PROJECT: BOKE MINE RAIL & PORT PROJECT
COUNTRY: REPUBLIC OF GUINEA

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT SUMMARY

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1. BACKGROUND

The Boke Mine, Rail and Port Project, also known as the Guinea Alumina Company (GAC) is a bauxite mining and associated infrastructure project in Guinea. GAC’s principal sponsor - The Emirates Global Aluminium PJSC (EGA), is an aluminium conglomerate with interests in bauxite/alumina and primary aluminium smelting based in the UAE. The overall environmental and social compliance of the project was assessed against the Lender’s safeguards instruments including the AfDB ISS and the IFC Performance Standards. The project comprises of a bauxite mine development, a port terminal, an upgrade of the existing railway infrastructure, Kamsar Container Terminal (KCT) quay expansion, harbour and channel works, and development of supporting infrastructure.

In addition to these components, GAC is extracting market bauxite samples (MBS) so that it can put its product on the international market, with the aim of promoting the financing of the project and demonstrating market interest in its bauxite. This MBS project involves the export of 250,000 to 300,000 tonnes of ore per year, for 2-3 years, starting 2017. The MBS are mined from the northern part of plateau 20, processed with a mobile crushing unit, and then loaded onto convoys of 50 tonne trucks for transport to stockpiles at the port concession of KCT in Kamsar. The ore is then transferred from the port into 7,000-10,000 tonne barges and shipped to deeper water, where the ore is loaded to a circa 50,000 tonne mineral ore vessel and then shipped to the markets. There are 5-6 shipments planned per year. This MBS project involves the construction of a 3 km unsealed link road from the mining area to the existing national highway, and has been undertaken without lender financing, but is being designed to comply with lender requirements.

This ESIA summary illuminates the assessment and management plans designed by GAC to ensure the project complies with both Guinean legislation, the AfDB’s ISS and international development partners E&S policy requirements.
2. POLICY AND LEGAL

2.1 The Guinean Regulatory Framework

Regulations on environmental impact assessments (EIA) in Guinea are defined by the following institutional and regulatory texts:

- In addition, the décret présidentiel 199/PRG/SGG/89 du 8 novembre 1989 codifiant les études d’impact sur l’environnement (Presidential decree 199/PRG/SGG/89 of 8 November 1989 defining the rules for environmental impact assessments) defines projects subject to an EIA and its approval by the ministry in charge of environment;
- Lastly, arrêté ministériel 990/ MME/SGG/90, du 31 mars 1990, définissant le contenu, la méthodologie et la procédure de l’étude d’impact sur l’environnement (Ministerial act 990/MME/SGG/90 of 31 March 1990 defining the content, methodology and process for environmental impact assessments), establishes the content, methodology, and procedures to be complied with when carrying out an environmental impact assessment.

The General Guide for Impact Studies, published in February 2013 has clarified the approval process of the ESIA. The entire submission and permitting procedure is managed by the Bureau Guinéen des Etudes et Evaluations Environnementales (BGEEE – the Guinean environmental directorate). Formal review of the permitting documentation is undertaken by the Comité Technique d’Approbation Environnementale (CTAE), an ad-hoc multi-disciplinary team composed of representatives of various ministries relevant to the Project. The final environmental compliance certificate is issued by the Ministry in charge of environment. Final approval is under the responsibility of the ministry in charge of the Project – in the case of GAC, the ministry of mines. The Guidelines for Environmental and Social Impact Assessment for Mining Operations of February 2013 (Directive de réalisation des études d’impact environnemental et social des opérations minières) set out specific rules with regards to the procedure and the content of and environmental and social impact assessment for mining projects.

2.2 GAC’s Approach to Environmental and Social Responsibility

GAC has developed key operating principles that include protecting the health & safety of its employees, contributing to sustainable development and conducting business with integrity. GAC aims to work closely with host countries and communities, respecting their laws and customs and ensuring a fair share
of benefits and opportunities. This defines the way GAC manages the economic, social and environmental challenges of its operations and are important to fulfilling the company’s commitment to contribute to sustainable development.

The key HSSEC policies developed by GAC will be applicable to the Project. Key GAC policies that will be enforced throughout the Project lifecycle include:

- GAC Code of Business Conduct;
- GAC Environmental Policy;
- GAC Community Policy;
- GAC Health & Safety Policy;
- GAC Drug & Alcohol Policy; and
- GAC Procurement Policy.

2.3 Lender’s Requirements

GAC is expecting that the project will be financed with the participation of different international financial institutions (IFIs). It is expected that such IFIs will require the project to comply with applicable international environmental and social sustainability standards.

The most widely accepted international standards are the International Finance Corporation’s Environmental and Social Performance Standards (2012) or IFC PS and African Development Banks (AfDB) Integrated Safeguards System (Dec. 2013).

**The AfDB’s Operational Safeguards (OS) relevant for the Project are:**

- OS 1: Environmental and social assessment;
- OS 2: Involuntary resettlement land acquisition, population displacement and compensation;
- OS 3: Biodiversity and ecosystem services;
- OS 4: Pollution prevention and control, hazardous materials and resource efficiency; and
- OS 5: Labor conditions, health and safety.

**The Performance Standards (PS) relevant to the Project are:**

- PS1: Social and Environmental Assessment and Management Systems.
- PS2: Labor and Working Conditions.
- PS3: Resource Efficiency and Pollution Prevention.
PS4: Community Health, Safety and Security.
PS5: Land Acquisition and Involuntary Resettlement.
PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.
PS8: Cultural Heritage.

In addition, the World Bank Group / International Finance Corporation (IFC), Environmental, Health and Safety (EHS) Guidelines of April 2007 and AfDB relevant keysheets were used to provide specific guidelines on effluents and wastes management, and supplement Guinean regulatory standards, where the IFC standard or AfDB keysheet were found to be more stringent than the national standard. GAC is also expecting that the Project will be financed with the participation of international commercial banks, some of which will be signatories of the June 2013 version Equator Principles.

3. PROJECT DESCRIPTION AND COMPONENTS

The overall project will be implemented in two separate phases.

The Phase 1, comprises:

- **Bauxite Mine development**: a conventional open pit operation which, at full capacity, will be capable of producing 12 mtpa (dry) of export grade bauxite ore;
- **GAC Port Terminal**: the port terminal will initially be developed to handle and export 12 mtpa of bauxite, with initial production during the last quarter of 2017. The GAC Port Terminal is being constructed on an existing fill platform, partially developed in 2007;
- **Existing Railway** upgrade of the railway linking the Boké region with the Port of Kamsar, to allow for transportation of an increased volume of bauxite from the activities of the three companies: Guinea Alumina Corporation (GAC), Compagnie de Bauxite et d’Alumine de Dian-Dian (COADB) and Compagnie des Bauxites de Guinée (CBG) to their respective port terminal. The existing railway is owned by L’Agence Nationale D’aménagement des Infrastructures Minières (ANAIM) and is operated by the Chemin de Fer de Boké (CFB), which will be responsible for implementing the upgrades. The capacity of the existing railway will be increased to 45 mtpa;
- **Kamsar Container Terminal (KCT) Quay** expansion;
- **Harbour and Channel works**, including an expanded navigation channel and transshipment operation to enable export of bauxite by larger vessels; and
- **Supporting infrastructure** for the mining, rail, port terminal and marine operations including the following:
  - for the mining: bauxite crushing plant and ore stockpile, water settling dam and loading platform, water tanks and landfill site, drinking water treatment unit, operations buildings,
GAC Pioneer Camp ANFO storage area and the hard rock quarry, and water reservoir located away from the main mining operations in the northern part of the concession,

- for the railway, port terminal and marine operations: a rail terminal and train offloading facilities, rail loops, bauxite stockpile area, reclaiming and conveyor transport, a water desalination plant, fuel handling facility, power generation, workforce accommodation and offices, and a maintenance workshop dedicated to maintaining GAC’s rail equipment.

The Phase 2 envisages:

- an expansion of the bauxite mine and further upgrades to the railway;
- the construction of a 2.0 mtpa alumina refinery in 2022 (the “GAC Alumina Refinery”);
- an expansion of the GAC Port terminal involving the construction of an additional berth for the export of alumina and import of refinery raw materials.

This ESIA summary focuses on GAC Phase 1 only (see figure &). In particular, on the basis of lenders’ provision of financing, the project main facilities include the bauxite mine, the construction of the GAC port terminal with the offshore export berthing facility and the loading conveyor, and the construction of railway spurs connecting the bauxite mine and the port terminal to the existing railway system. Additionally, the project facilities also include the upgrade to the existing railway (by CFB), the expansion of the KCT Quay, and the supporting infrastructure.

**Figure1: Key stages in the mining process**

As part of the bauxite export Project, this platform will include a rail terminal and train offloading facilities, a bauxite stockpile area as well as a reclaiming and conveyor transport to load the bauxite onto vessels, at a new loading berth to be located approximately 2.5 km to the west of the GAC port platform (Figure 2).
4. KEY PROJECT ALTERNATIVES CONSIDERED

Project alternatives were considered in the ESIA Addendum for mine infrastructure location, mine planning and operations scheme and port infrastructure location and loading technology. Selection criteria included, among others environmental and social impacts, technical and commercial feasibility. The Project ESIA defines a project AoI for each environmental or social component being considered, taking into account the areas affected by related Project impacts and including the footprint of the mine area and port area infrastructure. IESC views are that the Project AoI in the Project ESIA Addendum was not accurately defined as the Project facilities also include the existing railway upgrade and the KCT quay expansion, which were not considered and their related environmental and social impacts and risks were not assessed in the ESIA Addendum. An ESIA addendum for the railway upgrade has since been produced (March 2017), and these concerns have been largely addressed. Overall the Project ESIA Addendum included a reasonable assessment of environmental and social cumulative impacts for both the onshore and the coastal/offshore aspects.

The ESIA Addendum presents various alternatives that were considered by GAC as part of the Project definition process, with a view to maintaining an acceptable balance between technical and commercial feasibility and environmental and social impacts and benefits. The key alternatives considered and the preferred options are as follows:

- Development of the mine plan across GAC’s concession, and rate of mining of bauxite plateaus within the proposed mining area. Ultimately, the mining of the southern part of GAC’s concession...
associated with wet ore exportation was considered as the best case, mainly considering its commercial feasibility.

- Mine infrastructures locations, to the east or west of the GAC southern concession. The western alternative was selected. This allows shortening train travel from the mining area to the port, and therefore limiting transportation time, costs and nuisances. This also allows reducing the needs for stakeholder resettlement at the proposed infrastructure footprint.

- Water supply to mine operation – options considered included surface water pumping from the Tinguilinta River, groundwater pumping and raw water reservoir. Given the need to maintain sufficient flow in the Tinguilinta River, particularly during the dry season, water will be supplied from a combination of these three sources, with no surface water pumping from the Tinguilinta in months of low flow. Where possible, run-off water from the mine area will be recycled, e.g. for dust controls at the mine site.

- Marine terminal site selection - considering the railway infrastructure and the limited resettlement potential associated with the site, the option of the platform constructed by GAC in 2007 was preferred.

- Different marine loading and export schemes were evaluated by GAC on their technical feasibility. The option of exporting 100% of the bauxite in Newcastlemax vessels without using transshipment vessels considered as the best case, mainly considering its commercial feasibility and the potential economic development for the region and the country. The dredging program to implement this option may be implemented step by step taking advantage of the maintenance dredging undertaken every three to four years.

5. PROJECT LOCATION AND AREA OF INFLUENCE

The project location includes the Bauxite Mine located in the southern portion of the concession for Lease 149 in the Boké region, railway facilities extending approximately 90 kilometres to the Port of Kamsar, GAC Port Terminal facilities and Port Marine facilities (Figure 3).
The Bauxite Mine: The Bauxite Mine is located in the southern portion of GAC’s concession south of the Tinguilinta river, and the initial mining operations will be focused on Plateaus 20, 24, 26, 27, and 31. Operations will then extend to other plateaus, during the mine’s life which is anticipated to be 20 to 40 years. GAC expects that at least three plateaus will be actively mined concurrently, and that several pits can be mined at the same time on a given plateau.

The focus of the mine is export-grade bauxite, while areas of refinery-grade ore will be left in-situ if possible, or removed as necessary to mine the export-grade bauxite. The refinery-grade ore which is mined from the pits will be stockpiled on the plateaus at a distance of 1 to 2 km maximum from the pit, allowing for mine reclamation to be carried out. Overburden will also be stockpiled on the plateaus for use during reclamation of the pits. Bauxite mining will extend down to the bauxite/laterite zone, or approximately 10 meters in depth. Single pass mining of export grade bauxite is planned, with secondary pass for refinery grade if required; no in-mine benching will be required. Mining will progress uphill during wet seasons to allow for adequate drainage at the operating face, and in lower areas during dry seasons. The mining process is planned generally as follows:

- topsoil removal, employing dozer push, loading and stockpiling;
- drill and blast, iron cap removal where encountered, stockpiling of overburden, and drilling of the bauxite ore to an average depth of 8 meters;
- bauxite loading and hauling to the processing facilities and crusher for export-grade, or stockpiling for refinery-grade;
- blending can be performed in-pit, between pit and crusher/stockpile, and between stockpile and crusher (the control centre will manage the mine fleet and ore processing to achieve a consistent export-grade ore);
- crushing (3,000 tonne/hr) employing two hoppers and primary sizers, transfer conveyors, telescopic stacker, and 120,000 tonne stock pile situated near Plateau 26 (Figure 3.3); and
- train loading is scheduled to take place for 2.5 hours per day, employing three 23 tonne loaders to fill the rail wagons on the dedicated mine rail siding.

Figure 4: Bauxite Mine Development within GAC’s Concession

Reclamation will be performed in areas that have been mined out. Reclamation of active mine areas will be concurrent with mining operations. The areas will be re-contoured and regraded, scarified and then covered with topsoil and fertilized. These activities will be followed by revegetation or preparation of the land for agriculture or grazing. Stockpiles will be removed and reclaimed upon recovery or closure of the mine.

The Dam: The average water demand for the mine is estimated at 864 m$^3$/d, and sources potentially include raw water abstraction from the Tinguilinta River (subject to restrictions); raw water storage reservoir constructed in the middle Tiouladiwol valley in the northern part of the concession; potentially raw groundwater pumping from boreholes; collection of water runoff from disturbed areas and mine water from pits, to be used for dust suppression; and potentially collection from undisturbed areas partially captured to support the mine clean water requirement. The availability of these sources will be
subject to seasonal conditions, and exploitation of any source will need to take account of the requirement to maintain flows to communities and ensure environmental demands are met.

Water supply studies are ongoing; the raw water storage reservoir was initially studied by GAC and authorized by the Guinean Ministries in 2006. It consists of an approximate 31 m high dam and 90 ha reservoir with a capacity of 8.1 Mm$^3$, and is located approximately 4 km upstream of the village of Sinthiou Tiouladi. The current plan (as detailed in the 2016 Dam ESIA-Social and Environmental Impact Assessment Update), comprises the construction of a smaller 14 m high dam (based on the lower water elevation presented in the update) and therefore it has a smaller area of inundation. This is intended to be sufficient to meet the needs of the Export Bauxite Project in most years, with the possibility of expansion to fulfil future development and increased water demand. The rock required from the dam construction is understood to be sourced from GAC’s existing quarry which is on the access road to the upper section of the dam. Water will be supplied to the mine operations via a buried pipeline using diesel pumps.

**Figure 5: Project Platform Site at Kamsar**

6. **MEETING NATIONAL LEGISLATION AND LENDERS E&S REQUIREMENTS**

Prior to the current project design, an integrated social and environmental impact assessment (ESIA) for an integrated bauxite mine and alumina refinery operations in the northern part of the concession, along with associated infrastructure, rail spurs, and port enhancements, was submitted to, and approved by, *Bureau Guinéen des Etudes et Evaluations Environnementales (BGEEE)* of the *Ministère de l’Environnement, des Eaux et Forêts (MEEF)* in 2008. The approval process included a BGEEE public enquiry and Comité Technique d’Approbation Environnementale (CTAE) evaluation followed by the final ESIA for the issuance of the environmental compliance certificate. Following the redesign
of the Project, an ESIA Addendum covering the Phase I Project development was prepared in October 2015 and approved by the BGEEE. In addition to the 2015 ESIA studies, GAC has prepared a ESIA Addendum for a revised dam and water supply reservoir (reflecting the smaller size of this compared to the one in the 2008 ESIA), and a ESIA Addendum for the MBS Project. An ESIA has also been prepared for the upgrades to the rail line commissioned by Chemin de Fer de Boké (CFB), to support the reinforcing of the existing rail infrastructure from Sangarédi to Kamsar and providing the capacity necessary for GAC and others bauxite transport, and to which GAC is contributing.

This ESIA summary is prepared based on final “ESDD - Environmental and Social Due Diligence” report which includes the Independent Environmental and Social Consultant (IESC) review and comments to the updated environmental and social (ES) documents provided by GAC, and outcomes of the various discussions and March 2017 and September Project lenders site visit, and additional documentation reviewed in the development of stand-alone reports submitted to both the lenders and GAC in 2017. Based on the IESC review of the documentation and information provided to date and observations made during the site visits, the IESC still considers that the two areas of the Project where risk needs to be especially well managed are with respect to biodiversity management, and the physical and economic displacement of local communities. It is evident to the IESC through the ongoing review and provision of updated and amended Project documentation, and supported by observations made during the site visits, that the Project continues to demonstrate considerable effort and investment in striving to meet compliance with Lenders standards. This is further evidenced in the updated ESDD report through a number of critical actions identified in the report as 47 action required to be implemented and monitored. The final ESDD report and environmental and social action (ESAP) were thoroughly discussed during the September 2017 Paris ESDD closeout workshop.

7. SUMMARY OF POTENTIAL PROJECTS ENVIRONMENTAL AND SOCIAL IMPACTS

Table. 1: Environmental topics addressed in the ESIA Addendum

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<th>Topic</th>
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<th>Port site</th>
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<td>Greenhouse gas emissions</td>
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Air quality, noise, biodiversity and water issues received additional focus as these are areas where potential impacts were found to be significant – which led to particular focus on the definition of appropriate mitigation throughout the ESIA Addendum development study.

**Definition of buffer areas for avoidance of impacts**

As Project-wide commitment to environmental mitigation, GAC proposes to develop the mining plan using pre-defined buffers between the Project activities and the environment, to limit direct footprint and nuisance impacts on the environment. Buffers will be defined as follows:

- 50 m from any water body;
- 300 m along headwaters that sustain forest galleries;
- 100 m from the Tinguilinta river (the main river in the mining area);
- 250 m from water abstraction sites and wells used by communities;
- 100 m from any sensitive ecological site;
- temporary buffer zone of up to 800 m from blasted areas during blasting operations (depending on specific blasting parameters); and
- 50 m from mangrove areas (at the port).

**Air quality**

**The Mine Area:** Ambient air quality monitoring data collected at various receptor points within the project area indicates low levels of background concentrations of air pollutants, suggesting that the airshed in Project area can be considered as of reasonably good quality. Occasional elevated levels of air pollution may occur locally, due to local community activities – mainly from slash and burn agriculture, domestic woodstoves, and emissions from poorly maintained vehicles. Such elevated levels were not measured during the monitoring campaign undertaken as part of this ESIA Addendum.

The project at the mine area will primarily generate dust emissions from blasting, vehicle traffic on unpaved haul roads and other unpaved road surfaces, and from ore handling infrastructure. Fossil fuel combustion emissions will also result from power generation at the mine site (anticipated to be of limited significance), and also, more importantly, from the exhausts of the mine vehicle fleet composed of haul trucks, front-end loaders, and other vehicles.

A computer model has been used to predict the effect of the project on air quality and the predicted levels were compared to IFC EHS guidelines and WHO air quality interim targets. The mining activities
and processing plant was simulated using three operating scenarios across the lifetime of the mine to address the variability of the mine works, covering different time horizons.

The results from the assessment of the emissions concentrations levels were compared to the applicable standards. The results show that the Project may cause elevated ambient concentrations of nitrogen oxide (NO$_2$), sulfur dioxide (SO$_2$) and particulate matter (PM), above applicable guidelines, albeit only at some receptor points located within close proximity of emissions sources. In reality, most receptors (i.e. community settlements) located adjacent to the mining areas will be resettled to allow for access to the bauxite resource and will not be receptors during the mine operation.

Impacts will mostly be during the operation phase. As part of the construction phase, the project will however develop specific measures in the management of air quality emissions, based on international good practices. It will cover topics such as the avoidance of exposed surfaces soil and cleared areas re-vegetation, prohibition of open burning of cleared vegetation and waste or implementation of permanent dust suppression systems. In addition of implementing good international practices for the use and the maintenance of the equipment as operational mitigation measures, GAC will take into account the air emission rates of the equipment at its purchase step.

Dust resulting from vehicle traffic on unpaved surfaces (only a risk during the dry season) will be reduced through standard dust controls, including water spraying with the possible use of dust suppression additives.

An air quality monitoring program will be developed and implemented to confirm the modeling results and measure the Project compared to the applicable targets. If impacts are determined to exceed World Health Organization (WHO) criteria the option to relocate and compensate additional affected people will be considered. With the measures presented above and the accompanying monitoring program the Project will ensure air quality standards are met.

**The Port Area:** The context of the port varies from the mine area as Port Terminal is surrounded by urban developments (city of Kamsar), industrial facilities (CBG bauxite processing, storage and export complex) and natural habitats (mangroves). Air quality monitoring data indicates that the airshed around the port area may be classified as “undegraded” for NOx and SO$_2$ but “degraded” (using the terminology of the IFC EHS Guideline) for airborne breathable particulate matter concentrations.

The main sources of airborne dust during the operation of port terminal will be the handling of ore in the terminal, the transportation of the ore by means of conveyors, the loading of the ore on ships, and
the wind blow from exposed surfaces. NO\textsubscript{x} and SO\textsubscript{2} emissions will be mostly related to power generation at the site.

The impacts associated with atmospheric pollution from the operation of the GAC port terminal, including NO\textsubscript{x}, SO\textsubscript{2} and particulate matters, were observed to be limited over most of the area of influence, including the Kamsar urban area. The implementation of international best practice measures to reduce dust generation and exhaust emissions, including installation of wind breaks and water suppression or chemical dust suppressant, and appropriate maintenance of generators, equipment and vehicles, will keep impacts within acceptable levels.

**Greenhouse gas emissions**

Greenhouse gas (GHG) emissions are of concern globally because of their contribution to global climate change. It is good practice for any major project that results in significant quantities of GHG emissions to calculate these and identify measures that can be taken to minimize the potential contribution to climate change.

GHG emissions from the Project will primarily be associated with power generation at the port and the mine, bauxite haulage within the mine area, as well as the transport of material by train between the mine and the port terminal. The total carbon footprint of the Project has been estimated at approximately an average of 220 kt of CO\textsubscript{2}e per year during twenty years, or 4.4 Million tCO\textsubscript{2}e over the project lifetime. Deforestation activities during land clearing operations will also represent a large contributor to the overall inventory representing 1.8 Million tCO\textsubscript{2}eq over the project lifetime, or 40% of Project total GHG emissions.

GAC aims at developing a credible and robust GHG emissions inventory with respect to the proposed bauxite mine, including deforestation associated with site clearance and preparation, as well as at determining the recovery of sequestration potential after reforestation as part of the rehabilitation of the mined areas. The recovery of carbon sequestration potential associated with reforestation activities shall enable GAC to remove more than 350 ktCO\textsubscript{2}e from the atmosphere (8% of total project emissions) and mitigate part of the project impact on climate change.

Measures for limiting GHG emissions have been built into the design of the project, focusing on actions to reduce its impacts on climate change that includes:

- considering the energy efficiency in the purchase criteria of the equipment;
- ensuring energy and fuel consumption is precisely metered and reported;
• identifying areas for energy efficiency assessment;
• reducing energy and fuel consumption;
• considering incorporating renewable energy sources into the Project’s energy supply, where possible;
• setting carbon reduction targets;
• implementing a monitoring plan for reforestation activities; and
• developing a robust carbon offset strategy to mitigate the potential project impacts on climate change.

Noise

The Mine Area: The baseline acoustic environment in the mine area does not show any critical situations in terms of noise levels, except for receptors in the vicinity of the existing railway. The noise levels recorded during the monitoring campaign are relatively low and typical of rural areas of Guinea. As presented in the Project description, mining operations will be 24 hours, seven days a week but blasting will only be undertaken during daylight hours. The main source of impact related to the Project activities are associated with the processing plant, the operations at the mine pits as well as the vehicle movements along the haul roads from the mine sites to the processing plant.

Modeling has been used to predict the effect of the project on the noise levels in receptors surrounding the mine and these have been compared with thresholds derived from international standards for day-time and night-time noise levels defined by the IFC and the WHO. Construction noise impacts, mostly associated with site preparation / civil engineering work, were found to be most likely confined to the immediate vicinity of the works, therefore not likely to affect any nearby community settlements.

Noise generated by mine operation and ore transportation is predicted to cause limited impacts as most nearby human receptors identified in the mining area will need to be resettled to allow for access to the bauxite resource. Other settlements such as the village of Wossou, located on plateau 33 and surrounded by known bauxite resource, will be particularly sensitive to the nuisances generated by the Project, including noise, dust and vibrations. The possibility of designing the future mining plan to avoid disturbances to Wossou settlement and of a re-routing of the haul road currently planned near Wossou will be evaluated as a mitigation measure as the Mining Plan is further developed. Alternatively, as part of GAC’s Resettlement Action Plan and Community Engagement Strategy, GAC proposes resettling the affected village. Note that the Mining Plan does not envisage starting mining activities near Wossou until 15 years from start of operations, therefore leaving time to refine the impacts mitigation plan specifically for this settlement and other settlements in the eastern half of the mining area. GAC will be reducing noise impacts from the project by:
- considering noise levels in selection of equipment;
- providing noise shielding and barriers where possible;
- restricting noisy activities to daytime as much as possible; and
- implementing appropriate traffic management rules to limit the occurrence of noisy vehicle traffic activities at night and in the close vicinity of community settlements.

The project activities at the mine area will also generate vibrations from blasting, mine and process plant as well as road transportation. Blasting was found to constitute the main source of vibrations from the Project. It was found that significant impacts on human receptors were unlikely to occur, given GAC’s proposed blasting policy. This will be in line with internationally accepted practice, and will include a limited blasting frequency (once to twice per week), as well as maintaining a 800 m temporary buffer between blasting site and closest human presence.

**The Port Area:** The environment around GAC’s port area is noisier than the mine area, given the presence of the city of Kamsar and the industrial facilities (CBG mainly) to the north of the site. The existing transit of CBG’s bauxite trains entering the city of Kamsar to the CBG processing facility currently constitutes the major source of noise along the tracks.

The Project is not expected to significantly change the existing acoustic environment and the perception of ambient noise level, compared to the existing situation. Nonetheless, GAC will ensure that noise levels from port operations are kept as low as reasonably practicable, through equipment selection, appropriate operations and maintenance, and, if necessary, the implementation of noise barriers around key sources of noise on the site.

The Project will also result in the generation of underwater noise in the marine environment during construction of the loading trestle and berthing facility (piling work mainly), dredging, and (in the operational phase) vessels operation and periodic maintenance dredging. Of these identified noise sources, piling, typically undertaken using a hydraulic hammer, is the most significant noise generating. Piling noise impacts will be most significant within the Rio Nuñez. Noise may propagate some distance from this source but will be partially attenuated by the shallow and confined nature of the estuary. As a result, piling noise effects will be unlikely to be significant beyond the estuary and the impacts associated will be mitigated to an acceptable level by implementing measures included into the international good practice for piling operations, including a soft start/ramp up procedures whereby piling operation ramps up gradually to full power, to allow sensitive marine fauna to move out of the vicinity of the noise source.
Soils

The construction phase will cause the disturbance of soils from construction of the mine and rail facilities, along with the mine facilities access roads. During mine operation, there will be a progressive clearance of vegetation and soils ahead of mining. Topsoil will be set aside and stored for use in subsequent rehabilitation. Overburden and below-grade bauxite will be stored within or near the pit footprints.

In order to minimize soil loss during construction and operation of the mine the area of land to be occupied by the mine project will be kept to the minimum necessary for the works. Within this area, the productive soils will only be removed where necessary and affected land will be returned to original use as soon as possible after completion of construction or after closure of the mine. Technical studies have shown that the bauxite and overburden formations to be mined in the Project area have low potential for the generation of acid rock drainage (ARD). The material that could generate ARD is located well below the surface and will not be disturbed.

At Kamsar, the works will take place at the existing hard standing platform and the current footprint is not planned to be extended.

Integrated water management

Mine – surface water: The main surface water body in the Project area is the Tinguilinta River and its various tributaries that have the potential to be directly affected by mining activities in their upper headwaters. Information on surface and groundwater flows and water quality has been collected through the ESIA process, and the uses of water resources were surveyed across a wide area focusing on both community and biodiversity receptors. Numerical models have been developed to help understand the effects of mining on the streams that emanate from the mined area.

The impacts could affect ecological receptors that are sensitive to surface water quality and flow conditions, and may also compromise the availability of water for downstream water users during the dry season. The baseline studies have established that surface water resources are used by communities throughout the project area of influence for a variety of purposes, including potable water supply, fishing and riparian agriculture.

The net effect of water abstraction from the Tinguilinta River would be more significant in the dry season, when water levels and flows will be lower, and indications of issues with water availability in some years have been identified. Therefore, GAC is committed to put in place a solution that ensures significant adverse impacts do not result from its own activities. An investigation and assessment of
alternative water source and storage (and water saving) options will also be carried out prior to construction and operation commencing. This will include supplying water to the Project from several independent sources:

- pumping of water from the Tinguilinta River, except during low flow conditions, to avoid interference with community users and adverse effects on freshwater ecosystems;

- a groundwater bore field, at a precise location to be determined through the current aquifer testing program, provided that groundwater resources are sufficient to supply water to the Project without impacting other users;

- developing a water retention dam, to be located in the northern part of the GAC concession, and already covered by the previous GAC ESIA; and

- re-using mine water from mine retention ponds, where feasible, for certain uses on the Project site (e.g. dust controls).

In order to manage these impacts on water, the Project will develop a Mine Water Management System (MWMS) for the management of all surface water use and discharges to avoid or mitigate any significant impacts on hydrological and ecological conditions. No abstractions associated with the construction or operation of the mine will occur until sufficient mitigation is in place to safeguard against significant effects upon flow, ecology and social dependents within the zone of influence of the Project.

In order to minimize any drainage or flood related effects, a high level of flood conveyance capacity will be adopted for all drainage infrastructure, including culverts and bridges, based upon international best practice engineering methods and designs. Settlement dams will be installed in order to manage drainage from pit areas.

**Mine – Groundwater:** Groundwater is used by several villages in the area particularly during the dry season. An analytical hydrogeological model of the mining concession area was developed for the ESIA. The potential impacts on groundwater resources during mine operation are mainly due to the potential for accidental spills of fuel or maintenance chemicals. Metal leaching from overburden and ARD are considered to be a minor issue for the Project. Impacts on groundwater quality will be mitigated through an appropriate Hazardous Materials Management Plan, covering hazardous material storage, as well as effluent and waste controls, in line with internationally accepted practices, to avoid the risk of soil or groundwater contamination. This will include, inter alia, appropriate secondary retention and bounding on fuel and chemical storage facilities. GAC will also adopt appropriate procedures for spill response planning and subsequent cleanup.
Impact on groundwater supply will mainly be mitigated during the operation phase of the mine project by developing a design program for a sequential approach to bauxite mining. This will avoid the need for large areas of the concession area to be extracted concurrently and will also allow for each plateau to be successfully rehabilitated sooner. The phased approach will also allow for greater control over monitoring groundwater levels, spring outputs and water quality in the region. The MWMP will cover the groundwater aspects as well and will be continuously reviewed and updated. The overall objective will be to restore the natural base flow regime to any streams / rivers significantly affected, as far as reasonably practicable.

**Port Area:** A compacted sand platform was developed by GAC over the entire port concession area in 2012, to build up the terrace level above the existing natural ground levels in the surrounding mangrove swamp. Potential impacts on surface water and groundwater in the port area are mostly related to surface contamination risks due to runoff or accidental spills from construction sites, fuel storage or bauxite stockpile area. A permanent port drainage and water discharge management system will be commissioned during construction to reduce the impact of the port operations. The hazardous materials management plan and spills response plans will cover all hazardous material storages, including fuels, lubricants or other chemicals.

**Biodiversity**

**Mine Area:** Biodiversity at the mine area has been identified as one of the most important environmental sensitivities requiring active management as part of the Project. As presented, the proposed mining activities include a phased and progressive clearance of vegetation over the mining resources of the different plateaus throughout a 20 years timespan with an expected average mine life on each plateau of approximately four to six years. As mining activities progress from one plateau to another across Project life, areas already mined will undergo progressive mine closure and environmental rehabilitation.

The biodiversity of the mining area has been surveyed over the past 10 years since the start of ESIA work by GAC. Dedicated field biodiversity surveys were undertaken for this ESIA Addendum, focusing on the southern half of the GAC mining concession.

Areas with higher conservation value typically correspond to gallery forest (i.e. relatively dense forest growing along streams in the valleys between the plateaus) and wooded savannah. Some of these have been found to host regionally significant numbers of species of specific conservation interest, including, but not limited to, some emblematic primates (as discussed hereunder). Some of the gallery forests and wooded savannah of the Project area can therefore be considered as “critical habitats” as defined under
IFC Performance Standard 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources and/or the African Development Bank Operational Safeguard 3 concerning biodiversity and critical habitat.

The vegetation community that will be most affected by clearance corresponds to wooded savannah, bowel and agricultural land. Gallery forest within the GAC footprint area will be less affected as they are located at lower altitudes and bellow the mining levels. To reduce direct footprint impacts on biodiversity, the Project footprint, both for infrastructure as well as mining areas, will be subject to a specific site selection criteria, in order to minimize land clearance within or adjacent to high conservation value habitats. High conservation value habitats, and under-graded natural areas will be avoided to the maximum extent practicable. Following the closure and reclamation of mined areas, GAC will also work actively on revegetation and reclamation work which will be undertaken to reinstate the area to pre-mining conditions.

The Project hosts different fauna species listed as Endangered on the IUCN Red List including a population of the West African chimpanzee and the confirmation of the presence of a Red Colobus in the area in 2013 through a single sighting. Birds of conservation interest include the hooded vulture, white-backed vulture, the Denham’s bustard and the red-billed firefinch. The three main impacts that will be limited as far as possible are: habitat loss; habitat fragmentation in the concession; and negative impacts from non-Project related human activities, such as hunting of wildlife, especially on Chimpanzees.

The loss of habitat associated with Project related land use will reduce local availability of food, security, and breeding cover for wildlife inhabiting the concession area. The larger, more-mobile species will generally move from construction activities towards adjacent habitats; whereas, smaller, less-mobile species with a smaller territory may be lost during the construction and the operation phases of the project. The Project is also likely to lead to habitat fragmentation in the concession. The increased presence of humans and infrastructure as a result of induced in-migration may also directly impact animals due to hunting, traffic accidents, etc. Noise and vibrations due to blasting activities, vehicles and machines, and the presence of humans will have specific impacts especially on sensitive species like Chimpanzee, Red Colobus or Pata monkeys, whose behavior will be modified.

Chimpanzees are particularly sensitive to all these mining impacts categories since, much like humans, they are highly sensitive to external disturbances. The high level of territoriality of the Chimpanzees may prevent them from being able to simply avoid disturbances and make them especially susceptible.
to human impacts. Key measures proposed by GAC based on research conducted by the Wild Chimpanzee Foundation (WCF) to reduce impacts on fauna species include:

- protecting freshwater habitats and related forest galleries through engineering design and operational planning;
- implementation of a reforestation program of already affected areas establishing fauna corridors to facilitate animals movements between forested areas located across mining plateaus, the gallery forests and forested savannah;
- direct environmental management measures including reducing noise and light emissions where possible; and
- progressive mine closure and rehabilitation of mined areas, including revegetation and progressive reforestation, taking into account natural habitat rehabilitation objectives as well as the needs and requirements of local communities and the Guinean authorities.

Broader initiatives will be explored such as continued partnership with stakeholders to control bushmeat hunting and the illegal trade in rare animals, animal products and plants. Considering the project’s impacts on critical habitats, GAC will aim to develop a “net positive impact” approach to compensate for loss of critical habitats by specific offsets. The project will therefore implement an Offsets Strategy to compensate for the significant residual impacts predicted to occur. Ideally, offset areas will contain similar high value habitats and species as those predicted to be impacted by the mine. Conservation programs in these offset areas will be developed and implemented in collaboration with the Government of Guinea, local communities and specialized conservation groups.

**Port Area:** The terrestrial Project footprint corresponding to GAC terminal and port areas was cleared in 2005, and then developed as compacted sand platforms in 2012. Vegetation clearance is therefore not considered to be part of the present Project in the port area and no impact associated to loss of flora and fauna communities from further development of the direct Project footprint is envisaged.

The dominant flora community present within the port and terminal surroundings corresponds to Guinean mangroves, mainly located to the south and west of the Project area, and along the Rio Nuñez estuary. Disturbance to the adjacent mangrove communities from the project may be due to fugitive dust deposition (assessed as of low significance through the dust dispersion modeling study carried out as part of the ESIA Addendum) and accidental water contaminations from spills (mitigated through an appropriate Hazardous Materials Management Plan) which may alter distribution and abundance of the adjacent mangrove community.
The impact assessment for the marine biological environment includes both flora and fauna within the marine and intertidal environment. The project will have few significant interactions with the intertidal environment in either the construction or operational phases and therefore the scope for significant impacts is limited. In the wider area estuary and coastline potential interactions between the project and the intertidal environment will be limited to indirect issues such as the effects of dredge plumes or vessel bow wash. No significant effects on wider hydrodynamics such as currents, waves or sediment supply are envisaged by the Project engineering and modeling teams.

The main marine environment interactions from the Project will be related to the footprint of marine facilities on the seabed. Direct impacts over a sizeable area of seabed associated with the dredge and dredge spoil disposal footprints will be observed, but their areas will be relatively small compared to the entire estuary. Note also that dredging will take place along an already dredged channel, which can be considered as a modified natural environment already. In addition indirect impacts may occur over a wider area due to sedimentation from dredge plumes. From qualitative assessment undertaken as part of this ESIA Addendum, it is deemed likely that the dredging plume will have limited effects (beyond short-term effects) on the water quality of the Rio Nuñez, given the natural turbidity levels of the estuary in baseline conditions. Nonetheless, GAC proposes developing a specific dredge plume model as part of further studies, as the marine design and dredge program of the Project become more defined.

As outlined in the marine baseline and marine noise impact assessment, there are a number of marine mammal and turtle species potentially present within the Project area of influence, including some species of dolphins, West African manatee. All of these are considered to be of conservation importance. Interactions between the project and fish will also occur as a result of effects from plumes of suspended sediment and high levels of turbidity that will be associated with dredging and dredge spoil disposal. These activities will have potential impacts on water quality which could affect fish living within the water column and in the seabed environment whilst dredging or piling is undertaken.

A number of embedded mitigation measures are considered in the impact assessment for marine fauna including the minimization of overall project footprint, the development of a Dredging Environmental and Social Management Plan (DESMP) and the adoption of navigational controls on vessels and port operations to allow safe navigation and ‘zero wake impact’ operations in line with good international industry practice.
Waste management

The question of waste management is an important transversal issue in mine operations, and therefore a specific section has been developed as part of this Addendum report to present the whole process of waste generation and management during the mine project and associated port facility.

Both the mine and port components of the project will generate various other waste streams including construction waste, timber waste (land clearance of the mining area), domestic waste from the workforce, office and kitchen waste, clinical waste from medical facilities, ash from the incinerator, packaging waste and various types of potentially hazardous waste from workshops, sewage treatment plants, spill clean-up and other activities.

GAC envisages the construction and operation of its own landfill site to manage the domestic waste, allowing direct control on the design and operation of the landfill. This site will be chosen to have sufficient capacity to accommodate domestic wastes from the project over a project life of approximately 20 years. The site will be designed, built and operated in accordance with strict international standards to ensure it has no significant impact on the environment and people in the surrounding area. Hazardous waste will not be disposed in this landfill. Within the construction site and during mine operations, careful planning for waste management will be aimed at avoiding the creation of waste as far as possible, re-using and recycling waste where possible, and only disposing of waste as a last resort.

Only a small amount of hazardous chemicals and hydrocarbon wastes is expected to be generated by project activities; these will mainly be recycled or stored to be sent abroad in dedicated and authorized disposal channels or until appropriate facilities exist in Guinea for local disposal.

The human environment

GAC’s commitment to community engagement and social development: Since 2004 and the signature of its concession agreement with the Government of the Republic of Guinea, GAC has been an important stakeholder in the Project area for over one decade. GAC’s presence in Guinea has translated into employment for local and international staff, local and international procurement contracts, through activities such as Pioneer Camp development, operation and maintenance, geological exploration, road improvement works at the mine area, the future refinery site, and port infrastructure development at Kamsar.

Over this period, GAC has formed a Community Team and developed specific social management processes, including the management of:
stakeholder engagement;
- grievance procedure;
- social investment;
- resettlement and livelihood restoration;
- in-migration management; and
- code of business conduct for employees and suppliers.

**Giving particular attention to vulnerable groups:** As part of GAC’s social management, particular attention will be given to vulnerable groups within the community, identified as those who, due to their social position, are most likely to be negatively affected by change and may experience difficulties in benefiting from positive impacts. The ESIA Addendum has identified certain vulnerable groups, including children, single women acting as household heads, the elderly, and people in poor health. These will be included specifically in GAC’s stakeholder engagement and social support processes.

**Impact on the national and local economy:** GAC will contribute directly to the development of the economy of Guinea as a whole, as well as that of the prefecture of Boké, particularly within the mine area and at Kamsar. This will emanate from the creation of significant levels of direct and indirect employment, local procurement of goods and services, the payment of tax and royalties, as well as GAC’s direct community investment activities.

In the mine area, agriculture currently represents more than three-quarters of the average household income. In the port area, the city of Kamsar is historically developed around CBG’s activities, CBG being the main formal employer in the area. However, population increase and urban expansion mean that there are far more candidates for employment than CBG can employ. As a result, there are high levels of expectation in the local population for the GAC Project to act as a driver for local employment and further economic growth.

As already outlined at the start of this summary, the Project will lead to significant employment and skills uplift for Guinean workers. This will include:

- the continued creation of more than 2,200 jobs during construction, about 700 permanent jobs and 1,500 indirect jobs, the majority of which will be staffed from Guinea; and

- the integration of 200 Guineans in EGA’s UAE operations for training and up-skilling for subsequent redeployment in Guinea.

Note that (also as stated at the start of this summary), some of GAC’s ongoing infrastructure development such as the completion of the commercial dock at Kamsar may act as a catalyst for further
economic activity in the prefecture of Boké and beyond – this may include other mining projects or export / import activities in other economic sectors. To support a sustainable positive socioeconomic impact from the Project, GAC will work on multiple fronts of community engagement and human resources management, including preferential local hiring, professional training, employee health, safety and security.

**Ongoing consultation and coordination with government and traditional authorities:** Through Project activities, and by changing the socioeconomic landscape of area, the Project is likely to trigger a certain level of pressure on the prevailing social structure of the Project area, and possibly change the balance between formal government structures and traditional power structures involved in local decision-making on various aspects of community life. This is also a concern expressed by stakeholders during the stakeholder engagement process implemented as part of the ESIA Addendum.

Particular attention will be given by GAC to respecting the local administrative and traditional decision-making process, through engagement with local government and traditional chiefs and community elders. Great care will be given to questions surrounding the use of land and natural resources, given the importance of tradition and customary rights in decision making surrounding land use allocation in the mine area. For the port, the urban context and smaller Project footprint at Kamsar will shift focus towards formal authorities, but neighborhood leaders and traditional representatives, e.g. for fishermen and directly impacted families requiring relocation, will still be engaged through the stakeholder engagement plan.

Ongoing consultation and coordination with government and traditional authorities will also be used by GAC to support decision-making and consensus building on GAC’s proposed social management process, including GAC’s stakeholder engagement and grievance management process, social investment policy, in-migration management, and resettlement and livelihoods restoration for those stakeholders located in the footprint of the proposed Project activities.

**Demographics and social dynamics – In-migration:** The mining area as a whole can be considered as a rural area of Guinea with a population predominantly employed in agriculture, except for the village of Tinguilinta and neighboring settlements along the national road, which have undergone some rapid growth and socioeconomic changes in the past 10 years. This is partly due to the presence of GAC’s Pioneer Camp and the community’s expectation that GAC would start development activities in the near future.
The nearest urban area is Sangarédi, approximately 20 km east of the Project mining area, a mining town whose development has been part of CBG’s mining activities over several decades. The next closest urban area is the provincial capital of Boké, approximately 30 km west of the mine area. As the Project progresses towards construction and operation, the population of the mining area will increase, due to the presence of workforce, directly employed by GAC or its subcontractors, as well as the likely in-migration of job seekers attracted by direct and indirect employment opportunities. Note that the nearby presence of mining projects by Compagnie des Bauxites de Dian Dian (COBAD) and a mining expansion project by CBG may also be an important driver for in-migration in the wider Project area.

Whilst GAC intends to partially host its mine site expatriate workforce in a camp adjacent to its existing Pioneer Camp, employees recruited locally will be encouraged to use their own accommodation. As the Project progresses into production, it is likely that an increasing number of Guinean employees will settle in their own accommodation.

Potential newcomers not directly employed by GAC, in particular prospective in-migrants, may tend to settle near the camps and future GAC infrastructure. As an example, the settlement of Tinguilinta, located near the mining camp, has seen a population growth of about 20% annually in the 10 years following the start-up of the project in 2004. Typically, such rapid population increase generates pressure on the natural and social environment, for example with regards to water resources, access to agricultural land and forestry resources, as well as the prevailing community structures and social organization.

The primary tool for addressing the impacts of in-migration will be implementation of an In-migration Plan. This plan will be developed and implemented in partnership with an in-migration committee, including representatives of the local administration, village leaders, members of the affected communities. GAC also proposes engaging with other key mining players in the area (such as CBG and COBAD) to help define a coherent message to communities and seek alignment on each company’s approach for in-migration management. The plan will aim to discourage project-induced in-migration as far as possible through:

- appropriate communication on Project-related employment and how to apply for it;
- directing the flow of in-migrants to suitable locations by actions such as establishment of a recruitment office and a ban on recruitment “at the gate”; and
- collaborating with local authorities and community representatives to mitigate the impacts of in-migration through village planning and support for planning of infrastructure and services.
GAC’s local subcontractors will be required to comply with the specific provisions of GAC’s in-migration plan, in particular with regards to the publication and fulfillment of work opportunities. In-migration will be monitored and GAC’s in-migration plan updated as necessary throughout the life of the Project.

Managing impacts on land use and livelihoods

Developing a resettlement action plan and livelihood restoration framework

GAC proposes resettling affected stakeholders as a core mitigation to address major Project impacts related to:

- Project footprint; and

- Project emissions: air, noise and vibration, for the limited number of settlements that may experience above-guideline impacts to environmental quality as a result of Project emissions – from the results of the environmental impact assessment component of the ESIA Addendum, this is expected for a limited number of settlements, located in the near vicinity of mining activities.

Resettlement will be carried out through the implementation of Resettlement Action Plan (RAP) supported by a Livelihood Restoration and Resettlement Framework (LRRF) in line with the requirements of IFC Performance Standard 5 on Involuntary Resettlement and AfDB Operational Safeguard 2. This will include developing the RAP and LRRF through an appropriate level of prior consultation with affected stakeholders, government authorities and community representatives, as an iterative process embedded in GAC’s stakeholder engagement plan. The RAP and LRRF will also make reference to GAC’s in-migration plan.

Mine plan, associated resettlement and subsequent mine closure and rehabilitation:

The physical footprint of the mined areas on the plateaus considered in the mining plan of the project covers approximately 52 km², hence 20% of the total area of the plateaus within the southern part of the GAC concession or 8% of the overall GAC mining concession.

The majority of the land to be physically occupied by the project in the concession area consists of bowal (i.e. open grassland on poorly drained, ferralitic hard ground), as well as a mosaic of wooded savanna grassland and agricultural plots and fallow areas (traditionally managed according to a plurennial rotation of slash-and-burn agriculture and fallow). The construction phase will start with the clearance of the processing facility area near the existing settlements of Filow Bowal and Pompa Kassawa. Then, the bauxite plateaus will be accessed, cleared, and mined, starting with plateaus 20, 24, 26 and 27. These
project activities will result in the utilization of land currently dedicated to other uses, such as housing, farmland, animal husbandry, as well as natural land that are currently used by local communities for hunting, firewood gathering, timber, food and medicinal plants.

Note that, thanks to GAC’s proposed mine plan and progressive mine closure and rehabilitation, mine reclamation activities will start after an average initial period of three to five years of production. The proposed land reclamation and rehabilitation program will be developed in discussion with local authorities and community representatives, with a view to achieving an acceptable balance of agricultural land and natural habitats, and, where appropriate, supporting the reinstallation of communities into the area.

**Possible changes in community land management processes:** In the context of growing land pressure in the Project area, in-migration of newcomers to the mine area, and increase of salaried income from the Project and its suppliers, the traditional land ownership and transfer might be disrupted and modified. Currently land is usually allocated and managed according to family lineage, with traditional authorities involved in decision making at settlement level. Socioeconomic change triggered by the project may increase the occurrence of monetary land transactions, and foster a phenomenon of individualization of land ownership and use. The scarcity of available plots may trigger some inflation on the price of land and housing.

**The Port Area:** Port terminal facilities will take place over a concession that was allocated to GAC under its convention in 2004, and was prepared as a consolidated backfilled platform in 2012. At Kamsar, at the time of issuing this ESIA Addendum report, the extent of resettlement at the GAC port area is still not confirmed, and will depend on results of engineering feasibility studies – this will be mostly driven by constraints related to the routing of the rail spur connecting the ANAIM rail line to GAC’s facility. No further resettlement is expected within the actual proposed port terminal footprint.

**Protecting the health and safety of workers, communities and the environment**

**Maintaining a high level of leadership on health, safety and environment:** As stated in introduction of this non-technical summary, through their corporate code of conduct and HSSEC policies, EGA and GAC are committed to excellence in health and safety management, with an objective of “Zero Harm to our people, the environment and the communities”.

GAC aspires to establishing and maintaining a high level of health and safety leadership across its organization. This is supported by existing processes and procedures for health and safety management,
employee awareness and training programs, as well as community awareness campaigns through GAC’s stakeholder engagement activities.

As the project evolves towards construction, and later operation, the project workforce will increase rapidly, and the need to execute new activities will mean that GAC’s current health and safety processes will need to be updated, to ensure that they remain fit-for-purpose and address the specific new risks associated with construction and operation activities. Particular attention will be given to community safety through safe vehicle operations, delineation of hazardous areas, preparation and delineation of hazardous activities, as well as community information and awareness on the specific health and safety risks associated with GAC’s activities.

As a rule, new recruits are required to undergo health and safety training, subsequently complemented by on-the-job refresher trainings and day-to-day sensitization. GAC’s subcontractors are required to comply with the requirements of GAC’s health and safety processes and procedures. Similarly, GAC will ensure that it has the right processes for the management of waste and hazardous materials, to limit the risks of exposure of workers, communities or the environment to such materials. Generally speaking, the Project will make limited use of hazardous materials (except for diesel fuel and small quantities of maintenance chemicals).

**Supporting worker and community health:** In terms of community health, as highlighted during the field survey, key health issues in this region of Guinea include malaria, water-borne diseases, tuberculosis and other respiratory diseases, and tetanus. HIV/AIDS prevalence in the area is reported at approximately 4.5%, which is higher than the national average, and it is a recognized fact that demographic change and increased wealth (as may be brought upon by the project) is a factor of increased risk of HIV propagation.

As a result of underfunding, the availability of public healthcare in the project area is low. Healthcare facilities are more developed in Kamsar compared to the mine area. Access to health services remains however unequal and varies depending on the socioeconomic level of the population. Where possible, GAC will implement Project controls directed towards the preservation of community health. This will include:

- limiting the risks of incidents through appropriate operational controls and area delineation, to prevent accidents involving GAC and community members;
• managing emissions and wastes to comply with relevant environmental guidelines, or, if the proximity of stakeholders mean that guidelines cannot be met, engaging into a resettlement and livelihoods restoration and resettlement process with affected stakeholders;

• avoiding the development of conditions favorable to the propagation of diseases, e.g. through avoiding the development of areas of stagnant waters (to prevent the proliferation of mosquitoes and related transmission of malaria); and

• the recent Ebola outbreak in Guinea compelled to modify behaviors to limit the propagation of the disease. GAC implemented an awareness program for its employees and put in place practical measures to keep sanitary conditions of the workers as high as possible (e.g. daily temperature test, systematic hands disinfection, new procedure to organize meetings)

Whilst GAC recognizes that the improvement of health conditions for communities in the project area is not within its control, GAC proposes collaborating with local authorities (through the Stakeholder Engagement Plan and Local Development Plan) to support the improvement of health awareness, as well the quality of health infrastructures.

GAC also provides routine and emergency medical treatment facilities to Project workers and undertakes HIV, Ebola and malaria awareness, prevention and protection campaigns. GAC also supports the provision of better quality water in local communities through a well development program.

Cultural heritage: The cultural heritage survey covered the following in the GAC mining concession:

- all the potentially mined plateaus and valleys between them;
- a 300 m additional zone on both sides of this unit; and
- a 500 m area to the north of the ANAIM railway.

A total of 230 Cultural Heritage sites were encountered and listed. Among them:

- 156 sites are genies’ residences;
- 73 are burial sites; and
- 1 site is a historic site (natural cave used during past conflicts).

Natural sites (e.g. trees, forest, rocks, streams) and cemeteries are very often considered as the place of residences of genies. Guinea has a strong tradition of living cultural heritage founded in the important role sacred sites play in community life. Trees, rocks and water are often identified as sites of spiritual significance and can be important as sacrifice sites and in rites of passage. As well as such physical sites, intangible traditions and cultural knowledge are also important cultural assets. Genies and other
supernatural entities are part of the traditional animist practices and play a very important role in the life of communities and individuals.

In addition, 16 mosques and 11 almadjadas (small mosques) were inventoried. The village of Wossou (located on bauxite plateau 33, in the East of the mining area) has a unique heritage character in the area, related to its history, social influence on other villages and the presence of a mosque and scholars’ cemetery that are widely revered in the project area. Lastly, 12 archaeological sites that would be directly impacted by planned ground disturbing activities have been identified. At Kamsar, given that all activities onshore will take place over an existing backfilled platform, already covered by an ESIA and a resettlement action plan prior to its development in 2012, no further cultural heritage assessment was undertaken.

GAC will develop a Cultural Heritage Management Plan that will include information on the processes, procedures, and resources that will be used by the Project to manage all cultural heritages found in the area of the mine. These management measures will include integration of avoidance measures as part of the detailed design of the project, but also provision for further study to identify and evaluate sites prior to construction. If they cannot be preserved through avoidance, archaeological sites will be investigated and a rescue archaeology approach will be used to preserve the remains if required. For all cultural heritage sites, communities will be consulted through the Stakeholder Engagement Plan on appropriate means for relocation if possible, or for providing compensation where relocation is not practical. During construction and mine clearance a “Chance Finds” procedure will operate to identify and if necessary protect or rescue finds encountered on the ground. There will also be on-going stakeholder engagement for the identification and conservation of cultural heritage assets.

The Project will also establish a Cultural Heritage Training Program for project management and for the construction contractors and field staff to manage potential impacts to cultural heritage sites by facilitating the identification and reporting of potential Chance Finds encountered during construction activities.

Mine closure and rehabilitation: The closure phase corresponds to the end of the mining of the bauxite plateaus. As presented earlier in this non-technical summary, the mining of the available bauxite resource will be progressive, and the closure of areas will occur as each mine area within each of the plateaus is depleted. Once a plateau has reached the mine closure phase, mining activity and ore hauling activities from this mine site on the plateau will cease, and the site will be secured to move on to the rehabilitation phase. At the end of Project life, mine closure will ultimately entail dismantling, demolition and removal of equipment and buildings, reshaping and re-contouring of land surfaces and
rehabilitation of occupied areas. Progressive pit closure and rehabilitation will include re-contouring and re-grading the pit surfaces followed by surface spreading of topsoil. The mined areas will then be re-vegetated and the land will be prepared for future use according to the Mine Closure Plan (natural area, pasture, agricultural area, residential area).

The land occupied by the mine and its infrastructure will be returned to its former land use as far as reasonably possible. Upon mine closure, the mine pits will remain as terrain of lower-than-before elevation. The closure phase will also ultimately require the management of social and environmental issues including retrenchment of the workforce and managing the implications of loss of local employment and business.

The direct sources of impact during the closure of the mine in terms of the Project's direct contributions to local economic development are linked to the termination of jobs by the Project and its subcontractors, the closure of the local development initiatives initiated and the end of the contributions to the institutional budgets dedicated to local development. The departure of many households from the area will lead to a significant reduction in the population. The economy of the areas will go through a phase of recessions and tensions and conflict may arise between the former workers, looking for jobs and the other residents of the area.

In order to mitigate these risks associated with mine closure and in accordance to the Guinean Mining Code, the Project will develop a detailed Mine Closure Plan. The plan will be developed in consultation with relevant authorities, the workforce and local communities and will aim to leave a rehabilitated mine site behind that is stable, non-contaminating and with a sustainable water management system. GAC will also investigate post-closure economic diversification and re-skilling opportunities to mitigate the impact of job losses.

Closure planning will be a dynamic process requiring regular review during mine life to take into account changes in Project configuration, economic conditions, legal obligations, corporate requirements, community expectations and technical knowledge. The Plan will be developed conceptually prior to start of operations, and reviewed and updated regularly during operations. Rehabilitated pits will be subject to regular environmental monitoring to verify that rehabilitation objectives are being met, and define corrective actions if not.
Translating the ESIA into Environmental and Social Management

GAC has identified and committed itself to a large number of social and environmental measures designed to mitigate adverse impacts and ensure benefits are delivered. All mitigation measures specified in the 2015 ESIA Addendum and 2008 integrated ESIA are compiled, updated and translated into the Environmental and Social Management Plan (ESMP) for implementation of GAC bauxite export project. The objective of the ESMP is to lists and summarized all mitigation measures and social and environmental plans and procedures to be implemented by the Project and to provide a framework for monitoring or even auditing project compliance with these standards and good practices.

The ESMP is organized by topic and defines a clear statement of the actions that will be taken for each phase of the development (detailed design, construction, operation, closure), and for each component of the overall project (mine and port). It also includes commitments to further studies that will be undertaken to refine mitigation plans and to monitoring and contingency arrangements should monitoring reveal that impacts are more significant than expected.

Surveillance and monitoring of Project’s social and environmental impacts are a key aspect of an effective social and environmental management system. The need for changes to measures in place will be based on social and environmental quantitative thresholds or qualitative criteria as defined in the ESIA Addendum for the Project and/or the Social and environmental Monitoring Plan.

8. MITIGATION/ENHANCEMENT MEASURES

The Environmental and Social Impact Assessment (ESIA) of the GAC project includes an environmental and social management plan (ESMP) which sets out the framework for the environmental and social management of the Project. It establishes a set of environmental and social objectives and principles to operate through a responsible management approach, voluntary corporate actions and core values set by EGA. The ESIA studies indicates that all relevant management plans and procedures are in-place and integrated into the GAC health, safety, environmental and community management system, which was originally established following the 2008 ESIA.

Although presented as an Addendum of the 2008 ESIA, the 2015 ESIA identifies and assesses the major risks and impacts which the Project will have on both the social and environmental aspects of the Project’s area of influence (AoI). The ESIA Addendum includes a clear assessment of the significance of the impacts (Minor, Moderate and Major) in each phase of the Project (Construction, Operation and Closure), and describes the improvement and mitigation measures the Project will need to implement, and presents its evaluation of the residual significance (again on a qualitative Minor, Moderate and
Major scale). Overall the ESIA Addendum is considered to represent good practice and be reflective of the key risks and impacts arising from the Project. Identified gaps are discussed and recommendations are given in each section of this ESDD document. The ESIA Addendums for the Dam and MBS Project, include the identification of risks and impacts and draw on the 2015 ESIA Addendum with respect to the planned management and mitigation plans.

**Environmental and Social Management System:** In 2014, GAC initiated a review of its management system considering the scope and content of Phase 1 Project. This review process has continued through to the present enabling GAC to establish an overarching and Project specific Environmental and Social Management System (ESMS) that incorporates GAC policies, ESHS programs, discipline plans and procedures, so as to ensure that all required elements are integrated and balanced, adequate monitoring and continuous improvement is taking place in a systematic way. To deliver implement this ESMS, GAC is continuing to build its E&S team and recently recruited senior team leads to take the ESMS forwards. As for the railway upgrades, depending on the final agreement with the parties involved (i.e. CBG, COBAD and ANAIM) GAC will need to either incorporate E&S management of the railway into its ESMS or ensure that the railway constructor and operator’s ESMS is aligned with its own ESMS establishing a bridging document and appropriate mechanisms to monitor implementations of the ESMPs consistent with Guinean regulations, IFC PSs, AfDB OSs and Lender requirements.

**Health, Safety, Security, Environment and Community:** GAC has in place an overarching Health, Safety, Security, Environment and Community Policy which establishes principles to guide sound environmental and social performance. EHS policies include an Environmental Policy and a Health and Safety policy which outline GAC objectives for the protection of the health & safety of its employees, and environmental performance aimed at contributing to a sustainable development while conducting business with integrity.

**Labor and Working Conditions:** GAC subscribes to the main ILO conventions, which are also adopted by Guinean Labor Code (2014). The company’s Human Resources (HR) policy is reflected in a comprehensive Internal Regulations document that guides labor relations and includes recruitment and hiring; social services and benefits; work regulations and disciplinary actions; health, safety and security; work termination; conflict management and resolution, and working conditions in general. A grievance mechanism for employees and a whistle blowing mechanism are in place.

GAC has adopted EGA’s Human Resources policy and its code of conduct and internal labor regulations manual incorporates principles aligned with IFC PS2 and AfDB OS5 including freedom of association, no forced labor and no child labor, no discrimination and equal opportunity. Currently, with over 15% of female participation, shows a greater percentage of women employees than the industry average,
which is between 5 and 10 percent according to the Canadian based Global Mining Standards and Guidelines Group.

GAC states its commitment in the Code of Business Conduct and Internal Regulations to comply with working conditions, non-discrimination and equal opportunity, freedom of association and rejection of child and forced labor, in conformance with AfDB OS5 and IFC PS2 and. Also, GAC is committed to local hiring and requires contractors to hire local workers whenever possible. GAC has adopted EGA’s Human Resources Policy and is working to adapt it and develop an HR policy statement.

The department of Governance and Compliance of GAC supervises the implementation of that the Code of Business Conduct and the Suppliers Code of Conduct, which is required to be adopted by all contractors and main suppliers. An internal audit team ensures compliance with GAC’s HR policies, including respect of human and labor rights.

**Resource Efficiency and Pollution Prevention:** Overall it is considered that the actions presented in the ESIA in respect to pollution prevention are reflective of good practice, and whilst there are relatively limited activities, good practices were observed during the in-country visits, although it was acknowledged by GAC that several improvements which were needed to meet international good practise, and the newly appointed environment manager was working to address these.

The principle areas of pollution within the mining area are considered to be atmospheric emissions from the combustion of diesel by power generators and mobile plant with the generation of oxides of nitrogen (NO₂, and NOₓ), sulphur dioxide (SO₂), and particulates (PM) from the movement and processing of ore. Some of the baseline monitoring in the ESIA Addendum, including dust monitoring with the mine area, has been limited in duration, and therefore the IESC has concerns that the baseline is poorly defined with modelling assumptions being not representative of the actual impacts. It is recommended that further longer term confirmatory monitoring of background air emissions and dust in areas where monitoring has been limited should be undertaken and GAC has taken measures to address this shortcoming. These pollutants are also recognized to address the main contaminants of concern associated with the truck transport through the communities on the national highway by the MBS Project, although modelling indicates that over 10 m away from the road they are unlikely to be a significant risk.

Hazardous materials including explosives (Ammonia Nitrate Fuel Oil or ANFO), hydrocarbons (diesel and oils) and chemicals such as solvents (from maintenance operations) will be used. Within the GAC Port Terminal fuel use and storage will be relatively significant with a key focus for the management of
this fuel will be maintaining the integrity of the transfer pipelines both within the GAC Port Terminal, and between the Port Terminal and the marine jetty through which the fuels will be imported from marine vessels.

The GAC ESIA Addendum, and Waste Management Procedure, present an appropriate waste mitigation hierarchy which the Project Company intends to apply through its operations. Overall, the proposed approach to the management of materials and wastes with the potential to cause pollution reflects good industry practice, and the waste management area appeared well run, and GAC were addressing literacy issues within the local team which were preventing the use of chain of custody forms. As there is not a suitably designed and permitted landfill available to the Project in Guinea, it is understood that a Project landfill (consistent with GIIP) used for non-hazardous materials including scrap metal and plastics (which cannot be recycled), tires and household wastes will be constructed. Details of the planned landfill design will need to be reviewed and approved by IESC/Lenders prior to its construction. Additional areas of concern include disposal routes for hazardous wastes which cannot be safely incinerated on site or are a result of incineration (e.g. ash). These areas will need to be developed as part of the full suite of management plans and procedures for construction and operations.

Community Health, Safety, and Security: The ESIA studies characterize the risks to community health and safety, distinguishing between the mine and port areas, generally in terms of relocation of communities where necessary, population influx, road, port and railway safety, and access to health care considering the Construction Phase, Operational Phase, and Closure Phase.

The Community Health and Safety Management Plan is being developed to manage and monitor potential impacts of the Project on the communities from infrastructure and equipment safety; hazardous materials; communicable diseases; influx and workers presence within the communities; transport activities and traffic safety; environmental health and natural resources, and emergency response and preparedness. As infrastructure is built, safety analysis will be conducted and plans or procedures addressing community health, safety and security will be developed in accordance with GAC’s health and safety policy. Related procedure documents that are in place include: Traffic and Vehicle Management; Hazardous Substance and Dangerous Goods; Work over Water; Incident Reporting, Recording and Investigation; Journey Management; Spill Prevention and Response; Truck Transportation; and Waste Management; Emergency Response. However, the majority of these plans are focused on GAC’s operations within the mine or port areas, and do not consider in detail the public highway or communities along it, and these specific areas will be integrated into the appropriate plans or have standalone plans.
9. EMERGENCY PREPAREDNESS AND RESPONSE PLAN

An Emergency Preparedness and Response Plan has been prepared for the project, but it is considered to be very high level, and does not document, or provide a means of disclosure, the activities, resources and responsibilities for appropriate infrastructure that affects communities, relevant government agencies and other related parties.

GAC conducted a Human Rights assessment and identified risks and potential impacts to Human Rights. As part of their mitigation measures to potential human rights violations, the implementation of a Security Code of Conduct based on the Voluntary Principles of Security and Human Rights is planned to ensure that security providers align with the Voluntary Principles. Currently security services are contracted to a Guinean company that provides unarmed guards in the Project facilities. A Security Superintendent has been recently hired by GAC (April 2017) to develop and implement security policies, and a Security Management Plan with processes, procedures and controls aligned with the AfDB ISS and IFC PS4. A military attaché with extensive experience in Human Rights has been designated by the Guinean armed forces to liaise with GAC on issues related to public security force.

10. LAND ACQUISITION AND INVOLUNTARY RESETTLEMENT

Detailed RAP plans have been developed for the different components of this project. The project requires considerable access to land in the railway, mining and port areas. In previous stages of the Project (2007 and 2008), GAC resettled 164 households, 61 in Kamsar and 103 in two communities in the northern section of the mining area, which will not be used in the current design of the project. Interviews of affected people by the IESC, and the review of documentation provided by GAC including a completion audit for the northern section of the mining concession indicate that the resettlement process was adequate from the perspective of affected people and generally in line with AfDB OS 2 and IFC PS5. A number of recommendations from the audit need has been incorporated in the development and implementation of the different resettlement action plans. A completion audit for the resettlement in Kamsar was finalized in August 2016 finding numerous deviations and unresolved issues in the implementation of the RAP, from not providing compensation, to failing to implement agreed livelihood restoration programs. GAC has developed an action plan to address these issues that should be resolved as soon as possible and before the next resettlement takes place.

The project will cause additional physical and economic displacement. GAC has developed a Land Acquisition, Compensation and Resettlement Framework (LACRF) to guide the land access process based on AfDB OS2, IFC PS5 and Guinean Legislation. The LACRF includes principles to govern resettlement and compensation, provisions for consultation and stakeholder engagement, grievance...
management, compensation and entitlements, livelihood restoration, resettlement site development, identification and support of vulnerable households addressing gender issues, monitoring and evaluation. Comments to the LACRF were provided by the IESC and the Lenders to GAC to fully align the LACRF with Lenders’ requirements. GAC engaged experienced international consultants to develop two Resettlement Action Plans (RAP) for the mine and port areas respectively, and to develop location specific RAPs for dam components. Comments were also provided to GAC to fully align the Concession and Port RAPs with Lenders’ requirements. Most comments were incorporated to the mine and port area RAPs, and improvements will continue to be made as implementation is prepared and executed.

In the southern part of the concession, where the Project will be developed, 19 villages will need to be resettled progressively over approximately 20 years roughly in three phases: nine villages (262 households) during the construction and initial operation phases, four villages between years 8 and 14, and six villages during the last five years of operations. At the time of the site visit in March 2017, GAC had economically displaced two households for the construction of the access road to the MBS mining site and had started construction in Hakoundé Thiandi for the resettlement of the community of Béli Kindy in the concession area. Additional studies have shown that there will be no requirement for physical resettlement caused by the dam as originally thought; however economic displacement will be required and GAC needs to adjust the RAPs to reflect the changes and incorporate the Independent Environmental and Social Consultant (IESC) comments. In the port area, some structures and business have been moved back (1-2 m) to allow space for heavy vehicles accessing the construction site. A total of 297 households are expected to be resettled from the Kamsar community of Daprass to Filima prior to the construction of the rail spur and access road.

In addition to the physical displacement, there will be people economically displaced due to mining operations, access and haul roads in the mining area, and coastal and nearshore operations in Kamsar. A livelihood restoration plan has been developed for the mining area. To determine impacts to fishermen’s livelihoods, a fishing study was conducted in 2015 in the port area. However, the project design has since been modified and the study has been updated to account for reduced dredging and increased maritime traffic. Compensation and livelihood improvement will be implemented to mitigate economic displacement and other impacts, to fishermen and fishmongers in the Kamsar area that may be affected by exclusion zones, dredging, construction and operations of the port facility.

11. BIODIVERSITY CONSERVATION AND SUSTAINABLE MANAGEMENT OF LIVING NATURAL RESOURCES

In line with the intent of the Bank Operation Safeguard 2 (AfDB OS3), and IFC Performance Standard 6 (PS6), the IESC notes GAC’s overall willingness to use the mitigation hierarchy for the management of biodiversity-related aspects according to the ESIA studies commitments. In addition, impacts on
biodiversity and ecosystem services related to the construction and operation of the dam and reservoir, their component of the rail expansion, and the early-phase MBS project were subsequently assessed in standalone ESIA. GAC’s approach to biodiversity for the Project was presented in 2015 setting out their scoped areas of influence, the range of sensitivities identified through baseline surveys to date, and an outline of management intentions to minimise impacts on biodiversity. The Project’s area of influence hosts a number of highly threatened and restricted range species, including the West African Chimpanzee (Endangered, EN), Temminck’s Red Colobus (EN), Pinto’s River Frog (EN), Half-Toed Gecko (Critically Endangered, CR), various CR sharks and sawfish, three CR vulture species, and the Atlantic humpback dolphin (Vulnerable, VU, but likely to be upgraded to CR/EN).

Protection and conservation of Biodiversity: The 2015 Critical Habitat Assessment (CHA) was revised in June 2016 and March 2017 following Lenders/IESC requests to assess a broader range of species known to exist in the area, and to reassess some species already addressed in the original CHA. Species and habitats were assessed across all five IFC PS6 criteria, and assessed against Tier 1 or 2 thresholds. Nineteen species (including one at the port) and two habitats¹ (gallery forest and mangrove) qualify for Critical Habitat and are priority biodiversity features for the Project. The CHA notes difficulties in analysing a number of threatened or near-threatened species against CH thresholds (both at the mine and port sites) due to a lack of information on the species within the discrete management units (DMUs); the CHA acknowledges that a No Net Loss (NNL) approach must be applied for these potential CH-triggering species/habitats, and Net Gain for those components that do trigger CH (unless the Project demonstrates that it will not affect those biodiversity components).

The GAC mining concession is a mosaic of both natural and modified habitats, including critical habitat. Natural habitats include grassland savannah (“bowal”) on top of the plateaus, wooded (tree) savannah in the valleys and on the sides of the plateaus, gallery forests (i.e. riparian vegetation) in the valleys and headwaters. Modified habitats are primarily the result of agriculture and livestock practices and form mosaics on the valley slopes, and the IESC site visit observed the extent to which agricultural conversion is occurring. Given the regular presence of the West African Chimpanzee across the concession, the DMU (of Tanéné and Sangarédi sub-prefectures) is deemed critical habitat Criterion 1, Tier 1. Other species within the DMU also trigger critical habitat criteria (such as the Temminck’s Red Colobus, Pinto's River Frog, Half-toed Gecko, etc.), plus species that couldn’t be assessed due to lack to data, that will be managed for NNL (as noted above).

¹ The latest CHA also states that wooded savannah now qualifies as CH. Although it is important for a number of CH-qualifying species, we are not sure if it qualifies as CH in its own right, and wonder if this is an error.
Impacts associated with the reservoir have been assessed in the Dam ESIA (dated July 2016). Following feedback from Lenders/IESC, GAC contracted field teams to undertake targeted chimpanzee surveys of the area around the proposed reservoir, including the Pre-Clearance Biodiversity Survey (PCBS) and aerial drone survey. Results in Dec 2016 indicated significant use of the area by chimpanzee groups, primarily in pockets of dense woodlands along the valley crests, but also in the gallery forest along the valley floor, in particular in the exceptionally well-preserved sacred forest known as Aide Koba. Between 40-60% of this sacred forest would be flooded for 9 months of the year (around the wet season) with the proposed reservoir design specification. To comply with AfDB OS3 and IFC PS6, the project need to demonstrate that no other viable alternatives exist within the region on modified or natural habitats that are not critical (amongst other requirements).

As the reservoir water is intended primarily for use in dust suppression on the roads, part of any analysis of alternatives should be to look at other ways to achieve dust suppression therefore reducing the need for the reservoir water volume; therefore, PS1 and PS3 (i.e. resource efficiency) equally apply to this issue. The Lenders/IESC recommended to GAC to consider alternative options (e.g. lower water level, dam relocated a distance down the valley, use of chemical non-toxic dust suppressants instead of water, etc) so that loss of the Aide Koba forest habitat could be avoided and the Project could demonstrate compliance with PS6 Para.17. GAC has developed a brief description of alternative considerations and a water-supply analysis by ERM. As these water-supply/dust suppressant analyses stand, GAC have provided a high-level review of alternative options for them to meet the legitimate need for appropriate dust suppression. Although the analysis of some options is incomplete, GAC concludes that the proposed reservoir location and design is still their best option. Without information on the geo-technical viability of the two alternate dam locations further down the Tiouladiwol being available, we are not in a position to state that no other viable alternatives exist.

A more robust integrated water management analysis (taking account of the combination of sources and the variable use of water through the life of the project as the length and number of the haul roads varies) could have been conducted, with a view to sourcing sufficient water to meet the needs of dust suppression from multiple sources. This, in combination with the definite water savings that could arise from wide-scale use of chemical dust-suppressants (anticipated to reduce required water volumes by 50-80%), would have provided a promising analysis, that could have resulted in avoiding a portion of critical habitat at Aide Koba. As (a) dialogue with the community on accepting impacts to the sacred forest has concluded and compensation commenced, (b) that in theory 40% of Aide Koba should not be inundated according to current plans, and (c) construction contracts have already been awarded and construction potentially already commenced, we do not mark this as a Non-Compliance but do note this is as a missed opportunity for demonstration of avoidance of critical habitat on-site and hence effective application of the mitigation hierarchy.
The Lenders/IESC have also provided specific comments on the biodiversity components of the MBS project. Our primary concern was that the scheduling of the MBS phase on Plateau 20 had been significantly brought forward, without time to adequately undertake the proposed surveys to better understand mining impacts on known high-density chimpanzee habitat. A Pre-Clearing Biodiversity Survey was done, but during the site visit in March 2017, GAC was not able to demonstrate how the results had informed vegetation clearance or demarcation of avoidance areas in the MBS area of Plateau 20.

A Biodiversity Management Plan (BMP) was developed by The Biodiversity Consultancy (TBC) in July 2016, and revised in May 2017 to reflect feedback from Lenders/IESC. The BMP demonstrates a systematic approach to understanding the relevant biodiversity issues in the mine and port areas, identifying the risks, implementing the necessary mitigation measures, describing intentions for net gain, presenting initial Key Performance Indicators (KPIs) and monitoring actions. The suite of KPIs aims to quantify a range of outputs related to both general and species-specific control measures. The IESC recommended that wooded savannah be afforded more protection wherever possible on the concession (due to its importance to CH-qualifying species); this is now assigned greater priority within the land disturbance process, and this process is now better defined in the BMP.

A draft Biodiversity Monitoring and Evaluation Plan (BMEP) has recently been developed by ERM. The BMEP defines the scope, methods and required responses for monitoring priority species and habitats previously identified, particularly as part of the CHA and the BMP detailed above. The BMEP takes a Pressure-State-Response approach to indicators to indicate whether mitigation measures are being properly implemented and are effective, and determine the actual residual impacts on priority biodiversity features. The Project will need to use the BMEP to demonstrate that it does not lead to measurable adverse impacts on the CH-designated biodiversity values, or the ecological processes supporting these values. The BMP relies on impacts being mitigated successfully, therefore GAC need to ensure indicators are capable of detecting/measuring whether residual impacts are significant, and that triggers for adaptive management are used. Note: chimpanzees are currently excluded from the programme scope. A proposal for the long-term chimpanzee monitoring program has been agreed, with objectives to understand/document impacts of MBS and reservoir construction, to establish an optimised long-term monitoring program, and to inform design of an on-site offset/set-aside for chimpanzees. The program is being developed, due to start in August 2017, and will be integrated into the Project’s management system as required by AfDB OS3 and IFC PS6.
Good progress has been made in the various plans for managing biodiversity issues and any remaining minor integration gaps assessment are being aligned – they provide a good framework for GAC to manage their biodiversity issues.

There have been delays to early implementation of the BMP, but both the Environmental Superintendent and Biodiversity Manager have taken up their roles in the last six months. However, the IESC has consistently highlighted to GAC the need to engage additional staff resources with biodiversity capacity so that the programs and plans developed to date can be implemented effectively and ensure GAC is compliant with PS6.

**Residual impacts in mine area & Chimpanzee offset:** According to the ESIA studies and addendum, significant/major residual impacts on chimpanzees are anticipated due to the loss, fragmentation and deterioration of their habitat, direct loss of individuals (resulting from road crossing and hunting pressure) and indirect impacts related to the increasing community sizes. In addition, significant cumulative impacts on chimpanzees would result from the combination of GAC project activities and other existing or planned mining concessions nearby.

In February 2016, TBC drafted GAC’s ‘Chimpanzee Offset Pre-Feasibility Study and Strategy’ (updated March 2017). It assesses a range of options to minimize impacts and determine available options for residual impacts to chimpanzees, to ultimately achieve a ‘net gain’ situation (loss of chimpanzees in one area compensated by the protection of a larger number in another area). This Pre-Feasibility Study is a clear systematic consideration of the issues GAC should understand and manage to effectively implement the mitigation hierarchy, along with a process to follow to achieve this. Considering the significance of the potential biodiversity loss on chimpanzees, the study credibly highlights the challenges and way forward to try to reduce some of the inherent risks (albeit with the caveat of limited-information).

The Pre-Feasibility study presents a short-list of off-site offset sites options, identifies key red-flags that need to be addressed or better understood, and proposes site(s) which might offer a suitable, feasible conservation gain. Uncertainties in designing and implementing offsets are addressed realistically. An onsite set-aside (within the northern part of the GAC concession) has been proposed by Wild Chimpanzee Foundation (WCF), and a temporary (18-20 years) set-aside is mentioned in TBC’s Pre-Feasibility Study; details of the most suitable on-site set-aside location will be confirmed once 2017’s extensive chimpanzee monitoring surveys are analysed.
Building on this work, the Offset Feasibility Study last version received in July 2017 assesses the feasibility of implementing an offset program at the proposed Moyen Bafing National Park (MBNP) (as ranked in the Pre-Feasibility study), and the likelihood of achieving the necessary net gain required to offset the losses predicted at both GAC’s concession and their concessionary neighbour, CBG i.e. an aggregated offset. The work builds on the extensive, long-term efforts undertaken across the area by WCF and their expert primatologists over many years, including detailed research studies, ongoing community dialogue and government liaison; it is also informed by the conservation model put forward by WCF and OGUIPAR (the Office Guinéen des Parcs et Réserves), and TBC’s own site visits and research. The Moyen Bafing landscape is home to a relatively large human population (circa. 67,000 in 400 villages), including mine exploration licence areas, and may host the long-planned Koukoutamba Hydro-Electric Power dam (a World Bank project) once developed. Moyen Bafing forms part of the Fouta Djallon landscape, considered by chimpanzee specialists to be one of the most important landscapes for conservation of the species.

In the report, TBC analyses the MBNP for alignment with good practice biodiversity offset principles, and for offset success against a variety of criteria, including ecological, technical & socio-economic, institutional & legal and financial; they specifically also look at consequences associated with the Koukoutamba Dam development. They identify key offset-enabling factors and challenges to successful offset implementation, and propose key mitigation measures. Challenges and risk-levels are assessed, at both inherent (prior to mitigation) and residual (post mitigation) levels. The study also responds to the ‘red flags’ noted in the Pre-Feasibility report (mentioned above).

TBC concludes it will be challenging but feasible to implement a chimpanzee conservation project in Moyen Bafing that is aligned with best practice conservation standards and will deliver tangible and significant conservation gains, subject to some modifications to the originally proposed approach to protected area creation to take account of the Koukoutamba dam, and to better align the process with good conservation practice and with lenders requirements. They recommend these modifications be validated by the conservation project proponents (ideally by integration in an updated Fiche de Projet and the planned Arrêté Temporaire de Classement that will officially launch the protected area creation process) to provide sufficient assurance that conservation in Moyen Bafing would 1) be compatible with proposed development activities, notably the Koukoutamba dam and 2) meet the standards required of an offset, notably with regards to integration of local communities.

With the documentation seen to date, the IESC concurs with the overall conclusions of the study, and recognises GAC’s significant commitment to the offset program. It is noted that the risks to achieving successful offset outcomes will need very careful management and substantial resources (see below).
We also note there is ongoing net loss and degradation of the forest biomass, which without any intervention is expected to continue and likely increase as the area is opened up through dam development. The presence of the Koukoutamba dam and associated infrastructure within the MBNP present a situation with the potential to jeopardise the successful attainment of required offset gains, by resulting in ‘very substantial losses of chimpanzees’ not only through direct flooding of gallery forest habitat, but also with new roads and improved infrastructure opening up a previously remote area, and the potential for displacing physically and economically the population to other areas of the protected area. Were dam development in the MBNP to be poorly managed, this would trigger threats that could unhinge its long-term conservation value. The Study provides a robust analysis of the suite of potential risks, and provides a realistic assessment of the residual risks. It predicts that in the worst-case scenario (where impacts of the dam are completely un-managed) the suitability of the site as an aggregated offset for both CBG and GAC could be compromised, but that the MBNP would still offer the opportunity for protection of a population of 3,600 chimpanzees and therefore still meet the offset requirements for a single company. The need for close monitoring of the status of challenges and risks through the life of the offset will be crucial, as will be close liaison with all offset partners and collaborators. GAC has committed that an offset/technical oversight panel will be established as mitigation measures (to initially include Lenders), and part of their role will be to monitor progress in offset implementation, including the status of relevant threats to success.

Dialogue with the GoG and key players, and the contractual obligations placed on the dam designer/operators, will need to ensure best industry practices are designed in, adequately adopted and verified. The needs of communities within the landscape, especially in relation to local land and natural resource rights, will have to be assured so as to achieve the required offset outcomes. As recommended in the study, integration of explicit language in the updated Fiche de Projet and the planned Arrêté Temporaire de Classement, should ensure management of the indirect impacts of the dam project is more effective, that the model for chimpanzee conservation intervention will be through evidence-based adaptive management, and that specifying clear principles for community land-tenure, allowed-uses by zone, resettlement fully compliant with lenders requirements, and limiting/managing population influx to the PA, will all help minimise ambiguity in MBNP protected area implementation. As proposed by TBC, the Arrêté Temporaire de Classement statement of intent, and eventually an MoU between the different parties, should provide greater assurance that conservation and development activities will be compatible, and that the contract for dam design, construction and operation will require implementation of good practice management of biodiversity and social impacts.

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For long-term chimpanzee offset success to be achieved, the design and implementation of a robust conservation management and monitoring framework (to meet both ecological and socio-economic requirements) will be vital and positive ongoing relationships with offset-enabling conservation partners are crucial. The potential to achieve a conservation-win for chimpanzees is huge with this offset, if the significant risks are carefully monitored and managed, and appropriate resources made available. GAC has worked with TBC and lenders on predicted budgets designed for a 20-year program and has indicated their commitment to proceed on a Conservative/mid-case basis. Targeted monitoring over the next few years (based on the work-plan to be developed) will indicate whether the Conservative/mid-case scenario is sufficient or increased support is required. The IESC commends GAC in committing the substantial front-end resources to undertake these early feasibility assessments, thereby providing the opportunity to better understand the ecological, technical, socio-economic, institutional/legal, logistical, financial and developmental risks and constraints.

As per the Bank’s OS 3 and the IFC PS6 guidance, the presence of great apes means that special consideration is appropriate. The Guidance Notes state that generally projects with large or expansive footprints in critical habitat Category 1 Tier 1 will find compliance difficult. However, the lenders recognize that GAC have expended considerable time, money and effort, working with WCF, TBC, CBG and lenders (along with other stakeholders) to delineate avoidance/buffer zones and to determine the best options for the development of a significant offset program that will help to protect not only chimpanzees but other priority species and habitats. Implementation of the BMP, BMEP and on-site avoidance zones/buffers, and the predicted feasibility of the proposed offset program will assure that the Project is in compliance and aligned with operation safeguard 3 on biodiversity and ecosystem services and the IFC performance standard PS6 intentions. GAC will need to continue to demonstrate their thorough implementation of their on-site avoidance and management measures, and demonstrate they are lessening impacts prior to reliance on offsets for residual impacts.

**Port area:** The GAC terminal at Kamsar port is located within the Rio Nuñez estuary, and the shoreline is clearly a modified habitat, with dense human populations and a relatively high level of background noise. This area is already impacted by the current CBG bauxite rail and port operations. Nevertheless, the overall port area of influence includes natural habitats, such as mangroves, shoreline habitats and coastal and estuarine habitats as shown in the figure below. As baseline information on marine mammals, turtles, and marine/estuarine fish species was sourced mainly from the review of existing data gathered by CBG, the IESC has recommended additional monitoring surveys of these species. According to the 2015 ESIA Addendum, no seagrass meadows or significant areas of hard substrate/reef communities are identified in the area of influence; no evidence of turtle nesting areas was found on sandy beaches and no marine mammals were observed in the proximity of Port area. Nevertheless, subsequent studies have confirmed the presence of both turtles and Atlantic humpback dolphins, the
latter in large numbers (photo-id analysis has produced a minimum estimated population of 47 individuals inhabiting the Rio Nuñez estuary and area just offshore shown in figure. 6). Additional information and monitoring requirements were included for marine species in the updated CHA, BMP and in the BMEP. This is especially important for those red list species where insufficient data was available to be able to assess against CH criteria, and mitigation measures to achieve NNL have now been confirmed in the CHA and BMEP. Mangroves were classified as Critical Habitat, and also the Atlantic Humpback Dolphin triggers CH Category 1 thresholds.

**Figure 6. Critical habitats for Mangroves and Atlantic Humpback Dolphins**

About 68 ha of mangrove were directly affected by the clearing to preparing the GAC port terminal area. As critical habitat, mangroves require net gain – in August 2015 GAC commenced a mangrove restoration offset program at two selected sites (Taïgbé and Taïdy Islands) to compensate for the loss of habitat. Although two progress reports have been received, there has been some loss of newly restored mangrove due to tidal surges, and it is not clear how restoration progress is being systematically measured and monitored. A critical assessment of the project is due to be conducted by TBC upon the conclusion of the mangrove restoration in June 2017. Since mangroves qualify as critical habitats, additional quantifiable restoration opportunities will be sought where appropriate to increase assurance of achieving the necessary net gain required by AfDB OS3 and the IFC PS6.

**Ecosystems Services Assessment (ESA):** A stand-alone Ecosystems Services Assessment (ESA) was developed in 2015 in line with AfDB OS3 and IFS PS6 requirements, updated in July 2016 and again in early 2017. Overall, the ESA provides a reasonable assessment of ecosystem services (EcoS) for the Project (note: the latest version has editing errors so some key significance and mitigation tables for the mine and port sites are not included). The study area has focused primarily on the direct footprint, plus a 500 m buffer around the footprint, plus some extended areas to take minor streams into account. As
per lenders requirements, scoped-in EcoS were prioritized according to their value based on Importance and Replaceability and residual impacts on selected services were assessed, but some improvements are required.

Stakeholder consultation had not been conducted specifically for this assessment, but the IESC understands community surveys have now been undertaken and community leaders involved in EcoS prioritisation. It is noted that almost all EcoS residual impacts are deemed to be of minor significance following implementation of ESIA and additional mitigation measures, this is likely to be over-optimistic, especially considering the extent of project induced in-migration (PIIM) anticipated (and already seen), with land conversion is significantly escalating in the area. It is strongly recommended that specific consultation activities are conducted with affected communities before and during mine restoration in order to properly understand and address their ecosystem services needs and concerns. With regard to supply chain compliance, GAC has advised that their Code of Conduct is applicable to all suppliers and thus meets lenders requirements.

12. CULTURAL HERITAGE

The Project identified cultural heritage features in consultation with community members. All identified cultural heritage sites identified were characterized, recorded and mapped. GAC has set up general guidelines on avoiding, rescuing and relocating cultural heritage for both the Mining area and the Port area.

GAC will develop a Cultural Heritage Management Plan to protect sites and objects of cultural importance in accordance with AfDB OS 1 and IFC PS8, and Guinean legislation. The plan will define procedures detailing how cultural heritage sites will be protected in consultation with Guinean authorities and local authorities and will include guidelines for preservation, removal, recording, and compensation. A Cultural Heritage Chance Find Procedure has been developed.

13. MANAGEMENT PROGRAMS AND ORGANIZATIONAL STRUCTURE

The ESMP sets out the strategic framework for managing the Project environmental and social impacts while commits to general principles and procedures of Discipline Specific Management Plans, many of which are prepared and being implemented, and will need to be regularly reviewed and refined as the Project develops. The GAC ESHS organizational structure covers EHS and social aspects, and the organizational capacity and competency of GAC appear to be solid and adequate for the current project needs in the mining area (i.e. within the concession) and the port area (export platform and KCT). There are however some positions in the GAC team that were filled late, including the dedicated biodiversity expert/Biodiversity Manager for both the mine and marine port area, and the field team for community
engagement has been based on the recent decision taken by GAC Senior Management for EHS team to be further strengthened from the September 2017 lenders site visit and discussions held. GAC informed that a position for Influx Management has been created, however this position will be filled as soon as possible. As for the railway upgrades, GAC E&S organizational structure is yet to be established. Additional resources will likely be necessary depending on the final arrangements made with CBG, COBAD and ANAIM for the construction and operation of the railway. GAC will need to strengthen its E&S organizational structure to execute its responsibilities under the railway multi-user agreement and ensure ESMPs are adequately implemented.

14. STAKEHOLDER ENGAGEMENT AND GRIEVANCE MECHANISM

GAC has identified the main stakeholders and has been engaging with local communities both in the mine area and in the port area. GAC developed and implemented a Stakeholder Engagement Plan (SEP) as part of the ESIA Addendum and disclosed project information and conducted consultation as per Guinean regulations (during the scoping of the ESIA, as part of the development of the socio-economic and environmental baselines and after the draft ESIA was completed). Also in conformance with Guinean legislation, the BGEEE conducted a Public Hearing, supported by GAC prior to the approval of the ESIA Addendum. GAC has developed a SEP for the construction phase and will update it as required, including prior to the commencement of the Operations and Closure phases. The SEP be revised and updated when relevant events occur.

In late April 2017, riots broke out in Boké and Kamsar as residents protested against pollution from mining companies and power cuts. These events need to be taken into consideration and GAC must incorporate strategies and actions into the implementation of the SEP to address community concerns. GAC has also established mechanisms to engage specific groups such as transient herders that use bauxite plateaus during their migrations, and fishermen potentially affected by the project. GAC needs to ensure that a stakeholder map is regularly reviewed and updated to inform the updates of the SEP as needed.

GAC has a grievance mechanism in place, and has developed a social management database to help implement and monitor a number of social programs including the grievance mechanism and an external communication mechanism. The database requires revisions and upgrading and GAC has designated a full time staff member to manage and update the database. Although there are some opportunities for improvement, GAC has demonstrated it has essentially constant communication with the communities in the area of influence of the mine and port areas.
### 15. COST ESTIMATES FOR ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The cost estimates of all the mitigation measures, implementing the different environmental and social action plan as well as the costs of monitoring are provided in the tables 1 and 3. The cost of the resettlement and compensation are provided in table 2.

**Table 2: Budget from ESMP Studies:**

<table>
<thead>
<tr>
<th>Mitigation measures</th>
<th>Activity</th>
<th>Port area CAPEX</th>
<th>OPEX Per year</th>
<th>Mine area CAPEX</th>
<th>OPEX per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation of environmental management plans</td>
<td>Offices equipment, cars and staff salary to manage the plans implementation (ESMP)</td>
<td>USD 41 600 mGNF 320</td>
<td>USD 28 600 mGNF 220</td>
<td>USD 87 750 mGNF 675</td>
<td>USD 70 200 mGNF 540</td>
</tr>
<tr>
<td>Training of staff and contractors</td>
<td>All training or sensitization planned to be delivered to GAC and contractors staff</td>
<td>USD 39 000 mGNF 300</td>
<td>Construction (first year) USD 19 500/y mGNF 150/y</td>
<td>Construction (first year) USD 84 500 mGNF 650 Operation: USD 41 600/y mGNF 320/y</td>
<td></td>
</tr>
<tr>
<td>Physical impacts monitoring (air, noise, vibration)</td>
<td>Monitoring equipment, consumables, internal and external laboratories charges to monitor and report on air quality, noise, vibration</td>
<td>USD 10 400 mGNF 80</td>
<td>USD 10 400 mGNF 80</td>
<td>USD 26 000 mGNF 200</td>
<td>USD 35 100 mGNF 270</td>
</tr>
<tr>
<td>Physical impacts monitoring (surface and ground water)</td>
<td>Monitoring equipment, consumables, internal and external laboratories charges to monitor and report on surface and groundwater quality, discharged wastewater quality</td>
<td>-</td>
<td>-</td>
<td>USD 15 600 mGNF 120</td>
<td>USD 65 000 mGNF 500</td>
</tr>
<tr>
<td>Biodiversity</td>
<td>Wildlife monitoring program implementation (will likely be partially contracted)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>USD 117 000 mGNF 900</td>
</tr>
<tr>
<td>Implementation of social management plans</td>
<td>Offices equipment, cars and staff salary to manage the plans implementation (SEMP)</td>
<td>USD 39 000 mGNF 300</td>
<td>USD 26 000 mGNF 200</td>
<td>USD 78 000 mGNF 600</td>
<td>USD 52 000 mGNF 400</td>
</tr>
</tbody>
</table>

All figures provided in this table are in millions of Guinean Francs (mGNF) and USD
<table>
<thead>
<tr>
<th>Mitigation measures</th>
<th>Activity</th>
<th>Port area CAPEX</th>
<th>OPEX Per year</th>
<th>Mine area CAPEX</th>
<th>OPEX per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road safety and communities movements difficulties</td>
<td>Improve safety at crossing points with haul roads, build alternative tracks and crossing point over watercourse</td>
<td>To be determined</td>
<td></td>
<td>To be determined</td>
<td></td>
</tr>
<tr>
<td>Landscape and noise impacts for communities</td>
<td>Revegetation and reforestation of sites located on the edge of settlements</td>
<td>USD 58 300</td>
<td>mGNF 450</td>
<td>USD 97 500</td>
<td>mGNF 750</td>
</tr>
<tr>
<td>Local Development Plan and Local Development Agreement implementation</td>
<td>Improvement of communities’ access to infrastructure and public services (education, healthcare, drinking water etc.)</td>
<td>To be determined</td>
<td></td>
<td>To be determined</td>
<td></td>
</tr>
<tr>
<td>Local development tax</td>
<td></td>
<td>USD 500 000 for the first 15 years; then USD 1 000 000 mGNF 4 000 for the first 15 years then 8 000 mNGF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community Investment (PIIM)</td>
<td></td>
<td>500,000 USD year for first 15 years 1,000,000 per year after</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 3: Total Cost Estimate of RAP – Resettlement Action Plan**

<table>
<thead>
<tr>
<th>Element</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing, land development</td>
<td>15,900,000</td>
</tr>
<tr>
<td>Infrastructure (access roads, schools, health posts, mosque, wells)</td>
<td>1,395,000</td>
</tr>
<tr>
<td>Electrical including Filima reconnection and Solar (both sites)</td>
<td>600,000</td>
</tr>
<tr>
<td>Livelihood Restoration Programmes (ongoing beyond 2018)</td>
<td>1,800,000</td>
</tr>
<tr>
<td>Compensation</td>
<td>5,900,000</td>
</tr>
<tr>
<td>Physical relocation (moving)</td>
<td>350,000</td>
</tr>
</tbody>
</table>
Table 4: Total Cost of Implementing the ESMP

<table>
<thead>
<tr>
<th>Mitigation measures</th>
<th>Unit cost</th>
<th>Years</th>
<th>Total cost</th>
<th>Total in USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESMP</td>
<td>562900</td>
<td></td>
<td>562 900</td>
<td>562 900</td>
</tr>
<tr>
<td>Community Investment</td>
<td>500000</td>
<td>15 years</td>
<td>7 500 000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1000000</td>
<td>5 years</td>
<td>5 000 000</td>
<td>12 500 000</td>
</tr>
<tr>
<td>RAP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td></td>
<td></td>
<td>15 900 000</td>
<td></td>
</tr>
<tr>
<td>Infrastructure</td>
<td></td>
<td></td>
<td>1 395 000</td>
<td></td>
</tr>
<tr>
<td>Electrical</td>
<td></td>
<td></td>
<td>600 000</td>
<td></td>
</tr>
<tr>
<td>Livelihood restoration</td>
<td></td>
<td></td>
<td>1 800 000</td>
<td></td>
</tr>
<tr>
<td>Compensation</td>
<td></td>
<td></td>
<td>5 900 000</td>
<td></td>
</tr>
<tr>
<td>Physical relocation</td>
<td></td>
<td></td>
<td>350 000</td>
<td></td>
</tr>
<tr>
<td>Biodiversity offset</td>
<td></td>
<td></td>
<td></td>
<td>28 400 000</td>
</tr>
<tr>
<td>Decommissioning/Mine closure-Rehabilitation</td>
<td></td>
<td></td>
<td></td>
<td>8 000 000</td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td></td>
<td></td>
<td><strong>75 407 900</strong></td>
</tr>
</tbody>
</table>

16. CONCLUSION

As presented in this summary, the project will have negative environmental and social impacts that should be mitigated or optimized, as appropriate. The project’s probable negative impacts during the works and operational phases are generally of average to high importance. If the proposed measures and recommendations made above are taken into account, this will allow for smooth integration of the various project components into their natural and human environments, and this should guarantee the project’s sustainability from the environmental, social and climatic points of view.
References and Contacts

- GAC Dam Social & Environmental Impact Assessment (ESIA) update (July 2016)
- Rina Environmental and Social Due Diligence Report (ESDD) Final Report (August 2017)
- Air quality assessment supporting information
- Noise and vibration glossary, source terms data and noise contours
- Noise and vibrations monitoring data
- Water quality monitoring results
- Biodiversity – Baseline data collection
- WCF Mammal baseline report
- WCF Bushmeat and wood collection report
- Benthic grab survey field report
- Benthic samples laboratory results
- Chemical data
- Surface water modelling report
- Groundwater modelling report
- Field team and organization
- Methodological tools
- Additional info on report data
- A cultural heritage datasheet example
- Fiches patrimoine culturel (in French)
- Consultations process & summary of consultations & cultural heritage
- For more information, please contact:

For AfDB:

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