

Project Name: Development and Asphaltting of the Batshamba – Tshikapa Road Lot 2: Loange Bridge – Tshikapa, Phase 1: Loange Bridge – Lovua Bridge
Country :Democratic Republic of Congo
Project Number : P-CD-DB0-002
Department :OITC **Division: OITC.1**

a) Brief Description of the Project and the Key Environmental and Social Components

a.1) The Batshamba-Tshikapa Road Construction Project is executed in two lots: Lot 1, between Batshamba and the Loange Bridge; and Lot 2 between Loange Bridge and Kayala Village. Lot 2 is scheduled for development in two phases: (i) Phase I involves the development of the Loange Bridge-Lovua Bridge (63 km); and (ii) Phase II involves the development of the Kayala-Tshikapa Section (56 km, including the construction of the engineering structure across the Kasai River).

This project concerns Phase I of Lot 2 and is structured around the five major components described below:

- (i) Development works on the Loange Bridge- Lovua Bridge (63 km, including facilities for the laying of optical fibre); (i) implementation of the ESMP; (ii) works supervision and monitoring, and sensitization of the PIA population and operators;
- (ii) Development of 80 km of rural roads; (i) rehabilitation of related infrastructure (fencing of schools, health centres and market places) in villages within the project area; (iii) installation of weighing stations on RN1;
- (iii) Preparation of: (i) a Sector Policy Paper; and (ii) a National Transport Plan (PNT);
- (iv) Support to the CI to build its works technical monitoring and procurement capacity; monitoring/evaluation and audit of project accounts; project audit;
- (v) Compensation for expropriation of arable land in the project area.

a.2) On the environmental front, the project is classified under Category 1, in light of the nature of works to be undertaken (boxing up, development and asphaltting) and the potential direct and indirect impact that it might engender. To achieve optimal development, different variants were considered. Variants involving a modification of the current road alignment were retained, thanks to which 150 families would not be displaced and sensitive natural habitats not affected. In all, the alignment modification will involve less than 20 km. The main activities concern monitoring the implementation of environmental measures, monitoring the implementation of the Environmental and Social Management Plan of road works and related infrastructure with a view to improving the living conditions of the population and raising the people's awareness on STIs and other pandemics, road security and the environment. Specific measures taken to reduce or eliminate the negative effects identified are mostly adequate and included in contractors' specifications.

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b) Major Environmental and Social Impact

b.1) Negative Impact

RN1 currently carries very little traffic due to the poor quality of the carriageway. Forced to use the road for their movement, communities within the direct impact area remain isolated. This limits their development efforts. Given its degraded state, this earth road is currently a source of pollution since it generates dust during the dry season, with effects on the health of the population and on food and home hygiene. Noise caused by the movement of heavy vehicles adversely affects the people's life and well-being. The impact of the no-project situation is summarized as follows: (i) isolation; (ii) high emission of dust due to the nature of the soil, especially during the dry season; (iii) several diversions, resulting in soil compacting and runoff: this limits vegetation regeneration; (iv) risk of accident due to the poor state of the road; (v) lack of comfort during travel; (vi) very lengthy travel time; and (vii) high transport and vehicle maintenance costs.

Site Preparation Phase

This phase is important for the installation of bases and mobilization of equipment. The initial physical effects on the environment and the human milieu occur during this phase, followed by those during the construction phase.

Construction Phase

- i) Disruption of activities: during the site preparation and project implementation phases, some of the activities exercised within the project area and its immediate surroundings will be disrupted.
- ii) Impeded traffic and access: works will impede the movement of vehicles and pedestrians; the risk of accidents will increase due to the movement of site equipment and vehicles. The same risk will concern diversion tracks that could become waterlogged or flooded during the rainy season.
- iii) Acoustics: the impact will be relatively high during works. Noise pollution from earth-working, transport, stripping and asphaltting equipment will constitute a temporary and localized nuisance to the surrounding communities, especially to services, dwellings, churches and health structures.
- iv) Deterioration of the living environment and health: the collection of household refuse around homes will be disrupted. The scattering of waste (excavated earth, ballast, rubble and waste from works) will be an additional nuisance to the population. Works will generate relatively high amounts of fine dust on the site and the surrounding areas. This dust could affect the neighbouring communities, with the attendant risk of causing respiratory diseases.
- v) Space occupation and soil compacting following the repeated passage of heavy equipment due to the installation and operation of site bases, land stripping following clearing of vegetation on the installation sites. The sites will be associated with the risk of soil pollution following possible leakage of oils, storage of road construction materials and abandonment of waste.

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- vi) Soil erosion: the operation of existing borrow areas could increase soil erosion. Failure to rehabilitate borrow areas is likely to lead to the stagnation of unclean water and the proliferation of vectors of diseases.
- vii) Pollution: coating installations are also associated with air pollution by dust and combustion-related emissions. Site bases could engender pollution through waste water or poor waste management.

Operations Phase

Biological environment: since works planned only concern the existing road which is already integrated into the natural environment, the project will not affect natural habitats, fauna and flora. The project will have no negative impact on natural parks, biosphere reserves or sensitive/protected areas. Furthermore, no further deterioration of the quality of the abiotic environment (air, water, soil) is expected during the operation of the road following rehabilitation and development. The project will affect no archaeological, cultural or religious site.

Human environment: the project's negative impact during the operational phase remains insignificant. Nonetheless, it will constitute some inconveniences for the surrounding population.

- i) Noise pollution: during the operational phase, the road's reference speed will be 80 km/h. Traffic on the road will increase constantly. The noise nuisance will be worsened by the combined action of more vehicles plying the road.
- ii) Population and social life: over the period of adapting to the operation of the new road, certain types of usage connected with pedestrian traffic will be affected. The neighbouring communities will be exposed to increased risk of traffic accidents related to fluidity, higher traffic and speeds on the road, especially in Tshikapa town – hence the need to conduct a campaign to raise awareness.
- iii) Economic activities and dwellings: access will be limited for a number of activities during the operation of the rehabilitated road. These particularly concern those activities that use the right-of-way as parking space for customers or suppliers. Provision will be made for parking areas, which should limit the impact of this constraint.

Project-related risks:

By their very nature, the works are likely to generate: (i) the risk of accidents during the transportation of materials and traffic diversion; (ii) the risk of polluting existing rivers following the accidental spillage of waste oils and fuels, or leakage from stored materials; (iii) fuel depots carry some risk of soil and water pollution following the accidental spillage of oils, fuels or lubricants, as well as the risk of fire; (iv) in wooded areas, the risk of fire outbreak exists; as such, there is need to put a control plan in place; (v) eventual conflict over water resource usage in regions with insufficient water resources, due to additional pressure on reserves meant to meet the needs of the population (however, the works will not affect any catchment area or aquifer); (vi) in areas with steep slopes (around Rivers Bondo and Lovua), there is need to prevent the risk of erosion around alignment rectifications (landslide, soil creep).

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b.2) Positive Impact

Construction Phase

i) Development of socio-economic activities: the installation of site workers in the area or in Tshikapa town will increase the demand for low/average cost and high-end accommodation, thus contributing to raising rental income. During the works phase, the population in the project area will increase, thanks to the presence of contract workers and persons moving in to exercise commercial activities. The authority of village chiefs, civil leaders and mayors will be consolidated during the works execution phase, through their involvement in commitments undertaken by various parties (promoters, contractors and the population). This will guarantee social cohesion.

ii) Creation of Temporary Jobs and Activities

The project is likely to create about 2 000 jobs, i.e. nearly 800 over the duration of construction. This type of project requires an average 35 to 40 jobs per kilometre. The surrounding communities constitute the potential workforce, especially for guarding services, traffic control, manual construction of earthworks or weeding. The recruitment of several national mid-level or senior management staff such as: (1) works supervisors (engineers), team leaders (senior technicians), topographers (senior technicians); (2) consultancy staff responsible for works supervision and control: works supervisors (engineers), topographers (senior technicians) and laboratory workers (senior technicians); (3) subcontracting staff: quarry and borrow site operators.

iii) Increase in consumption: the flow of temporary workers towards the works zone will spur consumption of several basic products such as fuel, foodstuff, etc. This situation will increase the income of business operators.

Operations Phase

The positive impact of the road on the physical environment will be linked to developments financed under the operation and the establishment of a maintenance system to sustain it: (i) the construction of new discharge and crossing works will contribute to sanitizing the water network; (ii) construction of outlets and storm water drainage canals, strengthening of shoulders and banks, rolling basins and slope stabilisation will reduce landslides and soil creep; (iii) permanent maintenance by the Roads Agency will strongly reduce the risk of degradation. The beneficial impact of the road on the biological environment will be linked to: (i) the access that it will provide, enabling government departments, associations and NGOs to extend their activities to the project area.

Project benefits to users and the communities will comprise: (i) improvement of the state of the road and sanitation around social facilities; (ii) acceleration of movement, making access to health and education infrastructure faster; (iii) improvement of agricultural produce marketing and supply of PIA village communities with manufactured goods, thus having a direct impact on enhancing living conditions; (iv) revaluing the prices offered to farmers following the reduction in transport cost, thanks to better maintenance of transport vehicles; (v) reduction of the risk of poor sales; as a direct impact, this will improve the income of farmers in the PIA; (vi) emergence of opportunities to invest and set up micro-businesses to process agro-pastoral products, and activities induced in terms of housing and catering: this will broaden the scope of socio-economic activities in the PIA; (vii) improvement of conditions for deploying administrative staff (teachers, medical workers) to districts

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concerned; this will help to enhance the quality of services offered to the communities with regard to education, healthcare and capacity building. Therefore, the project will serve as a lever for improving the living conditions of PIA communities and reducing poverty among poor households.

c). **Mitigation Programme**

c.1) *Mitigative Measures during the Works Phase*

Mitigative measures planned in the specifications are not specifically environmental in nature. During the works phase, these measures mostly concern the incorporation of good environmental principles in the specifications for contractors, and civil engineering measures. These relate to management of workers, installations and hygiene conditions at base camps, organization and management of hydrocarbon depots (control the risk of leakage, explosion or fire), origin of materials (quarries) and their transportation conditions, and organisation of depots necessary for works or generated by renewals, regulation of traffic, management of solid and liquid waste, restoration of sites and dismantling of temporary installations at the end of works, and planting of vegetation along rights-of-way. Therefore, the measures principally focus on works organization and equipment of base camps to mitigate the general nuisance caused by the works.

- (i) Site installation: site areas will be set up in enclosed spaces, access to which would have been facilitated. The site areas would have been used neither for farming nor religious purposes. Works contractors will ensure that they set up their base camp away from wells and water courses, to avoid any risk of resource pollution. No materials depot capable of releasing pollutants will be authorized beyond the security cordon. Access will be guarded to limit interaction between the sites and the external environment. Working hours will be set in a manner that limits disturbing the neighbouring population. The speed of equipment will be limited on the work sites.
- (ii) Traffic plan and diversion: a traffic plan for equipment will be prepared to enable the neighbouring communities to have as much mobility and access as possible. The plan should be adaptable to the projected phasing of works. The plan will be further enhanced with the erection of traffic signs and information boards. Works areas will be clearly marked.
- (iii) Installation of fuel and lubricant depots: hydrocarbon products will either be stored in reservoirs or surface drums kept in appropriately confined areas to avoid any leakage or breakage, and to reduce the risk of fire to the barest minimum. Cleaning equipment for all manners of leakage will be provided and adequately maintained.
- (iv) Confinement of inflammable and dangerous substances: the storage areas of inflammable products (bitumen, lubricants and other petrochemical derivatives) must have adequate emergency equipment in good working condition. Oxygen, propane and acetylene meant for welding operations will be stored in fenced areas set aside for the purpose, and protected from all possibility of accidental contact with vehicles. Waste oil will be collected in drums for recycling and taken offsite under conditions imposed by the GEEC with regard to the MDC.
- (v) Soils contaminated by fuels and lubricants: a special area will be reserved for processing any soils contaminated by petroleum products. Such soils will be excavated,

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placed in waterproof confinement vats and decontaminated with solvents. Treated soils will be evacuated to authorized dumps.

- (vi) Tree felling and live hedges: the felling of trees requires prior authorisation from the GEEC decentralized services. The wood cut must be recovered. In compensation, plantations and seeding operations will be conducted on the works right-of-way (after completion). Provision has been made to undertake compensation line and shade tree planting in villages crossed.
- (vii) Movement of earth: borrow sites (quarries) or sites set aside for excess dumping will be selected in a manner as not to generate an impact on the landscape or present dangers. The sites will be rehabilitated at the end of works.
- (viii) Dust emission: to reduce dust emission from circulating equipment and transport of materials, site managers will have water spread on tracks adjacent to inhabited areas. Provisional fill or removal depots may also require humidification. Liquid waste, the risks of water pollution, solid waste: the waste will be collected and discharged according to their composition, in waterproof septic tanks or mobile collection systems. Wash water and maintenance of equipment should be subject to oil-water separation treatment; the water will be discharged to septic tanks and waste oils and bitumen will be collected, recycled or destroyed. Any oil and petroleum products deposits will be carefully controlled to avoid runoff on the ground and into rivers. Solid waste from sites will be transported to authorized landfills to be selected and recycled, particularly wood, metals and organic materials (the latter into compost).
- (ix) Risks of erosion and assessment of soil stability: the contractors will monitor changes in soil stability. This will consist in identifying areas at their worksites that are prone to erosion during and after construction. Drainage systems will be provided and physical slope stabilization techniques adopted (booms, gabions, retaining walls, etc.).
- (x) c.2) Mitigative measures during the operation phase

During the operation phase, the measures will concern the safety of the neighbouring communities, the staff and users, maintenance of the rehabilitated road, and related structures (drainage ditches, embankments, etc.).

The matrix summarizing impact-related measures by major phase is presented in Annex 1.

d) Monitoring Programme and Additional Initiatives

di) The works environmental surveillance and monitoring programme will be included in the social and environmental reports prepared by the control mission. The monitoring of project outputs will be organized and chaired by the MITPR. The MITPR, through environmental units of the Infrastructure Unit and Highways Authority and assisted by the Control Mission (MDC), will conduct regular monitoring of outputs until acceptance of the works by establishing a unit that will be responsible for monitoring the impacts of business operations for the duration of works. It will comprise:

- (i) a representative of the Infrastructure Unit, in its capacity as Delegated Project Owner;
- (ii) (ii) a representative of the Highways Authority (representing the Ministry of Infrastructure, Public Works and Reconstruction in its capacity as Project Owner);

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- (iii) the environmentalist of the Control Mission (MDC) in its capacity as Delegated Project Owner;
- (iv) a representative of the MECNT (GEEC).

The environmental monitoring unit will be responsible for: (i) specifying areas to be protected in consultation with the villagers and helping the local population in mitigating the environmental nuisance of the construction phase, (ii) helping to select the appropriate location for the site camp, (iii) ensuring the effective implementation of all measures recommended for preventing and reducing the project's impacts on the natural and social environment. The monitoring is intended to ensure that the proposed mitigation and enhancement measures are effectively implemented during the RN1 reconstruction phase. The Environmentalist of the control mission, in collaboration with the GEEC, will be mainly responsible for impact monitoring: verification of results and assessment of their accuracy (performance indicators and targets of the ESMP Matrix) for the duration of the works.

d.2) In accordance with DRC's Environmental Code, the GEEC will be directly involved in project environmental monitoring. Its activities will be mainly based on its institutional prerogatives, namely the control of nuisance and risks of pollution (management of potential risks of pollution, as well as liquid and solid waste, including bituminous waste, etc.). The GEEC will manage erosion hazards and water conservation works, and the forestry aspects (felling of trees and planting of new trees) in association with the forestry department.

d.3) A Resettlement Action Plan to facilitate compensation for lost income, and persons and property affected by the project has been prepared. It should be noted that almost all the affected property consists of residential houses and stalls of basic materials, and is located on the Tshikapa crossing (Phase 2 of the project).

On the Loange bridge- Lovua bridge section, the population will not be displaced. Minimizing involuntary resettlement as much as possible through the exploration of viable alternatives in the project design has been achieved as regards the main route. Nevertheless, there could be cases for compensation during the works. For this, the Resettlement Action Plan for the entire project provides for the establishment of a Committee to conduct the compensation (CPAR). The committee is placed under the supervisory authority of the Infrastructure Unit (Delegated Project Owner) who chairs it, assisted by a judge who will provide secretarial services for the Committee. The committee will be associated with the local government representatives (decentralized services) and civil society (NGOs, associations, etc.). It will be supported by external service providers such as an environmentalist, land and real estate expertise, the Mayor, traditional chiefs, and forces of law and order. The compensation will be fully borne by the Congolese Government. Funding for the plan will come fully on the ADF. The plan will be audited at project completion by an external firm.

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e) Institutional Arrangements and Capacity Building Needs

In addition to the Project Owner and Project Manager, and in accordance with DRC's Environmental Code, the Ministry of Environment, Nature Conservation and Tourism (MECNT), through the current Congolese Environmental Assessment Group (GEEC), will be directly involved in the environmental monitoring of the project. Its activities will be mainly based on its institutional prerogatives, namely the control of nuisance and pollution risks (management of potential risks of pollution, as well as liquid and solid waste, including bituminous waste, etc.). The GEEC will manage the forestry aspects (felling of trees and planting of new trees) by issuing permits, as well as hazards erosion and water conservation works (CES). The other government and administrative institutions concerned with environmental issues are mainly the forestry department, the surveys department, the town planning departments, the drainage and sanitation department (OVD), and the rural roads services.

The Infrastructure Unit and the Highways Authority have experienced human resources. They are each composed of two environmental experts and two socio-economists. The assistance of environmental and social experts will be required in the Control Mission (MDC) responsible for supervising the works and ensuring their compliance with the general recommendations of the GEEC, the city and rural communities as stakeholders. They will conduct regular monitoring of outputs until the acceptance of works.

f) Public Consultations and Information Dissemination Requirements

The ESIA was conducted based on the public consultation principle and drew on field visits, basic documents, as well as discussions with centralized and decentralized technical services, regional heritage services, economic operators, socio-professional groups, the neighbouring population, and the administrative and traditional authorities. This approach helped to: (i) enrich the project, develop and refine alternatives by taking into account the concerns of all stakeholders, (ii) promote the involvement of the surrounding population in the project, and (iii) create a climate of trust and cooperation based on an objective approach.

During the construction phase, the public consultation process will draw on the ESMP. It will focus on three main objectives: (i) highlighting all the impacts identified and explaining in detail the measures recommended for mitigation or enhancement, (ii) involving the population fully in the project, and (iii) involving the local population in the maintenance of the road and community structures on a contract basis. A register for complaints will be provided in each of the towns crossed by RN1. This register will help those affected or disadvantaged by the project to make claims. Teams assigned for environmental monitoring will meet, from time to time, collect the complaints from the register and take them into account in the impact mitigation programme, or in the compensation programme.

The GEEC, local authorities and the population will be involved in organizing an information seminar before works start-up and during the launching workshop. This consultative framework will involve all the stakeholders in road works (the Mayor of Tshikapa, local mayors, traditional chiefs, the technicians of the various ministerial services and departments, etc.) such that: (i) the proposed measures are taken/supplemented in consultation with them; and (ii) they design programmes and activities within their competence. The implementation of road safety measures during the works depends heavily on the level of involvement of the people. This arrangement will likely lay the bases for subsequent maintenance works.

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Consequently, the consultation process will follow the action plan recommended by the ESMP, and will comprise three phases: (i) a preparatory stage prior to installation of the site during which close social communication will be used; (ii) a works implementation phase; and (iii) a works completion phase and participatory planning of the operational phase.

g) Cost Estimates

The measures specified in this ESMP will be incorporated in the terms of reference of bidding companies for implementation. They include terms concerning good practices, conservation and preservation of soils and water, and human perceptions (diversions, noise reduction, work schedules, irrigation, etc.). The cost of implementing the ESMP covers environmental protection measures (development of lamination basins, as well as laying of geojute and planting to combat erosion), related works and environmental and social monitoring. The amounts are listed below:

g.1) Cost of Mitigation Plan

Mitigative Measures	Responsibility for Implementation	Implementation Schedule	Cost in Euros
Environmental Action Plan	Company	Prior to works	3 500
Preparation of a PPSPS	Company	Prior to works	3 500
Anti-erosion mechanisms	Company	During works	200 000
Planting of vegetation	Company	During works	400 000
Sensitization campaign against STI/AIDS	Company/OVD/OR/ GEEC	Prior to and during works	4 000
Alignment planting and landscape development	Company/Lands Service/ GEEC	Works completion	1 000
Sensitization campaign Signs on the worksite/Highway Code			
Works schedule/Diversion and Traffic Plan	Company	During works	8 000
TOTAL			620 000

g.2) Cost of Surveillance Plan: Environmental surveillance will be entrusted to an Environmentalist in the works control mission. The cost of the monitoring plan will be **35 000 Euros**, comprising the remuneration of the expert and other related expenses. The cost will be included in the costs of the Control Mission.

g.3) Cost of Monitoring Plan: Project monitoring will be conducted by a monitoring committee comprising the local authorities and supported by the Environmental Unit of the Highways Authority. The committee members will be trained in environmental monitoring practices. The cost of the monitoring plan will be included in the training for committee members (EUR 4 500). The operating costs of the committee are estimated at EUR 4 000 during project implementation (site visits, meetings, and required analysis) or EUR 36 000. This represents a total cost of EUR 40 000 to the project (eight quarters), and is included in the operating costs.

g.4) The other costs of the Environmental and Social Management Plan (ESMP) are included in the cost of works; they concern the recovery and disposal of waste oils, the establishment of refuelling stations, the rehabilitation of quarries and material depots, the

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development of company oil change sites or specialized installations, the development of materials storage sites, the watering of work sites and deviations near homes, the recovery of excess material, the marking of work sites and diversions, the development and construction of parking area, road signs and reduction of the speed of construction machines, the equipment for worksite staff (helmets, safety shoes, gloves, etc.).

g.5) Total cost of the ESMP: The total cost of the Environmental Management Plan is summarized in the following table:

Plan	Cost Estimates in Euros	Budget
Impact Mitigation Plan	620 000	Company Budget
Works Supervision Plan	35 000	Control Mission Budget
Monitoring Plan	40 000	Control Mission Budget
GRAND TOTAL	695 000	

This cost accounts for **1.17%** of the cost of works exclusive of tax, which stands at **59 650 000** Euros.

h) Implementation Schedule and Reporting

Within the EMSP implementation framework, the Monitoring Unit attached to Roads Agency (Office des Routes, OdR) will: (i) prepare a weekly note on the project containing the most relevant information on site safety; (ii) prepare a monthly environmental and social monitoring report. As assessment of activities (preventive control, field visits, and training) will be presented in a monthly report. This report will be accompanied by all documents that illustrate and justify the environmental monitoring: plans, photographs, non-compliance records, and meeting reports; (iii) prepare a half-yearly summary environmental and social audit report on project works; and (iv) prepare a final environmental and social monitoring report. At the closure of the site, an overall summary project environmental monitoring report will be prepared. The Monitoring Unit will take stock of the field activities and assess the effectiveness of measures and methods used on the site to prevent temporary project impacts. The ESMP implementation schedule is summarized in the table below:

Recommended Mitigative Measures	Responsibility for Implementation	Implementation Schedule	Reports
Preparation: Site Installation and Vacating of Road Area			
<ul style="list-style-type: none"> - Organization of information sessions on the ESMP* - Selection of sectors without trees or relatively bare areas in research park or another site close to the worksite - Limitation of area occupied by each worksite camp - Authorization by competent services before any tree felling operation 	Company/OdR/ GEEC	Prior to the works	Appraisal
<ul style="list-style-type: none"> - Watering of dusty road 	Company	During the works	Monitoring
<ul style="list-style-type: none"> - Planting of alignment at crossings of big villages 	Company/ OdR/ GEEC	After the works	Monitoring
Road Construction			
<ul style="list-style-type: none"> - Preparation of PAE incl. pollutants and waste management plan - Collect used oils and take them to an authorized depot - Collect and take stripping and demolition waste to authorized dump as they are produced - Provide bins for waste in the site camp - Collect and take household refuse from the site to the authorized dump 	Company/OdR/ MDC	Prior to the works Prior to the works	Supervision

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<ul style="list-style-type: none"> - Good maintenance of construction machines - Sensitize the contractor on compliance with the current standard for noise on the worksite (75dB). - Dusting system for the dryer of the plant mix/chimney system - Watering of the service road and worksite as required <p>Limit truck loads and/or protect them with tarpaulin</p>	Contractor/OdR/ GEEC	<p>Prior to the works</p> <p>Installation of the Unit</p> <p>During the works</p>	Supervision
<ul style="list-style-type: none"> - Formulate and apply a PPSPS. - Provide worker's gear (boots, hard hats, masks) - Mark out site and provide pedestrian track - Formulate and implement HIV/AIDS sensitization programme - Protect loads - Signposting (signboards, reflective strips, etc.) - Have a first aid kit - Produce and post hygiene and security notice for the site - Draw up security guidelines relating to accidents 	Contractor	Before and during works	Monitoring and assessment
<ul style="list-style-type: none"> - Draw up diversion plan in conjunction with the actors on the ground. - Recruit traffic wardens - Sensitize truckers with regard to the traffic routes adopted. - Construct a site track and clearly delimit the works right-of-way 	Contractor	During works	Monitoring
<ul style="list-style-type: none"> - Monitor water source in terms of quantities pumped for use at the site 	OdR/ GEEC	During works	Supervision
<ul style="list-style-type: none"> - Design crossing channels (culverts, ducts, etc.) to guarantee regular flow of water - Avoid flooding the road infrastructure itself and other private areas 	OdR / GEEC / Consulting firm	Prior to works	Supervision
<ul style="list-style-type: none"> - Place the equipment for storage of liquids in catchpits. - Protect fuel handling areas against leakage and spillage and connect them to an oil separator. 	Contractor	During installation of site facilities	Supervision
<ul style="list-style-type: none"> - Construct the site facilities in accordance with established health standards - Regularly empty sanitary facilities - Convey waste to authorized sites - Change oil at nearby stations or, if necessary, collect it in appropriate containers to take to SRH 	Contractor	Installation of site facilities During work	Supervision
<ul style="list-style-type: none"> - HIV/ AIDS sensitization programme 	Contractor/ OdR/ GEEC	During works	Assessment
Operation/induced development			
<ul style="list-style-type: none"> - Installation of speed regulators 	Contractor / OdR	Following works	Monitoring and evaluation
<ul style="list-style-type: none"> - Line planting/ landscaping in appropriate places 	Contractor/ OdR/GEEC	Before end of works	Assessment

*Periodic report to be prepared (based on the site meeting) and covering, among other aspects:

- Summary of activities conducted;
- Extent of application of ESMP by contractor;
- Multiplication of meetings in the villages and/or areas as required (for example, concerning identification of areas for storage of tree trunks in conjunction with the locals; organization of HIV/AIDS sensitization programme; negotiating concession of borrow areas and quarries to private parties; rehabilitation following works, etc.);

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- Record of incidents and accidents.

A summary of the contents of complaint records will be produced at the end of project and the records handed over to the head of the environmental section of the Infrastructure Unit (project owner, party primarily responsible for road project).

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MATRIX of Environment and Social Management Plan

ANNEX 1

Potential Negative Impacts	Recommended Mitigative Measures	Residual Impacts	Parties Responsible for Implementation	Parties Responsible for Supervision	Implementation Schedule	Performance Indicator	Cost
Preparation							
Compensations	Permanent monitoring of the compensation procedure progress	Minor	CPAAR	CPAAR/MDC	Before the Works	Number of protests/complaints	Compensation paid before the start of works
Cutting/clearing of all vegetation within the delimitation of the site facilities	Choice of sparsely wooded areas or areas near the site. Limitation of area occupied by site Seek prior authorization from competent services for all tree felling activity	Minor	Contract / OdR/ GEEC / competent services	OdR/ GEEC Control Mission	Prior to works	Number of protests	
Air pollution (dust)	Dampening of dust sources	Minor	Contractor	Control Mission	During works	Number of protests	Included in the works budget
Vegetation clearing and tree cutting within the road right-of-way and diversions	Seek authorization of the competent services prior to any tree cutting within the right of way Street tree planting along road sections	Minor	Contractor /OdR/ GEEC	Control Mission /Forestry services OdR/ GEEC	On completion of works	Approval by forestry services	Included in the project budget
Construction							
Ground pollution, notably by bitumen products or drain oil residue Loss of agricultural value and degradation of landscape through heaping up of debris (waste material from earthworks, etc.)	Formulation of a plan for management of pollutants and refuse Collect drain oil and channel to authorized disposal sites	Minor	Contractor	OdR/ GEEC/ control mission	Prior to works	Approval by the GEEC	3 500 Euros/ contractor
	Collect debris from stripping and demolition and evacuate to authorized dump as it is produced Put in place waste bins to collect refuse at the site facilities. Collect and evacuate household waste from the site station to the authorized dump				During the works	MDC report	Included in the works budget
Sound and air pollution	Sensitize the contractor to enable it respect the existing standards relating to site noise (75dB) and ensure proper maintenance of machinery De-dusting system for the dryer of the coating system/ Chimney system	Minor	Contractor		During works On installation of the unit	Number of protests	

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	Watering of service track and site as necessary. Limitation of lorry loads and/or protection with tarpaulins			Control Mission	During the works		Included in works budgets		
Risk of accident and health incident resulting from air pollution	Formulation and application of PPSPS.	Minor	Contractor/ consulting firm	GEEC / Control Mission	Prior to works	Approval by the GEEC	3 500 Euros /contractor		
Risks affecting health and security	Workers' gear (boots, hard hats, masks)				During works	Number of protests	Included in the works budget		
Difficult access for the populations around inland sections	Marking out of site, construction of pedestrian track	Minor	Contractor/ Consulting firms	OdR/ GEEC / Control mission	During the works	MDC report	Included in works budget		
Propagation of STI-HIV/AIDS	Formulation and implementation of HIV/AIDS sensitization programme				Contractor	OdR/ GEEC	Prior to works	MDC report	Included in the works budget
	Protection of loads								
	Signposting for works (signs, reflective strips, etc.)								
	Provide first aid kit	Contractor	Environmental expert OdR/ GEEC	During installation of base	MDC report	Included in site installation budget			
	Prepare and post a health and security notice for the site								
	Draw up security guidelines relating to accidents								
Pollution of water by fuel, drain oil	Place the equipment for storage of liquids in catchpits.	Minor	Contractor	GEEC	Installation of the base camp	Level of application of technical and environmental clauses	Included in site installation budget		
Contamination of ground water by waste water (site base)	Protect fuel handling areas against leakage and spillage and connect them to an oil separator.				During works				
	Construct site base in accordance with health standards and requirements	Minor	Contractor/NGO	Control mission, OdR/ GEEC	During works	Level of application of environmental clauses	Included in the works budgets		
	Regularly empty sanitary conveniences and take waste to authorized sites				At end of works				
	Drain oil from nearby filling stations or as necessary collect in appropriate containers and take to authorized dump.								
Operation									
Noise pollution	Provide speed regulators	Minor	Contractor	Control Mission	Following works	Level of environmental clauses application	Included in the works budget		
Frequent traffic accidents	Speed limit signs								
	Vertical and horizontal signposting								

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Direct impact on vegetation and landscape	Trees lining roadside/landscaping	Minor	Contractor/lands department/GEEC	Control mission	Following works	Level of application by the forestry services	Included in works budget
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ENVIRONNEMENTAL CLAUSES

I. GENERAL INFORMATION

1.1. Purpose of document

This document presents the technical and environmental specifications of the project. It is part of the contract dossier.

The effective start of works is subject to approval of the ESIA report by the Ministry of Environment of the Democratic Republic Congo.

1.2. Presentation of works

The road construction works, the ancillary structures and supporting infrastructure globally comprise:

- *Installation of the site and accommodation facilities,*
- *Clearing, sweeping and cleaning of the area of the two bridges and the access roads and shoulders,*
- *Use of borrow pits and quarries,*
- *Supply, transportation and implementation in respect of a base and foundation layer,*
- *Preparation and laying of bituminous concrete,*
- *Operation of the concrete production plant,*
- *Implementation of drainage mechanism (diffusers, retention basins),*
- *Construction of buildings and related infrastructure,*
- *Implementation of mechanisms for protection and enhancement of the environment (rehabilitation of borrow areas, anti-erosion mechanisms, access to local dwellings, protection of slopes, etc.).*

The works also entail horizontal signposting, markers for curves and structures and others marking distances.

II. REQUIREMENTS FOR ALL SOURCES OF IMPACT

2.1. Provisions relating to sensitization of site staff on the project environment, risk of accident and dust transmission and of STIs and AIDS.

1. *The control mission and the selected works contractor are required, prior to works start up, to jointly carry out an awareness campaign to sensitize the population living around the road as well as the site staff on the environmental concerns raised by the road project and above all the risks of accidents and transmission of STIs and AIDS.*

2. *This campaign will continue throughout the works period.*

3. *All accidents affecting the wildlife caused by the contractor or its staff should be immediately notified to the nearest forestry agency: such acts could be considered as a deliberate infraction of laws relating to hunting (against poaching) and punished accordingly.*

SUMMARY OF THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

To minimize the risk of accidents and various nuisances suffered by the population, the following will be prohibited:

- *Night work in the villages of Mukishi, Lukaka, Bondo, Kikuba, Mavuagime, Katolo, Kayala and Koja Kombo;*
- *Circulation of heavy machinery (trucks, bulldozers, etc.) during the night in the centres and settlements around the project site;*
- *Utilization of toxic chemical products in the agglomerations.*

2.2. Provisions relating to hygiene and cleanliness at the site and office/accommodation facilities

1 – Provisions relating to hygiene and cleanliness at the sites and bases will be included in the contractor's regulations.

2 – The solid and liquid waste from the site facilities should be regularly collected and disposed of by methods agreed by the two parties.

2.3. Provisions relating to supply of food (meat, fish), wood and drinking water for workers

1 – In order to combat poaching, workers will be provided with meat (excluding game) and fish.

2 – In addition, to curb the abusive felling of trees for fuel, the site facilities will be provided with fuelwood and charcoal.

3 - Provision will be made for running water at the housing units and sites.

III. ENVIRONMENTAL MEASURES

Construction of access tracks to material deposits should take due account (at the starting as well as closing stages) of:

- *Sensitive areas,*
- *Particular landscapes,*
- *Speed limitations which are: 20 km/h at the sites and quarries; 35 km/h for temporary diversions,*
- *Other speed limits are 80 km/h in open areas and a maximum of 40 km/h in villages).*

3.1. Site installation

3.1.1. Installation of site facilities and engine parking areas

The contractor will propose to the engineer the area for its site installations and present a site installation plan. The contractor will seek authorization from the engineer to set up its site. The scale of installations will depend on the volume and nature of works required, the number of workers and number and type of engines. The site installation plan should take into account the following protection measures:

1. The areas to be selected for site camp and parking areas should be open areas with no vegetation (such as glades). At any rate, the accommodation should be set up away from plantations. The machinery will be lined up in the area already cleared for works.

2. For these purposes, flood-prone areas will be avoided as they tend to be marked by considerable biological diversity.

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3. *The site camp will be set up at distances of at least:*

- *30 m from the road,*
- *100 m from water bodies,*
- *100 m from existing dwellings*

The site should be chosen with the aim of limiting clearing or uprooting of bushes and shrubs, tree cutting. Useful or very large trees (diameter over 20 cm) will be preserved and protected.

The surfaces of access and circulation routes must be compacted and periodically dampened. Provision should be made for adequate water drainage over the entire site area, so as to avoid stagnant water in certain parts

4. *The site camp and parking areas will be far from the agglomerations, so as to avoid nuisances such as fuel odour, noise, etc.*

5. *The installations should include at least one point of distribution of condoms at subsidized price (see national VIH/AIDS programme) clearly displayed, for the use of its employees, as well as several posters for sensitization concerning AIDS transmission.*

6. *The office and quarters should have sanitary installations (latrines, septic tanks, cesspools, sinks and showers) depending on the number of employees lodged at the site. .*

7. *There should be a sufficient number of water reservoirs and the water quality should meet the needs. There should also be appropriate drainage so as to protect the installations.*

8. *Kitchen and refectory areas will be provided with a smooth laminated flooring, to be disinfected and cleaned daily. A drinking water tank must be installed with a volume corresponding to needs. These facilities should also include hand wash basins. The facilities should be protected through adequate drainage.*

3.1.2. Detours and Various Access Tracks

1. *The choice of detours, access tracks to borrow materials and water collection stations for works, must be carefully done to avoid biodiversity areas (protected forest, inundated areas, cemeteries, historical sites, cultural and religious sites).*

2. *The uncontrolled opening of tracks for the supply of materials (multiplication of tracks) should be avoided when one track can serve several purposes.*

3. *Trees along these alignments (right-of-way and tracks) should be marked beforehand. Subsequently, felling should be selective and only concern the marked stocks. The contractor should as far as possible avoid rare tree species identified in the ESIA. To this end a felling plan and the intended use of felled trees should be prepared by the Contractor and approved by the MDC and the Monitoring Committee. It should be developed in consultation with the local services in charge of water and forests*

4. *Connecting roads and detours concerned in this section should be watered frequently at least twice a day, to avoid dust formation.*

3.1.3. Clearing

1. *As concerns the clearing of the right-of-way of diversions and access tracks to materials, paragraph 3 of subsection 3.1.2 applies here as well.*

2. *Rare (and/or protected) tree species recognized by the monograph of plant species in the Democratic Republic of Congo should as much as possible be avoided.*

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3. *During clearing, the rights-of-way should be watered to prevent dust formation.*
4. *Stumps should be removed manually to avoid excessive soil disturbance and provide employment to residents around the work sites.*
5. *Destruction of survey markers and other structures put up by the surveys service.*

3.1.4. **Earthworks**

1. *Access tracks for earth moving equipment should be limited strictly to the shoulders, detours should as much as possible be used to avoid encroaching on additional land foreign to the defined right-of-way.*
2. *Earthworks should be watered as a matter of course. The areas should be watered as required by the control mission, mainly close to populated areas and where villages are crossed.*

3.1.5. **Concrete Works**

1. *The concrete plant should be set up in a place where the natural environment will be least disturbed and noise pollution will not affect the population.*
2. *Materials (quartz, crushed granite, gravel, sand) should be washed away from rivers to avoid pollution (collect the wash water in a sump).*
3. *Materials should be systematically watered to prevent airborne dust.*
4. *The production site must comply with hygiene measures, recognized by law in the DRC*

3.1.6. **Choice of Crush Disposal Areas**

1. *The choice should be areas bereft of all vegetation (especially glades).*
2. *To this end, inundation areas that typically harbour significant biodiversity (plant and wildlife) should be avoided. Soil deposits should be disposed in such a manner as to prevent the destruction of woody plant species. Rodent shelters and termite mounds should be carefully avoided.*
3. *No deposit should be created within areas with dense vegetation or customary significance, religious importance or recognized as being of public interest.*
4. *At the completion of works, the disposal areas should be rehabilitated. The crush thus piled up should be spread so that the soil recovers its initial profile; it should be buried preferably.*
5. *This soil could also be used in the restoration of borrow sites and farming (if the soil has a good profile).*

3.1.7. **Arrangements for the Opening of Borrow Pits**

The Contractor should request the regulatory authorizations as provided for by law (especially the Mining Code and Decree).

Before authorizing the opening of new borrow areas, borrow pits chosen for maintenance works should have been exhausted. In case of necessary opening of new borrow sites, the following environmental criteria should be fulfilled:

1. *Any extraction of materials should be subject to approval by the village head.*
2. *No borrow should be created within areas with dense vegetation or customary significance, religious importance or recognized as being of public interest.*
3. *Borrows situated in villages should be carefully restored.*
4. *New borrows should not be created near:*

SUMMARY OF THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

- Residential areas and public places (market, place of worship) and wherever excavations can be a danger to the population.
- Roads so as not to alter the landscape (less than 30m from the road)
- Ecological, tourist and cultural, environmental areas: wood, scenic areas, etc.
- Before any collection, topsoil should be carefully removed to a depth of 30 cm and reserved for eventual restoration of the site.
- Crush deposits could be used in the restoration of borrow sites.

5. Borrow areas may equally be developed (by preserving them in the form of small impoundments for watering livestock).

6 In this situation, regarding the stretch of road crossing towns, care should be taken to ensure that this option is accepted by the population concerned and that borrows are situated far away from settlements to minimize nuisances (odours, mosquitoes, water-borne diseases ...), road hedges to be put in place.

7 In mining areas, the opening and operation of borrows should be subject to the express or written authorization by the mines service and comply with relevant requirements.

The Contractor should submit a plan for the quarry or borrow pit showing the drainage and environmental protection arrangements. The Contractor should present a programme for operating the quarry based on the volume to be extracted. Depending on the exploitable depth, the contractor should determine the area needed to be cleared taking into account the space necessary for the deposit of plant matter, clearing material not suitable for work, as well as access roads and movement tracks.

3.1.8. Work on Dirt Roads**3.1.8.1 Manual maintenance of the wearing surface**

The Contractor should deposit materials to be used at regular intervals in areas that do not hinder the normal flow of water.

The Contractor should properly mark out work areas using signposts.

To ensure a secure traffic flow, the Contractor should deposit only the quantity that can be used on the same day. All deposits should be spread and compacted at the end of the day.

3.1.8.2 Re-profiling without the use of materials

The Contractor should:

- 1 Avoid the accumulation of side earthen collars on roadsides and ditches,
- 2 Restore the drainage system and access to surrounding residential areas,
- 3 Grade passes until disappearance of corrugation
- 4 Remove loosened stones and place them outside the road right-of-way in places that do not impede the normal flow of water,
- 5 Install signs on machines: flag, beacon,
- 6 Install adequate mobile signalling before the site,
- 7 Control traffic using flag carriers.

3.1.9 Purge Materials

Materials from the purges should be stockpiled in a place approved by the Engineer. The materials should be uniformly spread. In case of heavy deposits, the thickness should not exceed one metre. Deposits should not impair the normal flow

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of water and the site must receive drainage to avoid erosion of stockpiled material. Stockpiled materials should in no case be washed away by rainwater into streams. Plantings to stabilize the deposits may be prescribed.

3.1.10 Water Collection for Works

1. *The pumps designed for works water collection should be in good working condition to prevent diesel and oil leaks that can pollute the water meant for human and animal consumption.*
2. *These pumps should be positioned at a minimum distance of 30 m from the collection site and be placed on a platform (embankments) to contain oil spills (accidental or not) and all sources of water pollution should be curbed.*
3. *All spills or discharges of sewage, sludge, hydrocarbons and pollutants of all kinds in the surface water, wells, boreholes and on the ground should be strictly prohibited.*

3.1.11 Construction of Access for the Riparian Population

- 1 *Access to homes should be restored using appropriate structures (culverts, gutters).*

3.1.12 Clearing of Work Site and Equipment Removal

1. *The floor of the base camp and car parks should be restored after cleaning up solid waste (used filters, used tires, rubble, household waste ...) and liquids.*
2. *The soil should be free of all oil stains.*
3. *The barracks should be carefully dismantled unless there is a specific request by the administrative authority or the village head to keep them for future use.*

IV. MISCELLANEOUS ARRANGEMENTS

4.1. Interference with Movement

1. *The Contractor should at all times maintain traffic flow and access for the neighbouring population to their homes, farms and places of economic activity during works.*

4.2. Deposits of Fuel, Lubricants and Oil

1. *Deposits of fuel, lubricants and oil as well as facilities for the maintenance of the Contractor's equipment must comply with the requirements for these types of facilities. These facilities should be located over 500 m away from watercourses; where appropriate, precautions should be taken to waterproof the site and to contain the facilities in a cabin to prevent the flow of products to surface water and infiltration into groundwater.*
2. *Areas for machine maintenance and washing should be concreted and provision made for a sump to collect oil and grease. Waste water from these maintenance areas should be channelled to the sump and into the platform to prevent the flow of pollutants into unsurfaced soil.*
3. *Oil filters and batteries should be stored in airtight containers and directed to a recycling centre.*

4.3. Safety Instructions

1. *Safety arrangements should be made for the local population on the sites: sites should be marked and indicated by signposts in quarries and access strictly forbidden to visitors.*
2. *In urban areas, barriers should be erected to prevent the public and unauthorized persons from entering work sites.*
3. *Worker safety arrangements should be made: wearing of dust masks, gloves and safety footwear, etc.*
4. *Speed limit measures in urban areas should be taken.*

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5. *Base camps and equipment parking lots should effectively be lit at night.*

4.4. Instructions Relating to Noise

The Contractor working in residential areas should, whenever possible, avoid noise during resting hours, especially at night. To this end, the Contractor should comply with the above instructions relating to equipment settings, etc.

4.5. Improvement of Environmental Context

1. *To preserve the environment and implement a sustainable project, contractors should take all appropriate measures in agreement with the Contracting Authority, the MDC and the Monitoring Committee to improve the environment.*

2. *In developing the implementation programme and during the works, the Contractor should take into account the following environmental issues, in particular:*

Environment	Place or situation	Issues
Residential areas	<i>On the entire route, quarries and access roads</i>	- <i>Protection against dust and noise</i>
Farming and grazing areas	<i>Entire site</i>	- <i>Protection against dust and noise</i>
Woodlands		- <i>Incineration of deforestation products</i> - <i>Non-deforestation beyond the limits indicated by the Contracting Authority</i>
Groundwater and surface water protection areas		- <i>Prohibition of any discharge of pollutants</i> - <i>Storage of pollutants in proofed areas.</i>
Hydrology Relief Geology Climatology	<i>Entire site</i>	- <i>Ease of movement and practicability of access tracks and paths.</i> - <i>Earthworks, drainage, pumping, stabilization, and retaining walls</i> - <i>Concreting period.</i>
Various networks	<i>Entire site</i>	- <i>No traffic allowed on the networks without special protection or authorization of the service managing the said networks.</i>
Streams and bypass streams	<i>Entire site</i>	- <i>All direct outpourings of toxic substances are prohibited into streams</i>
Industrial landfill		- <i>Extraction and stockpiling in accordance with the legislation in force</i> - <i>Protection against odours, run-off and any other pollution</i>
Blasting	<i>Areas of rock cuttings or hardened sediments</i>	- <i>Prior characterization</i> - <i>Prohibition of blasting near structures completed or under construction, homes or buildings.</i> - <i>Prohibition of blasting in residential areas or buildings.</i> - <i>Protection against discharges and dust</i> - <i>Blasting restrictions near roadways, networks, etc.</i>

3 - *At the end of works, a plan should be prepared with all the indications of environmental improvements carried out*