



Civil Aviation Advisory Publication

February 2014

Civil Aviation Advisory Publications (CAAPs) provide guidance, interpretation and explanation on complying with the *Civil Aviation Regulations 1988 (CAR)* or Civil Aviation Orders (CAO).

This CAAP provides advisory information to the aviation industry in support of a particular CAR or CAO. Ordinarily, the CAAP will provide additional 'how to' information not found in the source CAR, or elsewhere.

A CAAP is not intended to clarify the intent of a CAR, which must be clear from a reading of the regulation itself, nor may the CAAP contain mandatory requirements not contained in legislation.

Note: Read this advisory publication in conjunction with the appropriate regulations/orders.

Guidelines for the establishment and operation of onshore Helicopter Landing Sites

This CAAP will be of interest to:

- aerodrome and Helicopter Landing Site (HLS) designers
- current and future Air Operator's Certificate (AOC) holders authorised to conduct helicopter operations
- current and future aerodrome and HLS operators
- HLS certification agents
- helicopter pilots
- suppliers of aerodrome and HLS equipment.

Why this publication was written

These guidelines set out factors that may be used to determine the suitability of a place for the landing and taking-off of helicopters when the place does not meet the Standards and Recommended Practices (SARPs) for Heliports, as set out in Volume II of Annex 14 to the Convention on International Civil Aviation (the Chicago Convention).

Application of these guidelines will enable a take-off or landing to be completed safely, provided that the pilot in command:

- has sound piloting skills
- displays sound airmanship.

This CAAP has been re-written to:

- remove reference to the recommended criteria for off-shore resource platform and vessel-based HLS (helidecks), as that information is available now in CAAP 92-4
- assist in the transition to future operational parts to the *Civil Aviation Safety Regulations 1998 (CASR)*.

Status of this CAAP

This is the third issue of CAAP 92-2 and supersedes CAAP 92-2(1) issued in 1996. The Civil Aviation Safety Authority (CASA) has taken the opportunity to align concepts in this document with emerging terminology until HLS standards are promulgated in the Part 139 Manual of Standards (MOS).

For further information

Additional copies of this and other related CAAPs may be obtained from the CASA website. For policy advice, contact your local CASA regional office (Telephone 131 757).

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1. Relevant regulations and other references

- Regulations 92, 92A and 93 of CAR
- Part 139 and the proposed Parts 133 and 138 of CASR
- Section 8.11, *Helicopter Areas on Aerodromes*, of the Part 139 MOS
- Aeronautical Information Publication – Aerodromes (AIP–AD)
- Volume II of Annex 14, *Heliports*, to the Chicago Convention
- International Civil Aviation Organization (ICAO) *Heliport Manual* (Doc 9261)
- CASA Policy Notice CEO PN029-2005, available online at:
<http://www.casa.gov.au/corporat/policy/notices/CEO-PN029-2005.pdf>
- Part 27 and 29 of the Federal Aviation Regulations (FAR)
- European Aviation Safety Agency (EASA) CS-27 and CS-29
- National Fire Protection Standard NFPA 418-2011

2. Acronyms

AGL	Above Ground Level
AIP	Aeronautical Information Publication
AFM	Aircraft Flight Manual
AOC	Air Operator's Certificate
CAAP	Civil Aviation Advisory Publication
CAR	Civil Aviation Regulations 1988
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations 1998
D	D-Value (see Definitions)
DLB	Dynamic Load Bearing
EASA	European Aviation Safety Agency
EMS	Emergency Medical Service
FAR	Federal Aviation Regulation
FATO	Final Approach and Take-off area
HLS	Helicopter Landing Site
ICAO	International Civil Aviation Organization
LSALT	Lowest Safe Altitude

MOS	Manual of Standards
PinS	Point-in-space instrument approach and landing procedure
OEI	One Engine Inoperative
RD	Rotor Diameter (see Definitions)
RPT	Regular Public Transport
SARPs	Standards and Recommended Practices
TD/PM	Touchdown/Positioning Marking
TLOF	Touchdown and Lift-off Area
VHF	Very High Frequency
VMC	Visual Meteorological Conditions

3. Definitions and other expressions

Note: *An expression that is defined in the Civil Aviation Act, the Civil Aviation Regulations or the AIP has, when used in this CAAP, the same meaning as it has in those publications.*

AIR TAXI – the airborne movement of a helicopter at low speeds and at heights normally associated with operations in ground effect.

APPROACH AND DEPARTURE PATH – the track of a helicopter as it approaches, or takes-off and departs from, the Final Approach and Take-Off Area (FATO) of an HLS.

BASIC HLS – a place that may be used as an aerodrome for infrequent, opportunity and short term operations, other than Regular Public Transport (RPT), by day under helicopter Visual Meteorological Conditions (VMC).

BUILDING – any elevated structure on land.

CATEGORY A – with respect to rotorcraft, means a multi-engine rotorcraft that is:

- (a) designed with engine and system isolation features specified for Category A requirements in Parts 27 and 29 of the FARs or EASA CS-27 and CS-29; and
- (b) capable of operations using take-off and landing data scheduled under a critical engine failure concept which assures adequate designated ground or water area and adequate performance capability for continued safe flight or safe rejected take-off in the event of engine failure.

D-VALUE (D) – the largest overall dimension of the helicopter when rotors are turning. This dimension will normally be measured from the most forward position of the main rotor tip path plane to the most rearward position of the tail rotor tip path plane (or the most rearward extension of the fuselage in the case of Fenestron or Notar tails).

ELEVATED HLS – An HLS on a raised structure on land with a FATO and a TLOF surface 2.5 m or higher above the ground in the immediate vicinity.

FINAL APPROACH AND TAKE-OFF AREA (FATO) – in relation to an HLS, means an area of land or water over which the final phase of the approach to a hover or landing is completed and from which the take-off manoeuvre is commenced.

FINAL APPROACH – the reduction of height and airspeed to arrive over a predetermined point above the FATO of an HLS.

GRAVITATIONAL FORCE – the acceleration due to gravity, equal to 9.81 m/s².

GROUND TAXIING – movement of a helicopter on the ground under its own power on its undercarriage wheels.

HELICOPTER VMC – Visual Meteorological Conditions in relation to helicopters, as detailed in the Aeronautical Information Publication (AIP).

HELICOPTER LANDING SITE (HLS):

- (a) an area of land or water, or an area on a structure on land, intended for use wholly or partly for the arrival or departure of helicopters; or
- (b) a helideck; or
- (c) a heliport.

HELIDECK – an area intended for use wholly or partly for the arrival or departure of helicopters on:

- (a) a ship; or
- (b) a floating or fixed off-shore structure.

HELIPORT – an area that is:

- (a) intended for use wholly or partly for the arrival or departure of helicopters, on:
 - (i) land; or
 - (ii) a building or other raised structure on land; and
- (b) meets or exceeds the heliport standards set out in Volume II of Annex 14 to the Chicago Convention.

LIFT-OFF – in relation to a helicopter, means to raise the helicopter from a position of being in contact with the surface of the HLS into the air.

MOVEMENT – a touchdown or a lift-off of a helicopter at an HLS.

ROTOR DIAMETER (RD) – the diameter of the main rotor with the engine/s running.

SUITABLE FORCED LANDING AREA –

- (a) For a flight of a rotorcraft:
 - (i) means an area of land on which the rotorcraft could make a forced landing with a reasonable expectation that there would be no injuries to persons in the rotorcraft or on the ground; and
 - (ii) for a rotorcraft mentioned in (b) below, includes an area of water mentioned in (c) below.
- (b) For paragraph (a) (ii), the 'rotorcraft' is a rotorcraft that:
 - (i) is being used to conduct a passenger transport operation; and
 - (ii) either:
 - (1) is equipped with emergency flotation equipment; or
 - (2) has a type certificate or supplemental type certificate for landing on water.
- (c) For paragraph (a) (ii), the 'area of water' is an area of water:
 - (i) in which the rotorcraft could ditch with a reasonable expectation that there would be no injuries to persons in the rotorcraft or on the water; and
 - (ii) that is:
 - (1) adjacent to an offshore installation with search and rescue capabilities
 - (2) adjacent to land
 - (3) in a location, set out in the exposition or operations manual of the operator of the rotorcraft, that has search and rescue capabilities.

SAFETY AREA – a defined area on a Secondary HLS surrounding the FATO, or other defined area, that is free of obstacles, other than those required for air navigation purposes, and intended to reduce the risk of damage to helicopters accidentally diverging from the load-bearing area primarily intended for landing or take-off.

SECONDARY HLS – a place suitable for use as an aerodrome for helicopter operations by day or night that does not conform fully to the standards for a heliport set out in Volume II of Annex 14 to the Chicago Convention.

TAKE-OFF – in relation to a stage of flight of a helicopter from an HLS, means the stage of flight where the helicopter accelerates into forward flight and commences climb at the relevant climb speed, or if not intending to climb, enters level flight for the purposes of departure from the helicopter landing site.

Note: *Dependent on the take-off technique being used, the aircraft may be positioned using a vertical or a back-up profile prior to the forward acceleration segment.*

TOUCHDOWN – means lowering the helicopter from a flight phase not in contact with the surface of the HLS into a position which is in contact with the surface of the HLS for a landing.

TOUCHDOWN AND LIFT-OFF AREA (TLOF) – a defined area on an HLS in which a helicopter may touchdown or lift-off.

4. Background

4.1 With the development of the operational parts of the CASR, Australia is moving towards a more ICAO-based set of regulations. In order to meet these requirements, it is necessary to transition operators towards these standards.¹ This CAAP provides guidance on a set of recommended standards acceptable to CASA.

4.2 Presently, paragraph 92(1)(d) of CAR states:

An aircraft shall not land at, or take-off from, any place unless...the place...is suitable for use as an aerodrome for the purposes of the landing and taking-off of aircraft; and, having regard to all the circumstances of the proposed landing or take-off (including the prevailing weather conditions), the aircraft can land at, or take-off from, the place in safety.

4.3 The Civil Aviation Act 1988 (the Act) defines an aerodrome, as:

an area of land or water (including any buildings, installations and equipment), the use of which as an aerodrome is authorised under the regulations, being such an area intended for use wholly or partly for the arrival, departure or movement of aircraft.

4.4 In the latter definition, the concept of 'authorised' means an aerodrome that is authorised by a certificate or registration under Part 139 of CASR. This concept also applies to aerodromes established under the *Air Navigation Act 1920*; a place for which a requirement of Section 20 of the Act is in force; and to places that are not aerodromes. However, despite these references HLSs are not specifically defined in the CAR.

4.5 Likewise, Part 139 of CASR and its MOS do not (at this time) apply to an HLS unless it is located on an aerodrome. However, since helicopters operate from a variety of locations, CASA publishes guidance on what constitutes a suitable HLS in the form of this CAAP. Nothing in this CAAP should deter any helicopter operators, including those carrying out Aerial Work or other

¹ This will include Performance Class requirements, which may be the subject of a future CAO and Advisory Circular.

complex operations, from operating to the higher standards prescribed in Volume II of Annex 14 to the Chicago Convention (Annex 14).

4.6 In keeping with its submissions to ICAO on this topic, CASA recommends owners and operators of an HLS who intend to develop and operate a heliport for the purposes of RPT or Charter operations refer to, and comply with, the SARP as set out in Annex 14. This does not preclude these types of operations at non-ICAO standard Secondary HLS; however, compliance with suitable operational procedures will be needed to ensure the safety of the operations.

Note: *CASA does not expect operators of HLS that do not currently meet the recommended standards set out in this CAAP to upgrade their existing facility immediately, as operational limitations and other risk mitigations may be in place at this time which ensures safety. Nonetheless, CASA encourages operators to adopt these standards when redeveloping current sites or building new HLS.*

5. Operational Factors to consider prior to using an HLS

5.1 Helicopter pilots and operators should ensure that:

- the FATO and TLOF are clear of all objects and animals likely to be a hazard to the helicopter, other than objects essential to the helicopter operation
- no person is within 30 m of the closest point of a hovering or taxiing helicopter, other than persons who are essential to the safe conduct of the operation or the specific nature of the task and who are trained and competent in helicopter operational safety procedures

Note: *In accordance with CAO 95.7 (paragraph 3.2), pilots must ensure that neither the helicopter nor its rotor downwash constitute a hazard to other aircraft, persons or objects.*

- appropriate information from the owners and authorities is obtained to confirm the suitability of the HLS for the proposed operation
- where the performance information in an Aircraft Flight Manual (AFM) details greater or additional limitations for defined areas or the approach and departure paths (compared to those set out in these guidelines), then the greater and/or additional requirements are available for the flight.

5.2 Except in an emergency, a helicopter should not land at or take-off from an HLS unless:

- the applicable helicopter VMC exist for a flight operating under Visual Flight Rules
- the relevant instructions in the AIP (including AIP Book and ERSA) are followed for the flight
- the following criteria are met for an HLS that is located within controlled airspace:
 - two-way VHF radio communication with the relevant Air Traffic Service unit is established
 - the appropriate Air Traffic Control clearances have been received.

5.3 If a proposed HLS is to be located near a city, town or populous area (or any other area where noise or other environmental considerations make helicopter operations undesirable), the proposal may be subject to the provisions of the *Commonwealth Environment Protection (Impact of Proposals) Act 1974* and parallel State legislation.

5.4 There may be other local legislation that also applies to operations at HLSs. It is helicopter pilots and operators' responsibility to check and adhere to any local rules and regulations.

5.5 With respect to operations in multi-engine helicopters at an HLS, the AOC holder and the pilot-in-command should ensure that the operation complies with the relevant requirements of CASA

Policy notice CEO PN029-2005. The policy notice is available on the CASA website at <http://www.casa.gov.au/corporat/policy/notices/CEO-PN029-2005.pdf>.

6. Attributes of an HLS

6.1 The helicopter is one of the more versatile aircraft and can, if required under special circumstances, operate to and from a space little larger than its overall length. The smaller the site, and the less known about hazards presented by obstacles and surface conditions, the greater the risk associated with its use. The risk presented by such hazards can be reduced when:

- the size of the defined areas of the HLS are greater than the minimum required size
- the pilot-in-command has access to accurate, up-to-date information about the site, which is presented in a suitable and easily interpretable form
- visual information, cues and positional markings are present for the defined areas at the site.

Defined Areas

6.2 Defined areas are the basic building blocks of an HLS and have a set of attributes that persist even when co-located or coincidental with another defined area. In such cases, the defined area with the more limiting standard would apply.

6.3 Defined areas belong to one of four main categories:

- **FATO** – the area over which the final approach is completed and the take-off conducted
- **TLOF** – the surface over which the touchdown and lift-off is conducted
- **Stand(s)** – the area for parking and within which positioning takes place
- **Taxiways and associated taxi routes** – the surfaces and areas for ground or air taxiing.

6.3.1 A defined area on a landing site may have one or more of three basic attributes:

1. **Containment** – an attribute that affords protection to the helicopter and/or its undercarriage and permits clearance from obstacles to be established. Containment is of two types: undercarriage containment and helicopter containment. Where a defined area (such as a TLOF or taxiway) provides only undercarriage containment, it should be situated within, or co-located with, another defined area (i.e. a FATO, stand or taxi-route).
2. An additional safety/protection area:
 - **for a FATO** – a safety area surrounds the FATO and compensates for errors in manoeuvring, hovering and touchdown
 - **for a stand** – a protection area surrounds the stand and compensates for errors of manoeuvring
 - **for a taxiway** – a protection area incorporated in the taxi-route, which compensates for errors of alignment and/or manoeuvring.
3. **Surface loading capability** – this ensures adequate surface strength to permit a helicopter to touchdown, park or ground taxi without damage to the surface of the HLS or helicopter. Surface loading is either:
 - **static** – where only the mass of the helicopter is considered, although elevated heliports/helidecks may include additional factors to protect the building/structure or

- **dynamic** – where the apparent weight (i.e. a force comprised of multiples of gravitational force) of the helicopter is used. Two types of dynamic loading need to be considered:
 - o dynamic loading due to normal operations
 - o dynamic loading due to a heavy landing, determined by an ‘ultimate limit state’ test (i.e. touchdown at a rate of descent of 12 ft/s for surface-level heliports).

Note: See paragraph 1.2.1.10 and chapter 1.3.2 of the ICAO Heliport Manual; for guidance on surface loading generally and structural design elevated heliports.

In addition to surface loading, durability is also a necessary consideration for the designer. For this reason, likely traffic should be taken into consideration to ensure that the surface loading remains as specified for the life of the facility or the applicable maintenance period. With this in mind, the following section includes guidance for HLS designers when considering these concepts.

7. Recommended criteria for an HLS

7.1 Basic HLS

7.1.1 Because such HLSs are often developmental and ‘basic’ in nature, CASA recommends that helicopter operators carry out thorough risk and hazard assessments for the proposed operation and apply appropriate controls to any hazards identified during this process.

7.1.2 Any passengers, crew and operational personnel carried into such locations should be briefed on the hazards of the site and any safety procedures needed to ensure safe loading and unloading at the HLS.

7.1.3 A Basic HLS should:

- be determined, by way of the helicopter operator’s risk assessment, to be large enough to accommodate the helicopter and have additional operator-defined safety areas (or buffers) to allow the crew to conduct the proposed operation safely at the location;
- have a TLOF with suitable surface characteristic for safe operations and strong enough to withstand the dynamic loads imposed by the helicopter
- have sufficient obstacle free approach and departure gradients to provide for safe helicopter operations into and out of the site under all expected operational conditions.
- have approach and departure paths that minimise the exposure of the helicopter to meteorological phenomena which may endanger the aircraft and provide escape flight paths, if a non-normal situation arises, which maximise the potential for using suitable forced landing areas.
- only be used for day operations under helicopter VMC or better weather conditions, unless prescribed elsewhere in CASA legislation.

Note: *Dynamic load bearing capability assumes all static load limits imposed by the helicopter and any other structure or vehicle will also be met. Operators should ensure this is the case prior to using the site.*

7.2 Secondary HLS

7.2.1 Since a Secondary HLS is intended to be used for numerous types of operations (i.e. both day and night under helicopter VMC) its design should at a minimum satisfy the guidelines set out in the following sub-sections.

FATO

7.2.2 The FATO should, at minimum, be capable of *enclosing a circle*² with a diameter equal to one-and-a-half times the D-value (1.5 x D) of the largest helicopter intended to use the site, and be free of obstacles likely to interfere with the manoeuvring of the helicopter.

7.2.3 It is recommended that a safety area extend a distance of at least 0.25 x D or 3 m around the FATO, whichever is the larger, or a greater distance if considered necessary for a particular HLS.

7.2.4 The safety area around a FATO need not be a solid surface. No fixed objects should be permitted on or in the area defined as the Safety Area, except for objects not exceeding a height of 25 cm. Notwithstanding this, designers of an HLS should attempt to minimise obstacles within the FATO, TLOF and Safety Area.

7.2.5 The FATO should provide ground effect, particularly if the associated TLOF is located outside of its defined area.

7.2.6 It is essential that the FATO be capable of at least dynamic load-bearing for the helicopters being operated in performance class 1 or to category A requirements. If the FATO and TLOF are coincident (e.g. on a roof top) then it follows that the whole area should be dynamic load-bearing and provide ground effect.

7.2.7 The mean slope of a FATO should not exceed 5% for 'Category A' operations, 7% for other operations or a lesser percentage if required by the design helicopter AFM. The slope of an associated solid Safety Area should not exceed 4% up away from the FATO.

TLOF

7.2.8 The TLOF, being a cleared and stable area capable of bearing the dynamic loads which may be imposed by the helicopter on the site by a heavy landing, should, at a minimum, be an area at least 0.83 x D and may or may not be located within the FATO (see Figure 1).

7.2.9 If the TLOF is not within the FATO, it should be co-located with a stand. In this case the TLOF is also protected by the safety area of the stand.

7.2.10 Any operations from mobile platforms, such as trolleys and carts, in the TLOF should comply with these requirements. Notwithstanding this, CASA does not recommend operations to mobile platforms as this is an operator-based aircraft manoeuvring decision, and guidance on these appliances is not given in this CAAP. The use of ground handling appliances should normally be limited to pre-start and post-shutdown actions and comply with AFM requirements.

7.2.11 The TLOF should provide for adequate drainage to prevent accumulation of water on the surface, but the overall slope should not exceed the maximum slope landing capability of the helicopter. The recommended maximum slope for a TLOF is 2% in any direction.

² A FATO may be any shape provided it meets this requirement. Orthogonal shapes may provide better visual cues.



Figure 1 – Secondary HLS: A $1.5 \times D$ FATO with additional $0.25 \times D$ Safety Area (Total area is $2 \times D$). Also showing 'H', FATO perimeter and $0.5 \times D$ Touchdown/Positioning Markings (TD/PM).

Stands

7.2.12 A helicopter Stand should be of sufficient size to contain a circle with a diameter of at least $1.2 \times D$, plus a $0.4 \times D$ protection area for the largest helicopter that the stand is intended to serve (see Figure 2).

7.2.13 One directional or 'taxi-through' stands should be a minimum of $1.5 \times RD$ for ground taxiing and $2 \times RD$ for air taxiing, including the protection area.

7.2.14 When a helicopter stand is to be used for turning in the hover, the minimum dimension of the stand and protection area should be not less than $2 \times D$, and suitably larger for wheeled helicopters turning on the ground taking into account the arc, or path, of the tail rotor.

7.2.15 No fixed objects should be permitted within the stand and protection area. All moveable objects, except those essential to the operation (e.g. portable floodlights), should be removed so as not to present a hazard while the helicopter is operating.

7.2.16 If there is a need for more than one stand, locate each with its own TLOF and with its own safety area.

7.2.17 For multiple adjacent stands and related simultaneous operations, refer to the ICAO *Heliport Manual*.

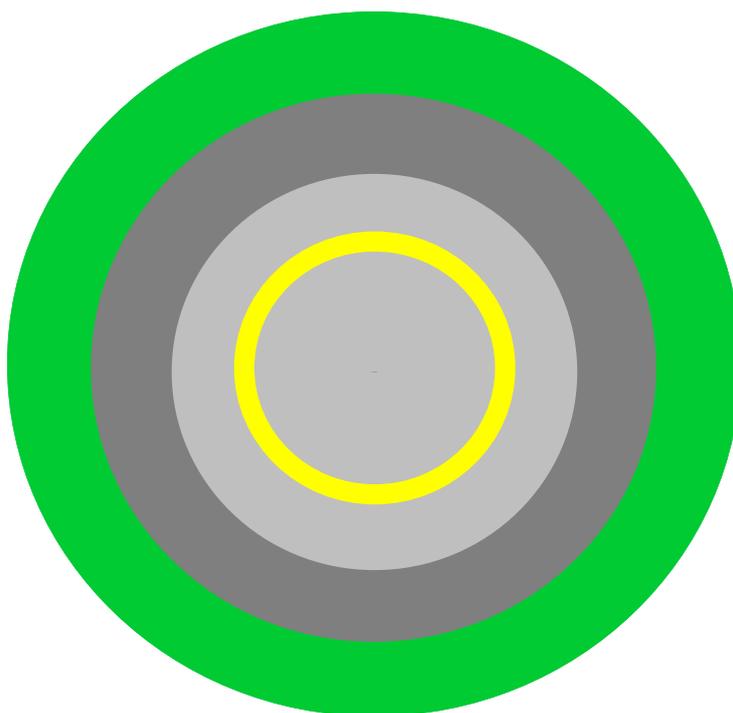


Figure 2 – Helicopter stand: A 1.2 x D stand (dark grey area) with additional 0.4 x D Protection Area (Total area is 2 x D). Also showing a 0.83 x D DLB area (light grey) and TD/PM.

Approach and departure paths

7.2.18 The approach and departure paths should be in accordance with the Annex 14 recommendations as illustrated in Figures 3 to 8³. The decision on which slope is appropriate for the HLS should be based on which is the most suitable for the performance class of the operations at the site.

7.2.19 CASA recommends application of these standards for RPT, Charter and future Air Transport operations, including emergency medical service (EMS) operations at metropolitan hospital sites. Some helicopters may however require even greater approach and departure path protection dependant on their performance capability.

A minimum of two approach and departure paths should be assigned. These should be separated by a minimum angle of 150°, and may be curved left or right to avoid obstacles or to take advantage of a more advantageous flight paths. This does not preclude one-way HLSs, provided adequate provisions are made for turning, limitations are notified to aircraft operators and any operational risks are suitably mitigated. Any curvature should comply with recommendations contained in ICAO Annex 14 Volume II.

7.2.20 The slope design categories in Figure 3 may not be restricted to a specific performance class of operation and may be applicable to more than one performance class of operation. The slope design categories depicted in Figures 3 and 4 represent recommended minimum design slope angles and not operational slopes:

- slope category “A” generally corresponds with helicopters operated in performance class 1
- slope category “B” generally corresponds with helicopters operated in performance class 3

³ These diagrams are reprinted from Annex 14 Volume II, *Heliports*, to the Convention on International Civil Aviation 4th edition, July 2013.

- slope category “C” generally corresponds with helicopters operated in performance class 2

7.2.21 Designers and HLS operators are advised that consultation with helicopter operators will help to determine the appropriate slope category to apply according to the heliport environment and the most critical helicopter type for which the heliport is intended. This is particularly true of the raised incline plane procedure outlined in Figure 8.

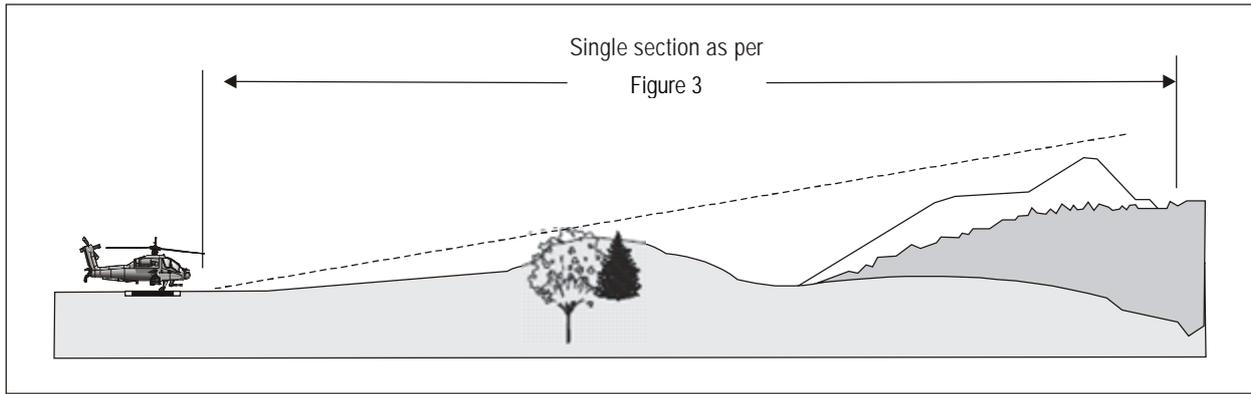
SURFACE and DIMENSIONS	SLOPE DESIGN CATEGORIES		
	A	B	C
APPROACH and TAKE-OFF CLIMB SURFACE:			
Length of inner edge	Width of safety area	Width of safety area	Width of safety area
Location of inner edge	Safety area boundary (Clearway boundary if provided)	Safety area boundary	Safety area boundary
Divergence: (1st and 2nd section)			
Day use only	10%	10%	10%
Night use	15%	15%	15%
First Section:			
Length	3 386 m	245 m	1 220 m
Slope	4.5% (1:22.2)	8% (1:12.5)	12.5% (1:8)
Outer Width	(b)	N/A	(b)
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)	3 386 m	1 075 m	1 220 m
Transitional Surface: (FATOs with a PinS approach procedure with a VSS)			
Slope	50% (1:2)	50% (1:2)	50% (1:2)
Height	45 m	45 m	45 m

Figure 3 – Recommended dimensions and slopes of obstacle limitation surfaces for secondary HLS visual FATOs

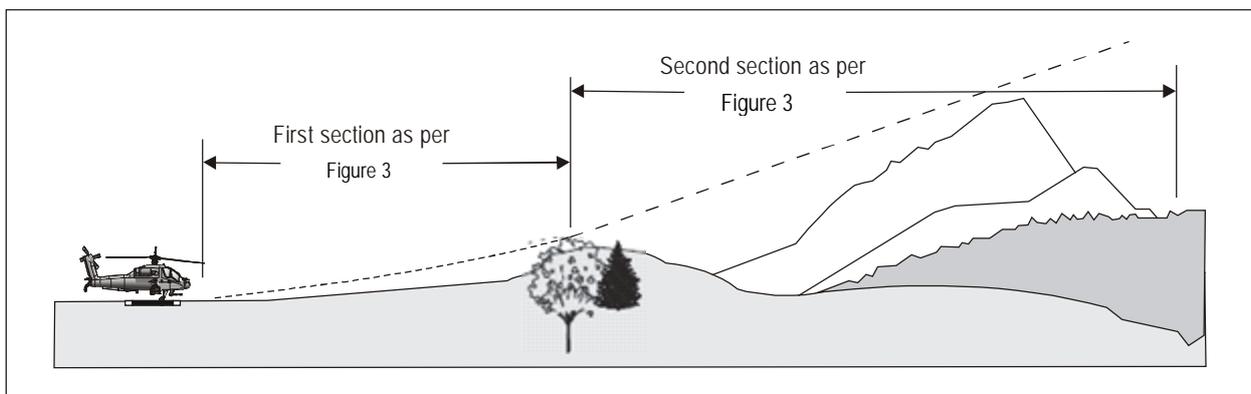
Note:

(a) The approach and take-off climb surface lengths of 3 386 m, 1 075 m and 1 220 m associated with the respective slopes, brings the helicopter to 152 m (500 ft) above FATO elevation.

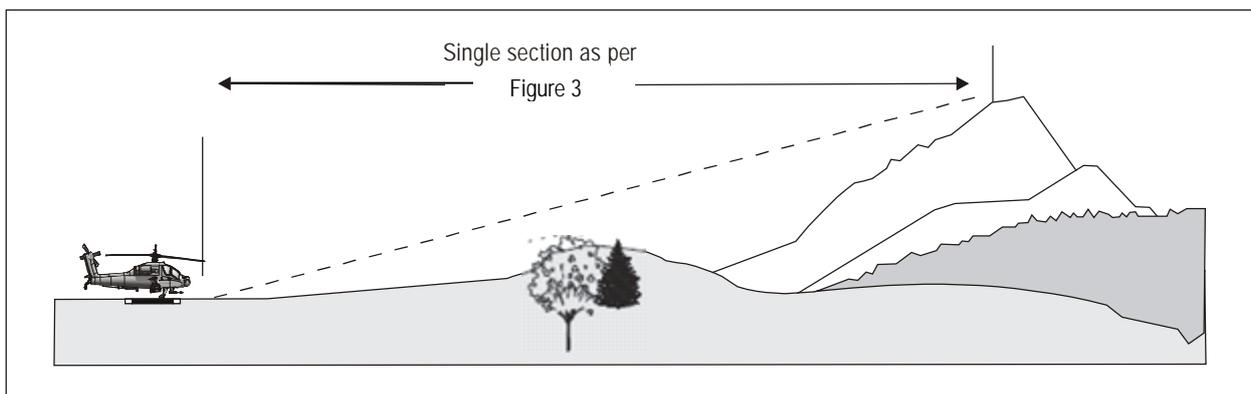
(b) Seven rotor diameters overall width for day operations or 10 rotor diameters overall width for night operations.



a) Approach and take-off climb surfaces - "A" slope profile - 4.5% design



b) Approach and take-off climb surfaces - "B" slope profile - 8% and 16% design



c) Approach and take-off climb surfaces - "C" slope profile - 12.5% design

Figure 4 – Approach and take-off climb surfaces with different slope design categories

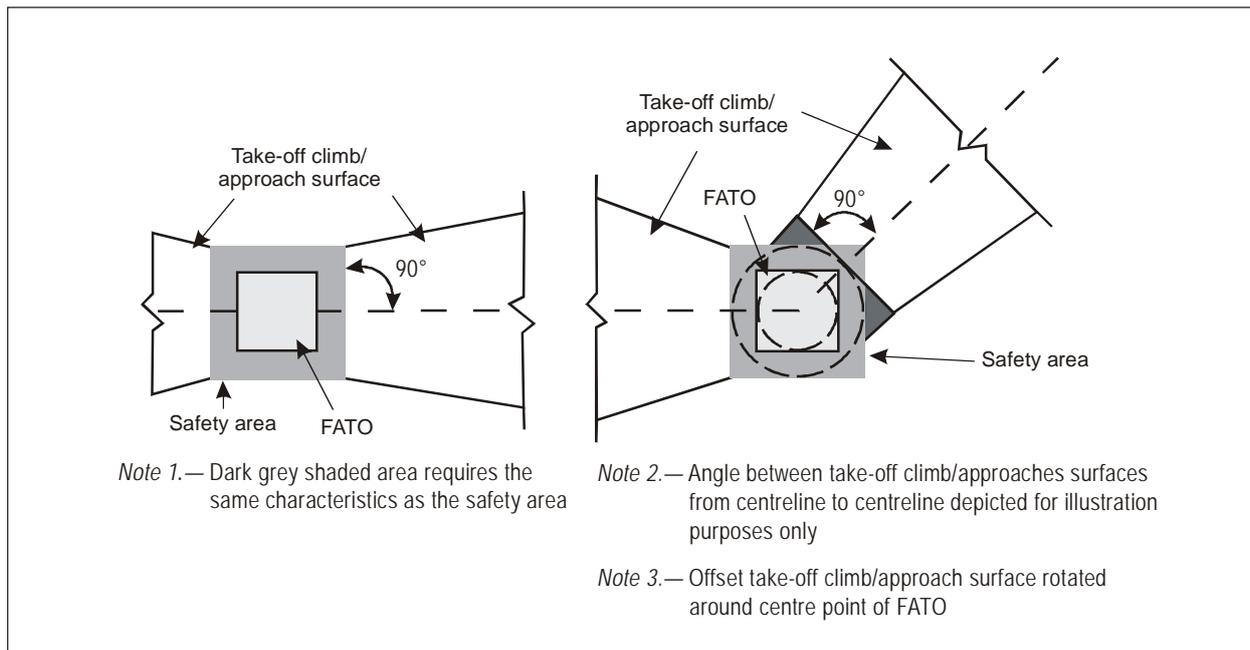


Figure 5 – Obstacle limitation surfaces — Take-off climb and approach surface

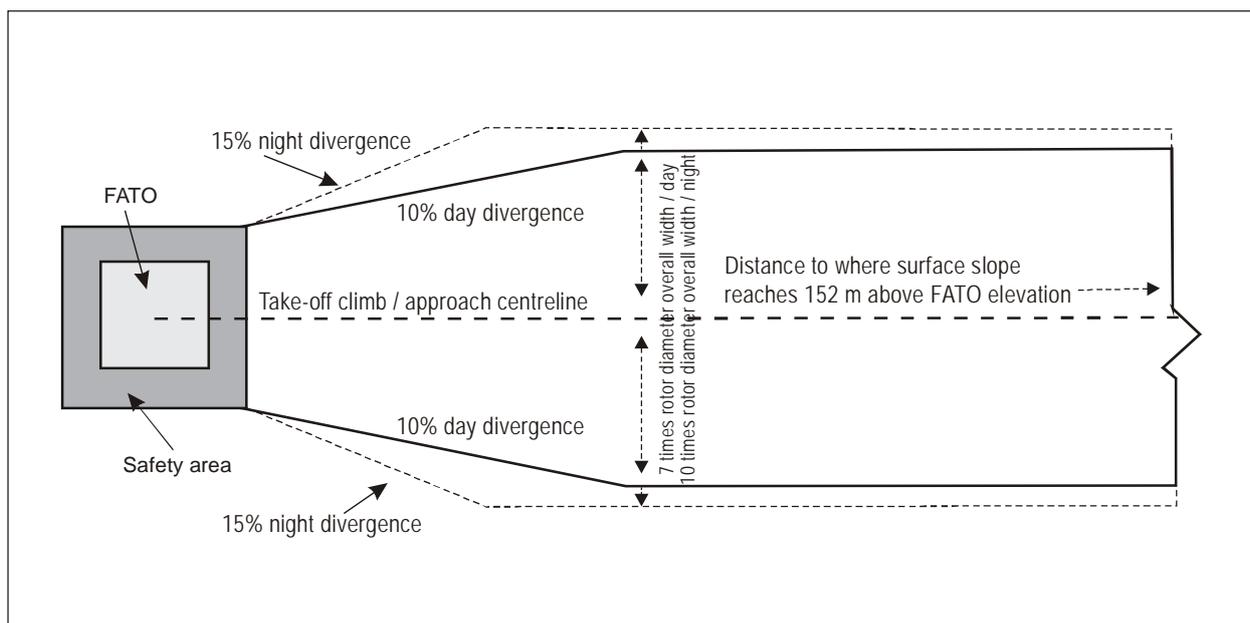


Figure 6 – Take-off climb/Approach surface width

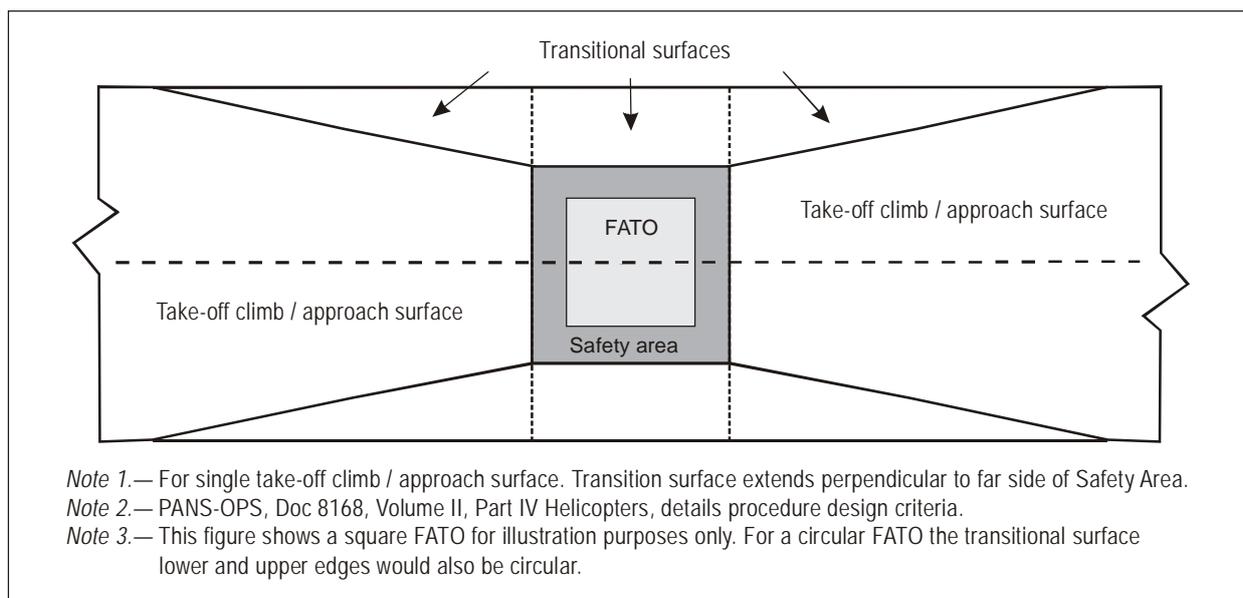


Figure 7 – Transitional surface for a FATO with a Point-in-Space (PinS) approach procedure with a VSS⁴

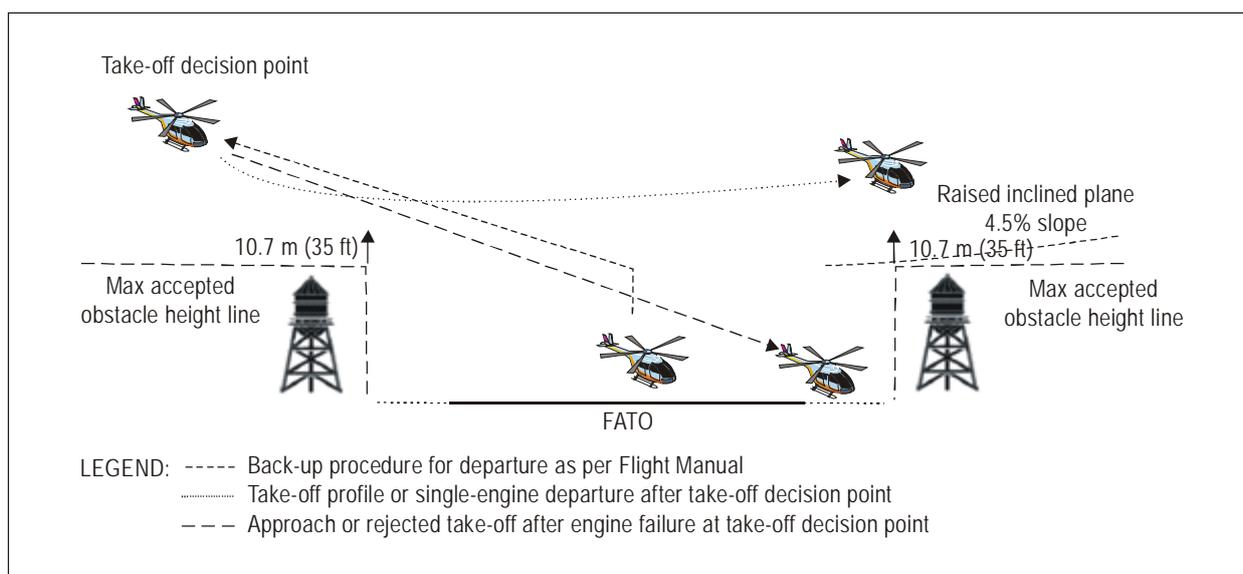


Figure 8 – Example of raised inclined plane during operations in Performance Class 1

Note 1: This example diagram does not represent any specific profile, technique or helicopter type and is intended to show a generic example. An approach profile and a back-up procedure for departure profile are depicted. Specific manufacturers operations in performance class 1 may be represented differently in the specific Helicopter Flight Manual. ICAO Annex 6, Part 3, Attachment A provides back-up procedures that may be useful for operations in performance class 1.

Note 2: The approach/landing profile may not be the reverse of the take-off profile.

⁴ A Transitional OLS is required when a PinS approach is published for the HLS

Note 3: *Additional obstacle assessment might be required in the area that a back-up procedure is intended. Helicopter performance and the Helicopter Flight Manual limitations will determine the extent of the assessment required.*

Other physical and ancillary considerations

7.2.22 An air taxiing route, with a width equal to twice the main RD of the design helicopter, should be provided where the FATO and the TLOF are not coincident.

7.2.23 The HLS should be sited with separate primary and emergency personnel access routes, with both routes located as far apart as practicable.

7.2.24 The HLS should be equipped with suitable fire protection and equipment based on the operations and the types of helicopters in use at the site. At least two fire extinguishers having specifications in accordance with Section 9 of the National Fire Protection Standard NFPA 418-2011 and any additional equipment as may be required to effectively extinguish a fire at the HLS, taking into account the types of operations and aircraft using the facility.

7.2.25 Where more than one fire extinguisher is available:

- at least one extinguisher should be positioned at each of the primary and emergency personnel access routes, preferably without creating potential obstacles to operations
- each separate TLOF or fuelling facility should be equipped with at least one standard fire extinguisher.

7.2.26 Alternative fire-fighting resources providing a similar or better level of protection may be used.⁵

7.3 Markings and indicators for Secondary HLSs

Wind Indicator

7.3.1 A Secondary HLS should be equipped with at least one wind indicator measuring 2.4 m in length and visible to the pilot during take-off, approach and landing. More than one indicator may be needed at more complex locations to ensure pilots receive full information on the wind flow over the site.

7.3.2 The wind indicator for night operations should be capable of being lit, or should meet the requirements of Section 7.7 of this CAAP.

Note: *CASA recommends the surface-level wind indicator standards outlined in Section 5.1.1 of Annex 14 Volume II as an alternative for both surface-level and elevated HLSs.*

HLS identification marking

7.3.3 An identification marking should be painted on the HLS FATO in the form of a large letter 'H', with dimensions equal to 4 x 3 x 0.75 m (height x width x stripe) and proportionately smaller for smaller facilities. The long side of the marking should be oriented to the preferred final approach paths to the HLS.

⁵ Systems in accordance with NFPA 418-2011 would meet this recommendation. Automatic foam monitors are not recommended.

FATO edge markings

7.3.4 The edge of the FATO should be marked with a 30-50 cm wide broken white stripe (or a suitable number of markers), painted to clearly delimit the FATO.

7.3.5 If the FATO is separate from the TLOF, it should be marked so it is easily identifiable to the pilot when conducting operations. The use of aiming point markings may assist in this situation (see below).

7.3.6 A runway-type FATO should be marked in accordance with the standards in Chapter 5 of Volume II of Annex 14.

Aiming point marking

7.3.7 An aiming point marking should be provided at the HLS where it is necessary to make an approach to a particular point prior to moving to the TLOF. CASA recommends that any aiming point marking should be in line with the standards outlined in Chapter 5 of Volume II of Annex 14; this may include an internal suitably-sized 'H' marking if required.

Approach and departure path(s) marking

7.3.8 Preferred approach and departure paths should be marked with suitably-sized single or double-headed yellow arrows at the perimeter of the TLOF, so as to be viewed easily by the pilot of a helicopter when over-flying or on approach to the site.

Touchdown/Positioning Marking (TD/PM)

7.3.9 A TD/PM is essential where it is necessary for a helicopter to touchdown or be accurately placed in a specific position.

7.3.10 A TD/PM provides the visual cues that permit a helicopter to be placed in a specific position and, when necessary, orientated such that, when the pilot's seat is above the marking, the undercarriage will be inside the load-bearing area and all parts of the helicopter will be clear of any obstacles by a safe margin.

7.3.11 A TD/PM should be a yellow circle and have a line width of at least 0.5 m. The inner diameter of the circle should be 0.5 x D of the largest helicopter that the HLS TLOF is intended to serve.

Note: *Further information on touchdown and positioning markings can be found in Chapter 5 of Volume II of Annex 14 and the ICAO Heliport Manual.*

Maximum operational helicopter tonnage marking

7.3.12 A maximum *operational* helicopter tonnage marking should be painted on the TLOF (if there is such a limit on the HLS) with the weight, expressed in kilograms to one decimal place, calculated by multiplying the indicator number by 1000.

7.3.13 The tonnage marking figures should be orientated so as to be readable by pilots on the preferred final approach paths to the HLS. This may involve a compromise in orientation.

7.3.14 A facility name marking may also be added, oriented as with the tonnage marking.

Note: *Further guidance on the formatting and style of HLS markings is available in CAAP 92-4.*

7.4 Night operations at Secondary HLS

7.4.1 For night operations at an RPT, Charter (or future Air Transport) capable HLS, including purpose-built EMS sites, designers should refer to Annex 14 and the ICAO *Helicopter Manual*. For other night operations, the following lighting guidelines are suggested; however, designers may apply the ICAO standard if desired.

FATO

7.4.2 The edge of the FATO should be lit by either omni-directional green lights or by a combination of markings and shielded perimeter lighting/floodlighting. The lights should be preferably flush with the level of the HLS but otherwise project no more than 25 cm above the level of the HLS. Where lights protrude above the surface of the FATO this should be noted in the HLS's operating information available to pilots. A minimum of eight equally-spaced lights should be used for square, octagonal and circular shaped FATOs, with proportionately more for larger rectangular shaped FATOs.

TD/PM

7.4.3 The TD/PM should be lit by either flush-mounted, yellow panel lights or floodlights.

Wind velocity information

7.4.4 Wind velocity information may be provided by one of the following:

- an illuminated wind direction indicator as mentioned in Section 7.3 above
- any other suitable means, such as an approved automated weather information station, or
- radio communication with an authorised weather observer located at, or in proximity to, the HLS.

Approach guidance

7.4.5 The standard approach direction(s) should be lit by point or panel lights, preferably flush to the HLS surface, depicted by yellow arrows similar in look to the painted markings. When it is considered essential that an accurate approach path be achieved due to the presence of obstacles, additional approach guidance lighting should be provided in accordance with Annex 14. Obstacle lighting should be provided where necessary, or operational limitations applied.

Air taxiing route

7.4.6 An air taxiing route should have a minimum width equal to 3 x the main RD of the helicopter and, depending on operational demands, be marked by either blue edge or green centreline lights spaced at 15 m intervals, or be suitably floodlit.

Visibility

7.4.7 All lights, except air-taxiing route lights, should be visible from a distance of at least 3 km at the prevailing Lowest Safe Altitude (LSALT) in clear conditions.

Note 1: *Neither TLOF lighting or marking is necessary to conform to the guidelines in this CAAP.*

Note 2: *Compatibility with Night Vision Devices is not necessary for lighting to conform to the guidelines in this CAAP. Operators and HLS owners who wish to allow night vision imaging system operations into a HLS should liaise with each other to ensure compatible procedures and lighting standards are considered.*

7.5 Elevated HLS

7.5.1 Elevated HLS should be designed and built in accordance with the guidance in Sections 3.2 of Annex 14 Volume II and the ICAO *Helicopter Manual*. However, CASA does not recommend the construction of new elevated HLS with FATO areas less than 1 x D of the design helicopter.

Note: *Readers looking for guidance on the design and operation of off-shore resource platform, off-shore resource ship and marine HLS should read CAAP 92-4.*

Executive Manager
Standards Division

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