



Republic of Angola
Empresa Publica de Águas de Luanda

Bitá System IV Water Supply Scheme – TFS, ESIA and Tender Documents for the Distribution Networks of 4 CDs

Environmental and Social Impact Assessment

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LIST OF ABBREVIATIONS

Abbreviation	Description
AKZ	Angolan Kwanza
ANGOMENHA	Organisation of Water Truck Operators in Luanda
B4WSP	Bitá IV Water Supply Project
CAE	Child Abuse and Exploitation
CD	Centro de Distribuição/ Distribution Centre
CLO	Community Liaison Office
CoC	Code of Conduct
D&B	Design and Build
DRC	Democratic Republic of Congo
DW	Development Workshop
EHS	Environment, Health and Safety
EHSMS	Environment, Health and Safety Management System
ENANA	<i>Exploração de Aeroportos e Navegação Aérea</i>
ENDE	<i>Empresa Nacional de Distribuição de Electricidade</i>
EP	Equator Principles
EPAL	Empresa Publica de Águas Luanda/ Public Water Company of Luanda
ERP	Emergency Response Plan
ESAL	<i>Empresa de Serigrafia Angola Limitad</i>
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Safeguards
E&S	Environmental and Social
ETA	Estação de Tratamento de Água/ Water Treatment Plant
FAO	Food and Agricultural Organisation
FGD	Focus Group Discussion
GBV	Gender-Based Violence
GoA	Government of Angola
GPS	Global Positioning System
GRM	Grievance Redress Mechanism
HALO	Hazardous Area Life-support Organisation
HSS	Health, Safety and Security
IFC	International Finance Corporation

Abbreviation	Description
IFI	International Funding Institution
INBAC	Instituto Nacional de Biodiversidade a Áreas de Conservação/ National Institute of Biodiversity and Conservation Areas
INRH	Instituto Nacional de Recursos Hídricos/ National Institute of Water Resources
KIIs	Key Informant Interviews
Km	Kilometres
lv	Low voltage
M ³	Cubic meters
MAT	Ministério da Administração do Território/ Ministry of Territorial Administration
MICS	Multiple Indicator Cluster Survey
MINAMB	Ministério do Ambiente/ Ministry of Environment
MINEA	Ministério de Energia e Águas/ Ministry of Energy and Water
Mm	Millimeters
MOGECA	<i>Modelo de Gestão Comunitária de Água (MOGECA)</i> or Community Water Management Model
Mv	Medium voltage
NGO	Non-Government Organisation
OP	Operational Policy
PAP(s)	Project Affected Person(s)
PDCA	Plan – Do – Check – Act
PIU	Project Implementation Unit
PNGA	<i>Plano Nacional de Gestão Ambiental/</i> National Environmental Management Plan
PS	Performance Standard
PS	Performance Standard
RAP	Resettlement Action Plan
ROW	Right of Way
RPF	Resettlement Policy Framework
SCEP	Stakeholder Consultation and Engagement Plan
SE	Stakeholder Engagement
SEA	Sexual Exploitation and Abuse
SRP	Spill Response Plan
SWM	Solid Waste Management
TAAG	<i>Transportes Aereos Angolanoes</i>
TB	Tuberculosis
TFS	Technical Feasibility Study
ToR	Terms of Reference
WASH	Water and Sanitation for Health
WHO	World Health Organisation

EXECUTIVE SUMMARY

Introduction

Luanda has grown rapidly since the peace agreement ended 27-years of civil unrest in 2002 and EPAL, the provincial water authority, has struggled to keep abreast of the growing demand. The Greater Luanda area currently has a population of some 6.5 million, with a total demand of 750,000 m³/d, but this is a suppressed demand because daily production capacity is only 500,000 m³/d.

The Bita IV Water Supply Project (B4WSP) is designed to serve the extensive areas of rapidly expanding areas of urban and peri-urban development south and south west of the capital city, primarily the municipalities of Belas, Talatona and Viana, which currently have inadequate or no potable water distribution. Bita IV will also provide for the increase in per capita demand throughout each service area to 150 l/h/d by 2025.

The Bita 4 water supply system is divided into four main supply areas, shown together with the proposed transmission mains and existing and proposed distribution centres in Figure ES-1.

The work proposed for Area 1 is essentially a new water supply system with four new CDs, while that planned for Areas 2 and 3 will retrofit existing distribution networks and distribution centres. The existing systems in Area 4 are also expected to become part of the Bita IV system. A fifth area (Area 5), not shown in Figure 1, comprises additional areas of the existing system that could be reinforced from Bita IV system in the future.

A major benefit of the Bita IV project will be the reduction of social and political pressure on the existing system to supply the rapidly expanding population of Luanda city centre. Those communities not served by existing networks are supplied from insecure sources such as fountains or by tanker. Even where connections exist, households may rarely if ever receive supplies due to the lack of treated water resources. Some 77% of the Bita 4 population presently depend on tankered water, while less than 10% have access to a tap at or near their house.

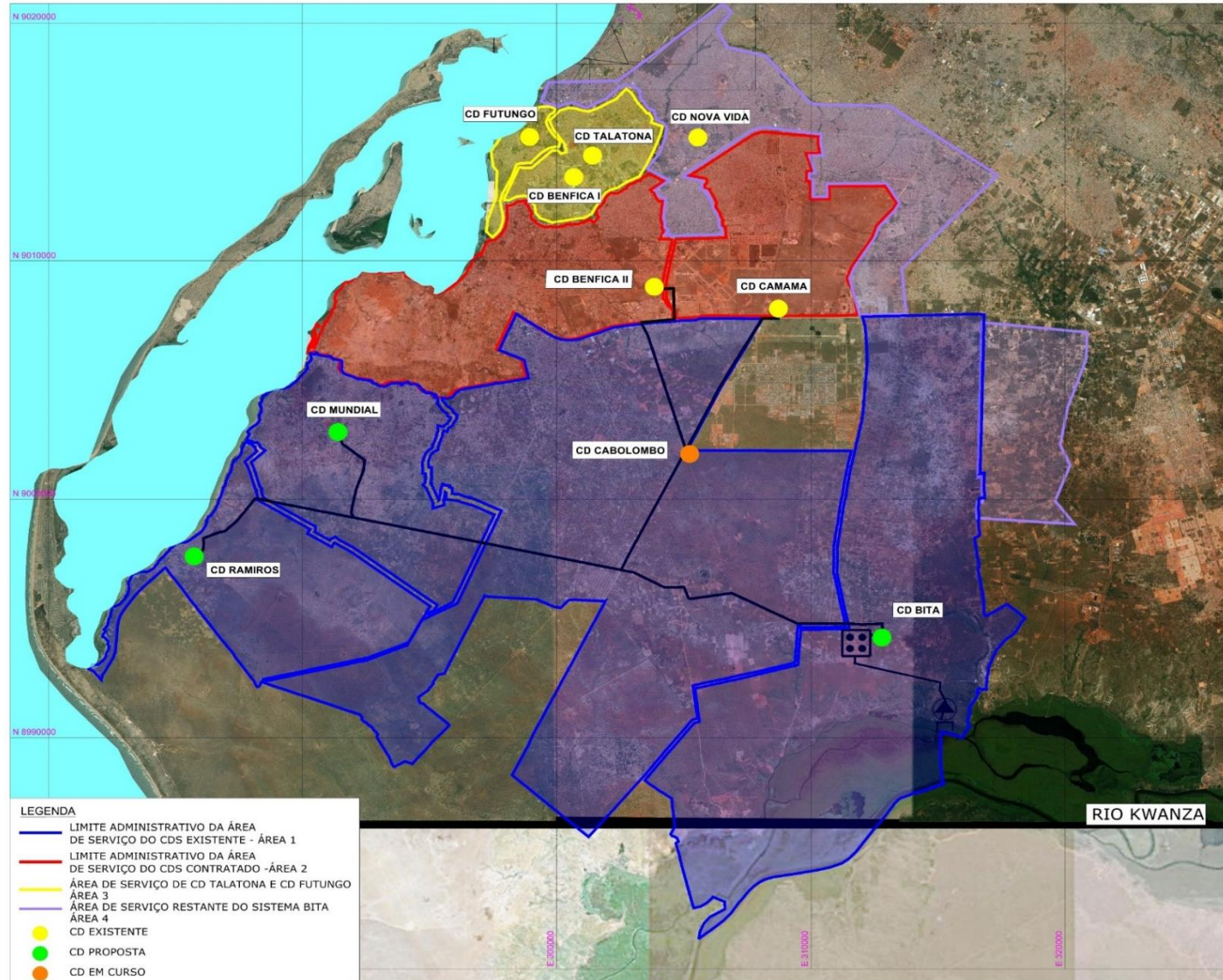


Figure ES-1: Component Service Areas of the Bitá System 4 Water Supply System.

Project Description

The components of the Bitá IV system will be designed and constructed under 13 separate Design and Build contracts as follows:

- **Lot B1:** the water intake structure from the Rio Kwanza, the raw water pumping station, raw water force main and Bitá raw water treatment plant, buildings and ancillary facilities;
- **Lot B2:** the treated water transmission pipelines from CD Bitá site northward to CD Cabolombo, CD Camama and CD Benfca II and westward toward CD Ramiros and CD Mundial;
- **Lot B3:** CD Bitá with a capacity of 50,000 m³/day, adjacent to the raw water treatment plant;
- **Lot B4:** CD Cabolombo with a capacity of 30,000 m³/day (not included in IBRD guarantee);
- **Lot B5:** CD Ramiros with a capacity of 10,000 m³/day;
- **Lot B6:** CD Mundial with a capacity of 10,000 m³/day;
- **Lot B7:** Construct the Bitá processed water treatment plant on the B4WSP Lot 1 site.
- **Lot B8:** Bitá distribution network and metered connections;
- **Lot B9:** Cabolombo distribution network and metered connections;
- **Lot B10:** Ramiros distribution network and metered connections;
- **Lot B11:** Mundial distribution network and metered connections;
- **Lot B12:** Rehabilitation and upgrading of the distribution networks associated with CD Camama including networks, house connections and flow meters; and,
- **Lot B13:** Rehabilitation and upgrading of the distribution networks associated with CD Benfca II including networks, house connections and flow meters.

Lots B1 and B3 are to be merged into a single design and build contract.

Since project initiation, Lot B4, CD Cabolombo with a capacity of 30,000 m³ was to be financed by the Chinese government, and is part-constructed by SinoHydro. It is not covered by the World Bank guarantee and is now instead to be financed by the Government of Angola. Lots B3 and B4 are covered within the present ESIA. EPAL / MINEA have a signed agreement with the previous landowners, and have taken full control of this land.

The areas throughout which each CD will distribute water are shown in Figure ES-2.

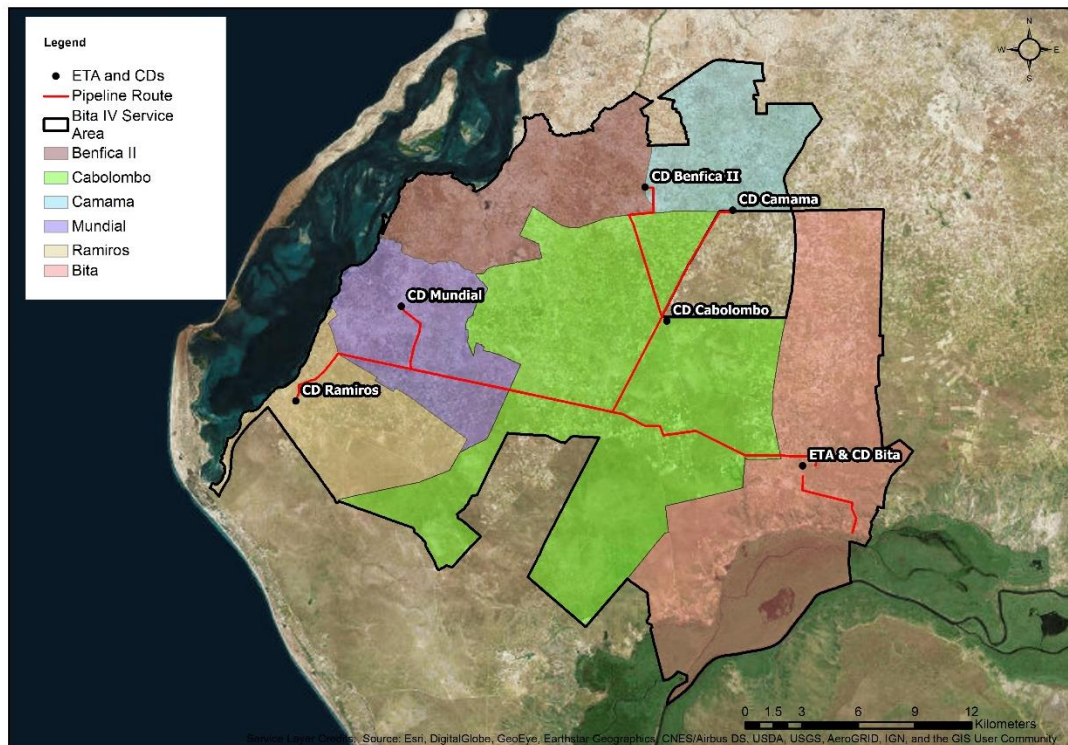


Figure ES-2: Transmission main and associated service areas.

The present *Environmental and Social Impact Assessment (ESIA)* is prepared in accordance with the structure and guidelines of World Bank Operating Policy 4.01 *Environmental Impact Assessment* for a Category B Project and with all other relevant World Bank safeguard policies, as well as with the local requirements of the Ministry of Environment (*Ministério do Ambiente*). Supporting documentation, namely the Resettlement Policy Framework (RPF) comply with World Bank Operating Policy OP 4.12 *Involuntary Resettlement*.

The present ESIA is an interim document, developed to support B4WSP appraisal, financing, and contracting purposes, on the basis of feasibility study-level designs and assessments. Updated pre-construction stage final ESIA's, as well as any relevant complementary assessments (including RAPs), in keeping with Angolan Law and WB policies, must subsequently be prepared by EPAL for each Lot as necessary. Such updated ESIA's and associated studies will be completed on the basis of approved final designs submitted by design-build contractors ahead of any construction taking place, and the final stage ESIA's must then be applied by all project contractors and consultants. This requirement is additionally recorded in Table ES-5: *Downstream measures and responsibilities*.

It is essential that D&B contractors recognise that Final ESIA's and RAPs require completion by EPAL on the basis of final design drawings ahead of any construction or resettlement activities.

Adequate quantities of potable quality water are a fundamental requirement for the sustenance of life. The consequences of not commissioning a new source on the Rio Kwanza, its treatment, and distribution throughout the project area will be grave and cumulative impacts for many thousands of residents, potentially including but not limited to:

- Further reduction in the presently poor access to adequate water;
- Increased pumping from illegal, unlicensed wells;
- Increased household expenditure on potable water;
- Increased reliance on poor quality water for bathing, washing clothes and food preparation;
- Increased dependence on tankered supplies, often from non-potable sources;
- Increased prevalence of water-borne disease;
- Social discord within families; and,
- Conflict between those with access to potable water and those without.

Examples of typical landscape and Bitá IV construction terrain are shown in Plates ES-1, ES-2, ES-3 and ES-4. The unmetalled nature of the existing roads and tracks is typical of the majority of the 72 km of transmission main routes.



Plate ES-1: View into Rio Kwanza Floodplain at Locality of Water Intake and Pumping Station.



Plate ES-2: Pipeline Route between Water Intake and Bitu Facilities Site.



Plate ES-3: View across Proposed Bitu Facilities Site.



Plate ES-4: View northwards towards the CD Cabolombo site.

On completion of final project designs submitted by D&B contractors, the full scale of land take, asset loss and resettlement can be accurately determined. It is the responsibility of the Angolan Government, through EPAL to manage resettlement compensations, including cash payments. EPAL will be required to recruit a consultant or firm to establish a secure payment compensation mechanism, for this purpose.

Policy and Legislative Framework

In this section of the ESIA the policy and legal framework under which the B4WSP will be executed and the ESIA and RPF implemented are discussed. The range of regulatory and legislative control is wide-ranging. When the project was first conceived, reference was made to the IFC Equator Principles and Performance Standards. While the project has now adopted World Bank Operational Policy as its principal source of environmental and social commitment, the IFC documentation is still covered in case at some stage in the future other financial institutions become involved in Bitá IV funding.

Included in the discussion of policy and legislation are:

- Angolan Institutional Framework
 - Ministry of Environment
 - Other supporting ministries and institutes
- Angolan Environmental and Social Legislation
- Environmental and Social Policy, Plans and Strategies
- International Conventions, Agreements and Protocols to which Angola is a signatory
- International Standards
 - Equator Principles
 - IFC Performance Standards
 - WB EHS General Guidelines
 - Triggered WB Operational Policies
 - Gap Analysis Between Triggered WB Safeguard Policies and Angolan Legislation
- Institutional Arrangements for ESIA and RPF Implementation

In respect of World Bank Operational (Safeguard) Policies, those that are expected to be triggered by the Bitá IV Water Supply Project are given in Table ES-1.

Table ES-1: Likelihood of World Bank Safeguard Policies being triggered by Bitá IV

World Bank Safeguarding Policies	Triggered?
Environmental Assessment (OP/BP 4.01)	Yes Category B
Natural Habitats (OP/BP 4.04)	Yes
Pest Management (OP 4.09)	No
Indigenous Peoples (OP/BP 4.10)	No
Physical Cultural Resources (OP/BP 4.11)	Yes
Involuntary Resettlement (OP/BP 4.12)	Yes
Gender and Development (OP/BP 4.20)	Yes
Forests (OP/BP 4.36)	No
Safety of Dams (OP/BP 4.37)	No
Projects on International Waterways (OP/BP 7.50)	No
Projects in Disputed Areas (OP/BP 7.60)	No

Baseline Environmental and Social Conditions

As is standard practice, the Bitá IV ESIA considers baseline environment and social conditions in respect of the physical environment, biological environment and the socio-economic environment.

Physical Baseline

Luanda enjoys a hot, dry, semi-arid climate modified by its proximity of the Atlantic Ocean. There are two distinct seasons; a dry season from May to August with temperatures 18-22°C, and a wet season from September to April, when temperatures range from 25-33°C. Average annual rainfall in Luanda is some 323 mm.

The project area is underlain by a sequence of Lower Cretaceous to Quaternary deposits that overlie the deep sub-crop of metamorphic rocks of the African Shield. Cretaceous and younger strata primarily comprise clastic and calcareous units, while the Quaternary and Recent deposits are predominantly of pluvial and alluvial origin. Within the Kwanza Basin the soils are young and poorly developed river and flood plain deposits comprising muds, sand and gravel. Beyond the flood plain, over most of the project area, the soils are either luvisols, predominantly clayey, or psamitic soils, predominantly coarser sands with a tendency to become fine with depth.

West Africa experiences very little seismic activity and what earthquakes do occur are of low magnitude. Only 12 earthquakes have been recorded in Angola since 1900, ranging from M4 to M5.3.

The project area falls within the 'scarp savanna and woodland' eco-region that extends from the Atlantic coast to the central plateau at a height of about 1,000 m, although in Luanda Province elevations do not exceed 200 m. North of Rio Kwanza the landscape is dominated by tall trees surrounded by tall grasses, with areas of mangrove, reed and papyrus on river banks and in the estuary.

The source of water for Bitá IV will be a surface water intake in the Lower Rio Kwanza Basin at a location to be determined by the D&B contractor following hydrological and other studies. The basin affords a catchment area of 152,570 km² and a length of some 965 km, the lowermost 250 km of which remains navigable. In the vicinity of Bitá, the Kwanza flood plain is some 3.7 km in width, the main flow channel 130 m wide, and average base flow across the year at the Bom Jesus gauging station, a short distance upstream, 300 m³/sec.

Angola has undergone enormous socio-economic upheaval since the end of the civil war in 2002, when people flocked to the capital and its surrounding areas in the belief it was safer than other parts of the country. Electricity and potable water are scarce, and the majority of the city's population live in informal settlements known as *musseques*. In respect of the 'greenness' of cities, Luanda ranks as average in energy and carbon dioxide, waste and sanitation, but ranks well below average in land use, transport, water and environmental governance. UN Habitat estimates that 92% of the city's population has access to some type of sanitation, but rarely to flush systems.

Luanda is one of a handful of capital cities that have yet to embark on constructing a modern public transport system using subways, trams, light rail or bus rapid transit. Workers living in the new suburbs of Talatona and Zango often face a two to three or more hour commutes in and out of the city centre. At a time when most developed countries are phasing out diesel fuel, 70% of all vehicles in Angola run on

diesel and the demand is increasing 6% per annum. With 4,000 deaths in 2014, Angola has the third highest PM_{2.5} mortality rate in southern Africa.

So far as it has been possible to ascertain, there are no archaeological or historic remains within the Bitá IV area.

Biological Baseline

Due to its size and location on the African continent, Angola encompasses a large variety of environmental settings. The province of Luanda lies within the northern coastal plains region, typified by dry, sparse *Adansonia-Acacia* (baobab-acacia) woodland interspersed by xerophytic shrubs and grasses³. The region is not homogenous, however, and features mangrove swamps, saltmarshes and intertidal flats along the coast as well as freshwater marshes on floodplains. Luanda itself is heavily influenced by human activity, resulting in widespread environmental degradation and reduced vegetation cover. Urbanisation, agriculture and deforestation for timber and fuel have altered the ecological community of the study area. Competition for resources and game hunting places humans in conflict with the native ecological community, reducing the range of species within the province and limiting the local biodiversity value.

The study area incorporates freshwater aquatic, freshwater marshland and degraded scrubland habitats.

Freshwater aquatic habitat is found in the Rio Kwanza in the vicinity of Bitá. The dominant flora is the invasive hydrophyte, *Eichhornia crassipes* (freshwater hyacinth), which indicates average salinity to be less than 4 g/l. Across the course of the Kwanza, 54 species of fish from 14 families have been identified, the most numerous those of the carp, cichlid and catfish families. Both crocodiles and freshwater turtles are reported, and very rarely, *Trichechus senegalensis* (African manatee). Almost no information is known about amphibian and invertebrate life but the few species that are known are highly endemic, such as the freshwater crab species *Potamonautes macrobranchii* and *Potamonautes kensleyi*.

Freshwater marshes are located on the Kwanza floodplain. This area is permanently saturated with freshwater and the vegetation cover is herbaceous and dense. *Phragmites mauritianus* (common reed), *Cyperus papyrus* (papyrus), *Typha capensis* (bulrush), *Pennisetum purpureum* (Napier grass) and *Echinochloa stagnina* (burgu grass) are common native species in the habitat. Freshwater wetlands support the lower trophic levels on which diverse avifauna feed. Hornbills, storks, fishing owls and hawks have all been observed.

The encroachment of urban sprawl and agriculture in Luanda has altered the vegetation cover of unmanaged land and limited its ecological value. *Adansonia-Acacia* trees are sparser and non-native species, introduced for agriculture, are present, such as *Azadirachta indica* (neem), *Anacardium occidentale* (cashew), *Mangifera indica* (mango) and *Carica papaya* (papaya). Urban agglomerations tend to support small, generalist fauna such as rodents. Rodent predators are therefore found in the Luandan scrub as well, predominantly snakes and lizards. Cattle and goats have been introduced through agriculture and graze low-level vegetation, suppressing the growth of herbs and shrubs.

Coastal mangroves are found within the Bitá IV area of influence. They occur in the lowest 20 km of the Kwanza floodplain, along the coast of the Mussulo lagoon and on islets within the lagoon. They are a highly specialised habitat, marking the interface between marine and terrestrial ecosystems. Most importantly in Luanda, mangroves serve as a habitat for avifauna feeding, roosting and nesting. Sixty-one species of congregatory water bird are known from the Ilheu Dos Passaros in flocks large enough to be important to national populations.

The coastal marine habitat of Mussulo Bay supports a variety of marine life based on coral, algae and seagrass habitats and the lagoon is an important nursery for reef-dwelling and pelagic fish. All five species of sea turtle are thought to nest in Angola. In one nesting season, 150 nests of various species were counted along the beaches of Luanda province, with forty-seven on Mussulo spit alone²¹. Green turtles, from juvenile to mature individuals, permanently inhabit Mussulo Lagoon and olive ridley turtles are common. Nile softshell turtles are also found.

Past urban expansion of Luanda has had a clearly detrimental effect on the terrestrial biotic community. Subsistence farming has resulted in land clearance and the cultivation of non-native species that have spread into the surrounding environment. Deforestation has exploited the landscape for domestic fuel and construction material, and has driven out native populations of medium to large mammals and avifauna. As a consequence there is limited area of real ecological value on the Luandan plateau.

The riverine and wetland habitats of the Kwanza are also influenced by human activity. There is no information on the health of fish stocks so the effect of fishing is unknown. *Phragmites mauritianus* is cut on the wetlands to create wicker and construction material.

Despite the exploitation of the ecosystems in and around Luanda province, there is still a rich diversity of life and high levels of endemism in the freshwater, marine and wetland habitats. These environments remain vulnerable to the effects of human encroachment and must be properly managed by future development.

Socio-Economic Baseline

The Metropolitan Plan for Luanda prepared in 2015 found that the capital had a population of just over 5.5 million. During the Civil War many people moved from the outlying provinces, where most of the fighting took place, to the relative safety of the capital. This mass movement of Internally Displaced Peoples to Luanda accelerated the city's population growth and, as the country was at civil war, social and physical infrastructure could not accommodate growing demand.

In Angola, particularly in Luanda, 48% of the population is under 15-years of age, attributed to a number of factors including, low life expectancy, the world's highest birth rate, and the world's second highest fertility rate. There is a high dependency ratio; for every 100 people of working age (15-64) there are 97 not of working age (under 14 or above 65) and hence economically dependent on someone else. Although this is typical of sub-Saharan Africa, Angola is a case seems to be one of extremes, combining the predominantly young population with a lack of social infrastructure, particularly schools and job opportunities, which leads to vast inequalities. The average household size in Luanda is 5.8 people.

The 1992 Constitution of the Republic of Angola gives the government ultimate authority over all land, water, air, soil and other natural resources. As such those without the means to purchase land from the state have been unable to access, sell and secure land within the formal market. This is an issue for many Bitá IV residents.

Angola spends 8.2% of its state budget on education; more than half on primary schooling, but only 0.95% of the education budget on secondary education. There is marked gender disparity between those finishing primary school; 33% of females and nearly 60% of males. While the enrolment rate for primary education is almost 87%, this falls rapidly to 54% for secondary and less than 9% for tertiary education. Illiteracy rates are 34% throughout Angola and 13% in Luanda.

As previously mentioned the civil war disrupted education for many generations of students and meant that the population had little opportunity to learn new skills and trades or peruse education. Youth unemployment is nearly 20%, while both total and female unemployment approach 10%. Since 2010 the primary sector, which includes agriculture, fishing and hunting, has been the main source of employment. Of the 600,000 new jobs created between 2009 and 2011, 32% were in the primary sector. The informal sector, that part of the economy that is neither taxed nor monitored by government agencies is the primary source of employment among the youth population because it involves relatively low-skilled work and offers instant rewards.

It is estimated that the city of Luanda absorbed 3 million IDPs during the civil war and that roughly 80% are still there⁴⁶. The majority settled in informal areas, such as *musseques*. These areas tend to be environmentally risky, with physical characteristics that make it difficult to install piped water supply. By supplying *musseques* and other informal settlements, Bitá IV may be expected to bring major health benefits, with reductions in those illnesses and diseases directly or indirectly linked to a lack of adequate water and sanitation. The most prevalent diseases in Angola are:

- **Diarrheal diseases**- such as cholera accounting for 15% of childhood deaths;
- **Malaria** – causing more than 5,000 childhood deaths and 25% of maternal mortality;
- **HIV/AIDS** – HIV prevalence in Angola is put at 1.9%, some 280,000 individuals;
- **Tuberculosis** – increasing in Angola, currently nearly 400 cases per 100,000 population.
- **Yellow Fever** – Most prevalent in Luanda due to uncollected refuse in the streets; and,
- **Schistosomiasis** – Prevalent in areas of poverty and poor sanitation.

Between 1990 and 2008 the percentage of Angola's population with improved access to sanitation more than doubled from 25% to 57%. However this was mainly in urban areas; of those with improved access only 18% were in rural areas. However, sanitation still remains a big problem for Luanda, and sewage treatment plants cover only a fraction of the sewage generated, the majority being left untreated and disposed of via, holding tanks, infiltration pits, or are piped, trucked or taken by bucket to drainage channels that ultimately discharge to the to the Atlantic coast.

Under Bitá IV, new water connections will only be made to houses with an adequate level of sanitation i.e. connected to a local sewage system or a septic tank. It is to be hoped that this will promote enhanced community sanitation.

As with the population, the volume of solid waste in Luanda has increased to the extent that large amounts are left on the street and causes a serious health and safety hazard. Private companies are

contracted by the Provincial Government to collect municipal waste from most parts of the inner city but demand is much greater than the collection capacity. Luanda has no recycling schemes in place, and all waste is directed to a single landfill about 20 km outside the city centre. Informal areas in particular have very little access to rubbish collection and disposal services so refuse is usually dumped into open sewers, often causing blockages and resulting in flooding and stagnant water.

Groups considered vulnerable include those defined on the basis of race, colour, gender, age, language, religion, literacy, political opinion, national or social origin, sickness or disability, property, birth, or other status are relatively well treated under the Angolan Civil Code but are not afforded special treatment to ensure they can share the benefits of a project such as Bitá IV. Groups likely to be encountered in the Bitá IV area include women and girls that are sometimes recruited by construction companies and forced into prostitution in construction camps, and male migrants from China, Southeast Asia, Brazil, Namibia, Kenya and Congo that have previously been subjected to forced labour in Angola's construction industry. Children and the disabled are also vulnerable as they are easy targets for exploitation and abuse, with 25% of Angolan children working full-time rather than attending school. Within the Bitá IV area no evidence has been found of specific ethnolinguistic groups or indigenous peoples, and those people internally displaced during the civil war have generally assimilated into Luandan society.

Project Alternatives

Although the various components of the Bitá IV project remain to be let to D&B contractors, a number of project alternatives have already been considered during project development and preparation of the TFS. Most significantly of these are:

- Transmission pipeline routings;
- Extent of Distribution Areas;
- Siting of the Cabolombo CD;
- Transmission pipeline route to Benfica II CD; and,
- Levels of Service to be provided.

In this section of the ESIA, the consideration of each of these are discussed against the benefits of the chosen alternative as presented in the TFS. Also assessed is the situation that will arise if B4WSP is not implemented, the 'Without Project' alternative.

Notwithstanding this prior consideration, not all of these issues were resolved by the TFS, while others were excluded from the TFS Scope of Work. The components that remain to be addressed the D&B contractors through the period of design to an ultimate solution and construction include but are not limited to:

- Siting of the intake works on Rio Kwanza;
- Raw water treatment process stream;
- Transmission pipeline route to Benfica II CD;
- The layout of each distribution network; and,
- Process water treatment stream

Environmental and Social Impacts

The assessment of environmental and social impacts utilises a formalised procedure to evaluate the significance of a wide range of environmental and social issues from design, through construction and operation, to decommissioning. Potential environmental impacts are identified by superimposing project elements and activities onto existing natural conditions and then making assessment based on the nature of the effect, magnitude, spatial extent, duration, project phase and the degree of reversibility. It is an underlying assumption of the assessment process that all works will be undertaken with due care for safety and environmental matters, using current and reasonable engineering good practices.

For each potential impact, the ESIA scores the expected consequences, the likelihood it will occur, and its significance, both with and without mitigation to identify a where mitigation of significant impacts will be vital and where residual impacts, to henceforth be managed in an environmentally-responsible manner are likely to occur. A summary of this is given in Table ES- 2.

Table ES-2: Summary of Impact Significance Pre- and Post-Mitigation

Sensitivity	Project Activity & Impact Description	Significance Before Mitigation	Typical Mitigation Measures (Additional measures given in Text)	Residual Significance	
Biodiversity	Construction Impacts				
	Site clearance	4	<ul style="list-style-type: none"> Minimise exposure of soil susceptible to erosion. Minimise disturbance to flora and fauna. 	4	
	Invasive Species Introduction	8	<ul style="list-style-type: none"> Prepare Invasive Species Management Plan. Staff training and awareness raising in communities. 	4	
	Operational Impacts				
	Induced Access	4	<ul style="list-style-type: none"> Careful site selection for all project components. Removal of temporary access roads on completion of construction. Access controls on permanent access roads. 	2	
	Bushmeat Hunting	3	<ul style="list-style-type: none"> Preparation of a Bushmeat Hunting and Wildlife Trade Management Plan. 	3	
	Permanent land-take	6	<ul style="list-style-type: none"> Careful design and pipe alignment choices. 	6	
	Use of RoWs	4	<ul style="list-style-type: none"> Access control on EPAL-only roads. 	2	
	Wastewater flow to marine environment	9	<ul style="list-style-type: none"> A comprehensive Sanitation Master Plan must be developed in order to manage all wastewater. GoA should urgently consider expanding sanitation network in the project area. Under the B4WSP new water connections will only be made to houses with an adequate level of sanitation. Where households do not have adequate sanitation facilities they may be able to have an external tapping point or use a community standpost, it is suggested that this be managed using Development Workshop's MOGECA Model. 	3	
Hydrology	Operational Impacts				
	Water Abstraction-Volume	4	<ul style="list-style-type: none"> Undertake a hydrological study. Design to take account of local hydrological conditions. 	4	
	Water Abstraction-Salinity	4		4	
	Continued water abstractions and effect of climate change	3	<ul style="list-style-type: none"> Monitor intake volumes and river levels to maintain sustainability. 	1	
Soil Erosion	Construction Impacts				
	Earthworks	6	<ul style="list-style-type: none"> Minimise exposure of soil susceptible to erosion Mobility of exposed soils shall be minimised Minimise on-site dust generation 	2	
	Temporary land-take	9		3	
	Temporary drainage	9		3	
		Construction traffic	6	<ul style="list-style-type: none"> Minimise on-site dust generation Minimise exposure of soil susceptible to erosion Mobility of exposed soils shall be minimised 	2
	Operational Impacts				
		Lack of Sanitation	12	<ul style="list-style-type: none"> Connect only those premises with acceptable sanitary arrangements Increase sanitation coverage 	9
	Ground around pipeline repairs left less well compacted than on construction	6	<ul style="list-style-type: none"> Repair breakages in accordance with 'Best Practice' industry standards. 	3	

Sensitivity	Project Activity & Impact Description	Significance Before Mitigation	Typical Mitigation Measures (Additional measures given in Text)	Residual Significance
	Inappropriate use of washouts	9	<ul style="list-style-type: none"> Maintain competency of washout rip-rap to reduce erosion. 	3
Surface Water Quality	Construction Impacts			
	Earthworks	9	<ul style="list-style-type: none"> Minimise on-site dust generation Segregate waste Tracking system to record waste disposal Correct storage and disposal of hazardous waste Mobility of exposed soils shall be minimised Manage overland flow Minimise volume of water created 	3
	Stockpile management	9	<ul style="list-style-type: none"> On-site dust generation management Odour control Prevent generation and transport of dust Minimise environmental impact during concrete mixing. 	3
	Temporary drainage	6	<ul style="list-style-type: none"> Minimise exposure of soil susceptible to erosion Mobility of exposed soils shall be minimised 	3
	Construction waste	4	<ul style="list-style-type: none"> Develop waste management plan which correctly stores and disposes of waste Hazardous waste to be properly managed 	3
	Powered Mechanical Equipment	6	<ul style="list-style-type: none"> Reduction of volatile organic compound (VOC) emissions Noise Control Maintenance and servicing of construction vehicles Correct chemical storage 	3
	Fabrication & installation	4	<ul style="list-style-type: none"> Temporary access roads shall be stabilised with gravel (or similar) immediately after grading. 	2
	Sewage & waste water during construction	3	<ul style="list-style-type: none"> Minimise volume of waste water created Correct disposal of waste Provide proper sanitation at all work sites 	3
	Operational Impacts			
	Sewage and waste water during WTP/CD operation	6	<ul style="list-style-type: none"> Correct disposal of waste 	3
	Lack of Sanitation	9	<ul style="list-style-type: none"> Connect only those premises with acceptable sanitary arrangements. Increase sanitation coverage. 	6
	Spillage of fuel, oil and lubricants	8	<ul style="list-style-type: none"> Implement Spill Response Plan (SRP) as part of Emergency Response Plan (ERP) 	4
	Pollution incidents	4	<ul style="list-style-type: none"> Continuously monitor water quality indicators upstream of intake 	2
	Soil & Groundwater Quality	Construction Impacts		
Construction waste		2	<ul style="list-style-type: none"> Minimise on-site dust generation Correct storage and disposal of waste Hazardous waste to be properly managed Manage overland water flow Re-use excavated soil Identify contaminated soil or groundwater as well as any potential sources of contamination Remediation and use of contaminated soils and groundwater 	2
Sewage & waste water		4	<ul style="list-style-type: none"> Minimise volume of waste water created Correct disposal of waste Provide proper sanitation at all work sites 	2

Sensitivity	Project Activity & Impact Description	Significance Before Mitigation	Typical Mitigation Measures (Additional measures given in Text)	Residual Significance
	Operational Impacts			
	Waste water during WTP/CD operation	9	<ul style="list-style-type: none"> Establish procedures for materials handling and control. 	3
	Lack of Sanitation Facilities	9	<ul style="list-style-type: none"> Only connect households which have an adequate level of sanitation in place. Increase sanitation coverage. 	3
	Fuel and oil spillage	6	<ul style="list-style-type: none"> Implement Spill Response Plan (SRP) as part of Emergency Response Plan (ERP). 	2
Materials & Resources	Construction Impacts			
	Material supply/usage	4	<ul style="list-style-type: none"> Promote conservation by reducing energy, water and material consumption Purchasing green materials 	3
	Operational Impacts			
	Waste Management	6	<ul style="list-style-type: none"> Preparation of Waste Management Plan. 	2
	Water Use	3	<ul style="list-style-type: none"> Water study prior to any abstraction, to inform a Sustainable Water Management Plan. Promotion of water efficiency and water recycling: implement demand management measures to avoid the wastage 	3
	Use of imported materials	8	<ul style="list-style-type: none"> Implement environmentally-responsible procurement and continually review material requirements 	6
	Use of fuels, oils and lubricants	8	<ul style="list-style-type: none"> Optimise use of green sources of energy, including renewables. Do not leave engines to idle. 	6
	Broken pipe removed during repair, spent chemical, oil and lubricant containers, defunct apparatus and equipment, waste from CD office and domestic facilities	8	<ul style="list-style-type: none"> Adopt relevant clauses of the contractor's Waste Management Plan. 	4
Air Quality	Construction Impacts			
	Construction traffic	6	<ul style="list-style-type: none"> Vehicle emissions to comply with national standards 	4
	Powered mechanical equipment	6	<ul style="list-style-type: none"> Exhaust emissions to comply with local standards 	4
	Sewage & Wastewater	2	<ul style="list-style-type: none"> Control Odour 	1
	Operational Impacts			
Emissions from WTP	8	<ul style="list-style-type: none"> Ensure manufacturer's recommended exhaust filters fitted and maintained in good order. 	6	
Dust	Construction Impacts			
	Earthworks	12	<ul style="list-style-type: none"> Minimise on-site dust generation 	6
	Stockpile management	9	<ul style="list-style-type: none"> Minimise on-site dust generation Minimise volume of soil required for stockpiles 	6
	Construction traffic	12	<ul style="list-style-type: none"> Minimise on-site dust generation Prevent the generation and transportation of dust Minimise environmental impact of mixing concrete 	6
Operational Impacts				

Sensitivity	Project Activity & Impact Description	Significance Before Mitigation	Typical Mitigation Measures (Additional measures given in Text)	Residual Significance
	The movement of maintenance vehicles along unsurfaced tracks	8	<ul style="list-style-type: none"> Impose speed limits. Water or even surface of regularly used tracks. 	4
	Excavation of pipeline repairs	6	<ul style="list-style-type: none"> Empty excavator bucket near the ground. Cover spoil heaps during windy conditions. 	1
Noise	Construction Impacts			
	Construction traffic	12	<ul style="list-style-type: none"> Minimise on-site dust generation Reduce exhaust emissions Minimise noise impacts on third party sensitive receptors Implement a Traffic Management Plan 	9
	Powered mechanical equipment	12	<ul style="list-style-type: none"> Reduce exhaust emissions Minimise noise impacts on third party sensitive receptors Implement a Traffic Management Plan Community Liaison 	9
	Fabrication & installation	12	<ul style="list-style-type: none"> Minimise noise impacts on third party sensitive receptors Implement a Traffic Management Plan 	9
	Operational Impacts			
	WTP, pumping stations, stand-by generator operations, especially at night.	6	<ul style="list-style-type: none"> Ensure manufacturer's recommended noise baffles fitted and maintained in good order. 	4
	Vehicle operation for distribution network repairs at night.	6	<ul style="list-style-type: none"> Ban excessive acceleration and switch off engine rather than leave to idle. 	2
Visual	Construction Impacts			
	Earthworks	6	<ul style="list-style-type: none"> None – the alignment and associated earthworks are dictated by engineering design requirements. 	6
	Stockpile management	4	<ul style="list-style-type: none"> Contain construction activities within site boundary 	4
	Temporary land-take	4	<ul style="list-style-type: none"> Contain construction activities within site boundary Minimise waste generation during construction: Minimise disturbance to flora and fauna 	2
	Site clearance	4	<ul style="list-style-type: none"> Minimise noise at source: Contain construction activities within site boundary Minimise exposure of soil susceptible to erosion Minimise disturbance to flora and fauna 	3
	Construction waste	4	<ul style="list-style-type: none"> Contain construction activities within site boundary 	3
	Light emissions	9	<ul style="list-style-type: none"> Minimise light impacts to third party sensitive receptors 	6
	Operational Impacts			
	Permanent pipeline land-take	8	<ul style="list-style-type: none"> Avoid sensitive sites and reduce land take. 	8
Permanent WTP & DCs including Distribution Towers	12	<ul style="list-style-type: none"> Paint appropriate colours. Plant tree screens. 	9	

Sensitivity	Project Activity & Impact Description	Significance Before Mitigation	Typical Mitigation Measures (Additional measures given in Text)	Residual Significance
Displacement of People, Property, Assets and Resources	Construction Impacts			
	Impacts on Livelihoods due to construction of river water intake (Lot 1)	2	<ul style="list-style-type: none"> Not deemed significant, but review again following detailed design of intake. 	1
	Displacement of People and Property (Julio)	12	<ul style="list-style-type: none"> Slight rerouting of transmission pipeline. 	6
	Displacement of People and Property (north of ETA/CD Bita)	12	<ul style="list-style-type: none"> Reduction of working width. 	6
	Displacement of People and Property (Quenguela)	12	<ul style="list-style-type: none"> Slight rerouting of transmission pipeline. 	6
	Displacement of People and Property (Quenguela Norte)	12	<ul style="list-style-type: none"> Reduction of working width and use of machinery that can safely operate around and under powerlines. 	6
	Displacement of People and Property (Tanque Serra)	12	<ul style="list-style-type: none"> Reduction of working width. 	6
	Displacement of People and Property (Ramiros)	12	<ul style="list-style-type: none"> Reduction of working width. 	6
	Economic Displacement	4	<ul style="list-style-type: none"> Design and application of Traffic Management Plan 	2
	Operational Impacts			
	Additional land take-post commissioning	2	<ul style="list-style-type: none"> Follow project RPF. 	1
Economic Development and Employment	Construction Impacts			
	Expectations for direct employment of local population not met and community relations managed badly.	4	<ul style="list-style-type: none"> Develop an Employment Plan, with clear employment requirements and procedures for the construction and operational/maintenance workforce. Prioritise the employment of a local Angolan workforce. 	2
	Operational Impacts			
	Reduced demand for private water suppliers and tanker drivers hence loss of livelihoods	9	<ul style="list-style-type: none"> Prioritise employment of those previously privately operating in the water sector but rendered unemployed by the project but only in positions for which they are qualified. 	9
POSITIVE Continued growth generated by the attraction of served communities	POSITIVE 16	<ul style="list-style-type: none"> Implement in accordance with an agreed and properly structured master plan. 	POSITIVE 16	
Cultural Heritage	Construction Impacts			
	Displacement or damage to archaeological, historic or recent cultural heritage sites	4	<ul style="list-style-type: none"> Develop a Cultural Heritage Management Plan. Implement a "Chance Finds" procedure during construction. 	2
Community Health, Safety and Security	Construction Impacts			
	Public Health and safety	12	<ul style="list-style-type: none"> Conduct good construction site "housekeeping" and management procedures 	4
	Increase occurrence of communicable diseases	9	<ul style="list-style-type: none"> Implement a Health Management System for the workforce. 	6

Sensitivity	Project Activity & Impact Description	Significance Before Mitigation	Typical Mitigation Measures (Additional measures given in Text)	Residual Significance
	Operational Impacts			
	Changes in exposure to water-borne and water-related diseases.	6	<ul style="list-style-type: none"> Provide information, education and communication about safe and hygienic use of water. 	3
	POSITIVE Continued growth generated by the attraction of served communities	POSITIVE 16	<ul style="list-style-type: none"> Maintain potable water quality. Collect medical and social data to illustrate improvements. 	POSITIVE 16
	Misuse/misdirection of water treatment chemicals including chlorine gas.	8	<ul style="list-style-type: none"> Train EPAL and supplier's staff in the risks associated with water treatment. 	6
	Lack of Sanitation	9	<ul style="list-style-type: none"> Only connect households which have an adequate level of sanitation in place. Increase sanitation coverage. 	6
Workforce Community Interactions	Construction Impacts			
	Conflict due to the immigration of a foreign workforce.	9	<ul style="list-style-type: none"> Ensure Works Procedures, defines a Code of Appropriate Conduct for all workers, including acceptable behaviour with respect to the local community. 	6
	Gender based violence and sexual exploitation and abuse.	12	<ul style="list-style-type: none"> Ensure Works Procedures, defines a Code of Appropriate Conduct for all workers, including acceptable behaviour with respect to the local community. Conduct GBV Risk Assessment in accordance with WB Guidance (ref to Section 8,4,15) Adopt GRM as described in the project SCEP (Appendix D) 	8
	Operational Impacts			
	Social conflict with well-paid foreign workers.	3	<ul style="list-style-type: none"> Operational Workforce largely from local community few if any foreign workers. 	1
Labour and Working Conditions	Construction Impacts			
	Poor management of occupational health and safety of workers.	16	<ul style="list-style-type: none"> Employment practices and working conditions should conform to International Labour Organisation (ILO) Standards and national regulations. 	4
	Operational Impacts			
	Conflict within the work force due to Differences in nationality, ethnicity, religion, etc.	9	<ul style="list-style-type: none"> The basis for differences in the standard of accommodation should be non-discriminatory; it should be documented and communicated transparently to the workforce. 	6
	Exposure and detonation of land mines and UOX	4	<ul style="list-style-type: none"> Obtain approval from the relevant Angolan authorities before moving onto a new site. 	4
Exploitation of child labour.	6	<ul style="list-style-type: none"> Ensure children under 14 are not hired. 	3	

The anticipated efficacy of proposed mitigation in terms of reductions to initial impact significance is demonstrated in Table ES-3 below.

Table ES-3: Predicted Effect of Mitigation

Impact Significance	Count		Percentage	
	No Mitigation	With Mitigation (Residual Significance)	No Mitigation	With Mitigation (Residual Significance)
High	16	0	19	0
Medium	24	9	28	11
Low	36	34	43	40
Negligible	9	42	11	49

The application of recommended mitigation is predicted to reduce all impacts to 'medium significance' or to low significance residual impacts. The majority of impacts are directly related to construction and temporary in nature. With the application of the mitigation proposed mitigation measures, no impacts of high significance are expected and all residual impacts are considered to be acceptable. However, this is only achievable with the effective and efficient implementation of the Bita IV Environmental and Social Management Plan.

Environmental, Social and Safety Management, Monitoring and Reporting Plan

The mitigation measures identified above are required to reduce the significance of predicted residual impacts to acceptable levels. All mitigation measures shall be implemented to the extent practicable in the interests of general good environmental and social practice.

The management controls provided in the ESIA include:

- air quality;
- noise & vibration;
- light and visual impact;
- sustainability in construction;
- waste management;
- erosion & sediment management;
- soil & earthworks management;
- groundwater management;
- vehicle management;
- concrete batching and related transportation;
- terrestrial ecology;
- water quality management;
- environmental incident response;
- physical and economic displacement of people, property, assets and resources;
- Gender-Based Violence (GBV) risk assessment and, where necessary, management plans;
- management of community relations; and
- labour and working conditions.

For each impact area the ESIA provides a tabulation assessing the significance of each impact identified and describing the specific mitigation measures required to reduce this significance. Table ES-4 is a summary of environmental quality monitoring requirements.

Table ES-4: Summary of Environmental Quality Monitoring Requirements

Project Phase	Category	Indicators	Location	Method	Duration	Frequency	Purpose	Expertise Required	Responsibility	Estimated Cost							
Pre-Construction	Baseline Air Quality and Noise Conditions	SO ₂ , Pb, PM ₁₀ , PM _{2.5} , TSP, NOx and CO Ambient Noise	Settlements and houses nearest CD sites or on pipeline alignments	Portable air quality and noise equipment of approved manufacture	Over 1 hour, 7-8am, any day except Sunday	1 time prior to construction	To define background conditions against which to assess project impacts	Resourced Environmentalist with experience of field monitoring	D&B Contractors	US\$ 80,000 (mainly equipment purchase)							
	Baseline Water Quality Conditions	PH, Conductivity, Colour, Hydrocarbons and Chloride	Rio Kwanza and other watercourses	AWWA, WHO or other approved standards of sampling and analysis	(Not applicable)	1 time prior to construction		Resourced Environmentalist with experience of field monitoring and analysis									
		Faecal Coliforms (<i>E.coli</i>) Total Coliforms	Vulnerable wells within 100 m of work sites														
		Total Suspended Solids Dissolved Oxygen	River Kwanza														
Construction	Site Inspection	Site Clearance	All areas to be cleared as part of B4WSP construction	Visual and Descriptive, against a Check List	(Not applicable)	Weekly during site clearance	To ensure compliance with ESMP and each contractor's CEMP, general standards of 'Good Practice' and that Health and Safety are adequately provided for.	Site inspector or counterpart environmentalist with awareness of site conditions and HSE requirements	EPAL and PIU	Included in contract supervision below							
		General Construction Activity	All sites, on and off site, associated with B4WSP construction	Visual and Descriptive, against a Check List	(Not applicable)	Biannually											
		Batching and Asphalt, etc.	All batching, asphalt and other processing plants	Visual and Descriptive, against a Check List	(Not applicable)	Monthly											
		Camp and Other Facilities	All construction camp and maintenance facilities	Visual and Descriptive, against a Check List	(Not applicable)	Quarterly											
	Air Quality Conditions	SO ₂ , Pb, PM ₁₀ , PM _{2.5} , TSP, NOx and CO Ambient Noise	Settlements and houses nearest Cd sites or on pipeline alignments	Portable air quality and noise equipment of approved manufacture	Over 1 hour, 7-8am, any day except Sunday	Once only at receptors on pipeline routes. Every two weeks at receptors near CDs	To assess the magnitude of any project impact	Resourced Environmentalist with experience of field monitoring	D&B Contractor. PIU will do spot checks	US\$ 70,000 (equipment purchased Pre-Construction)							
											Water Quality Conditions	PH, Conductivity, Colour, Hydrocarbons and Chloride	Rio Kwanza and other significant watercourses	AWWA, WHO or other approved standards of sampling and analysis	(Not applicable)	Rio Kwanza - monthly for 1 year Others, 3 times during rainy season. Wells, quarterly.	Resourced Environmentalist with experience of field monitoring and analysis
												Faecal Coliforms (<i>E.coli</i>) Total Coliforms	Vulnerable wells within 100 m of work sites				
	Water Quality Conditions	Total suspended Solids Dissolved Oxygen	River Kwanza	As appropriate for the parameter being monitored	As necessary	As necessary	To fully investigate all complaints and to provide the basis for appropriate mitigation and/or compensation	Resourced Environmentalist with experience of field monitoring and analysis	D&B contractor and PIU	US\$ 10,000							
											Complaint Investigation	Any of the Environmental Quality parameters listed above, depending upon the nature of the complaint	At or in the vicinity of all sites for which a specific complaint has been received				

Project Phase	Category	Indicators	Location	Method	Duration	Frequency	Purpose	Expertise Required	Responsibility	Estimated Cost
Construction (continued)	Contract Supervision	Contractor's compliance with Standards and EMP requirements. Low numbers of injuries to workers.	All sites of construction and project related activity	Primarily Visual and Descriptive, against a Check List	On-going	Daily	To ensure contractors comply with ESMP and CEMP requirements	Experienced site supervisor with awareness of environmental and Health and Safety issues	Contract Supervision Consultants	US\$ 550,000
	Cultural Heritage	The documentation of Chance Finds	Any previously unknown remains unearthed during construction	Ministry of Culture standard procedures	As necessary	For every Find deemed worthy of investigation	To ensure all new Finds are recorded in accordance with requirements	PIU and government Heritage Inspector	EPAL and PIU	US\$ 5,000
	Land Acquisition	The early identification of acquisition problems	All lands to be acquired under the project	Discussions with PAPs	(Not applicable)	Continuous	To provide early warning of PAP difficulties	Community Liaison Office and Representatives of the PAP community	PIU CLO	Included in RPF implementation costs
		The effectiveness of acquisition procedure and of compensation disbursement	All lands to be acquired under the project	CLO monitoring and evaluation	(Not applicable)	Throughout the duration of acquisition	To review procedures and ensure efficiency and transparency in compliance with World Bank procedures	CLO and Social Specialist	PIU CLO	
		The overall efficiency of acquisition and resettlement	All lands to be acquired under the project	External monitoring	During Funding Agency missions	As required by the Funding Agencies	To ensure the adopted procedures conform to Funding Agency requirements	Funding Agency Missioners	Funding Agencies	
Post-Construction	Air Quality Conditions	SO ₂ , Pb, PM ₁₀ , TSP, NO _x and CO Ambient Noise	Settlements and houses nearest CD sites	Portable air quality and noise equipment of approved manufacture	Over 1 hour, 7-8am, any day except Sunday	Biannually, or in response to complaint	To assess operation impacts, including improvements to the urban environment resulting from the project	Resourced Environmentalist with experience of field monitoring	EPAL	US\$ 6,000
	Water Quality Conditions	PH, Conductivity, Colour, Hydrocarbons Turbidity, Dissolved Oxygen or as proposed by WTW process designer	Rio Kwanza upstream of the B4WSP intake	AWWA, WHO or other approved standards of sampling and analysis	(Not applicable)	Continuous monitoring	To monitor quality of water taken for treatment	Intake pumping station operator trained in field monitoring and analysis		
	Health and Safety	The security of fuel, water treatment chemicals, and other hazardous substances	All CD and elsewhere where such materials are stored	Visual inspection of sites	1 day	Every 6 months	To ensure the safe storage of chemicals in accordance with operational EMP	Health and Safety Inspector	EPAL	US\$ 6,000
		Availability and use of PPE, safety and emergency equipment	All CDs	Visual inspection and inventory check			To promote compliance with OEMP and identify need for retraining			
		Continued familiarity and compliance with OEMP and ERPs								

Consultations and Communications

Key stakeholders have been defined as those who will be affected by, or will affect the project throughout its course. They have been identified through site survey, desk-based research, a previous (2014) ESIA and consultations with both the Client and World Bank.

The following is a provisional list of stakeholders identified at this stage, as the project proceeds this list is likely to expand: Empresa Publica de Águas Luanda (EPAL); The World Bank; Standard Chartered; Design and Build (D&B) contractors; National Institute of Water Resources of Angola (INRH) (Plate ES-5); Ministry of Energy and Water (MINEA); Ministry of Environment (MINAMB); Belas Municipality representatives; Talatona Municipality representatives; Viana Municipality representatives; Community leaders, also referred to as *sobas*; Current private water operators (i.e. water truck operators and those with privately owned tanks that resell water to their neighbours (Section 6); Project Affected Person (PAP) communities, especially: Julio (CD Bitá), East Bitá Village (CD Bitá), and, Alvarenga (CD Mundial); Quenguela (CD Cabolombo); Quenguela (CD Cabolombo); Project beneficiaries; Project Affected Persons (PAPs); Vulnerable peoples; Development Workshop (NGO) (Plate ES-6); and, Ministry of Territorial Administration (MAT).

As the project progresses and D&B contracts are awarded these stakeholders will be identified and analysed individually. Additionally, Community Based Organisations (CBOs) and Faith Based Organisations (FBOs) have, and will continue to be, considered important stakeholders but as none have been identified yet, they have not been considered further at this stage.

A Greivance Redress Mechanism (GRM) has been designed for the B4WSP so that affected parties may have an opportunity to air their greivances and have them resolved in a fair and transparent manner. **EPAL have expressly stated that they will make the effort in good faith to compensate all potentially affected parties regarding the implementation of Lots B1 to B7, and will issue a public statement inviting them to compensation entitlement in good faith.**

The ESIA presents a Stakeholder Consultation and Engagement Plan (SCEP) for the Bitá IV project. Plates ES-7 and ES-8 show some of the public sessions held during the preparation of the present ESIA and also the RPF issued under separate cover.



Plate ES-5: Meeting with INRH (06-06-2018).



Plate ES-6: Meeting with Development Workshop (13-06-2018).



Plate ES-7: Public meeting at EPAL Headquarters, Talatona (06-09-2018).



Plate ES-8: Public Meeting at Ramiros Youth Centre (13-09-2018).

Downstream Measures

Thus far, the present consultant has completed the TFS, on the basis of which the present ESIA and associated RPF have been prepared. Hereafter responsibilities for the progression of the B4WSP may be assigned as shown in

Table ES-5: Downstream measures and responsibilities

Organisation	Prime Responsibilities	Status
Dar Al-Handasah	TFS and conceptual design	Complete
	ESIA/RPF for Bank Guarantee	Complete
EPAL/MINEA	Appoint D&B contractors for raw water intake, pumping station, force main and water treatment plant, and process water treatment plant (Lots 1 and 7)	Complete
	Appoint D&B contractors for treated water transmission mains to CDs (Lot 2)	Complete
	Appoint D&B contractors for Bitu, Mundial and Ramiros CDs (Lots 3, 4 and 6)	Complete
	Appoint D&B contractors for Bitu, Cabolombo, Mundial and Ramiros distribution networks (Lots 8, 9, 10 and 11)	In Progress
	Appoint D&B contractors for Camama and Benfica II CD upgrades and network retrofits (Lots 12 and 13)	In Progress
	Appoint consultant to establish PIU or establish from within EPAL.	To Do
	Appoint E&S consultants to complete / update Final ESIA's and RAPs in accordance with final designs	To Do
	Appoint Resettlement Management Consultant	To Do
Resettlement Management Consultant	On behalf of EPAL manage the B4WSP resettlement and pay any compensation owed to PAPs	To Do
Individual Lot D&B Contractors	Undertake site surveys and complete detailed designs.	To Do
	Develop Environmental and Social Management Plans (ESMPs) following finalization of downstream ESIA's.	To Do
EPAL Appointed Individual Lot E&S Consultants	Review Bitu IV ESIA, adopt SCEP and complete Lot-specific ESIA	To Do
	Undertake PAP surveys and prepare Lot-specific RAP in accordance with B4WSP RPF	To Do
	Assist Client (D&B contractor) obtain MINEA and other permits required for construction	To Do

Organisation	Prime Responsibilities	Status
	Assist client prepare Lot-specific CEMP	To Do
Project Implementation Unit	Establish PIU with CLO in EPAL HQ and take on counterpart staff to manage B4WSP programme	To Do
	Establish Grievance and Appeal Committees within CLO	To Do
	With MINAMB, review and approve contractors' CEMPs	To Do
	Review updated Lot-specific ESIA and integrate into final B4WSP ESIA for MINAMB approval	To Do
	Review updated Lot-specific RAPs and integrate into final B4WSP RAP for MINAMB approval	To Do
	Oversee SCEP implementation, site supervision, ESMP/CEMP implementation and reporting	To Do
	Oversee execution of Grievance Redress Mechanism	To Do
	Monitor and evaluate ESIA, RPF and RAP implementation	To Do
MINAMB	Work with Lot-specific consultants to complete permitting B4WSP designs and approve contractor's CEMPs	To Do
	Review and approve PIU E&S reports	To Do
	Work with EPAL/MINEA to oversee the project to satisfaction of GoA	To Do

1 INTRODUCTION

1.1 PROJECT BACKGROUND AND RATIONALE

Luanda, the capital of Angola, has grown rapidly since the peace agreement ended 27-years of civil unrest in 2002 and EPAL, the provincial water authority for the capital, has struggled to keep abreast of the increasing demand for water from the rapidly growing population. Many people fled to the capital for safety during the war years and Greater Luanda currently has a population of some 6.5 million, supplied from three major water supply systems and three smaller systems. Total current demand is calculated to be 750,000 m³/d, but this is suppressed because daily production capacity is only 500,000 m³.

Existing supply systems S1 and S2 are sourced from intakes on the Rio Bengo and serve the capital and its northern and eastern suburbs. Existing System S3, from an intake on Rio Kwanza, serves the southern areas of the capital and its southern suburbs. Three smaller systems, each with their own intake on Rio Kwanza, serve new growth areas of Bom Jesus, Calumbo and Kilamba south and south east of the capital. The coverage of each these systems is illustrated in Figure 1-1.

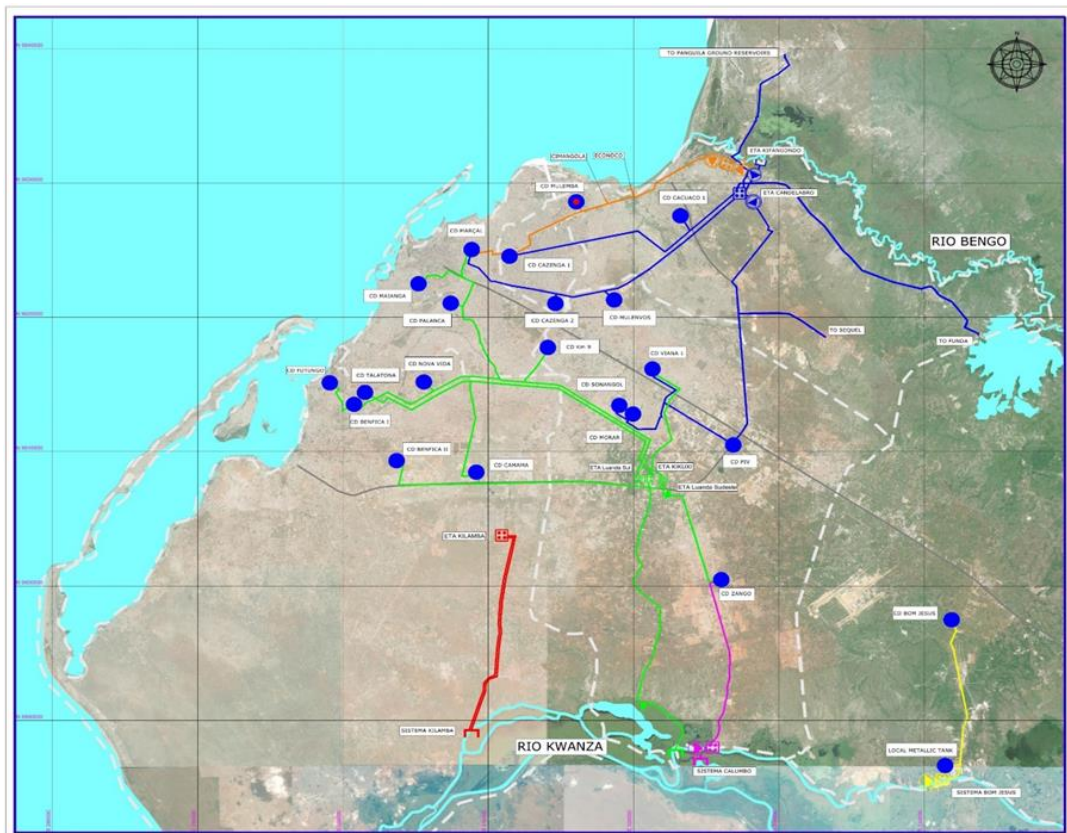


Figure 1-1: Existing Water Supply to Greater Luanda

As with System S3 and the three smaller systems, the Bitá IV Water Supply Project will also be sourced from the Lower Rio Kwanza Basin, Angola's largest drainage basin with a catchment area of some 155,000 km². In addition to enhancing the availability of water to existing networks, which includes parts of Luanda city centre, the Bitá IV Water Supply Project (hereafter B4WSP), will serve the extensive areas of rapidly expanding urbanisation further south, in the municipalities of Belas, Talatona and Viana, that currently have inadequate or no potable water distribution. The project will also provide for the increase in per capita demand throughout each service area to 150 l/h/d by 2025.

The Bitá IV water supply system is divided into the four supply areas described below and shown, together with the proposed transmission mains and existing and proposed distribution centres (CDs - Centro de Distribuição), in Figure 1-2. The work proposed for Area 1 is essentially a new water supply system utilising two existing CDs and two new CDs, while that planned for Areas 2 and 3 will reinforce Supply System S3. The existing systems in Area 4 are expected to become part of the Bitá IV system after 2030. A fifth area (Area 5), not shown in Figure 1-2, comprises additional areas of System S3 that the 2018 TFS¹ determined could be reinforced from B4WSP in the future if water is available.

A major benefit of the B4WSP will be the reduction of social and political pressure on System S3 to supply the rapidly expanding population of Luanda city centre. Those communities not served by existing networks are supplied from insecure sources such as fountains or by tanker. Table 1-1 illustrates the present lack of water security throughout Areas 1, 2 and 3 as recorded in the 2014 national census. Even where connections exist, households may rarely if ever receive supplies due to the lack of treated water resources. Some 77% of the Bitá 4 population presently depend on tankered water, while less than 10% have access to a tap at or near their house.

¹ Dar Al-Handasah, 2018. Bitá Water Supply System Guarantee Preparation: Technical Feasibility Study. EPAL

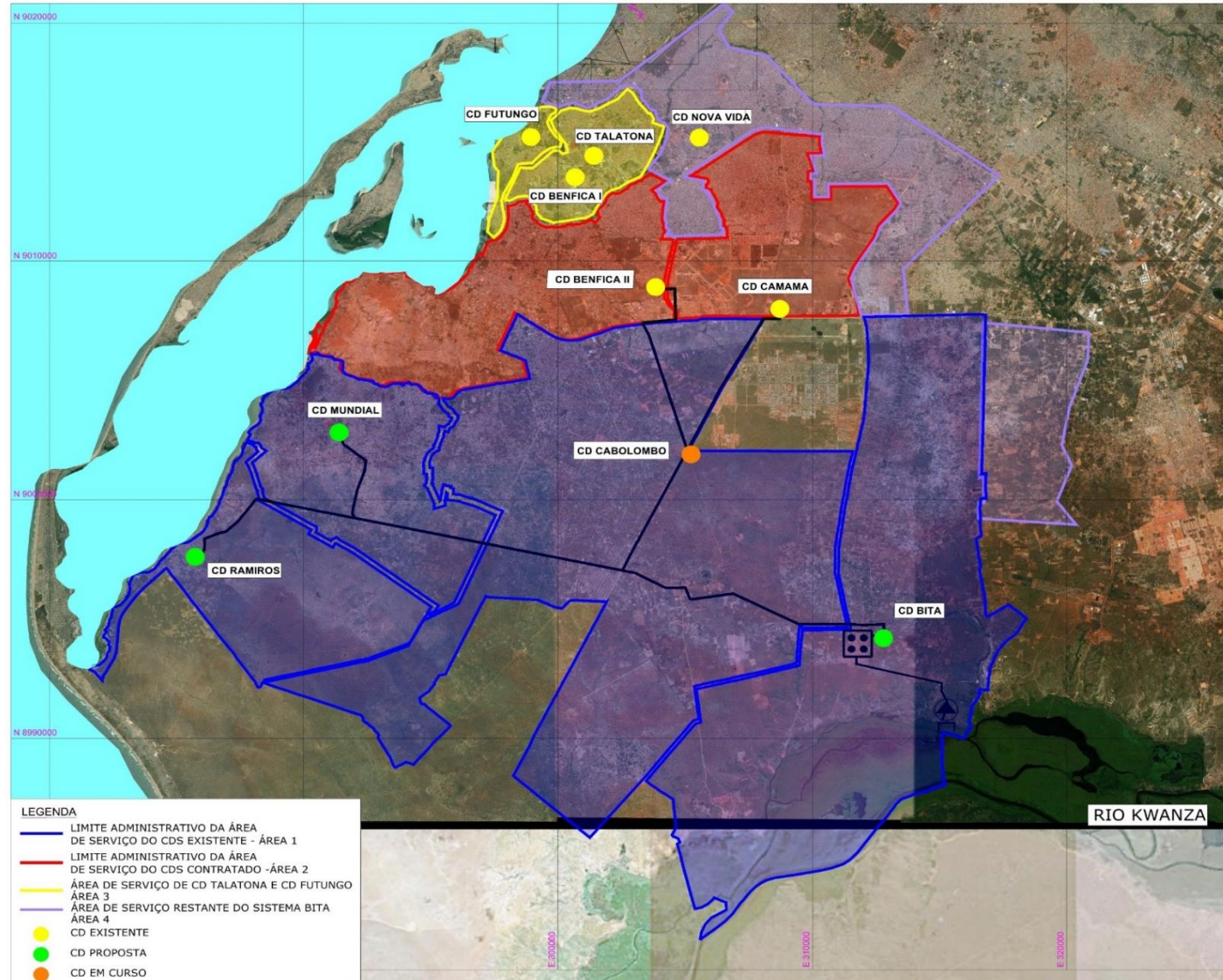


Figure 1-2: Component Service Areas of the Bitá System 4 Water Supply System

Table 1-1: Existing Water Supply for Areas 1, 2 and 3²

CD	Commune	Area Percentage (%)	Household Connections	Quintal Connections	Fountains	Well with Pump	Tankers
Area 1							
Bitá	Zango	23	0	0	510	35	3,147
	Barra de Kwanza	20	0	0	46	2	51
	Camama	14	0	0	3,296	55	9,596
Cabolombo	Camama	10	1,871	971	2,345	39	6,828
	Benfica	56	6,311	1,198	1,788	178	22,706
Ramiro s	Ramiros	60	10	25	21	2	3,032
Mundial	Ramiros	10	0	0	4	1	505
	Benfica	12	0	0	383	38	4,866
Total			8,193	2,194	8,392	349	50,733
Area 2							
Camama	Camama	38	75,946	3,661	8,841	146	25,740
Benfica II	Benfica	18	24,881	0	560	56	7,108
Total			100,827	3,661	9,400	202	32,848
Area 3							
Talatona, Morro Bento, Futungo, etc.	Futungo Belas	100	2,740	425	762	45	10,423
	Samba	48	3,604	2,268	620	81	8,093
Total			6,344	2,693	1,382	126	18,516

Some service areas of the existing and proposed CDs have existing distribution networks:

Area 1: Service area of new / contracted CDs:

CD Ramiros service area is partly covered by an existing distribution network which is fed currently from the existing CD Ramiros. The length of this network is around 17 km varying in diameters between 315 mm and 40 mm. The existing network includes 5 fountains and 199 house connections.

CD Cabolombo service area is partly covered by an existing distribution network which is fed currently from the CD Benfica II. The length of this network is around 97 km varying in diameters between 225 mm and 40 mm. The existing network includes around 2,755 house connections.

Area 2: Service area of existing CDs:

CD Camama service area is almost covered by an existing distribution network fed by CD Camama. This latter has an existing capacity of 30,000 m³ and is currently supplied from system S3. The length of the distribution network of CD Camama service area, based on the data made available by EPAL, is around 467 km varying in diameters between 500 mm and 40 mm. The existing network includes 75,946 house connections out of which 39,265 are equipped with flow meters while 36,681 connections are unmetered.

² National Institute of Statistics, 2015. Recenseamento Geral da População e Habitação (Angola Population and Housing Census) May 2014

CD Benfica II service area is almost covered by an existing distribution network which is fed by CD Benfica II. CD Benfica II with an existing capacity of 40,000 m³, is currently supplied from system S3. The length of the existing distribution network of CD Benfica II service area, based on the data made available by EPAL, is around 678 km varying in diameters between 400 mm and 40 mm. The existing network includes 24,881 house connections, assuming the same metering ratio as in Camama, 12,939 connections are equipped with have flow meters while 11,942 are unmetered.

Area 3: Service area of existing CDs fed indirectly by Bitá system

This area is covered by an existing distribution network which is fed by the existing CDs of Futungo and Talatona, currently supplied from system S3. However, these CDs could also be supplied by the on-going project of 800 mm pipeline coming from CD Benfica II to Talatona. The length of the distribution network in this area, based on the data made available by EPAL, is around 190 km varying in diameters between 400 mm and 50 mm.

1.2 SCOPE OF B4WSP DESIGN AND CONSTRUCTION

Design and construction of the B4WSP will be divided between 13 separate lots as follows:

- **Lot B1:** the water intake structure and open channel from the Rio Kwanza, the raw water pumping station, raw water force main and Bitá raw water treatment plant, buildings and ancillary facilities;
- **Lot B2:** the treated water transmission pipelines from the Bitá site northward to CD Cabolombo, CD Camama and CD Benfica II and westward toward CD Ramiros and CD Mundial;
- **Lot B3:** CD Bitá with a capacity of 50,000 m³/day, adjacent to the raw water treatment plant;
- **Lot B4:** CD Cabolombo with a capacity of 30,000 m³/day (not included in World Bank guarantee);
- **Lot B5:** Ramiros CD with a capacity of 10,000 m³/day;
- **Lot B6:** Mundial CD with a capacity of 10,000 m³/day;
- **Lot B7:** Construct the Bitá processed water treatment plant on the B4WSP Lot 1 site.
- **Lot B8:** Bitá distribution network and metered connections;
- **Lot B9:** Cabolombo distribution network and metered connections;
- **Lot B10:** Mundial distribution network and metered connections;
- **Lot B11:** Ramiros distribution network and metered connections;
- **Lot B12:** Upgrade to Camama CD and retrofits to existing distribution networks; and,
- **Lot B13:** Upgrade of Benfica II CD and retrofits to existing distribution networks.

Lots B1 and B3 are to be merged into a single design and build contract.

Since project initiation, Lot B4, CD Cabolombo, with a capacity of 30,000 m³ was to be financed by the Chinese government, and is part-constructed by SinoHydro. It is not covered by the World Bank guarantee and is now instead to be financed by the Government of Angola. Both B3 and B4 are covered within the present ESIA. EPAL / MINEA have a signed agreement with the previous landowners, and have taken full control of this land.

It is understood that an ESIA was not developed for B4. However, management and monitoring plans have been issued comprising:

- Environmental Management Plan (EMP), November 2017
- Health and Safety Plan (HSP), July 2017;
- Health and Safety Management-Development Plan (HSM-DP), 2018; and
- EMP / HSMP Monitoring Plan and Recommendations, January 2017.

There will be Bitá IV construction supervision contracts and EPAL will appoint a consultant to establish a Project Implementation Unit (PIU).

The existing population (2017) and 2025 together with their respective water demands are listed in Table 1-2. A map showing the transmission mains and CDs with their respective distribution areas are shown in Figure 1-3.

Table 1-2: Present and Future B4WSP Populations and Water Demands

Description		CD	Area (ha)	Estimated 2017 Population	2017 Total Demand (l/s)	Estimated 2025 Population	2025 Total Demand (l/s)
Area 1	Contracted CDs	Ramiro	7,768	26,791	19	37,881	65
		Cabolombo	23,274	136,276	167	192,689	369
		Bitá	16,581	98,936	51	139,891	196
		Mundial	6,303	164,356	205	232,392	383
Area 2	Existing CDs	Camama	4,948	353,812	471	500,273	1,110
		Benfica II	6,741	401,431	534	567,604	985
Area 3	Indirect beneficiaries served from Benfica II	Talatona, Benfica I, Futungo, Morro Bento	2,434	128,577	171	181,801	316
Sub-Total for Areas 1-3			68,049	1,310,179	1,618	1,852,531	3,424

Population estimates from the 2014 national census. Growth: 2014-2018 2.7% p.a., 2018-2030 3.9% p.a. Figures exclude NRW

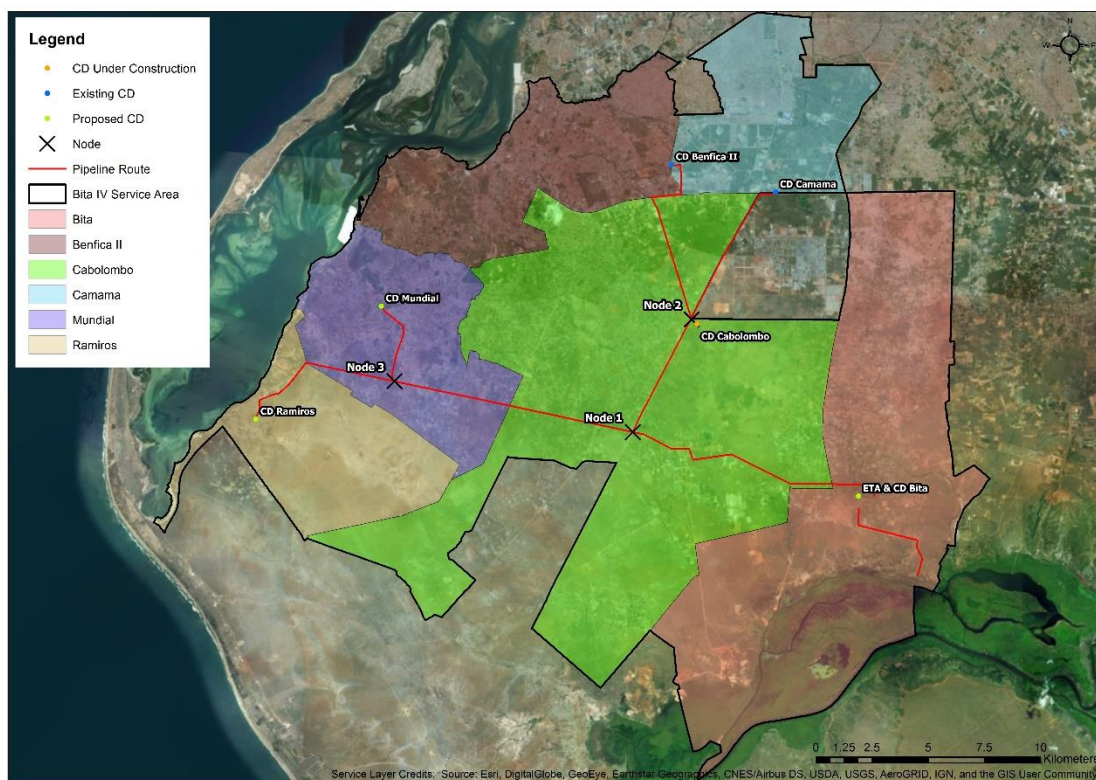


Figure 1-3: Transmission Network and Distribution Areas

1.3 SCOPE OF B4WSP ENVIRONMENTAL ASSESSMENT

The present ESIA is one of three prime deliverables of B4WSP Phase One, the other two being:

- Technical Feasibility Study (TFS), the latest revision of which was submitted in April 2019; and,

- Resettlement Policy Framework (RPF), the latest revision of which was submitted in April 2019.

The ESIA is prepared in accordance with the structure and guidelines of World Bank Operating Policy 4.01 Environmental Impact Assessment for a Category B Project and all other relevant World Bank safeguard policies, as well as with the local requirements of the Ministry of Environment (*Ministério do Ambiente*, MINAMB). The RPF will comply with the requirements of World Bank operating Policy OP 4.12, Involuntary Resettlement.

Adequate quantities of potable quality water are a fundamental requirement for the sustenance of life. The consequences of not commissioning a new source in the Lower Rio Kwanza Basin, its treatment, and distribution throughout the project area will have grave consequences and cumulative impacts for many thousands of residents, potentially including but not limited to:

- Further reduction in the access to adequate water;
- Increased pumping from illegal, unlicensed wells;
- Increased household expenditure on potable water;
- Increased reliance on poor quality water for bathing, washing clothes and food preparation;
- Increased dependence on tankered supplies, often from non-potable sources;
- Increased prevalence of waterborne disease;
- Social discord within families; and,
- Conflict between those with access to potable water and those without.

The present ESIA is an interim document, developed to support B4WSP appraisal, financing, and contracting purposes, on the basis of feasibility study-level designs and assessments. Updated pre-construction stage final ESIA's, as well as any relevant complementary assessments (including RAPs), in keeping with Angolan Law and WB policies, must subsequently be prepared by EPAL for each Lot as necessary. Such updated ESIA's and associated studies will be completed on the basis of approved final designs submitted by design-build contractors ahead of any construction taking place, and the final stage ESIA's must then be applied by all project contractors and consultants. This requirement is additionally recorded in Table 12-1: *Downstream responsibilities*.

It is essential that D&B contractors recognise that Final ESIA's and RAPs require completion by EPAL on the basis of final design drawings ahead of any construction or resettlement activities.

On completion of final project designs submitted by D&B contractors, the full scale of land take, asset loss and resettlement can be accurately determined. It is the responsibility of the Angolan Government, through EPAL to manage resettlement compensations, including cash payments. EPAL will be required to recruit a consultant or firm to establish a secure payment compensation mechanism, for this purpose.

1.4 B4WSP ENVIRONMENTAL ASSESSMENT TEAM

The B4WSP Project Proponent on behalf of the Government of Angola (GoA) is the *Ministério do Energy and Water* (MINEA) via *Empresa Pública de Águas du Luanda* (EPAL-EP), the Public Water Supply Company of Luanda. The Bitá IV Project Director is Lourdes Tito.

After special dispensation from the World Bank, EPAL and MINAMB, the preparation of the ESIA and RPF has been undertaken by Dar Al-Handasah (Angola), whose registered place of business is Guevara e a Rua Comandante Kwenha, Luanda (Tel: +244 227 280 640). The composition of the Dar ESIA Team is as shown in Table 1-3.

Table 1-3: Key ESIA Team Members

Name	Position/Qualifications	Contribution
Mr. Nabil Mina	B4WSP Project Manager	Organisation and Logistics
Dr. John Davey	Team Leader. BSc, PhD, FCIWEM, CEnv, CWEM, CSci.	PM, RPF (lead), ESIA and ESMP
Mr. John McCawley	Lead Environmentalist. BSc, MSc, MIEMA.	ESIA and ESMP (lead)

Name	Position/Qualifications	Contribution
Ms. Emma Woodward	Social and Consultation Specialist. BSc, GradIEMA	SCEP (lead), ESIA and Public Consultations
Ms. Riwa El Derbas	Senior Environmentalist, BSc, MSc, M.Sc.	Document review, ESIA and RPF
Mr. Elias ElKhoury	B.Eng	Engineering and Logistics
Mr. Sebastião Nicolau Barros	Licensed Engineer	Public Consultations

1.5 ESIA REPORT STRUCTURE

The structure and content of this ESIA report accords with the requirements of World Bank OP.4.01 Environmental Assessment, and other relevant environmental and social safeguard policies, GoA Decree 51/04 on Environmental Impact Assessment and related executive decrees issued under the Environmental Framework Law No 5/98 amended as necessary to reflect the manner in which issues of greater or lesser significance need to be discussed. Also, insofar as it is applicable, follows the environmental and social management framework³ recently issued by MINEA.

Section 2 describes the location, extent and components of the B4WSP project and the proposed construction, while **Section 3** outlines the policy and legislative framework within which it will be executed.

Sections 4, 5 and 6 respectively discuss the physical, biological and socio-economic conditions throughout the project site and its surroundings, while **Section 7** summarises the analysis of scheme alternatives that have been considered, or that remain under consideration.

Section 8 identifies the potential for environmental and social impacts, be they permanent, primarily the result of scheme location and design, temporary, the result of construction activity, or occurring and/or accumulating throughout the operational life of the project. Section 8 further stipulates mitigation measures which should be implemented to reduce the significance of the identified impacts. **Section 9** presents B4WSP Environmental, Social and Safety Monitoring Plan for the project, presenting for each of the impacts identified previously appropriate monitoring measures and estimates costs associated with this. **Section 10** highlights the institutional strengthening and capacity building required to enforce the management and monitoring plans.

Section 11 discusses the content and outcome of B4WSP Stakeholder Engagement and Public Consultations and makes suggestions for future engagement in later project stages. This section acts as a summary of the more comprehensive Stakeholder Consultation and Engagement Plan (SCEP) presented in the Appendices. Finally, **Section 12** outlines the downstream measures required to move B4WSP forward and assigns responsibility of these to an appropriate party.

³ MINEA, April 2018. Second Institutional Project for the Development of the Water Sector: Environmental and Social Management Framework. Project Coordination Unit, 160pp.

2 PROJECT DESCRIPTION

2.1 INTRODUCTION

As highlighted in the previous section the B4WSP will reinforce water supply to those areas of Luanda city served from Camama and Benfica II CDs as well as provide new water supply networks for the rapidly expanding urban development that has been constructed, and continues to be constructed, in the peri-urban areas to the south and south-west of the capital. The area of influence of the project relative to the Province of Luanda is shown in Figure 2-1. The Direct Area of Influence is denoted by the red shading. The Indirect Area of Influence covers:

- Coastal mangroves;
- The Ilheu dos Passaros (Integral Natural Reserve); and
- Kissama National Park.

The project footprint is shown in Figure 2-2, more detailed maps of the transmission line routing are shown in Appendix A. (Table 2-1 shows the diameters of the transmission pipelines).

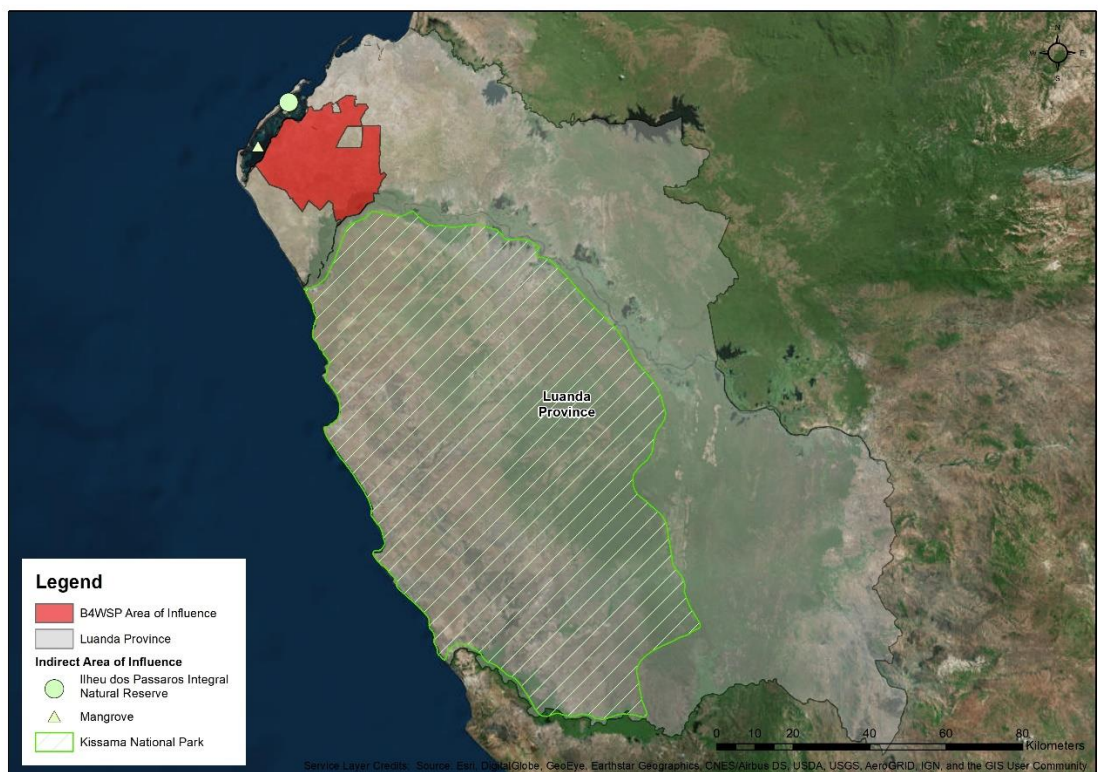


Figure 2-1: B4WSP Area of Influence (Direct and Indirect)

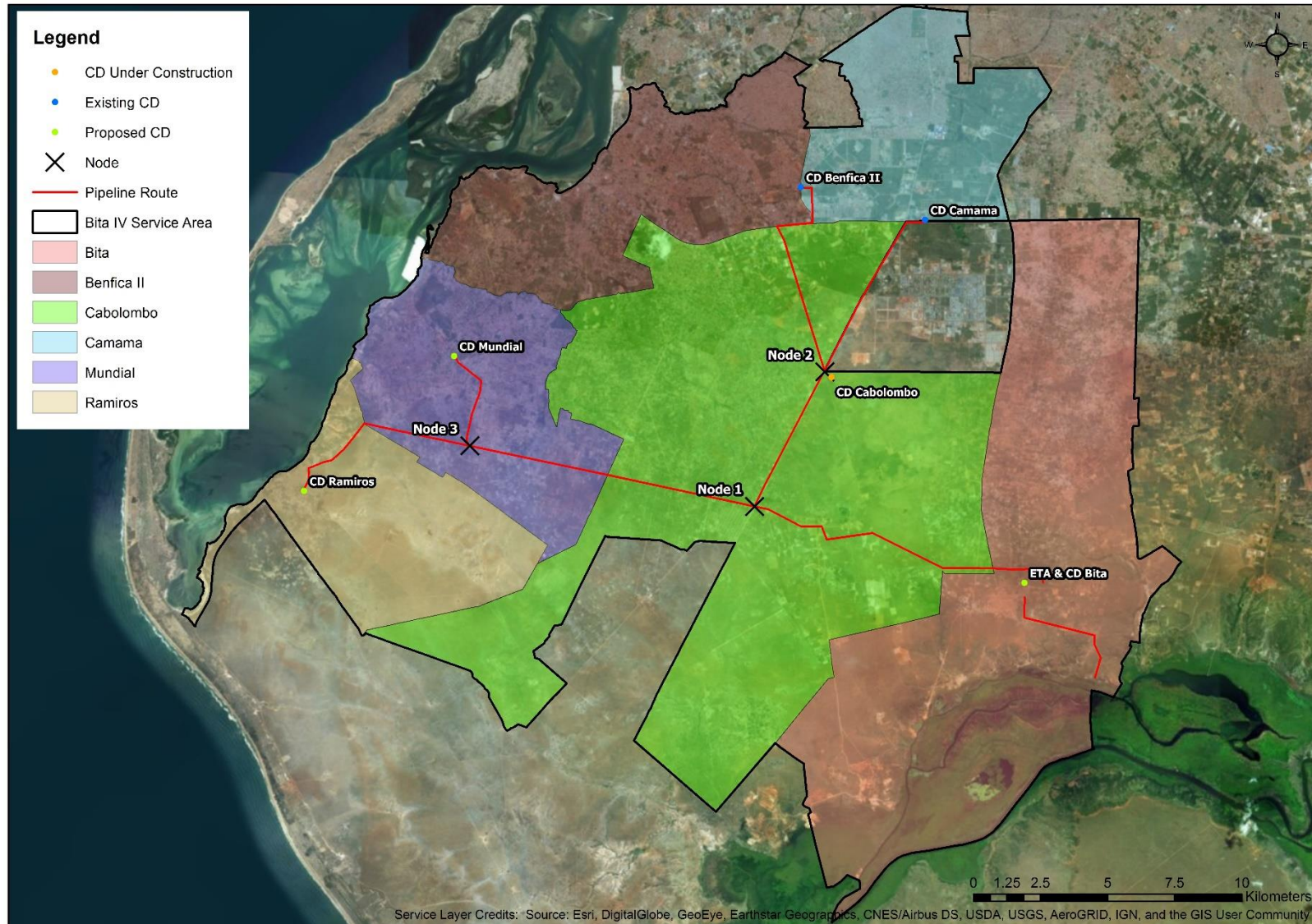


Figure 2-2: B4WSP footprint.

Table 2-1: Transmission pipe diameters

Pipe Stretch	Number of Pipes	Pipe Diameters (mm)
Raw Water Intake – CD/ETA Bitá	2	1,600
CD/ETA Bitá – Node 1	2	1,400
Node 1 - Node 2	2	1,400
Node 2-CD Camama	1	1,000
Node 2-CD Benfica II	2	1,200
Node 1 - Node 3	1	700
Node 3 - CD Mundial	1	600
Node 3 - CD Ramiros	1	300

B4WSP is ultimately designed to serve three distinct types of area:

- Those where urban development has recently commenced, with perhaps one in four properties constructed and no existing distribution networks. These areas will be served by the four new distribution centres (e.g. Area 1 in Figure 1-2);
- Those where distribution centres already exist but 30% or more of customers are not connected to the existing distribution networks (e.g. Areas 2, 3, and 4 in Figure 1-2);
- Additional areas where there is potential to reinforce existing supplies to central Luanda (not shown in Figure 1-2).

While large portions of the areas to be served by the four new CDs remain vacant, they are all areas of rapidly expanding urbanisation, with current land use as listed in Table 2-2.

Table 2-2: Current Land Use in the Distribution Areas of the New CDs.

CD	Distribution Area (ha)	Current Land Use		
		Structured Development (%)	Unstructured Development (%)	Vacant Land (%)
Bitá	16,671	0.5	8	91.5
Mundial	6,040	33	4	63
Ramiros	5,192	1.4	3.6	95
Cabolombo	22,109	42	6	52

The 2017 population of the project area (Areas 1, 2 and 3 in Figure 1-2 and Table 1-1 in the previous section) estimated from the 2014 national census, is 1.31 million, which is expected to rise to 1.85 million by 2025, an overall increase over 8 years of more than 40%. Of the present population, 77% rely upon tankered water while less than 10% have a public tap or street fountain within a short distance of their home.

With the proposed reinforcement of additional areas already served, albeit inadequately, the population that will benefit from B4WSP by 2025 rises to 4.6 million

The source, transmission and distribution components of the project comprise:

- An inlet works and pumping station in the Lower Rio Kwanza Basin;
- Raw water treatment plant;
- 82 km of transmission mains laid over a distance of 56 km;
- 3 CDs, with a fourth already under construction;
- 4 new distribution networks;
- 2 upgraded distribution networks;
- Process water treatment plant; and,
- 2 CD upgrades.

The construction of these components are divided between 13 new Design and Build (D&B) contracts as previous discussed in Section 1.2 above. In addition, there will be distribution networks from each CD, the design of which are the responsibility of the D&B contractor, with the coverage of each as previously shown in Figure 1-3. The project is planned and designed to ultimately provide a total of 6 m³/s, but for present purposes, until 2025, is being financed and contracted for 3 m³/s.

In developing the present B4WSP proposals, a number of alternatives, notably for the routing of the transmission mains, have been considered. Other options, for example, the location of the surface water intake channel, are still being considered.

2.2 B4WSP COMPONENTS

In the following section, the various B4WSP source and transmission components are summarised and an initial assessment made of the primary elements of likely land-take and asset loss. Since the final pipeline capacities and alignments remain to be determined, this assessment is very provisional and takes no account of construction phasing or alternative methods of working. The losses cited may therefore be considered 'worst-case' scenarios for the B4WSP source and transmission works. What is also not addressed, because they too remain to be determined by the D&B contractors, are land takes for access roads into CD Mundial and CD Ramiros, and that, if any, for water supply distribution throughout the communities each network will serve. Fuller details of the descriptions given below are presented in Appendix B to the present report.

2.2.1 RAW WATER INTAKE AND PUMPING STATION

The B4WSP intake works as presently conceived will comprise an intake canal some 400 m in length and 23.5 m wide, leading to a pumping station comprising 4 x duty and 1 x stand-by 1.5 l/s raw water pumps. Either side of the canal will be inner and outer access roads, separated over their full length by a 3 m high amenity bund. The general layout pending site specific design is shown in Figure 2-3. The total land take for the intake and pumping station will be approximately 2.5 ha. Reeds and papyrus are common, the former being harvested and dried for use in by the local community. There is a high population of crabs, and crocodiles are also reported to be present. On any given day several women from nearby villages wash clothes at the water's edge along the main river channels. The final intake site will be determined by the D&B contractor.

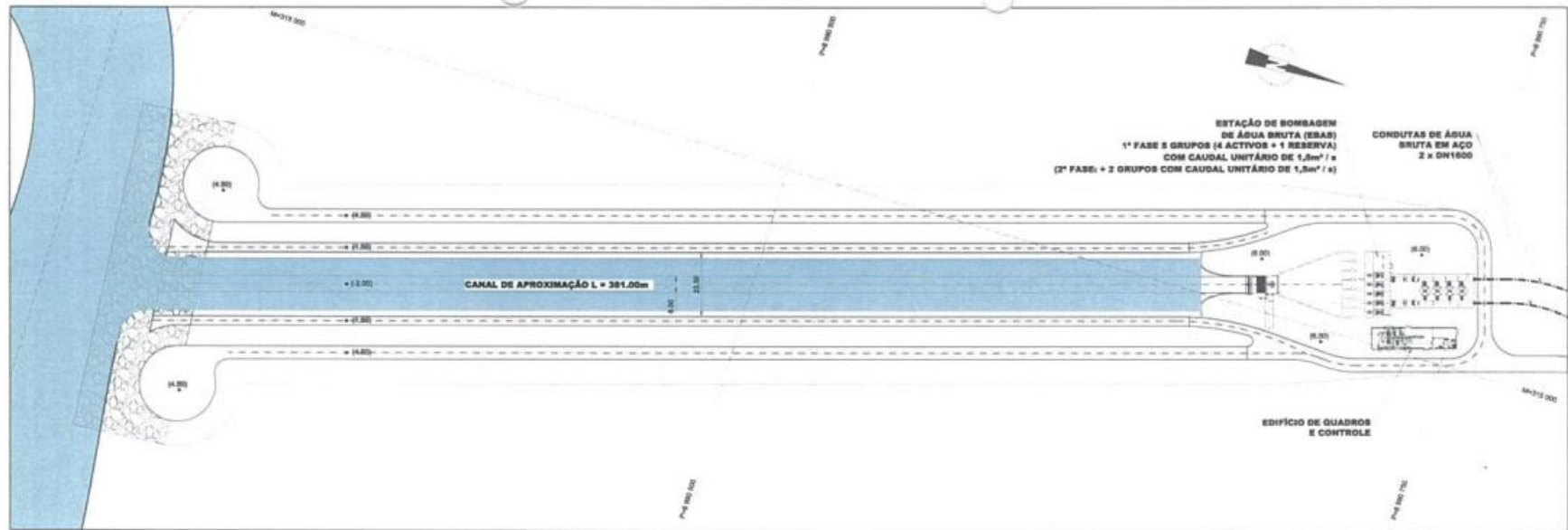


Figure 2-3: General Layout of the B4WSP Intake Works.

The Lower Kwanza Basin also contains substantial quantities of water hyacinth, shown in Plate 2-1. An invasive species that may potentially arrest inflow to the intake canal and if not regularly cleared, clog any primary screen before the pump intakes.



Plate 2-1: Water Hyacinth on the Rio Luwei near the B4WSP Intake Site.

The B4WSP has a system design capacity of 6 m³/s, starting with an operating flow of 3 m³/s by the end of the project. The Rio Kwanza has a marked seasonal regime with historically average peaks of 1500 m³/s around April, and average low flows of over 200 m³/s in October/November. Several reservoirs exist and additional ones are planned, currently mostly focusing on the production of hydropower, thus modulating the marked seasonal regime. In the Rio Kwanza Basin Management Plan, the available surface water resources estimated for the lower Kwanza are 29,865 hm³/year (947 m³/s) for an average year, and 23,609 hm³/year (748 m³/s) in case of a 20% percentile dry year. In addition, in the National Water Plan, the surface runoff generated in the basin during a “very dry year” is estimated at 11,938 hm³/year (~average of 378 m³/s). Most importantly, the lowest flow ever recorded during the dry season of the driest year in the historical record is of 122 m³/s. Taking this lowest-on-record dry-season flow as a reference, the B4WSP project design capacity of 6 m³/s represents less than 5% of that flow. Thus, it can be stated that the hydrological impacts of the B4WSP project diversion will be non-significant, even during very dry years.

Notwithstanding that the location of the intake remains to be confirmed, a site for the raw water pumping station has been earmarked above the floodplain at an elevation of about 10 m above sea level. The site, shown in Plate 2-2, is under productive agriculture and at the time of ESIA fieldwork was part planted with tomato and part tilled ready for planting. Other crops in the vicinity included millet and cassava.



Plate 2-2: View Northwards over the Proposed Intake Pumping Station Site.

The land in the Kwanza floodplain through which the intake channel will pass is understood to be government-owned. The Raw Water Pumping Station site extends to some 1, 950 m² and comprises productive agricultural land that may need to be expropriated if not already under EPAL ownership. There are no buildings on the site but an initial estimate of 20 trees may also need to be felled.

2.2.2 RAW WATER PUMPING STATION TO THE TREATMENT PLANT ON THE BITA FACILITIES SITE

From the intake pumping station, raw water will be pumped via twin 1600 mm diameter pipelines a distance of some 5-6 km to the treatment plant located on the main Bitá IV facilities site. As with other pipelines, the proposed route, shown in Figure 2-4, makes maximum use of existing tracks.

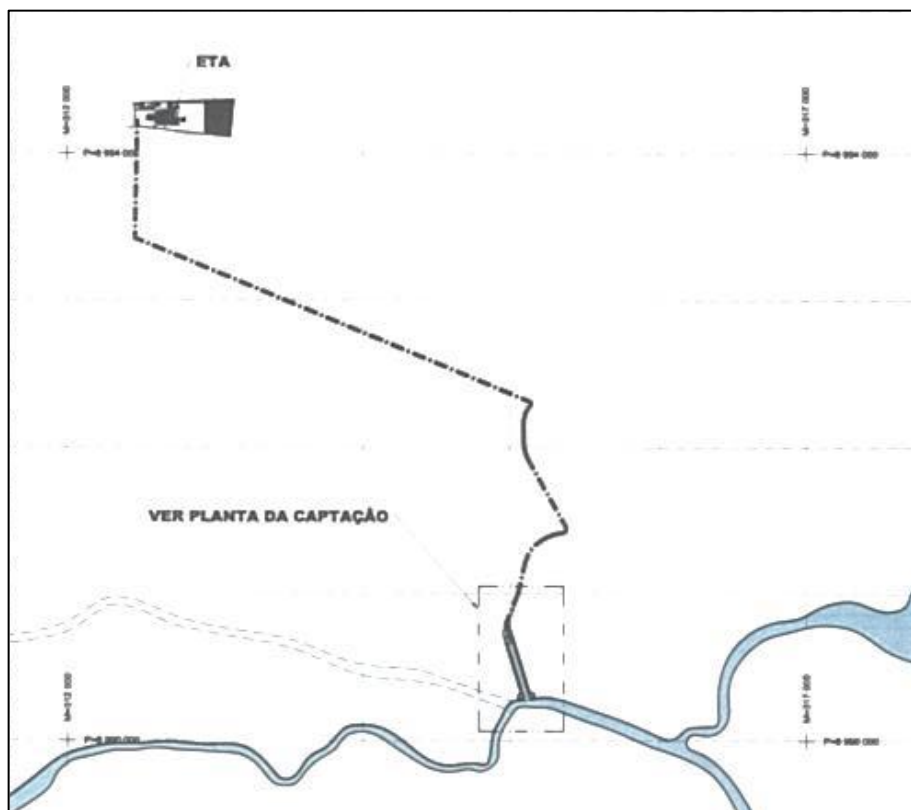


Figure 2-4: Pipeline Route from the Kwanza Floodplain to the Treatment Plant.

From the pumping station the pipes will follow a natural valley up onto the plateau as far as the village of Julio (Plate 2-3).



Plate 2-3: View across the Kwanza Valley at Bitá.

Approaching Julio village, the number of houses increases. Through the village and for the next 3.5 km to the Bitá Facilities Site the intention is to install a distribution pipe parallel to the raw water transmission lines, thus increasing the required working width to 18 m. Within the village, shown in Plate 2-4, this is likely to result in the loss of six houses and 23 trees, although may be reduced if the method of working adopted by the contractor permits.



Plate 2-4: Pipeline Route through Julio Village.

Some 1.4 km west of Julio the route alignment is restricted between a property fence and a low-voltage power line. Between 2.0 and 2.4 km from Julio is another pinch point involving 4 properties, shown in Plate 2-5.



Plate 2-5: Pinch point on the pipeline route around 2 km W of Julio Village.

From where the track turns north the available corridor widens to about 12 m through to the Bitu Facilities Site, as shown in Plate 2-6.



Plate 2-6: View southwards from the south-west corner of the Bita Facilities Site (not shown in image).

Between the Raw Water Pumping Station and the Bita Facilities Site, the likely land take and asset loss, prior to design mitigation, is expected to be 10 houses, 250 m of boundary wall, 88 trees and 40,700 m² of largely undeveloped land.

2.2.3 BITA FACILITIES SITE

At the Bita Facilities Site will be the raw water treatment plant, the Bita CD, and necessary storage and pumping, and the process water treatment plant, the latter to improve reject water from raw water treatment prior to discharge into the environment.

The expected process stream, to be designed by the D&B contractor, is expected to include the following:

Screening – Flocculation – Sedimentation – Filtration – Disinfection – Chemical Dosing

The initial capacity of the plant will be 3 m³/s, but designed to provide for future staged expansions to 6 m³/s as demand increases over time. Power for the facilities site will be secured from a connection to the national grid via *Empresa Nacional de Distribuição de Electricidade* (ENDE) substations and networks, and stand-by capacity to cater for outages by diesel generators.

The facilities site, shown in Plate 2-7, covers some 13 ha on the north-east side of the Bita community and is already owned by EPAL. The land is vacant and there are no existing buildings, but it is used for the informal grazing of goats and cattle. Low voltage power lines run along the southern and western site boundaries. Construction will result in the loss of some 30 trees.



Plate 2-7: View eastwards across the Bitu Facilities Site.

2.2.4 TRANSMISSION LINE FROM BITU FACILITIES SITE TO NODE 1

From the Bitu Facilities Site, with the water treatment plant and CD Bitu, the current proposal is for 2 x 1400 mm diameter pipes to convey treated water to Node 1 where one 700 mm pipe will turn westward toward Node 3 and 2 x 1400 mm pipes will continue northward to Node 2. The distance to Node 1 is 11.8 km, for most of which, distribution lines will be laid along the same alignment. If transmission and distribution pipes are laid at the same time, the required working width is 15 -17.5 m, but this may be reduced with phased construction and/or the chosen method of working.

From CD Bitu the pipeline runs north for about 500 m, then turns west. With a 600 mm distribution line and 2 x 1400 mm transmission lines, the 8-10 m wide track is insufficient to accommodate the required working width. A wall runs along the west (left) side of the track for almost the whole 500 m and a low voltage (LV) powerline runs along the east side, as shown in Plate 2-8. A large property, and wall, on the left side in the first 100 m may be avoided. Thereafter, there are a few properties to the east of the track to be avoided and it is assumed that 300 m of wall on the west side may be removed, along with a portion of the land behind it.



Plate 2-8: View northwards along pipe alignment from the Bitu Facilities Site.

After turning westwards there is no proposed distribution line and the required working width reduces to 15 m. A recent wall to the south, shown in Plate 2-9, encloses productive agricultural land and fruit trees, whereas the land to the north appears unused, as do three small buildings. For present purposes, it is assumed the wall will remain but the land to the north with the three buildings will be expropriated.



Plate 2-9: Land to be expropriated north of the road and the wall to the south retained.

At 2.2 km the pipeline crosses another track, shown in Plate 2-10, together with an overhead medium voltage (mv) power line and an existing buried water pipeline to Kilamba. Both afford construction constraints that will have to be dealt with by the D&B contractor.



Plate 2-10: A MV power line and buried water line crossed by the B4WSP alignment.

At 3.5 km is the site of the proposed B4WSP 400/220/60kV electrical sub-station, shown in Plate 2-11, where a north-south mv power line is crossed. The present transmission pipeline route passes through the sub-station land but given the safety implications, the D&B contractor will seek an alternative route through open land to the south. The likely diversion will be some 500 m in length, and a 75 mm distribution pipe also proposed to run through the site will also be rerouted.



Plate 2-11: Site already acquired for the B4WSP Electrical Sub-Station.

North-west from the electrical sub-station, the 2 x 1400 mm transmission pipelines are accompanied by a 200 mm distribution line and the required working width returns to 17 m. In order to ensure all construction activity remains at least 5 m from mv power cables the fence on the north side of the track and a small strip of land beyond will need to be expropriated from 6.8 to 8.05 km. Beyond 8.05 km the twin transmission lines turn northwards towards Quenguela, see Plate 2-12, while the 200 mm distribution line continues west.

From this turn into Quenguela, a distance of only 0.6 km, the current alignment requires the expropriation of five properties and a productive garden, believed to be occupied by one extended family. This can however be avoided by realigning the pipeline on the east side of the fence skirting the eastern border of these properties.



Plate 2-12: Quenguela Village.

On reaching the *Estrada Lar Patriota* at Quenguela, shown in Plate 2-13, the pipeline turns westwards for 0.75 km, then WNW for 1.9 km, following the main road to Node 1. Again, the existing track 12-15 m in width is too narrow to accommodate the full pipeline working width of 17-17.5 m, and additional land will have to be taken. For the final 500 m approach to Node 1, the track is 20 m wide and will fully accommodate the 17.5 m working width.



Plate 2-13: View westwards from Quenguela along *Estrada Lar Patriota*.

From the Bitá Facilities Site to Node 1, a distance of nearly 12 km, the provisionally estimated land take and asset loss prior to the consideration of changes to the present alignment will include 8 houses, 400 m of boundary wall, 1,600 m of fencing, 171 trees and 95,950 m² of appropriated land.

2.2.5 TRANSMISSION LINE FROM NODE 1 TO CD CABOLOMBO (NODE 2)

From Node 1 2 x 1400 mm pipelines will convey treated water north-eastwards to CD Cabolombo; a distance of 5.6 km. In different sections, distribution lines of 250 mm or 600 mm will follow the alignment over its whole length. The required working width for pipe installation will therefore be 17.5 m.

For the first 400 m of the alignment, walls and properties are located on the west side of the road and an overhead MV cable borders the east side of the road. However, the available road width is up to 20-25 m from Node 1 over much of the first 3.5 km to Quenguela Norte. Within the village the available width reduces to as little as 8 m. Therefore to avoid the MV powerlines on the east side of the road up to 7 properties (shown in Plate 2-14) may have to be expropriated and 35 trees felled. Beyond Quenguela Norte, the available road width again increases to 20-25 m. Plate 2-15 shows the alignment after approximately 3 km, where the available width is 15 m.



Plate 2-14: Alignment from Node 1 to Node 2 looking northward showing properties in Quenguela Norte which may need to be expropriated.



Plate 2-15: The alignment from Node 1 to CD Cabolombo.

2.2.6 NODE 2 INTO CD CABOLOMBO

Node 2 (shown in Plate 2-16) acts as a significant junction for the B4WSP as there are six pipelines being laid here:

- 2 x 1400 mm transmission pipelines are coming into CD Cabolombo from the south (Node 1);
- 2 x 1200 mm transmission pipelines are leaving CD Cabolombo heading northwest to CD Benfica II;
- 1 x 1000 mm transmission pipeline is also leaving CD Cabolombo heading northeast to CD Camama; and,
- 1 x 600 mm distribution pipeline is leaving CD Cabolombo to supply the service area.

In order to lay the above pipelines it is estimated that a 29 m working width is required. It is assumed that the land around CD Cabolombo is already owned by EPAL therefore further land acquisition is unnecessary.



Plate 2-16: View of Node 2 from CD Cabolombo.

2.2.7 TRANSMISSION LINE FROM CD CABOLOMBO (NODE 2) TO CD CAMAMA

From CD Cabolombo to CD Camama on the northern side of *Via Expresso*, the current proposal is for a single 1000 mm transmission pipeline. The distance between the two centres is approximately 6.9 km.

Distribution lines will again follow the whole alignment. A working width of 7.5 m will be required on the right side for the transmission line and 7 m on the left side for the distribution line. However, given the road is generally 20-25 m wide, it is expected that all construction activity will be contained within the existing RoW.

The alignment some 2 km north of CD Cabolombo is shown in Plate 2-17. A short distance beyond the road is asphalted as shown in Plate 2-18, and road construction continues to *Via Expresso*. The final 1.4 km of the alignment before *Via Expresso* becomes more urbanised (Plate 2-19) so the appointed D&B contractor may need to adopt a slightly altered methodology in order to contain construction within the RoW or consider rerouting this stretch.

When the pipeline reaches *Via Expresso* it turns eastwards, parallel and south of the highway for 600 m, before passing underneath in a twin box culvert and into CD Camama. The land ownership for the 600 m on the south side of *Via Expresso* is unknown and as a precautionary approach is assumed to be owned. An estimated land take of 3,750 m² has therefore been considered.



Plate 2-17: The wide but unsurfaced track some 2 km north of CD Cabolombo.



Plate 2-18: The start of the asphalted road that will continue to *Via Expresso*.



Plate 2-19: Section of the alignment towards Via Espresso possibly requiring rerouting by D&B Contractor.

2.2.8 TRANSMISSION LINE FROM CD CAMAMA TO CD BENFICA II

The route from CD Cabolombo to CD Benfica II follows *Estrada Lar Patriota* (ELP), a wide unsurfaced track, northwards to *Via Espresso*, a distance of 5.7 km. The road is of sufficient width (Plate 2-20) over most of its length to accommodate the required working width for twin 1200 mm pipes. As the alignment moves northward toward *Via Espresso* industrial premises begin to appear on either side of the road (Plate 2-21). Although these businesses will likely be affected by the construction of the transmission pipelines expropriation or land take is unlikely as the RoW remains wide enough to accommodate the required 17 m working width.



Plate 2-20: The Pipe Alignment from CD Cabolombo to Via Espresso



Plate 2-21: Industrial Premises on the alignment from Node 2 to CD Benfica II.

At *Via Expresso*, the pipeline turns east to follow the roadside verge on the south side of the highway. At the junction of the ELP and *Via Expresso* there is a constraint in width between the footings of a large power pylon and the foundations of a pedestrian footbridge over the highway, as shown in Plate 2-22. With a modification to pipeline laying methodology, it is anticipated that a pinching of working width can accommodate this.



Plate 2-22: Constriction at the junction with Via Expresso

Along the 1.3 km over which the pipeline parallels the highway are the entrances to several large compounds and a filling station (Plate 2-23) where pipe laying will have to be completed in several short sections and basic landscaping remediated to mitigate the severance of access.



Plate 2-23: The pipeline will cross the entrances to several large premises

At 1.3 km from the junction of ELP and *Via Expresso* the pipeline reaches a three-cell culvert that takes surface drainage northwards beneath *Via Expresso*. Somewhere in the vicinity, the exact location to be determined, the pipeline will also cross under the highway. The method of highway crossing to Benfica II and also to Camama (Section 2.2.6 above), e.g. microtunnelling, pipe jacking, etc., will be determined by the D&B contractor. Thereafter, the Bitá IV transmission main to CD Benfica will be laid in or on the verge of an existing surfaced highway.

2.2.9 TRANSMISSION LINE FROM NODE 1 TO NODE 3 (ALVARENGA)

From Node 1, a 1 x 700 mm transmission main will convey treated water 10.7 km to Node 3 at Alvarenga, from where the pipe will split with one 600 mm diameter pipe heading northwards to CD Mundial, and the second 300 mm diameter pipe continuing to CD Ramiros. Distribution lines of varying diameters between 300 mm and 600 mm will also be laid along the entire route between Node 1 and Node 3. The required working width is therefore 10 m, but this might be reduced to 7.5 m if the installation technique is phased between transmission and distribution pipes. Although the alignment is a straight east to west run on an existing unsurfaced road, the available working width changes significantly as the distance between property boundaries (walls and fences) on one side of the road and overhead cables of different voltages and heights dictate.

Between 2.5 and 3.2 km from Node 1 is the village of Tanque Serra, and buildings occupy both sides of the alignment, as shown in Plate 2-24. The road here is 10-15 m in width, and expropriation of two properties of two properties may be necessary. A steel water tank and reservoir, shown in Plate 2-25, is a constraint but could potentially be relocated in the vicinity.



Plate 2-24: The eastern entrance to Tanque Serra village.



Plate 2-25: The water tanks and reservoir to be potentially relocated in Tanque Serra.

West of the village, there are occasional locations, as shown in Plate 2-26, with property on one side and power lines on the other side of the proposed transmission main alignment. Another settlement west of Node 1, shown in Plate 2-27, again affords the constraint of property on both sides of the alignment.



Plate 2-26: The route beyond Tanque Serra, again between property and power cables.



Plate 2-27: The route through the village 6-7 km west of Node 1.

The possible land take and asset loss between Node 1 and Node 3 at Alvarenga is 2 properties, 200 m of fence, 47 trees, and 3,500 m² of open land.

2.2.10 TRANSMISSION LINE FROM NODE 3 TO CD MUNDIAL

For the 3.8 km between Node 3 (Alvarenga) to CD Mundial there will be a 600 mm transmission main and distribution pipes between 400 mm and 600 mm. The required working width will be up to 10 m, depending on the contractor's preferred installation procedure.

To minimise the impact on the centre of Alvarenga the pipelines are routed around the eastern boundary of the village. This commences with a 200 m of narrow track only 7 m in width. While land take will be necessary, the houses are set well back and no resettlement is expected. After 200 m the track widens to 10-12 m, as shown in Plate 2-28. Northwards, the route has properties and power cables on both sides but the track remains wide enough to accommodate the required construction without resettlement or significant land take.

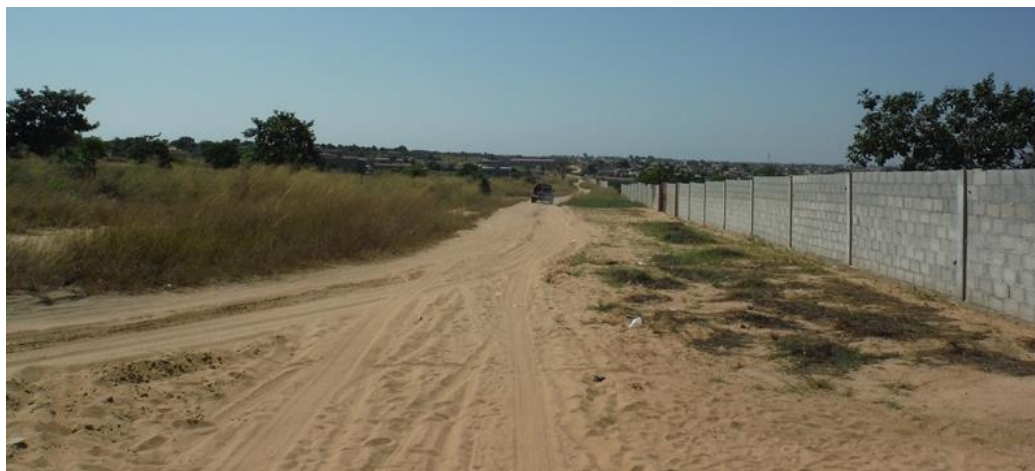


Plate 2-28: The pipeline alignment northwards from Alvarenga.

2.6 km north of Node 3, the route alignment swings north-westwards and continues for another 1.25 km to reach the site set aside for CD Mundial. The approach to this turn (from the reverse direction) is shown in Plate 2-29 and the proposed CD site is shown in Plate 2-30.



Plate 2-29: The approach to the where the pipeline alignment turns to the northwest (reverse view).



Plate 2-30: Site of CD Mundial.

From Node 3 to CD Mundial the expected land take and asset loss is currently expected to be the expropriation of some 11,100 m² of land and the loss of 13 trees. No houses or other structures are expected to be taken. The land for CD Mundial, some 0.7 ha, has already been procured by EPAL and is clear for development.

2.2.11 TRANSMISSION LINE FROM NODE 3 TO CD RAMIROS

From Node 3 (Alvarenga) to CD Ramiros, a distance of 7.5 km, the current proposal is for a single 300 mm diameter transmission main and distribution lines of 110 mm to 300 mm diameter. The maximum working width will therefore be 9.5 m.

The alignment through much of Alvarenga and beyond affords the working width, but in places, the space between the two power lines, allowing for safety margins, is reduced to 4-6 m. After almost 4 km, the alignment turns south west and Plate 2-31, the view back towards Node 3 illustrates the directness of this section of alignment, but also the constraint of power lines on both sides of the track.



Plate 2-31: View eastwards back towards Node 3 from pipe turning point.

From 4.0 km to 7.5 km at the CD Ramiros site, the pipeline route is bordered to the east by a large area of private land that has long been fenced off to prevent public access, and as a consequence has attained significant landscape and ecological value. The view from the turn, at 4.0 km, and the open land to the east is shown in Plate 2-32 and for a distance thereafter the road width is 12-15 m.

While the land to the west of the alignment becomes increasingly developed, the existing track is wide enough to limit resettlement to perhaps just one house. At 6.6 km, the alignment turns southwards for the last 0.9 km run to the CD Ramiros site (Plate 2-33). The road width reduces to 8-10 m, which may be adequate, but reduces to approximately 6.5 m on the final approach, shown in Plate 2-34, to the 0.6 ha CD site, shown in Plate 2-35.



Plate 2-32: View south-westwards from the pipeline turn approximately 4 km from Node 3.



Plate 2-33: The view southwards towards CD Ramiros.



Plate 2-34: The approach into the CD Ramiros site (behind and to the left of image).



Plate 2-35: CD Ramiros, previously a local distribution centre.

For proposed alignment between Node 3 and CD Ramiros, the expected land take and asset loss is currently expected to be one property, 48 trees and 2,500 m².

2.2.12 DISTRIBUTION NETWORKS

The distribution networks have been designed on the basis of a per capita demand of 150n l/h/d in the structured urban areas and 49 l/h/d in the unstructured peri-urban areas. The relative split of structured and unstructured areas for the four new distribution networks has been shown in Table 2-2.

Bitu has the highest proportion of vacant land and while there is development the majority of this is unstructured. Toward to north of the service area there is some structured development which is likely to be related to the suburb of Kilamba, a highly structured Chinese-built suburb to the west of the service area.

Mundial's proximity to the coast has resulted in structured development concentrated on the western side of the service area. Further inland however development becomes and unstructured and

eventually land is categorised as vacant. Similarly Ramiros’ development (both structured and unstructured) is concentrated around the coast. The majority of this service area is dominated by land which is categorised as vacant but is actually under single ownership; no developments have as yet been undertaken on this land.

Lastly, Cabolombo is largest service area but also has the highest proportion of structured development. This development is mainly focused in the north of the service area, closer to *Via Expresso*. The area around the CD site itself is still relatively unstructured in nature.

The distribution networks from the existing CDs at Camama and Benfica II serve structured communities. Provision is also made for fire flows; a maximum daily demand of 34 l/s from two hydrants, each operating for 2-hours.

In structured areas properties will be served with individual connections, with the network pipe and the meter being installed inside the house. For each, EPAL will charge a connection fee of AKZ 20,000 (about US\$ 41 at official exchange rates) but this can be paid in monthly instalments with the changes for water used. This cost does not include connecting the metered line to the house plumbing system, for which each household will be responsible. Unstructured communities will be served with neighbourhood fountains, arranged so the walking distance for residents will not be more than 100-150 m. Distribution lines will be sized according to need, from 600 mm down to 63 mm. Those larger than 300 mm will be ductile iron, those less than 300 mm uPVC or HDPE.

At the present time, the number of house connection and the number of fountains in each distribution area is not known. The expected total lengths of distribution pipework for each of the four new distribution systems are shown in Table 2-3.

Table 2-3: Length of New Distribution Networks

System	Status	Tank Height	Total Length of Pipework
Bitá	New Construction	47 m	631 km
Cabolombo		45 m	c. 2,000 km
Mundial		33 m	747 km
Ramiro		47 m	464 km

The design for upgrading and retrofit of Camama is based on the number of existing connections, 84,000, of which 64,193 (76%) have water, and 56,650 new connections. At Benfica II, this is based on 24,881 exiting connections, all of which have water, and 40,000 new connections.

At the present time, land take and resettlement are not believed to be required in the distribution areas. Street stalls and kiosks that have been built out into the road may need to be removed but in most cases could, if permitted by the local authorities, be replaced once pipe laying and trench reinstatement is complete. This situation will be reviewed by the EPAL appointed E&S consultants when then undertake their surveys and update the project ESIA on the basis of their designs.

The most significant environmental and social impacts attributed to the laying of distribution networks are:

- Disruption to vehicular and pedestrian movements;
- Loss of access to property and business premises;
- Noise and dust from construction activity;
- Danger to public health, especially at night, from open trenches, spoil heaps and unattended construction equipment; and,
- Close contact between construction workers, often foreign, and local residents, potentially resulting in theft, verbal, physical and sexual abuse, and general social discord.

All these potential impacts will be temporary, most lasting in any one location from a few hours to a few days. All are identified in Section 8 below and measures to avoid or mitigate them discussed.

2.3 SUMMARY OF LIKELY LAND TAKE AND ASSET LOSS

From the comments made in respect of land take and asset loss for each of the B4WSP source and transmission components, the following summary of these is given in Table 2-4 below. Exclusions to this preliminary calculation include:

- The raw water intake, open channel and pumping station;
- New access roads, additional working and laydown areas, etc.; and,
- Distribution networks, also to be designed by the D&B contractor.

Table 2-4: Preliminary Assessment of Land Take and Asset Loss Resulting from Proposed B4WSP Construction.

Section	Houses	Boundary Walls/ Fences (m)	Trees (All types)	Land (m ²)
Raw Water Intake and Pumping Station	Exact locations and designs yet to be determined.			GoA-owned
RW Pumping Station to WTP/CD Bitá	10	250	108	42,950
Bitá WTP/CD Site	0	0	30	EPAL-owned
Bitá WTP/CD to Node 1	8	2,000	171	95,950
Node 1 to CD Cabolombo (Node 2)	7	0	35	0
CD Cabolombo Site	Currently under construction.			EPAL-owned
CD Cabolombo (Node 2) to CD Camama	0	0	0	3,750
CD Camama Site	Existing EPAL-owned distribution centre.			EPAL-owned
CD Cabolombo (Node 2) to CD Benfica II	0	0	0	0
CD Benfica II Site	Existing EPAL-owned distribution centre			EPAL-owned
Node 1 to Node 3 (Alvarenga)	2	200	47	3,500
Node 3 to CD Mundial	0	0	13	11,100
CD Mundial Site	EPAL-owned site cleared for construction.			EPAL-owned
Node 3 to CD Ramiros	1	0	48	2,500
CD Ramiros Site	Existing EPAL-owned local distribution centre.			EPAL-owned
Total Provisional Land Take and Asset Loss	28	2,450	452	159,750

2.4 PROPOSED CONSTRUCTION

Given that the majority of the population within the intended B4WSP distribution areas currently have inadequate or no access to a public potable quality water supply, EPAL intend construction should commence as soon as funding can be secured. A Draft TFS for B4WSP was presented in May 2018 and finalised in October 2018. The present report is the Environmental and Social Impact Assessment. A Resettlement Policy Framework (RPF) in accordance with World Bank Operational Policy OP 4.12 is being prepared concurrently.

Terms of Reference for the Design and Build of the intake works, treatment plant, the transmission mains, construction of four new CDs (Bitá, Cabolombo, Ramiros and Mundial), upgrading of two existing CDs (Camama and Benfica II), and construction of the process water treatment plant were issued in 13 separate tenders in 2011. Tenders were received and contracts awarded in 2012. The tendered prices were subsequently updated in response to revised Technical Guidelines issued in

2013 (rev 0) and 2014 (rev 1). The Government of China provided funding to two of the new CDs, Cabolombo and Bitá, awarded to the Chinese contractor Sino Hydro. Construction has since commenced at Cabolombo but has yet to start at Bitá.

D&B contracts for the distribution networks are expected to be tendered shortly. The current status of the 13 D&B contracts and the tendered costs is summarised in Table 2-5 below.

Table 2-5: Current Construction Status and Expected Costs.

Contract	Scope	Current Status	Latest Cost Estimate (US\$ million)
Lot B1	Intake structure, Raw water pump station, Raw water pipeline and Bitá WTP	Retendered for 6 m ³ /s in 2015. Not Financed	298.9
Lot B2	Treated Water Transmission Lines from CD Bitá to all other CDs.	Not Financed	182.4
Lot B3	CD Bitá	Financed. Not started	23.68
Lot B4	CD Cabolombo	Financed Under Construction	19.40
Lot B5	CD Ramiros	Not Financed	14.10
Lot B6	CD Mundial	Not Financed	16.51
Lot B7	Bitá Processed Water Treatment Plant	Retendered for 6 m ³ /s in 2015. Not Financed	9.90
Lot B8	Bitá distribution and metered connections	Not Financed	To be determined
Lot B9	Cabolombo distribution and metered connections		
Lot B10	Ramiros distribution and metered connections		
Lot B11	Mundial distribution and metered connections		
Lot B12	CD Camama upgrade and retrofit to existing distribution networks		
Lot B13	CD Benfica II upgrade and retrofit to existing distribution networks		
LATEST ESTIMATED TOTAL			564.9

Current expectation is that the Bitá IV programme can commence with the elaboration of detailed design in April 2019.

3 POLICY AND LEGISLATIVE FRAMEWORK

3.1 INTRODUCTION

This section sets out the legal and policy context in Angola with regards to the management of environmental and social impacts. In addition, applicable international standards, conventions, agreements, protocols including those determined by the World Bank and International Finance Corporation (WB/IFC) are also provided.

Although Angolan laws and triggered World Bank safeguard policies apply to the project, it should be noted that the World Bank policies must be met, even where there may be gaps between the two sets of requirements.

3.2 ANGOLAN INSTITUTIONAL FRAMEWORK

3.2.1 MINISTRY OF ENVIRONMENT

The Ministry of Environment (MINAMB) is responsible for the development and coordination of Angola’s environmental policy with a view to protecting, preserving, and conserving environmental quality, areas of conservation, natural heritage, and natural resources.

MINAMB are the primary authority responsible for the regulation of Environmental Framework Law No.5/98 and its enabling legislation which provides the framework for environmental legislation and regulations in Angola (see Section 3.3.1).

A number of other Ministries and Institutes operate in conjunction with MINAMB to develop and regulate environmental policy in Angola. Ministries considered relevant to the current project are described below.

Table 3-1: Supporting Ministries and Institutes

Ministry	Key Responsibilities
Ministry of Energy and Water (MINEA)	MINEA monitors hydrogeological resources and energy generation activities. MINEA is responsible for the implementation of energy and water policy, developing strategies to ensure sustainable use of water resources, and preparation of general proceedings for the use of hydrological resources.
National Institute of Water Resources (INRH)	INRH's mission is to ensure the implementation of the national water resources policy in planning and integrated management, its use, preservation, protection, supervision and control. In addition to promote the inventory, classification and registration of the Public Water Domain, namely of water courses, lakes, ponds, springs, reservoirs, estuarine areas and other bodies of water, and to coordinate at the national level, the Safety Plans for Dams.
Ministry of Finance (MINFIN)	MINFIN is responsible for the administration of public funds, promotion and stimulation of economic activity, and promotion of equity distribution of national income. MINFIN shares responsibility with MINEA for water services regulation.

Ministry	Key Responsibilities
Ministry of Construction (MINCONS)	MINCONS holds the executive power with regards to proposing the formulation, execution, and monitoring of civil construction and public works policy.
Ministry of Construction and Public Works (MINCOP)	MINCOP is the Auxiliary Body of the Executive Branch to propose the formulation, execution and control of the Executive's policy in the fields of Civil Construction and Public Works.
Ministry of Agricultural and Forestry (MINAGRIF)	The mission of MINAGRIF is to propose, conduct, execute and control executive policy in the areas of agriculture, livestock, forests, food security and food, with a view to sustainable development.
Ministry of Public Administration, Labour, and Social Security (MAPTSS)	MAPTSS is responsible for the definition and implementation of policies relating to social security schemes, social action, employment, vocational training, employer – employee relations, and working.
Ministry of Planning and Housing (MINOTH)	MINOTH is tasked with formulating, conducting, executing and control of policy on land management, urban planning, and housing.
Ministry of Territorial Administration and State Reform (MAT)	MAT is is the Auxiliary Ministerial Department of the President of the Republic, whose mission is to propose, coordinate, execute and evaluate the Executive's policy on Local Government, Territorial Organization and Traditional Authorities, as well as ensuring the technical conditions for conducting general and local elections.
National Institute for Territorial Planning (NITP)	NITP is the executing authority for the 2004 Land Law and sets the policy for municipal land management.

3.2.2 LOCAL AUTHORITIES

The B4WSP is contained entirely within the Province of Luanda. Aside from the Provincial Government the only other authority at the Provincial level who may be involved with B4WSP is the Provincial Council for Social Consultation (Conselho Provincial de Auscultação e Concertação Social - CPACS). The CPACS is composed of Vice-Governors, Provincial Directors, municipal administrators, and representatives of traditional authorities, representatives of unions, public and private business sector representatives, farmers, churches recognized by law and NGO representatives.

The B4WSP passes through a number of Luandan municipalities, and representatives of these are consulted within the Stakeholder Consultation and Engagement Plan (SCEP). The local municipalities are:

- Belas Municipality,
- Talatona Municipality, and
- Viana Municipality.

Each Municipal Administration may also have a Municipal Council for Social Consultation (CMACS) and a Council for Civic Engagement (CACS). These Councils are oversight committees responsible for supporting the respective government administrations in the decision-making process for economic and social policy in that jurisdiction. Plans for their inclusion are detailed in the SCEP (Appendix D). In addition, when consulting with the Luanda-based NGO Development Workshop (DW) the ESIA team was informed that Community Forums, set up by DW in most localities within Luanda, are generally considered a more representative institution than the CACS and are therefore also included in the engagement plans given in the SCEP. Community leaders (*sobas*) are additionally consulted.

3.3 ANGOLA ENVIRONMENTAL AND SOCIAL LEGISLATION

3.3.1 ENVIRONMENT FRAMEWORK LAW

The Environmental Framework Law No. 5/98 (EFL) was promulgated in accordance with Articles 12 and 24 of the 1992 Angolan Constitution (reformed in 2010). The EFL is the overarching law governing environmental legislation in Angola. Under the EFL, MINAMB has developed a number of policies and regulations to ensure sustainable development. Key articles include:

- Article 3 - defines Environmental Impact Assessment (EIA), Environmental Impact Study (EIS), and public consultation;
- Article 10 - requires that all projects affecting communities, ecological balance, and use of natural resources shall be subject to environmental impact assessment;
- Article 11 - the National Government is responsible to develop regulations necessary to implement the National Environment Management Plan (*Nacional de Gestão Ambiental*);
- Article 12 – (Environmental Heritage) “The Government must ensure that the environmental heritage, and in particular natural, historical and cultural, is the subject of permanent measures and defence appreciation, through environmental protection associations.”. and
- Article 17 - licensing of activities that are liable to cause significant environmental impacts is required as determined by the EIA.

3.3.2 ENVIRONMENTAL IMPACT ASSESSMENT

The Decree on Environmental Impact Assessment 51/04 is established in accordance with Article 16 of the EFL. The Decree aims to minimise environmental impacts from developments:

- providing regulations to supplement the EFL on EIAs, in particular procedures and mechanisms to be used in EIAs;
- establishing norms for conducting an EIA for public and private projects which due to their nature, dimension, or location may have significant environmental and social impacts; and
- establishing which categories of project should be subject to an EIA, what elements are to be included in the EIA, the nature and extent of public participation, the entity responsible for compliance with these legal requirements, and the EIA monitoring process.

Other significant aspects of the Decree include:

- Article 3: Provides definitions including description of an environmental audit, EIA, EIS, and public consultation;
- Article 4: Indicates which projects require an EIA and which may be exempt;
- Article 6: Indicates the information that needs to be included in the EIA;
- Article 7: Indicates Technical Activities of the Environmental Impact Study
- Article 10: Explains the procedure for public consultation and indicates the costs of the consultation should be covered by the project proponent;
- Article 16: Indicates what is considered as non-compliance;
- Article 17: Sets out penalties for various offences; and
- Article 22: States that environmental audits shall be conducted.

The appendix to Decree 51/04 lists the project categories for which an EIA is expected. The current project is captured under infrastructure projects (6i: dams and other installations to retain or store water permanently; and 6l: works transferring water resources between hydrographic basins).

3.3.3 ENVIRONMENTAL LICENSING

The Decree on Environmental Licensing 59/07 provides guidance on environmental licensing requirements for projects. Article 10 stipulates that an environmental licence is mandatory for any project requiring an EIA.

Article 4 states that two licences shall be required for each project: a licence for construction and a licence for operation. An operation licence cannot be issued without the prior issue of an installation licence.

3.3.4 PUBLIC CONSULTATION

The Executive Decree on Public Consultation 87/12 defines the public consultation requirements for projects requiring an EIA in accordance with Article 10 of the EIA Decree. Public consultation shall be undertaken following submission of the EIS to the relevant Ministry, before approval and issuing of an Environment Licence. The public consultation process shall be undertaken by the responsible ministry, and includes the following steps:

- release of the non-technical summary of the EIA report to the interested and affected parties;
- consideration and appraisal of all presentations and comments relating to the proposed project; and
- compilation of a brief report within eight days of the completion of the consultation period, specifying the steps taken, the level of public participation and the conclusions which may be drawn.

The consultation process must take place over a period of 5-10 days and the costs borne by the developer.

3.3.5 TERMS OF REFERENCE FOR ENVIRONMENTAL IMPACT STUDIES

The Executive Decree on the Terms of Reference for Environment Impact Studies 92/12 sets the terms of reference for the EIS and specifies the general content. This Decree states that the EIS must be completed in terms of the legislation on EIA and should follow guidelines contained in any relevant sector-specific standard terms of reference for EIS once promulgated.

The Decree includes three annexes providing guidance on information to be presented to the relevant Ministry including;

- Annex 1: an application form for the project proponent to indicate which Environmental Licence is applied for;
- Annex 2: provides a form for the provision of simplified preliminary project information; and
- Annex 3: outlines the required content and structure of the EIS, however, the details for required content of each section are not included.

3.3.6 LAND LAW

The Land Law 9/04 considers land to be property of the State and states the following acceptable uses:

- provision of shelter and home for inhabitants of Angola, implying the existence of an appropriate urban planning system;
- a source of natural resources which can be used for mining, agriculture, forestry, and land planning; and
- support for economic, agricultural, and industrial activities.

Objectives of the Land Law include environmental protection and assurance of sustainable and economically efficient use of the land.

3.3.7 TERRITORY AND URBANISM SYSTEM LAW

The Territory and Urbanism System Law No. 3/04 specifies that the use of land shall comply with municipal or special territorial plans. The Law stipulates that an EIS must refer to these territorial plans.

3.3.8 RESETTLEMENT DECREE

Presidential decree no. 117/16 of 30th May defines the rules, procedures and criteria that must be followed by the Public Administration and State in the process of rehousing a group of people, ensuring the pursuit of public interest and also the protection of the rights and interests of citizens.

It is the responsibility of the Municipal Administrations to carry out the relocation operations at the level of the respective Municipalities. In cases where relocation results from expropriation proceedings, the expropriating entity must rehome, in accordance with the legislation in force on the matter.

3.3.9 WATER LAW

Water Law 6/02 defines the priorities for the use of water resources in Angola, particularly internal waters (defined as surface and underground). The Law considers water resources as State property. The Law encourages the development of a new administrative policy for the water sector which includes protection of water resources and the environment. In implementing such policies the Government aims at achieve the following objectives;

- ensuring access to water resources;
- ensuring a continuous balance between availability of water resources and demand;
- promoting research activities and sustainable use of existent water resources;
- ensuring proper sewage systems; and,
- regulating the discharge of domestic effluents.

3.3.10 WATER QUALITY DECREE

The Water Quality Decree no. 261/11 of 6th October lays down water quality standards and criteria for the purpose of protecting the aquatic environment and improving the quality of water in order to meet its main uses. The provisions of this decree-law apply to: inland water, both surface and subterranean, as well as water for aquaculture, livestock, irrigation and balneology (medicinal springs).

The regulations governing the discharge of waste water into national aquifers and in the soil are also regulated in the present statute, in order to preserve the quality of the aquatic environment and the protection of public health.

3.3.11 MARITIME SPACE LAW

The Maritime Space Law no. 14/10 of 14th July regulates the exercise of powers, rights and duties of the State and defines the limits of the maritime areas under national sovereignty and jurisdictions. This repeals Law n. 21/92, of August 28 – a law that regulates the Inland Waters, the Territorial Sea and the Exclusive Economic Zone. It also repeals Law No. 9/97, of 17 October, as well as all the standards which they have in contrary to the provisions of this law.

The United Nations Convention on the Law of the Sea was approved in Montego Bay, Jamaica, on December 10, 1982, and the Republic of Angola subscribed to it that same month. The Republic of Angola ratified the United Nations Convention under the Law of the Sea on 5 December 1990.

3.3.12 BIOLOGICAL WATER RESOURCES

The Biological Water Resources Act 6-A/04 emphasises the need for policies aimed at preserving and regenerating biological and aquatic resources. The Act also provides a mechanism for coordination of different legislation on marine resources, particularly fisheries and aquaculture activities.

3.3.13 FOREST AND WILDLIFE

Law 6/17 on Forest and Wildlife Basic Legislation establishes the principles that aim to guarantee the conservation and rational, sustainable use of forests and wildlife within the national territory.

3.3.14 FORESTRY REGULATION

Presidential decree 171/18 of 23rd July approves the Forestry Regulation and repeals all legislation contrary to the provisions of this decree, in particular Executive Order No. 199/16 of 22nd April. Whereas Law no. 6/17, of 24 January, on Forest and Wildlife Base legislation establishes the general norms that aim at guaranteeing the conservation and sustainable use of forests and also the general bases for the exercise of activities related to them, it may be necessary to regulate said Law, regarding the sustainable management of forest resources and ecosystems.

This decree regulates the sustainable management of forest resources and their ecosystems and aims to establish the rules on their conservation and rational use, taking into account the environmental, social, economic and cultural dimensions of these lands. This Regulation applies to forests and to the activities of protection, conservation, research, utilisation, and replication, forestry and reforestation, commercialisation of the forest resources, and others that the evolution of science and technology may indicate as such.

3.3.15 RED LIST SPECIES EXECUTIVE DECREE

Executive Decree No. 252/18 of 13 July approves the Red List Species of Angola. The Red List comprises threatened plant and animal species and is determined by a set of quantitative criteria. With its strong scientific base, Red List is recognised as the most authoritative guide to the status of biological diversity.

The decree recognises the importance of the International Convention on Trade in Endangered Species of Wild Fauna and Flora (CITES); the importance of maintaining and regenerating animal species, restoring damaged habitats, controlling in particular the activities or use of substances likely to harm wildlife species and their habitats; takes into account the provisions of the National Policy on Forests, Wildlife and Conservation Areas approved by Resolution No. 1/10 of January 14, in conjunction with the Strategy and the National Action Plan for Biodiversity also approved by Resolution n 42/06, of 26 July; is aware of the particular attention that should be given to species considered endangered, vulnerable and invasive at national level; and recognises the importance of the obligations imposed by the Convention on Biological Diversity (CBD);

There is a requirement to approve the Red List and to disclose the categories of species of Angola.

The Red List of species of Angola is composed of four categories namely:

- Category A - Extinct Species (Ex): When the species has a history of natural occurrence in Angola and is considered extinct or never seen in its habitat;
- Category B - Extinction Species (AEx): When several factors seriously threaten their existence, making it difficult to reproduce or regenerate in the wild, bringing their populations below sustainable levels;
- Category C - Vulnerable Species (Vul): When human activity threatens its existence naturally in the national territory; and
- Category D - Invasive Species: When the species does not occur naturally or is introduced into the National Territory.

The categories of each species are updated by means of scientific information available over a period of five years.

The Angola Red List species categories and numbers are as follows:

Category A

- 2 mammals
- 1 bird

Category B

- 19 mammals
- 1 reptile
- 7 birds
- 3 fish

Category C

- 18 mammals
- 31 birds
- 10 reptiles
- 1 crustacean
- 6 cetaceans (dolphins and whales)
- 4 fish
- 4 insects

- 30 plants

Category D

- 1 fish
- 17 plants

3.3.16 LIABILITY FOR ENVIRONMENTAL DAMAGE

The Decree on Liability for Environmental Damage 194/11 applies to any activity that may cause or threaten to cause damage to the environment. The Decree aims to establish the responsibility for the risk or degradation of the environment. Any party causing environmental damage is required to repair damages and/or provide compensation to affected parties as a result of damage caused.

3.3.17 WASTE MANAGEMENT

The Decree on the Regulation of Waste Management 190/12 establishes rules concerning waste generation and disposal, discharges to water and the atmosphere, and the collection, storage, and transport of waste. The Decree aims to prevent or minimise negative impacts of waste to human health and the environment and is applicable to all activities that might generate or dispose waste. The Decree excludes radioactive waste and any other waste subject to specific regulation.

3.3.18 CONSTRUCTION WASTE

Executive Decree no. 17/13, of 22nd January, establishes a legal regime applicable to the management of waste resulting from works or demolitions of buildings and landslides, abbreviated as CDW (Construction and Demolition Waste). This law defines the rules concerning the collection, transport, storage, sorting, recovery and disposal operations.

The decree begins by defining the responsibility of all actors on the CDW, from the original product to the waste produced. The decree does not apply to CDW produced in private works exempt from license. If it is impossible to determine the producer of the waste, the responsibility for its management rests with the holder. Such liability is extinguished by the transmission of waste to entities responsible for waste stream management systems, in accordance with the law.

The law details CDW Operations in the following sub-sections:

- Reuse of soils and rocks;
- Use of CDWs on site;
- Screening and fragmentation of CDW – this applies to materials that cannot be reused on site. They must be screened on site, in order to be sent to recycling or any other form of recovery;
- Landfilling of CDW waste - this is only permitted following screening of waste where it has been determined that alternative uses are not possible;
- Transportation - the transport of CDW is accompanied by a guide, the model for which is defined by a government decree.
- Waste Licensing - storage, sorting, treatment, recovery and disposal of CDWs are subject to a licensing regime
- Landfilling of CDW is also subject to licensing.

3.3.19 PHYSICAL CULTURAL HERITAGE

Regulation with respect to physical cultural heritage is embodied in the Environment Framework Law (5/98 of 19 June). Article 12 (Environmental Heritage) states:

“The Government must ensure that the environmental heritage, and in particular natural, historical and cultural, is the subject of permanent measures and defence appreciation, through environmental protection associations.”

In addition, the Environmental Impact Assessment Law (51/04 of 23 July), Article 7 defines Technical Activities of the Environmental Impact Study. Part 1c states:

“The environmental assessment of the project's area of influence and description, analysis environmental resources and their interactions, as they exist in order to characterise the environmental situation of the area before the project implementation, considering:

c. The socio-economic environment, the use and occupation of land, water use and sociocultural component, highlighting the sites and monuments archaeological, historical and cultural community, relationships dependence between the local community, environmental resources and potential future use of these resources.”

3.3.20 OCCUPATIONAL HEALTH AND SAFETY DECREE

Regulation with respect to occupational health and safety is embodied in the Occupational Health and Safety Decree (31/94 of 5 August). The Decree aims to enforce the rights of workers to a safe and hygienic work environment by ensuring workers receive protective gear and equipment and regular information on workplace safety, hygiene and health related issues. Under this Decree:

- **Employers are required to** take the useful and necessary measures so that the work is done in an environment and conditions that allow the normal physical, mental and social development of workers, that protects them against work accidents and occupational diseases;
- **The Ministry of Public Administration, Employment and Social Security is required to:**
 - a. define, develop and guide policy on safety, hygiene, and health;
 - b. monitor the application of established policy and monitor the compliance with laws and regulations concerning safety, hygiene and health at work;
 - c. assist and advise companies, as well as workers in implementing the policy;
 - d. promote the dissemination and awareness of employees to purchase insurance and hygienic habits of work;
 - e. develop the investigation and standardization on safety, hygiene and health at work;
 - f. order the stopping of equipment, machinery and production processes in the workplace when anticipating the imminence of work accidents, fire hazards or breaches of safety standards, hygiene and health at work involving risks to workers;
 - g. protect specially the women's professional activity, of minors and workers with a reduced work capacity; and,
 - h. elaborate the collection, treatment and dissemination of the statistical data regarding matters of safety, hygiene and health at work.
- **The Ministry of Health, Interior and Education is required to:**
 - a. develop measures related to medicine and the worker's health including those for early screening of occupational diseases and the rehabilitation of workers;
 - b. determine the competent bodies to implement these measures;
 - c. propose and apply the policy for road safety, fire and explosives;
 - d. study, apply and supervise the measures to ensure safe working conditions in the different sectors of activity, in the prevention of fires and explosions;
 - e. authorize and guide the proper use, handling and storage of explosives;
 - f. provide to educators and students the knowledge on safety, hygiene and health at work, ensuring them conditions for the transmission of that knowledge in the teaching places, especially when it is of a technical nature;
 - g. streamline, monitor and support the technical and methodological training in safety, hygiene and health at work and ensure their inclusion in the curriculum of technical education.

3.4 ENVIRONMENTAL AND SOCIAL POLICY, PLANS AND STRATEGIES

3.4.1 NATIONAL ENVIRONMENTAL MANAGEMENT PLAN

The National Environmental Management Plan (Plano Nacional de Gestão Ambiental - PNGA) was created in response to the EFL with the aim to achieving sustainable development and environmental protection. The PNGA:

- aims to achieve comprehensive sustainable development in all facets of national life;
- integrates environmental aspects into economic and social development processes; and,
- establishes responsibilities for all agents (governmental, private, and civil society) whose activities may have any type of influence in the use and management of the environment, and sets the overall guidelines for their respective actions.

Implementation of the PNGA is the responsibility of all sectors of government whose activities may have an influence on the environment, including MINEA.

The PNGA emphasises the need for environmental protection through:

- promotion of inter-sectoral coordination;
- protection of biodiversity, flora, and terrestrial and marine fauna;
- ecosystem rehabilitation and protection;
- environmental management; and,
- environmental education, information, and awareness.

3.4.2 NATIONAL WATER PLAN

Decree 126/17 sets out the National Water Plan (NAP) and implements the requirements of the Water Law 6/02. The NAP aims to:

- promote sustained economic growth and territorially balanced development across Angola;
- fight poverty and improve the quality of life of the Angolan population;
- establish a support plan for the country's development incorporating the definitions and strategic options related to water; and
- promote the sustainable and coordinated management of surface and groundwater resources of Angola.

3.4.3 NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN

The National Biodiversity Strategy and Action Plan, 2006 Resolution No. 42/06 (NBSAP) was created in response to recommendations provided by the United Nations Convention on Biological Diversity. The NBSAP guarantees the conservation and sustainable use of biological resources to enable the fair and equitable sharing of benefits. The Strategy and Action Plan are interconnected through eight strategic areas, each with various objectives and actions. These areas are:

- Research and Information Dissemination;
- Education for Sustainable Development;
- Biodiversity Management in Protected Areas;
- Sustainable Use of Biodiversity Components;
- The Role of Communities in Biodiversity Management;
- Institutional Strengthening;
- Legislation and Implementation; and
- Management, Coordination, and Monitoring.

3.4.4 STRATEGY TO COMBAT POVERTY

The Strategy to Combat Poverty, 2003 was developed to improve the conditions of Angolan citizens, particularly vulnerable people by motivation to participate in the socioeconomic development process. Objectives are to mitigate the risk of hunger through enhancement of rural economies and reconstruction, rehabilitation and expansion of basic infrastructure to promote socioeconomic development.

3.5 INTERNATIONAL CONVENTIONS, AGREEMENTS AND PROTOCOLS

Angola is a signatory to a number of international conventions, protocols, and agreements potentially of relevance to the current project. These are listed in Table 3-2.

Table 3-2: International Conventions, Agreements and Protocols

Key Articles	Key Objectives
African Convention on the Conservation of Nature and Natural Resources	Achieve ecologically rational, and economically sound and socially acceptable development policies and programmes by: enhancing environmental protection; fostering conservation and sustainable use of natural resources; and, harmonisation and coordination of policies in these fields.
Convention on Biological Diversity	Develop national strategies for the conservation and sustainable use of biological diversity by: conservation of biological diversity; sustainable use of its components; and the fair and equitable sharing of benefits arising from genetic resources.
Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)	Achieve global conservation of wildlife and habitats by: promoting cooperation in the support in research relating to migratory species; providing immediate protection for threatened migratory species; and, concluding agreements covering the conservation and management of migratory species requiring international cooperation.
United Nations Framework Convention on Climate Change	Achieve stabilisation of greenhouse gas concentrations in the atmosphere to a level that: prevents dangerous anthropogenic interference with the climate system; allows ecosystems to adapt naturally to climate change; ensures food production is not threatened; and, enables economic development to proceed in a sustainable manner.
Kyoto Protocol	To reduce greenhouse gas emissions in an effort to reduce impact to global climate systems.
United Nations Convention to Combat Desertification	Combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification to improve living conditions by: internationally supported effective action to achieve sustainable development in affected areas; and, implementation of long-term strategies focused on affected areas, improving land productivity, and the rehabilitation, conservation, and sustainable management of land and water resources.
Southern African Development Community (SADC) Protocol on Wildlife Conservation and Law Enforcement (1999)	Southern African Development Community (SADC) Protocol on Wildlife Conservation and Law Enforcement (1999) Establish common approaches to the conservation and sustainable use of wildlife resources and assist with the effective enforcement of laws governing those resources by: adopting and enforcing legal instruments to ensure conservation and sustainable use of wildlife resources; harmonising legal instruments governing wildlife and conversation; integrating management and conservation programmes into national development plans; and, assessing and controlling activities which may be detrimental to such resources.
Kampala Protocol	Addresses internal displacement caused by armed conflict, natural disasters and large-scale development projects in Africa by: promoting and strengthening regional and national measures to prevent and mitigate causes of internal displacement; and, establishing legal framework to prevent internal displacement and assist internally displaced people.

3.6 INTERNATIONAL STANDARDS

3.6.1 EQUATOR PRINCIPLES

The Equator Principles (EPs) provide a framework for international finance institutions (IFIs) to guide their due diligence activities with respect to responsible project investment. The EPs provide a consistent basis to evaluate the acceptability of environmental and social project impacts.

The principal requirement is to ensure that the following requirements have been met for all project phases:

- IFC Performance Standards; and,
- The World Bank Group Environmental, Health and Safety Guidelines.

3.6.2 IFC PERFORMANCE STANDARDS

The IFC Performance Standards (IFC PSs) on Environmental and Social Sustainability are considered the most comprehensive standards available for international institutions. They are used to promote economic development through the private sector in developing countries. The PSs provide a framework for an accepted international approach to the management of social and environmental issues. The IFC has published eight PSs to achieve social and environmental management throughout the project lifecycle. These PSs are adopted by signatories to the Equator Principles (see Section 3.6.1). The PSs and their objectives are described in Table 3-3.

Table 3-3: IFC Performance Standards

Title	Objectives
1: Assessment and Management of Environmental and Social Risks and Impacts	Identify and evaluate environmental and social risks and impacts of a project Adopt a mitigation hierarchy to anticipate and avoid, minimize, or where necessary compensate for risks and impacts to workers, affected communities, and the environment Promote improved environmental and social performance of clients through the effective use of management systems Ensure that grievances from affected communities and external communications from other stakeholders are responded to and managed appropriately Promote and provide means for adequate engagement with affected communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.
2: Labour and Working Conditions	Promote the fair treatment, non-discrimination and equal opportunity of workers Establish, maintain, and improve the worker-management relationship Promote compliance with national employment and labour laws Protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain Promote safe and healthy working conditions, and the health of workers Avoid the use of forced labour.
3: Resource Efficiency and Pollution Prevention	Avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities Promote more sustainable use of resources, including energy and water Reduce project-related greenhouse gas emissions
4: Community Health, Safety, and Security	Anticipate and avoid adverse impacts on the health and safety of affected communities during the project life from both routine and non-routine circumstances Ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to affected communities
5: Land Acquisition and Involuntary Resettlement	Avoid, and when avoidance is not possible, minimize displacement by exploring alternative project designs Avoid forced eviction Anticipate and avoid, or where necessary minimize, adverse social and economic impacts from land acquisition or restrictions on land use by providing compensation for loss of assets and ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected Improve, or restore, the livelihoods and standards of living of displaced persons

Title	Objectives
	Improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites
6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Protect and conserve biodiversity Maintain the benefits from ecosystem services Promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities
7: Indigenous Peoples	Ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture and natural resource-based livelihoods of indigenous peoples Anticipate and avoid adverse impacts of projects on communities of indigenous peoples, or where necessary minimize and/or compensate for such impacts Promote sustainable development benefits and opportunities for indigenous peoples in a culturally appropriate manner Establish and maintain an ongoing relationship based on Informed Consultation and Participation with the indigenous peoples affected by a project throughout the project's life-cycle Ensure the free, prior and informed consent of affected communities of indigenous peoples Respect and preserve the culture, knowledge, and practices of indigenous peoples.
8: Cultural Heritage	Protect cultural heritage from the adverse impacts of project activities and support its preservation Promote the equitable sharing of benefits from the use of cultural heritage

3.6.3 WORLD BANK ENVIRONMENTAL, HEALTH AND SAFETY GENERAL GUIDELINES

The World Bank Environmental, Health, and Safety (EHS) General Guidelines are technical reference documents providing general and industry-specific examples of good international industry practices (GIIP). The IFC typically uses EHS Guidelines as a technical source of information during project appraisal.

The EHS General Guidelines are split into four broad categories as set out in Table 3-4.

Table 3-4: World Bank EHS General Guidelines

Broad Category	Specific Guidance
1. Environmental	1.1 Air Emissions and Ambient Air Quality
	1.2 Energy Conservation
	1.3 Wastewater and Ambient Water Quality
	1.4 Water Conservation
	1.5 Hazardous Materials Management
	1.6 Waste Management
	1.7 Noise
	1.8 Contaminated Land
2. Occupational Health and Safety	2.1 General Facility Design and Operation
	2.2 Communication and Training
	2.3 Physical Hazards
	2.4 Chemical Hazards
	2.5 Biological Hazards
	2.6 Radiological Hazards
	2.7 Personal Protective Equipment
	2.8 Specific Hazard Environments
	2.9 Monitoring

Broad Category	Specific Guidance
3. Community Health and Safety	3.1 Water Quality and Availability
	3.2 Structural Safety of Project Infrastructure
	3.3 Life and Fire Safety
	3.4 Traffic Safety
	3.5 Transport of Hazardous Materials
	3.6 Disease Prevention
	3.7 Emergency Preparedness and Response
4. Construction and Decommissioning	4.1 Environment
	4.2 Occupational Health & Safety
	4.3 Community Health & Safety

In addition to the General EHS Guidelines there are Industry Sector Guidelines. Of particular relevance to B4WSP are those relating to Infrastructure; in particular, “Water and Sanitation”. Given that B4WSP will also require to source power, the guidelines “Electric Power Transmission and Distribution” are also of relevance.

3.6.4 WORLD BANK SAFEGUARD POLICIES

The World Bank Environmental and Social Safeguard Policies serve to identify, avoid, and minimise harms to people and the environment. These high-level policies require that environmental and social risks are addressed before investment support can be provided.

The 11 current Environmental and Social Safeguard Policies (Operational Policies – OP) address:

- Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank-Supported Projects (OP 4.00)
- Environmental Assessment (OP 4.01)
- Environmental Action Plans (OP 4.02)
- Performance Standards for Private Sector Activities (OP 4.03)
- Natural Habitats (OP 4.04)
- Pest Management (OP 4.09)
- Indigenous Peoples (OP 4.10)
- Physical Cultural Resources (OP 4.11)
- Involuntary Resettlement (OP 4.12)
- Forests (OP 4.36)
- Dams (OP 4.37)

There are in addition two legal policies:

- Projects on International Waterways (OP 7.50) and
- Projects in Disputed Areas (OP 7.50).

It should be noted that World Bank has developed a new Environmental and Social Framework. This went live on October 1st 2018, and will be applicable to all new WB financed projects from that date.

3.6.4.1 Triggered World Bank Safeguard Policies

The project activities will affect the biophysical and human / socio-economic environments. Certain activities can also lead to the acquisition of land, involuntary relocation of people, temporary or permanent cessation of economic activity, loss of assets or even loss of access to resources. Consequently, the plan is not only subject to the provisions of national legislation on the environment and conservation of biodiversity and resettlement, including any pertinent international conventions ratified by Angola, but will also be compliant with all relevant national policies / strategies.

In addition, since the project is to be guaranteed by the World Bank, the plan should meet the requirements of operating policies on environmental and social safeguards in relation to the activities and works mentioned above, namely:

- OP 4.01 Environmental Assessment;
- OP 4.04 Natural Habitats;
- OP 4.11 Physical Cultural Resources; and
- OP 4.12 Involuntary Resettlement.
- OP 4.20 Gender and Development (not a safeguards policy, but relevant)

The above environmental and social safeguard policies are deemed triggered in relation to B4WSP for reasons that include the following:

- OP 4.01 Environmental Assessment - The requirement for environmental assessment (EA) at some level is a core WB safeguard and through screening will identify the level of assessment necessary. Identification and evaluation of the project's potential environmental risks and impacts on the natural and social environment must be followed by appropriate mitigation. Public consultation is frequently necessary and assurance that the institutional capacity is in place, or must be put in place, in order to enact the requirements of the EA.
- OP 4.04 Natural Habitat – WB supports the protection, maintenance, and rehabilitation of natural habitats and their functions, and expects borrowers to apply a precautionary approach to natural resource management. Given that the project will abstract water from the Rio Kwanza, a rich and diverse habitat, and may potentially impact upon only partly developed landscape south of Luanda, it is clear that OP 4.04 is triggered and must be addressed in the EA.
- OP 4.11 Physical Cultural Resources – Given that the project involves extensive excavation to facilitate the laying of transmission and distribution pipelines, much of which is in a landscape that is only partly previously disturbed, it is necessary to recognise the potential for impacting physical cultural resources, both known and unknown. Mitigation that is developed must acknowledge the possibility of encountering such resources, and have plans in place that can respond effectively to such finds.
- OP 4.12 Involuntary Resettlement – Whilst the immense benefits of increasing supply of treated water to the areas within the B4WSP are recognised, such positive impacts must not be at the expense of households and communities that may be negatively impacted. Negative impacts can arise largely through purchase of the land upon which households are present in order to lay the pipelines and have access to pipeline easements through the lifetime of the project, and the ancillary structures such as distribution towers and treatment plant. The appropriate management of involuntary resettlement is essential and significant effort is directed to ensuring that assets to be purchased are appropriately valued and that resettlement and/or compensation provided accurately reflect losses.
- OP 4.20 Gender and Development - The objective of WB's Gender and Development policy is to assist member countries to reduce poverty and enhance economic growth, human well-being, and development effectiveness by addressing the gender disparities and inequalities that are barriers to development, and by assisting member countries in formulating and implementing their gender and development goals.

Reference is made below to a synopsis of the relevant World Bank Operational Policies as revised in April 2013. For a fuller understanding of these Operational Policies, and to review additional documents referenced here, please refer to WB Operational Policies website:

(<http://www.worldbank.org/en/projects-operations/environmental-and-social-policies>)

In relation to World Bank project classification, the Bitá IV project as a whole is considered as "Category B" because the following is foreseen:

- the potential environmental and social impacts specific to the area of the project, are moderate and may easily be mitigated using the appropriate measures; and
- suitably targeted and applied mitigation measures will reduce or eliminate these negative impacts.

3.6.4.1.1 OP 4.01 Environmental Assessment

1. World Bank (WB) requires environmental assessment (EA) of projects proposed for WB financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making.
2. EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed project. EA evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. WB favours preventive measures over mitigatory or compensatory measures, whenever feasible.
3. EA takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and physical cultural resources); and transboundary and global environmental aspects. EA considers natural and social aspects in an integrated way. It also takes into account the variations in project and country conditions; the findings of country environmental studies; national environmental action plans; the country's overall policy framework, national legislation, and institutional capabilities related to the environment and social aspects; and obligations of the country, pertaining to project activities, under relevant international environmental treaties and agreements. WB does not finance project activities that would contravene such country obligations, as identified during the EA. EA is initiated as early as possible in project processing and is integrated closely with the economic, financial, institutional, social, and technical analyses of a proposed project.
4. The borrower is responsible for carrying out the EA. For Category A projects, the borrower retains independent EA experts not affiliated with the project to carry out the EA. For Category A projects that are highly risky or contentious or that involve serious and multidimensional environmental concerns, the borrower should normally also engage an advisory panel of independent, internationally recognized environmental specialists to advise on all aspects of the project relevant to the EA. The role of the advisory panel depends on the degree to which project preparation has progressed, and on the extent and quality of any EA work completed, at the time WB begins to consider the project.
5. WB advises the borrower on WB's EA requirements. WB reviews the findings and recommendations of the EA to determine whether they provide an adequate basis for processing the project for WB financing. When the borrower has completed or partially completed EA work prior to WB's involvement in a project, WB reviews the EA to ensure its consistency with this policy. WB may, if appropriate, require additional EA work, including public consultation and disclosure.
6. The Pollution Prevention and Abatement Handbook describes pollution prevention and abatement measures and emission levels that are normally acceptable to WB. However, taking into account borrower country legislation and local conditions, the EA may recommend alternative emission levels and approaches to pollution prevention and abatement for the project. The EA report must provide full and detailed justification for the levels and approaches chosen for the particular project or site.

OP 4.01 goes on to describe in greater detail:

- EA instruments;
- Environmental screening;
- EA for special project types;
- Institutional capacity;
- Public consultation;
- Disclosure; and
- Implementation.

Refer also to:

- Annex A: Definitions
- Annex B: Content of an Environmental Assessment Report for a Category A Project
- Annex C: Environmental Management Plan

3.6.4.1.2 OP 4.04 Natural Habitats

1. The conservation of natural habitats, like other measures that protect and enhance the environment, is essential for long-term sustainable development. WB therefore supports the protection, maintenance, and rehabilitation of natural habitats and their functions in its economic and sector work, project financing, and policy dialogue. WB supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development.
Economic and Sector Work
2. WB's economic and sector work includes identification of (a) natural habitat issues and special needs for natural habitat conservation, including the degree of threat to identified natural habitats (particularly critical natural habitats), and (b) measures for protecting such areas in the context of the country's development strategy. As appropriate, Country Assistance Strategies and projects incorporate findings from such economic and sector work.

Project Design and Implementation

1. WB promotes and supports natural habitat conservation and improved land use by financing projects designed to integrate into national and regional development the conservation of natural habitats and the maintenance of ecological functions. Furthermore, WB promotes the rehabilitation of degraded natural habitats.
WB does not support projects that, in WB's opinion, involve the significant conversion or degradation of critical natural habitats.
Wherever feasible, WB-financed projects are sited on lands already converted (excluding any lands that in the WB's opinion were converted in anticipation of the project). WB does not support projects involving the significant conversion of natural habitats unless there are no feasible alternatives for the project and its siting, and comprehensive analysis demonstrates that overall benefits from the project substantially outweigh the environmental costs. If the environmental assessment indicates that a project would significantly convert or degrade natural habitats, the project includes mitigation measures acceptable to WB. Such mitigation measures include, as appropriate, minimizing habitat loss (e.g. strategic habitat retention and post-development restoration) and establishing and maintaining an ecologically similar protected area. WB accepts other forms of mitigation measures only when they are technically justified.
2. In deciding whether to support a project with potential adverse impacts on a natural habitat, WB takes into account the borrower's ability to implement the appropriate conservation and mitigation measures. If there are potential institutional capacity problems, the project includes components that develop the capacity of national and local institutions for effective environmental planning and management. The mitigation measures specified for the project may be used to enhance the practical field capacity of national and local institutions.
3. In projects with natural habitat components, project preparation, appraisal, and supervision arrangements include appropriate environmental expertise to ensure adequate design and implementation of mitigation measures.
4. This policy applies to subprojects under sectoral loans or loans to financial intermediaries. Regional environmental sector units oversee compliance with this requirement.

Policy Dialogue

1. WB encourages borrowers to incorporate into their development and environmental strategies analyses of any major natural habitat issues, including identification of important natural habitat sites, the ecological functions they perform, the degree of threat to the sites, priorities for conservation, and associated recurrent-funding and capacity-building needs.
2. The WB expects the borrower to take into account the views, roles, and rights of groups, including local nongovernmental organizations (NGOs) and local communities, affected by WB-financed projects involving natural habitats, and to involve such people in planning, designing, implementing, monitoring, and evaluating such projects. Involvement may include identifying appropriate conservation measures, managing protected areas and other natural habitats, and monitoring and evaluating specific projects. WB encourages governments to provide such people with appropriate information and incentives to protect natural habitats.

Refer also to:

- Annex A: Definitions

3.6.4.1.3 OP 4.11 Physical Cultural Resources

Introduction

1. This policy addresses physical cultural resources, which are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above or below ground, or under water. Their cultural interest may be at the local, provincial or national level, or within the international community.
2. Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices.

Objective

1. WB assists countries to avoid or mitigate adverse impacts on physical cultural resources from development projects that it finances. The impacts on physical cultural resources resulting from project activities, including mitigating measures, may not contravene either the borrower's national legislation, or its obligations under relevant international environmental treaties and agreements.

Physical Cultural Resources within Environmental Assessment

1. The borrower addresses impacts on physical cultural resources in projects proposed for WB financing, as an integral part of the environmental assessment (EA) process. The steps elaborated below follow the EA sequence of: screening; developing terms of reference (TORs); collecting baseline data; impact assessment; and formulating mitigating measures and a management plan.
2. The following projects are classified during the environmental screening process as Category A or B, and are subject to the provisions of this policy: (a) any project involving significant excavations, demolition, movement of earth, flooding, or other environmental changes; and (b) any project located in, or in the vicinity of, a physical cultural resources site recognized by the borrower. Projects specifically designed to support the management or conservation of physical cultural resources are individually reviewed, and are normally classified as Category A or B.
3. To develop the TORs for the EA, the borrower, in consultation with WB, relevant experts, and relevant project-affected groups, identifies the likely physical cultural resources issues, if any, to be taken into account by the EA. The TORs normally specify that physical cultural resources be included in the baseline data collection phase of the EA.
4. The borrower identifies physical cultural resources likely to be affected by the project and assesses the project's potential impacts on these resources as an integral part of the EA process, in accordance with WB's EA requirements.
5. When the project is likely to have adverse impacts on physical cultural resources, the borrower identifies appropriate measures for avoiding or mitigating these impacts as part of the EA process. These measures may range from full site protection to selective mitigation, including salvage and documentation, in cases where a portion or all of the physical cultural resources may be lost.
6. As an integral part of the EA process, the borrower develops a physical cultural resources management plan that includes measures for avoiding or mitigating any adverse impacts on physical cultural resources, provisions for managing chance finds, any necessary measures for strengthening institutional capacity, and a monitoring system to track the progress of these activities. The physical cultural resources management plan is consistent with the country's overall policy framework and national legislation and takes into account institutional capabilities with regard to physical cultural resources.
7. WB reviews, and discusses with the borrower, the findings and recommendations related to the physical cultural resources aspects of the EA, and determines whether they provide an adequate basis for processing the project for WB financing.

Consultation

1. As part of the public consultations required in the EA process, the consultative process for the physical cultural resources component normally includes relevant project-affected groups, concerned government authorities, and relevant nongovernmental organizations in documenting the presence and significance of physical cultural resources, assessing potential impacts, and exploring avoidance and mitigation options.

Disclosure

1. The findings of the physical cultural resources component of the EA are disclosed as part of, and in the same manner as, the EA report. Exceptions to such disclosure would be considered when the borrower, in consultation with WB and persons with relevant expertise, determines that disclosure would compromise or jeopardize the safety or integrity of the physical cultural resources involved or would endanger the source of information about the physical cultural resources. In such cases, sensitive information relating to these particular aspects may be omitted from the EA report.

Projects in Situations of Urgent Need of Assistance or Capacity Constraints under OP 10.00

1. This policy normally applies to projects processed under paragraph 11 of OP 10.00, *Investment Project Financing*. OP/BP 4.01, *Environmental Assessment*, sets out the application of EA to such projects. When compliance with any requirement of OP 4.11, *Physical Cultural Resources* would prevent the effective and timely achievement of the objectives of such a project, WB (subject to the limitations set forth in paragraph 11 of OP 10.00) may exempt the project from such a requirement, recording the justification for the exemption in the loan documents. However, WB requires that any necessary corrective measures be built into either the emergency operation or a future lending operation.

Projects Involving Subprojects or Financial Intermediaries

1. The physical cultural resources aspects of subprojects financed under WB projects are addressed in accordance with WB's EA requirements.

Country Systems

1. WB may decide to use a country's systems to address environmental and social safeguards issues in a WB-financed project that affects physical cultural resources. This decision is made in accordance with the requirements of the applicable WB policy on country systems.

Capacity Building

1. When the borrower's capacity is inadequate to manage physical cultural resources that may be affected by a WB-financed project, the project may include components to strengthen that capacity.
2. Given that the borrower's responsibility for physical cultural resources management extends beyond individual projects, WB may consider broader capacity building activities as part of its overall country assistance program.

3.6.4.1.4 OP 4.12 Involuntary Resettlement

1. WB experience indicates that involuntary resettlement under development projects, if unmitigated, often gives rise to severe economic, social, and environmental risks: production systems are dismantled; people face impoverishment when their productive assets or income sources are lost; people are relocated to environments where their productive skills may be less applicable and the competition for resources greater; community institutions and social networks are weakened; kin groups are dispersed; and cultural identity, traditional authority, and the potential for mutual help are diminished or lost. This policy includes safeguards to address and mitigate these impoverishment risks.

Policy Objectives

1. Involuntary resettlement may cause severe long-term hardship, impoverishment, and environmental damage unless appropriate measures are carefully planned and carried out. For these reasons, the overall objectives of WB's policy on involuntary resettlement are the following:
 - a) Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs.
 - b) Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits. Displaced persons³ should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs.
 - c) 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.

Impacts Covered

1. This policy covers direct economic and social impacts that both result from WB-assisted investment projects, and are caused by:
 - a) the involuntary taking of land resulting in:
 - i. relocation or loss of shelter;
 - ii. loss of assets or access to assets; or
 - iii. loss of income sources or means of livelihood, whether or not the affected persons must move to another location; or
 - b) the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.
2. This policy applies to all components of the project that result in involuntary resettlement, regardless of the source of financing. It also applies to other activities resulting in involuntary resettlement, that in the judgment of WB, are
 - a) directly and significantly related to the WB-assisted project,
 - b) necessary to achieve its objectives as set forth in the project documents; and
 - c) carried out, or planned to be carried out, contemporaneously with the project.
3. Requests for guidance on the application and scope of this policy should be addressed to the Resettlement Committee (see WB Policy 4.12, para. 7).

Required Measures

1. To address the impacts covered under para. 3 (a) of this policy, the borrower prepares a resettlement plan or a resettlement policy framework (see paras. 25-30) that covers the following:
 - a) The resettlement plan or resettlement policy framework includes measures to ensure that the displaced persons are
 - i. informed about their options and rights pertaining to resettlement;
 - ii. consulted on, offered choices among, and provided with technically and economically feasible resettlement alternatives; and
 - iii. provided prompt and effective compensation at full replacement cost, for losses of assets attributable directly to the project.
 - b) If the impacts include physical relocation, the resettlement plan or resettlement policy framework includes measures to ensure that the displaced persons are:
 - i. provided assistance (such as moving allowances) during relocation; and
 - ii. provided with residential housing, or housing sites, or, as required, agricultural sites for which a combination of productive potential, locational advantages, and other factors is at least equivalent to the advantages of the old site.
 - c) Where necessary to achieve the objectives of the policy, the resettlement plan or resettlement policy framework also include measures to ensure that displaced persons are
 - i. (i) offered support after displacement, for a transition period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standards of living; and
 - ii. (ii) provided with development assistance in addition to compensation measures described in paragraph 6(a);
 - iii. (iii) such as land preparation, credit facilities, training, or job opportunities.
2. In projects involving involuntary restriction of access to legally designated parks and protected areas (see para. 3(b)), the nature of restrictions, as well as the type of measures necessary to mitigate adverse impacts, is determined with the participation of the displaced persons during the design and implementation of the project. In such cases, the borrower prepares a process framework acceptable to WB, describing the participatory process by which
 - a) specific components of the project will be prepared and implemented;
 - b) the criteria for eligibility of displaced persons will be determined;

- c) measures to assist the displaced persons in their efforts to improve their livelihoods, or at least to restore them, in real terms, while maintaining the sustainability of the park or protected area, will be identified; and
- d) potential conflicts involving displaced persons will be resolved.

The process framework also includes a description of the arrangements for implementing and monitoring the process.

3. To achieve the objectives of this policy, particular attention is paid to the needs of vulnerable groups among those displaced, especially those below the poverty line, the landless, the elderly, women and children, indigenous peoples, ethnic minorities, or other displaced persons who may not be protected through national land compensation legislation.
4. WB experience has shown that resettlement of indigenous peoples with traditional land-based modes of production is particularly complex and may have significant adverse impacts on their identity and cultural survival. For this reason, WB satisfies itself that the borrower has explored all viable alternative project designs to avoid physical displacement of these groups. When it is not feasible to avoid such displacement, preference is given to land-based resettlement strategies for these groups (see para. 11) that are compatible with their cultural preferences and are prepared in consultation with them (see Annex A, para. 11).
5. The implementation of resettlement activities is linked to the implementation of the investment component of the project to ensure that displacement or restriction of access does not occur before necessary measures for resettlement are in place. For impacts covered in para. 3(a) of this policy, these measures include provision of compensation and of other assistance required for relocation, prior to displacement, and preparation and provision of resettlement sites with adequate facilities, where required. In particular, taking of land and related assets may take place only after compensation has been paid and, where applicable, resettlement sites and moving allowances have been provided to the displaced persons. For impacts covered in para. 3(b) of this policy, the measures to assist the displaced persons are implemented in accordance with the plan of action as part of the project (see para. 30).
6. Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. These strategies may include resettlement on public land, or on private land acquired or purchased for resettlement. Whenever replacement land is offered, resettlers are provided with land for which a combination of productive potential, locational advantages, and other factors is at least equivalent to the advantages of the land taken. If land is not the preferred option of the displaced persons, the provision of land would adversely affect the sustainability of a park or protected area, or sufficient land is not available at a reasonable price, non-land-based options built around opportunities for employment or self-employment should be provided in addition to cash compensation for land and other assets lost. The lack of adequate land must be demonstrated and documented to the satisfaction of WB.
7. Payment of cash compensation for lost assets may be appropriate where
 - a) livelihoods are land-based but the land taken for the project is a small fraction of the affected asset and the residual is economically viable;
 - b) active markets for land, housing, and labour exist, displaced persons use such markets, and there is sufficient supply of land and housing; or
 - c) livelihoods are not land-based.

Cash compensation levels should be sufficient to replace the lost land and other assets at full replacement cost in local markets.

8. For impacts covered under para. 3(a) of this policy, WB also requires the following:
 - a) Displaced persons and their communities, and any host communities receiving them, are provided timely and relevant information, consulted on resettlement options, and offered opportunities to participate in planning, implementing, and monitoring resettlement. Appropriate and accessible grievance mechanisms are established for these groups.
 - b) In new resettlement sites or host communities, infrastructure and public services are provided as necessary to improve, restore, or maintain accessibility and levels of service for the displaced persons and host communities. Alternative or similar resources are provided to compensate for the loss of access to community resources (such as fishing areas, grazing areas, fuel, or fodder).
 - c) Patterns of community organization appropriate to the new circumstances are based on choices made by the displaced persons. To the extent possible, the existing social and cultural institutions of resettlers and any host communities are preserved and

resettlers' preferences with respect to relocating in pre-existing communities and groups are honoured.

Eligibility for Benefits

1. Upon identification of the need for involuntary resettlement in a project, the borrower carries out a census to identify the persons who will be affected by the project (see the Annex A, para. 6(a)), to determine who will be eligible for assistance, and to discourage inflow of people ineligible for assistance. The borrower also develops a procedure, satisfactory to WB, for establishing the criteria by which displaced persons will be deemed eligible for compensation and other resettlement assistance. The procedure includes provisions for meaningful consultations with affected persons and communities, local authorities, and, as appropriate, nongovernmental organizations (NGOs), and it specifies grievance mechanisms.
2. Criteria for Eligibility. Displaced persons may be classified in one of the following three groups:
 - a) those who have formal legal rights to land (including customary and traditional rights recognized under the laws of the country);
 - b) those who do not have formal legal rights to land at the time the census begins but have a claim to such land or assets--provided that such claims are recognized under the laws of the country or become recognized through a process identified in the resettlement plan (see Annex A, para. 7(f)); and
 - c) those who have no recognizable legal right or claim to the land they are occupying.
3. Persons covered under para. 15(a) and (b) are provided compensation for the land they lose, and other assistance in accordance with para. 6. Persons covered under para. 15(c) are provided resettlement assistance in lieu of compensation for the land they occupy, and other assistance, as necessary, to achieve the objectives set out in this policy, if they occupy the project area prior to a cut-off date established by the borrower and acceptable to WB. Persons who encroach on the area after the cut-off date are not entitled to compensation or any other form of resettlement assistance. All persons included in para. 15(a), (b), or (c) are provided compensation for loss of assets other than land.

Resettlement Planning, Implementation, and Monitoring

1. To achieve the objectives of this policy, different planning instruments are used, depending on the type of project:
 - a) a resettlement plan or abbreviated resettlement plan is required for all operations that entail involuntary resettlement unless otherwise specified (see para. 25 and Annex A);
 - b) a resettlement policy framework is required for operations referred to in paras. 26-30 that may entail involuntary resettlement, unless otherwise specified (see Annex A; and
 - c) a process framework is prepared for projects involving restriction of access in accordance with para. 3(b) (see para. 31).
2. The borrower is responsible for preparing, implementing, and monitoring a resettlement plan, a resettlement policy framework, or a process framework (the "resettlement instruments"), as appropriate, that conform to this policy. The resettlement instrument presents a strategy for achieving the objectives of the policy and covers all aspects of the proposed resettlement. Borrower commitment to, and capacity for, undertaking successful resettlement is a key determinant of WB involvement in a project.
3. Resettlement planning includes early screening, scoping of key issues, the choice of resettlement instrument, and the information required to prepare the resettlement component or subcomponent. The scope and level of detail of the resettlement instruments vary with the magnitude and complexity of resettlement. In preparing the resettlement component, the borrower draws on appropriate social, technical, and legal expertise and on relevant community-based organizations and NGOs. The borrower informs potentially displaced persons at an early stage about the resettlement aspects of the project and takes their views into account in project design.
4. The full costs of resettlement activities necessary to achieve the objectives of the project are included in the total costs of the project. The costs of resettlement, like the costs of other project activities, are treated as a charge against the economic benefits of the project; and any net benefits to resettlers (as compared to the "without-project" circumstances) are added to the benefits stream of the project. Resettlement components or free-standing resettlement projects need not be economically viable on their own, but they should be cost-effective.

5. The borrower ensures that the Project Implementation Plan is fully consistent with the resettlement instrument.
6. As a condition of appraisal of projects involving resettlement, the borrower provides WB with the relevant draft resettlement instrument which conforms to this policy, and makes it available at a place accessible to displaced persons and local NGOs, in a form, manner, and language that are understandable to them. Once WB accepts this instrument as providing an adequate basis for project appraisal, WB makes it available to the public through its InfoShop. After WB has approved the final resettlement instrument, WB and the borrower disclose it again in the same manner.
7. The borrower's obligations to carry out the resettlement instrument and to keep WB informed of implementation progress are provided for in the legal agreements for the project.
8. The borrower is responsible for adequate monitoring and evaluation of the activities set forth in the resettlement instrument. WB regularly supervises resettlement implementation to determine compliance with the resettlement instrument. Upon completion of the project, the borrower undertakes an assessment to determine whether the objectives of the resettlement instrument have been achieved. The assessment takes into account the baseline conditions and the results of resettlement monitoring. If the assessment reveals that these objectives may not be realized, the borrower should propose follow-up measures that may serve as the basis for continued WB supervision, as WB deems appropriate (see also BP 4.12, para. 16).

Resettlement Instruments

Resettlement Plan

1. A draft resettlement plan that conforms to this policy is a condition of appraisal (see Annex A, para. 2-21) for projects referred to in para. 17(a) above. However, where impacts on the entire displaced population are minor, or fewer than 200 people are displaced, an abbreviated resettlement plan may be agreed with the borrower (see Annex A, para. 22). The information disclosure procedures set forth in para. 22 apply.

Resettlement Policy Framework

1. For sector investment operations that may involve involuntary resettlement, WB requires that the project implementing agency screen subprojects to be financed by WB to ensure their consistency with this OP. For these operations, the borrower submits, prior to appraisal, a resettlement policy framework that conforms to this policy (see Annex A, paras. 23-25). The framework also estimates, to the extent feasible, the total population to be displaced and the overall resettlement costs.
2. For financial intermediary operations that may involve involuntary resettlement, WB requires that the financial intermediary (FI) screen subprojects to be financed by WB to ensure their consistency with this OP. For these operations, the WB requires that before appraisal the borrower or the FI submit to the WB a resettlement policy framework conforming to this policy (see Annex A, paras. 23-25). In addition, the framework includes an assessment of the institutional capacity and procedures of each of the FIs that will be responsible for subproject financing. When, in the assessment of the WB, no resettlement is envisaged in the subprojects to be financed by the FI, a resettlement policy framework is not required. Instead, the legal agreements specify the obligation of the FIs to obtain from the potential subborrowers a resettlement plan consistent with this policy if a subproject gives rise to resettlement. For all subprojects involving resettlement, the resettlement plan is provided to WB for approval before the subproject is accepted for WB financing.
3. For other WB-assisted projects with multiple subprojects that may involve involuntary resettlement, WB requires that a draft resettlement plan conforming to this policy be submitted to WB before appraisal of the project unless, because of the nature and design of the project or of a specific subproject or subprojects
 - a) the zone of impact of subprojects cannot be determined, or
 - b) the zone of impact is known but precise sitting alignments cannot be determined. In such cases, the borrower submits a resettlement policy framework consistent with this policy prior to appraisal (see Annex A, paras. 23-25). For other subprojects that do not fall within the above criteria, a resettlement plan conforming to this policy is required prior to appraisal.
4. For each subproject included in a project described in para. 26, 27, or 28 that may involve resettlement, WB requires that a satisfactory resettlement plan or an abbreviated resettlement plan that is consistent with the provisions of the policy framework be submitted to WB for approval before the subproject is accepted for WB financing.

5. For projects described in paras. 26-28 above, WB may agree, in writing, that subproject resettlement plans may be approved by the project implementing agency or a responsible government agency or financial intermediary without prior WB review, if that agency has demonstrated adequate institutional capacity to review resettlement plans and ensure their consistency with this policy. Any such delegation, and appropriate remedies for the entity's approval of resettlement plans found not to be in compliance with WB policy, are provided for in the legal agreements for the project. In all such cases, implementation of the resettlement plans is subject to ex post review by WB.

Process Framework

1. For projects involving restriction of access in accordance with para. 3(b) above, the borrower provides WB with a draft process framework that conforms to the relevant provisions of this policy as a condition of appraisal. In addition, during project implementation and before enforcing of the restriction, the borrower prepares a plan of action, acceptable to WB, describing the specific measures to be undertaken to assist the displaced persons and the arrangements for their implementation. The plan of action could take the form of a natural resources management plan prepared for the project.

Assistance to the Borrower

1. In furtherance of the objectives of this policy, WB may at a borrower's request support the borrower and other concerned entities by providing
 - (a) assistance to assess and strengthen resettlement policies, strategies, legal frameworks, and specific plans at a country, regional, or sectoral level;
 - (b) financing of technical assistance to strengthen the capacities of agencies responsible for resettlement, or of affected people to participate more effectively in resettlement operations;
 - (c) financing of technical assistance for developing resettlement policies, strategies, and specific plans, and for implementation, monitoring, and evaluation of resettlement activities;
 - (d) financing of the investment costs of resettlement.
2. WB may finance either a component of the main investment causing displacement and requiring resettlement, or a free-standing resettlement project with appropriate cross-conditionality, processed and implemented in parallel with the investment that causes the displacement. WB may finance resettlement even though it is not financing the main investment that makes resettlement necessary.

Refer also to Annex A – Involuntary Resettlement Instruments.

3.6.4.1.5 O.P 4.20 Gender and Development

1. The objective of the Bank's gender and development policy is to assist member countries to reduce poverty and enhance economic growth, human well-being, and development effectiveness by addressing the gender disparities and inequalities that are barriers to development, and by assisting member countries in formulating and implementing their gender and development goals.
2. To this end, the Bank periodically assesses the gender dimensions of development within and across sectors in the countries in which it has an active assistance program. This gender assessment² informs the Bank's policy dialogue with the member country.
3. The Bank's Country Assistance Strategy (CAS) draws on and discusses the findings of the gender assessment.
4. In sectors and thematic areas where the CAS has identified the need for gender-responsive interventions, the Bank's assistance to the country incorporates measures designed to address this need. Projects in these sectors and thematic areas are designed to adequately take into account the gender implications of the project.
5. The Bank regularly monitors the implementation of this policy.

3.6.5 WORLD BANK GUIDANCE DOCUMENTS

Three World Bank Guidance Documents of particular relevance to B4WSP have been identified. These are:

- h. Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx
- i. Good Practice Note – Addressing Gender Based Violence in Investment Project Financing involving Major Civil Works, and
- j. Recommendations Document – Working Together to Prevent Sexual Exploitation and Abuse

3.6.5.1 Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx

Bank-financed investment projects often involve construction of civil works for which the required labour force and associated goods and services cannot be fully supplied locally. In such cases, the labour force (total or partial) needs to be brought in from outside the project area. The rapid migration to and settlement of workers and followers in the project area is called labour influx, and under certain conditions, it can affect project areas negatively in terms of public infrastructure, utilities, housing, sustainable resource management and social dynamics.

3.6.5.1.1 Potential Adverse Impacts

The influx of workers and followers can lead to adverse social and environmental impacts on local communities. Such adverse impacts may include increased demand and competition for local social and health services, as well as for goods and services, which can lead to price hikes and crowding out of local consumers, increased volume of traffic and higher risk of accidents, increased demands on the ecosystem and natural resources, social conflicts within and between communities, increased risk of spread of communicable diseases, and increased rates of illicit behavior and crime. Such adverse impacts are usually amplified by local-level low capacity to manage and absorb the incoming labour force, and specifically when civil works are carried out in, or near, vulnerable communities and in other high-risk situations. While many of these potential impacts may be identified in a project's ESIA they may only become fully known once a contractor is appointed and decides on sourcing the required labor force. This means that not all specific risks and impacts can be fully assessed prior to project implementation, and others may emerge as the project progresses. Thus, measures defined in the project Environmental and Social Management Plan (ESMP) to address such problems sometimes may be insufficient. It is therefore important to develop site-specific measures before the contractor starts work, and update them as necessary to reflect project developments. Overall, adequate monitoring and adaptive management of the potential impacts from labour influx are key to properly addressing them and mitigating risks.

3.6.5.1.2 Assessment and Management of Risks and Impacts

Key principles to properly assessing and managing the risks of adverse impacts on communities that may result from temporary project induced labor influx include:

- k. **Reduce labor influx by tapping into the local workforce.** The most effective mitigation measure against labor influx is to avoid or reduce it. Depending on the size and the skill level of the local workforce, a share of the workers required for the project may be recruited locally. This is generally easier for unskilled workers, while more specialized staff (typically required in smaller numbers) frequently will be hired from elsewhere;
- l. **Assess and manage labor influx risk based on appropriate instruments.** The assessment and management of labor influx should be based on risks identified in the ESIA (if available), other Bank-required assessments, and the Bank's sector-specific experience in the country. Depending on the risk factors and their level, appropriate mitigation instruments need to be developed. This may range from broad requirements set out in the ESMP in a low-risk environment, to the need to develop more specialized instruments, such as a site-specific Labor Influx Management Plan and/or a Workers' Camp Management Plan in a high-risk environment; and,

3.6.5.2 Incorporate social and environmental mitigation measures into the civil works contract. **Most adverse impacts from labor influx can only be mitigated by the contractor commissioned by the Borrower to carry out the works. It is therefore paramount that the responsibilities for managing these adverse impacts are clearly reflected as a contractual obligation, with appropriate mechanisms for addressing non-compliance. Good Practice Note –**

Addressing Gender Based Violence in Investment Project Financing involving Major Civil Works

The World Bank considers that no country, community, or economy can achieve its potential or meet the challenges of the 21st century without the full and equal participation of women and men, girls and boys. Thirty-five percent of women worldwide have experienced either non-partner sexual violence or physical and/or sexual intimate partner violence, both manifestations of Gender-Based Violence (GBV). GBV is an umbrella term for any harmful act that is perpetrated against a person's will and that is based on socially ascribed gender differences. GBV includes acts that inflict physical, mental, sexual harm or suffering; threats of such acts; and coercion and other deprivations of liberty, whether occurring in public or in private life. Major civil works can exacerbate the risk of GBV in both public and private spaces by a range of perpetrators in a number of ways: increased demand for sex workers; changes to patriarchal power dynamics; increased vulnerability of resettled women and children; and, increased use of potentially unsafe transport systems by women and girls.

The World Bank Good Practice Note is structured around three key steps that cover actions to be undertaken during project preparation and implementation:

- Firstly, **identify and assess** the risks of GBV, including social and capacity assessments, and include measures for their mitigation in project design. Ideally, this is done during project preparation, with the understanding that GBV risk assessment is a continuous process and should take place throughout the project life cycle as GBV can occur at any moment.
- Secondly, **address the risks** by identifying and implementing appropriate GBV risk mitigation and monitoring measures on an ongoing basis during project implementation.
- Thirdly, **respond to any identified GBV incidents**, whether related to the project or not, ensuring that effective monitoring and evaluation (M&E) mechanisms, which meet the World Bank's internal safeguard and GBV reporting requirements, are in place to report on such incidents and to monitor follow up.

3.6.5.3 Recommendations Document – Working Together to Prevent Sexual Exploitation and Abuse

Preventing or mitigating against project-related risk of sexual exploitation and abuse requires interaction and collaboration between five key groups of actors. These include:

- i. women and children at risk, as well as other vulnerable populations, in communities where Bank-financed projects take place;
- ii. communities that can play a role as dynamic risk management actors in expanding the circle of protection;
- iii. contractors and consultants responsible for following contractually mandated social and labour practices that prevent abuse and violence;
- iv. government partners at central and local levels who are critical to ensuring that SEA prevention and accountability mechanisms are in place; and,
- v. the World Bank, which can put in place the policies and systems to prevent such incidents and play a convening role to facilitate partnerships that allow each of these actors, including the World Bank itself, to take on their respective roles and accountabilities to protect women and children from grievous harm.

3.6.5.3.1 At the Centre: Women and Children at Risk

Violence against women and children—and sometimes even against men—contributes to enduring physical and mental harm. Identifying and understanding the risk to women and children, as well as to other vulnerable populations, of SEA and GBV is challenging yet critical. Risk factors are myriad and cut across multiple spheres, including at the individual, relationship, community, institutional and policy levels.

Identifying and mitigating SEA and GBV risks in World Bank projects requires development of a robust risk assessment methodology, with a rating of “High Risk” of SEA/GBV triggering actions in project design and supervision. It will be critical in High Risk environments to educate and raise awareness of women, adolescents and children about risks of SEA and their legal rights.

3.6.5.3.2 The Community: A Risk Management Partner

Community settings and norms can both contribute to and mitigate against the risk of SEA. The community context in which social relationships occur—such as families, schools, neighbourhoods, and workplaces—influences incidence of, and tolerance for, violence. At the same time, community members are often the most knowledgeable about locally relevant risk and protective factors and are critical stakeholders in preventing and responding to SEA. For these reasons, communities can serve as a rich source of information about the local context and as critical partners to the government, the implementing partner and the Bank in the design and implementation of projects.

To foster a continuous and dynamic partnership with community actors to prevent and respond to SEA and build community resilience, community partners should be identified through a scanning and mapping exercise that should be integrated into risk assessment methodologies.

3.6.5.3.3 Contractors and Consultants: Accountable Partners

Construction companies and supervisory engineering firms play a central role in the implementation and management of project activities; their performance is critical to strategies to prevent SEA in infrastructure and related projects.

Under the new Procurement Framework, social risk mitigation and related contractor obligations are built into Standard Bidding Documents. Of note, Contractors are required to have sexual harassment policies and worker's Codes of Conduct. It is recommended that Codes of Conduct include specific prohibitions against SEA, including prohibition of sexual activities with children, defined as anyone younger than 18. This standard must hold even when national standards, laws and policies have a younger age of consent.

3.6.5.3.4 Working Together to Prevent Sexual Exploitation and Abuse

In addition, for High Risk Projects, there should be a requirement that contractors demonstrate that they have the capacity to manage SEA risks, including prevention and response action plans and key staff with appropriate technical skill and experience, as well as training and awareness-raising programs for workers. In High Risk Projects, contracts for Supervisory Engineers should set explicit expectations for monitoring contractor performance of its SEA obligations, with a protocol in place for immediate, timely, mandatory and confidential reporting in case of incidents. Oversight should be further strengthened by using Third-Party Monitoring for High Risk Projects, with a focus on ensuring that provisions to prevent and respond to SEA are in place and functioning. The selection of a Third-Party Monitor should respond to the project context, scope and reality on the ground and may include a civil society organization, international or local nongovernmental organization (NGO), academic partner, private sector firm or dispute board mechanism. Finally, the Bank should work with industry to raise the bar by partnering with leading contractors, consultants and industry associations to develop an industry engagement and capacity building plan for prevention of SEA. The goal is to build a coalition of industry partners to champion change, support development of best practices, and develop learning and tools.

3.6.5.3.5 The Government: Committed and Prepared

Client governments—at the national, regional and local levels—are essential actors in preventing and responding to SEA and other forms of GBV. But the approaches recommended by the Task Force will, for many clients, be new and not well understood. The Bank should work to mobilize the government as an active partner in prevention and response to SEA and GBV and build government commitment and ownership

Technical Ministries, PIUs, and local governments should be targeted for awareness-raising and capacity-building interventions. Leveraging project launch activities, supported by specific learning modules, as an opportunity to strengthen ownership and awareness of risks can enhance country capacity to address SEA. Project-level Grievance Redress Mechanisms, which are the responsibility of Government, should integrate protocols to track complaints related to SEA—ensuring confidentiality and anonymity—including a feedback system for regular and timely feedback on actions taken to respond to complaints. The Bank should support government efforts to broaden their response to SEA and GBV by establishing linkages between project-level activities and existing

national policies and frameworks as an important opportunity to strengthen country-level, multi-sectoral coordination on GBV and implementation of these initiatives.

3.6.5.3.6 The World Bank: Responsible Change Agent

The World Bank has the obligation and institutional strength to serve as the link which brings all the actors—the communities where projects are located, workers, contractors and consultants, and government clients—together to protect women, children and communities against SEA. This is a challenging and sensitive issue, however, that will require Bank leadership to provide positive incentives to sustain staff attention and rigor.

3.7 GAP ANALYSIS BETWEEN WORLD BANK AND ANGOLAN ENVIRONMENTAL LEGISLATION

A comparison has been made in Table 3-5 between the triggered World Bank Safeguard Policies and Angolan legislation, as represented in the following three Angolan environmental laws:

- Law No. 5/98 of 19 June (Environmental Framework Law);
- Decree No. 51/04 of 23 July (Environmental Impact Assessment Law).
- Decree No. 59/07 of 13 July (Environmental Licensing Law).

Numbering of bullets in this section reflects World Bank numbering of the triggered Safeguard Policies described in Section 3.6. The Angolan laws and articles that match the Safeguard Policies are listed along with comments on how they compare. Please note that the gap analysis in relation to OP 4.12 Involuntary Resettlement has been carried out in the Resettlement Policy Framework document.

Angolan environmental law and World Bank triggered safeguard policies both apply to the project. In circumstances where there may be a discrepancy between Angolan environmental law and World Bank safeguard policies, the World Bank safeguard policies must still be met.

Table 3-5: Comparison between World Bank Regulation and Angolan Legislation

	World Bank	Angola Legislation	Comment
4.01	Environmental Assessment		
1.	Requirement for Environmental Assessment	<ul style="list-style-type: none"> • Law No. 5/98 of 19 June (Environmental Framework Law); • Article 5 (Goals and Measures). • Decree No. 51/04 of 23 July (Environmental Impact Assessment Law). • Decree No. 59/07 of 13 July (Environmental Licensing Law). 	<p>Angola environmental legislation requires EIA. Following EIA review, if a project achieves consent, an installation license will be issued. (Article 8, 59/07)</p> <p>A project operational license is only issued if the developer has adhered to the commitments identified in the EIA (Article 13, 59/07; and Article 23, 59/07).</p>
2.	Environmental Assessment process	<ul style="list-style-type: none"> • Decree No. 51/04 of 23 July (Environmental Impact Assessment Law). • Article 6 (Environmental Impact Study) • Article 7 (Technical Activities of the EA study) • Law No. 5/98 of 19 June (Environmental Framework Law); • Article 5 (Goals and Measures). • Article 4 (Specific principles), part (c) “prevention - any action or actions... should be considered in advance, and in so doing they are eliminated or the possible harmful effects are minimised. 	<p>Angola environmental legislation does not specifically note that preventative measures are favourable over mitigatory / compensatory measures (where feasible).</p>
3.	Environmental Assessment scope.	<ul style="list-style-type: none"> • Decree No. 51/04 of 23 July (Environmental Impact Assessment Law). • Article 6 (Environmental Impact Study) • Article 7 (Technical Activities of the EA study) 	<p>Angola environmental legislation does not specifically address:</p> <p>Human health and safety Involuntary resettlement Indigenous peoples Transboundary aspects Global aspects Adherence to the requirements of signed international treaties and agreements</p>
4.	Category A projects and borrower responsibility	<ul style="list-style-type: none"> • Decree No. 51/04 of 23 July (Environmental Impact Assessment Law). • Article 8 (Cost of Environmental Impact Study) – to be borne by the developer. • Decree No. 59/07 of 13 July (Environmental Licensing Law). • Chapter IV, Articles 29, 30, 31 specify the requirements of environmental consultants 	<p>Angola environmental legislation does not specifically require:</p> <p>independent EA experts not affiliated with the project; the need for an independent advisory panel where Cat A projects are highly risky or contentious;</p>
5.	World Bank advice to borrower.	<ul style="list-style-type: none"> • Generally not applicable. • Decree No. 51/04 of 23 July (Environmental Impact Assessment Law). • Article 10 (EIA requires mandatory public consultations) 	
6.	Pollution Prevention and Abatement	<ul style="list-style-type: none"> • Generally not present in Angolan EIA legislation. • Law No. 5/98 of 19 June (Environmental Framework Law); • Article 19 	<p>Article 19 of the Environment Framework Act recognises the seriousness of pollution. Clause 2 of</p>

	World Bank	Angola Legislation	Comment
			<p>Article 19 allows for the promulgation of pollution control legislation to address the production, discharge, deposit, transport and management of gaseous, liquid and solid pollutants. Clause 3 states that the government will establish urban and non-urban environmental quality standards in respect of the burning of fossil fuels and Clause 4 prohibits the importation of hazardous waste except through specific legislation, approved by the National Assembly.</p> <p>However, to date, there is no specific pollution control legislation and environmental standards for Angola have not yet been developed. In the meantime, the standards established by the World Bank and World Health Organisation are applied, and most foreign companies or aid agencies apply these or the pollution control standards from their home countries.</p>
7.	EA Instruments	<ul style="list-style-type: none"> Generally not present in Angolan environmental legislation. 	Angolan EA instruments are limited to Environmental Impact Assessment (EIA).
8.	Environmental Screening	<ul style="list-style-type: none"> Decree No. 51/04 of 23 July (Environmental Impact Assessment Law). Article 4 and Annex attached to this law (Screening) 	Angolan EIA legislation identifies project types subject to EIA, but does not categorise projects into A, B, C (or similar) in terms of scale of project and anticipated impacts.
9.	EA for Special Project Types Projects Involving Subprojects	<ul style="list-style-type: none"> Generally not present in Angolan EIA legislation. 	EA for Special Project Types and Projects involving Subprojects are not described in Angolan EIA legislation.
10.	Projects Involving Financial Intermediaries	<ul style="list-style-type: none"> Generally not present in Angolan EIA legislation. 	Projects Involving Financial Intermediaries are not described in Angolan EIA legislation.
11.	Appraising Financial Intermediaries	<ul style="list-style-type: none"> Generally not present in Angolan EIA legislation. 	Projects Involving Financial Intermediaries are not described in Angolan EIA legislation.
12.	Projects in Situations of Urgent Need of Assistance	<ul style="list-style-type: none"> Decree No. 51/04 of 23 July (Environmental Impact Assessment Law). Article 4, Part 3 	Projects in situations of urgent need of assistance are limited only to national defence and security.

	World Bank	Angola Legislation	Comment
	or Capacity Constraints under OP 10.00	<ul style="list-style-type: none"> Projects considered by the Government to relate to National Defence and Security may be exempted from carrying out an EIA. 	
13.	Institutional Capacity	<ul style="list-style-type: none"> Generally not present in Angolan EIA legislation. 	Institutional capacity to carry out EA-related functions is not described in Angolan EIA legislation.
14.	Public Consultation	<ul style="list-style-type: none"> Law No. 5/98 of 19 June (Environmental Framework Law); Article 8 (Participation of Citizens) - All citizens have the right and obligation to participate in Environmental Management; Article 9 (Non-governmental Organisations) - All projects and actions whose activities affect the interests of communities / interfere with ecology and natural resources should be subject to obligatory public hearings; Article 10 (Public Consultations) - All planned actions whose activities involve community interests, interfere with the ecological balance and use of natural resources to the detriment of third parties, should be subject to Environmental and Social impact assessment processes, in which it is mandatory to practice Public Consultations. Article 32 (Participation of Communities) - To ensure the necessary participation of local communities and the proper use of their knowledge and capabilities, the Government should promote the creation of a body of community supervision officers. Decree No. 51/04 of 23 July (Environmental Impact Assessment Law). Article 10 (Public Consultations) Projects subject to EIA require mandatory public consultations promoted by the Ministry responsible for the environmental area. Public consultation starts with prior disclosure of an EIS Technical Summary which includes the most significant effects the project can generate on the environment, including the use of natural resources, emissions, creating disturbances (luminous intensity, and temperature to noise, odours) or the elimination of waste, identifying preventive methods to assess them and reduce the impact on the environment as well as impacts of the project on the socio-economic environment. Disclosure of the elements referred to above must respect business confidentiality and compliance with the legal standards. Consider use of exhibitions during public consultation and take note of project-related complaints. Public consultation must be held for a period not less than 5 nor more than 10 days for the projects described in the Annexes. Following the public consultation, a brief report detailing the steps taken, the registered participation and the conclusions drawn must be prepared within eight days. The costs of public consultations is at the developer's expense. Refer also to Point 16. Public Consultation (below). 	<p>Public consultation is widely addressed in Angolan EIA legislation. It does not however specify two phases of consultation (post-screening / pre EIA ToR) and (at Draft EA production).</p> <p>There is also no indication of consultation during project implementation within Angolan EIA legislation.</p>
15.	Disclosure	<ul style="list-style-type: none"> Decree No. 51/04 of 23 July (Environmental Impact Assessment Law). 	Information disclosure is addressed in Angolan EIA legislation. It does not however specify that information should be

	World Bank	Angola Legislation	Comment
		<ul style="list-style-type: none"> Article 14, (Public Disclosure) - The final decisions on the projects assessed under this law, and the related processes must be subject to public disclosure, subject to limitations as are determined by law. Article 21, (Right to Information) - All citizens have right of access to information related to management of the country's environment. No third party rights must harm the legally protected. Decree No. 59/07 of 13 July (Environmental Licensing Law). Article 9 (Publicity of the process and the decision) – The final decisions taken on the projects considered for the purpose of environmental licensing, as well as the respective processes, should be of public disclosure without prejudice to the limitations established by law. 	provided in a range of forms and languages as required by the consultation groups.
16.	Category A project requirements – consultation	<ul style="list-style-type: none"> Refer to Point 14. Public Consultation (above). 	Public consultation is widely addressed in Angolan EIA legislation. It does not however specify the contents of such consultation documentation, nor the locality where documents should be displayed.
17.	Category B report requirements – consultation.	<ul style="list-style-type: none"> Refer to Point 14. Public Consultation (above). 	Public consultation is widely addressed in Angolan EIA legislation. It does not however specify the contents and availability of such consultation documentation.
18.	Report disclosure on Infoshop	<ul style="list-style-type: none"> Not applicable– only of relevance to WB. 	Not applicable.
19.	Implementation	<ul style="list-style-type: none"> Law No. 5/98 of 19 June (Environmental Framework Law); Article 18 (Environmental Audits) <ul style="list-style-type: none"> 1. All activities that, at the date of entry of this law, require environmental and social protection measures as a result of environmental damage, are subject to environmental audits. 2. The costs of repairing the environmental and social damage eventually found by the audit are the responsibility of the developers. Article 30 (Environmental Inspection) <ul style="list-style-type: none"> 1. The Government should set up under the regulations, an environmental surveillance system to ensure the implementation of environmental legislation. Article 31 (Duty to Cooperate) <ul style="list-style-type: none"> 1. All persons, irrespective of their functions, are subject to environmental monitoring, and should cooperate with enforcement agents in the carrying out of their professional activities. Decree No. 51/04 of 23 July (Environmental Impact Assessment Law). Article 15 (Supervision) <ul style="list-style-type: none"> The monitoring and control of the measures laid down in this law are the responsibility of the competent services of the Ministry responsible for the environment, without prejudice to the competence of other entities. 	The need for compliance audits is well recognised in Angolan legislation, but presented more generally. WB requirements go further in stating specifically that audits should address compliance with EA commitments, the status of the defined mitigatory measures, and reporting on the findings of the monitoring programs.

	World Bank	Angola Legislation	Comment
		<ul style="list-style-type: none"> • Inspection officers shall be appointed by the Ministry responsible for the area, and it is up to them to assess violations of this law, without prejudice to the special obligation of the agents of the authority and of the citizens in general. • The investigation of infringement proceedings to this decree shall be governed by executive decree of the Minister responsible for the environment. • Article 22 (Environmental Audits) • All units in operation that are covered by the provisions of this law may be subject to environmental audits within one year after the entry into force of this decree. • The costs of repairing any environmental and social damage identified by the audits are the responsibility of the project developers. • At the end of the period indicated (paragraph 1) units that are not subject to environmental audit should conduct impact studies to determine the cumulative environmental impacts of their activities. • Subsequently, all activities covered in this law are subject to environmental audits. • Environmental audits will be performed by specialised entities, licensed by the Ministry responsible for the environment. 	
	<p>Annex A: Definitions</p> <ol style="list-style-type: none"> 1. Environmental audit 2. Environmental impact assessment (EIA) 3. Environmental management plan (EMP) 4. Environmental and social management framework (ESMF) 5. Hazard assessment 6. Project area of influence. 7. Regional EA 8. Risk assessment 9. Sectoral EA 10. Strategic environmental and social assessment (SESA) 	<ul style="list-style-type: none"> • Law No. 5/98 of 19 June (Environmental Framework Law); • Article 5 (Goals and Measures). • Article 2 (defers to glossary annex) • Annex of Definitions • Decree No. 51/04 of 23 July (Environmental Impact Assessment Law). • Article 3 Definitions • Decree No. 59/07 of 13 July (Environmental Licensing Law). • Article 1 Definitions 	<p>Angolan laws define: Environmental Audit, in 51/04 of 23 July 59/07 of 13 July EIA, in 5/98 of 19 June 51/04 of 23 July</p> <p>Angolan laws do not define: EMP Legislation only requires that compliance with the requirements of EIA are met. ESMF There are no strategic environmental management regulations Hazard Assessment No specific definition Project Area of Influence No specific definition Regional EA No specific definition, although 5/98 of 19 June recognises a National Environmental Management Programme Risk assessment No specific definition, but encompassed in 5/98 of 19 June (analysis of effects, harmful and beneficial); 51/04 of 23 July, assessment of impacts Sectoral EA No specific definition Strategic Environmental and Social Assessment (SESA) No specific definition.</p>

	World Bank	Angola Legislation	Comment
	<p>Annex B: Content of an Environmental Assessment report for a Category A project</p>	<ul style="list-style-type: none"> • Law No. 5/98 of 19 June (Environmental Framework Law); • Article 16 - Refer below to Decree No. 51/04 of 23 July, Article 9. • Decree No. 51/04 of 23 July (Environmental Impact Assessment Law); • Article 6 (Environmental Impact Study). The study must contain: <ul style="list-style-type: none"> • Project description, • EIS report, • Project alternatives including 'no project', • Identification and evaluation of environmental impacts, • Extent of geographical area (area of influence) to be directly or indirectly affected by impacts, to include humans as well as biological environment, • Consideration of project compatibility with government plans, proposed programmes and implementation in the area of influence, • Other features and characteristics of the project deemed appropriate. • Article 7 (Technical Activities in the EIS) • Assess the project area (physical, biological, socio-economic environments). • Analysis of the environmental impacts and alternatives, magnitude and significance, considering positive, negative, short, medium, long term, temporary or permanent, degree of reversibility, cumulative, synergistic, distribution of burden and social benefits. • Mitigation measures for the negative impacts • Monitoring programme – planning and monitoring of positive and negative impacts, indicating factors and parameters to be considered. • Article 9 (EIA) • The process must meet the principles and objectives set out in the Environmental Framework Law: <ul style="list-style-type: none"> • a) a non-technical summary of the project; • b) a description of the planned activities; • c) a general description of the environmental situation of the site of activity; • d) a summary of the opinions and criticisms resulting from public consultations; • e) a description of the possible environmental and social changes brought about by project; • f) indication of the measures provided to eliminate or minimise the social effects negative environmental; • g) an indication of the systems for the control and monitoring of activity. • Article 10 (Public Consultations) <ol style="list-style-type: none"> 1. Projects subject to environmental impact assessment are mandatory subject to public consultations promoted by the Ministry responsible for the environment area. 2. The public consultation starts with the prior disclosure of a technical summary of Environmental Impact Study which included the most significant effects of the project can generate on the environment, including the use of natural resources, emissions, creating disturbances (luminous intensity, and temperature to noise, odours) or the elimination of waste, identifying them preventive methods to assess and reduce the impact on the environment as well as impacts of the project on the socio-economic environment. 	<p>Absent from the Angolan legislation compared to WB requirements are:</p> <p>Policy, Legal and administrative framework Generally the specific details for what should comprise project description, baseline data, etc. The Angolan legislation is largely limited to the headings and not the details. Also lacking in Angolan legislation is a particular focus on the content of the Environmental Management Plan, although it does stress the need for mitigation and monitoring.</p>

	World Bank	Angola Legislation	Comment
		<ul style="list-style-type: none"> 3. The disclosure of the elements referred to above must respect the confidentiality industrial and compliance with the legal standards that protect expertise unpatented. 4. In the public consultation exhibitions will be considered and appreciated and complaints that are presented and are related to the project. 5. The public consultation must be held for a period not less than five nor more than 10 days in the projects described in the Annexes. 6. After the deadline for public consultation is prepared in eight days following a brief report detailing the steps taken, the registered participation and the conclusions to be drawn. 7. The costs of public consultations runs the owner's expense the work. 	
	Annex C: Environmental Management Plan	<ul style="list-style-type: none"> Decree No. 51/04 of 23 July (Environmental Impact Assessment Law); Article 7 (EIS Technical Activities) Item 4. The impact and monitoring program (positive and negative) to be elaborated, indicating the factors and parameters to be considered. 	<p>Angolan legislation does not identify the detail required for an EMP, in particular the need for:</p> <p>Mitigation summary Monitoring Institutional measures, capacity development and training Implementation schedule and costs The clear integration of the EMP with the project.</p>
4.04	Natural Habitats		
1.	The conservation of natural habitats	<ul style="list-style-type: none"> Law No. 5/98 of 19 June (Environmental Framework Law); Article 12 (Environmental Heritage) The Government must ensure that the environmental heritage, and in particular natural, historical and cultural, is the subject of permanent measures and defence appreciation, through environmental protection associations. Article 13 (Biodiversity Protection) 1. This article relates to all activities that may harm biodiversity or conservation, reproduction, quality and quantity of biological resources of current or potential use or value, especially those threatened with extinction. 2. The Government shall ensure that appropriate measures are taken with a view to: <ul style="list-style-type: none"> (a) the special protection of plant species threatened with extinction or of isolated or group botanical specimens which, because of their genetic potential, size, age, rarity, scientific and cultural value, demand it; b) Maintenance and regeneration of animal species, habitat recovery particularly by monitoring the activities or use of species and their habitats. Article 14 (Environmental Protection Areas) 1. In order to ensure the protection and preservation of environmental components and conservation and improvement of ecosystems of recognized ecological value and socio-economic, the Government establishes a network of Environmental Protection Areas. 2. Protected areas may be at national, regional, local or international level, depending on the interests they seek to safeguard and may include land, lake, river, sea and other areas. 	The conservation of environmental heritage is well described in Angolan legislation.

	World Bank	Angola Legislation	Comment
		<ul style="list-style-type: none"> 3. The environmental protection areas shall be subject to classification measures, conservation and inspection, which must always take into account the conservation of biodiversity as well as social, economic, cultural, scientific and landscape. 4. The measures referred to in the preceding paragraph shall include the prohibited or permitted activities within protected areas and in their areas, as well as an indication of the role of local communities in the management of areas. 5. The national environmental protection areas are proclaimed by the National Assembly and it is only up to it to change its status. 6. The following are considered environmental protection areas: existing on the date of the country's independence, which should be subject to reassessment, for later reclassification. 	
2.	Economic and Sector Work	<ul style="list-style-type: none"> Not applicable– only of relevance to WB. 	
3.	Project Design and Implementation	<ul style="list-style-type: none"> Law No. 5/98 of 19 June (Environmental Framework Law); Reference Articles 12, 13 and 14 above. 	
4.	WB does not support projects that, in WB's opinion, involve the significant conversion or degradation of critical natural habitats.	<ul style="list-style-type: none"> Generally not present in Angolan environmental legislation. 	
5.	Wherever feasible, WB-financed projects are sited on lands already converted.	<ul style="list-style-type: none"> Generally not present in Angolan environmental legislation. 	
6.	In deciding whether to support a project with potential adverse impacts on a natural habitat, WB takes into account the borrower's ability to implement the appropriate conservation and mitigation measures.	<ul style="list-style-type: none"> Not applicable – only of relevance to WB. 	
7.	Ensuring appropriate environmental expertise to ensure adequate design	<ul style="list-style-type: none"> Not applicable – only of relevance to WB. 	

	World Bank	Angola Legislation	Comment
	and implementation of mitigation measures.		
8.	This policy applies to subprojects under sectoral loans or loans to financial intermediaries.	<ul style="list-style-type: none"> Not applicable – only of relevance to WB. 	
9.	Policy Dialogue	<ul style="list-style-type: none"> Generally not present in Angolan EIA legislation. 	
10.	The WB expects the borrower to take into account the views, roles, and rights of groups, including local nongovernmental organizations (NGOs) and local communities.	<ul style="list-style-type: none"> Law No. 5/98 of 19 June (Environmental Framework Law); Article 8 (Citizen Participation) All citizens have the right and the obligation to participate in environmental management either through membership organisations, individually, or through consultations for scheduled public projects or through participation by those entitled by law who deem it prejudices the principles of Sustainable Development or legislation in force. Article 9 (Non-governmental organisations) Duly legalised Non-governmental associative organisations, whose programme content and social objective is to protect the environment, the use rational use of natural resources and the protection of quality of life rights, have the right to participate in Environmental Management forums. Article 10 (Public Consultations) All planned actions whose activities involve the interests of communities, or interfere with the ecological balance and use natural resources to the detriment of third parties should be subject to impact assessment processes Environmental and Social, in which it is mandatory to practice Public Consultations. Article 21 (Right to Information) Every citizen has the right of access to information relating to the country's environment, without prejudice to the rights of legally protected third parties. Article 22 (Right to Education) Everyone has the right of access to environmental education in order to ensure effective participation in environmental management. Decree No. 51/04 of 23 July (Environmental Impact Assessment Law) Article 10 (Public consultations) 1. Projects subject to environmental impact assessment are mandatory subject to public consultations promoted by the Ministry responsible for the environment area. 2. The public consultation starts with the prior disclosure of a technical summary of Environmental Impact Study which included the most significant effects of the project can generate on the environment, including the use of natural resources, emissions, creating disturbances (luminous intensity, and temperature to noise, odours) or the elimination of waste, identifying them preventive methods to assess and reduce the impact on the environment as well as impacts of the project on the socio-economic environment. 	Public participation, including NGOs, is generally well described in Angolan legislation.

	World Bank	Angola Legislation	Comment
		<ul style="list-style-type: none"> 3. The disclosure of the elements referred to above must respect the confidentiality industrial and compliance with the legal standards that protect expertise unpatented. 4. In the public consultation exhibitions will be considered and appreciated and complaints that are presented and are related to the project. 5. The public consultation must be held for a period not less than five nor more than 10 days in the projects described in the Annexes. 6. After the deadline for public consultation is prepared in eight days following a brief report detailing the steps taken, the registered participation and the conclusions to be drawn. 7. The costs of public consultations runs the owner's expense the work. Article 14 (Public Disclosure of the Decision) The final decisions on the projects assessed under this law, and the related processes must be subject to public disclosure, subject to limitations as are determined by law. Decree No. 59/07 of 13 July (Environmental Licensing Law) Article 9 (Publicity of the Process and the decision) The final decisions on the projects appreciated for the purpose of environmental licensing, as well as their reasoning processes should be disclosed publicly subject to the limitations established by law. 	
	Annex A: Definitions		
OP 4.11	Physical Cultural Resources		
1.	Introduction	<ul style="list-style-type: none"> Law No. 5/98 of 19 June (Environmental Framework Law); Article 12 (Environmental Heritage) The Government must ensure that the environmental heritage, and in particular natural, historical and cultural, is the subject of permanent measures and defence appreciation, through environmental protection associations. 	The protection of physical cultural resources is recognised as important in Angolan legislation, although descriptions of what constitutes these resources is better developed in World Bank policy.
2.	Physical cultural resources	<ul style="list-style-type: none"> Refer above to Law No. 5/98 of 19 June, Article 12. 	
3.	Objective	<ul style="list-style-type: none"> Refer above to Law No. 5/98 of 19 June, Article 12. 	
4.	Physical Cultural Resources within Environmental Assessment	<ul style="list-style-type: none"> Decree No. 51/04 of 23 July (Environmental Impact Assessment Law) Article 7 (Technical Activities of the Environmental Impact Study) 1. The environmental assessment of the project's area of influence and description, analysis environmental resources and their interactions, as they exist in order to characterise the environmental situation of the area before the project implementation, considering: <ul style="list-style-type: none"> c. The socio-economic environment, the use and occupation of land, water use and sociocultural component, highlighting the sites and monuments archaeological, historical and cultural community, relationships dependence between the local community, environmental resources and potential future use of these resources. 	

	World Bank	Angola Legislation	Comment
5.	Projects classified as Category A or B, and are subject to the provisions of this policy	<ul style="list-style-type: none"> Generally not present in Angolan environmental legislation. 	
6.	Developing TORs for the EA	<ul style="list-style-type: none"> Not applicable – only of relevance to WB. 	
7.	The borrower identifies physical cultural resources likely to be affected.	<ul style="list-style-type: none"> Refer to Decree No. 51/04 of 23 July (Environmental Impact Assessment Law) Article 7 (Technical Activities of the Environmental Impact Study) 1.c. (described above in OP 4.11 Item 4.) 	
8.	The borrower identifies appropriate measures for avoiding or mitigating these impacts.	<ul style="list-style-type: none"> Refer to Decree No. 51/04 of 23 July (Environmental Impact Assessment Law) Article 7 (Technical Activities of the Environmental Impact Study) 1.c. (described above in OP 4.11 Item 4.) Article 7 (Technical Activities in the EIS) Assess the project area (physical, biological, socio-economic environments). Analysis of the environmental impacts and alternatives, magnitude and significance, considering positive, negative, short, medium, long term, temporary or permanent, degree of reversibility, cumulative, synergistic, distribution of burden and social benefits. Mitigation measures for the negative impacts Monitoring programme – planning and monitoring of positive and negative impacts, indicating factors and parameters to be considered. 	
9.	The borrower develops a physical cultural resources management plan.	<ul style="list-style-type: none"> Not specifically addressed in Angolan environmental legislation. 	
10.	WB reviews, and discusses with the borrower, the findings and recommendations.	<ul style="list-style-type: none"> Not applicable – only of relevance to WB. 	
11.	Consultation	<ul style="list-style-type: none"> Refer to Law No. 5/98 of 19 June (Environmental Framework Law) Articles 8, 9, 10, 21, 22 described above; although not specifically addressed in relation to physical cultural resources. 	
12.	Disclosure	<ul style="list-style-type: none"> Decree No. 51/04 of 23 July (Environmental Impact Assessment Law) Article 14 Public Disclosure of the Decision) The final decisions on the projects assessed under this law, and the related processes must be subject to public disclosure, subject to limitations as are determined by law; although not specifically addressed in relation to physical cultural resources. 	

	World Bank	Angola Legislation	Comment
13.	Projects in Situations of Urgent Need	<ul style="list-style-type: none"> Decree No. 51/04 of 23 July (Environmental Impact Assessment Law). Article 4, Part 3 Projects considered by the Government to relate to National Defence and Security may be exempted from carrying out an EIA. 	Projects in situations of urgent need of assistance are limited only to national defence and security.
14.	Projects Involving Subprojects or Financial Intermediaries	<ul style="list-style-type: none"> Generally not present in Angolan EIA legislation. 	EA for Special Project Types and Projects involving Subprojects are not described in Angolan EIA legislation.
15.	Country Systems	<ul style="list-style-type: none"> Not applicable – only of relevance to WB. 	
16.	Capacity Building	<ul style="list-style-type: none"> Not applicable – only of relevance to WB. 	
17.	Consideration of broader capacity building.	<ul style="list-style-type: none"> Not considered. 	
OP 4.20	Gender and Development	<ul style="list-style-type: none"> Angola's Constitution established the right of non-discrimination on the basis of gender and subsequent laws support equal right to household assets. The 1988 Family Code (Codigo da Familia – Law No. 01/88 dated 20 February 1988) provides for the equality of women and men within marriage, the recognition of registered and common law marriage, spousal rights to separate and community property, and the obligations of spouses in the event of separation and divorce. 	<p>Article 23 of 2010 Constitution (Principle of Equality)</p> <ol style="list-style-type: none"> Everyone shall be equal under the Constitution and by law. No-one may be discriminated against, privileged, deprived of any right, or exempted from any duty on the basis of ancestry, sex, race, ethnicity, colour, disability, language, place of birth, religion, political, ideological, or philosophical beliefs, level of education or economic, social or professional status.
1.	Policy Objective	<ul style="list-style-type: none"> For information 	
2.	Assessment across Country Sectors	<ul style="list-style-type: none"> For information 	
3.	Country Assessment Strategy	<ul style="list-style-type: none"> For information 	
4.	Gender-responsive Interventions process	<ul style="list-style-type: none"> For information 	
5.	Policy implementation monitoring	<ul style="list-style-type: none"> For information 	
	Good Practice Note on Addressing Gender Based Violence (GBV)		The WB Good Practice Note for Addressing Gender-Based Violence is summarised in Section 3.6.5.2

	World Bank	Angola Legislation	Comment
1.	GBV considerations in Infrastructure Project Financing Involving Major Civil Works	<ul style="list-style-type: none"> Article 36 of the Constitution of the Republic of Angola in 2010 includes the following provisions: The right to physical freedom and individual security shall also involve: <ol style="list-style-type: none"> The right not to be subjected to any form of violence by public or private entities; The right not to be tortured or treated or punished in a cruel, inhumane or degrading manner; The right to fully enjoy physical and mental integrity; The right to protection and control over one's own body; The right not to be submitted to medical or scientific experiments without prior informed and duly justified consent. (Art. 36) Article 60 of the Constitution of the Republic of Angola in 2010 includes the following provisions: No-one shall be subjected to torture, forced labour or cruel, degrading or inhuman treatment. Article 80 of the Constitution of the Republic of Angola in 2010 includes the following provisions: Children shall have to right to receive special attention from the family, society and the state which, by working closely together, must ensure that they are fully protected against all forms of neglect, discrimination, oppression, exploitation and abuse of authority, within the family and in other institutions. 	<p>There is no specific reference to gender-oriented violence, but rather the Constitution stresses the right to physical freedom and individual security for all.</p> <p>Similarly Article 60 decrees that no-one shall be subjected to torture, but does not address gender-based torture, and Article 80 addresses the right of children, but not in relation to gender.</p>
2.	Assessing GBV Risks and Capacity to Respond		<p>There is no Angolan legislation which requires GBV to be assessed. However, a study was conducted in 1997 by the Ministry of Family and the Advancement of Women, with technical support from the Swedish International Development Agency. It would be beneficial, to B4WSP and other projects, if this survey was updated⁴,</p>
3.	Responding to GBV Incidents	<ul style="list-style-type: none"> Article 48 of the Constitution of the Republic of Angola in 2010 includes the following provisions: Any associations or groupings whose purposes or activities are contrary to the constitutional order, or which incite and practice violence, promote tribalism, racism, dictatorship, fascism or xenophobia, in addition to any military, militarised or paramilitary-type associations, shall be prohibited. Law No. 25/11 against Domestic Violence of 2011 ensures protection and assistance to victims and to punish perpetrators for acts of violence and informs victims of their rights. 	<p>There is no specific reference to how GBV is responded to under Angolan law however, Article 48 does refer to the prohibition of groups which incite or practice violence, it is assumed that this encompasses GBV.</p>

⁴ UN Women (2016) Global Database on Violence against Women. Available from: <http://evaw-global-database.unwomen.org/en/countries/africa/angola> [Accessed: 20th April 2019].

	World Bank	Angola Legislation	Comment
	Working together to prevent Sexual Exploitation and Abuse (SEA)	<ul style="list-style-type: none"> In 2005, the Government of Angola (GoA) ratified the Optional Protocol on the sale of children, child prostitution and child pornography and thus committed itself explicitly to combat sexual exploitation of children in Angola⁵. 	<p>The WB Recommendation document “Working Together to Prevent Sexual Exploitation and Abuse” is summarised in Section 3.6.5.3</p> <p>Angolan legislation focuses mainly on child victims of SEA and does not fully address the possibility of adult victims.</p>
1.	Women and Children at Risk	<ul style="list-style-type: none"> In 2014, the GoA enacted the Law No. 3/14 on crimes underlying money laundering, which criminalises all forms of trafficking including child trafficking for sexual purposes and child prostitution. The Penal Code, protects children under age 16 from child pornography, but this protection does not extend to age 18, and there are no provisions against possession of child pornography. The article 184 of the Penal Code is also relevant to protect children from online child sexual exploitation. In addition, the Law to Combat Crime in the Field of ICT and Information Society gives more details on the prohibition of distribution, possession and production of child sexual abuse materials through the Internet. Although the GoA approved the Tourism Code of Conduct against the Sexual Abuse and Exploitation of Children through Joint Executive Decree No 8/10 of 20 January in 2010 it seems that no legislation explicitly prohibits the sexual exploitation of children in the context of travel and tourism. Under the Angola Family Code, only people over the age of 18 can marry. However, child early and forced marriage is allowed in two cases: boys may marry at 16 and girls at 15 with the permission of a person having authority over the minor or when permission has not been granted. The Law No. 25/12 on the Protection and Development of the Whole Child of 2012 defines priorities and coordinates the government’s policies to combat all forms of abuse against children, including trafficking, and sexual exploitation, and aims to strengthen and harmonise legal and institutional instruments to ensure the rights of the child. It also establishes the protection of children as victims and/or witnesses in crimes and its social reintegration and, physical and psychological recovery. In addition, the law codified the “11 Commitments to Children” campaign defining 11 strategic pillars and intervention areas. Law No. 25/11 against Domestic Violence of 2011 ensures protection and assistance to victims and to punish perpetrators for acts of violence and informs victims of their rights. 	<p>However, the protection does not explicitly extend protection to children and no reporting platform (website or hotline) has been identified that is dedicated to child online protection.</p>
2.	The Community as a Risk Management Partner		<p>Angolan legislation doesn’t specify how the community should be integrated to the prevention and management of SEA incidences. This is not feasible at the national governance</p>

⁵ ECPAT (2018) Sexual Exploitation of Children in Angola. Available from: <https://www.ecpat.org/wp-content/uploads/2018/07/Child-Rights-Committee-report-on-the-Optional-Protocol-on-the-Sexual-Exploitation-of-Children-Angola.pdf> [Accessed: 20th April 2019].

	World Bank	Angola Legislation	Comment
			level and most likely needs to be followed up by provincial and municipal governance.
3.	Contractors and Consultants: Accountable Partners		Angolan legislation doesn't specify how consultants and contractors shall be responsible for the prevention of SEA incidences. A code of conduct has been developed for the B4WSP (Appendix E) which shall be signed by all contractors and consultants which specifies that all acts of GBV and SEA are unacceptable and will be severely punished.
4.	The Government: Committed and Prepared	<ul style="list-style-type: none"> In 1999, the GoA approved a Plan of Action and Intervention Against the Sexual and Commercial Exploitation of Children which included the objectives of protecting and defending the rights of child victims of sexual and commercial exploitation and rehabilitating and preventing the social exclusion of these child victims. 	
5.	The World Bank: Responsible Change Agent	<ul style="list-style-type: none"> For information. 	
	Managing the Risks of Temporary Project Induced Labour Influx	<ul style="list-style-type: none"> Decree No. 51/04 of 23 July (Environmental Impact Assessment Law). 	The WB Guidance Note for Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx is summarised in Section 3.6.5.1
1.	Potential Adverse Impacts	<ul style="list-style-type: none"> For information. 	Outside of the EIA law, which specifies the need to assess environmental and social impacts, there is no specific reference in Angolan legislation to assessing or managing the impacts of labour influx. Nevertheless these impacts have been assessed in Section 8 of the present ESIA.
2.	Assessment and Management of Risks and Impacts	<ul style="list-style-type: none"> For information. 	

3.8 B4WSP PERMIT AND LICENSE REQUIREMENTS

EPAL operates under a Presidential Decree that gives it the right to abstract and treat water throughout the province of Luanda. Few formal licenses and permits are therefore required. However EPAL must still follow a procedure for land acquisition, construction, road closures and water quality.

Article 23 of Lei n.º 6/02 de 21 de June (Water Law) stipulates that “It is the responsibility of the institution responsible for the management of water resources in the basin to define the quantitative limits and means used for common use”. In addition, for private use, Article 24 states that “Any persons, whether natural or legal, public or private, national or foreign, duly authorized, shall have access to private use, under the terms of this and other applicable legislation”. With regards to quantitative limits, although the total volume of water that may be abstracted has not been indicated, as referenced in Section 2.2.1, taking the lowest-on-record dry-season flow as a reference point, and the BITA project design capacity of 6 m³/s, this represents less than 5% of that flow. It can therefore be comfortably stated that the hydrological impacts of the Bitá project diversion will be non-significant, even during very dry years.

Land for EPAL operations can be acquired in a number of ways depending on the ownership status of the previous occupant. For land held by formal rights holders, EPAL negotiate directly with the land holder. For public land, or land with less than formal title or with no title at all, EPAL negotiates with the local administration, who depending on the size of the land may in turn discuss with the Provincial Governor.

The procedure for Rights of Way for transmission and distribution pipelines is the same as for land for CDs. If land beyond the original plot is reserved for expansion at the same time as the original approvals are sought, further permits may be simplified or not required at all, depending on the circumstances. Approval for all EPAL projects goes through MINEA. If the expected budget exceeds AKW 1,000 million, (approximately US\$ 3.4 million) the authority of the President of the Republic is required.

Once land has been obtained and vacated, the project proponent applies for a permit to undertake geotechnical investigations from the Institute of Planning and Urban Management of Luanda. With the results from this study and a proposed design, a license to construct is issued by the same Institute after receiving the agreement of statutory consultees, notably MINAMB whose approval may be conditional on an environmental assessment.

Once the development has been approved for construction, there is little control over what is actually built or its quality, although for an industrial operation such as a water treatment works or distribution centre, MINAMB and the Ministry of Labour, Employment and Social Security will inspect the premises prior to issuing a license to operate.

For the temporary closure of unsurfaced tracks for pipeline construction, EPAL will coordinate with the public commission to obtain verbal authorisation; no formal license or written approval is required. For the closure of asphalted roads EPAL make application to the Office of Traffic and Movement of Luanda, who will coordinate with the Engineering Laboratory of Angola, the Ministry of Construction and Public Works, MINAMB, local administrations and the police. For asphalted roads a second application, to the Institute of Highways in Angola, is also required.

EPAL purchase of water treatment and disinfectant chemicals has to comply with the procedures for government procurement. EPAL makes a request to a supplier, the supplier submits an invoice, which EPAL send to the Ministry of Commerce. The Ministry sends approval to the supplier and the supplier dispatches the product to EPAL. Chemical and chlorine may be subject to government inspection.

It seems that no licenses or permits are usually required for the purchase, storage and use of low grade chemical products of the type used in construction and water treatment. However Presidential Decree No.261/11 does stipulate that water quality should be regulated and may be subject to testing before distribution.

At the present time, no licenses or permits have been required. All applicable licenses and permits necessary to fulfil the requirements of individual B4WSP Lot SoW is the responsibility of the relevant D&B contractor.

In the event that substantial and high-risk activities are identified, EPAL must ensure that appropriate permit procedures are in place, requiring daily verification and sign-off by competent health and safety officers or supervisors.

3.9 INSTITUTIONAL ARRANGEMENTS FOR ESIA IMPLEMENTATION

3.9.1 THE PROJECT IMPLEMENTATION UNIT (PIU)

To assist implement the B4WSP, EPAL will establish a Project Implementation Unit (PIU), the role of which will be to not only have oversight of all construction activities and ensure they are undertaken in accordance with the project ESMP and individual contractors' CEMPs, but also ensure land acquisition is undertaken in accordance with the recommendations of the project RPF and the subsequent RAPs. These studies shall be conducted by the EPAL appointed Environmental and Social (E&S) consultants within the PIU.

On completion of final project designs submitted by D&B contractors, the full scale of land take, asset loss and resettlement can be accurately determined. It is the responsibility of the Angolan Government, through EPAL to manage resettlement compensations, including cash payments. EPAL will be required to recruit a consultant or firm to establish a secure payment compensation mechanism, for this purpose.

The basic structure of the PIU is likely to be similar to that shown in Figure 3-1. The engineering disciplines shown are indicative, only for present purposes. Pertinent to the present discussion is the inclusion of a Community Liaison Office (CLO) to handle in a sympathetic, inclusive and transparent manner, all dealing with the local communities that will be impacted by B4WSP construction activities and ultimately be the project beneficiaries.

The indicative structure of the PIU, showing its institutional position in the existing EPAL organisation, and the inclusion of the Community Liaison Office (CLO) is shown in Figure 3-1. The CLO will have the following responsibilities and objectives:

- To incorporate the B4WSP ESIA and ESMP, the requirements of the World Bank and other project funding agencies, and a Quality Management System into an integrated Environmental Health and Safety Management Plan;
 - Provide a focal point of contact and coordination for safeguarding issues including those relating to the project's environment impacts, social impacts (including resettlement) and its Grievance Redress Mechanism (GRM); To oversee implementation of the project ESIA, ESMP and SCEP, and the contractors' CEMPs and RAPs, coordinating the development of lot-specific ESIAs and RAPs once the design work for each is complete, and bringing the results together as a combined Final ESIA and RAP/ARAP;
 - To undertake monitoring of ESIA and RAP/ARAP implementation to verify they comply with World Bank requirements;
 - To ensure that all contractors have obtained all the environmental licenses/permits prior to commencement of works and that the C-ESMP is approved by EPAL and World Bank; and,
 - To manage the project's Grievance Redress Mechanism (GRM), in particular, providing the GRM Secretariat, receiving and recording submitted grievances, putting them before the Grievance Committee and if necessary, the Appeals Committee, and coordinating with concerned Non-Governmental Organisations (NGOs) and Community Based Organisations (CBOs) for additional Project Affected Persons (PAP) support where necessary.
- Prior to the start of any sub-project, a meeting should be held with the *sobas* of the neighbourhoods, in order to explain the exact mechanism, as well as the identification and contacts of all the necessary stakeholders. This meeting should be accompanied by a local translator if necessary. Periodic auscultation of the communities during civil works should be taken in order to evaluate the degree of satisfaction of the communities and / or complaints / occurrences. This obligation must also be included in the contracting of supervisions.

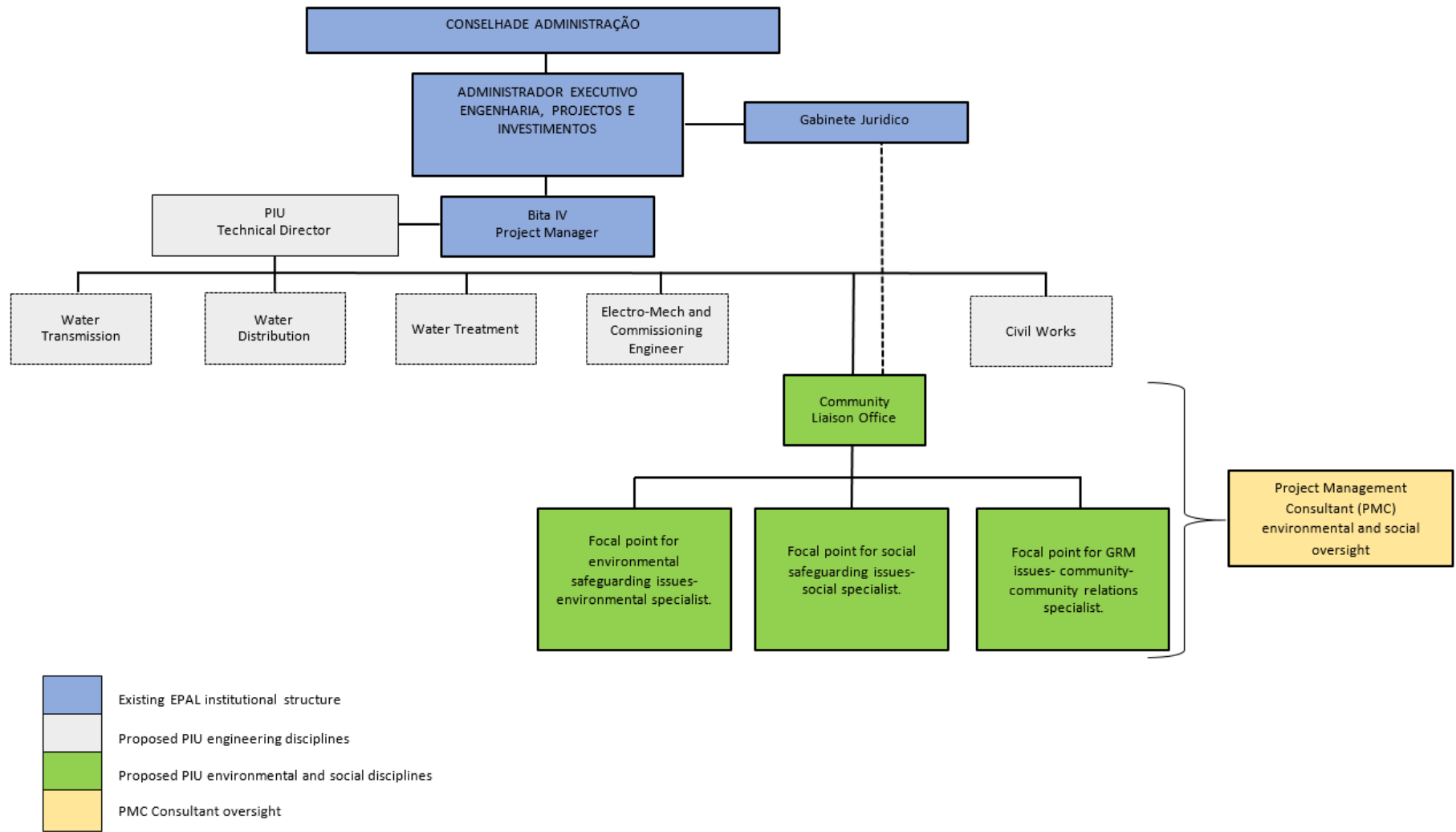


Figure 3-1: Indicative Structure of the PIU with the CLO

While EPAL does have some environmental capacity at present within its existing staffing, it is primarily concerned with water quality and other operational issues, and does not have experience of multi-contractor construction programmes such as B4WSP. The PIU will be created from within EPAL’s staff and be overseen by EPAL management. Technical assistance for this will be provided to support development of the PIU under the PDISA 2 contract (second institutional project for the development of the water sector). EPAL should decide if they wish to second their present staff to PIU, or appoint and train other staff for ongoing operational responsibilities.

The PIU within EPAL will appoint one (1) environmental and one (1) social safeguards focal points to oversee the implementation of safeguard instruments and one (1) community relations specialist in charge of the Grievance Redress Mechanisms (GRM). All three focal points shall be dedicated to the Bitu/System 4 throughout project life cycle. As EPAL has no experience with WB safeguards requirements, training and capacity building is required to ensure proper implementation of Environmental and Social safeguards instruments in compliance with the WB safeguard policies.

3.9.2 EPAL ENVIRONMENTAL HEALTH & SAFETY MANAGEMENT SYSTEM (EHSMS)

An idealised example of such an EHSMS is illustrated in Figure 3-2.

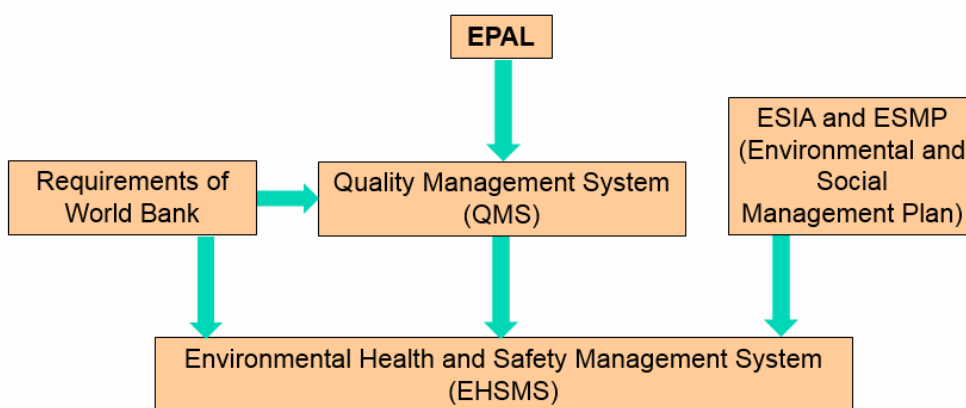


Figure 3-2: Idealised EPAL Environmental Health and Safety Management System

Figure 3-3 provides an idealised schematic demonstrating the relationship between EHSMS, ESIA and ESMP. The environmental and social risks identified in the ESIA are the starting point, but the EHSMS remains a live document, regularly updated during construction and future project operation. Without the EHSMS, success of the ESMP Construction Environmental and Social Management Plan (CESMP) and Operational Environmental and Social Management Plan (OESMP) are more doubtful.

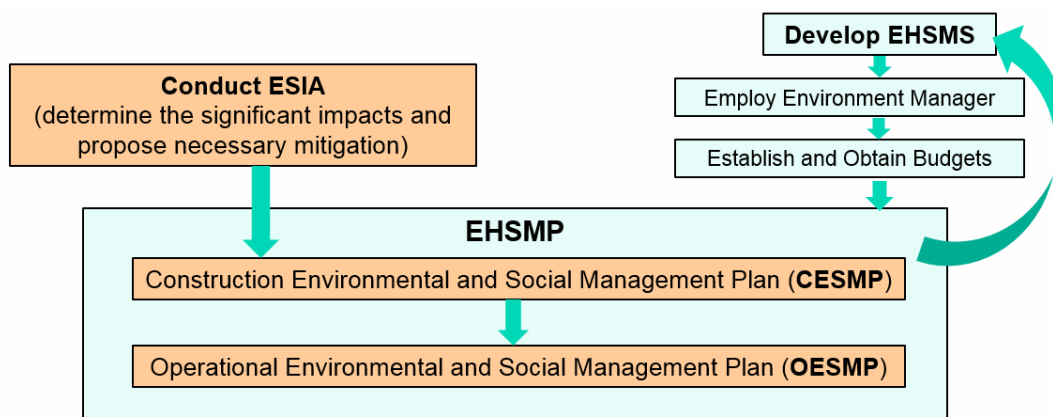


Figure 3-3: Relationship between EHSMS, ESIA and ESMP

3.9.2.1 The B4WSP EHSMS

Whilst the structure of the EHSMS will be confirmed by the PIU, it is useful to describe the generic cyclical process of operating an EHSMS. The key requirements of the Plan-Do-Check-Act (PDCA) approach are:

1. Management Commitment;
Management commitment is necessary to ensure that EHS requirements (including ESMP commitments) are sufficiently valued at all levels of the company. Issuance of a policy statement signed by management is a starting point.
2. Planning;
Planning entails taking the risk-assessed impacts and EHS / ESIA commitments and establishing a formal programme within the EHSMS to meet their delivery.
3. Implementation and Operations;
Roles and responsibilities are defined, training provided, communication mechanisms established, and the EHSMS is operationalised.
4. Checking and Corrective Action; and
Monitoring and audit are conducted, and records maintained to ensure that the EHSMS is being actioned as proposed. Corrective and preventive actions follow where this is not the case.
5. Management Review and Approval
Periodic management review and policy revision, closes the cycle and ensures management continue to be involved in this iterative process.

Figure 3-4 provides an indicative structure for implementing the ESMP. EPAL's PIU will oversee contractors and ensure that they implement the ESIA commitments, identified in the ESMP, through the Contractor developing their own CESMP that incorporates required commitments. EPAL should take advantage of the PIU responsibilities and adopt the EHSMS, OEMPs and other procedures into its existing structure to be used on future project beyond B4WSP.

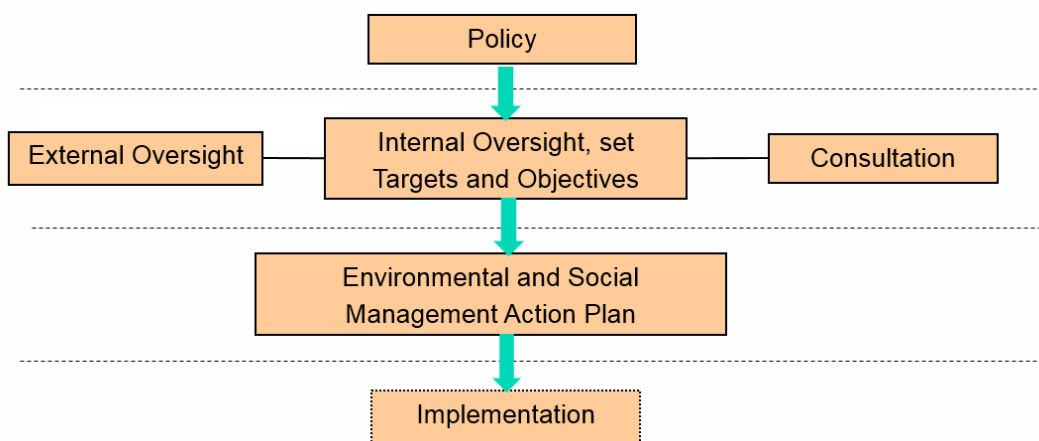


Figure 3-4: Indicative Structure for EHSMS Implementation

3.9.2.2 The Construction Environmental and Social Management Plan (CESMP)

The CESMP is developed by individual contractors from the B4WSP ESIA that is issued to inform them of the procedures / commitments they must adhere to, in order to enact the ESIA mitigation and so protect the environment and communities of the project site. Contractors will adopt the CESMP to fit their own particular systems, methods of working, staffing and construction schedule. In such cases, the contractor will submit their tailored CESMP for review and approval by the PIU. Contractors must adopt a PDCA approach through establishment of their own management system.

that follows the structure of the B4WSP EHSMS (or similar), including conducting internal audits. They will also be audited by PIU and potentially by Government Ministry auditors.

Any non-compliance by the contractor with the requirements of the ESIA will be penalised as per the relevant clauses in the contractor's contract.

3.9.2.3 Indicative CESMP Table of Contents

3.9.2.3.1 General ESMP Procedures

- Commitment & Policy Statements
- Regulatory Requirements
- Objectives, Targets and KPIs
- Implementation – Roles & Responsibilities
- Risk Assessment & Management
- Sub-Contractors' CESMPs
- Management Plans (generic structure)
- Sub-Contractor Management
- Inspection and Audit
- Grievance Mechanism
- Communications
- Monitoring, Management Review and Reporting.

3.9.2.3.2 Environmental and Social Management Practices

- Waste management
- Noise Management
- Air Quality management; etc.

3.9.2.4 The Operational Environmental and Social Management Plan

The OESMP is developed from the EIA/ESIA. It is adopted by EPAL and their operational staff to inform them of the procedures to be followed to enact ESIA mitigation. EPAL as the operator must also adopt a PDCA approach. It must conduct internal monitoring and auditing, and will also potentially be audited by external third parties (e.g. International Financial Institution (IFI) lenders, and potentially by Government Ministry auditors).

4 PHYSICAL BASELINE CONDITIONS

4.1 CLIMATE

Located some 1,000 km south of the Equator in the west coast of Africa, Luanda enjoys a hot, dry semi-arid climate modified by its proximity of the Atlantic Ocean to the north and west, and the lower floodplain of the Rio Kwanza Basin to the south. There are two distinct seasons; a dry season from May to August with temperatures 18-22°C, and a wet season from September to April, when temperatures range from 25-33°C. Average annual rainfall in Luanda is some 323 mm, variable year-on-year and lower than most adjacent areas due to the presence of the cold Benguela Current that flows northwards up the West African coast.

A summary of various climatic conditions is shown in Figure 4-1.

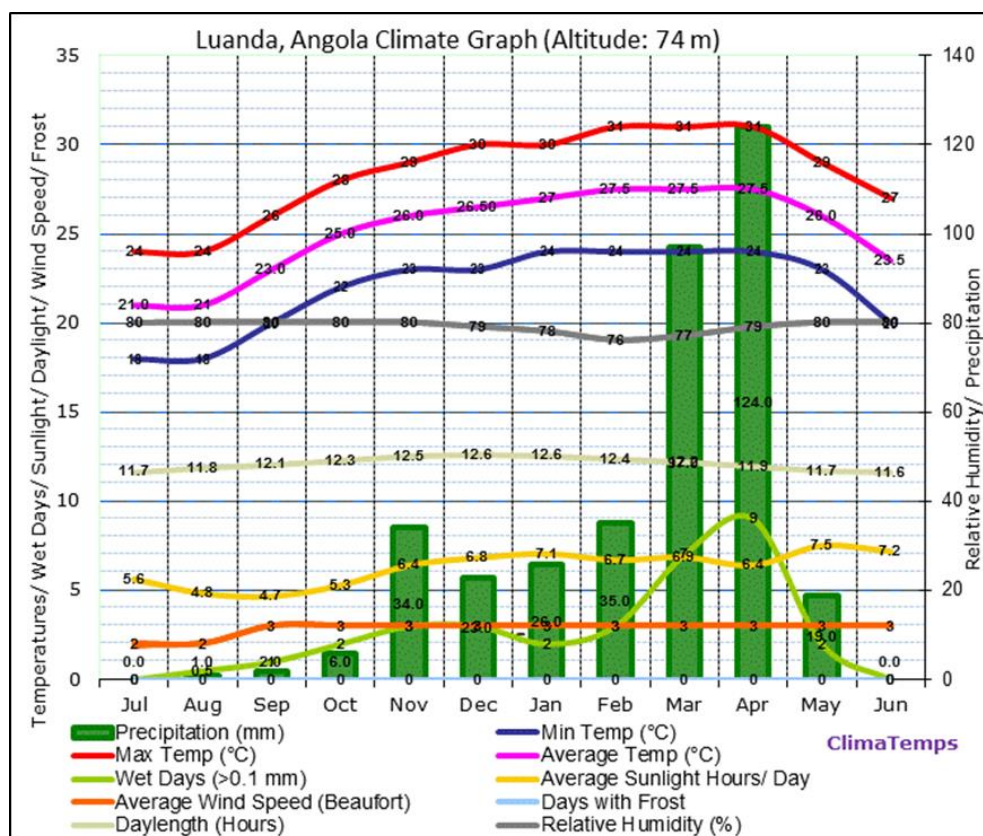


Figure 4-1: Summary of prevailing Climatic Conditions for Luanda

4.2 GEOLOGY AND SOILS

The project area is underlain by a sequence of Lower Cretaceous to Quaternary deposits that overlie the deep sub-crop of metamorphic rocks of the African Shield. Cretaceous and younger strata primarily comprise clastic and calcareous units, while the Quaternary and Recent deposits are predominantly of pluvial and alluvial origin; sands of varying grades with coarser and finer units, overlain by a broad cover of wind blow material from the Kalahari Desert.

The primary formation across the project area is the Miocene Cacuaco-Luanda Formation, in total up to 2,000 m in thickness, comprising clays, marls, gypsum, a variety of different limestones, and sandstone. The main minerals resources comprise limestone for building stone and cement, halite, and alluvial diamonds, the latter both mined and abstracted by traditional artisanal methods. Overlying these are the Middle Pliocene to Pleistocene Quelo Formation, a series of clastic formations with a maximum total thickness of some 500 m.

Within the Kwanza Basin the soils are young and poorly developed river and flood plain deposits comprising muds, sand and gravel. Beyond the flood plain, over most of the project area, the soils are either luvisols, predominantly clayey, or psamitic soils, predominantly coarser sands with a tendency to become fine with depth. Both types are of alluvial and/or fluvial origin. Both are also fertile and primarily given over to pasture. The main crop is cashew (*Anacardium occidentale*) and the most common shrub *Capparis subglabra*. Baobab trees (*Andesonia sp.*) are also common and of great community pride and value.

4.3 SEISMICITY

West Africa experiences very little seismic activity and what earthquakes do occur are of low magnitude. Only 12 earthquakes have been recorded in Angola since 1900, ranging from M 4 to M 5.3 in magnitude, and while they were of a severity that can be felt, little or no damage was caused.

The three most severe of recent earthquakes are listed in Table 4-1.

Table 4-1: Angola's Most Severe Earthquakes

Date	Magnitude	Epicenter
19 October 2001	M 5.3	179 km NW Luanda
05 June 1989	M 5.1	580 km SSE Luanda
22 February 1976	M 4.8	280 km SSW Luanda

Overall, the seismic risk to Angola and the area of the Bitá IV Water Supply Project, is low.

4.4 TOPOGRAPHY AND LANDSCAPE

The project area falls within the 'scarp savanna and woodland' eco-region that extends from the Atlantic coast to the central plateau at a height of about 1,000 m, although in Luanda Province elevations do not exceed 200 m. A variety of habitats are present; rain forest, cloud forest, grassland, mangroves and swamp. North of Rio Kwanza the landscape is dominated by tall trees surrounded by tall grasses, with areas of mangrove, reed and papyrus on river banks and in the estuary. Plate 4-1 and Plate 4-2 shown typical topography and landscape along the northern boundary of the Rio Kwanza floodplain, and the inland landscape towards Bitá.



Plate 4-1: Northern edge of the Rio Kwanza Floodplain near Bitá.



Plate 4-2: Typical Topography and Vegetation in the vicinity of Bitá CD.

Much as the fauna was decimated during the years of civil war, and illegal hunting remains a serious problem. In the area of the project, most large mammals have migrated to higher slopes and denser forest. South of the Rio Kwanza is the 9,600 km² Quiçama National Park, which is also a BirdLife International IBA. The long, thin Mussulo Peninsular, 4 km off the western Atlantic coast and connected to the mainland only at its southern end, is both an IBA and a National Nature Reserve (*Reserva Natural Integral do ilhéu dos Passáros*).

4.5 SURFACE AND GROUNDWATER

The B4WSP area is bounded to the north and west by the Atlantic Ocean; to the south and east respectively by the Rio Kwanza and Rio Bengo, both of which have their origins in the central plateau and upland to the south and east. Not surprisingly, in such an arid area, subsidiary rivers are not well developed and surface water drainage is towards the sea or the two main rivers valleys. Even local drainage channels are often not well defined as the sparse yet at times intense rainfall easily erodes the largely uncemented and poorly consolidated soil. In many places, surface drainage channel morphology is amended every rainy season.

The source of water for B4WSP will be an intake in the Lower Rio Kwanza Basin, the exact location to be determined after engineering, hydrological and other studies. The river has a catchment area of some 155,000 km² and a length of some 965 km, the lowermost 250 km of which remains navigable. In the vicinity of Bitá the Kwanza flood plain is some 3.7 km in width, the main flow channel 130 m in width, and average base flow across the year reported to be 300 m³/sec. The river and its

tributaries are subject to significant but not yet complete invasion by water hyacinth, as shown in Plate 4-3. During recent field work for the present ESIA, this tributary was also seen to be tidal, with westwards and eastwards flow observed on consecutive days.



Plate 4-3: Water Hyacinth in the Lower Rio Kwanza floodplain

The Upper and Middle Kwanza Basin currently supports three major hydropower dams shown in Figure 4-2.

- Capanda – 260 km upstream of the Bitá intake with a generating capacity of 520 MW;
- Lauca – 220 km upstream of Bitá with a capacity of 1325 MW; and,
- Cambambe – 150 km upstream, generating 260 MW.

The hydropower potential of the Rio Kwanza is substantial and several potential dam sites and operating scenarios have been studied. In addition to the three existing dams listed above, much smaller impoundments are proposed at Cacula Cabasa and Lauca, together with the three existing dams shown on Figure 4-2.

The fall in elevation between the upper three sites is shown in Figure 4-3.

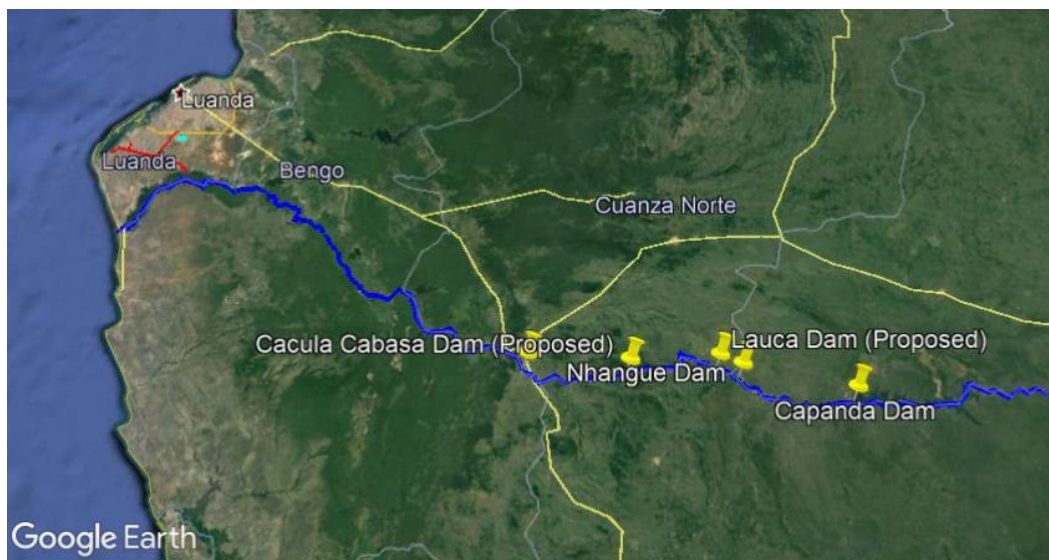


Figure 4-2: Hydropower Dams in Upper and Middle Rio Kwanza Basin

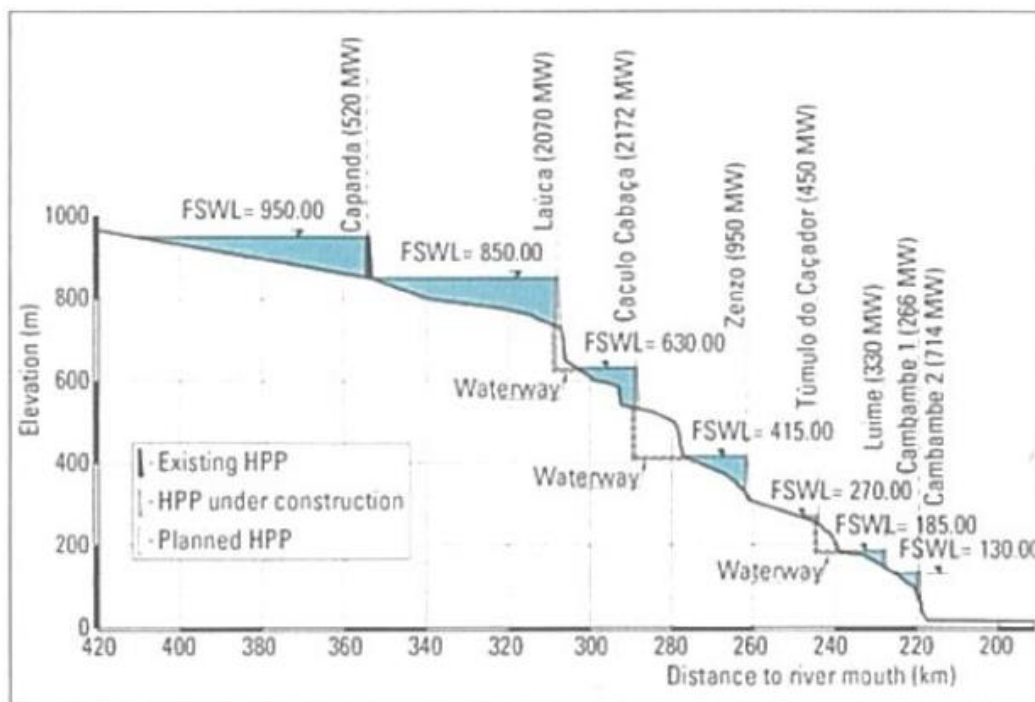


Figure 4-3: Cross Section through the Existing and Proposed Dams upstream of Cambambe

The essential characteristics of the three existing impoundments, insofar as the present ESIA has been able to confirm, are shown in Table 4-2. No Dam Break Analysis has been identified for any of the three.

Table 4-2: Dams of the Rio Kwanza

	Capanda	Lauca	Cambambe
Distance Upstream from Bitá	260 km	220 km	150 km
Catchment Area	109,022 km ²	112,617 km ²	115,524 km ²
Dam Height	132 m	132 m	110 m
Reservoir Surface Area	164 km ²	188 km ²	Not known
Reservoir Storage Volume	4,795 Mm ³	5,482 Mm ³	5,300 Mm ³
Water Surface Elevation	950 m	850 m	130 m

For the following reasons, the risk to the Bitá IV intake structure being seriously damaged or destroyed is considered to be low:

- The 10,000-year return flood for Cambambe is 9,000 m³/s. Lauca dam is designed to take a flow pressure of 11,000 m³/s and it is expected that Cambambe and Capanda are designed to similar standards⁶;
- As discussed in Section 4.3, seismic risk across Angola is low. This is confirmed by dam design studies, e.g. SRK (2013)⁷;
- Cambambe Dam, the lowest of the three existing dams, is some 150 km upstream of the Bitá IV intake; and,

⁶ The Bitá IV D&B contractor should confirm this and the missing data in Table 4.6.

⁷ SRK Consulting (South Africa), 2013. Cambamba Dam Project Phase 2: Environmental and Social Due Diligence, Final Report No. 452197, for HSNC Bank.

- The floodplain of the Lower River Kwanza Basin below Cambamba Dam widens extensively and much of the water from any dam break will be expected to spread laterally well before the Bitá IV intake.

A dam break higher in the catchment may inundate the Bitá intake but not significantly damage or destroy it. World Bank OP 4.37 Safety of Dams need therefore not be triggered for B4WSP.

Some 30 km upstream of the Bitá area are small intakes on Rio Kwanza at Bom Jesus and Quilonga Grande, and another at Calumbo, 11 km from Bitá.

The main ground water aquifer of the project area is the Middle Pliocene to Pleistocene Quelo Formation, a predominantly clastic sequence with a maximum thickness of some 500 m. Standing ground water levels are typically 60-70 m below ground level with low hydraulic gradients, 0.001-0.005, high salinities, 800-6,000 $\mu\text{S}/\text{cm}$, and permeabilities 0.004-5.3 m/d^8 . South of the center of the project area, approximately halfway between Rio Kwanza and the norther coast, is a ground water mound, shown in Figure 4-4, from where water flows towards the sea and the river.

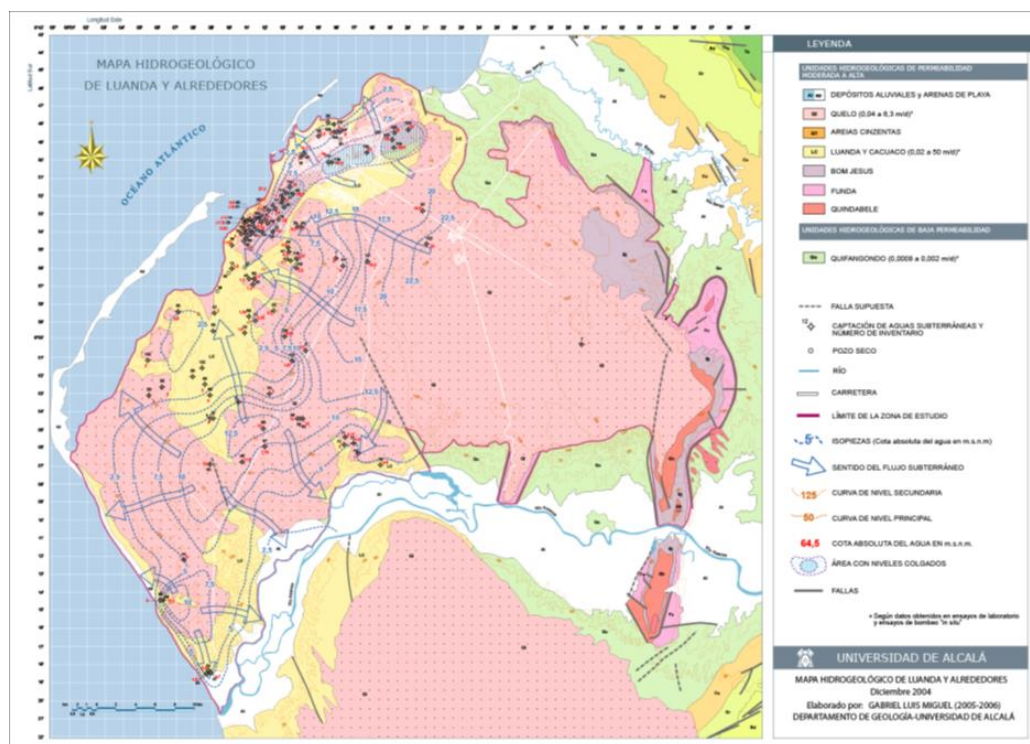


Figure 4-4: Hydrogeological Map of the Project Area and its Surroundings

4.6 DEVELOPMENT AND INFRASTRUCTURE

Angola has undergone enormous socio-economic upheaval since the end of the civil war in 2002, when people flocked to the capital and its surrounding areas in the belief it was safer than other parts of the country. Electricity and potable water are scarce, and the majority of the city's population live in informal settlements known as musseques. In respect of the 'greenness' of cities, Luanda ranks as average in energy and carbon dioxide, waste and sanitation, a reflection of the low emissions from power generation, but ranks well below average in land use, transport, water and environmental governance.

Given the pressing need for more water and electricity, and the daunting challenge of managing the sprawling musseques that surround the capital, the absence of a strong environmental agenda is not a surprise. The provincial government has recently published two master plans, one for the province, one for the metropolitan area, for the future development of land use, water and sanitation, transportation and energy infrastructure. There are some solar-powered traffic lights in the city and

⁸ Universidad de Alcalá. 2004. Mapa hidrogeológico de Luanda y Alrededores

some new housing developments incorporate solar power. But while several large complexes of new apartment blocks are ready for occupation, many remain empty because they often lack public transport and road links through which to access community services such as shopping centres and as yet afford little access to new employment opportunities.

UN Habitat estimates that 92% of the city's population has access to some type of sanitation, but rarely to flush systems. Drains and septic tanks are widely used in formal areas and in offices and homes it is common for WCs to be manually flushed with a bucket of water. Informal settlements often lack any sanitation infrastructure and it is often left to individuals and NGOs such as Development Workshop, to construct simple latrines.

Luanda is one of a handful of capital cities that have yet to embark on constructing a modern public transport system using subways, trams, light rail or bus rapid transit. Workers living in the new suburbs of Talatona or Zango often face a two to three or more hour commutes in and out of the city centre. The heat and humidity, the dusty streets where pavements are rare and crime is common, make walking to work impractical for many. The level of traffic congestion, poor driving habits, bad road surfaces and high temperatures do not encourage cycling.

Notwithstanding this, new roads and new housing is being constructed. There is a plan for a metro within the metropolitan area, but as yet no agreed strategy to move it forward. Government declarations highlight strategies, plans and programmes for better systems and improved services, but lack meaningful detail. See also Section 6.6.

4.7 SOLID WASTE MANAGEMENT

Poorer cities generate less waste than richer ones, and Luanda generates 292 kg/h/y, well below the world average of 408 kg/h/y. There is an operating solid waste management (SWM) system with private companies responsible for rubbish collection in most parts of the city and environmental standards for landfill and incineration sites reasonably enforced. But demand outweighs collection capacity and the accumulation of refuse in the streets is common. In informal settlements, rubbish is often dumped in open sewers and the law against littering is ignored. In sparser communities such as are found over much of the B4WSP area, there is much less waste generation, but also no collection, most being left for goats and cattle to rummage through for anything edible. Some fledgling recycling schemes have recently commenced operation.

Luanda currently has only one sanitary landfill, at Mulenvos, some 20 km NE of the city centre. Africa's largest landfill covering an area of some 110 ha, Mulenvos takes household, commercial, hospital and construction waste without separation or segregation. Opened in 2007 with a design capacity of 2,500 tonnes/day, it is now taking 7,200 t/d.

For many of the peri-urban areas throughout the B4WSP area, studies have shown that lower cost SWM solutions do work. Using a 14 ha area within the district of Cabolombo, with a population of more than 11,000 inhabitants, Russo and José (2012)⁹ showed that where informal *musseque* houses are so close together they prevent the passage of traditional waste collection vehicles, smaller vehicles and hand carts can be effectively deployed.

The study also characterised the waste generated in the *musseques* to be that shown in Figure 4-5. While the results reflect what was discarded, that the sample was collected for characterisation will have led to a higher proportion of organics and other edibles that had it remained for domestic animals, feral dogs and cats and vermin to scavenge it. See also Section 6.6.4.2.

⁹ Russo, M. and Novais, J. 2012. Low Cost Solutions for Solid Waste Management in Peri-Urban Areas of Mega-Cities in Africa: Luanda-Angola Case Study. ISWA World Solid Waste Congress, Florence, 8pp.

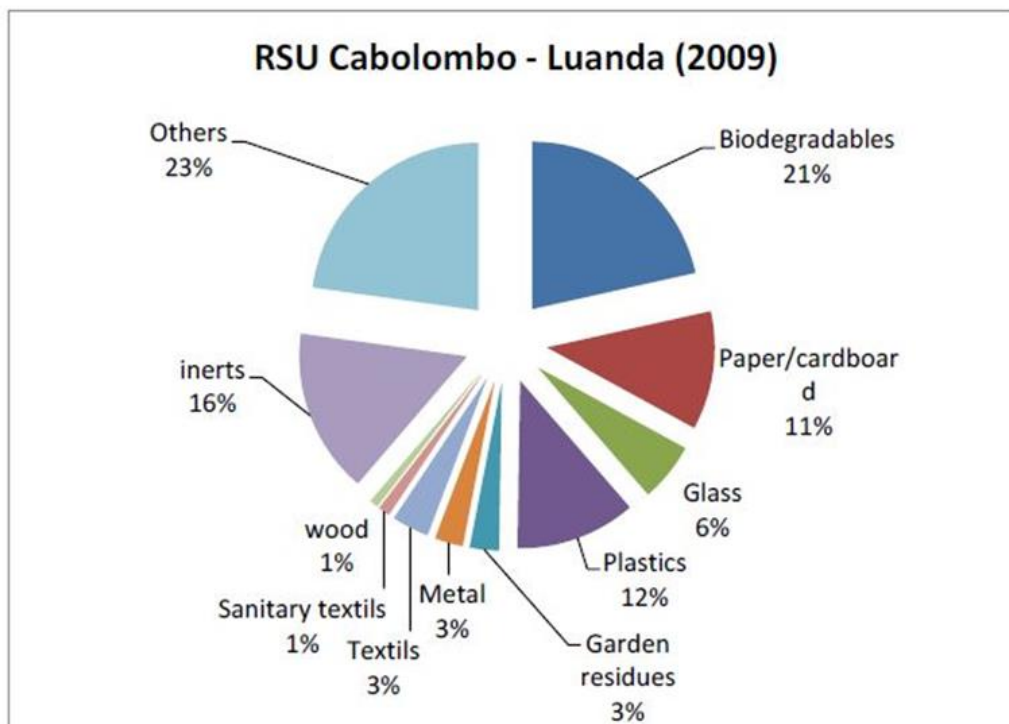


Figure 4-5: Characterisation of Cabolombo solid waste

4.8 AIR QUALITY, NOISE, DUST AND VIBRATION

With 96% of Angolan electricity being generated by hydropower, air quality should perhaps be considered good. But while this dramatically reduces carbon emissions from power generation, pollution, particularly within the urban and peri-urban areas has increased consistently with population growth, vehicle ownership and economic development. The present situation is that many industrial and commercial businesses as well as homes depend upon diesel generators, the roads are heavily congested with traffic, and vehicle maintenance, both cars and trucks. Also, in many areas, the lack of SWM capacity is resolved by residents burning accumulated refuse, as shown in Plate 4-4 rather than be subjected to odour and disease.



Plate 4-4: Burning of household refuse in the street.

At a time when most developed countries are phasing out diesel fuel, 70% of all vehicles in Angola run of diesel and the demand is increasing 6% per annum. After the Democratic Republic of Congo (DRC) and South Africa, Angola, with 4,000 deaths in 2014, has the third highest PM_{2.5} mortality rate in southern Africa.

In such an arid climate, the air is naturally dusty and on the many unsurfaced roads, typical of both main and secondary roads that serve the B4WSP area, vehicles easily raise the fine sand and dust as they speed to their destinations. On the other hand, the presence of unsurfaced roads, coupled with houses constructed from timber and galvanised steel sheets is less disturbed by vibration, such as that from passing construction traffic, than more ridged concrete buildings, and any damage that does result is readily repaired.

5 BIOLOGICAL BASELINE CONDITIONS

Under Portuguese rule, academic research developed a limited knowledge base of the flora and fauna of Angola. However, following the outbreak of civil war, from 1975 to 2002, almost all studies into the country's ecology arrested. Since the cessation of hostilities in 2002, research has slowly resumed, but the lack of national field experts and technical institutions with the capacity to undertake detailed studies is inhibiting progress. There is a general overview on plant and animal ecology at a national scale but species distributions are poorly recorded to regional or local detail. Consequently, the following biological baseline report reviews the biotic conditions of the study area and wider Luanda region but may not be entirely comprehensive.

5.1 ECOLOGICAL CHARACTER AND CONSERVATION STATUS

5.1.1 ANGOLA

Due to its size and location on the African continent, Angola encompasses a large variety of environmental settings. Angola's climatic variation exerts a strong influence on the nature of vegetation and ecosystems. Five Köppen-Geiger Climate Classes are identified across the country, ranging from hot arid desert to temperate humid highlands^{10,11}. This range results in large variability in the dominant vegetation cover across the country and the faunal communities that depend on it. The drier coastal plains exhibit deserts to the south and scrub ecosystems to the north. Inland, and at higher elevation, increased summer rainfall levels permit widespread miombo woodlands, characterised by low trees of the genus *Brachystegia*. These habitats support a high diversity of avifauna and megafauna which are globally rare and are at a greater risk of extinction^{12,13}.

5.1.2 LUANDA

The province of Luanda lies within the northern coastal plains region, typified by dry, sparse *Adansonia-Acacia* (baobab-acacia) woodland interspersed by xerophytic shrubs and grasses⁹. The region is not homogenous, however, and features mangrove swamps, saltmarshes and intertidal flats along the coast as well as freshwater marshes on floodplains. Each of these habitats support unique ecological communities that may contain many endemic species.

¹⁰ Romeiras, M.M., Figueira, R., Duarte, M.C., Beja, P. and Darbyshire, I., 2014. Documenting biogeographical patterns of African timber species using herbarium records: A conservation perspective based on native trees from Angola. *PLoS one*, 9(7), p.e103403.

¹¹ Peel, M.C., Finlayson, B.L. and McMahon, T.A., 2007. Updated world map of the Köppen-Geiger climate classification. *Hydrology and earth system sciences discussions*, 4(2), pp.439-473.

¹² Dean, W.R.J. 2000. The birds of Angola: An annotated checklist. *BOU Checklist No. 18*. British Ornithologists' Union, Herts, U.K

¹³ Ripple, W.J., Chapron, G., López-Bao, J.V., Durant, S.M., Macdonald, D.W., Lindsey, P.A., Bennett, E.L., Beschta, R.L., Bruskotter, J.T., Campos-Arceiz, A. and Corlett, R.T., 2016. Saving the world's terrestrial megafauna. *Bioscience*, 66(10), pp.807-812.

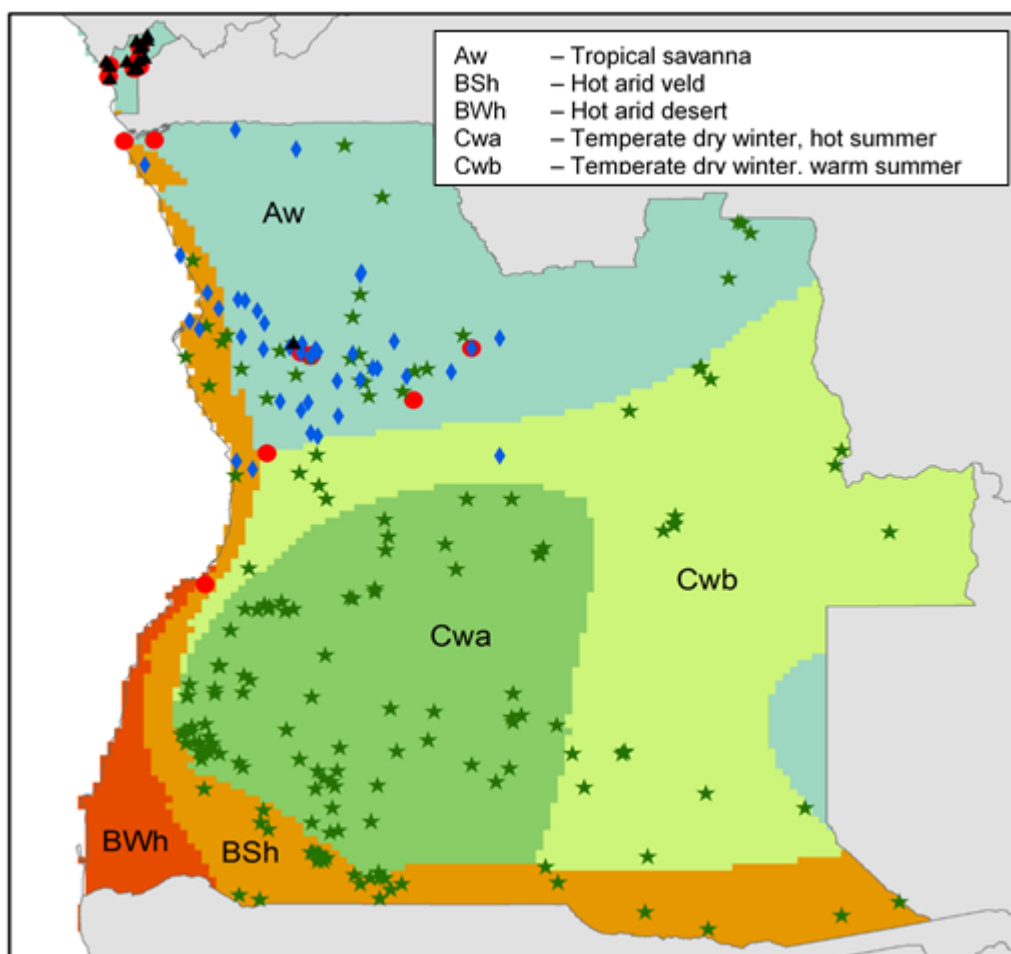


Figure 5-1: Map of Angola with coloured Koppen-Geiger Climate Classes (Symbols correspond to sampled dominant vegetation groups)

Luanda itself, however, is heavily influenced by human activity, resulting in widespread environmental degradation and reduced vegetation cover. Urbanisation, agriculture and deforestation for timber and fuel have altered the ecological community of the study area. Competition for resources and game hunting places humans in conflict with the native ecological community, reducing the range of species within the province and limiting the local biodiversity value. Conversely, human disturbance has facilitated the expansion of other plant and animal species. This may be directly through agriculture or indirectly through accidental introductions of invasive species. Nonetheless, the wider region of influence includes tracts of natural landscape that are both ecologically and economically valuable.

5.2 PROTECTED AREAS

Areas of conservation value are protected in legislature by Decree No. 43/77 of 5 May 1977. This decree defines five categories of protection, two of which are present in the area of influence of this study. National parks are defined as “areas reserved for the protection, conservation and propagation of wild animal life and indigenous vegetation, for the benefit and enjoyment of the public”. Strict nature reserves are defined as “areas for the total protection of wild flora and fauna”¹⁴.

¹⁴Jones, B.T., 2008. Legislation and policies relating to protected areas, wildlife conservation, and community rights to natural resources in countries being partner in the Kavango Zambezi Transfrontier Conservation Area. *African Wildlife Foundation and Swiss Agency for Development and Cooperation*.

5.2.1 QUIÇAMA NATIONAL PARK

Quiçama National Park is one of nine national parks in Angola, covering an area of 10,000 km². It is situated in Bengo Province, within 10km of the study area, bordered to the north by the Kwanza Rio and to the south by the Longa Rio. The park has largely preserved the natural landscape, containing a continuum of open baobab-acacia savannah mosaicing into dense miombo woodland in the east¹⁵. It was established in 1938 originally as a game reserve before it was protected as a national park in 1955. In recent decades a lack of management allowed poaching to reduce populations of elephants and Giant Sable almost to extinction. Reintroduction strategies have successfully released large animals into the environment and populations are beginning to recover¹⁶.

5.2.2 IMPORTANT BIRD AREAS

Dean (2000) identifies 23 Important Bird Areas (IBAs) in Angola, covering 6% of the country area, that are thought to support restricted-range and biome-restricted bird species, emphasising the requirement for protection and conservation of these areas³. Two of these sites are in proximity to the study area, Kisama National Park and Mussulo. Mussulo is a 35km spit protruding from the coast to the south of Luanda. The northernmost tip of the spit is 10km southwest of central Luanda. The spit shelters a large lagoon within which islets provide roosting and nesting sites for at least 61 species of congregatory water bird³. Ilheu dos Passaros is the most important of these islets. Its small size and mangrove swamps provide a source of food and shelter from disturbance and predation. The Mussulo spit itself is not protected by law, allowing for current development. Ilheu Dos Passaros, however, is protected as a Strict Nature Reserve.

5.3 HABITATS

The study area incorporates freshwater aquatic, freshwater marshland and degraded scrubland habitats. The study area's zone of influence includes some natural scrubland in Quiçama National Park, mangrove and marine habitats.

5.3.1 KWANZA WATERCOURSE

This freshwater aquatic habitat is found in the Kwanza and Luwei Rios where the Bitá Supply Intake will be situated (see Plate 5-1: view into the Kwanza floodplain). The watercourses are fast flowing but driven by the tide so that flow direction is known to alternate. Water salinity is thought to be low, but no quantitative measurements have confirmed this. The dominant flora on the watercourse is the invasive hydrophyte, *Eichhornia crassipes* (freshwater hyacinth). This species is native to the Amazon basin and may have been introduced by ships carrying propagules that have entered the Kwanza system. The hydrophyte floats on the water surface, growing rapidly and often smothering the aquatic ecosystem below (see Plate 5-2: water hyacinth on the Rio Luwei). The presence of this species indicates that average salinity of the Luwei at the intake is not greater than 4 g / litre (note average seawater is approximately 35 g / litre)¹⁷.

In terms of faunal life, the Kwanza Rio is thought to have a high number of endemic species, but this may be an effect of data deficiency with other rivers of the north-west region¹⁸. Across the course of the Kwanza Rio, 54 species of fish from 14 families have been identified. The most numerous of these belong to carp, cichlid and catfish families (Cyprinidae, Cichlidae and Clariniidae, respectively)⁶. Not all present fish are native, such as some species of tilapia (Cichlidae) that have been

¹⁵ Kuedikuenda, S.O.K.I. and Xavier, M.N., 2009. Framework report on Angola's biodiversity. *Luanda: Republic of Angola, Ministry of Environment*.

¹⁶ Zvomuya, F., 2014. Rebuilding Kissama: war-torn Angola's only national park affected by deforestation, but refaunation gives hope [online]. Available at: <https://news.mongabay.com/2014/07/rebuilding-kissama-war-torn-angolas-only-national-park-affected-by-deforestation-but-refaunation-gives-hope/> [Date Accessed: 12/07/2018].

¹⁷ De Casabianca, M.L. and Laugier, T., 1995. *Eichhornia crassipes* production on petroliferous wastewaters: effects of salinity. *Bioresource Technology*, 54(1), pp.39-43.

¹⁸ Darwall, W., Tweddle, D., Smith, K. and Skelton, P., 2009. The status and distribution of freshwater biodiversity in southern Africa. IUCN.

introduced for aquaculture¹. Both crocodiles and freshwater turtles are reported in the Kwanza, and very rarely, *Trichechus senegalensis* (African manatee). Almost no information is known about amphibian and invertebrate life in the Kwanza. The few species that are known are highly endemic, possibly only occurring in the Kwanza, such as the freshwater crab species *Potamonautes macrobranchii* and *Potamonautes kensleyi*¹⁹ (see Plate 5-3: freshwater crab).



Plate 5-1: View south into Kwanza floodplain with baobob tree (*Adansonia digitate*) in the centre-ground and Quiçama National Park on the horizon.



Plate 5-2: Rio Luwei watercourse (view south-east). Freshwater hyacinth blankets much of the water surface.

¹⁹ Cumberlidge, N. and Tavares, M., 2006. Remarks on the freshwater crabs of Angola, southwestern Africa, with the description of *Potamonautes kensleyi*, new species (Brachyura: Potamoidea: Potamonautidae). *Journal of Crustacean Biology*, 26(2), pp.248-257.



Plate 5-3: Freshwater crab in vicinity of Rio Luwei water intake.

5.3.2 KWANZA MARSHLAND

Freshwater marshes are located on the Kwanza floodplain occupying a width of 3.6 km at the Bitu Intake, but increasing up to 10 km in some areas. This area is permanently saturated with freshwater and the vegetation cover is herbaceous and dense. *Phragmites mauritianus* (common reed), *Cyperus papyrus* (papyrus), *Typha capensis* (bulrush), *Pennisetum purpureum* (Napier grass) and *Echinochloa stagnina* (burgu grass) are common native species in the habitat (see Plate 5-4 and Plate 5-5). Additionally, small plots of land are used for arable farming at the fringe of the floodplain where soil conditions are drier. *Zea mays* (maize), *Ipomoea batatas* (sweet potato), *Manihot esculenta* (cassava), *Solanum lycopersicum* (tomato), *Phaseolus* sp. (beans) and *Musa* sp. (bananas) are grown. The wetlands share their fauna with some watercourse species, namely crustaceans and crocodiles. Freshwater wetlands support the lower trophic levels on which diverse avifauna feed. Hornbills, storks, fishing owls and hawks have all been observed in the habitat³.



Plate 5-4: Kwanza marshland – reeds, sedges and bulrushes are the dominant vegetation



Plate 5-5: Papyrus thicket growing on the Kwanza marshland

5.3.3 LUANDA SCRUBLAND

The scrub habitats on the Luandan plateau are quite dissimilar to those of the Quiçama National Park. The encroachment of urban sprawl and agriculture in Luanda has altered the vegetation cover of unmanaged land and limited its ecological value (see Plate 5-6 and Plate 5-10). *Adansonia-Acacia* trees are sparser and non-native species, introduced for agriculture, are present, such as

Azadirachta indica (neem), *Anacardium occidentale* (cashew), *Mangifera indica* (mango) and *Carica papaya* (papaya). The understory vegetation is limited, most commonly *Pennisetum purpureum* (elephant grass) Much of the encroached land is managed for agriculture.

The protected scrubland of Quiçama National Park supports large herbivores such as elephants, giraffes, wildebeest and antelope, as well as their predators, lions, African wild dogs and cheetah. However, these species are absent from Luanda province, which exhibits low mammal diversity. Equally, Quiçama National Park hosts a diversity of avifauna but it is unclear how much of these species' ranges extend into Luanda and the study area.

Urban agglomerations tend to support small, generalist fauna such as rodents. Rodent predators are therefore found in the Luandan scrub as well, predominantly snakes and lizards. Cattle and goats have been introduced through agriculture and graze low-level vegetation, suppressing the growth of herbs and shrubs. Little else is known on the invertebrate component of the biota.

Patches of relatively undisturbed scrubland persist on the Luandan plateau as large private/undeveloped estates. The species composition of these areas may retain a richness comparable to Quiçama National Park, but research is required to confirm this. One such estate is located to the east and south-east of the proposed Ramiros Distribution Centre (CD Ramiros), part of which is located in Faz Sol Bairro, and alongside the final 3.5 km of the water transmission pipe leading to CD Ramiros (see Plate 5-8). This open landscape extends, relatively undisturbed, as far as the Rio Kwanza. It should be noted that this landscape, although alongside the Ramiros transmission and distribution lines, and fenced off from them, does not form part of B4WSP.

A second smaller isolated estate is located to the east and south-east of Cabolombo Distribution Centre (CD Cabolombo) in Quenguela Bairro. This estate is anticipated to be less diverse than Faz Sol, given its much smaller extent, and that it is surrounded on all sides by disturbed and part developed landscape. Similar to Faz Sol, it should be noted that this landscape, although alongside transmission and distribution lines, does not form part of B4WSP.



Plate 5-6: Disturbed scrubland with limited ecological value



Plate 5-7: Relatively Undisturbed Landscape east of CD Ramiros in Faz Sol Bairro

5.3.4 COASTAL MANGROVE

Coastal mangroves are found within the (directly and indirectly) area of influence of the Bitá Water Supply. They occur in the lowest 20km of the Kwanza floodplain, along the coast of the Mussulo lagoon and on islets within the lagoon. Mangrove swamps are intertidal wetlands dominated by halophytic shrub and tree vegetation. They are a highly specialised habitat, marking the interface between marine and terrestrial ecosystems. They exhibit limited plant diversity but support many, often endemic, animal species.

Rhizophora mangle, *Laguncularia racemosa* and *Avicennia germinans* (red, white and black mangrove, respectively) form the habitat structure and reclaim land from the sea via stabilisation of the substrate and accumulation of organic material. *Sesuvium* sp. and *Salicornia* sp. grow amongst the mangroves and marshes as surface-level vegetation. Mangroves provide habitat for crustaceans such as crabs, prawns and lobsters. Costa et al. (1994) records thirty-six species of fish in the Mussulo mangroves, of which many individuals were juveniles, highlighting the importance of this habitat as a nursery^{20,21}. Most importantly in Luanda, mangroves serve as a habitat for avifauna feeding, roosting and nesting. Sixty-one species of congregatory waterbird are known from the Ilheu Dos Passaros in flocks large enough to be important to national populations⁹.

5.3.5 COASTAL MARINE

The coastal marine habitat lies within the study area of influence. The marine life recorded along the northern Angolan coast is dependent on the convergence of the Benguela current with equatorial

20 Cosa M.J., Marques A.L.G., and Lopes M.T., 1994. Um ecosystema fragil – Baía do Mussulo, Angola. Estudo preliminar e identificação do impactes sobre os recursos naturais. Actas da 4a Conferencia nacional sobre a qualidade do ambiente, I: G-43-G-52.

21 Mumby, P.J., Edwards, A.J., Arias-González, J.E., Lindeman, K.C., Blackwell, P.G., Gall, A., Gorczyńska, M.I., Harborne, A.R., Pescod, C.L., Renken, H. and Wabnitz, C.C., 2004. Mangroves enhance the biomass of coral reef fish communities in the Caribbean. *Nature*, 427(6974), p.533.

currents⁶. This delivers nutrients to photic shallow waters, fuelling primary production. Mussulo lagoon is sheltered from the Atlantic Ocean by a spit, 35 km in length and 1 km in width, and meeting the open ocean just south of Luanda city.

Mussulo Bay supports a variety of marine life based on coral, algae and seagrass habitats. Costa et al. (2002) conducted a study of the ichthyofauna associated with seagrass (*Halodule wrightii*), recording eighteen species of fish from fourteen families²². Many of the species found were benthophagous juveniles; they conclude that the lagoon is an important nursery for reef-dwelling and pelagic fish. Five species of sea turtle are found along the coast of Angola, including the critically endangered hawksbill turtle. All five species are thought to nest in Angola. In one nesting season, one hundred and fifty-five turtle nests of various species were counted along the beaches of Luanda province, with forty-seven on Mussulo spit alone²³. Green turtles, from juvenile to mature individuals, permanently inhabit Mussulo Lagoon and olive ridley turtles are commonly found there. Nile softshell turtles are also found there, suggesting their presence is also common in the Kwanza Rio.

5.4 FLORA

Table 5-1 lists the floral species present within the study area and likely to occur in the immediate area of influence. This list is not exhaustive, and further species are likely to be present. No species are identified as threatened by the IUCN but *Eichhornia crassipes* is an invasive species with the potential to damage aquatic ecosystems.

Table 5-1: Study area plant species

Family	Species	Common Name
Acanthaceae	<i>Avicennia germinans</i>	Black mangrove
Aizoaceae	<i>Sesuvium</i> sp.	Sea purslane
Amaranthaceae	<i>Salicornia</i> sp.	Samphire
Anacardiaceae	<i>Anacardium occidentale</i>	Cashew
	<i>Mangifera indica</i>	Mango
Araceae	<i>Colocasia esculenta</i>	Taro
	<i>Elaeis guineensis</i>	Oil palm
	<i>Hyphaene guineensis</i>	Doum palm
Caricaceae	<i>Carica papaya</i>	Papaya
Chrysobalanaceae	<i>Chrysobalanus icaco</i>	Cocoplum
	<i>Parinari curatellifolia</i>	Mobola plum
Combretaceae	<i>Laguncularia racemosa</i>	White mangrove
Convolvulaceae	<i>Ipomoea batatas</i>	Sweet potato
Cymodoceaceae	<i>Halodule wrightii</i>	Shoal grass
Cyperaceae	<i>Cyperus</i> sp.	Papyrus sedges
Erythroxylaceae	<i>Erythroxylum emarginatum</i>	African coca tree
Euphorbiaceae	<i>Euphorbia ingens</i>	Candelabra tree
	<i>Manihot esculenta</i>	Cassava
Fabaceae	<i>Acacia tortilis</i>	Umbrella thorn acacia
	<i>Brachystegia spiciformis</i>	Zebrawood
	<i>Phaseolus</i> sp.	Beans
	<i>Tamarindus indica</i>	Tamarind

22 Costa, M.J., Santos, C.I. and Cabral, H.N., 2002. Comparative analysis of a temperate and a tropical seagrass bed fish assemblages in two estuarine systems: the Mira estuary (Portugal) and the Mussulo lagoon (Angola). Cahiers de Biologie Marine.

23 Carr, T. and Carr, N., 1991. Surveys of the sea turtles of Angola. Biological Conservation, 58(1), pp.19-29.

Family	Species	Common Name
Loganiaceae	<i>Strychnos spinosa</i>	Spiny monkey
Malvaceae	<i>Adansonia digitata</i>	Baobab
	<i>Sterculia setigera</i>	African star chestnut
Meliaceae	<i>Azadirachta indica</i>	Neem
Moraceae	<i>Ficus</i> sp.	Fig
Musaceae	<i>Musa</i> sp.	Banana
Myrtaceae	<i>Syzygium guineense</i>	Water berry
Nymphaeaceae	<i>Nymphaea nouchali</i>	Star lotus
Poaceae	<i>Echinochloa stagnina</i>	Burgu grass
	<i>Pennisetum purpureum</i>	Napier grass
	<i>Phragmites mauritianus</i>	Common reed
Poaceae	<i>Saccharum officinarum</i>	Sugarcane
	<i>Zea mays</i>	Maize
	<i>Eichhornia crassipes</i>	Freshwater hyacinth
Pteridaceae	<i>Acrostichum aureum</i>	Mangrove fern
Rhizophoraceae	<i>Rhizophora mangle</i>	Red mangrove
Solanaceae	<i>Solanum lycopersicum</i>	Tomato
Thyphaceae	<i>Typha capensis</i>	Bulrush
Xanthorrhoeaceae	<i>Aloe</i> sp.	Aloe

5.5 FAUNA

Table 5-2 lists the faunal species present or likely to be present in the study area and immediate area of influence. This list is not exhaustive and lacks much data on invertebrate taxa. Some of the species listed have not been reported within Luanda, but their ranges may extend there from refugia in the wider region, such as Quiçama National Park. Species indicated by *, **, *** are classified by the IUCN as ‘vulnerable’, ‘endangered’ or ‘critically endangered’, respectively. Plate 5-8 illustrates a hornbill (*Buceros* sp.), observed during surveys.

Table 5-2: Study area animal species

Family	Species	Common Name
Birds		
Accipitridae	<i>Circaetus cinereus</i>	Brown snake eagle
	<i>Gypohierax angolensis</i>	Palm-nut vulture
	<i>Gyps africanus</i> ***	White-backed vulture
	<i>Haliaeetus vocifer</i>	African fish eagle
	<i>Micronisus gabar</i>	Gabar goshawk
	<i>Polyboroides typus</i>	African harrier-hawk
Alcedinidae	<i>Ceryle rudis</i>	Pied kingfisher
	<i>Halcyon</i> sp.	Tree kingfisher
Anatidae	<i>Dendrocygna viduata</i>	White-faced whistling duck
Apodidae	<i>Apus caffer</i>	White-rumped swift
	<i>Cypsiurus parvus</i>	African palm swift
Ardeidae	<i>Ardea</i> sp.	Hérons
	<i>Ardeola ralloides</i>	Squaco heron

Family	Species	Common Name
	<i>Bubulcus ibis</i>	Cattle egret
	<i>Butorides striata</i>	Striated heron
	<i>Egretta garzetta</i>	Little egret
Bucerotidae	<i>Buceros sp.</i>	Hornbill
Charadriidae	<i>Vanellus senegallus</i>	African wattled lapwing
Ciconiidae	<i>Anastomus lamelligerus</i>	African openbill
Collidae	<i>Colius castanotus</i>	Red-backed mousebird
Columbidae	<i>Streptopelia sp.</i>	Doves
	<i>Turtur chalcospilos</i>	Emerald-spotted wood dove
Corvidae	<i>Corvus albus</i>	Pied crow
Cuculidae	<i>Centropus grillii</i>	Black coucal
Dricuridae	<i>Dicrurus adsimilis</i>	Fork-tailed drongo
Estrildidae	<i>Estrilda astrild</i>	Common waxbill
	<i>Lonchura cucullata</i>	Bronze mannikin
	<i>Uraeginthus angolensis</i>	Blue waxbill
Fringillidae	<i>Serinus mozambicus</i>	Yellow-fronted canary
Glareolidae	<i>Glareola pratincola</i>	Collared pratincole
Hirundinidae	<i>Hirundo rufigula</i>	Red-throated cliff swallow
	<i>Riparia cincta</i>	Banded martin
Jacanidae	<i>Actophilornis africanus</i>	African jacana
	<i>Merops sp.</i>	Bee-eaters
Laridae	<i>Sternula balaenarum *</i>	Damara turn
Motacillidae	<i>Anthus pallidiventris</i>	Long-legged pipit
Muscicapidae	<i>Bradornis pallidus</i>	Pale flycatcher
Nectariniidae	<i>Cinnyris bifasciatus</i>	Purple-banded sunbird
Numididae	<i>Numida meleagris</i>	Helmeted guineafowl
Passeridae	<i>Passer sp.</i>	Sparrows
Phalacrocoracidae	<i>Microcarbo africanus</i>	Reed cormorant
Phasianidae	<i>Pternistis sp.</i>	Francolins
Phoenicopteridae	<i>Phoenicopterus ruber</i>	American flamingo
Ploceidae	<i>Ploceus sp.</i>	Weavers
	<i>Quelea quelea</i>	Red-billed quelea
Rallidae	<i>Amaurornis flavirostra</i>	Black crane
Recurvirostridae	<i>Himantopus himantopus</i>	Black-winged stilt
Scolopacidae	<i>Arenaria interpres</i>	Ruddy turnstone
	<i>Tringa stagnatilis</i>	Marsh sandpiper
Sulidae	<i>Morus capensis **</i>	Cape gannet
Sturnidae	<i>Lamprotornis sp.</i>	Glossy starlings
Threskiornithidae	<i>Threskiornis aethiopicus</i>	African sacred ibis
Viduidae	<i>Vidua sp.</i>	Wydahs
<u>Fish</u>		
Cichlidae	Generic sp.	Cichlid family
Cyprinidae	Generic sp.	Carp family

Family	Species	Common Name
Clariidae	Generic sp.	Airbreathing catfish family
<u>Reptiles</u>		
Agamidae	<i>Agama sp.</i>	Lizard genus
Cheloniidae	<i>Caretta caretta</i> *	Loggerhead turtle
	<i>Chelonia mydas</i> **	Green turtle
	<i>Eretmochelys imbricata</i> ***	Hawksbill turtle
	<i>Lepidochelys olivacea</i> *	Olive ridley turtle
Colubridae	<i>Philothamnus angolensis</i>	Angolan green snake
Crocodylidae	<i>Crocodylus niloticus</i>	Nile crocodile
Dermochlyidae	<i>Dermochelys coriacea</i> *	Leatherback turtle
Elapidae	<i>Naja nigricollis</i>	Black-necked spitting cobra
Gerrhosauridae	<i>Gerrhosaurus bulsi</i>	Laurent's plated lizard
Scincidae	<i>Trachylepis acutilabris</i>	Wedge-snouted skink
Trionychidae	<i>Trionyx triunguis</i>	African softshell turtle
<u>Mammals</u>		
Cercopithecidae	<i>Chlorocebus pygerythrus</i>	Vervet monkey
Felidae	<i>Felis silvestris lybica</i>	African wildcat
Herpestidae	<i>Ichneumia albicauda</i>	White-tailed mongoose
Leporidae	<i>Lepus microtis</i>	African savanna hare
Muridae	<i>Pelomys sp.</i>	Swamp rats
Mustelidae	<i>Aonyx capensis</i>	African clawless otter
Sciuridae	<i>Paraxerus cepapi</i>	Smith's bush squirrel
Suidae	<i>Potamochoerus larvatus</i>	Bushpig
Trichechidae	<i>Trichechus senegalensis</i> *	African manatee
Viverridae	<i>Genetta sp.</i>	Genet
<u>Invertebrates</u>		
Potamonautidae	<i>Potamonautes sp.</i>	Freshwater crabs



Plate 5-8: Hornbill (*Buceros* sp.) on the northern edge of the Kwanza Floodplain.

5.6 ECOLOGICAL EXPLOITATION AND VULNERABILITY

Past urban expansion of Luanda has had a clearly detrimental effect on the terrestrial biotic community. Urbanisation has a multifaceted effect on the surrounding habitat. Subsistence farming results in land clearance and the cultivation of non-native species that can spread into the surrounding environment. Deforestation has exploited the landscape as a resource for domestic fuel and construction material. The development of tracks and, more recently, tarmac roads has fragmented continuous landscape, and is a developing problem in Quiçama National Park (Kuedikuenda and Xavier, 2009⁶). This has reduced vegetation cover and driven out native populations of medium to large mammals and avifauna. As a consequence there is limited area of real ecological value on the Luandan plateau, with the exception of private estates that may harbour a diverse animal community (see Plate 5-9 indicating terrain east of Ramiros).

The riverine and wetland habitats of the Kwanza are influenced by human activity, both directly and indirectly. The local population has a close relationship with the Kwanza Rio, exploiting it as a source of food, water for cleaning and raw material for wicker. Species of tilapia (Cichlidae) and catfish (Clariidae) are most commonly caught for food and *Trichechus senegalensis* have been known to drown after being caught in nets. There is no information on the health of fish stocks so the effect of fishing is unknown. *Phragmites mauritianus* is cut on the wetlands to create wicker and construction material. The interaction that locals have with the river inevitably results in plastic and sewage pollution to a certain extent. The degree of damage this is inflicting on the biota here has not been researched.

An indirect effect of nearby urbanisation is the introduction of invasive species to the Kwanza. The most apparent of these is *Eichhornia crassipes*. Propagules are likely to have been transported to the Kwanza through shipping in Luanda and freshwater hyacinth is now proliferating over the watercourse and on stagnant water. *E. crassipes* can potentially be very damaging to aquatic ecosystems. By covering the surface, it prevents light from penetrating into the water column to sustain benthic photoautotrophs, which are the first trophic level in aquatic systems. Upon death and decomposition, dissolved oxygen is metabolised from the surrounding water, choking aquatic life.



Plate 5-9: View east from Ramiros across private fenced land, where tree and scrub cover has proliferated due to the limitation of human access.

The populations of marine life in Mussulo lagoon are vulnerable to the effects of pollution and fishing. South Luanda has a high population density in close proximity to the coast of Mussulo lagoon. Urban effluent may enter the marine system which can threaten the avifauna on Ilheu does Passaros, and the fish populations within the lagoon. Turtles are occasionally caught, drowned, in fishing nets and their nests are dug up for egg collecting.

Despite the exploitation of the ecosystems in and around Luanda province, there is still a rich diversity of life and high levels of endemism in the freshwater, marine and wetland habitats. These environments remain vulnerable to the effects of human encroachment and must be managed accordingly with regards to current and future development.



Plate 5-10: Cassava field displaces native vegetation.

6 SOCIO-ECONOMIC CONDITIONS

This section of the report will analyse both primary and secondary data to give an accurate portrayal of the baseline socio-economic conditions in Angola, Luanda and the project area of influence specifically. Primary data will include information from a preliminary site survey, key informant interviews and a high level social survey. Secondary data, such as peer-reviewed articles, data from the World Bank and other reliable sources, will help to establish how socio-economic conditions in southern Luanda have changed over time.

6.1 SPATIAL CONTEXT

6.1.1 ADMINISTRATIVE BOUNDARIES

The Republic of Angola is made up of 18 provinces. The B4WSP area is contained solely within the province of Luanda. Luanda is sub-divided into nine municipalities; Luanda, Icolo e Bengo, Quiçama, Cacuaco, Cazenga, Viana, Belas, Kilamba Kiaxi and Talatona. However, these municipal borders have changed a number of times in recent years. Pre-2011 there were nine municipalities, all slightly different either in name or location from the current divisions as illustrated in Figure 6-1. This was then updated by the Ministry of Territorial Administration in 2011 to merge some of the municipalities in central Luanda and add Quiçama to the south of the province resulting in a total of seven municipalities (Figure 6-2).

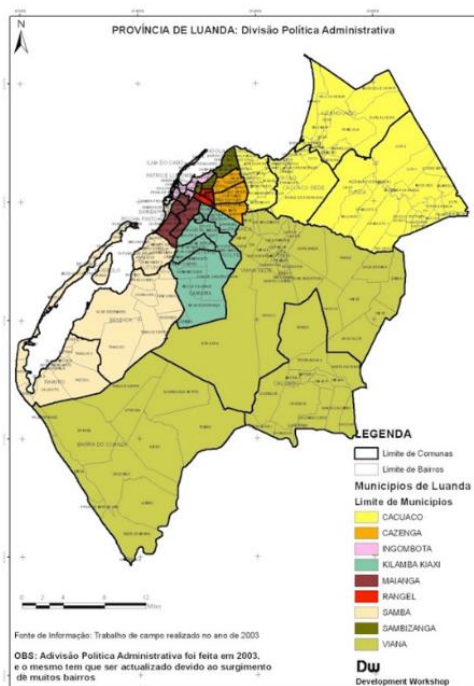


Figure 6-1: Pre-2011 municipality divisions in the province of Luanda.

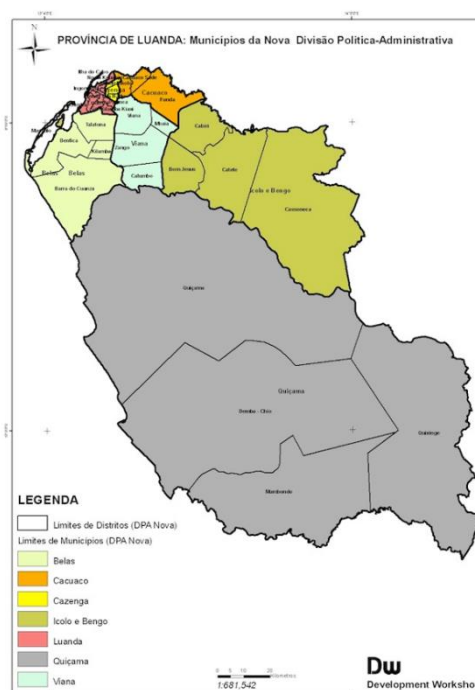


Figure 6-2: 2011-2016 municipality divisions in the province of Luanda.

The administrative divisions were then updated again in 2016, notably the central Luandan municipalities were once again divided and nine slightly difference borders were defined as shown in Figure 6-3.

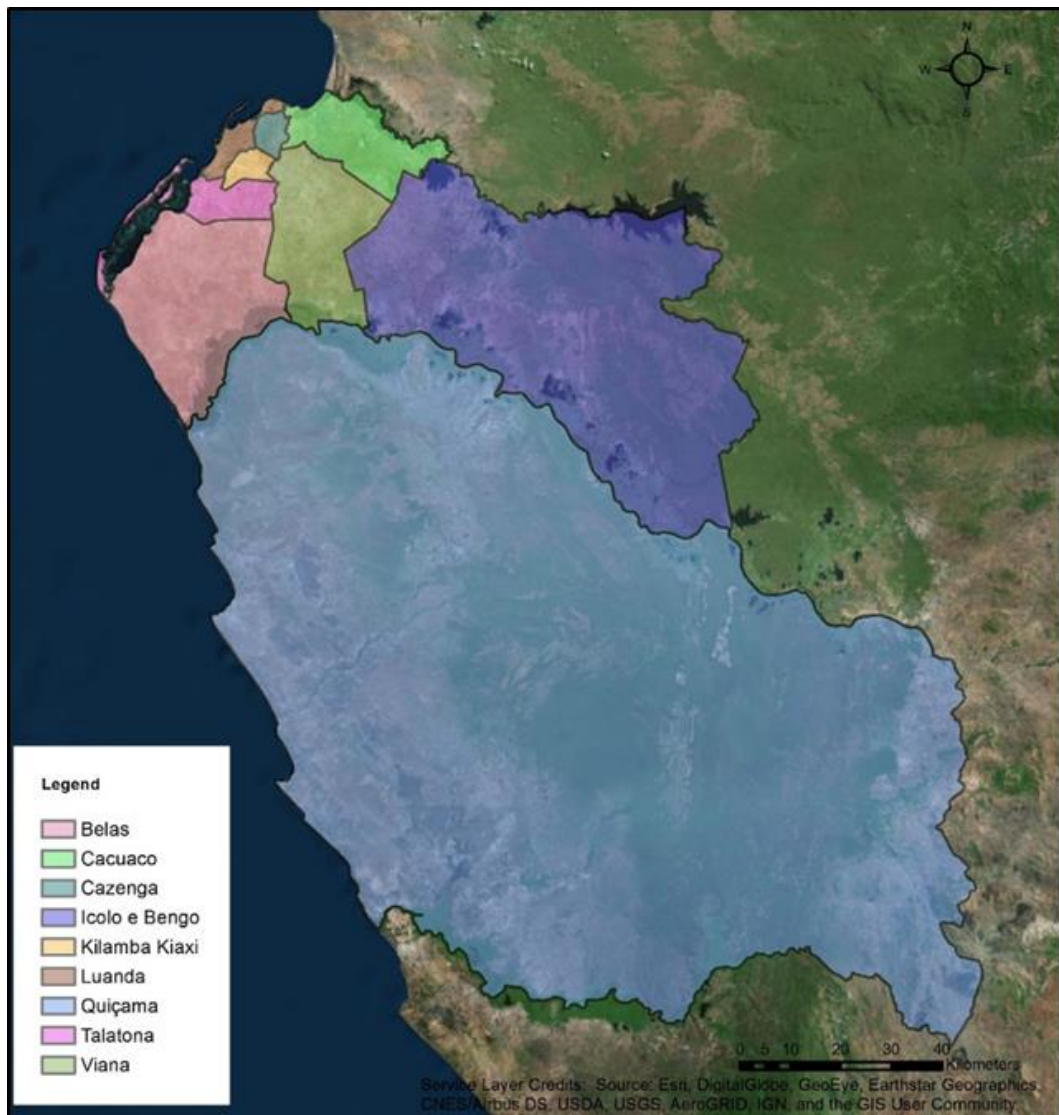


Figure 6-3: Municipalities of Luanda

Municipalities are further divided into Communes and Urban Districts. The B4WSP area is spread across three Municipalities; Belas, Viana and Talatona, each of which have one commune and six urban districts. Figure 6-4 highlights in yellow which communes and urban districts are within the B4WSP area.

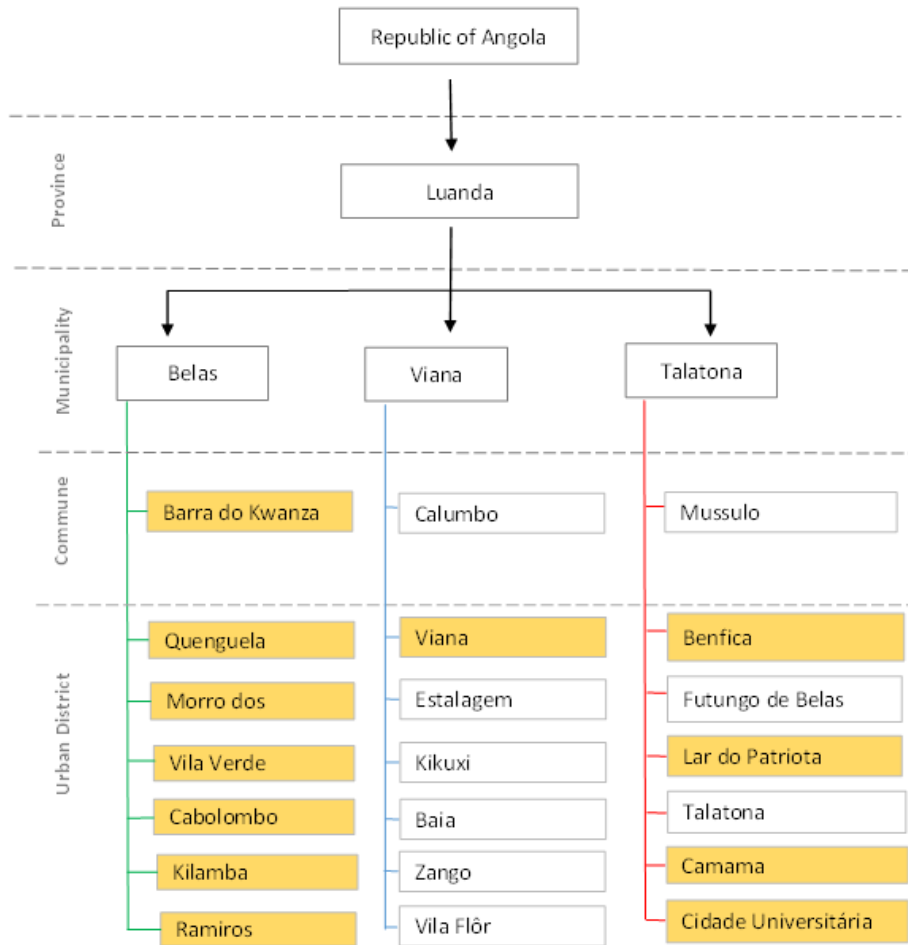


Figure 6-4: Administrative sub-divisions of Belas, Viana and Talatona Municipality.

Figure 6-5, Figure 6-6 and Figure 6-7 show Belas, Viana and Talatona and each of their Communes and Urban Districts respectively.

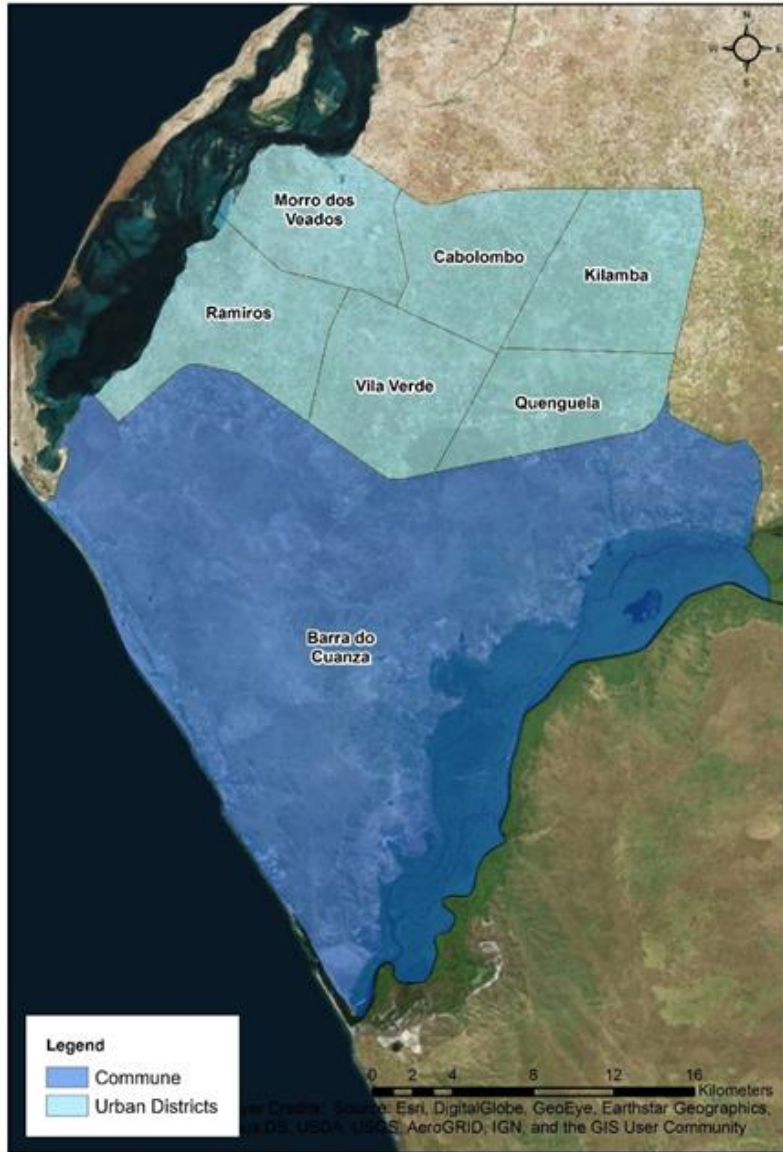


Figure 6-5: Belas Municipality

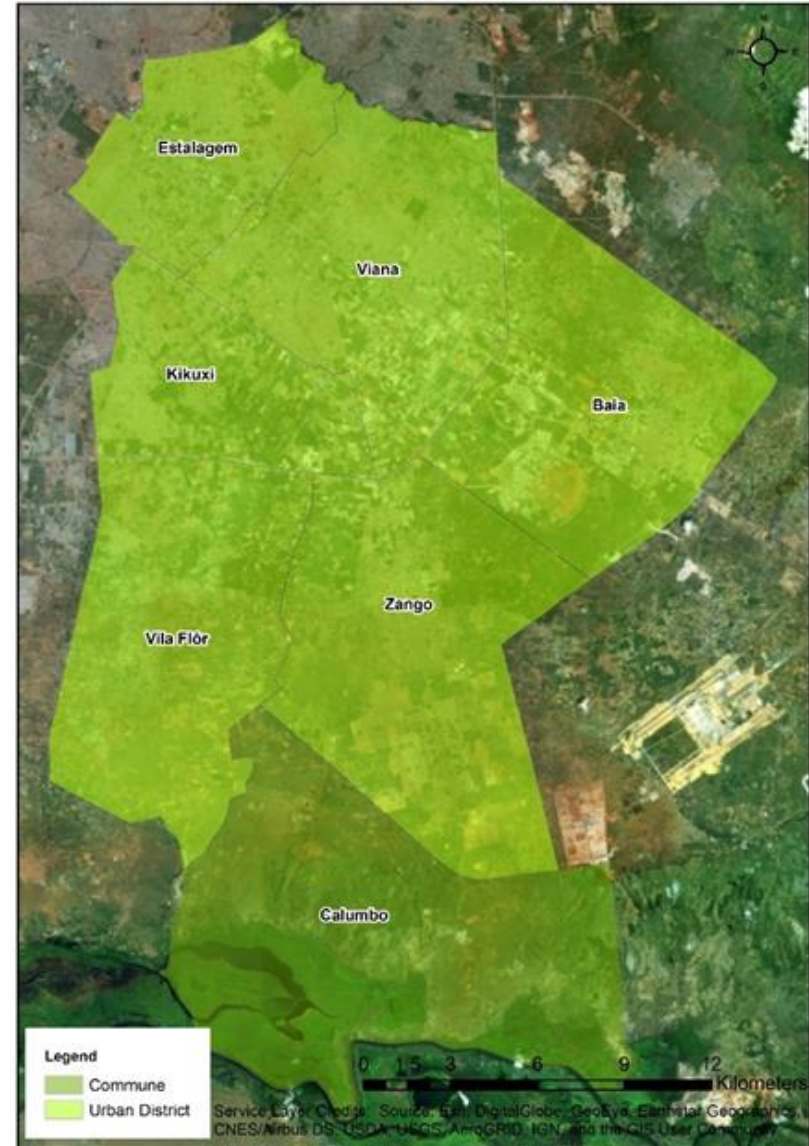


Figure 6-6: Viana Municipality

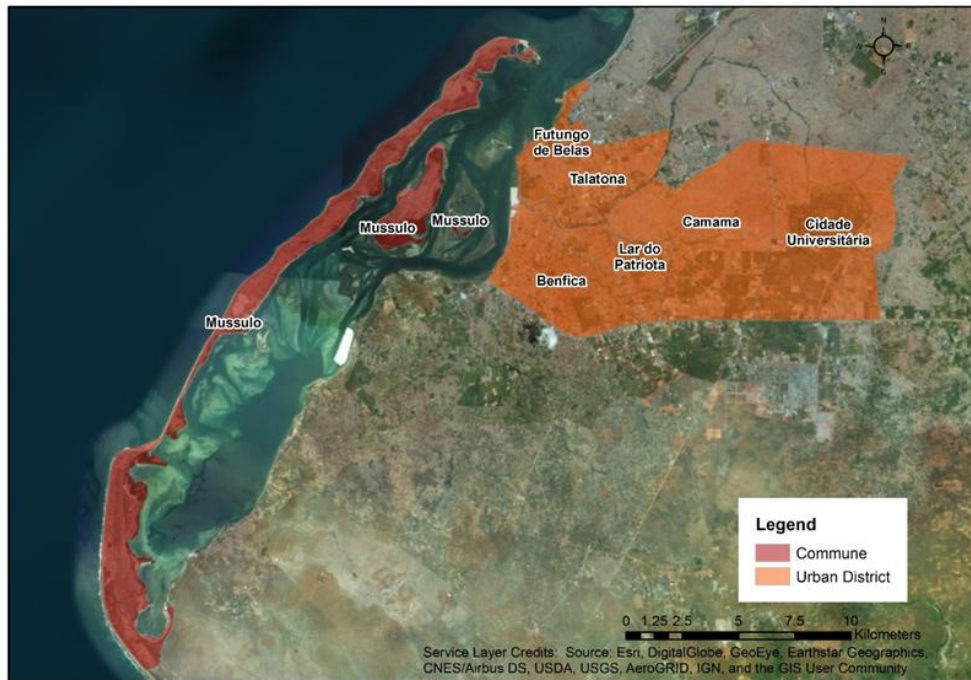


Figure 6-7: Talatona Municipality.

The B4WSP area of influence is mainly contained with the municipality of Belas (Figure 6-8).

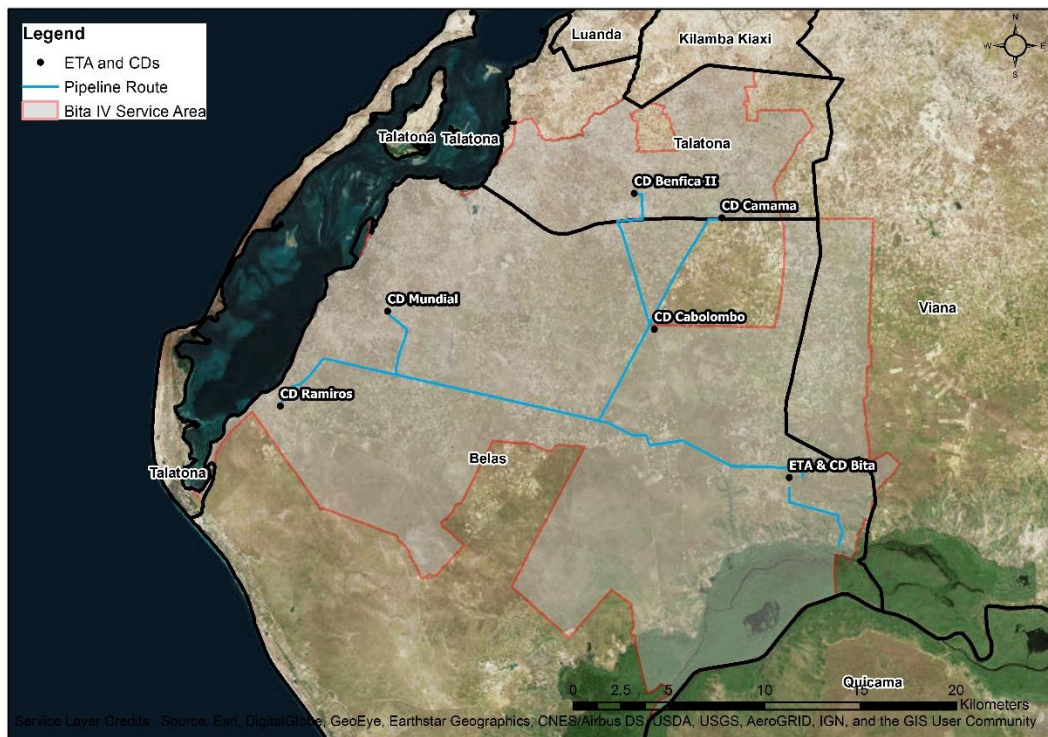


Figure 6-8: Municipality Borders, Project Area of Influence, Pipeline Route and CDs.

However, these administrative boundaries have been revised a number of times and therefore may not necessarily reflect the organic community structures that have evolved over time.

6.1.2 SERVICE AREAS

While the project recognises the importance of the administrative divisions described and shown in Section 6.1.1, neighbourhood or *bairro* boundaries have been used to establish service areas. This is because it is important that communities as a whole, not separated by relatively new administrative borders, be given water supply at the same time to minimise the risk of social upset because one area has gained access to piped water before another.

There are six service areas in total. Bitá, Cabolombo, Mundial and Ramiros are new areas, whereas Benfica II and Camama have an existing supply from the Bitá III System; the Bitá IV System will be reinforcing this existing supply. All six service areas are shown in Figure 6-9 and are collectively referred to as the project area of influence.

The character of these six areas vary considerably. For example, Bitá and Cabolombo service areas are the largest measuring at 16,581 ha and 23,274 ha respectively. Toward the south of these areas communities are quite rural resulting in informal and unstructured settlements and a sparse population. However, further northward the areas start to become more urbanised. Along the northern border of these service areas is the *Via Expresso*, Luanda's main highway around which many people have settled due to easy access in and out of central Luanda. Most of the people get their water from either a tanker or directly from the water courses. Figure 6-10 and Figure 6-11 show the *bairros* within Bitá and Cabolombo service areas respectively.

Mundial and Ramiros, particularly the western side of these service areas are more urbanised as they are closer to the coast and its associated development. The *bairros*, or neighbourhoods, here are more densely populated and while housing remains informal, there is evidence of spatial planning and former attempts at service provision e.g. fountains and standpipes that are no longer functioning. The eastern side of these service areas are more rural and are similar in nature to the southern parts of Cabolombo and Bitá service areas. Figure 6-12 and Figure 6-13 show the *bairros* within Mundial and Ramiros service areas respectively.

Benfica II and Camama are closer to the city centre and are situated on the northern edge of *Via Expresso*, making the areas popular suburbs with commuters. These areas already have potable distribution networks, albeit an unreliable supply and not serving all residents. The communities are mainly structured and densely populated. Figure 6-14 and Figure 6-15 show the *bairros* within Benfica II and Camama service areas respectively.

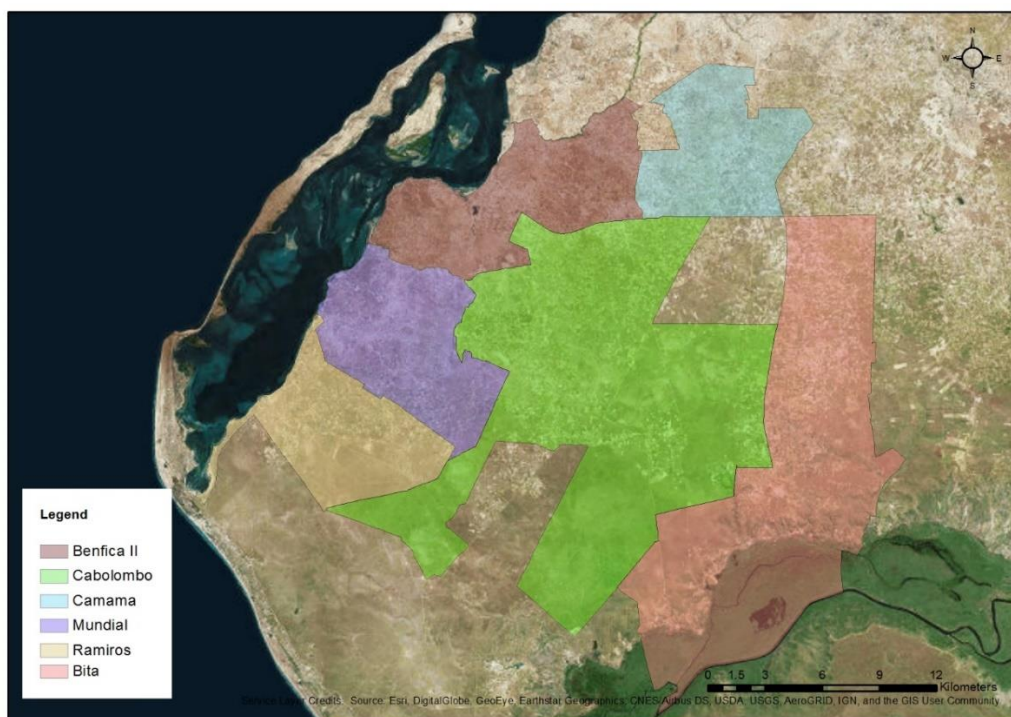


Figure 6-9: Bitá IV Service areas.

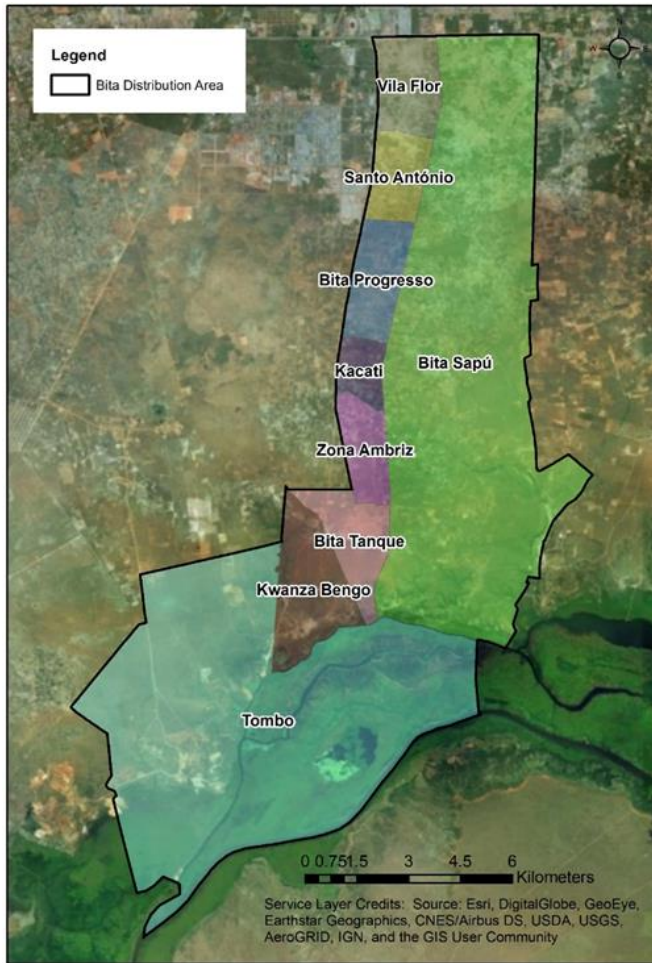


Figure 6-10: Bitá bairros.

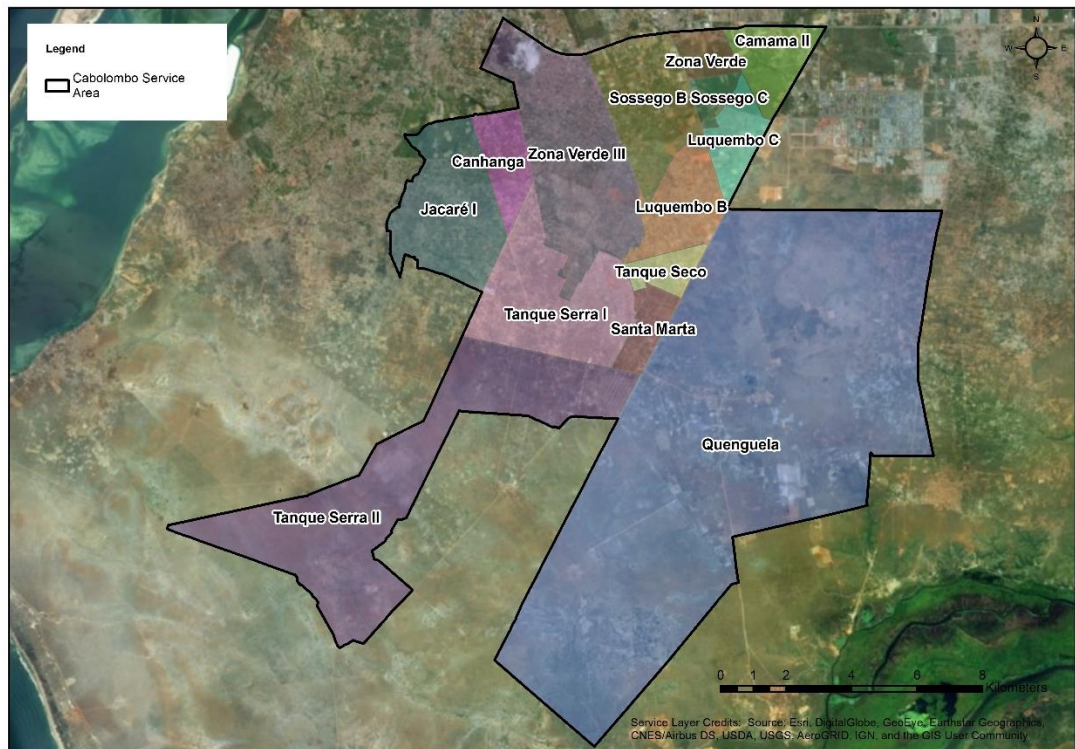


Figure 6-11: Cabolombo bairros.

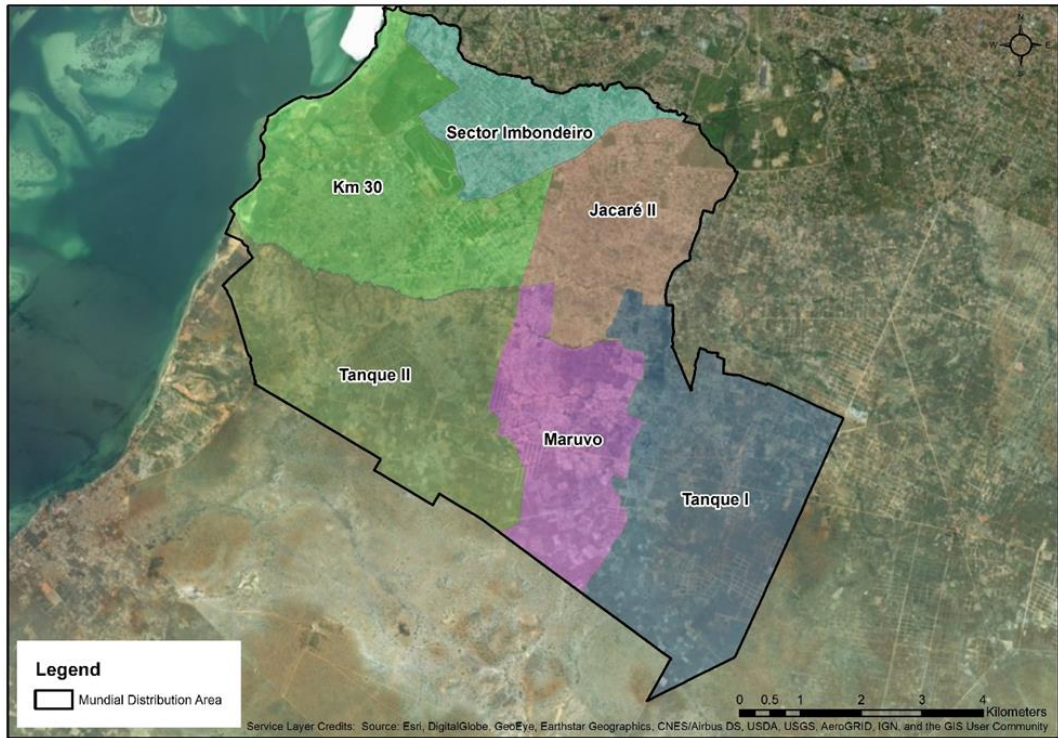


Figure 6-12: Mundial bairros.

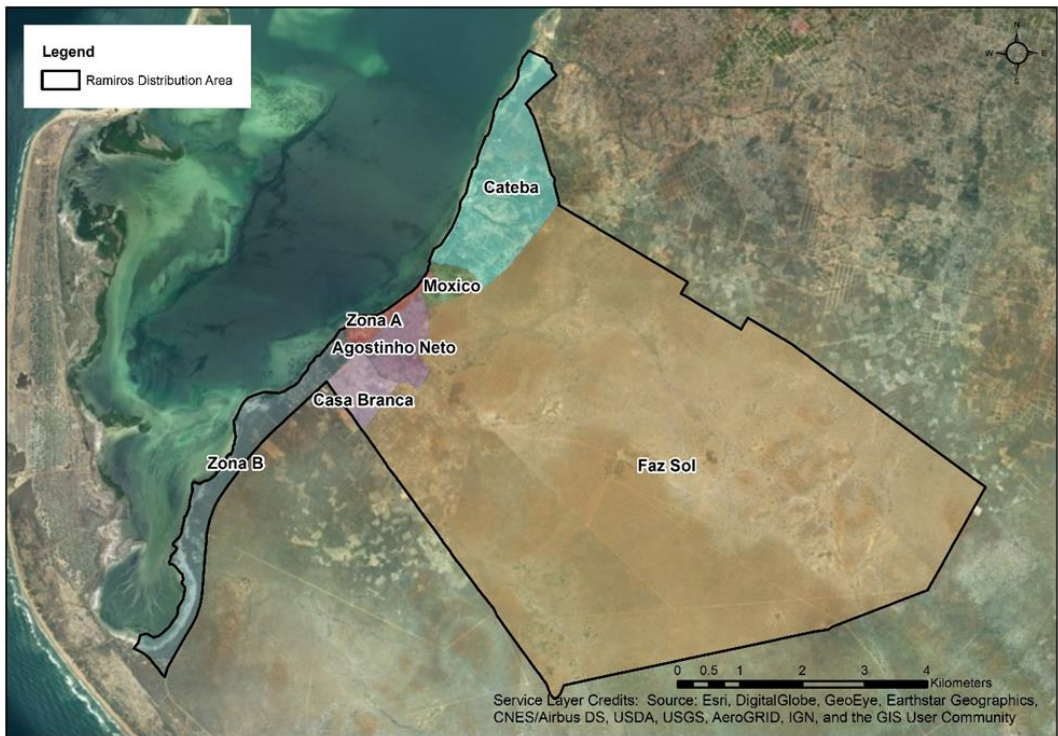


Figure 6-13: Ramiros bairros.

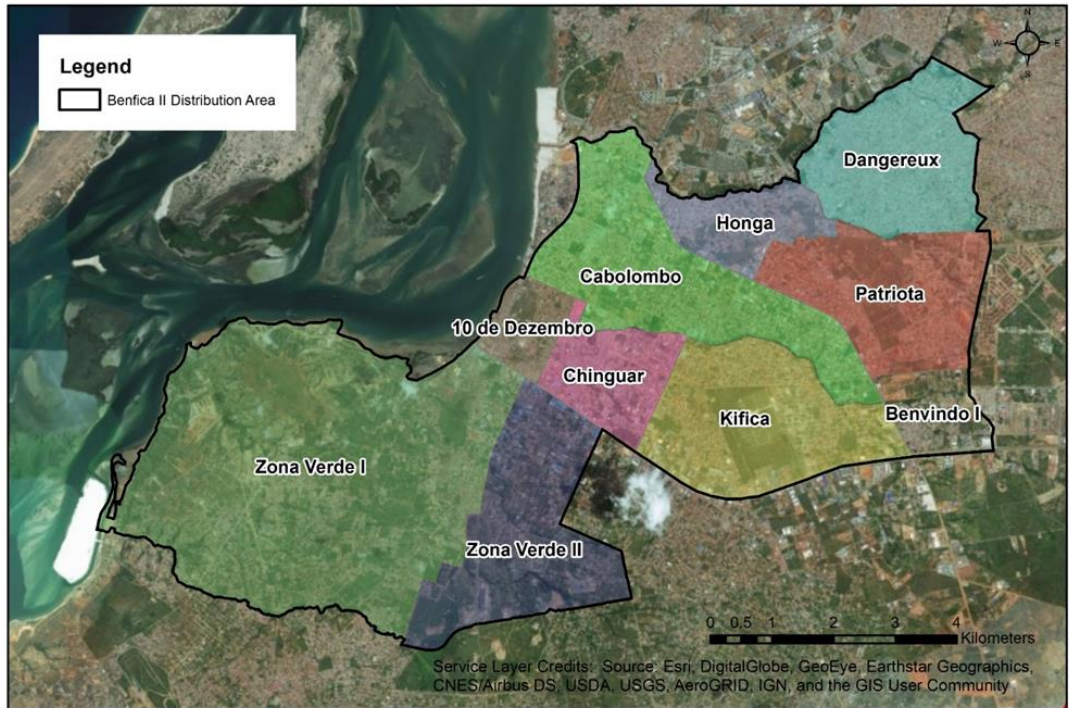


Figure 6-14: Benfica II bairros.

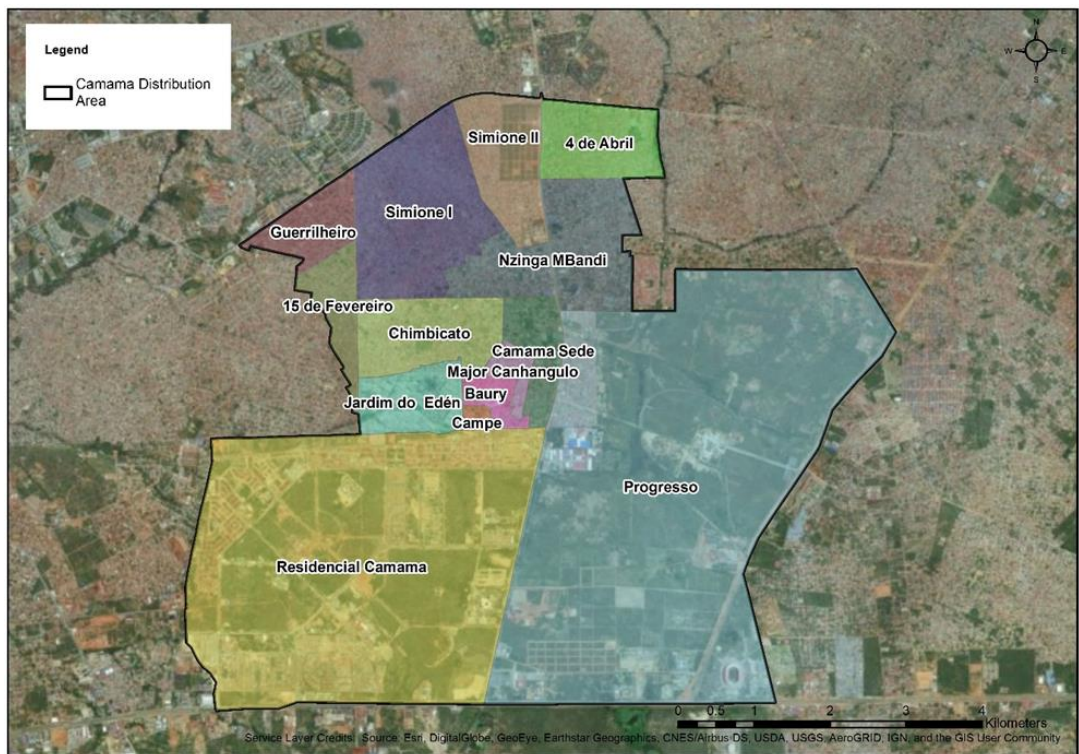


Figure 6-15: Camama bairros

6.2 POPULATION

In 2016 the World Bank estimated that Angola’s population was just under 29 million, a 75% increase on its 2000 population. This growth is mainly attributed to the urban centres of Angola such as N’dalatando, Huambo, Lobita and the most populous of them all, Luanda. The Metropolitan Plan for Luanda (PDGML), undertaken by the Provincial Government in 2015²⁴, found that the capital had a population of just over 5.5 million (Figure 6-16).

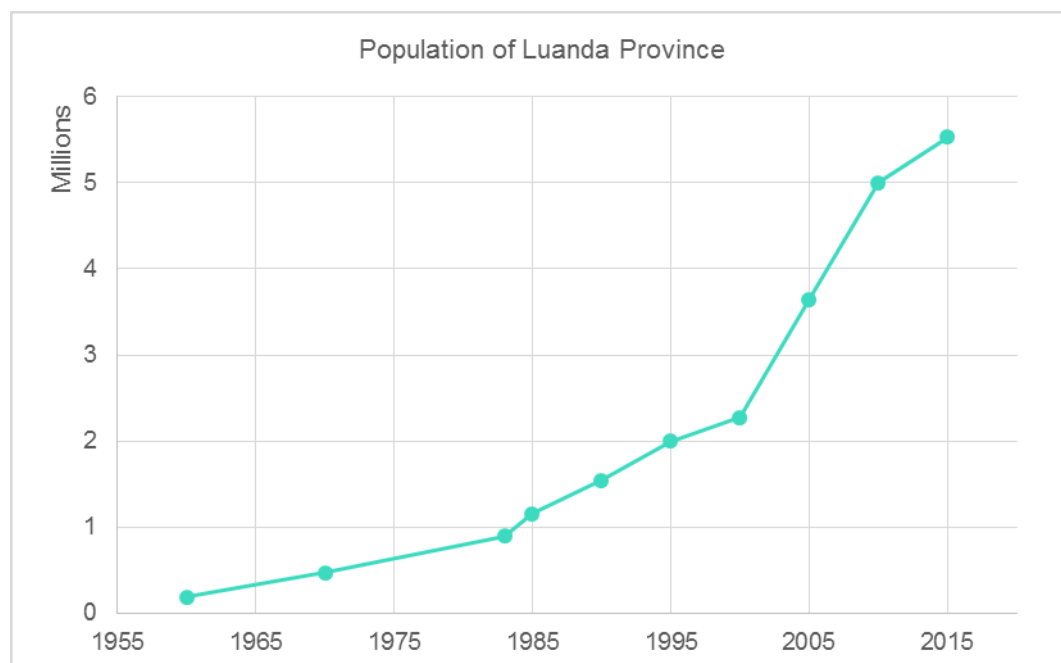


Figure 6-16: Population of Luanda Province 1960-2015²⁴.

During the Civil War (1975-2002) many people moved from the outlying provinces, where most of the fighting took place, to the relative safety of the capital. This mass movement of Internally Displaced Peoples (IDPs) to Luanda accelerated the city’s population growth and, as the country was at civil war, social and physical infrastructure could not accommodate growing demand. In fact, the violence and unstable atmosphere associated with a civil war reversed any progress that had been made up until that point.

6.2.1 AGE STRUCTURE

In Angola, particularly in Luanda, the population is very young; 48% of Angola’s population is under 15 years old and the average Luandan is 20. This young population profile can be attributed to a number of factors including, but not limited to:

- a relatively low life expectancy (60.2 years);
- the highest birth rate in the world (44.2 live births/ 1,000 population); and,
- a high fertility rate (6.16 children/ woman- second highest in the world)²⁵.

This young population is the main contributing factor to a high dependency ratio. For every 100 people of working age (15-64) in Angola there are 97 people who are not of working age (i.e. under 14 or above 65) and are therefore economically dependent on someone else²⁴.

Even though this age structure is deemed typical of many developing countries, especially those in sub-Saharan Africa, Angola’s case seems to be one of extremes. The combination of a

²⁴ Provincial Government of Luanda (2015) Plano Director Geral Metropolitano de Luanda (PDGML) Ambiente, Habitação, Social, Património, Sustentabilidade, Envolvimento da Comunidade. Lisbon: Universidade Nova de Lisboa.

²⁵Central Intelligence Agency (2018) *The World Factbook- Angola* [online]. Available at: <https://www.cia.gov/library/publications/the-world-factbook/geos/ao.html> [Accessed 19.07.18].

predominantly young population and a lack of sufficient social infrastructure, particularly schools and job opportunities, means that not only is education and therefore employment of limited supply but also that there are vast inequalities in their provision²⁴ (discussed further in Section 6.4).

6.2.2 HOUSEHOLD STRUCTURE

Luandan households tend to differ slightly from the typical Angolan household, for example the average household size in Luanda is 5.8, compared to 5.3 in the rest of Angola. Only 28.7% of households in other Angolan provinces have over 7 members whereas over a third of Luandan households do. Furthermore the average age of the head of the household in Luanda is 2 years younger than the national average. It is also more common for women to be the head of the household in Luanda than it is in the rest of Angola²⁴.

Elderly relatives do tend to stay with their extended families but due to the short life expectancy in Angola (Section 6.2.1) only 7.2% of Luanda’s households have a member over the age of 65 and fewer still (0.8%) have two. On the other hand it is very common for Luanda’s households to have children under the age of 15 as shown in Figure 6-17.

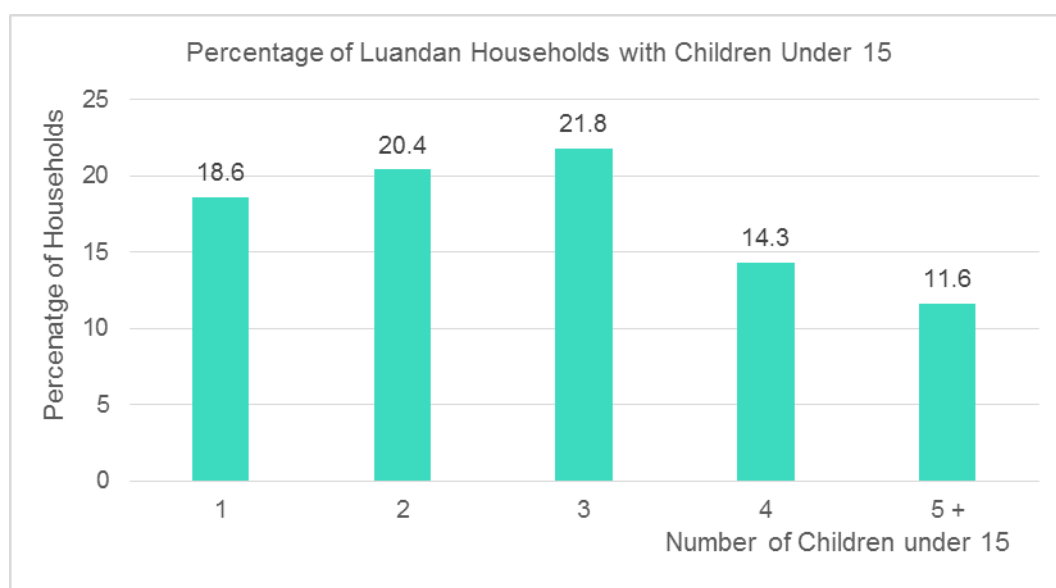


Figure 6-17: Percentage of Luandan Households with children under the age of 15²⁴.

6.2.3 POPULATION DENSITY

Angola’s last census was in 2014 and while this covered the Bitá IV project area of influence it did not calculate the population directly, instead the number of households within the project area of influence was calculated: 179,552. In 2015 the PDGML study estimated that the average size of a Luandan household was 5.8 people. By adopting this figure the total population of the project area of influence was found to be 1,041,401 in 2014 (Table 6-1).

The 2014 census and the PDGML (2015) gave different projected population growth rates; the census estimated an average annual national growth rate of 2.7% whereas the PDGML gave varying growth rates of 4.3%, 4.5% and 3.9% for the years 2020, 2025 and 2030 respectively. As the PDGML was the latest study these growth rates were applied and as such population projections for 2017, 2020, 2025 and 2030 were calculated (Table 6-1).

Table 6-1: Population projections for project area of influence²⁶

CD	Year				
	2014	2017 (4.3% growth)	2020 (4.3% growth)	2025 (4.5% growth)	2030 (3.9% growth)
Benfica II	353,800	401,431	455,474	567,604	687,263
Bitá	87,197	98,936	112,256	139,891	169,382
Cabolombo	120,106	136,276	154,622	192,687	233,309
Camama	311,831	353,812	401,444	500,273	605,738
Mundial	144,855	164,356	186,483	232,392	281,383
Ramiro	23,612	26,791	30,397	37,881	45,866
Total	1,041,401	1,181,602	1,340,676	1,670,728	2,022,941

The same calculations described above were applied to each service area and each *bairro*, the results of which can be seen in Table 6-2, Table 6-3, Table 6-4, Table 6-5, Table 6-6 and Table 6-7.

Furthermore the total area of each service area and *bairro* was used to map population density as shown in Figure 6-18, Figure 6-19, Figure 6-20, Figure 6-21, Figure 6-22 and Figure 6-23.

²⁶ Figures presented in this Table and the rest of this section are taken from Appendix 3 of the TFS directly whereas those shown in Table 3-2 of the TFS have been rounded.

Table 6-2: Benfica II Population Projection

Bairro	Area of Bairro (hectares)	Number of Households (Source: 2014 Census)	2014 Population (No. of HH * average HH size as per PDGML)	2017 Population (2014 population @ 4.3% growth rate as per PDGML)
Patriota	618	3050	17,690	20,072
Dangereux	593	15,171	87,992	99,838
Honga	274	4,394	25,485	28,916
Benvindo I	194	1,280	7,424	8,423
Cabolombo	845	10,368	60,134	68,230
Chinguar	304	5,219	30,270	34,345
10 de Dezembro	158	4,238	24,580	27,890
Zona Verde I	2,272	11,596	67,257	76,311
Zona Verde II	754	2,396	13,897	15,768
Kifica	729	3,288	19,070	21,638
Total	6,741	61,000	353,800	401,431

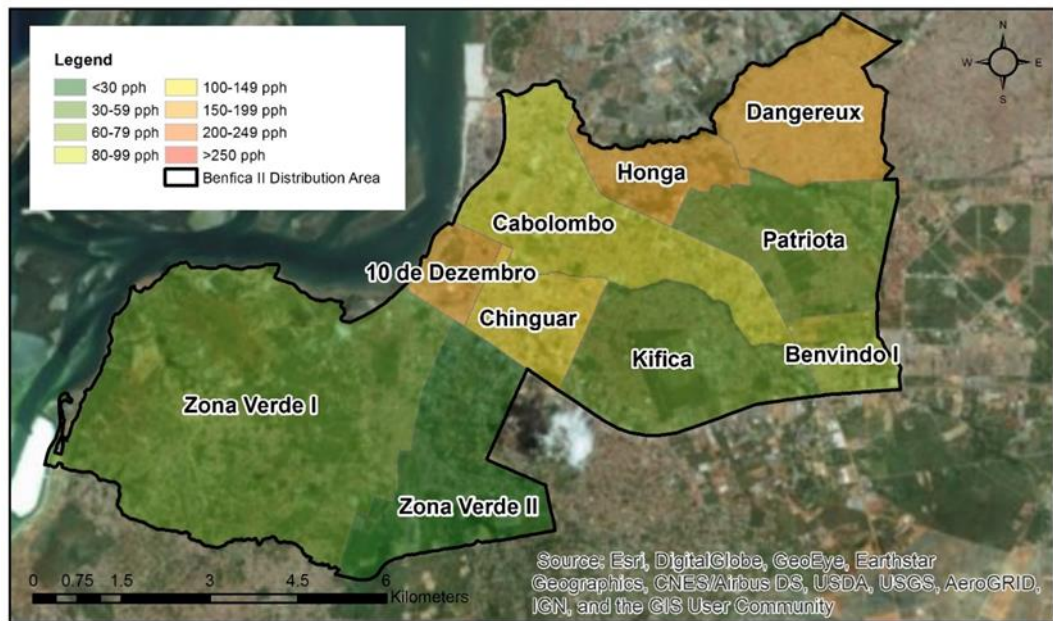


Figure 6-18: CD Benfica II Service area Population Density.

Table 6-3: Bitá Population Projection

Bairro	Area of Bairro (hectares)	Number of Households (Source: 2014 Census)	2014 Population (No. of HH * average HH size as per PDGML)	2017 Population (2014 population* 4.3% growth rate as per PDGML)
Bitá Sapú	6,651	9,530	55,274	62,715
Tombo	6,650	504	2,923	3,317
Kwanza Bengo	781	54	313	355
Bitá Progresso	496	1,145	6,641	7,535
Kacati	234	726	4,211	4,778
Vila Flor	502	45	261	296
Zona Ambriz	371	245	1,421	1,612
Bitá Tanque	502	1,825	10,585	12,010
Santo antonto	394	960	5,568	6,318
Total	16,581	15,034	87,197	98,936

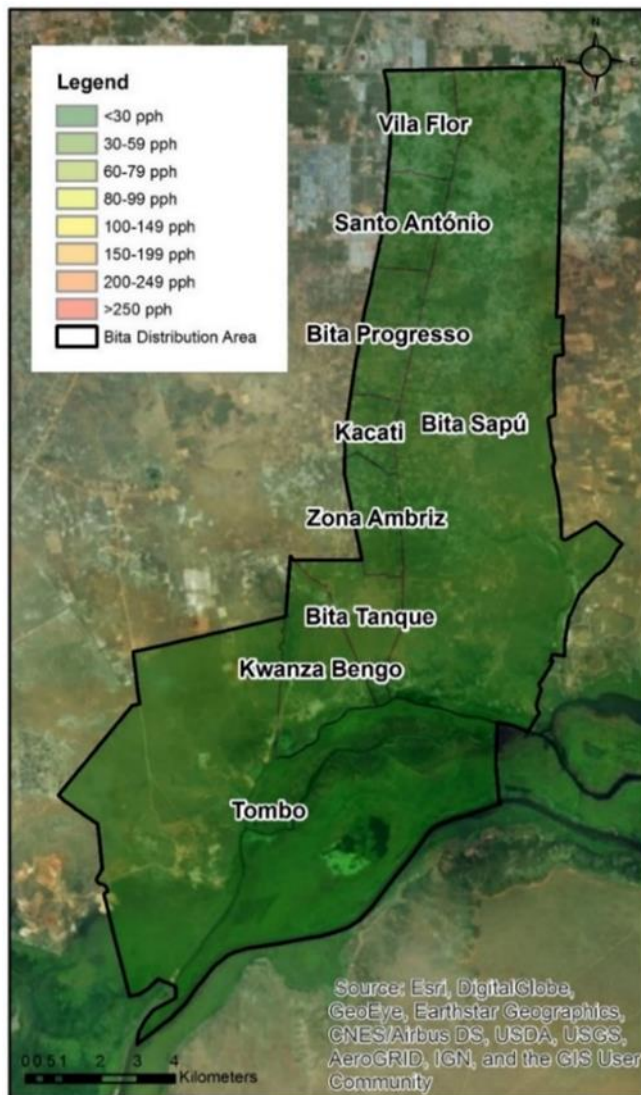


Figure 6-19: CD Bitá Service area Population Density

Table 6-4: Cabolombo Population Projection

Bairro	Area of Bairro (hectares)	Number of Households (Source: 2014 Census)	2014 Population (No. of HH * average HH size as per PDGML)	2017 Population (2014 population* 4.3% growth rate as per PDGML)
Camama II	485	469	2,720	3,086
Luquembo	390	2,173	12,603	14,300
Sossego C	1,002	2,405	13,949	15,827
Zona Verde	233	33	191	217
Quenguela	10,746	665	3,857	4,376
Tanque Serra I	1,464	1,137	6,595	7,482
Tanque Serra II	3,225	170	986	1,119
Jacaré I	1,254	3,492	20,254	22,980
Tanque Seco	226	385	2,233	2,534
Canhanga	407	712	4,130	4,686
Luquembo B	645	125	725	823
Santa Marta	267	330	1,914	2,172
Zona Verde III	1,960	8,526	49,451	56,108
Sossego B	970	86	499	566
Total	23,274	20,708	120,106	136,276

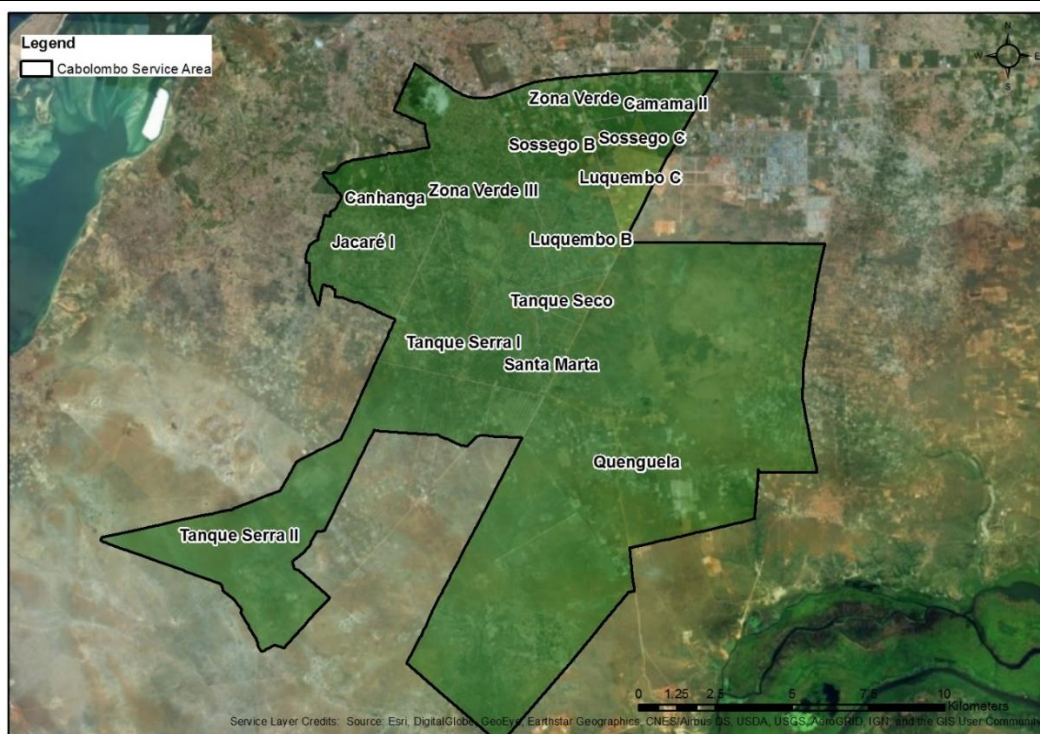


Figure 6-20: CD Cabolombo Service area Population Density

Table 6-5: Camama Population Projection

Bairro	Area of Bairro (hectares)	Number of Households (Source: 2014 Census)	2014 Population (No. of HH * average HH size as per PDGML)	2017 Population (2014 population* 4.3% growth rate as per PDGML)
15 de Fevereiro	80	2,885	16,733	18,986
Guerrilheiro	95	2,394	13,885	15,755
Residêncial Camama	1,453	3,112	18,050	20,480
Simione I	335	17,077	99,047	112,381
Major Canhangulo	31	1,022	5,928	6,726
Chimbicato	174	4,983	28,901	32,792
Camama Sede	88	1,525	8,845	10,036
Nzinga Mbande	273	4,526	26,251	29,785
Progresso	1,952	2,745	15,921	18,064
4 de Abril	140	6,040	35,032	39,748
Simione II	167	4,482	25,996	29,495
Jardim do Eden	111	1,795	10,411	11,813
Campe	11	1,006	5,835	6,620
Baurý	38	172	998	1,132
Total	4,948	53,764	311,831	353,812

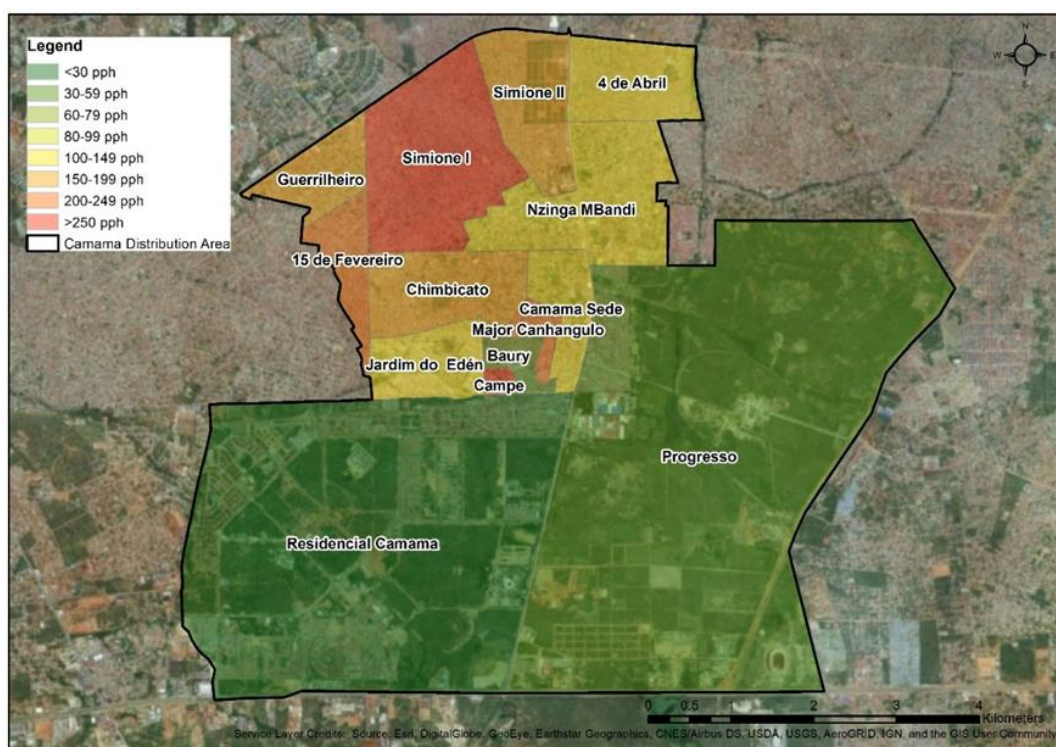


Figure 6-21: CD Camama Service area Population Density

Table 6-6: Mundial Population Projection

Bairro	Area of Bairro (hectares)	Number of Households (Source: 2014 Census)	2014 Population (No. of HH * average HH size as per PDGML)	2017 Population (2014 population* 4.3% growth rate as per PDGML)
Sector Imbondeiro	530	5,019	29,110	33,029
Tanque I	1,410	1,137	6,595	7,482
Maruvo	770	1,925	11,165	12,668
Km 30	1,510	7,818	45,344	51,446
Jacaré II	780	8,906	51,655	58,609
Tanque II	1,303	170	986	1,119
Total	6,303	24,975	144,855	164,356

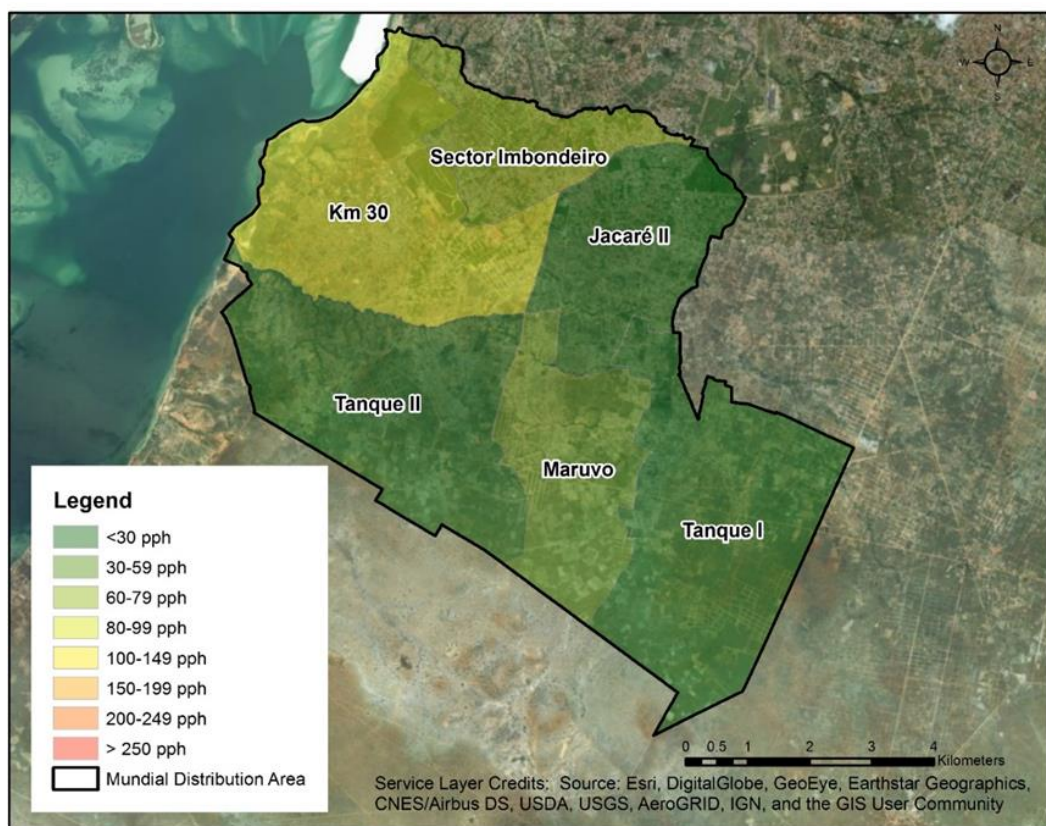


Figure 6-22: CD Mundial Service area Population Density

Table 6-7: Ramiros Population Projection

Bairro	Area of Bairro (hectares)	Number of Households (Source: 2014 Census)	2014 Population (No. of HH * average HH size as per PDGML)	2017 Population (2014 population* 4.3% growth rate as per PDGML)
Faz Sol	4,361	467	2,709	3,073
Zona A	38	214	1,241	1,408
Zona B	252	181	1,050	1,191
Cateba	356	589	3,416	3,876
Moxico	41	360	2,088	2,369
Casa Branca	2,620	539	3,126	3,547
Agostinho Neto	100	1,721	9,982	11,326
Total	7,768	4,071	23,612	26,791

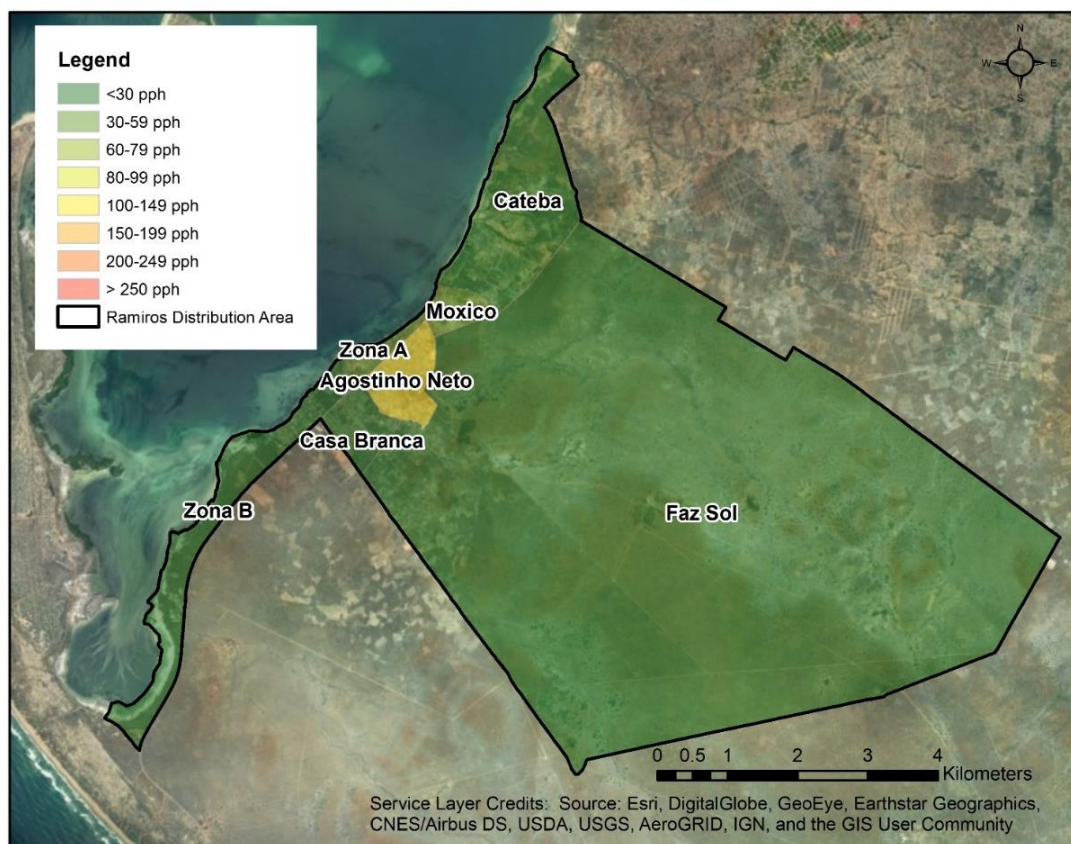


Figure 6-23: CD Ramiros Service area Population Density

6.3 HOUSING STOCK

The 1992 Constitution of the Republic of Angola gives the government ultimate authority over all land, water, air, soil and all other natural resources. The legal framework is derived from the Portuguese Civil Code, which does not readily accommodate traditional African land tenure practices²⁷. As such those without the means to purchase land from the state have been unable to access, sell and secure land within the formal market. This is an issue mainly for residents of Bitá, Cabolombo, Mundial and Ramiros service areas as settlements and housing is generally informal and unstructured, whereas in Benfica II and Camama service areas housing is more formal and structured.

6.3.1 BITA AND CABOLOMBO SERVICE AREAS

As shown in Table 2-2 Bitá has the highest proportion of vacant land and while there is development, predominantly in the north of the area bordering *Via Expresso*, the majority of this is unstructured. Similarly, any structured development in Cabolombo is also concentrated in the north of the service area. Houses in Bitá and Cabolombo service areas are generally informal and are typically made of corrugated iron and other ad-hoc building materials (Plate 6-1). Settlements in these two service areas generally lack spatial planning. Figure 6-24 shows the settlement of Julio in the *bairro* of Bitá Sapú (Bitá service area) as an example.

6.3.2 MUNDIAL AND RAMIROS SERVICE AREAS

Mundial's and Ramiros' proximity to the coast has resulted in structured development and therefore a greater population density concentrated on the western side of the service areas. Further inland however development becomes and unstructured. The *bairro* of Faz Sol in Ramiros service area is dominated by land which is under single ownership; no developments have as yet been undertaken on this land. The housing stock in these areas is generally constructed from more substantial materials including breeze blocs and concrete (Plate 6-2). Settlements also tend to be slightly more structured. Figure 6-25 shows the settlement of Tanque II, in a *bairro* by the same name (Mundial service area) as an example.

6.3.3 BENFICA II AND CAMAMA SERVICE AREAS

Benfica II and Camama service areas are the most formally structured and densely populated of the service areas. The housing stock in these areas is of high quality, most properties are gated and their roofs are tiled (Plate 6-3). Furthermore the layout of these areas is highly structured. Figure 6-26 shows the settlement of Lar do Patriota in the *bairro* of Patriota (Benfica II service area) as an example.

²⁷See Resettlement Policy Framework for more details.



Plate 6-1: Example of housing stock in the settlement of Julio, Bita Sapú bairro, Bita service area.



Figure 6-24: Satellite image showing the unstructured layout of Julio settlement, Bita Sapú bairro, Bita service area.



Plate 6-2: Example of housing stock in Tanque II bairro, Mundial service area.



Figure 6-25: Satellite image showing a more structured layout of Tanque II bairro, Mundial service area.



Plate 6-3: Example of housing stock in Patriota bairro, Benfica II service area.



Figure 6-26: Satellite image showing structured layout in Patriota bairro, Benfica II service area

6.4 EDUCATION AND EMPLOYMENT

The 27-year civil war disrupted the education of generations of Angolans leaving many without the skills to secure employment.

6.4.1 EDUCATION

As discussed in Section 6.2, Angola’s population growth is not on par with its social infrastructure and service provision, particularly schools. Unfortunately the civil war destroyed a lot of Luanda’s existing school network meaning that in 2004 the province had 620 schools, of which 40% are private. Therefore only 372 schools are freely available to Luanda’s school age population, which is roughly 2.6 million children²⁴. This leaves a ratio of 7,137 students to every public school in Luanda. Although some of these children will attend private schools, and others won’t attend school at all, those that do are unlikely to receive a high quality education due to limited resources²⁸.

6.4.1.1 Primary Education

In 2011 the GoA spent 8.2% of its state budget on education, over half of this was spent on primary education alone²⁹. This is reflected Figure 6-27 which shows that the total number of primary school age children who completed their primary education in Angola increased by 6.8% between 2008 and 2011. However, Figure 6-27 also highlights the disparity in male and female completion rates. This disparity is supported by the Gender Inequality Index³⁰ which places Angola 139th (out of 144 countries) for education attainment; a measure which compares female and male literacy rates as well as primary, secondary and tertiary enrolment rates. Furthermore, within Luanda province there is a difference of 4.5% between male and female primary attendance (Table 6-8).

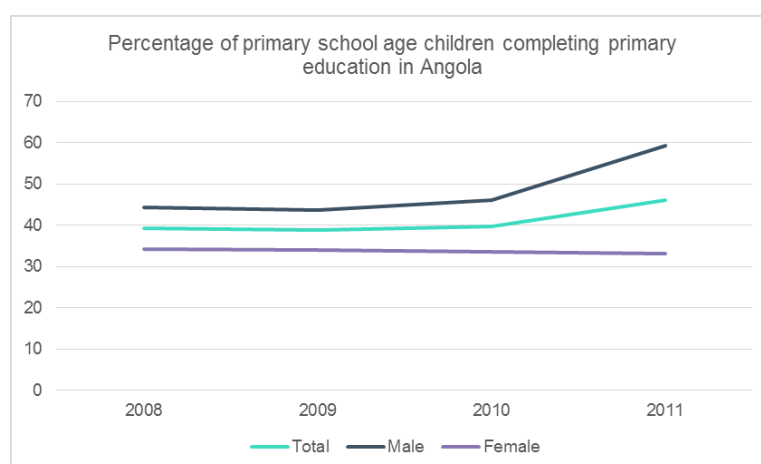


Figure 6-27: The percentage of primary school age children completing their primary education in Angola between 2008 and 2011³¹.

6.4.1.2 Secondary Education

Government spending at secondary level is much lower than at primary level, only 0.95% of the total education budget is spent on secondary education. This is likely because of the push from the United

²⁸ Previous Environmental and Social Impact Assessment completed by Bio Transparència in 2014.

²⁹ Gomes, E. and Weimer, M. (2011) *Education in Angola: Partnership Opportunities for the UK*. 1st ed. [pdf] London: Chatham House. Available at: https://www.chathamhouse.org/sites/default/files/19414_0511pp_gomes_weimer.pdf [Accessed 22.07.18].

³⁰ World Economic Forum (2017) *The Global Gender Gap Report*. 1st ed. [pdf] Geneva: World Economic Forum. Available at: http://www3.weforum.org/docs/WEF_GGGR_2017.pdf [Accessed 22.07.18].

³¹ World Bank (2018) *World Bank Open Data* [online] Available at: <https://data.worldbank.org/> [Accessed 22.07.18]

Nations for all countries to fulfil the Millennium Development Goals (MDGs), the second of which was to achieve universal primary education. Although the MDGs have now been updated with the Sustainable Development Goals (SDGs), which give greater consideration to secondary education, many developing countries are still directing the majority of their resources into primary education.

At both primary and secondary education levels school attendance in Luanda is higher than the national average, as shown in Table 6-8. This is particularly true of the secondary level where there is a 25% difference between the national average and Luanda province. A World Bank report on the determinants of enrolment suggests that children are more likely to attend secondary school in urban areas, such as Luanda, because the distance to travel is less than in rural areas³².

Table 6-8: Primary and Secondary Attendance rates for Males and Females in Luanda and Angola

Indicator	Luanda			Angola		
	Male	Female	Total	Male	Female	Total
Net Primary School Attendance Rates (%)	88.9	84.4	86.65	79.7	78.3	79
Net Secondary School Attendance Rates (%)	53.6	53.8	53.7	29.1	27	28.05

6.4.1.3 Tertiary Education

Tertiary education in Africa, particularly Portuguese colonies such as Mozambique and Angola, was introduced mainly to educate the children of colonisers but also to extend colonial ideologies to native Angolans³³. Along with the associated cost of tertiary education, and a lack of universities in Angola this could be a contributing factor to low tertiary education enrolment rates in Angola (Figure 6-28). The only tertiary education facility in the project area of influence is the Camama Campus of Agostinho Neto University which was opened in 2011.

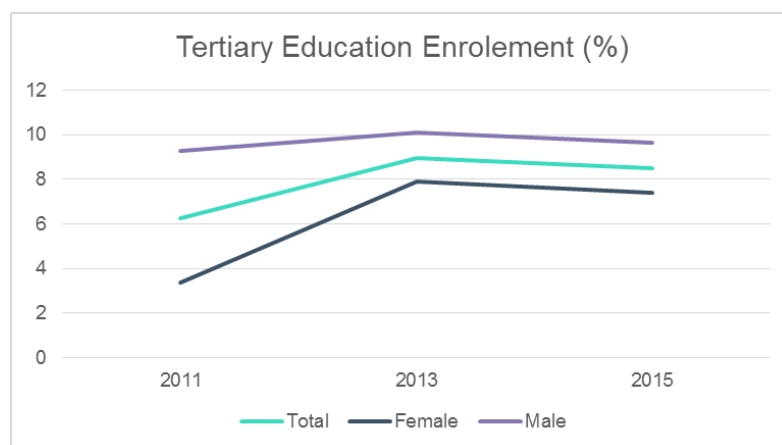


Figure 6-28: Tertiary education enrolment (%) in Angola³⁴.

³² World Bank (2007) *Determinants of Enrolment* 1st ed. [pdf] Washington: World Bank Group. Available at: <http://siteresources.worldbank.org/MENAEXT/Resources/6.4.pdf> [Accessed 22.07.18].

³³ Woldegiorgis, T. E. and Doevenspeck, M. (2013) The Changing Role of Higher Education in Africa: A Historical Reflection. *Higher Education Studies* [online] 3(6) p. 35-45. Available at: <https://files.eric.ed.gov/fulltext/EJ1079222.pdf> [Accessed 22.07.18].

³⁴ UNESCO (2018) *Angola* [online] Available at: <http://uis.unesco.org/country/AO> [Accessed 23.07.18].

6.4.2 EMPLOYMENT

As previously mentioned the civil war disrupted education for many generations of students and meant that the population had little opportunity to learn new skills and trades or peruse education, as a result much of Angola’s working age population is unemployed.

6.4.2.1 Unemployment

A significant proportion of Angola’s population is illiterate (34%), this could be a contributing factor to Angola’s unemployment rate of 6.2%³⁵. Illiteracy rates are less severe in Luanda province but are still significant at 13.3% of the population.

Figure 6-29 shows the percentage of Angola’s work force, which is defined as “the share of people that are in the labour force seeking employment, but unable to find employment”³⁶, these figures have been disaggregated into youth (ages 14 to 24) and female unemployment. Although female unemployment is generally aligned with the total, youth unemployment is significantly higher. Throughout the 25 year period shown in Figure 6-29 the percentage of youth not in work is roughly double the national total.

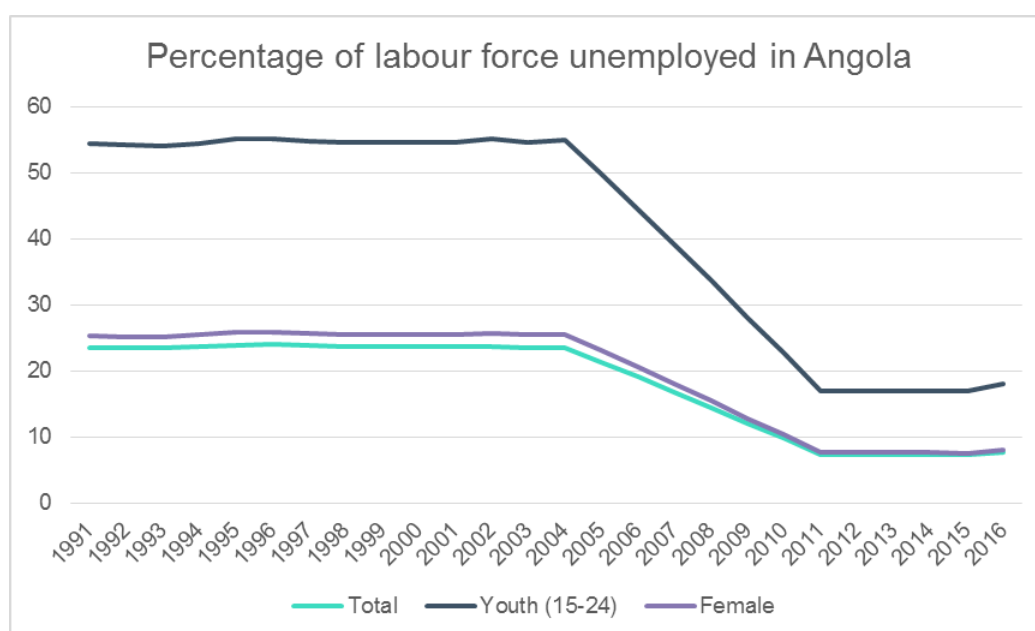


Figure 6-29: Percentage of Angola’s work force unemployed between 1991 and 2016.

This phenomenon of high youth unemployment is not limited to Angola alone, many sub-Saharan countries are also afflicted by this. Causes may include:

- **Imbalance between supply and demand:** Angola’s, and in particular Luanda’s population growth is high and, as previously mentioned, social infrastructure which includes opportunities for employment has not developed at an equal rate. As a result there is an imbalance between the supply of jobs and the demand. For example in 2005, nearly 25,000

³⁵ILO (2011) *Country Profile: Angola* [online]. Available at: http://www.ilo.org/ilostat/faces/oracle/webcenter/portalapp/pagehierarchy/Page21.jspx;_afLoop=21599311168861&_afWindowMode=0&_afWindowId=null!%40%40%3F_afWindowId%3Dnull%26_afLoop%3D21599311168861%26_afWindowMode%3D0%26_adf.ctrl-state%3D3n0uqri65_4 [Accessed 16.01.18].

³⁶World Bank (2018) *Jobs Data* [online] Available at: <http://datatopics.worldbank.org/jobs/country/angola> [Accessed 23.07.18].

jobseekers visited state-sponsored employment centres, yet only 8,038 advertised jobs for that year³⁷;

- **Poor quality or a lack of education:** secondary schools are often under resourced and teachers do not have the required qualifications. This has meant that many students are not qualified for formal employment. One bank in Luanda reported having received 3,000 applications for just one or two loan officer positions. The vast majority of applicants could not pass the mathematics exam, or if they did, did not exhibit the necessary self-initiative and business professionalism to be hired; and,
- **High level of corruption:** The Angolan youth blames high levels of corruption for unemployment implying that jobs are awarded based on nepotism. These claims are given weight by the corruptions perceptions index carried out by Transparency International which places Angola 167th out of 180 countries³⁸. Furthermore the World Bank emphasises the important role good governance plays in youth employment, stating that if the demand for youth employment is not met it could “cripple a country’s economic growth and exacerbate chronic unemployment and poverty”³⁹.

In addition, as part of consultation undertaken for the previous ESIA, it was found that communities in the project area of influence are concerned about youth unemployment and were hopeful that the project could help alleviate this.

6.4.2.2 Employment by Sector

Angola is still heavily reliant on its natural resources for revenue; oil accounts for roughly a third of the country’s GDP and over 95% of its exports⁴⁰. However, the oil industry does not create adequate jobs commensurate to the demand⁴¹. The secondary employment sector, which includes oil production as well as mining, quarrying, manufacturing, construction and public utilities has not employed more than 10% of the population in the past 25 years (Figure 6-30). Until 2010 the tertiary sector was the main source of employment in Angola. This sector includes services such as tourism and hospitality, transport, retail, community and social and financial, among others. Since 2010 the primary sector, which includes agriculture, fishing and hunting has been the main source of employment for Angolan’s. This corresponds with government policy which aimed to reduce unemployment and diversify the economy; between 2009 and 2011 600,000 new jobs were created, 32% of these new jobs were in the primary sector.

³⁷ Ignatowski, C., Rodrigues, C. and Balestino, R. (2006) *Youth Assessment in Angola*. 1st ed. [pdf] Washington: USAID. Available at: http://www.youthpolicy.org/national/Angola_2006_Youth_Assessment.pdf [Accessed 23.07.18].

³⁸ Transparency International (2017) *Corruption Perceptions Index 2017* [online] Available at: https://www.transparency.org/news/feature/corruption_perceptions_index_2017#research [Accessed 23.07.18].

³⁹ World Bank (2014) *The Importance of Good Governments for Youth Employment* [online] Available at: <http://blogs.worldbank.org/youthink/importance-good-governments-youth-employment> [Accessed 23.07.18].

⁴⁰ World Bank (2017) *The World Bank in Angola* [online] Available at: <http://www.worldbank.org/en/country/angola/overview> [Accessed 23.07.18].

⁴¹ International Conference on the Great Lakes Region (ICGLR) *Youth Unemployment in Angola, Burundi, Central African Republic, Democratic Republic of Congo and Republic of Congo* 1st ed. [pdf] Lusaka, Zambia: ICGLR) Available at: <http://www.icglr-lmrc.org/images/documents/LMRC-2014-Youth%20Unemployment-5%20Countries.pdf> [Accessed 23.07.18].

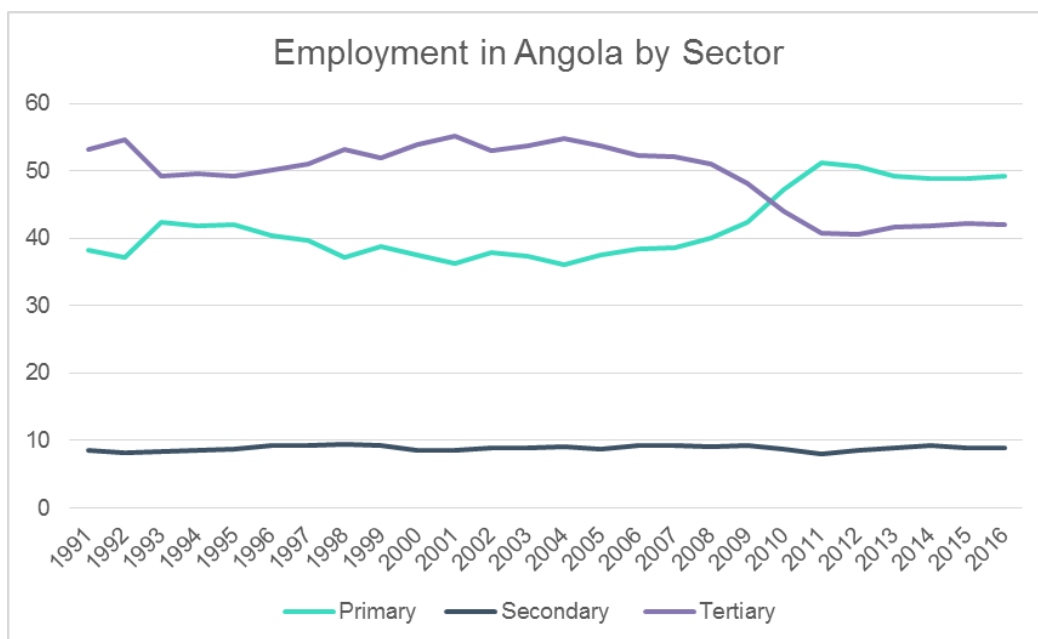


Figure 6-30: Percentage employment in Angola by primary, secondary and tertiary sectors.

6.4.2.2.1 Primary Sector

Agriculture

As shown in Figure 6-30 the primary sector is an important pillar of employment in Angola but also in maintaining a generally food secure country⁴². Unfortunately, much of Angola’s agricultural activity ceased during the civil war as the majority of the conflict was played out in rural areas forcing farmers to move away from the rural provinces and into urban centres, which were deemed relatively safe. In addition, due to land mining of large agricultural areas and severe droughts and floods in the southern provinces Angola has become heavily import dependent⁴³.

Most of the people engaged in agricultural activities in Luanda are subsistence farmers as there isn’t a great deal of open land available for commercial farming. The main crops produced in Luanda province include²⁸:

- Corn;
- Cassava;
- Sweet potatoes;
- Legumes; and,
- Oilseeds.

During site surveys the Consultant observed the following crops being grown for agriculture. Other flora was also identified and listed in Table 5-1:

- Corn;
- Cassava (Plate 6-4);
- Papyrus;
- Reeds (Plate 6-5); and,
- Tomatoes.

⁴²USAID (2007) *Angola: Food Security Update* 1st ed. [pdf] Washington: USAID. Available at: https://reliefweb.int/sites/reliefweb.int/files/resources/EA273D202773AC4D8525732100580236-Full_Report.pdf [Accessed 23.07.18].

⁴³ Technical Feasibility Study (document number: AN13019-101-TFS-RPT-ENV-01)

Livestock

For rural households in particular the keeping of livestock plays a very important economic and socio-cultural role in maintaining the wellbeing of farm families by providing food security, nutrition, income, soil productivity, transport as well as agricultural traction and diversification⁴⁴. In urban areas such as Luanda the dependence on livestock is slightly less significant and is generally on a smaller, subsistence scale but nonetheless remains important.

80% of all livestock in Angola is cattle, the remaining 20% is made up of poultry, pigs, sheep and goats. Livestock is mainly farmed in the southern provinces of Huíla, Cunene, Benguela, Huambo and Namibe. Due to Luanda's rising population and associated urban sprawl open space for grazing larger animals such as cattle is in short supply. The province registered 236,300 controlled heads of cows, pigs, goats and sheep in the 2007/08 agricultural year⁴⁵.

Livestock such as goats, cattle and poultry were observed in the project area of influence; one farmer was using the ETA & CD Bitá site to graze his cattle (Plate 6-6).

Fishing

Fishing in Angola is an important socio-economic activity and contributes to overall food security, this is particularly true of coastal communities. The Food and Agricultural Organisation (FAO) estimates that 150,000 people in Angola are employed by the fishing sector⁴⁵. Furthermore, demand in coastal areas is expected to grow with the population and generate more opportunities for employment. However, despite having plentiful fishing resources, Angola still imports horse mackerel from Namibia and South Africa to ensure food security for those inland. This is because a poor transport network inhibits the movement of goods, including fish, from the coast to inland areas.

In Luanda artisanal fisheries are an important source of income and food for communities along the coastline and riverside areas of the Kwanza. Plate 6-7 shows communities fishing in the wetlands near the water intake site.

⁴⁴ Bettencourt, V. M. E, Tilman, M, Henriques, S. D. P, Narciso, V, Carvalho, S. L. M (2013) *The Economic and Sociocultural Role of Livestock in the Wellbeing of Rural Communities of Timor-Leste* 1st ed. [pdf] Vimoso: CEFAGE. Available at: <https://allslide.net/embed/elisa-m-v-bettencourt-1-mario-tilman-2-pedro-d-s-henriques-3-vanda-narciso-maria-leonor-s-carvalho-1> [Accessed: 23.07.18].

⁴⁵ FAO (2005) *Livestock Sector Brief: Angola* 1st ed. [pdf] Washington: FAO. Available at: http://www.fao.org/ag/aqainfo/resources/en/publications/sector_briefs/lb AGO.pdf [Accessed 25.07.18].



Plate 6-4: Cassava growing in the project area of influence.



Plate 6-5: Reeds harvested and left out to dry near intake site.



Plate 6-6: Livestock grazing on ETA & CD Bitá site.



Plate 6-7: Fishing on the Rio Kwanza, 300 m from proposed intake site.

6.4.2.2.2 Secondary Sector

As shown in Figure 6-30 the secondary sector, while the most productive, only provides about 10% of Angola's jobs. The GoA, specifically the Ministry of Industry, recognise this and as such developed the Master Plan of Reindustrialization of Angola (Resolution No. 4/98 of March 1998) which highlights Luanda as key location for industrialisation.

This has been noted by not only the GoA but also the Chinese and Brazilian government who in the last year have invested heavily in Angola's construction industry causing what has been described as an "infrastructure boom". Despite this boom in construction the secondary sector remains to be the lowest source of employment for Angolans. This is because international contractors are usually hired to carry out the work and they often find it cost effective to bring the majority of their semi-skilled labour force from the contractor's home country, or transferred from projects finishing elsewhere.

The advantages of foreign labour include:

- Large numbers available quickly without a lengthy recruitment exercise;
- Less bothered about contract terms, conditions and welfare;
- Previous construction skills, e.g. few B4WSP area residents experienced in large diameter pipelaying;
- Not particular about the type of work undertaken;
- Higher motivation to finish the job quicker;
- Easier to give instructions; and,
- Locals often not interested in basic labouring jobs.

The disadvantages in employing a foreign labour force include:

- Time consuming visa and immigration procedures;
- Often complex and time-consuming visa requirements;
- Cost of providing and operating local accommodation and messing facilities; and,
- Higher wage costs than locals.

Overall, the advantages outweigh the disadvantages, especially where entry visa, work and residency procedures are lax or can be circumvented by corruption. International contractors almost always bring their own labour, leaving only the least skilled jobs such as drivers, watchmen, security guards, to be hired locally. The influx of foreign workers on the project the size of Bitá IV could number several hundred. The incoming workers are invariably male on a single-status posting, and by comparison with the local residents, relatively well paid, although their accommodation may at best be limited to dormitory-type bedrooms, communal messing and shared domestic facilities.

According to the Trafficking in Persons (TIP) Report (2018)⁴⁶, Angola is both a source and a destination for men, women and children subjected to sex trafficking and forced labour. Angolans, including minors, endure forced labour in a number of sectors including construction. Both sex trafficking and forced labour often depend upon complicit officials.

There is an agreement between GoA and the Government of China that requires Chinese companies to follow Angolan labour laws, yet the Angolan judiciary recently investigated several construction companies, including Chinese-run companies, for alleged forced labour abuses. Some Chinese construction companies that bring Chinese workers to Angola do not disclose the terms and conditions under which they are employed at the time of recruitment. Some Chinese women are recruited by Chinese gangs and construction companies, then deprived of their passports, kept in walled compounds under armed guard and forced into prostitution among the male workforce. Chinese, SE Asian, Brazilian, Namibian, Kenyan and Congolese migrants have all been subject to forced labour in Angola's construction industry. The province of Luanda is among the most active trafficking areas.

Whatever the status of this male workforce, whatever conditions they live under, conflicts with the local community often arise, particularly where the project requires workers to lay pipelines through remote villages and have close contact during the installation of street-by-street distribution systems and making house connections. Within many rural communities, trust between the residents is often

⁴⁶ United States Department of State, 2018 Trafficking in Persons Report – Angola, 28 June 2018

inherent, and shops with merchandise on display may be left unattended, or attended only by a child, and houses be left unlocked. Common problems causing conflict between foreign workers and the local population include but are not limited to:

- Theft of unharvested farm produce from fields;
- Theft from shops, stalls and houses;
- Vandalism of communal facilities;
- Competition for resources, such as firewood and fuel;
- Sexual abuse of local women;
- Sex with minors; and,
- Involvement with drugs.

Even where the workers are well accommodated, well fed and well paid, it is common for groups to roam the streets on their days off, buy food in large quantities from local farmers' markets, compete with artisanal fishermen, collect firewood for fires and BBQs, and generally compete with the local community for often limited resources.

Groups of workers and individuals may physically and/or sexually abuse local women, particularly where they are walking alone across unoccupied land. Young girls are particularly vulnerable. Surprisingly, the age of consent in Angola, the minimum age at which an individual is legally considered old enough to consent to participate in sexual activity, is just 12-years, although sexual relations with minors aged 12-15 may sometimes be considered sexual abuse. The situation is exacerbated by the stigma attached to such crimes, when the abused would not go to the police or even a male relative (husband, father, brother) but only share her experience, often after time and the trauma have passed, with other women within her social circle.

On return from home visits, foreign workers, in the construction and other industries, may bring in illegal narcotics. While drugs are less of a problem in Angola than in other countries in southern Africa, the tightening of anti-drugs activities in Europe, trafficking from Brazil via the port of Luanda is increasing, with the main onward destination being South Africa, Morocco and Tunisia. The 'mules' are most frequently Brazilian man or African women, the latter usually persons living in poverty or socially outcast.

Presidential Decree dated 6 March 2017 aims to regulate the performance of activities of non-resident foreign worker in a way that balances the treatment between Angolan and foreign workers. Under the decree, Angolan companies can only hire non-resident foreign workers for a maximum period of 36 months and their salaries have to be paid in Angolan Kwanzas. Additional cash benefits, direct or indirect, cannot exceed 50% of base salary, and the Central Bank has the power to regulate transfers to any bank abroad.

A company's workforce should not exceed 30% of non-resident foreign workers, the balance, 70%, to come from the national resident workforce - Angolans and foreign citizens resident in Angola.

The ESMP will therefore make provision for controlling the influx of foreign workers and their behaviour while on Angolan territory.

6.4.2.2.3 Tertiary Sector

Up until 2010 the services, or tertiary sector, employed the majority of people in Angola and still employs over 40% of the labour force today. One of the main industries in the tertiary sector is tourism and hospitality. The number of international arrivals to Angola has been steadily rising since the end of the civil war, Figure 6-31. It is estimated that over 80% of these arrivals originate from other continents; Brazil, Portugal and China are among the most common nationalities⁴⁷.

⁴⁷ Jover, E., Pinto, L. A and Marchand, A. (2012) *Angola: Private Sector Country Profile* 1st ed. [pdf] Available at: https://www.afdb.org/fileadmin/uploads/afdb/Documents/Evaluation-Reports-Shared-With-OPEV_/Angola%20-%20-%20Private%20Sector%20Country%20Profile.pdf [Accessed 23.07.18].

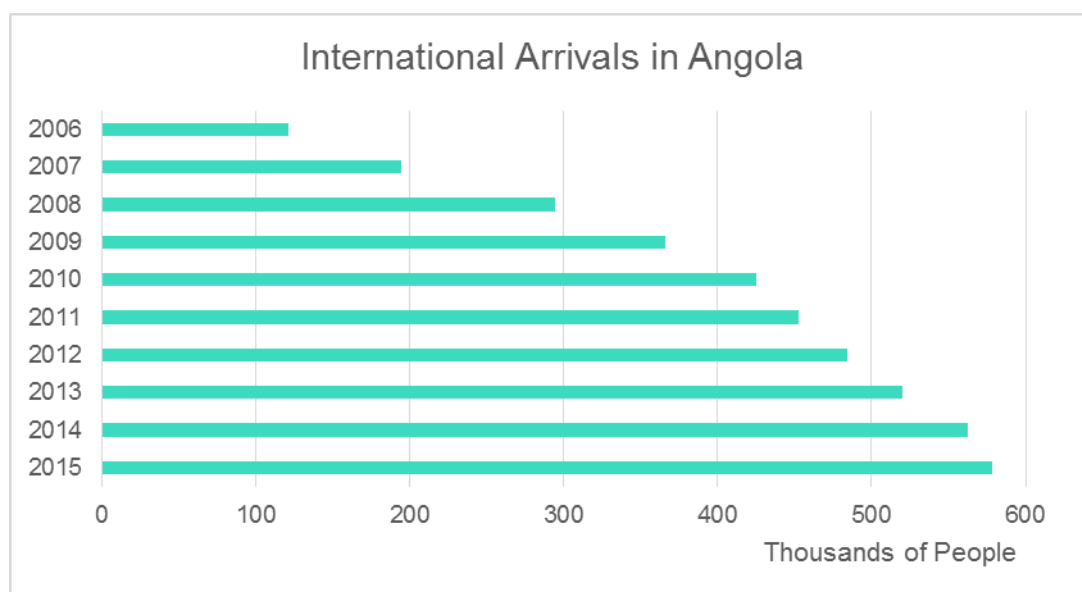


Figure 6-31: The number of international arrivals in Angola from 2006 until 2015.

Most of the current hotel demand in Luanda is business related however Angola’s long summer season, 1,650 km coastline, natural sandy beaches and national parks are all potential tourist attractions. Luanda has 60 hotels, the main ones and their associated capacities and tariffs are shown in Table 6-9. Furthermore, according to Angola’s Tourism Master Plan (2011-2020) the number of hotels is set to increase by 11 creating 874 new jobs by 2020⁴⁷. A potential limit on the growth of Angola’s tourist industry is the high cost of goods and services in Luanda, including hotels. For expatriates, Luanda was the most expensive city in the world last year⁴⁸.

Table 6-9: Main hotels in Luanda and their associated capacities and tariffs.

Hotel	No. Rooms	No. Suites	Total Capacity	Single Tariff (US\$)	Double Tariff (US\$)	Suite Tariff from (US\$)
5 Stars						
Talatona	180	21	201	575	655	875
Epic Sana	219	19	238	450	450	800
4 Stars						
Tropico	274	6	280	391	477	825
Alvalade	188	14	202	382	468	765
Presidente	194	3	197	378	437	838
PraiaMar	54	3	57	380	395	750
Skyna	220	17	237	390	420	820
Baía	133	6	139	420	500	765
3 Stars						
Tivoli	48	6	54	280	306	408
Contiental	75	8	83	285	325	385
Total	1,590	97	1,549	--	--	--

⁴⁸ BBC (2017) *Angola Capital: Most Expensive City in the World for Expats*. Available at: <https://www.bbc.co.uk/news/business-40346559> [Accessed 24.07.18].

6.4.2.2.4 Informal Sector

The informal sector, or grey economy as it is sometimes known, is part of the economy that is neither taxed nor monitored by any form of government, as such workers are not protected and employers are not held to national and international labour standards.

In Angola the informal markets are the primary source of employment among the youth population, often because this is relatively low-skilled work and offers instant rewards³⁷. In Luanda many 15-24 year olds sell or re-sell products such as cold drinks, fruit, mobile phone chargers and other household items on the street; they are known as *zunga* (*zungeiro* for male sellers and *zungueira* female sellers). *Zunga* usually have to walk around the city carrying their products, competing for commercial areas with others and running from the economic police. A stigma of criminality is attached to these informal activities and produces a social exclusion that leads many youth into drugs, alcohol or prostitution. This, of course, perpetuates their marginalisation and increases chances of contracting HIV, Sexually Transmitted Diseases, and other health problems³⁷.

6.4.2.3 Labour Laws

There are two main laws relating to Labour in Angola:

- **General Labour Law (Law 2/2000)**: provides a coherent and comprehensive legislative and social framework, consistent with human rights policies in democratic States. Although in theory this law protects workers' right to a decent wage and at least 22 days of annual leave per year, in practice labour inspections and effective protection of workers' rights can be lax²⁸.
- **Collective Bargaining Law (Law 20-A/92)**: allows for the negotiation of collective bargaining agreements and the amicable settlement of disputes between groups of employees and employers²⁸.

Under the articles 11 and 282 of the General Labour Law under age workers are only allowed if there is a written authorisation from their parent, guardian, legal representative or institution in charge. A contract should be made and under age work is only allowed for those over 14 years of age (proof of age is a requirement under Article 282). For people over 16 years of age this authorisation may be implied but must be subjected to physical and mental examinations to ensure that their performance in professional activity does not involve damage to their health and development (Article 285)²⁸.

For B4WSP specifically, employees hired directly by EPAL will benefit of the relevant regulations for civil servants applied in Angola. Workers hired indirectly by EPAL, with sub-contractual agreements (most applicable during construction), also have the benefits of the rights established by the Angolan Labour Law and the IFC PS2. As part of its social commitments, EPAL will have to ensure that their contractors comply with the laws and regulations of the Angolan work. The company has yet to implement an appropriate system of monitoring to ensure that no practice of illegal or unethical work occurs among its contractors, as well as the use of forced and under age workers.

In an effort to respond to the situation surrounding youth, the Angolan government has recently ratified the Law of the Basis of First Employment (2006). This law targets youth between 16 and 30 years and seeks to promote employment based on specific policies which include:

- understanding employment problems;
- creating more employment;
- facilitating wider access to information and training;
- engaging in international cooperation; and,
- integrating international conventions into employment policies.

The law also identifies priority sectors as agriculture and rural development, commerce and services, public construction and housing, and hospitality and tourism.

6.5 HEALTH AND SAFETY

6.5.1 HEALTH

It is estimated that the city of Luanda absorbed 3 million IDPs during the civil war and that roughly 80% of those who moved to Luanda are still there⁴⁹. The majority settled in informal areas, locally known as *musseques*. These areas tend to be environmentally risky parts of the city characterised as low costal zones, river basins susceptible to flooding or steep ravines with high erosion risks⁵⁰. These physical characteristics have made it difficult to get a piped water supply or indeed any formal sanitation system into such areas therefore any groundwater is often contaminated. A lack of access to a clean water supply has been linked to increased levels of poverty⁵¹, poor education, particularly for girls⁵², and poor public health⁵³. By supplying *musseques* and other informal settlements with water, Luanda's public health is likely to benefit⁵⁴.

The health issues discussed in this section can all be linked, directly or indirectly, to poor Water Sanitation and Hygiene (WASH) conditions⁵⁵. However, this section is by no means an exhaustive analysis of all WASH related health issues. Besides those discussed below in further detail other WASH related health issues that are prevalent in the study area include:

- **Typhoid:** the bacteria *Salmonella Typhi* is spread when someone comes into contact with the excreta of an infected person.
- **Trachoma:** can be contracted via contact with an infected person but also, particularly in developing countries, via eye-seeking flies. The main risk factors for developing this disease include poverty, crowded living conditions and poor sanitation.
- **Dengue Fever:** similar to malaria and yellow fever, dengue fever is spread via mosquitoes which are attracted to stagnant, dirty water and often congregate around municipal waste.
- **Leptospirosis:** spread via the urine of infected animals. This is a problem in the study area because there is limited knowledge and practice of hygienic behaviours.

6.5.1.1 Diarrheal Diseases

Since 2005 diarrheal diseases, such as cholera, have been the leading cause of death in Angola⁵⁶. Children under the age of five are most vulnerable to the effects of diarrheal diseases; globally it is the leading cause of child mortality and in Angola specifically it accounts for 15% of child deaths.

In 2006, there was a cholera outbreak in Luanda which spread to 16 of Angola's 18 provinces. The outbreak reached its peak in April 2006 when 950 cases were reported in one day. Over 600,000 cases were reported in Luanda and several hundred deaths⁵⁰. Ten years later another Cholera outbreak was recorded, this time originating in Angola's exclave of Cabinda. While this did spread to Luanda, the impact was relatively contained (five cases and zero deaths). Nevertheless, this demonstrates that cholera, and other diarrheal diseases, remain a critical issue for Luanda's population, particularly for those with limited access to clean water, a lack of adequate sanitation and lax hygiene practices, collectively referred to as WASH conditions. Poor WASH conditions make

⁴⁹ Stead, M, Rorison, S. and Scafidi, O. (2013) *Angola: Bradt Travel Guide*. 2nd ed. UK: Bradt.

⁵⁰ Cain, A. (2017) *Water Resource Management Under a Changing Climate in Angola's Coastal Settlements*. 1st ed. [pdf]. Available at: <http://pubs.iied.org/pdfs/10833IIED.pdf> [Accessed: 23.07.18].

⁵¹ Sullivan, C. Calculating a Water Poverty Index. *World Development* [online] Volume 30(7) Available at: <https://www.sciencedirect.com/science/article/pii/S0305750X02000359> [Accessed 23.07.18].

⁵² UNICEF (2003) *The role of Women and Girls in Water, Sanitation and Hygiene* [online] Available at: https://www.unicef.org/wash/index_womenandgirls.html [Accessed 23.07.18].

⁵³ Marmot, M. (2005) *The Health Gap: The Challenge of an Unequal World*. London: Bloomsbury.

⁵⁴ Cain, A. and Mulenga, (2009) *Water service provision for the peri-urban poor in post-conflict Angola* 1st ed. [pdf] Available at: <http://pubs.iied.org/pdfs/10577IIED.pdf> [Accessed 23.07.18].

⁵⁵ UNICEF (2003) *Water, Sanitation and Hygiene* [online] Available at: https://www.unicef.org/wash/index_wes_related.html [Accessed 23.07.18].

⁵⁶ IHME (2018). *Institute for Health Metrics and Evaluation: Angola* [online] Available at: <http://www.healthdata.org/> [Accessed 23.07.18].

all age groups more susceptible to diarrheal diseases and make it harder to recover from these diseases. This cycle is particularly dangerous the under-fives age group as undernutrition becomes a serious issue.

6.5.1.2 Child Undernutrition

Undernutrition is defined as “the outcome of insufficient food intake and repeated infectious diseases. It includes being underweight for one’s age, too short for one’s age (stunting), dangerously thin for one’s height (wasting) and deficient in vitamins and minerals (micronutrient malnutrition)”⁵⁷. As well as having profound effects on a child’s physical condition undernutrition has also been linked to reduced motor and cognitive development which can adversely impact productivity as an adult; childhood anaemia alone is associated with a 2.5% drop in adult wages⁵⁷. Furthermore, young girls and women whose growth was stunted during childhood are more likely to experience complications during labour increasing the risk of maternal mortality. A 2009 UNICEF report found that 16% of Angolan children under the age of five are underweight, 29% are stunted and 8% are wasted⁵⁸.

Studies suggest that the process of stunting is concentrated in the first 1000 days of a child’s life and as such interventions have been targeted at those under the age of two. The impact of these interventions strongly suggest that the first two years a child’s life present a “window of opportunity for preventing undernutrition”⁵⁸. In Angola interventions aimed at those under two years of age have contributed to the prevalence of child stunting reducing from 62% in 1996 to 29% in 2007. However, across much of Africa, Angola included, due to the increase in population growth, the prevalence of child stunting has actually now increased to 38%⁵⁸.

Although there is little information on the prevalence of child stunting specific to the B4WSP study area, the National Nutrition Survey conducted in 2007 presents’ data on Luanda province as a whole. Figure 6-32 compares Luanda province with other geographic regions in Angola, the national average and other urban areas with respect to the prevalence of stunting, wasting and underweight children under five years of age. This comparison shows the prevalence of underweight and stunted children is lower in Luanda than it is in other urban areas but wasting is 3.3% more prevalent.

⁵⁷ Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., De Onis, M., ... & Maternal and Child Nutrition Study Group. (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet*, 382(9890), 427-451.

⁵⁸ World Bank (2009) Nutrition at a Glance: Angola. Available from: <http://siteresources.worldbank.org/NUTRITION/Resources/281846-1271963823772/angola1711screen.pdf> [Accessed 26.09.18].

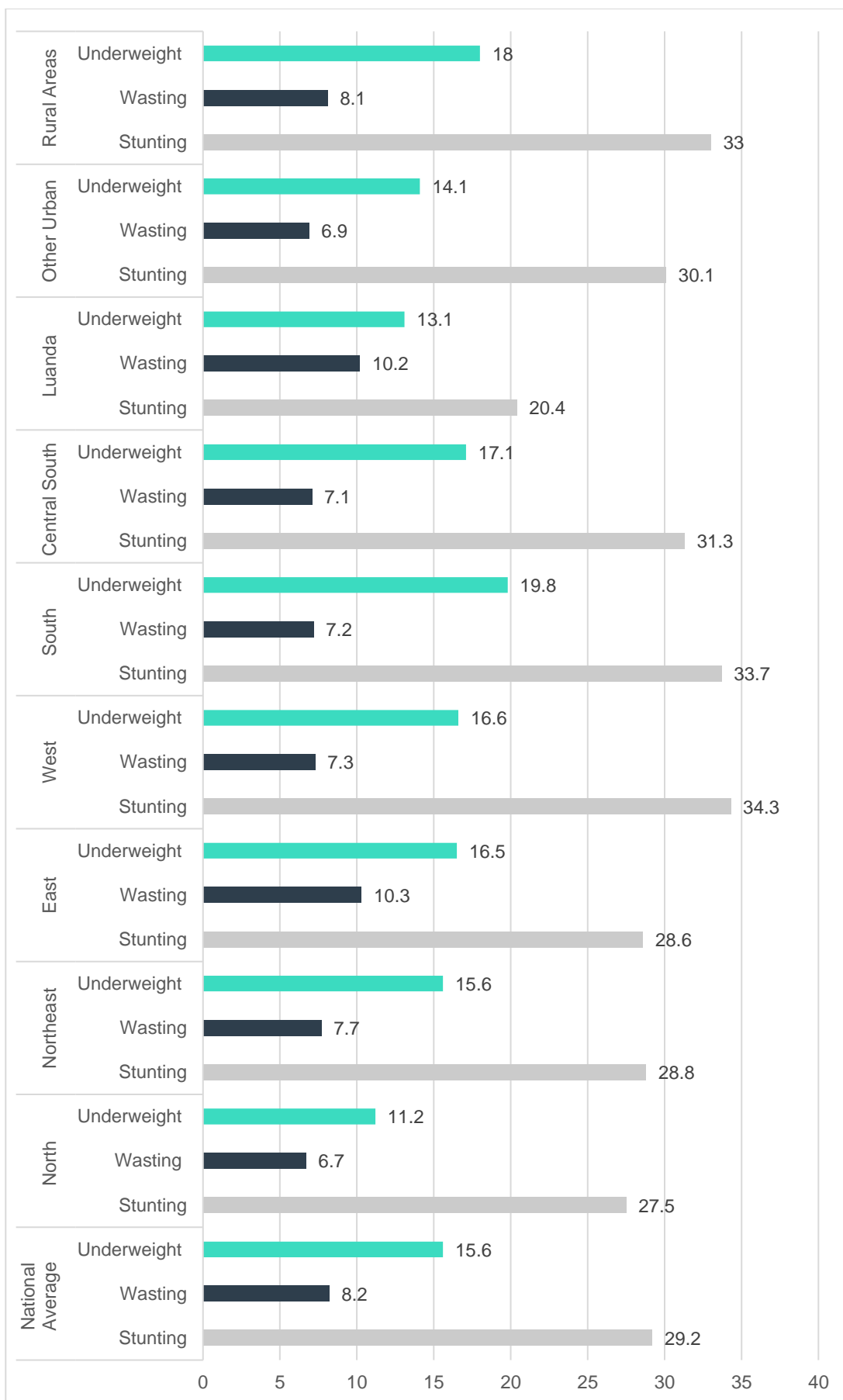


Figure 6-32: Prevalence of stunting, wasting and underweight children under five years of age in Angola⁵⁹

6.5.1.3 Malaria

Malaria is a parasitic disease spread by mosquitoes and is most common in the following groups in Angola:

- **Children under five:** Figure 6-33 shows the number of children under five who have died due to malaria;
- **Pregnant women:** it is estimated that 25% of maternal mortality is attributable to malaria²⁴; and,
- **Patients with other health conditions (e.g. HIV/AIDS or Tuberculosis):** a study conducted in 2013 at Hospital Sanatório de Luanda, found that 37.5% of patients diagnosed with TB also had malaria⁶⁰.

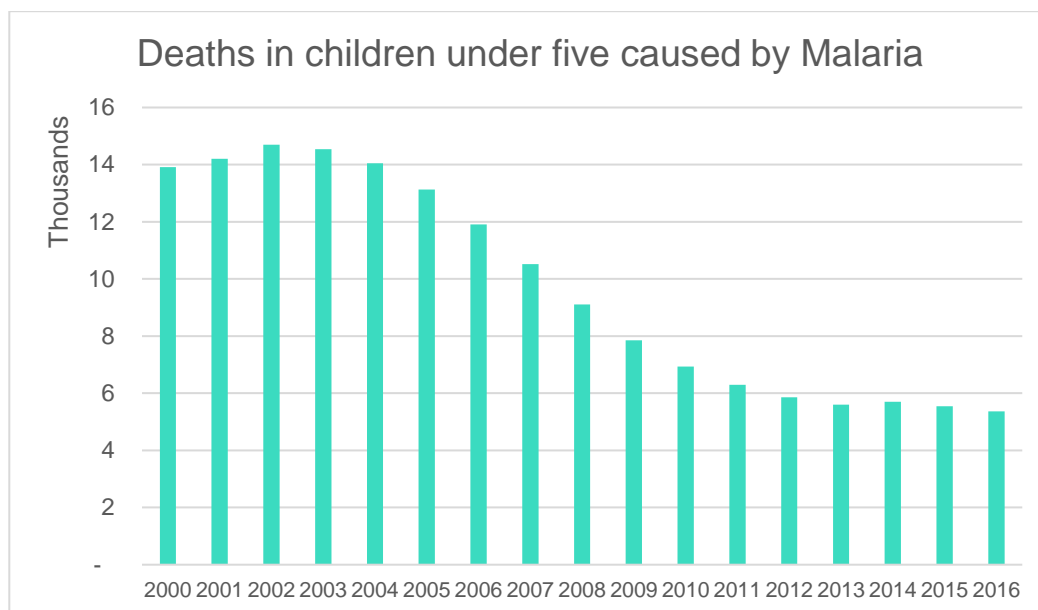


Figure 6-33: Deaths in Angolan Children under the age of five caused by Malaria⁶¹

While diarrheal diseases are the most deadly across Angola, malaria as the principle cause of mortality in Luanda’s informal *musseque* areas due to a combination of poor drainage, flooding and a lack of sanitation⁵⁰. Figure 6-34 shows critical high density hotspots at a high risk of malaria.

⁶⁰ Valadas, E., Gomes, A., Sutre, A., Brilha, S., Wete, A. Hänscheid, T and Antunes, F. (2013) Tuberculosis with Malaria or HIV co-infection in a large hospital in Luanda, Angola. *The Journal of Infection in Developing Countries* [online] Volume 7(3). Available at: <https://www.ncbi.nlm.nih.gov/pubmed/23493006> [Accessed 23.07.18].

⁶¹ UNICEF (2016) *Malaria Mortality Among Children under five is concentrated in sub-Saharan Africa*. Available at: <https://data.unicef.org/topic/child-health/malaria/> [Accessed 27.07.18].

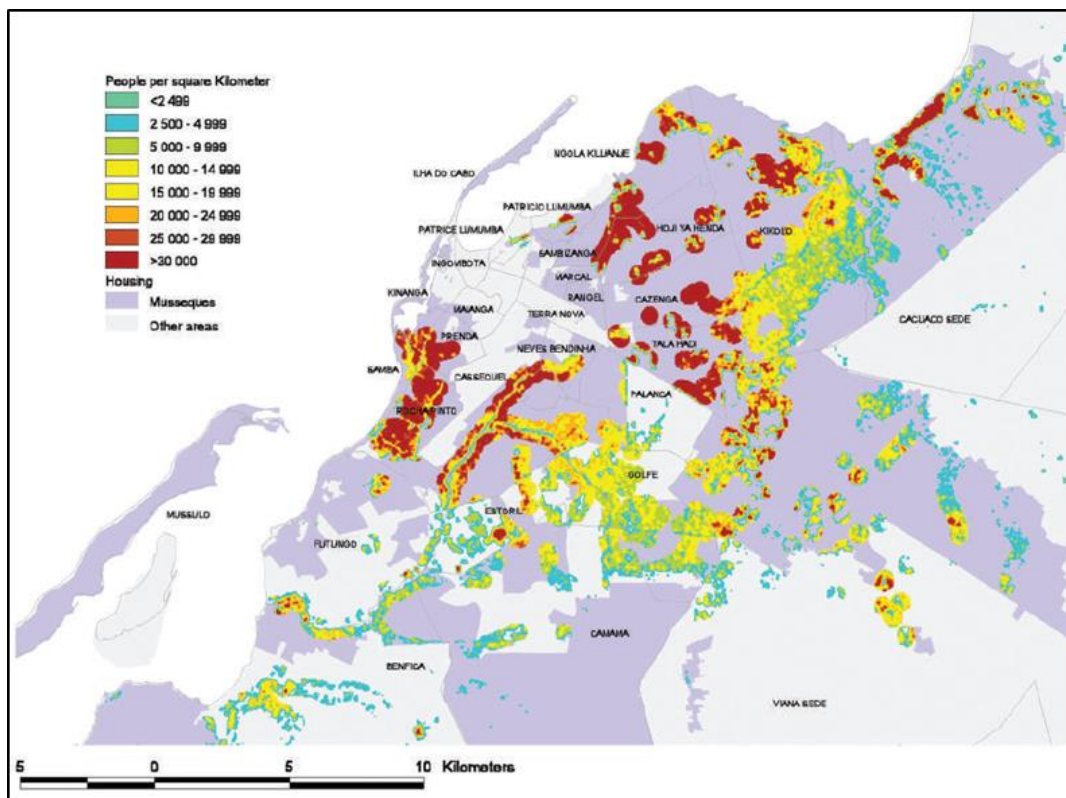


Figure 6-34: Map of Luanda showing critical high density hotspots at risk of malaria⁵⁰.

6.5.1.4 HIV/AIDS

Although Angola’s HIV/AIDS prevalence rate varies across the country, the highest being in Bié Province (5.8%), it averages out at 1.9%; this equates to about 280,000 individuals. Although this is comparatively low for countries in this region (Table 6-10), individuals who are HIV positive are 20 to 30 times more likely to contract TB, which is the leading cause of death among people living with HIV⁶². In Luanda specifically, studies conducted in 2001 show a prevalence rate of 8.6% in pregnant women, 33.26% in sex workers and 10% in TB patients⁶³.

6.5.1.5 Tuberculosis

Tuberculosis (TB) is a communicable, airborne disease that can pass from one person to another when an infected individual coughs, sneezes or speaks. TB is still a major concern for Angola. Since 2000 the incidence of all strains of TB has been increasing, reaching 370 cases/100,000 inhabitants by the end of 2016, reflecting a surge in the number of cases of multidrug-resistant tuberculosis and co-infection with HIV⁶⁴.

Luanda specifically had a HIV-TB coinfection rate of 6%⁶⁰. A 2012 study conducted in Hospital Sanatório de Luanda and concluded that Luanda does not have the technological infrastructure to perform culture-based diagnosis of TB making definitively diagnosing TB problematic⁶⁰.

⁶²UNAIDS (2018) *Country Fact Sheet: Angola* [online]. Available at: <http://www.unaids.org/en/regionscountries/countries/angola> [Accessed 23.07.18].

⁶³ WHO (2004) *Angola: Epidemiological Fact sheets on HIV/AIDS and Sexually Transmitted Infections 1st ed.* [pdf] Washington: WHO. Available at: http://www.who.int/3by5/support/EFS2004_ago.pdf [Accessed 23.07.18].

⁶⁴ WHO (2018) *Angola: Country Profile* [online] Available at: <http://www.who.int/countries/ago/en/> [Accessed 23.07.18].

Furthermore, a study conducted in 2017 suggests that there is a TB epidemic in Angola that has been getting worse for over a decade⁶⁵.

6.5.1.6 Yellow Fever

Yellow fever is transmitted via bites of infected mosquitoes, which can be found in the majority of Angola’s provinces but is most prevalent in Luanda. One possible reason for this is because of the vast amounts of uncollected refuse on the streets which attracts the mosquitoes that carry the virus⁶⁶, this is discussed further in Section 6.6.4.2. Angola tried to minimise the spread of yellow fever via widespread national vaccination campaigns. However between December 2015 and August 2016, yellow fever resurged in Angola, quickly spreading into what became the largest yellow fever outbreak in the last 30 years⁶⁷. 345 people were reported to have died during the outbreak and a further 3,000 cases were reported⁶⁶.

The outbreak originated in Luanda and a vaccination shortage meant the disease was able to spread to other provinces. Further compounding the problem was the widespread use of fake Yellow Fever certificates, often used due to a widespread misconception that the vaccine is lethal⁶⁶. The majority of Luanda’s population has now been vaccinated. Moreover, it was later found that without the vaccination campaign the death toll could have been about five times higher, and the number of observed cases could have been about six times higher⁶⁷. In order to enter Angola international travellers must now show a yellow fever certificate.

6.5.1.7 Schistosomiasis

Schistosomiasis is transmitted when larval forms of the parasite penetrate the skin during contact with water contaminated by the excreta of people suffering with schistosomiasis⁶⁴. Symptoms can include the development of a fever and a rash as well as abdominal, muscle and joint pain. If left untreated the parasite can stay in the body causing long-term problems some as severe as bladder cancer⁶⁸. The socio-economic impact of this disease is deemed considerable by World Health Organisation (WHO) as it disables more people than it kills reducing their capacity to work. Furthermore, schistosomiasis prevails in conditions of poverty with poor sanitation education and is most common in areas without proper sanitation infrastructure.

Table 6-10: Summary of Infectious and Parasitic Disease incidence in Angola compared to other sub-Saharan African countries

Country	Diarrheal diseases (annual mortality rate per 100,000 people)	Under 5 death rate from malaria (per 1000 livebirths)	Incidence of tuberculosis (per 100,000 people)	HIV Adult Prevalence Rate (% of population)	Contraceptive Prevalence (% of population)	Schistosomiasis (annual mortality rate per 100,000 people)
Angola	70.8	4	370	1.9	13.7	0.4
Botswana	-	0	326	21.9	52.8	-
Congo	33.4	4	378	3.1	30.1	0.5
Democratic Republic of Congo	134.9	12	323	0.7	20.4	-
Malawi	95.4	4	159	9.2	59.2	0.4

⁶⁵ Brady, P. and Vita, D. (2017) Challenges to Tuberculosis Control in Angola: The Narrative of Medical Professionals, *Journal of Public Health* [online]. Available at: <https://academic.oup.com/jpubhealth/advance-article-abstract/doi/10.1093/pubmed/fox159/4653514> [Accessed 23.07.18].

⁶⁶ BBC (2016) *Yellow Fever Vaccine: UN backs lower doses amid shortage* [online]. Available at: <https://www.bbc.co.uk/news/world-africa-36563308> [Accessed 23.07.18].

⁶⁷ Zhao, S, L. Stone, Gao, D, and He, D. (2018) Modelling the large-scale yellow fever outbreak in Luanda, Angola and the impact of the vaccination. *PLoS Neglected Tropical Diseases* Volume 12(1). Available at: <https://doi.org/10.1371/journal.pntd.0006158> [Accessed 23.07.18].

⁶⁸ Botelho, C. M., Figueiredo, J. and Alves, H. (2015) Bladder Cancer and Urinary Schistosomiasis in Angola, *Journal of Nephrology Research* [online] Volume 1(1) p.22-24. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4497783/> [Accessed 23.07.18].

Country	Diarrheal diseases <i>(annual mortality rate per 100,000 people)</i>	Under 5 death rate from malaria <i>(per 1000 livebirths)</i>	Incidence of tuberculosis <i>(per 100,000 people)</i>	HIV Adult Prevalence Rate <i>(% of population)</i>	Contraceptive Prevalence <i>(% of population)</i>	Schistosomiasis <i>(annual mortality rate per 100,000 people)</i>
Mozambique	50.5	8	551	12.3	11.6	0.5
Namibia	41.4	0	446	13.8	56.1	0.4
Swaziland	70.9	-	398	27.2	66.1	0.6
South Africa	29.5	0	781	18.9	-	0.4
Tanzania	52.4	-	287	4.7	38.4	0.3
Zambia	66	4	376	12.4	49	0.4
Zimbabwe	76.4	1	208	13.5	66.8	0.5
Regional Average	65.6	3.7	383.6	11.6	42.2	0.4

6.5.2 SAFETY

6.5.2.1 Land Mine Safety

During the civil war land mines were used by all parties, including foreign actors in the conflict. As a result Angola is thought to be the most heavily mined country in Africa⁶⁹. Her Royal Highness Princess Diana of Wales visited Angola in January 1997 and drew international media attention to the issue. Later that year “The Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction”, commonly referred to as the Mine Ban Treaty was adopted and formally enforced from March 1999⁶⁹. NGOs such as the Mines Advisory Group and The Hazardous Area Life-support Organisation (HALO) Trust have been working to demine Angola for 23 years and have so far succeeded in destroying more than 125,000 weapons, 2.9 million bullets and 1,480 metric tonnes of degraded ordnance. However, progress is slow, in a day one demining team can cover about 30m² which is not enough to meet the country’s target of being mine free by 2025, at current funding levels it may take until 2046 for Angola to be completely mine free⁶⁹.

The exact number of land mines in Angola is not known, estimates range from the conservative 500,000, to the exaggerated 20 million⁴⁹. As mentioned previously much of the fighting took place in the countryside away from urban centres such as Luanda. Figure 6-35 shows the density and distribution of minefields per province. The southern Provinces are the worst affected whereas Luanda, like many of Angola’s urban centres, is widely believed to be mine free. The project area of influence is unlikely to have any undetonated land mines as roads are well travelled and off-road areas have been explored and built on. The latest available data from the HALO trust indicates that the nearest land mines to the study area are 30 km west of the project area of influence (Figure 6-36). The two landmines shown in Figure 6-36 are thought to be the only land mines left in the Province of Luanda.

⁶⁹The Guardian (2018) Diana’s Landmine Legacy helps reclaim swaths of Angola – in pictures [online] available at: <https://www.theguardian.com/global-development/gallery/2018/jul/17/princess-diana-landmine-legacy-angola-huambo> [Accessed 23.07.18].

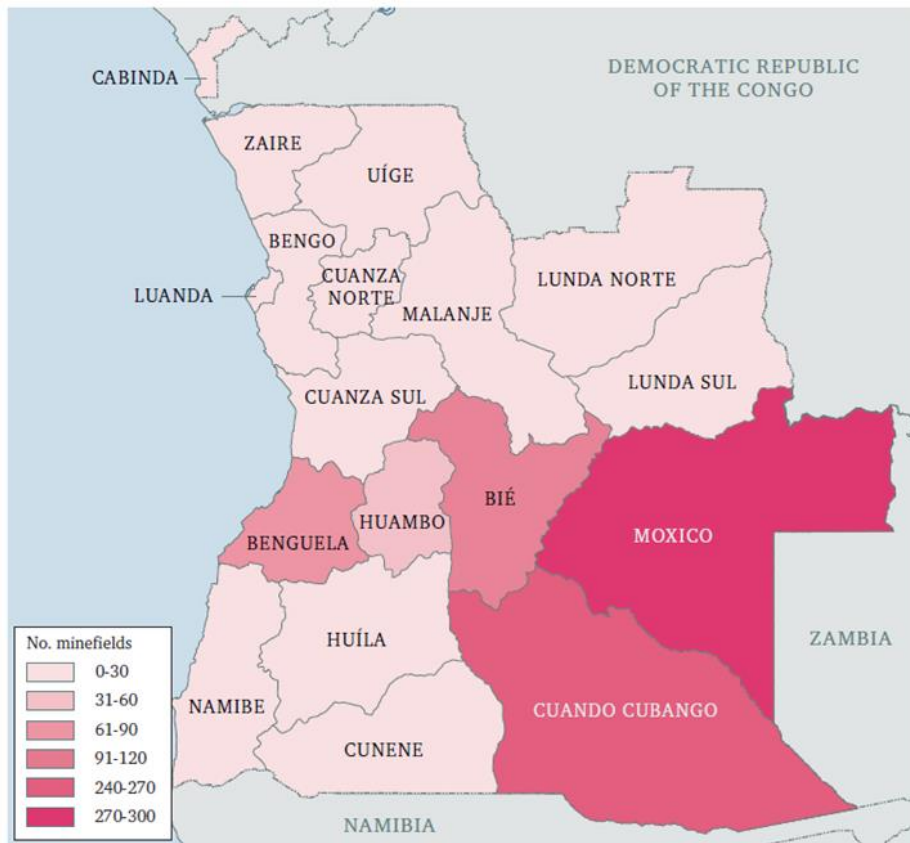


Figure 6-35: Minefield distribution and density per province in Angola⁷⁰.

⁷⁰ Lawson, K. (2007) *Mine Action in Angola: Landmine free by 2025* 1st ed. [pdf]. Available at: <https://www.chathamhouse.org/sites/default/files/events/2017-06-15-landmines-angola-appg.pdf> [Accessed 23.07.18].

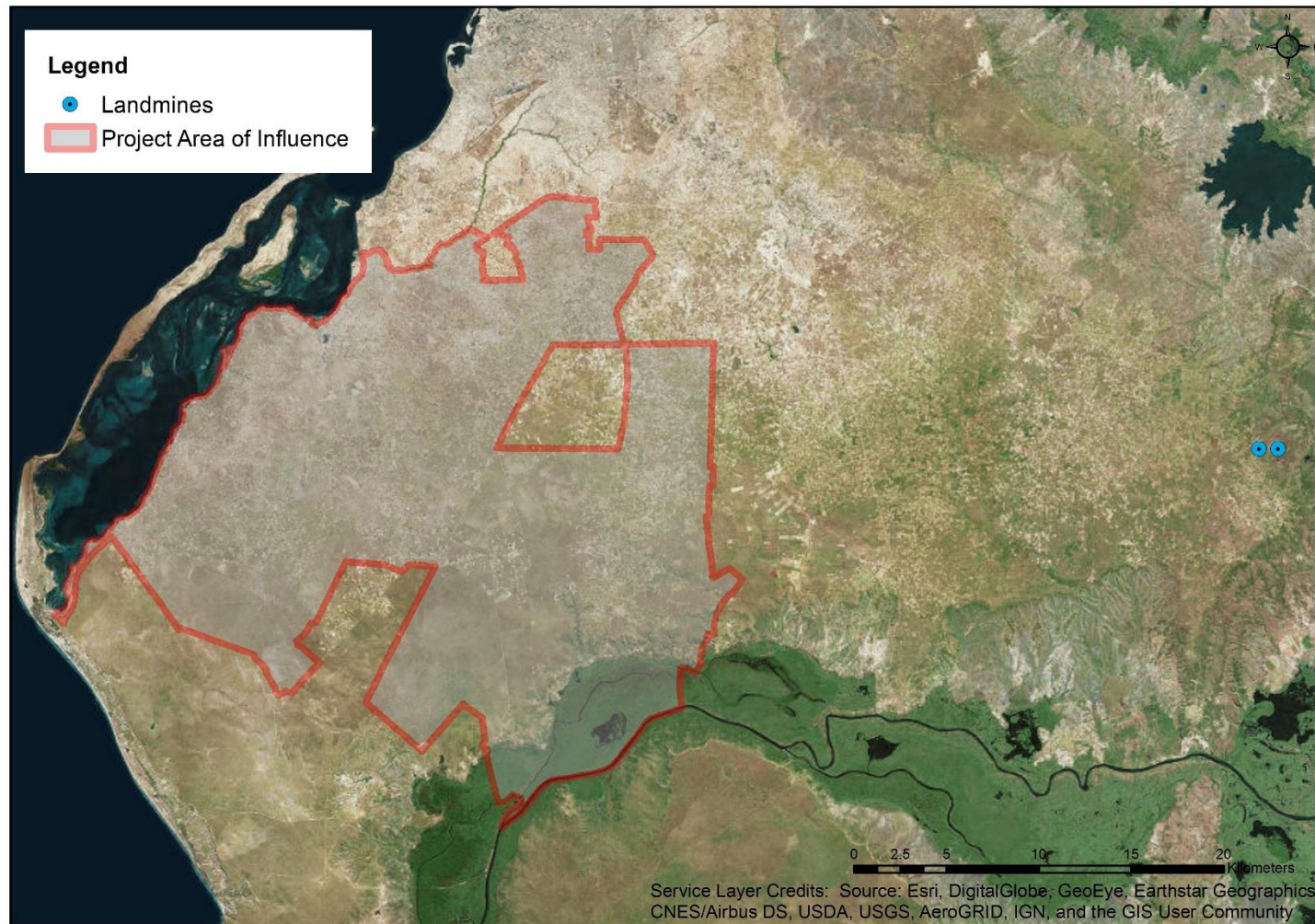


Figure 6-36: Landmine presence in Luanda Province in relation to the project area of influence⁷¹

⁷¹ The HALO Trust (2018) *Angola*. Available at: <https://www.halotrust.org/where-we-work/africa/angola/> [Accessed 01.08.18].

6.5.2.2 Road Safety

Generally roads toward the west of Angola, on and near the coastline, are paved as they were the first to be rebuilt after the war. However, the majority of roads in the eastern half of the country are still unpaved. This can be a problem during the rainy season when sudden floods can wash away roads, bridges and even dislodge undetonated ordnance.

In 2010 3,080 people were killed as a result of road traffic accidents in Angola and many more experienced life changing injuries⁴⁹. Poor maintenance of roads and vehicles as well as unskilled drivers are blamed for the number of road traffic accidents. Compounding the situation further there is a lack of suitable pedestrian crossings and road safety awareness among Angolans. In Luanda there are footbridges crossing main highways such as *Via Expresso* however many pedestrians opt to cross the road without using these, instead waiting for a gap in the traffic and running across. This behaviour is encouraged by the presence of zebra crossings on busy highways where such facilities are dangerous and ill-advised.

6.6 PUBLIC UTILITIES AND COMMUNITY SERVICES

The Angola civil war not only destroyed or delayed the development of social infrastructures such as schools, health centres and employment opportunities (discussed in Sections 6.4 and 6.5.1), it also destroyed or delayed the development of physical infrastructures including water supply networks, sanitation systems, electrical power networks and other infrastructure. See also Section 4.6.

6.6.1 WATER

The project area of influence can be sub-divided into two groups: those with a piped water supply (Benfica II and Camama) and those without a piped water supply (Bitá, Cabolombo, Mundial and Ramiros). A high level social survey was undertaken to assess the need for an upgraded water supply system in areas with piped water, and the need for a new water supply system in areas without a piped water supply. The information gathered, combined with surveys conducted for the previous ESIA, gives an overview of the current situation in the project area of influence. However, as the B4WSP is still in its infancy the Consultant was mindful not give out specific information regarding exact alignment routes and estimated completion dates as this information has not yet been confirmed. Instead the questionnaire (shown in Appendix D2) was focused around the respondent and their current relationship with water.

6.6.1.1.1 Survey Methodology

The previous ESIA team conducted a similar survey in the settlements of Julio (Bitá service area) and Ramiros (Ramiros service area). As data was already available for these areas and it was important not to increase stakeholder fatigue the Consultant focused on the remaining four service areas. Due to limited time and resources the sample size was restricted to 10 respondents from each of the four service areas. Locations of all surveys are shown in Figure 6-37. Further justification for survey locations are given in Table 6-11.

Cabolombo Service area

The entirety of the Cabolombo service area is contained within the Municipality of Belas but spreads over the Municipality's only commune (or *communa*), Barro do Kwanza, and four of its urban districts (or *distrito urbano*); Cabolombo, Kilamba, Quenguela and Vila Verde. Due to this area's sparse population (Figure 6-20) two locations were surveyed; the area surrounding CD Cabolombo (survey location 1) and the settlement of Quenguela (survey location 2). Five questionnaires were conducted in each location.

Mundial Service area

Mundial service area is also contained within Belas Municipality and while a small portion of it crosses into the municipality's only commune (Barro do Kwanza) the majority is confined to the urban districts of Ramiros, Vila Verde and Morro dos Veados. Due to this area's sparse population (Figure 6-22) two locations were surveyed; the settlement of Alvarenga (survey location 3) and the area surrounding the proposed site for CD Mundial (survey location 4). Five questionnaires were conducted in each location.

Benfica II Service area

The majority of Benfica II service area is contained within Talatona Municipality, however some crosses into the Municipality of Belas. Within Talatona the service area is restricted to the urban district of Lar do Patriota, Camama and Benfica. Morro dos Veados is the only urban district within Belas Municipality and in Benfica II service area. Benfica II service area is more densely populated (Figure 6-18) so it was only necessary to survey one location in this area (survey location 5). Ten questionnaires were conducted in this location.

Camama Service area

Camama service area is contained within two of Talatona's urban districts; Cidade Universitária and Camama. Like Benfica II, Camama is also densely populated (Figure 6-21) so it was only necessary to survey one location in this area (survey location 6). Ten questionnaires were conducted in this location. Table 6-11 gives more specific detail on the location of the surveyed sites (also shown in Figure 6-37) and explains why they were chosen.

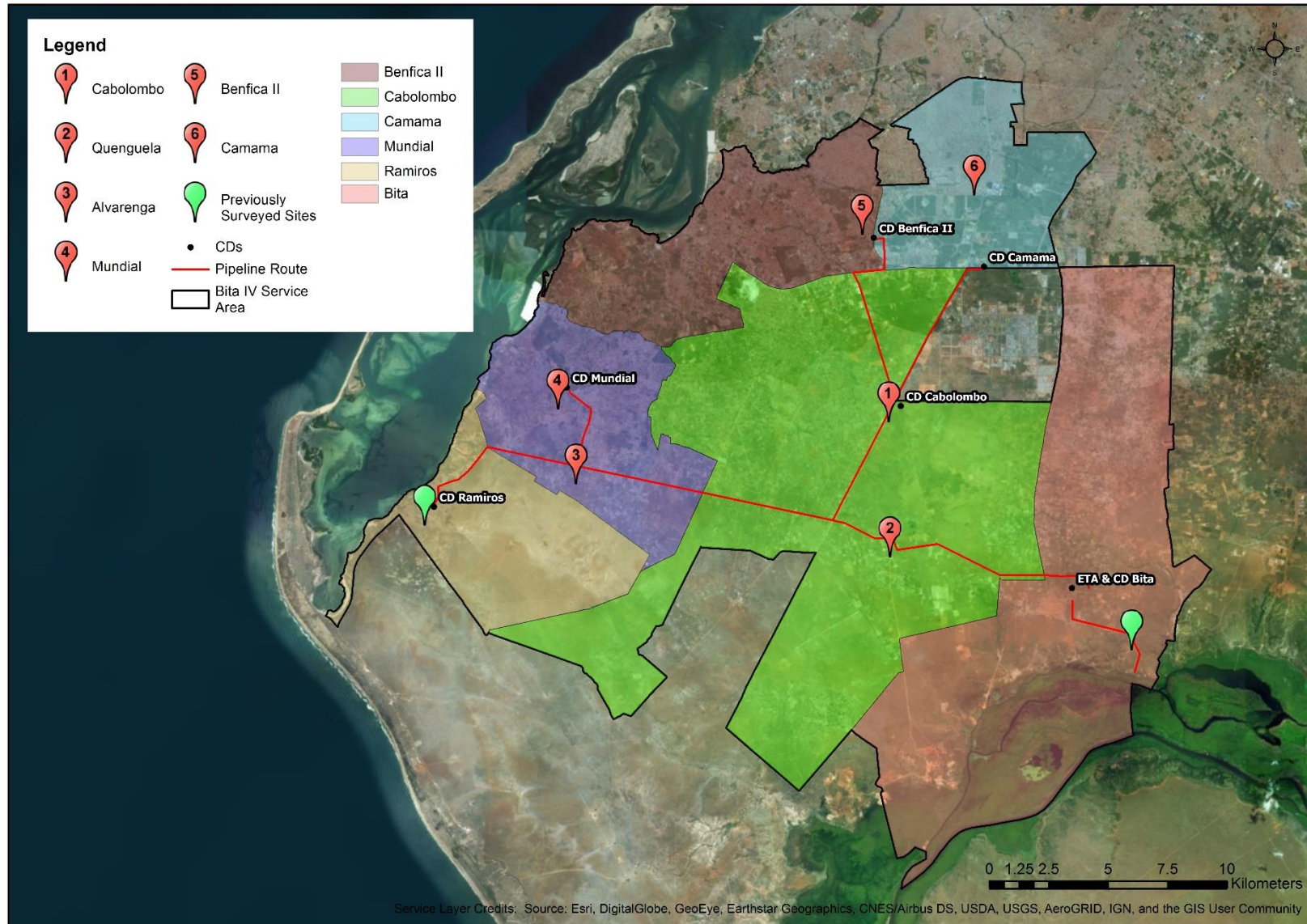


Figure 6-37: Locations of high level social surveys

Table 6-11: Survey Locations

Date Visited	Service area	Site No.	Location Description	Justification of Site Selection
18/06/2018	Cabolombo	1	CD Cabolombo and its surrounding settlements are located in the urban district of Cabolombo and split between the <i>bairros</i> of Quenguela, Luquembo B and Luquembo C.	The settlement was selected for surveys due to its proximity to CD Cabolombo. As construction has already begun on this CD it is likely that this settlement will be among the first to benefit from the project.
		2	The settlement of Quenguela is located in the centre of a <i>bairro</i> and an urban district with the same name and will be supplied by CD Cabolombo which is approximately 5.5 km northwest of the settlement.	It was selected due to its proximity to the proposed transmission lines. As a full social survey of PAPs and PAP communities is not possible due to time constraints, the Consultant took this opportunity to spend more time in the area and engage with its people on the subject of water and its supply.
18/06/2018	Mundial	3	Alverenga is a town located in the urban district of Ramiros but in the Mundial service area. It lies on the eastern border between the <i>bairros</i> of Tanque II and Maruvo. The town will be supplied by CD Mundial which is about 3 km northwest.	Alverenga was selected due to its proximity to the proposed transmission lines. As a full social survey of PAPs and PAP communities is not possible due to time constraints, the Consultant took this opportunity to spend more time in the area and engage with its people on the subject of water and its supply.
		4	The site for CD Mundial is within the urban district of Ramiros, Belas. More specifically it is in the eastern side of Km 30 <i>bairro</i> , roughly 3.5 km from the coastline.	Unlike CD Cabolombo, CD Mundial is yet to begin construction but when it does the communities surrounding the area are likely to be affected (although no resettlement or land acquisition is anticipated). As a full social survey is not possible due to time constraints, the Consultant took this opportunity to spend more time in the area and engage with its people on the subject of water and its supply.
20/06/2018	Benfica II	5	The fifth survey site was within Lar do Patriota, a Talatonan urban district, and only 0.5 km north of Benfica II CD. The surveyed site, and the rest of Benfica II service area is currently supplied by ETA Sudeste, this supply will be reinforced by the ETA Bitá supply.	This site was selected because of its proximity to CD Benfica II. The closer the households are to the CD the more likely it is that they will have a reliable and good quality water supply. However if this is not the case as close to the CD as this, then the supply is likely to become less reliable further away from the CD. This supports the argument for connecting CD Benfica II to the Bitá IV system.
	Camama	6	The final survey site is contained within the Talantona urban district of Camama but crosses the borders of several <i>bairros</i> including Campe, Baurý and Major Canhangulo. The settlement is currently supplied by CD Camama which is roughly 3.5km due south. The surveyed site, and the rest of Camama service area is currently supplied by ETA Sudeste, this supply will be reinforced by the ETA Bitá supply.	As with Benfica II this location is being surveyed in order to get an indication of the reliability and quality of water current supplied. Should the customers be experiencing persistent issues with their water supply it would support the argument for connecting CD Camama to the Bitá IV system.

6.6.1.1.2 Key Findings

Between the surveys conducted for the previous ESIA and this study, 92 people were consulted across the entire project area of influence with an even split between men and women (Table 6-12). Having said this during the survey it was observed that women were usually the most knowledgeable members of the household on matters regarding water. When questions were asked of male members of the household most would often consult the women.

Table 6-12: Number, gender and location of respondents.

Service area	Number of Residents Surveyed		
	Female	Male	Total
Benfica II	6	4	10
Bitá	12	17	29
Cabolombo	8	2	10
Camama	4	6	10
Mundial	8	2	10
Ramiro	8	15	23
Total	46	46	92

The previous ESIA did not have information on sources of water in Bitá and Ramiro service areas so the following information is only available for Benfica II, Cabolombo, Camama and Mundial service areas.

Water Sources

As shown in Table 6-13 the surveys indicate that in Cabolombo and Mundial service areas the most common primary water source is privately-owned water tanks. A recent paper by the NGO Development Workshop (DW) estimated that 70% of Luanda’s peri-urban population obtain their water from tanks such as these⁷². The water in these tanks originates from one of Luanda’s main rivers, the Bengo or the Kwanza, and is extracted by private pump operators. The operation of these pumps is extremely profitable and can achieve a return on investment in under two years. Truck operators then pay roughly US\$0.88/m³ to extract the water and while it is expected that truck operators stop at water treatment plants to chlorinate the water they are transporting for a fee of US\$0.12/ m³, it is not enforced. EPAL does take weekly samples to their labs for chlorine analysis but only from the trucks which have voluntarily stopped for chlorination.

Although the national GoA have in the past attempted to vilify private truck operators labelling them the ‘water-mafia’ and accusing them of exploiting the poor, the provincial government has at least begun to recognise the contribution they have made to Luanda’s water security by registering their organisation, ANGOMENHA. Members of this organisation pay a monthly tax of 1% to the Ministry of Finance to contribute to the maintenance of the system, thus demonstrating their acceptance of some degree of regulation. As the country was recovering from the Civil War and Luanda’s population was growing the water truck operators were supplying the peri-urban population with water while EPAL was growing its network and increasing its capacity. Furthermore, DW argue that the high price of water delivered by tanker trucks (discussed further on in this section) reflect the costs incurred from water abstraction, treatment, the salary of the driver, fuel and the depreciation of the vehicle rather than any exploitative net profits. These water truck operators then sell the water to households with private tanks.

In some cases the privately owned tanks are underground (Plate 6-8) whereas in others they are raised to increase water pressure (Plate 6-9). The capacity of these tanks vary from 5 m³ to 15 m³. Owners of these tanks then resell this water to their surrounding communities, Plate 6-10 and Plate 6-11 show examples of signs displayed to advertise the selling of water. Social relationships and

⁷² Cain, A (2018) Informal water markets and community management in peri-urban Luanda, Angola. *Water International* 43:2, pages 205-216.

community solidarity play an important role in this transaction. Water tank owners are able to choose to whom they sell water and at what price. It is therefore essential that those in unserved areas maintain a good relationship with water suppliers in their areas. In the event of a water shortage this system leaves those who are less well-integrated into the community (e.g. single mothers, the disabled) open to further exploitation increasing their vulnerability. Moreover, unlike with truck operators there is no network or organisation of private tank owners that transcends *bairro* boundaries, making it harder to regulate supply.

In Benfica II and Camama the most common primary water source is a piped, household connection. These areas are currently supplied by the Bitá III system, this water is treated at ETA Sudeste.

Respondents in the settlement of Quenguela (Cabolombo service area) also used a local fountain as their primary water source (Plate 6-12) however this water is not widely used for human consumption as it has been known to cause diarrhoea. One respondent in Quenguela collected rain water, this acted as her main source of water during the rainy season.

Table 6-13: Primary source of water in the service areas.

Service area	Tank	Mains	Fountain	Other
Benfica II	1	9	--	--
Cabolombo	5	--	4	1
Camama		10	--	--
Mundial	10	--	--	--
Total	16	19	4	1

Respondents were asked if they had a secondary water source which they could use if the first was not available; only half of the respondents did and of these all used a water tank (Table 6-14). Most respondents in Benfica II also had a private tank on their property which they used as back up should their piped connection fail, these tanks are typically filled by the same water truck operators described in Section Water Sources. In the three other service areas tanks were usually owned by a neighbour and not by the respondent themselves.

Although no respondent mentioned that at times water pipes had been broken in order to access water this was observed during site surveys (Plate 6-13).

Table 6-14: Secondary source of water in service areas.

Service area	Tank	Mains	Fountain	Other	No secondary source
Benfica II	8	--	--	--	2
Cabolombo	6	--	--	--	4
Camama	4	--	--	--	6
Mundial	2	--	--	--	8
Total	20	--	--	--	20



Plate 6-8: Privately-owned underground water tank in Mundial service area.



Plate 6-9: Privately-owned raised water tank in settlement of Alvarenga, Mundial service area.



Plate 6-10: Sign advertising the sale of water for 50 Kwanzas per container, 0.5 km from CD Cabolombo.



Plate 6-11: Sale of water is advertised by tying a water container to the outside of a property, 0.5 km from CD Cabolombo.



Plate 6-12: Water fountain in settlement of Quenguela, Cabolombo service area



Plate 6-13: People filling containers of water from a broken pipe on the road.

Reliability

When respondents in Benfica II were asked if their piped water supply was reliable 80% said it wasn't. A few cited experiences were they had been without water for 15 days and yet were still expected to pay a bill for the entire month. Most respondents in this area said they were without water for three to five days every month.

On the other hand in Camama, eight out of the ten respondents deemed their water supply to be reliable. However, seven of these respondents had never paid an EPAL bill so were perhaps less likely to be disgruntled and complain about an unreliable supply.

In CD Cabolombo, Quenguela and CD Mundial the majority of respondents thought their supply, which mainly came from private tanks, was reliable. However, in Alvarenga none of the respondents deemed their supply to be reliable. So while it is clear in some places the privately owned tanks do provide a reliable supply in others, such as Alvarenga, there are shortfalls in reliability.

Temporal Cost

The distance travelled to get water varied massively the highest being two hours in Alvarenga and the lowest being in ten minutes in Quenguela and Benfica II. Although the questionnaire did not ask which members of the household are responsible for collecting water secondary sources indicate that this is usually the women and girls (Table 6-15). This was supported by the women's tendency to know the most about water collection during the high level social survey. Water collection is a time-consuming activity predominately carried out by women and girls who could be at work or school, the cost of this time is rarely factored into the price of water.

Table 6-15: Person(s) responsible for the collection of water

Category	Percentage of Households
Woman	62.2
Man	4.7
Child (5-11)	5.9
Female (12-17)	16.6
Male (12-17)	5.3
Everyone	3.5

Economic Cost

The economic cost of water across Luanda varies considerably, as shown in Figure 6-38. In the project area of influence the way respondents paid for water varied from either monthly bills in those areas with a connection, or per 20 litre container (0.02 m³) in those without. In Benfica II and Camama respondents received monthly bills from EPAL but prices quoted varied from as low as AKZ 3,500, and up to AKZ 25,000. Having said this seven out of the ten respondents in Camama also said they had never paid their EPAL bill so the prices quoted may not be accurate.

In Cabolombo and Mundial water is typically brought in 20 litre containers (0.02 m³), generally these prices remained consistent across the survey sites. Most respondents quoted prices between AKZ 50 and AKZ 100. Average prices quoted at all survey sites are shown in Figure 6-39.

In addition to the high level social survey the TFS analysis found that EPAL charges AKZ 250/m³ (US\$ 0.86/m³) whereas private tank owners charge AKZ 1,200-1,600/m³ (US\$ 4.15 – 5.54/m³). Further calculations suggest that in the long term an EPAL connection is a more affordable source of water, even to the poorest 40% of Luanda's population. Data from the Multiple Indicator Cluster Survey (MICS, 2011) carried out by the *Instituto Nacional de Estatísticas de Angola* (INE), UNICEF and the World Bank provides a breakdown of average monthly income per capita per quintile (20% subsets) in Luanda Province. This data was inflated to current (2016) prices using the World Bank Consumer Price Index and used to estimate monthly average per capita income per quintile (5% subsets). In addition the 1996 MICS survey found that people with access to a formal water source spent 1.2% of their disposable income on water, as opposed to 5% for those obtaining water from informal sources. This information was used to deduce average monthly income per capita per quintile, average monthly disposable income per capita per quintile and average monthly spend on water per capita (and per household) per quintile, shown in Table 6-16. Furthermore, using the new (2015) fixed water tariffs of AKZ 59/m³ (when consuming up to 10m³) and AKZ 94/m³ (when

consuming between 10 and 15m³) monthly water consumption per capita and per household was also calculated for Luanda’s poorest 40% (assuming a formal connection) and is shown in Table 6-16⁴³.

Table 6-16: Average income distribution and ability to pay for water in Luanda for the poorest eight vintiles⁴³.

	Luanda Province’s Eight Poorest Vintiles								Avg.
	5%	10%	15%	20%	25%	30%	35%	40%	
Average monthly income per capita (AKZ, 2016)	5,810	5,934	7,054	8,864	11,072	13,417	15,687	17,737	10,697
Average monthly per capita disposable income (AKZ, 2016)	2,197	2,514	3,262	4,395	5,808	7,377	8,979	10,521	5,635
Average monthly spend on water per capita (AKZ, 2016)	26	30	39	53	70	89	108	126	68
Average monthly spend on water per household (AKZ, 2016)	153	175	227	306	404	513	625	732	392
Monthly water consumption per capita (m ³)	0.45	0.51	0.66	0.89	1.18	1.50	1.79	1.99	1.12
Monthly water consumption per household (m ³)	2.59	2.97	3.85	5.18	6.85	8.70	10.37	11.51	6.50

Table 6-16 shows that on average the poorest 40% of the Luandan population should be able to afford to spend AKZ 68/month on water, allowing them to buy 1.12m³/month per capita or 6.5m³/month per household. Therefore, given the relative cost of water sold by water truck operators to private tank owners which, as demonstrated by the high level social survey (Table 6-13), is the most common primary source of water in service areas currently without a connection, EPAL’s water is significantly more affordable to the poorest consumers⁴¹.

While in the long term a household connection will be a significant saving to the consumer, obtaining this connection does involve short term costs which may disincentivise household connections. Short-term costs include:

- **A one-off payment of AKZ 20,000:** it is EPAL’s policy to charge AKZ 15,000 connection fee and AKZ 5,000 registration fee. The D&B contractor for the distribution network shall install an external tapping point and water meter within the boundary of a property however water shall not be provided until the AKZ 20,000 fee is paid. DW suggested that this is a significant amount of money to the average Angolan household; the minimum wage in Angola is AKZ 15,000 per month.
- **Costs of internal plumbing:** if the customer wishes to connect the water supply to their internal plumbing network they will have to bear the cost of this.
- **Installation of minimum sanitation:** if customers wish to be connected they must have a minimum level of sanitation (discussed in Section 6.6.2), the cost of this and its installation shall also be the customer’s to bear.

Although the aforementioned costs may disincentivise individual household connections they will not apply to community standposts which, if they adopt DW’s *Modelo de Gestão Comunitária de Água* (MOGECA) or Community Water Management Model, will also be profitable for EPAL. The MOGECA model is based on the election of a water committee who manage community standposts, collect revenue, oversee operations and maintenance, monitor and register the number of days of water flow and ensure that records of all payments and expenses are kept. DW have developed and implemented this model in other municipalities of Luanda and have found that the approach is an effective way of preventing vandalism and neglect.

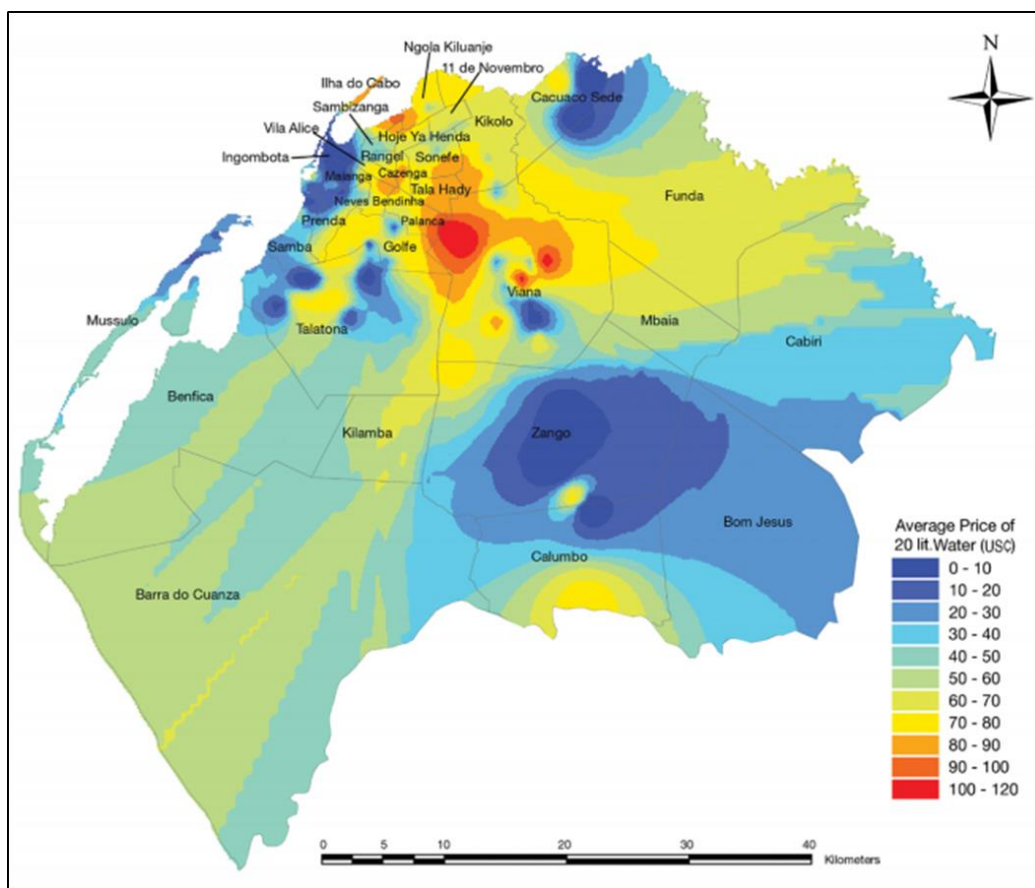


Figure 6-38: Water prices across Luanda province for one 20 litre bucket⁵⁰.

Cleanliness

75% of the respondents said they had access to at least one source of potable water the majority of the time. Respondents in Mundial service area had the least access to potable water (only 40%), in addition 80% of respondents in this area had no secondary water source perhaps making this the area most in need of a new water supply system. 90% of respondents in Benfica II and Camama had access to at least one source of potable water. The majority of respondents in Cabolombo (80%) has access to at least one source of potable water.

Other Comments

When asked if they had any other comments regarding their water supply 85% of respondents in areas without a water connection said that they would like a piped water supply to the house. Whereas in areas already receiving a piped supply comments were made regarding the cleanliness of the water, the cost in relation to the unreliable supply and poor maintenance of pipes by EPAL.

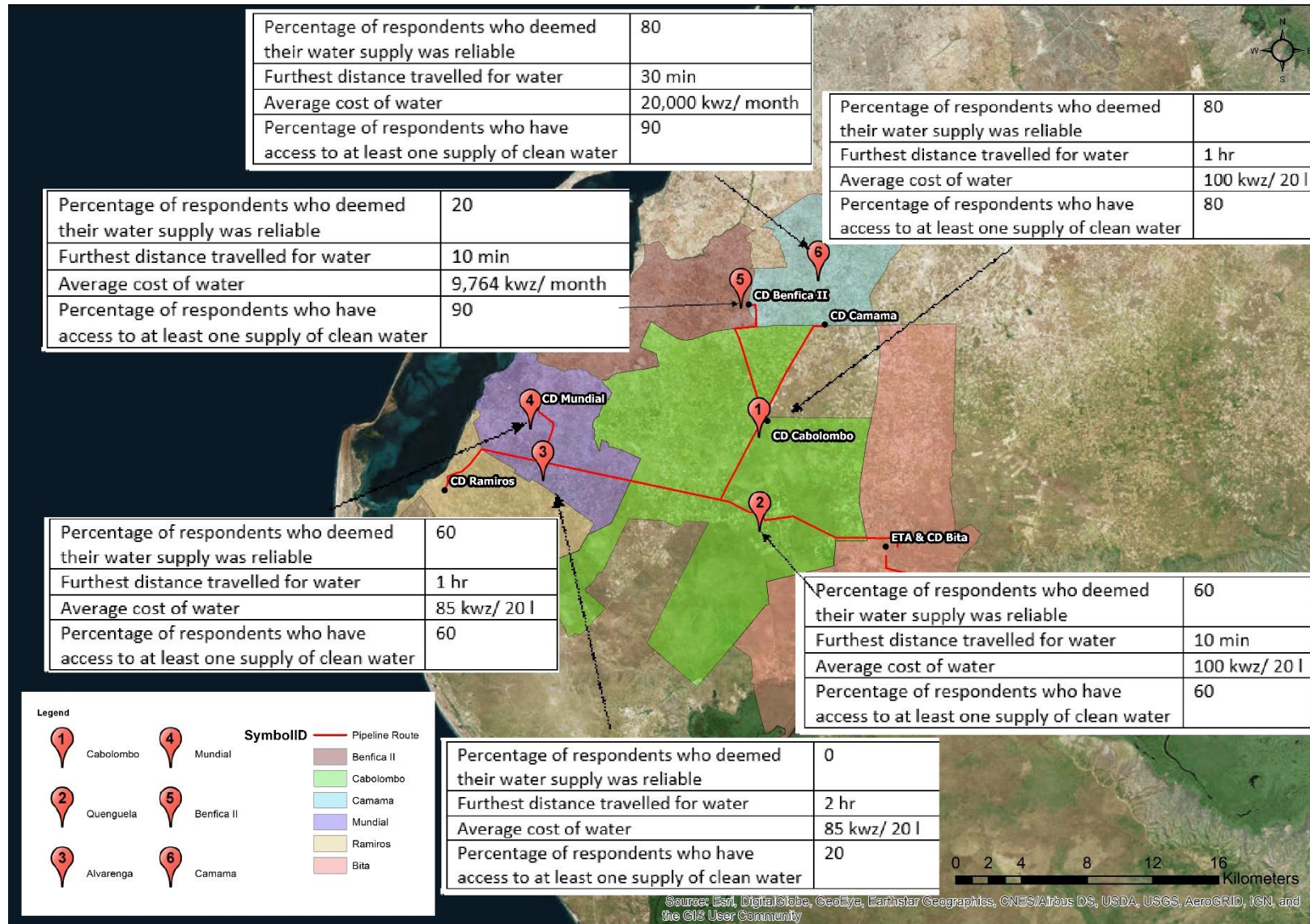


Figure 6-39: Survey results.

6.6.2 SANITATION

Between 1990 and 2008 the percentage of Angola’s population with improved access to sanitation more than doubled from 25% to 57%⁷³. However this development is mainly in urban areas; of those with improved access only 18% were in rural areas, the rest were in urban areas. Having said this sanitation still remains a big problem for Luanda.

Although there are a number of sewage treatment plants in the city, both private and public, these only cover a fraction of the sewage generated therefore the majority is left untreated and disposed of via septic tanks, holding tanks, pipes, trucks or buckets. The sewage then works its way into Luanda’s drainage channels and eventually ends up in the Atlantic Ocean, either directly or via the Rio Bengo toward the north of the city, or the Rio Kwanza toward the south²⁴. Not only does this pollute the waterways, beaches and ocean, affecting marine life and creating visual and odour pollution, it also has an immeasurable impact on people’s health, especially those who rely on the rivers for washing clothes, bathing and drinking water. Projects are being undertaken to address this including the installation of receiver sewers, pump stations, treatment plants and marine outfall pipes. This is under the remit of *Empresa de Serigrafia Angola Limitad (ESAL)*, Angola’s public sanitation organisation²⁴.

Under the B4WSP new water connections will only be made to houses with an adequate level of sanitation, although what this level of sanitation is has yet to be decided. DW recommended the project adopt the GoA’s definition of adequate sanitation in order to ensure that the project is accessible to the majority of the population but also to mitigate risks associated with supply water to an area without an established sanitation system. Waste water will not be disposed of into the marine environment. Additionally, any water stand points (*fontanarios de agua*) shall be constructed with adequate drainage for spill water.

There is little information on the present coverage of sanitation across the B4WSP that can be related to present administrative areas. The 2014 national census, since when municipal boundaries have changed, records the data shown in Table 6-17 for three of the project’s service areas.

Table 6-17: Prevalence of sanitation systems in Camama, Benfica and Ramiros Urban Districts.

Urban District	No. of Systems	Drains to Sewer	Drains to Tank	Drains to Open Trench or River	Latrine drains to Sewer	Latrine Drains to Tank	Latrine drains to open Trench or River	No Sanitation	No Response	No. with Appropriate Sanitation
Indoor Sanitation facilities (Within Building)										
Camama	103,419	8,095	84,631	1,581	159	8,507	446	Not recorded. It is assumed that all sanitation indoors is considered ‘appropriate’.		
Benfica	42,696	1,421	37,335	1,157	249	2,096	438			
Ramiros	2,492	117	2,029	51	1	237	57			
Outdoor Sanitation Facilities (On Plot)										
Camama	24,933	697	19,365	862	118	3,584	307	4,990	596	125,157
Benfica	11,188	265	8,378	921	107	1,221	296	9,679	338	51,072
Ramiros	1,892	27	1,203	279	18	326	39	2,100	11	3,958

NB: The data presented above is related to urban district boundaries that have since been update and therefore do not necessarily represent the current urban districts as shown in Section 6.1.

The survey differentiated between indoor and outdoor sanitary facilities, those that discharged directly to a sewer, tank or open trench/river, and those that did so via a latrine. For those systems not in a building, those with no sanitation, those that did not respond, and those with ‘appropriate’ sanitation are also listed, from which it is assumed all those with inside facilities responded to the census question and all were deemed ‘appropriate’. In summary the proportion with indoor facilities, outdoor facilities, no sanitation and ‘appropriate’ facilities are shown in Table 6-18.

⁷³ Water and Sanitation Programme (2015) Water Supply and Sanitation in Angola 1st ed. [pdf] Available at: <https://www.wsp.org/sites/wsp.org/files/publications/CSO-angola.pdf> [Accessed 23.07.18].

Table 6-18: Proportion of the population with indoor, outdoor and no sanitation facilities in Camama, Benfica and Ramiros.

Communa	Indoor Sanitation	Outdoor Sanitation	No Sanitation	'Appropriate' Sanitation
Camama	78%	19%	4%	97%
Benfica	67%	18%	15%	85%
Ramiros	38%	29%	33%	67%

NB: Due to rounding figures may not add up to 100.

It is assumed that all those with 'appropriate' sanitation, the majority in these three areas, will be accepted for connection to the new B4WSP water distribution networks. Notwithstanding this, it is to be expected that many of the project areas beyond the three listed in Table 6-18 will have facilities that are not 'appropriate,' or no sanitation at all. While the data given bodes well for the new distribution networks in these areas, they are not believed to be representative across all B4WSP service area.

6.6.3 POWER

As a whole Angola does not consume a great deal of electricity (375 kWh per inhabitant) resulting in a low electrification rate of around 40% of the population. An under-developed power infrastructure, unreliable supply and insufficient investment still characterise Angola's and more specifically, Luanda's power supply network. Moreover, there is generally poor access to electricity; it is estimated that it takes 121 days for a new electrical connection to be installed, while this is a decrease from 159 days in 2009 this still requires improvement. Having said this, the percentage of the population with access to electricity has been increasing since 1991 (Figure 6-40).

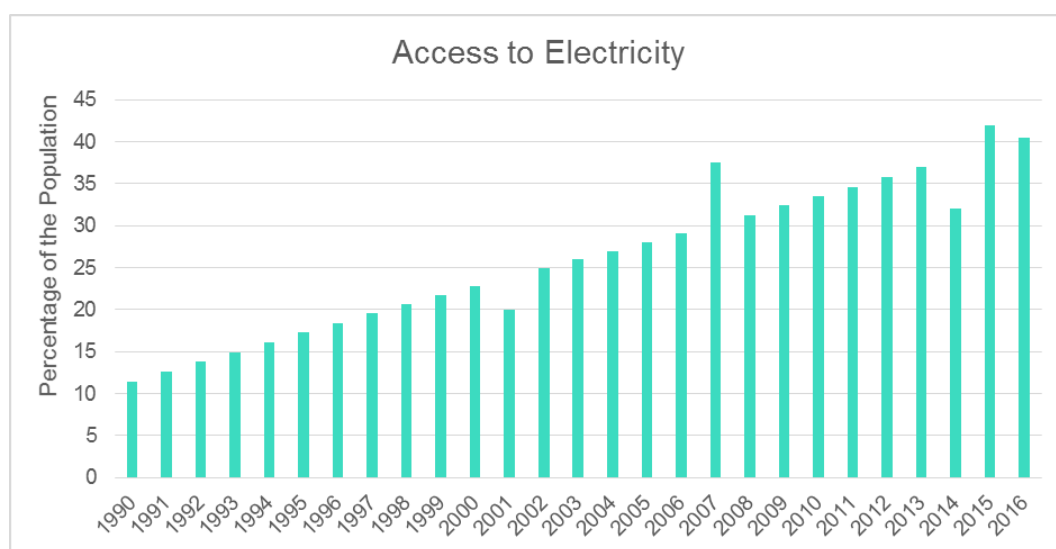


Figure 6-40: Percentage of Angola's population with an electricity connection in their home³¹.

Fuelled by the country's economic growth in the early years of the millennium, energy consumption recorded an annual average growth rate of 15.5% between 2008 and 2014⁷⁴. This growth increase is attributable to:

- a great effort from the GoA in order to extend electricity coverage. This was led by *Empresa Nacional de Distribuição de Electricidade* (ENDE), the agency responsible for Angola's electricity supply and distribution;
- an improvement of the population's living conditions, which results in higher electricity consumption; and,

⁷⁴ United Nations Development Programme (2015) *Sustainable Development for All: Rapid Assessment Gap Analysis, Angola* 1st ed. [pdf] Available at: https://www.seforall.org/sites/default/files/l/2015/05/Angola_RAGA.pdf [Accessed 23.07.18].

- an increase of the available generation capacity.

The energy consumption in Angola is mostly in urban and residential areas; residential sector demand accounts for 45% of total generation, followed by services (roughly 32%) and industry (approximately 9%).

In Luanda there are five main transmission stations in Cacuaco, Camama, Cazenga, Filda and Viana. These supply 36 electrical substations (SE) across the city, four of these are in the project area of influence:

- SE Benfica;
- SE Ramiros;
- SE Sapú; and,
- SE Talatona²⁴.

Within the study area most communities are supplied by low voltage powerlines such as the ones seen in Plate 6-2. However these connections can be unreliable and power cuts are not uncommon. As a contingency supply most people invest in small electrical generators.

6.6.4 OTHER INFRASTRUCTURE

6.6.4.1 Telecommunications

Angola's telecommunications systems include mobile phones, radio, television and the internet. Fixed-line phones are used in Luanda but are rare in the rest of Angola. In the 2015 PDGML the Provincial Government of Luanda recognise the opportunity an enhanced telecommunications network presents, stating it can:

- Enhance connectivity of its citizens;
- assist with connecting all governmental spheres to a single network dedicated to aid in inter departmental communication; and,
- integrate essential services such as water, energy, transportation and environmental facilities with telecommunications infrastructure such as Building Management Systems (BMS) or Smart Metering (SM), the status quo can be quickly assessed, providing an understand the province's issues, shortfalls and areas of focus²⁴.

6.6.4.2 Solid Waste Disposal

As with the population, the volume of solid waste in Angola, but especially Luanda, has increased to the extent that large amounts of refuse is left on the street and is causing a serious health and safety hazard. The GoA has tried to combat this; Presidential Decree 190/12 made it a legal requirement for all public and private entities that produce waste must prepare a Waste Management Plan. This plan must detail measures implemented in order to:

- minimise waste production;
- ensure any hazardous waste is treated before disposal; and,
- ensure all waste to be transported entails minimum risk of contamination for the workers, the general public and the environment⁷⁵.

In Luanda, private companies are contracted by the Provincial Government to collect municipal waste in most parts of the inner city, but demand is much greater than collection capacity and as a result large amounts of refuse is visible in Luanda (Plate 6-14). In addition, Luanda has no recycling schemes in place, and all waste is directed to a single landfill about 20 km outside the city centre, which is rapidly running out of space²⁴.

Informal areas in particular have very little access to rubbish collection and disposal services so refuse is usually dumped into open sewers, often causing blockages and resulting in flooding and stagnant water. Uncollected refuse and polluted, stagnant water create ideal conditions for

⁷⁵ Viera de Almedia (2012) New Regulation on Water Management in Angola 1st ed. [pdf] Available at: https://www.vda.pt/xms/files/v1/Newsletters/Flash_VdAtlas_Angola_New_Regulation_on_Waste_Management_in_Angola_-DM_2312585_1--4-.PDF [Accessed 23.07.18].

mosquitoes, flies and rodents to feed and breed resulting in numerous health issues for the population i.e. diarrhoeal diseases (Section 6.5.1.1), malaria (Section 6.5.1.3), and various infectious and parasitic diseases (Section 6.5.1). See also Section 4.7.



Plate 6-14: Pile of uncollected refuse in Cabolombo service area indicative of the lack of refuse collection in these informal areas

6.6.4.3 Transport

6.6.4.3.1 Road

Angola has 51,429 km of road network however only 10.5% of this network is paved. In addition those roads that are paved are generally poorly maintained. Roads can be classified into main highways, primary, secondary and tertiary based on the number of vehicles that used them per day (Table 6-19).

Table 6-19: Road classification parameters.

Road Type	Number of vehicles per day
Main highways	5000 +
Primary	100- 5000
Secondary	50-800
Tertiary	Less than 100

The majority of roads in the project area of influence are classified as secondary or tertiary and are unpaved. However the main road connecting node 1 and node 3 (Figure 2-2) is earmarked to become the outer ring road of Luanda and so this will become a main highway

6.6.4.3.2 Rail

The Angolan railway system is currently made up of three lines that are not connected and all run on different gauge widths. The Luanda Railway connects Luanda and Malenje and was first opened

in 1889, the Moçâmedes railway in the south connects Namibe and Menongue and was first opened in 1910 and the Benguela Railway in the centre of the country connects Lobito with the border of DRC and was first opened in 1912. Before the civil war the rail network was a lot more extensive however the fighting resulted in many of the tracks being pulled up and land mines being laid to ensure the network couldn't be used again⁷⁶.

The Luanda Railway is 538 km long and is managed by the Railway Company of Luanda under the supervision of *Instituto Nacional dos Caminhos de Ferro de Angola* (INCF), or the National Institute of Railways in Luanda²⁸.

6.6.4.3.3 Air

Empresa Nacional de Exploração de Aeroportos e Navegação Aérea (ENANA), is the agency responsible for the management of Angola's airports and air navigation. There are ten registered air carriers in Luanda although *Transportes Aereos Angolanoes* (TAAG) airlines is perhaps the most well-known²⁵. TAAG is state owned and is based in Luanda.

Angola has 176 airports in total however only 31 of these have paved runways and only one, the International Airport 4 de Fevereiro in Luanda, has the capacity to accommodate international flights²⁴. A new International Airport of Luanda is under construction, due to be completed by 2020. The new airport is located in the municipality of Viana, 40 km from the city centre and will be equipped with a double runway capable of landing the largest commercial aircraft in the world²⁸. It is hoped that this airport will also aid in the development of Luanda's tourist industry (discussed in Section 0).

6.7 VULNERABLE GROUPS

Vulnerable groups are those who traditionally are more likely to be adversely affected by the project impacts and/or are more limited than others in their ability to take advantage of a project's benefits. An individual or group may be considered vulnerable based on their "race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth, or other status. Consideration should also be given to factors such as gender, age, ethnicity, culture, literacy, sickness, physical or mental disability, poverty or economic disadvantage, and dependence on unique natural resources"⁷⁷. Although such groups are relatively well treated under the Angolan Civil Code they are not afforded the special treatment that may be necessary to ensure they can share in the benefits of a project such as Bitá IV.

6.7.1 AFFECTED COMMUNITIES

As the project footprint is linear several communities are likely to be affected by construction of ETA Bitá, the CDs and transmission pipelines⁷⁸. A preliminary site survey identified affected communities which are likely to be subject to adverse impacts as a result of the construction of B4WSP. These include, but are not necessarily limited to:

- Julio (CD Cabolombo service area);
- Quenguela (CD Cabolombo service area); and,
- Alvarenga (CD Mundial service area).

6.7.2 INFLUX OF FOREIGN WORKERS

One of the main impacts to communities along the pipeline route shall be in the influx of foreign workers. International contractors often find it cost effective to bring the majority of their semi-skilled

⁷⁶ BBC (2010) *Angola's Railways Back on Track* Available at: <https://www.bbc.co.uk/news/world-africa-11295533> [Accessed: 23.07.18].

⁷⁷ International Finance Corporation (2012) *Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts* 1st ed. [pdf] Available at: https://www.ifc.org/wps/wcm/connect/3be1a68049a78dc8b7e4f7a8c6a8312a/PS1_English_2012.pdf?MOD=AJPERES [Accessed 23.07.18].

⁷⁸ As distribution network pipes will be significantly smaller than transmission pipes their construction is not expected to significantly affect communities.

labour force from the contractor's home country, or transferred from projects that the company is finishing elsewhere.

The advantages of foreign labour include:

- Large numbers available quickly without a lengthy recruitment exercise;
- Less bothered about contract terms, conditions and welfare;
- Previous construction skills, e.g. few B4WSP area residents will be experienced in large diameter pipe-laying;
- Less particular about the type of work undertaken;
- Higher motivation to finish the job quicker;
- Easier to give instructions; and,
- Locals often not interested in basic labouring jobs.

The disadvantages of employing a foreign labour force include:

- Complex and time consuming visa and immigration procedures ;
- Often complex and time-consuming visa requirements;
- Cost of providing and operating local accommodation and messing facilities; and,
- Higher wage costs than locals.

Overall, the advantages outweigh the disadvantages, especially where entry visa, work and residency procedures are lax or can be circumvented by corruption. Chinese, Japanese and other contractors almost always bring their own labour, leaving only the least skilled jobs such as drivers, watchmen and security guards, to be hired locally. The influx of foreign workers on the project the size of Bitá IV could number several hundred. The incoming workers are invariably male on a single-status posting, and by comparison with the local residents, relatively well paid, and although their accommodation may at best be limited to dormitory-type bedrooms, communal messing and shared domestic facilities, at least they have access to food, water and sanitation.

According to the TIP Report (2018)⁷⁹, Angola is both a source and a destination for men, women and children subjected to sex trafficking and forced labour. Angolans, including minors, endure forced labour in a number of sectors including construction. Both sex trafficking and forced labour often depend upon complicit government officials.

There is an agreement between GoA and the Government of China that requires Chinese companies to follow Angolan labour laws, yet the Angolan judiciary recently investigated several construction companies, including Chinese-run companies, for alleged forced labour abuses. Some Chinese construction companies that bring Chinese workers to Angola do not disclose the terms and conditions under which they are employed at the time of recruitment. Some Chinese women are recruited by Chinese gangs and construction companies, then deprived of their passports, kept in walled compounds under armed guard and forced into prostitution among the male workforce. Chinese, SE Asian, Brazilian, Namibian, Kenyan and Congolese migrants have all been subject to forced labour in Angola's construction industry. The province of Luanda is among the most active trafficking areas

GoA attempts to raise awareness of the problem and the National Institute of Children (INAC) has safe houses for child victims in all provinces. The Ministry of Social Action, Family and the Promotion of Women does the same for abused women. Angolan law does not provide foreign trafficking victims with legal alternatives to deportation, often to a country where they may face hardship and retribution.

Angolan girls as young as 13 years of age are victims of sex trafficking and many women from Namibia, the DRC, Vietnam and Brazil engaged in prostitution in Angola may have been sex trafficked. Angolan adults often use children younger than 12 for forced criminal activity because children cannot be criminally prosecuted.

Whatever the status of this male workforce, whatever conditions they live under, conflicts with the local community are common, particularly where the project requires workers to lay pipelines through remote villages and have close contact during the installation of street-by-street distribution systems and making house connections. Within many rural communities, trust between the residents is often

⁷⁹ United States Department of State, 2018 Trafficking in Persons Report – Angola, 28 June 2018

inherent, and shops with merchandise on display may be left unattended, or attended only by a child, and houses be left unlocked.

Common problems causing conflict between foreign workers and the local population include but are not limited to:

- Theft of unharvested farm produce from fields;
- Theft from shops, stalls and houses;
- Vandalism of communal facilities;
- Competition for resources, such as firewood and fuel;
- Sexual abuse of local women;
- Sex with minors; and,
- Involvement with drugs.

Even where the workers are well accommodated, well fed and well paid, it is not uncommon for groups to roam the streets on their days off, buy food in large quantities from local farmers' markets, compete with artisanal fishermen, collect firewood for fires and BBQs, and generally compete with the local community for often limited resources.

Groups of workers and individuals may physically and/or sexually abuse local women, particularly where they are walking alone across unoccupied land. Young girls are particularly vulnerable. Surprisingly, the age of consent in Angola, the minimum age at which an individual is legally considered old enough to consent to participate in sexual activity, is just 12-years, although sexual relations with minors aged 12-15 may sometimes be considered sexual abuse. The situation is exacerbated by the stigma attached to such crimes, when the abused would not go to the police or even a male relative (husband, father, brother) but only share her experience after time and the trauma have passed with other women within her social circle.

On return from home visits, foreign workers, in the construction and other industries, may bring in illegal narcotics. While drugs are less of a problem in Angola than in other countries in southern Africa, the tightening of anti-drugs activities in Europe, trafficking from Brazil via the port of Luanda is increasing, with the main onward destination being South Africa, Morocco and Tunisia. The 'mules' are most frequently Brazilian man or African women, the latter usually persons living in poverty or socially outcast.

Presidential Decree dated 6 March 2017 aims to regulate the performance of activities of non-resident foreign worker in a way that balances the treatment between Angolan and foreign workers. Under the decree, Angolan companies can only hire non-resident foreign workers for a maximum period of 36 months and their salaries have to be paid in Angolan Kwanzas. Additional cash benefits, direct or indirect, cannot exceed 50% of base salary, and the Central Bank regulate the transfer of funds to foreign banks. A company's workforce should not exceed 30% of non-resident foreign workers, the balance, 70%, to come from the national resident workforce - Angolans and resident foreign citizens.

6.7.3 WOMEN

In comparison to other sub-Saharan African nations Angola is deemed to be a relatively safe place for women and girls. For example, Female Genital Mutilation, a phenomenon that has plagued many sub-Saharan African countries, is not thought to be widely practiced in Angola⁸⁰. In Luanda specifically, women make up 51% of the population, this balance between the male and female population is important in creating an equal environment as gender imbalance has been linked to increased levels of gender-based violence. This supports the Social Institutions and Gender Index's

⁸⁰ International Convention on Civil and Political Rights (2013) *Angola: Civil Society Report on the Implementation of the ICCPR* 1st ed. [pdf]. Available at: https://tbinternet.ohchr.org/Treaties/CCPR/Shared%20Documents/AGO/INT_CCPR_NGO_AGO_14346_E.pdf [Accessed 23.07.18].

findings that the level of son bias, defined by the Chronic Poverty Research Centre as “the systematic and often lethal neglect of and underinvestment in girls and women”⁸¹, is low in Angola⁸².

However, a major issue experienced by women in Luanda is that of gender-based violence (GBV). Angola’s Constitution enshrines in law the country’s commitment to the equal treatment of men and women; “however, laws and policies do not guarantee that social norms are supportive and that women’s rights are in fact realised”⁸³. A survey conducted in 2010 found that among married or partnered women aged 15–49, 26% reported having experienced physical violence, 8% of which reported this to be a regular occurrence. Of women who had ever been pregnant, 7% reported experiencing physical violence during the pregnancy. Among married women who had experienced physical violence, 58% reported that the perpetrator was their current partner or husband; 31% said it was a previous partner or husband. In their Good Practice Note on Addressing GBV⁸⁴ the World Bank states that “major civil works can exacerbate the risk of GBV in both public and private spaces by a range of perpetrators and in a number of ways”. This could include:

- **Labour influx:** this can increase the demand for sex workers in an area and lead to an increased prevalence of HIV/AIDS and other STDs. It can also lead to an increase in the number of women being trafficked for the purposes of sex work. The US Department of State’s Trafficking in Persons Report⁸⁵ highlights that “some Chinese women are recruited by Chinese construction companies with promises of work, but later are deprived of their passports, kept in walled compounds with armed guards, and forced into prostitution to pay back the costs of their travel [to Angola]”. The Labour influx can also increase the risk of forced early marriage in a community where marriage to an employed man is seen as the best livelihood strategy for an adolescent girl. Furthermore, higher wages for workers in a community can lead to an increase in transactional sex. The risk of incidents of sex between labourers and minors, even when it is not transactional, can also increase. See also Section 6.7.2;
- **Changes to patriarchal power dynamics:** infrastructure projects create changes in the communities in which they operate and can cause shifts in power dynamics between community members and within households. Male jealousy, a key driver of GBV, can be triggered by labour influx on a project when workers are believed to be interacting with community women. Hence, abusive behaviour can occur not only between project-related staff and those living in and around the project site, but also within the homes of those affected by the project;
- **Resettlement:** if not handled correctly resettlement can leave women and girls in particular worse off than they were pre-project. For example, when negotiating compensation this is sometimes only given to the head of the household, especially in countries where women are not permitted to open bank accounts or own land. This can mean that the female household members do not receive any compensation; and,
- **Employment:** Women and girls may not be able to equally participate in the employment opportunities a project brings due to other family commitments such as caring for kids and

⁸¹ Jones, N., Harper, C. and Watson, C. (2010) *Stemming girls’ chronic poverty: Catalysing development change by building just social institutions* 1st ed. [pdf]. London: The Chronic Poverty Research Centre, pp. 31. Available at: http://www.chronicpoverty.org/uploads/assets/files/reports/Full_report.pdf [Accessed 06.08.18].

⁸² Social Institutions and Gender Index (2018) *Angola* [online] Available at: <https://www.genderindex.org/country/angola/> [Accessed 23.07.18].

⁸³ Sloan, N.L., Verani, F., Shannon, C. and Jarvis, L. (2014) *The Effects of a Gender-Based Violence Awareness Campaign in Luanda, Angola: A Quasi-Experimental Study*. [pdf]. Available at: http://www.respond-project.org/pages/files/6_pubs/research-reports/Study17-GBV-Angola-Endline-Report-September2014.pdf [Accessed 13/03/2019].

⁸⁴ World Bank (2018) *Good Practice Note: Addressing Gender-Based Violence in Investment Project Financing involving Major Civil Works*. [pdf]. Available at: <http://pubdocs.worldbank.org/en/399881538336159607/Good-Practice-Note-Addressing-Gender-Based-Violencev2.pdf> [Accessed 13/03/19].

⁸⁵ US Department of State (2016) *Trafficking in Persons Report* 1st ed. [pdf]. Washington: US Department of State. Available at: <https://www.state.gov/documents/organization/258876.pdf> [Accessed 13/03/19].

elderly relatives, collecting water and doing household chores. Taking women away from their traditional role as home keepers may spark violence from their husband or partner. Furthermore, women and girls have limited access to safe and appropriate transportation options increasing the risk of violence experienced when women are confronted with traveling long distances to access work opportunities or forced to travel at night.

While progress is slow, the Angolan government are taking steps toward more strict legislation on the issue of GBV, for example as of 8th July 2011 domestically abused women, who are financially dependent on their abusers can now report the crime with the assurance that they will be able to get financial and medical support from the state⁸⁶. Similarly rape, including marital rape, is illegal and punishable by 8 years imprisonment⁸⁷.

In addition to GBV, Angola as a whole, but Luanda specifically, still face issues regarding gender parity:

- On average Angolan women and girls will receive five years less education than their male counterpart²³. Furthermore, in Luanda there is a 5% difference in the primary school attendance rates between boys and girls (Table 6-8);
- The percentage of girls married under the age of 15 is 8%, 2% more than the regional average⁸⁸; and,
- Despite Angolan national legislation articulating principles of non-discrimination and gender equity, customary laws and traditional practices often prevail. The Rural Development Institute argue that the Angolan government have done little to formalize the land rights of women⁸⁹. Discussions had with stakeholders in the B4WSP have confirmed that while women are treated equally there are no special measures to ensure this is the case.

Furthermore, it is not just Angolan women who are considered vulnerable but also women who are trafficked from other parts of the world. For example “some Chinese women are recruited by Chinese construction companies with promises of work, but later are deprived of their passports, kept in walled compounds with armed guards, and forced into prostitution to pay back the costs of their travel”⁹⁰.

To ensure that women’s thoughts and concerns regarding the B4WSP are given adequate attention it is suggested that public consultations be held at the weekend (for those who commute into Luanda, predominantly men) and during the week (for those who stay at home during the week, typically women). This is particularly relevant for this project as women and girls are generally the responsible for the collection of water (Table 6-15) and the most informed (Section 6.6.1.1.2). See Section 10 and Appendix D for more information on public consultations.

6.7.3.1 Gender and Development

With acknowledgement of WB O.P. 4.20 and in relation to the collection of water, note the following:

B4WSP will significantly improve water supply conditions in South Luanda, with improvements such as the reduction of water fetching time, expected to particularly benefit women and girls. As in other sectors in Angola, limited data are available. However, there is evidence of significant gender gaps in financial inclusion, agriculture and other sectors. As in many other countries, it is likely that women and girls generally bear the burden of fetching water. By displacing tanker truck service with piped service, the project will reduce the time spent for either attending tanker trucks deliveries, or for fetching water in jerrycans along scheduled tanker truck routes. Furthermore, a specific design feature introduced by the Project, and a departure from prevalent urban water supply approaches in

⁸⁶ Redvers, L. (2011) *Angola: Law on Domestic Violence a Step Forward for Women’s Rights* [online] Available at: <http://www.ipsnews.net/2011/07/angola-law-on-domestic-violence-a-step-forward-for-womenrsquo-s-rights/> [Accessed 23.07.18].

⁸⁷ US Department of State (2015) *Angola 2015: Human Rights Report 1st ed.* [pdf] Available at: <https://www.state.gov/documents/organization/252861.pdf> [Accessed 23.07.18].

⁸⁸ Girls Not Brides (2018) *Angola* [online] Available at: <https://www.girlsnotbrides.org/child-marriage/angola/> [Accessed 23.07.18].

⁸⁹ Rural Development Institute (2008) *Women’s Land Rights in Post-Conflict Angola* [online] Available at: <http://www.dw.angonet.org/forumitem/1228> [Accessed 23.07.18].

⁹⁰ US Department of State (2016) *Trafficking in Persons Report 1st ed.* [pdf]. Washington: US Department of State. Available at: <https://www.state.gov/documents/organization/258876.pdf> [Accessed 06. 08.19].

Angola and in Luanda, is the maximization of service delivery through household connections and yardpipes, by opposition to service through neighborhood public standpipes. This is expected to result in significantly improved convenience of service for the households, with elimination of the water fetching duty which is typically the responsibility of women and girls in the household. The expected benefit will be measured during project implementation, through annual household surveys in the Bitá Project areas, assessing the evolution of water supply conditions, including changes in water fetching requirements by gender. Household surveys may include questions relating to: sources (e.g. rivers, tanks, lakes, communal wells or tanks, private water tanks, water pipes) used to secure water; what members of households are responsible for securing water; how long it takes to fetch water; what constraints exist in terms of distance, safety; roles of household members in managing water quality, its purification and how it affects men and women; scarcity and/or quality of drinking water and its effects on household members by gender.

6.7.4 HUMAN TRAFFICKING AND FORCED LABOUR

As discussed in Section 6.7.2 women are sometimes recruited by construction companies and forced into prostitution in construction camps. Angolan girls as young as 13 years of age are victims of sex trafficking and many women from Namibia, the DRC, Vietnam and Brazil engaged in prostitution in Angola may have been sex trafficked.

However male migrants from China, Southeast Asia, Brazil, Namibia, Kenya and Congo are also known to have been subjected to forced labour in Angola's construction industry. The US Department of State note that some construction companies do not disclose the terms and conditions of the work at the time of recruitment and that workers may have their passports withheld, be subject to threats of violence, denial of food and confinement. Instances where workers are coerced to continue work in unsafe conditions, which at times has resulted in consequences as serious as death, have also been cited⁸⁵. The majority of human trafficking and forced labour activities go undocumented so the extent that this is active in the project area of influence is unknown.

GoA attempts to raise awareness of the problem and the National Institute of Children (INAC) has safe houses for child victims in all provinces. The Ministry of Social Action, Family and the Promotion of Women does the same for abused women. Angolan law does not provide foreign trafficking victims with legal alternatives to deportation, often to a country where they may face hardship and retribution.

6.7.5 CHILDREN

Generally children are considered to be a vulnerable population as they are easy targets for abuse and exploitation, they are more susceptible to illness and disease, and are often economically dependent on someone else. However, with regard to water supply in particular, children make a valuable contribution to households which is often overlooked.

In Angola a quarter of the children (aged between 5 and 14) work full time instead of attending school. This work varies in nature and not all of it is voluntary. Children younger than 12 cannot be criminally prosecuted in Angola and are therefore used to transport illicit goods across the Namibian border. Angolan boys are often moved to Namibia to endure forced labour in the agricultural industry and girls are subjected to domestic servitude and sex trafficking in South Africa, Namibia and European countries including the Netherlands and Portugal. The US Department of State highlights Luanda as one of the main Angolan provinces vulnerable to trafficking and forced labour activities⁸⁵.

Children are also more vulnerable to illness and disease resulting from poor sanitation and inadequate water supply. This is due to behavioural factors such as their hand-to-mouth habits and a lack of sanitation education (e.g. washing hands), physiological factors (e.g., relative to their weight children consume more water per pound than an average adult) or because they do not readily recognise the risks or unclean water.

Nearly half of Angola's population is under 15 years of age which increases the dependency ratio and makes children more economically vulnerable. Although children are still economically dependent on others their contribution to the household, specifically with regard to water collection is often overlooked; 28% of all water collection in households is done by children under the age of 17 (Table 6-15), the temporal cost of which often goes unaccounted for.

6.7.6 ETHNOLINGUISTIC MINORITIES

An ethnolinguistic group is a group unified by both a common ethnicity and language. Angola is home to several ethnolinguistic groups, while the majority of the population is Portuguese speaking other widely spoken languages include Umbundu, Kimbundu, Kikongo, Tchokwe kwanyama and Mbunda. These languages are linked to ethnic groups including the Ovimbundu, Kimbundu and the Bakongo²⁵. The available information does not indicate the presence of any ethnolinguistic minorities within the project area of influence.

6.7.7 INDIGENOUS PEOPLES

The area either side of the Rio Kwanza, from Luanda to beyond Malanje was predominantly inhabited by the people of the Ambundu ethnic group, who spoke Kimbundu. As a result of the upheaval of the Civil War, many of those now residing within the B4WSP area migrated to Luanda Province from elsewhere within the Ambundu area or from further afield. Many originated from Quiçama, the area south of Rio Kwanza, now a designated national park. Many also came from Humbundu in southern Angola, while others came from Malanje, a province to the east of Luanda. Previous studies have shown that more than 50% of these people migrated during the civil war, and that a large proportion, 85%, have no desire to return. However, these people are by definition⁹¹ not indigenous, and no indigenous people are found within the B4WSP project area.

6.7.8 INTERNALLY DISPLACED PEOPLES

A high proportion of the population of the project area of influence originated from Quiçama, the area now designated as a national park south of the Rio Kwanza. Many also came from Humbundu in southern Angola, while others came from Malanje, a province to the east of Luanda. Previous studies have shown that more than 50% of these people migrated during the civil war, and that a relatively small proportion (15%) have any desire to return²⁷. As the civil war concluded over 15 years ago most of those internally displaced have full assimilated into Luandan society, therefore no specific needs for this group have been identified.

6.7.9 DISABLED PEOPLES

It is estimated that since the beginning of the civil war in 2002 some 80,000 people have been disabled by the conflict, either directly through fighting, or indirectly through land mines (Section 6.5.2.1)⁷¹. There is no information available which could suggest how many disabled peoples are in the project area of influence, nonetheless it is important that the B4WSP consider their opinions and needs. The first phase of public consultations (explained more in Section 10 and Appendix D) will provide opportunity for the identification of disabled peoples in the project area of influence. The second phase will give them the opportunity to discuss their needs with the project team on a one-to-one basis without fear of judgement or intimidation.

6.8 LAND USE

In the absence of any formal cadastral register satellite imagery of the project area and Google Earth mapping was used to give an idea of how the land in the project area of influence is being used. Land was categorised into either:

- **Vacant:** land is uninhabited by people but could still be used for agriculture and other socio-economic activities;
- **Inhabited but unstructured settlement:** informal settlements that are unstructured where roads, urban blocks and lots cannot be identified; or,

⁹¹ Indigenous peoples are those that are native or aboriginal, ethnic groups who are the original inhabitants of the region.

- **Inhabited, structured settlement:** formal settlements that are structured, where houses have defined plots and internal roads between the houses can be identified.

It should be noted that the below analysis and categorisation is based on satellite images from 2014 and so may no longer be accurate but can still be used as an indication of established communities⁹².

Figure 6-41 shows the mapped land use for Bita service areas and the percentage of the total area in. Figure 6-42 shows the mapped land use distribution for Cabolombo and the percentage of the total area. Figure 6-43 shows the mapped land use distribution for Mundial and the percentage of the total area. Figure 6-44 shows the mapped land use distribution for Ramiros and the percentage of the total area.

This information is not available for Benfica II and Camama service areas, as the only construction taking place in these areas is of distribution networks which will have very little, if any impact on the current land use.

⁹² Hydrological Report (document number: AN13019-101).

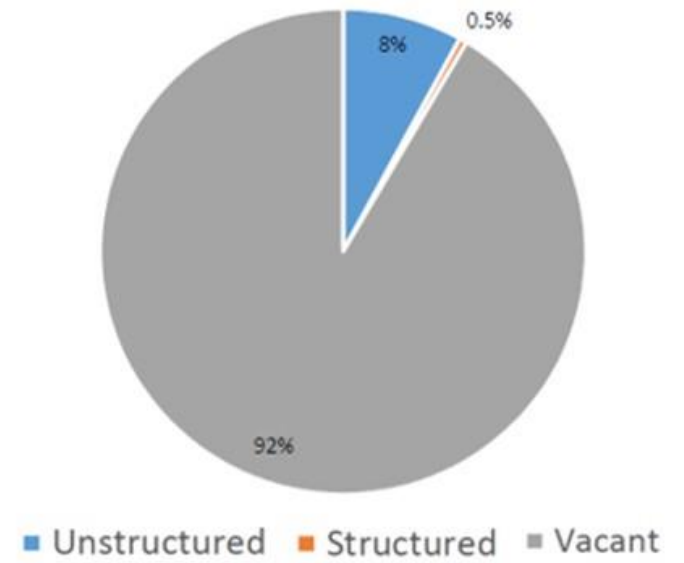
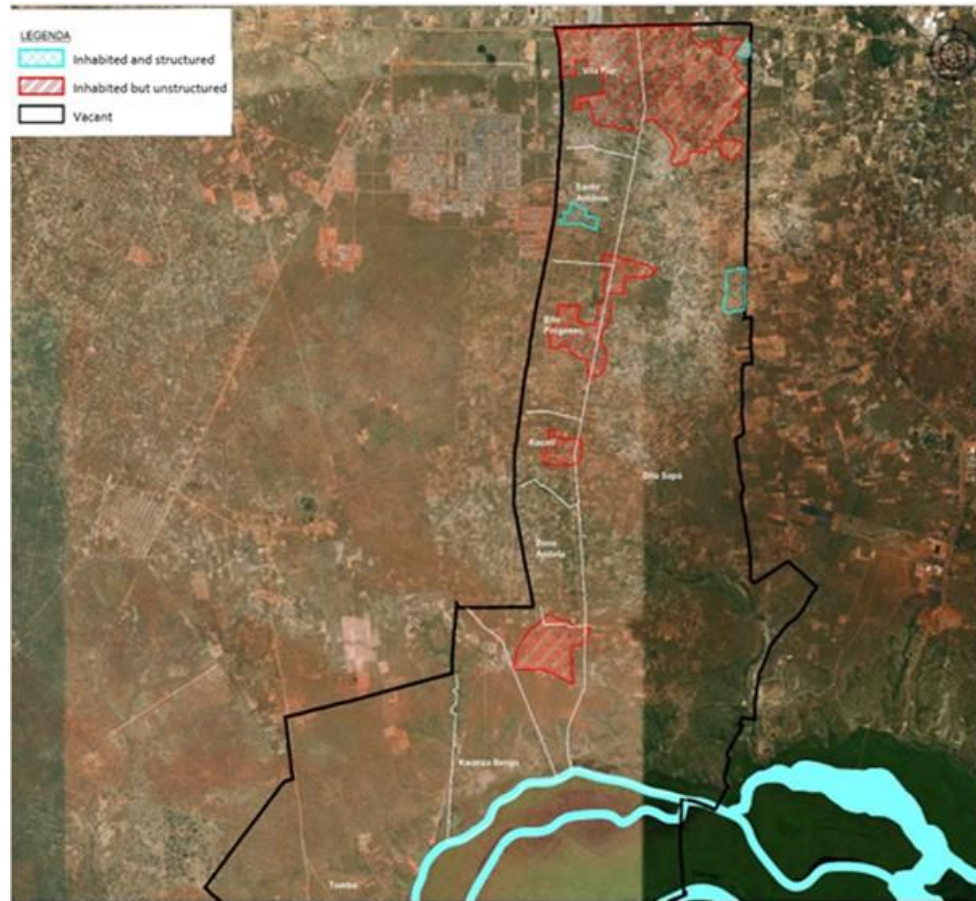


Figure 6-41: Land Use Distribution for Bita and Percentage of Total Area (16,671 ha).

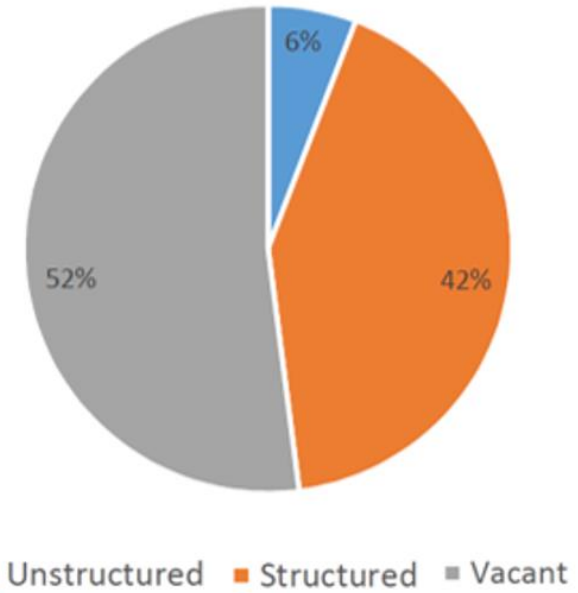
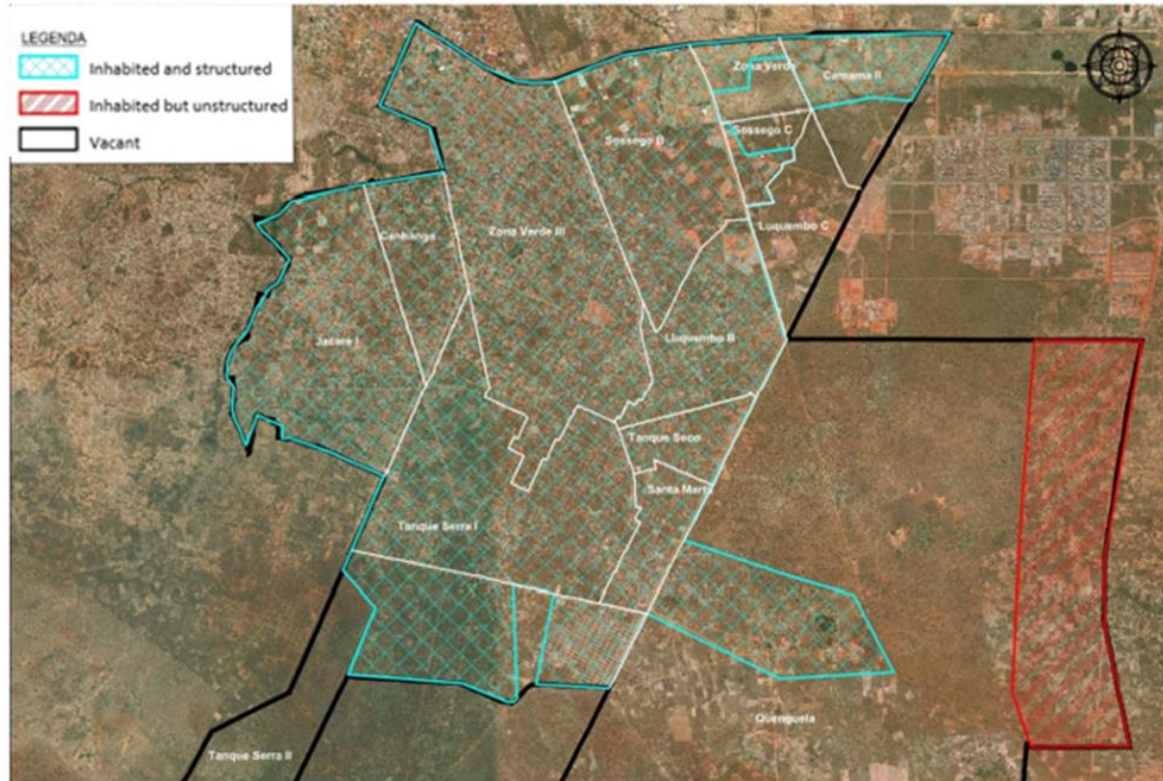


Figure 6-42: Land Use Distribution for Cabolombo and Percentage of the Total Area (22,109 ha).

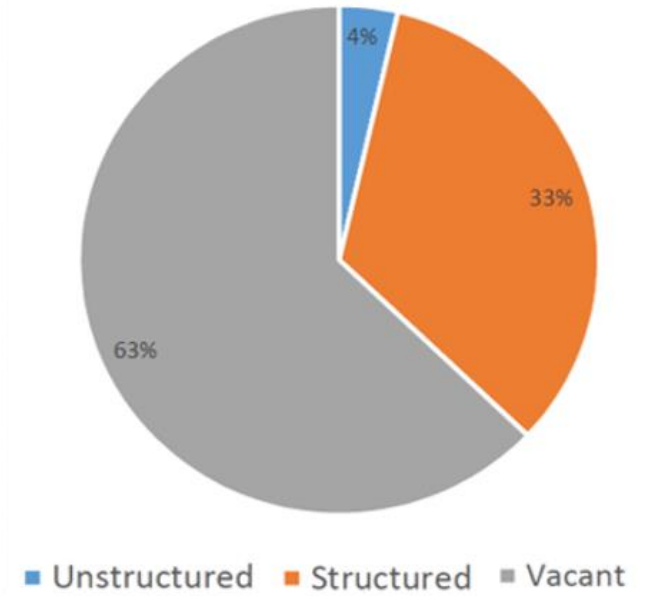
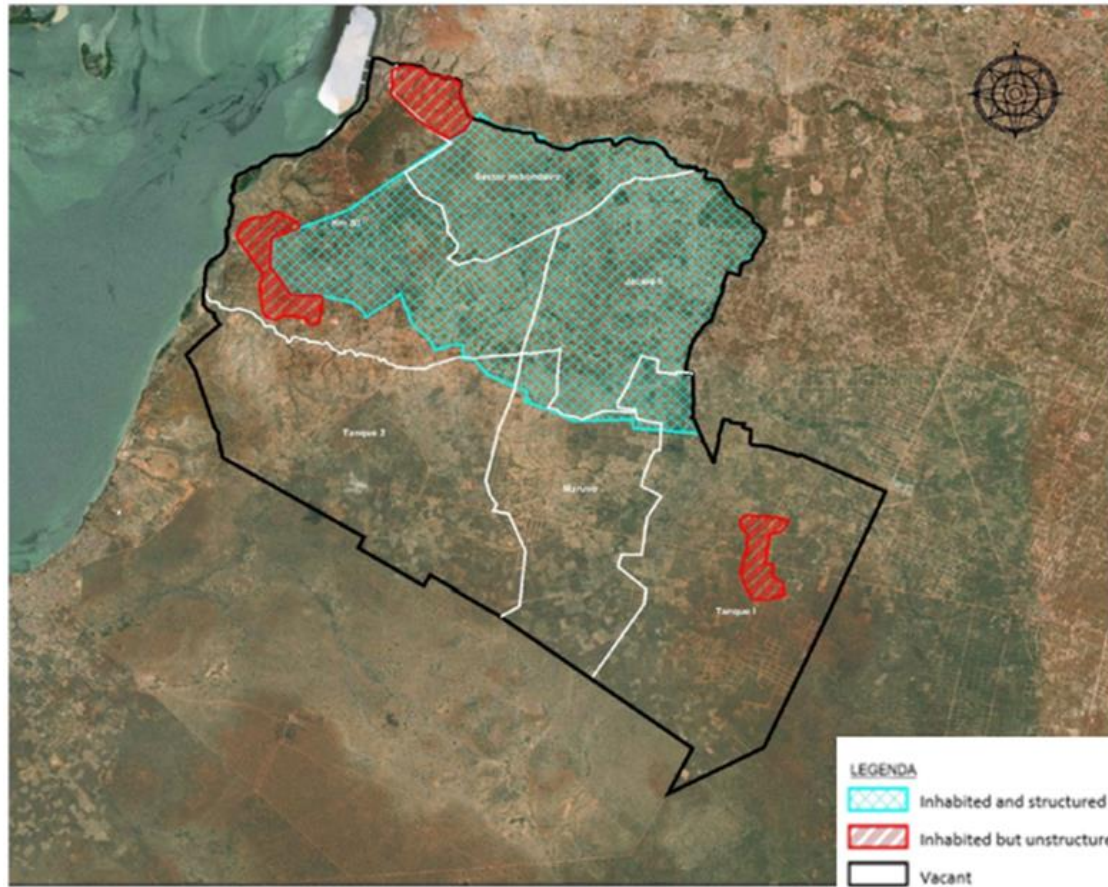


Figure 6-43: Land Use Distribution for Mundial and Percentage of the Total Area (6,040 ha).

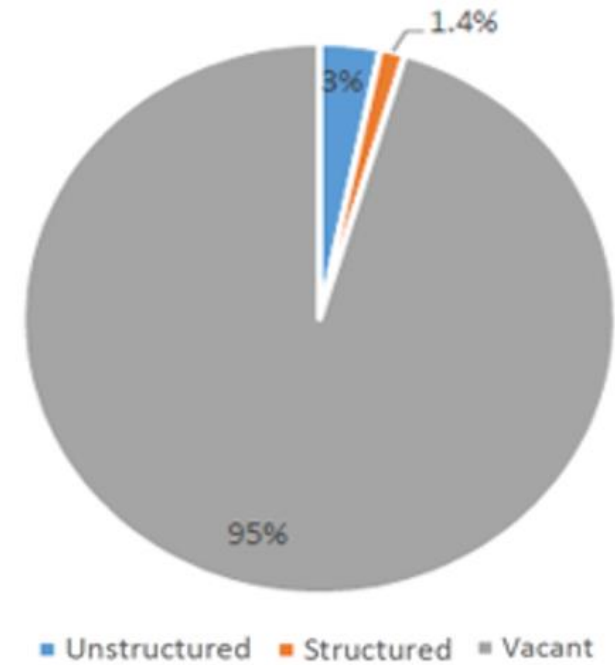
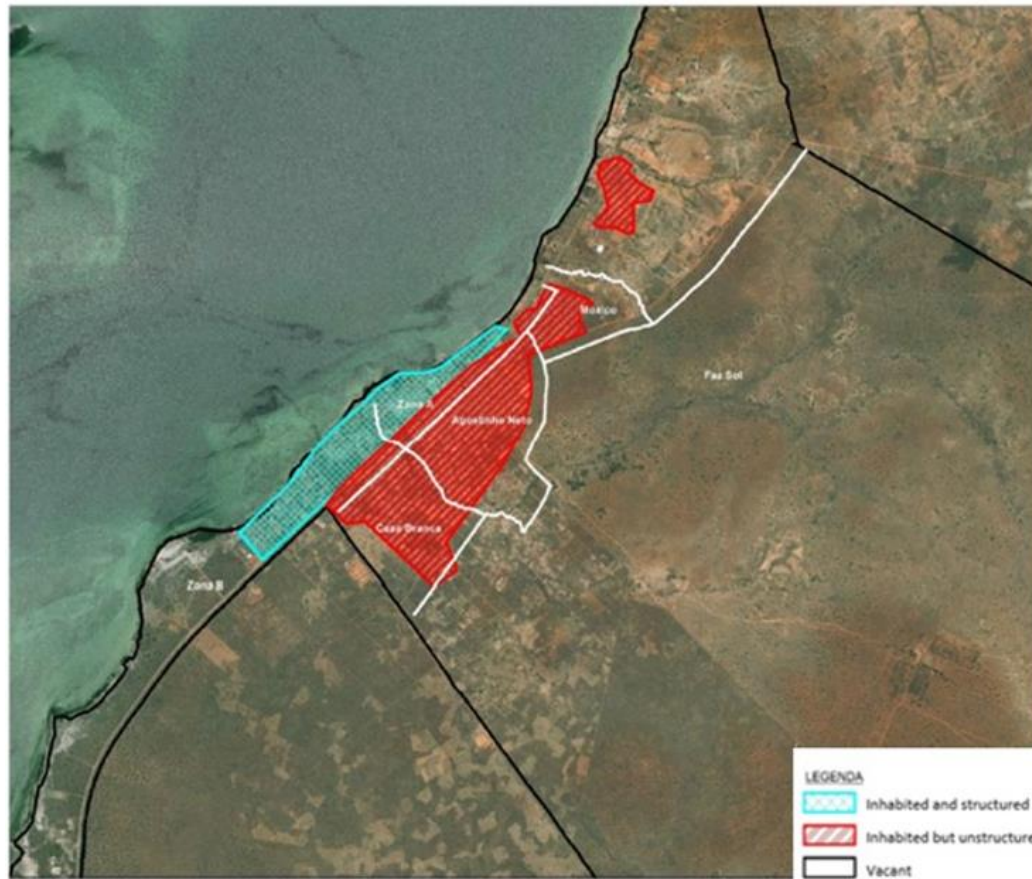


Figure 6-44: Land Use Distribution for Ramiros and Percentage of Total Area (5,129 ha).

6.8.1 LAND LAWS

The 1992 Constitution of the Republic of Angola gives the government ultimate authority over all land, water, air, soil, and all other natural resources. The legal framework is derived from Portuguese Civil Code, which does not readily accommodate traditional African land tenure practices.

The primary legislative instrument for land is the 2004 Land Law (*Lei de Terras de Angola*), the objectives of which include environmental protection and the assurance of sustainable and economically-efficient use of land. Applicable to all urban and rural land, the law allows the state to confer private property rights over urban land, and reintroduces the concept of customary domain over rural land. The state can confer transferable rights, and notably provides for the transformation of customary rights into legal rights to provide security of tenure and protection from the evictions that were common throughout both colonial times and the civil war. The law does not extend to private land, such as that of the Catholic Church and foreign embassies. Foreigners are permitted to hold land in Angola. For issues that fall outside the remit of the Land Law, such as the inheritance of property, deference is made to the earlier (2001) Angolan Civil Code (*Código Civil*). Under the 2001 Decree on the Resettlement of Displaced People the rights of displaced people to housing and provision for additional land allocation, is recognised.

Institutional responsibility for the assignment of land is divided between three entities. Concessions of urban land up to 1,000 m² may be authorised by the Municipality Administrator, while the approval of the Provincial Governor is required for areas up to 50,000 m². Areas greater than 50,000 m² may only be assigned by the Minister of Urban Planning and Housing.

Under the auspices of the Ministry of Agriculture and Rural Development, the Land Law identifies acceptable uses of land to be four-fold:

- for shelter and homes;
- for natural resources and mining, for agriculture;
- for forestry and land planning; and,
- for economic and industrial activities.

Also passed in 2004, the Law of Territorial Planning and Urbanisation (*Lei do Ordenamento do Território e do Urbanismo*) requires territorial development plans to be developed for all rural and urban land at central, provincial and municipal levels, and empowers municipalities to expropriate land for development.

Notwithstanding this legislative provision, many argue the Land Law has not been fully implemented and land administration and management remain weak. The majority of people are unfamiliar with land and property legislation and the majority remain without documented proof of tenure or entitlement. Customary law still governs issues such as land access, the control of land and its production, land transfer and land use. Customary law principles and practices can be highly localized, but most are applied on the basis that land is owned by a universal deity, the ancestors of living occupants, the community, or by individuals within a community, and are administered for the benefit of the community by the traditional leader or village elder (*soba*)²⁷.

6.9 CULTURAL HERITAGE

Sites set aside and afforded protection because of their historic and cultural heritage value, and/or their ecological value sites, are recognised in Angolan law under the auspices of the Ministry of Culture and the National Institute of Biodiversity and Protected Areas at the Ministry of Environment respectively²⁷.

Although Luanda has no formally recognised sites of cultural heritage the GoA has submitted 13 sites to the UNESCO tentative list, three of which are in Luanda:

- Fortress of S. Miguel (1996);
- Fortress of S. Pedro da Barra (1996); and,

- Fortress of S. Francisco do Penedo (1996)⁹³.

There are no formally recognised historic or cultural heritage sites within the B4WSP area. There are also no Protected Areas, the nearest being the Quiçama (or Kissama) National Park, located south of the B4WSP area, across the Rio Kwanza valley²⁷.

Modern cultural sites include facilities such as schools, churches, health centres, public halls, and outdoor meeting places. Examples of these can be found in the B4WSP study area and include but are not limited to:

- Cultural Centre Paz Flor;
- School of Symphony Orchestra Kapossoka;
- Casa de Zouk de Angola;
- The Community Youth Centre, Mbondo Chape; and,
- Novembro Stadium (November 11 Stadium)²⁸.

Furthermore, a large proportion of the Ramiros area is under single ownership. It has been fenced off to prevent public access and remains substantially undeveloped. The land has therefore believed to have attained significant ecological value, although this is not legally recognised (discussed further in Section 5).

6.10 ARCHAEOLOGICAL AND HISTORIC REMAINS

So far as it has been possible to ascertain, there are no archaeological or historic remains within the B4WSP area. This notwithstanding, the contracts for scheme construction will include a 'Chance Find' procedure (Appendix F) to ensure anything of potential significance that is unearthed during land clearance or excavation of foundations and trenches, will be subject to inspection by local heritage experts from the Ministry of Culture.

6.10.1 RELIGION

Nearly 80% of the Angolan population is Christian (Figure 6-45) as such The Church has an important role in community development. There are 12 churches in the project area of influence:

- Bom Deus;
- União da Igreja Evangélica em Angola. (Union of Evangelical Church in Angola);
- Nova Apostólica (New Apostolic);
- Igreja Convencional em Angola. (Conventional Church in Angola);
- Igreja Assembleia de Deus Pentecostal;
- Igreja Universal do Reino de Deus;
- Igreja Evangélica dos Irmão em Angola (Evangelic Church);
- Igreja Metodista. (Methodist Church);
- Igreja ICEA;
- Igreja do Sétimo dia; and,
- Igreja do Espírito Santo em Verdade²⁸.

⁹³ United Nations Education, Scientific and Cultural Organisation (2018) *Angola* [online] Available at: <https://whc.unesco.org/en/statesparties/ao> [Accessed 23.07.18].

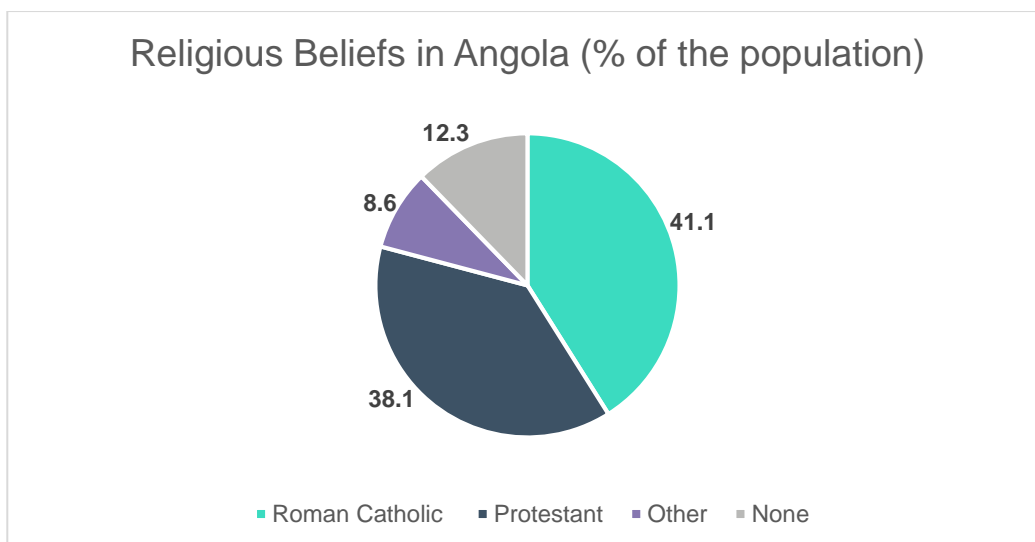


Figure 6-45: Religious beliefs in Angola (% of the population)²⁵.

7 PROJECT ALTERNATIVES

7.1 ALTERNATIVES CONSIDERED AND BEING CONSIDERED

Although B4WSP design is yet to be completed, a number of project alternatives have already been considered during project development and in the preparation of TFS, most significantly:

- Transmission pipeline routings;
- Distribution areas;
- Siting of the Cabolombo CD;
- Pipeline to Benfica II CD; and,
- Levels of Service to be provided.

In this section of the ESIA, the consideration of each of these are discussed against the benefits of the chosen alternative as presented in the TFS. Also discussed is the situation that will arise if B4WSP is not implemented, the 'Without Project' alternative.

Scheme elements that remain to be determined by the appointed D&B contractors for each of the twelve lots under which construction will be implemented include but are not limited to:

- Location of the intake works within the Lower Kwanza Basin;
- Water treatment process stream;
- Transmission pipeline route from CD Cabolombo to CD Benfica II;
- The layout of each distribution network.

7.2 TRANSMISSION MAIN ALIGNMENTS

The routing of the transmission line from the Bitá WTP to each of the new and existing CDs has been realigned four times since the project was first conceived. The changes are the result of improved understanding of the various constraints, including but not limited to pipeline hydraulics, the available right-of-way, as well as environmental and social issues such as the disturbance of communities, the loss of significant trees, land take and resettlement.

The original ESIA issued in 2014 was based upon an alignment shown in Figure 7-1, determined in 2012, and included in the original Bitá IV tender documents. From the Bitá WTP and CD site the transmission main ran north towards Via Expresso, just before which it turned west, to take in the original site of CD Cabolombo before continuing in a south-westerly direction to connect with CD Mundial and CD Ramiros. At this stage, B4WSP was not intended to supply additional water to CD Camama nor to CD Benfica II.



Figure 7-1: Original Transmission Pipeline Alignment

In 2013, the appointed D&B contractor proposed an alternative route, the ‘purple route’ shown in Figure 7-2. Following the decision to relocate the CD Cabolombo and to supply additional water to Camama and Benfica II, the ‘red route’ shown in Figure 7-2 was proposed.

Further modification of the transmission route was made during development of the TFS, when it was decided the connection from the main line to CD Cabolombo should utilise an existing road that allowed a straight run northwards to CD Camama rather than create a new alignment for which there was little precedent. It is on this alignment, illustrated in Figure 7-3, that the present ESIA and RPF are based.

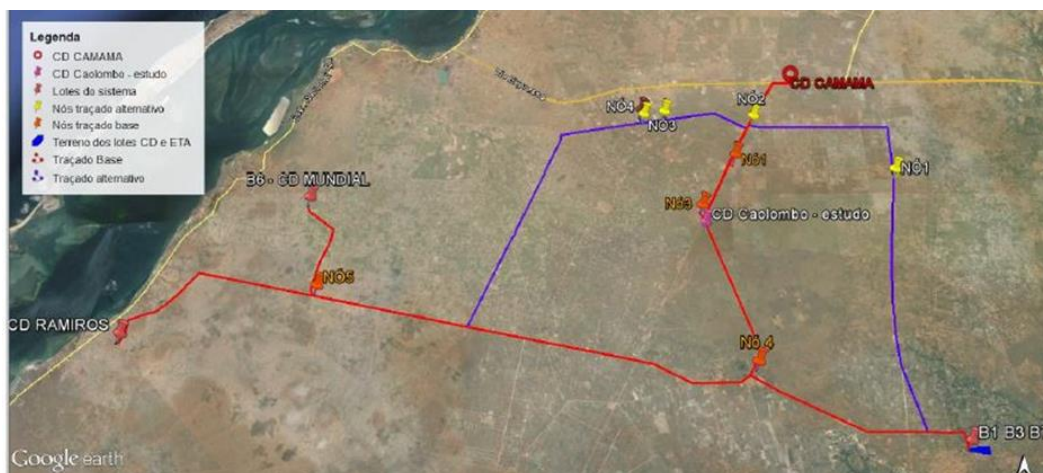


Figure 7-2: ‘Purple’ and ‘Red’ transition Main Alignment Options

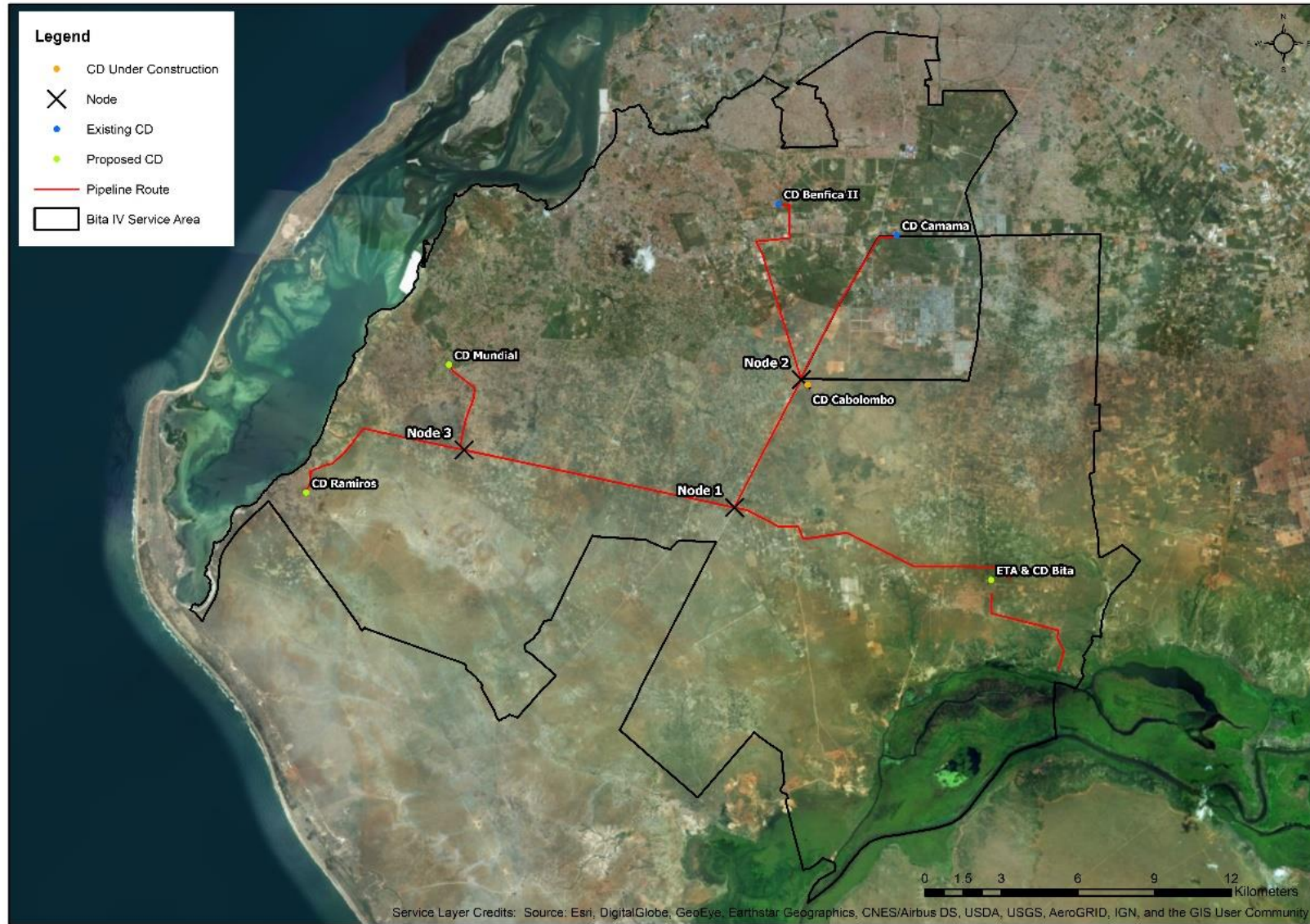


Figure 7-3: The Present Proposal for Transmission Main Alignment.

7.3 DISTRIBUTION AREAS

There have been two variations in the determination of the distribution areas to be served by B4WSP. The first, shown in Figure 7-4, was determined by Dar from standard distribution design and network hydraulics criteria on the basis of the supplies proposed from CD Ramiros, CD Mundial and CD Cabolombo. When it was decided to supply B4WSP water to CD Benfica II and CD Camama, Dar determined distribution areas for these on the same basis.

Under this original proposal, no distribution was foreseen for Bitá. The EPAL site there was to have a treatment and transmission centre only, but as time passed and the population of the Bitá area expanded, it became clear that a water supply system had to be provided.

When EPAL finally reviewed the opportunities for B4WSP water distribution, it was decided the area to be served should be defined on the basis of administrative boundaries rather than the vagaries of network hydraulics. The engineering was amended accordingly and the finally agreed and adopted areas for ultimate B4WSP distribution are those shown in Figure 7-3 above.

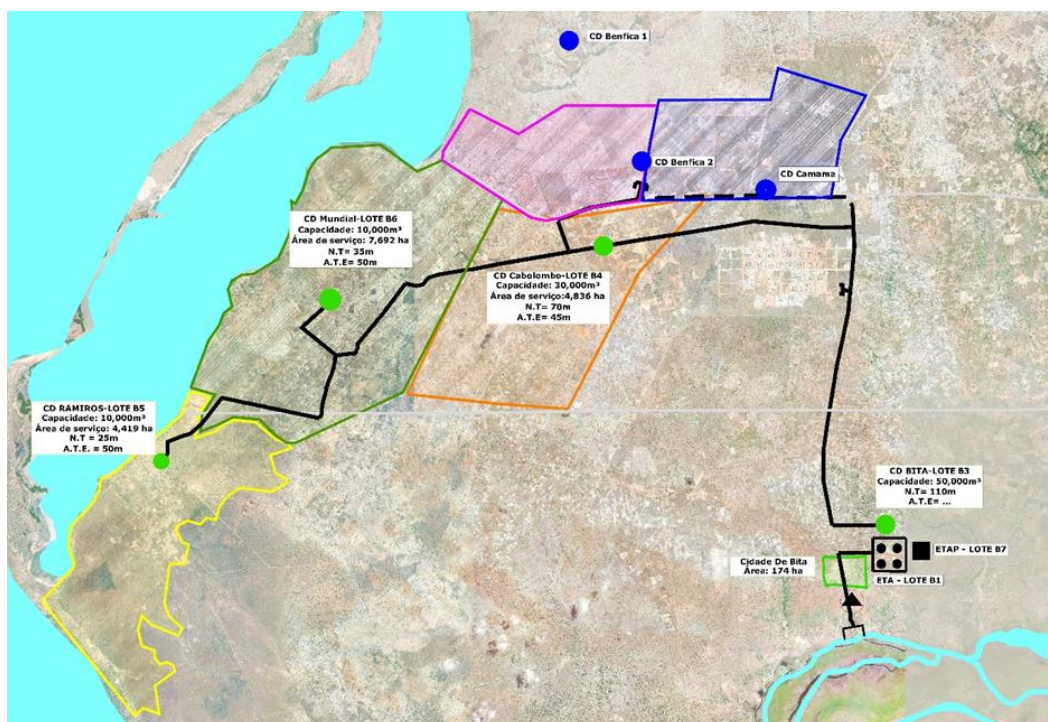


Figure 7-4: Originally Conceived B4WSP Distribution Areas

7.4 CABOLOMBO CD LOCATION

The original site and the now agreed site for Cd Cabolombo are shown in Figure 7-5, the change made to improve distribution hydraulics and to reduce difficult issues of land expropriation. Subsequently, the CD at the new site, some 4.5 km SSE of the original site, was removed from the Bitá IV scope of construction and is currently under construction by Sino Hydro with funding from the Chinese government.



Figure 7-5: The Alternative Cabolombo CD Sites

7.5 PIPELINE TO BENFICA II CD

Following the decision to relocate CD Cabolombo and to enhance the population served from the existing CD Benfica II, the best route from Cabolombo to Benfica II remained to be determined. Two options were apparent; (i) to utilise the already planned transmission main from CD Cabolombo to the existing CD Camama, then the existing 700 mm line from Camama to Benfica II, or (ii) to construct a new spur to Benfica II from the already planned Cabolombo to Camama main.

The TFS analysis showed that while the existing 700 mm line had adequate capacity for 3 m³/s, a new twin pipeline would be required if it was decided to provide 6 m³/s to CD Benfica II.

It has recently been decided that a new spur directly linking CD Cabolombo, crossing below the busy Via Expresso in the vicinity of an existing drainage culvert, to CD Benfica II will be provided.

7.6 LEVEL OF SERVICE

The level of service provided to the population to be served by B4WSP has been the subject to considerable discussion. EPAL's original considerations were for a total supply of either 9 m³/s or 6 m³/s depending on the service area, some of which would reinforce the capital area, while the remainder would supply the unserved and under-served peri-urban areas.

The World Bank's original assessment was for a project giving 3 m³/s for a design horizon of 2022. However, as time passed it became clear that construction of a project of this scale to a design deadline only four years away was not economically viable.

The scheme now envisaged is planned for 9 m³/s, designed for 6 m³/s, and with 3 m³/s provided by the Phase 1 contractor.

7.7 'WITHOUT PROJECT' ALTERNATIVE

Without the benefits of the B4WSP, the population to be ultimately served, 2.8 million today, 4.0 million by the design horizon of 2025, will suffer even more severe water shortages than they do today. Some 10% of these reside within the capital city, while 90% inhabit the rapidly expanding urban and peri-urban areas to the south and east. Without B4WSP, life in these areas becomes unsustainable.

From the data given in Section 0 (Table 1-1), none of the existing houses in Kango, Barra de Kwanza and Camama communes to be served from the new Bita CD, in the Ramiros and Benfica comunas to be served from Mundial CD, or in the remaining areas in Camama and the communa of Benfica, to be served respectively from the Camama and Benfica, have direct connections to a water supply network. Some 20% of these houses have access to street fountains, but the rest depend on tankered supplies, which are often of questionable quality, most frequently due to inadequate chlorination by tanker drivers. Throughout the whole of Bita IV areas 1, 2 and 3, only 7% of houses have a direct connection to a water distribution network, from which supply is in any case often

intermittent. 16% have access to a public tap or street fountain, while 77% depend on tankered supplies.

The present per capita demand of water is 115 l/h/d within the structured urban areas, and just 40 l/h/d in the non-structured peri-urban areas. By 2025 the structured areas will have greatly expanded, by when demand is expected to increase to 150 l/h/d, a level of service it will be impossible to supply without B4WSP.

However, the benefits that will accrue from the B4WSP project are not just about new water supply. Some of the areas to be served already have distribution networks, but many are poorly constructed, poorly maintained, and many households pay for a network connection that provides inadequate supplies. B4WSP will therefore also strengthen EPAL's institutional structure and internal capacity as the utility provider for the province of Luanda, improve the coverage of water distribution, reduce leakage and other sources of non-revenue water, increase the effectiveness of metering for more inclusive billing, improve cost recovery and enhance the return on investment.

Without the B4WSP the expansion of water services to the increasing populations of the new urban areas cannot be achieved and the continued upgrading of non-structured into structured settlements cannot be sustained. Without B4WSP an increasing proportion of the population of the capital and its hinterland will continue to suffer severe water shortage and the attendant health and social problems that result from a lack of adequate quantities of potable quality water.

8 IMPACT ASSESSMENT AND MITIGATION MEASURES

This section presents the methodology and criteria used to determine the potential environmental and social impacts associated with project implementation. The environmental and social assessment provides a formalised procedure to evaluate the significance of impacts. This is achieved through the consideration of project activities, elements and consequences to the receiving environment. The objective of the impact assessment analysis is to identify significant interactions that require practicable mitigation measures to reduce impacts towards acceptable levels and compliance with environmental performance standards.

Evaluation of environmental and social impacts involves the following steps:

- description of project activities through design, construction and operation;
- description of environmental and social attributes;
- identification of project-environment and project-social interactions;
- prediction of environmental and social effects; and
- description of environmental and social effects.

Project activities are described in Section 2 of this report. The environmental attributes that may be affected as a consequence of project implementation are outlined in Sections 4, 5 and 6. Potential environmental and social impacts are identified by superimposing project elements and activities onto existing natural conditions and then making assessment based on the nature of the effect, magnitude, spatial extent, duration, project phase and the degree of reversibility.

It is an underlying assumption of the assessment process that all works will be undertaken with due care for safety and environmental matters, using current and reasonable engineering good practices.

8.1 ASSESSMENT METHODOLOGY

8.1.1 INPUT DATA

Quantitative field surveys were not undertaken as part of this assessment, due to the time-frame provided. Therefore the characterisation of environmental baseline conditions has relied on site walkovers, stakeholder engagement, and the availability of data and information from the design team and/or publically available sources. The data set availability has varied according to the subject concerned. The following hierarchical approach has been applied for data use:

- Site walkover;
- Primary data source – these include peer reviewed scientific research papers, findings of previous related technical studies and design support information;
- Secondary data source – these include governmental reports, learned journals and technical magazines, newspaper articles, textbooks; and,
- Professional judgement based on both previous environmental assessments and previous construction experience.

8.1.2 ENVIRONMENTAL ASSEMENT CRITERIA

The determination of environmental or social impact is related to its 'significance'. Impact significance is a function of likelihood (i.e. the probability of the impact occurring) and the consequence of the impact once it has occurred (i.e. the scale and nature of the impact). Likelihood and consequence are each assigned a numerical value (Table 8-1). These are multiplied to arrive at a significance rating.

Table 8-1: Environmental Significance Rating Matrix

Likelihood	Consequence			
	1 - Slight	2 - Minor	3 – Moderate	4 - Major
1 – Improbable	1	2	3	4
2 - Unlikely	2	4	6	8
3 - Likely	3	6	9	12
4 - Certain	4	8	12	16

Significance is determined twice. Significance is initially determined on the basis that mitigation measures and management controls are not in place. This represents a worst case scenario. Significance is then determined for a second time on the basis that mitigation measures are taken into account. The definitions applied for likelihood, consequence and significance are presented in Table 8-2.

Table 8-2: Environmental Impact Terminology Definitions

Term	Definition
Likelihood	
4 - Certain	Always occurs.
3 - Likely	Has occurred in the company.
2 - Unlikely	Has occurred many times in the industry, but not in the company.
1 - Improbable	Has occurred once or twice in the industry.
Consequence (adverse)	
4 - Major	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements; non-compliance with performance standards.
3 - Moderate	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristic, features or elements.
2 - Minor	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
1 - Slight	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
Significance	
High (Scored 12 – 16)	An impact that causes changes to the environment that fundamentally affect its status, potential productivity or usage. Impacts rated as 'high' are considered unacceptable.
Medium (Scored 8 – 11)	An impact that causes change in the environment but does not fundamentally affect the status, potential productivity or usage.
Low (Scored 4 – 7)	An impact which is either too small to be measured or otherwise does not give rise to any material change in the environment.
Negligible (Scored 1 – 3)	No measureable or discernible impact, irrespective of other impacts.

The allocation of residual impact significance is based upon standardised assessment and expert interpretation. The process takes into account the nature and duration of the impact under consideration, and compliance with any applicable performance standards as appropriate.

8.2 ENVIRONMENTAL IMPACT PREDICTION

As described, impacts resulting from implementation of the project have been predicted in terms of significance. Predicted impacts take into account:

- initial screening to identify feasible impacts;
- an understanding of project activities; and,
- characteristics of the receiving environment, including sensitive receptors.

Impacts are predicted based on the evaluation criteria and associated definitions presented in Table 8-1 and Table 8-2. Impact significance has been first assessed on the basis that no controls or mitigation measures are in place. The prediction of impact significance has then been repeated on the assumption that mitigation measures are implemented as referenced. This approach enables the benefits of mitigation to be demonstrated, in cases where such mitigation is considered necessary, and identifies the residual impact significance for each impact. Final acceptability for impacts is based on residual significance.

Likelihood is assessed based on the estimated frequency of the predicted consequence arising; it is not a direct function of the project activity itself. An example is the impact fuel spillage on surface water quality. In this case the likelihood assigned is a measure of first the spill occurring and secondly the potential for the spill to lead to surface water becoming contaminated. If the spill could occur in an area where no credible pathways to surface water existed (e.g. due to terrain, soil conditions, or the absence of surface water) then the likelihood might be assigned as 'unlikely' or 'improbable'. Conversely, if the spill occurred in an area where surface water contamination could occur (e.g. adjacent to surface water bodies) the likelihood might be assigned 'likely' or 'certain'. This approach allows for a better prediction of residual impact significance where for a given impact, control measures may serve to reduce likelihood of occurrence, the consequence once it has occurred, or both.

8.3 PROJECT IMPACT DESCRIPTIONS

8.3.1 CONSTRUCTION ACTIVITIES

Construction activities are anticipated to include:

- Establishing temporary access to work and ancillary areas, demarcating clearance zones, and establishing access control;
- Clearance and levelling of some areas and major earthworks (e.g. laying transmission and distribution pipelines, introducing ditches and other control structures) where required.
- Sourcing and establishing surface water supply (e.g. creating river diversion channel).
- Building control / treatment / storage / transmission / distribution structures for water supply;
- Location and development of quarries / borrow pits, import of materials, e.g. aggregate; and
- Upgrade of existing facilities, transmission and distribution networks; and
- Improvement of existing drainage and introduction of new drainage, including culverts if required.

The equipment required will include heavy mobile plant (e.g. graders, bulldozers, excavators) and temporary fixed plant such as concrete batching plant and power generators.

8.3.2 OPERATION AND MAINTENANCE

During operation, activities will include the abstraction of water from the Rio Kwanza, pumping of raw water to the water treatment plant, treatment of water, water storage in reservoirs at the water distribution centres areas in containment areas such as reservoirs; transmission of water to further storage and distribution centres via a piped network, and distribution of water. These activities may contribute to direct and indirect impacts described in Table 8-3 to Table 8-18.

Maintenance of urban water supply and sanitation systems will entail many of the activities described above for the construction phase, although in general they are likely to be smaller in scale and spatial extent. It will include activities such as clearing and maintaining water collection and storage systems, and servicing mechanical components such as pumps, as well as fixing leaks.

It is a much-quoted truism that operational impacts can only be effectively mitigated if addressed during early project design.

8.3.3 DECOMMISSIONING

Where temporary roads and facilities used in the construction phase are no longer required (if, for example, they are not required for maintenance) they should be decommissioned and rehabilitated in accordance with a site-specific closure plan developed in consideration of international good practice. Normal practice for pipe-work is to disconnect, but leave it in the ground. The decommissioning process will include site clearance, removal of all equipment and appropriate disposal of waste materials, soil ripping and re-grading where necessary.

Water supply systems are normally intended to operate for a prolonged period, and so it would not be appropriate for closure or decommissioning plans to be prepared until a few years prior to this occurring. Public utilities such as treatment plants, CDs and pipelines are more likely to be repeatedly upgraded rather than a site or line wholly decommissioned.

The following pages define and describe the potential impacts that may arise during project design and construction (Tables 8-3 to 8-18), with various options for impact avoidance, mitigation and the management.

8.4 IMPACT ASSESSMENT AND MITIGATION MEASURES

8.4.1 BIODIVERSITY

Biodiversity impacts are associated with the direct loss of potential habitat as a result of permanent and temporary works. The key biodiversity impact relates to the water intake in the floodplain of the Rio Kwanza, whereby the water abstracted to supply the project could potentially reduce the remaining water to the extent that habitat is lost or severely altered. Discussions held with Instituto Nacional de Recursos Hídricos (INRH) concluded that water abstraction may only cause short-term stress to water availability for short periods related to the dry season, but that the common understanding was that there would be ample water supply, as released upriver at Cambambe Dam so as not to cause permanent habitat change. Much of the remaining project area (water transmission and distribution lines) is area that has already been cleared. In addition, most of the project follows existing road alignment. The RoW (including temporary works) along all pipeline alignments will be restricted as far as is feasible, to reduce any land take.

Table 8-3: Biodiversity – Environmental Assessment Summary

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Construction Impacts							
<p>Site clearance</p> <p>Clearance of natural existing habitat at the water intake / pumping station, and along transmission alignments to accommodate temporary and permanent works. It is noted, however, that transmission alignments are almost entirely contained in the Rights of Way (RoWs) of existing cleared tracks and roads. Distribution pipelines (not within transmission alignments) are anticipated to be entirely contained within existing RoWs. Thus, impacts along pipe alignments have already occurred and are not expected to be significantly exacerbated by the project. That said, a number of trees are anticipated to be in or close to the pipeline construction working width, and wherever possible such trees will be saved from clearance, especially when they have additional social / economic value.</p>	1	4	4	<p>Minimise exposure of soil susceptible to erosion:</p> <ul style="list-style-type: none"> Land and vegetation clearance shall be kept to a minimum to reduce soil exposure. Existing vegetation to be maintained when possible. In bare areas, additional vegetation shall be planted to stabilise exposed soil surfaces. To the extent practicable mulch, or construction aggregate shall be used to reduce soil exposure. Exposed soils shall be wetted to prevent erosion. Barriers and drainage controls shall be installed prior to earthworks commencing. <p>Minimise disturbance to flora and fauna:</p> <ul style="list-style-type: none"> In areas considered sensitive, a site walkover should be completed by a qualified and approved specialist in advance of site clearance to inform the client of the suspected presence of rare and endangered fauna and flora. Construction workers shall be provided with appropriate training regarding animal encounters. Temporary site fencing shall be designed to prevent trapping larger animals in areas considered at risk. Sensitive vegetation areas shall be fenced and retained to the extent practicable. To the extent practicable animal nests shall be retained and shall not be disturbed. If unable to be retained, where feasible nests shall be relocated by an appropriate specialist. 	1	4	4

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				<ul style="list-style-type: none"> If animals are discovered within the project site attempts should be made to relocate them. All such initiatives shall be based on appropriate specialist advice. Animals on-site shall not be killed or injured. No hunting of animals shall be permitted. Where practicable, do not cut tree roots larger than 50mm, as they provide structural integrity to the tree. Do not allow stagnant water to form within the project site to discourage mosquito and fly breeding. Keep food wastes in locked and sealed containers to remove animal food sources. Schedule regular collection of waste to remove from site. Do not use pesticides that cause collateral damage to species other than those targeted. If required, only spray pesticides in suitable weather conditions i.e. calm, fine weather. Do not spray if non-target plants, animals, or people will be exposed. Provide adequate buffer areas between sprayed areas and sensitive receptors such as waterways, sensitive flora, and adjacent properties where practicable. 			
<p>Invasive Species Introduction Movement of plant and workforce into areas could introduce invasive species which adversely impact fauna, flora, ecosystems, and crops; particular risk for aquatic vegetation likely to proliferate within standing water.</p>	4	2	8	<ul style="list-style-type: none"> Invasive Species Management Plan, which should be developed and implemented in consultation with authorities, including appropriate eradication measures for different species/groups of species. Staff training and awareness raising in communities. No introduction of exotic species (e.g. for site rehabilitation) without specialist vetting and government approval. Where possible, clearance of invasive species during routine maintenance of water storage and distribution systems. 	4	1	4
Operational Impacts							
<p>Induced Access Development of water supply infrastructure may encourage or facilitate human access in remote or undeveloped areas, which can lead to further development, increased disturbance and pressure on natural resources through bushmeat hunting, logging, fire, etc.</p>	2	2	4	<ul style="list-style-type: none"> Careful site selection and siting of all project components, with advice from biodiversity authorities/wildlife specialists to avoid remote and previously inaccessible areas where possible. Restrictions on access to all temporary access roads, and their removal after construction. Access controls on permanent access roads required for operation and maintenance. 	2	1	2

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
<p>Bushmeat Hunting</p> <p>Increased development in remote areas could lead to greater demand for bushmeat (from workforce and wider community), stimulate the wildlife trade and facilitate access to hunting areas.</p>	3	1	3	<ul style="list-style-type: none"> Preparation of a Bushmeat Hunting and Wildlife Trade Management Plan, agreed with government authorities and implemented jointly. Prohibition on workforce hunting, selling, or purchasing bushmeat and training to support this requirement. Prohibition on workforce (except security personnel) having guns in work areas or accommodation. Sensitisation and public awareness campaigns against hunting and bushmeat trade amongst local communities. 	3	1	3
<p>Permanent land-take</p> <p>Permanent loss of riparian and terrestrial habitat leading to a long-term reduction in biodiversity resources. However, most of the pipe alignments pass along existing tracks and roads.</p>	2	3	6	<ul style="list-style-type: none"> Permanent project footprint will be minimised through careful design and pipe alignment choices. 	2	3	6
<p>Use of RoWs</p> <p>Continued use of new ROWs to access previously inaccessible land for egg collecting, hunting and trade-in-live-species.</p>	2	2	4	<p>Access control on EPAL-only roads;</p> <ul style="list-style-type: none"> Ban staff from hunting or other biodiversity-degrading activities 	2	1	2
<p>Wastewater flow to Marine Environment</p> <p>With the increase in water supply will come an increase in wastewater effluent, and the risk particularly in the Ramiros and Mundial districts, for potential releases into the marine environment.</p>	3	3	9	<ul style="list-style-type: none"> A comprehensive Sanitation Master Plan must be developed in order to manage all wastewater. GoA should urgently consider expanding sanitation network in the project area. Under the B4WSP new water connections will only be made to houses with an adequate level of sanitation. Where households do not have adequate sanitation facilities they may be able to have an external tapping point or use a community standpost, it is suggested that this be managed using Development Workshop's MOGECA Model. 	3	1	3

8.4.2 HYDROLOGY

The Bitu water intake abstracts from the Rio Kwanza floodplain which receives its water largely from water release at Cambambe Dam, 160 km to the south-east, supplemented by drainage into the Rio Kwanza between Cambambe Dam and the point of Bitu water intake. There is the potential for excessive lowering of river levels either through inadequate release of water from Cambambe and downstream of Cambambe or through excessive abstraction (licensed and unlicensed) at Bitu and other locations. As reported by INRH, release of water from Cambambe Dam is 500 m³/s. If Cambambe Dam continues to release 500 m³/s or a similar volume of water, then alterations to water supply and required abstraction are not anticipated. It was observed that at the point of Bitu water intake, the river flows east on occasions and west on occasions. It is therefore considered to be influenced by Atlantic tidal flow. This in turn may have an impact on intake water salinity, Table 8-4 assess the significance of this impact both pre and post mitigation.

Table 8-4: Hydrology – Environmental Assessment Summary

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Operational Impacts							
<p>Water Abstraction - Volume</p> <p>The volume of water abstracted from the Rio Kwanza may, at drier periods of the year, be excessive in relation to the water available and beyond the environmental limits of the floodplain.</p>	4	1	4	<ul style="list-style-type: none"> Undertake a hydrological study, prior to detailed design. Design to take account of local hydrological conditions and sustainability of water supply. Ensure proper water management by adjusting abstracted volumes and controlling access to water for other purposes if required. 	4	1	4
<p>Water Abstraction - Salinity</p> <p>The salinity of water abstracted from the Rio Kwanza may, at certain times of tidal flow / drier periods of the year, be in excess of the raw water salinity standard required. This could lead to equipment damage and production of excessively saline treated water.</p>	4	1	4	<ul style="list-style-type: none"> A hydrological study should be undertaken prior to the acceptance of final B4WSP intake location and design to confirm site suitability and water quality. 	4	1	4
Continued surface water abstraction in the face of other uses and climate change	1	3	3	<ul style="list-style-type: none"> Monitor intake volumes and river levels to maintain sustainability 	1	1	1

8.4.3 SOIL EROSION, RUN-OFF AND FLOODING

Soil erosion (loss or damage) may occur during storm events where bare ground has been exposed in preparation for construction and ultimate reinstatement. The nature of ground conditions and soils in the area indicate the propensity for soil erosion to occur in existing natural drainage channels along the alignment during storm events. Soil erosion may also occur where pipeline trenches, especially on slopes, become conduits of water drainage. Table 8-5 assess the significance of these impacts.

Table 8-5: Soil Erosion – Environmental Assessment Summary

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Construction Impacts							
<p>Earthworks Excavation, stockpiling and backfilling of earthworks required for pipe trench construction may result in the interruption of drainage channels leading to soil erosion and flooding, in the absence of appropriate management.</p>	2	3	6	<p>Minimise exposure of soil susceptible to erosion:</p> <ul style="list-style-type: none"> Land and vegetation clearance shall be kept to a minimum to reduce soil exposure. Existing vegetation to be maintained when possible. In bare areas, additional vegetation shall be planted to stabilise exposed soil surfaces. To the extent practicable mulch, or construction aggregate shall be used to reduce soil exposure. Exposed soils shall be wetted to prevent erosion. Barriers and drainage controls shall be installed prior to earthworks commencing. Vegetation shall be planted following completion of site works. Exposed soils shall be inspected regularly to assess the efficacy of erosion control measures. <p>Mobility of exposed soils shall be minimised:</p> <ul style="list-style-type: none"> Linear barriers (silt fences, sandbag barriers, dykes) shall be installed adjacent to exposed soil surfaces, roads, stockpiled materials, and down-gradient locations along the site perimeter where the risk of erosion has been identified. Soil captured by barriers shall be regularly cleared. Soil shall be inspected and stockpiled for later use if appropriate. Prepare a Soil Erosion and Sedimentation Plan. Land clearance shall be kept to a minimum in order to maximize retention of vegetation cover. <p>Minimise on-site dust generation:</p> <ul style="list-style-type: none"> To the extent practicable spoil/soil stockpiles shall be provided with side enclosures and covered by impervious sheeting. Stockpiled materials shall also be dampened with water as required. 	2	1	2
<p>Temporary land-take Land is required in addition to the permanent works alignments to</p>	3	3	9	<p>Minimise exposure of soil susceptible to erosion:</p>	3	1	3

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
provide access roads, RoWs and laydown areas. Such temporary land-use can lead to erosion of existing soils in the absence of careful planning and control.				<ul style="list-style-type: none"> Land and vegetation clearance shall be kept to a minimum to reduce soil exposure. Existing vegetation to be maintained when possible. In bare areas, additional vegetation shall be planted to stabilise exposed soil surfaces. To the extent practicable mulch, or construction aggregate shall be used to reduce soil exposure. Exposed soils shall be wetted to prevent erosion. Vegetation shall be planted following completion of site works. Exposed soils shall be inspected regularly to assess the efficacy of erosion control measures. Linear barriers (silt fences, sandbag barriers, dykes) shall be installed adjacent to exposed soil surfaces, roads, stockpiled materials, and down-gradient locations along the site perimeter where the risk of erosion has been identified. Barriers and drainage controls shall be installed prior to earthworks commencing. Soil captured by barriers shall be regularly cleared. Soil shall be inspected and stockpiled for later use if appropriate. Prepare a Soil Erosion and Sedimentation Plan. 			
<p>Temporary drainage</p> <p>Temporary drainage is required during construction. Poor design and/or implementation of temporary drainage schemes can lead to soil erosion, run-off and flooding especially during high intensity rainfall events.</p>	3	3	9	<p>Minimise exposure of soil susceptible to erosion:</p> <ul style="list-style-type: none"> Exposed soils shall be wetted to prevent erosion. Linear barriers (silt fences, sandbag barriers, dykes) shall be installed adjacent to exposed soil surfaces, roads, stockpiled materials, and down-gradient locations along the site perimeter where the risk of erosion has been identified. Barriers and drainage controls shall be installed prior to earthworks commencing. Prepare a Soil Erosion and Sedimentation Plan. 	3	1	3
<p>Construction traffic</p> <p>Unmanaged construction traffic and temporary roads can lead to soil erosion across construction access roads, ROWs and laydown areas.</p>	2	3	6	<p>Minimise on-site dust generation:</p> <ul style="list-style-type: none"> Temporary access and haul roads shall be dampened with water to minimise dust from vehicular traffic where necessary, particularly in proximity to dwellings. Vehicle speeds shall be regulated on all un-sealed roads to 30 km/h or less. Land clearance shall be kept to a minimum in order to maximise retention of vegetation cover. Movement of site vehicles shall be confined to defined access routes in accordance with a Traffic Management Plan. Construction of new access roads shall be minimised by using existing tracks/easements wherever practicable. Temporary construction roads shall be covered with gravel/hard core immediately after grading. <p>Minimise exposure of soil susceptible to erosion:</p>	2	1	2

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				<ul style="list-style-type: none"> Exposed soils shall be wetted to prevent erosion. Mobility of exposed soils shall be minimised: Linear barriers (silt fences, sandbag barriers, dykes) shall be installed adjacent to exposed soil surfaces, roads, stockpiled materials, and down-gradient locations along the site perimeter where the risk of erosion has been identified. 			
Operational Impacts							
<p>Lack of Sanitation</p> <p>Connecting households to the water supply network if they do not have adequate sanitation may increase the volume of both running and stagnant waste water contributing to increased soil erosion, run-off and flooding.</p>	3	4	12	<ul style="list-style-type: none"> Where households do not have adequate sanitation facilities they may be able to have an external tapping point or use a community standpost, it is suggested that this be managed using Development Workshop's MOGECA Model. GoA should urgently consider expanding sanitation network in the project area. 	3	3	9
Ground around pipeline repairs left less well compacted than on construction	3	2	6	<ul style="list-style-type: none"> Repair breakages in accordance with 'Best Practice' industry standards. 	3	1	3
Inappropriate use of washouts	3	3	9	<ul style="list-style-type: none"> Maintain competency of washout rip-rap to reduce erosion. 	3	1	3

8.4.4 SURFACE WATER QUALITY

Impacts to surface water quality can result from uncontrolled surface runoff (suspended sediment, waste materials, pollution) and spills (construction materials such as bentonite, fuels, chemicals, lubricants). The main potential for impacts is in the locality of the water intake, raw water pumping station, and raw water pipes passing up the valley out of the Rio Kwanza flood plain. In addition, wherever transmission pipelines descend into valleys, there is a risk to surface water quality. This will be especially so, for Transmission Pipeline 4 towards CD Mundial at (GR 9.052450 S, 13.124310 E) between Node 1 (Quenguela District) and Node 3 (Alvarenga), although there are a number of other smaller at-risk valleys along all pipeline alignments. Surface water quality impacts are only considered significant during the construction phase of pipelines. However, within the Distribution Centres and/or Water Treatment Plant (Bitá, Mundial, Ramiros, Camama, Benfica 2) there is the potential for leaks of wastewater from the treatment plants, chemicals used in Bitá, Mundial, Ramiros, Camama, Benfica 2 water and wastewater treatment, and through sludge mismanagement during operation. Specific impacts and suggested mitigation measures are shown in Table 8-6.

Table 8-6: Surface Water Quality – Environmental Assessment Summary

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Construction Impacts							
<p>Earthworks Depending on activity methodology, working rates, topography and season (i.e. rainfall rates) earthworks can lead to surface runoff entrained with sediment and potentially pollutants reaching surface water bodies.</p>	3	3	9	<p>Minimise on-site dust generation:</p> <ul style="list-style-type: none"> Movement of site vehicles shall be confined to defined access routes in accordance with a Traffic Management Plan. <p>Segregate waste into:</p> <ul style="list-style-type: none"> putrescible waste (food scraps); general waste (plastic, paper, card); metals (rebar, girders); wood (formwork, crates, packaging); concrete (dry concrete, breezeblocks, spilled concrete); sewage (greywater, sewage, wastewater); bio-medical (bandages, pharmaceutical waste etc.); hazardous waste (paint, fuel, solvents, oily rags, contaminated soil); and green waste (vegetation cuttings). <p>Storage areas shall not:</p> <ul style="list-style-type: none"> encroach on roads; block access ways or signage; impede site drainage; or, present a risk of fall hazards. <p>Barricades shall be used around stockpiles to delineate safe work distances for site workers.</p> <p>Waste disposal:</p> <ul style="list-style-type: none"> To the extent practicable plastic drums, empty plastic bottles, scrap metal, waste paper and waste oil shall be sent for recycling. <p>Tracking system to record waste disposal:</p> <ul style="list-style-type: none"> A monthly audit of waste records shall be undertaken. The audit shall seek to confirm appropriate disposal methodologies have been used and shall quantify segregated waste categories to 	3	1	3

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				<p>highlight potential opportunities for further reduction. In addition, the volume and type of material reused onsite and recycled offsite shall be recorded.</p> <p>Correct disposal of hazardous waste:</p> <ul style="list-style-type: none"> Secondary containment (bundling) shall be provided around liquid hazardous waste storage areas. Bund volume shall be 110% of total primary storage capacity. Hazardous materials shall be stored in their original containers. Batteries shall be stored on metal or hard plastic trays. Used batteries shall be recycled to the extent practicable. <p>Mobility of exposed soils shall be minimised:</p> <ul style="list-style-type: none"> Linear barriers (silt fences, sandbag barriers, dykes) shall be installed adjacent to exposed soil surfaces, roads, stockpiled materials, and down-gradient locations along the site perimeter where the risk of erosion has been identified. Prepare a Soil Erosion and Sedimentation Plan. <p>Manage overland flow:</p> <ul style="list-style-type: none"> To the extent practicable collected surface water shall be used for dust suppression and other site activities requiring water if acceptable. <p>Minimise volume of water created:</p> <ul style="list-style-type: none"> Permits issued by the competent authority shall be obtained for all discharge of waste waters as a result of construction activities. Toilets shall be provided onsite during construction works. Site WCs to be serviced by a suitably registered contractor. Separate grey water from black water and consider grey water re-use. Any septic tanks shall be inspected and emptied regularly. Any septic tanks shall be emptied by a licensed contractor adhering to regulatory requirements. Septic waste shall be disposed of at an approved off-site facility. A safe distance shall be maintained between toilet facilities, septic tanks and sensitive receptors including waterways. Prepare a Waste Water Management Plan. 			
<p>Stockpile management Inadequate planning and management of stockpiles can lead to surface runoff entrained with sediment and pollutants reaching surface water bodies.</p>	3	3	9	<p>On-site dust generation management:</p> <ul style="list-style-type: none"> To the extent practicable spoil/soil stockpiles shall be provided with side enclosures and covered by impervious sheeting. Stockpiled materials shall also be dampened with water as required. To the extent practicable stockpiles shall be located in sheltered or covered areas. Wind screens shall be provided where necessary and practicable. <p>Odour control:</p> <ul style="list-style-type: none"> Sewerage and any waste water tanks shall be inspected regularly for leakage. <p>Prevent generation and transport of dust:</p> <ul style="list-style-type: none"> Dry cement powder shall be stored in sealed bags/containers. 	3	1	3

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				<ul style="list-style-type: none"> All bagged and boxed materials shall be stored on pallets and covered to prevent loss or damage. Where a concrete pump is used, temporary bunds shall be placed across all drainage leaving the site to trap any spilt material. Spilled materials shall be cleared from drainage lines and roadways before removing the bunds. <p>Minimise environmental impact during concrete mixing:</p> <ul style="list-style-type: none"> Concrete mixing shall be completed over level, sealed, and impervious surfaces. The mixing area shall be large enough to accommodate all equipment. Mixing shall not be undertaken within 20 m of waterways. Proper cleaning of concrete equipment: Washing of equipment shall be completed in a contained area to prevent runoff. Concrete trucks shall be washed out in facilities that can contain the volume of water required for washing. 			
<p>Temporary drainage Inadequate design and implementation of temporary drainage can result in surface runoff entrained with sediment and pollutants reaching surface water bodies.</p>	3	2	6	<p>Minimise exposure of soil susceptible to erosion:</p> <ul style="list-style-type: none"> In bare areas, additional vegetation shall be planted to stabilise exposed soil surfaces. <p>Mobility of exposed soils shall be minimised:</p> <ul style="list-style-type: none"> Linear barriers (silt fences, sandbag barriers, dykes) shall be installed adjacent to exposed soil surfaces, roads, stockpiled materials, and down-gradient locations along the site perimeter where the risk of erosion has been identified. Barriers and drainage controls shall be installed prior to earthworks commencing. Prepare a Soil Erosion and Sedimentation Plan. 	3	1	3
<p>Construction waste Inadequate design and implementation of construction waste areas, including stockpiles, can lead to surface runoff entrained with pollutants reaching surface water bodies.</p>	2	2	4	<p>Develop waste management plan which segregates waste into:</p> <ul style="list-style-type: none"> putrescible waste (food scraps); general waste (plastic, paper, card); metals (rebar, girders); wood (formwork, crates, packaging); concrete (dry concrete, breezeblocks, spilled concrete); sewage (greywater, sewage, wastewater); bio-medical (bandages, pharmaceutical waste etc.); hazardous waste (paint, fuel, solvents, oily rags, contaminated soil); and green waste (vegetation cuttings). <p>Flammable wastes (wood, oil, tyres) shall be stored away from potential ignition sources.</p> <p>Where practicable, wastes shall be contained in metal skips or similar. Liquid, food, biomedical and hazardous waste shall be stored in containers with closable lids to minimise the chances of spills, lower odour emissions, and prevent vermin infestations.</p> <p>Correct disposal of waste:</p> <ul style="list-style-type: none"> To the extent practicable plastic drums, empty plastic bottles, scrap metal, waste paper and waste oil shall be sent for recycling. 	3	1	3

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				<ul style="list-style-type: none"> A monthly audit of waste records shall be undertaken. The audit shall seek to confirm appropriate disposal methodologies have been used and shall quantify segregated waste categories to highlight potential opportunities for further reduction. In addition, the volume and type of material reused onsite and recycled offsite shall be recorded. <p>Hazardous waste to be properly managed:</p> <ul style="list-style-type: none"> Secondary containment (bundling) shall be provided around liquid hazardous waste storage areas. Bund volume shall be 110% of total primary storage capacity. Hazardous materials shall be stored in their original containers. Batteries shall be stored on metal or hard plastic trays. Used batteries shall be recycled to the extent practicable. 			
<p>Powered Mechanical Equipment (PME) Inappropriate management of PME refuelling and maintenance activities can lead to loss of containment of fuels, lubricants, coolants etc. resulting in surface water contamination.</p>	3	2	6	<p>Reduction of volatile organic compound (VOC) emissions given off by paints, adhesives, coatings and fillers during the drying process and refuelling activities as they may cause respiratory irritation:</p> <ul style="list-style-type: none"> A comprehensive and current list of all volatile fuels and chemicals stored on site shall be maintained and kept on-site for inspection. Details shall include quantities, locations and Material Safety Data Sheets (MSDS). On-site storage of volatile fuels such as unleaded petrol shall be avoided. <p>Noise Control:</p> <ul style="list-style-type: none"> All plant, machinery and vehicles shall be maintained in good working order. <p>Maintenance and servicing of construction vehicles:</p> <ul style="list-style-type: none"> Maintenance, servicing, and repairs shall be performed offsite when possible at an approved commercial workshop. Where not practicable, an onsite area with appropriate runoff controls shall be designated. All mobile vehicles and equipment, including loaders, back-hoes, bob cats, and trucks, shall be moved to an off-site workshop or an approved on-site workshop for routine (i.e. scheduled) servicing and maintenance activities (i.e. oil changes, and addition of lubrication). Large semi-fixed equipment (i.e. piling machines) can be maintained in-situ. All vehicles to be stored in a way to ensure access to businesses and residences. <p>Chemical Storage:</p> <ul style="list-style-type: none"> Fuels and chemicals shall be stored in appropriate non-damaged containers. Damaged containers shall be removed from site unless repairable. To the extent practicable fuels and chemicals shall not be stored within 50m of a water way. 	3	1	3

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
<p>Fabrication & installation</p> <p>In-situ fabrication and construction activities can lead to surface water contamination depending on construction methodologies and site-specific arrangements e.g. loss of bentonite, curing agents etc.</p>	2	2	4	<ul style="list-style-type: none"> Temporary access roads shall be stabilised with gravel (or similar) immediately after grading. 	2	1	2
<p>Sewage & waste water during construction</p> <p>Absence of temporary facilities for sewage and waste water treatment can lead directly to surface water contamination and associated public health concerns.</p>	3	1	3	<p>Minimise volume of waste water created:</p> <ul style="list-style-type: none"> Permits issued by the competent authority shall be obtained for all discharge of waste waters as a result of construction activities. Toilets shall be provided onsite during construction works. Site WCs to be serviced by a suitably registered contractor. Separate grey water from black water and consider grey water re-use. Any septic tanks shall be inspected and emptied regularly. Any septic tanks shall be emptied by a licensed contractor adhering to regulatory requirements. Septic waste shall be disposed of at an approved off-site facility. A safe distance shall be maintained between toilet facilities, septic tanks and sensitive receptors including waterways. Prepare a Waste Water Management Plan. <p>Correct disposal of waste:</p> <ul style="list-style-type: none"> To the extent practicable plastic drums, empty plastic bottles, scrap metal, waste paper and waste oil shall be sent for recycling. A monthly audit of waste records shall be undertaken. The audit shall seek to confirm appropriate disposal methodologies have been used and shall quantify segregated waste categories to highlight potential opportunities for further reduction. In addition, the volume and type of material reused onsite and recycled offsite shall be recorded. 	3	1	3
Operational Impacts							
<p>Sewage and waste water during WTP / CD operation</p> <p>Leaks of wastewater from the treatment plants, chemicals used in water and wastewater treatment, and through sludge mismanagement</p>	3	2	6	<ul style="list-style-type: none"> Establish procedures for materials handling and control, use of storage and containment equipment meeting international standards. 	3	1	3

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
<p>Lack of Sanitation Connecting households to the water supply network if they do not have adequate sanitation may result in waste water and sewage polluting surface water.</p>	3	3	9	<ul style="list-style-type: none"> Where households do not have adequate sanitation facilities they may be able to have an external tapping point or use a community standpost, it is suggested that this be managed using Development Workshop's MOGECA Model. GoA should urgently consider expanding sanitation network in the project area. 	3	2	6
<p>Spillage of fuel, oil and lubricants at the intake pumping station</p>	4	2	8	<ul style="list-style-type: none"> Implement Spill Response Plan (SRP) as part of Emergency Response Plan (ERP) 	2	2	4
<p>Pollution incidents upstream derogating intake water quality</p>	4	1	4	<ul style="list-style-type: none"> Continuously monitor water quality indicators upstream of intake 	2	1	2

8.4.5 SOIL & GROUNDWATER QUALITY

Impacts to soil and groundwater resources can result from uncontrolled surface runoff from waste storage areas, equipment maintenance yards, material storage areas and spills across the site (fuels, chemicals, solvents, lubricants). Such impacts could occur at any point along the pipeline alignments and also at the Distribution Centres and/or Water Treatment Plant. Soil and groundwater quality impacts are only considered feasible during the construction phase of the pipelines. However, within the Distribution Centres and/or Water Treatment Plant (Bitá, Mundial, Ramiros, Camama, Benfica 2) there is the potential for leaks of wastewater from the treatment plants, chemicals used in water and wastewater treatment, and through sludge mismanagement during operation impacting soil and groundwater (Table 8-7).

Table 8-7: Soil & Groundwater Quality – Environmental Assessment Summary

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Construction Impacts							
<p>Construction waste Inadequate design and implementation of construction waste areas, including stockpiles, can lead to surface runoff entrained with pollutants reaching surface water bodies.</p>	2	1	2	<p>Minimise on-site dust generation:</p> <ul style="list-style-type: none"> To the extent practicable spoil/soil stockpiles shall be provided with side enclosures and covered by impervious sheeting. Stockpiled materials shall also be dampened with water as required. To the extent practicable stockpiles shall be located in sheltered or covered areas. Wind screens shall be provided where necessary and practicable. <p>Segregate waste into:</p> <ul style="list-style-type: none"> putrescible waste (food scraps); general waste (plastic, paper, card); metals (rebar, girders); wood (formwork, crates, packaging); concrete (dry concrete, breezeblocks, spilled concrete); sewage (greywater, sewage, wastewater); bio-medical (bandages, pharmaceutical waste etc.); hazardous waste (paint, fuel, solvents, oily rags, contaminated soil); and green waste (vegetation cuttings). <p>Flammable wastes (wood, oil, tyres) shall be stored away from potential ignition sources.</p> <p>Storage areas shall not:</p> <ul style="list-style-type: none"> encroach on roads; block access ways or signage; impede site drainage; or, present a risk of fall hazards. <p>Hazardous waste to be properly managed:</p> <ul style="list-style-type: none"> Secondary containment (bundling) shall be provided around liquid hazardous waste storage areas. Bund volume shall be 110% of total primary storage capacity. Unused hazardous materials (e.g. paints, solvents) shall not be disposed of with general waste. 	2	1	2

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				<ul style="list-style-type: none"> Hazardous materials shall be stored in their original containers. Batteries shall be stored on metal or hard plastic trays. Used batteries shall be recycled to the extent practicable. <p>Manage overland water flow:</p> <ul style="list-style-type: none"> To the extent practicable collected surface water shall be used for dust suppression and other site activities requiring water if acceptable. <p>Re-use excavated soil:</p> <ul style="list-style-type: none"> Determine excavated material used for backfilling excavations or landscaping is suitable for the intended purpose showing no visual or olfactory signs of contamination. Excavated soil shall not be deposited in environmentally sensitive areas, in watercourses, or on agriculturally productive land. Surplus soil shall be used for amenity bunds or ground re-leveling and subsequently vegetated. <p>Identify contaminated soil or groundwater as well as any potential sources of contamination:</p> <ul style="list-style-type: none"> Investigation of the project site and adjacent areas shall be undertaken to identify any potential sources of contamination and any contaminated soil or groundwater. Investigations shall include a desk-top study, a site walkover, and site investigation and sampling of any potentially contaminated areas prior to commencing earthworks. <p>Remediation and use of contaminated soils and groundwater:</p> <ul style="list-style-type: none"> Soil and groundwater suspected as being contaminated shall be tested for contamination and shall not be reused on-site. Contaminated soil and groundwater shall be treated as hazardous waste and disposed of accordingly. 			
<p>Sewage & waste water</p> <p>Absence of temporary facilities for sewage and waste water treatment during construction can lead directly to soil and groundwater contamination and associated public health concerns.</p>	2	2	4	<p>Minimise volume of waste water created:</p> <ul style="list-style-type: none"> Permits issued by the competent authority shall be obtained for all discharge of waste waters as a result of construction activities. Toilets shall be provided onsite during construction works. Site WCs to be serviced by a suitably registered contractor. Separate grey water from black water and consider grey water re-use. Any septic tanks shall be inspected and emptied regularly. Any septic tanks shall be emptied by a licensed contractor adhering to regulatory requirements. Septic waste shall be disposed of at an approved off-site facility. A safe distance shall be maintained between toilet facilities, septic tanks and sensitive receptors including waterways. Prepare a Waste Water Management Plan. 	2	1	2
Operational Impacts							
<p>Waste water during WTP / CD operation</p> <p>Leaks of wastewater from the treatment plants, chemicals used</p>	3	3	9	<ul style="list-style-type: none"> Establish procedures for materials handling and control, use of storage and containment equipment meeting international standards. 	3	1	3

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
in water treatment, and through sludge mismanagement.							
<p>Lack of Sanitation Facilities</p> <p>If households are connected to the water supply network without adequate sanitation waste water may leech into the soil and groundwater, reducing its quality.</p>	3	3	9	<ul style="list-style-type: none"> Where households do not have adequate sanitation facilities they may be able to have an external tapping point or use a community standpost, it is suggested that this be managed using Development Workshop's MOGECA Model. GoA should urgently consider expanding sanitation network in the project area. 	3	1	3
<p>Fuel, oil spillage</p> <p>during maintenance operations</p>	2	3	6	<ul style="list-style-type: none"> Implement Spill Response Plan (SRP) as part of Emergency Response Plan (ERP). 	1	2	2

8.4.6 RESOURCES AND WASTE

Table 8-8 suggests measures for minimising waste and using resources sustainably.

Table 8-8: Materials & Resources – Environmental Assessment Summary

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Construction Impacts							
<p>Material supply / usage Sustainable construction practices are desired to reduce the quantities and types of materials and resources used during construction. Efficient design, ordering practices and on-site re-use of materials all serve to reduce demand on finite off-site resources.</p>	1	4	4	<p>Promote conservation by reducing energy, water and material consumption:</p> <ul style="list-style-type: none"> Order correct material quantities to prevent material wastage. Re-use excess materials and off-cuts in other forms. Store materials correctly (i.e. out of direct sunlight and rain) to prevent deterioration and wastage. Stack materials correctly to reduce risk of damage prior to use. <p>Purchasing green materials:</p> <ul style="list-style-type: none"> Use material purchased from sustainable resources, and those with a high "post-consumer" (recycled) content. Where practicable, reuse construction material such as pavers, gravel, and fences in other parts of the project. 	1	3	3
Operational Impacts							
<p>Waste Management Inefficient waste management during construction, operation and maintenance leading to excess consumption of materials, generation of wastes/emissions, pollution of soils and water.</p>	2	3	6	<ul style="list-style-type: none"> Preparation of Waste Management Plan following the waste hierarchy, supported by staff training. Earthworks to be designed to achieve a balance between cut and fill wherever possible. Use of authorised contractors for hazardous and any other wastes which the project cannot dispose of safely. Implementation of standard good wastewater and sewage sludge management procedures. 	2	1	2
<p>Water Use Abstraction of a significant volume of water from the Rio Kwanza, especially during dry periods of the year, may affect supply for other water users and, and result in conflicts over water use.</p>	3	1	3	<ul style="list-style-type: none"> Abstraction to take place with approval of relevant authorities. Water study prior to any abstraction, to inform a sustainable Water Management Plan. Regular preventative maintenance of all system components to ensure that water wastage is as far as possible limited. Promotion of water efficiency and water recycling: implement demand management measures to avoid the wastage of water or over-consumption. Clearly define water rights and water user fees and conditions in consultation with affected groups. 	3	1	3

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Use of materials such as DI, steel and plastic pipes, water treatment and disinfection chemicals, many imported	2	4	8	<ul style="list-style-type: none"> Implement environmentally-responsible procurement and continually review material requirements 	2	3	6
Fuel for equipment, generators, and maintenance vehicles, oils and lubricants for equipment maintenance	2	4	8	<ul style="list-style-type: none"> Optimise use of green sources of energy, including renewables. Do not leave engines to idle. 	2	3	6
Broken pipe removed during repair, spent chemical, oil and lubricant containers, defunct apparatus and equipment, waste from CD office and domestic facilities	2	4	8	<ul style="list-style-type: none"> Adopt relevant clauses of the contractor's Waste Management Plan. 	2	2	4

8.4.7 AIR QUALITY

There are no significant, anticipated air quality impacts as a consequence of project operation. However, air quality impacts may arise during construction due to engine emissions from site vehicles and powered mechanical equipment. Impacts cannot be quantified, as any impacts to third party receptors will be dependent upon the nature of the construction activities for a given location. However, it is considered that the greatest potential for impacts to occur will be in relation to existing settlements such as Julio, East Bitá, Quenguela, between CD Cabolombo and CD Camama, and villages towards CD Mundial and CD Ramiros (Tanque Serra, Alvarenga), where construction works may take place within 10 – 20 m of sensitive receptors (Table 8-9).

Table 8-9: Air Quality – Environmental Assessment Summary

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Construction Impacts							
<p>Construction traffic Construction traffic has the potential to emit engine exhaust pollutants (NOx, SOx, particulates) in close proximity to third party sensitive receptors resulting in acute, localised air quality impacts.</p>	2	3	6	<p>Minimise exhaust emissions from construction equipment:</p> <ul style="list-style-type: none"> All vehicles and plant used during the works shall be maintained in good working order to ensure optimum performance and minimise excess smoke. Equipment or vehicles seen to have an excessive amount of black smoke shall be served with defect notices and removed from service until repaired and approved for re-deployment by site supervisor representative. Plant and equipment that is idling or being used on an intermittent basis shall be turned off or throttled down when not in use. Unnecessary operation of construction machinery shall be prevented. This shall be achieved through increasing trip time efficiencies and the reduction of double handling by appropriate placement of stockpiles, haul roads, works depots and work areas. Appropriate modern machinery shall be used subject to availability. Machinery shall be provided with adequate emissions control devices (such as catalytic converters). An equipment inventory shall be maintained on site (including date of manufacture, hours of operation, maintenance dates, fuel type and emissions control devices installed). Fuel selection shall comply with equipment manufacturer's instructions and specifications approved in the region. Low sulphur content fuel shall be used. Construction machinery and vehicles shall only be operated by qualified and skilled personnel (as per manufacturer's instructions). 	2	2	4
<p>Powered mechanical equipment PME has the potential to emit engine exhaust pollutants (NOx, SOx, particulates) in proximity to third party sensitive</p>	2	3	6	<p>Minimise exhaust emissions from construction equipment:</p> <ul style="list-style-type: none"> All vehicles and plant used during the works shall be maintained in good working order to ensure optimum performance and minimise excess smoke. Equipment or vehicles seen to have an excessive amount of black smoke shall be served with defect notices and removed from 	2	2	4

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
receptors resulting in acute, localised air quality impacts. Site layout, equipment maintenance, use of electric equipment and temporary works planning can reduce impacts.				service until repaired and approved for re-deployment by site supervisor representative. <ul style="list-style-type: none"> Plant and equipment that is idling or being used on an intermittent basis shall be turned off or throttled down when not in use. Unnecessary operation of construction machinery shall be prevented. This shall be achieved through increasing trip time efficiencies and the reduction of double handling by appropriate placement of stockpiles, haul roads, works depots and work areas. Appropriate modern machinery shall be used subject to availability. Machinery shall be provided with adequate emissions control devices (such as catalytic converters). An equipment inventory shall be maintained on site (including date of manufacture, hours of operation, maintenance dates, fuel type and emissions control devices installed). Fuel selection shall comply with equipment manufacturer's instructions and specifications approved in the region. Low sulphur content fuel shall be used. Construction machinery and vehicles shall only be operated by qualified and skilled personnel (as per manufacturer's instructions). 			
Sewage & Waste water Sewage and waste water generated during construction can lead to odour impacts at sensitive receptors in the absence of appropriate planning, site layout and other control measures.	1	2	2	Minimise impact of odours on sensitive receptors: <ul style="list-style-type: none"> Adequate separation distances shall be provided between potential odour sources and sensitive receivers. Odour control shall be undertaken at source where practicable. Long-term on-site storage of wastes shall be prohibited. In addition, for short-term storage, no wastes shall be stored outside designated areas. Any septic tank covers/lids shall be kept tightly in place at all times. Sewerage and any waste water tanks shall be inspected regularly for leakage. 	1	1	1
Operational Impacts							
Emissions from water treatment plant, stand-by generators, and maintenance vehicles	2	4	8	<ul style="list-style-type: none"> Ensure manufacturer's recommended exhaust filters fitted and maintained in good order. 	2	3	6

8.4.8 DUST

The potential exists for construction activities to cause fugitive dust impacts to sensitive receptors. The potential is increased by the need for extensive excavation and stockpiling along all sections of the pipelines and during construction of CD/ETA Bita, CD Mundial, CD Ramiros, and upgrade to CD Camama and CD Benfica 2, especially during the dry season. It is considered that the greatest potential for impacts to occur will be in relation to existing settlements such as Julio, East Bita, Quenguela, between CD Cabolombo and CD Camama, and villages towards CD Mundial and CD Ramiros (Tanque Serra, Alvarenga), where construction works may take place within 10 – 20 m of sensitive receptors. There are no anticipated dust impacts as a consequence of project operation (Table 8-10).

Table 8-10: Dust – Environmental Assessment Summary

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Construction Impacts							
<p>Earthworks During dry weather the significant earthworks required have the potential to cause localised dust impacts in the absence of any control measures.</p>	3	4	12	<p>Minimise on-site dust generation:</p> <ul style="list-style-type: none"> Construction of new access roads shall be minimised by using existing tracks/easements wherever practicable. Temporary construction roads shall be covered with gravel/hard core immediately after grading. The use of dust suppression materials shall be considered where active construction has been completed. This could include covering with sub-grade material to stabilise the area. Landscaping of bare areas (including seeding and mulching) should be prioritised where such areas are unlikely to be damaged by subsequent construction activities. Construction activities shall be planned to minimise the area of land disturbed at any one time. To the extent practicable construction activities such as excavation and material handling shall be minimised on windy days, particularly when blowing in the direction of sensitive receptors. 	3	2	6
<p>Stockpile management During dry and windy weather stockpiles have the potential to cause localised dust impacts in the absence of any control measures or sympathetic design for site layout.</p>	3	3	9	<p>Minimise on-site dust generation:</p> <ul style="list-style-type: none"> To the extent practicable spoil/soil stockpiles shall be provided with side enclosures and covered by impervious sheeting. Stockpiled materials shall also be dampened with water as required. To the extent practicable stockpiles shall be located in sheltered or covered areas. Wind screens shall be provided where necessary and practicable. Stockpiled material shall ideally only be handled when moist. To the extent practicable construction activities such as excavation and material handling shall be minimised on windy days, particularly when blowing in the direction of sensitive receptors. The drop height of excavated materials (on to the ground or into vehicles) shall be minimised as far as practicable. <p>Minimise volume of soil required for stockpiles:</p> <ul style="list-style-type: none"> Excavated soil shall be re-used as soon as possible to reduce time requiring stockpiling. 	3	2	6

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				<ul style="list-style-type: none"> Handling of excavated soils shall be minimised by minimising the distance moved to the extent practicable. 			
<p>Construction traffic</p> <p>Construction traffic has the ability to raise dust by traversing over temporary access roads and from materials being transported (e.g. dump trucks).</p>	3	4	12	<p>Minimise on-site dust generation:</p> <ul style="list-style-type: none"> Trucks transporting potentially dusty bulk materials to, from and within the project site shall be covered with a suitable impermeable tarpaulin sheet or similar and shall not be overloaded. Temporary access and haul roads shall be dampened with water to minimise dust from vehicular traffic where necessary, particularly in proximity to dwellings. Vehicle speeds shall be regulated on all un-sealed roads to 30 km/h or less. Movement of site vehicles shall be confined to defined access routes in accordance with a Traffic Management Plan. The drop height of excavated materials (on to the ground or into vehicles) shall be minimised as far as practicable. Transfer of dust/mud from construction areas to sealed public highways shall be minimised through use of lorry wheel washes at the work site exits. <p>Prevent the generation and transportation of dust:</p> <ul style="list-style-type: none"> All deliveries of aggregate shall be covered. Lorries must not be filled higher than the tray walls. <p>Minimise environmental impact of mixing concrete:</p> <ul style="list-style-type: none"> For mixer and pump trucks, concrete chutes shall be appropriately stowed during transport. 	3	2	6
Operational Impacts							
The movement of maintenance vehicles along unsurfaced tracks,	2	4	8	<ul style="list-style-type: none"> Impose speed limits. Water or even surface of regularly used tracks. 	2	2	4
Excavation of pipeline repairs	2	3	6	<ul style="list-style-type: none"> Empty excavator bucket near the ground. Cover spoil heaps during windy conditions. 	1	1	1

8.4.9 NOISE AND VIBRATION

Construction activities have the potential to cause significant noise impacts to sensitive receptors (i.e. humans). In relation to pipeline construction, the greatest impacts are expected to be in relation to existing settlements such as Julio, East Bitá, Quenguela, between CD Cabolombo and CD Camama, and villages towards CD Mundial and CD Ramiros (Tanque Serra, Alvarenga), where pipeline construction works may take place within 10 – 20 m of sensitive receptors. The construction of CD/ETA Bitá, CD Mundial, CD Ramiros, and upgrade to CD Camama and CD Benfica 2 will generate significant noise impacts to their surrounding communities.

In addition to site construction, the movement of construction trucks, details of which are unavailable at this stage, will cause noise impacts that are proportional to the distance between temporary haul routes and sensitive receptors. A typical truck exerts a sound pressure level of 103 dB (A) at 1m. At a distance of 20m this is attenuated to 77 dB (A) and therefore still has the potential to exceed WB/IFC performance standards of 75 dB (A) for daytime work.

Powered mechanical equipment also has the potential to cause noise impacts. However, the nature of such noise is less transient where equipment is not mobile and may be sited at one location for days or weeks. Therefore the potential for noise impacts to a given sensitive receiver may be greater than for trucks due to the concentration of multiple equipment items in a single location leading to greater noise levels. However, the less mobile nature of the equipment also lends itself to greater potential for effective mitigation in the form of barriers and acoustic enclosures, particularly for non-mobile equipment such as generators, compressors and pumps. For a given location a typical construction team could include:

- Bulldozer: 81 dB(A) at 10 m
- Tracked excavator: 79 dB(A) at 10 m
- Wheeled loader: 68 dB(A) at 10 m
- Water pump: 65 dB(A) at 10 m
- Generator: 73 dB(A) at 10 m

At a distance of 20m, and assuming a direct line of sight to the sensitive receptor, the typical construction team described could cause noise levels of 78 dB(A). Such noise levels would exceed WB/IFC performance standards of 75 dB (A) for daytime work.

Table 8-11: Noise – Environmental Assessment Summary

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Construction Impacts							
<p>Construction traffic</p> <p>Construction traffic (dump trucks, mobile cranes, site vehicles etc.) can cause noise impacts to sensitive receptors. Impacts may be exacerbated where the RoW is constrained and/or access roads are poorly designed causing vehicles to pass in close proximity to sensitive receptors.</p>	3	4	12	<p>Minimise on-site dust generation:</p> <ul style="list-style-type: none"> Vehicle speeds shall be regulated on all un-sealed roads to 30 km/h or less. <p>Reduce exhaust emissions:</p> <ul style="list-style-type: none"> Plant and equipment that is idling or being used on an intermittent basis shall be turned off or throttled down when not in use. Appropriate modern machinery shall be used subject to availability. Machinery shall be provided with adequate emissions control devices (such as catalytic converters). An equipment inventory shall be maintained on site (including date of manufacture, hours of operation, maintenance dates, fuel type and emissions control devices installed). Construction machinery and vehicles shall only be operated by qualified and skilled personnel (as per manufacturer’s instructions). <p>Minimise noise impacts on third party sensitive receptors:</p> <ul style="list-style-type: none"> To the extent practicable access roads to the sites shall be located such that construction traffic movements cause minimum disturbance to residential buildings. To the extent practicable access to the sites, and vehicle turning areas, shall be designed so that the need for vehicles to reverse (and thus use their reversing alarm) is minimised. All equipment and machinery in use shall be adequately silenced in accordance with the manufacturer’s instructions. All plant, machinery and vehicles shall be maintained in good working order. Subject to availability quieter equipment shall be selected whenever possible. Targeted equipment includes: <ul style="list-style-type: none"> silenced / super-silenced compressors / electric compressor (in cases where suitable electrical power is available) hydraulic concrete cutters and crushers, and rock drills (up to 20 dB noise reduction) pneumatic breakers fitted with mufflers and damping collars (up to 21 dB noise reduction) <p>Implement a Traffic Management Plan:</p> <ul style="list-style-type: none"> Traffic speeds shall be regulated on all un-surfaced roads to 30km/h or less, as appropriate. Tyres and tyre pressures to be maintained to reduce friction between the wheel and surface. Such action will also improve fuel efficiency. Vehicle unloading shall be undertaken sensitively to avoid excessive handling noise. Drop heights shall be minimised to the extent practical. 	3	3	9

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				<ul style="list-style-type: none"> Normal operating noise levels shall be determined for all vehicles and shall be recorded. This shall act as a benchmark for vehicle maintenance targets with respect to noise. 			
<p>Powered mechanical equipment</p> <p>PME has the potential to cause noise impacts to third party sensitive receptors. Certain PME generates high noise levels and corresponding nuisance in terms of frequency, impulsiveness and sound pressure level. Site layout, scheduling, equipment maintenance, use of alternative methods/equipment and noise screens can reduce noise impacts.</p>	3	4	12	<p>Reduce exhaust emissions:</p> <ul style="list-style-type: none"> All vehicles and plant used during the works shall be maintained in good working order to ensure optimum performance and minimise excess smoke. Plant and equipment that is idling or being used on an intermittent basis shall be turned off or throttled down when not in use. Unnecessary operation of construction machinery shall be prevented. This shall be achieved through increasing trip time efficiencies and the reduction of double handling by appropriate placement of stockpiles, haul roads, works depots and work areas. Appropriate modern machinery shall be used subject to availability. Machinery shall be provided with adequate emissions control devices (such as catalytic converters). An equipment inventory shall be maintained on site (including date of manufacture, hours of operation, maintenance dates, fuel type and emissions control devices installed). Construction machinery and vehicles shall only be operated by qualified and skilled personnel (as per manufacturer's instructions). <p>Minimise noise impacts on third party sensitive receptors:</p> <ul style="list-style-type: none"> Plant and equipment known to emit noise strongly in one or more directions shall be oriented to direct noise away from the noise sensitive receptors. Noisy equipment and plant (generators and water pumps, etc.) shall be sited as far from noise sensitive receptors as practically possible. All equipment and machinery in use shall be adequately silenced in accordance with the manufacturer's instructions. All plant, machinery and vehicles shall be maintained in good working order. Generator sets and compressors shall be located in acoustic housings, which shall be closed at all times when in use. Subject to availability quieter equipment shall be selected whenever possible. Targeted equipment includes: <ul style="list-style-type: none"> silenced / super-silenced compressors / electric compressor (in cases where suitable electrical power is available) hydraulic concrete cutters and crushers, and rock drills (up to 20 dB noise reduction) pneumatic breakers fitted with mufflers and damping collars (up to 21 dB noise reduction) <p>Implement a Traffic Management Plan:</p> <ul style="list-style-type: none"> Temporary access roads shall be stabilised with gravel (or similar) immediately after grading. Vehicle unloading shall be undertaken sensitively to avoid excessive handling noise. Drop heights shall be minimised to the extent practical. 	3	3	9

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				<ul style="list-style-type: none"> Normal operating noise levels shall be determined for all vehicles and shall be recorded. This shall act as a benchmark for vehicle maintenance targets with respect to noise. Site access roads shall be designed and constructed as level as practicable. <p>Community Liaison:</p> <ul style="list-style-type: none"> Public billboards shall be erected at the construction sites, listing construction activities, contact persons and telephone numbers for receiving public concerns, complaints and suggestions. Public, particularly residents, in areas immediately adjacent to the construction sites shall be consulted prior to the start of any night time construction (i.e. where night time work has been agreed by the regulator) to alert them to the noisy activities during the night and to solicit specific public concerns and suggestions for mitigation. Unregulated night-time construction will only be permitted where necessary to maintain site stability or human safety. 			
<p>Fabrication & installation</p> <p>In-situ fabrication/construction⁹⁴ can lead to noise impacts additional to construction traffic and PME use. This can be caused by equipment handling, scaffolding and associated manual activities. However, such activities are mostly located in the trench. Therefore the line of sight to all but the closest sensitive receptors will be broken resulting in lower noise impacts.</p>	3	4	12	<p>Minimise noise impacts on third party sensitive receptors:</p> <ul style="list-style-type: none"> Subject to availability quieter equipment shall be selected whenever possible. Targeted equipment includes: <ul style="list-style-type: none"> silenced / super-silenced compressors / electric compressor (in cases where suitable electrical power is available) hydraulic concrete cutters and crushers, and rock drills (up to 20 dB noise reduction) pneumatic breakers fitted with mufflers and damping collars (up to 21 dB noise reduction) <p>Implement a Traffic Management Plan:</p> <ul style="list-style-type: none"> Tyres and tyre pressures shall be maintained to reduce friction between the wheel and surface. Such action will also improve fuel efficiency. 	3	3	9
Operational Impacts							
WTP, pumping stations, stand-by generator operations, especially at night.	2	3	6	<ul style="list-style-type: none"> Ensure manufacturer's recommended noise baffles fitted and maintained in good order. 	2	2	4
Vehicle operation for distribution network repairs at night.	2	3	6	<ul style="list-style-type: none"> Ban excessive acceleration and switch off engine rather than leave to idle. 	1	2	2

⁹⁴ This assumes that air valves and wash-outs within pipeline trenches are to be cast in-situ, mainly requiring crane, concrete-mixing as well as excavators.

8.4.10 VISUAL

Given the close proximity of sensitive receptors to the works areas, particularly to existing settlements such as Julio, East Bitá, Quenguela, between CD Cabolombo and CD Camama, and villages towards CD Mundial and CD Ramiros (Tanque Serra, Alvarenga), where pipeline construction works may take place within 10 – 20 m of sensitive receptors, it is considered that the potential for visual impacts exists during the construction phase. In addition to the physical presence of the temporary works it is possible that floodlighting emissions outside daylight hours have the potential to cause nuisance and disturbance to sensitive receptors. There will be temporary and permanent visual impact during construction and operation of the Distribution Centres, especially given the height of the distribution towers.

Table 8-12: Visual- Environmental Assessment Summary

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Construction Impacts							
<p>Earthworks Earthworks will cause disruption to visual amenity for sensitive receptors in the locality. This will include cranes, excavators, and lorries. However, impacts will be temporary and restricted to those receptors in close proximity – the pipeline earthworks will be constructed in trenches below grade.</p>	2	3	6	<ul style="list-style-type: none"> None – the alignment and associated earthworks are dictated by engineering design requirements. 	2	3	6
<p>Stockpile management Spoil stockpiles will cause disruption to visual amenity for sensitive receptors in the locality. Impacts will be temporary and dependent on layout of the temporary works.</p>	2	2	4	<p>Contain construction activities within site boundary:</p> <ul style="list-style-type: none"> Where practicable; equipment, storage containers, site offices, and stockpiles shall be positioned out of the sight-line of adjacent receptors. 	2	2	4
<p>Temporary land-take A RoW will be established adjacent to the permanent alignment to facilitate construction. This will be reinstated following the completion of construction.</p>	1	4	4	<p>Minimise noise at source:</p> <ul style="list-style-type: none"> Generator sets and compressors shall be located in acoustic housings, which shall be closed at all times when in use. Subject to availability quieter equipment shall be selected whenever possible. Targeted equipment includes: <ul style="list-style-type: none"> silenced / super-silenced compressors / electric compressor (in cases where suitable electrical power is available) hydraulic concrete cutters and crushers, and rock drills (up to 20 dB noise reduction) 	1	2	2

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				<ul style="list-style-type: none"> – pneumatic breakers fitted with mufflers and damping collars (up to 21 dB noise reduction). <p>Contain construction activities within site boundary:</p> <ul style="list-style-type: none"> • To the extent practicable appropriate fencing/hoarding shall be used to keep site activities from view. <p>Minimise waste generation during construction:</p> <ul style="list-style-type: none"> • Ordering of surplus construction materials shall be avoided to the extent practicable. • To the extent practicable construction materials shall be ordered in bulk to reduce packaging accumulation. Bulk ordering also brings benefits in terms of transportation and delivery costs. Stockpiled wastes shall be stored in areas with easy access for waste trucks <p>Minimise disturbance to flora and fauna:</p> <ul style="list-style-type: none"> • Sensitive vegetation areas shall be fenced and retained to the extent practicable. 			
<p>Site clearance Site clearance is required as the first step for earthworks activities.</p>	1	4	4	<p>Minimise noise at source:</p> <ul style="list-style-type: none"> • Generator sets and compressors shall be located in acoustic housings, which shall be closed at all times when in use. • Subject to availability quieter equipment shall be selected whenever possible. Targeted equipment includes: <ul style="list-style-type: none"> – silenced / super-silenced compressors / electric compressor (in cases where suitable electrical power is available) – hydraulic concrete cutters and crushers, and rock drills (up to 20 dB noise reduction) – pneumatic breakers fitted with mufflers and damping collars (up to 21 dB noise reduction). <p>Contain construction activities within site boundary:</p> <ul style="list-style-type: none"> • To the extent practicable appropriate fencing/hoarding shall be used to keep site activities from view. <p>Minimise exposure of soil susceptible to erosion:</p> <ul style="list-style-type: none"> • Land and vegetation clearance shall be kept to a minimum to reduce soil exposure. Existing vegetation to be maintained when possible. • In bare areas, additional vegetation shall be planted to stabilise exposed soil surfaces. • Vegetation shall be planted following completion of site works. <p>Minimise disturbance to flora and fauna:</p>	1	3	3

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				<ul style="list-style-type: none"> Sensitive vegetation areas shall be fenced and retained to the extent practicable. 			
<p>Construction waste</p> <p>Construction waste stockpiles have the potential to cause visual impacts to nearby sensitive receptors. However, impacts will be dependent upon relative locations and will be temporary in nature.</p>	1	4	4	<p>Contain construction activities within site boundary:</p> <ul style="list-style-type: none"> Where practicable; equipment, storage containers, site offices, and stockpiles shall be positioned out of the sight-line of adjacent receptors. To the extent practicable appropriate fencing/hoarding shall be used to keep site activities from view. 	1	3	3
<p>Light emissions</p> <p>Light emissions have the potential to cause nuisance and disturbance to sensitive receptors in proximity to construction areas in cases where construction activities continue beyond daylight hours.</p>	3	3	9	<p>Minimise light impacts to third party sensitive receptors:</p> <ul style="list-style-type: none"> To the extent practicable construction activities shall be restricted to daylight hours. Construction works to be planned to minimise area requiring lighting at any one time. Lights shall be turned off when not required. Lighting shall be arranged on-site to avoid spill-over to adjacent receptors with particular respect to residential properties, traffic signage and signals and sight lines of drivers, cyclists, and pedestrians. Shielding, fittings and baffles shall be used to reduce upward and unnecessary lateral light emission i.e. use top mounted in preference to ground mounted lights and flat lens fixtures. Lighting around the periphery of the site should throw light inwards to the site to reduce outward light pollution. Lights at night in worker camp areas, should only illuminate to the extent necessary for security and wayfinding. 	3	2	6
Operational Impacts							
<p>Permanent pipeline land-take</p> <p>The permanent pipeline facilities will be predominantly at-grade and below grade.</p>	2	4	8	<ul style="list-style-type: none"> None – the alignment and associated earthworks are dictated by engineering design requirements. 	2	4	8
<p>Permanent WTP & CDs including Distribution Towers</p> <p>The distribution towers in particular at a height of around 40 metres, will create permanent visual impacts.</p>	3	4	12	<ul style="list-style-type: none"> The WTP and CDs will be painted appropriate colours that blend with the sky and background environment. 	3	3	9

8.4.11 PHYSICAL AND ECONOMIC DISPLACEMENT OF PEOPLE, PROPERTY, ASSETS AND RESOURCES

The displacement of people, property, assets and resources is avoided for the majority of the B4WSP as pipelines are generally contained within the RoW of an existing road. However there are a few points at which the working width required for construction encroaches on to privately owned land. The specific impacts to individuals and communities will be assessed in more detail in the Resettlement Action Plan. However, Table 8-13 assess the broad significance of this impact and suggests mitigation measures to reduce this.

Table 8-13: People and Property Displacement – Social Assessment Summary

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Construction Impacts							
<p>Impacts on Livelihoods due to construction of river water intake (Lot 1)</p> <p>In the vicinity of the river water intake, livelihoods include fishing and the cutting of reeds for domestic purposes. Given the extensive floodplain and multitude of alternative locations for fishing and cutting reeds, the construction of the intake is not anticipated to be a major impact on livelihood. Since the study to determine the exact location for the intake has yet to be made, and the design conducted, this assessment must remain at a high level, and should be revisited following completion of design work.</p>	1	2	2	<p>Following completion of design work to locate the site of the intake, consider livelihoods in proximity to the intake that may be impacted – likely to be fishing and reed cutting. Assess whether this is a realistic impact, and if so its magnitude. In the event that a significant impact is identified, consider whether alteration to construction methodology can result in a reduced impact. Consider offsetting any impact through benefits in kind to the local community, based on their needs and engagement with them – establishment of fish-drying areas for example. Need for compensation is not considered likely, and should be a last resort.</p>	1	1	1
<p>Displacement of People and Property (Julio)</p> <p>Between the raw water intake point and ETA/CD Bita preliminary estimates suggest that up to 10 properties may need to be expropriated. Most of these properties are in the village of Julio and expropriation will affect the inhabitant's socio-economic status.</p>	3	4	12	<p>To avoid expropriation and minimise the negative impact construction of the transmission lines will have on the settlement of Julio the Consultant suggests rerouting the transmission lines to the south of the village. This land is currently unoccupied so rerouting will reduce compensation costs as well as any social disruption.</p> <p>Aside from rerouting the pipeline the following measures may also mitigate the severity of this impact:</p> <ul style="list-style-type: none"> • Early development and sensitive implementation of resettlement planning, in accordance with national regulations and international good practice to compensate for any losses (both physical and economic). • Develop corrective/compensation measures for affected parties where required (e.g. vulnerable groups). 	3	2	6

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				<ul style="list-style-type: none"> Create a Community Water Committee to effectively manage water resources and ensure equitable access among users. DW's MOGECA model has been applied in other areas of Luanda and has worked effectively. The arrangements for establishment of Water Committees should address the following: <ul style="list-style-type: none"> - assess current situation of Water Committees (are they operational, what role do they play, etc.); - discuss with EPAL the potential role and responsibilities of these committees to ensure participation in environmental and social management; - make recommendations (in agreement with EPAL) to ensure these committees are strengthened and can actively participate during project implementation. Appointed D&B contractors to develop and execute a RAP, including a full PAP survey, for all lots which require resettlement or land take. Due to the potential increase in land price as a result of speculation, it will be necessary for the D&B contractor in liaison with EPAL to ensure that land prices in resettlement areas are monitored during RAP elaboration to ensure adequate measures are taken to mitigate this possible eventuality. Engage with affected communities early (and in accordance with the SCEP, Appendix D) and continue to encourage an open discourse between EPAL, D&B Contractors and PAP communities. To ensure community harmony and a closer understanding that the Grievance Redress mechanism (GRM) is performing as intended, monitoring of the involvement of the community via public consultations, decision-making and during project implementation should be conducted. 			
<p>Displacement of People and Property (north of ETA/CD Bitá)</p> <p>A further 3 properties may need to be expropriated roughly 1 km from ETA/CD Bitá.</p>	3	4	12	<p>Expropriation may be avoided if the appointed D&B contractor takes appropriate measures to reduce his working width to within the available RoW.</p> <p>Aside from adjusting working methods the following measures may also mitigate the severity of this impact:</p> <ul style="list-style-type: none"> Early development and sensitive implementation of resettlement planning, in accordance with national regulations and international good practice to compensate for any losses (both physical and economic). Develop corrective/compensation measures for affected parties where required (e.g. vulnerable groups). Create a Community Water Committee to effectively manage water resources and ensure equitable 	3	2	6

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				<p>access among users. DW's MOGECA model has been applied in other areas of Luanda and has worked effectively. The arrangements for establishment of Water Committees should address the following:</p> <ul style="list-style-type: none"> - assess current situation of Water Committees (are they operational, what role do they play, etc.); - discuss with EPAL the potential role and responsibilities of these committees to ensure participation in environmental and social management; - make recommendations (in agreement with EPAL) to ensure these committees are strengthened and can actively participate during project implementation. <ul style="list-style-type: none"> • Appointed D&B contractors to develop and execute a RAP, including a full PAP survey, for all lots which require resettlement or land take. Due to the potential increase in land price as a result of speculation, it will be necessary for the D&B contractor in liaison with EPAL to ensure that land prices in resettlement areas are monitored during RAP elaboration to ensure adequate measures are taken to mitigate this possible eventuality. • Engage with affected communities early (and in accordance with the SCEP, Appendix D) and continue to encourage an open discourse between EPAL, D&B Contractors and PAP communities. • To ensure community harmony and a closer understanding that the Grievance Redress mechanism (GRM) is performing as intended, monitoring of the involvement of the community via public consultations, decision-making and during project implementation should be conducted. 			
<p>Displacement of People and Property (Quenguela) In the settlement of Quenguela (2.5 km southwest of Node 1) a further five properties, which are believed to belong to one extended family, may need to be expropriated. Furthermore, 22 substantial trees and any other subsistence farming activities would also be disrupted affecting the inhabitant's socio-economic status.</p>	3	4	12	<p>Expropriation may be avoided if the D&B contractor adjusts current design to keep the transmission line on the west side of a boundary fence. This will mean land take is required but no expropriation.</p> <p>Aside from rerouting the pipeline the following measures may also mitigate the severity of this impact:</p> <ul style="list-style-type: none"> • Early development and sensitive implementation of resettlement planning, in accordance with national regulations and international good practice to compensate for any losses (both physical and economic). • Develop corrective/compensation measures for affected parties where required (e.g. vulnerable groups). • Create a Community Water Committee to effectively manage water resources and ensure equitable access among users. DW's MOGECA model has 	3	2	6

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				<p>been applied in other areas of Luanda and has worked effectively. The arrangements for establishment of Water Committees should address the following:</p> <ul style="list-style-type: none"> - assess current situation of Water Committees (are they operational, what role do they play, etc.); - discuss with EPAL the potential role and responsibilities of these committees to ensure participation in environmental and social management; - make recommendations (in agreement with EPAL) to ensure these committees are strengthened and can actively participate during project implementation. <ul style="list-style-type: none"> • Appointed D&B contractors to develop and execute a RAP, including a full PAP survey, for all lots which require resettlement or land take. Due to the potential increase in land price as a result of speculation, it will be necessary for the D&B contractor in liaison with EPAL to ensure that land prices in resettlement areas are monitored during RAP elaboration to ensure adequate measures are taken to mitigate this possible eventuality. • Engage with affected communities early (and in accordance with the SCEP, Appendix D) and continue to encourage an open discourse between EPAL, D&B Contractors and PAP communities. • To ensure community harmony and a closer understanding that the Grievance Redress mechanism (GRM) is performing as intended, monitoring of the involvement of the community via public consultations, decision-making and during project implementation should be conducted. 			
<p>Displacement of People and Property (Quenguela Norte) North of Node 1 and approximately 2 km south of CD Cabolombo the inhabitants of Quenguela Norte may also be subject to physical and economic displacement. Preliminary estimates suggest up to 7 properties may need to be expropriated. Although the settlement is only on the east side of the road there is a medium voltage powerline on the west side which may act as a constraint during construction.</p>	3	4	12	<p>Expropriation may be avoided if the appointed D&B contractor takes appropriate measures to reduce his working width to within the available RoW and uses machinery that can safely operate under the powerline.</p> <p>Aside from adjusting working methods the following measures may also mitigate the severity of this impact:</p> <ul style="list-style-type: none"> • Early development and sensitive implementation of resettlement planning, in accordance with national regulations and international good practice to compensate for any losses (both physical and economic). • Develop corrective/compensation measures for affected parties where required (e.g. vulnerable groups). • Create a Community Water Committee to effectively manage water resources and ensure equitable access among users. DW's MOGECA model has been applied in other areas of Luanda and has 	3	2	6

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				<p>worked effectively. The arrangements for establishment of Water Committees should address the following:</p> <ul style="list-style-type: none"> - assess current situation of Water Committees (are they operational, what role do they play, etc.); - discuss with EPAL the potential role and responsibilities of these committees to ensure participation in environmental and social management; - make recommendations (in agreement with EPAL) to ensure these committees are strengthened and can actively participate during project implementation. <ul style="list-style-type: none"> • Appointed D&B contractors to develop and execute a RAP, including a full PAP survey, for all lots which require resettlement or land take. Due to the potential increase in land price as a result of speculation, it will be necessary for the D&B contractor in liaison with EPAL to ensure that land prices in resettlement areas are monitored during RAP elaboration to ensure adequate measures are taken to mitigate this possible eventuality. • Engage with affected communities early (and in accordance with the SCEP, Appendix D) and continue to encourage an open discourse between EPAL, D&B Contractors and PAP communities. • To ensure community harmony and a closer understanding that the Grievance Redress mechanism (GRM) is performing as intended, monitoring of the involvement of the community via public consultations, decision-making and during project implementation should be conducted. 			
<p>Displacement of People and Property (Tanque Serra) 3 km west of Node 1, preliminary assessments suggest that up to 2 properties in the settlement of Tanque Serra may need to be expropriated.</p>	3	4	12	<p>Expropriation may be avoided if the appointed D&B contractor takes appropriate measures to reduce his working width to within the available RoW.</p> <p>Aside from adjusting working methods the following measures may also mitigate the severity of this impact:</p> <ul style="list-style-type: none"> • Early development and sensitive implementation of resettlement planning, in accordance with national regulations and international good practice to compensate for any losses (both physical and economic). • Develop corrective/compensation measures for affected parties where required (e.g. vulnerable groups). • Create a Community Water Committee to effectively manage water resources and ensure equitable access among users. DW's MOGECA model has been applied in other areas of Luanda and has worked effectively. The arrangements for 	3	2	6

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				establishment of Water Committees should address the following: <ul style="list-style-type: none"> - assess current situation of Water Committees (are they operational, what role do they play, etc.); - discuss with EPAL the potential role and responsibilities of these committees to ensure participation in environmental and social management; - make recommendations (in agreement with EPAL) to ensure these committees are strengthened and can actively participate during project implementation. <ul style="list-style-type: none"> Appointed D&B contractors to develop and execute a RAP, including a full PAP survey, for all lots which require resettlement or land take. Due to the potential increase in land price as a result of speculation, it will be necessary for the D&B contractor in liaison with EPAL to ensure that land prices in resettlement areas are monitored during RAP elaboration to ensure adequate measures are taken to mitigate this possible eventuality. Engage with affected communities early (and in accordance with the SCEP, Appendix D) and continue to encourage an open discourse between EPAL, D&B Contractors and PAP communities. To ensure community harmony and a closer understanding that the Grievance Redress mechanism (GRM) is performing as intended, monitoring of the involvement of the community via public consultations, decision-making and during project implementation should be conducted. 			
<p>Displacement of People and Property (Ramiro) 1 km northwest of CD Ramiro there is potential for another property to be physically and economically displaced by the construction of a transmission line.</p>	3	4	12	Expropriation may be avoided if the appointed D&B contractor takes appropriate measures to reduce his working width to within the available RoW. <p>Aside from adjusting working methods the following measures may also mitigate the severity of this impact:</p> <ul style="list-style-type: none"> Early development and sensitive implementation of resettlement planning, in accordance with national regulations and international good practice to compensate for any losses (both physical and economic). Develop corrective/compensation measures for affected parties where required (e.g. vulnerable groups). Create a Community Water Committee to effectively manage water resources and ensure equitable access among users. DW's MOGECA model has been applied in other areas of Luanda and has worked effectively. The arrangements for establishment of Water Committees should address the following: 	3	2	6

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
				<ul style="list-style-type: none"> - assess current situation of Water Committees (are they operational, what role do they play, etc.); - discuss with EPAL the potential role and responsibilities of these committees to ensure participation in environmental and social management; - make recommendations (in agreement with EPAL) to ensure these committees are strengthened and can actively participate during project implementation. • Appointed D&B contractors to develop and execute a RAP, including a full PAP survey, for all lots which require resettlement or land take. Due to the potential increase in land price as a result of speculation, it will be necessary for the D&B contractor in liaison with EPAL to ensure that land prices in resettlement areas are monitored during RAP elaboration to ensure adequate measures are taken to mitigate this possible eventuality. • Engage with affected communities early (and in accordance with the SCEP, Appendix D) and continue to encourage an open discourse between EPAL, D&B Contractors and PAP communities. • To ensure community harmony and a closer understanding that the Grievance Redress mechanism (GRM) is performing as intended, monitoring of the involvement of the community via public consultations, decision-making and during project implementation should be conducted. 			
<p>Economic Displacement</p> <p>Along all pipeline transmission and distribution routes, there is the potential for disruption to formal and informal economic activities during construction. However, based on surveys conducted along routes the potential for this is not anticipated to be great.</p>	2	2	4	The impact to local economic activities is not anticipated to be great, and will be temporary, largely a result of temporary road closures during construction, which either prevent potential customers from making purchases or limits delivery of goods. The impact will be reduced by the D&B contractor, through development of a Traffic Management Plan (TMP) that identifies alternative access routes during laying of pipelines, and installation of signage to redirect road users.	2	1	2
Operational Impacts							
Additional land take post-commissioning	2	1	2	<ul style="list-style-type: none"> • Follow project RPF. 	1	1	1

8.4.12 ECONOMIC DEVELOPMENT AND EMPLOYMENT

The B4WSP has the potential to stimulate economic development and reduce unemployment in Luanda (discussed in Section 6.4.2). This being said community expectations should be managed to ensure local communities are not disappointed. Furthermore, private operators who currently provide an informal source of water to the unconnected distribution areas (Bitá, Cabolombo, Mundial and Ramiros- Section 6.6.1) are likely to be adversely affected by a new water supply system being installed. The significance of these impacts and appropriate mitigation measures to reduce this are given in Table 8-14.

Table 8-14: Economic Development and Employment – Social Assessment Summary

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Construction Impacts							
Direct employment of local population in workforce, and stimulation of local economy through improved infrastructure and demand for goods and services will enhance livelihoods and economic activity; there is potential for adverse effects if expectations are not met and community relations are not well managed.	2	2	4	<ul style="list-style-type: none"> Develop an Employment Plan, with clear employment requirements and procedures for the construction and operational/ maintenance workforce. Conduct transparent and culturally appropriate communication with communities regarding employment opportunities. Conduct fair and transparent hiring and staff management procedures. Agree employment requirements and vocational training plan with local institutions, so that local people can be trained to meet the project's needs in a timely fashion. Prioritise the employment of Angolan personnel in those positions for which they are qualified. 	2	1	2
Operational Impacts							
Providing piped water to the area is likely to reduce the demand on private operators which currently supply these areas affecting their socio-economic status.	3	3	9	<ul style="list-style-type: none"> Private operators are considered to be stakeholders in the project and will be invited to attend public consultation sessions which will give details of when the project will start and what areas will be affected. If a further need to engage with private operators is identified during public consultations Focus Group Discussions (FGDs) may be an appropriate way to do this. Prioritise employment of those previously privately operating in the water sector but rendered unemployed by the project but only in positions for which they are qualified. 	3	3	9
POSITIVE Continued growth generated by the attraction of served communities	4	4	POSITIVE 16	<ul style="list-style-type: none"> Implement in accordance with an agreed and properly structured master plan. 	4	4	POSITIVE 16

8.4.13 CULTURAL HERITAGE

The potential exists for the construction of B4WSP to disturb sites of cultural significance. Table 8-15 assess the significance of this impact against the baseline (Section 6.9) and suggests possible mitigation measures.

Table 8-15: Cultural Heritage – Social Assessment Summary

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Construction Impacts							
Displacement or damage to archaeological, historic or recent cultural heritage sites by construction activities, harm to local setting, amenity value, etc. Change to intangible cultural heritage due to increased access, and interaction with workforce.	2	2	4	<ul style="list-style-type: none"> Conduct careful site selection of all project components, taking account of any community consultation/specialist surveys. Develop a Cultural Heritage Management Plan covering tangible and intangible (e.g. local traditions and practices) cultural heritage. Implement a "Chance Finds" procedure during construction (shown in Appendix F). 	2	1	2

8.4.14 COMMUNITY HEALTH, SAFETY AND SECURITY

While the operation of B4WSP has the potential to greatly benefit the local communities' health by providing a source of potable water which, as discussed in Section 6.5.1, has been proven to reduce the risk of infectious diseases, the construction of the project may adversely affect local communities' health, safety and security. Table 8-16 assesses the significance of the potential pre and post mitigation impacts.

Table 8-16: Community Health, Safety and Security – Social Assessment Summary

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Construction Impacts							
Poor construction management practices may lead to adverse effects on safety, human health and well-being.	4	3	12	<ul style="list-style-type: none"> Conduct good construction site "housekeeping" and management procedures (including site access). Carry out risk assessments and emergency response planning to consider impacts on local communities. 	4	1	4
Interaction between workforce and local communities may increase occurrence of communicable diseases, including HIV/AIDS and sexually transmitted diseases (STDs).	3	3	9	<ul style="list-style-type: none"> Implement a Health Management System for the workforce, to ensure it is fit for work and that it will not introduce disease into local communities. Conduct training and awareness raising for workforce and their dependents on HIV/AIDS and other STDs, and communicable diseases including malaria; conduct health awareness raising campaigns for communities on similar topics. 	3	2	6
Operational Impacts							
Changes in exposure to water-borne and water-related diseases, especially those associated with water-dwelling disease vectors (new areas of standing water created) and with wastewater (if not properly treated). Improved health through better access to drinking water; potential for adverse effects if water quality or availability is poor or unreliable.	3	2	6	<ul style="list-style-type: none"> Provide information, education and communication about safe uses of water and hygienic behaviour. Implement environmental management measures for vector control: e.g. monitoring for key vectors; avoid contact via site selection; focal insecticide and molluscicide application. Ensure adequate water supply for addressing the effective demands of the local community. Establish regular controls and maintenance activities to improve reliability and quality of water supply (e.g. through education and training, measures to limit contamination of source and equipment). Facilitate programmes/measures to ensure appropriate sanitary and medical facilities are available. 	3	1	3
POSITIVE Reduction in occurrence of waterborne disease; healthier happier individuals and community	4	4	POSITIVE 16	<ul style="list-style-type: none"> Maintain potable water quality. Collect medical and social data to illustrate improvements. 	4	4	POSITIVE 16

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Misuse/misdirection of water treatment chemicals ⁹⁵ including chlorine gas.	4	2	8	<ul style="list-style-type: none"> Train EPAL and supplier's staff in the risks associated with water treatment. 	4	1	4
<p>Lack of Sanitation</p> <p>If households are connected to the water supply network without adequate sanitation waste water and sewage may be left stagnant and infect drinking water supplies increasing the incidence of WASH related diseases.</p>	3	3	9	<ul style="list-style-type: none"> Where households do not have adequate sanitation facilities they may be able to have an external tapping point or use a community standpost, it is suggested that this be managed using Development Workshop's MOGECA Model. GoA should urgently consider expanding sanitation network in the project area. 	3	2	6

⁹⁵ Camelford, Cornwall, United Kingdom, 1988. Tanker driver discharged aluminium sulphate into the treated water tank instead of raw water tank. 30,000 people affected, many with short-term skin and digestive system complaints, many still suffer chemical sensitivity, loss of memory and premature aging. Several deaths have and still are attributed to the incident.

8.4.15 WORKFORCE COMMUNITY INTERACTIONS AND IN-MIGRATION

Depending on the appointed D&B contractors and the origin of their workforce there is a potential for in-migration to the project area which could unsettle local communities and lead to tension between the two groups. One group particularly vulnerable is Angolan women and girls. Evidence shows that in-migration is associated with negative environmental, social, and economic impacts that often lead to deterioration in the social context in which the project's host communities reside and the project is operating⁹⁶. Because they are far from home and need to socialize, influx populations may hasten the introduction and/or increased expression of vices such as prostitution, gambling, alcoholism, and drug use, which can have significant negative social impacts and consequences, particularly for women and children. The handbook also identifies risks related to a rise in the "four Ms": men, money, movement (influx), and mixing (that is, the interaction between high and low disease prevalence groups).

The risks associated with the influx of workers can be described as cultural and social conflicts, which may arise when outside workers are in contact with locals of different cultural backgrounds. Conflicts may often be associated with increased consumption and availability of alcohol and drugs as well as a gender-based violence (GBV) and child abuse and exploitation (CAE).

Of particular concern is the risk of increased GBV during project construction. The likely impact of this is assessed to be high in Table 8-17 however, it is recommended that downstream E&S studies conduct a more detailed GBV risk assessment which shall, as a minimum entail:

- **Identification of areas of impacts:** it is likely that GBV and SEA impacts will not just be limited to the project site but extend into adjoining communities and, in some cases where women are trafficked there could be regional, national and international ramifications;
- **Efficient use of existing research:** decision-making on the assessment of impacts and suggested mitigation measures should, where available, be based on pre-existing evidence gathered on GBV from the national to the project level. Collecting primary data on GBV should be avoided due to the sensitive nature of the issue;
- **Plans for GBV specific engagement:** as noted in Section 11 and Appendix D of the present ESIA, if the project or project-Lot is considered to carry a Substantial and High risk by the World Bank the SCEP should be updated to include GBV specific considerations for how to appropriately conduct consultations. These may include:
 - The use of technology to open up lines of communication between affected communities and the project, track perceptions of GBV risks as linked to the project and inform communities of services and information related to GBV;
 - Seeking guidance from communities and their leaders to identify existing and potential local GBV risks and potential mitigation and monitoring measures;
 - Recognising the existing gender-power dynamics and social dynamics which may inhibit participation of some vulnerable groups; and,
 - Ensuring that the engagement activities provide opportunities to share information with stakeholders on project-related risks and the proposed reporting and response measures; with a particular focus on women, children and other vulnerable groups.
- **Recommendations for mitigation and management of GBV:** if it is identified that the risk of GBV will increase substantially a separate GBV Action Plan will be developed. The GBV Action Plan will be in full compliance with the World Bank's Good Practice Note on addressing GBV in Investment Project Financing involving major civil works⁸² and the ToR set out in Appendix G of the present ESIA.

⁹⁶ IFC (2009) Handbook to Address Project Induced Migration, https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_handbook_inmigration_wci_1319576839994 Accessed 27.09.2018.

Adequate effort should be made to maintain social harmony and cooperation among workers and local residents. The significance of these potential impacts and proposed measures to mitigate them are shown in Table 8-17.

Table 8-17: Workforce Community Interactions – Social Assessment Summary

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Construction Impacts							
Real or perceived disruption to normal community life, through the physical presence of a workforce; in particular, potential for conflicts to occur over water use, theft and vandalism. Includes in-migration of individuals, which may put pressures on resources and infrastructure.	3	3	9	<ul style="list-style-type: none"> Adoption of a Stakeholder Consultations and Engagement Plan (Appendix D), as a framework for early and ongoing community consultation. Implementation of Grievance Redress Mechanism detailed in Section 10 and Appendix D. All employees of contractors (including sub-contractors), supervision consultants and other consultants with a footprint on the ground in the project area must sign and abide by the Code of Conduct shown in Appendix E. 	3	2	6
Labour influx of a predominately single-status male workforce may lead to the sexual exploitation and abuse of women and children and an increase in gender-based violence.	4	3	12	<ul style="list-style-type: none"> A key part of future Environmental and Social studies shall be to conduct a GBV risk assessment in accordance with the guidance set out in the World Bank's Good Practice Note on Addressing GBV in Investment Project Financing involving Major Civil Works⁸² (the requirements of which are explained in Section 8.4.15) and, if necessary, develop a GBV action plan, a ToR for which is presented in Appendix G. Adopt a Sustainable Water Management Plan, which takes existing community usage into consideration. Any company's workforce should not exceed 30% of non-resident foreign workers, the balance, 70%, to come from the national resident workforce - Angolans and foreign citizens resident in Angola. 	4	2	8
Operational Impacts							
Social conflict with well-paid foreign workers	3	1	3	Operational Workforce largely from local community few if any foreign workers.	1	1	1

8.4.16 LABOUR AND WORKING CONDITIONS

It is the responsibility of the appointed D&B contractor to ensure that labour and working conditions are of an adequate standard. The significance of possible impacts is assessed in Table 8-18 and mitigation measures are suggested.

Table 8-18: Labour and Working Conditions – Social Assessment Summary

Project Activity & Impact Description	No Mitigation			Mitigation	With Mitigation		
	Consequence	Likelihood	Significance		Consequence	Likelihood	Residual Significance
Construction Impacts							
Poor management of occupational health and safety leading to accidents, injuries and illnesses among workers (e.g. risks of working close to water); mental health issues due to remote or enclosed living.	4	4	16	<ul style="list-style-type: none"> Employment practices and working conditions should conform to International Labour Organisation (ILO) Standards and national regulations. When working within open excavations and / or confined spaces, appropriate safety equipment must be worn. This will include gas monitoring within confined spaces. Contractors will also have to sign Code of Conduct which ensures workers have adequate living and working conditions (see Appendix E). Rest and recreational facilities and time should be provided, and rules on alcohol and drugs defined and clearly communicated to workers. 	4	1	4
Construction and Operational Impacts							
Differences in nationality, ethnicity, religion, etc. may lead to discrimination and harassment, and differences (perceived or real) in working conditions between workers may lead to resentment.	3	3	9	<ul style="list-style-type: none"> The basis for differences in the standard of accommodation should be non-discriminatory; it should be documented and communicated transparently to the workforce. Clear and comprehensive health and safety reporting and grievance procedure system should be established, and be freely available to all of the workforce. All workers to sign Code of Conduct shown in Appendix E. 	3	2	6
Construction of ETA, CDs and laying of transmission and distribution networks could potential uncover and detonate land mines laid during the civil war.	4	1	4	<ul style="list-style-type: none"> D&B contractors to contact the relevant authority and request: (a) specific and up to date information about land mines in the area they will be excavating; and, (b) advice on what to do if a land mine is uncovered during construction before excavation works start. EPAL to ensure this is in the D&B contractor's Terms of Reference. 	4	1	4
Exploitation of children for labour.	3	2	6	<ul style="list-style-type: none"> Children under 14 (the minimum age for employment in Angola are not hired). Youth employment (those between the ages of 14 and 18) have decent working conditions. Children are not permitted to conduct potentially hazardous work. Children between the ages of 12 and 15 can only do light work for up to a maximum of 14 hours a week. 	3	1	3

8.4.17 POWER TRANSMISSION LINES

Power transmission lines will be required to supply electricity to B4WSP facilities e.g. the Bitá Water Treatment Plant. The supply of electricity is included within the D&B contract, but at the time of ESIA submission, power transmission routes are not known, and therefore cannot be assessed in detail. It will be a requirement that subsequent B4WSP ESIA's assess this impact and identify appropriate mitigation. It is recommended that the EPAL appointed consultant writing the subsequent ESIA's takes note of IFC EHS Guidelines for Electrical Power Transmission and Distribution. Impacts to landowners/occupiers along power transmission routes should be managed as per the appropriate Angolan legislation pertaining to power transmission lines, along with the application of World Bank Safeguard Policies.

The EHS guidelines pay particular attention to the following impact areas:

- Environmental
 - Terrestrial habitat alteration
 - Construction of Right of Way;
 - Right of Way maintenance;
 - Fire Risk;
 - Avian and bat collisions / electrocutions.
 - Electrical and Magnetic Fields (EMF)
 - Hazardous Materials
- Occupational Health and Safety
- Community Health and Safety
 - Electrocution
 - Electromagnetic interference
 - Visual amenity
 - Noise and Ozone
 - Aircraft Navigation Safety

8.5 IMPACT SUMMARY

8.5.1 MITIGATION EFFICACY

For adverse impacts the anticipated efficacy of proposed mitigation in terms of reductions to initial impact significance is demonstrated in Table 8-19 below.

Table 8-19: Predicted Effect of Mitigation

Impact Significance	Count		Percentage	
	No Mitigation	With Mitigation (Residual Significance)	No Mitigation	With Mitigation (Residual Significance)
High	16	0	19	0
Medium	24	9	28	11
Low	36	34	43	40
Negligible	9	42	11	49

The assessment has indicated that with the application of mitigation measures reductions in impact significance can be achieved in all but 12 cases (not including significance impact already deemed negligible pre-mitigation). These exceptions are:

- Biodiversity – Permanent land-take (medium significance impact) (Table 8-3);
- Biodiversity – Site clearance (low significance impact) (Table 8-3);
- Hydrology – Water Abstraction Volume (low significance impact) (Table 8-4);
- Hydrology – Water Abstraction Salinity (low significance impact) (Table 8-4);
- Air Quality- Construction Traffic (low significance impact) (Table 8-9);
- Air Quality- Powered Mechanical Equipment (low significance impact) (Table 8-9);
- Noise and Vibration – Operation of project (low significance impact) (Table 8-11);
- Visual – Earthworks (low significance impact) (Table 8-12);
- Visual – Stockpile management (low significance impact) (Table 8-12);
- Visual – Permanent land-take (medium significance impact) (Table 8-12);
- Economic Development and Employment – Private Water operators (medium significance impact) (Table 8-14); and
- Labour and Working Conditions – Detonation of landmines (low impact significance) (Table 8-18).

8.5.2 ACCEPTABILITY OF IMPACTS

With no mitigation in place it is predicted that 16 adverse, highly significant impacts could occur (Table 8-19) which are considered unacceptable. These are:

- Soil erosion – Lack of Sanitation (high significance impact) (Table 8-5);
- Dust – Earthworks (high significance impact) (Table 8-10);
- Dust – Construction Traffic (high significance impact) (Table 8-10);
- Noise – Construction Traffic (high significance impact) (Table 8-11);
- Noise – Powered Mechanical Equipment (high significance impact) (Table 8-11);
- Noise - Fabrication and Installation (high significance impact) (Table 8-11);
- Visual – Permanent WTP & CDs (high significance impact) (Table 8-12);
- Displacement of People, Property, Assets and Resources – Julio (high significance impact) (Table 8-13);
- Displacement of People, Property, Assets and Resources – north of ETA/CD Bitá (high significance impact) (Table 8-13);
- Displacement of People, Property, Assets and Resources – Quenguela (high significance impact) (Table 8-13);
- Displacement of People, Property, Assets and Resources – Quenguela Norte (high significance impact) (Table 8-13);

- Displacement of People, Property, Assets and Resources – Tanque Serra (high significance impact) (Table 8-13);
- Displacement of People, Property, Assets and Resources – Ramiros (high significance impact) (Table 8-13);
- Community Health, Safety and Security – Poor construction management leading to adverse effects on human health & well-being (high significance impact) (Table 8-16);
- Workforce Community Interactions- Influx of predominantly male, single-status workforce increasing the risk of gender-based violence and sexual exploitation and abuse of women and children (high significance impact) (Table 8-17); and,
- Labour & Working Conditions – Poor management of OHS (high significance impact) (Table 8-18).

However, with the application of recommended mitigation it is predicted that these impacts could be reduced to 'medium significance' or 'low significance' residual impacts. With the application of mitigation no 'high significance' impacts are predicted and all residual impacts are considered to be acceptable.

9 ENVIRONMENTAL, SOCIAL AND SAFETY MONITORING PLAN

9.1 ENVIRONMENTAL QUALITY STANDARDS AND KEY PERFORMANCE INDICATORS

Angola has a dearth of formal environmental quality standards across all environmental and social issues. B4WSP's will therefore adopt a series of performance indicators and international standards for monitoring ESMP and CEMP implementation. The priorities for adopting standards will be as follows:

- Priority 1 – Angolan practice that aligns with recognised international standards;
- Priority 2 – Standards of closely aligned countries, e.g., Portugal (EU), South Africa;
- Priority 3 – Other international standards, e.g., WHO, etc.
- Priority 4 – Other performance indicators developed for B4WSP

The key monitoring performance indicators for B4WSP construction and operation are given in Table 9-1.

Table 9-1: Key B4WSP E&S Performance Indicators

Parameter	Standard/Indicator
During Design	
Pipeline Corridors	Optimum/minimal land take and E&S impacts
Intake Location	Hydrological setting, raw water quality relevant to treatment process, risk from sedimentation or weed infestation
Land Take	Area, condition, use, structures, unharvested crops, trees, fences, walls, replacement value, compensation offered and paid, unresolved issues or grievances
Asset Loss	Type, size, materials, capacity, condition, replacement value, compensation offered and paid, additional assistance provided, livelihood sustained, unresolved issues or grievances
Resettlement	Household composition, comparison of old and new land or compensation offered, resettlement location, description of new site vs old site,
During Construction	
Potable Water for Camp	WHO Guidelines for Drinking Water
Air Quality Emissions	European Stack Emission Standards for Fixed Plant European Exhaust Emissions Standards for Mobile Plant and Vehicles
Noise and Vibration	European Noise Emission Limits for Outdoor Areas
Worker's Health and Safety	Compliance with Angolan foreign labour regulations; No. of accidents and working days lost; Compliance with approved contractors' HSE Plans; Compliance with Angolan Labour Laws;

Parameter	Standard/Indicator
	Compliance with European Standards for the Discharge of Wastewater.
Public Health and Safety	No. of incidents involving the public resulting in (i) nuisance, (ii) damage or loss of property, and (iii) physical and verbal abuse. No. incidents involving women and children to be counted separately.
Disruption of normal Lifestyles	No. of complaints regarding nuisance from noise, dust and nuisance, with details of disruption and/or losses by residents
Loss of access	Loss of access incidents due to pipelaying. Nuisance/loss measured against Contractor's pre-determined expected maximum delay.
Construction Traffic	Delays on public roads and tracks. Adherence to contractors' Traffic Management Plans
Waste Management	Quantities of the different types of waste produced and their disposal destinations. Contractor's Waste management Plan should encourage recycling and/or donations, e.g., timber, panels, to the local community.
Cultural Heritage	The documentation of Chance Finds
During Operation	
Raw Water Quality	Cessation of intake above threshold turbidity or specific pollutant content
Treated Water Quality	WHO Guidelines for Drinking Water

More specific social indicators are given in the RPF.

9.2 ACCESS REQUIREMENTS

For the proposed programme of site inspections and environmental and social monitoring to be effective, it will be necessary for authorised personnel from EPAL, PIU, and key agencies such as MINAMB to have guaranteed 24/7 access to all sites related to any component of the project throughout both construction and subsequent operation. Accordingly, contract documents and operating agreements should incorporate a Clause with an intent equivalent to the following:

Any Officer or Agent authorised in writing by EPAL, PIU or other organisation for which from time to time it may be necessary, may at any time enter any premises whether prescribed or otherwise and may:

- *Examine and inspect equipment, control apparatus, monitoring instruments or plant;*
- *Take samples of any material that is emitted, discharged or deposited, or is likely to be, from such premises;*
- *Examine any books, records or documents relating to the performance or use of such equipment, apparatus, instruments or plant, or relating to the emission, discharge or deposit from such premises; and*
- *Photograph such premises as he considers necessary or make copies of any book, records or documents seen in the course of examination.*

PIU will be responsible for liaising with all parties involved in the design and construction of Works, especially EPAL and the individual Lot D&B contractors and supervision consultants, and to provide oversight guidance on compliance and impact mitigation.

9.3 ENVIRONMENTAL MONITORING REPORTING

For environmental monitoring to be both effective and meaningful to the implementation of the project ESMP and Lot specific CEMPs, it must be comprehensively reported to all concerned parties. Major reports should also be made available for public consultation. The primary levels of reporting will be as follows:

For Construction Environmental Impacts:

- Baseline and Site Condition monitoring prior to commencement of construction, including the condition of existing building adjacent to work sites;
- Individual Site Inspection Reports by EPAL/PIU;

- Individual Site Inspection Reports by the supervision consultants, reported at monthly progress Meetings;
- Individual visit reports by MINAMB or other concerned agencies;
- Biannual ESMP Implementation Reports by PIU, to summarise the results of individual site inspections by both the EPAL/PIU and supervision consultants, and of environmental quality monitoring;
- Post-construction monitoring of completed pipeline sections by EPAL at monthly intervals for six months annually thereafter;
- End-of Project ESMP Implementation Report by EPAL/PIU to be presented at PIU Close-Out Seminar.

For Construction Social Impacts:

- Contractors monthly totals of staff and labour on site, with name, ID or visa number and age, differentiating engineers and workers, foreign and local, male and female, with details of month-on-month changes in complement;
- PIU CLO quarterly reports on complaints received, under review, pending, and grievance redress agreed and proposed, differentiating the types of grievance and giving details of those involving criminal activity by foreign labour;
- Where a complaint relates to physical or sexual harassment or abuse of a local resident by one or more of the contractor's workforce, the employment of child or forced labour, daily follow-up reports until the issue resolved;
- End-of Project ESMP Implementation Report as cited above.

For Land Take, Asset Loss and Resettlement:

- PAP Household Survey Report, identifying and evaluating land take, asset loss and resettlement, with proposed compensation;
- File for each PAP household detailing their losses, compensation offered and paid with dates, minutes of meetings with them or their advisors, settlement agreement, subsequent issues or grievances, resolutions or redress;
- Monthly RAP Implementation Summary Reports for the first six-months of the project, summarising RAP activity across B4WSP contracts, giving number of plots, requirement for resettlement, status of negotiations, offers accepted, pending, appealed, resolved, outstanding grievances;
- Quarterly RAP Monitoring and Evaluation reports,
- PAP resettlement Surveys, by household at 3-months, 12-months and 24-months after resettlement, to evaluate the changes, positive and negative in the PAP individual and household living standards, income and general satisfaction with both the procedures and the outcome.

9.4 CEMP ENVIRONMENTAL SITE INSPECTIONS

Site Inspections provide for the day-to-day monitoring of construction activities and sites, and will provide the primary mechanism by which contractors' performance and subsequent system operations are assessed to comply with CEMPs. Whilst these will primarily be the responsibility of the supervision consultants, it will be prudent for the PIU to undertake occasional inspections, particularly at 'high-risk' sites to provide a longer-term overview of site condition and to ensure consistency of approach between the different D&B contracts.

Site inspections should be carried out on a regular basis, but not necessarily to a structured pattern. During construction, the recommended minimum programme for PIU inspections is given in Table 9-2. Supervision consultants must have environmental and social specialists as part of their inspection teams.

Table 9-2: Programme for PIU Site Inspections

Activity	Inspections
Site Clearance	Weekly until complete
Batching and Asphalt Plants, etc.	Monthly
Camp and Maintenance Facilities	Quarterly
General Construction Activity	Biannually

To facilitate inspections, a standard checklist will be used and all parties. Relevant persons from each supervision consultant will be formally briefed by the PIU as part of the project’s capacity building programme. Areas of forward site clearance and ‘high-impact’ sites will be inspected weekly. Other major facilities, such as maintenance depots, materials storage facilities, and construction camps, will be inspected every monthly, while a general site inspection will be undertaken quarterly.

Each PIU site inspection shall be subject to a report that details location, activities, identifies areas in which the contractor is non-compliant with the EMP, and proposes remedial action. Copies of these reports shall be circulated to the EPAL, MINAMB and the relevant consultant and contractor. Where remedial action is proposed, discussions shall be held with the consultant and the Contractor to ensure the requirements has been understood and the works put in hand.

During the preparation of any or all reports, access will be granted to the more routine and more frequent site inspection records retained by the supervision consultant as part of his normal duties. Incorporation of individual site inspection reports into the Biannual Reports will highlight persistent non-compliance or continued negligence.

Following construction, six one-monthly inspections will be undertaken of completed pipeline sections to ensure no unreasonable settlement of backfill, not leakage or vandalism, and the general conditions of the lines and chambers.

9.5 SPECIFIC CEMP MANAGEMENT PLANS

During the assessment of impacts, and development of corresponding mitigation, a number of specific management plans were identified as required as listed below:

- Invasive Species Management Plan
- Bushmeat Hunting and Wildlife Trade Management Plan
- Soil Erosion and Sedimentation Plan
- Emergency Response Plan (including Spill Response Plan)
- Waste Management Strategy
- Waste Management Plan
- Waste Water Management Plan
- Cultural Heritage Management Plan
- Traffic Management Plan
- Community Liaison Plan

The D&B contractors are required to develop each of these management plans in order to encapsulate the relevant mitigation requirements as identified in the ESIA. Development and reporting requirements are indicated in Table 9-3.

Table 9-3: Management Plan Development and Reporting

Management Plan	Responsibility	Frequency	Reporting To
Invasive Species Management Plan	EHS Representative	Commencement and thereafter as required	Project Site Manager
Bushmeat Hunting and Wildlife Trade Management Plan	EHS Representative	Commencement and thereafter as required	Project Site Manager

Management Plan	Responsibility	Frequency	Reporting To
Soil Erosion and Sedimentation Plan	EHS Representative	Commencement, review weekly and after rainfall events	Project Site Manager
Emergency Response Plan (including Spill Response Plan)	EHS Representative	Commencement and thereafter as required	Project Site Manager and Relevant Authorities as necessary
Waste Management Strategy	EHS Representative	Commencement	
Waste Management Plan	EHS Representative	Commencement and thereafter as required	Project Site Manager
Waste Water Management Plan	EHS Representative	Commencement and thereafter as required	Project Site Manager
Cultural Heritage Management Plan (incorporates Chance Finds)	EHS Representative	Commencement and thereafter as required	Project Site Manager and Relevant Authorities as necessary
Traffic Management Plan	EHS Representative	Commencement and weekly thereafter	Project Site Manager and Relevant Authorities as necessary
Community Liaison Plan	EHS Representative	Commencement and thereafter as required	Project Site Manager and Relevant Authorities as necessary

9.6 SPECIFIC CEMP REGISTERS

A number of registers in association with management plans must be developed as follows:

- Environmental Risk Register – developed at outset and continuously reviewed and updated
- Waste Management and Disposal Register – daily updates
- Hazardous Wastes Register – updated weekly or as required
- Environmental Incidents Reporting – updated as required
- Community HSS Incidents – updated as required
- Workforce H&S Incidents – updated as required
- Complaints Register – updated as required

9.7 ENVIRONMENTAL QUALITY MONITORING

9.7.1 OBJECTIVES

Environmental Quality Monitoring (EQM) is fundamental to the determination of success of impact avoidance and mitigation measures, and of residual impact management. The B4WSP EQM programme should include:

- Monitor changes in the physical, chemical, biological and social characteristics of the environment;
- Determine if the identified changes result from project or non-project causes;
- Determine the impact of non-compliance with the ESMP/CEMP by contractors, with particular regard to emissions and discharges that contravene ESMP/CEMP-adopted local, national or international standards;
- Assess the effectiveness of impact mitigation; and
- Highlight areas of concern unforeseen in the ESMP and recommend further mitigation measures.

9.7.2 BASELINE CONDITION MONITORING

Although general baseline conditions are described in the present ESIA, D&B contractors will be expected to expand on these with site specific details of relevance to their Scope of Work. This will include the identification of any sites sensitive to noise and dust along transmission and/or pipeline routes, and sites where the proposed work is expected to induce significant change.

The results of the baseline monitoring will be incorporated into the final B4WSP by PIU when the final designs have been determined.

9.7.3 CONSTRUCTION MONITORING

The monitoring of noise, vibration and air quality at CD sites, along transmission main routes and throughout the distribution areas will continue throughout the period of construction, although sites may change as pipelaying moves on. Monitoring shall also be undertaken at contractors' facility sites such as site offices, labour camps, workshops, batching plants, laydown areas and fabrication yards. In accordance with World Bank rules, ESIA monitoring shall extend to third-party sites such as quarries, borrow pits and pre-cast concrete yards.

Depending upon the arrangements for the drainage of both on-site and off-site facilities, discharges to surface watercourses and any vulnerable ground water wells will also be monitored where necessary.

Another important subject for on-site monitoring will be the storage of materials, particularly fuel, which should be in bunded tanks, and construction chemicals such as accelerators, and hardeners. Solid and liquid waste generation and disposal will be recorded and contractor's will be expected to follow best practice procedures for the reuse and recycling of potential fill materials, offcuts and spent formwork. Acceptable forms of recycling will include donations of materials to local community facilities or assistance to resettled PAPs.

9.7.4 OPERATIONAL MONITORING

Post-construction monitoring should continue for a period of not less than 2 years in order to:

- Monitor changes in the physical, chemical, biological and social characteristics of the environment;
- Determine if the identified changes result from project or non-project causes;
- Monitor emissions and discharges and ensure compliance with adopted standards;
- Determine the effectiveness of the impact mitigation; and
- Provide early warning of any potentially serious long-term problems.

At CD sites, operational monitoring will focus on noise and atmospheric emissions, the storage and use of hazardous materials such as chlorine, and waste generation and disposal of settled sludges, chemical residues and spent filter media. On transmission main routes the most significant parameters will be subsidence around pipelines and chambers and leakage; throughout distribution networks, leakage and damage due to traffic loading or vandalism.

It is to be hoped monitoring at some sites will be continued on completion of the project requirements in order to promote a better understanding of the overall long term impacts of such projects in Angola. The establishment of permanent network would be a significant asset in assessing impacts resulting from future developments within and adjacent to the B4WSP's zone of influence.

The parameters to be routinely monitored during construction and operation are listed in Table 9-4.

9.7.5 COMPLAINT BASED MONITORING

In addition to the routine monitoring, additional site inspections and environmental quality monitoring may be needed to investigate complaints of excessive noise, dust, damage or pollution.

9.7.6 PARAMETERS TO BE MONITORED AND FREQUENCY

Many of the parameters to be monitored will be subject to visual inspection, with noise, vibration air quality (stationary and mobile emissions), surface and ground water requiring detailed analysis. The parameters to be measured and the likely frequency, are given in Table 9-4 below.

Table 9-4: Summary of B4WSP Environmental Quality Analysis

Parameter	Unit	Frequency
For air quality:		
SO ₂	ppm	For air quality; one hour 7-8 am any day except Sunday, monthly. For PM see below. Once only at sensitive receptors on pipeline routes. Every two weeks at sensitive sites adjacent to CDs
Pb	µg/m ³	
PM ₁₀	µg/m ³	
PM _{2.5}	µg/m ³	
TSP	µg/m ³	
NO _x	ppm	
CO	ppm	
For noise and vibration:		
Noise	dB(A)	For noise and vibration, 1 day during working hours, every 3 months
Vibration	VL ₂₁₀	
For surface and ground waters:		
pH	pH units	For Rio Kwanza at the proposed B4WSP intake site; monthly for 12 months, then biannually. For other surface waters; start, middle and end of each rainy season;
Conductivity	µS/cm	
Colour	TCU	
Total Hydrocarbons	µg/l	
Chloride	mg/l	
For ground waters:		
Faecal Coliforms (<i>E.coli</i>)	colonies/100 ml	For ground water from wells within 100 m of a work site; quarterly
Total Coliforms	colonies/100 ml	
For surface waters:		
Total suspended Solids	mg/l	
Dissolved Oxygen	mg/l	

This table is indicative only and contractors will be expected to make variations in order to fully evaluate the potential impact of their activities. For example, PM₁₀, PM_{2.5} measurements will need to be more frequent while laying the transmission main along the edge of *Via Expresso*. Vibration measurements will should be continuous when crossing beneath *Via Expresso* to reach CD Benfica II and CD Camama.

Monitoring results will be reported with the reporting procedure discussed earlier in the present section of the ESIA. In their discussion of the results, contractors will be expected to include the following:

- Sampling, methodologies, equipment calibration reports, and other background material, and the empirical results;
- Details of any extreme or abnormal events that may have influenced the empirical findings;
- Analysis of the findings highlighting any changes of significance and discussing the causes of change;
- Recommendations on actions to be taken; and
- Follow up on the recommendations of previous reports.

9.7.7 RESPONSIBILITY

Each D&B contractor will be responsible for the programme of environmental quality monitoring as approved for his CEMP. If the contractor does not wish to undertake the work himself he may, with the approval of PIU, sub-contract it to a local environmental consultant registered with MINAMB. While each supervision consultant, PIU, EPAL and MINAMB may wish to undertake occasional

check measurements with their own staff and equipment, the primary source of B4WSP environmental quality monitoring data will be that taken and reported by the contractors.

D&B contractors must include as part of their team, environmental and social specialists in order to assure a proper implementation of their developed ESMPs.

MINAMB are also likely to take both an advisory and an approval role in the monitoring programme. In particular, they will wish to be involved in the following:

- Preparation of Scopes of Works and ToRs;
- Pre-qualification of tenderers;
- Provision of technical support in the evaluation of bids;
- Review and approve contractors' reports; and
- Make recommendations to the PMT for additional and/or remedial works.

9.7.8 ENVIRONMENTAL AUDITING

No specific provision is made for Environmental Audits. PIU will de facto audit the reports of the Supervision Consultants, and EPAL will effectively audit those of the PIU and decide what should be made publically available.

The Funding Agencies may or may not formally auditing the environmental and social aspects of the project on completion of construction, but future missions are likely to include members with particular responsibility for environmental and social issues.

9.8 SUMMARY OF ENVIRONMENTAL MONITORING REQUIREMENTS

A summary of the environmental quality monitoring requirements with estimated costs is given in Table 9-4.

Table 9-4: Summary of Environmental Quality Monitoring Requirements

Project Phase	Category	Indicators	Location	Method	Duration	Frequency	Purpose	Expertise Required	Responsibility	Estimated Cost
Pre-Construction	Baseline Air Quality and Noise Conditions	SO ₂ , Pb, PM ₁₀ , PM _{2.5} , TSP, NOx and CO Ambient Noise	Settlements and houses nearest CD sites or on pipeline alignments	Portable air quality and noise equipment of approved manufacture	Over 1 hour, 7-8am, any day except Sunday	1 time prior to construction	To define background conditions against which to assess project impacts	Resourced Environmentalist with experience of field monitoring	D&B Contractors	US\$ 80,000 (mainly equipment purchase)
	Baseline Water Quality Conditions	PH, Conductivity, Colour, Hydrocarbons and Chloride	Rio Kwanza and other watercourses	AWWA, WHO or other approved standards of sampling and analysis	(Not applicable)	1 time prior to construction		Resourced Environmentalist with experience of field monitoring and analysis		
		Faecal Coliforms (<i>E.coli</i>) Total Coliforms	Vulnerable wells within 100 m of work sites							
		Total Suspended Solids Dissolved Oxygen	River Kwanza							
Construction	Site Inspection	Site Clearance	All areas to be cleared as part of B4WSP construction	Visual and Descriptive, against a Check List	(Not applicable)	Weekly during site clearance	To ensure compliance with ESMP and each contractor's CEMP, general standards of 'Good Practice' and that Health and Safety are adequately provided for.	Site inspector or counterpart environmentalist with awareness of site conditions and HSE requirements	EPAL and PIU	Included in contract supervision below
		General Construction Activity	All sites, on and off site, associated with B4WSP construction	Visual and Descriptive, against a Check List	(Not applicable)	Biannually				
		Batching and Asphalt, etc.	All batching, asphalt and other processing plants	Visual and Descriptive, against a Check List	(Not applicable)	Monthly				
		Camp and Other Facilities	All construction camp and maintenance facilities	Visual and Descriptive, against a Check List	(Not applicable)	Quarterly				
	Air Quality Conditions	SO ₂ , Pb, PM ₁₀ , PM _{2.5} , TSP, NOx and CO Ambient Noise	Settlements and houses nearest Cd sites or on pipeline alignments	Portable air quality and noise equipment of approved manufacture	Over 1 hour, 7-8am, any day except Sunday	Once only at receptors on pipeline routes. Every two weeks at receptors near CDs	To assess the magnitude of any project impact	Resourced Environmentalist with experience of field monitoring	D&B Contractor. PIU will do spot checks	US\$ 70,000 (equipment purchased Pre-Construction)
	Water Quality Conditions	PH, Conductivity, Colour, Hydrocarbons and Chloride	Rio Kwanza and other significant watercourses	AWWA, WHO or other approved standards of sampling and analysis	(Not applicable)	Rio Kwanza - monthly for 1 year Others, 3 times during rainy season. Wells, quarterly.	To assess the magnitude of any project impact	Resourced Environmentalist with experience of field monitoring and analysis		
		Faecal Coliforms (<i>E.coli</i>) Total Coliforms	Vulnerable wells within 100 m of work sites							
		Total suspended Solids Dissolved Oxygen	River Kwanza							
	Complaint Investigation	Any of the Environmental Quality parameters listed above, depending upon the nature of the complaint	At or in the vicinity of all sites for which a specific complaint has been received	As appropriate for the parameter being monitored	As necessary	As necessary	To fully investigate all complaints and to provide the basis for appropriate mitigation and/or compensation	Resourced Environmentalist with experience of field monitoring and analysis	D&B contractor and PIU	US\$ 10,000
	Contract Supervision	Contractor's compliance with Standards and EMP requirements. Low numbers of injuries to workers.	All sites of construction and project related activity	Primarily Visual and Descriptive, against a Check List	On-going	Daily	To ensure contractors comply with ESMP and CEMP requirements	Experienced site supervisor with awareness of environmental and Health and Safety issues	Contract Supervision Consultants	US\$ 550,000

Project Phase	Category	Indicators	Location	Method	Duration	Frequency	Purpose	Expertise Required	Responsibility	Estimated Cost
Construction (continued)	Cultural Heritage	The documentation of Chance Finds	Any previously unknown remains unearthed during construction	Ministry of Culture standard procedures	As necessary	For every Find deemed worthy of investigation	To ensure all new Finds are recorded in accordance with requirements	PIU and government Heritage Inspector	EPAL and PIU	US\$ 5,000
	Land Acquisition	The early identification of acquisition problems	All lands to be acquired under the project	Discussions with PAPs	(Not applicable)	Continuous	To provide early warning of PAP difficulties	Community Liaison Office and Representatives of the PAP community	PIU CLO	Included in RPF implementation costs
		The effectiveness of acquisition procedure and of compensation disbursement	All lands to be acquired under the project	CLO monitoring and evaluation	(Not applicable)	Throughout the duration of acquisition	To review procedures and ensure efficiency and transparency in compliance with World Bank procedures	CLO and Social Specialist	PIU CLO	
		The overall efficiency of acquisition and resettlement	All lands to be acquired under the project	External monitoring	During Funding Agency missions	As required by the Funding Agencies	To ensure the adopted procedures conform to Funding Agency requirements	Funding Agency Missioners	Funding Agencies	Included within Funding Agency costs
Post-Construction	Air Quality Conditions	SO ₂ , Pb, PM ₁₀ , TSP, NO _x and CO Ambient Noise	Settlements and houses nearest CD sites	Portable air quality and noise equipment of approved manufacture	Over 1 hour, 7-8am, any day except Sunday	Biannually, or in response to complaint	To assess operation impacts, including improvements to the urban environment resulting from the project	Resourced Environmentalist with experience of field monitoring	EPAL	US\$ 6,000
	Water Quality Conditions	PH, Conductivity, Colour, Hydrocarbons Turbidity, Dissolved Oxygen or as proposed by WTW process designer	Rio Kwanza upstream of the B4WSP intake	AWWA, WHO or other approved standards of sampling and analysis	(Not applicable)	Continuous monitoring	To monitor quality of water taken for treatment	Intake pumping station operator trained in field monitoring and analysis		
	Health and Safety	The security of fuel, water treatment chemicals, and other hazardous substances	All CD and elsewhere where such materials are stored	Visual inspection of sites	1 day	Every 6 months	To ensure the safe storage of chemicals in accordance with operational EMP	Health and Safety Inspector	EPAL	US\$ 6,000
		Availability and use of PPE, safety and emergency equipment	All CDs	Visual inspection and inventory check			To promote compliance with OEMP and identify need for retraining			
		Continued familiarity and compliance with OEMP and ERPs								

10 INSTITUTIONAL STRENGTHENING AND CAPACITY BUILDING

10.1 CURRENT CAPACITY

EPAL currently have limited capacity in the management of environmental and social issues according to World Bank safeguard policies. Present environmental management capacity is focused on the quality and associated issues of the water delivered to consumers, while, as seen from the comparison of Angolan and World Bank resettlement procedures discussed in previous sections of this report, it is necessary to build significant capacity to meet social management expectations.

10.2 STRENGTHENING EPAL INSTITUTIONALLY

For the foreseeable future, for B4WSP design and construction, EPAL will establish a Project Implementation Unit (PIU) to oversee and coordinate all aspects of the project. The unit will require specialist engineering expertise in water treatment, transmission and distribution, and experience in system construction and supervision to ensure the completed works of each of the 12 remaining contract Lots are successfully integrated in such a way that makes, *the whole greater than the sum of its parts*.

It is currently expected that the PIU will be housed within EPAL’s new headquarters building.

Within PIU will be housed B4WSP’s Community Liaison Office (CLO) to oversee the D&B contractors and their supervision consultants’ development and implementation of individual Lot CEMPs. The overall structure between the Funding Agencies, GoA, EPAL, PIU and Lot implementation is illustrated in Figure 10-1.

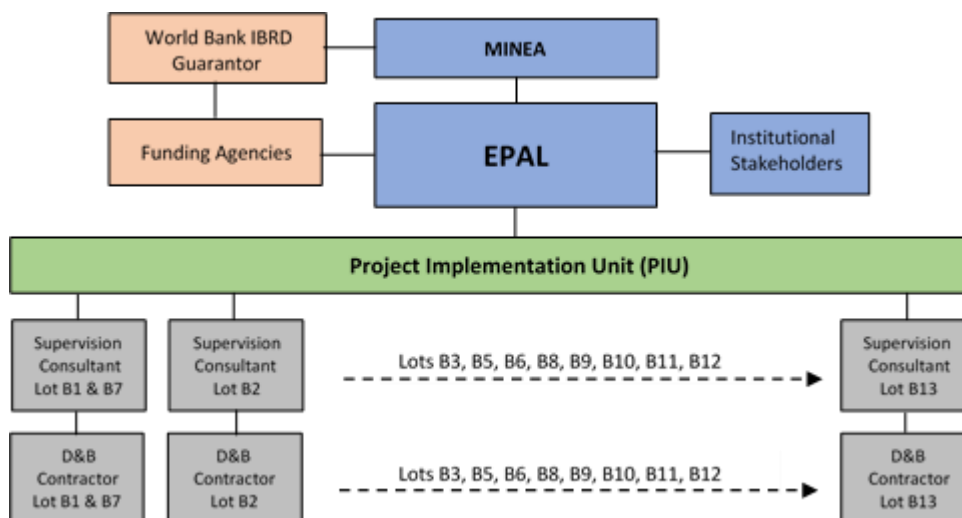


Figure 10-1: Institutional Arrangements for B4WSP Implementation

There will, of course, be a variety of informal communications links not shown in Figure 10-1; between PIU and other institutional stakeholders, the CLO and MINAMB, the CLO and NGOs/CBOs, between the different D&B contractors and different Lot construction supervision consultants. Communications between the PIU CLO and PAPs and PAP communities are illustrated in Figure 5-3 of the RPF and discussed in the Appendix D, the Social Consultation and Engagement Plan, herein.

On completion of final project designs submitted by D&B contractors, the full scale of land take, asset loss and resettlement can be accurately determined. It is the responsibility of the Angolan Government, through EPAL to manage resettlement compensations, including cash payments. EPAL will be required to recruit a consultant or firm to establish a secure payment compensation mechanism, for this purpose.

10.3 BUILDING CAPACITY FOR A STRENGTHENED EPAL

In order to build capacity within EPAL for B4WSP and future D&B projects, and for subsequent operational management, it is recommended that each PIU specialism be assigned counterpart staff to learn, and be trained in those aspects, that present training opportunities do not allow for.

In order to maintain EPAL's ongoing functions, it is recommended that the PIU counterpart positions be filled by new appointees, and that any secondment of present staff be compensated for by new appointments to fill previous roles. For example, in respect of the CLO, it is proposed that EPAL's existing environmental expertise be left in place, to deal with the issues in which they are already experienced, while new appointees are seconded to PIU.

EPAL capacity building and implementation of the ESIA will be paid for from an estimated budget set aside, and as recorded in the Project Technical Feasibility Study (TFS). Specific budgets for implementation of all subsequent downstream ESIA's will be included in those specific ESIA's. However as an approximation, the total budget estimated for ESMP implementation is 2% of total project costs.

10.4 CAPACITY BUILDING FOR ENVIRONMENTAL & SOCIAL ISSUES

In respect of the composition and staffing levels for the CLO, this can only be seriously considered when the full scale of land take, asset loss and resettlement are more fully defined by the D&B contractors, when the relative levels of foreign and local Angolan workers are known, and a schedule for the execution of each construction Lot has been agreed. Current expectations are that the following will be required:

- One international CLO manager;
- One international environmental expert with CEMP implementation experience;
- Two local environmental counterpart staff;
- One local environmental quality monitoring counterpart staff;
- One international social specialist;
- Two local social counterpart staff;
- One local senior social specialist to front the Secretariat for GRM;
- Two local secretaries/document controllers, one for GRM, one for all other E&S issues.

In advance of determining the full scale of land take, asset loss and resettlement, it is recommended that PIU prepare themselves by appointing an environmental specialist, a social specialist and a specialist in Grievance Redress Mechanism (GRM); with the full complement of staff only employed following completed design by D&B contractors, and assessment of asset loss.

Many of the CLOs administrative functions will be handled through the administrative facilities afforded by PIU.

In all formal progress meetings and reports, be they for individual Lots or B4WSP-wide, environmental and social issues must be a specific topic on each agenda and a specific section in each report, whether or not at that particular time there are environmental and social issues to report.

10.5 TRAINING IN E&S ISSUES

All EPAL and other government staff, e.g. MINEA, MINAMB, closely associated with the project, together with those responsible for E&S issues within the individual Lot supervision consultants and D&B contractors will need to be made sensitive to the requirements of the B4WSP ESMPs, RPF and RAP. This will be achieved through a one-day seminar presented by the CLO. Other concerned departments, organisations and NGOs/CBOs should also be invited so that EPAL may promote the vigorous procedures that are being followed in Angola, perhaps for the first time.

In addition, a half-day induction course on environmental and social awareness will be given to all PIU engineering and contract staff, international specialists and local counterparts, and repeated at intervals as new or replacement staff are appointed. For all contractors' workforce, poster displays and toolbox talks on a range HSE issues will be given the foremen and managers.

The counterpart staff within CLO will undergo significant formal 'on-the-job' training. For the CLO, this will include but not be limited to training in the following fields of activity:

- World Bank social safeguard commitments;
- E&S oversight field activities, Mechanical & Electrical and reporting procedures;
- CEMP oversight, monitoring and evaluation, coordination with MINAMB;
- The Rights of PAPs and PAP communities, B4WSP GRM procedures;
- Applicable Environmental Quality Standards and B4WSP field monitoring requirements;
- Post-Commissioning, Post-PIU requirements and activities.

On completion of B4WSP implementation, part of PIU closure, EPAL will organise a 2-day seminar to review the outcome of PIU activities throughout the period of construction and Defects Liability Period. This would compare the experience gained with that expected by the ESIA and RPF, the lessons learnt and the adoption of similar procedures for future projects.

Separately from the PIU, it is also recommended EPAL organise a seminar 12-18 months after the commissioning of the final B4WSP CD to discuss operational experience.

No specific external training is anticipated at the present time. However, the Director of PIU and the CLO Manager should review opportunities to enhance the abilities of counterpart staff beyond the limitation of B4WSP activities. EPAL should consider if they will require PIU tenderers to include a provisional sum for external training in their tender submissions.

The inputs and costs for the training outlined above must be included in PIU tenderers submissions.

11 CONSULTATIONS AND COMMUNICATIONS

This section of the ESIA highlights the key stakeholders in the B4WSP, categorises them, summarises previous engagement activities and makes recommendations for further Stakeholder Engagement (SE) through to the operational phase of the project. It should be noted that this section acts as a summary of a more detailed Stakeholder Consultation and Engagement Plan (SCEP), submitted as Appendix D. Versions of the Environmental and Social Impact Assessment (ESIA), Resettlement Policy Framework (RPF) and Stakeholder Consultation and Engagement Plan (SCEP) are available in the local language (Portuguese) and will be shared with the public in Angola.

11.1 IDENTIFICATIONS AND CLASSIFICATION OF STAKEHOLDERS

Key stakeholders have been defined as those who will be affected by, or will affect the project throughout its course. These stakeholders have been identified through a site survey, desk based research, the previous ESIA and consultations with both the Client and World Bank.

The following is a provisional list of stakeholders identified at this stage, as the project proceeds this list is likely to expand:

- Empresa Pública de Águas Luanda (EPAL);
- The World Bank;
- Commercial Banks;
- Design and Build (D&B) contractors;
- National Institute of Water Resources of Angola (INRH);
- National Institute of Biodiversity and Conservation Areas (INBAC);
- Ministry of Energy and Water (MINEA);
- Ministry of Environment (MINAMB);
- Ministry of Territorial Administration (MAT);
- Belas Municipality representatives;
- Talatona Municipality representatives;
- Viana Municipality representatives;
- Community leaders, also referred to as sobas;
- Current private water operators (i.e. water truck operators and those with privately owned tanks that resell water to their neighbours);
- Project Affected Person (PAP) communities, including but not limited to:
 - Julio (CD Bitá);
 - East Bitá Village (CD Bitá); and,
 - Alvarenga (CD Mundial).
- Project beneficiaries;
- Project Affected Persons (PAPs);
- Vulnerable peoples; and,
- Development Workshop (Non-Governmental Organisation, NGO).

As Design and Build (D&B) contracts are yet to be awarded for all lots, all contractors have been identified and analysed as one homogeneous group. As the project progresses and D&B contracts are confirmed for every lot these stakeholders should be identified and analysed individually.

Additionally, Community Based Organisations (CBOs) and Faith Based Organisations (FBOs) have, and will continue to be, considered important stakeholders but as none have been identified yet, they have not been included in the below analysis.

The above list of stakeholders were analysed based on their dependence on, and influence over, the project and put into one of the following categories. Table 11-1 summarises which stakeholders are considered primary, secondary and tertiary (a detailed methodology for stakeholder classification has been included in the SCEP):

- **Primary Stakeholders:** those who are likely to be directly affected (positively or negatively) by a project. This category typically includes local populations, particularly poor and marginalised groups who have traditionally been excluded from participating in development efforts.
- **Secondary Stakeholders:** those who influence a development intervention or are indirectly affected by it. This typically includes, civil society organisations, private sector firms, the funding agent(s) and their shareholders and other development agencies.
- **Tertiary Stakeholders:** More indirectly affected by the project than secondary stakeholders. Those who show interest in the project and would like to be kept informed of the project as it progresses. These stakeholders may also provide necessary project information and may be able to influence a project.

Table 11-1: Summary of Primary, Secondary and Tertiary Stakeholders

Primary Stakeholders	Secondary Stakeholders	Tertiary Stakeholders
PAP Communities and their leaders	Design and Build Contractors	Commercial Banks
Project Beneficiaries	The World Bank	--
PAPs	MINAMB	--
Vulnerable peoples	MINEA	--
Belas Municipality	INRH	--
Viana Municipality	MAT	--
Talatona Municipality	INBAC	--
EPAL	Development Workshop	--
Current private water operators	--	--

Categorising stakeholders into either primary, secondary or tertiary clarifies their relationship with the project and allows the nature, level of intensity of engagement activities to be tailored to each stakeholder’s needs. This is discussed further in Section 4 of the SCEP.

11.2 SUMMARY OF PREVIOUS ENGAGEMENT ACTIVITIES

Figure 11-1 shows the four key stages of the project where some form of SE is required. For the current stage (concept design) Key Informant Interviews (KIIs), a high level social survey and public consultations have been undertaken. This section presents the results of each of these activities.

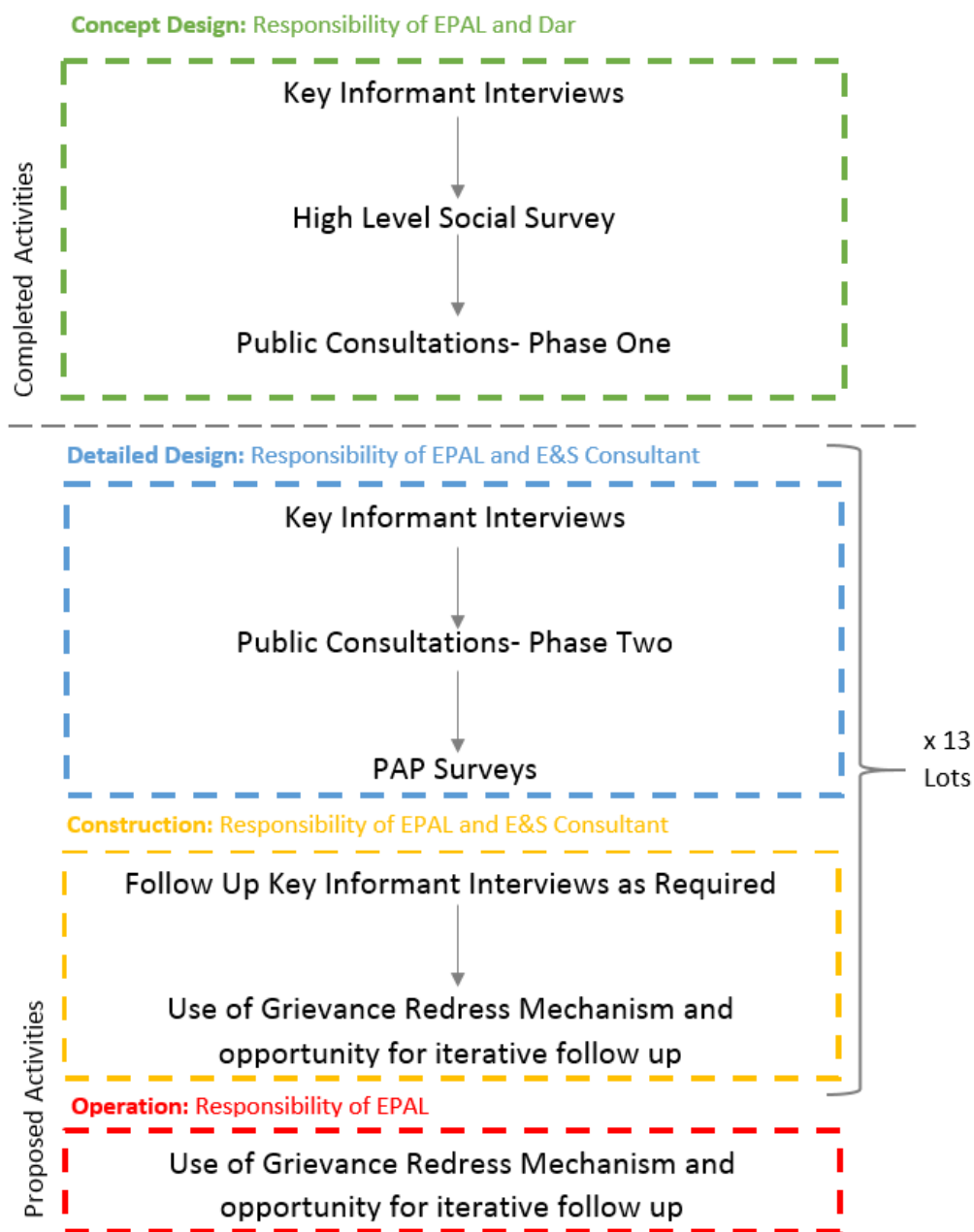


Figure 11-1: Stakeholder Engagement Activities for each project stage.

11.2.1 KEY INFORMANT INTERVIEWS

KIIs were primarily used for institutional stakeholders who usually engage in this manner. Objectives of these meetings include:

- Make key informants aware of the project and its likely impacts;
- Request key informants to share any information they deem relevant to the project's progress; and,
- Advise informants that the ESIA team will be conducting surveys in the service areas.

For each meeting an agenda was drafted, minutes were taken and translated into both English and Portuguese (shown in Appendix D1). Where requested, minutes of meetings were shared with the stakeholder in question. A summary of key findings from each of these meetings is given in Table 11-2 and Plate 11-1, 11-2 and 11-3 are photos taken during these meetings.

Table 11-2: Summary of Key Informant Interviews

Stakeholder	Project Members Involved	Date	Key Findings
EPAL	<p>Agux Andrade <i>Civil Engineer</i></p> <p>Elias Elkhoury <i>Civil Engineer</i></p> <p>Elline Coronho <i>Civil Engineer</i></p> <p>Emma Woodward <i>Environmental and Social Specialist</i></p> <p>John McCawley <i>Environmental Specialist</i></p> <p>Melhem Zoghzoghi <i>Civil Engineer</i></p>	21/05/18	<p>EPAL to accompany Dar team during site visit to intake, pumping station, raw water pipeline route to ETA & CD Bitá and other CD locations.</p> <p>EPAL to arrange for Centro Cerro to accompany Dar team during site visit to pipeline routes. Distribution networks are likely to have no significant environmental and social impact and therefore sample surveys will be undertaken, one in each service area.</p> <p>Dar team request any maps available covering the service areas.</p> <p>On previous projects EPAL has not gone through a regulated process for land acquisition and resettlement. Instead have undertaken negotiations with the owner directly. It was explained that even if it is not widely used, Dar needs to understand the institutional framework surrounding resettlement. EPAL was to investigate.</p>
EPAL (Nounes Domingo)	<p>Elias Elkhoury <i>Civil Engineer</i></p> <p>Emma Woodward <i>Environmental and Social Specialist</i></p> <p>John Davey <i>Environmental Manager</i></p> <p>John McCawley <i>Environmental Specialist</i></p>	30/05/18	<p>Nounes had worked on several EPAL projects which required land acquisition and resettlement. Most of the land taken was agricultural. There were a few resettlements but there was still no clear procedure for this.</p> <p>Cash is usually the only form of compensation given as this is the preference of the people. The proper channels are only used when the pipeline will disturb the existing infrastructure. Then this is negotiated with the appropriate ministry or authority.</p> <p>Ministry of Agriculture has set compensation prices for agricultural land including crops and fruit trees. EPAL to provide Dar with this information.</p> <p>In theory the project team should be accompanied by a government representative (from either the Ministry of Agriculture, Ministry of Construction or the Ministry of Public Works) to make sure people are getting a fair price for assets lost however it is understood that this is generally not the case on EPAL's projects.</p> <p>PAPs are divided into one of three categories: PAP legally bought the land from the government and has a leasehold title deed with a future expiry date. In this case the owner can negotiate a price for compensation.</p> <p>PAP is legally allowed to live on the land (has a provisional title with some rights of use) but does not own the land itself. In this case GoA recommends a compensation rate of US\$ 14/m².</p> <p>PAP occupies the land but has no formal right to it. In this case GoA recommends a compensation rate of up to US\$ 14/m².</p> <p>Compulsory purchase of land has happened before but is avoided as far as possible.</p> <p>Only the owner is eligible for compensation not his renters or descendants.</p> <p>The public are only officially made aware of the project after detailed design stage at an event organized by MINEA.</p> <p>The cut-off date for compensation eligibility is usually after the alignment/land ownership survey is complete and just before construction begins, limiting the amount of time people have to move onto the land and claim compensation. However, even if there is a survey confirming which</p>

Stakeholder	Project Members Involved	Date	Key Findings
			<p>properties are legitimately eligible for compensation this is not always respected, and EPAL often pays compensation to people who have moved onto the land after the cut-off date. EPAL to provide Dar with a sample questionnaire for land ownership surveys which was made in 2001.</p> <p>Public consultation has not been undertaken in Angola at the concept design stage as once the people know about the project, they will move onto the land to claim compensation. EPAL may therefore be reluctant to undertake public consultations at this stage of the project.</p> <p>Women are paid the same compensation as men.</p> <p>There are no extra provisions made for vulnerable groups.</p> <p>Non-tangible losses such as unharvested fruit are compensated as far as possible. However, no compensation is offered for losses such as an increased journey time to work/school etc.</p> <p>If given new land, the PAP will have the same rights to the new land as he had to his old land.</p>
INRH	<p>Elias Elkhoury <i>Civil Engineer</i></p> <p>Elline Coronho <i>Civil Engineer</i></p> <p>Emma Woodward <i>Environmental and Social Specialist</i></p> <p>John Davey <i>Environmental Manager</i></p> <p>John McCawley <i>Environmental Specialist</i></p>	06/06/18	<p>Documents including the National Water Plan and Kwanza Rio Masterplan will be provided to Dar once EPAL has formally requested them.</p> <p>The minimum flow recorded for the lower Kwanza is 122 m³/s. Historically the Kwanza's flow, during the wet season, has been recorded as high as 2000m³/s.</p> <p>A pilot study, funded by the World Bank and the Angolan Government is currently looking into how much water is abstracted from the Kwanza, both legally and illegally, but there is no data on it presently.</p> <p>Cambambe Dam (upstream from intake point) releases 450-500m³/s. Common practice dictates that least 14% of this (which equates to 70 m³/s) is required to maintain the Rio's ecosystem.</p> <p>Presidential Decree 82/14 which, among other things, gives the INRH the authority to revoke a company's abstraction license if it is deemed necessary.</p> <p>INRH mentioned Allan Cain at <i>Development Workshop</i> has experience in implementing water projects and could be a useful source of information.</p>
MAT	<p>Elline Coronho <i>Civil Engineer</i></p> <p>Emma Woodward <i>Environmental and Social Specialist</i></p> <p>John Davey <i>Environmental Manager</i></p> <p>John McCawley <i>Environmental Specialist</i></p>	13/06/18	<p>The ministry is responsible for land management over a large area that include much of the B4WSP.</p> <p>Department of Urban Management at the MAT can help when trying to find cadastral records for land holder with a title.</p> <p>When occupant of land has no title, go to the village soba.</p> <p>Most land expropriation is undertaken by the Ministry.</p> <p>Public consultation is undertaken by the Municipality, the government land management institution and the Ministry.</p> <p>Affected persons are contacted by the relevant municipality.</p> <p>Land and assets are valued by either the Ministry of agriculture, for agricultural land, or the Ministry of Urbanism, for urban land.</p> <p>Cash is the usual means of compensation. Land-for land swaps are available; it is the choice of the affected land holder.</p> <p>Under the 2004 Land Law all groups are treated equally and there is no special measures taken for any group.</p> <p>Grievance redress depends on the problem. The Municipality review rejected compensation but if this does not resolve it cases usually go to court.</p> <p>Renters are not compensated, all compensation goes to the land holder.</p>

Stakeholder	Project Members Involved	Date	Key Findings
<p>Development Workshop</p>	<p>Elias Elkhoury <i>Civil Engineer</i></p> <p>Elline Coronho <i>Civil Engineer</i></p> <p>Emma Woodward <i>Environmental and Social Specialist</i></p> <p>John Davey <i>Environmental Manager</i></p> <p>John McCawley <i>Environmental Specialist</i></p>	<p>13/06/18</p>	<p>Development Workshop (DW) have worked in Angola for 35 years in the fields of land tenure, urban planning and development, governance, water and drainage.</p> <p>DW published a book explaining their model for the community management of water which is currently used by the government and could be useful for the B4WSP.</p> <p>DW have and continue to work with various government ministries including; Urbanism and Housing, Energy and Water, Environment, Territorial Planning as well as many municipal administrations in Angolan provinces.</p> <p>DW's paper on land prices was based on research undertaken in 2010 which was a peak time for property prices. DW estimated that these prices are now 30-50% of what was published in the paper.</p> <p>No compensation is paid to non-titles land and the government see it as being held illegally. The Codigo Civil is the "mother law" and states that land occupiers that are located in good faith should have land rights. These rights were removed by the 2004 land law, weakening occupier's land rights.</p> <p>DW advocate against this change in legislation and are using the New Urban Agenda (Quito, 2016) as a vehicle to effect this change.</p> <p>DW advocate that occupiers of land at current market value should be compensated for that land at current market value, rather than be provided land elsewhere.</p> <p>Even though the Land Law requires public consultations this never takes place and occupants are usually given a few days' notice before they need to move.</p> <p>Evictions are usually undertaken by the Police or Army.</p> <p>DW recommended surveys and aerial photos be taken at a cut-off date. It should be communicated to the public that this cut-off date will be used to establish rights to compensation and anyone occupying the land after this date would not be entitled. This will need to be done in coordination with the legal team at the Ministry of Territory and Housing.</p> <p>DW recommended using two mechanisms for public consultation:</p> <p>The formally recognized approach is to go to the Municipal Administrator who will then involve the soba of each settlement and the government appointed Consultative Community Council (CACS) of each area. The CACS can help organize public meetings. However the CACS council is appointed by the government and is not likely to be entirely representative of the population. Additionally CACS have not been established in all locations yet.</p> <p>The informal approach is to use Community Forums. These forums exist in most places and are more representative of the community and its interests. Furthermore the forums often comprise of CBOs and FBOs who may have more specific needs which the project needs to address. DW helped set up these forums and therefore can provide useful contacts.</p> <p>Information about the meetings can be disseminated via CACS, forums, sobas, newspapers and radio.</p> <p>DW highlighted that a number of communities in south Luanda (Bitá area) are displaced communities from other parts of Angola (Moxico in particular). These communities have moved into the area en masse, including with their sobas and differing languages. Some groups have been intentionally resettled, e.g. Katanga (DCR) refugees was provided as an example.</p> <p>Grievance redress only applies to title holders. If compensation is proposed it is not accepted, PAP can only go back to Municipality, then to Court.</p> <p>Court is expensive and likely to take years. There is no independent review procedure.</p> <p>Non-title owners are not entitled to compensation so they will accept whatever is offered.</p>

Stakeholder	Project Members Involved	Date	Key Findings
			The Land Law makes no special provision for any special group. Everyone is, in theory, treated equally. DW suggested Dar involve vulnerable populations in the community management structure. For example wheelchair users often transport water on their mobility aids, this gives disabled people a chance to actively participate in and benefit from the Project.
MINAMB	<p>Elline Coronho <i>Civil Engineer</i></p> <p>Emma Woodward <i>Environmental Specialist</i></p> <p>Agux Andrade <i>Civil Engineer</i></p> <p>Sebastian Akl <i>Civil Engineer</i></p>	21/06/18	An update to the project and project area was provided.
INBAC	<p>John McCawley <i>Environmental Specialist</i></p> <p>Angela Kisalu <i>Civil Engineer</i></p>	21/06/18	The Institute of Biodiversity and Conservation Areas (INBAC) Requested data on the ecology of the Lower Kwanza Rio. This however was unavailable.
EPAL	<p>Elias Elkhoury <i>Civil Engineer</i></p> <p>Sebastião Barros <i>Civil Engineer</i></p>	16/08/18	Regarding the RPF, Dar again requested that the land ownership status between the bottom of the river valley and the settlement of Julio be confirmed. EPAL arranged meeting with Belas administration to confirm the status of this land. Regarding ESIA, and according to the World Bank's comments, DAR requested the following: Updated EPAL organizational structure; Clarification on the existence or not of a quality management system within the EPAL, to include the ESIA, as well as the environmental and social management plan, to ensure the implementation of the studies in the work; Clarification on the status of the lands located along the alignment of the raw water pipes, from EBAB to ETA.
Administração Municipal de Belas	<p>Elias Elkhoury <i>Civil Engineer</i></p> <p>Sebastião Barros <i>Civil Engineer</i></p>	21/08/18	Belas administration confirmed they had received EPAL's request to confirm the ownership status of the land between the water intake and the village of Julio. Belas administration confirmed that it works closely with the Ministry of Agriculture to confirm land prices where expropriation and resettlement may be required.
EPAL	<p>Elias Elkhoury <i>Civil Engineer</i></p> <p>Sebastião Barros</p>	19/09/18	EPAL has requested health data from the Municipality of Belas and will forward this to Dar once it has been received. A discussion around licences and permits required yielded that EPAL may need to obtain a 'site licence' to begin construction and up to one may be granted for each lot. However this licence may not be necessary, it is granted at the Municipality's discretion.

Stakeholder	Project Members Involved	Date	Key Findings
	<p><i>Civil Engineer</i></p> <p>John Davey <i>Environmental Manager</i></p> <p>Emma Woodward <i>Environmental Specialist</i></p>		<p>EPAL has the authority to abstract water as declared by Presidential Decree 72-A /01, 5th October. EPAL does not need a licence to buy or store chemicals used in the water treatment process. However, the purchase of such chemicals does need to be approved by the Ministry of Commerce.</p> <p>Furthermore before construction starts plans must be approved by MINEA (if the project is under 1000 million kwz) or by the President of Angola (if the project is over 1000 million kwz).</p> <p>If an un-asphalted road needs to be closed during construction then EPAL shall collaborate with local resident’s committees and agree alternative routing to avoid complete severance between people and their homes, places of work and business. This agreement is verbal and usually not put into writing.</p> <p>If an asphalted road needs to be closed during construction then EPAL shall send official letters to both the <i>Gabinete de Trânsito e Mobilidade de Luanda</i> or Transit and Mobility Office of Luanda and National Institute of Roads or <i>Instituto de Estradas de Angola</i> (INEA). Copies of these letter shall also be sent to the local police, the provincial and municipal government.</p> <p>Works on the streets without asphalt: EPAL-EP verbally informs the Residents Committee, which in turn will disseminate the information to the residents;</p> <p>Once the D&B contractor has done a detailed design for the distribution networks this will be shared with EPAL along with any constraints identified and EPAL shall try and remove any constraints e.g. ask people to move their cars.</p> <p>The D&B contractor of the distribution networks shall install an external tap and a water meter within the boundaries of a customer’s property. However, if the customer wishes to receive water they must then pay a 15,000 kwz connection fee and a 5,000 kwz registration fee. Once this has been paid the customer will begin to receive water. The customer may then decide to connect to external tap to their internal plumbing but the cost of this shall be borne by the customer.</p> <p>Official letters were sent to the relevant urban district administrators to inform them of the public consultation sessions that took place last week and requested that they share the time, date and location of the meetings with their respective jurisdictions. An example of one of these letters was provided.</p>
<p>Development Workshop</p>	<p>Elias Elkhoury <i>Civil Engineer</i></p> <p>John Davey <i>Environmental Manager</i></p> <p>Emma Woodward <i>Environmental Specialist</i></p>	<p>20/09/18</p>	<p>DW has information for the municipalities of Cazenga, Cacuaco and Viana but not for Belas. Dar asked if these areas were in anyway similar to Belas and therefore one could reasonably assume that the prevalence of waterborne diseases were roughly the same. DW responded that Belas is one of the newly settled areas in the city and they would not assume that it has the same characteristics as the other municipalities surveyed.</p> <p>DW worked with local municipalities to collect the health data in Cacuaco, Cazenga and Viana but prior to these surveys the municipality had minimal health data for its population.</p> <p>DW recommended the minimum level of sanitation a household must have in order to obtain a household connection is a soakaway. Holding tanks and septic tanks are not very common in the project area. DW suggested that anything more than a soakaway may disincentivise people making household connections and make water unaffordable.</p> <p>DW has worked with EPAL in the past and has managed water distribution via their <i>Modelo de Gestão Comunitária de Água</i> (MOGECA) or Community Water Management Model which has now been adopted by MINEA. DW suggested that where an individual cannot afford a household connection or they do not have the minimum level of sanitation required to install a household connection that this model be followed for standpipes and fountains within the community. This model elects a water committee which is responsible for collecting EPAL’s water fees, maintaining the standpipes and fountains and distributing water to the community.</p>

Stakeholder	Project Members Involved	Date	Key Findings
			<p>DW would be interested in being part of the GRM process for Bitá IV, they would be happy to put together a proposal and a cost estimate for EPAL.</p> <p>DW recommended Dar contact Luanda Urban Poverty Programme (LUPP) as they are comprised of several CBOs that have experience in dealing with women's issues.</p>



Plate 11-1: INRH Meeting (06.06.18).



Plate 11-2: MAT Meeting (13.06.18).



Plate 11-3: Development Workshop Meeting (13.06.18).

11.2.2 HIGH LEVEL SOCIAL SURVEY

After meeting with institutional stakeholders and informing them of the project the ESIA team could then proceed with a high level social survey of the service areas. The objectives of which included:

- To gain a better appreciation of the socio-economic situation, particularly with regard to water provision;
- To investigate the need for a new water supply in Cabolombo and Mundial; and,
- To investigate the need for an improved water source in Benfica II and Camama.

A previous ESIA was carried out for this project in 2014, this was based on an alternative pipeline alignment (as discussed in Section 7 of the ESIA). The previous ESIA team conducted a similar survey in the service areas of Bitá and Ramiros. As data was already available for these areas and it was important not to increase stakeholder fatigue the Consultant focused on the remaining four service areas; Cabolombo, Mundial, Camama and Benfica II. Figure 11-2 shows the locations at which the social survey was conducted. The survey form used is shown in Appendix D2.

The survey indicated that in Cabolombo and Mundial service areas the majority of people are currently getting their drinking water from privately owned water tanks. Other water used for washing clothes or bathing is sometimes attained from water fountains but this water is widely used for human consumption.

Benfica II and Camama service areas are already supplied with water treated at ETA Sudeste, and the Bitá IV System will be reinforcing this supply. When asking local people about their current water supply, some cited reliability issues and most had back-up tanks on their properties in case the mains supply didn't work. More information on the methodology of this survey and further analysis of its results is available in Section 6 of this ESIA.

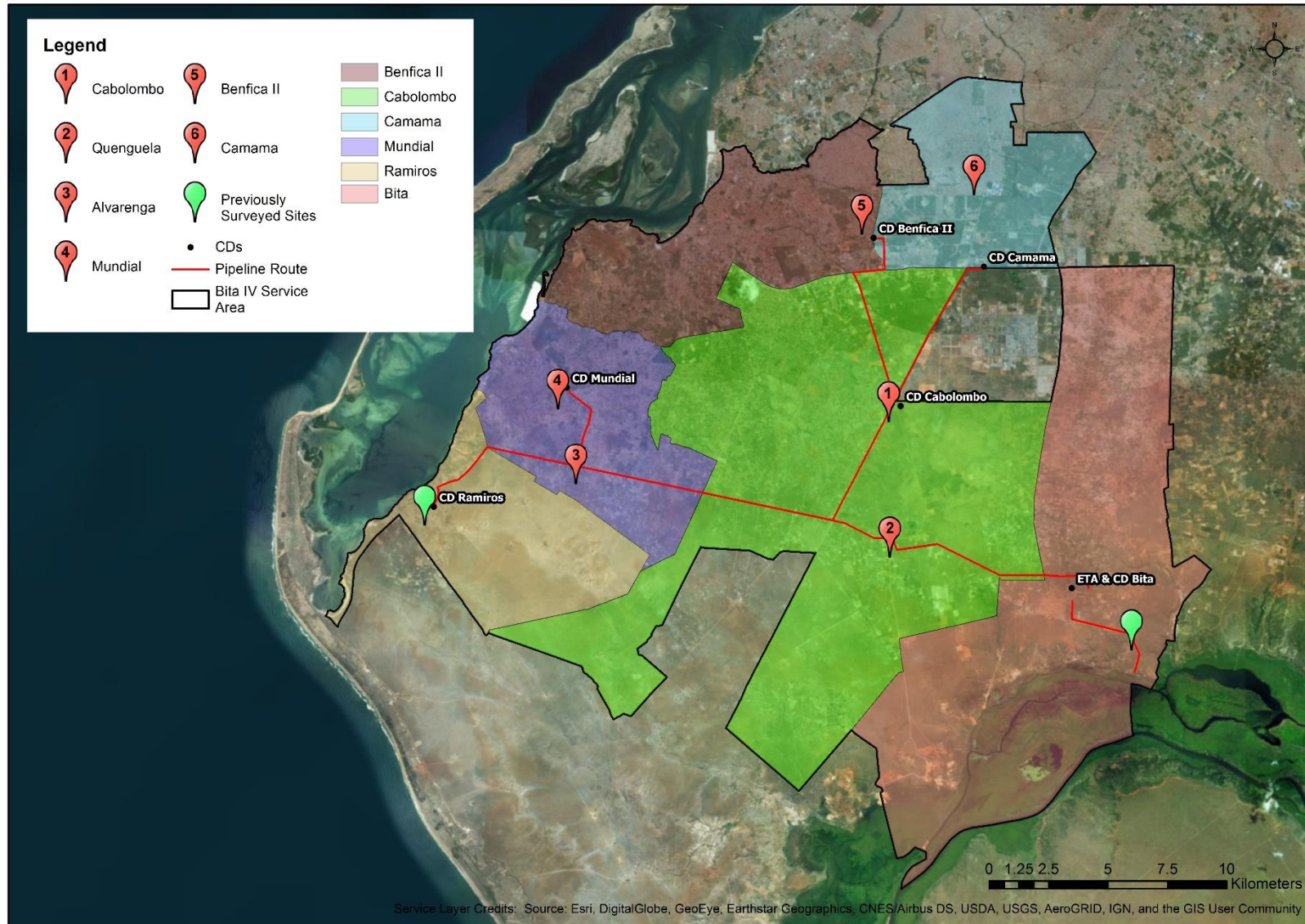


Figure 11-2: High level social survey locations.

11.2.3 PUBLIC CONSULTATIONS

Four public consultation meetings were held in September 2018 in and around the study area. The objectives of these meetings included:

- To enable affected groups and interested parties to understand the likely implications of the B4WSP and raise any concerns they may have;
- For the project team (EPAL and Dar) to listen to and where possible appease community concerns about the project; and,
- To encourage a two-way exchange of information to ensure the project’s social sustainability.

Meeting invitations were issued by EPAL to all urban district administrators within the project area. Administrators were asked to inform the people within their jurisdiction of the meeting’s time, date and location. Appendix D3 shows an example of one of these letters.

Table 11-3 shows the date, location and attendee catchment area for each of these meetings. Figure 11-3 displays the location of each of the meetings in relation to the project area. Although timings varied all of the meetings followed the format shown in Table 11-4. Plates 11-4, 11-5, 11-6 and 11-7 were taken during the public consultations.

Table 11-3: Schedule of Public Consultation Meetings

Meeting No.	Date	Location	Specific Venue	Attendee Catchment Area
1	Thursday 6 th September 2018	Talatona	EPAL Head Office	Institutional stakeholders
2	Wednesday 12 th September 2018	Cabolombo	Instituto de Gestão do Kilamba	Those who represent <i>bairros</i> of Bita and Cabolombo service areas.
3	Thursday 13 th September 2018	Ramiro	Comunitário Juvenil dos Ramiro	Those who represent <i>bairros</i> of Mundial and Ramiro service areas.
4	Friday 14 th September 2018	Talatona	Administração do Distrito Urbano da Camama	Those who represent the <i>bairros</i> of Benfica II and Camama service areas.

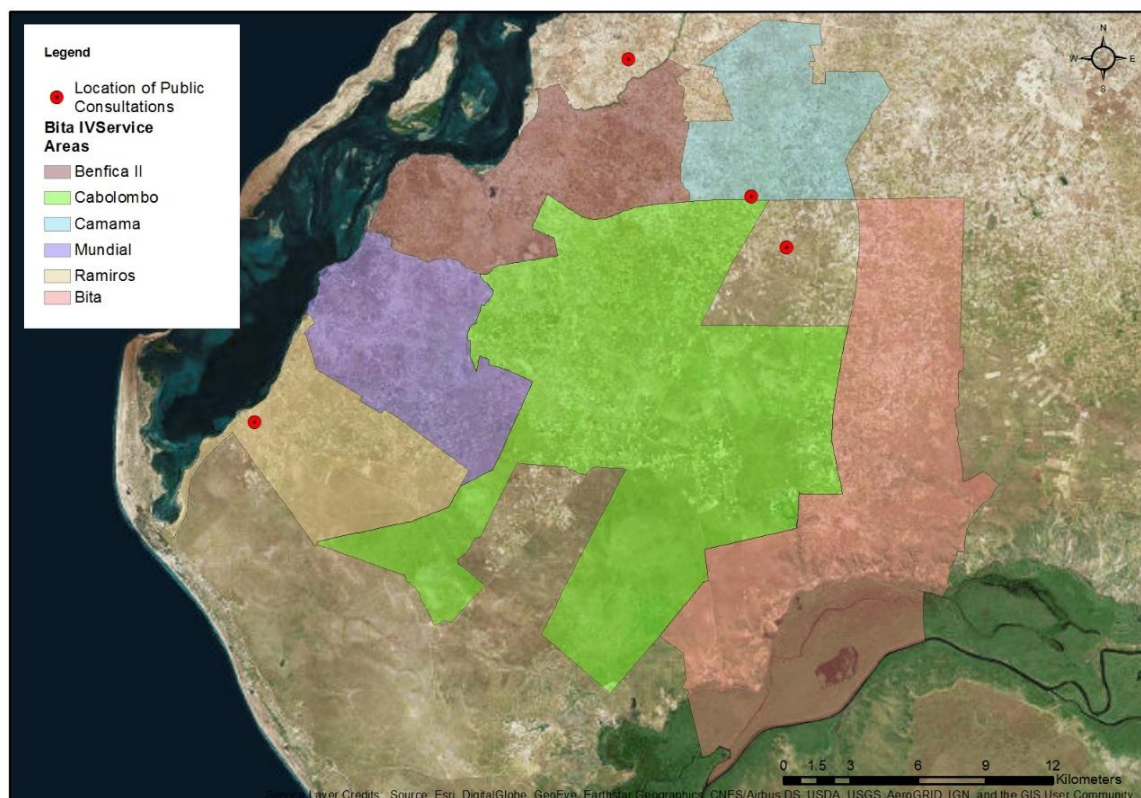


Figure 11-3: Locations of phase one public consultation meetings.

Table 11-4: Agenda for public consultations during concept design stage.

Time	Activity	Responsibility
9:30 - 10	Upon arrival attendees were asked to sign in, were given a programme for the meeting and a non-technical summary of the draft ESIA executive summary in the local language (shown in Appendix D4). Attendees are also invited to look at A3 posters put up around the room.	Dar and EPAL
10-10:15	Local municipality representative opened the meeting.	Local Municipality
10:15-10:30	EPAL provided a brief project description.	EPAL
10:30 – 11	Dar then presented the following (slides used are shown in Appendix D5): <ul style="list-style-type: none"> • Benefits of the project; • ESIA process including an explanation of site visits, establishing a baseline, assessment of impacts and planned mitigation measures; • RPF process and the purpose of the document; and, • Project's timeline and the next steps. 	Dar
11 - 12	The meeting was then opened up to questions from the audience. EPAL, Dar and the local municipality representatives answered as appropriate. Anyone who asked a question or made a comment was asked to also write their question down on a comments form for the Consultant's records.	Dar, EPAL and Local Municipality

A total of 270 people attended the meetings, 58 of whom asked questions and/or gave their comments on the project (Table 11-5). Those who asked questions were given a verbal response during the meeting but were also asked to submit their comments in written format. These were responded to in Tables 5-5, 5-6, 5-7 and 5-8 of Appendix D. The most common comments received and their corresponding responses are shown in Table 11-6.

Table 11-5: Public consultations attendance and comments received.

Date	Venue	Attendees	Written Comments
Thursday 6th September 2018	EPAL Headquarters, Talatona	68	20
Wednesday 12th September 2018	Instituto de Gestao do Kilamba	98	12
Thursday 13th September 2018	Centro Comunitario Juvenil dos Ramiros	74	8
Friday 14th September 2018	Munistracão do Distrito Urbano da Camama	30	18
Totals		270	58

Table 11-6: Most common questions/comments received during public consultations and responses given.

Most Common Questions/ Comments Received	Response Given
The project will take a long time to implement and the community need a quicker solution to the problem.	It is EPAL's intention to commence construction as soon as possible. In the meantime most places will have to continue to rely on current water sources
The administrators of this area need to work with the resident's committees to implement the project and minimise social and environmental impacts.	This is outside of Dar's and EPAL's control however the project will continue to collaborate with community representatives and municipality administrators and will encourage other stakeholders to do the same.
I suggest the project employs young people to address the issue of youth unemployment in the area.	The ESIA study recognises the unemployment issue in the area, particularly among the youth population, and suggests that local personnel be given priority, in those positions for which they are qualified, in order to maximise the project's economic benefit to the local population.

Most Common Questions/ Comments Received	Response Given
What type of resettlement will be undertaken for the project?	Resettlement and land acquisition shall be undertaken in compliance with Angolan law and World Bank standards. The Bank favours land-for-land swaps but this will be negotiated on a case by case basis.
There has been poor service in Benfica II and Camama areas for many years. How will the project address this?	By upgrading the CD and distribution networks in Camama and Benfica II it is hoped that the project shall address this.



Plate 11-4: Public Consultation at EPAL Headquarters on 6th September 2018.



Plate 11-5: Public Consultation at Kilamaba School on 12th September 2018



Plate 11-6: Public Consultation at Ramiros Youth Centre on 13th September 2018.



Plate 11-7: Public Consultation at Camama's Urban District Offices on 14th September 2018.

11.3 PROPOSED ENGAGEMENT ACTIVITIES

11.3.1 DETAILED DESIGN

As discussed in Section 2 the B4WSP is sub-divided into 13 lots, each of which will require another, more detailed ESIA and, if applicable, a Resettlement Action Plan (RAP). These studies must be conducted in accordance with Angolan law and international best practice, both of which require public consultation. The Consultant recommends that EPAL, in coordination with appointed D&B contractors and the resettlement management consultant, undertake the following SE activities during the detailed design stage:

- KIIs;
- Public consultations; and,
- PAP surveys.

It is important that these activities be coordinated by a central point within the Project Implementation Unit (PIU), most likely the Community Liaison Office (CLO), who has oversight over the 13 D&B contractors and the E&S consultant appointed by EPAL. If this is not the case stakeholders may be contacted multiple times which will increase stakeholder fatigue and might lead to stakeholders becoming reluctant to engage with the project again in the future.

11.3.1.1 Key Informant Interviews

During detailed design further engagement with key informants will encourage a continuous relationship between the project and its institutional stakeholders. In addition it will also provide an opportunity to present a more detailed analysis of the project's environmental and social impacts. Responsibility for scheduling, chairing and recording these meetings is with the Project Proponent and their appointed E&S Consultant. The following stakeholders in particular should be consulted again at the detailed design stage:

- Belas municipality administrators;
- Viana municipality administrators;
- Talatona municipality administrators; and,
- Community leaders.

11.3.1.2 Public Consultation – Phase Two

Once the World Bank guarantee the project and the detailed design phase commences, EPAL, in coordination with their appointed E&S Consultants will undertake another, more detailed ESIA and if necessary a RAP. All studies will need to be conducted in accordance with Angolan standards and, because the project will ultimately be funded by an International Finance Institution (IFI), IFC Performance Standards will also have to be adhered to, both of which require public consultations. This section presents the Consultant's proposed plan for detailed design phase public consultations.

It is suggested that this phase of consultations take the form of workshops whereby the public can inform and influence the detailed design of the project. This will also identify potentially vulnerable groups who may require special measures, such as Focus Group Discussions (FDGs), be taken to ensure they have an equal opportunity to raise their concerns and present their contributions. Workshops should be held in an accessible, public space on a weekend.

The workshops will be hosted by two to three Portuguese speaking EPAL employees. The meetings are expected to last 90 minutes and residents from all PAP *bairros*, should be invited. The meeting date, time and location should be advertised on EPAL's website at least seven days before the meetings take place. Additionally, formal letters from EPAL should be sent to the *soba* or *bairro* coordinator of every settlement in the project area of influence informing them of details of the meeting and asking them to disseminate this information to the people within their jurisdiction. Table 11-7 presents a proposed schedule activities that will need to take place for phase two consultations. Table 11-8 contains a proposed agenda for phase two public workshops.

Table 11-7: Proposed Schedule of Activities for Phase Two

Activity No.	Activity	Parties Responsible
1	Find and hire suitable venues in Benfica II, Camama, Ramiros, Mundial, Cabolombo and Bita.	EPAL
2	Advertise the time, date and location of the workshops on EPAL's website, inform <i>sobas</i> , CACS and community forums of the meeting and request that they share this information with their respective communities.	EPAL
3	Prepare materials for workshop meetings.	EPAL and E&S Consultant
4	Ramiros meeting	EPAL and E&S Consultant
5	Mundial meeting	EPAL and E&S Consultant
6	Bitá meeting	EPAL and E&S Consultant
7	Cabolombo meeting	EPAL and E&S Consultant
8	Benfica II meeting	EPAL and E&S Consultant
9	Camama meeting	EPAL and E&S Consultant

Table 11-8: Proposed Agenda for Phase Two Workshop

Agenda Item	Discussion
1	Upon arrival attendees will be asked to sign in and will be given a non-technical summary of the draft ESIA/RAP executive summary in the local language. Open the meeting by introducing the team present and thanking the attendees for coming.
2	Present maps showing where the distribution centres will be located and where the distribution networks will cover.
3	Present a timeline of Project implementation, if possible specific to that service area.
4	Explain the Grievance Redress Mechanism (GRM) to the attendees.
5	Exercise One: Attendees will be asked to get into groups, ideally each group representing one bairro within that service area. They will then be asked to rank the following attributes associated with water in order of importance to them: Clean; Affordable; Reliable; Close by; and Other. This exercise will shed some light on what their priorities are regarding water and its supply. This exercise also highlights differences between social groups. For example, women who are typically charged with collecting the water, may say it is more important that their water supply is close by.
6	One group will be asked what order they ranked their cards in and why, other groups will then be asked to explain how and why their cards differed. <i>NB: Pictures will be taken of the exercise and its results.</i>
7	Exercise Two: Now that attendees have more information on the Project they will be asked what they see as its advantages and disadvantages, i.e. how they see it impacting their day-to-day lives. Each group will be given small pieces of paper and asked to write either one advantage or one disadvantage on each and create two lists of advantages and disadvantages, ranking in them in order of significance.
8	One representative from each group will be invited to read out one main advantage and one main disadvantage. Each group will be asked to do the same until there is a list of the three advantages and three disadvantages of the Project. <i>NB: Pictures will be taken of the exercise and its results.</i>
9	After this attendees will be given the opportunity to ask further questions regarding the Project.

11.3.1.3 Project Affected Persons Survey

For those D&B contracts which may involve resettlement (most likely lots B1 and B2 only) a RAP is required. A fully comprehensive RAP includes the collection of appropriate and accurate baseline socio-economic data to identify all affected persons, determine their eligibility for compensation and assistance, and discourage the inflow of ineligible and fraudulent claimants.

Given that water projects are perceived to afford overriding benefits to the communities to be served, the proposed B4WSP PAP survey will comprise semi-structured interviews targeting 100% sample of directly affected households, and business enterprises, i.e., those suffering loss of land and/or fixed assets and/or being resettled or relocated. The details of the survey, the results obtained and their analysis will be presented in the RAP.

The RPF and completed for the purposes of the guarantee have established a framework within which resettlement may take place, this guidance should be followed by any D&B contractor required to execute a RAP.

11.3.2 CONSTRUCTION

11.3.2.1 Key Informant Interviews

Further KIIs will need to be undertaken before construction, in particular:

- Belas municipality administrators;
- Viana municipality administrators;
- Talatona municipality administrators; and,
- Community leaders.

Responsibility for scheduling, chairing and recording these meetings is with the project proponent. As and when necessary the appointed D&B contractor should also be in attendance. The purpose of these meetings is to: (i) inform local government of the final detailed design; (ii) give an estimation of when various construction activities will take place; (iii) the potential impacts these will have on the environment and people; (iv) what measures will be put in place to minimise, mitigate manage these impacts; and, (v) ask for their feedback and cooperation throughout the construction period.

One of the key agenda items for the KIIs during the construction period will be the impact of the project on vulnerable groups. Community leaders shall be asked for feedback on any issues that have arisen, such as increased incidence of GBV, and the appointed E&S Consultant, on behalf of EPAL, shall amend the GBV Action Plan adding to or amending the current arrangements as appropriate. This may require the E&S consultant to hold FGD with women in the area so that they can be involved in finding a better way to manage the occurrence of GBV.

11.3.2.2 Grievance Redress Mechanism

The B4WSP Grievance Redress Mechanism (GRM) may be used in the design and operational stages of the project as well as construction. However, it has been placed in the construction phase for the purposes of this report as this is when it is anticipated to be most heavily used. The GRM (illustrated in Figure 11-4) designed for B4WSP prioritises handling disputes fairly and amicably, with the result that the individual PAP or PAP household are not worse off than they were pre-project.

Most grievances are likely to fall into one of the following categories:

- Land based;
- Non-land based; or
- Gender Based Violence or Sexual Exploitation and Abuse.

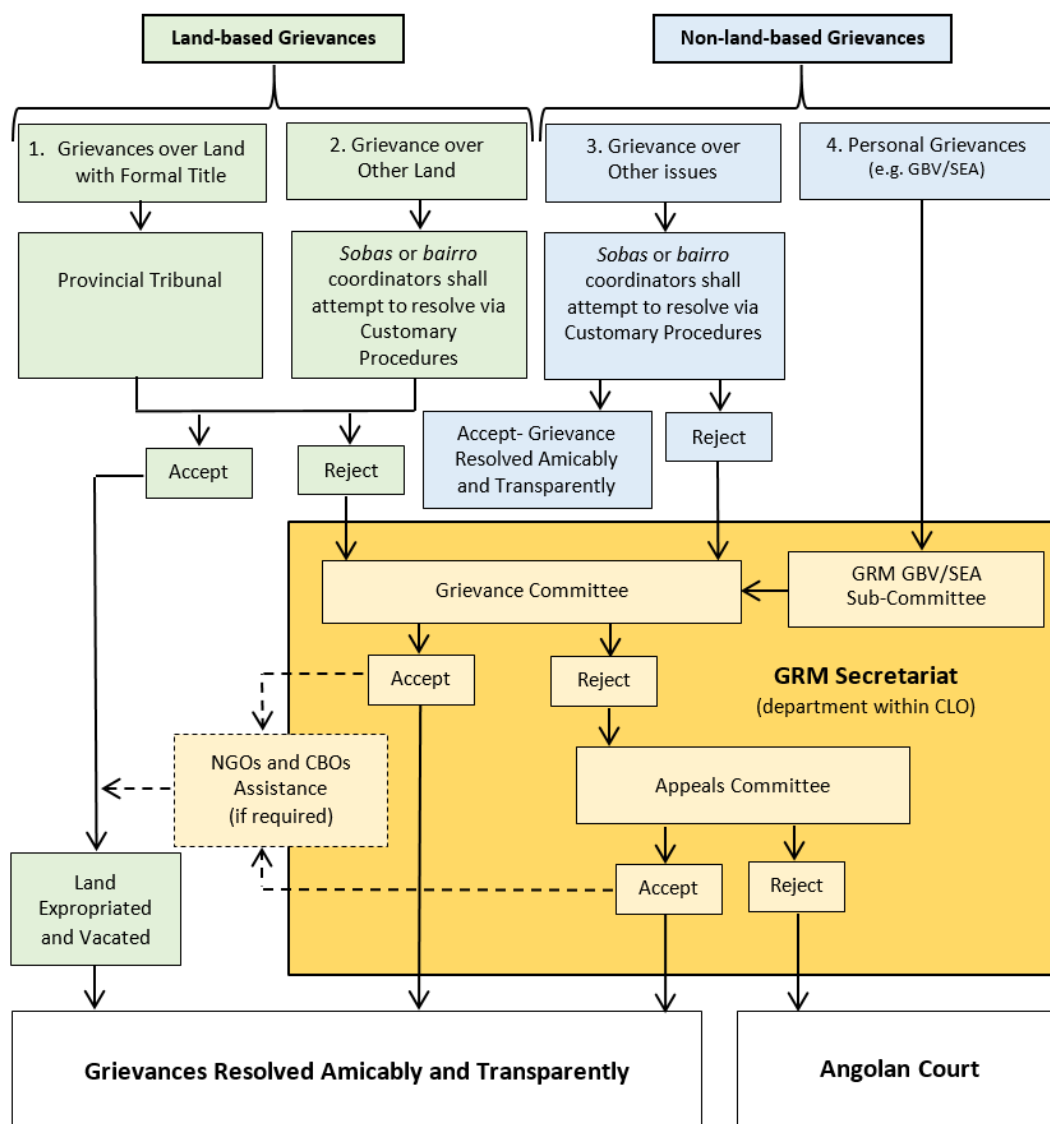


Figure 11-4: GRM for B4WSP

Land Based Grievances

In respect of land take, asset loss and resettlement, the procedure begins with the offer of compensation from GoA/EPAL to the PAP. On the basis of ‘full replacement cost’, many B4WSP PAPs will find the initial offers of compensation made by GoA/EPAL to be acceptable. If this is acceptable, expropriation proceeds and the land is subsequently vacated for the project.

If the offer is not acceptable, those land holders with formal title will appeal through existing Land Law provision to the Provincial Tribunal. Those land users with provisional or no title will appeal through communal procedures, this may be escalated to the Grievance Committee.

Because of its close involvement with land take, expropriation and resettlement, the Community Liaison Office (CLO) embedded within the Project Implementation Unit (PIU) will know of each of these cases and monitor the outcome of all settlements against World Bank OP 4.12 requirements. If the land holders, whatever their title, are still unsatisfied, they may make an appeal in writing through the *soba* or *bairro* coordinator to CLO’s GRM Secretariat, where the submission will be given a case reference number. Alternatively, PAPs may make direct written submission themselves.

EPAL have expressly stated that they will make the effort in good faith to compensate all potentially affected parties regarding the implementation of Lots B1 to B7, and will issue a public statement inviting them to compensation entitlement in good faith.

Non-land Based Grievances

Similarly, grievances during the period of construction, e.g., damage to property by a contractor's staff or vehicles, vandalism or theft of property by construction crews, verbal abuse, violent assault, excessive noise or dust, etc., may be made via the *soba*, *bairro* coordinator or by the complainant themselves.

Gender Based Violence or Sexual Exploitation and Abuse Grievances

In Angola, as in other countries, stigma is often attached to the victims of gender-based violence (GBV) and sexual exploitation and abuse (SEA), such that they often prefer to suffer in silence, not sharing their experience with the police or family members. Female victims may only wish to relay their suffering to close friends of the same gender after time and the trauma has passed. Male victims of SEA may also wish to keep their suffering to themselves as SEA is typically regarded as a women's issue.

Any such event attributed to B4WSP construction crews, project engineers or others will be treated sympathetically and in a manner that keeps victim's identity confidential. Written submissions to the GRM Secretariat may be made by the victim, by friends or relatives, or, in the case of female victims, through a female-interest NGO/CBO. Within the Secretariat, these submissions will be steered through the procedure by a female member of the Grievance Committee, unless the complainant requests otherwise.

11.3.3 OPERATION

Once the project is operational the PIU shall continue to operate the same GRM process detailed in Section 0 during the defects liability period, usually one year after the construction phase is concluded. After this EPAL will be responsible for addressing any further grievances.

Please note the proposed engagement activities included in Section 11.3 are suggested. The approach outlined above may need to be adjusted as more project details come to light.

12 DOWNSTREAM MEASURES

The last section described how consultations and communications provides the opportunity for EPAL and Bitá IV to improve public relations, adhere to international best practice and ensure the project is socially sustainable. In order to realise this, B4WSP will adopt the engagement methods outlined above and discussed in further detail in Appendix D, which will continue throughout the project life cycle.

Thus far, the present consultant has completed the TFS, on the basis of which the present ESIA and associated RPF have been prepared. Hereafter responsibilities for these issues are divided between the various concerned organisations as shown in Table 12-1.

Table 12-1: Downstream Responsibilities

Organisation	Prime Responsibilities	Status
Dar Al-Handasah	TFS and conceptual design	Complete
	ESIA/RPF for Bank Guarantee	Complete
EPAL/MINEA	Appoint D&B contractors for raw water intake, pumping station, force main and water treatment plant, and process water treatment plant (Lots 1 and 7)	Complete
	Appoint D&B contractors for treated water transmission mains to CDs (Lot 2)	Complete
	Appoint D&B contractors for Bitá, Mundial and Ramiros CDs (Lots 3, 4 and 6)	Complete
	Appoint D&B contractors for Bitá, Cabolombo, Mundial and Ramiros distribution networks (Lots 8, 9, 10 and 11)	In Progress
	Appoint D&B contractors for Camama and Benfica II CD upgrades and network retrofits (Lots 12 and 13)	In Progress
	Appoint consultant to establish PIU or establish from within EPAL.	To Do
	Appoint E&S consultants to complete / update Final ESIA's and RAPs in accordance with final designs	To Do
	Appoint Resettlement Management Consultant	To Do
Resettlement Management Consultant	On behalf of EPAL manage the B4WSP resettlement and pay any compensation owed to PAPs	To Do
Individual Lot D&B Contractors	Undertake site surveys and complete detailed designs.	To Do
	Develop Environmental and Social Management Plans (ESMPs) following finalization of downstream ESIA's.	To Do
EPAL Appointed Individual Lot E&S Consultants	Review Bitá IV ESIA, adopt SCEP and complete Lot-specific ESIA	To Do
	Undertake PAP surveys and prepare Lot-specific RAP in accordance with B4WSP RPF	To Do
	Assist Client (D&B contractor) obtain MINEA and other permits required for construction	To Do
	Assist client prepare Lot-specific CEMP	To Do
Project Implementation Unit	Establish PIU with CLO in EPAL HQ and take on counterpart staff to manage B4WSP programme	To Do
	Establish Grievance and Appeal Committees within CLO	To Do
	With MINAMB, review and approve contractors' CEMPs	To Do

Organisation	Prime Responsibilities	Status
	Review updated Lot-specific ESIA's and integrate into final B4WSP ESIA for MINAMB approval	To Do
	Review updated Lot-specific RAPs and integrate into final B4WSP RAP for MINAMB approval	To Do
	Oversee SCEP implementation, site supervision, ESMP/CEMP implementation and reporting	To Do
	Oversee execution of Grievance Redress Mechanism	To Do
	Monitor and evaluate ESIA, RPF and RAP implementation	To Do
MINAMB	Work with Lot-specific consultants to complete permitting B4WSP designs and approve contractor's CEMPs	To Do
	Review and approve PIU E&S reports	To Do
	Work with EPAL/MINEA to oversee the project to satisfaction of GoA	To Do

Lots B1 and B3 are to be merged into a single design and build contract.

12.1 MONITORING AND EVALUATION

Through the various contacts and consultation sessions held during the preparation of the present ESIA, B4WSP has already established a good rapport with institutional stakeholders, potential PAPs and the general public. As the project progresses these relationships will evolve further. By monitoring project implementation and evaluating its success, particularly in respect of the SCEP, this evolution will be further enhanced. Furthermore the monitoring and evaluation process maintains or increases the efficiency and effectiveness of stakeholder engagement and garners trust with all involved.

The CLO embedded within the PIU shall have a department responsible for monitoring and evaluating compliance with the SCEP, the ESMP the RPF and the still to be issued RAPs. This department shall compile monthly reports which shall be presented at the monthly progress meeting where EPAL, D&B contractors and the supervising consultant will review and if necessary act upon the information presented. As a minimum these reports shall include:

- The number and minutes of stakeholder meetings held;
- New grievances submitted;
- Grievances in progress;
- Number of grievances appealed;
- Grievances resolved; and,
- Other comments raised.

12.2 REPORTING

As discussed above, the EPAL appointed E&S Consultants will be conducting more detailed ESIA's, and where necessary RAPs, of all B4WSP Lots upon receipt of detailed designs from D&B contractors. All reports must be seen and approved by the supervising consultant, the PIU CLO, EPAL and MINAMB. Furthermore, D&B contractors shall be required to record and report on any and all social engagement that takes place throughout their contract period. This should be presented in the ESIA and/or RAP which shall also be disclosed to the public via EPAL's website for a period no less than seven days.

