MANIPUR GAZETTE

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No. 531 **Imphal, Tuesday, November 15, 2011** **(Kartika 24 1933)**

GOVERNMENT OF MANIPUR
SECRETARIAT: HOME DEPARTMENT

NOTIFICATION

Imphal, the 15th October, 2011

No. 9/6(52)/2011-H.–Whereas, the Station Headquarters, Leimakhong C/o 99 APO has informed that Government of Manipur had issued a Notification No. 3/3(5)/85-H dated 27-06-2009 under sub-section (2) of Section 9 of the Manoeuvres Field Firing and Artillery Act, 1938 (Act No. 5 of 1938) specifying the areas shown in the schedule hereto as the areas in which Field Firing practice may be authorized for a period w.e.f .31-01-2010 to 30-01-2012.

SCHEDULE

The boundary line of the Field Firing areas starts from the Central Portion of the Village of Kaingam (Village No. 33) and goes North-Eastern direction towards the village of Makhan for 2.5 miles, then it turns towards North-Western direction upto Sanding Khuman Lock over Kounu Range for 3.5 miles. It turns South-East towards Laingannouga Khuma for 2.5 miles over Kounu Range. The line goes for 2.5 miles towards Eastern direction and meets the starting point at Kaingam.

2. And whereas, the Station Headquarters, Leimakhong C/o 99 APO has also requested for extension of the authorization for Field Firing practice for a further period of another 2 (two) years w.e.f. 31-01-2012 to 30-01-2014.

3. Now therefore, the undersigned in exercise of the powers conferred under sub-section (3) of Section 9 of the Manoeuvres Field Firing and Artillery Act, 1938 (Act No. 5 of 1938) is pleased to invite the attention of all concerned to submit objection/representation, if any, on the above proposal to the undersigned within within 2 (two) months from the date of publication in the official Gazette.

By orders etc.

RANJAN YUMNAM,
Under Secretary (Home),
Government of Manipur.

GOVERNMENT OF MANIPUR
SECRETARIAT: HOME DEPARTMENT

Imphal, the 25th October, 2011

NOTIFICATION

No. 2/4(1)/07-H (AC): The Governor of Manipur is pleased to re-notify Notification No. SO.84 (E) dated 14th January, 2010 issued by the Ministry of Civil Aviation, Government of India for favour of taking necessary action by all concerned:

"In exercise of the power conferred by section 9-A of the Aircraft Act, 1934 and in supersession of the notification of the Government of India in the Ministry of Civil Aviation No. S.O 1589 (E), dated the 30th June, 2008, the Central Government being of opinion that it is necessary and expedient so to do for the safety of aircraft operations hereby direct as under:

1. No building or structure shall be constructed or erected and no tree shall be planted on any land within the limits specified in Annexure-I & II from Civil & Defence Aerodromes and Aeronautical communication stations listed in Annexure IIIA, IIIB, IIIC, IIID & IIIE without obtaining "No Objection Certificate".
2. For the purpose of issuing of No Objection Certificate referred to in paragraph 1,
   (a). the Airports Authority of India shall be responsible for issuing the No Objection Certificate on behalf of Central Government in respect of all Civil Aerodromes in India including the State Government Aerodromes and the Private Aerodromes where civil commercial flights are operating as listed as Annexure-IIIA;
   (b). for Defence Aerodromes, defence authorities shall be responsible for issuing No Objection Certificate in accordance with this notification and subject to any other restriction or condition which such authorities deemed fit for issuing the "No Objection Certificate".
3. No building or structure higher than the height specified in Annexure-I & II shall be constructed or erected and no tree which is likely to grow or ordinarily grows higher than the height specified in the said Annexure I & II shall be planted on any land within a radius of twenty kms from the aerodrome reference points.
4. In respect of aerodromes which are required to be constructed or developed where the height of any existing building or structure or tree on any land within the limit specified in Annexure I & II, exceeds the height specified in this notification, the owner or the person having control of such building, structure or tree shall reduce the height thereof within a period of one month from the date of publication of notification in this regard so as not to exceed the specified height.

5. Where the owner or the person or the person having control over the building, structure or tree fails to reduce the height within the period specified in para 4, the State Government Authorities or any other concerned authority shall be responsible for taking action in respect of such building, structure or tree; and any building or structure including tower, installation or chimney that is constructed or erected or any tree that is grown in violation of the provisions contained in this notification shall be considered as illegal and the authorities referred to above shall be responsible for removal or reduction of height thereof.
6. In case of Government and Private Civil Aerodromes and Air-stripes specified in Annexure IIIB where, at present, civil schedule operations are not taking place or there is no possibility of such operations taking place for reasons including airspace restriction, permanent structures or terrain penetrating the obstacle limitation surface, national security, etc, the provisions of this notification shall be applicable on the basis of the aerodrome reference code and operational usage of that aerodrome or strip.
7. Each aerodrome operator shall be responsible for preparing zoning maps in conformity with the provision of this notification with digitised data in WGS84 coordinate indicating all the latest features around the airport.

[F. No. AV-20036/66/2000-AAI]
ALOK SINHA, Jt. Secy.

ANNEXURE-I

The Land area specified below shall be completely free from all obstacles as provided hereunder:-

1. The land comprising within the Runway strip of uniform width of 150 meters on either side of centerline which extends to 60 meters beyond each extremity of Runaway end along extended centerline of Runaway for a instrument runaway code 3 and 4.
2. The land comprising within the Runway strip of uniform width of 75 meters on either side of centerline which extends to 66 meters beyond each extremity of Runway end along extended centerline of Runway for a Instrument runway code 1 & 2 for non-Instrument runway Code 3 & 4.
3. The land comprising within the Runway strip of uniform width of 40 meters on either side of Centerline which extends to 60 meters beyond its extremity of runway end along extended centerline of Runway for a non-Instrument runway code 2.
4. The land comprising within the Runway strip of uniform width of 30 meters on either side of Centerline which extends to 30 meters beyond its extremity of runway end along extended centerline of Runway for a Instrument runway code 1.
5. The rectangular area of land enclosed within the approach funnel of the Runway within a maximum distance of 300 meters from the extremity of the runway and 60 meters on either side of the extended runway centerline for Code 3 & 4 and 45 meters on either side of extended runway centerline for Code 1 & 2.

6. In an aerodrome, where-

(a). Very High Frequency Omni Radio Range (VOR)/Distance Measuring Equipments (DME)/ Very High Frequency Direction Finder (VHFDF) facilities are available, land within the 300 meters radius of the facilities;

(b). Localizer facilities are available, the area bounded by the following, namely:-

(i) a line 300 meters in the direction of approached or nearest end of the runway, whichever is greater from localizer antenna and perpendicular to the runway;

(ii) a line 60 meters from the centerline of localizer antenna on both sides and parallel to the runway;

(iii) a line containing centre of localizer antennas and perpendicular to the runway; and

(iv) area within circle of 75 meters radius with centre at middle of the antenna system;

(c). GLIDE PATH facilities are available, the area bounded by the following, namely:-

(i) a line 300 meters in the direction of approached from the glide path facility;

(ii) a line containing glide path antenna and perpendicular of runway;

(iii) near edge of the runway from the glide path;

(iv) a line 30 meters in the direction away from the runway and parallel to it;

(d). Locators or Markers Beacons facilities are available, the land within a radius of 30 meters of the side of the Markers and Locators Beacons;

(e). Air Surveillance Radar facilities are available, no structure will be permitted on the land above the level of 3 meters below the pedestal height up to the distance of 500 meters from Radar antenna;

(f). Air Routes Surveillance Radar facilities are available, no structure will be permitted on land above the level of 5 meters below the pedestal height up to the distance of 200 meters from Radar antenna;

(g). Secondary Surveillance Radar are available, the distance and the height restriction shall be the same as in respect of the air surveillance radar or air routes surveillance radar, depending upon operational usage;

(h). Microwave Link facilities are available, on corridor of 30 meters on either side of the direct line of the azimuth and 10 meters below from the direct line or flight in the vertical plane;

(i). Ultra High Frequency (UHF) link facilities are available, on a corridor of 30 meters on either side of the direct line of the azimuth and 10 meters below from the direct line of sight in the vertical plane;

(j). En-route Beacons facilities are available, land within a radius of 30 meters around the antenna;

(k). Remote Receiver facilities are available, land within a radius of 1525 meters of the sight.

Explanation :- For the purpose of this Annexure-

(a). "Runway Strip" means a defined area included the Runway and Stopway, if provided, intended:-

(i) to reduce the risk of damage to aircraft running of a runway; and

(ii) to protect aircraft flying over it during take-off or landing operation;

(b). "Runway Code", mans the Runway Code, in relation to the dimension of Runway Strips specified in Column 1 of the table below:

DIMENSION OF RUNWAY STRIP

Runway Code	Length (meter)	Width extending laterally on either side of Runway Centerline (meter)	Length beyond Runway end /Stopway (meter)	Width extending laterally on either side of Runway Centerline (meter)	Length beyond Runway end/ Stopway (meter)
(1)	(2)	(3)	(4)	(5)	(6)
1.	<800	75	60	30	30
2.	800<1200	75	60	40	60
3.	1200<1800	150	60	75	60
4.	1800 & above	150	60	75	60

(c). "Approach funnel", in relation to-

(i) an Instrument Runway Code 3 & 4, means the area in the shape of an isosceles trapezium having the longer parallel side 4800 meters long (2400 meters on either side of the extended Centerline of the Runway) and smaller parallel side 300 meters long (150 meters on either side of the extended Centerline of the Runway), where the smaller and the longer parallel sides are placed at a distance of 60 meters and 15060 meters respectively, from the end of the Runway and at right angles to the extended Centerline;

(ii) an instrument Runway (precision) code 1 & 2, means the area in the shape of an isosceles trapezium having the longer parallel side 4650 meters long 92325 meters on either side of the extended centerline of the runway) and smaller parallel side where the smaller and longer parallel sides are placed at a distance of 60 meters and 15060 meters respectively, from the end of the runway and at right angles to the extended centerline;

(iii) an instrument Runway (non precision) code 1 & 2 means the area in the shape of an isosceles trapezium having the longer parallel side 900 meters long(450 meters on either side of the extended centerline of the runway) and smaller parallel side 150 meters long (75 meters on either side of the extended centerline of the runway) where the smaller and longer parallel sides are placed at a distance of 620 meters and 2560 meters respectively, from the end of the runway and at right angles to the extended centerline;

(iv) non instrument runway code 3 & 4 means, the arc in the shape of an isosceles trapezium having the longer parallel side 750 meters long (375 meters on either side of the extended centerline of the runway) and smaller parallel side 150 meters long (75 meters on either side of the extended centerline of the runway) where the smaller and longer parallel sides are placed at a distance of 60 meters and 3060 meters respectively, from the end of the runway and at right angles to the extended centerline;

(v) an instrument runway code 2 means, the area in the shape of an isosceles trapezium having the longer parallel side 580 meters long (9290 meters on either side of the extended centerline of the runway) where the smaller and longer parallel sides are placed at a distance of 60 meters and 2560 meters respectively, from the end of the runway and at right angles to the extended centerline;

(vi) an instrument runway code 1, means the area in the shape of an isosceles trapezium having the longer parallel side 320 meters long (160 meters on either side of the extended centerline of the runway) and smaller parallel side 60 meters long (30 meters on either side of the extended centerline of the runway) where the smaller and longer parallel sides are placed at a distance of 30 meters and 1660 meters respectively, from the end of the runway and at right angles to the extended centerline. The diagrams of runway strips and approach funnel of instrument runway code 1, 2,3 & 4 and non-instrument runway code 3 & 4 have been shown at Appendix ;

(d)."instrument runway" means a runway served by visual aid or non visual aids providing directional guidance adequate for a straight in approach and intended for the operation of aircraft using instrument approach procedures;

(i) Non- precision approach runway- An instrument runway served by visual aids and a non-visual aid providing at least directional guidance adequate for a straight in approach,

(ii) Precision approach runway, category I- An instrument runway served by Instrument Landing System and / or MLS and Visual aids intended for operations with a decision height not lower than 60 meters and either a visibility not less than 800 meters or a runway visual range not less than 550 metres,

(iii) Precision approach runway, category II- An instrument runway served by Instrument Landing System and or MLS and visual aids intended for operations with a decision height lower than 60 meters but not lower than 30 meters and a runway visual range not less than 350 metres,

(iv) Precision approach runway, category-III - An instrument runway served by Instrument Landing System and /or MLS to and along the surface of the runway and

A-intended for operations with a decision height lower than 30 meters, or no decision height and a runway visual range not less than 200 meters,

B- intended for operations with a decision height lower than 15 meters, or no decision height and a runway visual range less than 200 meters but not less than 50 meters,

C- intended for operations with no decision height and no runway visual range limitations.

(e)."Non-instrument runway" means a runway intended for operations of the aircraft using visual approach procedures;

(f). "Very High Frequency Omni Radio Range, Terminal Very High Frequency Omni Radio Range, and Doppler Very High Frequency Omni Radio Range" means the facilities operating in the Very High Frequency band of frequencies112 to 118 MHz radiate signals whereby an aircraft with the help of an instrument in its cockpit when turned to the ground equipment frequency automatically gets its direction with respect to the facility and helps an aircraft to navigate on a predetermined course or home to an airport served by the facility;

(g)."Instrument Landing System" means the facility which serves to help an aircraft to make a safe landing on the runway in conditions of poor visibility and comprises of the following component facilities, namely:-

(i) Localizer facility which radiates Very High Frequency signals which when picked up by an aircraft guide it onto the centerline of the runway in the horizontal lane and is normally situated about 305 meters from the runway end;

(ii) GLIDE PATH facilities radiates Ultra High Frequency signals and is normally situated about 275 meters to 305 meters from the runway threshold and offset about 122 meters to 137 meters from the centerline of the runway and provides the glide angle information to a landing aircraft with the help of an instrument in the cockpit which when turned to the glide path frequency indicates whether the aircraft is flying up or down or along the correct glide angle;

(iii) Outer Marker or Outer Locator facility operating on 75 MHz in the Very High Frequency band is normally installed along the extended centerline of the runway at a distance between 3.5 and 6 nautical miles (1 nautical mile= 1853 meters) and produces radiation pattern to indicate the landing aircraft, the pre-determined distance from the threshold along the Instrument Landing System glide path;

(h)."Radar" includes-

(i) Air Surveillance Radar which is a radar facility serving aerodrome to scan the air traffic within 50 to 60 nautical miles of the aerodrome;

(ii) Air Routes Surveillance Radar or Secondary Surveillance Radar is a high power long range radar covering a distance of 200 nautical miles approximately and it scans air traffic to a larger distance than Air Surveillance Radar;

(i). Communication/Navigational facilities include:

(i) Microwave Link which is a radio facility whereby mostly intelligence/data is carried to the Air Traffic Control Display site;

(ii) Ultra High Frequency Link which is a radio relay facility operating in Ultra High Frequency Band;

(iii) Beacons which are radio transmitters operating in the Medium Frequency band from 200 to 400 KLHz radiating omni directionally in the horizontal plane and an aircraft equipped with a suitable cockpit instrument can get its location automatically with respect to this facility;

(iv) Remote Receivers which are radio receiving stations (HF Band) installed at remote site away from factory or industrial areas to avoid interference link man-made static, etc.

Note 1: Any equipment or installation required for air navigation purposes must be located-

(a). on that portion of the strip within:

(i) 75 meters of the Runway centerline where the Runway code is 3 or 4,

(ii) 45 meters of the Runway centerline where Runway code is 1 or 2; or

(b). on a runway end safety area, a taxiway strip or within the distances specified in Annex 14 of the guidelines of the International Civil Aviation Organisation; or

(c). on a clearway and which would endanger an aircraft in the air, and shall be frangible and mounted as low as possible.

Note 2: Any equipment or installation required for air navigation purposes which must be located on or near a strip of precision approach Runway category I, II or III of Instrument Landing System and which-

(a) is situated on that portion of the strip within the 77.5 meters of the Runway centerline where the code No. is 4 and code letter is F;

(b) is situated within 240 meters from the end of the strip and within:-

(i) 60 meters of the extended Runway centerline where Runway code is 3 or 4; or

(ii) 45 meters of the extended Runway centerline where Runway code is 1 or 2; or

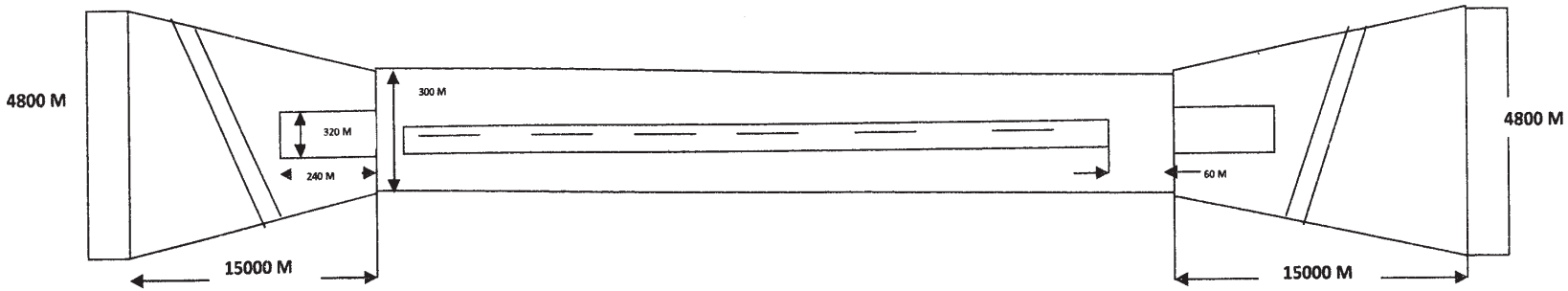
(iii) penetrates the inner approach surface, the inner transitional surface or the balked landing surface,

and shall be frangible and mounted as low as possible.

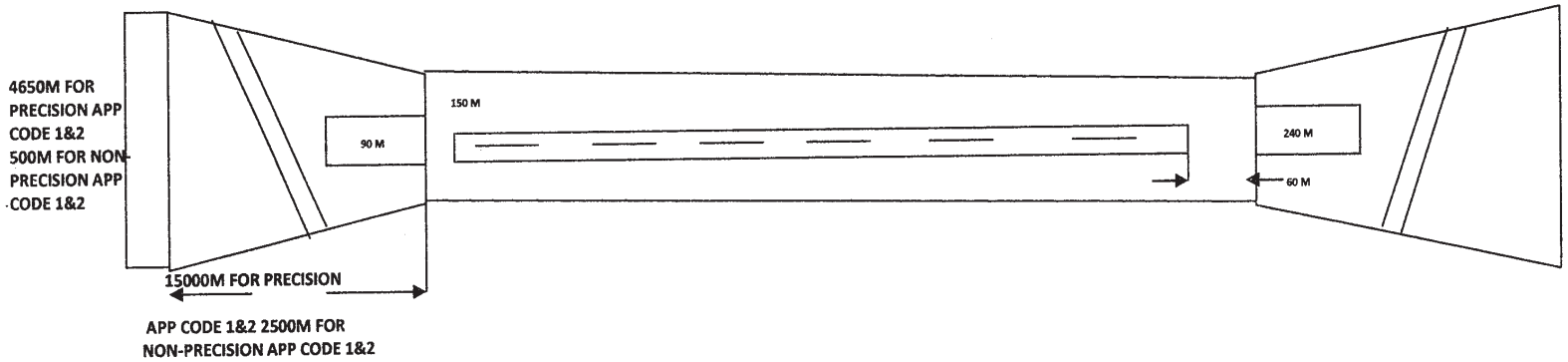
NOTE 3: Location of Navigational Aids shall be determined as per the provisions of Annex-10 of the guidelines of International Civil Aviation Organisation.

Appendix to Annexure –I.

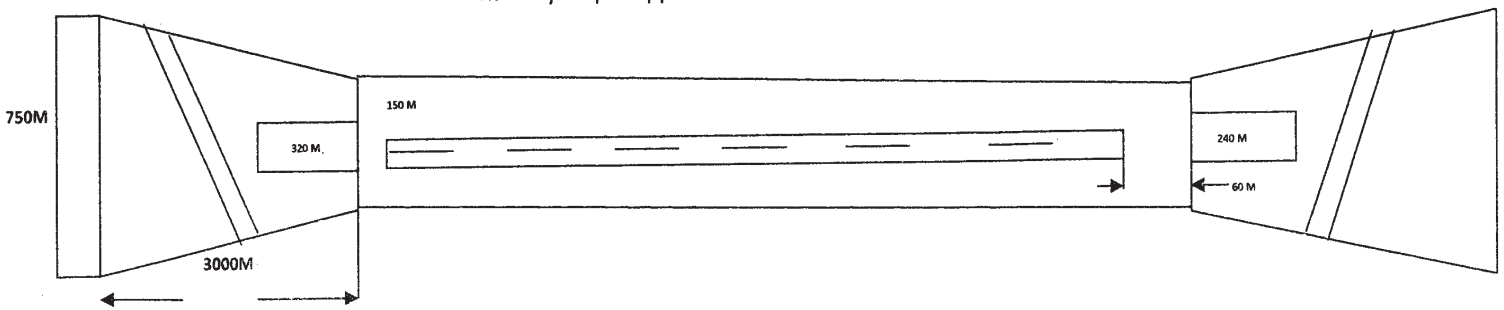
Runway strip & approach funnel of instrument runway code 3 & 4.



Runway strip & approach funnel of instrument runway code 1 & 2.



Runway strip & approach funnel of non-instrument runway code 3 & 4.



ANNEXURE II

The height or permissible elevations shall be calculated based upon the Annex 14 obstacle limitation surfaces, the radio navigation aids based on Annex 10 and the operational requirements for minimum altitudes of various segments of published instrument approach procedures based on Document 8168, VOl II of International Civil Aviation Organisation.

1. Based on Annex 14 Obstacle Limitation surface as under:

1.1 Take-off climb surface - The dimensions of the take-off climb surface shall not be less than the dimensions specified in the table given below except that if the runway is meant for takeoff, a lesser length may be adopted for the takeoff climb surface where such lesser length would be consistent with procedural measures adopted to govern the outward flight of aeroplanes, namely;:-

Table
Dimensions and slopes of obstacle limitation surfaces
(RUNWAYS MEANT FOR TAKE-OFF)

Surface and dimensions* (1)	Code number		
	1 (2)	2 (3)	3 or 4 2 (4)
TAKE-OFF CLIMB			
Length of inner edge	60 meters	80 meters	180 meters
Distance from runway end	30 meters	60 meters	60 meters
Divergence (each side)	10%	10%	12.05 %
Final width	380 meters	580 meters	1200 meters 1800 meters **
Length	1600 meters	2500 meters	15000 meters
Slope	5 %	4 %	2 %
•All dimensions are measured horizontally. ** 1800 m when the intended track includes changes of heading greater than 15 degree for operations conducted in IMC, VMC by night.			

1.2 Transitional Surface

1.2.1 The outer limit of the transitional surface is determined by its intersection with the plane containing inner horizontal surface and the slopes of transitional surfaces are given below:-

1.2.2

(i) Precision approach Runway - 14.3 % (1:7)
(ii) Non precision - 14.3 % (1:7) for code 3 & 4
20% (1:5) for code 1 & 2.
(iii) Non-instrument Runway - 14.3 % (1:7) for code 3 &4.
20% (1:5) for code 1 & 2;

1.2.3 The slope of the transitional surface shall be measured in a vertical plane at right angles to the centre line of the Runway;

1.2.4 The elevation of a point on a lower edge shall be-

(a) along the side of approach surface, equal to the elevation approach surface at the point; and

(b) along the strip - equal to the elevation of nearest point of the centre line of the Runway or its extension;

1.3 Approach Surface

1.3.1 The approach surface shall be established for each Runway strip in the direction of intended landing of the aeroplanes and the limits and slopes are given in table below-

1.3.1.1 Instrument Runway (divergence 15% On Either Side)

Length of Inner edge – 150 meters for Code No. 1 & 2
– 300 meters for Code No. 3 & 4

Distance from Threshold – 60 meters

Table

RUNWAY		**Precision approach Runway**		**Non-Precision approach Runway**		
Code No.	Length (meter)	First Section Length (Metre) Slope	Second Section Length (Metre) Slope	First Section Length (Metre) Slope	Second Section Length (Metre) Slope	Horizontal Section (Meter)
1.	<800	3000 2.5 %	12000** 3 %	2500 3.33 %	- -	- -
2.	800<1200	3000 2.5 %	12000** 3.33 %	2500 3.33 %	- -	- -
3.	1200<1800	3000 2 %	3600 2.5 %	3000 2 %	3600 2.5 %	8400**
4.	1800 and above	3000 2 %	3600 2.5 %	3000 2 %	3600 2.5 %	8400**

*Total length of approach surface for code No. 3 & 4(precision & non precision) shall be 15000 meters.

**Total length of approach surface for Precision approach Runway Code No. 1 & 2 shall be 15000 meters.

1.3.1.2 Non-Instrument Runway

Length of Inner edge – 80 meters for code No. 1 & 2 and 150 meters for Code No. 3 & 4

Distance from Threshold – 60 meters

RUNWAY		**DIVERGENCE 10% ON EITHER SIDE**	
Code No.	Code length No. (Meter)	Length (Meter)	Section slope
1.	<800	1600	5 %
2.	800<1200	2500	4 %
3.	1200<1800	3000	3.33 %
4.	1800 & above	3000	2.5 %

1.3.1.3 Aerodrome where there are more than one runway with over-lapping approach areas and associated surface, most stringent of the two would be the applicable criteria.

1.3.1.4 For determining the approach surface, the physical extremities of the runway shall only be considered. In case of displaced threshold the permissible height shall be calculated based on approach surface and transitional surface with respect to the runway extremity or displaced threshold whichever is more restrictive. However in case the threshold has been displaced due to obstacles of permanent nature, which are not likely to be removed, the displaced threshold will be taken as reference point.

1.3.1.5 At Aerodromes, where the proposals for runway extension exist, the requisite surface shall be determined from the proposed extension as well as from the existing runway strip/associated clearway, as applicable and the lower of the two elevations shall be permitted.

1.3.1.6The elevation of the associated Runway extremity/displaced threshold/proposed extension of Runway shall be the datum for approach surface.

1.3.1.7 The slope of the approach surface shall be measured in a vertical plane containing the centerline of the runway.

1.4 Inner Horizontal Surface

1.4.1 Dimensions and permissible heights of Inner Horizontal Surface are given in the table below:-

DIMENSIONS AND PERMISSIBLE HEIGHTS OF INNER HORIZONTAL SURFACE

RUNWAY		INSTRUMENT		NON-INSTRUMENT	
Code No.	Length (Meter)	Radius (Meter)	Height (Meter)	Radius (Meter)	Height (Meter)
1.	<800	3500*	45	2000*	45
2.	800<1200	3500*	45	2500*	45
3.	1200<1800	4000**	45	4000*	45
4.	1800 & above	4000**	45	4000*	45

*Radius shall be measured from the Aerodrome Reference Point.
** Radius shall be measured from the extremities of the Runway.

1.4.1.1 The reference datum for Inner Horizontal Surface shall be the Aerodrome elevation as defined in clause (g) of the Explanation of this notification.

1.4.2 For Runway code No. 3 & 4, the Inner Horizontal Surface shall be a composite pattern, which consists of two circular areas centered at the two ends with a radius of 4000 meters. These areas shall be joined tangentially to form an elliptical shape as shown in Appendix-A.

1.4.3 Where it is required to protect two or more widely spaced long runways, an even more complex pattern involving four or more circular areas are formed. These areas should be joined tangentially by straight lines and the Inner Horizontal Surface shall be defined by the external limits of the resulting pattern.

1.4.4 When two aerodromes are close to each other with overlapping circuits the Inner Horizontal Surface will be drawn as prescribed in para 1.4.2. The inner horizontal surface of these two aerodromes shall be joined tangentially to form one common Inner Horizontal Surface.

1.4.5 In case of common horizontal surface serving two aerodromes, the elevation of the Inner Horizontal Surface will be the lower of the two aerodromes.

1.5 Conical Surface

1.5.1 The conical surface shall be projected upwards and outwards from the periphery of the Inner Horizontal Surface. The slope (5% /1:20) of the conical surface shall be measured in a vertical plane perpendicular to the periphery of Inner Horizontal Surface. The outer limits and permissible heights of the conical surface are given in the table below:

RUNWAY		INSTRUMENT RUNWAY				NON-INSTRUMENT RUNWAY	
Code No.	Length (Meter)	Precision Runway		Non-Precision Runway		Horizontal Distance of Conical Surface beyond Inner Horizontal Surface (Meter)	Maximum Height above Inner Horizontal Surface (Meter)
1.	<800	1200	60	1200	60	700	35
2.	800<1200	1200	60	1200	60	1100	35
3.	1200<1800	2000	100	1500	75	1500	75
4.	1800 & above	2000	100	2000	100	2000	100

The reference datum for Conical Surface shall be the aerodrome elevation as defined in this annexure.

Note:- Where a part of Inner Horizontal Surface and conical surface lies below the approach/ take-off climb surface, the permissible heights shall be the lowest of the applicable surfaces.

1.6 Outer Horizontal Surface

1.6.1 The Outer Horizontal Surface shall extend to 15000 meters from the Aerodrome Reference Point for Aerodrome with runway code 3 & 4.

1.6.2 In case of Aerodrome with Runway code-2, the Outer Horizontal Surface shall extend to 14740 meters from Aerodrome Reference Point for instrument runways and 13740 meters for Non-Instrument runways.

1.6.3 Where combined Outer Horizontal Surface is established for two Aerodromes, the Outer Horizontal Surface shall be centred on the Aerodrome Reference Point of the Aerodrome of higher category.

1.6.4 Outer Horizontal Surface for Aerodrome with runway code no. 1 shall not be established.

1.6.5 The Outer Horizontal Surface, would be defined such that the Conical Surface may continue to be extended at 5 5 slope to a point wherein the permissible maximum height of 300 meters (above aerodrome elevation) is reached and thereafter this surface is maintained upto 15 Kilometres from Aerodrome Reference Point. Construction (s) protruding above these surfaces shall normally not be permitted. Obstructions existing in the area should be marked or lighted.

1.6.6 In order to avoid abrupt vertical changes in surfaces, the surfaces beyond the conical surfaces will slope laterally at 1:7 from edges of the approach and take off surfaces between the permissible heights of 150 meters to 300 meters.

1.6.7 The datum for Outer Horizontal Surface shall be the aerodrome elevation as defined in this Annexure.

1.7 The inner approach, inner transitional and balked landing surfaces (OFZ).

1.7.1 Obstacle free zone shall be established for precision approach Category II & III operations. The zone shall be kept free from fixed objects other than light weight frangible mounted aids to air navigation which must be near the Runway to perform their functions and from transient objects such as aircraft and vehicles when the Runway is being used for Category II or III operations.

1.7.2 The dimensions and slopes of the Obstacle free zone (Code 3 & 4) are given below:-
Note:- Obstacle free zone for Runway Code No. 1 & 2 are not established.

1.7.2.1 The inner approach surface

Width	- 120 meters
Distance from Threshold	- 60 meters
Length	- 900 meters
Slope	- 2%

1.7.2.2 The inner transitional surface

Slope	- 33.3%

1.7.2.3 Balked landing Surface

Length of Inner edge	- 120 meters
Distance from THR	- 60 meters
Diversions	- 10%
Slope	- 3.33%

1.8 The No Objection Certificate needs to be obtained from the competent authority in all cases wherein the requested height of the structure etc. is more than 150 meters above the reference datum up to a distance of 20 Kilometers from the Reference Point.

2. Based on Annex 10 (Navigational Aids)

2.1. Very High Frequency Omni Radio Range (VOR)/ Terminal Very High Frequency Omni Radio Range (TVOR)/and Very High Frequency Omni Radio Range Distance Measuring Equipment (VOR DME) - An area beyond the radius of 300 meters from the facility no structure shall sustain vertical angle greater than 1.5 degree at the centre of the Very High Frequency Omni Radio Range counterpoise from the horizontal plane passing through the counterpoise.

2.2 Stand alone Distance Measuring Equipment - Beyond 150 meters no steel towers, power lines, metal buildings shall protrude elevation angle of 3 degree measured from the base of Distance Measuring Equipment antenna.

2.3 Localizer

2.3.1 Beyond the area specified in Annexure I and within ±10 degrees azimuth in front of antenna, and object should not sustain an angle of elevation more than 0.75 degrees at the centre of antenna array.

2.3.2 Beyond areas specified in Annexure 1 and from ±10 degrees to ±35 degrees azimuth in front of antenna an object should not sustain an angle of elevation more than1.1 degree at antenna array.

2.4. Beyond the area specified in Annexure I and within ± 8 degrees azimuth in front of the glide path antenna, a building/structure should not subtend an angle of elevation of more than 1.1 degree at antenna base.

2.5 Air Surveillance Radar:

Beyond 500 meters from particular radar site the height of the permissible structures may be increased at the rate of 0.05 meter per meter, up to a point wherein the height of the permissible structure does not protrude above the line drawn from a point 10 % below the minimum sector altitude at the farthest point (from Radar site) to the centre of antenna pedestal, considering the Minimum Sector Altitude (MSA) in that particular sector. Beyond the above stated point no large object would be permitted to protrude above the line drawn from a point 10%below the minimum sector altitude at the farthest point (from Radar site) to the centre of antenna pedestal depending on the Minimum Sector Altitude in that particular sector. Large object means the structure/s in isolation or collectively subtending azimuth angle of 0.4 degree or above at Radar antenna. In case of cluster of buildings wherein the gap between the two adjacent buildings subtends an azimuth angle of less than 0.4 degree on the antenna pedestal, the entire cluster should be considered as one object. Diagrammatic representation is at Appendix-B.

2.6 Air Route Surveillance Radar:

Beyond 200 meters from particular radar site the height of the permissible structures may be increased at the rate of 0.05 meter per meter, up to a point wherein the height of the permissible structure does not protrude above an angle of elevation of more than 0.5 degree at the antenna pedestal or an angle equal to antenna tilt angle set during last flight inspection whoever is higher. Beyond the above stated object point, no large object would be permitted to protrude above the line drawn at an angle of 0.05 degree at the antenna pedestal or an angle equal to antenna tilt angle set during last flight inspection whichever is higher. Large object means the structure subtending azimuth angle of 0.4 degree or above at Radar antenna. In case of cluster of buildings wherein the gap between the two adjacent buildings subtends an azimuth angle of less than 0.4 degree on the antenna pedestal, the entire cluster should be considered as one object. Diagrammatic representation is at Appendix-C.

2.7. Secondary Surveillance Radar:

Same as Air Surveillance Radar/ Air Route Surveillance Radar depending on operational usage.

2.8 Advance Surface movement Guidance and control system

No structure should be built on the relevant area of the airport that blocks the line-of-sight between any of the sensors of the Advance Surface Movement Guidance and control system and the relevant operational area. In case there is operational or safety/security requirement to add a structure on the airport surface which may obstruct the line of sight between Surface Movement Radar (SMR) antenna/sensors, Airports Authority of India (AAI) would augment the system to meet the Advance Surface Movement Guidance and control system operational requirement.

2.9 Indian Land Uplink Station (INLUS)/Indian National Reference Station (INRES) of GPS Aided Geo Augmented Navigation (GAGAN) System

No structure will be permitted to protrude the above the plane inclined at elevation angle of 2 degree from the horizontal surface drawn at the level of antenna of Indian Land Uplink Station and Indian National Reference Station of GPS Aided Geo Augmented Navigation system which is a part of
Global Navigation Satellite System (GNSS).

2.10 Communication Navigation Surveillance (CNS) Simulation study

In case any structure is required to be made within aerodrome surface in the operational interest which creates an obstruction from Communication Navigation Surveillance point of view, a simulation study could be carried out to study the impact of this structure on the performance of the relevant facility and in case the study confirms that the impact would not hamper the operability of the facility, such structure could be permitted within the aerodrome boundary.

3 Operational criteria based on DOC 8168, Vol II

In order to achieve the lowest possible operating minima for aircraft operation, it is necessary to protect not only the Annex 14 Obstacle Limitation Surfaces but also to safeguard the Procedure for Air Navigation Service (PANS) Operations (OPS) (Document 8168) Surfaces. Considerations need to be given to the objects which penetrate the Procedure for Air Navigation Service Operations Surface, regardless whether or not they penetrate Annex 14 Obstacle Limitation Surfaces. Such obstacle may result in an operational penalty like higher Obstruction Clearance Altitude or Height (OCA/H) and introduction of longer approach segment. Therefore, while examining the cases for issue of No Objection Certificate from the considerations Annex 14 and Annex 10 criteria as provided in para 1 & 2 above, the operational criteria needs to be considered based on the provisions of Document 8168, Vol. II. It needs to be ensured that the minimum altitude of the following segment of published or the proposed instrument approach procedures are not infringed by the proposed constructions either within the Obstacle Limitation Surfaces (OLS) or outside of it.

(i) Minimum Sector Altitude (MSA)
(ii) Minimum Holding Altitude (MHA)
(iii) Minimum Vectoring Altitude (MVA)
(iv) Minimum Altitude of Initial and Intermediate Segments
(v) OCA/H (Straight-in and Circling) for all aircraft categories

NOTE:

1. Instrument approach procedures of all the civil aerodromes in India have been published in the AIP India under the section Aerodrome. In the published procedures, the minimum altitudes of the various segments of instrument approach procedures have been specified.
2. The minimum obstacle clearance criteria are applied as per the provisions of International Civil Aviation Organization (ICAO) Document 8168 Vol II. Normally, for minimum sector altitudes (applicable upto 30NM from the facility on which procedure is designed), minimum vectoring altitudes, minimum holding altitudes and for the initial approach an obstacle clearance of 1000 feet is applied.
3. Final approach areas of Very High Frequency Omni Radio Range (VOR)/Non Directional Beacon (NDB) have been illustrated in Annexure D.
4. Shielding Benefit

Shielding principles as indicated below are employed with respect to natural terrain/duly authorized existing obstacle which penetrate above the obstacle limitation surfaces described and as contained in this document, subject to aeronautical study, if considered 'necessary' by the competent authority.

4.1 Aerodrome and Ground Aids (AGA) parameters

4.1.1 The following criteria shall be applied for the purpose of applying shielding benefits for the proposed building or structure with respect to existing natural terrain/building structures.

4.1.2 The principle of shielding will not be applied in the transitional surface area.

4.1.3 The principle of shielding shall be applied in the approach areas beyond 4000 meters of the inner edge of runway strip.

4.1.4 The principle of shielding shall be applied in the Inner Horizontal Surface (IHS) beyond radius of 3000 meters from the nearest runway strip.

4.1.5 The principle of shielding shall also be applied in conical and outer horizontal surfaces.

4.1.6 The shielding benefit is to be provided with respect to the authorized structures/natural terrain in a horizontal plane projected from the top of the each of the obstacle away from the runway and on a plane having negative slope of 10% towards the runway. In case of Inner Horizontal Surface the benefit of the negative slope shall be applicable upto 3000 meters from the nearest Runway end or the Aerodrome Reference Point as the case may be. In case of approach surface the benefit of negative slope shall be applicable up to 4000 meters from the nearest runway end. In case of Conical and Outer Horizontal surfaces, shielding benefit of negative slope shall be restricted to same surface.

4.1.7 The following guidelines are provided to draw the areas for determining the areas where the shielding benefit would be applicable.

4.1.7.1 Towards the runway (Negative Slope)

i) Draw a line from the highest point of the reference terrain/ obstacle to the nearest runways for obstacles located within the Inner Horizontal Surface, Conical or the Outer Horizontal Surface.ARP as applicable.

ii) The shielding benefits will cover the areas bound within the lines as in para 4.1.6 and para 4.1.7 (i).

iii) In case of obstacle located within the approach surface of any runway, the negative shielding shall be applicable to that particular runway only. The area shall be drawn by joining the highest point of the reference terrain/obstacle to the nearest runway end. The dimension of the area shall be same as the dimension of the obstacle.

4.1.7.2 Away from the runway (Horizontal Slope)

(i) For obstacles located in the Inner Horizontal Surface, Conical and Outer Horizontal Surface, draw a line from the Aerodrome Reference Point to the centre of the obstacle.

(ii) Draw the projection from the extremities of the obstacle away from the runway parallel to the line drawn as per para 4.1.7.2 (i).

(iii) For obstacles located in the approach surface, draw a line from the nearest runway end to the centre of the obstacle.

(iv) Draw the projection of the obstacle away from the runway parallel to the line drawn as per para 4.1.7.2 (iii).

(v) The shielding benefit of horizontal plan shall be applicable to the obstacles located below the projection line drawn as per para 4.1.7.2 (ii and iv) as indicated in Appendix-E.

4.1.8 Tall and skeletal obstructions such as isolated towers, chimney, masts, electric pylons, telephone and power lines and poles will not provide any shielding.

4.1.9 While providing the shielding benefit it shall be ensured that the minimum altitudes, of various segments of the published instrument approach procedures are not adversely affected.

4.2 Communication Navigation Surveillance (CNS) Parameters

For navigation Aids and Surveillance facilities shielding benefit could be provided to the structures in cases wherein such structures are in their shadow of highest existing authorised structure/terrain of permanent nature. Shadow for this purpose is defined as an area falling below a line drawn from the top and both the extremities of the existing authorised structure/terrain of permanent nature, to the facility and extrapolation of the same plane behind from the said obstacle.

5. Conduct of Aeronautical Study

The following guidelines are provided for conduct of aeronautical study.

i) The request for aeronautical study shall be processed by Airports Authority of India on case to case basis.
ii) Aeronautical study shall be undertaken by a predetermined approved agency and as per guidelines.
iii) Recommendations of aeronautical study after approval of the competent authority shall be considered by Airports Authority of India for issuing No Objection Certificate for the height sought.

6. Procedure for determining the maximum permissible heights

6.1 The following steps shall be taken for calculating the maximum permissible heights for cases relating to the issue of No Objection Certificate for building/installations.

6.1.1 Annex 14 Criteria

i) The site of the proposed buildings/installations shall be marked on the zoning map of the aerodrome, prepared by the aerodrome operator, where Annex 14 surfaces have been drawn.
ii) If the location is within the approach/take off surface, the permissible applicable heights in the approach /take-off climb surface, transitional surface, Inner Horizontal Surface/Conical surface shall be calculated.
iii) If the site is located outside the approach/take-off climb surface, the height shall be determined as per the location applicable to the relevant surface (transitional, Inner Horizontal Surface, Conical or Outer Horizontal Surface).

6.1.1 Annex 10 Criteria

Determine the distances of the proposed site from the each communication/navigational aid/surveillance facility separately and calculate the applicable heights based on the provisions as contained in para 2 of Annexure II.

6.1.3 The permissible heights from the above two criterion shall be the lowest applicable to the specific/individual communication/navigational aid/surveillance facility.

6.4 Procedure for Air Navigation Service Operations (PANS OPS) Criteria:

i) After having determined the permissible heights based on the Annex 14 Obstruction Limit Surface (OLS) criteria and Annex 10 criteria, it shall further be ensured that the Procedure for Air Navigation Service Operations (PANS OPS) Surface are not infringed and the minimum altitudes of the published/proposed segments of instrument approach procedures are fully protected. This has also be referred to at para 3.

ii) For the obstacles located outside the limits of Annex 14 OLS, it shall be ensured that Procedure for Air Navigation Service Operations (PANS OPS) Surfaces of the published instrument approach procedures are not penetrated.

iii) For consideration of obstacle clearance in the final approach area for the proposed construction, the criteria of primary and secondary area shall be applicable.

iv) The limits of the Procedure for Air Navigation Service Operations (PANS OPS) surfaces extend upto 30NM from the facility [(Very High Frequency Omni Radio Range (VOR) & Non Directional Beacon (NDB)] serving the aerodrome based on which procedure is designed. This is to ensure that the minimum sector altitudes and the minimum vectoring altitudes are not adversely affected by the proposed constructions.

6.3 The lowest height determined based on Annex 14, Annex 10 and Procedure for Air Navigation Service Operations (PANS OPS) shall be the permissible heights of the proposed building/installations for which No Objection Certificate is to be issued.

Explanation: - Description of Annex 14 Obstacle Limitation Surface for the purpose of this Annexure shall be as given hereunder and the diagrams in respect thereof shall be as given in Appendix-F-1 to F-5

(a). Conical Surface - A surface sloping upwards and outwards from the periphery of the inner horizontal surface.

The limits of the conical surface shall comprise:

(i) a lower edge coincident with the periphery of the inner horizontal surface; and

(ii) an upper edge located at a specified height above the inner horizontal surface.

The slope of the conical surface shall be measured in a vertical plane perpendicular to the periphery of the inner horizontal surface.

(b). Inner horizontal surface - A surface located in a horizontal plane above an aerodrome and its environs. The radius or outer limits of the inner horizontal surface shall be measured from a reference point or points established for such purpose.

(c). Inner approach surface - A rectangular portion of the approach surface immediately preceding the threshold. The limits of the inner approach surface shall comprise:

(i) a lower edge beginning at the intersection of the side of the approach surface with the inner horizontal surface and extending down the side of the approach surface with the inner edge of the approach surface and from there along the length of the street parallel to the runway centreline ;

(ii) a upper edge located in the plane of the inner horizontal surface.

(d). Inner Transitional surface – A surface similar to the transitional surface but closer to the runway. The limits of an inner transitional surface shall comprise:

(i) a lower edge beginning at the end of the inner approach surface and extending down the side of the inner approach surface to the inner edge of that surface, from there along the strip parallel to the runway centre ine to the inner edge of the balked landing surface and from there up the side of the balked landing surface to the point where the side intersects the inner horizontal surface; and .

(ii) an upper edge located in the plane of the inner horizontal surface.

(e). Balked landing surface - An inclined plane located at a specified distance after the threshold extending between the inner transitional surface. The limits of the balked landing surface shall comprise:

(i) an inner edge horizontal and perpendicular to the centreline of the runway and located at a specified distance after the threshold;

(ii) two sides originating at the ends of the inner edge and diverging uniformity at a specified rate from the vertical plane containing the centreline of the runway; and

(iii) an outer edge parallel to the inner edge and located in the plane of the inner horizontal surface.

(f). Take-off climb surface - The surface shall be established for a runway meant for take-off. The limits of the take-off climb surface shall comprise:

(i) an inner edge horizontal and perpendicular to the centreline of the runway and located either at a specified distance beyond the end of the runway or at the end of the clearway when such is provided and its length exceeds the specified distance;

(ii) two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the take-off to a specified final width and continuing thereafter at that width for the remainder of the length of the take-off climb surface; and

(iii) an outer edge horizontal and perpendicular to the specified take-off track.

(g). Aerodrome elevation - The elevation of the highest point of the landing area.

(h). Aerodrome Reference Point - The designated geographical location of an aerodrome.

(i). Threshold – The beginning of that portion of the runway usable for landing.

(j). Displaced Threshold - A threshold not located at the extremity of a runway.

(k). Frangible Object - An object of low mast designed to brick, distort or yield on impact so as to present the minimum hazard to aircraft.

(l). Obstacle - All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that are located on an area intended for surface movement of aircraft or that extend above a defined surface (indicating in Annexure IV) intended to protect aircraft in flight.

(m). Obstacle Free Zone (OFZ) - The airspace above the inner approach surface, inner transitional surfaces, and balked landing surface and that portion of the strip bounded by these surfaces, which is not penetrated by any fixed obstacle other than low mast and frangible mounted one required for air navigation purposes.

(n). Runway - A defined rectangular area on a land aerodrome prepared for the landing and takeoff aircraft.

(o). Runway End Safety Area (RESA) - An area symmetrical above the extended runway centerline and adjacent to the end of the strip primarily, intended to reduce the risk of damage to an aeroplane undershooting or overrunning the runway.

(p). Runway Strip - A defined area included the runway and stop way, if provided, intended:-

(i) To reduce the risk of damage to aircraft running of a runway; and

(ii) To protect aircraft flying over it during take-off or landing operations.

DIMENSION OF RUNWAY STRIP

Code No.	Length (Meter)	Width extending laterally on either side of runway centreline (Meter)	Length beyond runway end/stopway (Meter)	Width extending laterally on either side of runway centreline (Meter)	Length beyond runway end/stopway (Meter)
1.	<800	75	60	30	30
2.	800<1200	75	60	40	60
3.	1200<1800	150	60	75	60
4.	1800 & above	150	60	75	60

(q). Clearway- A defined rectangular area on the ground or water under the control of the appropriate authority selected or prepared as a suitable area over which an aeroplane may make a portion of its initial climb to specified height.

(r). Stopway - A defined rectangular area on the ground at the end of take-off run available prepared as a suitable area in which an aircraft can be stopped in case of an abandoned takeoff.

(s). Take-off Runway - A runway intended for take-off only.

(t). Obstacle Clearance Altitude / Height (OCA/H) - The lowest altitude or the lowest height above the elevation of the relevant runway threshold or the aerodrome elevation as applicable used in establishing compliance with appropriate clearance criteria.

(u). Declared distance:-

(i) Take Off Run Available (TORA):- The length of the runway declared available and suitable for the ground run of an aeroplane taking off.

(ii) Take Off Distance Available (TODA):- The length of take-off run available plus the length of clearway, if provided.

(iii) Accelerate Stop Distance Available (ASDA):- The length of take-off run available plus the length of stopway, if provided.

(iv) Landing Distance Available (LDA):- The length of the runway declared available and suitable for the ground run of an aeroplane landing.

(v). Critical area - Critical area is an area of defined dimensions about the localizer and glide path antenna where vehicles including aircraft are excluded during Instrument Landing System (ILS) operations. The critical area is protected because the presence of vehicles and / or aircraft inside its boundary will cause unacceptable discrepancies to the Instrument Landing System (ILS) signal in space.

7. List of AAI Operational Aerodrome in Manipur as on date:-

Sl. No	Airport	State	Coord. Lat/Long. (in degrees)	Elev. (In Meters)	Runway Orientation	Dimension (In Meters)	Owner
1.	IMPHAL (TULIHAL)	MANIPUR	244549N 0935411E	774.2	04/22	2746x45	AAI

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