx	-◆-	-◆-	Small Negative (-)	Minimal/no (0)
Impacts on landscape general aesthetics	-◆-	-◆-	Small Negative (-)	Minimal/no (0)
Impact on climate change	-◆-	-◆-	Small Negative (-)	Minimal/no (0)

Impact	Value of affected element	Impact Magnitude	Impact Significance (without mitigation measures)	Impact Significance (with mitigation measures)
	Low/Med/High 	Negative High Medium Little/No Med. Positive 		
Insect infestation on attraction by lights	-♦-	-♦-	Small Negative (-)	Minimal/no (0)
Bird strikes during take-offs and landing of aircraft	-♦-	-♦-	Large Negative (---)	Medium Negative (--)
Bat populations build up in airport buildings	-♦-	-♦-	Medium Negative (--)	Minimal/no (0)
Sewage and solid waste generation and its disposal	-♦-	-♦-	Large Negative (---)	Small Negative (-)
Impacts on public safety	-♦-	-♦-	Large Negative (---)	Small Negative (-)
Risk of earthquakes	-♦-	-♦-	Large Negative (---)	Medium Negative (--)
Cumulative impacts		-♦-	Large Negative (---)	Small Negative (--)

Impacts whose significance level is categorized as minimal/no or small negative comprises 34% of the negative impacts are tolerable but efforts must be made to reduce the impact to levels that are as low as reasonably practical.

Impacts whose significance level was categories as medium or large negative comprises 66% of the negative impacts are un-acceptable and therefore mitigation measures must be implemented to reduce their significance.

A number of mitigation measures have been proposed to minimize or compensate for adverse impacts and an Environment Management and Monitoring Plan (EMMP) prepared with costs for implementation of the mitigation estimated at USD 82,800. ESMP will ensure that mitigation measures are effectively implemented during the construction and operation phases of the project. Monitoring and follow-up plan has been proposed in EMMP for all phases (planning, construction and operation). The cost for monitoring amounting to USD 189,420 has also been included.

Upon successful implementation of the environmental and social management plan to address the environmental and social impacts of the project, most of the residual negative impacts are expected to be either small or minimal with a few exceptions like: loss of structures/displacement, risk of earthquakes, impacts due poor waste management, as well as cumulative impacts.

Conclusion and Recommendations

The project will result into a number of positive and negative impacts on the environment. Measures to mitigate each of the identified the negative impacts have been recommended.

Once these measures are implemented, then the impacts will either be eliminated or minimized.

In the event that the project is approved, the following are recommended:

- Ensure that the mitigation measures proposed under this report are implemented.
- Ensure that the Project Affected Persons pending relocation or compensations are taken care before onset of construction activities.
- There should continuous sensitization of stakeholders and collaboration with the affected community through the local authorities.
- Provide employment opportunities to locals in Buseruka Sub-County and Hoima District in general.
- Ensure that the Environmental Management and Monitoring plan presented in this report is made available to the relevant parties responsible for implementation.
- To supplement the EMMP presented in this report, the contractor should develop the following Environmental management plans;
 - Environmental Health and Safety Policy and Environmental Health and Safety Management Plan to handle EHS aspects.
 - Waste Management Plan as required in Paragraphs 5, 14-17 of the IFC Performance Standard 3.
 - **Contractor's Social Environmental Action Plans (CSEAP) as guiding instruments during construction based on the associated impacts; in chapter 7.**
 - Resettlement Action Plan (RAP) where necessary
 - Emergency Response Management Plan
 - Traffic Management Plan,
 - Labour Force Management Plan,
 - Physical Cultural Resources Management Plan,
 - Public Consultation and Disclosure Plan;
 - Decommissioning, Remediation and/or Restoration Plan.
- Ensure that on completion of project works, all sites disturbed by the project works are restored to as near as possible their original state before the commencement of the project works
- The contractor should recruit an Environment, Health and Safety Officer, a Community Liaison Officer, among other staff, who will monitor the implementation of the Environmental Management and Monitoring Plan.
- **The contractor's environmentalist should produce and submit monthly reports to the developer on how far the project conforms in operation with the statements in this ESIA report/ESIS**
- The developer should keep records and make annual reports to the NEMA describing how far the project conforms in operation with the statements in this ESIS.
- As required by the National Environment Audit Guidelines, the developer should carry out environmental audits of the project and submit the first Environmental audit report to the Executive Director, NEMA within a period of not less twelve months and not more than thirty six months after the commencement of the project. Also, environmental audits should be conducted by the developer between the first year and the third year after the commencement of the project component operations or after the completion of the project component operations or earlier if the project will run for less than a year for the project components including borrow pits, quarry sites, **workshops, workers' camps, equipment storage sites, etc. for which individual ESIA's will have been carried out.**

- The developer should obtain necessary permits including permit to carry out a regulated activity in a Wetland/River Bank/Lakeshore, water abstraction permit, construction permit, waste discharge permit, fuel transportation and storage permit, registration of work place permit, among others.
- The developer or his contractor should ensure that impacts not contemplated at this stage are quickly addressed in case they arise.
- If the developer wishes to add any other component onto the project which was not considered under this assessment, a fresh Environmental Assessment (as an addendum) for the additional component should be undertaken to determine its compatibility with the immediate environment, its impacts on the environment and to identify appropriate mitigation measures for its adverse impacts.

Institutional Cooperation

A number of institutions will be involved in this project in all phases as was indicated in stakeholder identification. In order to enhance implementation of the proposed mitigation measures, there is need for collaboration between UCAA and all relevant stakeholders. It is imperative that clear roles and responsibilities for the different institutions be streamlined before construction activities start. This has been discussed but this could be enriched before project commencement.

Stakeholder consultation and Sensitization

Continuous sensitization should be carried out during construction and operation phases but more so during construction. This activity should be spearheaded by UCAA and the local authorities as the contractor is usually reluctant to carry this out. Tender documents for the contractor should emphasize the need for the contractor to carry out sensitization as they commence the work. Key issues for emphasis during sensitization include but not limited to: Health and safety, HIV /AIDS, opportunities, compensation issues, gender issues and others must be implemented during project implementation.

Employment Opportunities

The active work force has not yet been estimated but what is clear is that there will be skilled and non-skilled / casual labourers. It is recommended that workers should be recruited from the local communities, especially in non-skilled positions, whenever possible. Employing local people will not only benefit the communities but also eliminate or reduce the costs of providing housing and logistics. Local people should be given priority and proper consideration should be **made to ensure that some manual work being' flag women' is given to women as well as work** in the traditionally female areas of cooking and market activities.

Planning and Co-ordination with Local Authorities

Throughout all phases of the project, local authorities should be informed of the decisions taken by UCAA and consulted whenever possible. This will ensure good cooperation with the communities and avoid misunderstandings. A committee with representatives from the District, lower local governments and communities should be proposed and should be established in order to ease communication during construction.

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LIST OF ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
CAA	Civil Aviation Authority
CDO	Community Development Officer
DLG	District Local Government
EIA	Environmental Impact Assessment/Entebbe International Airport
EID	Early Infant Diagnosis
EMCT	Mother to Child Transmission of HIV
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Mitigation Plan
FGDs	Focus Group Discussions
GoU	Government of Uganda
HIV	Human Immune Virus
LC	Local Council
KIA	Kabaale International Airport
MARPs	Most at Risk Populations
MEMD	Ministry of Energy and Mineral Development
MEMD	Ministry of Energy and Mineral Development
NGOs	Non-Government Organizations
PAP	Project Affected Populations
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
REA	Rural Electrification Agency
S/C	Sub County
SACCO	Savings and Credit Cooperatives
SPSS	Statistical Package for Social Scientist
STD	Sexually Transmitted Diseases
UCAA	Uganda Civil Aviation Authority
UMIS	Uganda Malaria Indicator Survey

Units

dBa	Decibels
Km	Kilo meters
UGX	Uganda Shilling

1 INTRODUCTION

1.1 Background of the project

Oil exploration has been on-going in the Albertine Graben since the 1920's. Commercially viable oil and gas deposits were discovered in the Albertine Graben in Western Uganda (Sensitivity Atlas for the Albertine Graben, 2010). The discoveries are in the area east of Lake Albert and the Nile Delta north of Lake Albert in Hoima, Buliisa and Nwoya Districts.

Oil exploration and production activities so far indicate that the oil potential in this area is promising. For example, out of the 34 oil and gas wells that have been drilled, only 2 have been found without oil. Furthermore, the productivity prospects in the area are reasonably high; for instance the buffalo prospect alone can produce 400 million barrels of oil with estimated revenue 15 times the Uganda's current expenditure. The estimated reserves in the Albertine Graben as a whole are about 2 billion barrels. The size of the reserves is enough to sustain production for 20 years (Sensitivity Atlas for the Albertine Graben, 2010).

It against this background therefore that a Uganda refinery study (MEMD 2010) was carried out to **establish the feasibility of constructing a refinery in Uganda to facilitate utilization of the country's oil and gas resources**. The study recommended that a refinery be constructed close to the oil fields to avoid lengthy and costly pipelines and to optimize the value accruing out of the resources. The study further recommended, among the required infrastructure, the development of an aircraft runway local to the refinery location, capable of accommodating large cargo airplanes with carrying capacity of 112 - 250 tonnes and with ability to accommodate take-off runs of at least 3,500m.

An environmental baseline study was also carried out for the refinery area in 2013 to identify any significant environmental and social aspects that may arise out of the project for consideration during the Front End Engineering Design (FEED) phase and the detailed Environmental and Social Impact Assessment (ESIA). The study recommended that critical environmental aspects including value attachment to archaeological sites, social impacts related to water contamination, noise emissions, fire hazards, HIV/AIDS, risk of earthquakes, impact on soils due to hazardous waste, ground water potential, treatment and discharge, impact on air quality, noise pollution be considered during the planning stages of the refinery project (MEMD, 2013).

The Government of Uganda (GoU), represented by the Ministry of Energy and Mineral Development (MEMD) and through the Uganda Civil Aviation Authority (UCAA) as the implementing agency supported by the International Civil Aviation Organization (ICAO), proposes to construct an airport in Hoima District to facilitate the delivery of heavy, long and sensitive equipment to be utilized in the planned oil refinery and other oil related facilities. The GoU seeks to develop an airport that should be able to initially handle international cargo flights, and, later on, other commercial operations serving the Hoima area.

The most suitable location for the refinery was found to be in Kabaale Parish, Buseruka sub-county, Hoima District. Kabaale is located about 30 km from Hoima Town via Buseruka Township, off Hoima-Buliisa road and about the same distance via Kiziranfumbi Township on the Hoima - Fort Portal Road. The MEMD earmarked 29 km² of land in Kabaale to host the refinery and its attendant infrastructure, including the proposed airport.

From the Uganda environment context, the proposed development falls under the category of "major infrastructure development projects" which are listed under the Third Schedule of the National Environment Act (NEA) Cap 153 and annex 3 3 (c) of the Guideline for Environmental Impact

Assessment in Uganda, 1997. Section 10 (b) & (c) of the Third Schedule of the NEA requires that an Environmental Impact Assessment (EIA) be conducted for airports and airfields before their implementation. In line with Ugandan as well as International safeguard requirements and policies, including Annex 16, ICAO Standards on Environmental Protection, an Environmental and Social Impact Assessment has been carried out for the construction of the Proposed Kabaale International Airport.

The UCAA through ICAO therefore commissioned Ramboll Denmark A/S in association with Newplan Limited to undertake the Master Plan Development and Detailed Design for the Proposed Kabaale International Airport. Newplan has carried out the Environmental and Social Impact Assessment for the proposed Kabaale Airport and the associated power transmission lines. This report provides findings of the ESIA for the proposed Kabaale International Airport. The power transmission lines for the airport are presented in a separate ESIA report.

1.2 Aim of the Environmental and Social Impact Assessment

This environmental and social impact Assessment was aimed at identifying and assessing the potential environmental and social impacts of the proposed project with a view of eliminating/minimizing the negative impacts prior to, during and after infrastructure construction while enhancing the positive impacts.

1.3 Specific objectives of the ESIA

- i. Acquire baseline data on physical, biological and socio-economic setting of the project area
- ii. To consult relevant stakeholders, including potentially affected persons and document their concerns regarding the proposed project.
- iii. To identify and assess the positive and negative significant environmental and social impacts and recommend appropriate mitigation strategies (to avoid, minimize, restore and compensate)
- iv. To prepare an Environmental and Social Impact Statement (ESIS)
- v. Develop an Environmental and Social Management and Monitoring Plan to guide environmental management during project implementation. The plan consists of the required actions, the entity responsible for the action, the timeline, indicators and cost estimates.

1.4 Limitations of the study

Limitations

- i. During the scoping phase, the initial design of the airport facilities was not complete, and therefore, only one general location was assessed. Following the completion of the initial design however, four alternative locations for the Terminal/apron were assessed during the detailed ESIA studies and the analysis has been presented in this report.
- ii. Denial of access to the quarry site by the management of Kolin Construction, even with introductory letters from CAA and the district. Therefore, general area assessment was undertaken.

1.5 Methodology and scope

The scope of the ESIA was guided by provisions in the first schedule of the EIA regulations for Uganda and the approved terms of reference for the study (Appendix1).

A number of methods were applied including literature review (review of design reports, legislative framework, district and sub-county development plans, and other relevant documentation), field investigations (identification of sensitive receptors, socio-economic baseline data collection and

analysis, biodiversity assessment, archaeology and cultural heritage assessment, noise assessment, air quality assessment), stakeholder consultations, and impact identification and analysis.

The following activities were undertaken during the ESIA study:

- Review of literature and secondary baseline data including area infrastructure, planned lay out of the proposed site infrastructure, and planned works, area land use, ecologically sensitive areas, socio-economic aspects, environmental legislation and standards.
- Field studies, that included land use mapping, utilities surveys, site geophysical mapping, identification of sensitive receptors, identification of stakeholders and an inventory of activities in the neighborhood likely to be affected or communities dependent on ecosystem services that might be affected by development of the proposed Kabaale International airport.
- Consultations with stakeholders that included affected communities, relevant government agencies (Ministry of Works and Transport, Department of Occupational Safety and Health under the Ministry of Gender, Labour and Social Development, Department of Museums and Monuments Under the Ministry of Tourism, Wildlife and Antiquities, Directorate of Water Resources Management, Telecommunication Companies (MTN, Airtel, Africell), Electricity Regulatory Authority, Rural Electrification Agency, Petroleum Supplies Department, Wetlands Management Department, Uganda National Roads Authority Private sector (e.g. EnviroServ Uganda Limited, Hydromax Limited), and local authorities (technical and political leaders in Hoima District and of affected sub- counties: Kiziranfumbi and Buseruka, Local Councils in the affected villages (LCI Chairpersons) and Non-Government Organizations represented by Nature Uganda.
- Prediction and analysis of environmental impacts resulting from the proposed development, and proposing appropriate mitigation measures.
- Development of an Environment Management and Monitoring Plan for implementation by UCAA.

1.5.1 Methodology for Baseline Studies

Key activities that were undertaken during baseline studies included:

- Document Review
- Baseline surveys
- Stakeholder engagement

Document Review

Documentation review began in April 2015 on project commencement by all team members. This activity continued throughout the preparation of the draft ESIA report. Major documents reviewed included the following:

- Master plan for Kabaale Airport, 2015
- Environmental Sensitivity Atlas for the Albertine Graben, 2010
- Environmental Baseline Survey for the Proposed Oil Refinery in Kabaale Parish, Buseruka Sub County, Hoima District, 2013.
- The Proposed Physical Development Plan for the Albertine Graben
- Hoima District Development Plan 2015/2016-2019/2020
- Sub-County Development Plans for Buseruka and Kiziranfumbi Sub-Counties.
- National Development Plan 2010/11-2014/15
- Resettlement Action Plan for Refinery land, 2010
- Policy, Legal and Institutional Framework relevant to the project
- World Bank Guidelines

- Multilateral Conventions and Agreements
- Other relevant documents

Policy, Legal and Institutional Framework relevant to the project

Policy framework

- The National Environment Management Policy
- National Gender Policy, 2003
- Land Use Policy
- The National AIDS Policy (2004)

Legal Framework

- The Constitution of the Republic of Uganda
- The National Environment Act, Cap 153
- The Civil Aviation Act Cap 354
- The Water Act Cap 152, 1995
- Mining Act, 2003
- Land Act, Cap 227
- The Electricity Act, 1999
- The Access to Roads Act, 1965
- The Land Acquisition Act, 1965
- The Historical and Monuments Act, 1967
- The Occupational Safety and Health Act, 2006
- The Workers Compensation Act, 2000
- Petroleum Act, Cap 149
- The Petroleum Supply Act, 2003
- Town and Country Planning Act, Cap 246
- Local Governments Act, Cap 243
- Uganda Wildlife Act, Cap 200
- The Public Health Act, 1964
- The Civil aviation (Aerodrome) Regulations, 2014
- National Environment (Noise Standards and Control) Regulations, 2003
- The National Environment (Waste Management) Regulations, 1999
- The National Environment (Control of Smoking in Public Places), Regulations 2004
- The Environment Impact Assessment regulations, 1998
- The National Environment Audit Regulations, 2006
- The Water (Waste Discharge) Regulations, 1998
- National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999
- Water Resources Regulations, SI No. 33/1998
- The Guidelines for Environmental Impact Assessment in Uganda, 1997
- The Environmental Audit Guidelines for Uganda, 1999
- The Draft National Air Quality Standards, 2006

Institutional framework

- Ministry of Water and Environment (MoWE)
- Directorate of Water Resources Management
- National Environmental Management Authority (NEMA)
- Ministry of Tourism, Trade and Industry

- Ministry of Gender, Labour and Social Development
- Ministry of Energy and Mineral Development
- Ministry of Local Government
- Ministry of Works and Transport
- Ministry of Tourism, Wildlife and Antiquities

World Bank Safeguard Policies

- Environmental Assessment (OP/BP 4.01)
- Cultural Property (OP/BP 4.11) Physical Cultural Resources
- Involuntary Resettlement (OP/BP 4.12)
- Natural Habitats (OP/BP 4.04)
- World Bank Guidelines on Vulnerable People
- Public Disclosure

International conventions

- United Nations Framework Convention on Climate Change (UNFCCC)
- The Convention on International Civil Aviation
- Convention for the Safeguarding of the Intangible Cultural Heritage, 2003
- Rio Declaration (Agenda 21)
- The Convention on Biological Diversity 1992 (CBD)
- The Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention, 1972)
- The African Convention on the Conservation of Nature and Natural Resources, 1968
- International requirements and guidelines
- World Bank safeguard policies and guidelines
- International Civil Aviation Organization
- World Health Organization

1.5.2 Baseline surveys

Baseline information on environmental characteristics of the area of influence of the proposed airport and related infrastructure that included biological (flora and fauna), physical (ambient air quality and noise levels), and socio-economic conditions were collected using different methodologies: literature review, onsite assessments/field investigations/public/stakeholder consultations, and social surveys by use of questionnaires, sampling, testing and measurements.

- Review of existing information:

For all the taxonomic groups to be surveyed during the detailed field investigations, literature review was conducted to compile all available and accessible secondary data. Land cover maps showing the proposed project site were reviewed to direct the planning of the field surveys.

- Onsite assessments/field investigations

Field studies included biological environment survey, tests and measurements.

Sensitive, vulnerable and important receptors and resources in the project area were identified and described in sufficient detail to predict the impacts of establishment of Kabaale airport and future operations.

The Biological environment surveys were planned to cover five broad taxa (Plants, Herpetiles – (e.g. Reptiles), Birds and Mammals). These taxa were proposed for the study because they are easy to

study, assess and record and a good amount of information on the conservation status can be easily found.

The biological environment studies were proposed to characterize the existing environment, predict changes in the future; assess and evaluate the potential for any significant environmental impacts. Four broad taxa (Plants, Herpetiles – (Reptiles & Amphibians), Birds and Mammals) were assessed during the ESIA study because they are easy to study, assess and record and a good amount of information on the conservation status can be easily found.

The biological environment study therefore included:

- Collection of baseline data on flora and fauna of the area
- Identification and description of sensitive habitats and species
- Identification and description of all species including those of conservation importance
- Identification and evaluation of potential significant environmental impacts and suggestion of mitigation measures to the identified impacts

The physical environment assessed included climatic characteristics, geology and topography, hydrology, soils, air quality and noise assessment.

Social cultural issues like settlements, land use, social infrastructure, economic activities and cultural issues were assessed.

The field investigations were carried out between August- October 2015 by the ESIA team composed of; Team Leader responsible for overall field assessments and physical environment, Botanist responsible for plants including wetlands, forests, etc., Ecologists responsible for birds, mammals, amphibians and reptiles.

The socio-cultural team was composed of: a Senior Sociologist responsible for the overall social assessments and consultations. Assistant Sociologists were responsible for interviews and consultations, and an Archeologist responsible for physical cultural resources assessment.

- Social surveys

The socio-cultural environment was determined based on secondary data, consultations, observations and a socioeconomic household survey of the project area.

Social surveys were carried out through use of questionnaires that were designed to capture baseline socio-economic characteristics of the people in the project area. An interviewer-administered questionnaire (Appendix 2A) was developed with both open ended and close ended questions.

A 30% sample of the households in six directly and indirectly affected villages was randomly selected for inclusion in the interviews. The sample size was determined based on the number of households in a village. The sample size was further guided by **Glen D. Israel's (2009)** published tables (Appendix 2B).

Research Assistants with the knowledge of the local language and with a good command of the English language were deployed and trained to carry out the exercise. Quantitative data from the questionnaires was analyzed using the Statistical Package for Social Scientists (SPSS) while qualitative data was analyzed using thematic procedure and content analysis.

1.5.3 Sampling, testing and measurements

Measurements of ambient noise levels and air quality were carried out to obtain baseline data.

Noise measurements were undertaken using the AWA5661 sound level meter, air quality (particulate matter and gases) measurements were conducted using CEM DT-9881M particulate meter and iBIRD MX6 meter at various points within the proposed project site, at and around the existing Entebbe International Airport and other highly populated areas: trading centres, residential areas, health

centers, trading centers, areas of worship, and schools within the villages neighboring the project site, as well as other sensitive receptors within a radius of 2km from the site to obtain baseline against which future monitoring of noise levels will be based. Measurements were taken from the 26th to 29th August 2015 with each measurement taking 15 minutes at each point.

1.5.4 Public /Stakeholder engagement

The aim of stakeholder consultations was to identify and take note of environmental concerns and views of the stakeholders at an early stage so that appropriate mitigations are incorporated into project implementation. The Consultations helped to inform the community about the proposed project and gather the views from them.

Key stakeholders were identified, stakeholder analysis undertaken, and a stakeholder engagement plan developed. Stakeholder analysis was carried out during the scoping phase to identify stakeholders with interest or influence in the project and those to be affected by the project. The stakeholder engagement plan has been used in the engagement of stakeholders during the Environmental and social impact study.

Consultative meetings were held with major stakeholders and regulatory institutions between August and November 2015 to ensure their participation in the ESIA process as required by the National Environment- Act, CAP 153, EIA Regulations 1998, and Conduct of Environmental Practitioners Regulations, 2001 and Guidelines for EIA in Uganda, - World Bank Safeguard Policies and IFC Performance Standards 2003.

Focus group discussions (FGDs) formed part of stakeholder engagement. The FGDs were conducted with security organs in the area i.e. police of Kabaale Parish, Kabaale Health Centre III staff and women of Buseruka village who form part of the internally homogeneous groups whose perspectives may vary with those of other groups.

Community meetings were carried out in August and September 2015 in the directly and indirectly affected villages in Buseruka Sub-County. These were Kigaaga, Kitegwa, Nyamasoga, Kabaale, Nyakasinini, and Katooke villages.

Communities were mobilized by the Local Council Authorities of the respective villages while the ESIA team made appointments with the Local Authorities in Hoima District and in Buseruka and Kiziranfumbi Sub-counties, as well as relevant government agencies, and Non-Government Organizations. Community meetings were held at the village level at their usual meeting places.

Views in all meetings were documented and they form part of this report. Chapter 6 describes the results of stakeholder consultations.

1.5.5 Impact Assessment Methodology

Baseline environmental and social conditions were described in detail and valued on a continuous scale from 'low value' to 'high value', which was assigned to the impact zones and the characteristics thereof. This value was related to international, national or local guidelines, standards and evaluations. Values were assigned to elements of the biological environment such as flora, aquatic ecosystem etc. The human environment aspects were **taken to have "high value" due to their intrinsic value** in addition to others. These were presented diagrammatically as Figure 1-1 below:



Figure 1-1 Diagrammatic representation of value of environmental component

The second step was to describe and evaluate the magnitude of potential project impacts, measured in terms of their extent in time and space (long term/short-term), the vulnerability of the environments affected (sensitivity), the reversibility (permanent or temporary) of the impacts and the probability that the impacts will occur. The magnitude of impacts was **evaluated on a scale from 'high negative' to 'high positive'** (Fig 1-2).

Phase	Magnitude of Impacts
	High neg. Medium neg. Little / no Medium pos. High pos. ----- ----- ----- ----- ----- ---
Planning	-----▲-----
Construction	-----▲-----
Operation	

Figure 1-2 Scales showing magnitude of impacts

The third and final step combines 'value' (step 1) and 'magnitude of impacts' (step 2) to obtain the 'overall impact assessment' (step 3). This assessment evaluates the importance of an impact on a scale ranging from 'very large negative' to 'very large positive'.

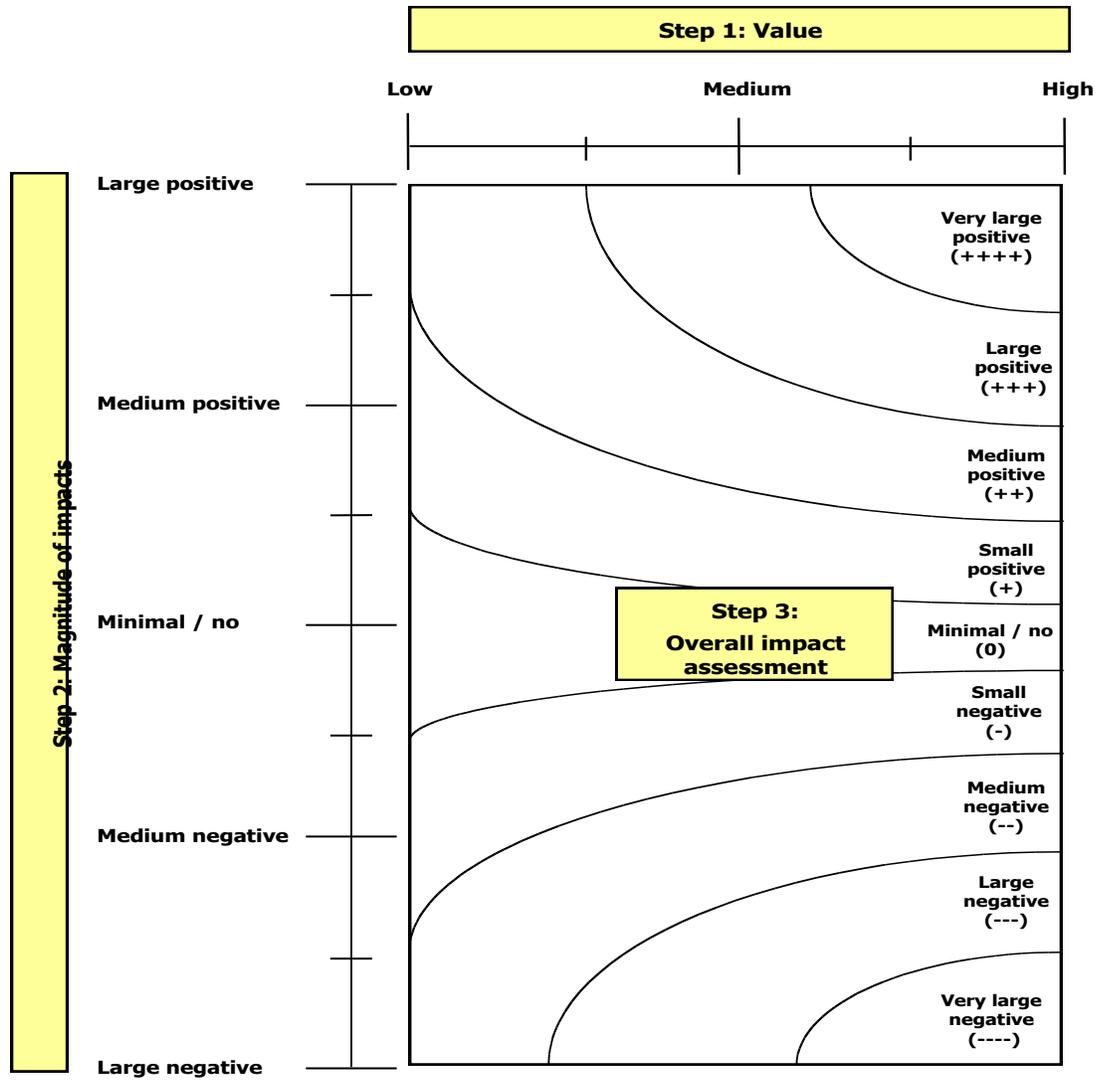


Figure 1-3 Steps in evaluating potential Impacts

Overall impact assessment results were tabulated as shown below (Table 1-1).

Table 1- 1 Overall Impact Assessment

Study	Value/vulnerability of affected element	Impact Magnitude	Overall impact assessment (before mitigation)	Overall impact assessment (after mitigation)
Scale	Low/Med/High ----- -----	Negative Positive High Medium Little/No Med. High ----- ----- ----- -----		
Planning Phase				
Social Expectations	-♦-	-♦-	e.g. Large negative impact (---)	e.g. Medium negative impact (---)
Preparation and Construction Phase				
Employment	-♦-	-♦-	e.g. Medium positive (++)	e.g. Large positive (+++)
Operation and Maintenance phase				
Aesthetic value	-♦-	-♦-	e.g. Medium negative (--)	e.g. Small negative (-)

Impact Significance and Analysis

Likely adverse changes to the environment from construction and operations of the proposed airport was assessed and scenarios developed and investigated to determine a cause-effect relationship, most sensitive receptors and state the scale/magnitude of the impacts with respect to the duration, consequences, likelihood of occurrence and any uncertainties. The consultant also identified the most sensitive receptors, as well as likely constraints to development of the airport.

Having identified key sensitivities in the project area, including the physical, biological and social environment, and all activities to be undertaken during the project, environmental impact analysis was undertaken with higher certainty using the following impact characteristics;

- **Extent:** On site, within limited area (<200m from site), Local (within 5km radius of the site), Regional (district wide, nationally)
- **Duration:** Temporary (only during a particular phase), Short term (1-2 years of the project life), Medium term (2-5 years), Long term or permanent (> 5 years/throughout the lifetime of the project).
- **Magnitude of impact** - The magnitude is measured in a scale from "large positive" to "large negative".
- **Impact significance before mitigation:** very large positive (++++), large positive (+++), Medium positive (++) , Small positive (+); Minimal/no (0), Small negative (-), Medium negative (--), Large negative (---), and Very large negative (----).
- **Overall impact significance after mitigation:** very large positive (++++), large positive (+++), Medium positive (++) , Small positive (+); Minimal/no (0), Small negative (-), Medium negative (--), Large negative (---), and Very large negative (----).

Emphasis was on significant impacts, and these were described, assessed and addressed in Chapter 7 of this report.

Where potential significant negative impacts were identified, practical and cost effective mitigation measures were proposed for implementation by UCAA.

All mitigation and management measures were clearly specified in the Environmental and Social Management Plan (ESMP) for the construction, operation and restoration phase.

1.5.6 Mitigation and enhancement measures

The study proposed measures to mitigate any adverse negative impacts likely to arise due to the implementation of the project. The proposal of mitigation measures were based on environmental and social aspects, as well as the need to subject measures to periodic reviews to ensure their workability and adaptability.

The positive impacts for the proposed project were also identified as well as recommendations for their enhancement.

1.6 Public Disclosure

As part of public disclosure, consultation with various stakeholders was carried out at scoping phase and during the detailed environmental and social impact study, and comments incorporated into the ESIS (ESIA Report). As soon as the ESIS has been submitted to NEMA, it shall become a public document and may be inspected at any reasonable time by any person. If there is controversy, NEMA will publicize receipt of the ESIS, and identify the concerned stakeholders, the places for inspection of the ESIS and shall make copies or summaries of the statement available for public inspection and review. NEMA shall also transmit the ESIS to the lead agencies who are expected to make comments and send them back to NEMA within 30 working days of receiving it (EIA Regulations Section 18 (1) &2. The KIA being a Category A Project, will be disclosed at the World Bank Info shop (English, and should be accessible to local affected groups (in local language).

1.7 Report Structure

This Environmental and Social Impact Statement is divided into 9 Chapters as indicated below:

Chapter 1. Introduction: provides a description of the background of the project, the need for an EIA and the methodology used in the assessment;

Chapter 2. Project Description: describes the project location, the area of influence, the project components, and project technical designs;

Chapter 3. Policy, Legal and Institutional Framework: presents an overview of the legal and institutional framework under which this ESIA has been conducted including national and international EIA study requirements.

Chapter 4. Provides an analysis of project alternatives

Chapter 5. Description of the Existing Environment and Social Baseline Conditions

Chapter 6. Public Consultations: provides an overview of public disclosure and consultation activities undertaken in connection with the ESIA study process.

Chapter 7. Evaluation of Potential Impacts and Mitigation Measures: describes the potential positive and negative environmental and social impacts according to their magnitude and presents the anticipated overall impacts of the Project. It also highlights the mitigation and enhancement measures.

Chapter 8. Environmental Management and Monitoring: provides guidelines to be adopted in environmental monitoring and management of the project.

Chapter 9. Conclusion and Recommendations: gives concluding remarks and recommendations on project implementation.

2 DESCRIPTION OF THE PROPOSED PROJECT AREA

2.1 Kabaale International Airport facilities

The proposed Kabaale airport with a runway length of 3500m and a width of 75m including shoulders will be constructed within the already acquired refinery land of approximately 29 square kilometers. The airport will operate under Visual Flight Rules (VFR). The airport will also comprise a taxiway of width of 25 m and 60 m length including shoulders. A taxi lane will be constructed along the Western edge of the apron to facilitate access to stands.

New access roads shall be constructed in order to access the airport facilities. However, some of the roads including the perimeter road, regular access roads to the land side, circulation roads, access road to the apron, will have a larger width than the general road network because it will facilitate the movement and manoeuvring of trucks with wide loads being transported directly from the apron to the refinery construction site or other sites in the 29 km² area. These access roads will be left operational after construction activities to be used by maintenance vehicles. The airport run way will cross a number of existing roads. The major ones are Kabaale-Kyapaloni-Nyamasoga road (0285301, 0162250), Kyapaloni-Katooke road (0286319, 0159171), and Kabaale-Kyapaloni-Kiziranfumbi road.

About 174.2 acres of land will be required for the airport construction. This land has already been acquired permanently by the Government of Uganda through the Ministry of Energy and Mineral development.

2.2 Project Area Location

The proposed airport site covers 5 villages namely Kyapaloni, Bukona, Nyahaira, Kitegwa- Majengo and Nyamasoga in Kabaale Parish, Buseruka Sub-County, Hoima District. Hoima District is located mid-western of Uganda. It shares borders with Masindi and Buliisa Districts in the North, Kyankwazi District in the East, and Kibaale District in the South. Hoima District stretches to the national western boundary of the Democratic Republic of Congo (see Figure 2-1 and 2-2).

The proposed Kabaale International Airport site can be accessed using Kabaale-Kiziranfumbi Road. Kabaale-Kiziranfumbi road is a motorable gravel road that connects to Hoima-Kaiso-Tonya road at Kabaale trading center. Kabaale is approximately 29 square kilometers from Hoima Town via Buseruka Township, off Hoima-Buliisa road and about the same distance via Kiziranfumbi Township on the Hoima - Fort Portal Road.

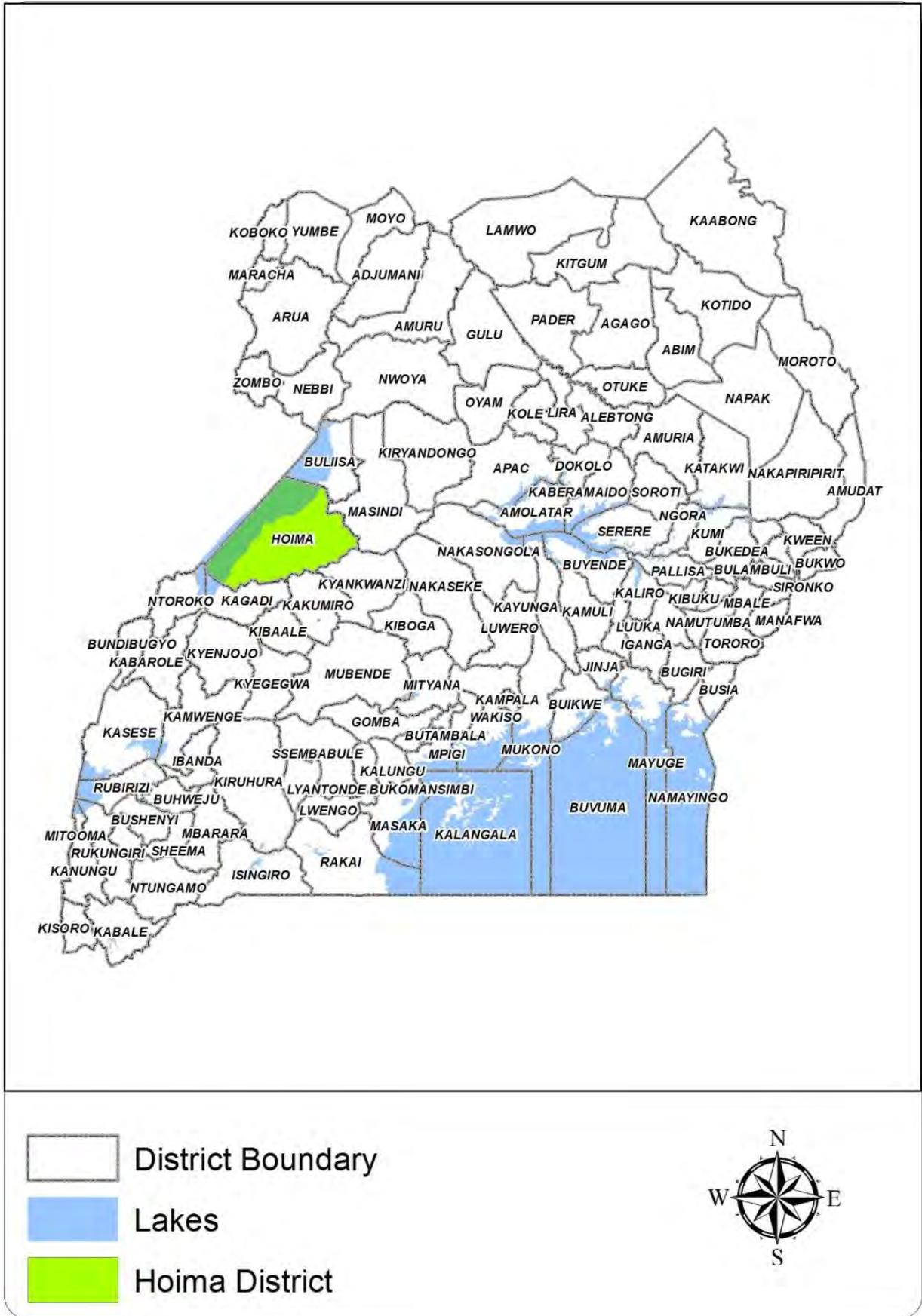


Figure 2-1 Location of Hoima District in Uganda

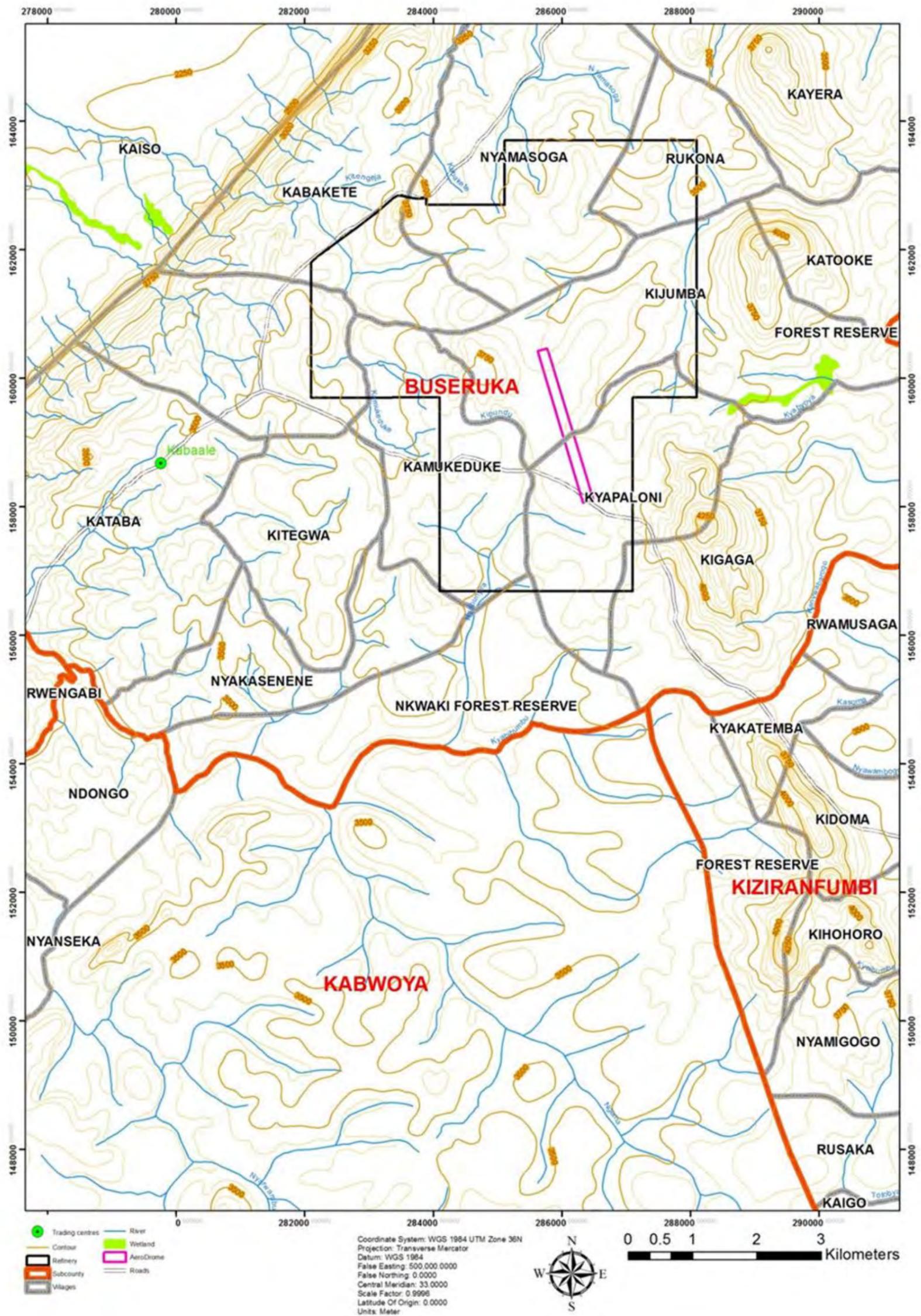


Figure 2-2 Proposed location of Kabaale International Airport

2.3 Area of Influence

This is defined as the area that will be affected by the project development. The zones in this area have been defined based on the intensity of the impacts; hence, Direct Impact Area (DIA) and Indirect Impact Area (INDIA). The DIA is an area that will have a direct impact from the project activities. The key DIA areas include: airport site, the camp site (temporary- not identified), the access roads, soil disposal sites (not yet identified), wetland land areas /valleys that are likely to receive storm water from worksites/ airport site during operation, etc.

The INDIA refers to areas that are surrounding the project area that may not be directly affected by the project, but may be influenced by human activities anticipated after the project has commenced. These areas include: the local communities surrounding the airport site, local communities along the access road on either side, people who may use roads in the project area and other resources and infrastructure like water, schools etc.

2.4 Project Components/Facilities/Activities

The primary objective of Kabaale International Airport is to provide air access to the Kabaale region and particularly to provide capacity for large cargo aircraft which will bring in equipment and tools for construction of the refinery and petrochemical plants. Subsequently, it is expected that the airport will offer passenger services domestically and internationally.

2.5 Project Phases

The project will be divided into two phases:

Phase I

This will comprise an airport servicing cargo aircraft and passenger aircraft for the construction and operation of the refinery and oil fields. In Phase I, the airport will also service the local population and incoming tourists and any export oriented industries that might be set up nearby due to the new airport. The land use plan for phase I (Appendix 3A) shows the initial infrastructural needs for the airport. This includes among others runway with turn pads, taxiway, apron for four AN-124 aircraft, a small passenger terminal, cargo terminal, landside road system, ARFF, administration building, fuel farm and a permanent air traffic control mobile tower.

Phase II

This will involve further development of the airport to service increased commercial passenger flights and cargo flights for the fish and flower export industry. The land use plan for phase II (Appendix 3B) includes all additions foreseen in the future. These include for instance expansion of passenger and cargo terminals, a new parallel taxiway and expansion of apron. These expansions will be undertaken only when traffic warrants. For instance, the necessity of a passenger terminal expansion is expected prior to establishing a new parallel taxiway.

Aircraft Types

It is expected that the equipment and tools for the oil refinery plant will be oversized and heavy and will require very large types of cargo aircraft. The following aircraft are likely to be operating in and out of the airport.

AN 124-100

The Russian built AN 124-100 is one of the world's largest cargo aircraft which carries very large oversized loads like heavy machinery and equipment. It has special loading gear, cranes and ramps which allow loading in the front and the rear of the aircraft. It is 69.1 m long with a wing span of 73.3 m. Its runway length requirement is 3,000m.

Boeing 747-800

The Boeing 747-800 is the largest western civil cargo aircraft. It comes in different sizes and with different payloads ranging from the old B747-100 to the new B 747-800. A few variants can be frontloaded with a ramp.

It is 74.2 m long, with a wing span of Wingspan: 68.4 m. Runway length requirement is 3,479 m.

IL76

The IL 76 is the Russian "standard" cargo aircraft which is available all over Africa and the Middle East and of course in the Commonwealth of Independent States (CIS) countries. The plane has a wide tail ramp for loading of outsized loads. It is 46.5 m long, with a wing span of 50.5 m. Runway length requirement s 1,500 m.

2.6 Project components and activities

As is typical of all airports internationally, the proposed Kabaale International Airport shall have an airside and land side. Appendix 3A and 3B show the land use plans for phase 1 and phase 2 of the proposed Kabaale International Airport.

2.6.1 Air Side

The airside shall comprise the following Facilities:

- Runway
- Taxiway
- Apron
- Air Traffic Control Tower
- Navigation Aids
- Areas for ground support Equipment and Cargo handling
- Airport maintenance vehicles
- Airport Rescue and Fire Fighting
- Fuel Farm
- Terminal
- Cargo Handling Services/Cargo Terminal
- Passenger Terminal

Runway, Taxiway, Apron

The runway will have a length of 3500m, width of 45m and shoulders of 7.5 m on either side.

The taxiway width (between the runway and the apron) will be 25 m, with a length of 190 meters (from the center of the runway to the center of the taxi lane). The runway and taxiway will be constructed using Asphalt.

The apron shall have an area of 11,000m² and will be paved with concrete.

Air traffic control tower

It is proposed that a basic prefabricated air traffic control tower be constructed with provision of semi-permanent/temporary solution. A proposal for a permanent ATC tower has also been made. The tower is proposed to be located close to the apron, airport rescue and firefighting, as well as the electrical substation (Appendix 3A).

A decision is yet to be made with regards to the tower and details will be provided in the ESIA report.

Navigational Aids

Instrument Flight Rules (IFR) will be applied and Navigation aids for precision approach will be installed. This will include localizer, Glide Path, PAPI, approach lights and runway lights for safe landings.

Areas for ground support Equipment and Cargo handling

The apron will be designed with a size that allows for power-in, power-out operations of even the largest aircraft using the airport. This means that the Ground Support Equipment (GSE) can be kept to a minimum for turn-around operations. However, there will still be a need for different GSE and vehicles for the daily operation of the airport. Equipment and vehicles needed include:

- Cargo loaders/off loaders
- Cargo dollies
- Fuel truck
- Ground Power Units
- Tractors
- Staircases
- Trolleys
- Special equipment and ramps for off-loading of heavy and oversized cargo loads

It is envisioned that cargo processing (customs etc.) of very large equipment and parts will be undertaken on apron, and hence without the need to bring this through the cargo terminal

Airport maintenance vehicles

The maintenance vehicles will include but not be limited to:

- Sweepers
- Trucks
- Runway maintenance equipment
- Inspection cars
- Marshall cars

Airport Rescue and Fire Fighting

Due to the limited size of the airport, and due to the fact that there will be less than 700 operations by the aircraft within a consecutive three month period at any given time, a single fire station will be sufficient. It will be able to house three rescue and fire fighting vehicles which is in accordance with ICAO Annex 14.

The fire station will be located close to the apron and the runway, to facilitate a maximum response time of 180 seconds to all parts of the airport. Proximity to the apron is of special importance as this is where most incidents happen, which require rescue and firefighting staff and equipment to be deployed. A water tank will be installed next to the fire station for refill of the fire trucks.

Fuel Farm

The fuel farm will be dimensioned in accordance with ICAO Doc 9977 and will contain Jet A1 fuel for the jets and turbo-props and Avgas for small piston aircraft. The tanks of the fuel farm will be dimensioned in consultation with the AN 124 operators. A 4,000 m² area has been reserved for the fuel farm.

The required capacity of the tanks will be estimated based on:

- Days of fuel reserve: Most likely 7 days due to the difficult road distance and access for the fuel trucks. When the Jet fuel can be delivered directly from the refinery the storage capacity can be reduced considerably.
- Number of departures per day.
- Estimated fuel uplift per departure.

The fuel farm is to be located next to the cargo apron, runway and Airport Rescue and Fire Fighting unit with a 4m wide access road for use in case of emergencies and crash landing at the runway.

Terminals

The cargo and the passenger terminals will be separate buildings.

Cargo Handling Facilities / Cargo Terminal

A tent terminal was proposed during the initial master plan development for the airport. However, a permanent structure was preferred based on the fact that the Airport is expected to handle relatively high passenger traffic in the near future. The different possibilities are being explored and a decision will be made.

Passenger Terminal

According to the air traffic forecast for passenger flows, around 50,000 passengers could be expected in the year of the airport opening. This will be a mix of local population, tourists and workers for the oil industry. The passenger terminal will be a simple light readymade terminal building which will protect the passengers from sun and rain. The terminal system will be based on flexible modules which can be expanded as required.

No particular shopping facilities, restaurants, lounges or similar facilities will be offered. Facilities for security checks, immigration authorities and customs will be provided for international flights. In the later stages where scheduled services will be offered, the terminal will be expanded and will include more convenient facilities such as comfortable waiting areas, small shops, cafes etc.

It is suggested to provide a small lounge for passengers and crew from company aircraft and small charter planes. Companies and operators may choose to fly in key staff and/or VIP people to the different plants.

2.6.2 Land Side

The landside will comprise the following:

- Landside Road System
- Parking Area
- Administration, meteorological office and briefing room.
- Staff Housing
- Commercial Areas

Landside Road System

The airport will be connected to the internal road system in the industrial park planned to be developed by the Government of Uganda as advertised in the New Vision of 22nd May 2015 that required expression of interest for consultancy serviced to develop a master plan for the oil and gas industrial park. Particular attention will be paid to the width and curves at the road between the airport and the refinery in order to secure sufficient space for transport of outsized equipment, material and general heavy cargo.

Car Parking Areas

Parking areas with landside access will be provided for staff and customers at the airport. The areas are proposed to be developed in a phased manner to meet the actual demand. Initially, 25 parking spaces will be provided. The car parking will be fenced and guarded for security reasons and located 50 metres from the terminal building for security reasons.

Administration, meteorological office and briefing room

Common office building housing the airport administration, the security surveillance office based on **CCTV cameras in the airport area, the meteorological office, the briefing room, a small pilot's lounge,** and rooms for technical support systems will be established. Staff rooms and a small canteen will be included in the building.

The floor area of the building is estimated at 400 m².

Housing for Airport employees

The airport will permanently employ staff for management and operation of the airport. In peak periods, short-term employees will be employed for handling of the incoming cargo loads. Specific planning for such facilities will be coordinated with the overall plans for the industrial area.

Commercial areas

Commercial locations for hotels, guest houses, shops, restaurants, cafes, workshops, etc. within the airport area are yet to be determined. B

Landside fencing

The airport will be fenced with a 2.5 meter high fence with barbed wire on the top. The airport area will be supervised by use of CCTV to detect illegal entry to the airport area. A perimeter road will be established along the fence for physical inspection of the fence and the airside area.

Ancillary services

Ancillary services shall include the following:

- Water supply, including a water storage tank and connection to mains. (A rainwater harvesting system will be included in the design set-up)
- Electricity supply, including an Airport Power Station and its connection to the grid Communications
- Aircraft fuel storage for at least 3 days of operations
- Sewage water treatment plant
- Solid waste disposal system and solid waste treatment plant

2.7 Water Sources and supply

The airport will need fresh water supply for the offices, terminals, kitchens, bathrooms, cleaning - i.e. **for the general "household" of the airport, for the fire brigade for the refill of fire trucks and for airside cleaning and maintenance, and for water supply to the aircraft.**

Preliminary observations and consultations with the different local stakeholders revealed that there are limited water sources in the area with particular regard to surface water and ground water particularly in dry seasons. The major surface water supply source identified in the area is River Wambabya from which Hydromax 9MW hydro power plant and enviroserv waste management facility draw their water. There are some boreholes and some shallow wells in Kabaale. Groundwater is identified at 1065 metres above mean sea level which is quite close to the surface.

According to the water sources and supply study, the proposed location of the KIA is largely a greenfield site without any existing water supply network or recognized operator. According to the National Water Utility – the National Water and Sewerage Corporation (NWSC) – there is no intention to start investing in this area where there is no existing demand. The proposal is therefore for the airport to have a private supply – at least NWSC finds it viable to construct a public supply.

The general water supply sources include:

- Surface water - River Wambabya to the East, River Rutoha to the south west and Lake Albert to the west.
- Ground water – using drilled production wells.
- Trucked water supply from National Water and Sewerage Corporation (NWSC).

Detailed investigations have revealed that the water supply demand for the airport is estimated to be 52 m³ per day including water demand from passengers and staff including cleaning of facilities. The demand for fire fighting water supplies is estimated to be 81.9 m³ stored in an elevated tank.

The assessed water supply sources include River Wambabya, River Rutoha and Lake Albert and ground water. Details of the analysis are provided under section 3.4 of the report.

Sewerage and Solid Waste

Wastewater generated is estimated to be the same as the water supply demand, i.e. 52 m³ per day. The different options for waste water collection and treatment are presented in the chapter4-analysis of project alternatives.

Solid waste is suggested to be separated at source, via a three-bin system for (1) Biodegradable Waste; (2) Glass and (3) Plastics and Metals. Organic waste generation is estimated to be 500 – 750 tons per year. Biodegradable materials will require a landfill while glass, plastics and metals should be collected by a contractor and recycled.

2.8 Power Supply

This will include electricity supply and an Airport Power Station. Two 33kV power lines are proposed: one (24 km long) from the 9.0 MW Hydropower Station at Buseruka to the project site in Kabaale and the second (18km long) from the Umeme 33kV Muteme Feeder at Kiziranfumbi to the project site. A proposed main 33/0.4kV substation will be located at the airport adjacent to the taxi lane. A detailed ESIA has been conducted and the ESIS prepared and submitted as a separate report to the Client and NEMA.

2.9 Access to the Airport Site

The site is accessible through Kabaale Kiziranfumbi Murrum road, a branch off the newly constructed Hoima- Kaiso Tarmac road at Kabaale Trading Center. The Airport site is approximately 30km from Hoima Town.

The Airport site can also be accessed via Hoima-Kiziranfumbi- Fort portal Road to the site. However, this road is in a very poor condition, and usually difficult to access particularly during heavy rainstorms.

2.10 Material Sourcing

Some of the materials to be used for construction include sand, gravel, rock, cement among others.

Two potential material sites were identified as follows:

Sand deposit site

One potential borrow area where project material (sand) could be extracted is located in Butima High Village, Kidoma Parish, Kiziranfumbi Sub-county, Hoima District. This site called Butima High sand mining site located at coordinates 36 N0293325 UTM 0155548 is already existing and active. This site borders Wambabya Central Forest Reserve and Wambabya River. This site is about 19 kilometers from the proposed airport site along Kabaale- Kiziranfumbi road. The existing baseline conditions are provided in Chapter 5 of this report. Laboratory tests however indicated that the sand deposits quality is below the standard and not suitable for construction purposes for this specific project. Therefore, the construction contractor will identify a natural sand deposit elsewhere or use crushed aggregate sand as recommended in the final geotechnical report attached.

Quarry Site

An existing quarry site operated by Kolin Construction and located at Coordinates 36N 0279441 UTM 0158810 in Kataba Village, Kabaale Parish, Buseruka Sub-County in Hoima District was identified as a potential site for extraction of concrete aggregate. This site located along Kaiso-Tonya road about 8km from the airport site. Geotechnical investigations carried out on the stone quarry indicated that the quarry aggregate and rock is suitable for construction material for this specific project. Details are provided in the final geotechnical report (attached separately).

3 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

This chapter presents the national and international policy, legal and institutional framework relevant to the proposed airport project and to which it should comply.

3.1 Policy Framework

3.1.1 The National Environment Management Policy, 1994

The overall goal of this policy is to promote sustainable economic and social development mindful of the needs of future generations and EIA/ESIA is one of the vital tools it considers necessary to ensure environmental quality and resource productivity on long-term basis. The policy calls for integration of environmental concerns into development policies, plans and projects at national, district and local levels. Hence, the policy requires that projects likely to have significant adverse ecological or social impacts undertake an EIA before their implementation. The Third Schedule of National Environment Act (Cap 153) lists projects including airports and airfields (section 3d), as projects requiring EIA. The proposed project involves construction of an airport, hence the requirement for undertaking this EIA.

3.1.2 National Oil and Gas Policy

This policy is based on the following principles:

- i) Using finite resources to create lasting benefits to society;
- ii) Efficient Resource Management;
- iii) Transparency and Accountability;
- iv) Protection of the Environment and Biodiversity;
- v) Spirit of Cooperation; and
- vi) Capacity and Institutional Building;

The Policy Goal is to use the country's oil and gas resources to contribute to early achievement of poverty eradication and create lasting value to society.

The objectives of the Policy are:

- i) To ensure efficiency in licensing areas with the potential for oil and gas production in the country.
- ii) To establish and efficiently manage the country's oil and gas resource potential.**
- iii) To efficiently produce the country's oil and gas resources.**
- iv) To promote valuable utilization of the country's oil and gas resources.
- v) To promote the development of suitable transport solutions which give good value to the country's oil and gas resources.**
- vi) To ensure collection of the right revenues and use them to create lasting value for the entire nation.
- vii) To ensure optimum national participation in oil and gas activities.
- viii) To support the development and maintenance of national skills and expertise.
- ix) To ensure that oil and gas activities are undertaken in a manner that conserves the environment and biodiversity.
- x) To ensure mutually beneficial relationships between all stakeholders in the development of a desirable oil and gas sub sector for the country.

By undertaking this project, the objectives of the policy are met, especially objectives v, viii, ix and x.

3.1.3 National Policy on Conservation and Management of Wetlands, 1995

Wetlands are ecologically sensitive areas harbouring a lot of aquatic macro and micro biota and play critical ecosystem functions such as flood control and ground water recharge. However, these benefits are in jeopardy due to poor management practices of wetlands. The Government of Uganda adopted a National Policy for the Conservation and Management of Wetland Resources to promote the

conservation of wetlands in order to sustain their values for present and future well-being of the people. There are some wetlands in the project area that are likely to be degraded by the project activities. One of the strategies of the Conservation and Management of Wetland Resources policy is to carry out Environmental Impact Assessment on planned developments that are likely to impact on wetlands as is the case in this project.

3.1.4 The Energy Policy, 2002

The goal of the energy policy is to meet energy needs of Uganda's population for social and economic development in an environmentally sustainable manner. The policy recognizes linkages between the energy sector and other sectors such as environment, water resources, agriculture, land use, forestry, economy, industry, education, health, transport, and decentralization and hence at the sector level, the policy strengthens provisions of the National Environment Management Policy, 1994 that emphasises need for environmental impact assessment. This policy recognises the energy sector as potentially having more significant environmental impacts than most other economic sectors. Since energy development and environmental damage are related, the policy recognises need to mitigate both physical and social environmental impacts of energy projects.

Objective (5) of the policy aims at managing energy-related environmental impacts and it states that the Government will ensure that environmental considerations are given priority by energy suppliers and users to protect the environment and monitor compliance with environmental protection guidelines. To meet these objectives, Government is required to:

Promote the use of alternative sources of energy and technologies that are environmentally friendly.

Sensitise energy suppliers and users about environmental issues associated with energy.

Work towards the establishment and acceptance of broad targets for the reduction of energy-related emissions that are harmful to the environment and energy users.

Promote efficient utilisation of energy resources.

Strengthen the environment-monitoring unit in the energy sector.

By undertaking this EIA/ESIA, the Government of Uganda is fulfilling policy objective 5.

3.1.5 National Gender Policy, 1997

This policy aims at mainstreaming gender concerns in the national development process in order to improve the social, legal/civic, political, economic and cultural conditions of the people of Uganda, particularly women.

This policy specifically applies to recruitment of construction labour requiring women to have equal opportunity as men for available jobs. The policy also safeguards the interests of all the females that may be affected by the project.

3.1.6 The Forestry Policy, 2001

The Forestry Policy stresses the ecological and socio-economic importance of protecting the country's forest resources. Implementation of the Policy is a responsibility of the National Forestry Authority (NFA), which also provides guidelines for management of forest reserves, community forests and private forests. The Forest Policy entails provisions for safeguards and conservation of forests so as to ensure sufficient supplies of forest products, protect water resources, soils, fauna and flora. The policy also mandates government with responsibility to control unsustainable forest exploitation practices. The proposed aerodrome will not affect any forest within the project area although **it's located** approximately 3km from Bugoma Central Forest Reserve.

3.1.7 The National AIDS Policy, 2004

This policy provides overall policy framework for national HIV/AIDS response. The National Policy on HIV/AIDS recognises special groups, which include migrant workers. The Policy recommends the need to identify strategies to address migrant workers in view of the challenges posed by mobility and vulnerability to HIV. Strategies to fulfil the objective of this policy will need to be incorporated into the project during the planning phase.

3.1.8 National Development Plan, 2010/11- 2014/1

A Five-year National Development Plan (NDP) spanning FY2010-2015 was published by the Government of Uganda and this took from achievements of the Poverty Eradication Action Plan (PEAP) that was **being implemented up to 2008. The NDP's main theme is "Growth, Employment and Socio-Economic Transformation for Prosperity," marking a broadening of the country's development strategy from poverty reduction to structural transformation with the aim to raise growth and living standards.** The NDP is the first in a series of six plans intended to transform Uganda over 30 years into a modern and prosperous nation.

The NDP recognises that limited access and use of energy significantly slows down economic and social transformation. The low energy consumption per capita in Uganda has largely contributed to the slow **economic transformation by limiting industrialisation as well as value addition. It's one major factor that impacted on the country's competitiveness over the last decade. The energy exploitation and consumption patterns reflect that the country is still in infancy stages of energy application in production processes.** The exploitation pattern is such that biomass accounts for 92 % of total energy consumed while fossil fuels account for 7 %. The proposed project through supporting the construction of the refinery aims at increasing fossil fuel energy, hence relevant to the NDP.

3.1.9 Uganda's Vision 2040

In Vision 2040, Uganda sets goals to achieve by the year 2040 ranging from political, economic, social, energy, and environment. It recognises energy as a key driver of the economic development. By supporting oil development, the project is in line with aspirations of Vision 2040.

3.2 Legal Framework

3.2.1 National Environment Act, Cap 153

The National Environment Act, Cap 153 contains provisions for environmental management and protection including the need to carry out Environmental Impact Assessment (EIA) studies in connection with some categories of projects that are likely to have significant impacts on the environment as contained in its Third Schedule.

Airports are listed under Section 3: Transportation of the Third Schedule of the Act and are therefore required to be considered for Environmental Impact Assessment. The ESIA having been conducted for the project is therefore in line with the National Environment Act, CAP 153.

3.2.2 Land Act, Cap 227

This Act makes provision for the procedures and method of compulsory acquisition of land for public purposes whether for temporary or permanent use.

Section 7(1) of the Act provides for compulsory acquisition but must be consistent with Article 26 (2) of the Constitution which provide for prior payment of compensation before Government compulsorily acquires or takes possession of a person's property.

The land proposed for the airport has been already been acquired by the developer following the procedures and methods provided in the Act.

3.2.3 Local Governments Act, Cap 243

This Act provides the legal foundation of the Government Policy on decentralization and devolution of functions, powers, and services to Local Governments. Under this Act, district and lower local councils are given the responsibility of managing their natural resources at the Local Government level. Thus, Local Government in Hoima will be responsible for environmental monitoring during construction and operation of the Kabaale international airport.

3.2.4 Land Acquisition Act, 1965

This Act makes provision for the procedures and methods of compulsory acquisition of land for public purposes whether for temporary or permanent use. The Act requires that adequate, fair and prompt compensation is paid before taking possession of land and property. Disputes arising from the compensation to be paid should be referred to the court for decision if other means cannot handle. The land proposed for the airport was acquired by the developer and all land/property owners compensated in line with the Act.

3.2.5 Uganda Wildlife Act Cap 200

The Uganda Wildlife Policy formed the basis for the enactment of the Uganda Wildlife Act, Cap 200 and the establishment of the Uganda Wildlife Authority (UWA) as a mandated agency to manage all matters of wildlife in Uganda. The purpose of this Act is to promote the conservation and sustainable utilization of wildlife throughout Uganda so that the abundance and diversity of their species are maintained at optimum levels commensurate with other forms of land use. Also, the Act puts emphasis on public participation in wildlife management.

Airports often suffer wildlife strikes of especially birds, and other wildlife animals, as such; this issue should be taken into consideration and further be advised by the Uganda Wildlife Authority. Preservation of the wildlife including flora and fauna should be highly esteemed in this Kabaale airport project.

3.2.6 Public Health Act, Cap 281

This Act provides local authorities with administrative powers to take all lawful, necessary and reasonable measures to prevent the occurrence or deal with any outbreak or prevalence of any infectious communicable or preventable disease and to safeguard and promote the public health. The Act mandates local authorities (Section 103) to prevent pollution of watercourses in interest of public good. This Act is applicable to onsite management of process waste, sewage and domestic waste during the construction of the airport.

3.2.7 Constitution of the Republic Of Uganda, 1995

The Constitution of the Republic of Uganda 1995 has a number of articles concerning protection of **natural resources**. In **Article XIII: "the obligation of protecting important natural resources on behalf of the people of Uganda" is vested with the state**. **Article XXVII stipulates the need for sustainable management of land, air and water resources**, Article 237 on Land ownership provides that Land in Uganda belongs to the citizens of Uganda and shall vest in them in accordance with the land tenure systems provided for in this Constitution. Article 242 highlights land use in which Government may,

under laws made by Parliament and policies made from time to time, regulate the use of land while Article 245 among others concerns protection and preservation of the environment from abuse, pollution and degradation as well as managing the environment for sustainable development and promoting environmental awareness.

Furthermore, article 26 on protection from deprivation of property, the Constitution gives a right to every person to own property either individually or in association with others (1). Section 2 of this **article stipulates that no "person shall be compulsorily deprived of property or any interest in or right over property of any description except where the following conditions are satisfied.**

- a) Taking of possession or acquisition is necessary for public use or in the interest of defence, public safety, public order, public morality or public health; and
- b) The compulsory taking of possession or acquisition of property is made under a law which makes provision for-
 - i) Prompt payment of fair and adequate compensation, prior to the taking of possession or acquisition of the property; and
 - ii) A right of access to a court of law by any person who has an interest or right over the property.

The land proposed for the project was acquired by the developer in line with provisions under this Act. It should however be used mindful of the requirement for environmental protection provided under the Act.

3.2.8 Workers' Compensation Act 2000

The Act provides for compensation of workers for injuries suffered and scheduled diseases incurred in the course of their employment.

The Act further spells out degrees of compensation depending on the levels of incapacitation, calculation of respective earnings, medical examination and treatment of workers, agreement as to compensation by the worker, power of Court to submit question of law, determination of claims and decisions of the court concerning the treatment of medical reports as well as procedures relating to claims.

This Act is applicable to this project to deal with issues likely to emanate from accidents while at work.

3.2.9 Petroleum Supply Act, 2003

The Petroleum Supply Act of 2003 provides for supervision and monitoring transportation, supply, storage and distribution of petroleum products. Among other provisions, the act provides for the safety and protection of public health and the environment in petroleum supply operations. During construction, petroleum will be required for the construction vehicles and other equipment. Petroleum will also be required during the operation phase. The Act will thus be applicable.

3.2.10 Occupational Safety and Health Act, 2006

This is a two way Act that obliges employers to protect their workers and charges the employees to take responsibility of their safety while at work. The Act concerns not only the work area but also its immediate environment.

According to Section 13 (1)a of the Occupational Safety and Health Act, it is the responsibility of an employer to take as far as reasonably practicable, all measures for the protection of his or her workers **and the general public from the dangerous aspects of the employer's** undertaking at his or her own cost.

Section 19 (2) further spells that it shall be the duty of an employer to ensure that Personal Protective Equipment provided under Sub-section (1) is used whenever it is required.

This Act is of relevance to construction of the airport to guarantee the safety of all the workers that will be involved in the project.

3.2.11 The Access to Roads Act, Cap 350

The Act seeks to ensure that a private landowner/developer who has no reasonable means of access to public highway may apply for leave to construct a road of access to a public highway. The Act establishes a mechanism of applying for an access road to public highway and a legal regime to ensure the safety of the neighbouring environment. The Act permits the owner of any land over which an access road is to be constructed to be paid compensation in respect of the use of land, the destruction of crops or trees and other property on the land. The Act also has provisions for grievance resolution between the developer and owner of land over which the access is to be constructed by applying to a **Magistrate's Court for leave to construct a road of access.**

The proposed project site will require construction of several access roads to the airport therefore triggering this Act.

3.2.12 The Civil Aviation Act, Chapter 354

This Act establishes the Civil Aviation Act to promote the safe, regular, secure and efficient use and development of civil aviation inside and outside Uganda. The authority is responsible for licensing air transport, among other functions.

In a bid to ensure safe and efficient civil aviation under section 46, the minister responsible for civil aviation is given powers to give directions;

- For requiring the total or partial demolition of any building or structure in the vicinity of the aerodromes;
- For restricting the height of trees and other natural and man-made structures upon any land within the vicinity of an aerodrome;
- For extinguishing any private right of way over land within the vicinity of an aerodrome;
- For restricting the installation of cables, mains, pipes, wires or other apparatus upon, across, under or over any land within the vicinity of an aerodrome;
- For restricting the use of certain electronics within the vicinity of an aerodrome.

If any of the aforementioned is necessary for the proposed aerodrome, the minister will have to be approached.

According to the Act under section 58, any material loss or damage caused to any person or property on land or water by a person in, or an article or person falling from an aircraft in flight, taking off or landing shall be recoverable from the operator or owner of the aircraft, unless the loss or damage was caused or contributed to by the negligence of the person who experienced the loss or damage. This act is crucial for the operator of the airport, especially during operation phase.

3.2.13 Physical Planning Act 2011

This Act replaced the Town and Country Planning Act, Cap 246 which was enacted in 1951 and revised in 1964 but is now inconsistent with contemporary government system in Uganda. The 1951 Act was enacted to regulate and operate in a centralized system of governance where physical planning was

carried out at national level through the Town and Country Planning Board. Implementation of the Act was supervised by local governments, especially the urban local governments.

Uganda has since gone through many social, political and economic changes. For example, promulgation of the 1995 Constitution established a decentralized system of governance which divulged powers and functions including physical planning, finance and execution of projects from the central government to local governments. This therefore created a need to enact a physical planning legislation which is consistent with this Constitutional requirement. The Physical Planning Act, 2011 establishes district and urban physical planning committees, provides for making and approval of physical development plans and applications for development.

Section 37 of The Physical Planning Act, 2011 requires an EIA permit for developments before they are implemented, stating:

“Where a development application related to matters that require an environmental impact assessment, the approving authority may grant preliminary approval subject to the applicant obtaining an EIA certificate in accordance with the National Environment Act”.

Hoima District has jurisdiction over the proposed project area and therefore has regulatory control to ensure that the proposed project conforms to local physical planning requirements.

3.2.14 Mining Act, 9/2003

The Uganda Geological Survey and Mines Department is responsible for the implementation of the Mining Act, 9/2003 which establishes the framework for the utilization of mineral resources in Uganda. The Commissioner in charge of mining is responsible for granting of licenses for prospecting and exploration of minerals as stipulated in Section 19, 20 and 27 of the Act. A mining license is required in order to mine any mineral. Application and granting of a mining lease is also provided for in Section 40, 41 and 42 of the same Act. Section 14 (2) provides for the health and safety of persons employed in the mine while the rights of owners or lawful occupiers of land on which the powers of the Commissioner are exercised for prospecting exploration are also preserved under Section 14 (3) of this Act .

Section 82 of the Act entitles the owner or lawful occupier of any land subject to a mineral right to claim fair and reasonable compensation from the holder of such mineral right for any disturbance of the rights of such owner or occupier, or for any damage done to the surface of any such land as a result of **the mineral holder’s operations.**

Part XI of the Act, incorporating Sections 108 to 112, on the other hand, contains provisions relating to the protection of the environment in accordance with the requirements of the National Environment Act, Cap 153. This part, inter alia, requires the Commissioner or an authorized officer, in deciding whether to grant a mineral right, to take into account the need to conserve the natural resources in or on the land over which such mineral right is sought, and in any neighbouring or adjoining lands, requires the Commissioner to request for an Environmental Impact study as a condition for granting a mining lease. Section 110 requires that the holder of the lease submits an environmental restoration plan of the area that may be damaged or adversely affected by the operations.

Part XII of the Act, incorporating Section 113 to 121 of the Act, deals with important miscellaneous matters, such as the right of women to work or be employed underground in a mine or any operations or activities relating to or associated with mining.

Construction of the airport infrastructure and access roads to the airport will require aggregates, therefore, stone quarry sites and borrow pits shall be identified for use during construction. Aggregates

are minerals categorized as industrial minerals; therefore the Mining Act will be applicable in this project.

3.2.15 The Historical Monument Act, Cap 46

This act provides for the preservation and protection of historical monuments and objects of archaeological, paleontological, ethnographical and traditional interests and for other matters connected therewith. Section 1 of this Act describes the terms used above. Section 8 of this Act specifies actions that are prohibited. Section 11 stipulates that any discoveries of the objects made that are considered to be of importance according to this Act shall be reported to the conservator of antiquities or district commissioner or the curator of the museum within fourteen days.

Any person who contravenes any of the conditions issued under this Act commits an offence and this attracts a fine as stipulated in Section 19 of this Act.

6 pottery sites, 4 iron smelting/smithing sites, and 4 burial sites were recorded within the airport area from Kyapaloni to Bukona village. Further, excavations are part and parcel of the construction phase of the project and may reveal monuments and cultural property. These if found will be handled in accordance with this Act.

3.2.16 The Civil Aviation (Aerodromes) Regulations, 2014

Regulation 6 of these regulations requires any person constructing an aerodrome to have a valid construction permit from the Civil Aviation Authority. However, it emphasizes application for the construction permit only after securing approval of the proposed aerodrome from the National Environment Management Authority, which is NEMA in the case of the proposed project.

- According to the regulations, the application for the construction permit of an airport should have the following contents;
- A detailed design of the proposed construction including related architectural requirements approved by the relevant authority;
- Airport data in accordance with the characteristics of the critical aircraft for which the aerodrome is intended; and
- A topographical map of the proposed aerodrome site as specified by the Authority.

The Authority shall prior to issuance of a construction permit; assess the suitability of the place proposed for consideration:

The proximity of the place to other airports and landing area including military aerodromes;

Obstacle, terrain and existing airspace restriction; and

That it is not against public interest that the place where the airport is to be constructed should be used as such.

According to Regulation 7, the authority shall issue an aerodrome construction permit where the application meets the aforementioned and any other requirements as may be specified by any relevant authority. The airport developer or contractor will be expected to apply for the said permit bearing in mind all requirements.

Regulation 12 requires the application for license of operation of an aerodrome to be accompanied by among other requirements, an environmental impact assessment report thus the need for the Environmental Impact Assessment being undertaken for the project.

Regulation 40 requires an aerodrome operator to ensure that is an adequate number of qualified and skilled personnel to perform the activities for aerodrome operation and maintenance.

Regulation 43 prohibits a person to store fuel, pyrotechnic materials and other highly inflammable or dangerous goods at an aerodrome except with a permit from the authority. The developer of the project is therefore expected to apply for a permit in case such items are to be stored at the airport.

The regulations under regulation 44 provide for safety measures against fire including not smoking in prohibited place, which should be heeded to.

The regulations require a license applicant to submit an aerodrome manual to the Authority for approval, the requirements of which are stated in regulation 59 and 60. According to regulation 64, the Aerodrome manual should include a wildlife management plan to control wildlife hazards at the airport.

The regulations under part IX stipulate the need for aerodrome lights which should be incorporated into the project.

The regulations under regulation 105 and 106 require an airport operator to develop and implement a safety inspection programme and a fire prevention programme respectively. The developer of the airport of the airport is expected to develop these programmes.

3.2.16 The National Environment (Waste Management) Regulations 1999

These regulations apply to all categories of hazardous and non-hazardous waste, storage and disposal of hazardous waste and their movement into and out of Uganda and to all waste disposal facilities, landfills, and sanitary fills and to incinerators.

The regulations also describe issues such as sorting and disposal of domestic waste, cleaner production methods, application for licenses for transportation and storage of waste, packaging of waste and powers of environmental inspectors, among others.

Construction of the airport is likely to generate waste of different types for example, soil spoil, used oils, metallic containers and **other waste from the workers' camp site. Handling of these wastes has to follow the regulations.** Hazardous waste such as fuel or used oil should be stored in specially designed facilities for that purpose and licensed by NEMA. Storage and transportation of such waste should also be licensed by NEMA.

3.2.17 National Environment (Noise Standards and Control) Regulations, 2003

This regulation provides for permissible noise levels (for different environments), Control and mitigation of noise, licensing and enforcement. Section 8 subsections 1 of the regulation give the duty to control the noise to the owner of machinery or owner or occupier of the facility or premise, such that noise does not exceed the permissible levels. Permissible noise levels are given in the First Schedule Part I – VIII of this regulation. Section 8 subsection 3 makes it an offense if the owner or occupier of the premises contravenes this regulation. Section 12 requires that an owner or occupier of premises whose works are likely to emit noise in excess of permissible noise levels to apply to the Executive Director for license to emit in excess of permissible levels as given in form prescribed in Part 1 of the Second Schedule. Noise will be emitted from project vehicles and equipment during construction of the aerodrome and during operation. Some noise is also expected during the operation phase of the project, thus making this regulation relevant.

3.2.18 Impact Assessment Regulations, 1998

Section 3(2) of these regulations states that **"No developer shall implement a project for which Environmental impact assessment/Project brief is required under the National environment Act, Cap**

153 sections 19(1), (3),(4)unless an EIA/Project brief has been conducted as per these regulations. Since the development falls under this category, EIA has been conducted in compliance with all relevant laws and guidelines.

The first schedule of the Environmental impact Assessment Regulations point out issues that should be considered in making Environmental impact Assessment. This ESIA report takes into account of all issues specified within the First Schedule to the Environmental Impact Assessment Regulations

Section3 (4) of the EIA Regulations describes the process of conducting environmental impact studies and preparation of an Environmental Impact Statement. This process has therefore been strictly followed and the final Environmental and social impact statement will be submitted to the Executive Director of NEMA for review and consideration of approval (section 26).

3.2.19 The National Environment (Audit) Regulations, 2006

Regulation 3 indicates the requirement of a regular environmental Audit which is also stipulated in Regulation 31 of the Environmental Impact Assessment Regulations, S.I. No. 13/1998. This should be enforced as stipulated in Section 3 (3) c and Section 22 of the National Environment Act Cap 153. Regulation 4 requires that a person to carry out this audit should be duly certified and registered in accordance with the National Environment (Conduct and Certification of Environmental Practitioners) Regulations, 2003. Furthermore, Regulation 14 provides for the manner in which the environmental inspector may carry out an enforcement audit.

Regulation 31 provides for self-auditing and Section 1 stipulates that the developer is responsible for compliance to the measures provided in the Environmental Impact Statement (EIS). Section 2 of the same regulations requires that an initial audit be carried out within not less than 12 months after commencement and the audit shall be carried out by qualified persons approved by the Executive Director for the purpose.

The developer of the proposed project will be expected to carry out regular environmental audits and submit the audit reports to NEMA.

3.2.20 The National Environment (The Control of Smoking in Public Places) Regulations S.I, 2004

The Regulations emphasize the right to clean and healthy smoke free environment. The regulations are in line with Section 107 of the National Environment Act, Cap 153 which gives provisions of the requirements under these regulations.

Furthermore, the regulations give a list of Public places in which smoking is prohibited, and a list of Public places in which smoking is restricted. The areas where smoking is prohibited include; Offices, office buildings and work places including individual offices, public areas, corridors, lounges, eating areas, reception areas, lifts, escalators, foyers, stairwells, toilets, laundries, amenity areas. **Construction sites are usually characterized by eating places at workers' camps, workshops, work sites, offices, toilets and others.**

In line with the regulations, 'No smoking' signage should strategically be placed at prohibited areas and areas designated as 'smoking areas' properly indicated.

3.2.21 The National Environment (Regulations, Management of Ozone Depleting Substances And Products, Regulations S.I No. 63/2001

This Law was formulated in response to the Vienna Convention for Protection of Ozone Layer of which Uganda is a signatory. Details of the Convention are discussed under Section for International Conventions. According to this regulation Section 3, this Law seeks to:

- a. Regulate the production, trade and use of controlled substances and products;
- b. Provide system of data collection that will facilitate compliance with relevant reporting requirements under the Protocol
- c. Promote the use of ozone friendly substances, products, equipment, technology and;

- d. Ensure the elimination of substances and products that deplete the ozone layer.

Schedules 1 and 2 of this Law give a list of Controlled Products (Greenhouse gases) and Controlled substances (Ozone depleting substances) and Prohibition dates respectively.

These regulations should be borne in mind during selection of equipment and machinery for the project.

3.2.22 The Draft National Air Quality Standards, 2006

Pollutants such as carbon oxides, Nitrogen oxides, Sulphur oxides, Volatile Organic Compounds, Hydrocarbons, Ozone (O₃), Manganese and particulate matter such as dust are expected to be emitted especially by the project haulage vehicles and other machinery if ill serviced. The draft national air quality standards provide regulatory limits for these emissions (Table 3-1).

Table 3-1 Regulatory air quality standards for selected pollutants

Pollutant	Averaging time for ambient air	Standard for ambient air
Carbon dioxide (CO ₂)	8 hr.	9.0 ppm
Carbon monoxide (CO)	8 hr.	9.0 ppm
Hydrocarbons	24 hr.	5 mgm ⁻³
Nitrogen oxides (NO _x)	24 hr. 1 year arithmetic mean	0.10 ppm
Smoke	Not to exceed 5 minutes in any one hour	Ringlemann scale No.2 or 40% observed at 6m or more
Soot	24 hr.	500 µg/Nm ⁻³
Sulphur dioxide (SO ₂)	24 hr.	0.15 ppm
Sulphur trioxide (SO ₃)	24 hr.	200 µg/Nm ⁻³

Note: ppm = parts per million; "N" in µg/Nm⁻³ connotes normal atmospheric conditions of pressure and temperature (25oC and 1 atmosphere).

The developer of the proposed project is expected to abide with the regulatory limits in Table 3-1 at all worksites, quarries, equipment yards and workers' camps to ensure minimal impact on local air quality.

3.3 International Conventions

Uganda has signed and/or ratified a range of international agreements relating to the environment, both regionally and globally. The National Environment Act Cap 153 provides for the implementation of the International Conventions on Environment ratified by Uganda. The relevant conventions for the proposed airport are discussed below

3.3.1 The Convention on International Civil Aviation and its annexes

Uganda has ratified the Convention on International Civil Aviation, which is an international treaty governing the international cooperation in the aviation sector. The Convention is supplemented by 19

Annexes covering all issues regarding licensing, planning, design, operations and safety some of which are discussed below.

Annex 14: Aerodromes

Under Section 1.5.2, it is recommended that land use and environmental control measures are taken into account during the design of aerodromes. Section 9.2.1 requires fire fighting equipment and services to be provided at an aerodrome. The design of the proposed airport should take the recommendations and requirements of the Annex into account.

Under Section 10.3.1 it is stipulated that all contaminants are removed from the surface of runways in use as rapidly and completely as possible to minimize accumulation. The developer should put this into practice in line the Annex and in order to control pollution of downstream environments.

Annex 16 Environmental protection (volume I: Aircraft noise)

Chapter 3.1.10 requires an applicant to prepare a noise compliance demonstration plan that specifies the proposed certification process, including the use of any equivalencies. This plan is to be submitted to the appropriate certificating authority allowing sufficient time to permit adequate review and possible revisions prior to the start of any noise certification testing. Noise is expected during the airport construction and operation. The developer of the proposed airport project will develop a noise compliance demonstration plan in line with this annex.

Annex 16 Environmental Protection (Volume II: Aircraft engine emissions)

Under Chapter 2 of Part II, this Annex recommends that aircraft engines are designed in such a way that intentional discharge of liquid fuel into the atmosphere is avoided. The annex lays out emissions that should controlled for certification of aircraft engines. The emissions include Smoke, gaseous emissions, unburned HC, Carbon monoxide, and Oxides of nitrogen. Baseline air quality measurements were undertaken as a measure against which future monitoring of air quality during the operation phase of the project will be based.

3.3.2 African Convention on the Conservation of Nature and Natural Resources-1982

This convention was signed by the Heads of State and Governments of independent African States, assembled at Algiers, Algeria on 15th September 1968.

Under this convention in Article II, the contracting States shall undertake to adopt the measures necessary to ensure conservation, utilization and development of soil, water, flora and faunal resources in accordance with scientific principles and with due regard to the best interests of the people.

3.3.3 The Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention, 1972)

The convention considers the following as "cultural heritage"; monuments: architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science. Each State Party to this Convention recognizes that the duty of ensuring the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage referred to in Articles 1 and 2 and situated on its territory, belongs primarily to that State. It will do all it can to this end, to the utmost of its own resources and, where appropriate, with any international assistance and co-operation, in particular, financial, artistic, scientific and technical, which it may be able to obtain.

In case some of the cultural heritage elements mentioned under this convention are discovered during the detailed studies and the construction phase of the project, the Convention will be referred to.

3.3.4 Convention for the Safeguarding of the Intangible Cultural Heritage, 2003

The Convention sets out the duties of States Parties in identifying potential sites and their role in protecting and preserving them. Each member country pledges to conserve not only the World Heritage sites situated on its territory, but also to protect its national heritage. The States Parties are encouraged to integrate the protection of the cultural and natural heritage into regional planning programmes, set up staff and services at their sites, undertake scientific and technical conservation research and adopt measures which give this heritage a function in the day-to-day life of the community. A cultural heritage assessment will be carried during the detailed ESIA, hence triggering this convention.

3.3.5 Convention for the Protection of the Ozone Layer and Its Montreal Protocol

is a protocol to the Vienna Convention for the Protection of the Ozone Layer) (a protocol to the Vienna Convention for the Protection of the Ozone Layer) is an international treaty designed to protect the ozone layer by phasing out the production of a number of substances believed to be responsible for ozone depletion. The treaty was opened for signature in January 1987 and was last revised in 1999 at Beijing. It has been ratified by 96 countries including Uganda. The Ozone depleting substances are Chlorofluorocarbons (CFCs) and Hydro chlorofluorocarbons (HCFCs). The ozone shield is important because it protects plant and animal life on land from the sun's ultraviolet rays, which can cause skin cancer, cataracts, and damage to the immune system. Thinning of the ozone layer also may alter the DNA of plants and animals. They also act as greenhouse gases, with several thousand times the per-molecule greenhouse potential of carbon dioxide.

The signatory are required to;

Recognize that worldwide emissions of certain substances can significantly deplete and otherwise modify the ozone layer in a manner that is likely to result in adverse effects on human health and the environment.

Determine to protect the ozone layer by taking precautionary measures to control equitably total global emissions of substances that deplete it, with the ultimate objective of their elimination on the basis of developments in scientific knowledge.

Acknowledge that special provision is required to meet the needs of developing countries.

Accept a series of stepped limits on CFC use and production

Uganda has put a law in place to guide in the adherence to this Protocol; The National Environment (Management of Ozone Depleting Substances and Products) Regulations 2001. Requirements under this convention should be borne in mind during selection of equipment and machinery for the project.

3.3.6 United Nations Framework Convention on Climate Change (UNFCCC)

The Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. The convention encouraged industrialized countries to stabilize greenhouse gases while the Kyoto protocol commits them to do so. Uganda signed the Kyoto Protocol in June 1992, ratified it September 1993 and its enforcement was March 1994. Uganda ratified the convention in March 2002 while entry into force was February 2005. Greenhouse gases are gases in an atmosphere that absorb and emit radiation within the thermal infrared range and greatly affect the temperature of the Earth. In Uganda, Climate Change Unit in the Ministry of Water and Environment is responsible for the implementation of the strategies to meet the Conventions requirements. The emission of greenhouse gases including Carbon dioxide expected to be released from construction vehicles and equipment during construction of the proposed Kabaale airport should be limited in support of the convention.

3.3.7 Rio Declaration (Or Agenda 21)

The concept of public participation in development planning project is key aspect in this convention. From the most important conventions and declarations, one should note the Rio World Conference on Environment and Development in 1992 (in Brazil), followed by the Aarhus Convention in 1998 (in Denmark), public participation in environmental matters became like a human right.

'Free access to information for the public and active participation in development project Processes'. Moreover, the World Commission **encourages a stakeholder's involvement to be ensured by governments** in all stages of the projects starting from early planning. The public has been involved and will continue to be engaged in throughout the different phases of the project.

3.3.8 The Convention on Biological Diversity 1992 (CBD)

The CBD was one of the major outcomes of the 1992 United Nations Conference on Environment and Development – **termed the "Earth Summit"** – in Rio de Janeiro. The three main goals of the Convention on Biological Diversity (CBD) are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from utilization of genetic resources. Since some project is to be located in a natural habitat, the developer or his representative will have to bear in mind the objectives of CBD during the implementation of the project.

3.4 International Requirements

3.4.1 The International Civil Aviation Organization (ICAO)

Overview

Air transport supports economic and social development worldwide, yet contributes to the production of greenhouse gases, roughly two per cent of CO₂ emissions from human activity. While that proportion is relatively small, it does not exclude the sector from the responsibility of setting and meeting targets. The fact that emissions will inevitably increase with the anticipated growth of air transport makes it imperative for the sector to act.

The International Civil Aviation Organization (ICAO) involvement in aviation environmental protection emphasizes the value of a common, coordinated and global approach to addressing the impact of air transport operations on noise and local air quality around airports, and the much broader challenge of climate change. The environmental programme of ICAO has grown larger in scope since the coming into force of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992. This framework created a mechanism for ICAO to interact and cooperate with other UN bodies on greenhouse gas emissions issues, while continuing to deal with an expanding list of noise and local air quality issues. ICAO has established environmental protection Standards and Recommended Practices (SARPs), policies and guidance for international application. The key focuses of ICAO guidelines in its Annex 16A & B that require coordinated approach include aircraft noise and engine emissions. It also pays attention to integrated measures to abate adverse environmental impacts including technological improvements, operating procedures, organization of air traffic, appropriate airport and land use planning, as well as application of available market based alternatives. Environmental protection is one of the Strategic Objectives of ICAO.

The Committee on Aviation Environmental Protection (CAEP) is a technical committee of the ICAO Council, responsible for conducting studies and recommending measures to minimize and reduce **aviation's impact** on the environment, including setting certification Standards for aircraft noise and aircraft engine emissions. ICAO reviews and adopts CAEP recommendations. It also informs the **organization's Assembly that meets every three years and establishes policies** on aviation environmental protection. The organization also produces complementary studies, reports, manuals and

circulars on the subject of aviation and environment. ICAO has three environmental goals for international aviation, which aim to:

- (i) Limit or reduce the number of people affected by significant aircraft noise;
- (ii) Limit or reduce the impact of aviation emissions on local air quality; and
- (iii) Limit or reduce the impact of aviation greenhouse gas emissions on the global climate.”**

In support of these goals and in its role as international aviation’s leading environmental body, CAEP has established environmental documents, including reports, guidance material, and/or specific studies that help to ensure that the most up-to-date information on aviation environmental issues is fully available to State authorities and the broader aviation community for future planning and related decisions and actions. Uganda joined ICAO as a member in 1967, and thus the ICAO policies are applicable to the proposed airport project.

3.4.2 Manual of Aerodrome Standards (MOAS)

The standards basically give guidance to the design of the aerodromes.

Section 2.11.1 of the standards require information concerning the level of protection provided at an aerodrome for aircraft rescue and fire fighting purposes to be made available.

Section 3.4 requires the incorporation of runway end safety areas and gives the dimensions which should be considered during the design for the project.

Section 9.2.1 requires that Rescue and fire-fighting equipment and services are provided at an aerodrome.

Under section 9.4.1, the standards require establishment of a maintenance programme, including preventive maintenance at an aerodrome to maintain facilities in a condition which does not impair the safety, regularity or efficiency of air navigation.

In a bid to reduce bird strike hazards, the standards stipulate under section 9.5.3 that garbage disposal dumps or any such other source attracting bird activity on, or in the vicinity of, an aerodrome shall be eliminated or their establishment prevented, unless an appropriate study indicates that they are unlikely to create conditions conducive to a bird hazard problem. This should be borne in mind during the design of the proposed aerodrome.

3.4.3 Airport Planning Manual

The airport planning manual prepared by ICAO is directed at authorities responsible for the planning and development of airports and particularly those which may not have experienced planning departments or staff. It is compiled in a manner intended to be suitable for use by these authorities for **finance and in advising airport consultants, engineers and planners of the airport authorities’** requirements for development work.

Under section 2.9.1, it mentions protecting and enhancing the environment and public awareness as some of the goals of the airport master planning process.

Under section 5.1.3, it mentions an environmental study as a major step in the site evaluation and selection process for an airport and in section 5.3 points out the key environmental aspects to look out for the site evaluation.

The ESIA for the proposed project is being undertaken in line with the manual’s recommendation.

3.5 World Bank Safeguard Policies

The 'Environmental and Social Safeguard Policies' of the World Bank consist of Operational Policies (OP), Operational Directives (OD) and Bank Procedures (BP). Relevant policies likely to be triggered by the proposed airport construction are highlighted below.

3.5.1 Environmental Assessment (OP/BP 4.01)

Section 7 requires that a range of EA instruments be used depending on the project. Section 8 categorizes the project according to type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts. This policy emphasizes consultation and public disclosure. Section 14 requires that developer of category A and B projects consults the project-affected groups and local non-governmental organizations (NGOs) about the project. The policy also requires that relevant material be provided in a timely manner prior to consultation and in a form and language that is understandable by groups being consulted (Section 15). Before the project can be upraised by the Bank, an EA report for such project (Category A and B) has to be disclosed to the affected persons and the public. Furthermore, the developer is required to report on compliance monitoring of the EMP.

A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas including wetlands, forests, grasslands, and other natural habitats-are less adverse than those of Category A projects. The proposed project is categorized as a Category A project.

3.5.2 Cultural Property (OP/BP 4.11) Physical Cultural Resources

These procedures assist in preserving physical cultural resources (PCR) and held in avoiding the destruction or damage. PCR includes resources of archaeological, paleontological, historical religious (including graveyards and burial sites), or other cultural significance.

Archaeological sites, historical and burial sites could be found in the proposed project area during the detailed field investigations thus making this policy relevant.

3.5.3 Involuntary Resettlement (OP/BP 4.12)

This involuntary resettlement may cause severe long-term hardship, impoverishment, and environmental damage unless appropriate measures are carefully planned and carried out. Therefore the Bank has the following objectives on involuntary resettlement;

To avoid involuntary resettlement and where this is not feasible, resettlement activities should be conceived and executed as sustainable development programs through meaningful consultation;

Providing sufficient investment resources to enable the persons displaced by the project to share in project benefits. Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

The land proposed for the project has already been acquired by the developer with majority of the land owners/tenants resettled in cash. However, there are some people left using the land who are to be relocated or awaiting compensation in kind as agreed. Thus the policy will is still relevant.

3.5.3 Natural Habitats (OP/BP 4.04)

The policy promotes environmentally sustainable development by supporting the protection, conservation, maintenance, and rehabilitation of natural habitats and their functions. The policy limits the circumstances under which projects can damage natural habitats. Specifically, it prohibits projects which would lead to significant loss or degradation of any Critical Natural Habitats, while in Non-Critical Natural Habitats feasible alternatives can achieve the projects potential overall net benefits. In the Kabaale project area, a numbers of wetlands and streams are to be affected. Therefore, measures **should be put in place for the project's net benefit to be achieved.**

3.5.4 World Bank Guidelines on Vulnerable People

The World Bank resources and toolkits for vulnerable people are relevant to this project. They describe the vulnerable as those who are most likely to fall through the cracks of regular programs and need to be protected from negative outcomes and/or allowed participation. Vulnerable people need to be given special attention to remove the barriers that stand in the way of equal participation in projects, or through special project components and targeting strategies tailored to their needs.

Groups of vulnerable people have been identified in the communities and these include; the widows, orphans, the women, etc., and these will be given special attention during relocation and land acquisition.

3.5.5 Public Disclosure

The policy requires that;

Category A project EA reports be disclosed at the World Bank Info shop (English) and should be accessible to local affected groups (local language) in their country.

Category B project reports be accessible to local affected groups (local language) in their country

Category FI should have their Framework disclosed at the World Bank Info shop and appropriate in-country Web site (e.g. Ministry of Water and Environment). Individual subproject disclosure requirements defined in Framework (OP 4.01, 1999 revised in 2011).Public disclosure will be to the local affected groups.

3.5.6 WHO Air Quality Standards

Pollutants such as carbon oxides, Nitrogen oxides, Sulphur oxides, Volatile Organic Compounds, Hydrocarbons, Ozone (O₃), Manganese and particulate matter such as dust are expected to be emitted especially by the project haulage vehicles and other machinery if ill serviced. The World Health organization provides regulatory limits for some of these emissions in Table 3-1.

To comply with international requirements, it would be important for the developer to keep any emissions within the levels given by the World Health Organization at all worksites, quarries, equipment yards and workers' camps to ensure minimal impact on local air quality.

Table 3-2 World Health Organisation Ambient Air Quality Guidelines

	Averaging Period	Guideline value in $\mu\text{g}/\text{m}^3$
Sulfur dioxide (SO ₂)	24-hour	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)
	10 minute	500 (guideline)
Nitrogen dioxide (NO ₂)	1-year	40 (guideline)
	1-hour	200 (guideline)
Particulate Matter PM ₁₀	1-year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)
	24-hour	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)
Particulate Matter PM _{2.5}	1-year	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline)
	24-hour	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)

Source: *Environmental, Health, and Safety Guidelines, 2007*

3.6 National Institutional Framework

Key institutions identified responsible for ensuring compliance with legal requirements for the project and their mandate are summarized in Table 3-3.

Table 3-3 Institutional framework

Institution	Department	Interests/mandate
Ministry of Water and Environment	National Environment Management Authority (NEMA)	Coordination, monitoring and supervision of environmental conservation activities directly or through District Environmental Officers at District level and Environmental Liaison units at ministries Review and approval of Environmental Impact Statements (EIS) in consultation with any relevant lead agencies
	Directorate of Water Resources Management (DWRM)	Water resource management, protection and use regulation through issuing water use abstraction, wastewater discharge permits, wastewater discharge, hydraulic works construction, borehole drilling and easement certificates; water resource monitoring and assessment.
	Wetland Management Department	Wetland monitoring
	The Directorate of Water Development (DWD)	Technical support services and capacity development for water supply
Ministry of Works and Transport		Policy formulation and setting standards. Developer of the project
	Civil Aviation Authority	Licensing, monitoring and regulating civil aviation matters Implementer of the project
Ministry of Energy and Mineral Development	Directorate of Petroleum/Mid-Stream Petroleum Department	Energy policy formulation, policy implementation and monitoring. Developer/Final client of the project
	Petroleum Supplies Department	Monitoring of fuel use, transportation and storage to ensure safety
Ministry of Gender, Labour and Social Development	Department of Occupational Health and Safety	Inspection of workplace environment to safeguard occupational safety, rights of workers and gender equity.
Ministry of Gender, Labour and Social Development	Department of Occupational Health and Safety	Inspection of workplace environment to safeguard occupational safety, rights of workers and gender equity.
	Department of Community Development	Review Social Corporate responsibility actions taken
Ministry of Tourism, Wildlife and Antiquities	Department of Museums and Monuments	Policy formulation, planning and coordination of conservation and development of museums and cultural heritage. Monitoring project construction activities, especially excavations to ensure that chance finds or artefacts of cultural significance are not destroyed.
Ministry of Local Government	Hoima District Local Government	Environmental and social monitoring Review of ESIA report Review the progress of the land acquisition and resettlement implementation and problems, if any, identified through monitoring. Contribute to decisions regarding actions to solve the problems and designate officers to carry out these actions

Institution	Department	Interests/mandate
Ministry of Lands, Housing and Urban Development	Uganda Land Commission	Land acquisition matters
Hoima District Land Board		Land allocation at local government level and setting compensation rates for crops and structures within District.
Department of Geological Survey and Mines		Controls the mining sector (including stone quarrying) through the Mining Act.
Bunyoro Kitara Kingdom		Project support

3.7 Permits and Licenses

A list of some of the permits and licenses necessary for execution of the project are indicated in the Table below.

Table 3-4 Permits required by the proposed development

Permit	Issuing Agency	Use	Responsibility
Certificate for Approval for ESIA for the project	NEMA	Implementation of the project	CAA/ICAO
License for operation of an Aerodrome	Civil Aviation Authority	Implementation of the project	CAA
Aerodrome construction permit	Civil Aviation Authority	Construction of the airport	CAA
Water abstraction permit	Directorate of Water Resources Management	Abstraction of water for airport construction and operation	CAA
Hazardous waste storage, transportation and disposal license	NEMA	On-site storage of used waste such as used oil	CAA

4 ANALYSIS OF PROJECT ALTERNATIVES

3.1 Findings

Four alternative locations for the terminal and apron were identified to the South-east (alternative 1) and South-west (alternative 2), to the North-west (alternative 3), and to the North-east (alternative 4) of the runway (Figure 4-1) were assessed during the ESIA to facilitate analysis and selection of the optimal location based on environmental, socio-economic, cultural and technical conditions.

The four alternative locations were selected to avoid hills to the south-east and north-west, a valley to the south west, and a wetland to the south of the run way which are natural obstacles that would be within the Obstacle Limitation Surface of an aerodrome (Figure 4-1). Identification of the optimal location was also based movement of prevailing winds in the Hoima area which is mainly South to North, and aircraft take-off and landing in the direction towards the wind.

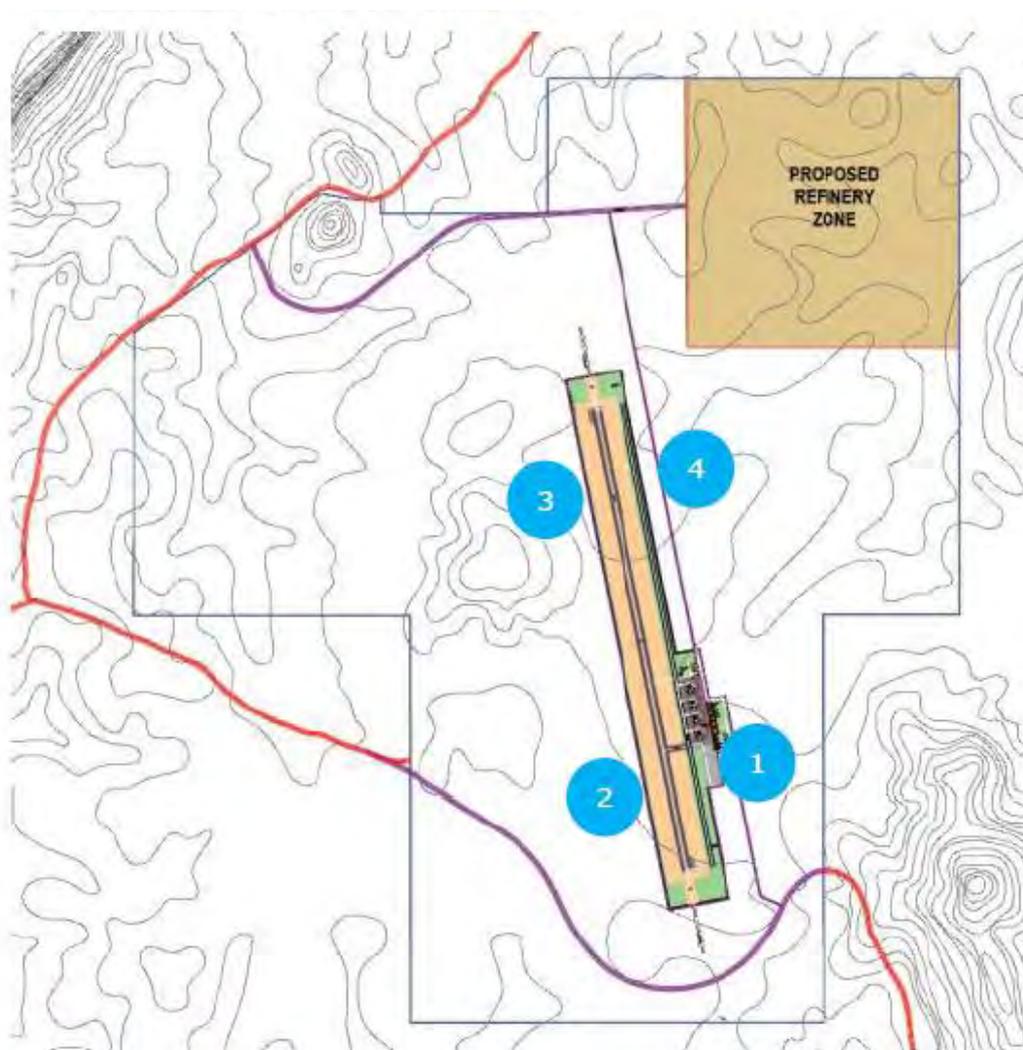


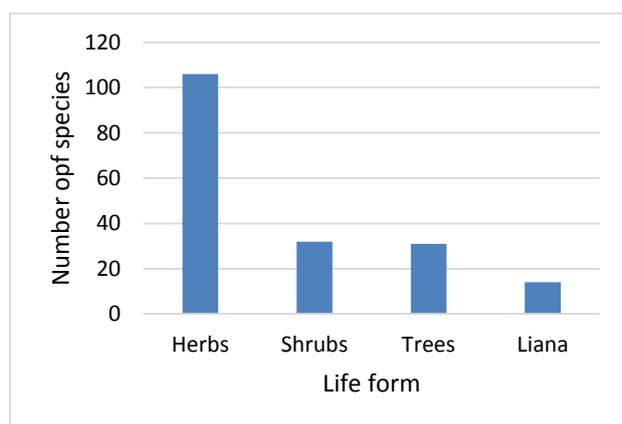
Figure 4-1 The alternative locations for the terminal/ apron

The four alternatives are briefly described below:

3.2 Description of alternatives

Alternative 1

This location is on the South- eastern side of the run way. It is dominated by grassland ecosystem. It had a riverine wetland noted near the apron area and one wetland (with Nyabunyira stream) at the lower southern end of the runway. A total of about 202 plant species, 127 genera and 46 families were recorded under this alternative. It is dominated mainly by herbs as shown below.



The most abundant herbs include *Imperata Cylindrica*, *Pennisetum purpureum*, *Panicum maximum*, *Sorghum arundinaceum*, *Pseudarthria hookeri*, *Setaria sphacelata*, *Hyparrhenia filipendula*. Two species of conservation concern, *Milicia Excelsa* and *Maesopsis eminii* were recorded under the alternative. 3 notorious invasive species were recorded under the alternative: *Mimosa Pigra*, *Acacia hockii* and *Lantana camara* albeit in low abundance.



Alternative 2

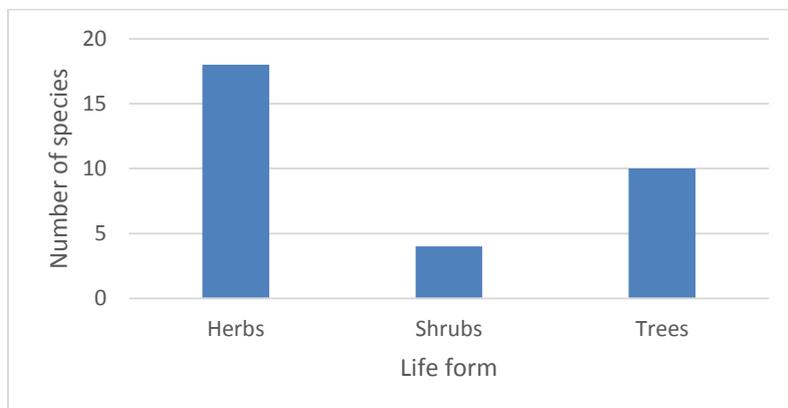
This alternative location lies on the South- western side of the run way (E285891 N159368 -UTM Arc 1960 Zone 36 N). It was dominated by grassland ecosystem (Figure 4-2 below).



Figure 4-2 Grassland within alternative 2 location

One valley (at 0286009E 0159488N) through which Kipundu stream flows is in the vicinity but was dry at the time of the survey. The wetland (with Nyabunyira stream) at the lower southern end of the runway is also in its vicinity. One homestead (2-3 huts) was also noted in its vicinity.

A total of about 36 species, 28 genera and 14 families were recorded under this alternative. It is dominated mainly by herbs as shown below.



The most abundant herbs include *Imperata Cylindrica*, *Hyparrhenia rufa*, *Amaranthus hybridus var. cruentus*, *Pseudarthria hookeri*, *Panicum maximum*, *Pennisetum purpureum*. No species of conservation concern were recorded here. Three invasive species were recorded under the alternative *Bidens pilosa*, *Imperata cylindrica*, *Senna spectabilis*. These are not listed among the notorious ones and were in low abundance.

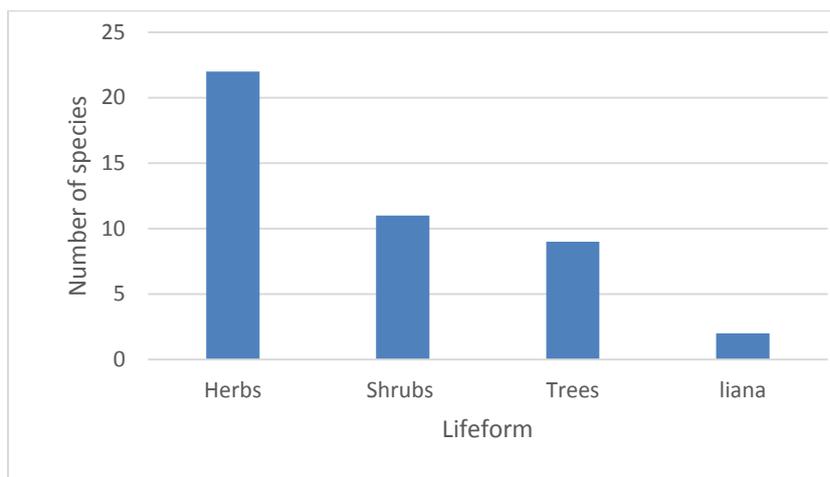
Alternative 3

This alternative location lies on the North western side of the run way (E284978N161740-UTM Arc 1960 Zone 36 N). It was dominated by grassland ecosystem (Figure 4-3 below).



Figure 4-3 Grassland ecosystem dominating alternative 3 location

A total of about 51 species, 43 genera and 22 families were recorded under this alternative. It is dominated mainly by herbs as shown below.



Herbs recorded include *Imperata Cylindrica*, *Pseudarthria hookeri*, *Panicum maximum*, *Ageratum conyzoides*, *solanum incanum*, *Cynodon dactylon*. *Combretum sp* and *Albizia sp* are the most common trees. No species of conservation concern were recorded here. Five invasive species were recorded under the alternative; *Cynodon dactylon*, *Imperata cylindrica*, *Solanum incanum*, *Lantana camara*, and *Acacia hockii*. Of the invasives recorded, Lantana Camara and Acacia hockii are listed as notorious. All invasive species were in low abundance.

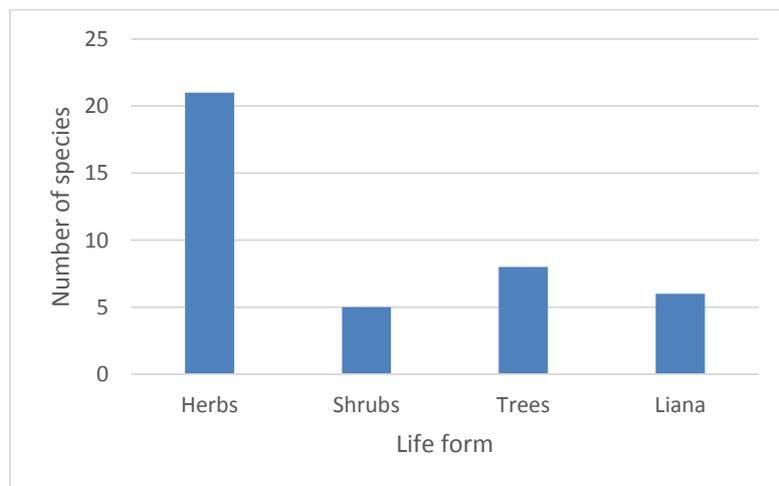
Alternative 4

This alternative lies on the North- eastern side of the run way (E285615 N161547-UTM Arc 1960 Zone 36 N). It is dominated by grassland ecosystem (Figure 4-4 below) with two wetlands (habitat 2 and 4 described under table 1) in its vicinity.



Figure 4-4 Grassland ecosystem dominating alternative 4 location

A total of about 51 species, 31 genera and 18 families were recorded under this alternative. It is dominated mainly by herbs as shown below.



Herbs recorded include *Chamaecrista kirkii*, *Chamaecrista mimisoides*, *Asystasia gangetica*, *Achyranthes aspera*, among others. No species of conservation concern were recorded here. Two invasive species were recorded under the alternative; *Bidens pilosa* and *Acacia hockii*. Of the invasive species recorded, only *Acacia hockii* is listed as notorious.

The above alternatives have been analyzed to get the preferred alternative for further investigation.

3.3 Selection criteria

The principle used in the choice was to “minimize the cost, as well as environmental and social impacts”. The parameters used in choosing of the best alternative were assigned scores ranging from 1- 4 as shown in the Table below. The alternative with the lowest score was considered as the best. The minimal impact was assigned 1 and high negative impact assigned 4.

Based on the lowest score, the preferred alternative was selected and justified, and it is this selected alternative that has been subjected to a detailed environmental and social impact assessment.

Detailed criteria are given in Table 4-1 below.

Table 4-1 Weighing of Alternatives

Criteria	Alternative 1-South East of Runway	Alternative 2- South west of Runway	Alternative 3-North west of Runway	Alternative 4- North-east of the runway
Biophysical environmental impacts				
Sensitivity	Mostly open grassland, and relatively flat and gently sloping with a riverine wetland and another wetland (with Nyabunyira stream) which drains into R.Hohwa which drains into Lake Albert. This area is ecologically sensitive.	This area is dominated by grassland ecosystem. Has Nyabunyira valley through which Kipundu seasonal stream flows and a wetland with Nyabunyira stream at the lower southern end of the runway. This section is ecologically sensitive.	This option doesn't comprise an ecologically sensitive area. It's a grassland	This is a grassland ecosystem with a wetland
Score	2	3	1	2
Species of conservation importance	Two plant species of conservation concern, <i>Milicia Excelsa</i> and <i>Maesopsis eminii</i> were recorded	No threatened species were identified in the site	No threatened plant species were identified in the site	No threatened species were identified in the site
Score	2	1	1	1
Condition of Flora	Vegetation in areas of the wetland is modified and with the airport construction, the wetland may degrade further.	Vegetation in areas of the wetland is modified and may be degraded further with the airport construction	Area previously under cultivation, but now fallow, may degrade further with airport construction	Vegetation in areas of the wetland is modified may degrade further with implementation of this project.
Score	1	3	1	2
Social Impacts				
Effect on public infrastructure	No structures are to be affected	Two structures will be affected, but have already been compensated during acquisition of refinery land	No structures are to be affected	No structures are to be affected
Score	1	1	1	1
Site Access	Easily accessible along Kyapaloni-Katooke road	Location along Nyamasoga-Kyapaloni road	Location along Nyamasoga-Kyapaloni road	Not easily assessable although it can be accessed along Kabaale- Kiziranfumbi road

Score	1	1	1	2
Potential impacts on Cultural heritage sites	This option had 79 potsherds and 2 pieces of iron slags, these are archeologically significant and worth preserving	This option had 7 pots herds which are not archeologically significant	This option had only 2 insignificant potsherds	21 potsherds, 29 pieces of iron slag and 1 mirolithic stone tool. These are archeologically significant and worth preserving
Score	2	1	1	3
Technical issues				
Major crossings i.e. roads, railways and large river	No major road crossing	Crosses Nyamasoga - Kyapaloni road	No major crossing	No major crossing
	1	2	1	1
Other Technical Issues	This location takes into consideration runway alignment, balanced cut-and fill, obstacles and sufficient space and options for further expansion. Furthermore, a southern location on the east side of the runway will maximize the free land south of the refinery, which can be used for further industrial development related to the oil industry.	Not possible due to a deep valley and a swamp in the Southern corner of the runway and potential apron area.	Not possible due to a high hill next to the runway	This location here would reduce the size of usable land for industrial development south of the refinery.
Score	1	4	4	3
TOTAL SCORE	11	16	11	15

3.4 Other technical design options

Sewage Treatment

Three options for sewage treatment have been identified by the design team. They include:

- Septic tanks
- Prefabricated compact system
- Sewage lagoons.

These options have been evaluated based on financial cost of the system since the volume of water is relatively small – less than 100 cu.m. Given that the airport is located in a hilly area and it would require significant land area for sewage lagoons, this option will drop out. If at a later stage, a central sewage treatment system is constructed for the entire (or most of the) industrial park, the international airport will connect to it.

Given that the cost of the compact system is high and also requires significant human capacity for maintenance, it is not recommended.

The best option for sewage treatment is therefore the septic tanks. It can easily be connected to the central sewerage system once it is constructed. Its level of pollution is usually within acceptable limits and maintenance is straightforward – removal of sludge at regular intervals.

Construction water supplies

Significant water supplies will be required during the construction phase of the project. However, this will be the responsibility of the contractors on site. The contractor may use any of the identified water sources below, or opt for his own sources.

Three water supply options were identified as follows:

- i. Surface water - River Wambabya to the East, River Rutoha to the south west and Lake Albert to the west.
- ii. Ground water – using drilled production wells.
- iii. Trucked water supply from National Water and Sewerage Corporation (NWSC).

River Wambabya

River Wambabya is a larger river, and is currently used for hydropower generation at the Kabalega HEP station. The station is designed for a flow 4 cu.m./s and to generate 9 MW of power. The actual flows are in the region of 1 cu.m./s or less.



River Rutoha

River Rutoha is a smaller river commencing at Kanywabarogo, southwest of the airport. Development of River Rutoha source would involve constructing an impounding reservoir along the river.



Head of one tributary of Rutoha (Kanyabarogo) at Kyakatempa.

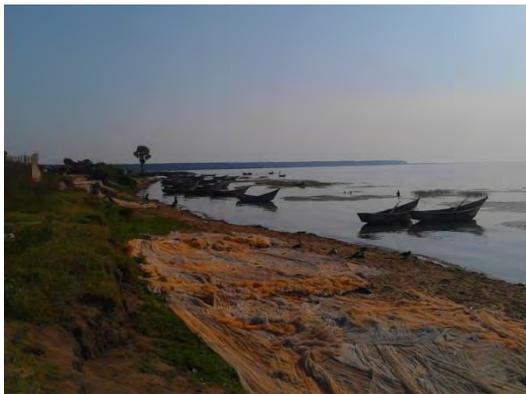


State of flow at Rutoha Bridge along Hoima - Kaiso/Tonya Road. The flow is too low for a river intake, an impounding reservoir would be required.

Lake Albert

Lake Albert as part of the Nile system has limitless capacity to meet any demand. Because of the large elevation difference from the source to the Airport site, number of intermediate reservoirs and pump stations will be required to break the pressures on the pumping mains.

The lake shores of the lake are shallow, construction will involve laying a long pipeline into the lake to abstract clean water (See photograph below).



The proposed scheme would follow generally the map shown below.



Groundwater

Hand pumped boreholes are the common source of water in the project area. There is a possibility of using drilled boreholes to provide limited quantity supplies for the works and for the in the project. Assuming 8 hr pumping regime, yield required to supply the 52 cu.m./d demand would 7 cu.m./h, which can be met by one or two normal boreholes (yield 5 – 8 cu.m.h) reported in the area. This option will require detailed Hydrogeological investigations to be undertaken to drill and install two or more production wells. The investigations are necessary to establish actual quantity and quality of the boreholes. Design will involve pumping systems, security, piping, power and treatment of the water.

Trucking water

NWSC, the water utility company, operates the water supply for Hoima town, 58 km away. The water sources are drilled wells, and are currently insufficient for the town. There is currently no possibility of supplying water from Hoima town.

The Consultant has inquired from NWSC about its intentions for future supply within the project area: NWSC has no immediate plans for new or expanded supply in the area, because of poor sustainability of operation owing to present limited demand. The only possibility of delivering water to the site would be by trucking.

For the running of the service, it would require two 20 cu.m. Tankers (one duty, one standby).

Comparison of water supply options

Table below shows the attributes of the various options considered.

Option 1: Groundwater sources for short term, Public water supply for long term	
Planning & implementation	Can be implemented immediately. Will be implemented by the construction contract. No major environmental and social concerns
Sustainability	Can be sustainable for only the short term, and for demands less than 50 cu.m./d. Otherwise Public water supply can be expected when other industries/consumers are established in the area.
Cost:	Lower cost investment (approx. USD 1.1 m) Minimal operation cost (est. 0.12 per cu.m. plus USD 500 fixed per month)
Management	Needs the operator to manage or contract out management to the HEP operator.
Option 2: Water supply from Kabalega HEP dam, using package treatment plant.	
Planning and implementation	Can be implemented immediately. Implementation can be outsourced to HEP power operator. Needs full ESIA.
Sustainability	Will be sustainable in the long term:
Cost:	High investment cost (Approx. USD 1.7 m) Slightly higher operational cost (est. USD 0.2 per cu.m plus USD 1,200 fixed per month).
Management	Can be managed by the HEP operator.
Option 3: Water supply from Lake Albert, using package treatment plant	
Planning and implementation	Needs more time for implementation – studies etc. Would have to be implemented through Ministry of Water and Environment to form a nucleus of a wider area supply. Needs a detailed ESIA.

Sustainability	Will be the most sustainable in the long term:
Cost:	High investment cost (Approx. USD 2.5 m) Much higher operational cost (est USD 0.36 per cu.m. plus USD 3,000 fixed per month).
Management	Management would have to be handed over to NWSC.
Option 4: Trucked water from Hoima	
Planning and implementation	Not much planning required, needs only purchasing 2 no. water tankers.
Sustainability	Not sustainable in the long term.
Cost:	Low investment cost (Approx. USD 80,000) Very high operational cost (est. USD 3.0 per cu.m)
Management	Can be easily managed by the airport operator.

From the above analysis option 1 is considered the most financially attractive as it provides the least cost water at a fairly low cost.

3.5 Conclusion and recommendations

Both location Alternative 1 and 2 had the lowest score, however, Alternative 1 was considered as the most preferred alternative as this would result in the least significant impacts on the bio-physical and socio-economic environment. Technically, option 2 was less preferred because of its proximity to a hill **next to the runway, thus, it's within the obstacle limitation surface**. Based on a balanced technical, economic and environmental valuation, Alternative 1 was selected as the preferred alternative. Alternative 1 therefore, and the entire area for construction of the airport facilities was subjected to a detailed environmental and social impact assessment.

Considering that the site for construction of the sewerage treatment facility was not identified and therefore not assessed during the ESIA process, it is recommended that an independent environmental assessment be undertaken for this facility before beginning of the construction activities, and a Project Brief prepared and submitted to NEMA for approval.

With regard to water supply alternatives, option 1 which is groundwater sources for short term and public water supply for long term was considered to require low investment cost and with minimal environmental and social impacts.

5 ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

5.1 The Physical Environment

5.1.1 Regional Geology

The project area is located on the eastern side of the Albertine Graben. The Albertine Graben is a Cenozoic rift basin formed and developed on the Precambrian Orogenic belts of the African craton. Rifting was initiated during the late Oligocene of early Miocene (25-40 million years ago). The Albertine graben was initiated by either reactivating pre-Cambrian lineaments or creating new normal faults by an external regime during the cretaceous prior to initiation of the East African rift system.

Available geological and geophysical data suggests that the Albertine Graben has undergone substantial tectonic movements and thick sediments (approximately 6kms) have been deposited in fluvial deltaic and lacustrine environments. Surface geological mapping undertaken and information obtained from wells drilled indicate that the sediments are predominantly sandstones, siltstones, clay stones and shales. The sandstones and siltstones are mostly of high porosity and permeability.

Albertine graben is underlain by some of the world's oldest rocks, some of which were formed as long as long as 3 billion years ago. The Albertine graben is part of the East African rift system and forms the northern most part of its western arm which runs along the western border of Uganda and DRC as shown in Figure 5-1 below.

The area is seismically active resulting in active faults running NE-SW. Movements along such active faults zones lead to earthquakes and dislocation but can also trigger landslides and mass movements depending on the location.

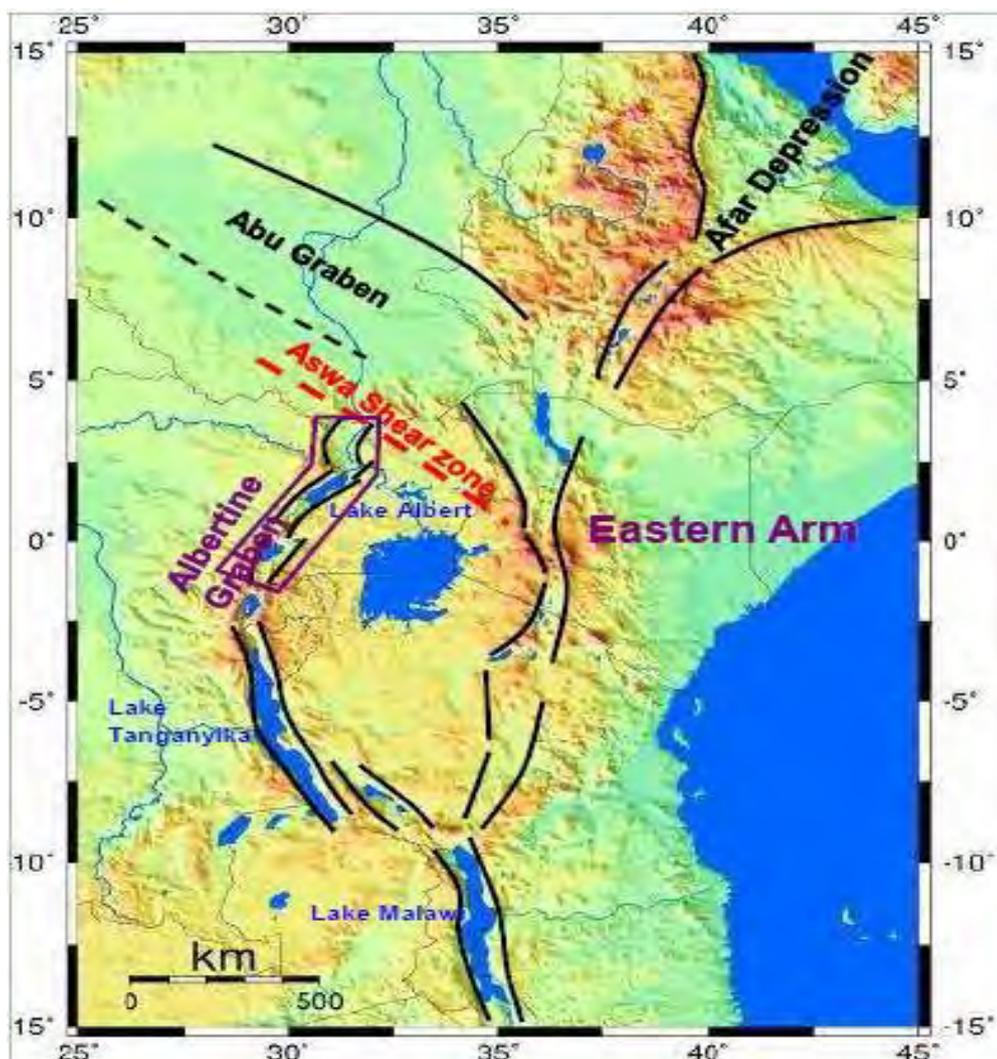


Figure 5-1 Tectonic setting of the wider area including the Albertine Graben forming the northernmost part of the Western arm of the East African Rift System

5.1.2 Site Geology

The geology map of Hoima (see extract in Figure 5-2 below) indicates that the formation in the area includes sedimentary, volcanic rocks and metamorphic complexes. The underlying rocks include shale, slate, quartzite, granite and gneiss. At the project site, no major rock outcrops were observed apart from a few boulders of lateritic rock.

The proposed site is underlain by basically two types of rocks; granite gneisses and quartzites or quartzitic sandstones. The granite gneisses are mostly highly weathered to completely weathered giving rise to reddish and brown lateritic soils (Figure 5-3), as well as sandy loams while the quartzites or quartzitic sandstones are moderately weathered. Weathered phyllites are also present giving rise to grey clayey soils.