ADVISORY CIRCULAR

CAA-AC- AGA602
July 2020

Guidance for Compliance at Category C Aerodromes

1. Purpose

1.1. The purpose of this Advisory Circular (AC) is to provide guidance to aerodrome operators of small domestic aerodromes to comply with the requirements of the Civil Aviation (Aerodromes) Regulations, 2019, for the purpose of applying for, and maintaining, an Aerodrome License in respect of physical characteristics and some aspects of operations. This circular is written for operators of small aerodromes in Uganda handling domestic traffic only of aerodrome reference code 1 and airport category C in accordance with these Regulations.

2. References

2.1. Civil Aviation (Aerodromes) Regulations 2019

3. Introduction

3.1. To enable the safe, effective and compliant use of an aerodrome, the aerodrome operator must ensure that its aerodrome meets the statutory requirements. Otherwise, the CAA may have to impose restriction in the size of aircraft, and/or restrictions on certain types of aircraft or the possible closure of the aerodrome.

3.2. The Republic of Uganda is obliged to comply with the international requirements for the certification and licencing of aerodromes as a signatory to the Convention on International Civil Aviation (Chicago 1944), under which the requirements are published in the form of standards and recommended practices in Annex 14 to the Convention, and which are adopted in full by Uganda in its Civil Aviation (Aerodromes) Regulations 2019.

3.3. The criteria for aerodrome characteristics, visual aids (markings, markers and lighting), control of obstacles, and operational procedures are detailed in these Civil Aviation (Aerodromes) Regulations. This advisory circular is only for guidance, it is the responsibility of the aerodrome operator to ensure compliance with the Regulations, and the responsibility of the aircraft operator to ensure the suitability of a runway for any particular flight in the prevailing conditions at the time of the flight.

3.4. To ensure safety and efficiency of aircraft operations, aerodrome operators must provide a runway surrounded by a safety area called a runway strip, and ensure that additional areas to the side and ends are clear of obstacles.

3.5. This is particularly important in Uganda due to the elevation of the aerodromes above sea level, and the higher ambient temperatures. The combination of high temperature plus altitude can increase the take-off run required for a small aircraft by 50% compared with a sea level aerodrome at 15^{o}C temperature. If the take-off is from a WET grass runway then the increase in take-off run required can be an ADDITIONAL 30% on top of the above 50%.

4. Appropriate application of requirements All sizes of aerodromes and complexities of operations do not have to comply with identical requirements. The Regulations break down the requirements into 4 codes based on the runway length requirements of the aeroplanes that the runway is intended to serve. This circular provides guidance for operators of aerodromes in aerodrome reference code 1B. This equates to the shortest runways and smallest aeroplanes as listed below. Therefore, the criteria covered in this circular are the absolute minimum permissible for the operator of any licenced aerodrome.

4.2. Aerodrome reference code 1B is applicable for the following types of aeroplanes that fall within aeroplane reference codes 1A and 1B:

a) Cessna 206 Turbo Stationaire, ARFL: 323m, wing span 10.97m (1A)
b) Piper PA34 Seneca: ARFL: 520m, wingspan 11.9m (1A)
c) Cessna 208 Caravan, ARFL: 626m, wing span 15.87m (1B)
d) Cessna Grand Caravan, ARFL: 658m, wing span: 15.87m (1B)
e) LET410 UVPE, ARFL: 510m, wingspan 19.98m (1B)
f) Beech King Air 250, ARFL 643m, wing span 16.6m (1B)

4.3. If an aerodrome operator wishes its aerodrome to be used by larger aircraft, then it must meet larger dimensions of runway, runway strips and more demanding obstacle limitation surfaces, not detailed in this circular. An example of such a code 2B aircraft is:

a) Beechcraft 1900, ARFL 1162m, wingspan: 17.7m

5. Runway strips

5.1. **General**

5.1.1. A runway is a defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft. This is either the asphalt, grass or murram area that is actually used by the aircraft for landing and take-off.

5.1.2. However, a runway need not be useable in both directions. This can apply if there is high ground at one end. Also, the runway is not the only ground required on an aerodrome.

5.1.3. A runway strip is a defined area, including the runway, intended to reduce the risk of damage to aircraft running off a runway; and to protect aircraft flying over it during take-off or landing operations.

5.1.4. Therefore, it follows that not only the runway must be clear of obstacles, but also the surrounding runway strip that covers a larger area than the runway itself.

5.1.5. An aircraft lands and takes off on the runway, and the runway is surrounded on both sides and at both ends by this runway strip.

5.2. **Dimensions of runway strips** For aerodrome reference code 1B, the dimensions of the runway strip are 30m each side of runway centreline, and 30 m beyond each end of the runway. Therefore, in order to provide a runway, the aerodrome operator must locate the runway strip first with these dimensions. For example, for a 1,000m long runway, a rectangle on the ground is required for the runway strip of 1,060m length and 60 m overall width.

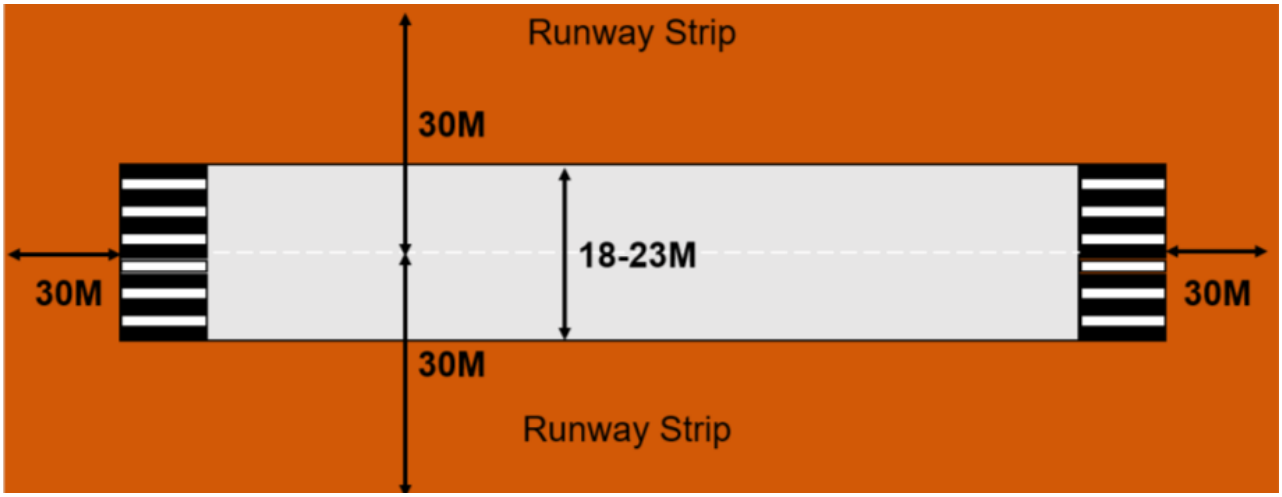

Figure 1: Runway strip layout code 1

5.3. **Obstacle limitation surfaces** Unfortunately, just having the runway strip, and the runway contained within the strip, is not sufficient. The runway will be used by aircraft to and from flight in the air. Therefore, it is logical and necessary to provide safe airspace clear of obstacles on both sides and at both ends of the runway strip. This airspace is at the ends of the strip, **not at the ends of the runway**, where approach and take-off climb obstacle limitation surfaces must be provided without any obstacles intruding into these imaginary surfaces. These areas of airspace will provide for the safe operation of aircraft whilst landing and taking off. Both the approach and take-off climb surfaces are at a gradient of 5% or 1:20 originating at the end of the strip, but they start vertically at the elevation of the end of the runway, as illustrated overleaf:

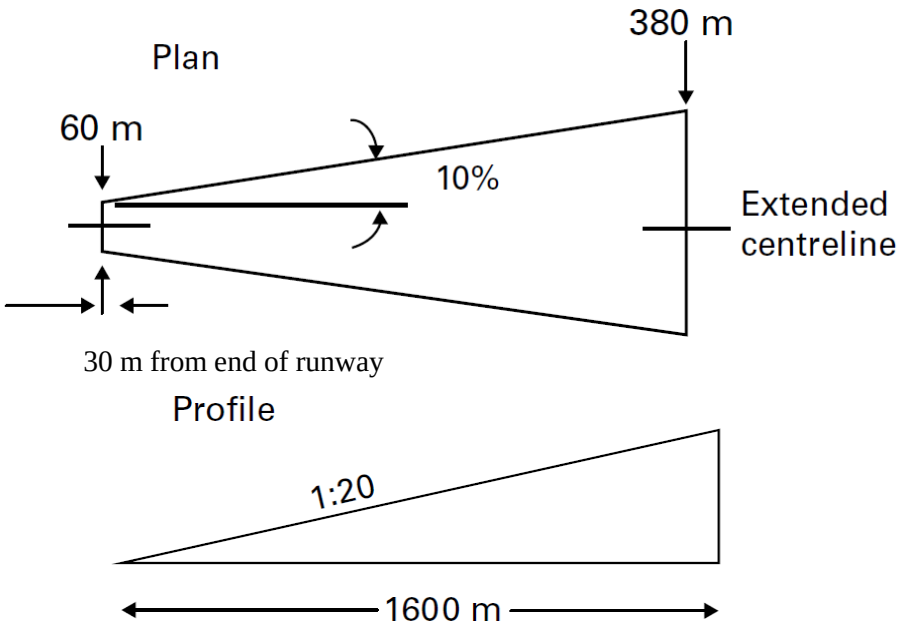

Figure 2: Approach and take-off climb surfaces (Code 1 non-instrument) at each end of the runway strip, plan and profile views

5.3.3. If the aerodrome operator discovers that there are obstacles within these limitation surfaces then there are two options:

a. Remove or lower the obstacles, or

b. Reduce the length of the runway strip, and therefore reduce the length of the runway.

5.3.4. At the sides of the runway strip and at the sides of the approach surface, a steeper obstacle limitation surface applies, termed the **transitional surface**. This is at a steeper gradient of **20% or 1:5**, and often creates the limiting height for trees, buildings and even parked aircraft alongside the runway/aerodrome. The purpose of this transitional surface is illustrated below, not to scale:

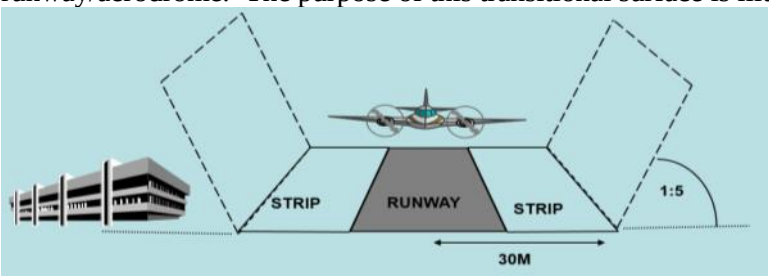

Figure 3: Runway strip and transitional surface layout and overflight

5.3.5. To enable an aircraft to overfly the runway strip off centreline, this transitional surface provides a graduated area clear of obstacles to increasing heights on each side of the strip, as illustrated overleaf:

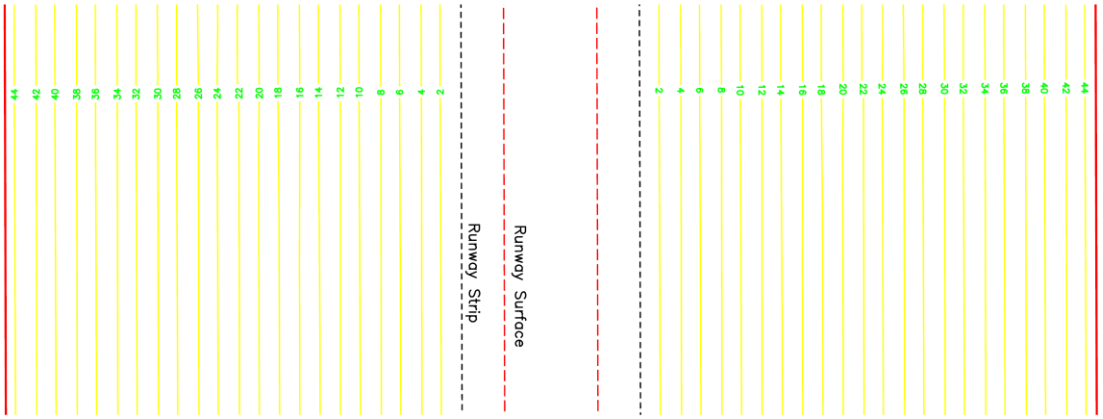

Figure 4: Transitional surface contours above runway level

5.3.6. Finally, this transitional surface continues upwards to a height of 45m above the lowest part of the runway. This is to allow an aircraft to manoeuvre around the aerodrome safely. This inner horizontal surface extends in a circle for a radius of 2000m from the mid-point of the runway. From the outer edge of this inner horizontal surface, a conical surface continues upwards and outwards to a further height of 35m above the inner horizontal surface, a total of 80m above the lowest part of the runway, at a gradient of 5% or 1:20 (the same as the transitional surface.

5.3.7 All of these obstacle limitation surfaces must be free from obstacles intruding above their respective levels, including high ground, trees, buildings, communication masts. With the prior approval of the CAA-DSSER it may be possible to site certain safety or navigation structures only within the runway strip or transitional surface. However, such approval will only be given, for example for a wind direction indicator, if it cannot be located outside the strip, or beneath the obstacle limitation surface and still function correctly. Trees and other vegetation, including tea plants will not be permitted in the runway strip or obstacle limitation surfaces.

5.3.8 These criteria described above are the absolute minimum international and national standard for the smallest size of aerodrome and runway, and therefore, must be strictly applied. At aerodromes where more than one aircraft might operate at the same time, aircraft waiting to enter the runway must hold position outside the 30m runway strip until such time as the runway has been vacated by the other landing or departing aircraft.

5.4. Runway end safety area

5.4.1 Also, on the ground at the end of the runway strip, 30 m from the ends of the runway, there is an additional area of safe ground required, termed the runway end safety area. This is an area symmetrical about the extended runway centre line and adjacent to the end of the strip primarily intended to reduce the risk of damage to an aeroplane undershooting or overrunning the runway .

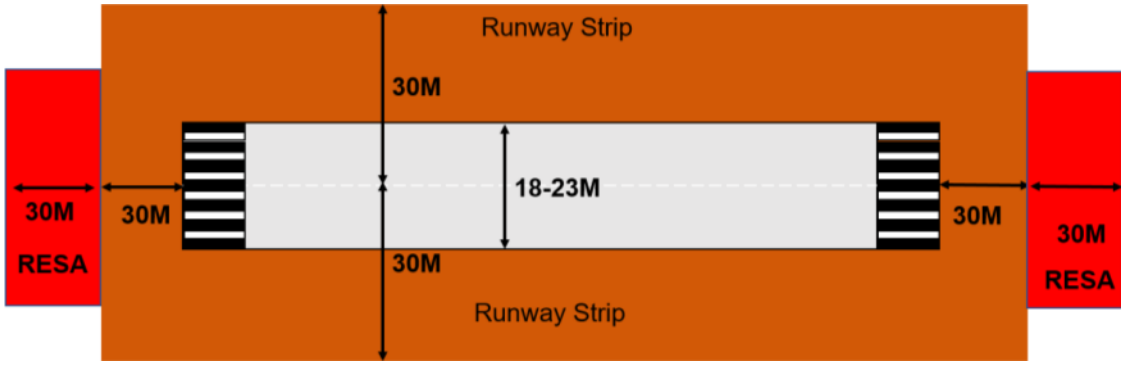

Figure 5: Runway end safety areas added to runway strip

5.4.2. The surface of the runway end safety area must be level and even enough to reduce the risk of damage to an aircraft, and also free from obstacles holes and ditches. In practice, this means that it must be to a similar standard as the runway strip.

5.4.3 The dimensions of the RESA are a length of 30m, in addition to the 30m end of the runway strip, and the RESA is a width of twice the width of the runway. For example, if the runway is 18m wide then the RESA must be 30m long and 36m wide.

5.4.4 The RESA will exist beneath the approach and take-off climb surfaces as it is a ground requirement, separate from the obstacle limitation requirements in the air around the runway, as illustrated below.

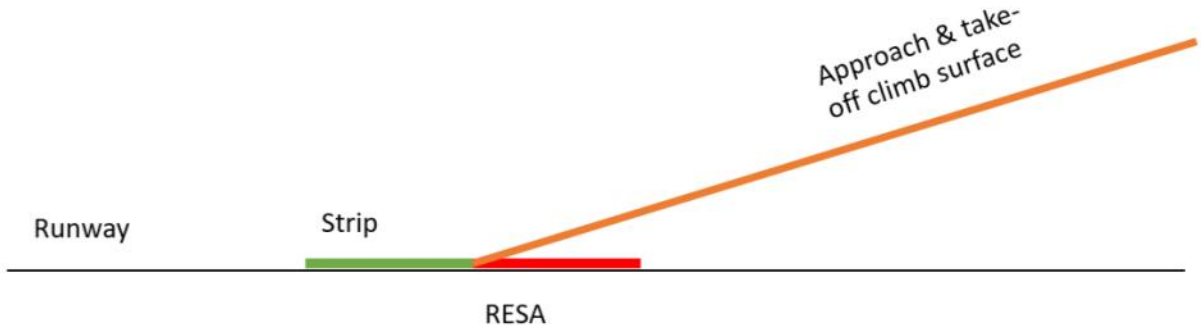

Figure 6: Approach and Take-off Climb Surface

6. Surface conditions

6.1. Ground slope

6.1.1. There are limits, both along the length and along the width of the runway, for the slope of the surface. The gradients and level changes applicable are detailed in the table attached at the end of this circular.

6.1.2. There are also limits for the rate of change of slope. Slope changes and transitions between slopes should be gradual and abrupt changes or sudden reversals of slopes should be avoided. This is to avoid sudden bumps that may damage an aircraft or disrupt its landing or take-off run.

6.2. **Ground hazards**

6.2.1. Within the general area of the strip surrounding the runway, measures should be taken to prevent an aeroplane's wheel, when sinking into the ground, from striking a hard vertical face. Special problems may arise for runway concrete markers or other objects mounted in the strip or at the intersection with a taxiway or another runway. In the case of construction, such as runways or taxiways, where the surface must also be flush with the strip surface, a vertical face can be eliminated by chamfering from the top of the construction to not less than 30 cm below the strip surface level. Other objects, the functions of which do not require them to be at surface level, should be buried to a depth of not less than 30 cm. This is termed delethalisation: the below ground ramping to buried vertical face of construction designed to reduce risk of damage to aircraft running on cleared and graded area of the strip.

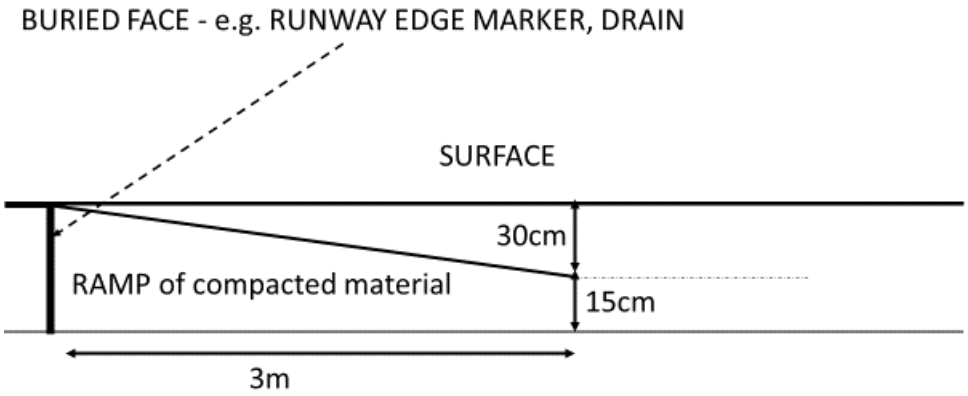

Figure 7: Delethalization of sunken objects

6.2.2. Agricultural crops other than long grass should not be grown within the runway strip since they would either provide a wildlife-attractive environment or be a fire hazard. This includes shrubs, tea plants, or any plants either with a strong woody or lignin content.

6.3. **Ground strength and obstructions**

6.3.1. The total area within the runway strip should be capable of supporting unrestricted access for emergency service vehicles as well as being capable of supporting an aircraft of the type using the runway, without causing significant damage to that aircraft. That is to say, if an aircraft runs off the runway, the surface, strength and gradients of the runway strip must not make this incident any worse or cause injury or fatality to the occupants of the aircraft.

6.3.2. One way of judging the suitability of the runway strip surface outside the limits of the runway itself, is to be able to drive a vehicle at high speed on the surface without damage or gross discomfort. Aircraft land, and therefore could undershoot or run off the runway, at speeds in excess of 100 kilometres per hour. Therefore, aerodrome operators must not underestimate the importance or providing a good quality runway strip and runway end safety area.

6.3.3. It will occasionally be necessary, but only with prior CAA-DSSER approval, to install facilities within the runway strip for safety purposes. This may include:

a. Wind direction indicator
b. Aeronautical signs
c. Runway edge, end and threshold markers

6.3.4. Such permitted obstacles may **NOT** include:

a. Trees
b. Shrubs
c. Ditches
d. Open drains
e. Anthills
f. Concrete structures above the strip level, or at the strip or runway surface level, unless they essential and are delethalised, such as runway edge markers.
g. Taxiway edges that are not delethalised within the runway strip
h. Wind direction indicator, if it could be installed further away from the runway and still provide representative wind velocity indications.

6.3.5. Any structures, such as listed in 6.3.4 above, that are installed within the strip, subject to prior approval from CAA-DSSER, must be frangible, marked and delethalised.

6.3.6. Frangibility is the ability of an object to retain its structural integrity and stiffness up to a specified maximum load but when subject to a load greater than specified or struck by an aircraft will break, distort or yield presenting minimum hazard to an aircraft.

6.3.7. Requirements for the marking of obstacles are detailed in the Regulations, but are not included in this circular as the scope and priority is to avoid all obstacles within the strip and obstacle limitation surfaces. Details of runway markers and wind directions indicators are included below.

7. Wind Direction Indicator

7.1. The wind direction indicator is a mandatory requirement for aerodrome operations. The wind direction indicator should be in the form of a truncated cone made of fabric and should have a length of not less than 3.6 m and a diameter, at the larger end, of not less than 0.9 m. It should be constructed so that it gives a clear indication of the direction of the surface wind and a general indication of the wind speed. The colour or colours should be so selected as to make the wind direction indicator clearly visible and understandable from an aircraft height of at least 300 m, having regard to background. The colour or colours need to give adequate conspicuity against the local backgrounds, suitable colours of the cone may be black white, at murram aerodromes, or white, red and white, or orange, and should be arranged in five alternate bands, the first and last bands being the darker colour.

7.2. The mast supporting the wind direction indicator should be marked with red and orange bands if it is an obstacle, and the cone should be mounted at a height of 10 or 5 metres above ground.

Figure 8: Sample marking of a wind direction indicator

8. Marking the runway

8.1. Pilots approaching the aerodrome to land on the runway need to be able to clearly identify the runway's direction, boundaries, and, in particular, the threshold. The threshold only relates to landing, and is the start of the portion of runway available for landing. The size and perspective of whatever marker or marking is selected by the aerodrome operator is important in assisting the pilot to select and judge his approach to land.

8.2. There are four options of markings and markers to indicate the runway extents:

Option 1. Inset, flush concrete marker
Option 2. Elevated frangible conical markers (cones)
Option 3. Paint markings
Option 4. Elevated edge markers

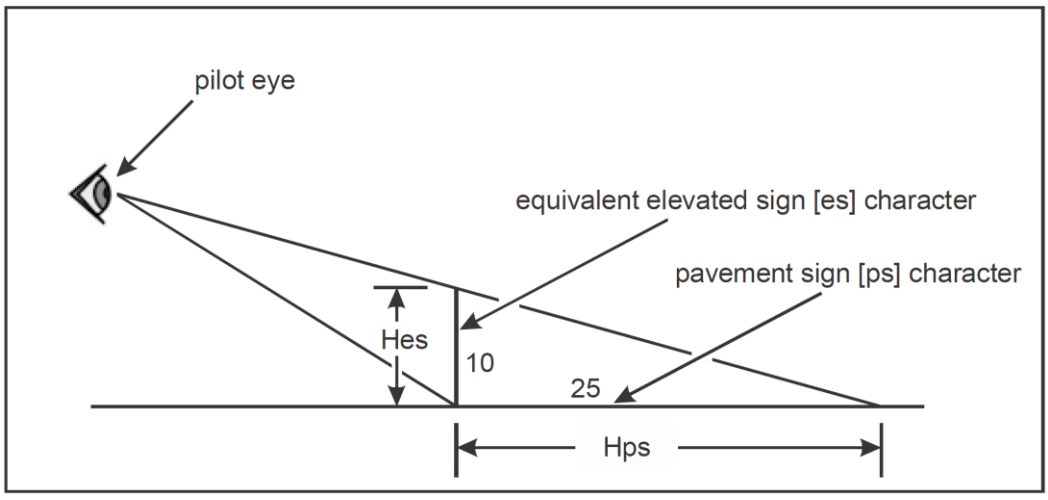

Figure 9: distorted ground marking explanation

(Hes= height elevated sign; Hps= "height" pavement or ground marking)

8.3. Each of these options has different challenges and benefits depending upon the frequency of use of the runway, the type of aircraft operating and both the surface and the weather conditions. For all options, the runway markings or markers should be visible from an aircraft on the approach at a range of at least 2 km. The visibility of the markers or markings is a function of their size, colour and contrast with the surroundings, as well as the prevailing weather and sunlight conditions. Each option is described below, and the aerodrome operator is advised to submit its proposals to CAA-DSSER before committing to any option.

8.4. All versions of runway edge markers and markings should be arranged in pairs on opposite sides of and equidistant from the centreline.

8.5. Where frangible markers are used to delineate the boundaries of an unpaved runway, or other areas within the runway strip, whether temporary or otherwise, such markers should be lightweight. Whilst ballast may be required to ensure stability of the markers, e.g. para 8.11, below, aerodrome operators should ensure that the units retain their frangibility, taking into account the types of aircraft that commonly use the runway.

8.6. **Option 1: Inset, flush concrete marker**. The edge markers shall be constructed along the longitudinal edges of the runway. On unpaved surfaces: grass, or murram, the markers shall be constructed using precast or cast-in-place concrete slabs. The slabs must be installed flush, so as to be even and level with the surrounding ground surface, and placed at intervals of 90 metres. The flat rectangular markers should have a minimum size of 1 m wide by 3 m long, and should be placed with their long dimension parallel to the runway centre line, and with their inner edge no closer to the runway centreline than half the declared runway width. These concrete markers must never be above the surrounding runway surface, and their edges in all directions must be delethalised as described above. This can normally be achieved using a ramp, as shown, of compacted material. The total dimensions of one edge marker's installation in grass, with the white concrete pad measuring 1x3m and these compacted ramps is 9 m long and 7m wide. This is made up of 3m of ramp on all four sides of the 1m x 3m concrete marker. When installed in murram, if the murram is compacted sufficiently to withstand heavy rains, this should avoid the need for delethalisation on the sides of the marker that are in murram as the aircraft wheels should not sink into the murram surface in the same way as on grass. A concrete marker in situ is illustrated overleaf.

Figure 10: Example of a concrete runway edge marker

8.7. The end markers are of a similar construction but form a right-angle shape on each corner of the runway.

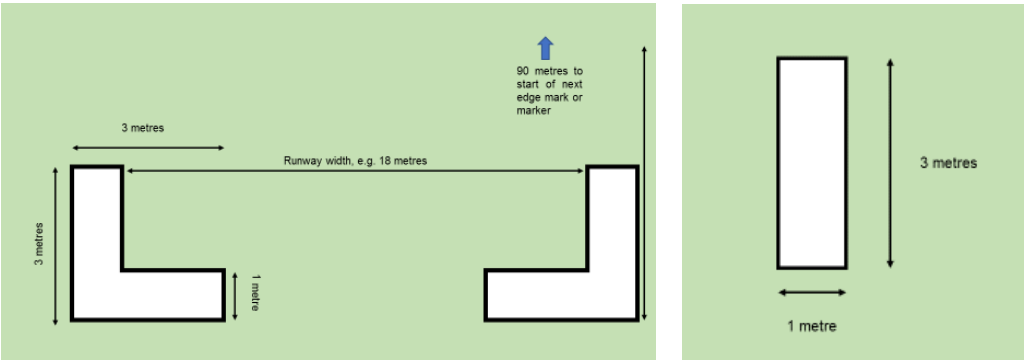

Figure 11: Location and dimension of runway end and edge marks and markers

8.8. **Option 2: Elevated frangible conical markers:** The conical markers should have a height not exceeding 500 mm and not less than 750 mm in diameter at the base. Conical markers should be equally spaced at the edge of the runway not exceeding intervals of between 60m and 90m. The markers should be coloured to contrast with the background against which they will be seen, as well as two colour markers to contrast with each colour, such as white, black and white, or red and white, as illustrated below:

Figure 12: Examples of cone runway edge marker

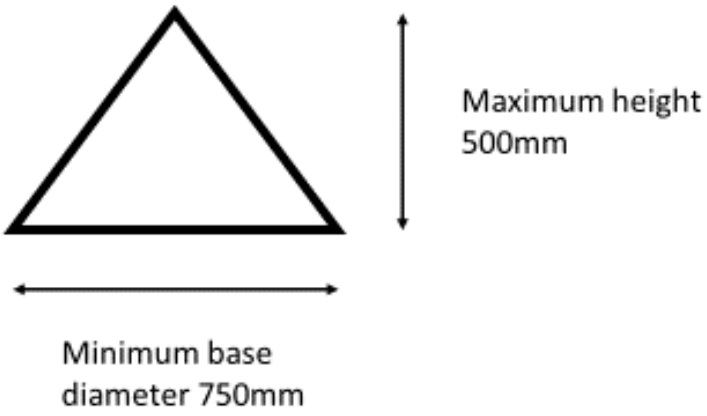

Figure 13: Dimensions of cone runway edge marker

8.9. **Option 3: Paint marking**: - It is surprisingly difficult at ground level to see the correct layout of paint marking, so operators should make out a plan, then mark out where you need the marks with cones or rope or lining. When first set out, they may appear to be much bigger than may be thought is needed, but the above dimensions as in para 8.5 for concrete markers must be followed. Ensure that the edge marking align with each other in parallel straight lines. Types of paint or marking include;

a. A mixture of china clay, latex and cracked starch, similar to that used on sports grounds
b. Water based emulsion paints
c. Polypropylene inserted marking: involving the stitching of UV treated polypropylene material into the surface of the pitch using a specialist hand operated machine. Produces a permanent line that, according to the manufacturers, is suitable for up to ten years

Lime may not be used for runway marking as it is corrosive to aircraft and not healthy for people, its use is outdated.

8.10. **Option 4. Elevated edge markers**, other than conical markers are either board or drum style markers. Rather than being aligned parallel to the runway centreline, these markers are aligned at right angles to the runway centreline, along the outer edge of the runway similar to the layout of paint or concrete markers. They must be frangible and not exceed 500mm in height. If re-using 200ltr drums, then frangibility is difficult to achieve but both frangibility, and attraction to thieves, can be improved by removing both the bottom and top of the drum before setting them out on the aerodrome, as shown below.

Figure 14: Runway edge markers

Figure 15: Sample: runway marked by black and white drums

8.11. Marker boards must be frangible, and not higher than 500mm. Suitable dimensions are shown below, but the colour, normally white, should be selected by the aerodrome operator according to the particular aerodrome's background, as seen by the pilot.

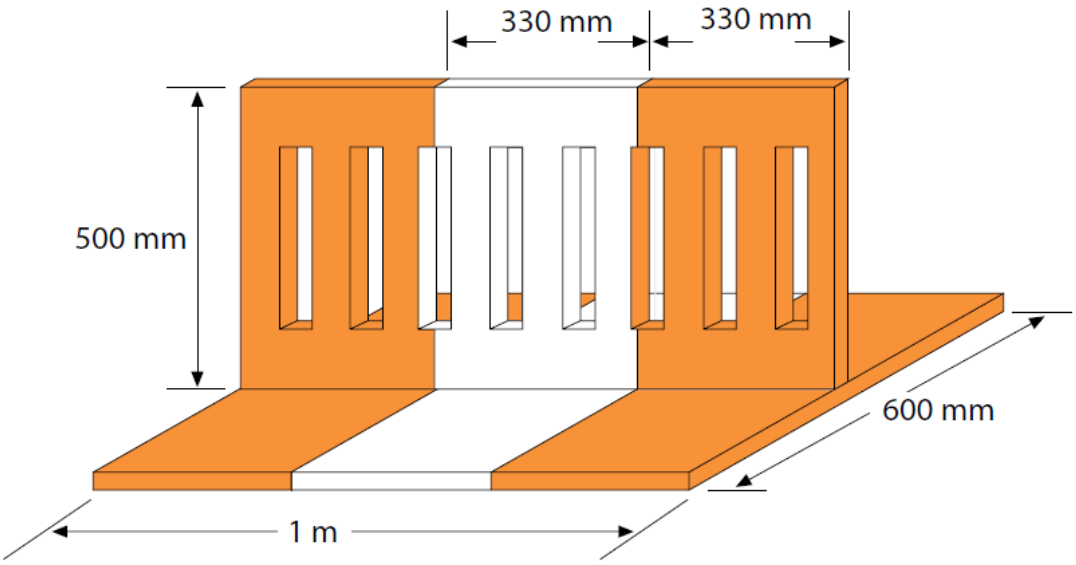

Figure 16: Dimensions of a runway edge marker board (conspicuous colour to be selected by aerodrome operator)

8.12. Runway designation markers which indicate runway orientation are required, located at each threshold in accordance with number dimension in metres as shown on the next page and illustrated below. A runway designation marking consists of a two-digit number. This two-digit number shall be the whole number nearest the one-tenth of the magnetic North when viewed from the direction of approach. When the above rule would give a single digit number, it shall be preceded by a zero.

Figure 17: Example of runway designation marking in situ

8.13. If the runway threshold is displaced from the extremity of the runway, a frangible sign at the start of the take-off run available (TORA), showing the designation of the runway may be provided for aeroplanes taking off.

8.14. In addition to the edge and end markers, and the runway designation marking, it may be desirable to emphasise the threshold of the runway by adding black and white runway threshold marker boards at the outer edges of the runway threshold. These must be frangibly constructed, maximum height 500mm, and are illustrated overleaf.

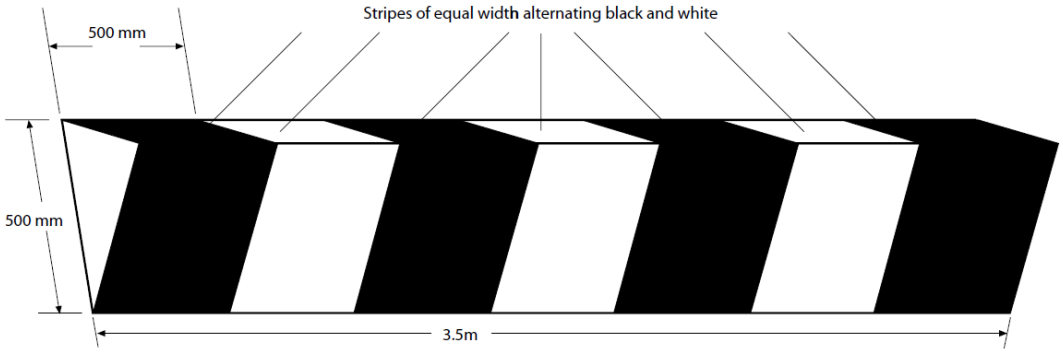

Figure 18: Threshold marker board

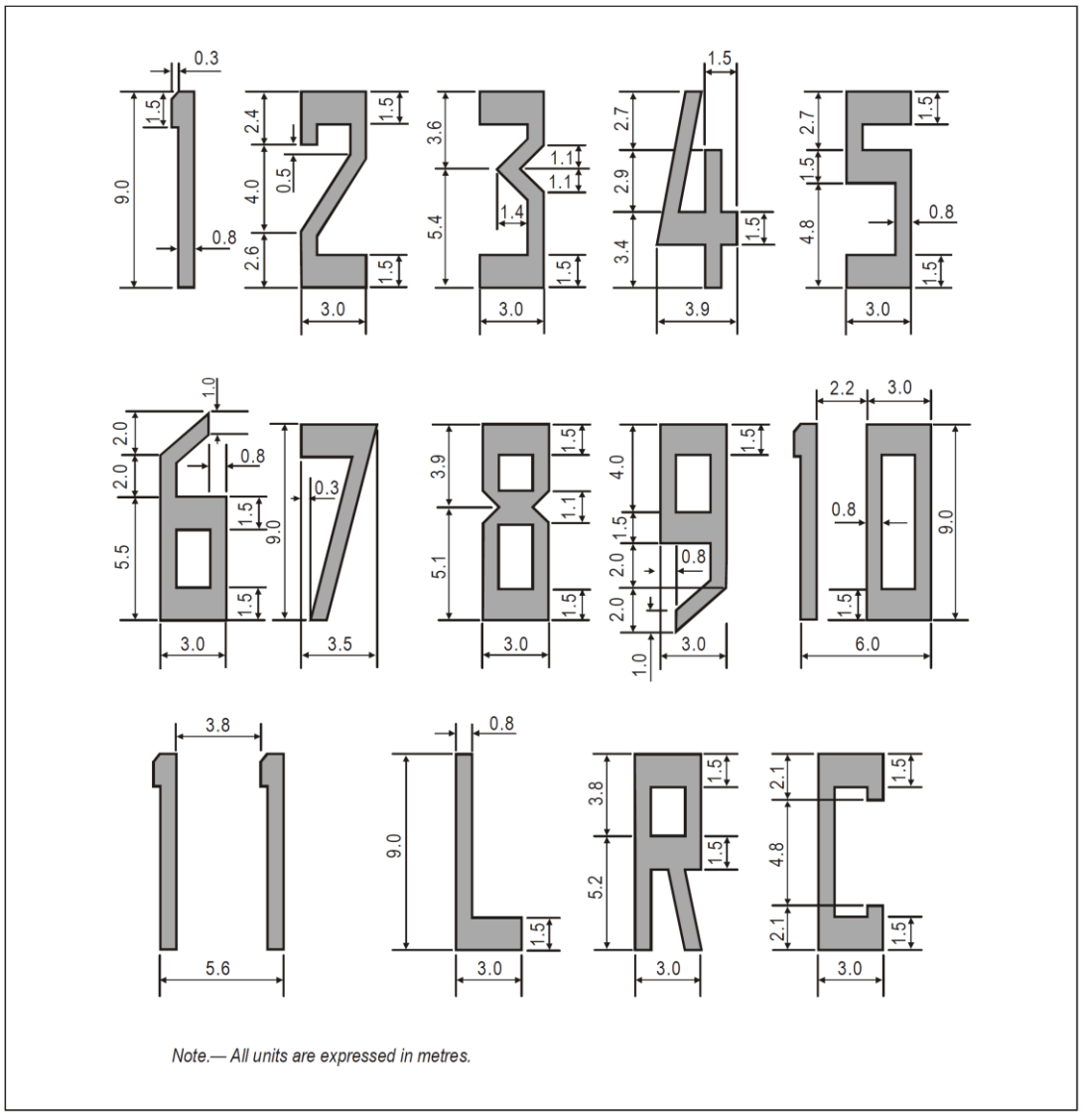

Figure 19: Runway designator number dimensions

9. Aerodrome Name Marker or Marking

9.1. Aerodrome name markers or markings shall be constructed in accordance with letters and number as recommended in Figure 3 above. The marking of the name may be done at the top of the terminal building if this building exists, or on the ground, preferably at or near the apron (if provided).

10. Aerodrome Boundary Marker

10.1. Further emphasis of the aerodrome location can be achieved by placing markers at the extremities of the aerodrome, not the runway. Such markers are illustrated below. As these markers are outside the runway strip and obstacle limitation surfaces they may be of sturdier and more permanent construction than frangible runway and threshold markers. They are painted orange and white, as illustrated.

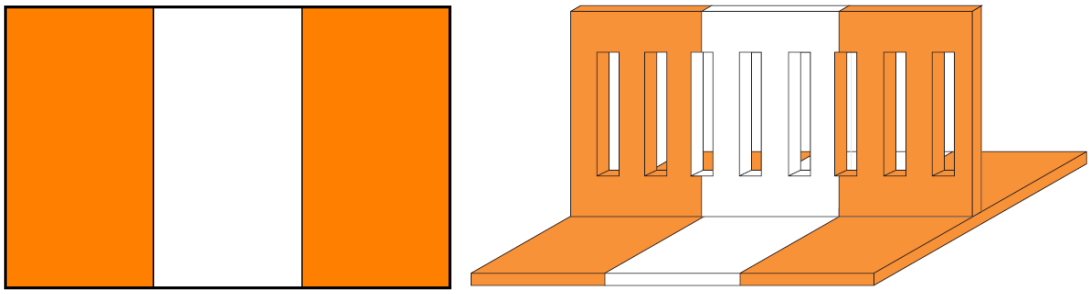

Figure 20: Aerodrome boundary markers

11. Notification to the aeronautical information service

11.1. According to the Civil Aviation (Aerodromes) Regulations 2019, an aerodrome operator has an obligation to report all information relating to the aerodrome and its facilities, and which is significant for the safe conduct of flights, to the users of the aerodrome. As well as maintaining an up to date aerodrome manual, the aerodrome operator must report the characteristics and aeronautical data and relevant aerodrome procedures through the CAA-DSSER to the AIS. In the event of unplanned changes or failures, the following shall be reported to the AIS directly for NOTAM action:

a. Changes to the physical facilities of the aerodrome, such as a blocked runway;
b. Construction or maintenance work on or immediately adjacent to the manoeuvring area;
c. Unserviceable portions of any part of the manoeuvring area;
d. Temporary unavailability of the whole or part of the aerodrome, such as during work in progress;
e. Any other information of operational significance, such as any change to data or information that is published in the Uganda AIP.

12. Aerodrome maintenance

12.1. Subsequent to the grant of a licence, an aerodrome operator has an obligation to ensure operational safety of the aerodrome. To achieve this, continuous maintenance of the aerodrome facilities is required particularly the movement areas and the visual aids installed or constructed at the aerodrome. The operator shall develop and implement maintenance procedures commensurate with the degree of operation and environmental condition of the locality. For instance, higher frequency of maintenance will be required at aerodromes where the number of aircraft movement is high or where the aerodrome is located at unfavourable soils conditions. The aerodrome operator shall maintain serviceability of the aerodrome by ensuring that:

a. The landing areas, runways, taxiways and the apron are kept in serviceable condition,
b. For murram surfaces, there should be no loose stones or corrugations and the surface of the runway should be cambered to allow water to drain quickly,
c. For grass, the grass on the runway must remain healthy, uniform and must be trimmed short.
d. No gullies formed by rain should be allowed to develop.
e. The runway edge markers and markings and runway designators are not damaged, dirty or faded,
f. The grass in the strip area is trimmed,
g. Torn or faded wind direction indicators are promptly replaced,
h. Obstacles in the vicinity of the aerodrome are continuously monitored and reported,
i. Access roads are in useable condition,
j. Where constructed, the fence is maintained,
k. Appropriate warning signs are in place and maintained; and
l. Incursion by people and animals is controlled.
m. Runway strips and obstacle limitation surfaces are kept free of obstacles, and that growth of vegetation close to such surfaces is monitored and cut

12.2. The following illustrations indicate examples to be avoided:

Figure 21: Murram surface with standing water

Figure 22: Hole in runway of unhealthy grass

Figure 23: Patchy, clumped unhealthy grass

Figure 24: Ditch at runway edge

Figure 25: Runway markers broken, fade, overgrown

Figure 26: markers surrounded by a gap, not flush with the runway surface or delethalised

Figure 27:Runway markers not straight

Figure 28:WDI mast bent and not marked

13. Wildlife strike hazard

13.1. Aerodrome operators must assess the risk, and take measures to minimise the risk of wildlife strikes to aircraft using their aerodrome.

14. Records

14.1. Aerodrome operators must record all aircraft movements and any other occurrences at the aerodromes, such as wildlife strikes, foreign object debris, flooding damage, etc.

15. Inspections

15.1. Prior to each aircraft movement, the aerodrome operator should carry out a physical visual inspection of the runway for any damage, wildlife, FOD, etc, and take action accordingly.

16. Procedure to apply for a licence to operate a domestic aerodrome up to aerodrome reference code 1B

16.1. A private or public entity may wish to construct an unpaved aerodrome for use by an aircraft with MTOW not exceeding 5700kg. It is important that the services, facilities and installations to be provided at the aerodrome are safe for operation of such aircraft.The Authority shall consider granting of a permit to construct the aerodrome where the applicant has submitted a duly completed Application Form as prescribed by the Authority. The application form shall be accompanied by:Letter of Approval from the Local Authority, and relevant authorities;

a. Proof of land ownership.
b. Detailed design of the proposed construction including related architectural requirements.
c. Aerodrome data in accordance with the characteristics of the aircraft for which the aerodrome is intended and the expected aerodrome category;
d. Topographical map of the proposed aerodrome site in scale of 1:50,000 indicating other aerodromes in the proximity.
e. Approval from the authority responsible for the national environmental management.
f. A fee as prescribed by the Authority to cover costs for inspection and assessment.

17. Enquiries Any enquiries should be addressed to:

Director of Safety Security and Economic Regulation
Uganda Civil Aviation Authority
PO Box 5536
Kampala
Uganda

UGANDA CIVIL AVIATION AUTHORITY
DIRECTOR
SAFETY, SECURITY AND ECONOMIC REGULATION

Director Safety, Security and Economic Regulation

Appendix: Dimensions of runways (strips) and slopes of approach obstacle limitation surfaces for non-instrument approach runway criteria,
Aerodrome Reference Code 1A and 1B

Ref. para Annex 14 vol 1	Characteristic	Code Number
		Non-instrument runway
		1
(1)	(2)	(3)
	Minimum width	
3.1.10	Runway pavement: Code letter A, B	18 m
3.1.10	Runway pavement Code letter C	23 m
3.4.3	Runway strip width from runway centre line	30 m
3.4.2	Runway strip length from runway or stopway	30m
3.4.8	Graded portion of runway strip from runway centre line	30 m
3.5.4	RESA length from strip end (recommended)	120 m
3.5.6	RESA semi-width (from extended rwy centreline) (recommended)	40 m
Minimum separation distance between parallel runway centre lines		
3.1.11	Independent parallel approaches and departures	120m
Minimum separation distance between runway centre line and a holding bay, runway/road holding positions		
Table3.2	Non instrument runway	30 m
Table3.2	Take-off runway	30 m
Longitudinal slopes		
3.1.13	Maximum pavement overall longitudinal slope	2%
3.1.13	Maximum portion of pavement longitudinal slope	2%
3.1.15	Maximum pavement slope change between 2 consecutive slope changes	2%
3.1.15	Max rate of change in transition from one pavement slope to another per 30m	0.4%
3.1.15	Transition from one pavement slope to another: minimum radius of curvature	7500m
3.4.13	Maximum longitudinal slope in graded area of strip	2%
3.5.10	Maximum downward RESA longitudinal slope	5%
Transverse slopes		
3.1.19	Pavement maximum and ideal transverse slope, code letter A, B	2%
3.1.19	Pavement maximum & ideal transverse slope, code letter C, D, E, F	1.5%

3.1.19	Pavement minimum transverse slope	1%
3.1.19	Shoulder maximum transverse slope	2.5%
3.4.15	Maximum transverse slope graded area: first 3 m from paved edge	-5%
3.4.15	Maximum transverse slope of graded area, outside first 3 m	3%
3.4.16	Maximum transverse slope ungraded area of strip	^5%
3.5.11	Maximum transverse RESA slope upwards or downwards	5%
3.6.4	Maximum upward ground slope in clearway	1.25%

Obstacle Limitation Surfaces: Non-instrument approach runway criteria, Aerodrome Reference Code 1A and 1B

Surface	Runway classification Non-instrument Code number 1
(1)	(2)
CONICAL	
Slope	5%
Height above inner horizontal	35 m
INNER HORIZONTAL	
Height	45m
Radius	2000m
APPROACH	
Width of inner edge	60m
Distance from threshold	30m
Divergence (each side)	10%
First section	
Length	1600m
Slope	5%
Total length of approach surface	
TRANSITIONAL	
Slope	20%