# RA 3532 - Helicopter Landing Site - Obstacle Environment

**Rationale**

*The purpose of the Obstacle Limitation Surfaces (OLS) is to define the airspace around Helicopter Landing Sites (HLS) to be maintained free from obstacles so as to permit the intended operations at the HLS to be conducted safely.*

**Contents**



**Regulation 3532(1)**

## Permanent Helicopter Landing Sites - Obstacle Limitation Surfaces (General)

3532(1) Heads of Establishment (HoE) and Aviation Duty Holder-Facing Organizations (ADH-Facing Organizations) **shall** ensure that the OLS are defined to limit the extent to which objects may project into the airspace.

**Acceptable Means of Compliance 3532(1)**

## Permanent Helicopter Landing Sites - Obstacle Limitation Surfaces (General)

1. The Approach Surface **should**:

   a. Be an inclined plane or a combination of planes or, when a turn is involved, a complex surface sloping upwards from the end of the safety area and centred on a line passing through the centre of the Final Approach and Take Off area (FATO). In the case of an approach surface involving a turn, the surface **should** be a complex surface containing the horizontal normal to its centre-line and the slope of the centre-line **should** be the same as that for a straight approach surface (Figure 1);

   b. Contain no more than one curved portion. The sum of the radius of arc defining the centre-line of the approach surface and the length of the straight portion originating at the inner edge **should** be no less than 575 m with a minimum radius of 270 m (Figure 2);

   c. Have a slope measured in the vertical plane containing the centre-line of the FATO;

   d. Have limits comprising:

      (1) An inner edge horizontal and equal in length to the minimum specified width/diameter of the FATO plus the safety area, perpendicular to the centre-line of the approach surface and located at the outer edge of the safety area;

      (2) For a non-instrument or non-precision approach: two side edges originating at the ends of the inner edge diverging uniformly at a specified rate from the vertical plane containing the centre-line of the FATO;

      (3) For a precision approach:

**Acceptable Means of Compliance 3532(1)**

(a) Two side edges originating at the ends of the inner edge diverging uniformly at a specified rate from the vertical plane containing the centre-line of the FATO, to a specified height above the FATO.

(b) And then diverging uniformly at a specified rate to a specified final width and continuing thereafter at that width for the remaining length of the approach surface.

(4) An outer edge horizontal and perpendicular to the centre-line of the approach surface and at a specified height above the elevation of the FATO.

e. Have an elevation of the inner edge the same as the elevation of the FATO at the point on the inner edge that is intersected by the centre-line of the approach surface. For HLS intended to be used by helicopters operated in performance Class 1 and when approved by an appropriate authority, the origin of the inclined plane may be raised directly above the FATO.

*Figure 1. Approach Surface*

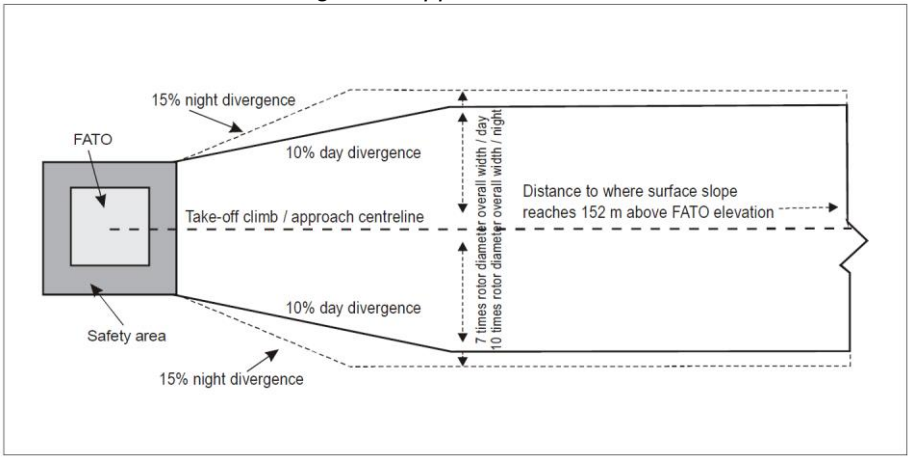
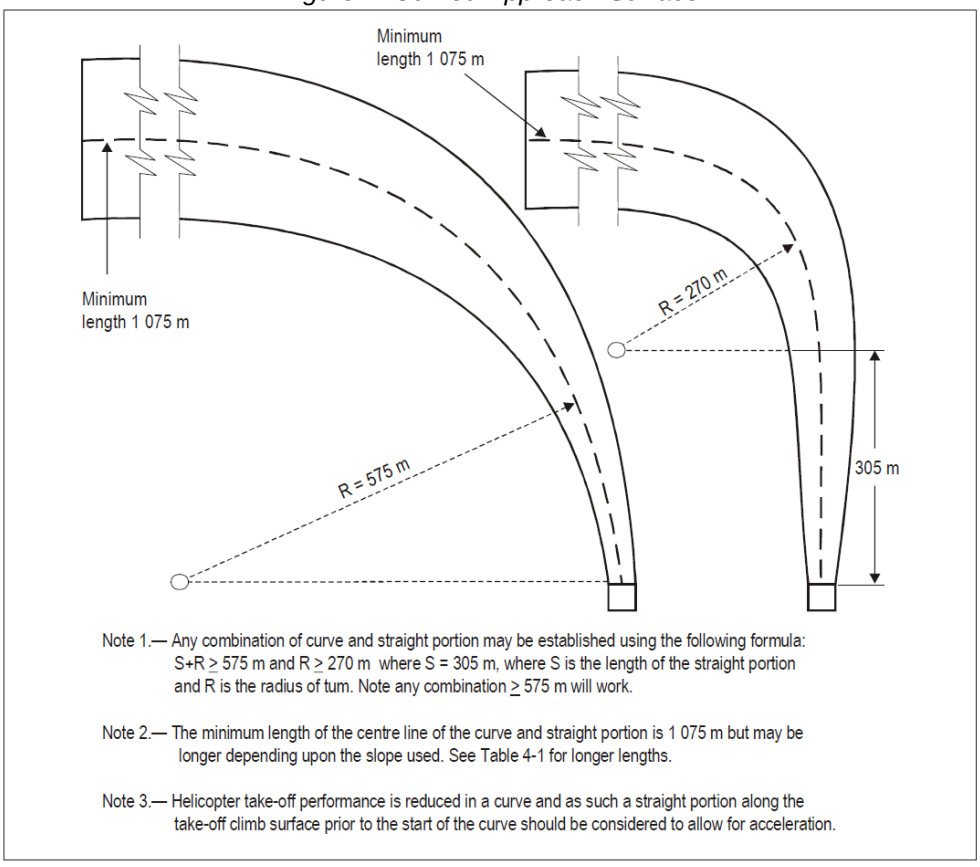



*Figure 2. Curved Approach Surface*



**Acceptable Means of Compliance 3532(1)**

2. The Transitional Surface **should**:

a. Be a complex surface along the side of the safety area and part of the side of the approach/take-off climb surface, that slopes upwards and outwards to a predetermined height of 45 m (150 ft.);

b. Have limits comprising:

(1) A lower edge beginning at a point on the side of the approach/take-off climb surface at a specified height above the lower edge extending down the side of the approach/take-off climb surface to the inner edge of the approach/take-off climb surface and from there along the length of the side of the safety area parallel to the centre-line of the FATO; ►and◄

(2) An upper edge located at a specified height above the lower edge;

c. Have an elevation of a point on the lower edge that:

(1) Along the side of the approach/take-off climb surface is equal to the elevation of the approach/take-off climb surface at that point; and

(2) Along the safety area is equal to the elevation of the inner edge of the approach/take-off climb surface;

d. Be measured in a vertical plane at right angles to the centre-line of the FATO.

3. The Take-Off Climb Surface **should**:

a. Be an inclined plane, a combination of planes or, when a turn is involved, a complex surface sloping upwards from the end of the safety area and centred on a line passing through the centre of the FATO. In the case of a take-off climb surface involving a turn, the surface **should** be a complex surface containing the horizontal normal to its centre-line and the slope of the centre-line **should** be the same as that for a straight take-off climb surface (Figure 3);

b. Contain no more than one curved portion. The sum of the radius of arc defining the centre-line of the approach surface and the length of the straight portion originating at the inner edge **should** be no less than 575 m with a minimum radius of 270 m;

c. Have a slope measured in the vertical plane containing the centre-line of the surface;

d. Have limits comprising:

(1) An inner edge horizontal and equal in length to the minimum specified width/diameter of the FATO plus the safety area, perpendicular to the centre-line of the take-off climb surface and located at the outer edge of the safety area;

(2) Two side edges originating at the ends of the inner edge and diverging uniformly at a specified rate from the vertical plane containing the centre-line of the FATO; and

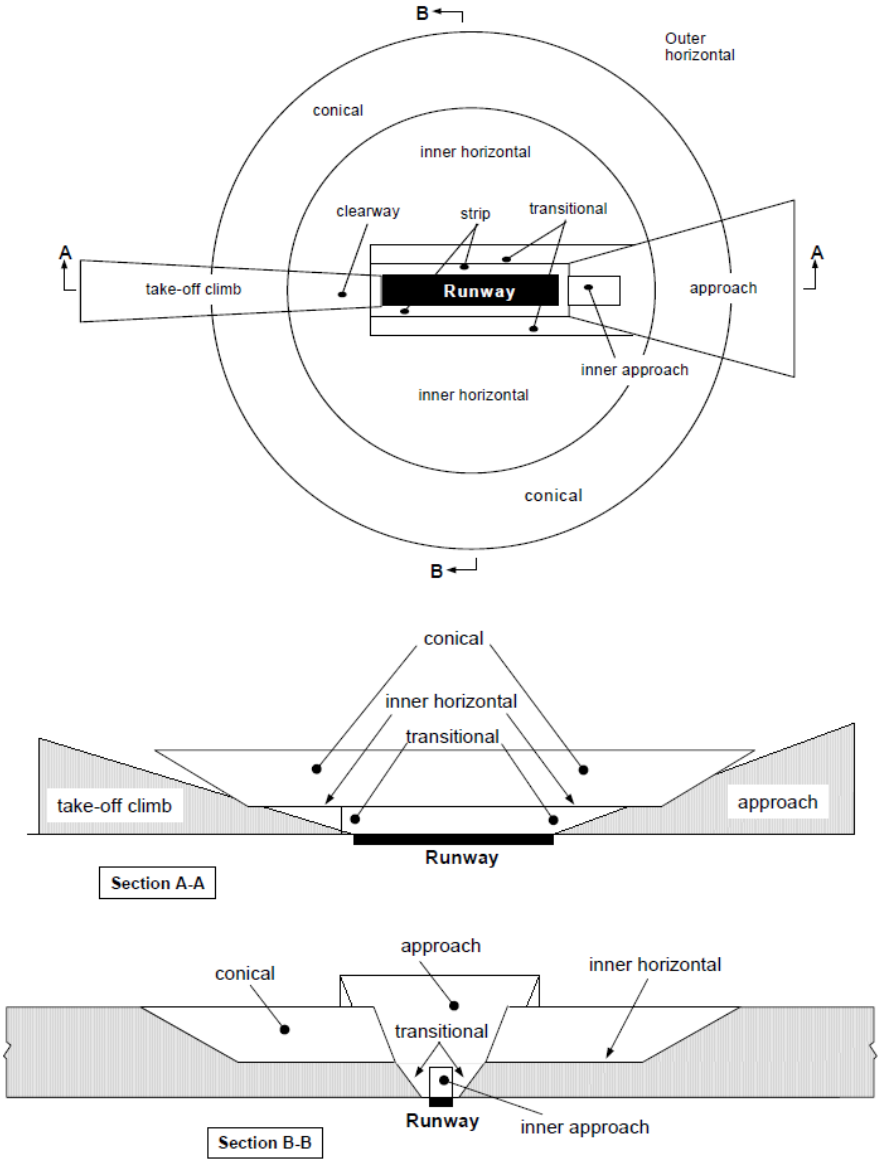
(3) An outer edge horizontal and perpendicular to the centre-line of the take-off climb surface and at a specified height of 152 m (500 ft.) above the elevation of the FATO.

(4) An elevation of the inner edge equal to the elevation of the FATO at the point on the inner edge that is intersected by the centre-line of the take-off climb surface. For HLS intended to be used by helicopters operated in performance Class 1 and when approved by an appropriate authority, the origin of the inclined plane may be raised directly above the FATO;

e. Where a clearway is provided, have an elevation of the inner edge of the take-off climb surface located at the outer edge of the clearway at the highest point on the ground based on the centre-line of the clearway;

**Acceptable Means of Compliance 3532(1)**

*Figure 3. Take off climb surface*




4. Surface level HLS **should** have at least two approach and take-off surfaces to avoid downwind conditions, minimize crosswind conditions and permit for a balked landing.

5. Visual Approach Slope Indicator Obstacle Protection Surface **should**:

a. Be an inclined plane sloping upwards from the end of the safety area and centred on a line through the FATO centre (Figure 4);

b. Have an inner edge horizontal and equal in length to the minimum specified width of the FATO plus the safety area, perpendicular to the centre-line of the approach surface and located at the outer edge of the safety area;

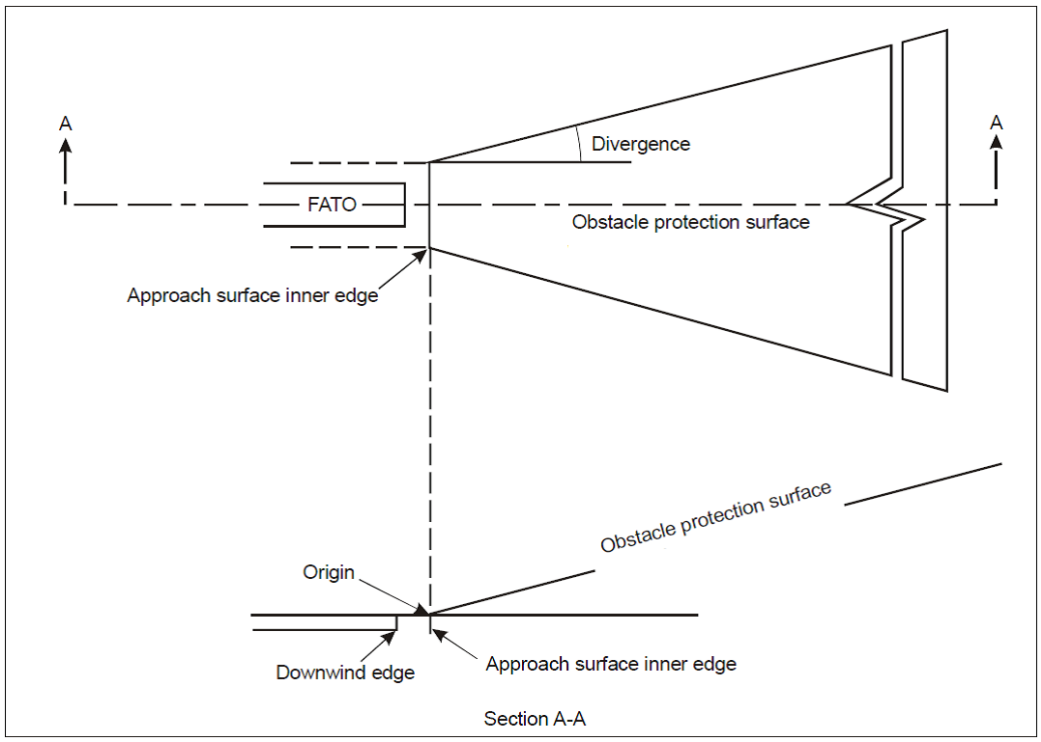
c. Have two side edges originating at the ends of the inner edge diverging uniformly at a specified rate from the vertical plane containing the centre-line of the FATO;

d. Have an outer edge horizontal and perpendicular to the centre-line of the approach surface and at a specified height above the elevation of the FATO; and

e. Have a slope measured in a vertical plane at right angles to the centre-line of the FATO.

**Acceptable Means of Compliance 3532(1)**

*Figure 4 Visual Approach Slope Indicator Obstacle Protection Surface*




6. Where no transitional surface is provided, a protected side slope **should** be provided rising at 45° from the edge of the safety area to a distance of 10 m, whose surface **should not** be penetrated by obstacles, except that when obstacles are located to one side of the FATO only, they may be permitted to penetrate the side slope surface.

7. No fixed object **should** be permitted above the plane of the FATO on a safety area, except for frangible objects, which, because of their function, ►**should**◄ be located on the area. No mobile object **should** be permitted on a safety area during helicopter operations.

a. Objects whose function requires them to be located on the safety area **should not:**

(1) If located at a distance of less than 0.75D[1] from the centre of the FATO, penetrate a plane at a height of 5 cm above the plane of the FATO; and

(2) If located at a distance of 0.75D or more from the centre of the FATO, penetrate a plane originating at a height of 25 cm above the plane of the FATO and sloping upwards and outwards at a gradient of 5%.

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## Permanent Helicopter Landing Sites - Obstacle Limitation Surfaces (General)

8. Helicopter take-off performance is reduced in a curve and as such a straight portion along the take-off climb surface prior to the start of the curve allows for acceleration.

9. For HLS intended to be used by helicopters operated in performance Class 2 and 3 it is good practice for the departure paths to be selected so as to permit safe forced landings or one-engine-inoperative landings such that, as a minimum requirement, injury to persons on the ground or water or damage to property are minimized. The most critical helicopter type for which the HLS is intended and the ambient conditions may be factors in determining the suitability of such areas.

[1] Where D is the largest overall dimension of the helicopter using the HLS.

**Guidance Material 3532(1)**

10. To support operations with only one approach and take-off climb surface, an aeronautical study may be undertaken by an appropriate authority considering as a minimum, the following factors:

a. The area/terrain over which the flight is being conducted;

b. The obstacle environment surrounding the HLS;

c. The performance and operating limitations of helicopters intending to use the HLS; and

d. The local meteorological conditions including the prevailing winds

**Civil Equivalence.**

11. This regulation is in line with International Civil Aviation Organization (ICAO) Annex 14 Vol II Chapter 4.

**Regulation 3532(2)**

## Permanent Helicopter Landing Sites - Obstacle Limitation Surfaces for Non-Instrument Approach

3532(2) HoEs and ADH-Facing Organizations **shall** ensure that OLS are established for a FATO at HLS with non-instrument approach procedures.

**Acceptable Means of Compliance 3532(2)**

## Permanent Helicopter Landing Sites - Obstacle Limitation Surfaces for Non-Instrument Approach

12. OLS indicated in Table 1 **should** be established for a FATO at HLS with non-instrument approach procedures.

*Table 1. Dimensions and slopes of* OLS *for all non-instrument FATOs*

| **SURFACE and DIMENSIONS** | ***SLOPE DESIGN CATEGORIES*** | | |
|---|---|---|---|
| | A | B | C |
| **APPROACH and TAKE-OFF CLIMB SURFACE:** | | | |
| Length of inner edge | Width of safety area | Width of safety area | Width of safety area |
| Location of inner edge | Safety area boundary (Clearway boundary if provided) | Safety area boundary | Safety area boundary |
| **Divergence:** (1st and 2nd section) | | | |
| Day use only | 10% | 10% | 10% |
| Night use | 15% | 15% | 15% |
| **First Section:** | | | |
| Length | 3386 m | 245 m | 1220 m |
| Slope | 4.5% (1:22.2) | 8% (1:12.5) | 12.5% (1:8) |
| Outer Width | (b) | N/A | (b) |

**Acceptable Means of Compliance 3532(2)**

| | | | |
|---|---|---|---|
| **Second Section:** | | | |
| Length | N/A | 830 m | N/A |
| Slope | N/A | 16% (1:6.25) | N/A |
| Outer Width | N/A | (b) | N/A |
| Total length from inner edge (a) | 3386 m | 1075 m | 1220 m |
| **Transitional Surface:** (FATOs with a PinS approach procedure with a Visual Segment Surface (VSS)) | | | |
| Slope | 50% (1:2) | 50% (1:2) | 50% (1:2) |
| Height | 45 m | 45 m | 45 m |

**Guidance Material 3532(2)**

## Permanent Helicopter Landing Sites - Obstacle Limitation Surfaces for Non-Instrument Approach

**Civil Equivalence.**

13. This regulation is in line with ICAO Annex 14 Vol II para 5.3.

**Regulation 3532(3)**

## Permanent Helicopter Landing Sites - Obstacle Limitation Surfaces for Precision or Non-Precision Approach

3532(3) HoEs and ADH-Facing Organizations **shall** ensure that for an instrument FATO with a Precision or Non-Precision Approach the following OLS are established; Take-Off Climb Surface, Approach Surface, and Transitional Surface.

**Acceptable Means of Compliance 3532(3)**

## Permanent Helicopter Landing Sites - Obstacle Limitation Surfaces for Precision or Non-Precision Approach

14. The slopes of the OLS **should** be less than, and their other dimensions **should** be greater than those specified in Table 2 for precision FATO and Table 3 for non-precision FATO.

*Table 2. Dimensions and slopes of* OLS*: Instrument (Precision) FATO*

| | ***3º approach*** ***Height above FATO*** | | | | ***6º approach*** ***Height above FATO*** | | | |
|---|---|---|---|---|---|---|---|---|
| ***Surface and dimensions*** | ***90 m (300 ft)*** | ***60 m (200 ft)*** | ***45 m (150 ft)*** | ***30 m (100 ft)*** | ***90 m (300 ft)*** | ***60 m (200 ft)*** | ***45 m (150 ft)*** | ***30 m (100 ft)*** |
| **APPROACH SURFACE** | | | | | | | | |
| Length of inner edge | 90 m | | | | | | | |
| Distance from end of FATO | 60 m | | | | | | | |
| Divergence each side to height above FATO | 25% | | | | | | | |

**Acceptable Means of Compliance 3532(3)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Distance to height above FATO | 1745 m | 1163 m | 872 m | 581 m | 870 m | 580 m | 435 m | 290 m |
| Width at height above FATO | 962 m | 671 m | 526 m | 380 m | 521 m | 380 m | 435 m | 290 m |
| Divergence to parallel section | 15% | | | | | | | |
| Distance to parallel section | 2793 m | 3763 m | 4246 m | 4733 m | 4250 m | 4733 m | 4975 m | 5217 m |
| Width of parallel section | 1 800 m | | | | | | | |
| Distance to outer edge | 5462 m | 5074 m | 4882 m | 4686 m | 3380 m | 3187 m | 3090 m | 2993 m |
| Width at outer edge | 1 800 m | | | | | | | |
| Slope of first section | 2.5% (1:40) | | | | 5% (1:20) | | | |
| Length of first section | 3000 m | | | | 1500 m | | | |
| Slope of second section | 3% (1:33.3) | | | | 6% (1:16.66) | | | |
| Length of second section | 10000 m | | | | 8500 m | | | |
| Total length of surface | 13000 m | | | | 10000 m | | | |
| **TAKE-OFF CLIMB SURFACE** | | | | | | | | |
| Length of inner edge | 90 m | | | | | | | |
| Location of inner edge | Boundary of end of Clearway | | | | | | | |
| First section divergence | 30% | | | | | | | |
| First section length | 2850 m | | | | | | | |
| First section outer width | 1800 m | | | | | | | |
| First section maximum slope | 3.5% | | | | | | | |
| Second section divergence | Parallel | | | | | | | |
| Second section length | 1510 m | | | | | | | |
| Second section outer width | 1800 m | | | | | | | |
| Second section maximum slope | 3.5% | | | | | | | |
| Third section divergence | Parallel | | | | | | | |
| Third section length | 7640 m | | | | | | | |
| Third section outer width | 1800 m | | | | | | | |
| Third section maximum slope | 2% | | | | | | | |
| **TRANSITIONAL** | | | | | | | | |
| Slope | 14.3% | 14.3% | 14.3% | 14.3% | 14.3% | 14.3% | 14.3% | 14.3% |
| Height | 45 m | 45 m | 45 m | 45 m | 45 m | 45 m | 45 m | 45 m |

**Acceptable Means of Compliance 3532(3)**

*Table 3 Dimensions and slopes of* OLS*: Instrument (non-precision) FATO*

| Surfaces and Dimensions | |
|---|---|
| **APPROACH SURFACE** | |
| Width of inner edge<br>Location of inner edge | Width of Safety Area Boundary |
| **Frist Section** | |
| Divergence | 16% |
| Length | 200 m |
| Outer width | 890 m |
| Slope (maximum) | 3.33% |
| **Second Section** | |
| Divergence | - |
| Length | - |
| Outer width | - |
| **Third Section** | |
| Divergence | - |
| Length | - |
| Outer width | - |
| Slope (maximum) | - |
| **TRANSITIONAL** | |
| Slope | 20% |
| Height | 45 m |
| **TAKE-OFF CLIMB SURFACE** | |
| Length of inner edge | 90 m |
| Location of inner edge | Boundary of end of Clearway |
| **First Section** | |
| Divergence | 30% |
| Length | 2850 m |
| Outer width | 1800 m |
| Maximum slope | 3.5% |
| **Second Section** | |
| Divergence | Parallel |
| Length | 1510 m |
| Outer width | 1800 m |
| Maximum slope | 3.5% |

**Acceptable Means of Compliance 3532(3)**

| | |
|---|---|
| **Third Section** | |
| Divergence | Parallel |
| Length | 7640 m |
| Outer width | 1800 m |
| Maximum slope | 2% |

**Guidance Material 3532(3)**

## Permanent Helicopter Landing Sites - Obstacle Limitation Surfaces for Precision or Non-Precision Approach

**Civil Equivalence.**

15. This regulation is in line with ICAO Annex 14 Vol II para 4.2.

**Regulation 3532(4)**

## Permanent Helicopter Landing Sites - Obstacle Limitation Surfaces for Visual Approach Slope Indicator

3532(4) HoEs and ADH-Facing Organizations **shall** ensure that an OLS is established for FATOs where visual approach slope indicators are utilized.

**Acceptable Means of Compliance 3532(4)**

## Permanent Helicopter Landing Sites - Obstacle Limitation Surfaces for Visual Approach Slope Indicator

16. The characteristics of the OLS, ie origin, divergence, length and slope, **should** correspond to those specified in Table 4.

*Table 4. Dimensions and slopes of the* OLS

| **Surface and Dimensions** | **FATO** | |
|---|---|---|
| Length of inner edge | Width of safety area | |
| Distance from end of FATO | 3 m minimum | |
| Divergence | 10% | |
| Total length | 2500 m | |
| Slope | PAPI[2] | $A^a$ – 0.57° |
| | HAPI[3] | $A^b$ – 0.65° |
| | APAPI[4] | $A^a$ – 0.9° |

a. As indicated in ICAO Annex 14, Volume 1, Figure 5-20.
b. The angle of the upper boundary of the 'below slope' signal.

17. New objects or extensions of existing objects **should not** be permitted above the OLS except when, in the opinion of the appropriate authority and subject to a Safety Assessment, the new object or extension would be shielded by an existing immovable object.

18. Existing objects above the OLS **should** be removed except when, in the opinion of the appropriate authority and subject to a Safety Assessment, the object is shielded

[2] Precision Approach Path Indicator.
[3] Helicopter Approach Path Indicator.
[4] Abbreviated Precision Approach Path Indicator.

**Acceptable Means of Compliance 3532(4)**

by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety of operations of helicopters.

19. Where an aeronautical study indicates that an existing object extending above an OLS could adversely affect the safety of operations of helicopters, one or more of the following measures **should** be taken:

a. Suitably raise the approach slope of the system;

b. Reduce the azimuth spread of the system so that the object is outside the confines of the beam;

c. Displace the axis of the system and its associated OLS by no more than 5°;

d. Suitably displace the FATO; or

e. Install a visual alignment guidance system specified in RA 3535[5].

**Guidance Material 3532(4)**

## Permanent Helicopter Landing Sites - Obstacle Limitation Surfaces for Visual Approach Slope Indicator

**Civil Equivalence.**

20. This regulation is in line with ICAO Annex 14 Vol II para 4.2.

**Regulation 3532(5)**

## Domestic Helicopter Landing Sites - Obstacles

3532(5) HoEs and ADH-Facing Organizations **shall** ensure that obstacles in the immediate vicinity of a Domestic HLS are minimized.

**Acceptable Means of Compliance 3532(5)**

## Domestic Helicopter Landing Sites - Obstacles

21. Domestic HLS **should** be cleared of obstacles as indicated in RA 3531(9)[6].

**Guidance Material 3532(5)**

## Domestic Helicopter Landing Sites - Obstacles

22. Nil.

**Regulation 3532(6)**

## Domestic Helicopter Landing Sites - Approaches

3532(6) HoEs and ADH-Facing Organizations **shall** ensure that obstacle free approach and exit paths are established for all Domestic HLS.

**Acceptable Means of Compliance 3532(6)**

## Domestic Helicopter Landing Sites - Approaches

23. Approach and exit paths for day operations (excluding recce) **should**:

a. Have a maximum obstruction angle that does not exceed 6°, as measured from the edge of the 'cleared to ground level' area to a distance of 500 m; and

b. Be positioned into wind.

24. Approach and exit paths for night operations (excluding recce) **should**:

[5] ►Refer to ◄ RA 3535 - Helicopter Landing Sites - Lights.
[6] ►Refer to RA 3531(9): Domestic Helicopter Landing Site.◄

**Acceptable Means of Compliance 3532(6)**

a. Have a maximum obstruction angle that does not exceed 4°, as measured from the edge of the 'cleared to ground level' area to a distance of 3000 m or the maximum range of the glidepath indicator, whichever is greater;

b. Have a sector of not less than 16° in azimuth measured from the edge of the 'cleared to ground level' area no less than the width of the 'cleared to 0.6 m' area (minimum 50 m, but no more than 100 m);

c. Have prominent obstacles outside of the approach/exit lanes detailed in the HLS Directory and lit where possible; and

d. Be positioned into wind.

e. Use a glidepath indicator.

**Guidance Material 3532(6)**

## Domestic Helicopter Landing Sites - Approaches

25. Nil.