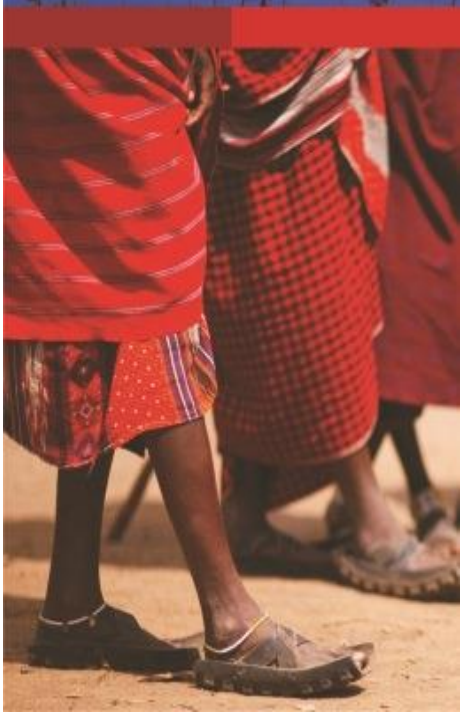

DIGBY WELLS
ENVIRONMENTAL

Environmental and Social Scoping Study for the Sanankoro Gold Prospect

Scoping Report

Project Number:

CGL5913

Prepared for:

Cora Gold Limited

October 2019

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EXECUTIVE SUMMARY

Cora Gold Limited (Cora Gold) is undertaking gold exploration activities associated with the Sanankoro Gold Prospect located in southern Mali. Digby Wells Environmental (Digby Wells) was appointed to undertake a Scoping Study to characterise the biophysical and socio-economic environment of the project area, provide early indication of potential environmental and social risks and determine the Terms of Reference (ToR) for the Environmental and Social Impact Assessment (ESIA) process that will be required as part of the environmental permitting process. The ESIA will be undertaken in accordance with Malian Law No. 2012-015 of 27 February 2012 (the Mining Code) and associated Decrees, among others. In addition, International Best Practice will also be considered.

Biophysical Environment and Risks

The local vegetation is predominantly distributed grasslands. Due to Artisanal and Small Scale Mining (ASM) activities throughout the project area, much of the land associated with the resource target areas, and areas identified for the processing plant and other administrative infrastructure within the project area has been disturbed. Isolated forest galleries which are associated with floodplains are also present within the project area. Furthermore, land (including floodplains and wetland areas) associated with the project area are extensively utilised for agricultural activities while nearby streams are used for ASM activities. Medium and large mammals in the Project area are rare and hunting is a practised to a limited extent. Several Nationally Protected and Red Data Plant species are expected to occur regionally.

The streams and drainage lines in the project area are predominantly ephemeral, including the Fie and Niger Rivers which traverse the west and north boundaries of the project area. Surface water resources are utilised by the communities for economic activities (agricultural and ASM) while groundwater is used for potable and domestic uses. A total of six water samples were collected upstream and downstream of the project area which indicate no issues in terms of water quality. This could be due to dilution as aesthetically there are many impacts from ASM activities. Generally groundwater quality results were found to be good.

Water management in the project design and during operations is important as these areas may intersect with various water resources. To this end, detailed floodplain determinations will be required to delineate the floodplains, as well as determine potential surface water volumes during extreme rainfall events. Groundwater modelling will also be an important task to determine the potential impact dewatering may have on surface water resources, as well as to determine potential contamination plumes from the project's waste deposits. The potential pit areas, plant and other administrative infrastructure are however largely disturbed by existing ASM activities along the targeted ore structures.

Socio-Economic Environment and Risks

The project is located within the Kangaba Cercle of the Koulikoro Region and spans over the Séléfougou and Maramadougou rural communes. A total of six rural communes are located

within the project area, namely: Séléfougou, Sanankoro, Bokoro (hamlet), Sélin, Faragouagnan and Kignèlen (hamlet).

The primary economic activities in the project area comprise ASM, cultivation, livestock breeding, and limited small trade which includes the exploitation of natural resources. Agricultural activities are located within and near the communities and maintained by the respective villagers. Livestock rearing in the project area includes large and small livestock, such as cattle, sheep, goats and poultry. ASM activities are practiced throughout the regions and the population undertaking ASM activities is increasing, as well as attracting individuals from neighbouring regions and countries.

Several communities and their associated economic activities are located within 500 m of potential pit areas. Communities' households, agricultural fields and ASM activities within 500 m of proposed pits will result in economic and physical displacement. This, together with the expected increased influx of people into the area as a result of the presence of the project, is expected to be the key socio-economic implications.

A Resettlement Action Plan (RAP) and Livelihood Restoration Plan (LRP) will be required for the economic and physical displacement associated with project land acquisition. The RAP and LRP will need to have a clear entitlement framework to address any potential challenges as it is expected that resettlement will be widely contested due to the extent and reliance of this activity currently. ASM management, and the loss of livelihood, will have significant impacts in the area and will need to be managed carefully and in cooperation with the technical and administrative authorities.

It is recommended that baseline socio-economic surveys are undertaken in the affected communities to determine the baseline of affected communities and the extent of potential resettlement prior to any population influx. It is important to manage community expectations and potential resettlement should not be communicated until a final layout plan is complete.

Population influx is expected because of the project as individuals from surrounding regions and neighbouring countries move to the project area in search of employment. The population influx will also place additional pressure on the already stressed natural resources as well as social services and infrastructure in the project area.

Conclusion

No immediate fatal flaws were identified for the project. However, the identified project risks will require careful planning and management. These risks and key impacts can be managed throughout the ESIA process and include:

- Economic and physical displacement;
- Population influx and the resulting impacts, including increase in ASM; and
- Water management.

The project area is already largely disturbed, however, natural habitats (including potential protected species and wetland areas) exist which should be avoided as far as possible. It is

recommended that the environmental and social studies are undertaken in collaboration with the engineering design and feasibility studies to feed into project decision making. The ESIA process takes approximately 12 to 16 months, depending on the level of collaboration between the respective feasibility teams. It should be noted that the above timing considers two season surveys for biotic studies (wet and dry season) but excludes potential resettlement and livelihood restoration as this process is independent to the ESIA and environmental permitting.

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1 Introduction

Digby Wells Environmental Jersey Limited (hereinafter Digby Wells) was appointed by Cora Gold Limited (Cora Gold) to undertake an environmental and social screening assessment (Scoping Study) for the Sanankoro Gold Prospect located in southern Mali.

Cora Gold is a West African gold exploration company and has initiated an extensive exploration programme with the intent to develop its Sanankoro Gold Discovery (or "the project") along the Yanfolila Gold Belt. The targeted project is located within the Kangaba Cercle in the Koulikoro Region.

This report constitutes an Environmental and Social Scoping Study for the project which aims to provide a high level baseline of the project area and an early indication of the potential environmental and social risks associated with developing the Sanankoro mining project. For the purpose of this report, the project area is defined by the proposed exploration tenement area which covers an approximate area of 320 square kilometres (km^2). The tenement area, which is known as Sanankoro, consists of four contiguous permits namely, Sanankoro, Bokoro Est, Bokoro II and Dako.

1.1 Project Background

Prior to Cora Gold's interest in Sanankoro, considerable historical exploration activity was carried out by Gold Fields Limited between 2000 and 2012. These activities included extensive soil geochemistry as well as Rotary Air Blast (RAB), Air Core (AC) and Reverse Circulation (RC) drilling. Progressively gold mineralised structures, including Zone A and Zone B with a total distance of approximately 14 km as well as the Sélin structure were determined. Furthermore, extensive surface artisanal workings exist at Sanankoro which confirm the continuity of mineralisation of these structures.

Cora Gold subsequently acquired the interests to Sanankoro and continued exploration metallurgical testwork which primarily focussed on the high potential Zone A and Sélin structures. Through its exploration, Cora Gold confirmed continuous oxide gold mineralisation with significant grades up to 4.48 grams per ton of gold (g/t Au) and 2.83 g/t Au at the Sélin and Zone A prospects respectively.

In 2019, Cora Gold initiated a drilling campaign with SRK and Wardell Armstrong to establish a maiden gold oxide mineral resource estimate for the delineation of feasible pit areas. During August 2019, results based on three out of four core holes completed confirmed the continuity of gold sulphide mineralisation which was intersected at a vertical depth up to 170 m below surface. These results have demonstrated the potential to significantly expand scale of discovery at Sanankoro.

Cora Gold intends to start a small mine (approximately 30,000 – 50,000 ounces of gold per annum) with a processing plant with an approximate capacity of 0.5 – 1 million tonnes per annum (Mtpa) to generate revenue and to use this funding to further expand the facilities and to enable a better understanding of the deposit.

1.2 Purpose of this Report

The aim of an environmental and social scoping study is to establish the biophysical and socio-economic characteristics of the project area as well as identify potential impacts that could arise as a result of the development at a high-level.

The objectives of this report are therefore as follows:

- Provide a high-level description of the background physical environment, social, cultural and economic conditions of the project area;
- Identify the primary potential positive and negative impacts associated with the project;
- Provide mitigation types for the identified impacts;
- Determine any potential risks and fatal flaws that may inhibit the project's development; and
- Provide a Terms of Reference (ToR) which outlines the required legislative requirements to obtain the relevant environmental permits to commence the operation as well as the environmental and socio-economic assessments studies deemed relevant for the environmental permitting process.

2 Project Description

2.1 Project Location and Access

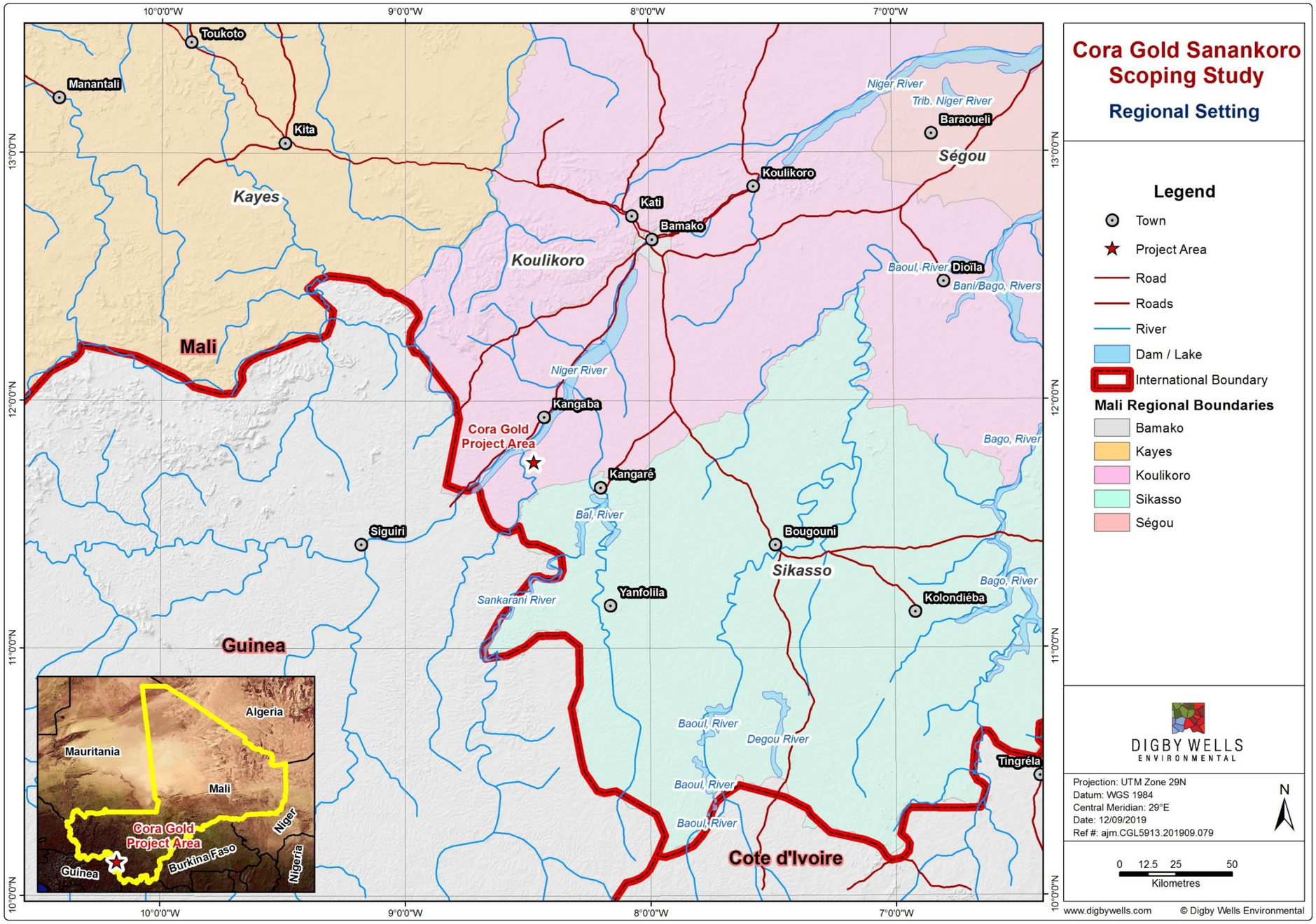
Mali is divided into eight Regions and one capital district, namely Bamako. These eight Regions are subdivided into 49 Cercles which represent a second level administrative unit in Mali.

Sanankoro is located in the Koulikoro Region which is divided into seven Cercles encompassing 106 rural communes. The project falls within the Kangaba Cercle and spans across the Séléfougou and Maramadougou rural communes. A total of six rural communities/villages are located within the project area, namely: Séléfougou, Sanankoro, Bokoro (hamlet), Sélin, Faragouagnan and Kignèlen (hamlet).

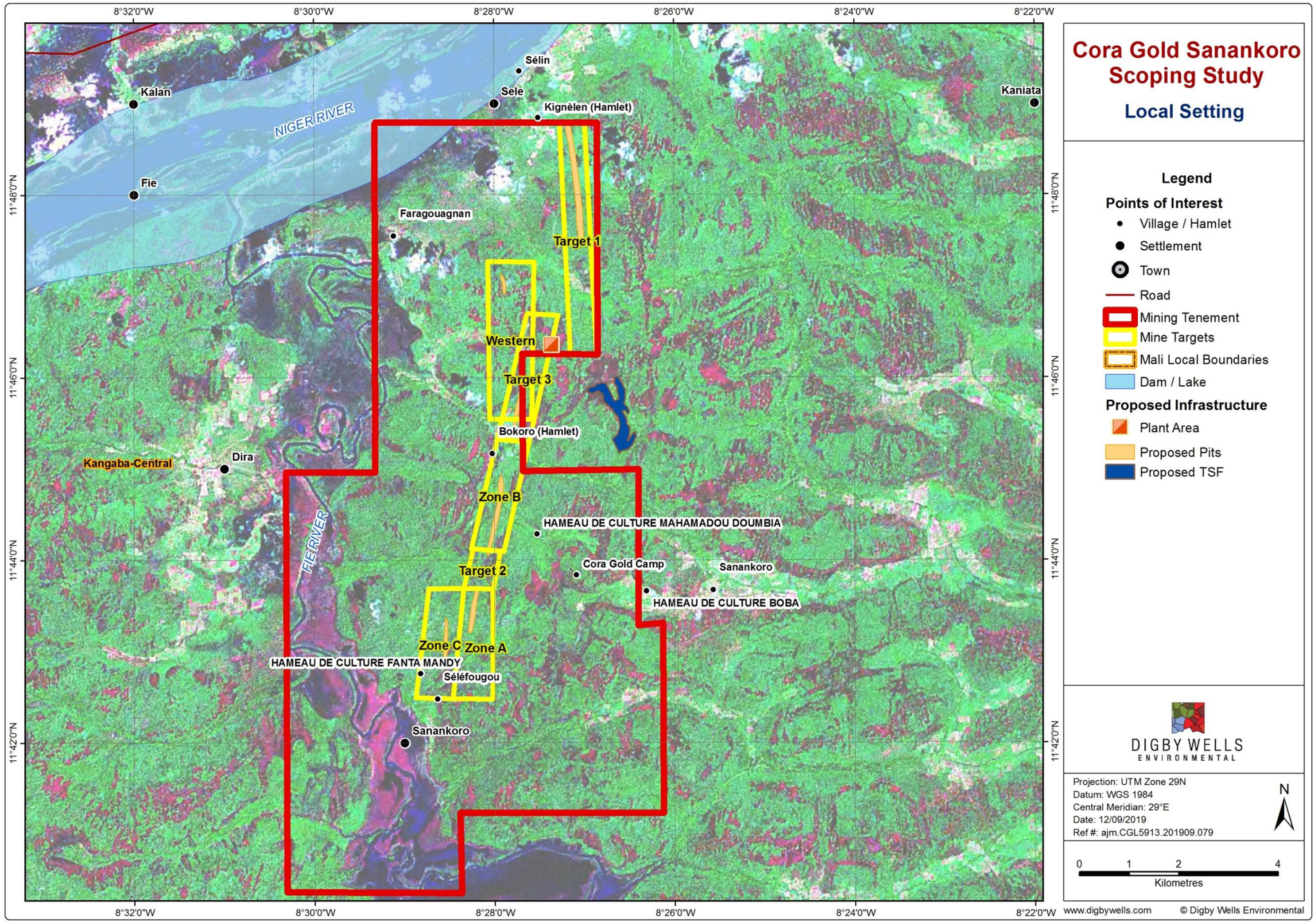
The Boucle du Baoulé National Park as well as several nature reserves including Fina, Kongossambougou and Badinko are located in the Koulikoro Region. The Fié and Niger Rivers are located west and north of the project area respectively.

The Region of Koulikoro is bordered by Mauritania on the north and by Guinea to the south. The capital city, Bamako, is located approximately 110 km northwest of the project area. From Bamako, Sanankoro is accessible via paved road to either the Sélingué (National Road 27) or Kangaba (National Road 16) communes and then various undeveloped road options are available to the project site.

The regional and local setting of the project area are shown in Plan 1 and Plan 2 respectively below.



Plan 1: Regional Setting



Plan 2: Local Setting

2.2 Mining Method and Associated Infrastructure

Through progressive exploration activities, the resource estimate will be determined to inform a detailed mine plan for the project. At this stage, Cora Gold only intends to exploit the oxide ore with the potential of expanding this to sulphide treatment at a later stage if required. The ore is planned to be mined via conventional open-pit mining methods.

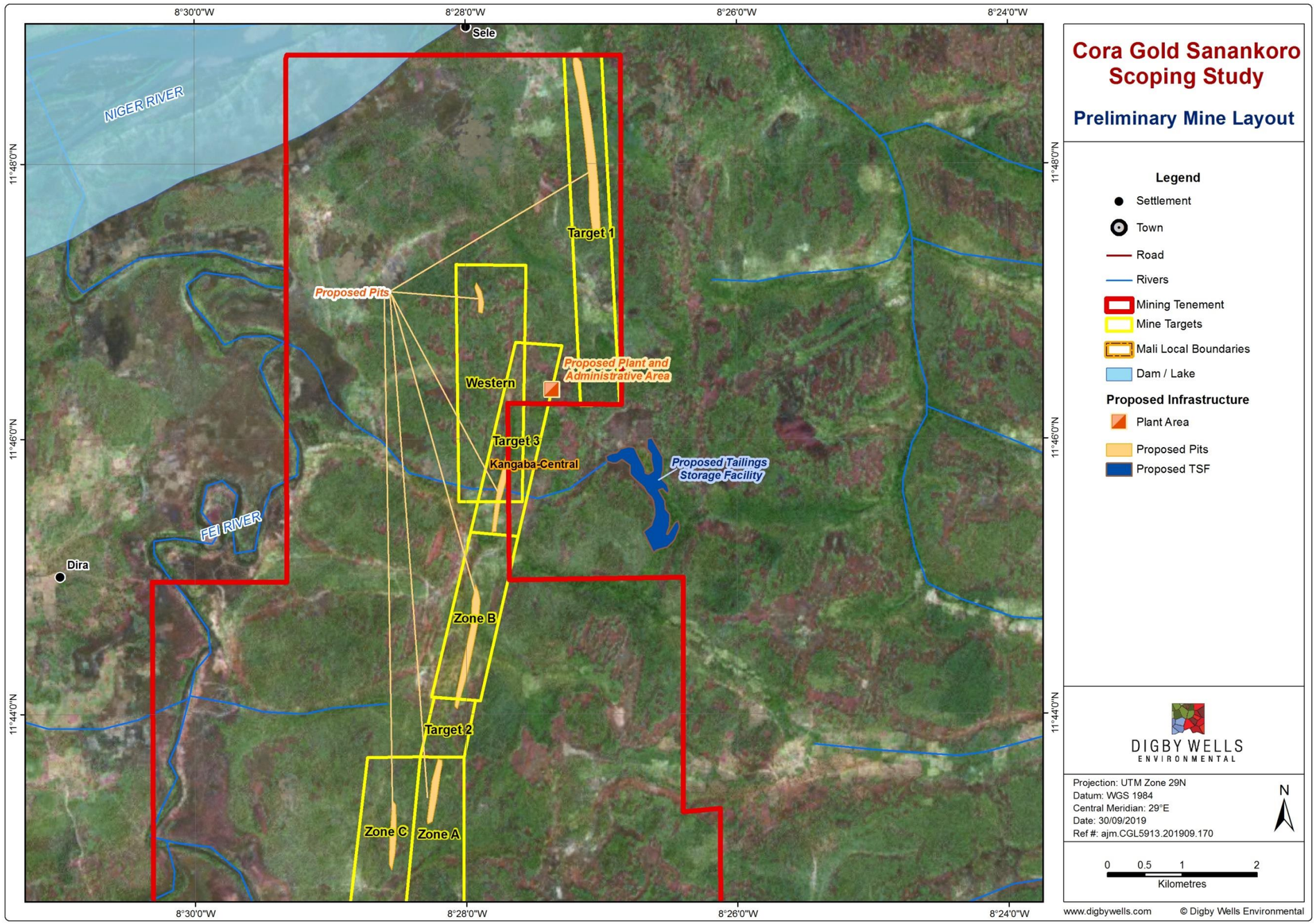
It is expected that the project will consist of several open pits along the Zone A and Sélin vertical structures, along with ancillary mining infrastructure, including:

- Waste Rock Dumps (WRDs);
- Tailings Storage Facility (TSF);
- Run of Mine (ROM) pad;
- Gold ore processing plant;
- Administration offices and warehouses;
- Mine camp (existing); and
- Power generation facility.

The potential processing of the oxide ore would be either through heap leach (1 million tonnes per annum) or gravity and Cyanide-In-Leach (CIL) methods (0,5 million tonnes per annum). Interim metallurgical results indicated up to 97% gold recovery.

In addition to this, there is also the option of treating the substantial amount of residue tailings material within the project area which have been generated by artisanal mining activity and deposited along the local river courses. It is estimated that this could amount to up to 1.5 million tonnes.

Plan 3 depicts a preliminary mine layout plan which indicates locations of potential pit areas, TSF and processing plant (inclusive of administrative infrastructure). It is noted that the mine layout is subject to refinement as more information on the resource estimate, mine plan and site sensitivities becomes available.



Plan 3: Preliminary Infrastructure Layout

3 Methodology

The Scoping Study was undertaken through a desktop review and infield assessment to the project area. The methodology implemented is detailed in the subsections below.

3.1 Desktop Assessment

A desktop review was undertaken to broadly determine the biophysical and social environment of the project area. In addition, applicable laws and permitting processes were reviewed to inform the ToR provided in Section 7 below and ensure that an understanding of the compliance requirements is achieved.

The desktop review included information provided by Cora Gold, namely: Environmental Study of the Sanankoro Permit Wildlife and Flora Inventory (2017), Preliminary Socio-Economic Study of the Influence Zone of the Sanankoro Permit (July, 2019), Drill Results at Depth at Sanankoro (August, 2019) and provisional mine layouts. In addition, secondary/publically accessible information such as aerial imagery, environmental and social research reports relevant to the project region as well as government documents including national census data was reviewed to inform the assessment.

The desktop review aimed to obtain a characterisation of the following environmental aspects:

- Abiotic:
  - Climate;
  - Surface water;
  - Groundwater; and
  - Soils and land use.
- Biotic:
  - Fauna and Flora;
  - Wetlands; and
  - Aquatic Ecosystems.
- Social and Cultural:
  - Socio-economic;
  - Heritage and archaeology; and
  - Determine the potential need for resettlement.

3.2 Infield Assessment

Following the desktop review, Digby Wells undertook an infield assessment to the project area between 15 July and 19 July 2019. The visit was conducted by a social specialist and an environmental generalist consultant from Digby Wells' Bamako office. The infield assessment served to orientate the project team and to gather additional information as well as ground-truth existing biophysical and socio-economic environmental information.

From a biophysical perspective, the potential pit areas (along the Zone A and Sélin structures and their immediate surrounds were surveyed to identify high-level vegetation habitats, animals, land uses and existing water resources among others. The existing artisanal mining sites within the project area were also surveyed. Consultations with the accompanying Cora Gold personnel as well traditional authorities from surrounding communities was undertaken to incorporate local knowledge and experiences of the biophysical characteristics into the assessment.

From a socio-economic perspective, initial consultation with the accompanying Cora Gold representative and several local administrative authorities were undertaken. No direct consultation with communities was undertaken to avoid raising expectations during this early stage of the project. Primary data collection focussed on the six communities within Sanankoro which are likely to be directly influenced by the project. These villages are Séléfougou, Sanankoro, Bokoro (hamlet), Sélin, Faragouagnan and Kignèlen. Individual discussions with the village authorities of each of these localities were undertaken as part of the socio-economic assessment. In addition, a meeting with the Séléfougou Commune Authority was conducted during the infield assessment.

The infield assessment further aided in identifying/confirming issues and risks associated with the project. These risks were determined based on environmental sensitivities identified, the socio-economic characterisation of the project area, the potential location of the pits and the anticipated project activities.

4 Biophysical Characterisation

The subsections below provide a summary of the environmental characterisation of the project area.

4.1 Regional Climate

The project area is located within the Sudano-Guinean zone which experiences hot summers and mild winters. According to the Köppen and Geiger classification, the Koulikoro region is classified as *Aw.* savannah climate which is characterised by annual average temperatures ranging from 24 Degrees Celsius (°C) to 30 °C. The maximum temperatures are recorded during March and April and the lowest temperatures experienced during December.

During the rainy season (May to October), the average rainfall varies between 1,100 millimetres (mm) and 1,400 mm while practically no rainfall is experienced during the dry season (November to April).

The table below summarises the average annual climatic information obtained for the Kangaba Cercle

Table 4-1: Average Temperature and Rainfall for Kangaba Cercle

	January	February	March	April	May	June	July	August	September	October	November	December
Temperature (°C)												
Average	24.2	27.5	30	30.9	30.9	28.4	26.7	25.6	26.3	27.2	26.5	24.5
Average Minimum	14.6	18.1	21.3	23.1	23.7	21.9	21.3	20.5	20.6	20.4	17.9	15.1
Average Maximum	33.8	37	38.7	38.8	38.2	34.9	32.1	30.8	32	34.1	35.1	34
Precipitation (mm)												
Average Rainfall	0	0	5	29	71	155	240	303	214	85	12	0

Source: Climate-Data.org

4.2 Topography

The relief of the project area is characterised as undulating lateritic plateaus with isolated hills throughout the landscape. The Fié and Niger Rivers flood the west and north of the project area respectively. The average altitude of the project area is 350 metres above sea level (mamsl) with a minimum of approximately 321 masml in the slopes and the maximum altitude is about 947 masml on the hills.

The land cover is severely impacted by anthropogenic activities resulting in soil degradation. The overall conditions of the area have however allowed the establishment of abundant vegetation characterised by mosaics of savannahs (shrubs, trees and grasslands) and cleared forest areas. The figures below provide evidence of the landscape present within the project area.

Figure 4-1: Undulating Landscape

Figure 4-2: Savannah Vegetation Cover in the Project Area

4.3 Soils and Land Use

The soil types present within the project area comprise lateritic soils and alluvial soils. Isolated hills associated with rock outcrops are also present throughout the project area. Lateritic soils were identified along the plateaus are common to tropical and subtropical climates and are typically rich in iron and/or aluminium oxides. Soils of colluvial and alluvial origin (loamy and sandy-clay soil types) are present along floodplains, valleys and depressions found within the project area. Alluvial soils are general characterised by high silt content and their fertility is characterised by the gradual deposition of plant debris and sediments on their surface.

In terms of land use, the primary land uses comprise agriculture and Artisanal and Small Scale Mining (ASM) activities. The project area is covered by arable land and is occupied by cultivated fields, fallow land and areas used for grazing which forms a diverse mosaic of cleared rural areas. These land uses are commonly found along the river floodplains toward the west and north of the project area and surrounding slopes (Figure 4-3). ASM is a key

land use within the project area identified towards the south and centre of the project area. Notably, this has also resulted in increasing migration into the project area which places further pressure on the ecosystem. Secondary land uses include forest logging (collection of firewood, medicinal plants and wood to make canoes and furniture), hunting and fishing particularly in the Fié River.

Figure 4-3: Evidence of Grazing along the Fié River

4.4 Terrestrial Biodiversity

Several biodiversity inventories have been carried out for the Sanankoro area. Most recently, a Biodiversity Inventory Study was undertaken during 2017 by the Environment and Social Development Company (ESDCO) – SARL. The objective of this study was to provide an identification and description of the habitats present in the project area as well as provide an assessment of the conservation status of biodiversity. This study, together with the infield assessment carried out by Digby Wells was utilised in establishing the baseline environment in terms of biodiversity for the project area.

4.4.1 Floral Characteristics

4.4.1.1 Regional Vegetation

Mali is divided into five main ecosystems which present a wide range of agro-ecological environments which are further divided into 14 regions. The project area is located within the Upper Bani Niger Region (specifically the High Bani Niger) which is situated in the moist/humid Guinean zone. This region is bordered by the Mandingue Plateau to the north, by the Koutiala in the north east, and by Plateau de Foniokoulou, which continues into Guinea, to the east (United States Agency of International Development (USAID), 2008).

This sub-humid zone constitutes 6% of the country's remaining forests and is considered an important production site comprised of wooded savannah and natural forest. In 2008, USAID reported that between 40% to 90% of the ground has grassland vegetation cover, with gallery forests in valleys creating continuous bands of dense vegetation.

Although vegetation is parts of the zone are well conserved, pockets of degradation do exist specifically in the High Bani Niger and southern part of the Mandungue Plateau. This is mainly as a result of ASM sites such as Siama, Finkolo and Fabouloa.

4.4.1.2 Site-Specific Vegetation Composition

The vegetation of the project area consists of several types of formations associated with the savannah and forest vegetation types. Savannah dominates the project area and is characterised by the presence of herbaceous layer and woody species including *Ostrioderich chevaleri, Pterocarpus sp Combretum sp., Vitex sp.,* and *Landolphia sp.* The forest vegetation is characterised by a low presence or absence of grassy vegetation and dominated by the presence of large trees.

These vegetation types are divided into the following distinctive formations within the project area (ESDCO, 2017):

- **Grassland Savannah** – this vegetation is found in the northeast and southeast of the project area and is characterised by the presence of grasses on shallow soils;
- **Shrub Savannah** – this vegetation is found in the southeast of the project area and is characterised by herbaceous plants which are under 7 m high. Dominant species include *Terminalia macroptera* and *Pterocarpus erinaceus*;
- **Wooded Savannah** – this vegetation type is found in the northwest and southwest of the project area and is characterised by trees over 7 m high with a less dense herbaceous layer. Dominant woody species include *Parinari Excelsa*, *Erythrophleum Guinense*, *Parkia Biglobosa*, *Isoberlia Doka* and *Daniela Oliveri*;
- **Bowé Areas** – Bowe represent degraded land where ferricrete is exposed and is found throughout the project area across the different vegetation types. These areas hardly bear woody vegetation due to the near-absence of a soil layer and are commonly associated with ASM sites;
- **Forest Galleries** – this vegetation type is found in the in the west of the project area along the rivers and is characterised by deciduous and/or evergreen species. Dominant species include *Daniela Oliveri*, *Mytragina Inermis*, *Uapaca Somon*, *Pterocarpus erinaceus*, *Cola cordifolia*, and *Oxytenantera Abyssinica*; and
- **Clear Forests** – this vegetation type is found in the south of the project area and is confined to the sparsely populated areas of the Fié River basin. Dominant species include *Antiaris Africana*, *Khaya Senegalensis*, *Afzelia Africana* and *Combretum sp*. ;

The natural habitat is also largely disturbed by agricultural land and residential areas. Cultivation and grazing activities are present along the floodplains and slopes, contributing to pressure of the forest galleries. In addition, artisanal mining continues to expand throughout the project area, contributing to the formation of bowé areas of the savannah habitats. Other activities resulting in the exploitation of forest resources include logging (for carpentry and

firewood) and collection of medicinal plants as well as picking products, beekeeping and sourcing charcoal.

The figures below depict some transformed land as a result of agricultural and artisanal mining activities.

Figure 4-4: Grazing alone the Fié River Floodplain

Figure 4-5: Cleared Forest for Artisanal Mining Activities

Source: ESDCO, 2017

During the floristic inventory carried out by ESDCO (2017), a total of 79 plant species were recorded. The most common species included: *Combretum glutinosum, Pterocarpus erinaceus, Acacia macrostachya, Isoberlinia doka, Detaruim microcarpum, Entada africana, Lannea acida, Lannea microcarpa, Daniellia oliveri* and *Terminalia laxiflora*.

During Digby Wells' infield assessment in July 2019, a total of three red data species were recorded in the project area as detailed in the table below. It is noted that the surveyed areas, namely along the Zone A and Sélin structures, is largely degraded as a result of artisanal mining. The red data species occurred and are expected to occur in more natural areas within the project area.

Table 4-2: Red data species recorded at Sanankoro (Digby Wells, 2019)

Scientific Name	Habitats	Threats
Afzelia africana	Forest galleries	Exploitation, partly for the international market
Khaya senegalensis	Savannah and forest galleries	Logging, with local exploitation largely uncontrolled and poorly supervised.
Pavetta lasioclada	Forest galleries	Threatened by agricultural practices, logging for firewood and clearing for artisanal mining.

Table 4-3 provides a list of the fully protected plant species in terms of Decree No. 10-387/P-RM of 26 July 2010 which are expected to occur in the project area.

Table 4-3: Lists of fully protected species

Scientific Names	Bambara Names
Parkia biglobosa	*Nere*
Vitellaria paradoxum	*Shi*
Cordyla pinnata	*Dugura*
Cordyla pinnata	*Dugura*
Acacia Senegal	*dɔnkɔri*
Detaruim microcarpum	*Tabacoumba*
Tamarindus indica	*N'Tomi*
Acacia albida	*Balanzan*
Cordila pinnata	*Dougoura*

4.4.2 Faunal Characteristics

4.4.2.1 Regional Fauna

Mali is characterised by its faunal biodiversity throughout the country's various climatic zones. Within the Upper Bani Niger, abundant water resources create diverse habitats for a variety of mammals, rodents, reptiles and avifauna. Illegal trapping of small fauna populations and hunting of large mammals has greatly affected availability of species in the region (USAID, 2008). Abundant animal species include hippopotamus, python, baboon, and green and red monkeys. Other reptiles and rodents which are known to occur include cobra, green Mamba, ground squirrel, and Gambian rat. Rare species include antelopes, Grand Calao/hornbill, crocodile, vulture, common jackal, turtle, and tortoises. Lion has also historically been associated with the region, but is considered unlikely. The table below provides a list of key declining species in the region.

Table 4-4: Declining Species in the Region

Scientific Name	Common Name	Status
Panthera Leo	Lion	Rare
Crocodylus	Crocodile	Rare
Canis Aureus	Common jackal	Rare
Orycteropus Afer	Aardvark	Rare
Mellivora Capensis	Ratels/badger	Rare
Galago Senegalensis	Bush baby	Rare
Gyps Africanus	White-backed vulture	Rare
Testudines	Turtle	Rare
Testudinidae	Tortoise	Rare
Kobus Ellipsiprymmus	Defassa waterbuck	Threatened
Pamthera Pardus	Leopard	Near Extinction
Trichechus senegalensis	Manatee	Near Extinction
Pan Troglodytes	Chimpanzee	Near Extinction

Alcelaphus Bubalis	Hartebeest	Near Extinction
Manis Gigantea	Giant pangolin/reptile	Near Extinction
Potamochoerus Porcus	Bush pig	Near Extinction
bird species		
Strigiformes	Owl	Threatened
H. Vocifer	*African fish eagle*	Threatened
Bucorvus	Ground hornbill/grand calao	Rare
Gyps rueppellii	Vulture	Rare
Falco Peregrinus	Peregrine falcon	Near Extinction

Source: USAID, 2008

4.4.2.2 Site-Specific Fauna

The wildlife inventory carried out by ESDCO (2017) recorded a total of 673 faunal species within the project area, as detailed in the table below.

Table 4-5: Recorded Faunal Species at Sanankoro (ESDCO, 2017)

Scientific Name	Family	Common name	No.
Mammals			
Xerus Erythropus	Sciuridae	Striped ground squirrel	03
Heliosciurus Gambianus	Sciuridae	Gambian sun squirrel	01
Erythrocebus Patas	Hominids	Patas monkey	05
Atelerix Albiventris	Erinaceaidae	Four-toed hedgehog	01
Epomophorus Gambianus	Pteropodidae	Gambian Epauletted Fruit Bat	50
Lepus Victoriae	Leporidae	African Savanna Hare	01
Birds			
Tockus Erythrorhynchus	Bucerotidae	Red-billed hornbill	106
Lophoceros nasutus	Bucerotidae	African Grey Hornbill	60
Centropus Senegalensis	Cuculidae	Senegal coucal	03
Streptopelia Senegalensis	Columbidae	Laughing Dove	85
Ptilopachus Petrosus	Odontophoridae	Stone Partridge	01
Crinifer Piscator	Musophagids	Western plantain-eater	01
Coracias Abyssinica	Coraciidae	Abyssinian roller	04
Treron Waalia	Columbidae	Bruce's green pigeon	04
Streptopelia Semitorquata	Columbines	Red-eyed dove	20
Oena Capensis	Columbidae	Namaqua dove	02
Lagonosticta Senegalla	Estrildidae	Red-billed firefinch	01
Lamprotornis Caudatus	Sturnidae	Long-tailed glossy starling	70
Francolinus Bicalcaratus	Phasianidae	Double-spurred francolin	04
Numida Meleagris	Numididae	Helmeted guineafowl	20
Passer Griseus	Passerines	Northern grey-headed sparrow	50
Ardea Garzetta	Ardeidae	Little egret	100
Poicephalus Senegalus	Psittacidae	Senegal parrot	53
Lamprotornis Chalybeus	Sturnidae	Greater blue-eared starling	26
Reptiles			

Scientific Name	Family	Common name	No.
Agama Cristata	Agamidae	Insular agama	01
Invertebrates			
Apis Mellifera	Adansonii	Western honey bee	01

It is noted that majority of farmers in the area have hunting as their secondary activity. This demonstrates the anthropogenic pressure on the diversity of wildlife in the project area.

4.5 Presence of Wetlands

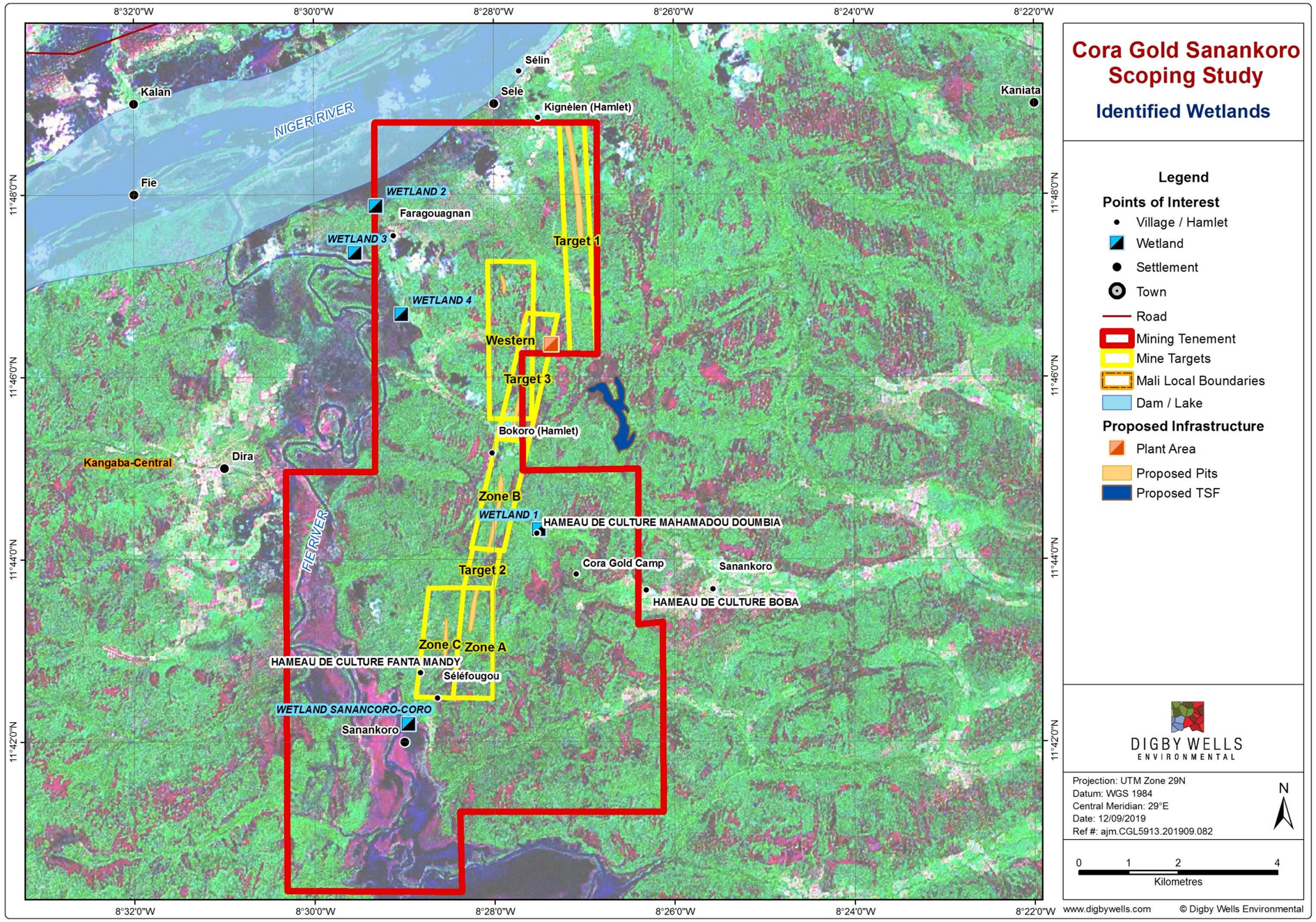
Several wetland systems exist within the project area. These wetland areas are predominantly associated with floodplains on the banks of the Niger and Fié Rivers as well as various other non-perennial tributary streams which run throughout the project area. The wetlands are flooded during the rainy season and consequently the saturation of wetland soils results in the presence of hydrophytic plants. Wetland areas are commonly used for agricultural (rice cultivation) as well as gold processing activities.

Table 4-6 provides a description of the wetlands which were encountered during the infield assessment. These wetlands are shown in Plan 4. It is noted that the infield investigations focussed on the potential pit areas and their immediate surroundings only and to confirm the presence of wetland systems. More wetlands, in areas such as the possible TSF location, may be directly or indirectly affected by the development are expected to occur.

Table 4-6: Identified Wetlands

Wetlands	Co-ordinates		Site Observations	Photographic Evidence
	North	West		
Wetland 1	11.738848	-8.458386	Wetland (depression) located in the east of the project area (downstream of the potential TSF and plant area). No anthropogenic pressure was observed to the wetland.	
Wetland 2	11.797901	-8.488515	A floodplain wetland identified along the north-western boundary of the project area along the banks of the Niger River. This floodplain is utilised by the surrounding communities to cultivate paddy rice.	

Wetlands	Co-ordinates		Site Observations	Photographic Evidence
	North	West		
Wetland 3	11.789321	-8.492404	A floodplain wetland identified along the north-western boundary of the project area along the banks of the Fié River. No agricultural anthropogenic activities were identified.	
Wetland 4	11.778107	-8.483781	A floodplain wetland identified along the north-western boundary of the project area along the banks of the Fié River (further downstream of Wetland 3). This wetland serves as a refuge for birds and a pasture for animals.	



Plan 4: Identified Wetland Areas

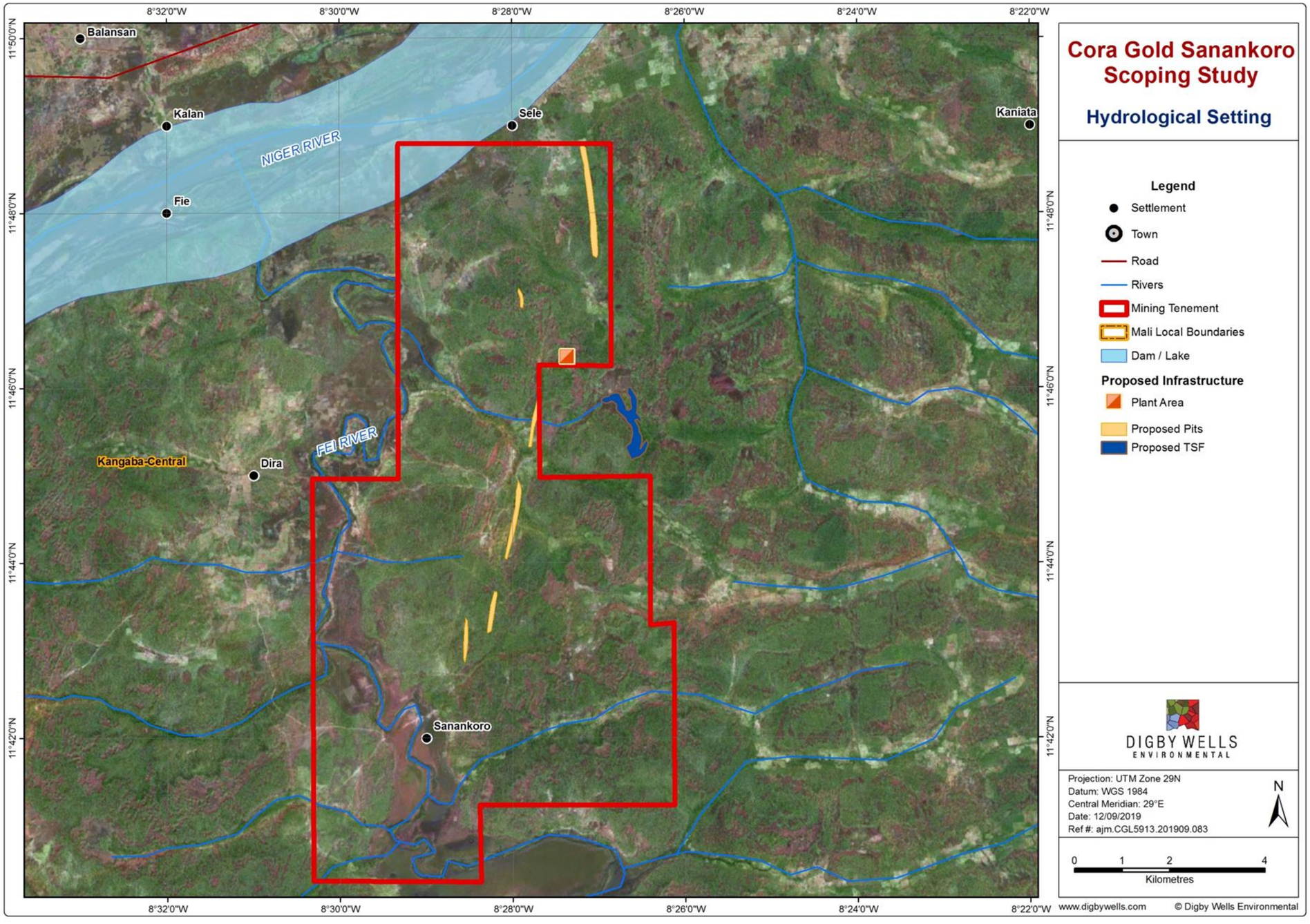
4.6 Surface Water

4.6.1 Hydrological Characteristics

The hydrological setting of the project area is illustrated in Plan 5 below. The project area intersects with the Niger River System, with its main tributaries Fié River and Niger River located in proximity to the potential development footprints. Lake Sélingué, an artificial lake utilised for hydroelectric production and commercial fishing, is located immediately south of the project area on the Fié River.

The Fié River (Figure 4-6) traverses the western boundary of the project area and is approximately 1,5 km from the potential pit areas while the Niger is located approximately 800 m outside of the northern boundary of the project area. The Fié River drains into the Niger River which ultimately joins the Niger River approximately 40 km upstream of Bamako. The ASM activities for the project area are associated mainly with the Fié River. Various non-perennial streams including Talétou Kô and Bokoro Kô also traverse the project area, draining into the Fié River.

Figure 4-6: The Fié River to the west of the Sanankoro permit



Plan 5: Hydrological Setting

4.6.2 Water Uses

Surface water uses in the project area comprise potable domestic use, market gardening and animal watering and ASM activities. Fishing is also extensively practiced on the Niger and Fié Rivers.

Generally, perennial streams are utilised for ASM activities during the dry season and consequently some drainage lines have been permanently destructed and considerable amounts of residue tailings material have been deposited along local river courses. Old quarries were also identified in the project area (Figure 4-7) which are utilised for clean stormwater storage ponds to serve artisanal mining activities during the rainy season. Sedimentation contributes to clogging or damming up which leads to drying of downstream areas.

Figure 4-7: Old ASM Quarry used as a Rainwater Storage Pond

4.6.3 Water Quality

Cora Gold appointed the National Water Laboratory, Mali to undertake a water quality analysis in January 2019. A total of three surface water samples were collected as detailed in the table below as well as depicted on Plan 6.

Table 4-7: Surface Water Sampling Locations

Label	Location	Co-ordinates	
		Easting	Northing
SW1	Niger River (Downstream)	558432	1307134
SW2	Fié River	555449	1303122
SW3	Niger River (upstream)	554362	1305926

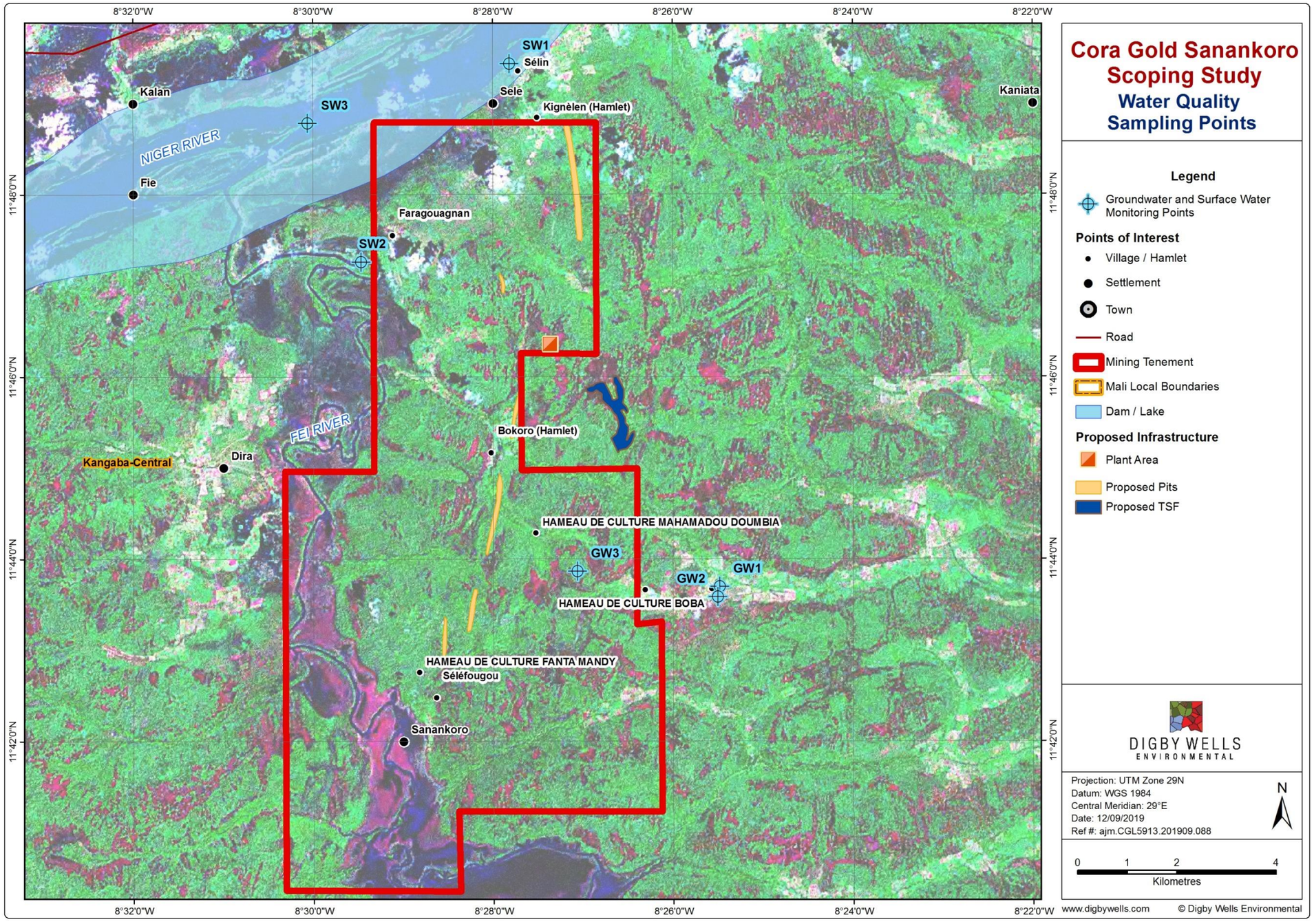
The water quality results were compared to the Guidelines for Drinking Water Quality Standards published by the World Health Organisation (2017) to provide an indication of the level of pollution, as detailed in Table 4-8 below. With the exception of Chromium in all three samples, the laboratory results were found to be within acceptable limits for drinking water. It is noted that, according to ENSEEIHT (2018), BOD5 for water intended for human consumption is acceptable at a concentration of 0 milligram per litre (mg/l) and domestic waste water at 1.5 mg/l to 2 mg/l. Generally concentrations of a few mg/l for both BOD5 and

COD (which is always greater than BOD5) represent good quality surface water. These concentrations are exceeded for all samples upstream and downstream of the project area. It is further noted that Cyanide concentrations (which are of concern with respect to the ASM activities) are well below 0.05 mg/l in all three samples collected.

Table 4-8: Surface Water Quality Results

Parameter	Units	WHO 2017 Drinking Water Quality Guideline Limits	Sample Results		
			SW1	SW2	SW3
Colour (TCU)	-	-	51	257	52
Turbidity (NTU)	-	-	6	29	4
Calcium (Ca2+)	mg/l	-	2.85	1.18	3.25
Magnesium (Mg^{2+})	mg/l	-	1.03	0.94	1.02
Sodium (Na+)	mg/l	-	1.17	1.92	3.32
Potassium (K +)	mg/l	-	0.157	0.48	1.27
Iron (Fe 2+)	mg/l	-	0.157	0.0840	0.143
Dissolved Oxygen (O_2)	mg/l	-	7,97	7.37	8.02
% saturation in O_2	mg/l	-	96.4	91	103.7
BOD5	mg/l	-	120	240	170
COD	mg/l	-	292	567	422
Lead (Pb)	mg/l	0.01	0.009	0.00	0.00
pH	-	-	7.46	6.5	7.15
Conductivity (25°C)	µS/cm	-	44	21	41
Hardness ($CaCO_3$)	mg/l	-	11.36	6.82	12
Alkalinity ($CaCO_3$)	mg/l	-	13.90	12.54	14
Bicarbonates (HCO_3^-)	mg/l	-	16.97	15.30	17.54
Sulphates (SO_4^{2-})	mg/l	-	2.62	0.93	1.96
Chloride (Cl-)	mg/l	-	2.15	0.37	1.18
Manganese (Mn)	mg/l	-	0.087	0.133	0.123
Copper (Cu^{2+})	mg/l	2	0.0	0.0	0.0
Ammonia ($NH+_4$)	mg/l	-	0.11	0.54	0.16
Nitrogen Dioxide (No_2)	mg/l	-	0.003	0.005	0.011
Cyanide (CN-)	mg/l	-	0.002	0.007	0.007
Arsenic (As)	mg/l	0.01	0.00	0.00	0.00
Nickel (Ni)	mg/l	0.07	0.0	0.0	0.0
Chromium (Cr6+)	mg/l	0.05	**0.06**	**0.23**	**0.26**
Total Dissolved Solids (105°C)	mg/l	-	60.06	28.66	55.96
Nitrate ($NO3^-$)	mg/l	50	0.92	0.17	0.93
Fluoride (F^-)	mg/l	1.5	0.219	0.220	0.253
Zinc (Zn)	mg/l	-	0.07	0.05	0.73
Orthophosphate	mg/l	-	<0.001	<0.001	<0.001

Source: National Water Laboratory Mali, 2019



Plan 6: Water Quality Sampling Points

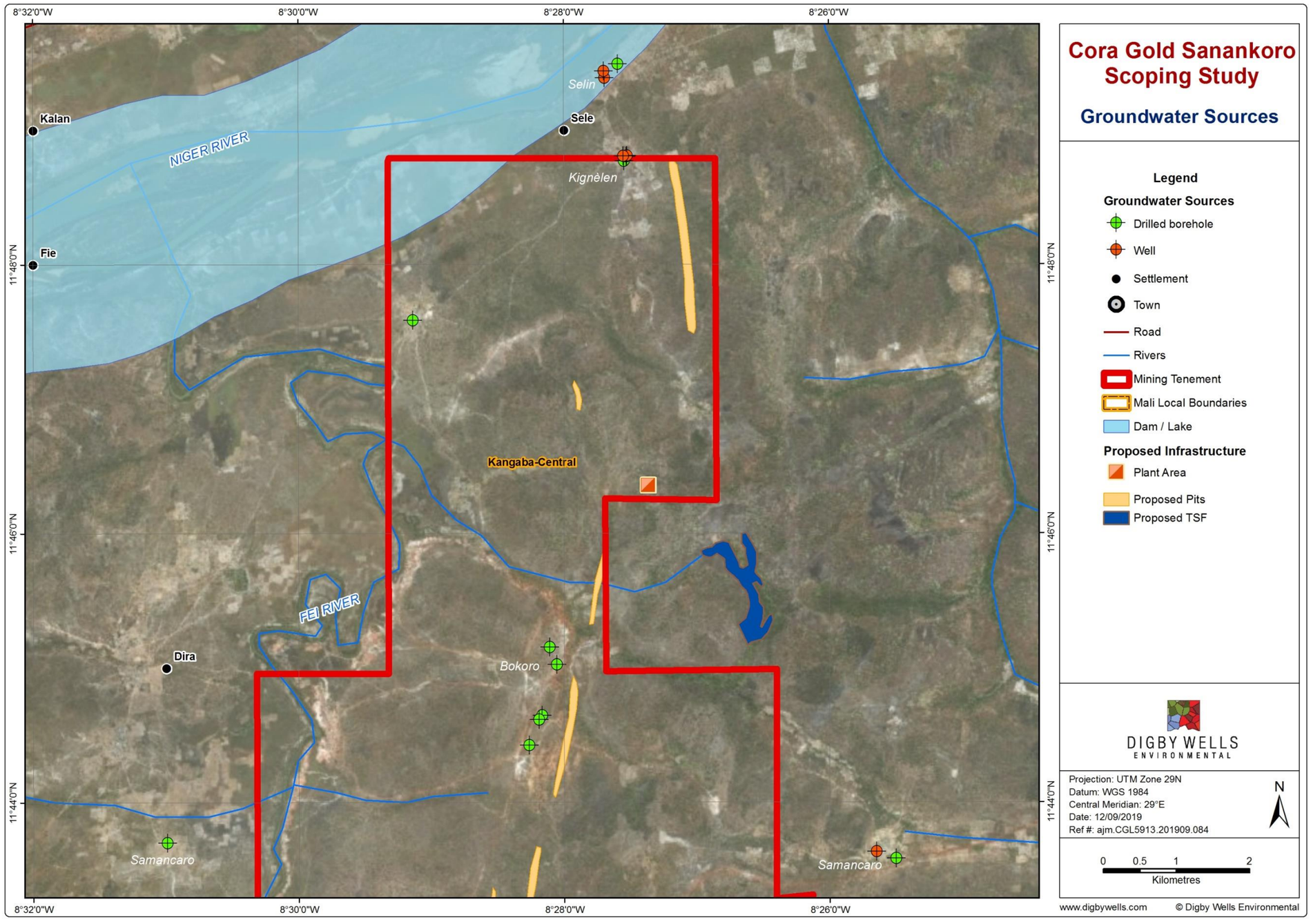
4.7 Groundwater

The regime of the Niger River System is strongly influenced by groundwater flows. In general, groundwater is influenced by annual precipitation and permeability of soils.

Within the project area, groundwater is an important source of drinking water to the surrounding communities who report generally good quality of the water (based on its aesthetic characteristics). An inventory of groundwater source points was carried out during 2018 as detailed in Table 4-9 below and depicted in Plan 7. These sources comprise drilled boreholes as well as tradition and large-diameter wells. Water sources can be public or private depending on the locality. Groundwater sources are unequally distributed throughout the project area. Generally these sources are publically accessible from the support of technical and/or financial partners to provide communities with drinking water. This is with the exception of the drilled boreholes identified in the Bokoro hamlet which are privately owned by individuals.

Table 4-9: Location of Groundwater Sources

Location	Description of Source	Co-ordinates	
		X	Y
Sanankoro	Well	562390	1296455
	Drilled borehole	562655	1296364
	Drilled borehole	552686	1296563
Bokoro	Drilled borehole	557915	1299251
	Drilled borehole	558014	1299012
	Drilled borehole	557810	1298314
	Drilled borehole	557635	1297906
	Drilled borehole	557767	1298259
Sélin	Drilled borehole	558838	1307235
	Well	558656	1307046
	Well	558648	1307141
Faragouagnan	Drilled borehole	556037	1303722
Kignèlen	Drilled borehole	558927	1305910
	Well	558955	1305970
	Well	558965	1305983
	Well	558916	1305978



Plan 7: Groundwater Sources in the Project Area

4.7.1 Groundwater Quality

A total of three groundwater samples were collected for water quality analysis during January 2019. The table below provides details of the sampling points which are also depicted on Plan 6 above.

Permit	Location	UTM	
		Easting	Northing
GW1	Sanankoro Public School	562689	1296567
GW2	Sanankoro Nursery	562653	1296366
GW3	Cora Gold Camp	559815	1296872

The groundwater quality results were compared to the Malian National Standard for Drinking Water to provide an indication of the level of pollution, as detailed in Table 4-10 below. Generally, the laboratory results from the sampled boreholes indicate that groundwater is of acceptable quality. This was further confirmed by community members interviewed during the infield assessment. Notably, the physiochemical water quality at GW2 (Sanankoro Nursery) was deemed poor as it is slightly mineralised, soft and coloured. This was also observed in the sample collect at the Cora Gold camp (GW3) borehole. Cyanide concentrations (which are of concern with respect to the ASM activities) are well below 0.07 mg/l in all three samples collected.

Table 4-10: Groundwater Quality Results

Parameter	Units	Mali Drinking Water Standard	Sample Results		
			GW1	GW2	GW3
Colour (TCU)	-	25	0	**35**	0
Turbidity (NTU)	-	10	0	10	0
Calcium (Ca2+)	mg/l	400	16.10	8.40	3.01
Magnesium (Mg^{2+})	mg/l	100	6.48	2.34	1.33
Sodium (Na+)	mg/l	400	25.02	15.91	4.32
Potassium (K +)	mg/l	100	3.87	3.77	1.67
Iron (Fe 2+)	mg/l	0.3	0.015	0.014	0.014
Lead (Pb)	mg/l	0.01	0.0	0.0	0.0
pH	-	5.5≤ - ≤9	7.10	6.75	6.22
Conductivity (25°C)	µS/cm	1500	251	140	49
Hardness ($CaCO_3$)	mg/l	500	67	31	13
Alkalinity ($CaCO_3$)	mg/l	<150	113	62	17
Bicarbonates (HCO_3^-)	mg/l	-	138.49	75.58	20.53
Sulphates (SO_4^{2-})	mg/l	500	4.68	0.80	7.59
Chloride (Cl-)	mg/l	600	1.89	2.15	1.97
Manganese (Mn)	mg/l	0.5	0.020	0.045	0.09
Copper (Cu^{2+})	mg/l	1	0.0	0.0	0.0

Parameter	Units	Mali Drinking Water Standard	Sample Results		
			GW1	GW2	GW3
Ammonia ($NH+_4$)	mg/l	0.5	0.11	0.09	0.06
Nitrogen Dioxide (No_2)	mg/l	0.02	0.002	0.003	0.003
Cyanide (CN^-)	mg/l	0.07	0.003	0.002	0.002
Arsenic (As)	mg/l	0.01	0.0	0.00	0.00
Nickel (Ni)	mg/l	0.02	0.00	0.0	0.0
Chromium (Cr6+)	mg/l	0.05	0.0	**0.21**	0.00
Total Dissolved Solids (105°C)	mg/l	1200	193.16	132.67	66.88
Nitrate ($NO3^-$)	mg/l	500	1.69	1.43	1.13
Fluoride (F^-)		0.5	0.178	0.288	0.250
Zinc (Zn)	mg/l	3	0.02	0.04	0.24
Orthophosphate	mg/l	0.005	<0.01	<0.01	<0.01
Ryznar Index	-	-	9.23	10.60	12.07

5 Socio-Economic Characterisation

The subsections below provide a summary of the socio-economic characterisation of the project area.

5.1 Administrative and Political Structure

Mali is a landlocked country in West Africa which covers an area of 1,240,192 m² of which 20,002 m² is occupied by water.

The governance system is characterised by Administrative Management (District, Region, Cercle and District) and Decentralised Management (Regional Assemblies, Council of Cercles and Communal Councils).

At Region level, a Governor is appointed as the executive of the Region and a Prefet is appointed to each Cercle. At the district level, sub-prefets who constitute support staff to the Prefet are in place and act as the interface between communes, villages and the Prefet.

Regional Assemblies for each Cercle are appointed at Regional level and their members are elected from the members of the Cercle Councils of the Region. At the level of the Cercles, administrative management is carried out through the Council of Cercles whose elected representatives are selected from the Communal Councils. Lastly, the Commune Council officials are elected from their representing villages.

The administrative and political organisation applicable to the project area is depicted in the figure below.

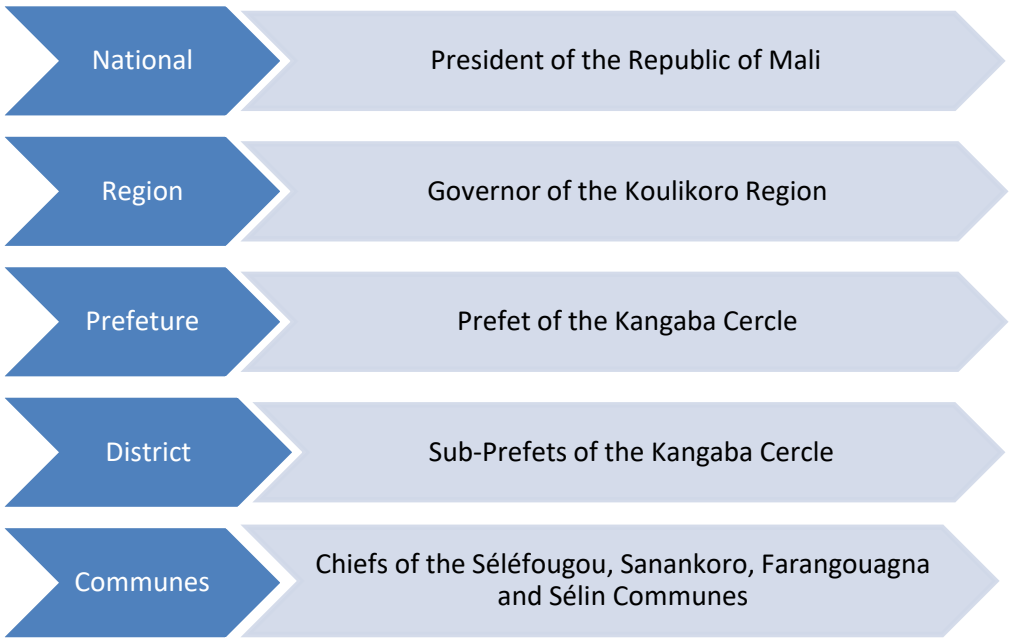


Figure 5-1: Administrative Structure of the Project Area

For the purposed of this socio-economic characterisation, the project is defined as follows:

- Primary Study Area:
  - Séléfougou Commune, comprising
    - Séléfougou Village;
    - Sanankoro Village; and
    - Bokoro Hamlet (belonging to the Séléfougou village).
  - Maramandougou Commune, comprising:
    - Sélin Village;
    - Faragouagnan Village; and
    - Kignèlen Hamlet (belonging to the Figuiratomo village).
- Secondary Study Area:
  - Remaining localities of the Séléfougou and Maramandougou Communes (inclusive of four and nine villages, respectively); and
  - Kangaba Cercle (covering 58 Communes).

The primary study area corresponds with the extent of the project area which, as indicated in Section 2.1, includes the abovementioned six villages which span over two rural communes. These localities are mostly likely to be affected by the project. The secondary study area extends to the reminder of the corresponding rural communes, extendable to the Kangaba Cercle and Koulikoro Region where applicable.

5.2 Demography

5.2.1 Population Size

The population statistics of the primary study area is detailed in the table below (General Census of Population and Housing (GCPH) of Mali, 2009).

Table 5-1: Demographic statistics of the main study area

Rural Commune	Locality	Number of households	Household size	Population		
				Male	Female	Total
Séléfougou	Sanankoro Village	45	9.6	232	198	430
	Séléfougou Village	442	7.2	1552	1621	3173
	Bokoro Hamlet	950	8	4550	3050	7600
Subtotal		**1437**	**8,2**	**6334**	**4869**	**11203**
Maramandougou	Sélin Village	50	8,5	209	216	425
	Kignèlen Hamlet	6	33	93	105	198
	Faragouagnan Village	54	6,7	178	170	348
Subtotal		**110**	**16**	**480**	**491**	**971**
Total		**1547**	**12,1**	**6814**	**5360**	**12 174**

Sources: GCPH (2009) in blue and data gathered in focus group meetings by Digby Wells (2019) in purple.

As shown in the table, the gender distribution indicates a higher dominance of men (55.9%) to women (44.1%) in the primary study area. This is contrary to the secondary study area and national statistics that show a higher number of women to men.

5.2.2 Age Distribution

Information gathered during the focus group meetings indicates that the population within the primary study area is mostly made up of young people (aged between 14-45 years old). This is followed by the group aged 46-59, while the age groups 0-13 and those aged above 60 make up the smallest part of the population (Figure 5-2). This age distribution is consistent with the second study area and country generally.

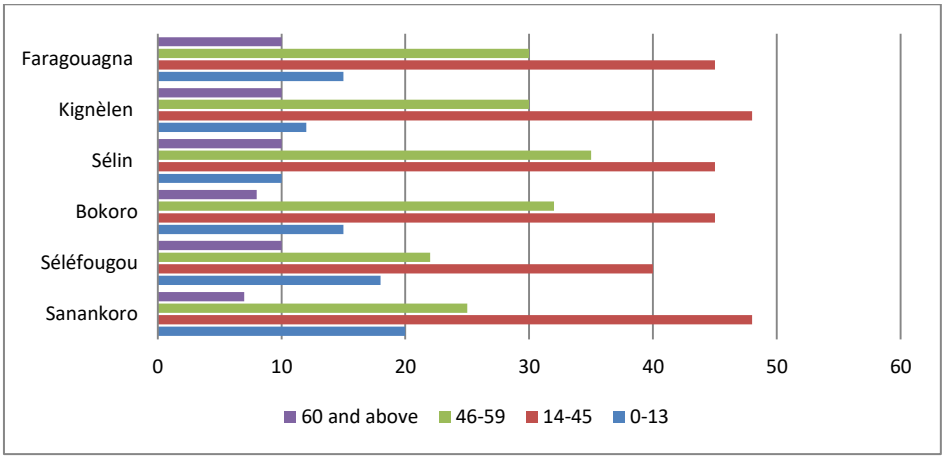


Figure 5-2: Age Distribution of the Primary Study Area

Source: Digby Wells, 2019 (estimation provided by village authorities)

5.2.3 Population Composition

The population of the primary study area is mainly composed of both indigenous people and Malian nationals of other regions. The presence of several African nationalities was also reported during focus group meetings. This was mainly attributed to artisanal mining opportunities present within the project area.

Migration to the project area was said to have accelerated from the year 2012 and is mainly centred around the Bokoro Hamlet where the largest ASM site in the project area (also recorded as one of the most productive in Mali) is found. To this end, Bokoro is the main host community for newcomers (national and foreign nationalities) in the region. It is estimated that newcomers make up over 90% of the population within Bokoro. The foreign nationalities whose presence has been reported in Bokoro mainly comprise people from Guinea, Burkina Faso, Nigerian, Cameroon and Senegal.

It should be noted that increasing migration into the Koulikoro Region has also been attributed to the political unrest experienced in the northern and central parts of Mali.

5.2.4 Ethnic Groups and Spoken Languages

With respect to the indigenous population, the predominant ethic group within the primary study area is Malinké (around 90%). The Fulani, Bambara, Bozos and Somonos together make up the remaining 10%. Due to ASM activity, ethnic groups in Mali have generally diversified overtime and are represented by several groups including Malinké, Bambara, Dogo, Senufo, Peulh, Miniyanka, Sonrhai, Tamasheq, Samoko, Bobo and Kassonke among others. In addition to ethnic groups in Mali, some ethnic groups from neighbouring countries are also represented, including: Mossis, Dioulas, Djermas, Haoussas, Wolofs etc.

In terms of languages, the most spoken language in the primary study area is Malinké, followed by Bambara and Fulani.

5.2.5 Religion

Religious practice in the primary study area is dominated by Islam (around 98%) with traditional religion and Christianity making up the remaining 2%.

5.3 Socio-economic Activities

The main socio-economic activities of the primary study area are agriculture, artisanal mining, livestock farming, fishing and small commercial trade. ASM is practiced along ore structures throughout the project area while agriculture is practiced within and around all villages which have expanded in proximity to the ASM sites due to the growth of the activity. As a result some socio-economic activity within the project area occurs directly or within 500 m of the proposed project activities.

Based on information gathered during the focus group meetings, the percentage of the economically active population per economic activity is presented in Figure 5-3. The percentage of local income derived per economic activity is presented in Figure 5-4.

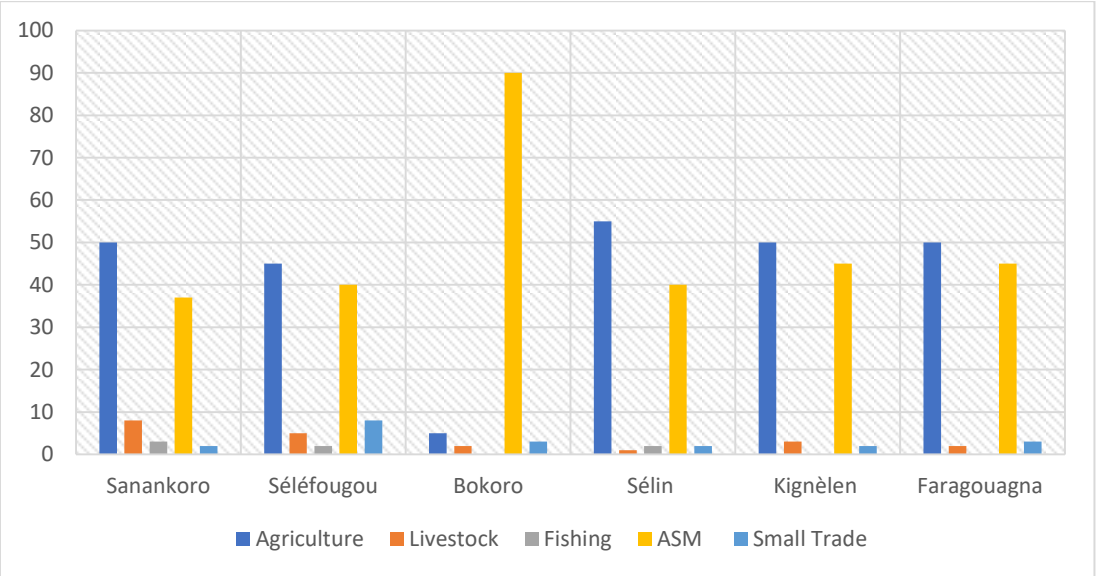


Figure 5-3: Percentage of Active Population by Economic Activity

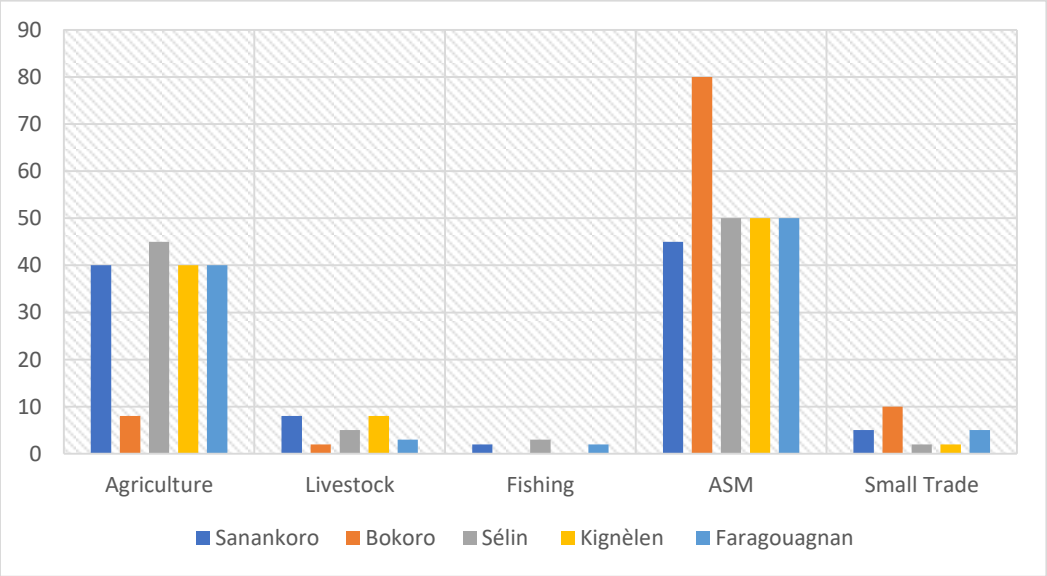


Figure 5-4: Percentage Income of Localities in the Project Area

Agriculture and artisanal mining are the most widely practised economic activities in the project area. On average artisanal mining accounts for 55% of the income derived in the project area, followed by agriculture below 35%. Livestock, small commercial trade and fishing contribute marginally to economic income at 5%, and 4.8% and 1.4% respectively.

These activities are discussed in further detail below.

5.3.1 Artisanal Mining

ASM is much more common in the southwestern part of Mali, particularly in the administrative Regions of Kayes, Koulikoro and Sikasso. The Kangaba Cercle is home to

several mining sites, both operational and decommissioned. Notably, no active ASM sites are currently present in the Maramandougou Commune, however it is understood that many of its inhabitants practice the activity in adjacent communes. Through the Bokoro Hamlet, the Séléfougou Commune is home to one of the largest ASM sites in Mali.

In the project area, ASM is considered an essential activity to sustain livelihoods and widely practiced as a main or secondary activity throughout. Income generated through ASM is used for food, health care services, education, equipment and household infrastructure as well as to support secondary agricultural practices (i.e. purchase of seeds/fertilisers, livestock and equipment, supplement income of workers etc.).

Due to the continuous expansion of artisanal mining in the project area, growing environmental pressures are evident. This includes threats associated with deforestation, loss of plant cover and soil as well as pollution of the surrounding water resources which are utilised for gold processing activities. Another emerging consequence of artisanal mining which was noted is its effect on education. Young boys (aged between 14-18 years old) are said to often leave school in favour of ASM. Furthermore, younger populations are abandoning agricultural activities to participate In ASM.

Figure 5-5: ASM site in Bokoro

The ASM site in Bokoro is semi-mechanised and the use of modern equipment such as metal detectors, water pumps, spitters, transport trucks etc. is present. The use of traditional equipment such as pickers and shovels are however still common throughout the region.

5.3.2 Agriculture

Consistent with all Cercles in Mali, agriculture is extensively practiced in the Kangaba Cercle and associated communes and is most commonly subsistence agricultural practice. The main crops cultivated in the project area include sorghum, millet, maize, rice (with wetlands used to cultivate paddy rice), cowpeas, peanuts, cassava and sweet potato. Cotton was identified as the only crop cultivated for commercial markets within the Cercle and constitutes a significant source of income. It was noted however, that this is said to be declining in the last few years.

Yields per hectare remain relatively modest, but most households are able to meet their food needs or supplemented from local markets. The total area of dry crop and cash crop cultivation (including maize, millet and rice) is estimated at 497 ha of the project area and with an average yield of 825 kg/ha and 480 kg/ha for groundnut and cowpeas.

Market gardening and arboriculture are poorly developed in the Kangaba Cercle, particularly in the primary study area. Limited market gardening was identified at water points or along the banks of the Niger and Fiè Rivers. The area reserved for market gardening activities in the project area is estimated at 17 ha while arboriculture was estimated to be practiced on approximately 12 ha of land in the project area.

Traditional equipment and methods are still commonly used to cultivate fields. Only one tractor was identified for agricultural practice in the Bokoro Hamlet (Figure 5-6). According to the village authorities, and as mentioned above, artisanal mining is a source of financing for agriculture (buying equipment, fertilizer, seeds, etc.).

Figure 5-6: Traditional and Modern Ploughing observed in the Project Area

The following main constraints were identified for the agricultural sector in the project area:

- Limited equipment to expand practices;
- Insufficient access to fertilizers, other chemical inputs and adapted seeds;
- Abandonment of agriculture for artisanal mining;
- Increased land utilisation for artisanal mining; and
- Lack of technical and financial partnerships.

The following main strengths were identified for the agricultural sector in the project area:

- Support of State technical services;
- Availability of arable land and irrigable plains;
- Proximity and availability of water resources throughout the project area; and
- Availability to seed of appropriate quality.

5.3.3 Livestock Breeding

Livestock breeding is extensive throughout the Kangaba Cercle and significantly contributes to food security (meat, milk, eggs). Livestock breeding in the project area is estimated at 1,500 cattle; 770 sheep; 775 goats and 1,900 poultry. There is a transhumance (seasonal movement of livestock) corridor within the project area between the banks of the Fié River and the Bokoro Hamlet.

Figure 5-7: Grazing Livestock in the Project Area

The following main constraints were identified for the livestock breeding in the project area:

- Difficulties accessing vaccines and other quality veterinary services;
- Insufficient equipment and livestock infrastructure;
- Low technical and financial support;
- Increased utilisation of pasture land for artisanal mining;
- Presence of diseases (e.g. bovine pleuropneumonia and symptomatic); and
- Theft of livestock.

The following main strengths were identified for the livestock breeding in the project area:

- Availability of water resources;
- Presence of State technical services; and
- Presence of a transhumance corridor.

5.3.4 Fishing

Fishing is practiced in the Niger River, its tributaries as well as village ponds in the Kangaba Cercle. Fishing is mainly for domestic consumption and for sale in key markets in Kangaba, Bamako, Séléfougou and Figuiratomo. In the project area, fishing appears to be a restricted activity, practiced mainly by Bozos and Somonos fishermen along the Niger and Fiè Rivers. Figure 5-8 below shows the fishing nets and some catches in the Fiè.

Figure 5-8: Fishing nets and some catches in the Fiè

The presence of the Niger and Fiè Rivers as well as their associated tributaries is important for fishing in the project area. The following main constraints were identified for fishing in the project area:

- Potential pollution of the river courses associated with artisanal mining activities[1];
- Insufficient technical assistance; and
- Limited access to fishing equipment.

5.3.5 Trade

Due to the difficulty of accessing the project area (undeveloped transport routes), the level of purchasing power of the people of Kangaba Cercle for commercial activities is limited. Bulk trade activity mainly takes place in Bokoro due to the existence of the ASM activities and consequent greater financial potential. Commercial trade is mostly of agricultural products, manufactured products, condiments, construction equipment and materials, clothing, livestock, poultry, electronic equipment, fuel, spare parts and cosmetics.

5.4 Socio-economic Infrastructure

5.4.1 Access to Education

The management of education in the Kangaba Cercle is under the responsibility of Kati's Academy of Basic Education. In terms of school infrastructure, Sanankoro comprises one first cycle (first to sixth grade) public school in Sanankoro Village and two first cycle community schools in Sélin and Faragouagnan. A private first cycle school has been constructed in Bokoro and two first cycle madrasas (Arabic schools) are also available in Bokoro. There is no second cycle (seventh to ninth grade) in the area, and as a result students are obliged to continue their studies in second cycle schools available in the broader communes/Cercles. The table below details the school infrastructure available in the project area.

[1] Although sampling shows good quality (Section 4.6.3 above), this was a single sampling source and does not discount the potential impacts to water resources.

Table 5-2: School Infrastructure available in the Project Area

School infrastructure	Number of classrooms and type of construction material
Private School of Bokoro	2 straw classrooms
Ançardine of Bokoro (madrasas)	2 straw classrooms
'Dar'Hadis of Boroko (madrasas)	-
Public School of Sanankoro	6 cement and banco classrooms with 3 latrines
Centre for Education for Development (CED) of Sanankoro	-
Faragouagnan Community School	2 classrooms in straw
Sélin Community School	3 PADI straw classrooms

Source: ESDCO, 2019

Apart from Sanankoro Public School, the existing infrastructure was found to be inadequate, in addition to no second cycle schools being available in the area. Excluding the two madrasas, the school infrastructures mentioned in the table above accommodates up to 496 students. A total of 16 teachers serve these schools comprising five for the Public School of Sanankoro, five for the Private School of Bokoro, four for the Sélin Community School and two for the Faragouagnan Community School.

5.4.2 Access to Health

The table below details the health facilities available in the primary study area.

Table 5-3: Health infrastructure statistics in the project area

Village/Hamlet	Rural Communes	Existing health structures			Total
		Community Health Centres	Health Posts	Private Care Office	
Séléfougou	Séléfougou	1			1
Sanankoro			1		1
Bokoro				5	5
Sélin	Maramandougou		1		1
Faragouagnan			0		
Kignèlen			0		
Total		**1**	**2**	**5**	**8**

Source: ESDCO, 2019

A total of eight health facilities are available in the project area. Notably, private care is only available in Bokoro as a result of the presence of ASM activities. Generally it was found that staff from the public facilities are poorly trained and access to the facilities is said to be a challenge particularly during the rainy season.

The common diseases, in order of frequency indicated during the focus group meetings, are malaria, respiratory diseases, ulcers, waterborne diseases, malnutrition in children and some

cases of trauma. The following main challenges were identified for health care in the project area:

- Poor access to community health centres and the health posts;
- Insufficient health care staff and resources; and
- General growing insalubrity in the area.

In terms of tertiary level health facilities, the Koulikoro Regional Hospital and/or the Kati Hospital are available to the project area.

5.4.3 Access to drinking water

Access to drinking water is a known challenge to most rural communes in Mali. This is mainly attributed to inadequate and uneven distribution of the hydraulic equipment to access groundwater resources. Drinking water in the project area is sourced from boreholes and wells detailed in Table 4-9 above. It is noted that the all boreholes in Bokoro are privately owned while other boreholes in the remaining villages and hamlet are publically access through the National Solidarity Fund, Mali Plan, Mali-Japanese Cooperation or Italian Financing. Equipment associated with these sources is said to be fully functional (ESDCO, 2019).

5.4.4 Electricity

The rural communes of Mali are not connected to the national electricity network, Energie Du Mali (EDM). Electricity generation sources used by these communities include solar energy (solar panels), generators and batteries.

Access to electricity in the project area is consistent with this reality in the country. This was confirmed during focus group meetings with the village authorities and infield observations. The Malian Agency for the Development of Domestic Energy and Rural Electrification (AMADER) is responsible for the electrification of the two commune capitals (Séléfougou and Figuiratomo) and was commissioned in 2003.

5.4.5 Housing Infrastructure

As in most rural areas in Mali, the main habitat infrastructures in the project area are of two types, namely round huts with straw roofs or square houses with sheet metal roofing. A few rare rectangular or square cement houses were identified in the project area. The photos below show the types of common housing infrastructure in the project area.

As a result of the proximity of villages to existing ASM sites, particularly Bokoro and Sanankoro, some housing infrastructure occurs within a 500 m buffer of the potential pit areas associated with the project. This will result in physical displacement of this housing infrastructure.


Figure 5-9: Dwelling Types in the Project Area

5.4.6 Land Tenure

In terms of land tenure, land in the Republic of Mali belongs to the State. However, communities have a customary right to the use of land. Authorisation to the use of the land is administered thorough the Commune Councils. It was established through the focus group meetings that land disputes between certain localities and / or certain families do exist in the project area.

5.4.7 Sanitation and Waste

No formal sanitation or waste management systems are available in the project area. This is consistent with many rural communes In Mali. Uncontrolled deposits of food and other waste and especially the flow of sewage water in the streets was observed throughout the project area.

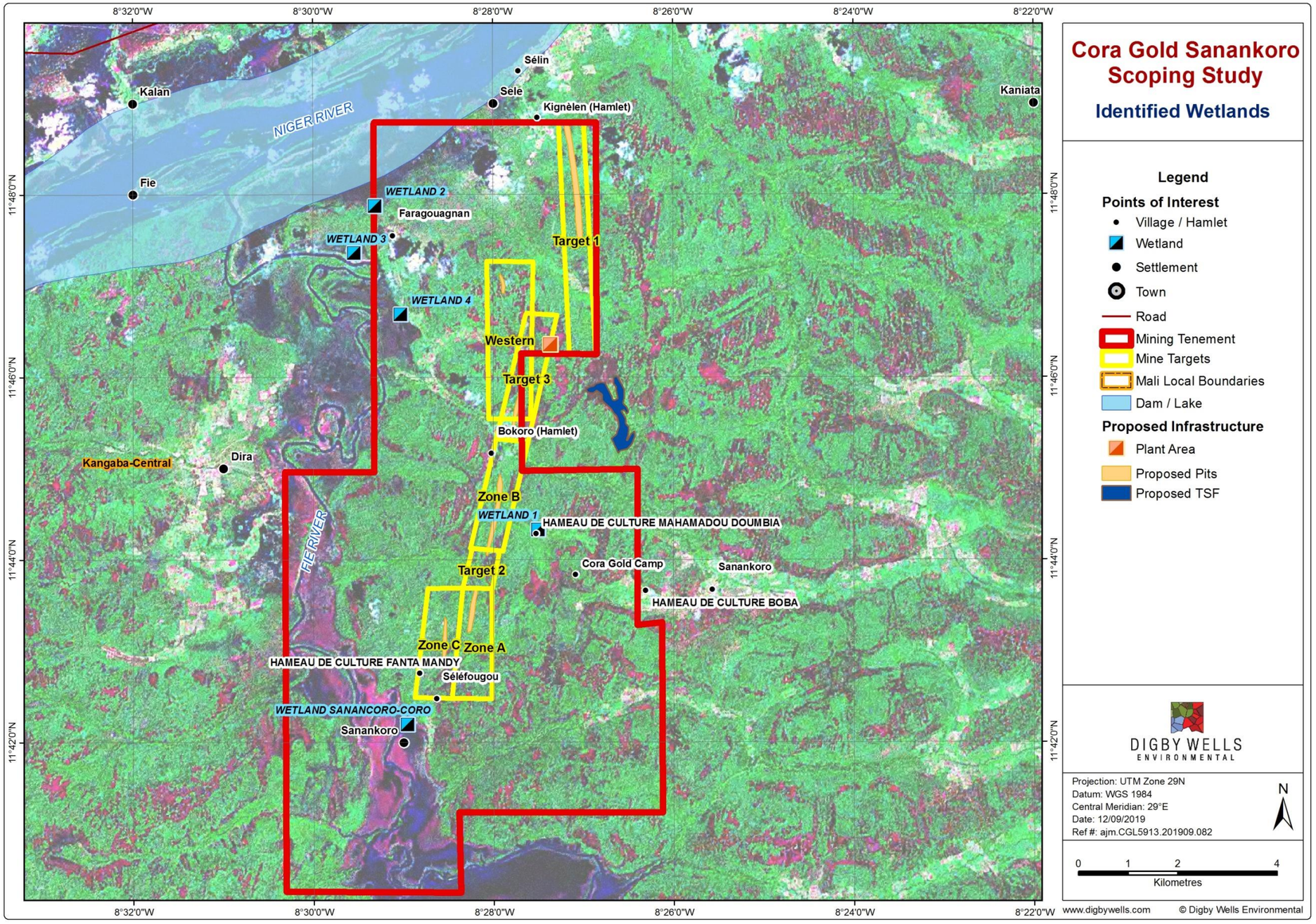
5.5 Cultural Heritage

The worship of sacred trees, stones, and demarcated sacred places is commonly practiced in the area. Through the focus group discussions, various areas considered to be of cultural significance were highlighted in the project area. These comprise sacred trees (Sélin, Kignèlen), sacred objects or stones (Sélin), sacred woods " Djagatou " (Sélin, Sanankoro), old cemetery (Sanankoro), and the tomb of saint (Bokoro). Customary authorities and hunting associations are considered custodians of cultural heritage.

The table below provides the localities of scared places encountered during the infield assessment (Plan 8). Although the existence of various places and objects of cultural significance were described by people within the project area, not all locations were shared during the time of the infield assessment.

Table 5-4: Some sacred places and sacred trees of the project area

Objects and sacred trees	North	East
Kignèlen Sacred Tree	11.814604	-8.456083
Sanankoro Cemetery	11.707526	-8.480195
Sanankoro Djakatou	11.708242	-8.480903



Plan 8: Identified Heritage Resources

6 Preliminary Impacts Identification

This chapter aims to provide an overview of the environmental and social impacts that may occur should the project proceed. The potential impacts are discussed below per environmental aspects. The potential impacts were identified based on the high-level understanding of the environmental and socio-economic attributes of the project area as well as the preliminary indication of infrastructure areas (Plan 3 above). It is assumed that the processing plant, ancillary administrative infrastructure and workshops will be located in the same area.

6.1 Identified Potential Impacts

The potential impacts identified for the project as well as potential mitigation types are detailed in the table below.

Table 6-1: Identified Potential Impacts and Mitigation Types

Aspect	Potential Impact Description	Mitigation Type
Biophysical Environment		
Soils, Land Use and Land Capability	The development footprint will be cleared and topsoil will be stripped and stockpiled for the establishment of infrastructure. This is expected for the TSF and associated access routes only as the resource targets as well as areas identified for the plant and other administrative infrastructure have been disturbed by ASM activities. This will result in the exposure of soil resources and consequently could result in the following key impacts: ▪ Alteration of the physical and chemical soil structure resulting in the loss of soil capability and quality (agricultural potential); and ▪ Loss of valuable topsoil and subsoil through wind and water erosion. The use of heavy vehicles can lead to soil compaction which during high rainfall events could lead to sheet runoff, exacerbating soil erosion. Due to ASM activities, communities and associated activities such as subsistence cultivation and livestock grazing have developed/expanded in proximity to the ore targets. The development of the project is therefore expected to result in changes to land use for the establishment of infrastructure and loss of land capability where agricultural practices remain along the ore targets.	▪ Establishment of site clearing procedures to ensure that the footprint of disturbance is limited as far as possible; ▪ Establishment of a soil monitoring programme for soil stockpiles to prevent the loss of topsoil; ▪ Establishment of a revegetation programme immediate following construction to minimise unnecessary bare surfaces; and ▪ Establishment of appropriate access routes and traffic control measures to prevent the unnecessary movement of vehicles in undisturbed areas.
Terrestrial Biodiversity	Site clearance for the establishment of infrastructure will have a significant direct impact on biodiversity, including: ▪ Direct loss of floral species/vegetation types; ▪ Loss of habitat for faunal species (small mammals, rodents, reptiles and birds) as well as disturbance of their migration patterns; ▪ Loss of protected trees; and ▪ Compromised integrity of terrestrial biodiversity caused by the infestation of Alien Invasive Plants (AIPs) as a result of habitat fragmentation. It is acknowledged that the potential resource targets (Zone A and Selin) and areas currently identified for the plant and other administrative infrastructure are already disturbed due to ASM and exploration activities therefore biodiversity impacts are expected to be limited to areas such as the TSF and potential access routes. The presence of the project is likely to	▪ Establishment of site clearing procedures to ensure that the footprint of disturbance is limited as far as possible; ▪ Establishment of a Biodiversity Management Plan aimed at ensuring the preservation and sustainable use of natural resources in the project area; ▪ Establishment of a relocation programme for the conservation of protected floral and faunal species encountered in the development footprint; ▪ Establishment of an AIP management plan to prevent the spread of AIPs; and ▪ Implement of a Rehabilitation and Closure Plan (RCP) in line with established closure and final land use

Aspect	Potential Impact Description	Mitigation Type
	result in the influx of people into the project area seeking employment opportunities. This could lead to the following indirect impacts resulting in the loss of terrestrial biodiversity: ▪ Increased exploitation of natural resources (particularly in the forest habitat); and ▪ Increased use of land for the development of socio-economic infrastructure, agricultural areas and hunting activities.	objectives.
Wetlands	Depending on the final project layout, direct impacts to wetland habitats as follows: ▪ Destruction of wetlands and consequently loss of habitat for associated faunal species; and ▪ Economic displacement of rice cultivation. Wetlands are present in the Project area and are predominantly associated with floodplains of streams and drainage lines. Other potential indirect impacts that could be experienced to wetlands include sedimentation (should soil erosion impacts be realised) and reduced water quality. This can consequently lead to reduced integrity of wetlands and establishment of AIPs which would adversely affect the ecological services they provide to the ecosystem. Wetlands play an important role in toxicant removal and ecosystem services. Furthermore, the wetlands in the project area associated with rice cultivation and therefore impacts to wetland will likely have significant biodiversity and socio-economic implications.	▪ Implementation of wetland buffer zones (at least 100 m) and avoiding the placement of infrastructure in wetlands and their associated buffer zones; ▪ Establishment of stormwater management structure to prevent the contaminated runoff entering surrounding water resources ▪ Establishment of a soil monitoring programme for soil stockpiles to prevent sedimentation of surrounding water resources; and ▪ Establishment of an AIP management plan to prevent the spread of AIPs to wetlands.
Surface Water	Surface water impacts that could occur relate to reduced water quality and reduced water quantity. In terms of water quality, the following possible impacts may be experienced: ▪ Sedimentation of water resources (should soil erosion impacts be realised) resulting in reduced water quality; and ▪ Water pollution as a result of hydrocarbon spills and/or contaminated runoff entering water resources. In terms of water quantity impacts, the establishment of the project will require the containment of water and stormwater management system which will result in reduced catchment yields. Impacts to both surface water quality and quantity will impact downstream users and surrounding biodiversity (including direct impacts to aquatic life). It is also noted that the various perennial and non-perennial streams associated with the Fié	▪ Establishment of a surface water quality management programme upstream and downstream of the project area to detect impacts from project activities; ▪ Establishment of stormwater management structure to prevent the contaminated runoff entering surrounding water resources; ▪ Establishment of a comprehensive water management plan (particularly if stream diversions are required) to minimise downstream impacts; and ▪ Establishment of appropriate compensation mechanisms in the event that significant water quantity

Aspect	Potential Impact Description	Mitigation Type
	and Niger Rivers traverse the project area and could potentially coincide with infrastructure and pit areas. In this event, modifications of drainage patterns in the project area and possibly river diversions will be required. This will likely require major earthworks, high costs and substantial environmental implications.	reduction to downstream reaches is probable.
Groundwater	Groundwater impacts that could occur relate to reduced water quality and reduced water quantity. Open-pit mining will require dewatering activities to allow for safe mining. This results in lowering of the groundwater table and the formation of a cone of depression. The cone of depression may impact on water availability to surface water resources, wetlands and community wells and boreholes. In terms of groundwater quality, potential pollution could occur as a result of seepage of hazardous substances and runoff as well as leaching of contaminants from WRDs, ROM pad and TSF, creating a contamination plume. Any potential contamination plumes are likely to migrate to the pits during operation due to the cone of depression, however post closure may result in the mobilisation of contaminants into the downstream catchment.	▪ Establishment of a groundwater quality management programme upstream and downstream of the project area to detect impacts from project activities; ▪ Establishment and continuous update of a groundwater numerical model to determine the potential contamination plume and cone of depression; and ▪ Establishment of appropriate compensation mechanisms in the event that significant groundwater quantity reduction which affects surrounding public boreholes is probable.
Air Quality	Construction and operational activities have the potential to impact on air quality. The increase in traffic, use of earthmoving machinery, material handling, stockpiling and use of crushers and processing to take place is likely to result in the generation of dust, Particulate Matter (PM) and gaseous emissions. Generation of dust and gaseous emissions could lead to the degradation of air quality and potential nuisance impacts, reduction in visibility and potential respiratory illness for nearby sensitive receptors.	▪ Establishment of an air quality monitoring programme to detect impacts from project activities; and ▪ Establish of a grievance mechanism to address community complaints related to poor air quality.
Socio-Economic Environment		
Cultural Heritage	Sites of cultural significance area present throughout the project area, such as burial grounds and graves and sacred sites. The project may result in the direct destruction of such sites, or the degradation depending on the proximity of project activities.	▪ Implementation of heritage buffer zones to prevent the destruction of areas of cultural significance; ▪ Establish of a grievance mechanism to address community concerns regarding impacts to heritage resources; ▪ Establishment of a Chance Find Procedure to manage

Aspect	Potential Impact Description	Mitigation Type
		unknown heritage resources may be encountered.
Traffic	The project will result in the establishment of access routes and haul roads which will result in an impact on traffic and community health and safety.	▪ Implementation of a traffic management plan (e.g. installation of signage and enforcement of speed limits).
Socio-Economic	A 500 m buffer is recommended around pit areas. This may result in the physical displacement of communities in proximity to the potential pit areas (particularly the Bokoro Hamlet). Furthermore, economic displacement is probable as agricultural and ASM activities are undertaken in these areas of displacement. Given the extent of ASM in the project area, this is likely to be a significant and contested impact.	▪ Implementation of a Resettlement Action Plan (RAP) to compensate the physical displacement of communities; ▪ Implementation of a Livelihood Restoration Plan (LRP) to compensate the economic displacement of communities; and ▪ Establishment of a clear communication strategy and Stakeholder Engagement Plan (SEP) to manage displacement related impacts.
	The project will provide formal employment opportunities through skilled, semi-skilled and unskilled labour requirements. In addition, opportunity for skills development and transfer to people within the project area and surrounding areas will be realised. This in turn will result in economic growth. The purchasing power within the project area will also be increased as employed personnel will have the means to purchase more goods and services as well as further invest in secondary economic activities. At regional and national level, the project will contribute increasing revenue through tax and local budget contributions.	▪ Establishment of procurement strategies/procedures which favour the employment of local people and use of local goods and services suppliers as far as possible to maximum local economic growth; ▪ Implementation of training programmes for maximise skills development.
	The presence of the project will likely exacerbate the influx of people from both within Mali and neighbouring countries who are seeking employment opportunity. This in turn can lead to the following adverse impacts: ▪ Increased pressure on existing socio-economic infrastructure; ▪ Increased exploitation of natural resources and degradation due to land occupation; ▪ Increase in social pathologies and communicable diseases; and	▪ Establishment of a clear communication strategy and SEP to manage impacts related to influx; ▪ Establishment of procurement strategies/procedures which favour the employment of local people first to avoid conflict in communities; and ▪ Implementation of Local Development Initiatives to alleviate further pressures to existing socio-economic

Aspect	Potential Impact Description	Mitigation Type
	▪ Adverse influences on cultural customs of the indigenous population.	infrastructure.
	Often, those living in rural areas with few economic opportunities may have unrealistic expectations of a new project. As a result dissatisfaction and unmet expectations are probable. This presents risks of unrest in the project area (e.g. striking and damage of mine infrastructure). In addition, the expectations of better employment opportunity from the project may further deter young people from agricultural practice which will negative affect livelihoods in the project area.	▪ Establishment of a clear communication strategy and SEP to manage stakeholder expectations; ▪ Establishment of procurement strategies/procedures which favour the employment of local people first to avoid conflict; ▪ Implementation of Local Development Initiatives to alleviate further pressures to existing socio-economic infrastructure; and ▪ Establish of a grievance mechanism to address community concerns.
	The presence of the project can positively contribute the development of socio-economic infrastructure and skills development in the wider project area through strategic Local Development Initiatives. This in turn will result in local economic development.	▪ Establishment of a Community Development Plan (CDP) aimed at ensuring greater community spend and commitment.

7 Terms of Reference

This chapter therefore provides an overview of the applicable Legal Framework as well as ToR for the environmental and social assessment which will be required as part of the permitting process. The ToR has been tailored with specific consideration of the outcomes of this Scoping Study.

7.1 Legal Framework

The development and mining of the Sanankoro Gold Prospect will require compliance with national legislation and International Best Practice. The applicable legislative framework is summarised in the subsections below.

7.1.1 Mali Legislation

Cora Gold is required to apply for an Exploitation Permit for the project area in accordance with Law No. 2012-015 of 27 February 2012 (the Mining Code). In terms of Article 22, Decree No. 2012-311 of 21 June 2012 of the Mining Code, any application for exploitation must be accompanied by an application for an Environmental Permit. This requires for an Environmental and Social Impact Assessment (ESIA) Process to be undertaken in accordance with the rules and procedures set out under the following legislation:

- Law No. 01-020 P-RM of 30 May 2001 on Pollution and Nuisance; and
- Decree No. 2018-0991 / P-RM of 31 December 2018.

The Direction Nationale de l'Assainissement et du Controle des Pollutions et Nuisances (DNACPN) are the responsible authorities for environmental permitting in Mali. Broadly, the ESIA Process requires a detailed assessment of environmental and social impacts that could arise as a result of the development as well as develop an Environmental and Social Management Plan (ESMP) to mitigate and manage these impacts (refer to Section 7.2 below).

7.1.2 International Standards

The Equator Principles and International Finance Corporation's Performance Standards (IFC PS) widely recognised as effective tools for the sustainable management of environmental and social risks of a project to ensure projects were developed, operated and closed in a socially responsible manner and reflecting sound environmental management practices. These standards provide an approach to the determination, assessment and management of environmental and social risk in project financing.

To comply with International Best Practice, the Equator Principles and IFC Performance Standards should be utilised as the regulatory framework for the project. A summary of the Equator Principles and IFC Performance Standards is provided in the tables below.

Table 7-1: Equator Principles (2013)

Principle	Requirement
Principle 1	Under the Equator Principles, proposed developments are categorised depending on its potential environmental and social risks. The Sanankoro Gold Project will be classed as category A. Projects of this category are deemed to have potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented.
Principle 2	For a category A project, a suitably comprehensive assessment process appropriate to the nature and scale of the project is required. The nature of the Sanankoro Gold Project necessitates a detailed ESIA and ESMP is prepared.
Principle 3	For projects taking place in Designated countries (generally first world countries), the applicable standard will be host country laws, regulations and permitting requirements that pertain to Environmental and Social matters. For projects taking place in Non-Designated countries, the Equator Principles requires compliance with the IFC Performance Standards and the World Bank Environmental, Health and Safety Guidelines (EHS Guidelines). In addition to the IFC Performance Standards and EHS Guidelines, compliance with in-country legislation is also required.
Principle 4	The Equator Principles will require a Category A project that an Environmental and Social Management System be composed of policies and procedures to manage environmental and social risks.
Principle 5	Category A projects require that effective stakeholder engagement is undertaken and is an ongoing process. Vulnerable and indigenous groups must be taken into consideration and all legal requirements of consultation met.
Principle 6	The Equator Principles require that a Category A project implement a grievance mechanism to record and document all concerns and issues raised by the communities, regarding the project.
Principle 7	The Equator Principles require a Category A project to undergo an independent review by a consultant.
Principle 8	The Equator Principles require the inclusion of covenants regarding the implementation of the Equator Principles III into legal documentation structuring the deal. This requirement gives the requirements of the Equator Principles III a legally binding nature between the contracting parties.
Principle 9	The Equator Principles requires a Category A project to appoint an independent environmental consultant to undertake the monitoring and reporting, or that applicable skills be retained in house.
Principle 10	The Equator Principles require a Category A project to make the ESIA available online. It is further required that a GHG emissions report be publicly released if

	emissions exceed, or are anticipated to exceed, 100 000 CO2 equivalent per annum. Once the likely mining and haulage scenarios are established the requirement for an emissions report will be evaluated.

Table 7-2: IFC Performance Standards (2012)

Performance Standard	Requirement
PS 1: Assessment and Management of Environmental and Social Risks and Impacts:	PS 1 underscores the importance of managing environmental and social performance throughout the life of a project. An effective Environmental and Social Management System (ESMS) is a dynamic and continuous process initiated and supported by management, and involves engagement between the project promoter, its workers, local communities directly affected by the project (the Affected Communities) and, where appropriate, other stakeholders. The ESMS entails a methodological approach to managing environmental and social risks and impacts in a structured way on an ongoing basis
PS 2: Labour and Working Conditions:	PS 2 recognises that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers. Failure to establish and foster a sound worker-management relationship can undermine worker commitment and retention and can jeopardise a project. Conversely, through a constructive worker-management relationship, and by treating the workers fairly and providing them with safe and healthy working conditions, tangible benefits can be realised, such as enhancement of the efficiency and productivity of their operations.
PS 3: Resource Efficiency and Pollution Prevention:	PS recognises that increased economic activity and urbanisation often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment. More efficient and effective resource use and pollution prevention and mitigation technologies and practices have become more accessible and achievable in virtually all parts of the world.
PS 4: Community Health, Safety, and Security:	PS 4 recognises that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration and/or intensification of impacts due to project activities. While acknowledging the public authorities' role in promoting the health, safety, and security of the public, this Performance Standard addresses the promoter's responsibility to avoid or minimise the risks and impacts to community health, safety, and security that may arise from project related-activities, with particular attention to vulnerable groups.

PS 5: Land Acquisition and Involuntary Resettlement:	PS 5 recognises that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood) as a result of project-related land acquisition and/or restrictions on land use. Resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land use that result in physical or economic displacement. This occurs in cases of (i) lawful expropriation or temporary or permanent restrictions on land use and (ii) negotiated settlements in which the buyer can resort to expropriation or impose legal restrictions on land use if negotiations with the seller fail.
PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources:	PS 6 recognises that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. The requirements set out in this Performance Standard are guided by the Convention on Biological Diversity.
PS 7: Indigenous Peoples:	PS 7 recognises that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalised and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples may be more vulnerable to the adverse impacts associated with project development than non-indigenous communities. This vulnerability may include loss of identity, culture, and natural resource-based livelihoods, as well as exposure to impoverishment and diseases.
PS 8: Cultural Heritage:	PS 8 recognises the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure the protection of cultural heritage in the course of project activities. In addition, the requirements of this Performance Standard on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity.

7.2 ToR for the ESIA

Based on the project's classification (Category A Project), national legislative requirements for an Environmental Permit as well as the potential impacts mentioned above, a comprehensive ESIA Process is required. The key stages for the ESIA will include:

- Scoping (and site selection);
- Stakeholder engagement;
- Baseline data collection (wet and dry seasons);
- Project description and interaction with the design and decision-making;
- Assessment of impacts and identification of mitigation measures;
- Integrated management system and plans; and
- Reporting and disclosure.

The subsections below provide the proposed Plan of Study for the ESIA Process with respect to the required in terms of the specialist studies and stakeholder engagement to inform the ESIA.

7.2.1 Specialist Studies

7.2.1.1 Biophysical Environment

The following section describes the biophysical studies that are required as part of the ESIA process.

7.2.1.1.1 Air Quality

The potential impacts on air quality need to be understood. Given ASM activities in the project it is expected that cumulative impacts may be realised. It is crucial that the impacts on air quality at mining activities (stockpiles, pits, waste and haul roads) are understood as it has the potential to adversely affect both people and the environment. The objectives and deliverables for the air quality assessment are summarised in Table 7-3.

Table 7-3: Objectives and Key Deliverable for the Air Quality Assessment

Objectives	Key Deliverables
▪ Determine the regional climate and assess the baseline conditions (dust deposition), as well as the local (site-specific) prevailing weather conditions and its influence on the climatic and atmospheric dispersion and dilution potential of pollutants released into the atmosphere; ▪ Identify existing sources of emissions and characterise the ambient air quality within the airshed;	▪ Site-specific meteorological data will be obtained and evaluated. In the absence of site specific meteorological data, modelled meteorological data. ▪ Dust fallout baseline.

Objectives	Key Deliverables
▪ Review of potential health effects associated with air pollutants; and ▪ Define the potential sensitive receptors, such as local communities, as well as environmental constraints relative to air quality.	
▪ Estimate the emissions from various sources within the proposed operations.	▪ Emissions Inventory
▪ Compute ambient concentrations as a function of source configurations, emission strengths and meteorological characteristics, to ascertain the spatial and temporal patterns in the ground level concentrations arising from the emissions of various sources; and ▪ Determine pollutants contribution from the operational phase.	▪ Dispersion Model
▪ Highlight predicted zones of maximum ground level impacts (particulate matter and gases), potential for human health and environmental impacts; and ▪ Recommendations of buffer zones and impact management zones.	▪ Air Quality Impact Assessment, inclusive of monitoring recommendations

7.2.1.1.2 Soils, Land Use and Land Capability

A Soil, Land Use and Land Capability study is required to determine the project's impact to the livelihoods (agricultural activities) of the communities in the project area. The objectives and deliverables of the study are provided in Table 7-4.

Table 7-4: Objectives and Key Deliverables for the Soils and Land Use Assessment

Objectives	Key Deliverables
▪ Identify the dominant soil forms, their distribution, the existing land capability and current land use within the project area.	▪ Literature review
▪ Determine soil type and depth on site and define soil acidity, fertility and texture	▪ Sample analysis of topsoil (0-0.3 m) and subsoil (0.3-0.6 m) of the dominant soil forms (40 samples)
▪ Identify and rate potential impacts on the soils, land capability and land use ▪ Identify management and mitigation measures to reduce impact significance	▪ Soils and Land Use Impact Assessment Report

7.2.1.1.3 Biodiversity

The biodiversity studies will consist of terrestrial flora and fauna, aquatic and wetland studies.

Fauna and Flora

A detailed vegetation study is required in the growing season to determine the different plant communities, species compositions, biodiversity as well as any potential Red Data plant species and Protected tree species.

Detailed faunal studies on the mammals, birds, reptiles, amphibians and invertebrates will be conducted to list all species present in Project area. This record will determine the biodiversity ranges and the likelihood of any potential Red Data or protected species in the Project area. The objectives and deliverables of the study are provided in Table 7-5.

Table 7-5: Objectives and Key Deliverables for the Fauna and Flora Assessment

Objectives	Key Deliverables
▪ Determine the actual flora species present on site and discuss these in context of plant communities within the ecosystem of the area; ▪ Discuss protected, endemic, exotic, alien invasive and culturally significant plant species; ▪ Identify any rare or protected species; ▪ Identify mammals, birds, amphibians and invertebrates potentially making use of the area	▪ Fauna and Flora Baseline
▪ Identify and map sensitive areas, as described by the provincial and national legislation	▪ Flora and Fauna Impact Assessment

Aquatics

An aquatics study of the Fié and Niger Rivers as well as any tributaries downstream of key infrastructure is necessary to determine the aquatic composition of the system prior to mining activities. A study is necessary for both the high and low flows to record the baseline. Although it is expected that there will be limited flows of smaller streams within the project area during the dry season, the instream habitat will still be surveyed to understand the seasonal characteristics of the aquatic habitat. The objectives and deliverables of the study are provided in the table below.

Table 7-6: Objectives and Key Deliverables for the Aquatics Assessment

Objectives	Key Deliverables
▪ Determine the actual aquatic species (fish and macroinvertebrates) present in the river and its tributaries and discuss these in context of the ecosystem of the area ▪ Identify and discuss any red data or protected species ▪ Determine existing surface water quality by taking water samples ▪ Determine the existing status of the river bed by taking sediment samples	▪ Aquatics Baseline
▪ Identify and map sensitive areas and determine the potential impacts from mining operations	▪ Aquatics Impact Assessment

Wetlands

The wetlands identified on site were predominantly floodplain wetlands, although the potential remains for further wetlands throughout the project area. The extent of the possible wetlands in the area will be confirmed by a wetland specialist. Wetlands are regarded as critical, sensitive habitats that must be conserved. Wetland areas are already impacted by agricultural and ASM activities. The wetlands study will work in conjunction and include findings from the fauna, flora, aquatics and hydrological studies. The objectives and deliverables of the study are provided in Table 7-7.

Table 7-7: Objectives and Key Deliverables for the Wetlands Assessment

Objectives	Key Deliverables
▪ Delineate the wetland areas of the project areas ▪ Classify the soil characteristics of the wetland areas ▪ Determine and classify the current health of the wetland systems ▪ Determine the impact already being exerted on the systems	▪ Wetlands Baseline
▪ Identify and map the wetland areas and their health ▪ Incorporate analysis from the fauna, flora, aquatics and hydrological studies to determine the potential impacts from mining operations	▪ Wetlands Impact Assessment

7.2.1.1.4 Surface Water

A hydrological investigation will define the catchment boundaries to comprehensively understand the hydrological characteristics of the project area and water management measures required. The objectives and deliverables of the study are provided in Table 7-8.

Table 7-8: Objectives and Key Deliverables for the Surface Water Assessment

Objectives	Key Deliverables
▪ Describe the baseline surface water environment	▪ The desktop assessment will include use of already available information from previous studies, land type data, land use map, 1:50 000 topographical data and climate information for the description of the surface water environment
▪ Determine existing surface water quality by conducting a site visit and take surface water quality samples; ▪ Delineate floodlines to determine impacts from the pits and required diversions.	▪ Surface water quality sample analysis
▪ Determine the potential impacts that could arise from the proposed Project on the surface water environment and the nearby rivers ▪ Assess potential impacts that the proposed development may have, and to provide mitigation measures for those identified impacts	▪ Surface water impact assessment report ▪ Surface water quality and streamflow monitoring programme
▪ Provide the expected volumes of water to ensure that onsite water is managed appropriately. This will depict water inflows, losses and outflows within the mine	▪ Water and salt balance

▪ Prepare a conceptual Stormwater Management Plan (SWMP) according to the recommended management standards. Ensuring that clean water is separated from dirty water. The SWMP will include the following:
  ▪ An outline of key SWMP principles;
  ▪ Delineation of clean and dirty water catchments indicated on a plan;
  ▪ Conceptual placement of clean and dirty water structures indicated on a plan; and
  ▪ Storm water management monitoring plan.
	▪ Conceptual SWMP (no engineering design will be included; this is for environmental purposes only)

7.2.1.1.5 Groundwater

A geohydrological investigation is important to understand the potential dewatering of the aquifer. It will also help to determine the potential impact from WRDs and TSF to contaminate the groundwater. An understanding of the system before the placement of infrastructure and waste storage facilities is necessary. A numerical model will be required to inform the decisions around the design of the mine infrastructure. The objectives and deliverables of the study are provided in Table 7-9.

Table 7-9: Objectives and Key Deliverables for the Groundwater Assessment

Objectives	Key Deliverables
▪ Establish a conceptual idea of the hydrogeological occurrence and dynamics.	▪ Desktop study and literature review
▪ Collect data pertaining to the current groundwater conditions and use, including localities of current groundwater abstraction points (boreholes, hand dug wells or springs), ownership, usage volumes and types, equipment and groundwater levels.	▪ Hydrocensus
▪ Establish a reference point against historical and future groundwater conditions ▪ Describe the baseline groundwater environment, identify potential impacts on groundwater and describe the ToR for the Groundwater Impact Assessment	▪ Analysis of hydro-chemical samples from selected boreholes
▪ Undertake a geochemical assessment of the waste rock and tailings material to characterise the wastes and identify contaminants of concern. Contaminants will be identified based on the processing method. Strontium should also be assessed to determine its potential for mobilisation.	▪ Geochemical assessment
▪ Delineate weathered zones and identify possible linear structures that could act as preferred groundwater flow paths and finalise the drilling targets necessary for the study ▪ Determine aquifer responses and calculate the parameters presenting the aquifer hydro-dynamics underlying the investigation area	▪ Geophysics and borehole sampling ▪ Aquifer tests
▪ Describe the complete groundwater system in terms of characterisation of aquifers, contaminant formation, boundaries, hydro-stratigraphic units, the	▪ Hydrogeological model

Objectives	Key Deliverables
groundwater flow system, precipitation, evapo-transpiration, runoff, hydraulic parameters, recharge and discharge rates and hydro-chemical data ▪ Determine potential contaminant transport from the proposed project	
▪ Compile a detailed groundwater impact assessment based on the outcome of the numerical model, with recommended mitigation measures that may be necessary to address groundwater impacts associated with the project ▪ Define a network of observation points and compile a monitoring program that would monitor groundwater conditions (levels and chemistry) before and after commencement of operations	▪ Groundwater Impact Assessment Report ▪ Groundwater quality monitoring programme

7.2.1.2 Social Studies

The following section details the socio-economic studies that are required as part of the ESIA.

7.2.1.2.1 Archaeological and Heritage

A phase one Archaeological and Heritage Impact Assessment (AHIA) is required to identify potentially significant cultural heritage or archaeological sites and resources. The objectives and deliverables of the study are provided in Table 7-10.

Table 7-10: Objectives and Key Deliverables for the Archaeological and Heritage Assessment

Objectives	Key Deliverables
▪ Provide an understanding of the location, nature and extent of the proposed Project in relation to archaeological and cultural heritage ▪ Stakeholder consultations on cultural heritage	▪ Heritage field investigations and baseline
▪ Identify heritage resources and potential impacts to stipulate any limitations or conditions of the development ▪ Determine the general protection required of these; provide mitigation measures or conditions for authorisation	▪ Heritage Impact Assessment
▪ Promote compliance with the Heritage Legislation by providing mitigation measures to be implemented	▪ Statutory Comment Feedback Reports (if required)

7.2.1.2.2 Noise

Given the proximity of communities to potential pit areas, a baseline noise assessment is required to measure the ambient noise level in the project area prior to mining activities. The study will focus on measuring where noise will be generated during construction and operations and where possible noise receptors are located. The objectives and deliverables of the noise study are provided in Table 7-11.

Table 7-11: Objectives and Key Deliverables for the Noise Assessment

Objectives	Key Deliverables
▪ Conduct baseline noise monitoring at selected sensitive receptors	▪ Noise Baseline
▪ Quantify expected noise levels for the construction and operation phases of the proposed project	▪ Dispersion mapping Isopleths
▪ Determine whether the proposed project will be in compliance with the relevant noise regulations and guidelines ▪ Model the noise propagation and the impact to sensitive receptors ▪ Include recommended mitigation measures as well as recommended action plans to minimise the impact of noise on the surrounding environment	▪ Noise Impact Assessment Report

7.2.1.2.3 Socio-Economic

A thorough and up to date understanding of the baseline socio-economic conditions of the communities around the Project area is critical to determine the potential impacts and possible implementation plans for community development.

It is important to complete the socio-economic survey as soon as possible before in-migration to the Project area occurs. The baseline is then used to assess the possible impacts of the project to the population and propose appropriate mitigation measures and action plans. The objectives and key deliverables for the socio-economic study are provided in Table 7-12.

Table 7-12: Objectives and Key Deliverables for the Social Assessment

Objectives	Key Deliverables
▪ Record relevant social spatial information (e.g. settlement patterns, location of public infrastructure and landmarks, etc.) ▪ Review and analyse the available Commune reports for the project area	▪ Socio-Economic Baseline.

Objectives	Key Deliverables
▪ Carry out household surveys, FGDs and one on one meetings ▪ Identify potential socio-economic impacts ▪ Compile the Terms of Reference for the Social Impact Assessment ▪ Gain an appreciation of the project area of impact and compile a detailed socio-economic baseline	
▪ Identify (verify), assess and rate likely socio-economic impacts of the proposed project	▪ Impact Assessment Report
▪ Identify cost-effective and practical mitigation measures aimed at reducing the severity of adverse impacts, and enhancement measures for potential benefits, and define practical steps for implementing the recommended mitigation measures	▪ Social Management Plan

7.2.1.2.4 Resettlement Action Plan and Livelihood Restoration Plan

Based on the potential pit locations, a RAP and LRP will be required to compensate for the physical and economic displacement. A Resettlement Policy Framework (RPF) should be compiled to outline the entitlement framework and resettlement scope, as well as confirming the resettlement legislation to be applied. The objectives and key deliverables for the socio-economic study are provided in Table 7-13.

Table 7-13: Objectives and Key Deliverables for the RAP and LRP

Objectives	Key Deliverables
▪ Determine the legislative requirements for involuntary resettlement ▪ Define the resettlement scope and entitlement framework ▪ Compile resettlement costs and options	▪ RPF
▪ Development of consultation materials and establish consultation structures ▪ Stakeholder engagement ▪ Resettlement survey planning ▪ Asset and census survey of households and economic activities ▪ Socio-economic verification survey ▪ Identification of replacement housing and livelihood options	▪ RAP and LRP

7.2.1.3 Preliminary Conceptual Rehabilitation and Closure Assessment

A preliminary conceptual Rehabilitation and Closure Plan is required to account for all proposed mine activities, and to comply with Article 154 of the Mining Code. A closure cost assessment must also be developed to determine the financial provision for closure at the end of the life of mine. The objectives and key deliverables for the Conceptual Rehabilitation and Closure Assessment are provided in Table 7-14.

Table 7-14: Objectives and Key Deliverables for the Conceptual Rehabilitation and Closure Assessment

Objectives	Key Deliverables
▪ Determine the closure objectives for the desired end land use ▪ Determine the specific rehabilitation actions to be undertaken during operation, decommissioning and closure phases of the mining operation ▪ Provide consolidated environmental maintenance and monitoring programmes for the project	▪ Rehabilitation and Closure Plan (RCP)

7.2.1.4 Other Assessments

A number of other studies may be required for the project, depending on the final project design and authority requirements (i.e. international funder requirements). These assessments could include:

- Climate Change;
- Community Health; and
- Traffic Impact Assessment.

7.2.2 Environmental and Social Impact Assessment

The results of the studies must be collated into a document which will identify the impacts that the project activities will have on the receiving environment. The impacts should be assessed in terms of their severity, duration, extent and significance.

The document will also consider the cumulative impacts associated with the project, in which other external factors or activities are considered and which may contribute to and exacerbate the mine's impacts.

These findings along with a detailed project description will be captured in the ESIA. The ESIA will also provide the legal framework as a reference point for the project. Mitigation and management measures associated with each impact will be provided. These measures will be implemented to minimise the significant negative environmental and social impacts and enhance potential positive impacts.

7.2.3 Stakeholder Engagement

A Stakeholder Engagement process will be initiated prior to any activities commencing. The Stakeholder Engagement process focuses on consulting key Interested and Affected Parties (I&APs) to identify the issues and concerns that will inform the socio-economic and environmental aspects of the studies. The strategy for this phase is based on interviews with authorities and I&APs and it is proposed that public meetings in the nearby and affected villages take place. The final studies, which should include environmental investigations, must be distributed to registered I&APs to provide them with accurate information and create a basis from which they can raise issues and concerns.

8 Conclusion and Recommendations

This Scoping Study was undertaken to screen the biophysical and socio-economic characteristics of the Sanankoro Gold Project. The assessment aimed to provide early indication of potential environmental and social risks and determine the ToR for the ESIA process that will be required as part of the exploration/environmental permitting process.

The Scoping Study revealed anthropogenic activities within the project area have resulted in environmental degradation with respect to biodiversity as well as potentially adverse implications of water resources. Remaining natural areas should be preserved as far as possible. Cora Gold has already started considering alternative infrastructure locations to optimise the use of already disturbed areas within the project area. Based on the preliminary findings of this Scoping Study, the location of the plant and other potential administrative infrastructure which was originally located in an undisturbed area near the potential TSF site was reconsidered to an existing disturbed area. It is likely that only the TSF and associated access routes will result in disturbance of remaining natural areas in the project area. This is largely due to the topographical and space requirements for the TSF. Furthermore, Cora Gold intends to avoid ore structures which may be exploited in future. Where natural areas are impacted there is also the opportunity to compensate for these by improving existing impacted areas that will now fall within the mine project area and could be restricted from community access. To this end, impacts to biodiversity are expected to be limited and, if correctly implemented, the project could result in positive offsets to existing negative impacts determined within the project area.

In terms of the socio-economic environment, various communities whose livelihoods are mostly sustained through ASM and agricultural activities are present and growing within the project area. The project area is host to one of the most productive ASM sites in Mali which is increasing both through migrant workers and increasing numbers of local youth being attracted to ASM. The socio-economic infrastructure and services however remain relatively limited. Other notable environmental attributes include:

- The presence of various water resources (wetlands, possible aquatic biota, perennial and non-perennial streams) associated with the Fié and Niger River Systems;
- The presence of arable land throughout the project area;

- Good groundwater quality and quantities for potables uses by the surrounding communities;
- The presence of forest galleries and savannah with associated sensitive plant and tree species; and
- The presence of heritage resources and sacred places of cultural significance to surrounding communities.

No immediate fatal flaws were identified for the project. The most significant Project risks are likely to be associated with the following:

- Economic and physical displacement, particularly livelihoods associated with ASM;
- Population influx and the resulting impacts, including increase in ASM;
- River diversions and possible destruction of critical wetland habitats; and
- Potential cross-border water quality and quantity impacts.

Based on the preliminary layout, the potential pits along the Zone A and Selin ore targets currently located within 500 m of several communities and their economic activities, including directly within the Bokoro ASM site and community agricultural land. The project will therefore entail land acquisition which will result in physical and economic displacement of several communities. This impact is expected to be the most significant and potentially contested given the reliance of these economic activities. The displacement will need to be managed through a RAP and LRP. The RAP and LRP will need to have a clear entitlement framework to address any potential challenges associated with land ownership.

The project is located in underdeveloped but growing communes in Mali; population influx is expected as individuals from surrounding areas and neighbouring countries will likely migrate in search of employment. The population influx will place additional pressure on natural resources as well as the already stressed social services and infrastructure in the project area. This in turn may result in increased individuals pursuing ASM activities and conflict between ASM operations, the communities and Cora Gold. It is imperative that a clear and collaborative plan with the authorities is implemented to deal with ASM prior to the project commencing.

It is expected that the TSF and possibly some pit areas will be located within water resources (wetlands and streams associated with the Fié and Niger Rivers). Surface water resources are important for economic activities within the project area and possibly for other downstream users while groundwater is the primary source of potable water. The establishment of the mining related infrastructure may impact on water and drainage, affecting water availability to the surrounding and downstream users. The extent of this impact (including potential need for diversions) will need to be confirmed. As a result detailed floodplain and groundwater modelling to determine the extent of flooding and the effect that dewatering may have on the surface water resources.

The ToR detailed in Section 7 above, is strongly recommended to give a comprehensive understanding of the environmental and socio-economic characteristics as well as the potential impacts that could arise as a result of the project. These studies and ESIA will also fulfil national legislative requirements for the exploration/environmental permitting process as well as international best practice. An ESMP will be developed which will provide mitigation and management aimed at minimising negative impacts as far as possible and enhance possible positive impacts to ensure the sustainability of the development.

To ensure that the ESIA is undertaken is accordance with International Best Practice, several tasks are recommended to be initiated ahead of the ESIA Process. This will aid in ensuring a comprehensive understanding of the baseline environment as well as provide an early indications of key impacts for which detailed management will be required. To this end, Table 8-1 provides an action plan and recommendations to adequately manage project risks going into the ESIA Process.

Table 8-1: Recommendations and Proposed Immediate Action Plan

Number	Immediate Action – Exploration Phase	Frequency
1	A dust monitoring network should be installed to quantify the current, baseline dust deposition rates associated with existing activities within the project area.	Monthly monitoring.
2	Commence with the water monitoring program upstream and downstream of the project area. The monitoring should take place at least quarterly and should include a surface hydrology modelling programme to assist in designing the mine and associated pits. It will inform the mine on the design of water control structures	Quarterly
3	Determine the current groundwater depth and aquifer strength. This will allow the development of a conceptual groundwater model and aid in prefeasibility planning. A seasonal groundwater monitoring programme is recommended at the communities in this report.	Quarterly
4	Continue to maintain relationships and communication with the Project area authorities. This provides support for the management of potential problems with the local communities. Any change in staffing in the project area should undergo an extensive hand-over period to ensure relationships are maintained with authorities and communities.	Ad hoc
5	Undertake a socio-economic survey of the communities that will be physically and economically displaced. This will provide a baseline to monitor potential population influx into the project area. Compensation costs for economic and physical displacement should be included as part of the socio-economic survey to assist in feasibility planning.	Once off

Number	Immediate Action – Exploration Phase	Frequency
	Communication regarding potential resettlement should be avoided until the mine layout is finalised.	
6	Identify all places of worship and sacred objects in the Project area and implement chance find procedures. This will aid in preventing the destruction of items or places of cultural significance, which could result in community unrest.	Continuous