REGIONÁLNÍ CENTRUM EIA

INTEGRA GROUP

REVIEW AND AUTHORIZATION of the Environmental and Social Impact Assessment Document of the Saint-Louis Airport Rehabilitation Project

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I. INTRODUCTION

With a privileged geographical position, Senegal aspires to become a reference platform in the field of air transportation. To this end, the State has initiated the regional air hub project, which involves the rehabilitation of five airports (Saint Louis, Matam, Ziguinchor, Tambacounda and Kédougou).

Current state of the St. Louis Airport no longer meets today´s requirements, particularly from the point of air traffic safety, environmental requirements, capacity and technical parameters.

The colonial-age airport was first used in 1927. Since then, no changes have been made. Only the construction of the terminal building began in 2006 and was interrupted in 2010. The rehabilitation of the airport will bring it up to international standards and will contribute to the revitalization of air traffic in this area, an appropriate market for the development of tourism.

It is expected the upgrading of the airport will boost the region's economy by offering attractive infrastructure, niches of opportunity for foreign capital. In addition, the airport will be able to meet the comfort and safety requirements in order to meet the transportation needs of foreign trade. In addition to creating jobs, this rehabilitated airport will have to perform several functions, including:

- meeting disaster relief needs;
- meeting the needs of postal services;
- being useful for national defence;
- contributing to national development by creating the necessary conditions for the development of a healthy and viable air transportation sector.

With the discovery of oil and gas off Saint-Louis, the renovation of the airport makes sense to facilitate international trade.

This project is structured into three major parts: the commissioning of Blaise Diagne International Airport (effective since December 2017), the launch of the national fleet's activities under the supervision of Air Sénégal SA and the rehabilitation of five above mentioned airports.

The rehabilitation of these five airports, with an estimated cost of 176 million dollars has the following objectives: bringing airports up to standard, increasing air transportation density and opening up inland regions.

The Saint-Louis airport is located in the Commune of Saint-Louis, Rao district, Saint-Louis department, Saint-Louis region. It receives very few passengers and is mainly used by military aircraft, private jets and presidential convoys. The analysis of aircraft and passenger movement statistics from 2006 to 2016 showed that these movements went from 824 to 577 for aircraft and from 14,835 to 2,329 for passengers.

The subject of the authorization is “Environmental and Social Impact Assessment (ESIA) Document of the Saint Louis Airport Rehabilitation Project”. ESIA provides decision-makers with appropriate information basis for managing the project's consequences on the biophysical, social and cultural environment and on the health of populations and workers.

The purpose of this report is to present the results of the Environmental and Social Impact Assessment (ESIA) of the Saint-Louis airport rehabilitation project.

This ESIA identified and analysed the potential positive and negative impacts inherent to the implementation of the various activities on the biophysical and socio-economic environment in the project area, in accordance with the legal and regulatory provisions in force in Senegal relating to the environment. Thus, an Environmental and Social Management Plan (ESMP) has been drawn up, which indicates, among other things, the measures to eliminate and/or mitigate negative impacts and the methods for implementing environmental and social management. This ESMP is accompanied by an environmental monitoring and surveillance plan with costs, indicators, actors involved, etc.

The renovation works carried out at the airport will have an environmental impact and risk of accidents. Considering the fact, it is rehabilitation project of existing airport, it is supposed the impacts on environmental components (e.g. air, water, soil, etc.) will be acceptable. It is likely that in number of impacts, current state will be improved.

Considering that rehabilitation and operation of the airport will be associated with the potentially significant environmental and social impacts, project is classified as the B category project. Accordingly, an ESIA had to be worked out, in order to minimize the negative impact of the project on the significant region's natural and social environment.

The purpose of the authorization is to assess the accordance of the project with the Recommendation of the Council on Common Approaches for Officially Supported Export Credits and Environmental and Social Diligence (the "Common Approaches"), determining the evaluation procedure for the impact of export on the environment.

The results of the ESIA Document are also checked against the EHS Guidelines Environmental ("Health, and Safety General Guidelines") and the IFC Performance Standards ("Performance Standards of the International Financial Corporation").

If any discrepancies are found, the authorization should suggest a procedure for the necessary completion of the assessment, whose positive conclusion is a prerequisite for the conclusion of an insurance contract for the export being assessed.

The assessment has been elaborated in compliance with the regulations of the World Bank and the environment protection regulations applicable in the Senegal.

II. BASIC CHARACTERISTICS OF THE PROJECT

The planned activities will be divided into two main phases, which are the civil engineering activities related to the construction of pavements and buildings and the airport equipment consisting of the development and installation of equipment to provide the service. At the end of the planned works, the airport's right-of-way will be 130 ha.

As part of the rehabilitation of Saint-Louis airport, various activities are planned. The renovation work at the airport will have an impact on the biophysical and human environment.

Regarding pavements, the project includes the extension of the existing runway by 600 m and its widening to 45 m, the widening of the old taxiway to 23 m, and the rehabilitation of the tarmac (parking area).

In the long term, the following will be implemented:

a 2.500 m x 45 m track;

a 150 m x 100 m tarmac;

a 190 m x 23 m taxiway.

For security reasons, the airport right-of-way will be fenced off. The fence wall of the 6.530 m long will be 2,50 m high with reinforced concrete components and above it, stainless concertina lines.

Two terminals with a surface area of 1.950 m^2 each will also be built. A modular hangar with a surface area of 400 m^2 and a height of 4 m will also be built, as well as a hall for parking service vehicles and airport equipment.

The fire hangar consisting of the parking hall for fire fighting vehicles and equipment will be built on an area of 400 m^2 with a height of 5 m.

New control tower consists of the watchtower complex and its support, which is a structure on top of which the watchtower is placed. After reconstruction, it will have a total height of 21 m.

All this construction activities will also generate noise, dust and construction site waste that will have to be sorted, recycled if necessary or taken to the municipal landfills.

As an important part of **airport facilities**, the lighting of the airport runway, will be completed. TRANSCON will provide these lights with all the necessary equipment for their installation. The equipment and accessories required for lighting throughout the airport will be centralized in the power block, power plant and tarmac lighting system.

The project plans to maintain the airport's existing fuel depot. Two 50.000-litre tanks are about 15 m from the first buildings. The prohibition of telephoning and smoking are safety rules established in the storage area.

The depot is managed by SMCADY, which is responsible for the distribution of aviation fuels at all airports in Senegal.

To fight fires, the depot has 12 ABC type extinguishers and two BC type extinguishers. The depot is inspected annually by the JIG (Joint Inspection Group) and the tanks cleaned every 3 years.

The navigation aid system that allows an aircraft pilot to determine its position and displacement relative to a ground station will be delivered and installed by TRANSCON. The system must be installed in a location that is free of obstacles within a 400 m radius.

In terms of fire warning and extinguishing, the project provides for the installation of light and sound alarms and smoke detectors in places where their installation is necessary. TRANSCON will equip the airport with three fire extinguishing vehicles, a 9,000-litre water tank and an 8,000-litre foaming agent reserve. The fire hangar managed by the ASECNA Fire Brigade on site will be equipped with the necessary fire-fighting equipment.

Evaluation

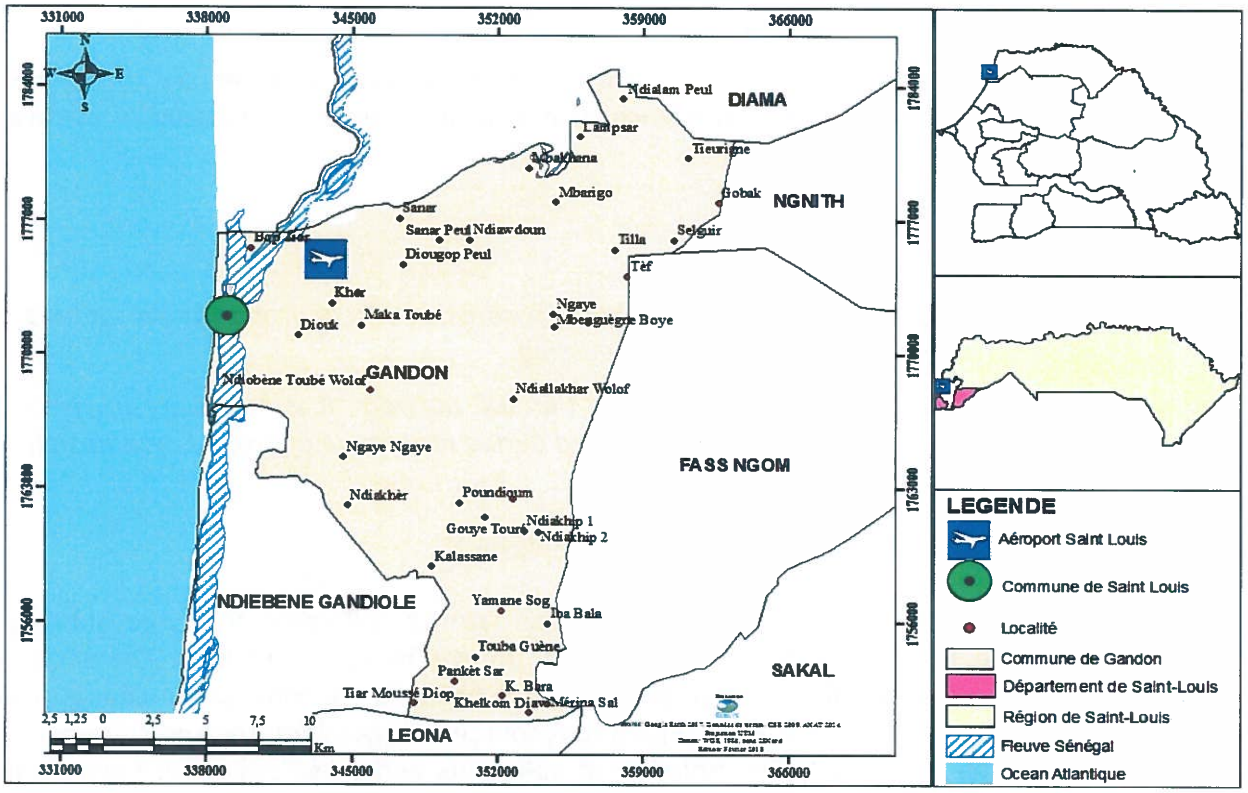
ESIA Document appropriately describes the main parts and activities of the project. The description gives basic information and is divided in a number of sub-chapters. As for the potential environmental impacts, noise pollution, risks of water pollution and collision with animals (birds) were correctly identified as the most significant.

III. INFORMATION ON INPUTS IN TERMS OF THE ENVIRONMENT

This part of authorization evaluates the completeness and correctness of the information in Chapter III. and V. of the ESIA Document.

III.1. SITE LOCATION

The airport site is located in the Commune of Saint-Louis, Rao District, Department and Region of Saint-Louis. The region is located in the north of Senegal and covers 19,034 km².



Located northeast of the Commune of Saint-Louis, Saint-Louis airport is limited:

- to the north by the Senegal River;
- to the south by houses and the N2 national road;
- to the east by houses, market gardens and the Bango/Khor road;
- to the west by a natural vegetation composed mainly of mangroves and the Senegal River.

Evaluation

The ESIA Document contains basic information on the site. Due to really small distance of residential zone is necessary to elaborate air and noise emission models in the next phase of project preparation.

Description of site location is supplemented with a number of maps and pictures.

III.2. WATER

Water requirements during the construction phase are not yet estimated at this planning stage of the rehabilitation works. However, it is likely that water supply will be provided through the SDE network serving the current airport.

In addition, there are other sources of supply near the site, namely the Bango water reserve located in the lower estuary of the Senegal River, less than ten kilometres from the northeast exit of the city of Saint-Louis.

The water supply system for the future airport will always be provided by the SDE network. Water requirements in the operating phase are linked to several uses, which are:

- water for domestic use (drinking and sanitary);
- water for cleaning and maintenance activities;
- water for the fire-fighting system.

The installation of a large capacity reserve sized according to needs is necessary to ensure its autonomy in water and avoid any inconvenience related to a possible interruption of the water supply.

Evaluation

The sources of water supply and consumption, both in construction and operational phases are identified. However, the volume of consumption is missing.

It is supposed that the water will be supplied from the SDE network. It is necessary to verify the capacity, eventually to extent it. It should be completed during next stage of project preparation.

III.3. RAW MATERIALS, NATURAL RESOURCES, ENERGY

Construction materials such as sand, gravel, basalt and laterite will come from the authorized quarries closest to the site. They will be transported to the site by road via trucks. The necessary quantities cannot be estimated at this stage of the project because the company in charge of the work is not yet selected. Nevertheless, with regard to resource management, the shuttle service for trucks and construction machinery, the emission of pollutants and noise pollution, management measures will have to be taken.

The power supply source will be the SENELEC network which provides the electricity supply for the current airport. A power plant will be installed for emergency power supply and night lighting of the aircraft parking area or tarmac. The system includes a 140 kVA diesel generator set and a 1X400 KVA substation and current regulators.

Evaluation

It is obvious that the project demands appropriate volumes of materials, which will have been transported and moved to the construction site.

We recommend to elaborate more precise information about sources and particularly the amounts of the aircraft fuel, raw materials and natural resources which are to be necessary for the construction and operation of the project. This type of information is necessary input for noise and air emission studies. Missing information should be completed during next stage of project preparation.

III.4. TRANSPORT

In ESIA is nearly no information regarding land transport relevant to construction and or operation of airport.

Evaluation

It is most likely that number and intensity of road traffic in the area of rehabilitated airport will increase. We recommend to complete information on number of trucks, kilometres and air emissions after rehabilitation and compare it with situation before construction. It is necessary to propose and keep appropriate mitigation measures.

IV. INFORMATION ON OUTPUTS INTO THE ENVIRONMENT

This part of authorization evaluates the completeness and correctness of the information given in the chapter III.

IV.1. LIQUID WASTE MANAGEMENT

Liquid waste in the construction phase is mainly water from sanitary facilities, machine washing water, cloudy water containing cement or oil. In case of rain, by leaching process, runoff water can be loaded with suspended solids.

Waters mixed with cement, mortar and fresh concrete will become alkaline (pH above 9). In addition, these waters may be mixed with hydrocarbons (from construction machinery and equipment) or contain dissolved substances and toxic metals.

During the operating phase, wastewater can come from a variety of sources:

- sanitary facilities;
- the emptying of aircraft toilets;
- technical workshops.

The ONAS (national concessionaire) sewerage network does not cover the airport area. However, there are still possibilities to connect to it while respecting the limit values at the connection point. In all cases, TRANSCON must propose an autonomous management system for the liquid discharges that is adapted and sized according to the nature and quantity of the liquid effluents to be treated.

For surface water drainage, it is recommended to design a separate sewer system to discharge runoff water from the airport platform taking into account the constraints imposed by the outlets and the drainage constraints. The maintenance of this network must also be ensured in order to guarantee its hydraulic and purification performance for a long time.

IV.2. SOLID WASTE MANAGEMENT

Good waste management practices, namely the principle of collection, sorting, recycling and disposal by appropriate and appropriate means, will be applied.

The ESIA recommends so that demolition should be carried out according to the deconstruction principle, which makes it possible to separate the different categories of materials, remove hazardous waste and recover certain elements. According to this approach, the buildings to be demolished are not considered as future waste but as resources of materials to be recovered. The ultimate objective is to reduce the quantities of waste produced at source and to promote its recovery and recycling in order to limit landfilling.

The deconstruction is thus organized in three phases: decontamination, dismantling of the materials used in the finishing work (non-hazardous waste) and finally the removal of the inert waste.

From this perspective, two main types of waste are identified during the construction phase. These are waste from the demolition of existing buildings and pavement and construction waste (structural and finishing waste).

The waste thus produced can be classified into three categories:

- **mineral or inert waste**: concrete, bricks, tiles, rubble, glass, excavation materials (topsoil);
- **non-hazardous waste**: plastics, PVC, scrap metal, natural wood, paper, cardboard, various packaging, pallets, etc.;
- **hazardous waste**: soil polluted by hydrocarbons, tar and associated products, waste electrical and electronic equipment, household appliances, computer equipment, light bulbs, neon lights, waste hydrocarbons and oils, paints, varnishes, solvents, batteries, batteries.

For each type of waste, the possible recovery methods are reuse, material recovery or energy recovery. In the absence of possible recovery, the waste is considered to be final and must be landfilled or incinerated in a cement plant.

The table below is a summary of the various types of waste produced and their proposed recovery method.

Table 1: Construction site waste and method of recovery

Type of waste	Valuation method
Excavation materials and excavated material	Reuse on site
Pavement demolition materials	Recycling possible in hot or cold bound form, reuse on site
Concrete, tiles, rubble, cement	Recycling in bound form with hydraulic binder, recycling in unbound form, on-site reuse
Glass	Recycling possible with a specialized transportation
Packaging, pallets	Reuse, recycling, energy recovery
Natural wood, wood residues	Composting, energy recovery
Plastics, PVC	Recycling with a specialized buyer
Paints, varnishes, solvents	Incineration in cement works
Bulbs, neon lights, batteries	Recycling possible with a specialized transferee
Waste hydrocarbons, waste oils	Incineration in cement works
Scrap metal	Recycling with specialized structures
Electrical appliances, household appliances, electronics	Reuse where possible or disassembly into spare parts to be recycled

During the **operational phase**, the airport activity includes several entities on the same site. Each company produces a different type of waste. The waste produced according to the nature of the activities of the airport entities is summarized in the table below.

Table 2: The different types of waste produced during the operational phase

Types of activities	Types of waste
Industrial activities (maintenance, workshops)	- packaging waste (including a significant proportion of soiled packaging), - more special waste such as oils, solvents, - electrical waste (cables, different types of lighting, etc.), - toxic waste in dispersed quantities (DTQD).
Customer Services	- waste similar to that of industrial activities (vehicle rental companies), - food waste, - paper (newspapers...), - unbleached packaging waste (cardboard boxes, glass bottles, cans, etc.) for restaurants and shops,
Administration	- paper waste,
Ground assistance	- food waste, oils and packaging,
Works	- inert waste, - non-hazardous industrial waste (HIW), - packaging waste, - special industrial waste.

The airport managers must provide all companies on the platform with an area dedicated to the sorting of non-hazardous and hazardous waste.

A management system will be implemented that takes into account:

- compliance with regulations;
- waste reduction at source and;
- material recovery (recycling, reuse) and energy recovery (incineration with energy recovery).

This regulatory-based system formally prohibits burning waste, abandoning it or discharging it into wastewater systems. It will not allow the mixing of waste (e. g. hazardous and non-hazardous) or the landfilling of recoverable waste.

Evaluation

The Waste Water and Waste Management chapter (III.9. of ESIA) contains an appropriate description of the expected types of waste and their disposal methods during construction phase. However, the expected amount of the waste is not determined and should be completed.

It is recommended to propose an autonomous management system for liquid discharges.

The suggested mitigation measures and procedures of re-use, treatment and/or disposal comply with environmental protection laws and can be evaluated as sufficient. Hazardous Waste Management, including monitoring should be implemented.

Waste Management Plan for the operational phase should be elaborated and completed during next phase of project preparation.

IV.3. AIR EMISSIONS

Aircraft and their daily activities

The combustion of fuel in an aircraft engine releases carbon dioxide (CO_2), water vapor (H_2O), nitrogen oxides (NO_x), carbon monoxide (CO), unburnt hydrocarbons (HC), sulphur oxides (SO_x) and soot particles. Studies have shown that air traffic contributes also to the formation of ozone (O_3), which is not produced directly by aircraft operation but is a secondary pollutant.

The amount of emissions during taxiing, take-off, climbing, descending and landing activities of the aircrafts on the runway are a function of the density of air traffic. Number of landing/taking-off should be completed.

Other sources of air pollution have been identified in the airport area:

- fuel storage, aircraft refueling and fuel distribution station;
- the renovation of buildings;
- of the power plant running on a diesel-powered generator set;
- road traffic in and around the airport with private vehicles, taxis, buses and coaches, light commercial vehicles, heavy goods vehicles used for freight.

Table 3: Pollutants emitted in the airport area and their sources

Sources		Main pollutants emitted
Air traffic	Aircraft movement Engine tests Operation of auxiliary power units	Nitrogen oxides (NO_x); Carbon monoxide (CO); Unburned hydrocarbons (HC); Sulphur dioxides (SO_2); Smoke
Land traffic	Service vehicles Employee transportation Passenger transport	Nitrogen oxides (NO_x); Carbon monoxide (CO); Unburned hydrocarbons (HC); Sulphur dioxides (SO_2); Smoke; Lead (Pb), depending on fuel
Energy	Oil-fired power plant	Nitrogen oxides (NO_x); Unburned hydrocarbons (HC); Carbon monoxide (CO); Sulphur dioxides (SO_2); Smoke
Procurement	Provisioning Fuel storage (evaporation)	Volatile Organic Compounds (VOCs)
Maintenance	Painting; Other operations	Volatile organic compounds (VOCs)

In ESIA is recommended that the airport manager submit an air quality management system by first identifying the sources of emissions and assessing the airport's contribution to air pollution in the area. In addition, mitigation measures to reduce its polluting emissions and ensure compliance with the requirements of the standards in force have to be proposed.

Evaluation

It is supposed total amount of emissions relevant with Airport construction and operation is not significant. Nevertheless, any quantification should be elaborated and assessed during next stage of project preparation.

IV.4. NOISE POLLUTION

Noise generated by the operation of aircraft is the main source of discomfort felt by staff and people living near the airport.

It is generated by three main sources:

- aerodynamic noise caused by air friction on the aircraft. This type of noise is observed during the approach and landing phases, which cause turbulent air flows in addition to the noise caused by the landing gear and speed brakes, producing a loud humming sound;
- noise generated by turbojet engines that produce a roar during take-off when operating at full power;
- rotating parts that also generate noise. The higher the speed of rotation of the propellers, the higher the sound emitted becomes and therefore annoying.

ESIA states that noise control is a major issue to be taken into account in airport management by developing an action plan to reduce aircraft noise pollution. In addition, the study recommends the development of a Noise Exposure Plan (NEP) to protect people from excessive noise pollution.

It is underlined that noise emissions can only be effectively reduced with the co-operation of aircraft manufacturers, and airlines, who should regularly renew their fleets and raise awareness and train their pilots in techniques to reduce noise emissions. The airlines should reduce night flights as much as possible.

Construction works should preferably be carried out during daytime. Noise in the construction area will be temporary and periodic.

Evaluation

It is supposed the standard construction machines and vehicles will be used for the construction of the airport, mainly during daytime. Noise in the construction period will be temporary, few months as a maximum (should be specify).

Aircrafts that are considered to serve the Airport and their acoustic performance have to be specified during next step of project preparation.

Due to very short distance of residential areas from the Airport area (only 10^{th} of meters), it is requested, to propose and implement effective mitigation measures with the goal to keep noise limits.

As a part of project documentation, we recommend to elaborate Noise study both for construction and operation phase.

V. INFORMATION ON THE CURRENT CONDITION OF THE ENVIRONMENT IN THE AREA OF THE PROJECT

The information evaluated in this part corresponds to the chapter "V. Description of the environmental and social conditions in the project area".

The airport site is located in the Commune of Saint-Louis, Rao District, Department and Region of Saint-Louis. The region is located in the north of Senegal and covers 19,034 km². It has three departments: Saint-Louis, Dagana and Podor.

The Saint-Louis Region is limited:

- to the north by the Senegal River and the Republic of Mauritania;
- to the west by the Atlantic Ocean;
- to the east by the Matam Region;
- to the south by the Louga and Matam Regions.

Located in the southwestern part of the Saint-Louis Region, the Commune of Saint-Louis has an estimated population of 239,075 in 2018.

Saint-Louis airport is accessible by the N2 national road, Dakar-Thiès-Louga-Saint-Louis.

The area of influence corresponds to the space on which the potential impacts (dust, noise, releases into the natural environment, etc.) of a project can be perceived.

It depends on the nature of the project and the natural (habitats of fauna, flora, etc.) and human environments surrounding it on which the project is likely to have an influence. Area of direct influence and extended area of influence were evaluated within ESIA.

In the airport's direct area of influence were identified: a cemetery on the northern edge of the runway, a non-functional hydrant, an aircraft wreckage and local garbage piles.

Throughout the airport, rainwater is evacuated:

- on areas not built by natural networks;
- on built surfaces via a functional drainage network.

The components of the current airport are:

- a collapsed fence wall that encourages animals to wander inside the airport;
- an abandoned hangar;
- a terminal building under construction since 2006;
- a VIP lounge that also serves as an airport terminal;
- a technical building housing the control tower, the technical block, the secretariat;
- a meteorological park and the meteorological station;
- a 1.9 km long track, with two Stop Extensions (PA) of 100 m each and 30 m wide;
- a Jet A1 fuel storage area with two 50,000-litre tanks and a service station;

- a fire station equipped with an extinguishing vehicle with an 8,000-litre water tank and a 20,000-litre underground storage tank;
- a power plant;

Description of the environmental conditions (on 26 pages) contains following:

- Geographical location and accessibility of the site;
- Location and land use of areas of influence
- Physical environment – Geology, Relief, Water resources, Morpho-pedological characteristics of the area
- Climate
- Biological environment – Flora, Protected areas, Protected species, Wildlife and avifauna

Evaluation

The chapter contains all necessary information for the evaluation of current environment and possibility to rehabilitate and operate proposed airport.

As more important environmental parameters of the area, the surface water and corresponding flora have been identified. Due to the proximity of the airport to these surface waters, the airport area could be evaluated as an environmentally sensitive.

It is supposed the impacts on other environmental components will be less significant.

VI. EVALUATION OF ENVIRONMENTAL IMPACTS

The information evaluated in this chapter corresponds to chapter VIII. of ESIA Document – "Environmental and Social Impact Analysis".

This chapter presents the assessment of the positive and negative impacts that the Saint-Louis airport rehabilitation project will have on the human, biophysical and socio-economic environment.

The various points covered in this section are the identification of direct, indirect, temporary and permanent impacts of the project on the environment as well as the identification of socio-economic impacts, and mitigation or enhancement measures depending on the nature of the impact.

The environmental management and monitoring plan to minimize residual impacts and ensure effective monitoring of the components likely to be affected is presented in Chapter X of ESIA.

VI.1. IMPACTS ON THE BIOPHYSICAL ENVIRONMENT

During the rehabilitation/construction phase the activities likely to have an impact on the physical environment of the area are the activities of a construction site, such as the installation of equipment, civil engineering works (earthworks, levelling, backfilling), construction works, waste generation, etc. These activities are likely to lead to:

- secondary dust emissions from the transport and storage of building materials;

- exhaust emissions from the operation of construction machinery and vehicles;
- risks of contamination of the soil, subsoil and water resources through discharges, accidental oil spills or the use of hazardous chemicals, but also through poor waste management;
- soil degradation following civil engineering work and site installation;
- the modification of the surface and groundwater flow regime due to civil engineering works (levelling, earthworks, backfilling, etc.).

VI.1.1. Air quality and climate impacts

Air quality will be affected by emissions of pollutants and especially dust from demolition and reconstruction activities, vehicles and construction machinery.

If the loads of materials (sand, gravel, etc.) are not covered, trucks risk losing part of the materials throughout their journey. In addition, the airport is located close to the homes in the Bango, Ngallele and Khar Yalla districts, where the first homes are located within the airport wall.

In Saint-Louis, the main dust emissions occur during the dry season between November and June. These would be greatly increased if the work were to take place during this period. Exhaust emissions will come from the operation and use of machinery, vehicles, site generators, concrete plants, etc. This equipment burns diesel oil and emits CO, CO_2, SO_x, NO_x, etc.

In the operational phase, air quality deterioration and air pollution will be mainly due to airside emissions and exhaust pipe emissions from the different types of vehicles circulating on the site. These emissions will mainly come from aircraft (take-off, landing), fuel combustion, support vehicles, fuel storage, aircraft refueling, fuel distribution station, power plant powered by diesel generators and increased road traffic in and around the airport.

In the troposphere, nitrogen peroxide decomposes in the presence of O_3 (ozone) and forms NO_2 and NO whose mixture forms nitrogen oxides (NO_x). NO_x contributes directly to climate change caused by greenhouse gases. Studies have shown that air traffic contributes to the formation of ozone, which is not produced directly by aircraft operation but is a secondary pollutant.

Considering all these factors, the significance of the impacts can be **considered as low** (rehabilitation phase) **to average** (operation phase) on air quality and climate change.

Mitigation measures

In order to reduce or compensate impacts on air quality, the ESIA recommends the following mitigation measures:

- to sprinkle the site soil and traffic lanes to minimize dust generation;
- limit the speed of trucks to 30 km/h at the houses and on the construction site;
- cover with tarpaulins the trucks transporting materials (rubble, sand, etc.) on site;
- implement demolition methods that minimize dust emissions
- reduce open sand storage to a strict minimum or cover it if necessary;

- stop unused vehicles and equipment by avoiding the standby position such as idling engine;
- ensure preventive and curative maintenance of exhaust emission equipment;
- inform and raise awareness among local populations;
- identify emission sources and implement an air quality management system;
- assess air quality in the area of influence of the project in the operational phase;
- ensure long-term monitoring of ambient air quality at the various sites identified as potential receptors;
- ensure the use of good quality fuel during the operating phase;
- create green spaces far from the track;
- carry out reforestation campaigns outside the site;
- carry out regular and complete maintenance and roadworthiness tests on vehicles and construction machinery to minimize pollution due to poor combustion;
- comply with national and international standards in terms of GHG emissions.

VI.1.2. Impacts on soils and water resources

The airport's **rehabilitation** works are likely to alter the quality of the soil, surface water and, consequently, groundwater. These potential impacts are as follows:

Grading and excavation work on the site will change the soil profile and local topography. This modification will slightly disrupt the natural runoff of stormwater because the difference in elevation is small. Indeed, the altitudes of the airport site vary between 0 and 15 m.

This work could also reverse the natural horizons of the soil by creating embankments and excavated material that can disrupt the pedogenetic process and impoverish the soil.

However, this work will be limited to the site's right-of-way and will be carried out over a short period of time. Thus, the significance of the impact of preparation activities is considered low on the modification of local topography and soil destruction.

In the **operational** phase, the main impacts on land and water relate to pollution likely to be caused by the airport's activities, including the storage of fuels (aircraft) and diesel (power plant), refueling of aircraft, fuel distribution, etc. The handling of fuel, waste and new oils and chemicals can lead to contamination of the soil and water by accidental spills or leaks.

Poor management of maintenance and cleaning activities on aircraft, airport pavements, buildings and roads can cause soil, surface and groundwater pollution by infiltration.

However, fuels and oils will be stored in sealed tanks and under retention. As for the unloading area, it will be designed in such a way as to be able to recover and evacuate liquids in the event of leaks. Also, tank trucks that will be used for the transportation of fuel will be subject to prior roadworthiness tests.

The storage and handling of certain substances (fuels, lubricating oils, used oils, chemicals, etc.) used in the operation and maintenance of equipment, machinery and construction vehicles can lead to **accidental spills or leaks** that can contaminate the soil, runoff and groundwater by infiltration.

These accidental spills and leaks are punctual even if the immediate environment of the site may be inadvertently affected. In addition, the risk of **soil and water pollution** is present off-site through the transportation of raw materials during rehabilitation work.

Generally, it could be concluded the significance of the impact on soils, surface and groundwater can be considered **as average**.

Mitigation measures

- conduct a soil survey;
- define heavy vehicle routes and areas in order to limit rolling surfaces and soil compaction;
- limit the site's footprint to the strictly necessary area;
- ensure that vehicles and construction machinery have a proper technical inspection;
- take into account the NS 05-061 standard on waste water before any discharge of effluents into the natural environment;
- limit spills and accidental leaks by:
    - the provision of anti-pollution kits;
    - the storage of oils and other hazardous products in sealed retention basins;
- collect solid and liquid waste according to a waste management plan in accordance with national and international regulatory provisions;
- raise awareness and train staff on solid and liquid waste management;
- put in place procedures and safety measures that must be followed for any refueling operation;
- collect runoff water according to its origin and control its quality before any discharge;
- implement a stormwater management plan;
- treat water likely to be polluted by hydrocarbons;
- recycle treated wastewater if possible;
- dispose of and handle fuel on prepared and sealed surfaces;
- implement an inspection and maintenance program for the various installations;
- implement response procedures in the event of an accidental spill or leak;
- sort and then store the waste in a sealed storage area;
- find approved channels for the transportation, storage and disposal of waste;
- carry out periodic tests (hydraulic and waterproofness) at regular intervals to check the condition of the tanks and the operation of the trucks.

With the implementation of these mitigation measures, the **significance of these impacts on land and water resources will be very low.**

VI.1.3. Impacts on water resources used by populations

The airport preparation and rehabilitation works will lead to increased water requirements (for civil engineering, soil watering, cleaning operations, workers' needs, etc.) over a short period of time. The water supply will probably be provided by the Senegalese Water Company (SDE), which is the current supplier of the airport.

Water requirements during the rehabilitation and operational phases are not yet estimated. However, during these rehabilitation works, water will be used rationally in order to save water for supplying of the populations.

During operation phase, the water will be used mainly for domestic use (drinking and sanitation), cleaning and maintenance activities, and for the fire-fighting system.

Mitigation measures

- collect and use rainwater for watering the slopes if the work is carried out during the rainy season;
- see the possibilities of sourcing water from the Bango water reserve and the Senegal River branch and contact the Office of Lakes and Rivers (OLAC) in this regard;
- collect and use rainwater for watering green spaces;
- implement a rational water management policy;
- put up signs in toilets and sinks to make employees and visitors aware of the importance of water conservation;
- repair any degradation that may cause water leakage in a timely manner,
- use water tarpaulins in good condition if necessary, to prevent water leaks;
- raise employee awareness of the importance of the resource and the need to preserve it.
- promote preventive maintenance of pipes and water points (taps, flushes, washbasins, etc.).

VI.1.4. Impacts on flora and fauna

It should be emphasized that the vegetation identified on the site serves as a shelter, a nesting box, a resting place but also as a feeding station through its seeds, fruits and insects living there.

The airport's preparation and **rehabilitation** work will lead to deforestation of the plant species currently present on the site. However, the current site is not very rich in vegetation and only two of species Adansonia digitata and Acacia senegal present a major conservation challenge because they are classified as partially protected species under the Forest Code in force in Senegal.

In addition, the extension of the airport to the north will lead to the disappearance of the mangrove swamp. This mangrove protects the coastline from waves and wind and water erosion, but also conserves biological diversity and provides spawning grounds and nutrients for many fish and shellfish species.

Rehabilitation work will generate noise that will impact wildlife and birds. The risks of pollution following an accidental spill or leak can endanger plant species, small mammals and reptiles (rodents, lizards, salamanders, varans, snakes, crustaceans, etc.). The risk of small fauna (small reptiles or rodents) falling into open excavations during foundations can also be noted during the work.

During the **operational** phase, the main potential impacts will be related to the generation of noise and lighting due to the operation of aircrafts, ground transport, but also to human presence (employees, passengers, etc.).

Avian fauna is most exposed with risk of collisions. Collisions can cause injury or even death to the animal, either at the time of the accident or after it has fallen. However, in the project area, there are fewer and fewer places where these birds can take refuge. Thus, the significance of the impact is considered low.

In summary, all of the above factors could lead to the degradation of vegetation and the displacement of wildlife to other areas, thus impoverishing the area in terms of biodiversity. Thus, the **significance** of the impact is considered **very low** during construction phase and **average** during operation phase.

Mitigation measures

The ESIA recommends following measures to reduce the impacts on fauna and flora:

- limit the site's footprint to the strictly necessary area;
- avoid the accidental or deliberate introduction of alien species during the work and establish a monitoring plan for these species;
- prevent the animals from wandering around inside the site;
- establish a request for clearing;
- contact the IREF to report on the reference situation found on site and obtain technical advice on how to felling trees.
- make an inventory of the wildlife and plant species present in the direct area of influence of the project;
- implement an off-site reforestation plan and ensure follow-up, in collaboration with the Saint-Louis forest sector;
- have a memorandum of understanding within the framework of compensatory reforestation with the Waters and Forests of Saint-Louis;
- choose the mangrove as a site for the reforestation plan to be established and thus support the service in its mangrove restoration activities;
- support the forestry service for possible intervention.
- set up a buffer area between the airport and the natural areas;

VI.2. IMPACTS ON THE SOCIO-ECONOMIC ENVIRONMENT

VI.2.1. Positive impacts

During the rehabilitation and operation phase of the Saint-Louis airport, positive externalities will be generated through the recruitment of manpower, the development of small businesses, the purchase of goods and services, cultural mixing and possibly the discovery of archaeological objects.

Direct job creation

Demolition, reconstruction and redevelopment activities of the airport will result in the recruitment of unskilled personnel. A qualified workforce will also be recruited. The participation of local labor in the work will improve the standard of living. The paid participation of local labor in the work will improve the standard of living.

The Saint-Louis Airport will outsource the reception, maintenance and disposal of various types of waste. This approach could be beneficial for local companies specializing in these services. The recruitment of staff, particularly local staff, contributes on a large scale to reducing unemployment.

Thus, the importance of the impact is considered from **moderate to high**.

Some of recommendations

- recruit local workers as a priority;
- pay decent wages to workers;
- involve IWHSS in the declaration and identification of workers;
- develop a modern social policy for staff.
- promote the female workforce;
- propose employment contracts in accordance with Senegalese regulations;
- develop maintenance and security training specific to safety, hygiene and health standards for local companies if the outsourcing of these services is confirmed;
- set up a service of surface technicians in charge of the hygiene and sanitation of the airport premises.

Indirect job creation

The rehabilitation phase of the airport also generates indirect jobs through the development of new activities near the site, such as catering, trade in manufactured products, everyday food, etc.

In addition, urban and peri-urban transportation will be more developed with the movement of construction site personnel. Thus, the significance of the impact is considered to be **average**.

Recommendations

- develop and secure spaces around the airport to allow the installation of indirect jobs activities;
- define with the local populations the rules of good conduct for peaceful coexistence with the security and access requirements of the airport area;
- manage entrepreneurship ambitions around the airport;

Business opportunities for SMEs

The contracting company for the airport rehabilitation contract is of Czech origin, however, it will use local companies to carry out the structural and ancillary works and provide other services. This constitutes a business opportunity for national entrepreneurship with public works and other local structures specializing in the supply of building materials on renovation sites. Thus, the significance of the impact is considered **high**.

Recommendations

- promote access by local companies to goods and services: local rental of construction machinery and vehicles for demolition, rubble removal, transportation of workers, construction materials, equipment, etc.;
- prioritize local craftsmen in providing office furniture and other amenities;
- develop subcontracting so that local small and medium-sized enterprises can access markets related to the implementation of the project.

Strengthening regional air services

In order to strengthen Senegal's position as a reference point in air transport and to increase regional connectivity, the regional air hub project was initiated. The State of Senegal intends to focus on three essential pillars to make the country a regional air transportation hub.

The rehabilitation of Saint-Louis airport will contribute, on the one hand, to strengthening the regionals services but also to relaunching tourist activities in this part of Senegal. Based on these impacts, significance is considered **very high**.

Recommendations

- rehabilitate and equip Saint-Louis airport with the most modern technologies;
- assign a sufficient number of qualified personnel and specialists to the various workstations;
- provide on-call accommodation for staff;
- authorize and make available shuttle vehicles between the airport and passengers' final destinations;
- create a healthy atmosphere of cohabitation with service providers in the airport area.

Revitalizing of tourism, cultural and economic activities

The rehabilitation of the Saint-Louis airport will be a new springboard for tourists to discover the region (visits to the wetlands of the North, Djiouth Park, etc.). It will also be an opportunity for these tourists to discover the region's annual cultural activities (International Jazz Festival).

The revitalization of this sector will be accompanied by the development of its various branches, including transportation, accommodation and catering.

The relaunch of Saint-Louis airport activities will allow the development of the air transportation network and at the same time economic activities, which will result in the satisfaction of the transportation needs of foreign trade (sub-regional). It will also contribute to the diversification of

destinations in the interior of the country and the efficiency of travel time for individuals, politicians, the army and businessmen. As a result, the significance of the impact is considered **very high**.

Recommendations

- provide ramps to facilitate access for people with reduced mobility;
- create relaxation areas, dining areas for airport staff and airport users;
- create tours and tourist itineraries;
- initiate development and equipment projects for tourist sites in the Saint-Louis region
- create information desks to better inform users;
- develop the ground transportation network to facilitate access to the airport;
- strengthen the security, safety and protection of the airport space.

VI.2.2. Negative impacts

Besides the positive impacts, the rehabilitation and operation of the airport will produce also negative externalities. They were divided into: **noise pollution, waste generation, loss of housing, cultural and historical heritage and water and energy consumption**.

The main environmental components impacted during airport operations are air quality, living environment and water and energy consumption; the air quality is addressed in the chapter on impacts on the physical environment.

Noise pollution

The *rehabilitation work* will generate noise and dust, especially during demolition activities but also during reconstruction. These emissions can affect the living environment of the local populations and the natural environment that are exposed. Among this noisy equipment, can be mentioned:

- mobile equipment (transportation trucks, loaders, excavators, bulldozers, etc.);
- fixed equipment (concrete mixers, drills, compressors, small machinery, generators, etc.).

However, the buildings to be demolished will be located within the site of the current airport and are far from the first dwellings. The impact is considered to be of **moderate** importance.

During the *operation phase*, noise generated by the operation of aircraft is the main source of discomfort felt by workers and residents of the airport. It is produced by three sources:

- Aerodynamic noise that is caused by the friction of air on the aircraft.
- Engine noise generated by turbojet engines.
- The higher the speed of rotation of the propellers, the higher the sound emitted.

It should be pointed out that noise control is a major issue to be taken into account in airport management by drawing up an action plan to reduce aircraft noise pollution. The runway at Saint-Louis Airport is less than 200 meters from the nearest residential areas.

This cohabitation will inevitably expose the populations concerned to the noise pollution generated by the operation of the airport but also and above all the airport's workers.

The implementation of the action plan should significantly reduce noise, which will then be of **medium importance**.

Mitigation measures

- use equipment and tools with low noise levels and respect the limit of 85 dB at 1 m;
- carry out daily acoustic measurements in the noisiest areas and on the property line and implement corrective measures;
- provide workers with adequate PPE to protect against noise pollution;
- timely maintenance of pneumatic tools, machinery and equipment to keep the noise level generated at an acceptable level;
- ensure that very noisy equipment such as site diesels and compressors are properly covered;
- install a screen wall towards residential areas, particularly in the nearest neighborhood.
- Act on flight scheduling and choose time slots that limit night flights;
- Favor airlines that regularly renew their fleets;
- Encourage airlines to raise awareness and train their pilots in flight techniques to reduce noise emissions;
- Implement appropriate air navigation procedures to better channel noise pollution and reduce its impact;
- Create a framework for functional consultation between airport managers, local populations, administrative and local authorities and certain technical services.

Waste generation

The *rehabilitation* phase will start with a demolition and removal of the current wearing course. Site preparation work and operations associated with the installation of the new pavement and roads, the reconstruction of buildings and the installation of airport equipment and facilities will produce large volume of excavated material, rubble and waste (packaging, green waste, metals, etc.).

For the effective management of these various types of waste, a waste management system will be set up. The system includes the principle of collection, sorting, recycling and disposal.

The management of hazardous waste (solvents, waste oil, paint waste, etc.), especially their recovery and treatment, will be carried out in accordance with the regulations in force.

The impact will then be of **medium significance** and **short duration**.

During the *operational phase*, a number of companies operate at the airport and produce a different type of waste. This waste can be classified into two main categories, non-hazardous waste such as inert waste, non-hazardous industrial waste, industrial and commercial packaging waste, etc. and hazardous waste such as waste oils, batteries, neon lights, soiled packaging, etc.

At the same time, these companies will produce wastewater. The wastewater will mainly come from sanitary facilities and kitchens, emptying aircraft toilets, washing and repairing airport commercial vehicles and technical workshops.

Central and local airport authorities will have to introduce very stringent hygiene and sanitation measures to familiarize workers and users with best practices in the field of waste management. The aim will be to set up a regular collection system for all solid waste generated, to sort it and to work together with the Commune of Saint-Louis or with approved service providers for its disposal, while giving priority to recovery methods (material or energy).

In the absence of possible recovery, the waste must be landfilled or incinerated in a cement plant.

The same will apply to sanitary wastewater, which will be collected in septic tanks regularly removed by authorized local service providers. For other types of wastewater, TRANSCON must propose an autonomous management system for these liquid discharges that is adapted and sized according to the nature and quantity of the liquid effluents to be treated.

The value of this environmental component will be considered high and the impact **medium**.

Mitigation measures

- set up a waste disposal center as soon as the worksites open;
- ensure that waste is not abandoned, released into the natural environment or burned in the open air;
- draw up a waste tracking form for hazardous waste;
- collect separately and recover waste as much as possible;
- ensure that the mixed waste is stored in "all coming" bin(s) or container(s) and disposed of in authorized landfills;
- create a buffer area between the airport and the houses.
- set up a solid waste management procedure and provide all companies on the platform with an area dedicated to the sorting of non-hazardous and hazardous waste;
- optimize the recovery of different materials by sorting waste as much as possible at source;
- ensure that sorting should separate hazardous waste, inert waste and common waste;
- place garbage cans and skips in the airport area and protect them from waste spills;
- inform and raise awareness of waste management among staff in airport infrastructure assistance and maintenance services;
- to reduce waste at the source and avoid landfilling of recoverable waste.

Increase in traffic intensity

The rehabilitation of the airport will require a considerable supply of building materials and equipment. Besides the personnel transport for both rehabilitation and operation of the airport will probably increase traffic in this area and therefore the risk of accidents, but also noise and pollution levels.

The impact will then be of **medium importance**.

Mitigation measures

- inform stakeholders (municipalities, populations, AGEROUTE...) on the date of the convoy (by radio, newspaper, mail) on the routes, risks and measures to be taken to avoid accidents;
- inform the DPC and use a professional escort between Dakar and the site;
- use trucks in good technical state for transport to the site;

Loss of housing for residents of the surrounding neighborhoods (Khar Yalla and Bango) and market gardening land

The airport right-of-way is currently fenced, but in part, so that beyond the fence the site is irregularly occupied by local populations who have built their homes there. Similarly, vegetable fields have been identified east of the current fence.

The release of the airport right-of-way by relocating these human facilities is inevitable for bringing the infrastructure up to standard, which must establish a plan for aeronautical easements. Indeed, Annex 14 of the Convention on the International Civil Aviation Organisation (ICAO) stipulates that "airports must have an obstacle-free airspace so that aircraft can approach and take off safely and that this volume of space must also be defined so that it can be protected, in order to ensure the growth or even the very existence of the airport".

Thus, the release of the right of way will lead to the loss of housing but also to the loss of marketable land and therefore income for the populations who used this land.

At this stage of the project, the modalities for releasing the airport right-of-way are not yet clearly established. However, it is strongly recommended that the authority take all necessary measures to comply with ICAO texts for the safety of persons and aircraft.

Although the area concerned is not very large, the **impact** on land is **still major**.

Mitigation measures

- relocate the populations living on the airport right-of-way to a suitable site;
- set up measures to support the populations affected by relocation;
- compensate affected populations before work begins;
- comply with IFC Performance Standard 5 for involuntary movement of people and economic activities;
- support populations in their relocation when releasing illegally occupied land bases;
- secure and enhance these spaces for the airports concerned;
- establish with the land registry the actual airport boundaries and install a barbed wire fence (different from the fence wall provided by the project).

Cultural and historical heritage

In the project area, there are no archaeological sites or historic monuments that could be affected or threatened with extinction as a result of the work. However, two cemeteries were identified respectively at the end of the runway (north side) and on the northern boundary of the airport.

Construction work (excavation, extension of the runway) could have an impact on these cemeteries, which have great cultural value for the local population. However, during the development of the contours of Saint-Louis airport, care will be taken not to impact these cemeteries.

During construction work at the airport site, in the event of the discovery of archaeological remains and/or physical cultural properties, it will be the responsibility of **TRANSCON** to immediately notify the services of the Ministry of Cultural Heritage.

The value of the environmental component is average. The degree of disturbance will be considered **low** in case of all mitigation measures are implemented.

Mitigation measures

To avoid impacts on cemeteries, the following measures should be adopted:

- avoid impacting cemeteries as part of rehabilitation work;
- communicate and consult with local populations (keep them informed) before starting work around cemeteries.

VI.3. IMPACTS ON HEALTH, SAFETY AND SECURITY

Operations relating to the Saint-Louis airport will have an impact on the hygiene, health and safety of workers and the populations around the site. The identification of these impacts will make it possible to propose measures to avoid and reduce their likely effects.

Impacts on hygiene

Activities related to the reconstruction and operation of the airport can degrade hygiene in and around the construction site.

Besides, poor waste management, poor health conditions for employees, lack of staff awareness and waste management procedures may affect hygiene on and around the site.

On a construction site, the reception conditions, the cleanliness of the premises, clothing, the provision of clean sanitary facilities, drinking water and waste management policies are all essential to ensure hygiene. Taking these aspects into account will make it possible to limit the impact, which will be of little importance.

The absence of procedures for managing the cleanliness of premises, toilets and employees' comfort can have an impact on the hygiene of the premises and the surrounding area.

Hygiene is essential for the well-being at work, health and safety on the site, but **is not an issue** of environmental impact assessment.

Taking these aspects into account will make it possible to limit the impact, which will be from **moderate** (rehabilitation phase) **to little importance** (operation phase).

Mitigation measures

- raise awareness among workers on the importance of hygiene preservation;
- establish strict hygiene rules to be respected by any person working on the site;
- provide a sufficient number of well-maintained sanitary facilities according to the proportion of workers;
- guarantee access to toilets for workers of all categories;
- set up one or more drinking water points accessible to all;
- raise staff awareness of the importance of maintaining hygiene;
- keep workplaces, gathering places, equipment, furniture clean;
- provide adequate and hygienic toilets in sufficient number and by gender;
- ensure the permanent healthiness of the premises and sanitary facilities;
- contract with specialized cleaning services in good standing to manage the site's sanitation.

Health Impacts

The health status of construction workers deteriorates due to poor working conditions, strenuous work and physical constraints. The most important risk factors for the health are:

- the noise;
- carrying heavy loads;
- exposure to chemicals;
- harsh climatic and environmental conditions;
- the vibrations of the tools used;

Driving vehicles on site, working in a very noisy environment, using noisy machinery can affect hearing. The vibrations of the tools used, the rhythmic and repetitive gestures adversely affect the health of workers. Demolition activities are subject to the risk of dust and fibre inhalation. The hazardous chemical agents as well as the ambient temperature are risk factors that can affect workers' health.

Air quality will be temporarily affected by the emission of dust and exhaust gases produced by demolition and construction activities. Breathing in air contaminated with harmful particles can create respiratory problems such as acute respiratory infections.

Given the environment of the construction site (nearby dwellings), **populations** can also suffer from noise, dust pollution and deterioration of air quality.

The worker's health must be preserved in the performance of his duties. The company manager is responsible for implementing all security conditions to ensure that they are in place.

In the course of airport **operation,** the workers are exposed to various risks that can affect their health. They are exposed to the screen, noise, exhaust gases from aircraft and awkward postures.

Airside personnel are exposed to high noise levels. Workers, may be exposed to high noise from the movements of aircraft, ground service vehicles and other noisy installations. They are also exposed to exhaust gases from aircraft and car engines that can cause them breathing problems.

Noise and air pollution induced by aircraft activities can affect the health of **local populations**.

Failure to comply with health checks exposes the population, travelers and crew members to diseases because travelers will come from all walks of life. If the appropriate vaccines are not taken by travelers, those carrying a contagious disease may carry the disease, contaminating workers, the population, etc.

Ground handling service providers may be exposed to chemical risks when, they are in direct contact with fuels or other chemicals. Fuels can pose a risk of exposure to volatile organic compounds through inhalation or dermal contact both in normal operations and in the event of a spill.

The environmental value is high and the importance of the **impact to workers is high.**

Even if the working environment is not a subject of EIA, it is important issue of the project and main issues and mitigation measures are covered in this authorization.

The environmental value is considered high with a moderate degree of disturbance and a **moderate impact significance** on local populations.

Mitigation measures

- favor wet working processes;
- use a dust collection device and suction devices at source;
- carry out noise measurements and provide the PPE adapted to the measured values;
- choose machines that are less noisy;
- favor remote-controlled machines (distance from the noise source);
- provide vehicles and machinery with soundproof cabins;
- avoid as much as possible the use of manual handling with the risk of injury;
- train workers in load handling techniques;
- provide workers with handling and lifting equipment;
- stop the engine of unused machinery.
- require the wearing of personal acoustic protection devices;
- carry out the pre-recruitment medical check-up and periodic check-ups every six months;
- make workers aware of the actions that save lives;
- carry out risk assessment at each workstation;
- require passenger health screening;

Safety Impacts

During demolition work, workers are exposed to risks of falling from heights, electrical risks, and risks of fire and explosion.

The use or storage of gas cylinders (torch), dismantling or working near the kerosene storage area exposes workers to the risk of fire and explosion.

The transportation of construction materials, the circulation of machinery and the transportation of rubble and rubble can lead to traffic accidents and harm workers and populations.

The presence of stray dogs, oxen, sheep and other domestic animals on the runway and taxiways can lead to collisions between aircraft and animals. The presence of birds increases the likelihood of a collision with an aircraft. The suction of the FODs by the aircraft's engines causes destruction of the aircraft and can cause accidents.

The establishment of landfills in the vicinity of the airport, the planting of vegetation, agricultural activities (fields, orchards, etc.) create an environment conducive to the frequentation and reproduction of birds. They promote accidents and collision with the aircrafts.

Aircraft failures, although very rare, can be catastrophic for populations, if a crash occurs. The take-off and landing phases are the most at risk and can lead to runway overruns and collisions that affect safety.

As Saint-Louis is a border area, safety and security must be greatly increased to avoid the risk of a terrorist attack.

The environmental value is high and the **significance of the impact is high up to very high.**

Mitigation measures

- implement a traffic plan;
- appoint an HSE manager in charge of supervision and prevention against occupational risks;

- require or have a diagnosis carried out before work;
- identify and detect networks before intervention;
- materialize the electrical risk in situ;
- respect the safety distances if it is not possible to switch off the power supply, for example for reasons of continuity of service;
- issue mandatory electrical authorizations to workers requiring them and give them the prescription booklet and specific PPE;
- set up secure access (ladders, temporary stairs, etc.);
- use individual rolling platforms for work up to 4 metres high and regularly check the working platforms;
- set up collective protection and wear appropriate personal fall protection devices;
- keep the site clean and properly organize the depots;
- regulate access to the site and place hazard symbols, protective markers and prohibition and warning signs in all areas where there is a danger;
- provide space for customs, police and health services.

VI.4. ASSESSMENT OF CUMULATIVE IMPACTS

Information on possible cumulative impacts are missing in the ESIA.

It should be **completed during next phase** of project preparation.

VI.5. EMERGENCY SITUATIONS DURING CONSTRUCTION AND OPERATION PHASES AND EXPECTED IMPACT

Risk assessment of potential hazards, accidents and dangers both in construction and operational phases has been made very detailed in chapter IX. of ESIA study. On more than 65 pages the methodology, description of site, processes and equipments, identification of potential hazard, risk prevention and control measures are covered. All risk sources are defined and prevention methods and control measures are proposed.

Possible emergency situations include:

- weather conditions;
- proximity of residential zone (only tens of metres);
- foreign objects inside the airport area;
- failures in electrical installations;
- human errors;
- aircraft crash and collisions;
- fire/explosion;
- kerosene and oil spill/leaks;
- danger of birds for air traffic;

It is possible to summarize that all possible risks were identified and effective mitigation and other measures were proposed.

VI.6. CONCLUSIONS AND RECOMMENDATIONS

The Saint-Louis Region has significant potential in terms of wildlife resources. However, the airport site is not of particular interest in terms of wildlife resources. Nevertheless, its proximity to surface waters makes it an area of average environmental sensitivity because surface waters contribute to the physiological life of fauna and flora but also to the maintenance of biodiversity.

This project to rehabilitate the Saint-Louis airport will mark a new era in civil aviation in Senegal. In the long term, it will provide a better environment for aeronautical activity and will encourage the growth of air traffic in this area.

In addition, this project is an opportunity to create jobs and will help revive the tourism sector. It will have many positive impacts on the socio-economy and will encourage the arrival of investors for the implementation of large-scale projects since the accessibility of the region will be easier.

Beyond the positive aspects, this environmental assessment prior to the execution of the project made it possible to identify negative impacts that could affect various environmental components. Noise and waste generation, pollution (soil, water, air), accident risks are generally the likely impacts that may result from project activities.

To mitigate all these negative effects and optimize the positive ones, the ESIA proposed impact management measures as well as prevention and protection measures against possible risks related to the rehabilitation and operation of the airport.

The **project includes** the extension of the existing runway by 600 m and its widening to 45 m, the widening of the old taxiway to 23 m, and the rehabilitation of the tarmac (parking area).

In the long term, the following will be implemented:

- a 2500 m x 45 m track;
- a 150 m x100 m tarmac;
- a 190 m x 23 m taxiway.

For security reasons, the airport right-of-way will be fenced off. Two terminals with a surface area of 1950 m^2 each will also be built.

A modular hangar with a surface area of 400 m^2 and a height of 4 m will also be built, as well as a fire-fighting hangar consisting of a parking hall for fire-fighting vehicles, fire-fighting equipment with an area of 400 m^2 and a height of 5 m, a control tower combined with the technical unit with a total height of 21 m.

Considering the fact, it is rehabilitation project of existing airport, and estimated increase in air traffic intensity will not be significant (+ only a few landings/take-offs per week) it is supposed the impacts on residential zone (noise) and environmental components (e.g. air, water, soil, etc.) will be acceptable. It is also supposed that in number of issues, current state will be improved.

As for the **airport equipment** the following will be installed:

The daytime marking of the runways will be done by:

- white retro-reflective paint for track axes, track numbers and markings;
- yellow retro-reflective paint for taxiway and tarmac;
- white non-reflective paint for continuous runway edge lines.

The navigation aid system allows an aircraft pilot to determine its position and displacement relative to a ground station.

In terms of **fire warning and extinguishing**, the project provides for the installation of light and sound alarms and smoke detectors. The airport will be equipped with 3 fire extinguishing vehicles, a 9,000-litre water tank and an 8,000-litre foaming agent reserve. The fire hangar will be equipped with the necessary fire-fighting equipment:

- fire hydrants (2 rooms);
- special storage drums for fire-fighting foam (200% capacity inside fire-fighting vehicles);
- maintenance tools, spare parts, exit scissors, oxygen masks inside the working room;
- 6 fire protection suits and special coatings on walls near vehicles.

The other necessary airport equipment are as follows:

- ambulance;
- sanitary vehicle;
- drinking water tanks;
- patrol cars.

As a **key tool of environmental protection**, the Environmental and Social Management Plan (ESMP) will be implemented. It aims to ensure the correct and timely implementation of all measures to mitigate negative impacts and improve positive ones.

The objectives of the ESMP include the following:

- ensure that project activities are undertaken in compliance with all legal and regulatory requirements;
- ensure that the environmental issues of the project are well understood by the promoter and implemented both in the construction and operational phases.

The ESMP will be reviewed as required to ensure its relevance and effectiveness. The proposed amendments will be discussed with the appropriate government authorities.

This ESMP will include:

- measures to mitigate and improve impacts;
- the project's environmental monitoring and follow-up plan with monitoring indicators;
- the timetable for the execution of the various operations;
- social support measures;
- the institutional arrangements for implementation;
- the information, awareness and communication program;
- the actors involved in the implementation of the ESMP and their responsibilities;
- the estimated cost of the recommended measures.

VII. DEFINITE FINAL EVALUATION OF ACCEPTABILITY OR NON-ACCEPTABILITY OF THE PROJECT'S ENVIRONMENTAL IMPACT

Final evaluation of the project's major environmental impact is summarized in the table below.

Environment component	Evaluation	Recommendation
Noise	conditionally satisfactory	The residential zone is just behind the airport fence. Air traffic intensity after rehabilitation will probably still low (only few take-offs and landings per week). Carrying out the proposed mitigation measures, should ensure the noise limits are met. It is recommended to elaborate the noise study during next step of project preparation.
Waste	satisfactory	Set up a waste management procedure. Optimize the recovery of the various materials by sorting waste at source. Work to reduce waste at source and avoid landfilling of recoverable waste. Carry out chemical, biological and other analyses of waste water. To elaborate quantification of waste during next step of project preparation.
Ambient Air Quality	satisfactory	To identify emission sources and implement an air quality management system. To implement measures to reduce polluting emissions. Ensure long-term monitoring of ambient air quality at the various sites in residential zone identified as potential receptors.
Surface and Ground Water	satisfactory	To implement a stormwater management plan. Ensure that no vehicle maintenance is carried out on site. Ensure that vehicles and construction machinery are in proper technical condition. To keep the standard on waste water before any discharge of effluents into the natural environment. To storage of oils and other hazardous products in sealed retention basins. To implement mitigation measures proposed in ESIA.
Soil	satisfactory	Rehabilitation works will be carried out over a short period of time. The most significant impacts on soil relate to pollution in case of accidental leaks of chemicals, poor waste management, maintenance and cleaning activities. Mitigation measures proposed in ESIA should be carried out.
Fauna and Flora	satisfactory, very low impacts	Impacts on flora are supposed to be non – significant. Potential collisions with avian fauna can cause injury or even death to the animal. Mitigation measures proposed in ESIA are appropriate and should be carried out.
Health and safety impacts	conditionally satisfactory, have to be improved	ESIA evaluate H&S impacts particularly for staff and passengers. The subject of EIA is predominantly impact assessment on residential zone (inhabitants). Nevertheless, all in ESIA evaluated possible H&S impacts should be solved. Safety and security at the airport must be increased. Carrying out the proposed mitigation measures, should resolve existing shortcomings and risks.
Socio-Economic Impact	satisfactory	Positive socio-economic impacts of the project prevail the negative ones. Appropriate mitigation measures for negative impacts - noise, waste production, increase of traffic, loss of housing are proposed.
General evaluation	**conditionally satisfactory**	**We recommend to complete missing quantifications. To implement proposed mitigation measures and where relevant to propose additional measures.**

If all above-mentioned recommendations are implemented within the next stage of project preparation, the "Saint-Louis Airport Rehabilitation Project" **is acceptable as regards its environmental and social impacts.**

VIII. ASSESSMENT AUTHORIZATION ELABORATED BY

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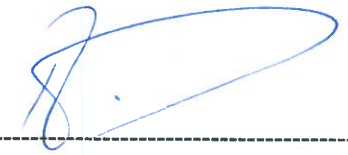
IX. DATE OF ELABORATION

January 2019

X. SIGNATURE OF PERSON WHO ELABORATED THE ASSESSMENT



Vladimír Rimmel, MSc.