THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF WATER

UPDATED ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED CLIMATE RESILIENT WATER SUPPLY PROJECT IN BUSEGA, BARIADI AND ITILIMA DISTRICTS, SIMIYU REGION

DRAFT REPORT

APRIL | 24 | 2019

Location:	Busega, Bariadi and Itilima Districts, Simiyu Region
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NORPLAN TANZANIA LIMITED
Consulting Engineers and Planners

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REV.	DATE	DESCRIPTION	PREPARED BY	CHECKED BY	APPROVED BY
0	26 March 2019	Draft Report	Jørn Stave and Irene N. Koksæter	Jørn Stave	Kristine Lien Skog
1	24 April 2019	Final Report	Jørn Stave and Irene N. Koksæter	Jørn Stave	Kristine Lien Skog

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ACRONYMS

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMU	Environmental and Social Management Unit
FTEA	Flora of Tropical East Africa
GCF	Green Climate Fund
ha	Hectare
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
masl.	Metres above sea level
MoW	Ministry of Water
NEMC	National Environment Management Council
NT	Near threatened
PAP	Project Affected Person
PMU	Project Management Unit
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SEP	Stakeholder Engagement Plan
USD	United States Dollar

1 INTRODUCTION

1.1 Background

The Ministry of Water (MoW) is currently implementing the Water Sector Development Programme that aims to improve access to safe water and sanitation facilities in rural and urban areas in Tanzania. Under this programme, MoW is planning to construct a water supply scheme in Simiyu region from Lake Victoria to the districts of Busega, Bariadi and Itilima. The project is entitled *Climate Resilient Water Supply Project in Busega, Bariadi and Itilima Districts, Simiyu Region*, hereinafter referred to as the *Simiyu Water Supply Project*.

The project will be financed and built in two phases and is planned to eventually cover about 20 % of Simiyu's total area including the five district centres and about 250 villages with up to 55% of the region's total population. Phase 1 will bring piped water to the townships of Nyashimo, Bariadi and Lagangabilili as well as to villages located up to a distance of 12 km from the water supply mains, while Phase 2 will extend the water supply to Mwanhuzi and Maswa. The scope of the current work package is limited to Phase 1.

1.2 ESIA Update

As part of the planning and permitting of the Simiyu Water Supply Project, MoW appointed Multiconsult of Norway in collaboration with NORPLAN Tanzania Limited to carry out the Environmental and Social Impact Assessment (ESIA) in 2016.

Based on the ESIA submitted to the National Environment Management Council (NEMC), MoW was granted an Environmental Impact Assessment (EIA) Certificate in accordance with Section 92(1) of the Environmental Management Act No. 20 of 2004. The EIA Certificate was issued on 5 December 2016.

The ESIA Report was also submitted to the Green Climate Fund (GCF) for review and approval as part of the financing agreement for the Simiyu Water Supply Project. One of the requirements from GCF was the following:

"Delivery of the updated Environmental and Social Impact Assessment ("ESIA"), including updates to the related stakeholder engagement plan and Environmental and Social Management Plan ("ESMP"), and the updated Resettlement Policy Framework ("RPF"), to reflect the change of location for the construction of the command reservoir, which updates shall include:

(i) relevant environmental and social risks and impacts arising from the changes;
(ii) land requirements of the new location;
(iii) potential cumulative impacts on land uses;
(iv) stakeholder consultations and information disclosure procedures and
(v) in relation to the ESIA (1) cumulative impacts related to planned mining development potentially affecting the Project area; and (2) further assessment of impacts on indigenous people, traditional lands, and culturally important sites once details of transmission corridor and activities in the field of climate smart agriculture are determined, only in case there is clear indication that the Project will interfere with cultural heritage or with any ethnic group/indigenous people."

The required updates of the ESIA documents, including the ESMP, Stakeholder Engagement Plan (SEP) and Resettlement Policy Framework (RPF), were further specified in draft Terms of Reference prepared by KfW in December 2018.

The Updated ESIA package consists of the following volumes:

- Updated ESIA Report, including ESMP (this document)

- Updated Stakeholder Engagement Plan (SEP)
- Updated Resettlement Policy Framework (RPF)

All these reports are stand-alone documents. However, it should be noted that while the SEP and RPF have been updated in full, the Updated ESIA/ESMP (this document) is supplementary to the original ESIA and only includes those items that have changed since 2016/2017.

2 UPDATED PROJECT DESCRIPTION

2.1 Status of Project Design

The feasibility level design, upon which the ESIA was based, is described in the original ESIA Report. During 2018, the design was updated by GKW Consult. The latest design is presented in the Detailed Engineering Design Report dated 7 December 2018 (GKW Consult 2018).

The detailed design was reviewed during a field trip and workshop in Bariadi on 13 – 15 February 2019. MoW then raised several issues related to the routing of the water mains within (or outside) the road reserve. These issues have significant bearing on the magnitude of displacement and resettlement planning (but no/insignificant implication for biodiversity and other environmental aspects).

Thus, until the detailed routing has been approved by MoW, this Updated ESIA only deals with those project components that are final, viz. the change in location of the water treatment plant and command reservoir (see below).

Once the detailed design of the whole project has been finalised, a full Resettlement Action Plan (RAP) will be prepared based on the Updated Resettlement Policy Framework (RPF) and on the exact alignment of the water mains and all other project components.

2.2 General Layout and Changes Arising from the Detailed Design

2.2.1 Water Intake

The planned intake point is located at Bukabile village, Bariadi district, at a distance of 175 m from the Lake Victoria shore line (1,140 masl.) and with a total water depth of about 4 m and an extraction at 3 m depth. The connection to the water treatment plant will be via a 2.75 m long steel pipe (i.e. longer than originally planned due to the changed location of the water treatment plant, see below).

2.2.2 Water Treatment Plant

The location of the water treatment plant was originally planned at a distance of 80 – 100 m from the lake shore line. However, in the detailed design it has been moved further inland about 1.7 km from the lake. This change was motivated by the recommendation in the ESIA that the water treatment plant should be located at further distance from the lake and at higher elevation in order to minimise the risk of flooding during heavy rains and to avoid wastewater effluents draining into the lake.

2.2.3 Pumping Stations and Pumping Main to Command Reservoir

In order to transfer the treated water from the water treatment plant to the main command reservoir, a single or two stage pumping scheme will be implemented. It should be noted that the previously planned Shigala pump station has been cancelled in the detailed design because the water will be pumped directly from the water treatment plan to the new combined command and primary reservoir at Lwangwe hill (see below).

2.2.4 Main Command Reservoir

The main command reservoir was originally proposed to be located at Ngasamo hill (1,418 masl.) but has since been shifted to Lwangwe hill (1,438 masl.). This major decision was triggered by the ESIA finding that Ngasamo hill had been earmarked for nickel mining.

The change in location of the command reservoir also implies that two of the primary reservoirs have been shifted to new locations: The former Shigala primary reservoir will be part of the command reservoir at Lwangwe hill (now called Lwangwe primary reservoir) and the Ngasamo primary reservoir has been shifted to the nearby Isadukilo hill (Isadukilo primary reservoir). New inflow and outflow pipelines have been included accordingly.

In conjunction with the realignments at Ngasamo (i.e. primary reservoir shifted from Ngasamo hill to the nearby Isadukilo hill), the detailed design has also accommodated a re-routing of the water main at Ngasamo village. This was done to avoid the settlements along the main road by creating a bypass to the south of Ngasamo village.

2.2.5 Gravity Main towards Bariadi and Lagangabilili

From the main command reservoir at Lwangwe hill, the water will be supplied by gravity towards Bariadi. In order to allow for gravity supply to the secondary reservoirs (for rural/village supply) and to serve the phase 2 demand, there will be two gravity mains from the main reservoir towards Bariadi.

The first gravity main will provide water to the primary reservoirs along the route up to Yoma reservoir. Yoma reservoir will be at an elevation of 1,328 masl., volume of 2,000 m^3 and will be the main reservoir for Bariadi and other built-up residential areas. The distribution network in Bariadi has also been extended to Somanda area where 80% of the distribution will be by gravity and 20% by pumping.

The gravity main for phase 1 will only extend up to Bariadi, from where the water will be pumped to Lagangabilili primary reservoir and supplied to Lagangabilili by gravity. It should be noted that the second gravity main from Lwangwe hill will not be constructed until phase 2.

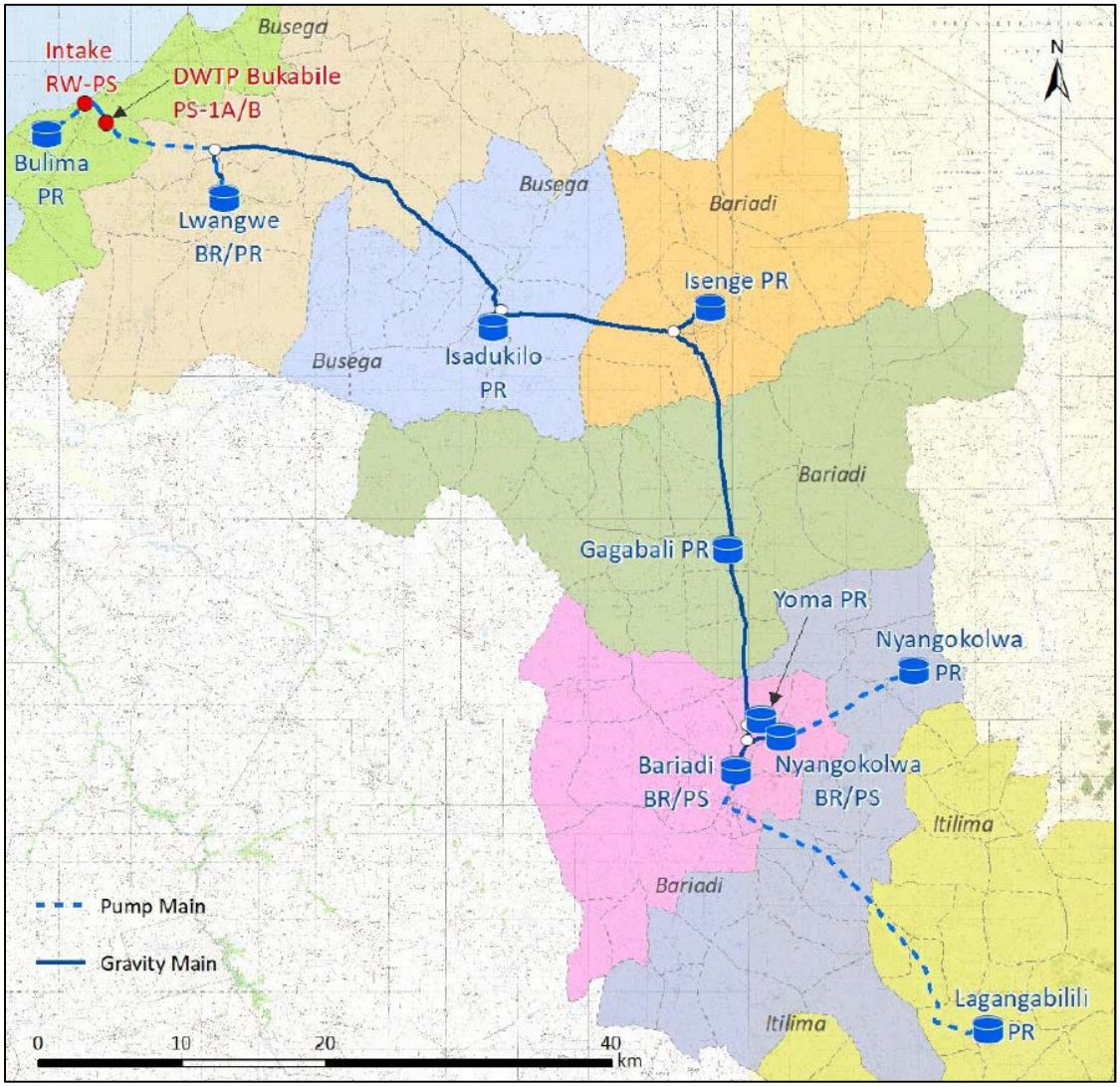

Figure 1: Overview of updated layout for Phase 1.

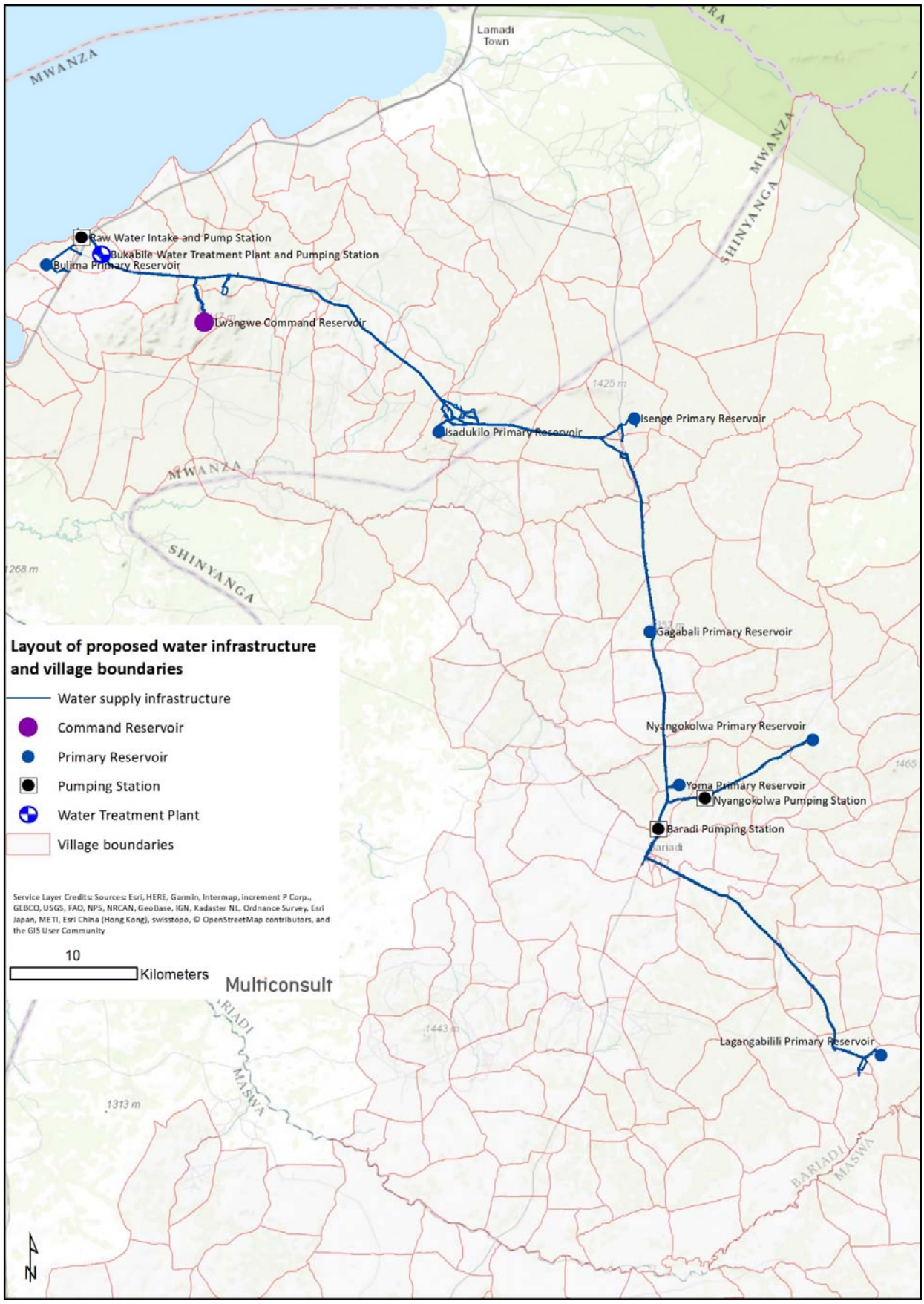

Figure 2: Routing of water main for Phase 1 with new locations of water treatment plant and reservoirs.

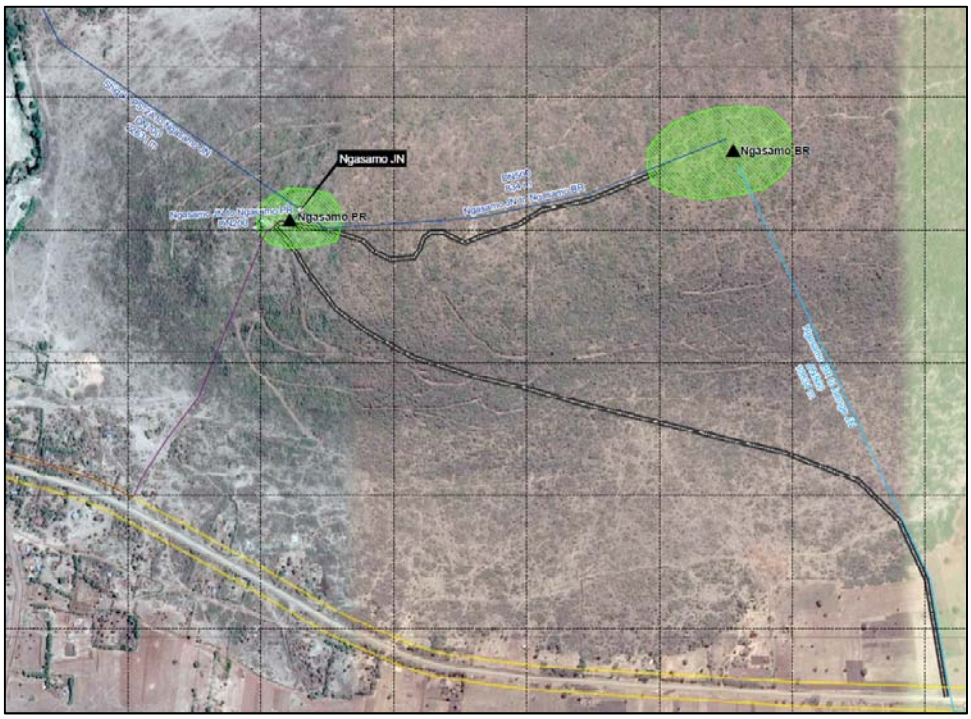

Figure 3: Originally proposed command reservoir (right) and primary reservoir (left) at Ngasamo hill.

Figure 4: Location of Lwangwe command reservoir and primary reservoir.

(Light blue line: pump main; dark blue line: gravity main; grey line: access road)

Figure 5: Location of Isadukilo primary reservoir (lower left corner) and Ngasamo bypass.
(Blue line: gravity main; grey line: new access road)

2.2.6 Wayleave Requirements

The standard wayleave requirement for water mains in Tanzania is currently 10 m (i.e. 5 m on each side of the centre line). However, according to the new Water Supply and Sanitation Act of 2018 (waiting for President's approval), the width of the wayleave will be not less than 20 m. This expanded wayleave requirement will need to be incorporated into the detailed design once a decision has been reached regarding the routing of the water mains.

2.3 Other Project Components

The other components of the *Climate Resilient Water Supply Project in Busega, Bariadi and Itilima Districts, Simiyu Region* remain as described in the original ESIA Report. This include sanitation and wastewater management as well as the smart agriculture and irrigation components.

3 METHODS TO UPDATE THE ESIA

3.1 Introduction

This Updated ESIA focuses on the project components that have been subject to design changes, i.e. water treatment plant, Lwangwe command and primary reservoirs, Isadukilo primary reservoir and the Ngasamo south transmission main bypass. In addition, the proposed primary reservoir at Isenge hill (Dutwa water supply) has been subject to further investigations related to cultural heritage, as this hill had been identified as a possible sacred site in the ESIA Report.

3.2 Detailed Study at Lwangwe and Isadukilo/Ngasamo

3.2.1 General Approach

A combination of methods were employed to assess the risks and impacts associated with installation of water supply infrastructure at Lwangwe and Isadukilo/Ngasamo. These included:

- Pre-screening using online based tools to check out proximity of the project area towards sensitive ecosystems
- Literature review to gather an indication of the key socio-economic issues in the project area that might require verification
- GIS/ESRI map/satellite imagery interpretation to assess the level of human activity within the broader project area as well as the direct impact zone
- A site visit from 6th to 12th August 2018 to verify the results from the pre-screening reviews as well as to undertake consultations with key stakeholders on site and to map any sensitive environmental and social objects that might represent concerns for the future development of the project. A social specialist and a biodiversity specialist undertook the site visit

Detailed thematic methodologies are elaborated in the sections below.

3.2.2 Biological Investigations

The biological investigations are based on existing information, site visits and consultations. Transects walks and inspections at the proposed reservoir sites, pipeline routes and access roads were undertaken to establish existing ecological conditions.

Digital camera was used to take photographs for illustrations while GPS was used for used for recording the geographical location for any important field observations.

Prior to the site visit, web-based tools were used to verify if there are any environmentally sensitive areas close to the proposed sites.

3.2.3 Cultural Heritage

Prior to the commencement of fieldwork, background research was conducted including review and evaluation of archaeological, historical and ethnographic literature relevant to the proposed project area and locality in general.

The archaeological survey aimed at identifying archaeological sites and relics as well as other cultural heritage sites such as graves, burial and religious or sacred sites in the project's impact zones.

Key informant interviews with local communities were conducted in order to find and identify the value and importance of the cultural heritage at the proposed sites, if any. The interviews were conducted in Swahili language, so that the informants could express themselves better. In rare cases where people could not speak Swahili, a translator was used.

3.2.4 Socio-economic Investigations

Consultations with key informants combined with observations, transect walks and literature review were the main methodologies for socio-economic investigations. The above methodologies aided the identification of sensitive socio-economic features within the project's impact zone.

Analysis of satellite images was used for screening, while GPS was used for recording sensitive socio-economic features and GIS has been adopted for illustration of results.

Figure 6: Consultation with local villagers.

3.2.5 Assessing Land Use and Land Ownership Issues

With regard to land use, preliminary understanding on the current use of the land in the proposed project area was collected through discussion with local communities currently occupying and using the area. The discussion focused on the planned and current land use, gathering their concerns about the proposed project activities, and recommendations for mitigation in case of perceived negative impacts. In addition to the consultations, the experts undertook transect walks to observe the current land use and verify the results of the consultations.

3.3 Field Visit to Proposed Water Treatment Plant

The new site for the water treatment plant was visited on 13 February 2019 in conjunction with a workshop to discuss the detailed design proposed by GKW Consult (see field report and minutes of meetings enclosed to the updated Stakeholder Engagement Plan). The field visit was done together with the design consultant and representatives from MoW and the Simiyu regional administration. Observations related to land use and potential resettlement were recorded.

3.4 Consultation at Isenge

In order to address the risk of affecting a possible sacred site at Isenge hill, where the primary reservoir for Dutwa has been proposed, a follow-up consultation meeting was organised on 15 February 2019 with the village chairman and other local representatives and community members. The minutes of meeting are enclosed to the updated Stakeholder Engagement Plan (SEP).

4 SITE-SPECIFIC BASELINE CONDITIONS

4.1 Lwangwe Hill

4.1.1 Bio-physical Baseline

Physical Environment

The Simiyu water supply project extends from Lake Victoria across a relatively flat landscape which is only interrupted by isolated hills and rocky outcrops including the Lwangwe and Isadukilo hills. Lake Victoria is at elevation 1,133 masl., while the Simiyu plains range from about 1,200 masl. to 1,300 masl.

The natural vegetation is dominated by wooded grassland savannah, but much of the original land cover has been converted into an agricultural landscape characterised by smallholder farms and extensive grazing lands with low tree cover.

The geology in the general project area is dominated granitoids, migmatites and meta-sediments. Granitoid or granitic rocks are various types of coarse grained rocks formed by solidification of magma deep within the earth. The minerals granitoides are composed of predominantly feldspar and quartz. Granitoid rocks include granite, quartz monzonite, quartz diorite, syenite and granodiorite. The rock outcrops, called kopjes, including Lwangwe and Isadukilo hills, are most probably granite. Kopjes are formed as the softer metamorphic rocks overlaying the granite is weathered away.

Biological Environment

The Lwangwe hill is not located in a protected area or key biodiversity area.

Except for the Lwangwe hill, the whole project area is characterised by highly modified habitat with settlements and cultivation. The villagers have planted alien tree species such as Neem tree known as Mwarobaini in Swahili (*Azidarachta indica*), Mjohoro (*Cassia siamea*) and Myaaa (*Euphorbia tirucalli*) planted as hedge. The only animals occurring are domestic ones including cows, goats, sheep, chickens, donkeys and dogs.

Outside of the settlements, the vegetation consists of only scattered trees on farmland. Common emergent trees include *Acacia tortilis, Albizia harveyi* and *Ficus sur.* No plant species of conservation concern occur in this vegetation as the all natural vegetation has been cleared and replaced with agricultural crops.

At Lwangwe hill, the vegetation is predominantly disturbed thicket bushland characterised by an assemblage of small trees and shrubs 3-5 m tall growing on the rocky hills. However, all tall trees have been cleared for charcoal making, building poles and fuel wood left with coppices. Some of the cleared land is also being cultivated (a harvested cotton field was observed in a small patch at the hill plateau close to the proposed water reservoir site).

At the lower altitude, the hill is dominated by a stand of Ebony/Mpingo (*Dalbergia melanoxylon*). Other common tree species include *Dichrostachys cinerea, Xeroderris stuhlmanii, Commiphora* ssp., *Phyllanthus engleri* and *Lonchocarpus capassa*. At the hill top, the shrub of *Leonotis mollisima, Grewia mollis* and *Harrisonia abyssinica* are common. In addition, an endemic and un-named tree species of *Terminalia* sp. A of FTEA which is restricted to floristic region T1 only in Tanzania was identified growing in this vegetation type and is among the highly exploited tree species for the above listed human activities.

The thicket bushland on Lwangwe hill has some conservation value as it supports the growth of some key plant species such as *Terminalia* sp. *A* of FTEA and *Dalbergia melanoxylon* which is a CITES listed tree species protected by Tanzania Forest Department by laws. *D. melanoxylon* is also a Near Threatened (NT) species according to the IUCN Red List of Threatened Species. In addition, this vegetation type supports small mammals as well as some reptiles and variety of insects. This is due to the fact that it is the only refuge territory for the wildlife within an otherwise heavily disturbed habitat.

Figure 7: An endemic and rare tree species of* Terminalia *sp. A of FTEA growing at the plateau of Lwangwe hill.

4.1.2 Socio-economic Baseline

Land Tenure

Lwangwe hill is communal land administered by the Lwangwe Village Land Council. The access road and the transmission main are routed through Nyankuluma Shigala village. Several households hold land use rights over the land through which the access road and the transmission main are routed in Shigala village.

Land Use

The proposed access road follows the same alignment as the existing 6 m wide community road. Along the existing community road are farms and settlements that will be impacted by the widening of the road and the installation of the transmission main. Farming involves the cultivation of seasonal crops like maize, cotton, sorghum, paddy and sweet potatoes. The few perennial crops observed were mainly mango trees and sugar cane.

In addition, there is a treasure hunting site in about 200 m west of the proposed access road corridor. Local folk believe that there is a treasure left behind at the end of the First World War and small-scale exploration was observed during the site visit. There is a risk that the expected population influx will expose this site to over-exploitation during the construction phase.

Figure 8: Treasure Hunting at Shigala village near Lwangwe hill.

Even if the Village Land Council has not legally allocated land use rights to anyone at the proposed location of the Lwangwe reservoir, cultivated land was observed on top of the Lwangwe hill. Consultations with the village authorities indicated that the illegal farmer had been issued with instructions to stop any farming activities at the site.

Public land, manifesting in form of forest areas, is also common in the direct impact zone of the access road and the transmission main.

Land Ownership

The Lwangwe Village Council is responsible for the management and administration of all communal land (including Lwangwe hill), while the land through which the access road and the transmission line is routed is managed by the households that hold land use rights over the land.

Cultural Heritage

A quick archaeological investigation at Lwangwe villages revealed no relics in the project area other than grinding and grounding stones, which were left in situ for possible further assessment. The stones were used in ancient times to process wild seeds and tubers into flour-like powder, foodstuffs, medicine, cosmetics or colorants. The availability of these relics suggest that people settled here during prehistoric or historic era. In addition, burial sites were observed within the proposed corridor for the access road and transmission line pipeline.

4.2 Isadukilo Hill and Ngasamo

4.2.1 Bio-physical Baseline

Physical Environment

The general environment is similar to that described for the Lwangwe project area (see above). Isadukilo hill is smaller than the Lwangwe hill but otherwise similar in geological characteristics and natural habitat.

As for Lwangwe, the surrounding landscape through which the water pipes and access road will pass is heavily modified by crop cultivation and human settlement such that Isadukilo hill is the only place with some natural vegetation intact (although disturbed).

Biological Environment

The Isadukilo hill is not located in a protected area or key biodiversity area.

Except for the Isadukilo hill, the whole project area is characterised by highly modified habitat where the natural vegetation has been cleared and replaced with settlements, alien species planted for shade and ornamental and domestic wildlife. Common alien tree species include Neem/Mwarobaini (*Azidarachta indica*), Mjohoro (*Cassia siamea*), *Leucaena glauca* and *Albizia lebbeck*.

The farmland south of the village and up to the foot of Isadukilo hill is practically devoid of natural habitats except for some patches of vegetation consisting of *Acacia polyacantha, Albizia harveyi, Tamarindus indica* and *Ficus lingua*.

At Isadukilo hill, the vegetation is similar to that of Lwangwe hill, i.e. disturbed thicket bushland characterised by an assemblage of small trees and shrubs 3-5 m tall. The two species *Terminalia* sp. *A* of FTEA and *Dalbergia melanoxylon* were not recorded on the hill during the field survey but it is very likely that they do grow there. Similarly, wild animals probably occur although no species of conservation concern (see original ESIA study).

4.2.2 Socio-economic Baseline

Land Tenure and Ownership

The Isadukilo hill is communal land, managed and administered by the Village Land Council.

The access road and the water pipeline corridor, including the water main bypass at Ngasamo village, are routed through village land on which several households and institutions hold customary land use rights.

Land Use

The site for the proposed is reservoir tank is currently a forested area reserved by the communities for environmental protection purposes. Further away from the hill, the corridor for the access road and water pipeline traverses through farmland and settlements and in close proximity to some public infrastructure (school, mosque and community well) and several burial grounds.

Farming involves the cultivation of seasonal crops like maize, cotton, sorghum, paddy and sweet potatoes. The few perennial crops observed were mainly mango trees and sugar cane.

In the wider Ngasamo village, land is also used for small-scale gold mining and processing activities at Ngasamo hill. The mining sites are estimated to be about 5 km from the project area. There is a risk that the expected population influx will expose this site to a risk of increased illegal exploitation during the construction phase.

Cultural Heritage

A quick archaeological investigation at Isadukilo and Ngasamo villages revealed no relics in the project area other than graves. One grave is likely to be directly impacted along the transmission main bypass in Ngasamo village (to be confirmed during the RAP).

4.3 Water Treatment Plan

The new site for the water treatment plant at Bukabile has similar characteristics as the previously proposed piece of land. It is a fairly flat parcel of land situated along the main road. There are no residential structures

but the land is cultivated and seasonally grazed by livestock. The total land required for the water treatment plant is 10 ha. The land is privately owned.

Figure 9: Changed location of the water treatment plant at Bukabile.

4.4 Isenge Hill

Isenge primary reservoir (for water supply to Dutwa) has been proposed at the top of Isenge hill. According to the ESIA Report, Isenge hill is a sacred site where rituals and ceremonies are held. People from Dutwa and even from far away go there to ask for rain when there is drought, to ask for forgiveness, to ask for blessings and all other things that need divine power. The ESIA recommended that "the siting of the primary reservoir at Isenge holy hill must be agreed with traditional leaders or be shifted to another suitable location."

In order to follow up on this recommendation, a consultation meeting was held with the village chairman and other local representatives and community members on 15 February 2019. It was then revealed that the rituals and ceremonies are done at the chief grave and clan burial site on the northern slopes of the hill. According to the local leaders, the proposed water reservoir on top of Isenge hill would not interfere with the place where they conduct the rituals and ceremonies. They had also no objection to having the access road and water pipes passing on the south/south-west slope of the hill (where they have been proposed). The minutes of this meeting are enclosed to the updated Stakeholder Engagement Plan (see separate volume).

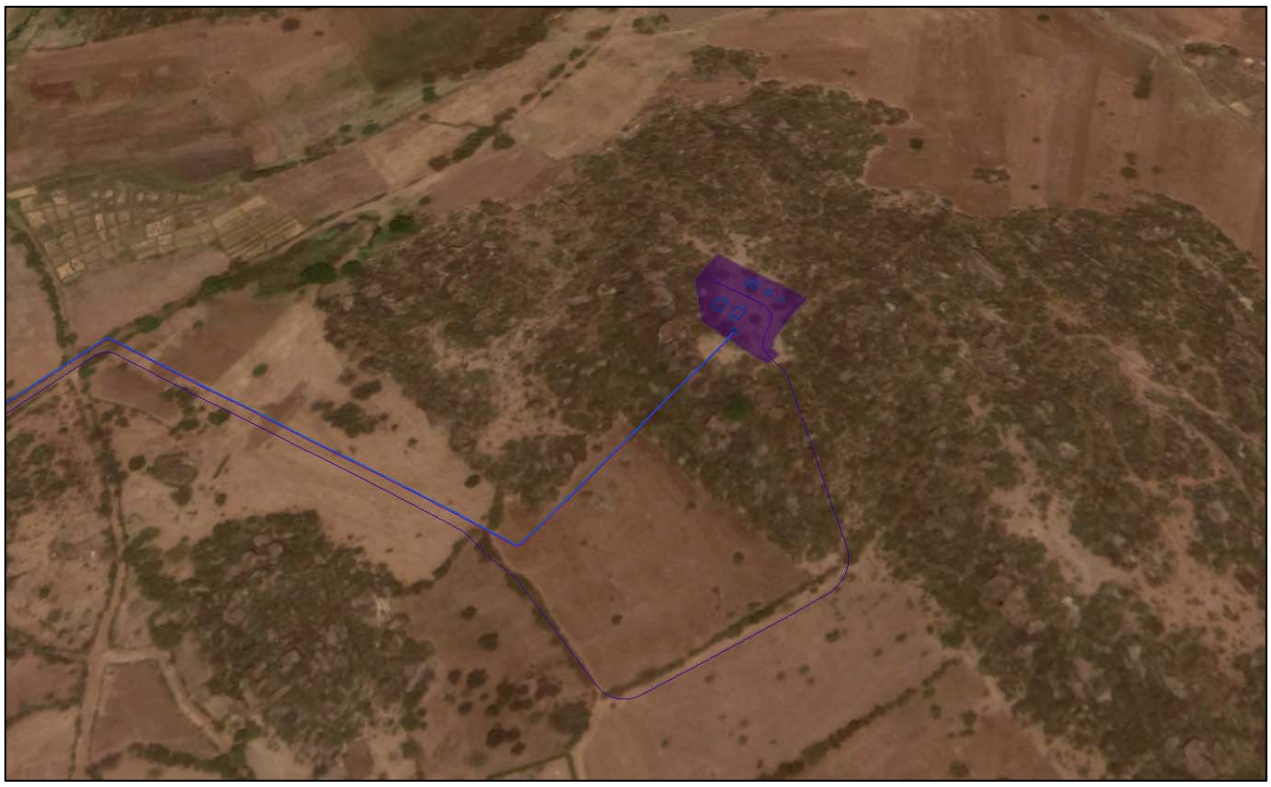

Figure 10: Google Earth view of Isenge hill with the planned infrastructure.

4.5 Ethnic Groups and Indigenous Peoples

People living in Busega, Bariadi and Itilima districts predominantly belong to the Sukuma tribe, which is one of the most dominant tribal groups in the region. Other tribal groups have also migrated to Simiyu region for economic reasons and these are usually casual labourers on cotton farms during the planting and harvesting season.

The ESIA Report confirmed that the Sukuma are not considered to be Indigenous Peoples and they do not consider themselves to be disadvantaged or marginalised. The only ethnic group that identify themselves as Indigenous Peoples in this part of Tanzania is the Hadzabe who predominantly live around Lake Eyasi more than 100 km south-east of the proposed water supply scheme.

The ethnicity of all the directly affected persons will be recorded during the RAP, but there is no indication that the project will affect any marginalised ethnic groups or Indigenous Peoples as defined in IFC Performance Standard 7.

5 IMPACTS AND MITIGATION MEASURES

5.1 Lwangwe Hill

5.1.1 Bio-physical Impacts and Mitigation

Vegetation Clearing

The main impact on the natural environment will be caused by vegetation clearing for the water main, access road and reservoirs. However, as most of the land is cultivated and the wayleave is relatively narrow, the overall loss of vegetation from land clearing will be limited. This also applies to the Lwangwe hill although this is where the only remnants of natural habitat are found. It is therefore important that the vegetation clearing is limited as much as possible and be confined only to the required width of the access road /water main and reservoir area. Special care must be given to prevent any cutting of *Terminalia* sp. *A* of FTEA and *Dalbergia melanoxylon.*

5.1.2 Socio-economic Impacts and Mitigation

Physical and Economic Displacement

About one hectare (10,000 m^2) will be permanently acquired for the construction of the reservoir tank. There will be no risk for physical displacement but a possibility for temporarily disruption of agricultural activities if construction activities are undertaken during the planting season.

A total of about 8 ha (80,000 m^2) of land will be permanently acquired for the construction of the access road and installation of the transmission main to Lwangwe reservoir. This results into a moderate risk of economic displacement. However, there are no structures within the proposed corridor for the access road and transmission main, hence no physical displacement is expected.

In comparison with the original location of the command reservoir at Ngasamo hill, Lwangwe hill is a better alternative since it avoids the potential conflict with nickel mining while also maintaining a low magnitude of resettlement impact (note that physical displacement of households could also be avoided at Ngasamo hill).

Cultural Heritage

There is a risk that some graves will be affected along the water main and access road. In case avoidance is not possible, the Ministry of Water (MoW) should follow the Tanzanian regulations regarding compensation and relocation of graves.

5.2 Comparison of Ngasamo Hill versus Lwangwe Hill for Location of Command Reservoir

The table below summarises the environmental and social risks/impacts for Ngasamo hill versus Lwangwe hill. The data on Ngasamo hill are taken from the ESIA study (Multiconsult 2017) and supplementary investigations of Google Earth satellite imagery.

Table 1: Comparison of Ngasamo hill versus Lwangwe hill.

Parameter	Indicator	Ngasamo Command Reservoir and associated facilities	Lwangwe Command Reservoir and associated facilities
General issues	Total land take	1 ha for the reservoir	1 ha for the reservoir and 8 ha for the access road
	Existing land use	Community forestry, though earmarked for nickel mining	Community forestry
	Access	Existing access road	New access road required

Parameter	Indicator	Ngasamo Command Reservoir and associated facilities	Lwangwe Command Reservoir and associated facilities
	Possibility of cumulative impacts	Yes, if the planned mining activities commence	None
Environmental issues	Presence of "critical habitat"	No	No
	Potential habitat for IUCN red listed species	Yes (*Dalbergia melanoxylon* Near Threatened)	Yes (*Dalbergia melanoxylon* Near Threatened)
	Potential habitat for endemic species	Yes (*Terminalia* sp. *A* of FTEA)	Yes (*Terminalia* sp. *A* of FTEA)
	Close proximity to protected areas	No	No
Socio-cultural issues	Social context (densely or sparsely populated or unpopulated)	Unpopulated	Sparsely populated
	Likelihood of physical displacement	None	Potential of low impact economic displacement along the access road (likely to impact at least 25 households)
	Likelihood of economic displacement	Low	Medium
	Nature of livelihoods	Community forestry	Agriculture along the access road and community forestry at the reservoir location
	Land tenure	Public/government land	Communal land
	Proximity to cultural heritage sites	None	Risk of graves along the water pipeline and access road
	Presence of Indigenous Peoples	None	None
Regulatory issues	Existing concessions	Yes, mining concession and leasehold for a telecom company	None
	Land administration	Government / Red Nickel Hill and telecom company	Village council
	National regulations triggered	Land acquisition regulations and mining regulations	Land acquisition regulations

The general environmental and social conditions at both hills are very similar, with the exception of the land use and land tenure aspects. The installation of the command reservoir at Lwangwe hill will potentially disrupt the livelihoods of a few households that are currently utilising the land within the proposed project footprint for agriculture. The impact is expected to be low. The impacted areas at household level will be small since the project will acquire only strips of land from each household. In addition, there is a possibility that the land users will be permitted to resume activities on the impacted area during the operation phase.

On the other hand, Ngasamo hill is free of settlements and agricultural activities; however, it is a known fact that the hill is endowed with nickel resources that the government intended to exploit but has since abandoned (at least for the time being). This would imply that the Ngasamo hill is available for MoW to install the command reservoirs. However, with the uncertainty regarding future mining activities coupled

with the ever-changing government priorities, locating the command reservoir on Ngasamo hill might put the sustainability of the project at a risk while also exposing the government and financiers to reputational risks.

5.3 Isadukilo Hill and Ngasamo

5.3.1 Bio-physical Impacts and Mitigation

As for Lwangwe project area, the main impact on the natural environment will be caused by vegetation clearing for the water pipes, access road and reservoir. However, as most of the land is cultivated and the wayleave is relatively narrow, the overall loss of vegetation from land clearing will be limited. This also applies to the Isadukilo hill although this is where the only remnants of natural habitat are found. It is therefore important that the vegetation clearing is limited as much as possible and be confined only to the required width of the access road / water pipeline corridor and reservoir plot. Special care must be given to prevent any cutting of *Terminalia* sp. *A* of FTEA and *Dalbergia melanoxylon.*

5.3.2 Socio-economic Impacts and Mitigation

Physical and Economic Displacement

About one hectare (5,000m^2) will be permanently acquired for the construction of the primary reservoir at Isadukilo hill. There will be no risk of physical displacement around the proposed water reservoir or along the water pipeline and access road to the hill. However, some farmland will be affected at the foot of the hill (where the water pipeline and access road will pass).

The transmission main bypass at Ngasamo village will significantly reduce the magnitude of displacement. The original routing along the main road would potentially affect at estimated 40 houses which would have had to be demolished. In comparison, the re-routing around the village will reduce the physical displacement to an estimated seven houses.

Cultural Heritage

There is a risk that some graves will be affected along the water main and access road. In case avoidance is not possible, the Ministry of Water (MoW) should follow the Tanzanian regulations regarding compensation and relocation of graves.

5.4 Comparison of Ngasamo Hill versus Isadukilo Hill for Location of Primary Reservoir

As explained above, the relocation of the command reservoir from Ngasamo hill to Lwangwe hill will imply that the primary reservoir for Ngasamo village and the surroundings has to be relocated to Isadukilo hill from the originally proposed location at Ngasamo hill.

The table below summarises the environmental and social risks/impacts for Ngasamo hill versus Isadukilo hill. The data on Ngasamo hill are taken from the ESIA study (Multiconsult 2017) and supplementary investigations of Google Earth satellite imagery.

Table 2: Comparison of Ngasamo hill versus Isadukilo hill.

Parameter	Indicator	Ngasamo Primary Reservoir and associated facilities	Isadukilo Primary Reservoir and associated facilities
General issues	Total land take	0.5 ha for the primary reservoir	0.5 ha for the primary reservoir and 3 ha for the access road
	Existing land use	Community forestry, though earmarked for nickel mining; existing telecom mast	Community forestry

Parameter	Indicator	Ngasamo Primary Reservoir and associated facilities	Isadukilo Primary Reservoir and associated facilities
	Access	Existing access road	New access road required (1.3 km)
	Possibility of cumulative impacts	Yes, if the planned mining activities commence	None
Environmental issues	Presence of "critical habitat"	No	No
	Potential habitat for IUCN red listed species	Yes (*Dalbergia melanoxylon* Near Threatened)	Yes (*Dalbergia melanoxylon* Near Threatened)
	Potential habitat for endemic species	Yes (*Terminalia* sp. *A* of FTEA)	Yes (*Terminalia* sp. *A* of FTEA)
	Close proximity to protected areas	No	No
Socio-cultural issues	Social context (densely or sparsely populated or unpopulated)	Unpopulated	Sparsely populated
	Likelihood of physical displacement	None	None
	Likelihood of economic displacement	Low	Medium
	Nature of livelihoods	Community forestry	Agriculture
	Land tenure	Public/government land (possibly leasehold for a telecom company)	Communal land
	Proximity to cultural heritage sites	None	Risk of graves along the water pipeline and access road
	Presence of Indigenous Peoples	None	None
Regulatory issues	Existing concessions	Yes, mining concession and leasehold for a telecom company	None
	Land administration	Government / Red Nickel Hill and telecom company	Village council
	National regulations triggered	Land acquisition regulations and mining regulations	Land acquisition regulations

The comparison of Ngasamo hill against Isadukilo hill for the construction of the primary reservoir shows that both alternatives have relatively low impacts in terms of biodiversity and resettlement. It is likely that the water pipeline and access road to Isadukilo hill will cause some economic displacement (loss of farmland and possibly graves) while Ngasamo hill is free of settlements and agricultural activities. However, the fact that Ngasamo hill is endowed with nickel resources would present the project with a sustainability risk if the primary reservoir (and command reservoir) was to be placed on that hill. In addition, the preferred location of the primary reservoir tank at Ngasamo hill is currently occupied by a telecommunication mast.

5.5 Water Treatment Plant

The water treatment plant at Bukabile will require 10 ha of land which has to be acquired. The impacts are similar to those that would occur at the previously proposed site (closer to the lake). Since there are no residential or other structures on the land, physical displacement will be avoided. The number of affected farmers will be confirmed during the RAP.

5.6 Isenge Hill

The location of the primary reservoir at the top of Isenge hill does not interfere with the cultural site on its northern slopes. The water pipeline (and access road), which will be aligned on the south/south-west slope of the hill, will also not affect the cultural site.

Consultations with the village chairman and other local representatives and community members have affirmed that they have no objections to the proposed project and the detailed layout. Thus, the recommendation in the ESIA Report that "the siting of the primary reservoir at Isenge holy hill must be agreed with traditional leaders…" has now been fulfilled.

5.7 Indigenous Peoples

As explained in Section 4.5, there is no indication that the proposed project will affect any marginalised ethnic groups or Indigenous Peoples as defined in IFC Performance Standard 7. A detailed census of all project affected persons (PAPs), including identification of vulnerable and marginalised households (and their ethnicity), will be done as part of the RAP.

5.8 Cumulative Impacts

The main cumulative impact identified in the ESIA Report was the planned nickel mining at Ngasamo hill and the associated railway line (for shipping out nickel and importing input materials). A company called Red Hill Nickel had acquired a retention licence for the Ngasamo hill area where they had planned to exploit the lateritic nickel ore deposits.

With the adjusted layout of the Simiyu Water Supply Project, there will no longer be a conflict with mining operation at Ngasamo hill. However, more importantly, there is no longer any indication that nickel mining will occur in the area, at least not in the foreseeable future, as the mining license was withdrawn by the President in early 2017.[1] The cumulative impacts described in the ESIA Report are therefore no longer applicable.

As explained in Section 5.2, the relocation of the command reservoir from Ngasamo hill to Lwangwe hill will eliminate the sustainability risks related to any potential land use conflict between the water supply infrastructure and future mining operations.

[1] *https://www.thecitizen.co.tz/News/Ministry-calms-investors-over-licence-revocation/1840340-3516914-105plkdz/index.html*

6 AMENDMENTS TO ESMP

6.1 Introduction

The Environmental and Social Management Plan (ESMP) outlined in the ESIA Report remains valid but will be updated with further details once the final design has been approved. The most important aspect of the ESMP is related to resettlement planning. The Resettlement Policy Framework (RPF) has been updated in conjunction with this ESIA update and will be upgraded to a Resettlement Action Plan (RAP) following the approval of the detailed design.

The present amendment to the ESMP deals with those issues that have been identified in this ESIA Update. It should be noted that Tender Documents, including detailed and comprehensive clauses on EHS (environment, health and safety), have been drafted by the design consultant GKW Consult. The draft Tender Documents address all the construction related mitigation measures contained in the ESIA Report.

6.1.1 Changes to Environmental and Social Requirements

The following ESMP requirement shall be added to Section 9.4 (Owner's EMSP):

- An ecologist shall be assigned to undertake a detailed biodiversity inventory along the confirmed alignments of the water pipelines and access roads at Lwangwe and Isadukilo hills prior to construction and preferably in the rainy season. The purpose of such inventory is to avoid impacts on conservation worthy trees (*Terminalia* sp. *A* of FTEA and *Dalbergia melanoxylon*) and sensitive micro-habitats for birds or small mammals, possibly by adjusting the wayleaves if technically and economically feasible.

The estimated cost is USD 6,000.

6.1.2 Changes to Institutional Arrangements

The ESIA Report recommended the establishment of an Environmental and Social Management Unit (ESMU) with two appropriately experienced and qualified persons in charge of the environmental and social management. The two staff would be assigned as Environmental Officer and Community Liaison Officer. The Community Liaison Officer should be supported by several assistants at local level.

Following consultations with the Ministry of Water (MoW) and KfW and the update of the Resettlement Policy Framework (RPF) and Stakeholder Engagement Plan (SEP), it is recommended that the ESMU be placed within the Project Management Unit (PMU) and be expanded with more staff. The PMU will be established prior to commencement of the procurement process and before the bulk water supplier organisation is set up (which might not happen until the end of the construction phase).

Thus, the above requirement should be replaced with the following:

- For purposes of implementing the requirements of the ESIA (including ESMP and Stakeholder Engagement Plan, SEP) and the RPF, the Project Management Unit (PMU) will establish an Environmental and Social Management Unit (ESMU) being staffed with an Environmental Officer, Community Liaison Officer and several support staff responsible for resettlement implementation as well as environmental, health and safety management and monitoring.

LITERATURE CITED

GKW Consult. 2018. Provision of Consultancy Services for Feasibility Study, Detailed Engineering Design, Preparation of Tender Documents for Water Supply Schemes from Lake Victoria to Bariadi, Lagangabilili and Mwanhuzi Towns. Final Detailed Engineering Design Report. Ministry of Water and Irrigation and Kreditanstalt für Wiederaufbau (KfW), Tanzania. Final Submitted. 7 December 2018.

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