REPUBLIQUE DU CAMEROUN

Paix – Travail - Patrie

AUTORITE AERONAUTIQUE

Le Directeur Général

REPUBLIC OF CAMEROON

Peace - Work - Fatherland

CAMEROON CIVIL AVIATION AUTHORITY

The Director General

Circular N° 000014 /C/CCAA/DG of 19 SEP 2022

Relating to the compatibility of land use in the vicinity of aerodromes

TABLE OF CONTENTS

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

LISTE OF FIGURES

LIST OF TABLES

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

1. INTRODUCTION

1.1 Purpose

(1) This circular provides guidance to ensure compatibility between proposed activities and facilities in the vicinity of aerodromes and the operation of the relevant aerodromes.

(2) It is meant for stakeholders involved in the planning and management of land use, more specifically aerodrome operators, relevant administrations, and local authorities in charge of implementing environmental and town planning policies.

1.2 Background

This circular applies to aerodromes open for public or private air traffic.

1.3 Description of changes

Not applicable.

2. REQUIREMENTS AND REFERENCES

2.1 Requirements

(a) Law N°2013/010 of July 24, 2013 on the civil aviation regime in Cameroon;

(b) Decree No. 2003/2032/PM of 4 September 2003 to lay down conditions for the creation, opening, classification and closure of aerodromes and aeronautical easements;

(c) Decree N°2015/0996/PM of 29 April 2015 to organise the prevention of wildlife strike on Cameroon's aerodromes:

(d) Order No 00007/A/MINT of 10 June 2019 laying down the standards for the design, construction and operation of aerodromes in Cameroon;

(e) Circular N°017/C/CCAADSA/SDNAA/SAE/of November 13, 2017 laying down the procedure for requesting the establishment of a structure in the vicinity of aerodromes.

2.2 References

(a) ICAO Doc 9137 Airport Services Manual, Part 3 - Wildlife Hazard Management, 5th Edition, 2020;

(b) ICAO Doc 9137 Airport Services Manual, Part 6: Obstacle Regulations, 2nd edition, 1983;

(c) ICAO Doc 9184 Airport Planning Manual, Part 2 - Land Use and Environmental Regulations, 4th edition, 2018;

(d) ICAO Doc 10066 Procedures for Air Navigation Services, Aeronautical

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

Information Management, 1st edition, 2018;

(e) ICAO EUR DOC 015, European guidance material on managing building restricted areas, third edition, 2015;

(f) Guidance material for land use at/or near aerodromes, Civil Aviation Authority of New Zealand, June 2008;

(g) TP1247F: Land use in the vicinity of aerodromes, Transport Canada, 2013/2014;

(h) Guidance on land use and environmental management, Civil Aviation of Madagascar, 3rd edition, 2017;

(i) Master II thesis in Computer Science Applied to Geographic Information Systems (IASIG) presented by Mr. NEGOU Joseph Romeo under the theme "Contribution of cartography for the securing of air navigation: Case of the Yaounde-Nsimalen International Airport."

3. DEFINITIONS AND ABBREVIATIONS

3.1 Definitions

(a) **Aerodrome**: A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

(b) **Runway strip:** A defined area including the runway and stopway, if provided, intended to:

- reduce the risk of damage to aircraft running off a runway; and
- protect aircraft flying over it during take-off or landing operations.

(b) **Runway:** A defined rectangular area on a land aerodrome prepared for the landing and take-off run of aircraft.

(c) **Aerodrome reference point:** The designated geographical location of an aerodrome.

(d) **Runway threshold:** The beginning of that portion of the runway usable for landing.

3.2 Abbreviations

(e)	**ARP**	Aerodrome Reference Point
(f)	**DME**	Distance Measuring Equipment
(g)	**EPNL**	Effective Perceived Noise Level
(h)	**ILS**	Instrument Landing System
(i)	**MANPADS**	Man-Portable Air Defense Systems

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

(j)	**NDB**	Non-Directional Beacon
(k)	**ICAO**	International Civil Aviation Organisation
(l)	**OFZ**	Obstacle Free Zone
(m)	**OLS**	Obstacle Limitation Surfaces
(n)	**OPS**	Obstacle Protection Surfaces
(o)	**VOR**	VHF Omnidirectional Range
(p)	**PAPI**	Precision Approach Path Indicator
(q)	**PSA**	Aviation Easement Plans
(r)	**VASIS**	Visual Approach Slope Indicator Systems

4. BACKGROUND

(1) Cameroon aerodromes are increasingly experiencing challenges on the attractiveness of airport areas due to the lack of proper planning of the surrounding land use. A significant increase in human activity in these large areas is expected in the coming years, which, in the absence of appropriate preventive measures, would pose a risk both to the operation of the aerodromes and to the neighbouring populations.

(2) It is worth mentioning that the notion of "land surrounding or located in the vicinity of aerodromes" is not simply limited to land located on airport property, the use of which is subject to prior approval by the Cameroon Civil Aviation Authority. It also includes land located outside the airport grounds, within a radius of approximately 15 kilometres from the aerodrome, whose unplanned or unregulated use may have an impact on the long-term operation and development of the aerodrome.

(3) The figures below illustrate, for instance, the evolution of built-up areas in the vicinity of Yaounde-Nsimalen International Airport between 2000 and 2020, and the forecasts over the next 30 years if the same pace is maintained.

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

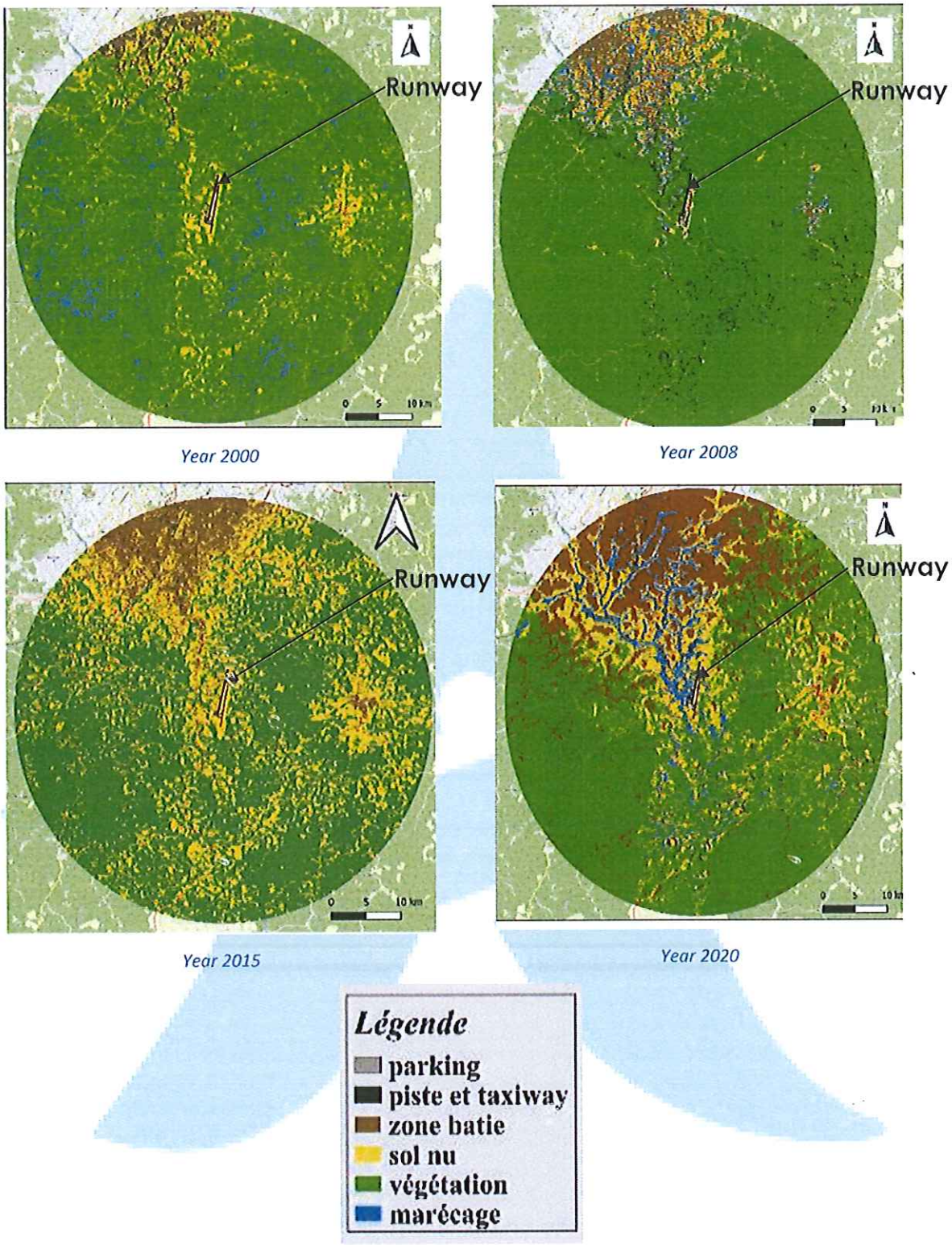


Figure 4-1: Overview maps of land use changes in the vicinity of Yaounde-Nsimalen International Airport between 2000 and 2020

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

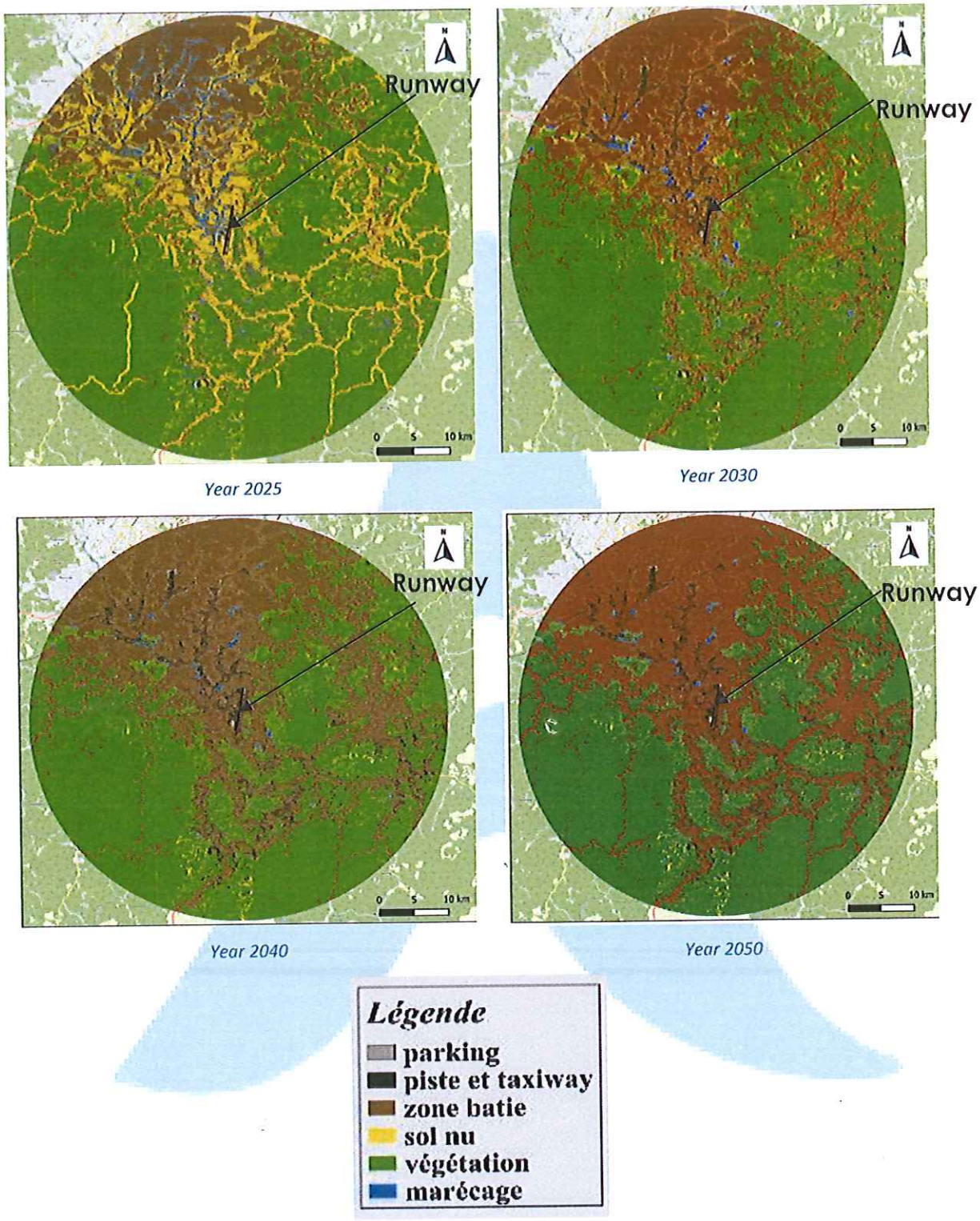


Figure 4-2: Land use forecast around Yaounde-Nsimalen International Airport between 2025 and 2050[1]

[1] Master's thesis on the theme "Map contribution to the security of air navigation: Case of the Yaounde-Nsimalen International Airport."

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

(4) Another obvious example of the consequences of the lack of planning is that of Douala airport, which has two intersecting runways, the second of which is rendered inoperative due to the fact that buildings have been constructed near the runway.

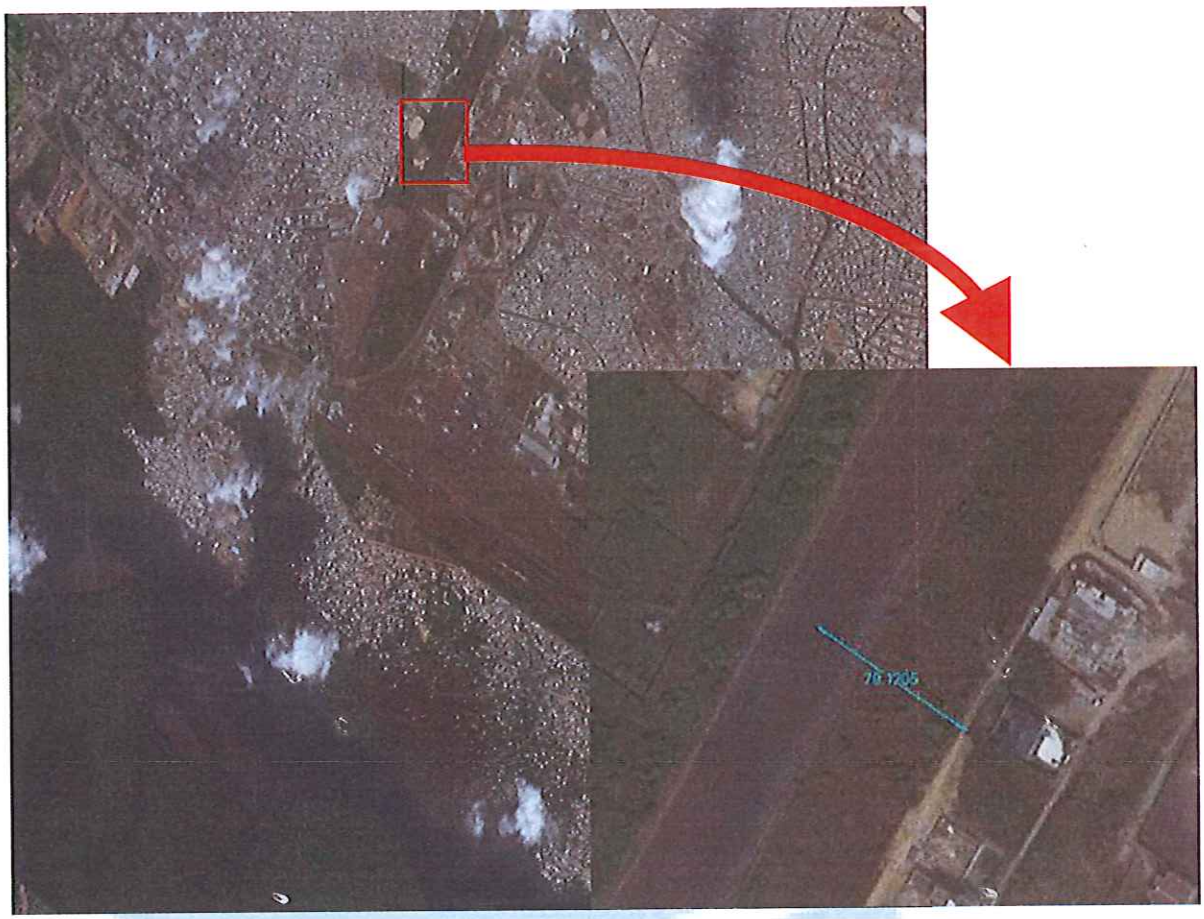


Figure 4-3: Former runway 04/22 at Douala International Airport, made non-operational due to housing less than 80 m from the axis

(5) In addition, activities around airports are not always compatible with their operations. Some of these activities cause safety and security problems for civil aviation, such as:

- When birds damage aircraft in flight or on the ground;
- When smoke affect the visibility of airport facilities for flight crews; and
- When human activities near runways create opportunities for targeting aircraft with MANPADS.

(6) The operation of aircraft is also not without risk for the populations that settle near airport facilities. Prolonged exposure to aircraft noise may have harmful consequences on the health of the local population.

(7) Thus, in order to meet the objectives of socio-economic development and the safe operation of aerodromes, it is important to take into account

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

all the constraints inherent to the operation of aerodromes in the planning of land use in their vicinity.

5. AERODROME MASTER PLAN

(1) Considerations for land use planning in the vicinity of aerodromes include planning for the operations and facilities required to accommodate the aerodrome's long-term traffic. This information is given in the aerodromes master plans.

(2) The aerodrome master plan is a document that portrays the strategic vision for the long-term development of a specific aerodrome. It is basic for:

- The protection of the airport domain, in coordination with the local authorities and administrations in charge of land and urban planning issues;
- The establishment of the aerodrome operator's strategy for the domain extension;
- The development of the local strategy for compatible land use around the different areas identified in the master plan

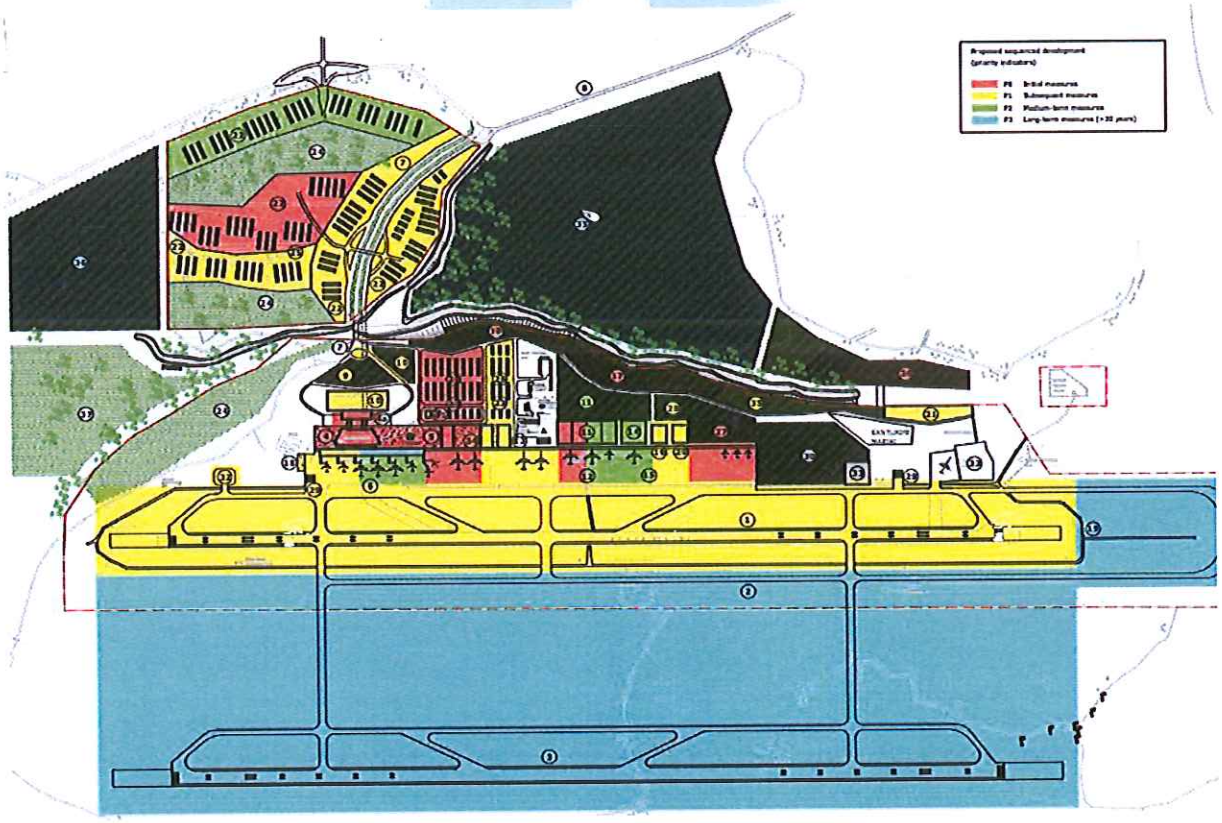


Figure 5-1: Yaounde-Nsimalen International Airport Master Plan

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

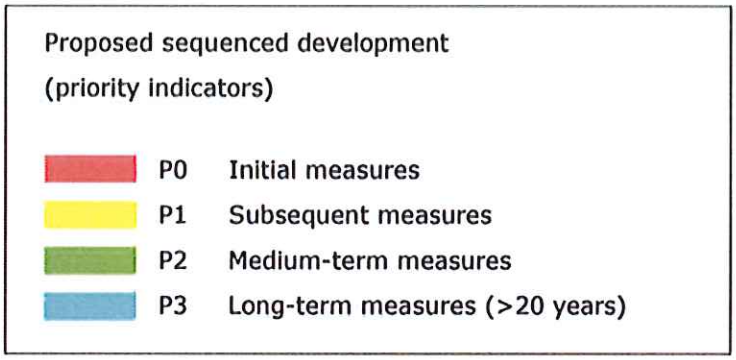


Figure 5-2: Yaounde-Nsimalen International Airport Master Plan Legend

(3) In this sense, it is important for aerodrome operators to establish master plans together with the administrations in charge of land affairs and town planning, and for the latter to support them in preserving the areas identified as necessary for aerodrome development.

(4) Cameroon Airports S.A (ADC S.A.) has established master plans for the Douala and Yaounde-Nsimalen international airports, which have been validated by the Cameroon Civil Aviation Authority and are made available by both the operator of these airports and the Cameroon Civil Aviation Authority.

6. AERONAUTICAL EASEMENTS

6.1 Purpose

(1) The airspace surrounding an aerodrome must be protected from obstacles in order to allow aircraft using it or being brought to use it to operate safely. Flight procedures taking into account many factors, including the physical environment of the aerodrome, are established and published for air users. Compliance with these procedures ensures that obstacles are cleared with the required safety margins during the non-visual phase of flight. In the visual phase of flight, obstacle clearance must be ensured by external visual cues or by visual means requiring conducive weather conditions.

(2) However, it is necessary to ensure that the clearance margins established for these procedures are maintained. This means removing, modifying, or limiting the number of new obstacles when they affect or are likely to affect the operation of an aerodrome.

(3) The aeronautical easements, established in accordance with the provisions of Article 87 of Law N°2013/010 of 24 July 2013 on the civil aviation regime in Cameroon, aim at preventing new obstacles from jeopardising the safety of the current and future operation of the aerodrome. They allow for compliance or removal of existing obstacles

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

that penetrate the defined areas and jeopardise the operation of the aerodrome.

(4) The purpose of the aeronautical easements plans (PSA) is to support the local authorities involved in town planning in the vicinity of aerodromes, particularly for limiting the height of buildings and other facilities. They are established on the basis of the obstacle limitation surfaces (OLS) described in chapter 4 of the annex to Order N°00007/A/MINT referred to in section 2.1. These OLS take into account the characteristics of the runway facilities and their mode of operation, which have been defined to ensure the ultimate development of the aerodrome, in accordance with the aerodrome master plan.

(5) The PSAs are addressed to the local relevant authorities, project developers (real estate in particular), and people living near the aerodrome, who will not be able to freely develop or build new facilities that would not respect the defined altimeter levels. They also allow for the removal of existing obstacles that penetrate the defined surfaces under certain conditions.

(6) The PSAs for the Douala and Yaounde-Nsimalen international airports, as well as for the Bafoussam-Bamougoum airport, have been approved by the Cameroon Civil Aviation Authority and can be made available by both the airport operators and the Cameroon Civil Aviation Authority

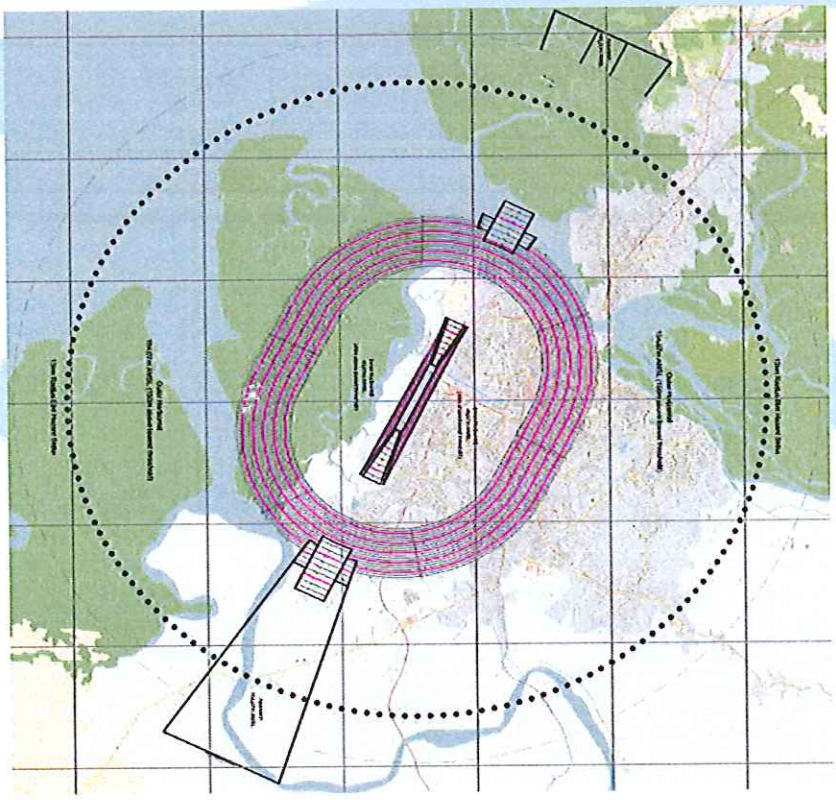


Figure 6-1: Douala International Airport Easement Plan

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

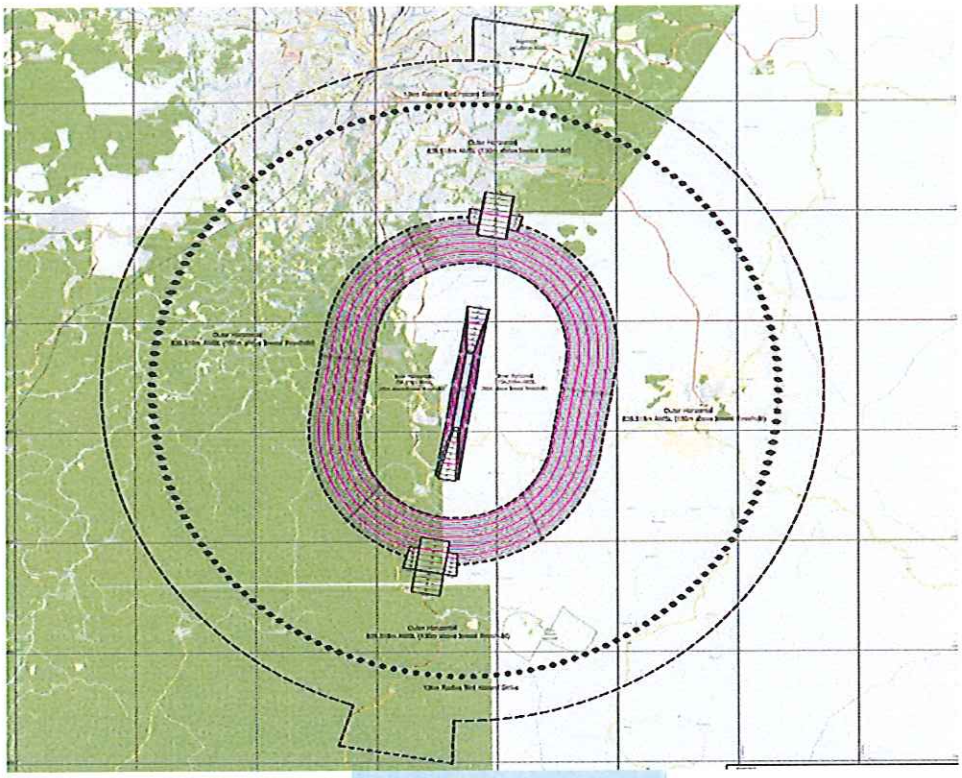


Figure 6-2: Yaounde-Nsimalen International Airport Easement Plan

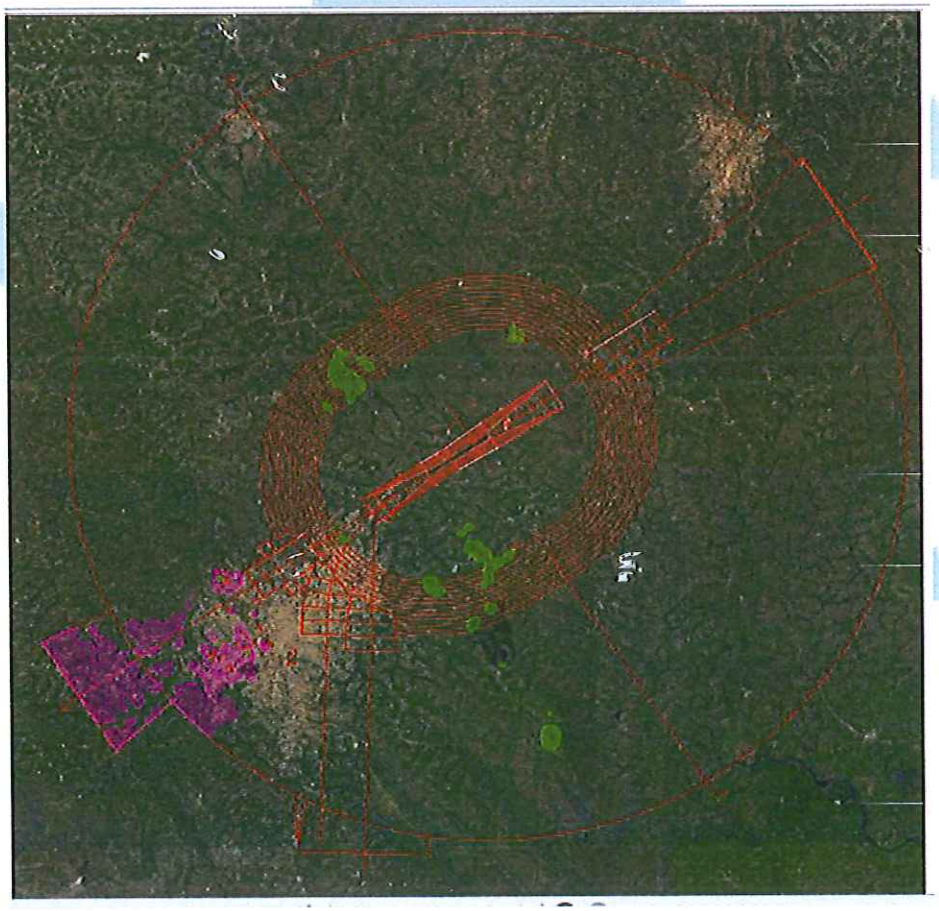


Figure 6-3: Bafoussam-Bamougoum Airport Easement Plan

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

6.2 Types of Obstacles

(1) The Order establishing the aerodromes design and operations standards in Cameroon defines an obstacle as all fixed (temporary or permanent) or mobile objects, or part thereof, that:

- are located on an area intended for the surface movement of aircraft; or
- extend above a defined surface intended to protect aircraft in flight; or
- stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.

(2) There are two (02) groups of obstacles:

- Fixed obstacles: natural terrain, buildings, pylons, factory chimneys, forests, etc.; and

Massif: *Compact group of natural terrain, buildings, forests, etc.*

Thin: *Pylons, etc. (significant height relative to other dimensions.*

Filiform: *Power lines, telecommunication lines, etc.*

- Mobile obstacles: can be channelled (vehicles on a road, trains on a railroad, etc.) or not (boats on a waterway, etc.).

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

***Channelled**: Moving along a pre-defined path, vehicles on a road etc.*

***Unchanneled**: Free movement, boats on water etc.*

(3) The proximity of obstacles has an impact on the current and future usability of an aerodrome. Therefore, it is crucial that the planning and siting of potential obstacles be done in consultation with the aerodrome operator as early as possible.

6.3 Obstacle limitation surfaces

(1) Obstacle limitation surfaces used for the establishment of aeronautical easements define a volume around the aerodrome to be maintained obstacle free. Each runway in the Master Plan (current and future runways) is protected by these surfaces.

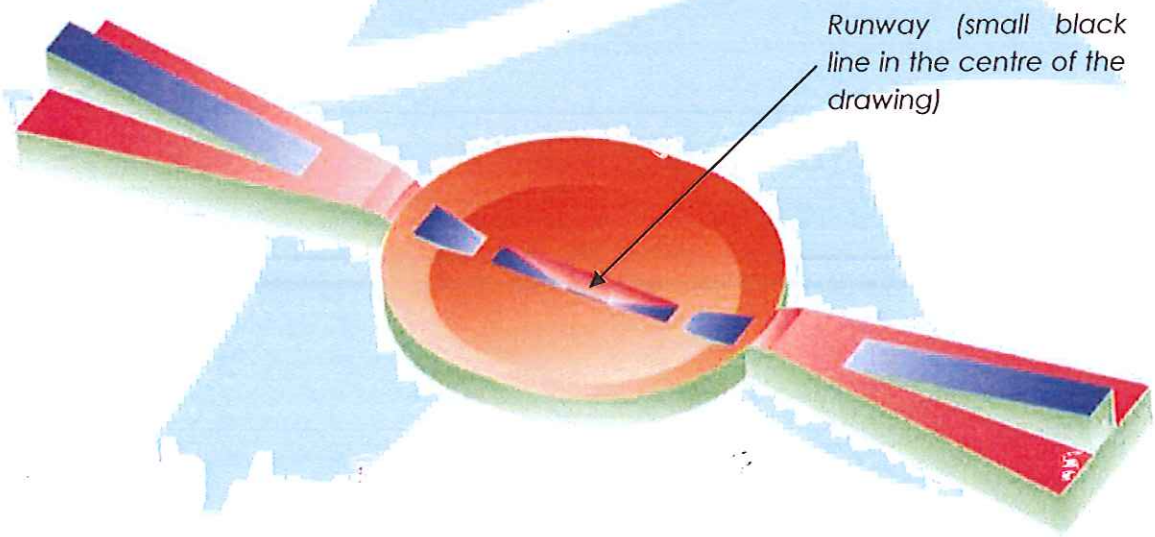


Figure 6-4: Obstacle Limitation Surfaces around an Aerodrome Runway

(2) These include the basic surfaces associated with each runway in the master plan, as well as, where applicable, the obstacle-free area surfaces for runways used for precision approaches, and the obstacle protection surfaces for approach slope indicators.

(3) The characteristics of these surfaces are given in Chapter 4 of the Appendix to Order N°00007/A/MINT of 10 June 2019.

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

(4) Basic surfaces

These are defined for each runway, regardless of the mode of operation (visual or instrument). They include:

(a) approach surface(s);

(b) one or more take-off climb surfaces;

(c) two transition surfaces;

(d) an inner horizontal surface; and

(e) a conical surface.

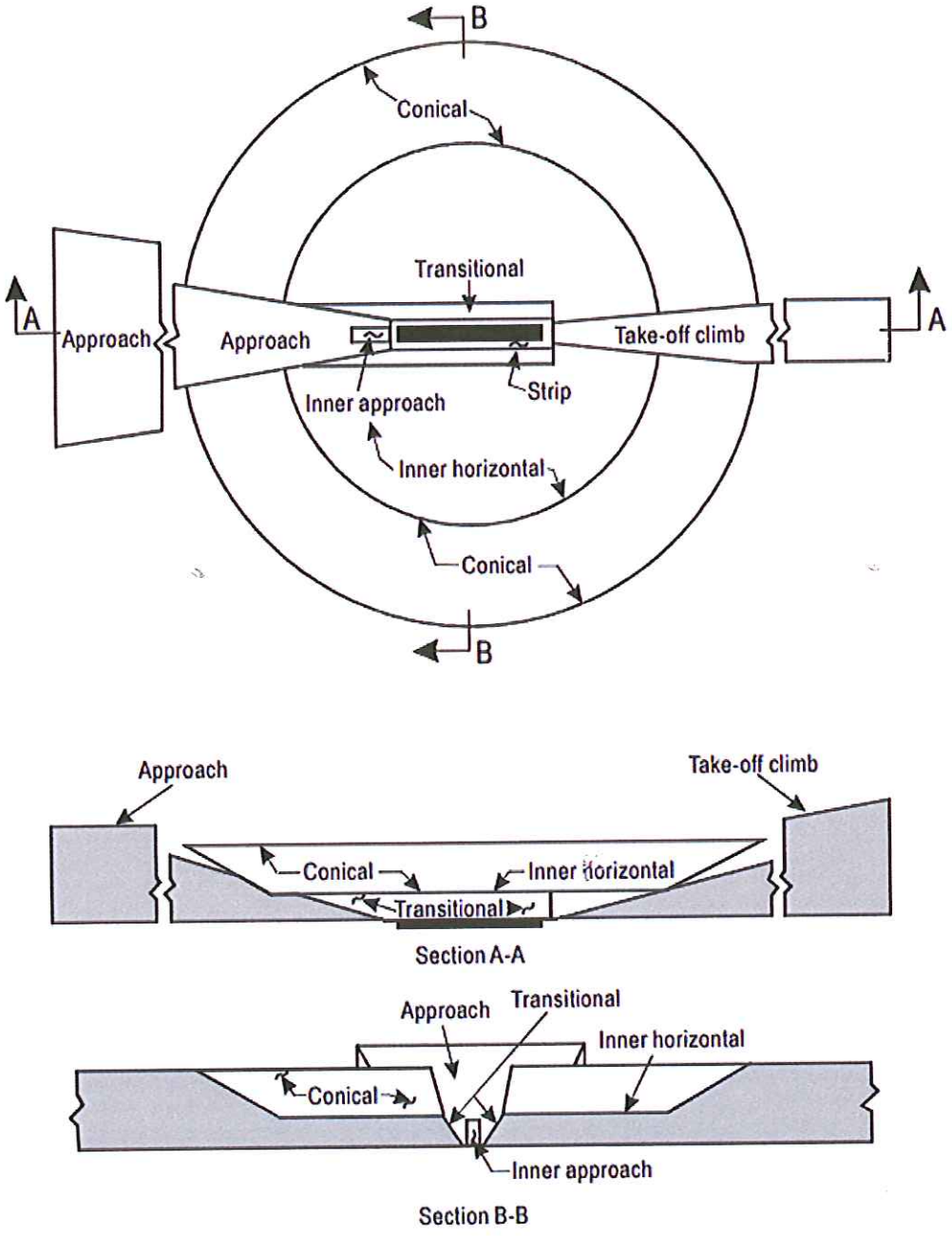


Figure 6-5: Basic obstacle limitation surfaces

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

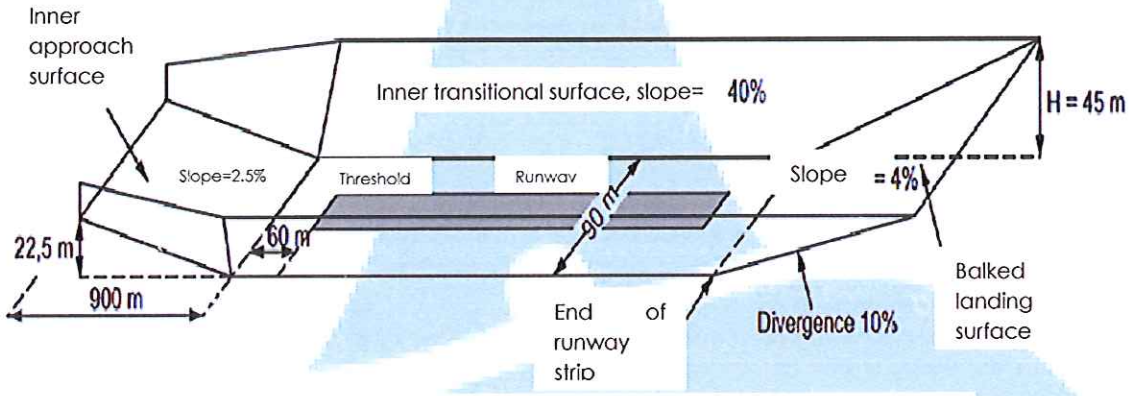
(5) Obstacle-free zone surfaces

They are specific to runways used for precision approaches and complement the basic surfaces. In this sense, if the aerodrome master plan foresees the long-term operation of a runway with precision approaches, this runway is also protected by these surfaces They include:

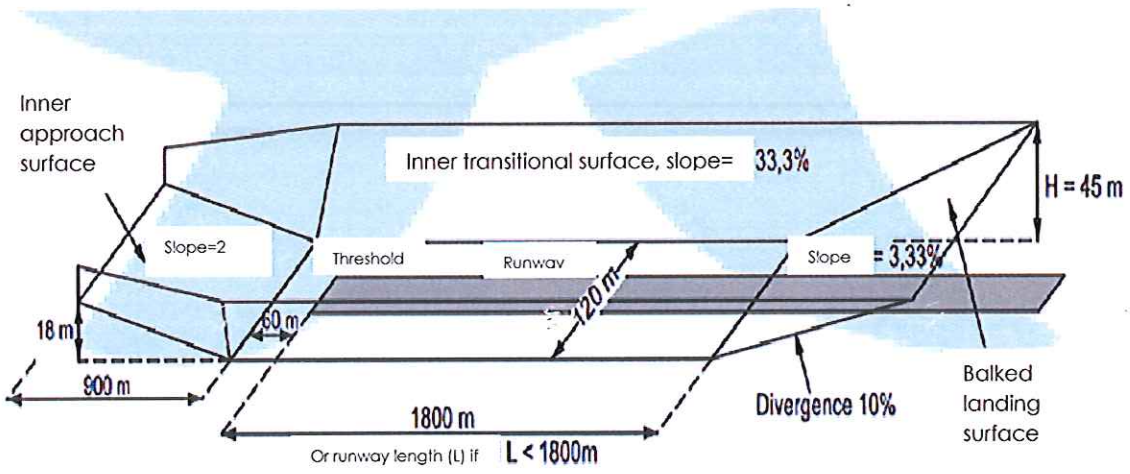
(a) the inner approach surface (on the figure below « surface intérieure de d'approche ») ;

(b) the inner transitional surface (on the figure below « surface intérieure de transition »); and

(c) the balked landing surface (on the figure below « surface d'atterrissage interrompu »).



Obstacle Free Zone for code 1 or 2 runways with precision approach CAT I



Obstacle Free Zone for code 3 or 4 runways with precision approach CAT I, II or III

Figure 6-6: Obstacle-free zone surfaces

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

(6) Obstacle Protection Surface (OPS)

Order No. 00007/A/MINT of June 10, 2019, provides that an Obstacle Protection Surface (OPS) be established when a visual approach slope indicator is to be installed.

The slope of this surface depends on the type of visual indicator (PAPI, APAPI, T-VASIS or AT-VASIS) used or planned, and its angular setting (A).

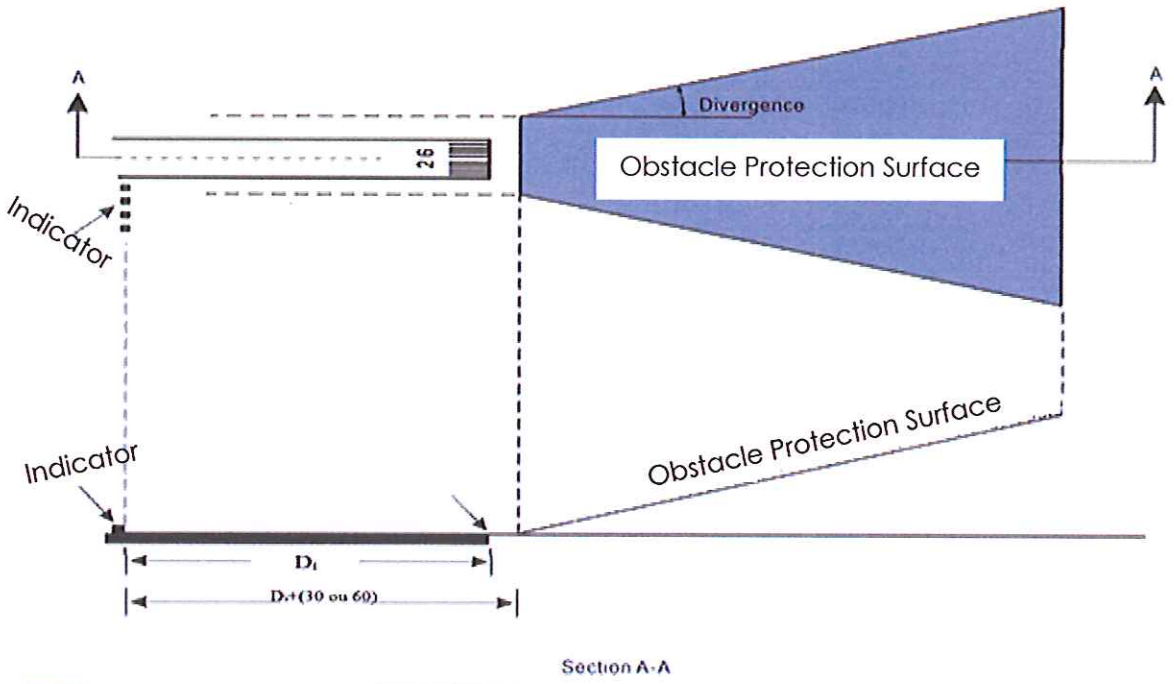


Figure 6-7: Obstacle Protection Surface

7. PROTECTION OF RADIO NAVIGATION AIDS, TELECOMMUNICATION AND SURVEILLANCE SYSTEMS.

(1) In order to avoid any risk of interference or jamming of the signal emitted by radio navigation aids, telecommunication and surveillance systems, it is necessary to ensure that no object is located in the zone of influence of this equipment. These zones of influence are delimited by protective surfaces whose characteristics are specific to each type of equipment.

(2) Some aerodromes have established protection plans for these equipment (Yaounde-Nsimalen and Douala international airports in particular). The aerodrome operator and the air navigation service provider must be consulted prior to any operation in the vicinity of these equipment.

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

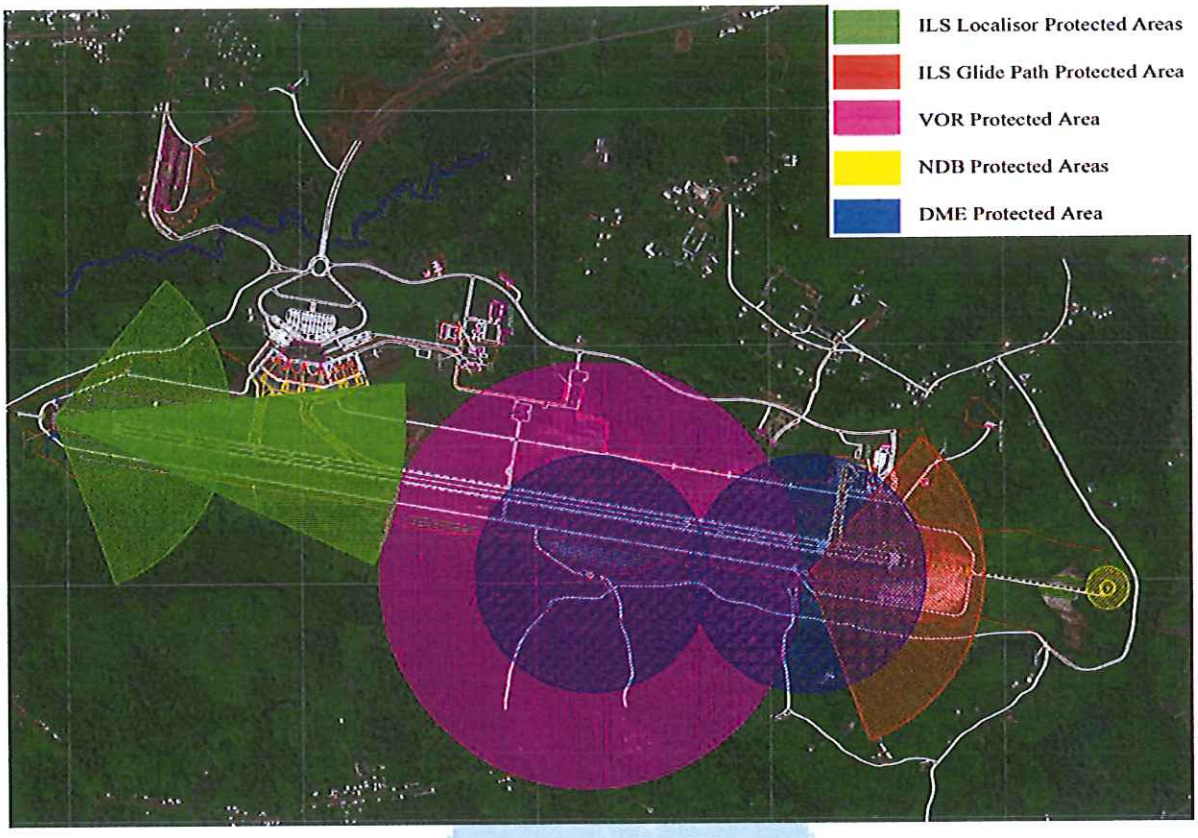


Figure 7-1: Yaounde-Nsimalen International Airport Radio Equipment Protection Plan

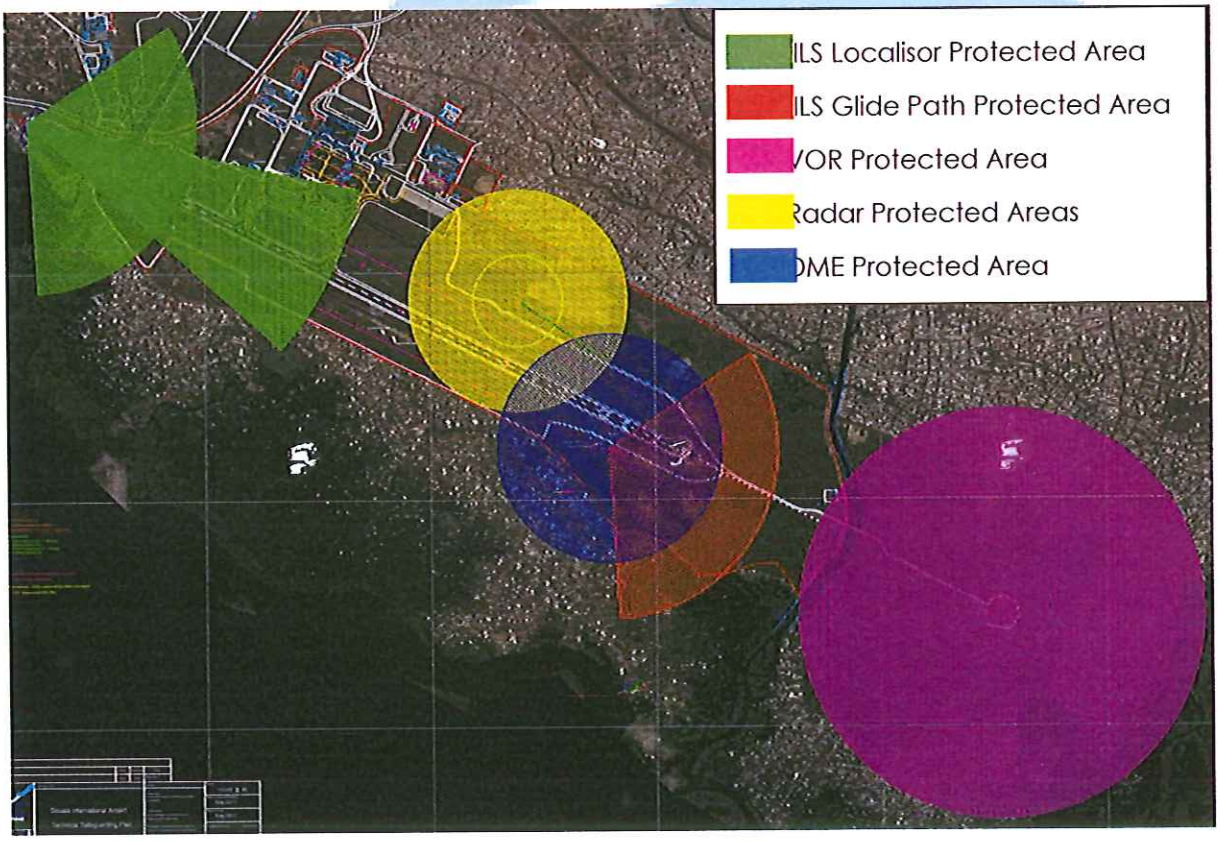


Figure 7-2: Douala International Airport Radio Equipment Protection Plan

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

7.2 Protection of omnidirectional air navigation, communication and surveillance equipment

(1) The protection surfaces for omnidirectional air navigation, communication and surveillance equipment are as shown in figures 7-3 and 7-4. They include:

(a) a first portion, cylindrical in shape, with a lower edge that follows the shape of the surrounding terrain on which it rests, and;

(b) a second portion, conical in shape, with a specified angle and base radius, and limited in its lower part by its intersection with the cylinder.

(2) The values of the parameters to be considered for each type of omnidirectional air navigation aid are given in Table 7-1. They are derived from the guidelines provided by the manufacturers of the equipment installed at the airports in Cameroon.

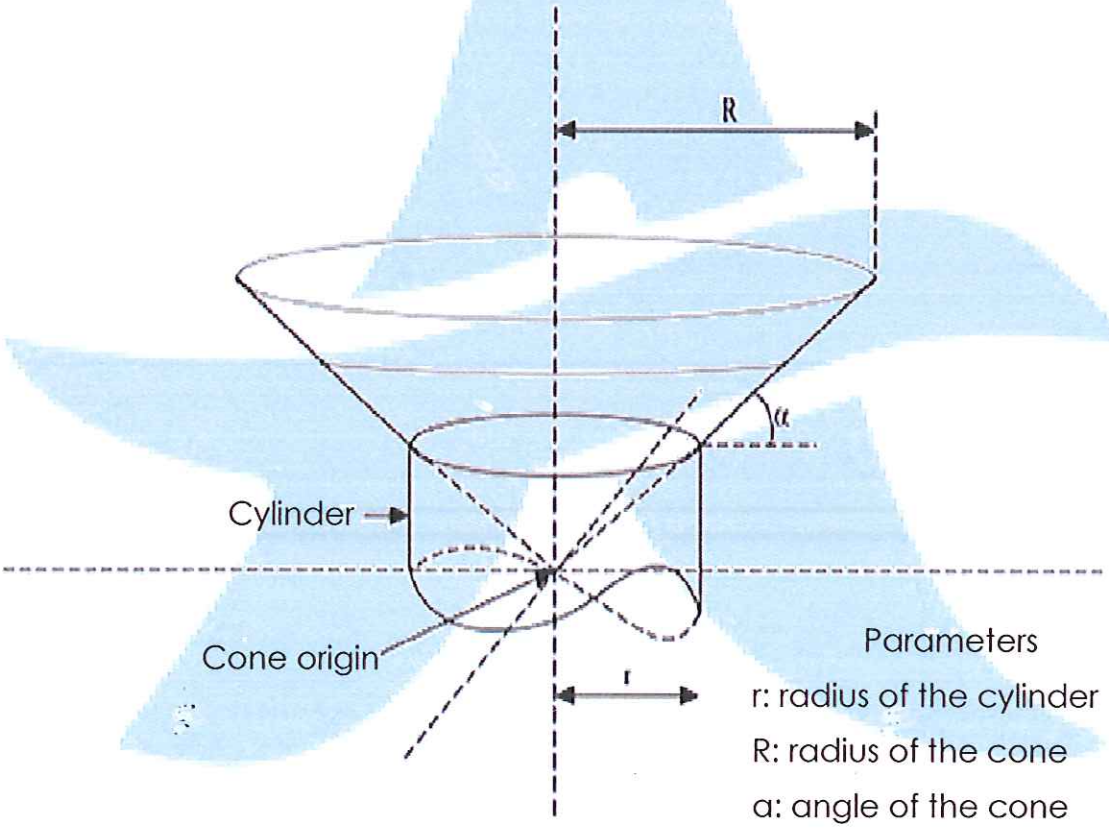


Figure 7-3: Protective surface of omnidirectional equipment

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

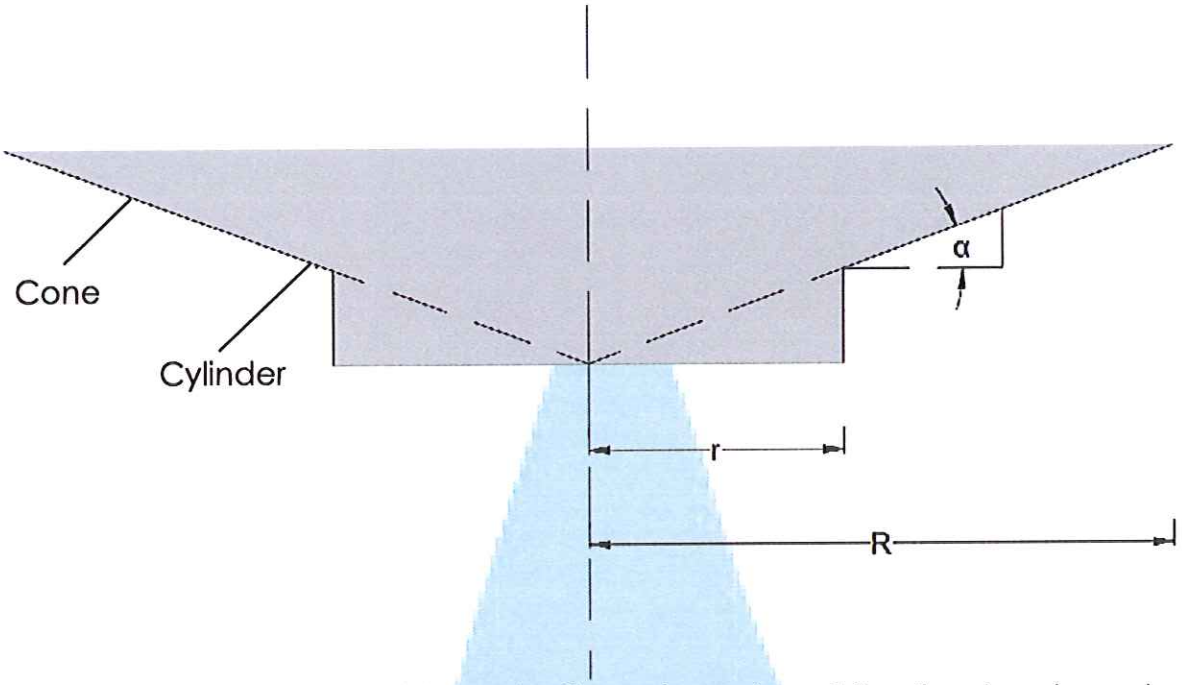


Figure 7-4: Cross-section of the protective surface of omnidirectional equipment

Table 7-1: Protective surface characteristics of omnidirectional broadcast radio navigation aids, communication and surveillance equipment

	Type of navigation equipment	Cylinder radius r (m)	Cone angle a (°)	Cone radius R (m)	Origin of the cone and cylinder axes
Radio navigation aids	DME	80	1.0	600	At ground level
	CVOR	80	1.0	600	At ground level
	DVOR	80	1.0	600	At ground level
	VHF radioborns	20	20.0	200	At ground level
	NDB	20	5.0	1000	At ground level
Communication equipment	VHF Communication Tx	20	1.0	2000	Antenna base
	VHF Communication Rx	20	1.0	2000	Antenna base
Surveillance equipment	Secondary surveillance radar	100	0.25	5000	Antenna base

7.3 Protection of directional navigation aids

(1) The protection surfaces of the directional air navigation aids are compliant with the one presented in figure 7-5. They consist of a surface located on an inclined plane, bounded by:

(a) an inner edge located at a specified distance from the antenna;

(b) an outer edge in the shape of an arc of a circle and located at a

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

specified distance from the antenna, and;

(c) two sides which, starting from the ends of the inner edge, diverge uniformly at a specified angle from a vertical plane through the antenna.

(2) The values of the parameters that may be considered for each type of directional air navigation aid equipment are given in Table 7-2. They are derived from the guidelines provided by the manufacturers of the equipment installed at the airports in Cameroon.

Table 7-2: Protective surface characteristics of directional broadcast radio aids to air navigation

Type of navigation equipment	Parameters					
	a (m)	b (m)	r (m)	D (m)	H (m)	ϕ (m)
ILS Localiser (single frequency)	Distance to threshold	50	a+4000	100	10	10
ILS Localiser (dual frequency)	Distance to threshold	50	a+4000	100	10	20
ILS Glidepath	100	20	a+4000	20	20	5
DME	100	20	a+4000	20	20	20

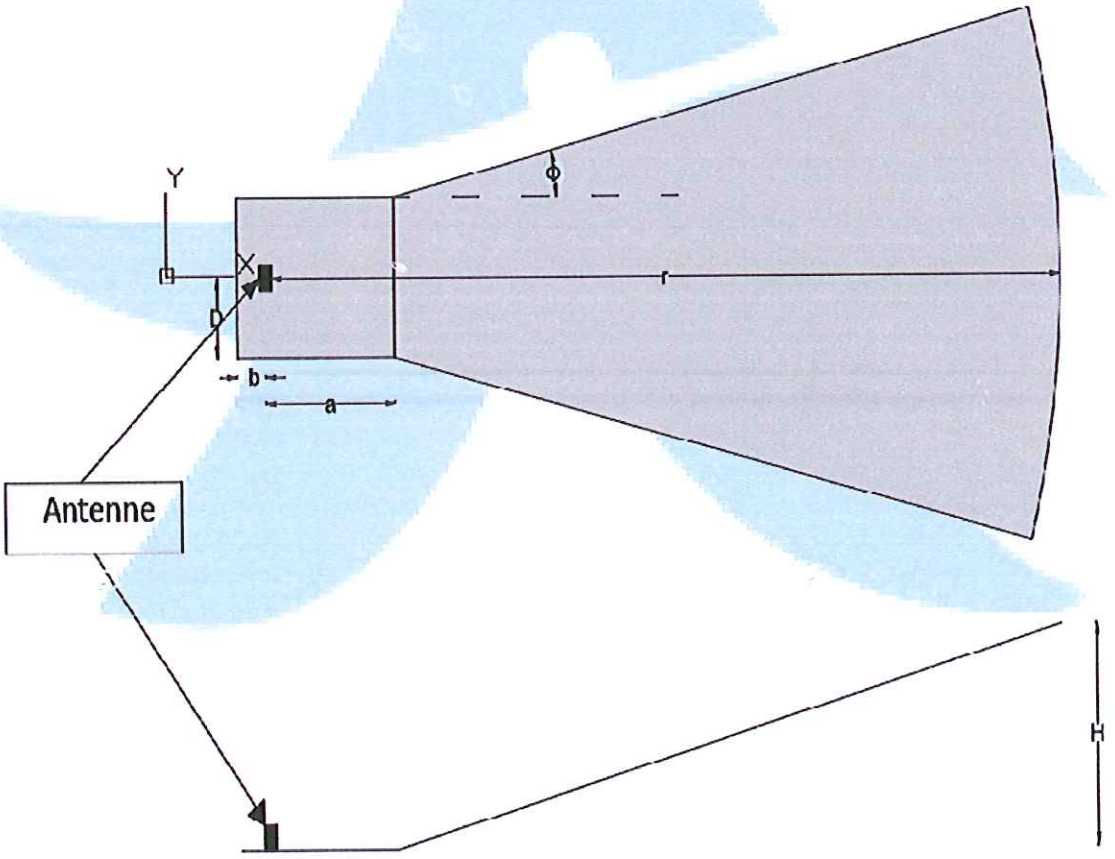


Figure 7-5: Protective surface of directional equipment

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

8. WILDLIFE HAZARD

8.1 General

(1) An important consideration for aerodrome operations is the presence and habits of animals in the area, and the potential for collisions with aircraft. The management of wildlife hazards is essential to the safe operation of aerodromes. As any change in land use in the vicinity of aerodromes may affect the presence and/or activity of animals, it is critical that the proposed use be assessed, and mitigation measures put in place to ensure that it does not further attract wildlife.

(2) Close collaboration is required between aerodrome managers, national land use and environmental authorities, and the aviation authority to ensure that:

- no activities or developments that may constitute attractive areas for wildlife are carried out within a thirteen-kilometre (13 km) radius of the airport reference point (ARP), and
- such areas are controlled or removed.

(3) The prescribed radius (13 km) is based on a statistical analysis conducted by ICAO showing that 95% of bird collisions occur within this area.

8.2 Acceptability of land use in relation to the risk of animal attraction

(1) The acceptability of land use is a function of its location relative to the aerodrome, and is determined by detailed assessments taking into account:

- the environment in which the aerodrome is located;
- seasonal factors, and;
- existing or planned risk mitigation measures.

(2) The following is a non-exhaustive list of some of the types of land uses that have been shown to be attractive to hazardous animals, and which, depending on the level of risk, should be avoided, ceased, or mitigated:

- Fish sales or processing;
- Agriculture;
- Grazing;
- Landfills;
- Food outlets;
- Wildlife refuges;
- Artificial and natural water bodies;

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

- Sewage treatment plants;
- Farms and animal husbandry;
- Slaughterhouses.

(3) The criteria presented in Table 8-1 below are used as a reference for determining the acceptability of land use in the vicinity of an aerodrome. These criteria are based on the delineation of the aerodrome vicinity into two zones:

- **The primary zone** encompasses the airspace in which aircraft are at or below an altitude of 1,500 feet above ground level. These are the altitudes where dangerous birds are most numerous and more than 70% of bird strikes are recorded;
- **The secondary zone**, extending from the limit of the primary zone to a radius of thirteen (13) kilometres, which constitutes a buffer zone in which the altitude and flight path vary greatly according to various parameters (environmental conditions, air traffic controller indications, etc.)
- **Special areas,** outside the above areas, may, although built outside the thirteen-kilometre radius, be considered as potentially attracting dangerous species to the primary or secondary zones.

Table 8-1: Acceptability Criteria for Land Use in the Vicinity of Aerodromes based on the Risk of Animal Attraction

Land Use	Land Use Acceptability by Zone			Risk
	Primary	Secondary	Special	
Landfill sites	No	No	No	Potentially high
Farms and animal husbandry.	No	No	No	
Sales, cleaning, animal processing	No	No	No	
Wildlife refuges;	No	No	No	
Wildlife shelters	No	No	YES	Potentially moderate
Parks, picnic areas	No	No	YES	
Wet/dry waste recycling facilities	No	YES	YES	Potentially low
Plowing/cropping	No	YES	YES	
Outdoor restaurants	No	YES	YES	

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

9. IMPACT OF AIRCRAFT NOISE

9.1 General

(1) Aircraft noise can have significant impacts on local communities exposed to it, including their health. Therefore, it is one of the determining factors in land use planning in the vicinity of airports.

(2) One of the planning objectives is to reduce the number of people affected, or likely to be affected in the future, by aircraft noise. This can be achieved by identifying areas that are highly exposed to aircraft noise. This activity is carried out jointly by the authorities responsible for land use planning, the aerodrome manager, and the air navigation service provider. This assessment takes into account not only the current traffic at the aerodrome, but also long-term traffic forecasts.

9.2 Aircraft noise exposure forecasts and acceptability criteria

(1) Assessment of noise exposure forecast at a given point in the vicinity of an aerodrome is carried out using a noise indicator, based on long-term traffic forecasts (minimum 20 years).

(2) There are various noise indicators. The "Effective Perceived Noise Level" (EPNL), commonly used for the measurement of noise produced by aircraft (for acoustic certification of aircraft among others), is more suited to the needs of the aviation industry and can be used for this assessment.

(3) The assessment carried out allows to draw isophonic curves of noise exposure around the aerodromes. As a result, acceptability criteria can be used to define acceptable types of use according to the exposure area.

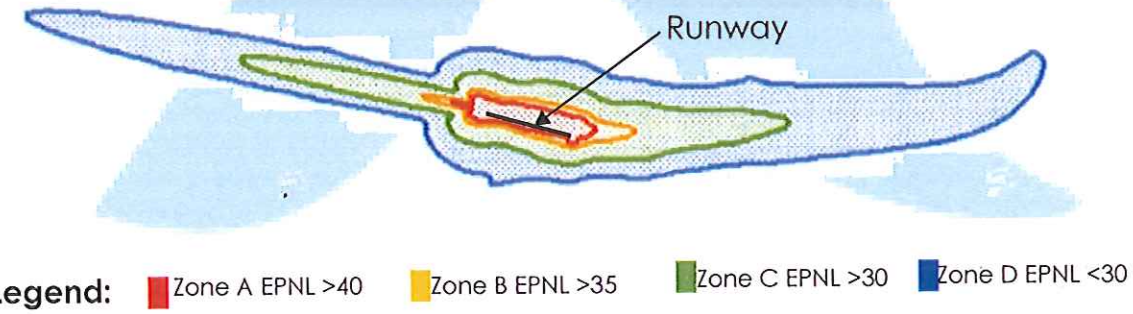


Figure 9-1: Typical runway layout with noise contours

(4) In general, commercial, industrial, and agricultural activities are, under certain conditions (including measures to limit the attraction of wildlife risk or to avoid flight disruption), appropriate uses for land that is highly exposed to aircraft noise. Incompatible utilisation includes, but is not limited to, residential buildings, schools, hospitals, and libraries, which are sensitive to noise.

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

(5) Based on a noise exposure assessment using the EPNL indicator, the acceptability criteria presented in Table 9-1 can be used.

Table 9-1: Acceptability Criteria for Land Use in the Vicinity of Aerodromes Based on Noise Exposure

Land Use Types	Noise Exposure Forecast Values	>40	40- 35	35- 30	>30
Residential	Detached or townhouses	NO	NO	NO	To
	Apartments	NO	NO	NO	To
Outdoor recreation	Sports fields	NO	J	K	YES
	Stadiums	NO	NO	K	YES
	Playgrounds	K	K	YES	YES
	Parks, picnic areas	NO	K	YES	YES
Commercial	Offices	F	E	D	YES
	Stores	F	D	YES	YES
	Restaurants	F	D	D	YES
	Hotels	NO	G	D	YES
	Parking lots	YES	YES	YES	YES
	Outdoor market	NO	K	YES	YES
Public	Schools	NO	NO	D	C
	Churches	NO	NO	D	C
	Hospital	NO	NO	D	C
	Libraries	NO	NO	D	C
Industrial	Plants	I	I	YES	YES
	Cement plants	I	I	YES	YES
	Quarries	YES	YES	YES	YES
	Refineries	I	I	YES	YES
	Laboratories	NO	D	YES	YES
Transport	Highways	YES	YES	YES	YES
	Railroads	YES	YES	YES	YES
	Shipping terminals	YES	YES	YES	YES
	Passenger terminals	D	YES	YES	YES

A: Acceptable, however, it is suggested that any residential construction in areas where EPNL is greater than 25 be subject to sound insulation measures.

C: Siting of facilities near the EPNL 30 curve is not recommended, unless the restrictions mentioned in Note D are applied.

D: These types of uses are not advised unless a detailed noise analysis is performed and the required sound insulation characteristics are considered in the design of the building.

E: An office building may be constructed in this area provided that all relevant factors have been considered and a detailed analysis determines the noise abatement techniques required to make the interior environment suitable for office functions

F: It is recommended that this type of use be allowed only if it is related to aviation activities or services. However, conventional construction would be inadequate, and the building should be specially soundproofed.

I: Most of these types of uses would be acceptable in all isophonic curve areas. However, consideration should also be given to the noise level created within these buildings themselves and the acceptable noise level in the work areas.

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

J: Undesirable, if it involves assistance. K: An analysis of the high noise level and its impact on this type of use is strongly recommended.

10. EXHAUST PLUMES

(1) The development of industrial sites near aerodromes is generally compatible with aircraft noise due to the relatively high level of ambient noise from industrial activity.

(2) However, exhaust plumes (smoke, dust and fumes) from some industrial processes can cause a reduction in visibility on or near aerodromes. In addition, high-temperature exhaust trails can cause turbulence problems (significant air disturbances) as aircraft pass.

(3) These industrial processes include:

- Steel mills;
- Quarries; and
- Incinerators.
- Sawmills (sawdust and waste burners);
- Power generation plants; or
- Refineries.

(4) The installation of this type of facility is carried out in such a way that the exhaust trail is not in the flight path of the aircraft. In this sense, any project to set up an industrial facility near an aerodrome is subject to a study to assess the risk of flight disruption caused by its emissions.

11. INSTALLATION OF SOLAR PANELS

(1) Inappropriate installation of solar panels, both on and off airport property, can lead to safety problems, including

- Disturbances caused by thermal drag;
- Interference with radio navigation aids;
- Penetration of obstacle limitation surfaces; or
- Dazzle of flight crews or air traffic control personnel.

(2) Thus, it is necessary to take into account these constraints before any installation of this type of installation. For the specific case of dazzle risks, an analysis taking into account the position of aircraft during landing, take-off, and indirect approaches is essential to define the ideal location for these installations.

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

12. CONTACT

For more information, please contact: sdnaa@ccaa.aero

As for aerodromes not mentioned as examples in this document, indications of the right-of-way that can be considered for the implementation of the constraints outlined in this document are included in the appendix.

Any proposal to modify this circular is welcome and can be submitted to the above e-mail address.

REPUBLIQUE DU CAMEROUN
REPUBLIC OF CAMEROON
Paix - Travail - Patrie
Peace - Work - Fatherland
Le Directeur Général
CAMEROON CIVIL AVIATION AUTHORITY
AUTORITE AERONAUTIQUE

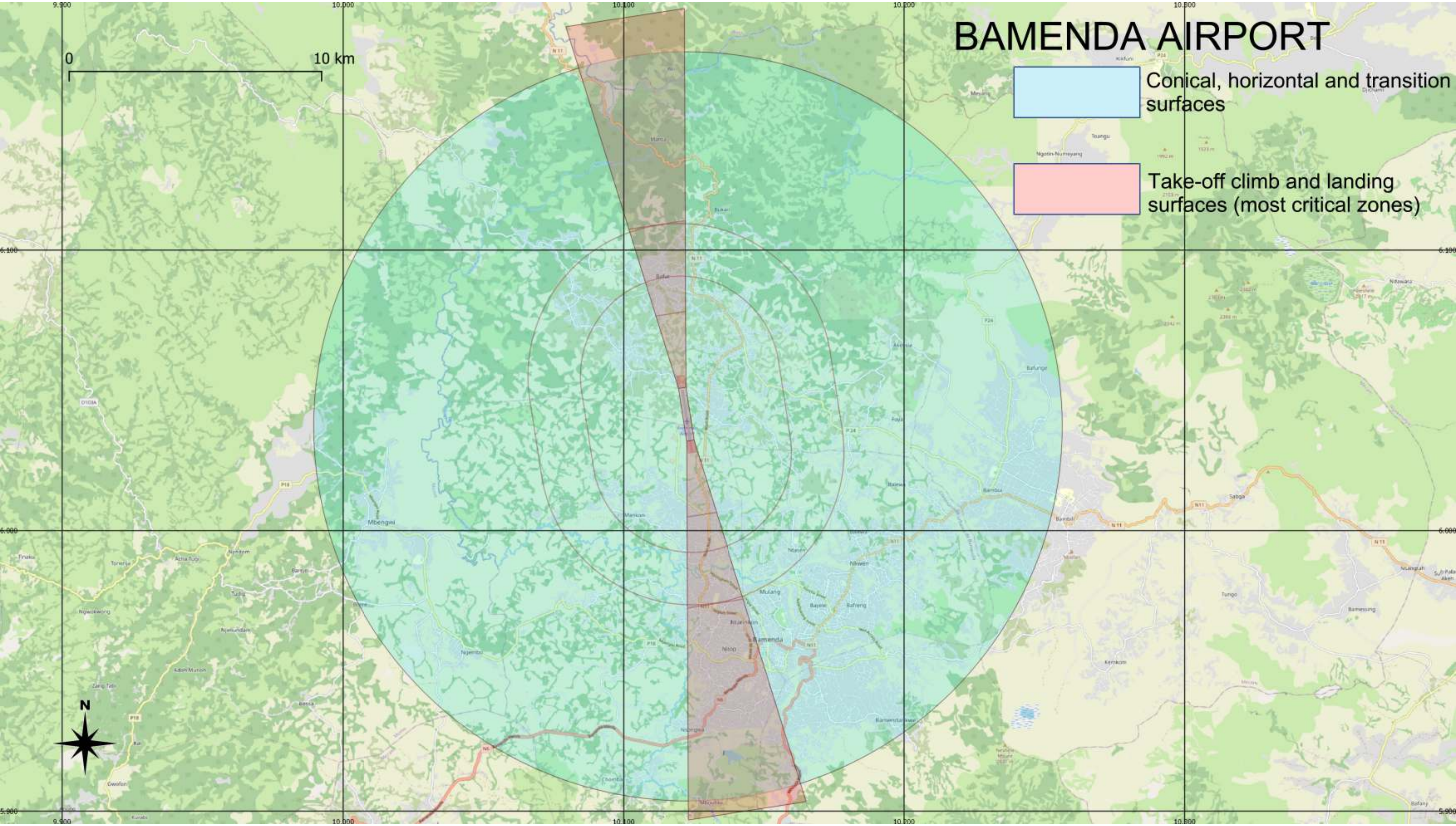
Paule ASSOUMOU KOKI

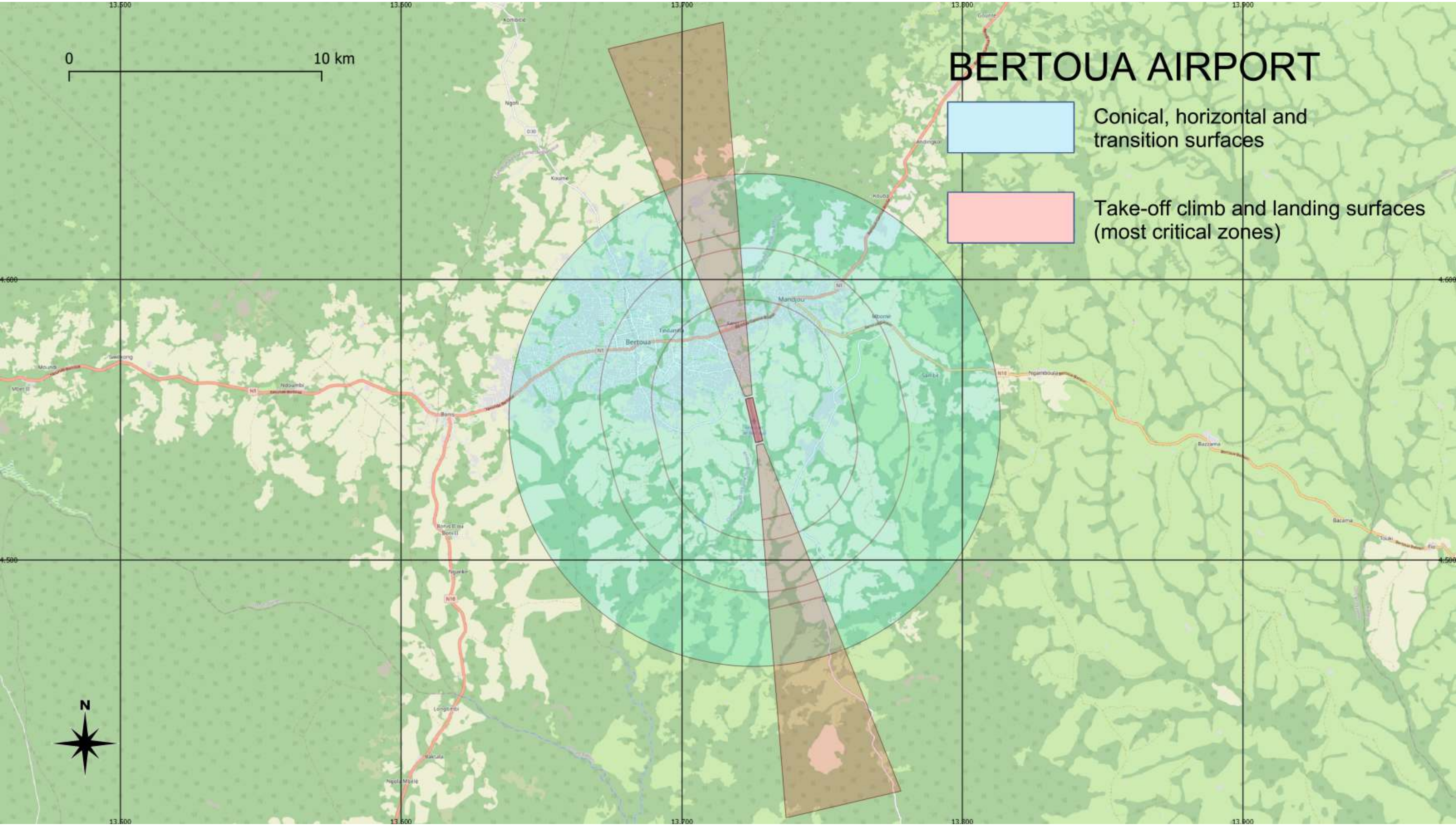
B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

13. APPENDIX

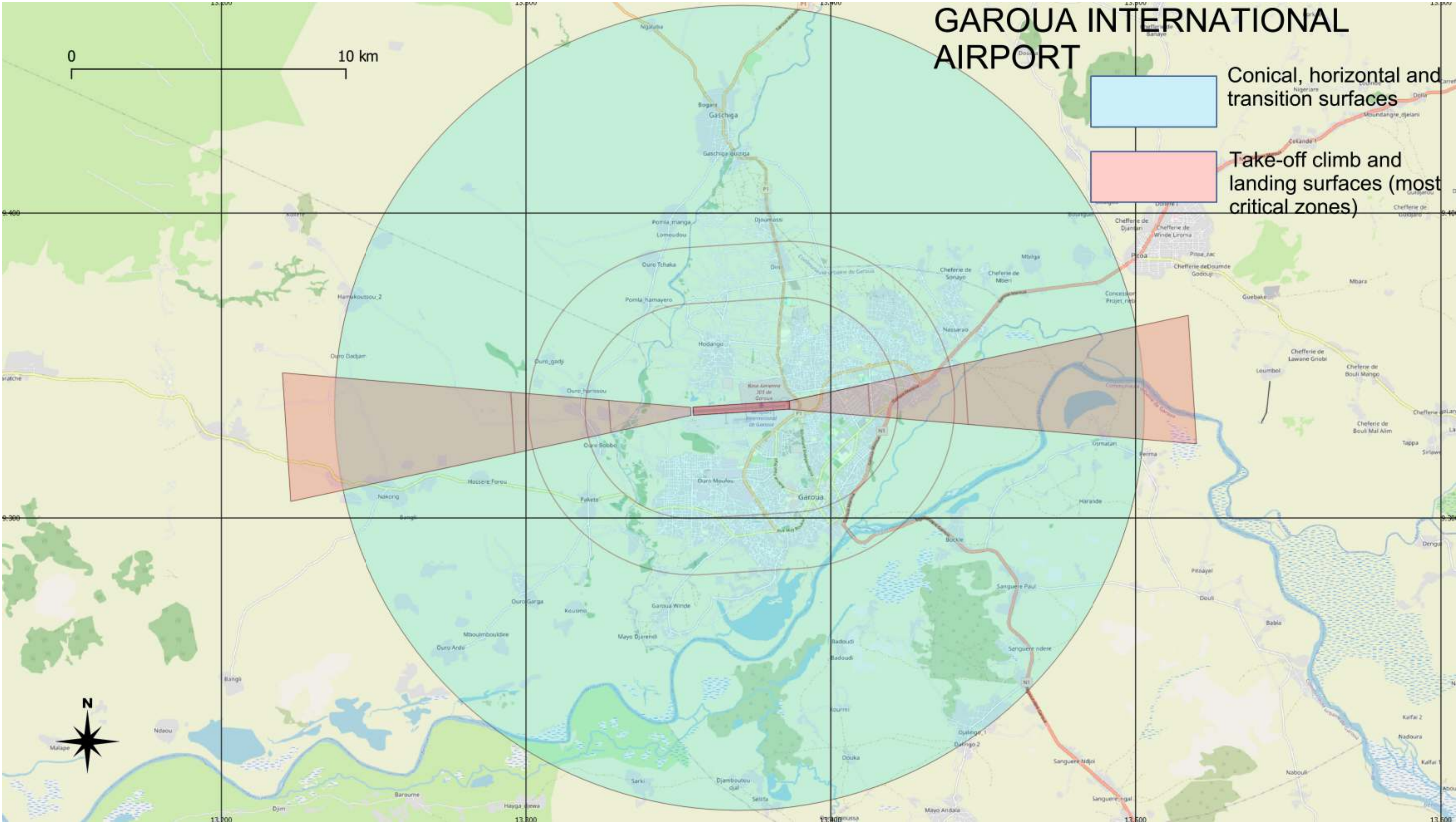
This appendix provides, as an indication, the right-of-way that may be taken into consideration on some aerodromes (different from those already mentioned in this document) for the implementation of the constraints outlined in this document, related to the safe operation of these aerodromes and to their future development

B.P./P.O.Box : 6998 Yaoundé - Tel./Phone : +237 222 30 30 90 / 222 30 26 92 - Fax : +237 222 30 33 62 - Email : contact@ccaa.aero - Site web: http://www.ccaa.aero

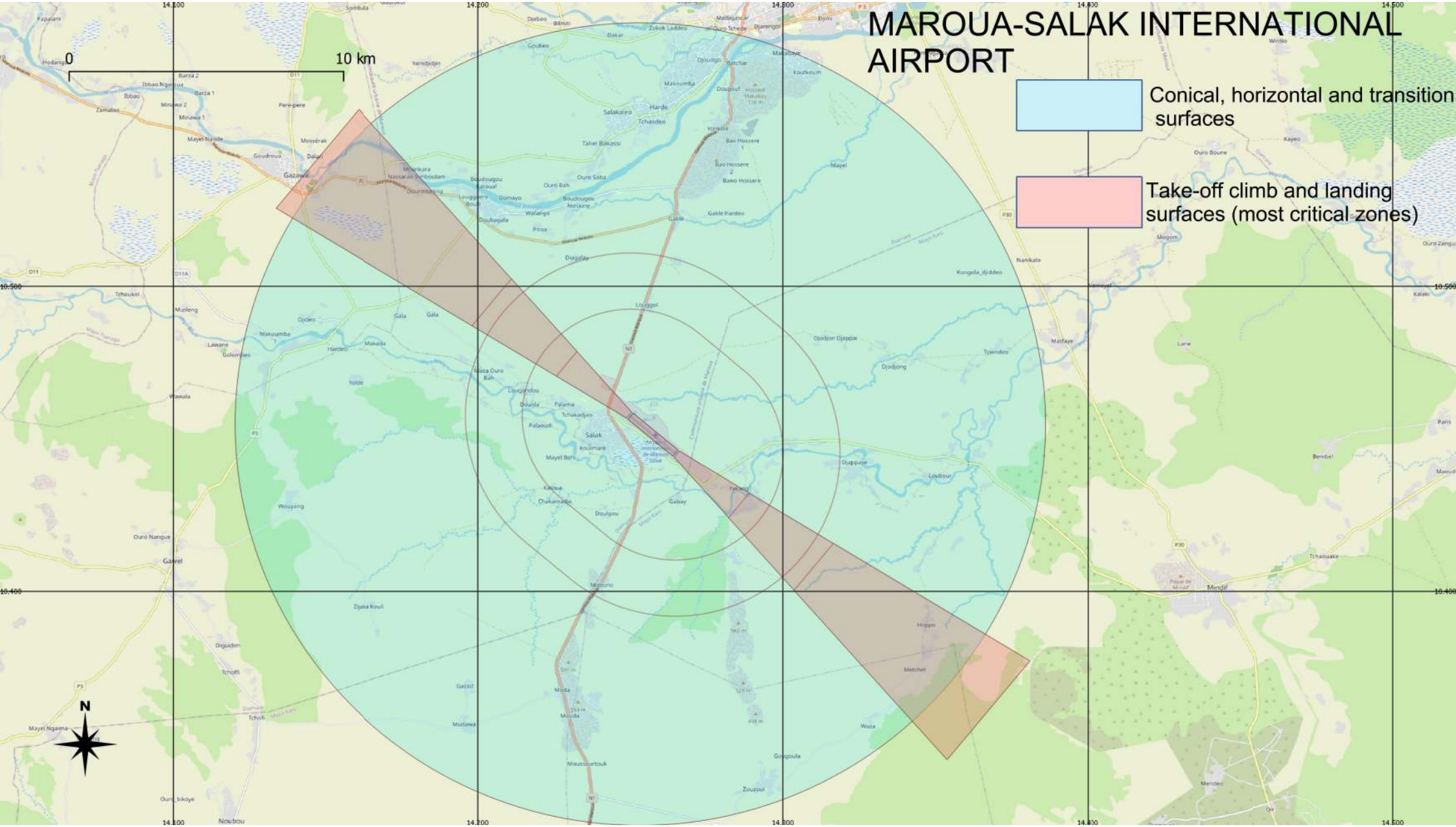

BAMENDA AIRPORT
Conical, horizontal and transition surfaces
Take-off climb and landing surfaces (most critical zones)
0
10 km
N

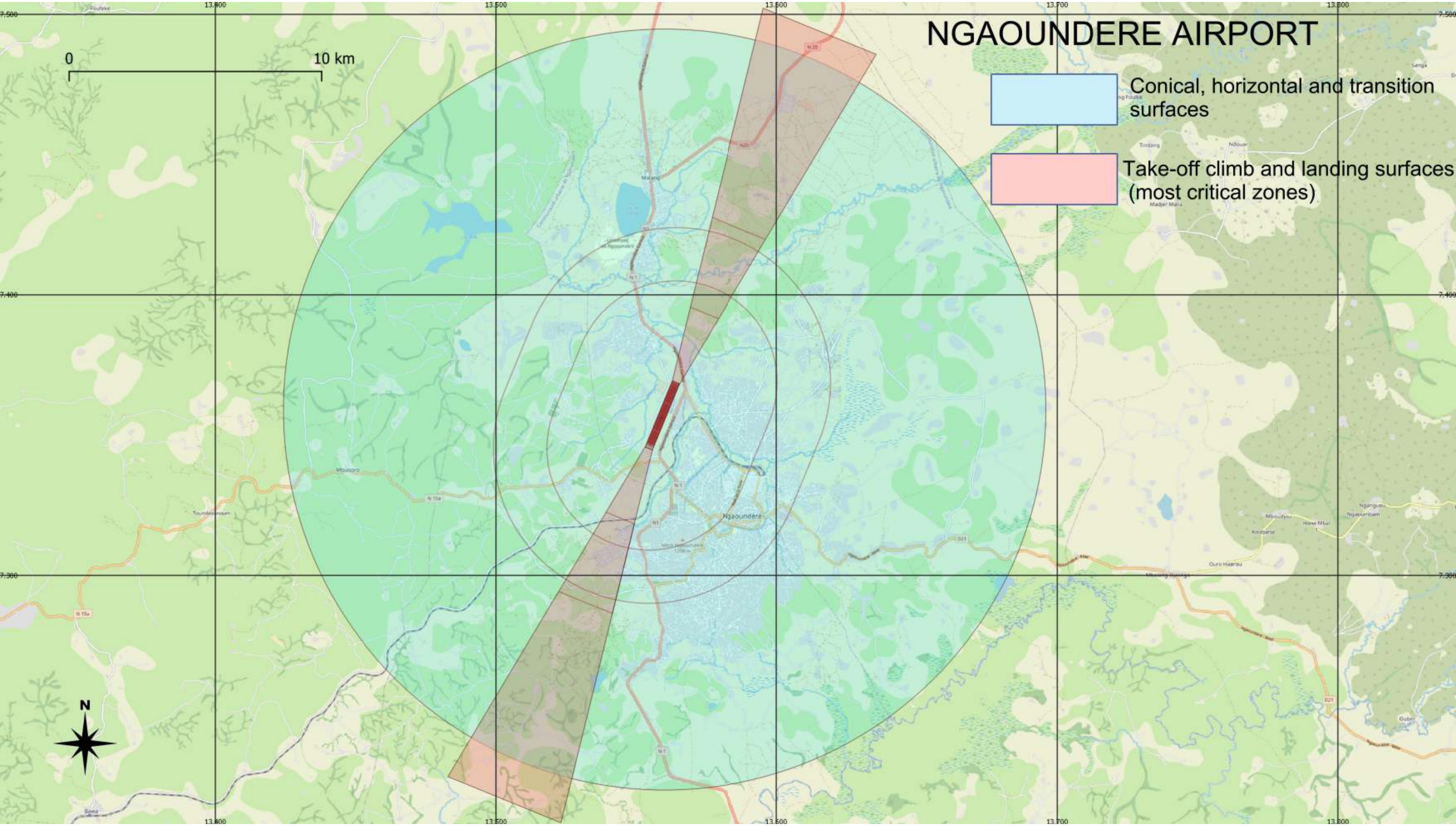


BERTOUA AIRPORT
Conical, horizontal and transition surfaces
Take-off climb and landing surfaces (most critical zones)
0
10 km
N
Bertoua
Mandjou



GAROUA INTERNATIONAL AIRPORT
Conical, horizontal and transition surfaces
Take-off climb and landing surfaces (most critical zones)
0
10 km
N
Garoua
Gaschiga
Pitoa


MAROUA-SALAK INTERNATIONAL AIRPORT
Conical, horizontal and transition surfaces
Take-off climb and landing surfaces (most critical zones)
0
10 km
N


NGAOUNDERE AIRPORT
0
10 km
Conical, horizontal and transition surfaces
Take-off climb and landing surfaces (most critical zones)
N
Ngaoundéré
13.400
13.500
13.600
13.700
13.800
7.500
7.400
7.300