



REPORT

# New International Airport of Cabinda (NAIC Project) - Angola

*Environmental and Social Impact Assessment - Chapter 04 - Legal Requirements*

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## Distribution List

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## 4.0 LEGAL REQUIREMENTS

This Chapter presents an overview of the national and international regulatory framework, including policies, legislation, requirements, guidelines, and standards applicable to the Project. The chapter also includes the analysis of limits that have been considered applicable for each physical component.

In the presence of multiple standards from different regulatory sources, this Chapter identifies the most stringent ones and adopts the standard that will be applied throughout the ESIA process in accordance with international requirements.

### 4.1 Environmental and Social Standards of International Financial Institutions

The ESIA study is prepared in accordance with the Equator Principles IV (EPIV) and OECD Common Approaches (CAs), which in turn require the Project to be developed in compliance with IFC Performance Standards (PSs). The standards are briefly described in the following sections. In addition, it was also considered applicable to the Project:

- A number of international substantive environmental standards and Laws including conventions and treaties adopted by Angola, as also described further below in this chapter;
- Requirements of other lenders, such as International Labour Organization (ILO) conventions covering core labour standards and the basic terms and conditions of employment;
- Applicable local, national, and international environmental and social (including occupational health and safety) legislation and guidelines, including key E&S permits and approvals required under national legislation.

#### 4.1.1 Equator Principles (EPs)

EPIV (4<sup>th</sup> version in force since October 2020)<sup>1</sup> is a risk management framework adopted by financial institutions members of the EP Association for determining, assessing, and managing ES risks in Projects. EP are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. As of May 2023, 138 financial institutions in 38 countries have officially adopted the EP, covering the majority of international Project finance debt in emerging markets<sup>2</sup>. A summary of the ten principles is listed as follows:

- **Principle 1: Review and categorisation.** By this principle, the proposed project for financing is categorised based on the magnitude of its potential environmental and social risks and impacts. The categories are:
  - Category A. Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented;
  - Category B. Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures; and
  - Category C. Projects with minimal or no adverse environmental and social risks and/or impacts.

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<sup>1</sup> The Equator Principles Association, 2020 ([The Equator Principles EP4 July2020 \(equator-principles.com\)](https://www.equator-principles.com/)).

<sup>2</sup> BankTrack, 2021 ([BankTrack – Tracking the Equator Principles](https://www.banktrack.org/ep)).

- **Principle 2: ES assessment.** By this principle, Projects that fall in Category A and Category B are required to conduct an Assessment process to address its relevant environmental and social risks and impacts. The Assessment Documentation should propose measures to minimise, mitigate, and offset adverse impacts in a manner relevant and appropriate to the nature and scale of the proposed Project. For Category A, and as appropriate, Category B Projects, the Assessment Documentation includes an ESIA and a CCRA. Furthermore, in limited high-risk circumstances, it may be appropriate for the client to complement its Assessment Documentation with specific human rights due diligence. A Climate Change Risk Assessment is required depending on the type of Project as well as the nature of risks. In any case, projects that have Scope 1 and Scope 2 Emissions (combined) expected to be more than 100,000 tonnes of CO<sub>2</sub> equivalent annually, must present a Climate Change Risk Assessment. Consideration must be given to relevant Climate Transition Risks (as defined by the Task Force on Climate-Related Financial Disclosures – TCFD) and an alternatives analysis completed which evaluates lower Greenhouse Gas (GHG) intensive alternatives.
- **Principle 3: Applicable ES standards.** By this principle, the Assessment process should, in the first instance, address compliance with relevant host country laws, regulations, and permits that pertain to environmental and social issues. For Projects located in Non-Designated Countries (as is the case for Angola), the Assessment process evaluates compliance with the then applicable IFC Performance Standards on Environmental and Social Sustainability (Performance Standards) and the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines).
- **Principle 4: ESMS and EP action plan.** By this principle, Category A and Category B Projects are required to develop or maintain an ESMS. Moreover, an ESMP needs to be prepared by the client to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards.
- **Principle 5: Stakeholder engagement.** By this principle, Category A and Category B Projects are required to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities and, where relevant, other stakeholders. For Projects with potentially significant adverse impacts on Affected Communities, the client needs to conduct an Informed Consultation and Participation process. The client needs to tailor its consultation process to: the risks and impacts of the Project; the Project's phase of development; the language preferences of the Affected Communities; their decision-making processes; and the needs of disadvantaged and vulnerable groups. This process should be free from external manipulation, interference, coercion, and intimidation.
- **Principle 6: Grievance mechanism.** By this principle, Category A and, as appropriate, Category B Projects are required, as part of the ESMS, to establish a grievance mechanism designed to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance.
- **Principle 7: Independent review.** For Project financing, according to Principle 7, Category A and, as appropriate, Category B Projects will go under an Independent Review of the Assessment Documentation including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation, prepared by an Independent Environmental and Social Consultant, not directly associated with the client. This will assist the Equator Principles Financial Institutions' (EPFIs) due diligence and assess Equator Principles compliance.
- **Principle 8: Covenants.** By this principle, the client will covenant in the financing documentation to comply with all relevant host country environmental and social laws, regulations and permits in all material respects. Furthermore, for Category A and Category B Projects, the client will covenant the financial documentation to a) comply with the ESMPs and Equator Principles AP (where applicable) during the construction and operation of the Project in all material respects; b) to provide periodic reports in a format

agreed with the EPFI prepared by in-house staff or third-party experts, that demonstrate compliance with the ESMPs and Equator Principles AP (where applicable), and provide representation of compliance with relevant local, state and host country environmental and social laws, regulations and permits; and c) to decommission the facilities, where applicable and appropriate, in accordance with an agreed decommissioning plan.

- **Principle 9: Independent monitoring and reporting.** To assess Project compliance with the Equator Principles and ensure ongoing monitoring and reporting after Financial Close and over the life of the loan, the EPFI will, for all Category A and, as appropriate, Category B Projects, require the appointment of an Independent Environmental and Social Consultant, or require that the client retain qualified and experienced external experts to verify its monitoring information which would be shared with the EPFI.
- **Principle 10: Reporting and transparency.** By this principle, the client reporting requirements are in addition to the disclosure requirements in Principle 5. For all Category A and, as appropriate, Category B Projects, the client is required to a) at a minimum, provide a summary of the ESIA (accessible and available online); and b) publicly report GHG emission levels during the operational phase for Projects emitting over 100,000 tonnes of CO<sub>2</sub> equivalent annually.

The EPs apply globally to all industry sectors and to the following four financial products:

- 1) Project finance advisory services;
- 2) Project finance;
- 3) Project-related corporate loans; and
- 4) Bridge loans.

For each of those financial products, specific thresholds and criteria for their application have been identified in the EPs.

#### 4.1.2 OECD Common Approaches (CAs)

The Project will be covered by export credit guarantee, thus it has to comply with the Organization for Economic Co-operation and Development (OECD) CAs within which Projects are expected to be benchmarked against international standards as part of the environment and social due diligence process. These international standards include:

- IFC Performance Standards;
- World Bank Group EHS Guidelines.

#### 4.1.3 International Finance Corporation (IFC) Performance Standards

IFC Performance Standards (PSs)<sup>3</sup> are adopted not only by the IFC but also by a large number of financial institutions. As such, they are among the standards to be considered in assessing Project risks and impacts. The requirements of the eight PSs are summarised below:

- **Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts.** PS 1 underscores the importance of managing environmental and social performance throughout the life of a project, and in particular establishes the importance of (i) integrated assessment to identify the environmental and social impacts (including cumulative impacts from other existing, planned or reasonably defined developments in the same area of influence of a project), risks, and opportunities of projects; (ii)

<sup>3</sup> IFC, 2012. *Performance Standards* ([www.ifc.org/performancestandards](http://www.ifc.org/performancestandards)).

effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) the client's management of environmental and social performance throughout the life of the Project;

- **Performance Standard 2: Labour and Working Conditions.** PS 2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers. Through a constructive worker-management relationship, and by treating the workers fairly and providing them with safe and healthy working conditions, clients may create tangible benefits, such as enhancement of the efficiency and productivity of their operations;
- **Performance Standard 3: Resource Efficiency and Pollution Prevention.** PS 3 outlines a project-level approach to resource efficiency and pollution prevention and control in line with internationally disseminated technologies and practices. In addition, this PS promotes the ability of developers to adopt such technologies and practices as far as their use is feasible in the context of a project that relies on commercially available skills, and resources;
- **Performance Standard 4: Community Health, Safety and Security.** PS 4 reflects the potential for increased risk and impact to communities associated with Project activities, equipment, and infrastructure. It requires the proponent to evaluate potential risks and impacts to the health and safety of the affected communities throughout all stages of the Project lifecycle and to establish preventative measures to the standard of good international industry practice. This includes risks associated with alteration of natural resources and priority ecosystems that could adversely affect health and safety in affected communities or exacerbate climate change;
- **Performance Standard 5: Land Acquisition and Involuntary Resettlement.** PS 5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. To help avoid expropriation and eliminate the need to use governmental authority to enforce relocation, clients are encouraged to use negotiated settlements meeting the requirements of PS 5, even if they have the legal means to acquire land without the seller's consent;
- **Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.** PS 6 indicates that protecting and conserving biodiversity — the variety of life in all its forms, including genetic, species and ecosystem diversity — and its ability to change and evolve is fundamental to sustainable development. The objectives of PS 6 are 1) to protect and conserve biodiversity, 2) to maintain the benefits from ecosystem services, and 3) to promote the sustainable management and use of natural resources through the adoption of practices that integrate conservation needs and development priorities;
- **Performance Standard 7: Indigenous Peoples.** PS 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. Private sector projects can create opportunities for Indigenous Peoples to participate in, and benefit from project-related activities that may help them fulfil their aspiration for economic and social development. Furthermore, Indigenous Peoples may play a role in sustainable development by promoting and managing activities and enterprises as partners in development;
  - Considering that no communities that responds to the Indigenous people IFC definition have been identified in the Aol of Cabinda Province, IFC PS7 is not considered applicable to the Project.
- **Performance Standard 8: Cultural Heritage.** PS 8 seeks to protect cultural heritage that may be affected in the course of project activities. It draws on international conventions and best practices. PS 8 requires consultation with affected communities to identify cultural heritage of importance and to incorporate the

views of affected communities on cultural heritage into project decision making. Consultation must also involve the relevant national or local regulatory agencies entrusted with the protection of cultural heritage. The objectives of this PS include ensuring development proponents take the necessary steps to protect cultural heritage from adverse project impacts and to take actions to support its preservation. Also, where appropriate, PS 8 requires the equitable sharing of benefits from the use of cultural heritage.

#### **4.1.3.1 IFC Environmental Health and Safety Guidelines and other documents**

The PSs are in turn supported by Guidance Notes that explain the means to achieve compliance with the PSs, as well as General and Industry Sector EHS Guidelines, which provide industry specific directives.

The General EHS and Sector Specific Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities at reasonable costs by existing technology. A comparison of the national regulation with the EHS Guidelines and other relevant international standards is presented in Section 4.6 to set up the more stringent and consequently the applicable standard to the Project.

The following EHS Guidelines are considered applicable to the Project:

- IFC General EHS Guidelines;
- IFC EHS Guidelines for Airports (2007);
- IFC EHS Guidelines for Airlines (2007);
- IFC EHS Electric Power Transmission and Distribution (2007).

Additionally, the following guidance is as a minimum considered applicable to the Project:

- Standards and Recommended Practices (SARPs) expected from signatories to the ICAO convention. SARPs are distributed among 19 annexes;
- Procedures for Air Navigation (PANS) expected from signatories to the ICAO convention;
- Air Transport Association (IATA) Guidelines;
- Stakeholder Engagement: A Good Practice Handbook for Companies doing Business in Emerging Markets (IFC);
- United Nations Guiding Principles on Business and Human Rights;
- Interim Advice for IFC Clients on Safe Stakeholder Engagement in the Context of COVID-19;
- Addressing Grievances from Project Affected Communities (IFC);
- Handbook for Preparing a Resettlement Action Plan (IFC);
- EBRD/IFC Guidance Note on Worker's Accommodation: Processes and Standards (2009);
- Good Practice Note: Managing Contractors' Environmental and Social Performance (IFC);
- Good Practice Handbook: Use of Security Forces: Assessing and Managing Risks and Impacts;
- EPIV Implementation guidelines and supporting guidance.

## **4.2 Project Categorization**

In accordance with the OECD CAs (Annex 1 – Illustrative list of Category a Project), point 7 states that the construction of airports with a basic runway length of 2,100 metres or more is classified as Category A project.

The IFC approach described in the Interpretation Note on Environmental and Social Categorization defines Category A projects as “Business activities with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented”.

Considering that the NAIC Project will be developed in a greenfield area and in a contest where ES impacts will encompass socio-economic, physical and biological aspects in a wide area of influence, the Project categorization is clearly defined as A.

## **4.3 International Regulations applicable to the Project**

### **4.3.1 Public Air Law Treaties and Conventions**

According to ICAO (2017)<sup>4</sup>, Angola is signatory of the following multilateral air law treaties:

- Convention on International Civil Aviation (Chicago Convention), signed at Chicago on 7 December 1944;
- Protocol Relating to an Amendment to the Convention on International Civil Aviation [Article 83 bis], signed at Montréal on 6 October 1980;
- Convention for the Unification of Certain Rules Relating to International Carriage by Air, signed at Warsaw on 12 October 1929;
- Convention on the International Recognition of Rights in Aircraft, signed at Geneva on 19 June 1948;
- Protocol to Amend the Convention for the Unification of Certain Rules Relating to International Carriage by Air, done at Warsaw on 12 October 1929, as amended by the Protocol signed at The Hague on 28 September 1955;
- Convention on Offenses and Certain Other Acts Committed on Board Aircraft, signed at Tokyo on 14 September 1963;
- Convention for the Suppression of Unlawful Seizure of Aircraft, signed at The Hague on 16 December 1970;
- Protocol for the Suppression of Unlawful Acts of Violence at Airports Serving International Civil Aviation, Supplementary to the Convention for the Suppression of Unlawful Acts against the Safety of Civil Aviation, done at Montréal on 23 September 1971, signed at Montréal on 24 February 1988;
- Convention on International Interests in Mobile Equipment (Cape Town Convention), signed at Cape Town on 16 November 2001;
- Protocol to the Convention on International Interests in Mobile Equipment on Matters Specific to Aircraft Equipment, signed at Cape Town on 16 November 2001;
- Convention on the Suppression of Unlawful Acts Relating to International Civil Aviation, signed at Beijing on 10 September 2010;

### **4.3.2 Relevant Environmental International Conventions and Protocols**

Considering the location of the New International Airport of Cabinda, a number of international conventions signed by the Angolan Government are applicable to the Project. Angola is a signatory to many international and regional agreements on environmental protection, and the relevant are listed as follows:

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<sup>4</sup> [Angola.pdf \(icao.int\)](#).

- African Convention on the Conservation of Nature and Natural Resources of 15 September 1968 in Algiers (Date of signature: 27/01/2012; Date of ratification: 31/08/2020);
- Convention on the Conservation of Migratory Wildlife Species (CMS) of 23 June 1979 in Bonn (Entry into force in Angola: December 2006);
- UNESCO Convention on the Protection of Cultural and Natural World Heritage of 16 November 1972 in Paris (Date of ratification: 07/11/1991);
- Convention on Wetlands of International Importance, especially as Waterfowl Habitats (Ramsar Convention) (Letter of accession submitted by the Republic of Angola in 16/07/2022);
- Convention on International Trade in Endangered Species of Fauna and Flora (CITES) (Date of ratification: 14/02/2017);
- Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (Date of ratification: 06/02/2017, party since 07/05/2017);
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Elimination of 22 March 1989 (Entry into force in Angola: 07/05/2017);
- Bamako Convention on the Prohibition to import hazardous waste in Africa and the control of their Transboundary Movements of 30 January 1991 (Date of ratification: 01/12/1997);
- Rio Convention (agreed at the Earth Summit held in Rio de Janeiro in June 1992), which led to the following 3 conventions:
  - United Nations Framework Convention on Climate Change (UNFCCC) of 9 May 1992 in New York (Entry into force in Angola: 28/08/1998);
  - United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/ or Desertification, particularly in Africa (UNCCD) of 14 October 1994 in Paris (Date of ratification: 09/05/2000);
  - Convention on Biological Diversity (CBD) 1992. (Date of ratification: 01/04/1998);
- Kyoto Protocol to the United Nations Framework Convention on Climate Change of 11 December 1997 (Date of ratification letter for accession: 17/03/2020);
- Cartagena Protocol on Biosafety to the Convention on Biological Diversity of 29 January 2000 (Entry into force in Angola: 28/05/2009);
- Convention for the Safeguarding of the Intangible Cultural Heritage of 17 October 2003 (Entry into force in Angola: 28/10/2020);
- Convention on Persistent Organic Pollutants of 22 May 2001 in Stockholm (Entry into force in Angola: 21/01/2007);
- Paris Climate Agreement of 15 December 2015 (Entry into force in Angola: 16/12/2020);

### 4.3.3 Key UN Human Rights Treaties

According to the UN Treaty Body Database<sup>5</sup>, Angola has ratified (or accessed) the following treaties which were considered relevant to the Project:

<sup>5</sup> [https://tbinternet.ohchr.org/\\_layouts/15/TreatyBodyExternal/Treaty.aspx?CountryID=5&Lang=EN](https://tbinternet.ohchr.org/_layouts/15/TreatyBodyExternal/Treaty.aspx?CountryID=5&Lang=EN).

- CAT - Convention against Torture and Other Cruel Inhuman or Degrading Treatment or Punishment (Date of ratification: 02/10/2019);
- CCPR - International Covenant on Civil and Political Rights (Date of accession: 10/01/1992);
- CEDAW - Convention on the Elimination of All Forms of Discrimination against Women (Date of accession: 17/09/1986);
- CERD - International Convention on the Elimination of All Forms of Racial Discrimination (Date of ratification: 02/10/2019);
- CESC - International Covenant on Economic, Social and Cultural Rights (Date of accession: 10/01/1992);
- CRC - Convention on the Rights of the Child (Date of ratification: 05/12/1990);
- CRC-OP-SC - Optional Protocol to the Convention on the Rights of the Child on the sale of children child prostitution and child pornography (Date of accession: 24/03/2005);
- CRPD - Convention on the Rights of Persons with Disabilities (Date of accession: 19/05/2014).

#### **4.3.4 International Labour Organization (ILO) conventions**

International labour standards are legal instruments drawn up by the ILO's constituents (governments, employers and workers) and setting out basic principles and rights at work. They are either Conventions (or Protocols), which are legally binding international treaties that may be ratified by member states, or Recommendations, which serve as non-binding guidelines. In many cases, a Convention lays down the basic principles to be implemented by ratifying countries, while a related Recommendation supplements the Convention by providing more detailed guidelines on how it could be applied. Recommendations can also be autonomous, i.e. not linked to a Convention. Once a standard is adopted, member states are required under article 19(6) of the ILO Constitution, to submit it to their competent authority (normally Parliament) within a period of twelve months for consideration. In the case of Conventions, this means consideration for ratification. If it is ratified, a Convention generally comes into force for that country one year after the date of ratification.

The ILO Governing Body had initially identified eight "fundamental" Conventions, covering subjects that were considered to be fundamental principles and rights at work: freedom of association and the effective recognition of the right to collective bargaining; the elimination of all forms of forced or compulsory labour; the effective abolition of child labour; and the elimination of discrimination in respect of employment and occupation. These principles were also covered by the ILO Declaration on Fundamental Principles and Rights at Work (1998). Following the adoption of the Protocol of 2014 to the Forced Labour Convention, 1930, a ninth ILO instrument was then considered as "fundamental". At the 110th Session of the International Labour Conference in June 2022, the ILC adopted a Resolution on the inclusion of a safe and healthy working environment in the ILO's framework of fundamental principles and rights at work. As a result, the ILO Declaration on Fundamental Principles and Rights at Work, 1998, has been amended to this effect and the Occupational Safety and Health Convention, 1981 (No. 155) and the Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187) are now considered as fundamental Conventions within the meaning of the 1998 Declaration, as amended in 2022.

Currently Angola has ratified the following conventions:

Country	Freedom of association		Forced labour			Discrimination		Child labour		Occupational safety and health	
	C087	C098	C029	P029	C105	C100	C111	C138	C182	C155	C187
Angola	13 Jun 2001	04 Jun 1976	04 Jun 1976		04 Jun 1976	04 Jun 1976	04 Jun 1976	13 Jun 2001	13 Jun 2001		

### 4.3.5 International Civil Aviation Organization (ICAO) Standards

The International Civil Aviation Organization (ICAO) is a specialized United Nations agency, funded and directed by 193 national governments to support their diplomacy and cooperation in air transport as signatory states to the Chicago Convention of 1944 (ICAO, n.d.).

ICAO is not an international aviation regulator but serves as a global forum of States for international civil aviation. ICAO develops policies and Standards, undertakes compliance audits, performs studies and analyses, provides assistance and builds aviation capacity through many other activities and the cooperation of its Member States and stakeholders. The stipulations contained in ICAO standards never supersede the primacy of national regulatory requirements. It is always the local and national regulations that are enforced in, and by, sovereign states, and which must be legally complied with by air operators that make use of the applicable airspace and airports.

The establishment and maintenance of international Standards and Recommended Practices (SARPs), as well as Procedures for Air Navigation (PANS), are a core aspect of ICAO's mission and role. Currently, ICAO manages over 12,000 SARPs across the 19 Annexes of the Chicago Convention in addition to six PANS, many of which are constantly evolving due to latest developments and innovations. Their summary is found available online on ICAO's webpage through the link: [ICAO SARPs \(Annexes and PANS\)](#). SARPs do not have the same legal binding force as the Convention itself, because Annexes are not international treaties.

In October 2022, the ICAO Secretary General positively recognized the advances that the Government of Angola, through the Ministry of Transport, has been carrying for the modernization and efficiency of the civil aviation sector, including investments in airport infrastructure and professional training (Ver Angola, 2022).

#### 4.3.5.1 ICAO Aerodrome Reference Code

The ICAO Aerodrome Reference Code (number code and letter code) is selected for aerodrome planning purposes and is determined in accordance with the characteristics of the airplane for which an aerodrome facility is intended. In other words, it helps define the largest aircraft an airport can handle. It is included in ICAO Annex 14. The number and letter codes are explained below:

- **ICAO number code** is based on the Reference Field Length, for which there are four categories. Airplane Reference Field Length is defined as "the minimum field length required for take-off at maximum certificated take-off mass, at sea level, in International Standard Atmosphere (ISA) conditions in still air and with zero runway slope". Table 1 shows the division of the four categories:

**Table 1: Description of the numerical part of the ICAO code.**

Code number	Aeroplane Reference Field Length
1	< 800 m
2	800 m but < 1200 m
3	1200 m but < 1800 m
4	1800 m and above

- **ICAO letter code** is based on a combination of aircraft wingspan (WS)<sup>6</sup> and Outer Main Gear Wheel Span (OMGWS)<sup>7</sup>. The categories are shown in Table 2 below:

**Table 2: Description of the letter part of the ICAO code.**

Code number	WS	OMGWS
A	< 15 m	< 4.5 m
B	15 m but < 24 m	4.5 m but < 6 m
C	24 m but < 36 m	6 m but < 9 m
D	36 m but < 52 m	9 m but < 14 m
E	52 m but < 65 m	9 m but < 14 m
F	65 m but < 80 m	14 m but < 16 m

#### **4.3.5.2 ICAO - RSA 13 - Wildlife Management and Control Regulatory Framework & Guidance Material**

As part of the Mid – Region Safety Group coordinated by the Sudanese Civil Aviation Authority in cooperation with the Egyptian and the United Emirates Civil Aviation Authorities, in the contest of Runway and Ground Safety Working Group, a guideline namely Wildlife Management and Control has been published in 2017 and revised in 2018.

The purpose of this document seeks to propose a regulatory framework to support the creation and success of local WildLife Management and Control entity considering the following elements: (i) a Model regulation, (ii) Guidance material; and (iii) Model Guidance for Development of Wildlife Hazard Management Programs at Airports.

#### **4.3.6 International Air Transport Association (IATA) Regulations, Standards, Codes and Best Practices**

IATA is the trade association for the world’s airlines (for both freight and passenger carriers), representing around 300 airlines or 83% of total air traffic<sup>8</sup>. It supports airline activity and helps formulate industry policy and standards, which are essentially created to promote safety and optimize efficient operations.

IATA regulations are based on recommendations implemented by government entities (such as ICAO). Standards and procedures are created through aviation industry working groups, where IATA workgroups are included. Adherence to these standards and procedures is through IATA manuals<sup>9</sup>, with the common purpose of guiding the industry, while promoting collaboration between airlines and other parties involved in the air transport supply chain.

##### **4.3.6.1 IATA Level of Service (LoS) Best Practice**

IATA LoS<sup>10</sup> is a basic airport planning tool that provides a useful framework to support the design and expansion of airport terminal facilities and to monitor the capacity of existing facilities. The parameters that define a

<sup>6</sup> The wingspan (WS) of an airplane is the distance from the tip of one wing to the tip of the other. It is always measured in a straight line, from wingtip to wingtip, independently of wing shape or sweep.

<sup>7</sup> Outer main gear wheel span (OMGWS) means the distance between the outside edges of the main gear wheels.

<sup>8</sup> [IATA - About Us](#)

<sup>9</sup> [IATA - Why Should you Use IATA Manuals?](#)

<sup>10</sup> [IATA Level of Service \(LoS\) Best Practice](#)

passenger terminal’s capacity are directly related to passenger experience and comfort factors. Therefore, the LoS framework provides guidelines in terms of space, maximum queuing time and seating for:

- Public departures / arrivals halls;
- Check-in area including self-service kiosks, bag drop desks/units and traditional check-in desks;
- Security control;
- Emigration / Immigration control;
- Gate holdrooms / departure lounges;
- Baggage reclaim;
- Customs control.

IATA defines six LoS (Table 3). For each level of service, IATA proposes minimum pro-capita surfaces for the main functional components of the terminal and level of service C was recommended as the minimum design objective, as it indicates good service at a reasonable cost.

**Table 3: IATA LoS framework in the 9<sup>th</sup> edition of the manual. Source: Di Mascio, et al. (2020).**

Level of Service	Flow	Passenger Comfort	Delays
<b>A – Excellent</b>	Free	Excellent	No delay
<b>B – High</b>	Stable	High	Very few
<b>C – Good</b>	Stable	Good	Acceptable
<b>D – Adequate</b>	Unstable	Adequate	Acceptable for short periods
<b>E – Inadequate</b>	Unstable	Inadequate	Unacceptable
<b>F – Unacceptable</b>	Cross-flows, system breakdowns	Unacceptable	Unacceptable

### 4.3.7 US Federal Aviation Administration (FAA)

The Federal Aviation Administration (FAA) is the agency of the United States Department of Transportation responsible for the regulation and supervision of civil aviation in the United States, as well as the operation and development of the National Airspace System. Its main mission is to ensure the safety of civil aviation.

Along with the European Union Aviation Safety Agency (EASA), the FAA is one of the world’s two main agencies responsible for aircraft certification.

The FAA publishes guidelines and standards that regulate civil aviation safety. These standards ensure uniform development, evaluation and certification for airspace systems, procedures and equipment. FAA standards allow for simplification of procedures, certification of product performance, and assurance of consistent operations.

According to documentation provided (file named “AN22063-0200D Airport Land-Uses Compatibility Study REVB\_pt”), the NAIC Runway Protection Zones were defined as per the FAA criteria.

### 4.3.8 California Airports Land Use Planning Manual

The California Airports Land Use Planning Manual provides guidance to Airport Land Use Commissions on imposing height and other zoning and land use restrictions around airports. In the Project, this manual was used for definition of the Airport Runway Protection Zones.

### 4.3.9 Dutch Pollutant Standards for Soil and Groundwater

Dutch Pollutant Standards<sup>11</sup> are environmental pollutant reference values (i.e., concentrations in environmental medium) used in environmental remediation, investigation, and clean-up. Soil and groundwater target values provide an indication of the benchmark for environmental quality in the long term, assuming that there are negligible risks for the ecosystem. For metals, a distinction is made between deep and shallow groundwater. This is because deep and shallow groundwater contain different background concentrations. An arbitrary limit of 10 metres has been adopted.

Dutch Standards have been considered in this ESIA as they are widely used as benchmark values in the absence of official soil and groundwater quality limits in the country of operations and of explicit soil quality targets adopted by lenders.

### 4.3.10 WHO Guidelines for drinking-water quality

The 2017 World Health Organization Guidelines for Drinking-Water quality (4<sup>th</sup> edition) is a robust set of recommendations that provides a scientific point of departure for national authorities to develop regulations and standards for water safety in support of public health, according to the reality of each country.

The IFC General EHS Guidelines recommends that in the absence of national standards, a country should adopt the current edition of the WHO Guidelines for Drinking-Water. Although this is not Angola's case, since water quality standards have been established by Presidential Decree No. 261/11 of October 6<sup>th</sup>, the WHO Guidelines are used as Project Standards to help defining a broader list of drinking-water standards, since they cover a much wider range of parameters.

### 4.3.11 Environmental Quality Standards – European Directive 2008/105/EC

Although established for the European Union members, the European Directive 2008/105/EC is an important and internationally recognized piece of legislation in the field of water policy, which sets out Environmental Quality Standards (EQS) for priority substances and other pollutants with the aim of achieving good surface water chemical status. EQS are defined for the water column and for three substances (mercury and compounds, hexachlorobenzene and hexachlorobutadiene) in biota due to their high bioaccumulation properties.

Angolan Presidential Decree No. 261/11 of October 6<sup>th</sup> has established national standards for surface water. Still, in a lack of indication from the IFC of any international standards to be adopted for surface water, the EQS are used for this Project not only as a comparative but also to help defining a broader list of surface water standards.

### 4.3.12 Italian Contamination Threshold Values from Legislative Decree 152/2006

Since the Project is located in a region where the main economic activity is related to the oil & gas industry, with the processing and transportation of hydrocarbons, it was considered important to analyze the amounts of hydrocarbons present in groundwater for baseline studies. In the absence of national limit values and also IFC recommendations, the chosen standards to be used will be those of the Italian Legislative Decree 152/2006 since they are considered to be robust and internationally recognized.

The definition of the contamination threshold concentrations defined by Italian Legislative Decree 152/06 takes into account the guidelines contained in Annex II of the European Directive 2006/118/EC. The Directive on the

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<sup>11</sup>[Staatscourant 2000, 39 pag. 8 | Overheid.nl > Officiële bekendmakingen \(officielebekendmakingen.nl\)](#).  
[LISTA-HOLANDESA-2013.pdf \(enviroeng.eu\)](#)

protection of groundwater aims to establish specific measures to prevent and control the pollution of groundwater, with the aim of preventing the deterioration of the status of all groundwater bodies.

#### 4.4 National Legal and Regulatory Framework

Article 21<sup>st</sup> of the **Constitution of the Republic of Angola** states that it is a fundamental task of the Angolan state, among others, to promote the harmonious and sustainable development in all national territory, protecting the environment, the natural resources, and the historical, cultural and artistic heritage.

The need for environmental protection and the requirement for achieving sustainable development is founded on the right of all citizens to live in an unpolluted, healthy environment, as well as the duty to defend and preserve it, as defined in Article 39/1 of the Constitution. The same article determines that the state should adopt all necessary measurements to protect the environment, the flora and fauna species in the national territory as well as maintain ecological balance through the correct location of economic activities, the rational use of all natural resources, within a framework of sustainable development, respect the rights of future generations and ensure the preservation of different species.

With this vision, the Angolan government approved Law n° 5/98 of 19th of June, which established the **Environmental Framework Law**. This framework Law instituted environmental right in the legal framework of the country, highlighting the collective and individual responsibilities in face of the complexity of environmental questions.

Law n° 5/98 establishes the generic duty to defend the environment and to use natural resources in a sustainable way, as well as contribute to the quality of life.

Angola Constitution, as well as the Environmental Framework Law, establish the generic legal baseline for Environmental Protection in the country, and set the basis for future environmental legislation. The relevant legal local framework to this Project is presented below in Table 4.

**Table 4: Summary of Applicable Angolan Regulations.**

Area	Act / Plan	Topic	Notes	Applicability
Environmental Sector	Law No. 5/98, of June 19 <sup>th</sup>	Environmental Framework Law	Establishes the general duty regarding environmental protection and the sustainable use of natural resources.	General law – all activities
Environmental Sector	Presidential Decree No. 117/20, of April 22 <sup>nd</sup>	Environmental Impact Assessment Regulation and Environmental Licensing Procedure	Agricultural, forestry industrial, commercial, housing, tourism and infrastructure projects that, by their nature, dimension or location, have impacts on the environmental and social balance and harmony are subject to an environmental impact assessment study and licencing.	Environmental licencing of the project – Installation, operation and decommissioning licences
Environmental Sector	Executive Decree No. 92/12, of March 1 <sup>st</sup>	Term of Reference for the Development of Environmental Impact Studies	Establishes the guidelines for the preparation of studies subject to an Environmental Impact Assessment, including laying out the minimum content that must be contained within the Environmental and Social Impact Assessment report.	ESIA
Environmental Sector	Executive Decree No. 87/12, of February 24 <sup>th</sup>	Regulation on Public Consultation	Regulates the development of public consultation within an environmental impact assessment process.	ESIA
Environmental Sector	Presidential Decree No. 194/11, of July 7 <sup>th</sup>	Regulation on Responsibility for Environmental Damage	Establishes the responsibility regarding the risk and degradation of the environment based on the “polluter pays” principle in order to prevent and remedy environmental damage.	General law – all activities
Environmental Sector	Decree 01/10, of 13 <sup>th</sup> January	Regulation on Environmental Auditing	Regulates the development of environmental auditing to public and private entities whose activities are susceptible of provoking significant environmental impact.	Future auditing processes, developed in environmental licencing renewals and environmental operation licence
Biodiversity	Resolution No. 1/10, of 14 <sup>th</sup> January	National Policy on Forests, Wild Fauna	Promote the sector’s contribution to the sustainable development of the country,	Project impacts and mitigation measures

Area	Act / Plan	Topic	Notes	Applicability
		and Conservation Areas	through the preservation, conservation, development and wise use of forests, wild fauna and conservation areas, for the benefit of present and future generations.	
Biodiversity	Presidential Decree No. 26/20, of February 6 <sup>th</sup>	National Biodiversity Strategy and Action Plan (2019-2025)	The National Strategy and the Biodiversity Action Plan aims to ensure the conservation and sustainable use of biodiversity components, taking into account the fair and equitable sharing of the benefits from the use of resources conservation, preservation, protection and restoration of biodiversity in Angola.	Project impacts and mitigation measures
Biodiversity	Law 06/17, of 24 <sup>th</sup> January	Framework Law of Forests and Wild Fauna	It establishes the norms which aim to ensure the preservation and rational and sustainable use of forests and wild fauna existent in national territory, and regulates the activities related to it.	Project impacts and mitigation measures
Biodiversity	Law 08/20, of 16 <sup>th</sup> of April	Law of the Environmental Conservation Areas	It establishes the National System of Environmental Conservation Areas, which defines the criteria and rules for its creation, classification and management, through principles that ensure the preservation, conservation and sustainable use.	Project impacts and mitigation measures
Biodiversity	Presidential Decree No. 148/22, of 9 <sup>th</sup> of June	Regulation of Green Spaces	It establishes the national regulation for the management of green spaces, including requirements regarding the creation of green spaces proposed in landscape integration plans for new urban projects and also the maintenance of vegetation in public and private properties.	Project Landscape Integration

Area	Act / Plan	Topic	Notes	Applicability
Waste and Wastewater	Presidential Decree No. 190/12, of August 24 <sup>th</sup>	Regulation of Waste Management	Establishes that all public and private entities that produce waste or carry out activities related to waste management shall prepare a Waste Management Plan (WMP) prior to the commencement of their activity, containing at least all information set out in Appendices I and II, respectively.	Waste management in all project phases
Waste and Wastewater	Executive Decree No. 17/13, of January 22 <sup>nd</sup>	Regulation of Construction and Demolition Waste Management	Establishes legal regulations relating to waste management resulting from the construction or demolition of buildings or landslides, briefly referred to as construction and demolition wastes, including its prevention and reuse and operations of collection, transport, storage, sorting, treatment, recovery, and disposal.	Waste management in the construction phase
Waste and Wastewater	Presidential Decree No. 265/18, of November 15 <sup>th</sup>	Regulation for the Transfer of Waste for Reuse, Recycling and its Recovery to the outside of the country	Establishes the rules and procedures relating to operational and administrative control over the transfer of waste for reuse, recycling and its recovery abroad. This Diploma is only applicable to non-hazardous waste destined for reuse, recycling and recovery, to be transferred abroad. It applies to non-hazardous waste.	Waste management in all project phases
Waste and Wastewater	Executive decree 24/15, of 29 <sup>th</sup> January	Regulation on the registry and licencing of companies that develop activities in the area of waste and wastewater management and treatment	Establishes the requirements and procedures for the licencing of waste and wastewater operators.	External waste management operators subcontracted in the construction and operational phases

Area	Act / Plan	Topic	Notes	Applicability
Health and Safety at work	Executive Decree No. 6/96, of February 2 <sup>nd</sup>	General Regulation of Occupational Health and Safety Services	Establishes the principles that aim to promote safety, hygiene and health at work in companies, commercial and industrial establishments, and cooperatives.	All activities and workers in the construction and operational phases
Health and Safety at work	Decree No. 53/05, of August 15 <sup>th</sup>	Legal System for Work-Related Accidents and Occupational Diseases	Establishes the legal regime of work-related accidents and occupational diseases, considering as such events that occur during the course of employment within a company or institution that cause the employee injury or bodily harm resulting in inability, partial or total, temporary or permanent to work or resulting in death.	All activities and workers in the construction and operational phases
Health and Safety at work	Law No. 7/15, of June 15 <sup>th</sup>	General Labour Law	Applies to all workers providing services paid on behalf of an employer within the organization and under its supervision and direction and provides the framework for the rules and procedures for employee and employer relationship.	All workers in the construction and operational phases
Health and Safety at work	Decree No. 31/94, of 5 <sup>th</sup> of August	Health, Safety and Hygiene at Work System	Establishes the requirement for health, safety and hygiene at work systems for state, mixed and private companies and associations.	Health safety and hygiene at work management system in the construction and operational phases
Health and Safety at work	Executive decree No. 128/04, of 23 <sup>rd</sup> of November	General Regulation on Health and Safety at Work Signage	It established the minimum prescriptions for placing and using Health and Safety at Work Signage.	Health and safety at work signage in the construction and operational phases
Health and Safety at work	Presidential Decree No. 195/11, of 8 <sup>th</sup> of July	Legal regime for the prevention of fires in buildings	Establishes the requirements in safety prevention in buildings, including the consideration of safety conditions in the project phase, maintenance of safety conditions during the life cycle of the buildings, and also the requirement of previous inspection by	Fire safety measures in the construction yard and the future airport buildings

Area	Act / Plan	Topic	Notes	Applicability
			firefighters or civil protection services, with the emission of an approval certificate.	
Health and Safety at work	Presidential Decree No. 285/22, of 8 <sup>th</sup> of December	List of forbidden or conditioned jobs for minors	It establishes the list of forbidden jobs for minors and the conditions for certain jobs allowed to minors.	All workers in the construction and operational phases
Water sector	Law No. 6/02, of June 21 <sup>st</sup>	Water Law	Establishes the general principles of the legal systems regarding the use of water resources.	General law – all activities
Water sector	Presidential Decree No. 261/11, of October 6 <sup>th</sup>	Regulation of Water Quality	Establishes water quality standards and criteria for the purpose of protecting the aquatic environment and improving the quality of water on the basis of their main uses. Applies to inland waters, both superficial and groundwater, as well as the water for aquaculture, livestock, agricultural irrigation, and seaside resorts.	Quality of the used water and quality of wastewater discharged
Water sector	Presidential Decree No. 83/14, of April 22 <sup>nd</sup>	Regulation of Public Water Supply and Sanitation of Wastewater	Defines the rules regulating public water supply and wastewater sanitation activities.	Requirements for the water distribution network and wastewater discharge system in project design
Water sector	Presidential Decree No. 82/2014, of 21 <sup>st</sup> of April	Regulation on the general use of water resources	It regulates the water uses established in the water law, including the licencing of water extraction, wastewater discharge and commercial aquaculture, with the emission of water resources using titles (TURH).	Licencing of water extractions and wastewater discharges if existent in the project
Spatial Planning and Land Use	Law No. 3/04, of June 25 <sup>th</sup>	Spatial and Urban Planning Law	This law has as its object the biophysical space, consisting of all urban soils and rural areas, subsoil, the continental shelf and inland waters, with a view to ensure actions which result in the occupation and use of the spaces above, through the implementation of spatial and urban planning instruments.	General law – project location and design

Area	Act / Plan	Topic	Notes	Applicability
Spatial Planning and Land Use	Law No. 9/04, of November 9 <sup>th</sup>	Land Law	Establishes the general bases of the legal regime of land included in the original property of the State, land rights that may be levied on them, and the general scheme of transmission, constitution, exercise and extinction of these rights.	Land use rights for the project's installation lot
Spatial Planning and Land Use	Decree No. 58/07, of July 13 <sup>th</sup>	General Regulation Land Concession	Establishes the legal framework for the concession of free lands within Angola and does not apply for private property lands. It also indicates that where there is expropriation for public use or for temporary requisition of lands, fair and adequate indemnity to the owner and to affected holders of other property rights is always owed.	Land use rights for the project's installation lot
Spatial Planning and Land Use	Law no. 23/21, of 18 <sup>th</sup> October	Legal Framework on Land Registry	It establishes the methodology and norms for developing, renewing and maintaining land records, stating that each property should be identified through a numeric code, namely the property identification number (NIP), to be used in all public documents as a way to identify registered properties.	Land use rights for the project's installation lot
Spatial Planning and Land Use	Presidential Legislative Decree 9/18, of 18 <sup>th</sup> of June	Legal Framework for Geodesy and Cartography	It defines the rules to produce cartography and maps, including technical standards and requirements of licencing and homologation.	Topography and cartography services used in project design and construction phase
Spatial Planning and Land Use	Approved in the provincial government only	Cabinda Province Development Plan 2013-2017	General masterplan for the development of the Cabinda Province	Project planning, dimensioning and execution plan
Spatial Planning and Land Use	Approved in national scale	National Development Plan (PND) 2018 - 2022	The National Development Plan (PDN) 2018-2022 is a medium-term plan carried out within the scope of the National Planning System in force, following the National Development Plan	Project planning, dimensioning and execution plan

Area	Act / Plan	Topic	Notes	Applicability
			(PND) 2013-2017, and aims to promote socio-economic and territory of the country. Specifically for Cabinda Province, the plan mentions as main projects: <ul style="list-style-type: none"> <li>- Construction of the new refinery;</li> <li>- The rehabilitation or construction of the Cabinda Airport;</li> <li>- The Caio Port construction;</li> <li>- The creation of port connections between Cabinda and Soyo (new port terminals).</li> </ul> Based on information available to date, the PND 2023-2027 is still being prepared.	
Heritage	Law No. 14/05, of October 7 <sup>th</sup>	Cultural Heritage Law	Defines cultural heritage as all material goods and intangible assets which, by their recognized value, shall be subject to the authority and protection of the law, presenting a series of activities which are considered infringements against cultural heritage.	Mitigation measures in the construction phase
Heritage	Presidential Decree No. 53/13, of 6th of June	Regulation on immobile cultural heritage	Regulates the norms and procedures to protect, preserve and value monuments and architectonic places and sets, classified or in the process of classification.	Mitigation measures in the construction phase
Construction Sector	Decree 80/2006, of 30th of October	General regulation for the licencing of construction, urbanization and allotment operations	It establishes the requirement of licencing for a set of construction works, including buildings, setting the requirements for the licencing process. It also establishes the requirement of obtaining an operation permit prior to use of the buildings.	Project design requirements and construction and building use permits
Construction Sector	Decree No. 13/07, of 26th of February	General regulation of urban edifications	It establishes the general rules for the use of urban buildings, including the existence of a using permit, as well as the development of Periodic conservation works (8 years). It also	Project design requirements and construction and building use permits

Area	Act / Plan	Topic	Notes	Applicability
			defines some technical requirements for the urban buildings.	
Construction Sector	Presidential Decree No. 146/20, of 27th of May	General regulation on the development of activities in civil construction and public works, project design development and construction works' supervision	It establishes the rules for the companies that work in the construction sector, including the requirement of registry and permits.	Construction companies contracted for the project
Transports	Presidential Decree No. 157/21, of 16th of June	National Master Plan for the Transport Sector and Road Infrastructures	It establishes the masterplan for the development of the transport sector, including airports, roads, railroads and seaports.	Project planning, dimensioning and execution plan
Other Legislation	Law No. 12/11, of February 16th	Administrative Offences Law	Establishes the general bases applicable to administrative offences committed by an individual or collectively by citizens or public or private collective entities.	General law – all activities
Other Legislation	Presidential Decree 153/11, of 15th of June	Regulation on Ozone Depleting Substances	Regulation that establishes the rules for producing, exporting, re-exporting and importing of substances, equipment and devices that contribute to the depletion of the ozone layer.	Cooling equipment gases and other gases used in the construction and operation phases
Other Legislation	Joint Executive Decree 518/18, of 5th of December	HCFC'S and other mixtures import quotas	It sets limits, requirements, and permits for the import of ozone depleting substances.	Cooling equipment gases and other gases used in the construction and operation phases
Other Legislation	Decree No. 40/2004, of 2nd of July	Regulation for the licencing of installations for the use of electric energy	Establishes technical requirements for electrical installations, including in buildings, that have to be considered in the electrical project and also licencing requirements prior to the use of the building.	Project design requirements and licencing (building's electrical grid)

Area	Act / Plan	Topic	Notes	Applicability
Other Legislation	Decree No. 39/04, of 2nd of July	Statute of the technician responsible for electrical installations	Establishes rules regarding the management of electrical installations, including the requirement of a responsible technician for the operation of self-supply systems with capacity over 50 kVA.	Self-supply diesel generators used in the construction phase and the operational phase
Other Legislation	Decree No. 41/04, of 2nd of July	Regulation on the licencing of electrical energy production, transport and distribution installations	It establishes licencing requirements for several types of electric energy installations, including for self-supply diesel generators.	Self-supply diesel generators used in the construction phase and the operational phase
Other Legislation	Presidential Decree No. 173/13, of 30th of October	Licencing of storage installations for oil, fuel, gas and LPG products	It establishes requirements for the licencing of different types of storage installations and equipment for oil products, including diesel storage units, such as those used for support to self-supply diesel generators.	Diesel storage units used in the construction phase and the operational phase
Climate Change	Presidential Decree No. 216/22 of 23 August, which approves the ENAC – National Strategy for Climate Change 2022-2035.	Government's adaptation and mitigation strategy	Prepared by the Ministry of the Environment with support from the United Nations Development Program (UNDP), the ENAC identifies and defines a set of strategic options of mitigation and adaptation for different economic sectors. Based on the ENAC, Angola will update the Internally Determined National Contribution (INDCs).	Project planning, dimensioning and execution plan
Climate Change	Presidential Decree No. 8/22 of 13 January	Regulation on the National System for Monitoring, Reporting and Assessment of the Policy on Climate (SNMRV)	It will achieve its objective for climate policy, through information sharing, monitoring, reporting, assessment and reporting on the implementation of legal instruments ratified by the Republic of Angola on Climate Change. It integrates the Methodology Plan and the Database as instruments for monitoring greenhouse gas (GHG) emissions, the Knowledge Management System, the Capacity	Project planning, dimensioning and execution plan

Area	Act / Plan	Topic	Notes	Applicability
			Development Plan and the Control and Assurance System of Quality.	
Climate Change	Presidential Decree No. 8/22 of 13 January	Creates the National Climate and Environmental Observatory, coordinated by the Ministry of Culture, Tourism and Environment.	The Observatory aims at coordinating and controlling the multidisciplinary platform for the flow of statistical data and information related to climate and earth observations, environmental and socio-economic indicators, fundamental for taking political decisions related to drought, land and water use, forest fires, agriculture, ecology and health.	Project planning, dimensioning and execution plan

## 4.5 Permits and Authorizations

According to the Article 17 of the Environmental Framework Law (Law No. 5/98, of June 19<sup>th</sup>), an **Environmental License** is required for the activities which, due to their nature, location, or dimension, could cause significant environmental and/or social impact. The issuance of the license is based on the ESIA findings for the proposed activity and followed by the issuance of any other licenses legally required for each case. The request for an environmental license is made by the Project proponent, through the registration of the proposed activity in the Integrated Environmental System (SIA – Sistema Integrado do Ambiente).

Moreover, in accordance with Presidential Decree n° 162/20 - which establishes the Statutes and New Functions of the Ministry of Culture, Tourism and Environment (MCTA in Portuguese), it is the responsibility of the MCTA to proceed with the environmental licensing of projects whose activity significantly interferes with the environment.

The Presidential Decree No. 117/20, of April 22<sup>nd</sup> (EIA Regulation and Environmental Licensing Procedure) defines, in its Chapter 3, all the required licenses:

- **Environmental Installation License:** its purpose is to authorize the implementation of the Project, in accordance with the specifications contained in the project approved by the entity that oversees the activity (the MCTA for Category A and B projects, and the Municipal Authorities for Category C projects);
- **Environmental Operations License:** is issued after compliance with all the requirements contained in the ESIA and the mitigation measures of the installation phase, after inspection (except for Category D projects). It has the purpose of starting the operation of the enterprise or of the units, installations and systems that are part of the activity in the area of interest, after verifying compliance with all the requirements contained in the EIA study;

For Category A, B and C projects, environmental installation licenses are valid for 3 years, while operation licenses (which are granted after inspection) are valid for 5 years. Both are renewable upon request submitted to the authorities 90 days before their expiry. An environmental audit precedes the renewal of licenses.

- **Deactivation License:** this is intended for the closure of projects at the end of their activity, in order to ensure that potential environmental impacts are properly identified and treated in accordance with current legislation.
- **Declaration of Environmental Conformity:** this is a document that can also be issued by the MCTA, which purpose is to facilitate the process of negotiating credit with banks and other entities. It certifies that the evaluation process of a project leading to environmental licensing is underway.

At the time of this ESIA submission, the Registration in the Platform of MCTA has been completed with the number of protocol assigned as 21321520239. The local EIA is under preparation.



Figure 1: Screenshot from the local environmental licensing process

## 4.6 Definition of Project Standards

The Project will be required to comply with the most stringent limits defined in the applicable legislation, regulation, and standards discussed in the previous sections of this chapter. The most stringent limits are adopted as *Project Standards* and summarised in the Tables 6 – 14 below, which show a comparison between

limits for air, water, soil, and noise. An analysis to define the Project standards is reported in the last column of each table.

The Project standards are reported and used in the relevant technical chapters of this ESIA when baseline conditions are described, or impacts assessed for each environmental component affected by the Project.

### **Water Quality Standards – Drinking-water**

In Angola, water quality standards have been established under Presidential Decree No. 261/11 of October 6<sup>th</sup>. The Regulations<sup>12</sup> consist in 4 chapters and 10 Annexes which set the standards and measures to be applied to improve the quality of water for its main uses, such as human consumption, irrigation agriculture, bathing, aquaculture, and fishing. Regarding drinking-water, standards belonging to classes A1 and A2 are acceptable for human consumption after treatment, however in class A3 water cannot be used as drinking water, unless permitted by the Ministry of Health (MINSA) (see Table 5 below).

**Table 5: Understanding of the three different classes determined by the Angolan Presidential Decree for drinking-water parameters.**

<b>CLASS</b>	<b>Meaning</b>	<b>Observation</b>
<b>Class A1</b>	If any physical, chemical, or biological parameter identified in water presents equal values or greater than the limit established in this class (but lower than the values determined by class A2), the water must go through <b>physical treatment and disinfection</b> .  Values below Class A1 limits are considered ideal for drinking water.	The limits defined in this class are the most stringent and therefore are the values chosen as standards for this Project.  Necessary measures should be applied if needed.
<b>Class A2</b>	If any physical, chemical, or biological parameter identified in water presents equal values or greater than the limit established in this class (but lower than the values determined by class A3), the water must go through <b>physical and chemical treatment and disinfection</b> .	If this type of scenario occurs, the necessary measures should be applied.
<b>Class A3</b>	If any physical, chemical, or biological parameter identified in water presents equal values or greater than the limit established in this class, the water must go through a <b>high level of physical and chemical treatment and disinfection</b> .	Water containing parameters with measured values above the established in this class cannot be used as drinking water, unless permitted by the Ministry of Health (MINSA).  If this type of scenario occurs, the necessary measures should be applied.

Conditions under which these rules may be waived or not applied according to Article 9 in Chapter 2 of the Regulations:

- a) when floods or natural disasters occur;

<sup>12</sup> [WATER Presidential decree.pdf](#).

- b) when there are exceptional meteorological or geographic circumstances and provided that the non-compliance only concerns the parameters marked with (\*);
- c) when waters subject to a process of natural enrichment in certain substances are involved, which implies that the limits set for classes A1, A2 and A3 are exceeded;
- d) when surface waters of shallow lakes and almost stagnant waters are concerned (this derogation being applicable to lakes with a depth of not more than 20 m whose water renewal period exceeds one year and which are not wastewater receivers).

Table 11 shows the Angolan water quality standards for drinking-water. A specific column also depicts the standards from the 2017 WHO Guidelines for Drinking-Water quality (4<sup>th</sup> edition)<sup>13</sup>, since it covers a much wider range of parameters, and the IFC General EHS Guidelines<sup>14</sup> recommends that in the absence of national standards, a country should adopt the current edition of the WHO Guidelines for Drinking-Water.

### **Water Quality Standards – Surface water quality and Discharge of liquid effluents**

The Regulations of Presidential Decree No. 261/11 also set minimum environmental water quality standards for surface water and for the discharge of liquid effluents, and those are described respectively in Table 12 and Table 13.

In the case of **surface water quality**, due to the lack of indication in the IFC EHS of any international standards to be adopted, the Angolan national standards are compared with the Environmental Quality Standards (EQS) for surface waters set out in the European Directive 2008/105/EC<sup>15</sup>, which defines internationally recognized thresholds to ensure a good chemical status of surface waters and the protection of most sensitive species from direct toxicity, also including predators and humans via secondary poisoning. The EQS are also used to make up for missing parameters considered important for the protection of surface waters.

In the case of the **discharge of liquid effluents**, the national standards are compared with the *Indicative Values for Treated Sanitary Sewage Discharges* present in the General EHS Guidelines n° 1.3 (Wastewater and Ambient Water Quality)<sup>16</sup>.

### **Air quality, Soil/Groundwater quality, and Noise/Vibration Standards**

Angola still lacks national standards for air quality and other environmental aspects such as soil quality and noise and vibration.

The IFC General EHS Guidelines<sup>17</sup> recommends that in the absence of national standards, a country should adopt the current edition of the WHO Guidelines for Air Quality<sup>18</sup> for **ambient air quality**. Therefore, they will be used as the standards for this Project (Table 6). In case diesel generators are used in the Project, Table 8 provides standards for atmospheric emissions from stationary sources, according to the IFC General Guidelines. In addition, large industrial establishments are present in the Project AoI, and air pollutants released by industry such as particulate matter may contain heavy metals, potentially representing human health and environmental risks. Since the IFC and WHO do not provide standards for the concentration of heavy metals in

<sup>13</sup> [Guidelines for drinking-water quality, 4th edition, incorporating the 1st addendum \(who.int\)](https://www.who.int/publications/m/item/guidelines-for-drinking-water-quality-4th-edition-incorporating-the-1st-addendum).

<sup>14</sup> General EHS Guidelines, 2007. 3.0 Community Health and Safety (Water Quality and Availability). [Final - General EHS Guidelines APRIL 29.doc \(ifc.org\)](#)

<sup>15</sup> [EUR-Lex - 32008L0105 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/eli/dir/2008/105/oj).

<sup>16</sup> IFC General EHS Guidelines: 1.3 Wastewater and Ambient Water Quality [Final - General EHS Guidelines APRIL 29.doc \(ifc.org\)](#)

<sup>17</sup> IFC General EHS Guidelines: 1.1 Air Emissions and Ambient Air Quality [Final - General EHS Guidelines APRIL 29.doc \(ifc.org\)](#)

<sup>18</sup> World Health Organization, 2021. *WHO global air quality guidelines: Particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide*.

the air, the Italian Contamination Threshold Values from Legislative Decree 155/2010 were adopted for the Project. These are described in Table 7.

Regarding soil and groundwater quality standards, the Dutch Pollutants Standards are used since they are recognized as a valid and robust legislation to define limits for soil and groundwater quality, as explained in section 4.3.9 of this report. Table 9 and Table 10 depicts the soil and groundwater standards used for this Project, respectively. The Dutch Standards adopt the concept of Target values and Intervention Values, where the former provides a reference indication for long-term environmental quality, assuming negligible risks for the ecosystem, and the latter are representative of the level of contamination above which a serious case of contamination exists. Moreover, standards for groundwater are different for shallow (< 10 m) and deep (> 10 m) groundwaters since they contain different background concentrations. The depth of groundwater in the Project area is not known at the time of this report preparation. However, it has been reported that during the geotechnical investigations, 3 boreholes were drilled, all 25 m deep and none of them reached the water table. In this way, it is assumed that possible groundwater in the Project area is possibly found at greater depths, therefore standards designated for deep groundwater will be adopted for this Project (regarding metals concentrations as mentioned in section 4.3.9).

Also, the Italian Contamination Threshold Values from Legislative Decree 152/2006 are used as Project standards for the isomer sets of hydrocarbons ( $\geq$  C12) in soil, and for the Total Hydrocarbons content in groundwater, since the Dutch Pollutants do not provide limits for those parameters.

Moreover, Table 14 shows the **noise and vibration standards** that will be used for this Project. These standards were extracted from the IFC General EHS Guidelines n°. 1.7 Noise<sup>19</sup>, which follows the recommendations of the WHO guidelines for Community Noise<sup>20</sup>.

**Table 6: Project Standards: Air quality.**

Pollutant	Time/ Averaging Period	Maximum Allowable Limit		
		National Standards	IFC / WHO Standards	Project Standards
SO <sub>2</sub> (µg/m <sup>3</sup> )	1-hour	-	-	-
	24-hour (short-term exposure)	-	125 (Interim target 1) <sup>21</sup> 50 (Interim target 2) 40 (recommended AQG <sup>22</sup> level)	<b>40</b>
NO <sub>2</sub> (µg/m <sup>3</sup> )	1-hour	-	200 (recommended AQG level)	<b>200</b>
	Annual (long-term exposure)	-	40 (Interim target 1) 30 (Interim target 2) 20 (Interim target 3) 10 (recommended AQG level)	<b>10</b>

<sup>19</sup> IFC General EHS Guidelines: 1.7 Noise [Final - General EHS Guidelines APRIL 29.doc \(ifc.org\)](#)

<sup>20</sup> World Health Organization, 1999. *Guidelines for Community Noise*. [Guidelines for community noise \(who.int\)](#).

<sup>21</sup> Interim Targets are air pollutant levels that are higher than the air quality guideline levels, but which authorities in highly polluted areas can use to develop pollution reduction policies that are achievable within realistic time frames. The interim targets should be regarded as steps towards ultimately achieving air quality guideline levels, rather than as end targets.

<sup>22</sup> AQG: Air quality guideline level. A particular form of a guideline recommendation consisting of a numerical value expressed as a concentration of a pollutant in the air and linked to an averaging time. It is assumed that adverse health effects do not occur or are minimal below this concentration level.

Pollutant	Time/ Averaging Period	Maximum Allowable Limit		
		National Standards	IFC / WHO Standards	Project Standards
	24-hour (short-term exposure)	-	120 (Interim target 1) 50 (Interim target 2) 25 (recommended AQG level)	<b>25</b>
PM <sub>10</sub> (µg/m <sup>3</sup> )	24-hour (short-term exposure)	-	150 (Interim target 1) 100 (Interim target 2) 75 (Interim target 3) 50 (Interim target 4) 45 (recommended AQG level)	<b>45</b>
	Annual (long-term exposure)	-	70 (Interim target 1) 50 (Interim target 2) 30 (Interim target 3) 20 (Interim target 3) 15 (recommended AQG level)	<b>15</b>
Fine particles (PM <sub>2.5</sub> , µg/m <sup>3</sup> )	Annual (long-term exposure)	-	35 (Interim target 1) 25 (Interim target 2) 15 (Interim target 3) 10 (Interim target 4) 5 (recommended AQG level)	<b>5</b>
	24-hour (short-term exposure)	-	75 (Interim target 1) 50 (Interim target 2) 37.5 (Interim target 3) 25 (Interim target 4) 15 (recommended AQG level)	<b>15</b>
Ozone (µg/m <sup>3</sup> )	Daily maximum 8-hour ozone concentrations	-	160 (Interim target 1) 120 (Interim target 2) 100 (recommended AQG level)	<b>100</b>
CO (mg/m <sup>3</sup> )	24-hour (short-term exposure)	-	7 (Interim target 1) 4 (recommended AQG level)	<b>4</b>
	Daily maximum 8-hour CO concentrations	-	-	-

**Table 7: Project Standards: Air quality - Heavy Metals.**

Pollutant	Unit	Maximum Allowable Limit		
		National Standards	Italian Contamination Threshold Values from Legislative Decree 155/2010	Project Standards
Lead (Pb)	µg/m <sup>3</sup>	-	0.5	<b>0.5</b>
Arsenic (As)	ng/m <sup>3</sup>	-	6	<b>6</b>
Cadmium (Cd)	ng/m <sup>3</sup>	-	5	<b>5</b>
Nickel (Ni)	ng/m <sup>3</sup>	-	20	<b>20</b>

**Table 8: Limits for Atmospheric Emissions from Stationary Sources.**

Source	Pollutant (mg/Nm <sup>3</sup> )	Project Standard (IFC recommendations) <sup>Error! Bookmark not defined.</sup>
Diesel generators	NOx	<b>1,460</b> (if exhaust bore size diameter [mm] < 400)
		<b>1,850</b> (if exhaust bore size diameter [mm] > or = 400)
	SO <sub>2</sub>	<b>1.5</b> percent Sulfur or up to <b>3.0</b> percent Sulfur if justified by project specific considerations
	Particulate Matter (PM)	<b>50</b> or up to <b>100</b> if justified by project specific considerations

**Table 9: Soils Standards – according to the Dutch Standards<sup>11</sup> and Italian Contamination Threshold Values from Legislative Decree 152/2006.**

Parameters	Units	Soil Target Values	Soil Intervention Values	Project Standards
<b>METALS</b>				
Arsenic	mg/kg of dry soil	29	76	<b>29</b>
Antimony	mg/kg of dry soil	3	22	<b>3</b>
Barium	mg/kg of dry soil	160	-	<b>160</b>
Beryllium	mg/kg of dry soil	1.1	30	<b>1.1</b>
Cadmium	mg/kg of dry soil	0.8	13	<b>0.8</b>
Chromium <sup>3+</sup>	mg/kg of dry soil	100	180	<b>100</b>
Chromium <sup>6+</sup>	mg/kg of dry soil	-	78	-
Cobalt	mg/kg of dry soil	9	190	<b>9</b>
Copper	mg/kg of dry soil	36	190	<b>36</b>
Lead	mg/kg of dry soil	85	530	<b>85</b>
Mercury	mg/kg of dry soil	0.3	10	<b>0.3</b>
Molybdenum	mg/kg of dry soil	3	190	<b>3</b>
Nickel	mg/kg of dry soil	35	100	<b>35</b>
Selenium	mg/kg of dry soil	0.7	100	<b>0.7</b>
Silver	mg/kg of dry soil	-	15	-
Tellurium	mg/kg of dry soil	-	600	-
Thallium	mg/kg of dry soil	1	15	<b>1</b>
Tin	mg/kg of dry soil	-	900	-
Vanadium	mg/kg of dry soil	42	250	<b>42</b>
Zinc	mg/kg of dry soil	140	720	<b>140</b>

Parameters	Units	Soil Target Values	Soil Intervention Values	Project Standards
<b>INORGANIC COMPOUNDS</b>				
Bromide	mg Br/l	20	-	<b>20</b>
Chloride	mg Cl/l	-	-	-
Fluoride	mg F/l	500	-	<b>500</b>
Cyanide - free	mg/kg of dry soil	1	20	<b>1</b>
Cyanides - complex (pH < 5)	mg/kg of dry soil	5	50	<b>5</b>
Cyanides - complex (pH ≥ 5)	mg/kg of dry soil	5	50	<b>5</b>
Thiocyanates	mg/kg of dry soil	1	20	<b>1</b>
<b>AROMATIC COMPOUNDS</b>				
Benzene	mg/kg of dry soil	0.01	1.1	<b>0.01</b>
Ethylbenzene	mg/kg of dry soil	0.03	110	<b>0.03</b>
Phenol	mg/kg of dry soil	0.05	14	<b>0.05</b>
Styrene (vinylbenzene)	mg/kg of dry soil	0.3	86	<b>0.3</b>
Toluene	mg/kg of dry soil	0.01	32	<b>0.01</b>
Xylene	mg/kg of dry soil	0.1	17	<b>0.1</b>
<b>POLYCYCLIC AROMATIC HYDROCARBONS (PAH)</b>				
PAH (sum 10)	mg/kg of dry soil	1	40	<b>1</b>
Anthracene	mg/kg of dry soil	-	-	-
Benzo(a)pyrene	mg/kg of dry soil	-	-	-
Benzo(a)anthracene	mg/kg of dry soil	-	-	-
Benzo(k)fluoranthene	mg/kg of dry soil	-	-	-
Benzo(ghi)perylene	mg/kg of dry soil	-	-	-
Fluoranthene	mg/kg of dry soil	-	-	-
Naphthalene	mg/kg of dry soil	-	-	-
Phenanthrene	mg/kg of dry soil	-	-	-
<b>CHLORINATED HYDROCARBONS</b>				
Dichloromethane	mg/kg of dry soil	0.4	3.9	<b>0.4</b>
Dioxin (sum I-TEQ)	mg/kg of dry soil	-	-	-
Dichloroaniline	mg/kg of dry soil	0.005	50	<b>0.005</b>
Monochloroaniline	mg/kg of dry soil	0.005	50	<b>0.005</b>
Polychlorinated biphenyl (sum)	mg/kg of dry soil	0.02	1	<b>0.02</b>
Tetrachloroethene	mg/kg of dry soil	0.002	8.8	<b>0.002</b>
Trichloroaniline	mg/kg of dry soil	-	10	-
Trichloromethane	mg/kg of dry soil	0.02	5.6	<b>0.02</b>

Parameters	Units	Soil Target Values	Soil Intervention Values	Project Standards
Trichloroethene	mg/kg of dry soil	0.1	2.5	<b>0.1</b>
Vinyl chloride	mg/kg of dry soil	0.01	0.1	<b>0.01</b>
1,1,1-trichloroethane	mg/kg of dry soil	0.07	15	<b>0.07</b>
1,1,2-trichloroethane	mg/kg of dry soil	0.4	10	<b>0.4</b>
<b>OTHER CONTAMINANTS</b>				
Acrylonitrile	mg/kg of dry soil	0.000007	0.1	<b>0.000007</b>
Asbestos	mg/kg of dry soil	-	100	-
Butanol	mg/kg of dry soil	-	30	-
Diethylene glycol	mg/kg of dry soil	-	270	-
Ethylacetate	mg/kg of dry soil	-	75	-
Ethylene glycol	mg/kg of dry soil	-	100	-
Formaldehyde	mg/kg of dry soil	-	0.1	-
Isopropanol	mg/kg of dry soil	-	220	-
Methanol	mg/kg of dry soil	-	30	-
Mineral oil	mg/kg of dry soil	50	5000	<b>50</b>
Tribromomethane	mg/kg of dry soil	-	75	-
<b>Isomer sets of hydrocarbons (<math>\geq</math> C12)<sup>23</sup></b>				
		<b>greenfield/residential areas<sup>24</sup></b>	<b>commercial/industrial areas</b>	
Hydrocarbons < C12	mg/kg of dry soil	10	250	<b>10</b>
Hydrocarbons > C12	mg/kg of dry soil	50	750	<b>50</b>

**Table 10: Groundwater Standards – Target and Intervention Values according to the Dutch Standards<sup>11</sup>.**

Parameters	Units	Groundwater Target Values	Groundwater Intervention Values	Project Standards
<b>METALS</b>				
Arsenic	µg/l	7.2	60	<b>7.2</b>
Antimony	µg/l	0.15	20	<b>0.15</b>
Barium	µg/l	200	625	<b>200</b>
Beryllium	µg/l	-	15	-
Cadmium	µg/l	0.06	6	<b>0.06</b>
Chromium	µg/l	2.5	30	<b>2.5</b>

<sup>23</sup> Italian decree 152/2006

<sup>24</sup> [Soglie di contaminazione suolo e sottosuolo - Ecosurvey®](#)

Parameters	Units	Groundwater Target Values	Groundwater Intervention Values	Project Standards
Cobalt	µg/l	0.7	100	<b>0.7</b>
Copper	µg/l	1.3	75	<b>1.3</b>
Lead	µg/l	1.7	75	<b>1.7</b>
Mercury	µg/l	0.01	0.3	<b>0.01</b>
Molybdenum	µg/l	3.6	300	<b>3.6</b>
Nickel	µg/l	2.1	75	<b>2.1</b>
Zinc	µg/l	24	800	<b>24</b>
<b>INORGANIC COMPOUNDS</b>				
Bromide	mg/l <sup>2</sup>	-	-	-
Chloride	mg/l	100	-	<b>100</b>
Fluoride	mg/l <sup>2</sup>	-	-	-
Cyanide - free	µg/l	5	1500	<b>5</b>
Cyanides - complex (pH < 5)	µg/l	10	1500	<b>10</b>
Cyanides - complex (pH ≥ 5)	µg/l	10	1500	<b>10</b>
Thiocyanates	µg/l	-	1500	-
<b>AROMATIC COMPOUNDS</b>				
Benzene	µg/l	0.2	30	<b>0.2</b>
Ethylbenzene	µg/l	4	150	<b>4</b>
Phenol	µg/l	0.2	2000	<b>0.2</b>
Styrene (vinylbenzene)	µg/l	6	300	<b>6</b>
Toluene	µg/l	7	1000	<b>7</b>
Xylene	µg/l	0.2	70	<b>0.2</b>
<b>POLYCYCLIC AROMATIC HYDROCARBONS (PAH)</b>				
PAH (sum 10)	µg/l	-	-	-
Anthracene	µg/l	0.0007	5	<b>0.0007</b>
Benzo(a)pyrene	µg/l	0.0005	0.05	<b>0.0005</b>
Benzo(a)anthracene	µg/l	0.0001	0.5	<b>0.0001</b>
Benzo(k)fluoranthene	µg/l	0.0004	0.05	<b>0.0004</b>
Benzo(ghi)perylene	µg/l	0.0003	0.05	<b>0.0003</b>
Fluoranthene	µg/l	0.003	1	<b>0.003</b>
Naphthalene	µg/l	0.01	70	<b>0.01</b>
Phenanthrene	µg/l	0.003	5	<b>0.003</b>
<b>CHLORINATED HYDROCARBONS</b>				
Dichloromethane	µg/l	0.01	1000	<b>0.1</b>

Parameters	Units	Groundwater Target Values	Groundwater Intervention Values	Project Standards
Dioxin (sum I-TEQ)	ng/l	-	-	-
Dichloroaniline	µg/l	-	100	-
Monochloroaniline	µg/l	-	30	-
Polychlorinated biphenyl (sum)	µg/l	0.01	0.01	<b>0.01</b>
Tetrachloroethene	µg/l	0.01	40	<b>0.01</b>
Trichloroaniline	µg/l	-	10	-
Trichloromethane	µg/l	6	400	<b>6</b>
Trichloroethene	µg/l	24	500	<b>24</b>
Vinyl chloride	µg/l	0.01	5	<b>0.01</b>
1,1,1-trichloroethane	µg/l	0.01	300	<b>0.01</b>
1,1,2-trichloroethane	µg/l	0.01	130	<b>0.01</b>
<b>OTHER CONTAMINANTS</b>				
Acrylonitrile	µg/l	0.08	5	<b>0.08</b>
Butanol	µg/l	-	5600	-
Diethylene glycol	µg/l	-	13000	-
Ethylacetate	µg/l	-	15000	-
Ethylene glycol	µg/l	-	5500	-
Formaldehyde	µg/l	-	50	-
Isopropanol	µg/l	-	31000	-
Methanol	µg/l	-	24000	-
Mineral oil	µg/l	50	600	<b>50</b>
Tribromomethane	µg/l	-	630	-
Total Hydrocarbon Content	mg/l	Standard from the Italian Contamination Threshold Values from Legislative Decree 152/06 <sup>25</sup>		<b>0.35</b>

<sup>25</sup> [Soglie di Contaminazione acque sotterranee - Ecosurvey®](#)

Table 11: Drinking-Water Standards.

Parameter	UNIT	Angolan National Standards <sup>26</sup>						IFC / WHO Standards <sup>13</sup>	Project Standards
		Class A1		Class A2		Class A3			
		Max allowable <sup>27</sup>	Recom-mended <sup>28</sup>	Max allowable	Recom-mended	Max allowable	Recom-mended		
<b>WATER CHEMICAL PARAMETERS</b>									
Acrylamide	mg/l	-	-	-	-	-	-	0.0005	<b>0.0005</b>
Alachlor	mg/l	-	-	-	-	-	-	0.02	<b>0.02</b>
Aldicarb	mg/l	-	-	-	-	-	-	0.01	<b>0.01</b>
Aldrin and dieldrin	mg/l	-	0.001	-	0.0025	-	0.005	0.00003	<b>0.001</b>
Aluminium (Al)	mg/l	-	-	-	-	-	-	<i>Available evidence does not support the derivation of a health-based guideline value for aluminum in drinking water. Although 0.1–0.2 mg/l often leads to consumer complaints.</i>	-
Ammonia (NH <sub>4</sub> )	mg/l	0.05	-	1	1.5	2	4 <sup>#</sup>	<i>No health-based guideline value is proposed for Ammonia. Occurs in drinking-water at concentrations well below those of health concern.</i>	<b>0.05</b>
Antimony	mg/l	-	-	-	-	-	-	0.02	<b>0.02</b>

<sup>26</sup> Presidential Decree No. 261/11 of October 6<sup>th</sup> (Regulation on Water Quality). [WATER Presidential decree.pdf](#)

- **CLASS A1**: water to receive physical treatment and disinfection. Most stringent limits and therefore chosen as standards for this Project.
- **CLASS A2**: water to receive physical and chemical treatment and disinfection.
- **CLASS A3**: water to receive high level of physical and chemical treatment and disinfection. It cannot be used as drinking water, unless permitted by the Ministry of Health (MINSa).

<sup>27</sup> Maximum allowable concentration: limit value of concentration of a given substance or organism in a medium above which it is considered that there are risks to public health, so it cannot be exceeded.

<sup>28</sup> Maximum recommended concentration: limit value of concentration of a given substance or organism in a medium that should preferably be respected or not exceeded.

<sup>#</sup> Limit can be exceeded in case of geographic or meteorological conditions.

Parameter	UNIT	Angolan National Standards <sup>26</sup>						IFC / WHO Standards <sup>13</sup>	Project Standards
		Class A1		Class A2		Class A3			
		Max allowable <sup>27</sup>	Recom-mended <sup>28</sup>	Max allowable	Recom-mended	Max allowable	Recom-mended		
Arsenic	mg/l	0.01	0.05	-	0.05	0.05	0.1	0.01	<b>0.01</b>
Atrazine and its chloro-s-triazine metabolites	mg/l	-	-	-	-	-	-	0.1	<b>0.1</b>
Barium	mg/l	-	0.1	-	1	-	1	1.3	<b>0.1</b>
Benzene	mg/l	-	-	-	-	-	-	0.01	<b>0.01</b>
Benzo[a]pyrene	mg/l	-	0.0002	-	0.0002	-	0.001	0.0007	<b>0.0002</b>
Bisphenol A	mg/l	-	-	-	-	-	-	-	-
Boron	mg/l	1	-	1	-	1	-	2.4	<b>1.0</b>
Bromate	mg/l	-	-	-	-	-	-	0.01	<b>0.01</b>
Bromodichloromethane	mg/l	-	-	-	-	-	-	0.06	<b>0.06</b>
Bromoform	mg/l	-	-	-	-	-	-	0.1	<b>0.1</b>
Cadmium	mg/l	0.001	0.005	0.001	0.005	0.001	0.005	0.003	<b>0.001</b>
Carbofuran	mg/l	-	-	-	-	-	-	0.007	<b>0.007</b>
Carbon tetrachloride	mg/l	-	-	-	-	-	-	0.004	<b>0.004</b>
Chlorate	mg/l	-	-	-	-	-	-	0.7	<b>0.7</b>
Chlordane	mg/l	-	-	-	-	-	-	0.0002	<b>0.0002</b>
Chloride	mg/l	200	-	200	-	200	-	<i>No health-based guideline value is proposed for chloride in drinking-water. Concentrations in excess of 250 mg/l are increasingly likely to be detected by taste.</i>	<b>200</b>
Chlorine	mg/l	-	-	-	-	-	-	5	<b>5</b>

Parameter	UNIT	Angolan National Standards <sup>26</sup>						IFC / WHO Standards <sup>13</sup>	Project Standards
		Class A1		Class A2		Class A3			
		Max allowable <sup>27</sup>	Recom-mended <sup>28</sup>	Max allowable	Recom-mended	Max allowable	Recom-mended		
Chlorite	mg/l	-	-	-	-	-	-	0.7	<b>0.7</b>
Chloroform	mg/l	-	-	-	-	-	-	0.3	<b>0.3</b>
Chloroform-extractable materials	mg/l	0.1	-	0.2	-	0.5	-	-	<b>0.1</b>
Chlorotoluron	mg/l	-	-	-	-	-	-	0.03	<b>0.03</b>
Chlorpyrifos	mg/l	-	-	-	-	-	-	0.03	<b>0.03</b>
Chromium (total)	mg/l	-	0.05	-	0.05	-	0.05	0.05	<b>0.05</b>
Copper	mg/l	0.02	0.05#	0.05	-	1.0	-	2	<b>0.02</b>
Cyanazine	mg/l	-	-	-	-	-	-	0.0006	<b>0.0006</b>
Cyanide	mg/l	-	0.05	-	0.05	-	0.05	-	<b>0.05</b>
2,4-D	mg/l	-	-	-	-	-	-	0.03	<b>0.03</b>
2,4-DB	mg/l	-	-	-	-	-	-	0.09	<b>0.09</b>
DDT and metabolites	mg/l	-	-	-	-	-	-	0.001	<b>0.001</b>
Dibromo acetonitrile	mg/l	-	-	-	-	-	-	0.07	<b>0.07</b>
Dibromochloromethane	mg/l	-	-	-	-	-	-	0.1	<b>0.1</b>
1,2-Dibromo-3-chloropropane	mg/l	-	-	-	-	-	-	0.001	<b>0.001</b>
1,2-Dibromoethane	mg/l	-	-	-	-	-	-	0.0004	<b>0.0004</b>
Dichloroacetate	mg/l	-	-	-	-	-	-	0.05	<b>0.05</b>
Dichloroacetonitrile	mg/l	-	-	-	-	-	-	0.02	<b>0.02</b>

Parameter	UNIT	Angolan National Standards <sup>26</sup>						IFC / WHO Standards <sup>13</sup>	Project Standards
		Class A1		Class A2		Class A3			
		Max allowable <sup>27</sup>	Recom-mended <sup>28</sup>	Max allowable	Recom-mended	Max allowable	Recom-mended		
1,2-Dichlorobenzene	mg/l	-	-	-	-	-	-	1	<b>1</b>
1,4-Dichlorobenzene	mg/l	-	-	-	-	-	-	0.3	<b>0.3</b>
1,2-Dichloroethane	mg/l	-	-	-	-	-	-	0.03	<b>0.03</b>
1,2-Dichloroethene	mg/l	-	-	-	-	-	-	0.05	<b>0.05</b>
Dichloromethane	mg/l	-	-	-	-	-	-	0.02	<b>0.02</b>
1,2-Dichloropropane	mg/l	-	-	-	-	-	-	0.04	<b>0.04</b>
1,3-Dichloropropene	mg/l	-	-	-	-	-	-	0.02	<b>0.02</b>
Dichlorprop	mg/l	-	-	-	-	-	-	0.1	<b>0.1</b>
Di(2-ethylhexyl) phthalate	mg/l	-	-	-	-	-	-	0.008	<b>0.008</b>
Dimethoate	mg/l	-	-	-	-	-	-	0.006	<b>0.006</b>
Dissolved or emulsified hydrocarbons	mg/l	-	0.05	-	0.2	-	1	-	<b>0.05</b>
Dissolved oxygen (O <sub>2</sub> )*	% O <sub>2</sub> saturation	70	-	50	-	30	-	<i>No health-based guideline value is proposed for dissolved O<sub>2</sub>. However, very high levels of dissolved oxygen may exacerbate corrosion of metal pipes.</i>	<b>70</b>
Chemical Oxygen Demand (COD)*	mg/l	-	-	-	-	30	-	-	-

\* For the Angolan National Standards, limits can be exceeded in shallow lakes and at low renewal rate.

Parameter	UNIT	Angolan National Standards <sup>26</sup>						IFC / WHO Standards <sup>13</sup>	Project Standards
		Class A1		Class A2		Class A3			
		Max allowable <sup>27</sup>	Recom-mended <sup>28</sup>	Max allowable	Recom-mended	Max allowable	Recom-mended		
Biochemical Oxygen Demand (BOD)*	mg/l	3	-	5	-	7	-	-	<b>3</b>
1,4-Dioxane	mg/l	-	-	-	-	-	-	0.05	<b>0.05</b>
Edetic acid	mg/l	-	-	-	-	-	-	0.6	<b>0.6</b>
Endrin	mg/l	-	-	-	-	-	-	0.0006	<b>0.0006</b>
Epichlorohydrin	mg/l	-	-	-	-	-	-	0.0004	<b>0.0004</b>
Ethylbenzene	mg/l	-	-	-	-	-	-	0.3	<b>0.3</b>
Fenoprop	mg/l	-	-	-	-	-	-	0.009	<b>0.009</b>
Fluoride	mg/l	0.7 – 1.7	1.5	0.7 – 1.7	-	0.7 – 1.7	-	1.5	<b>0.7 – 1.5</b>
Haloacetic acids (HAAS)	mg/l	-	-	-	-	-	-	-	-
Hexachlorobutadiene	mg/l	-	-	-	-	-	-	0.0006	<b>0.0006</b>
Hexachlorociclohexano	mg/l	-	0.001	-	0.0025	-	0.005	0.002	<b>0.001</b>
Hydroxy atrazine	mg/l	-	-	-	-	-	-	0.2	<b>0.2</b>
Iron* (Fe)	mg/l	0.1	0.3	1.0	2.0	1.0	-	<i>No health-based guideline value is proposed for Fe. Not of health concern at levels causing acceptability problems in drinking-water.</i>	<b>0.1</b>
Isoproturon	mg/l	-	-	-	-	-	-	0.009	<b>0.009</b>
Lead	mg/l	-	0.05	-	0.05	-	0.05	0.01	<b>0.01</b>
Lindane	mg/l	-	-	-	-	-	-	0.002	<b>0.002</b>

Parameter	UNIT	Angolan National Standards <sup>26</sup>						IFC / WHO Standards <sup>13</sup>	Project Standards
		Class A1		Class A2		Class A3			
		Max allowable <sup>27</sup>	Recom-mended <sup>28</sup>	Max allowable	Recom-mended	Max allowable	Recom-mended		
Manganese* (Mn)	mg/l	0.05	-	0.01	-	1.0	-	<i>No health-based guideline value is proposed for Mn. Not of health concern at levels found in drinking-water.</i>	<b>0.05</b>
Mecoprop	mg/l	-	-	-	-	-	-	0.01	<b>0.01</b>
Mercury	mg/l	0.0005	0.001	0.0005	0.001	0.0005	0.001	0.006	<b>0.0005</b>
Methoxychlor	mg/l	-	-	-	-	-	-	0.02	<b>0.02</b>
Metolachlor	mg/l	-	-	-	-	-	-	0.01	<b>0.01</b>
Microcystin-LR	mg/l	-	-	-	-	-	-	0.001	<b>0.001</b>
Molinate	mg/l	-	-	-	-	-	-	0.006	<b>0.006</b>
Monochloramine	mg/l	-	-	-	-	-	-	3	<b>3</b>
Monochloroacetate	mg/l	-	-	-	-	-	-	0.02	<b>0.02</b>
Nickel	mg/l	-	-	-	-	-	-	0.07	<b>0.07</b>
Nitrate*, as NO <sup>3-</sup>	mg/l	25	50#	-	50#	-	50#	50	<b>25</b>
Nitrioltriactic acid	mg/l	-	-	-	-	-	-	0.2	<b>0.2</b>
Nitrite, as NO <sup>2-</sup>	mg/l	-	-	-	-	-	-	3	<b>3</b>
N-Nitrosodimethylamine	mg/l	-	-	-	-	-	-	0.0001	<b>0.0001</b>
Pendimethalin	mg/l	-	-	-	-	-	-	0.02	<b>0.02</b>
Pentachlorophenol	mg/l	-	-	-	-	-	-	0.009	<b>0.009</b>
Perchlorate	mg/l	-	-	-	-	-	-	0.07	<b>0.07</b>

Parameter	UNIT	Angolan National Standards <sup>26</sup>						IFC / WHO Standards <sup>13</sup>	Project Standards
		Class A1		Class A2		Class A3			
		Max allowable <sup>27</sup>	Recom- mended <sup>28</sup>	Max allowable	Recom- mended	Max allowable	Recom- mended		
Phenols	mg/l	-	0.001	0.001	0.005	0.01	0.1	-	<b>0.001</b>
Phosphate*	mg/l	0.4	-	0.7	-	0.7	-	-	<b>0.4</b>
Polynuclear aromatic hydrocarbons (PAHs)	mg/l	-	0.0002	-	0.0002	-	0.001	0.0007 (Benzo[a]pyrene)	<b>0.0002</b>
Potassium (K)	mg/l	-	-	-	-	-	-	<i>No health-based guideline value is proposed for K. Occurs in drinking-water at concentrations well below those of health concern.</i>	-
Potassium permanganate (KMnO4)	mg/l	-	-	-	-	-	-	<i>Currently, there is no evidence that potassium levels in municipally treated drinking-water, even water treated with potassium permanganate, are likely to pose any risk for the health of consumers.</i>	-
Selenium	mg/l	-	0.01	-	0.05	-	0.01	0.04	<b>0.01</b>
Silver (Ag)	mg/l	-	-	-	-	-	-	<i>No health-based guideline value is proposed for Ag. Available data inadequate to permit derivation of health-based guideline value.</i>	-
Simazine	mg/l	-	-	-	-	-	-	0.002	<b>0.002</b>
Sodium	mg/l	-	-	-	-	-	-	50	<b>50</b>
Styrene	mg/l	-	-	-	-	-	-	0.02	<b>0.02</b>
Sulfates	mg/l	150	250	150	250#	150	250#	<i>No health-based guideline value has been derived for sulfate. It is generally considered that taste impairment is minimal at levels below 250 mg/l.</i>	<b>150</b>

Parameter	UNIT	Angolan National Standards <sup>26</sup>						IFC / WHO Standards <sup>13</sup>	Project Standards
		Class A1		Class A2		Class A3			
		Max allowable <sup>27</sup>	Recom-mended <sup>28</sup>	Max allowable	Recom-mended	Max allowable	Recom-mended		
Surfactants (sodium lauryl sulfate)	mg/l	0.2	-	0.2	-	0.2	-	-	<b>0.2</b>
2,4,5-T	mg/l	-	-	-	-	-	-	0.009	<b>0.009</b>
Terbutylazine	mg/l	-	-	-	-	-	-	0.007	<b>0.007</b>
Tetrachloroethene	mg/l	-	-	-	-	-	-	0.04	<b>0.04</b>
Toluene	mg/l	-	-	-	-	-	-	0.7	<b>0.7</b>
Total Kjeldahl Nitrogen (TKN)	mg/l	1	-	2	-	3	-	-	<b>1</b>
Total pesticides	mg/l	-	0.001	-	0.0025	-	0.005	-	<b>0.001</b>
Trichloroacetate	mg/l	-	-	-	-	-	-	0.2	<b>0.2</b>
Trichloroethene	mg/l	-	-	-	-	-	-	0.02	<b>0.02</b>
2,4,6-Trichlorophenol	mg/l	-	-	-	-	-	-	0.2	<b>0.2</b>
Trifluralin	mg/l	-	-	-	-	-	-	0.02	<b>0.02</b>
Uranium	mg/l	-	-	-	-	-	-	0.03	<b>0.03</b>
Vinyl chloride	mg/l	-	-	-	-	-	-	0.0003	<b>0.0003</b>
Xylenes	mg/l	-	-	-	-	-	-	0.5	<b>0.5</b>
Zinc (Zn)	mg/l	0.5	3	1	5	1	5	<i>No health-based guideline value is proposed for Zn. Not of health concern at levels causing acceptability problems in drinking-water.</i>	<b>0.5</b>

Parameter	UNIT	Angolan National Standards <sup>26</sup>						IFC / WHO Standards <sup>13</sup>	Project Standards
		Class A1		Class A2		Class A3			
		Max allowable <sup>27</sup>	Recom-mended <sup>28</sup>	Max allowable	Recom-mended	Max allowable	Recom-mended		
<b>INDICATOR OF ORGANISMS</b>									
Enterococcus faecalis	CFU/100ml <sup>14</sup>	20	-	1000	-	10.000,00	-	<i>The presence of intestinal enterococci provides evidence of recent faecal contamination, and detection should lead to consideration of further action, which could include further sampling and investigation of potential sources such as inadequate treatment or breaches in distribution system integrity.</i>	<b>20</b>
Escherichia coli	CFU/100ml <sup>14</sup>	-	-	-	-	-	-	0 CFU / 100ml water sample. <i>Escherichia coli is considered the most suitable indicator of faecal contamination.</i>	<b>0</b>
Faecal coliforms	CFU/100ml <sup>14</sup>	20	-	2000	-	20.000,00	-	-	<b>20</b>
Salmonella	-	Absence in 5000 ml	-	Absence in 1000 ml	-	-	-	<i>E. coli is a generally reliable indicator for Salmonella spp. in drinking-water supplies. Within a water safety plan, control measures that can be applied to manage risk include protection of raw water supplies from human and animal waste, adequate treatment and protection of water during distribution.</i>	<b>Absence in 5000 ml</b>
Total coliform bacteria	CFU <sup>29</sup> /100ml	50	-	5000	-	50.000,00	-	0 CFU / 100ml water sample.	<b>0</b>

<sup>29</sup> CFU/ml = colony forming unit per milliliter. CFU is a unit commonly used to estimate the concentration of microorganisms in a test sample (Source: [Definition of CFU - glossary term CFU \(synbiosis.com\)](https://www.synbiosis.com)).

Parameter	UNIT	Angolan National Standards <sup>26</sup>						IFC / WHO Standards <sup>13</sup>	Project Standards
		Class A1		Class A2		Class A3			
		Max allowable <sup>27</sup>	Recom- mended <sup>28</sup>	Max allowable	Recom- mended	Max allowable	Recom- mended		
								<i>Total coliforms should be absent immediately after disinfection, and the presence of these organisms indicates inadequate treatment.</i>	
Total pathogens 22°C/72h	CFU/ 1ml	100	-	-	-	-	-	-	<b>100</b>
Total pathogens 37°C/48h	CFU/ 1ml	10	-	-	-	-	-	-	<b>10</b>
<b>WATER PHYSICAL PARAMETERS</b>									
Conductivity	µS/cm at 20°C	1000	-	1000	-	1000	-	-	<b>1000</b>
Colour (after filtration)	TCU <sup>30</sup> , scale Pt-Co	10	20#	50	100#	50	200#	<i>Drinking water should ideally have no visible colour. Levels of colour below 15 TCU are often acceptable to consumers. The source of colour should be investigated.</i>	<b>10</b>
Odour / smell	At a factor dilution of:	3	-	10	-	20	-	<i>Changes in the normal appearance, taste or odour of a drinking-water supply may signal changes in the quality of the raw water source or deficiencies in the treatment process and should be investigated.</i>	<b>3</b>
pH	Units	6.5 – 8.5	-	5.5 – 9.0	-	5.5 – 9.0	-	<i>The optimum pH required will vary in different supplies according to the composition of the water and the nature</i>	<b>6.5 – 8.5</b>

<sup>30</sup> True Colour Unit (TCU), or a platinum-cobalt unit, refers to the result of dissolved organics, minerals, or chemicals in water. All suspended substances have been filtered.

Parameter	UNIT	Angolan National Standards <sup>26</sup>						IFC / WHO Standards <sup>13</sup>	Project Standards
		Class A1		Class A2		Class A3			
		Max allowable <sup>27</sup>	Recom-mended <sup>28</sup>	Max allowable	Recom-mended	Max allowable	Recom-mended		
								<i>of the construction materials used in the distribution system, but it is usually in the range 6.5–8.5.</i>	
Temperature	°C	22	25#	22	25#	22	25#	<i>WHO does not define a standard for water temperature, although it states that "temperature will have an impact on the acceptability of a number of other inorganic constituents and chemical contaminants that may affect taste. High water temperature enhances the growth of microorganisms and may increase problems related to taste, odour, colour and corrosion".</i>	<b>22</b>
Total Dissolved Solids (TDS)	ppm (~mg/L)	25	-	-	-	-	-	<i>No health-based guideline value is proposed for TDS. Not of health concern at levels found in drinking-water. The palatability in levels less than 600 mg/l is generally considered to be good.</i>	<b>25</b>
Turbidity	mg/l	-	-	-	-	-	-	Average 0.2 or less / No more than 0.5	<b>Average 0.2 or less / No more than 0.5</b>

Table 12: Surface Water Standards.

Parameter	UNIT	Angolan National Standards	EU Directive 2008/105/EC Standards <sup>15</sup>				Project Standard
			Inland Surface Waters <sup>31</sup>		Other Surface Waters <sup>32</sup>		
			1-year Average <sup>33</sup>	Max allowable <sup>34</sup>	1-year Average	Max allowable	
Alachlor	µg/l	-	0.3	0.7	0.3	0.7	<b>0.3</b>
Ammonia	mg/l	1	-	-	-	-	<b>1</b>
Anthracene	µg/l	-	0.1	0.4	0.1	0.4	<b>0.1</b>
Anionic surfactants	mg/l	0.5	-	-	-	-	<b>0.5</b>
Atrazine	µg/l	-	0.6	2.0	0.6	2.0	<b>0.6</b>
Benzene	µg/l	-	10	50	8	50	<b>10</b>
Biochemical Oxygen Demand (BOD)	mg/l	5	-	-	-	-	<b>5</b>
Carbon-tetrachloride	µg/l	-	12	not applicable	12	not applicable	<b>12</b>
C10-13 Chloroalkanes	µg/l	-	0.4	1.4	0.4	1.4	<b>0.4</b>
Chemical Oxygen Demand (COD)	mg/l	-	-	-	-	-	<b>125</b>

<sup>31</sup> Inland surface waters: rivers and lakes.

<sup>32</sup> Other surface waters: transitional, coastal, and territorial waters.

<sup>33</sup> Annual average concentration: threshold established after measurements over a 1-year period. The purpose of this standard is to ensure protection against long-term exposure to pollutants in the aquatic environment and chronic effects.

<sup>34</sup> Max allowable concentration of the substance concerned, i.e. the maximum for any single measurement. The purpose of this standard is to ensure protection against short-term exposure to pollutants, and direct and acute eco-toxic effects, i.e. pollution peaks.

Parameter	UNIT	Angolan National Standards	EU Directive 2008/105/EC Standards <sup>15</sup>				Project Standard
			Inland Surface Waters <sup>31</sup>		Other Surface Waters <sup>32</sup>		
			1-year Average <sup>33</sup>	Max allowable <sup>34</sup>	1-year Average	Max allowable	
Chlorfenvinphos	µg/l	-	0.1	0.3	0.1	0.3	<b>0.1</b>
Chloride	mg/l	250	-	-	-	-	<b>250</b>
Chloro-phenols	µg/l, per compound	100	-	-	-	-	<b>100</b>
Cyclodiene pesticides: Aldrin Dieldrin Endrin Isodrin	µg/l	-	Σ = 0,01	not applicable	Σ = 0,005	not applicable	<b>Σ = 0,01</b>
DDT total	µg/l	-	0.025	not applicable	0.025	not applicable	<b>0.025</b>
para-para-DDT	µg/l	-	0.01	not applicable	0.01	not applicable	<b>0.01</b>
1,2-Dichloroethane	µg/l	-	10	not applicable	10	not applicable	<b>10</b>
Dichloromethane	µg/l	-	20	not applicable	20	not applicable	<b>20</b>
Di(2-ethylhexyl)-phthalate (DEHP)	µg/l	-	1.3	not applicable	1.3	not applicable	<b>1.3</b>
Dissolved Oxygen	% of saturation	50	-	-	-	-	<b>50</b>
Diuron	µg/l	-	0.2	1.8	0.2	1.8	<b>0.2</b>
Endosulfan	µg/l	-	0.005	0.01	0.0005	0.004	<b>0.005</b>
Fluoranthene	µg/l	-	0.1	1	0.1	1	<b>0.1</b>

Parameter	UNIT	Angolan National Standards	EU Directive 2008/105/EC Standards <sup>15</sup>				Project Standard
			Inland Surface Waters <sup>31</sup>		Other Surface Waters <sup>32</sup>		
			1-year Average <sup>33</sup>	Max allowable <sup>34</sup>	1-year Average	Max allowable	
Hexachloro-benzene	µg/l	-	0.01	0.05	0.01	0.05	<b>0.01</b>
Hexachloro-butadiene	µg/l	-	0.1	0.6	0.1	0.6	<b>0.1</b>
Hexachloro-cyclohexane	µg/l	-	0.02	0.04	0.002	0.02	<b>0.02</b>
Isoproturon	µg/l	-	0.3	1.0	0.3	1.0	<b>0.3</b>
Kjeldahl Nitrogen	mg/l	2	-	-	-	-	<b>2</b>
Naphthalene	µg/l	-	2.4	not applicable	1.2	not applicable	<b>2.4</b>
Nonylphenol (4-Nonylphenol)	µg/l	-	0.3	2.0	0.3	2.0	<b>0.3</b>
Octylphenol ((4-(1,1',3,3'-tetramethylbutyl)- phenol))	µg/l	-	0.1	not applicable	0.01	not applicable	<b>0.1</b>
Oil and grease	mg/l	-	-	-	-	-	-
Pentachloro-benzene	µg/l	-	0.007	not applicable	0.0007	not applicable	<b>0.007</b>
Pentachloro-phenol	µg/l	-	0.4	1	0.4	1	<b>0.4</b>
Pesticides (total)	µg/l	2.5	-	-	-	-	<b>2.5</b>
Pesticides (per individual substance)	µg/l	0.5	-	-	-	-	<b>0.5</b>
pH	units	5.0 – 9.0	-	-	-	-	<b>5.0 – 9.0</b>
Poly-aromatic hydrocarbons (PAH)	µg/l	100	not applicable	not applicable	not applicable	not applicable	<b>100</b>

Parameter	UNIT	Angolan National Standards	EU Directive 2008/105/EC Standards <sup>15</sup>				Project Standard
			Inland Surface Waters <sup>31</sup>		Other Surface Waters <sup>32</sup>		
			1-year Average <sup>33</sup>	Max allowable <sup>34</sup>	1-year Average	Max allowable	
Benzo(a)pyrene	µg/l	-	0.05	0.1	0.05	0.1	<b>0.05</b>
Benzo(b)fluor-anthene	µg/l	-	Σ = 0.03	not applicable	Σ = 0.03	not applicable	<b>Σ = 0.03</b>
Benzo(k)fluor-anthene							
Benzo(g,h,i)-perylene	µg/l	-	Σ = 0.02	not applicable	Σ = 0.02	not applicable	<b>Σ = 0.02</b>
Indeno(1,2,3-cd)-pyrene							
Poly-chlorinated biphenyl	µg/l	0.02	-	-	-	-	<b>0.02</b>
Simazine	µg/l	-	1	4	1	4	<b>1</b>
Temperature	°C	30	-	-	-	-	<b>30</b>
Allowable variation in temperature from ambient	°C	3	-	-	-	-	<b>3</b>
Sulphate	mg/l	250	-	-	-	-	<b>250</b>
Tetrachloro-ethylene	µg/l	-	10	not applicable	10	not applicable	<b>10</b>
Trichloro-ethylene	µg/l	-	10	not applicable	10	not applicable	<b>10</b>
Tributyltin compounds (Tributyltin-cation)	µg/l	-	0.0002	0.0015	0.0002	0.0015	<b>0.0002</b>
Trichloro-benzenes	µg/l	-	0.4	not applicable	0.4	not applicable	<b>0.4</b>
Trichloro-methane	µg/l	-	2.5	not applicable	2.5	not applicable	<b>2.5</b>

Parameter	UNIT	Angolan National Standards	EU Directive 2008/105/EC Standards <sup>15</sup>				Project Standard
			Inland Surface Waters <sup>31</sup>		Other Surface Waters <sup>32</sup>		
			1-year Average <sup>33</sup>	Max allowable <sup>34</sup>	1-year Average	Max allowable	
Trifluralin	µg/l	-	0.03	not applicable	0.03	not applicable	<b>0.03</b>
Total arsenic	mg/l	0.1	-	-	-	-	<b>0.1</b>
Total cadmium	mg/l	0.01	≤ 0.00008 (Class 1) 0.00008 (Class 2) 0.00009 (Class 3) 0.00015 (Class 4) 0.00025 (Class 5)	≤ 0.00045 (Class 1) 0.00045 (Class 2) 0.0006 (Class 3) 0.0009 (Class 4) 0.0016 (Class 5)	0.0002	≤ 0.00045 (Class 1) 0.00045 (Class 2) 0.0006 (Class 3) 0.0009 (Class 4) 0.0016 (Class 5)	<b>0.00008</b>
Total chromium	mg/l	0.05	-	-	-	-	<b>0.05</b>
Total copper	mg/l	0.1	-	-	-	-	<b>0.1</b>
Total cyanide	mg/l	0.05	-	-	-	-	<b>0.05</b>
Total lead	mg/l	0.05	0.0072	Not applicable	0.0072	Not applicable	<b>0.0072</b>
Total mercury	mg/l	0.001	0.00005	0.00007	0.00005	0.00007	<b>0.00005</b>
Total nickel	mg/l	0.05	0.02	Not applicable	0.02	Not applicable	<b>0.02</b>
Total nitrogen	mg/l	-	-	-	-	-	
Total phosphorus	mg/l	1	-	-	-	-	<b>1</b>
Total suspended solids	mg/l	-	-	-	-	-	
Total zinc	mg/l	0.5	-	-	-	-	<b>0.5</b>

**Table 13: Effluent Wastewater Standards. Indicative values for treated sanitary sewage discharge.**

Parameter	Unit	Angolan National Standards	IFC Standards 2012 <sup>35</sup>	Project Standard
Aldehyde	mg/l	1	-	<b>1</b>
Aluminium	mg/l	10	-	<b>10</b>
Ammonia	mg/l	10	-	<b>10</b>
Biochemical Oxygen Demand (BOD)	mg/l	40	30	<b>30</b>
Chemical Oxygen Demand (COD)	mg/l	150	125	<b>125</b>
Colour	-	Not visible at a dilution of 1:20	-	<b>Not visible at a dilution of 1:20</b>
Dissolved Oxygen	mg/l	40	-	<b>40</b>
Chlorine (free)	mg/l	0.5	-	<b>0.5</b>
Chlorine (total)	mg/l	1	-	<b>1</b>
Detergents (sodium lauryl sulphate)	mg/l	2	-	<b>2</b>
Mineral oils	mg/l	15	-	<b>15</b>
Nitrate	mg/l	50	-	<b>50</b>
Odour	-	Not detectable at a dilution of 1:20	-	<b>Not detectable at a dilution of 1:20</b>
Oil and grease	mg/l	15	10	<b>10</b>
pH	units	6.0 – 9.0	6.0 – 9.0	<b>6.0 – 9.0</b>
Phenol	mg/l	0.5	-	<b>0.5</b>
Sulphate	mg/l	2000	-	<b>2000</b>
Sulphide	mg/l	1	-	<b>1</b>
Sulphite	mg/l	1	-	<b>1</b>
Sulphur	mg/l	1	-	<b>1</b>
Temperature	°C	Not to increase by more than 3°C	-	<b>Not to increase by more than 3°C</b>
Total arsenic	mg/l	1	-	<b>1</b>
Total cadmium	mg/l	2	-	<b>2</b>
Total chromium	mg/l	2	-	<b>2</b>
Hexavalent chromium	mg/l	0.1	-	<b>0.1</b>

<sup>35</sup> IFC General Environmental, Health, and Safety (EHS) Guidelines. [Final - General EHS Guidelines APRIL 29.doc \(ifc.org\)](#).

Parameter	Unit	Angolan National Standards	IFC Standards 2012 <sup>35</sup>	Project Standard
Total coliform bacteria <sup>36</sup>	MPN <sup>37</sup> /100 ml	-	400	<b>400</b>
Total copper	mg/l	1	-	<b>1</b>
Total cyanide	mg/l	0.5	-	<b>0.5</b>
Total iron	mg/l	2	-	<b>2</b>
Total lead	mg/l	1	-	<b>1</b>
Total manganese	mg/l	2	-	<b>2</b>
Total mercury	mg/l	0.05	-	<b>0.05</b>
Total nickel	mg/l	2	-	<b>2</b>
Total nitrogen	mg/l	15	10	<b>10</b>
Total phosphorus	mg/l	3 (in waters that feed lagoons or reservoirs) 0.5 (in lagoons or reservoirs)	2	<b>2</b>
Total suspended solids	mg/l	60	50	<b>50</b>

**Table 14: Noise Level Guidelines (IFC Environmental Health and Safety Guidelines<sup>19</sup>).**

Environment	Time Base	Unit	Project Standards (as per IFC guidelines)
Residential; institutional; educational <sup>38</sup>	Day time 07:00 - 22:00	LAeq [dB]	<b>55</b>
	Nigh time 22:00 - 07:00	LAeq [dB]	<b>45</b>
Industrial; commercial	Day time 07:00 - 22:00	LAeq [dB]	<b>70</b>
	Nigh time 22:00 - 07:00	LAeq [dB]	<b>70</b>

<sup>36</sup> Not applicable to centralized, municipal, wastewater treatment systems which are included in EHS Guidelines for Water and Sanitation.

<sup>37</sup> MPN/100ml = Most Probable Number in 100 ml.

<sup>38</sup> Guidelines values are for noise levels measured out of doors. For acceptable indoor noise levels for residential, institutional, and educational settings refer to WHO (1999).



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