



Technical Guidance Material For *Design Requirements for Helistops* Advisory Circular

Subject: DESIGN REQUIREMENTS FOR A HELISTOPS.

Date: 18 December 2018

APPLICABILITY

This technical guidance material is applicable to applicants that wish to apply for the Approval of a Helistop as stipulated in the South African Civil Aviation Regulations Part 139.

PURPOSE

To provide technical guidance that is acceptable to the South African Civil Aviation Authority in demonstrating compliance with the design of helistops and to determine the suitability of a proposed site for the landing and taking-off of helicopters for the purpose of approval.

REFERENCES AND REQUIREMENTS

South African Civil Aviation Regulations Part 139.04.2

1. LIST OF ABBREVIATIONS

ABBREVIATION	DESCRIPTIPON
D	Overall length of design helicopter
FATO	Final approach and take off
RD	Rotor diameter of design helicopter
SACAA	South African Civil Aviation Authority
TLOF	Touchdown and lift off

2. DEFINITIONS

TERMINOLOGY	DESCRIPTION
Elevated Helistop	A helistop located on a raised structure on land.
Final approach and take off area	A defined area over which the pilot completes the final phase of the approach to a hover or a landing and from which the pilot initiates take-off.
Helistop	A minimally developed heliport, located either at ground level or elevated on a structure used for the purpose of landing and take-off of helicopters but without auxiliary facilities such as helicopter parking area, fuelling, terminal building, aircraft maintenance organisations and hangars.
Hospital Helistop	A helistop limited to serving helicopters engaged in air ambulance, or other hospital related functions.
Overall helicopter length	The maximum length of a helicopter including rotors, measured through the fore and aft centre line of the helicopter
Surface level Helistop	A helistop located at ground level.
Touchdown and lift off area	A load-bearing, generally paved area, normally centred in the FATO, on which the helicopter lands and/or takes off.

3. RESTRICTIONS

Helistops intended for restricted use, shall be categorised as follows:

- a) a restriction on mass only; or
- b) a restriction on rotor diameter only, or
- c) a restriction on mass and rotor diameter; or
- d) VFR daylight operations only; or
- e) VFR day and night operations only; or
- f) a restriction during certain hours in a day; or
- g) for private use only; or
- h) for emergency use only; or
- i) for commercial use.

4. PHYSICAL CHARACTERISTICS FOR HELISTOPS

4.1. Helistop site selection.

4.1.1. The SACAA will approve a Helistop to come into existence provided the following requirements can be met:

- a) The minimum requirements prescribed for that type of Helistop can be met.
- b) The Local Authority of the area where within such a Helistop is to be situated has issued a letter of no objection to the establishment of such Helistop.
- c) Safe routes to and from the proposed Helistop exist and will remain in existence for as long a period as the facility is intended.

4.1.2. The South African Civil Aviation Authority will regard each request to establish a Helistop considering the feasibility as to:

- a) the desired location and physical layout;
- b) operational safety such as fire protection;
- c) the effect it will have on the surrounding community; and
- d) the permanency thereof.

4.2. Selection of approach and departure paths.

4.2.1. Consideration of wind- Approach/ departure paths should preferably be 180 degrees to permit pilots to avoid downwind conditions and minimize crosswind operations.

4.2.2. The preferred flight approach/ departure path should, to the extent feasible, be aligned with the predominant wind direction, however, the presence of buildings or some other obstacles may prevent a 180 degrees approach orientation.

4.2.3. Other approach/ departure paths should therefore be based on the assessment of the prevailing winds, when this information is not available the separation between such flight path and the preferred flight path should not be less than 135 degrees as shown in Figure 1.

4.2.4. In determining approach/ departure paths, it should also be necessary to take into account the obstructions in the vicinity of the Helistop and in particular those likely to be a hazard to air navigation.

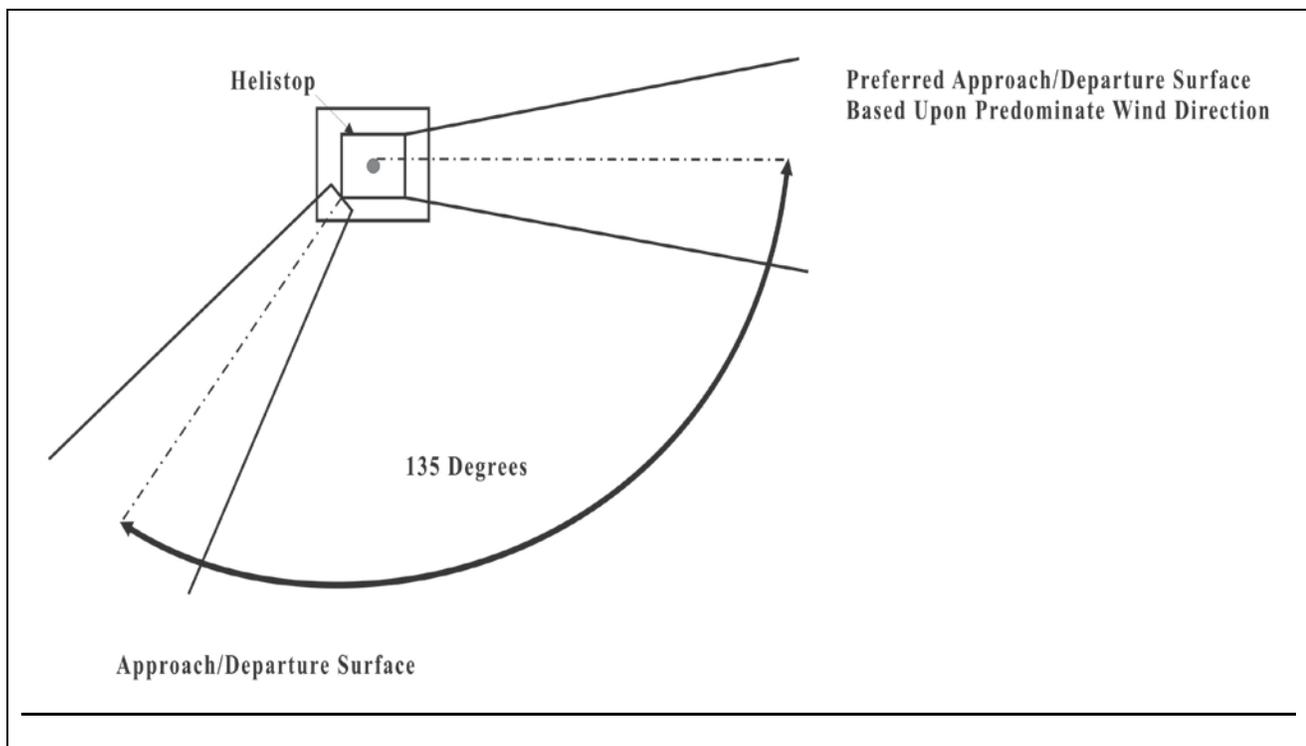


Figure 1: Minimum separation between approach/departure paths

4.3. Slopes for obstacle restriction.

4.3.1. Approach Surfaces: VFR day 1:8 or 12.5 % VFR night 1:15 or 6.7 %

4.3.2. Transitional Slopes: VFR day 1: 2 or 50% VFR night 1:4 or 25%

4.3.3. Divergence: VFR day - 10% VFR night - 15%

4.3.4. Length of approach area:

a) VFR day : 1220m.

b) VFR night : 2280m.

4.3.5. The applicable slopes for obstacle restriction should be as indicated in Figure 2 and Table 1 respectively.

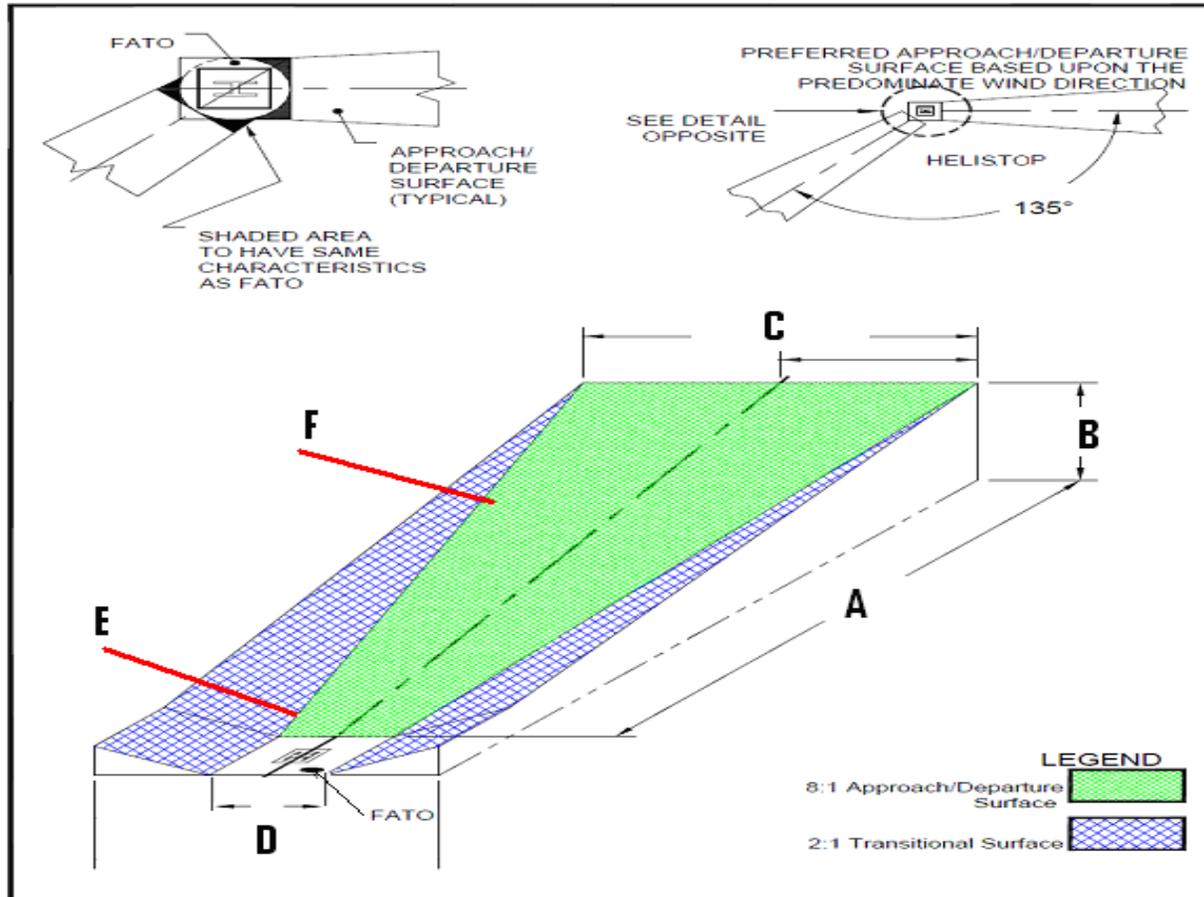


Figure 2: Obstacle restriction for approach/departure and transitional surfaces

	A	B	C	D	E	F
VFR day	1220 m	152 m	270 m	26 m	10%	1:8 or 12.5%
VFR night	2280 m	152 m	484 m	26 m	15%	1:15 or 6.7 %

Table 1: Approach and departure surfaces

4.4. Helistop location.

4.4.1. A Helistop can be located either at ground level, elevated on a structure or rooftop.

4.5. Helistop design characteristics.

4.5.1. The design characteristics of a Helistop should be as indicated in the Helistop layout below, refer to Figures 3 and 4.

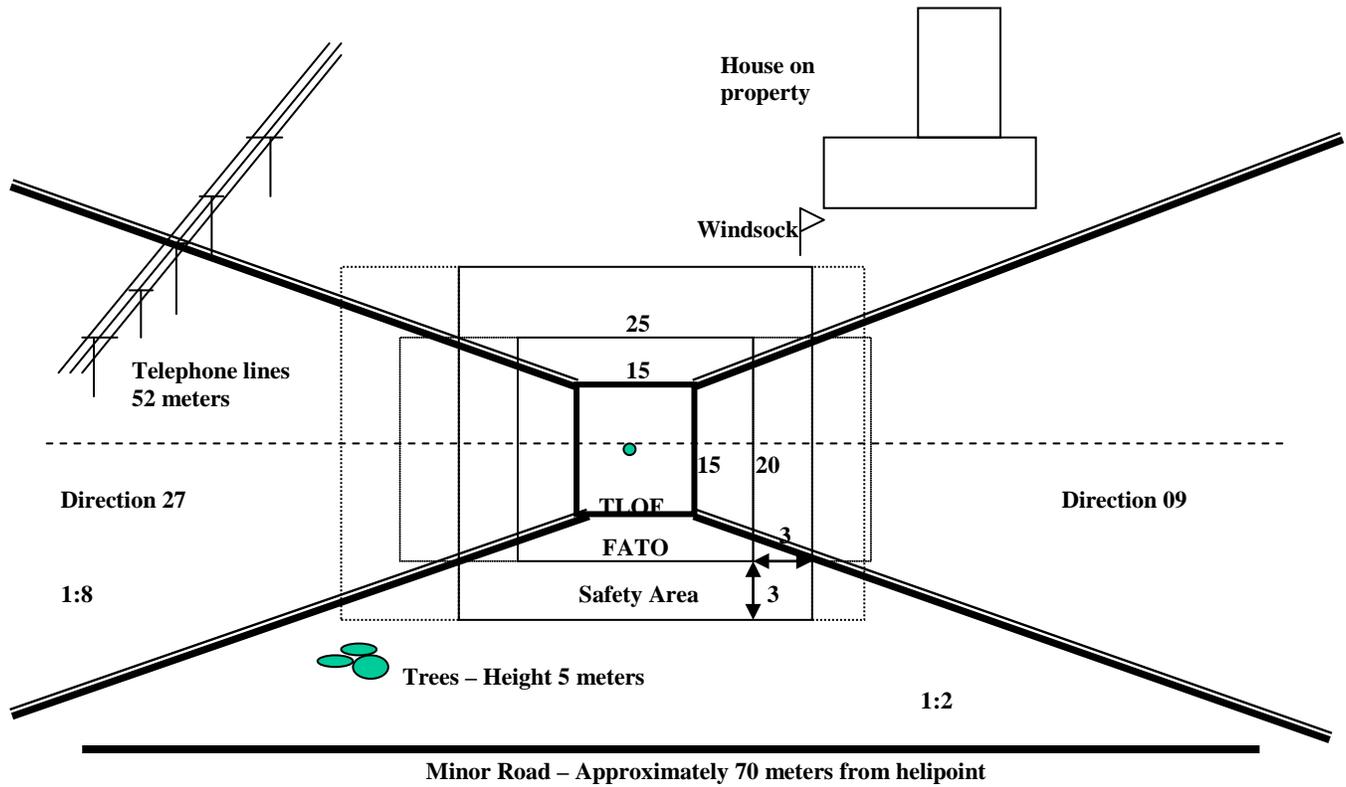


Figure 3: Ground level Helistop layout plan

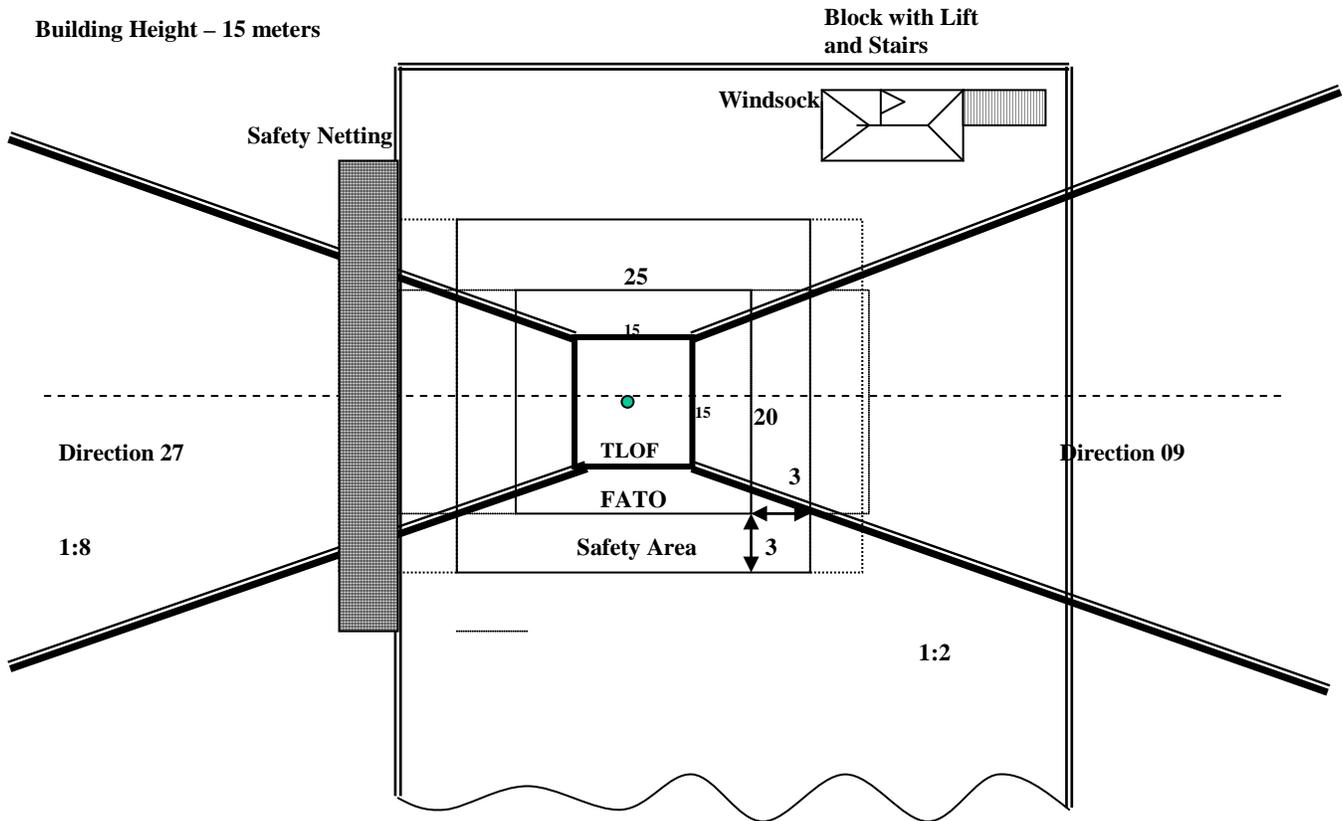


Figure 4: Elevated Helistop layout plan

5. TOUCHDOWN AND LIFT-OFF AREA (TLOF)

- All approved helistops shall be provided with a touchdown and lift off area.
- The entire TLOF area shall be dynamic load bearing and preferably be on a paved surface.
- When the TLOF is unpaved or natural grass, the area should be treated and be capable of supporting the dynamic loads of the design helicopter.
- The minimum TLOF dimensions should be 15m x 15m for a square or 15m diameter for a circle but not less than 1.0 x the rotor diameter (RD) of the largest helicopter if RD is greater than 15m.
- Slopes on a TLOF area should be sufficient to prevent accumulation of water on the surface of the area, but shall not exceed 2 % in any direction.

6. FINAL APPROACH AND TAKE-OFF AREA (FATO)

- A surface-level helistop should be provided with at least a FATO area that is aligned with prevailing winds.
- The surface of a FATO should be resistant to the effects of rotor downwash.
- There should be no obstacles within the FATO area likely to interfere with the manoeuvring of the helicopter.

- d) The minimum dimensions of a FATO should be 20m x 25m for an area in a form of a rectangle or 20m diameter for a circle but not less than 1.5 x the overall length(D) of the design helicopter.
- e) When the TLOF is marked, the FATO outside the TLOF should be capable of supporting the static loads of the design helicopter.
- f) When the TLOF is not marked and it is intended that the helicopter can land anywhere within the FATO, the FATO outside the TLOF and any FATO supporting structure should, like the TLOF, be capable of supporting the dynamic loads of the design helicopter.

7. SAFETY AREA

- a) The FATO should be surrounded by a safety area which need not be solid.
- b) The safety area should be free of all obstacles except for small, frangible objects that, because of their function, must be located there.
- c) Objects whose functions require them to be located within the safety area shall not exceed a height of 25 cm.
- d) The safety area shall extend outwards from the periphery of the FATO for a distance of at least 3m or 0.25 D.

8. WIND DIRECTION INDICATOR

- a) All approved Helistops shall be provided with at least one wind direction indicator.
- b) A wind direction indicator should be located so that it provides the pilot with valid wind direction and speed information in the vicinity of the helistop under all wind conditions.
- c) The windsock should provide the best possible colour contrast to its background.
- d) The wind direction indicator should be located outside the safety area.
- e) For night operations, the wind direction indicator should be internally or externally illuminated.
- f) The windsock should be a truncated cone made of lightweight fabric and should have the dimensions as specified in Table 2.

	Surface Level Helistop	Elevated Helistop
Windsock length	2.0m	1.2m
Diameter(smaller end)	0.3m	0.15m
Diameter(larger end)	0.6m	0.3m

Table 2: Dimensions of a windsock

9. HELISTOP MARKINGS

- a) All approved helistops should be marked with a capital letter "H" placed horizontally in the centre of the touch-down area.
- b) The "H" should be placed so that the parallel stems thereof are orientated with the most desirable direction for take-off and landing.
- c) The dimensions of the 'H' should be the following:
 - i. Height 3 m
 - ii. Width 2 m
 - iii. Width of stems 30 cm
- d) The edges of the TLOF or FATO area should be marked with a solid line that is 30cm wide.
- e) For a Helistop intended for private use a white diagonal bar spanning about 45 degrees should be affixed within the touchdown area from the top right corner to the bottom left corner, interrupted 15cm from the "H" as indicated in Figure 5.
- f) The colour used for this line should be white and if so desired may be accentuated by a black outline in order to make it more conspicuous. See Figure 5 and 6 for markings of a circular and square touchdown and liftoff areas.

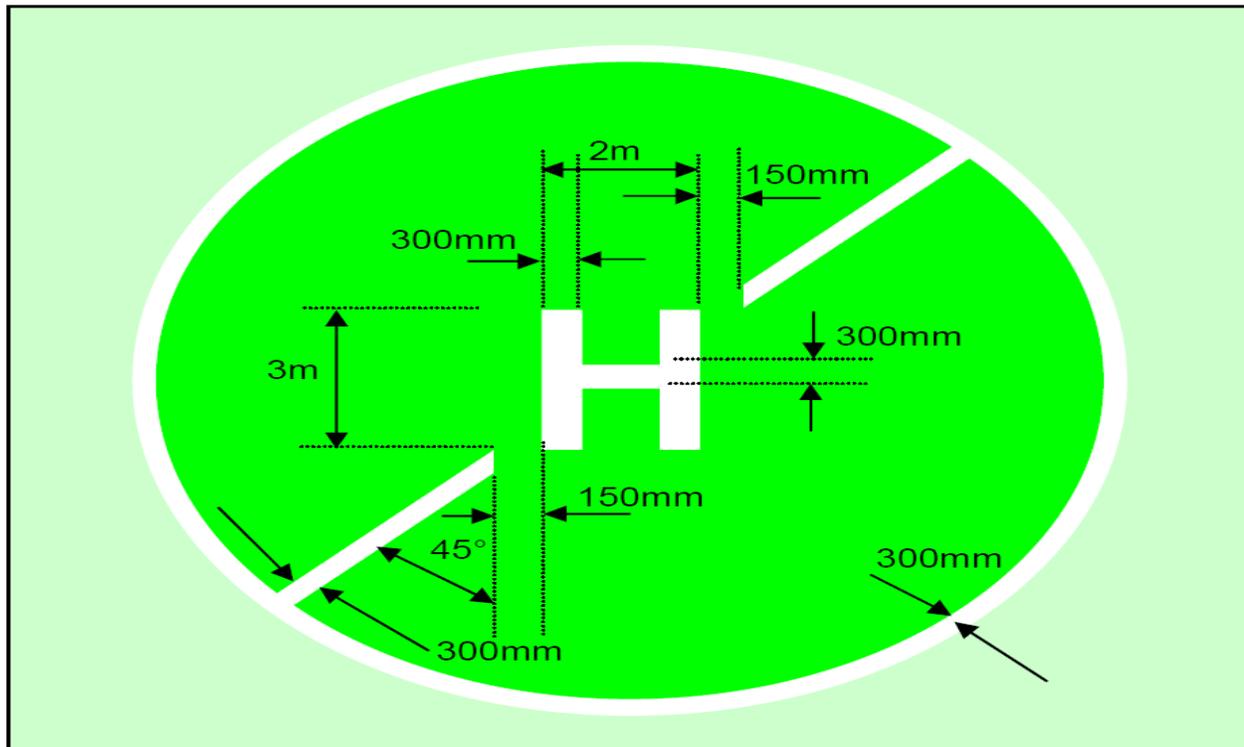


Figure 5: Markings for a circular touchdown area

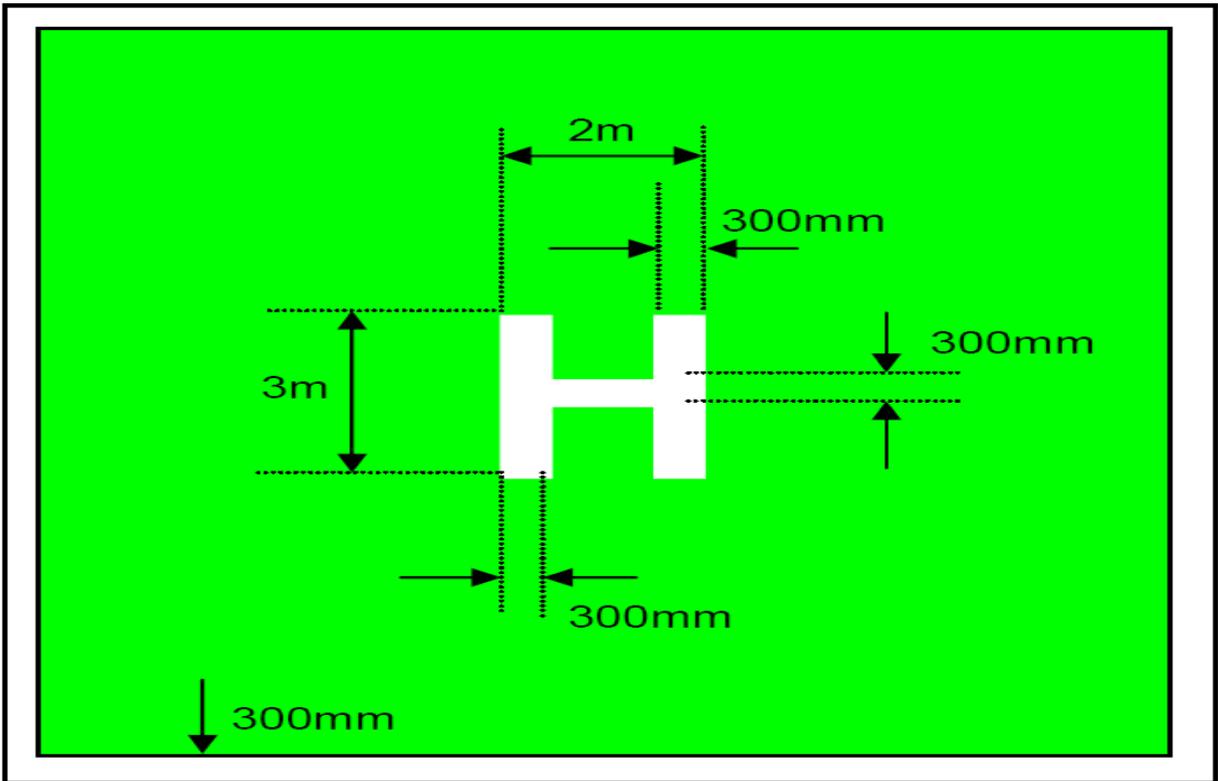


Figure 6: Markings for a square touchdown and liftoff area

10. HELISTOP ABANDONED OR NOT MAINTAINED

- a) All markings of a permanently closed helistop denoting the FATO or TLOF area should be removed.
- b) If it is impractical to remove the markings, a white X should be painted over the entire touchdown and liftoff area as indicated in Figure 7.
- c) The X should be large enough to ensure early pilot recognition that the helistop is closed.
- d) The wind direction indicator and other visual indications of an active helistop should also be removed.

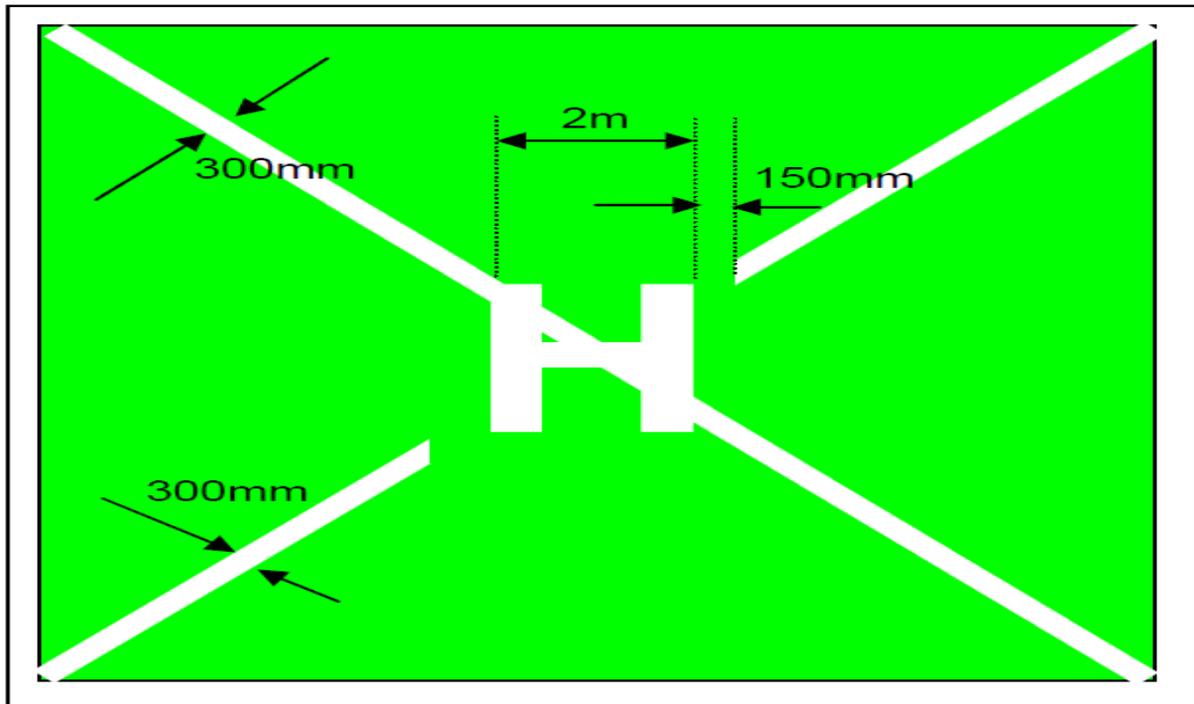


Figure 7: Markings indicating closed Helistop.

11. HOSPITAL HELISTOP

11.1. Hospital Helistop markings.

11.1.1. A hospital helistop identification marking should consist of a letter H, white in colour and a red cross, both positioned at the centre of the touchdown and liftoff area.

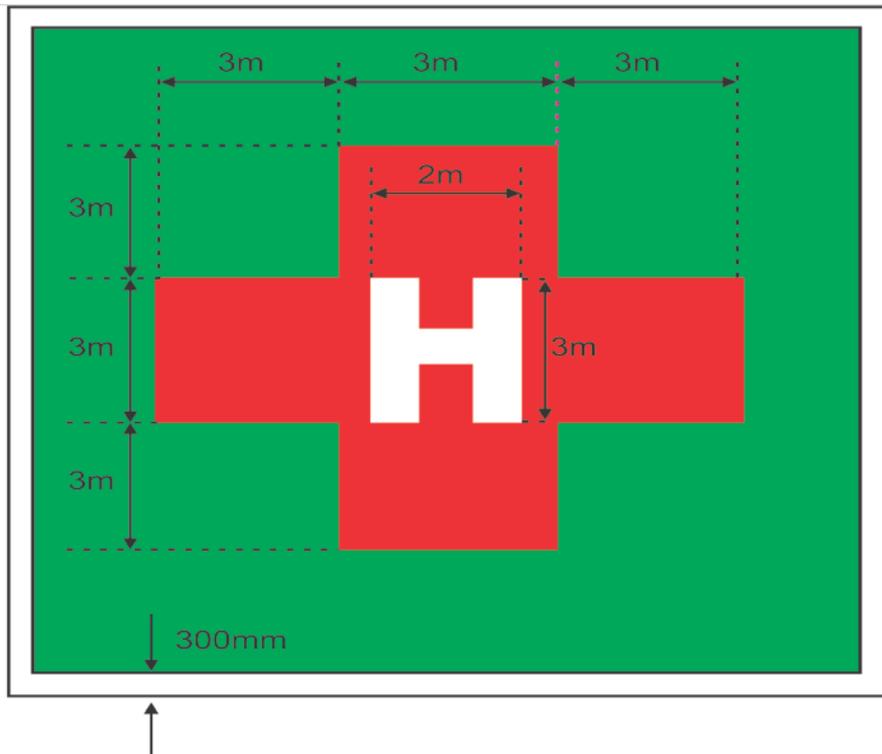
11.1.2. The white 'H' should be superimposed over the red- cross and the stems of the 'H' should be placed so that they are orientated with the most desirable direction for take-off and landing.

11.1.3. The dimensions of the white 'H' should be as follows:

- a) Height 3 m
- b) Width 2 m
- c) Width of stems 30 cm

11.1.4. The dimensions of the red- cross should be as indicated in Figure 8 as follows:

- a) Height 9 m
- b) Width 9 m
- c) Width of bars 3 m



CROSS PAINTED RED

ALL OTHER MARKINGS PAINTED WHITE

Figure 8: Dimensions of a Red Cross

11.1.5. The features of a hospital helistop should be as indicated in Figure 9.

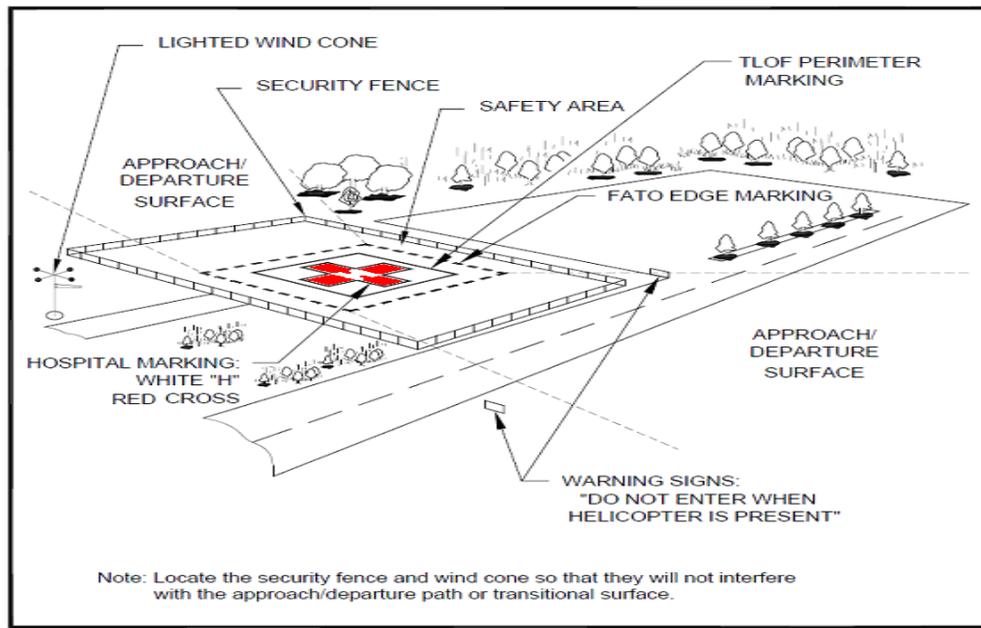


Figure 9: Features of a Hospital Helistop

12. ELEVATED HELISTOP

12.1. Touchdown and lift off area (TLOF).

12.1.1. The specifications and markings for a touchdown and lift-off area of a ground level Helistop should be equally applicable to an elevated Helistop.

12.2. Final approach and takeoff area (FATO).

12.2.1. An elevated Helistop should be provided with a final approach and take off area that is aligned to prevailing winds.

12.2.2. A final approach and take off area should be obstacle free.

12.2.3. The surface of a FATO should be resistant to the effects of rotor downwash.

12.2.4. The dimensions of the FATO should be 20m x 25m for a rectangle or 20m diameter for a circle but not less than 1.5 x the overall length (D) of the design helicopter.

12.2.5. Slopes on a FATO shall be sufficient to prevent accumulation of water on the surface of the area, but should not exceed 3 % in any direction.

12.3. Safety area.

12.3.1. A FATO should be surrounded by a safety area which need not be solid.

12.3.2. A safety area surrounding a FATO should extend outwards from the periphery of the FATO for a distance of at least 3 m or 0.25 D whichever is the greatest.

12.3.3. No fixed object shall be permitted above the plane of the FATO on a safety area, except for frangible objects, which, because of their function, must be located on the area.

12.4. Safety net.

12.4.1. Areas exposed on elevated structures or rooftops should be secured on all sides with a safety net

12.4.2. A railing or fence should not be used since it would be a safety hazard during helicopter operations, however if required, the net may double as a guard rail when the helistop is not being used for helicopter operations.

12.4.3. The safety net should not project above the level of the TLOF, it should be installed in such a way that it does not create an obstacle to landing and departing helicopters.

12.4.4. The safety net should have the characteristics as indicated in Table 3.

Width	At least 1.5 metres
Minimum strength	200 Kg per linear metre.
Slope	the FATO surface to slope upwards and outwards at 1:4 with its outer edge no higher than the TLOF surface.

Table 3: Characteristics of a safety net

12.5. Design loads for an elevated Helistop.

12.5.1. The design loads of an elevated Helistop should be at least 150 % of the maximum certificated take-off weight transmitted through the main wheels or through the areas of a skid-equipped helicopter.

13. MARKINGS INDICATING RESTRICTIONS

13.1. Private use restriction marking.

13.1.1. A helistop restricted to private use should be marked with a white diagonal bar affixed within the touch-down and lift off area from the top right corner to the bottom left corner and shall be interrupted 15cm from the boundary of the "H".

13.1.2. The width of the diagonal line should be 30 cm.

13.2. Restriction on rotor diameter.

13.2.1. If a restriction on rotor diameter is imposed on a helistop, then this should be indicated by a circled number indicating the maximum permissible rotor diameter in metres.

13.2.2. The sign should be affixed to the top left of the "H" viewed from the most preferred approach direction as indicated in Figure 10.

13.2.3. The size of the circle should be at least 2 meters in diameter and the width of the band shall be 10 cm wide.

13.2.4. The size of the figures within the circle should be 1.5 metres.

13.3. A restriction on operational mass.

13.3.1. An elevated helistop should indicate the operational mass restriction of a helicopter in accordance with the structure's strength.

13.3.2. The elevated helistop should be marked with figures indicating the maximum operational mass in metric tonnes, placed to the bottom right of the "H" and underlined with a bar 10 cm wide as indicated in Figure 10.

13.3.3. The height of the figures should be 1,5 metres, see Figure 11 for numbers and proportions.

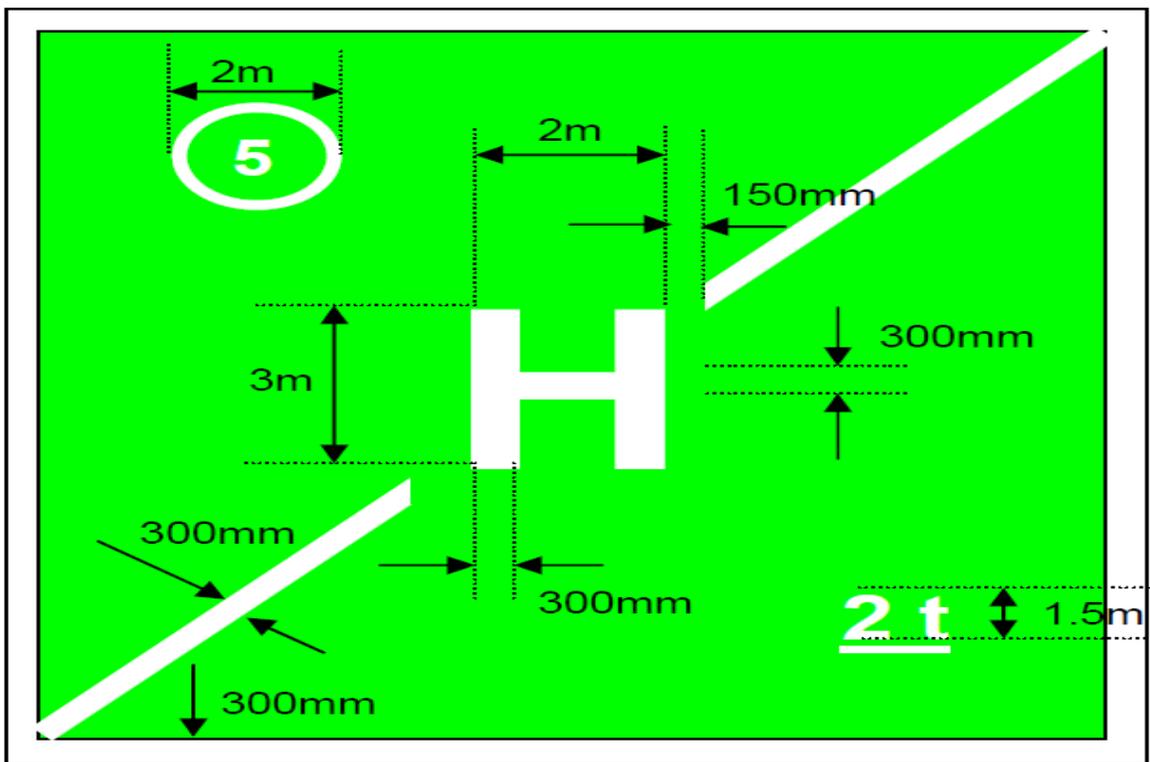


Figure 10: Rectangular touchdown with mass and rotor diameter restrictions

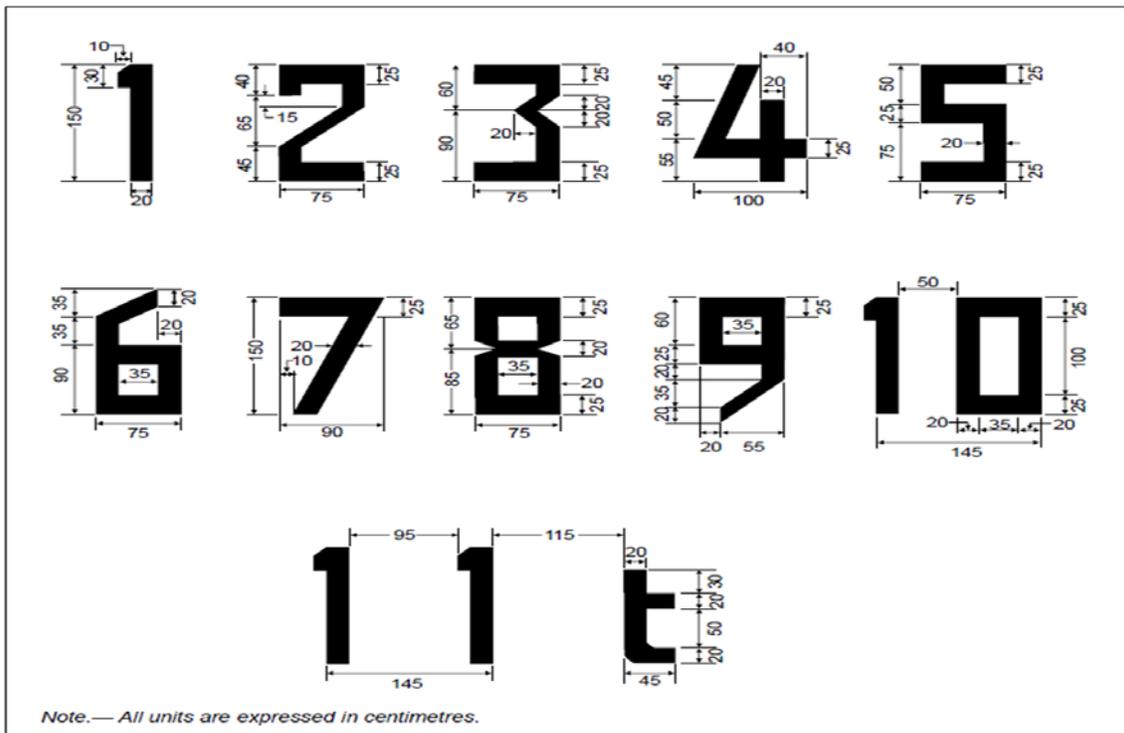


Figure 11: Forms and proportions of numbers and letters

14. LIGHTING AIDS FOR HELISTOPS

All objects that are considered by the SACAA to be hazardous to helicopter operations should be equipped with obstruction warning lights.

14.1. Touchdown and lift-off (TLOF) area lighting.

- 14.1.1. A touchdown and lift off area lighting system should be provided at a Helistop intended for use at night.
- 14.1.2. For a TLOF area in a form of a square, there should be a minimum of four lights on each side including a light at each corner.
- 14.1.3. For a TLOF area in a form of a circle; there should be an even number of lights, with a minimum of 8 uniformly spaced lights, refer to Figure 12.
- 14.1.4. TLOF perimeter lights should be fixed omnidirectional lights showing green.
- 14.1.5. The lights should be preferably insert when a light extending above the surface would endanger helicopter operations.

14.2. Final Approach and Takeoff (FATO) area lights.

- 14.2.1. Where a FATO is established at a Helistop intended for use at night, FATO lights should be provided.
- 14.2.2. FATO lights should be placed along the edges and the lights should be uniformly spaced as follows:

- a) for an area in the form of a rectangle, there should be a minimum of four lights per side including a light at each corner as indicated in Figure 12.
 - b) for an area in a form of a circle, there should be a minimum of ten equally spaced lights.
- 14.2.3. (3) FATO lights should be fixed omnidirectional lights showing white, where the intensity of the lights is to be varied the lights should show variable white.

14.3. **Approach lighting system.**

- 14.3.1. An approach lighting system is an optional feature to be installed at a helistop where it is desirable and practicable to indicate a preferred approach direction.
- 14.3.2. Approach lights, if provided should be a configuration of six yellow, omni-directional lights on the centreline of the preferred approach/ departure path as indicated in Figure 12.
- 14.3.3. The lights should be spaced at intervals of 4m commencing at the boundary of the FATO and extending outwards in the direction of the preferred approach path.

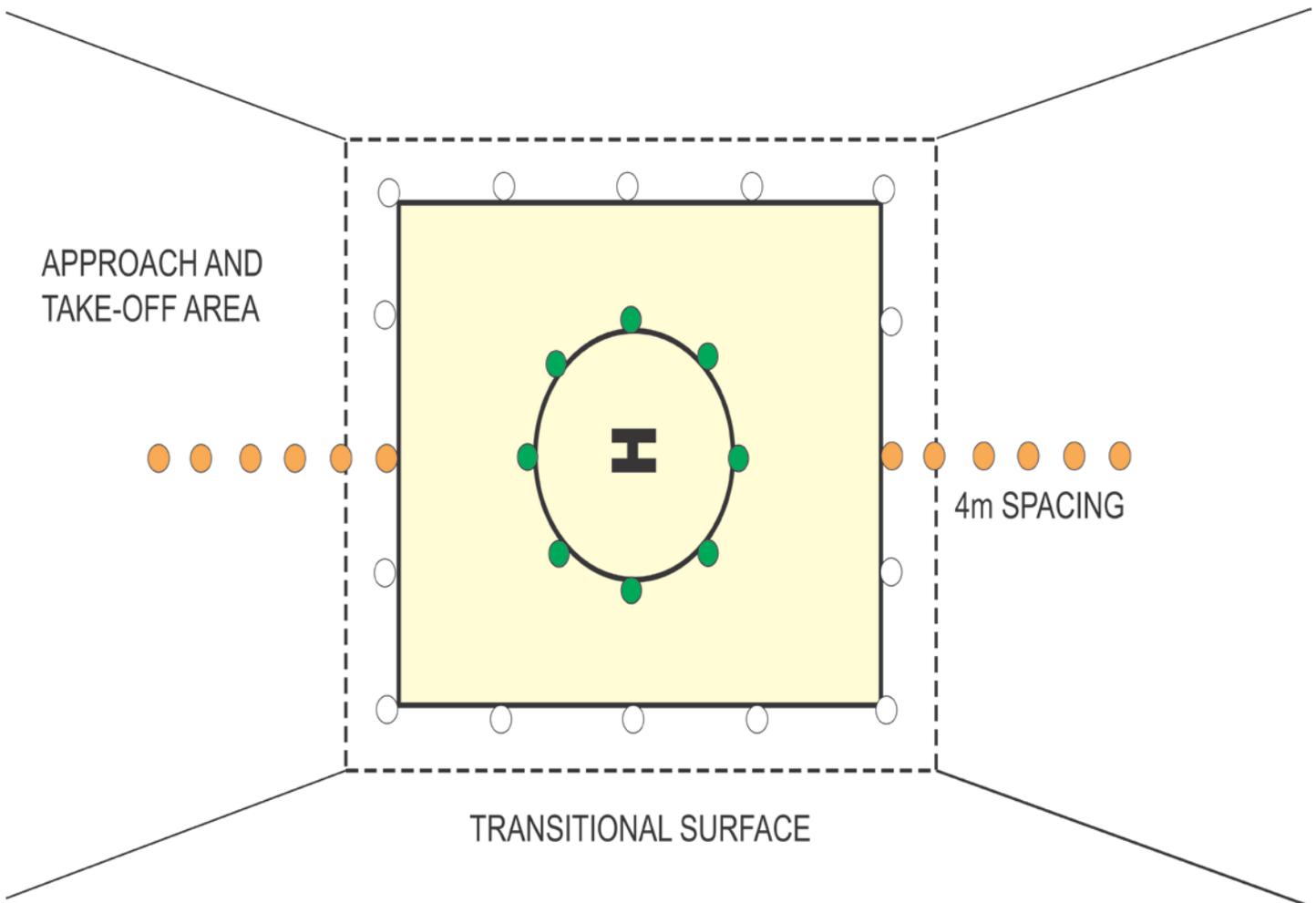
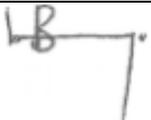


Figure 12: Layout of lighting aids for Helistops

15. FIRE-FIGHTING EQUIPMENT

- 15.1. At a surface level Helistop, provide at least three fire extinguishers, comprising of a 1 x 5 Kg Carbon Dioxide (CO₂) and 2 x 9 Kg Dry Chemical Powder (DCP) extinguishers at the access point to the Helistop.
- 15.2. At an elevated Helistop, at least 2 x 50 Kg premix foam mobile trollies should be provided. Locate fire hose cabinets, fire extinguishers, and other fire-fighting equipment near, but below the level of the TLOF.

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SIGNATURE OF M: CAT Z & H	NAME IN BLOCK LETTERS	DATE
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