

## Chapter 4

### ROTARY-WING RUNWAYS, HELIPADS, LANDING LANES, AND HOVERPOINTS

**4.1. Contents.** This chapter presents design standards and requirements for rotary-wing (helicopter) landing facilities: runways, helipads, helicopter landing lanes, and hoverpoints.

**4.2. Landing and Take-off Layout Requirements.** The landing design requirements for rotary-wing landing facilities, which include rotary-wing runways, helipads, landing lanes, slide areas (autorotation lanes), and hoverpoints, are similar to the requirements for fixed-wing runways, as discussed in Chapter 3.

**4.3. Rotary-Wing Runway.** The rotary-wing runway allows for a helicopter to quickly land and roll to a stop, compared to the hovering stop used during a vertical helipad approach.

4.3.1. Orientation and Designation. Consider the strength, direction, and frequency of the local winds when orienting a runway to minimize cross winds. Follow the methods for fixed-wing runways presented in Chapter 3. Runways are identified by the whole number, nearest one-tenth (1/10), of the magnetic azimuth of the runway centerline when viewed from the direction of approach.

4.3.2. Dimensions. Table 4.1 presents dimensional criteria for the layout and design of rotary-wing runways.

4.3.3. Layout. Layout for rotary-wing runways, including clear zones, are illustrated in Figure 4.1 for VFR runways and Figures 4.2 and 4.3 for IFR runways.

**Table 4.1. Rotary-Wing Runways.**

Item No.	Item Description	Requirement	Remarks
1	Basic Length	490 m [1,600 ft]	<p>For Army and Air Force facilities, use basic length up to 1,220 meters [4,000 feet] in elevation above Mean Sea Level (MSL). Increase basic length to 610 meters [2,000 feet] when above 1,220 meters [4,000 feet] in elevation above MSL.</p> <p>For Navy and Marine Corps facilities, basic length to be corrected for elevation and temperature. Increase 10% for each 300 m [1,000 ft] in elevation above 600 m [2,000 ft] MSL and add 4.0% for each 5°C [10°F], above 15°C [59°F] for the average daily maximum temperature for the hottest month.</p> <p>For a special mission or proficiency training such as autorotation operations, the length may be increased up to 300 meters [1,000 feet]; in which case, make no additive corrections.</p>
		137.2 m (450 ft)	For facilities constructed prior to publication of this manual.
2	Width	23 m [75 ft]	Increase width to 30 meters [100 feet] on runways which regularly accommodate H-53.

3	Longitudinal Grade	Max. 1.0%	Maximum longitudinal grade change is 0.167% per 30 linear meters [100 linear feet] of runway. Exceptions: 0.4% per 30 linear meters (100 linear feet) for edge of runways at runway intersections.
4	Transverse Grade	Min. 1.0% Max. 1.5%	From centerline of runway. Runway may be crowned or uncrowned.
5	Paved Shoulders		See Table 4.4.
6	Runway Lateral Clearance Zone (corresponds to half the width of primary surface area)	45.72 m [150 ft]	VFR operations.
		114.30 m [375 ft]	IFR operations.
		See Remarks	<p>Measured perpendicularly from centerline of runway. This area is to be clear of fixed and mobile obstacles. In addition to the lateral clearance criterion, the vertical height restriction on structures and parked aircraft as a result of the transitional slope must be taken into account.</p> <p>(1) Fixed obstacles include manmade or natural features constituting possible hazards to moving aircraft. Navigational aids and meteorological equipment are possible exceptions. For Army and Air Force, siting exceptions for navigational aids and meteorological facilities are found in Attachment 14 of this manual. For Navy and Marine Corps, siting exceptions for navigational aids and meteorological facilities are found in NAVFAC P-80.3.</p> <p>(2) Mobile obstacles include parked aircraft, parked and moving vehicles, railroad cars and similar equipment.</p> <p>(3) Taxiing aircraft are exempt from this restriction. However, parallel taxiways (exclusive of shoulder width) must be located in excess of the lateral clearance distance.</p>
7	Grades Within the Primary Surface Area in Any Direction	Max. 5.0%	Exclusive of pavement and shoulders. For Air Force installations, a minimum of 2.0 percent before channelization.
8	Overrun		See Table 4.5.

9	Distance from the Centerline	Min. 213.36 m [700 ft]	Simultaneous VFR operations for Class A Runway and Army Class B Runway.
	of a Fixed-Wing Runway	Min. 304.80 m [1,000 ft]	Simultaneous VFR operations for Class B Runway for Air Force, Navy and Marine Corps.
	to the Centerline of a Parallel Rotary-Wing Runway, Helipad, or Landing Lane	Min. 213.36 m [700 ft]	Non-simultaneous operations. Distance may be reduced to 60.96 m [200 ft]; however, waiver must be based on wake-turbulence and jet blast. In locating the helipad, consideration must be given to hold position marking. Rotary-wing aircraft must be located on the apron side of the hold position markings (away from the runway) during runway operations.
		Min. 762.00 m [2,500 ft]	Instrument Flight Rules (IFR) using simultaneous operations (Depart-Depart) (Depart-Approach).
		Min. 1,310.64 m [4,300 ft]	Instrument flight rules (IFR) using simultaneous approaches.
10	Distance Between Centerlines of: (a) Parallel Rotary-Wing Runways, Helipads, or Any Combination Thereof. (b) Landing Lane and	Min. 213.36 m [700 ft]	Visual flight rules (VFR) without intervening parallel taxiway between centerlines.
	Parallel Rotary-Wing	Min. 762.00 m [2,500 ft]	Instrument Flight Rules (IFR) using simultaneous operations (Depart-Depart) (Depart-Approach).
	Runway or Helipad.	Min. 1,310.64 m [4,300 ft]	Instrument flight rules (IFR) using simultaneous approaches.

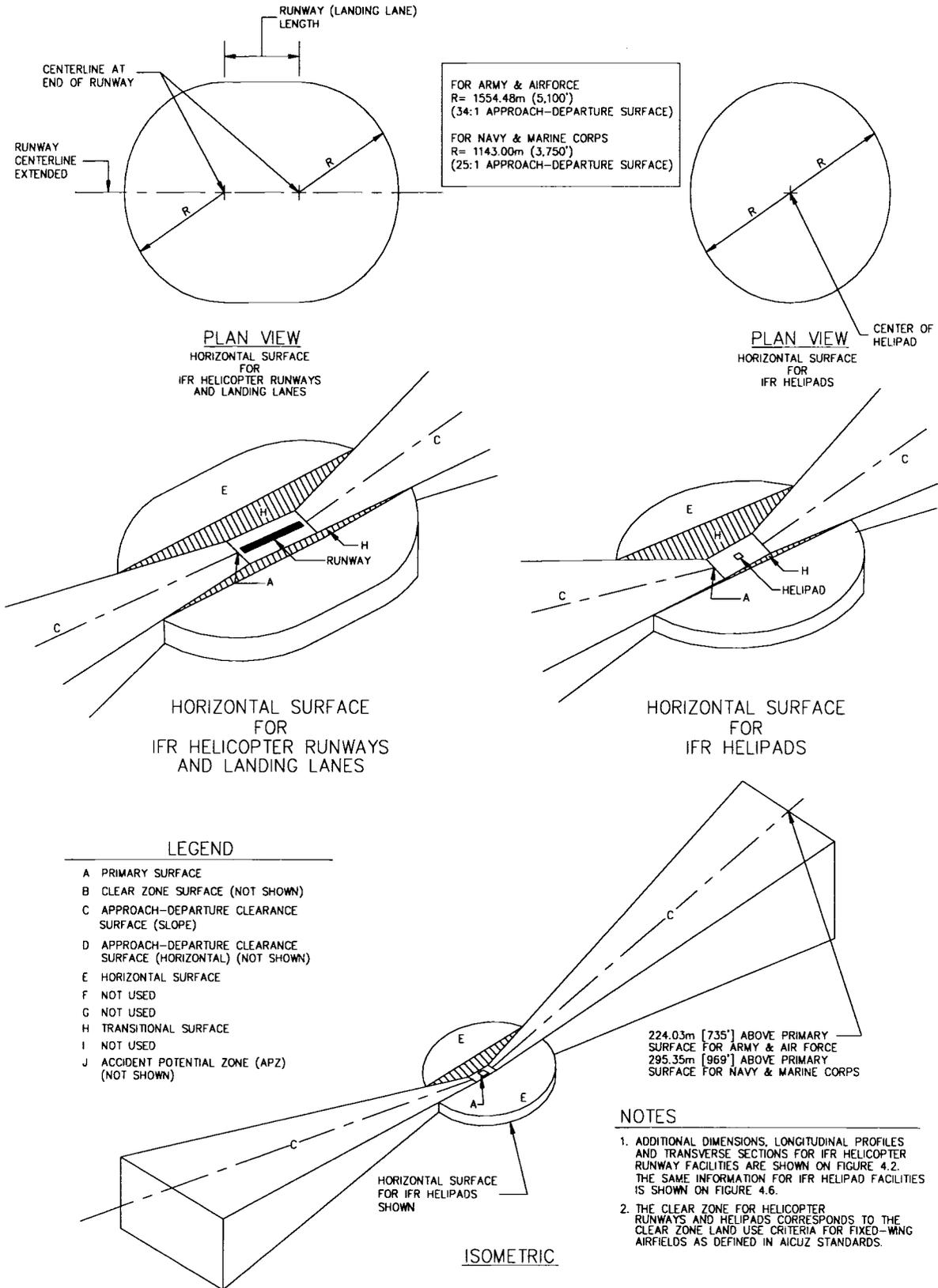
**NOTES:**

1. Metric units apply to new airfield construction and where practical modification to existing airfields and heliports, as discussed in paragraph 1.4.4.
2. The criteria in this manual are based on aircraft specific requirements and are not direct conversions from inch-pound (English) dimensions. Inch-pound units are included only as a reference to the previous standard.
3. Airfield and heliport imaginary surfaces and safe wingtip clearance dimensions are shown as a direct conversion from inch-pound to SI units.





**Figure 4.3. IFR Airspace Imaginary Surfaces — IFR Helicopter Runway and Helipad.**



**4.4. Helipads.** Helipads allow for a helicopter hovering, landing, and take-off. Except at facilities where helicopter runways are provided, helipads are the landing and take-off locations for helicopters. The Army and Air Force provide for three types of helipads: Standard Visual Flight Rules (VFR) Helipad; Limited Use Helipad; and Instrument Flight Rules (IFR) Helipad. The Navy and Marine Corps only provide one type of helipad: Standard Size Helipad. The type of helipad depends on the following operational requirements:

4.4.1. Standard VFR Helipad. VFR design standards are used when no requirement exists or will exist in the future for an IFR helipad. Criteria for this type of helipad permit the accommodation of most helipad lighting systems.

4.4.2. Limited Use Helipad. This is a VFR facility used at sites where only occasional operations are conducted. These sites may be, but are not limited to, hospitals, headquarter areas, missile sites, and established airfields or heliports where the Limited-Use Helipad may be used to preclude mixing helicopters and fixed-wing traffic. Limited Use Helipads may also be used to separate light helicopter traffic (5,670 kg [12,500 lbs] or less) from medium and heavy helicopter traffic.

4.4.3. IFR Helipad. IFR design standards are used when an instrument approach capability is essential to the mission and no other instrument landing facilities, either fixed-wing or rotary-wing, are located within an acceptable commuting distance to the site.

4.4.4. Helipad Location. A helipad location should be selected with regard to mission requirements, overall facility development, approach-departure surfaces, and local wind conditions.

4.4.4.1. Near Runways. When a helipad is to be located near fixed- and rotary-wing runways, its location should be based on type of operations, in accordance with criteria in Table 4.1.

4.4.4.2. Above Ground Helipads. Construction of helipads on buildings or on any type of elevated structure above ground is not authorized for Air Force and Army. For these agencies, helipads will be constructed as a slab on grade. For Navy and Marine Corps facilities, contact the agency aviation office with safety waiver approval if deviation is required.

4.4.4.3. Parking Pads. At individual helipad sites where it is necessary to have one or more helicopters on standby, an area adjacent to the helipad, but clear of the landing approach and transitional surfaces, should be designated for standby parking. This area will be designed as a parking apron in conformance with the criteria presented in Chapter 6.

4.4.5. Dimensional Criteria. Table 4.2 presents dimensional criteria for the layout and design of helipads.

**Table 4.2. Rotary-Wing Helipads and Hoverpoints.**

Item No.	Item Description	Requirement	Remarks
1	Size	15 m x 15 m [50 ft x 50 ft] min.	Air Force and Army VFR limited use helipads.
		30 m x 30 m [100 ft x 100 ft] min.	Standard VFR and IFR helipad.
		9 m (30 ft) diameter	Hoverpoints.

2	Grade	Min. 1.0% Max. 1.5%	Grade helipad in one direction. Hoverpoints should be domed to a 150 mm (6 inch) height at the center.
3	Paved Shoulders		See Table 4.4.
4	Size of Primary Surface (center primary surface on helipad)	45.72 m x 45.72 [150 ft x 150 ft] min.	Hoverpoints.  Air Force and Army limited use VFR helipad.  Navy and Marine Corps Standard VFR helipad.
		91.44 m x 91.44 m [300 ft x 300 ft]	Air Force and Army standard VFR helipad.
		472.44 m x 228.60 m [1,550 ft x 750 ft]	Standard IFR. Long dimension in direction of helicopter approach.
		228.60 m x 228.60 m [750 ft x 750 ft]	Army and Air Force IFR same direction ingress/egress.
5	Grades Within the Primary Surface Area in Any Direction	Min. of 2.0% prior to channelization.* Max. 5.0%	Exclusive of pavement and shoulders. For IFR helipads, the grading requirements apply to a 91.44 m x 91.44 m (300 ft x 300 ft) area centered on the helipad.  The balance of the area is to be clear of obstructions and rough graded to the extent necessary to reduce damage to aircraft in event of an emergency landing. For VFR helipads, the grade requirements apply to the entire primary surface.
6	Length of Clear Zone**	121.92 m [400 ft]	Hoverpoints, VFR, and standard IFR helipads. Begins at the end of the primary surface.
		251.46 m [825 ft]	Army and Air Force IFR same direction ingress/egress.
7	Width of Clear Zone**		Corresponds to the width of the primary surface. Center Clear Zone width on extended center of the pad.
		45.72 m [150 ft]	Air Force and Army VFR limited use helipads and hoverpoints. Navy and Marine Corps Standard VFR.
		91.44 m [300 ft]	Air Force and Army standard VFR helipad and VFR helipad same direction ingress/egress.
		228.60 m [750 ft]	Standard IFR helipad.
8	Grades of Clear Zone** any direction	5.0% max	Area to be free of obstructions. Rough grade and turf when required.

9	APZ I Length***	243.84 m [800 ft]	Hoverpoints, VFR, and standard IFR.
		121.92 m [400 ft]	Army and Air Force IFR same direction ingress/egress.
10	APZ I Width***	45.72 m [150 ft]	Army and Air Force VFR limited use and hoverpoints. Navy and Marine Corps standard VFR.
		91.44 m [300 ft]	Army and Air Force standard VFR.
		228.60 m [750 ft]	Standard IFR.
11	Distance Between Centerline of Helipad and Fixed or Rotary Wing Runways		See Table 4.1.

\* Bed of channel may be flat.

\*\* The clear zone area for helipads corresponds to the clear zone land use criteria for fixed-wing airfields as defined in DoD AICUZ standards. The remainder of the approach-departure zone corresponds to APZ I land use criteria similarly defined. APZ II criteria is not applicable for rotary-wing aircraft.

\*\*\* There are no grading requirements for APZ I.

**NOTES:**

1. Metric units apply to new airfield construction and where practical modification to existing airfields and heliports, as discussed in paragraph 1.4.4.
2. The criteria in this manual are based on aircraft specific requirements and are not direct conversions from inch-pound (English) dimensions. Inch-pound units are included only as a reference to the previous standard.
3. Airfield and heliport imaginary surfaces and safe wingtip clearance dimensions are shown as a direct conversion from inch-pound to SI units.

4.4.6. Layout Criteria. Layouts for standard, limited use, and IFR helipads, including clear zones, are illustrated in Figures 4.4 through 4.6.

**4.5. Same Direction Ingress/Egress.** Helipads with same direction ingress/egress allow a helicopter pad to be located in a confined area where approach-departures are made from only one direction. The approach may be either VFR or IFR.

4.5.1. Dimensions Criteria. Table 4.2 presents dimensional criteria for the VFR and IFR one direction ingress/egress helipads.

4.5.2. Layout Criteria. Layout for VFR and IFR same direction ingress/egress are illustrated in Figures 4.7 and 4.8.

**4.6. Hoverpoints:**

4.6.1. General.. A hoverpoint is a prepared and marked surface used as a reference or control point for air traffic control purposes by arriving or departing helicopters.

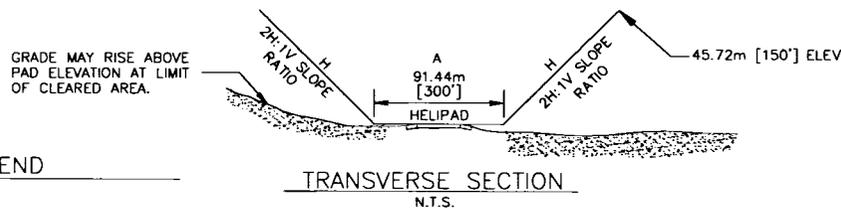
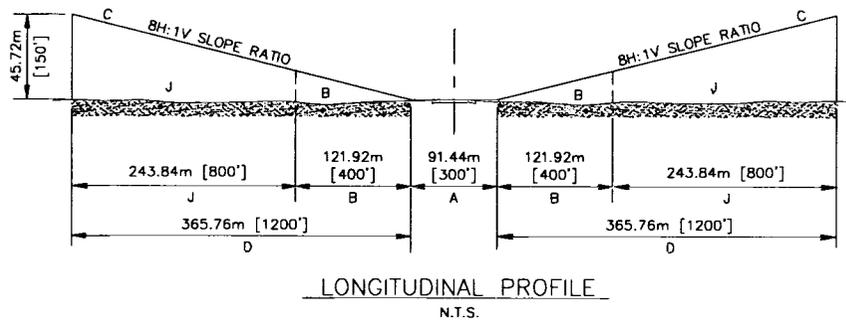
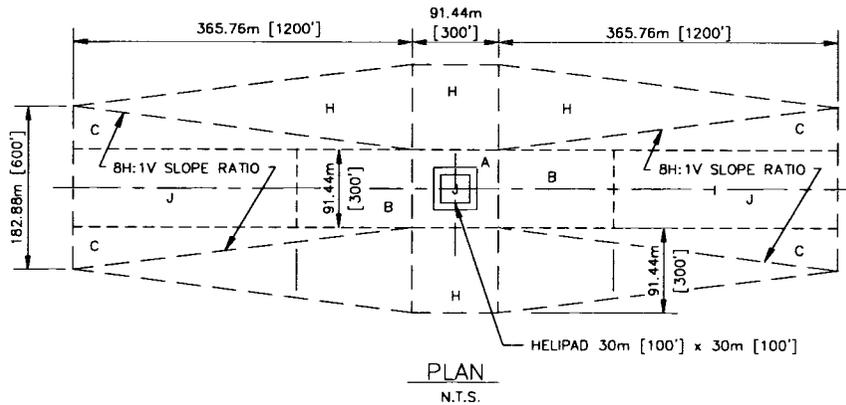
4.6.2. Hoverpoint Location. A hoverpoint is located in a non-traffic area.

4.6.3. Dimensions. Table 4.2 presents dimensional criteria for the layout and design of hoverpoints.

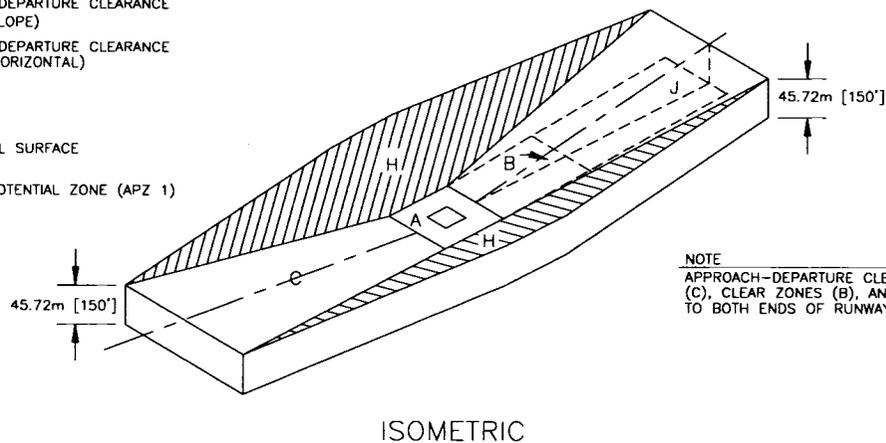
4.6.4. Layout. Hoverpoint design standards are illustrated in Figure 4.9.

4.7 Rotary-Wing Landing Lanes. Except when used as an autorotation lane, these lanes permit efficient simultaneous use by a number of helicopters in a designated traffic pattern.

Figure 4.4. Standard VFR Helipad for Army and Air Force.

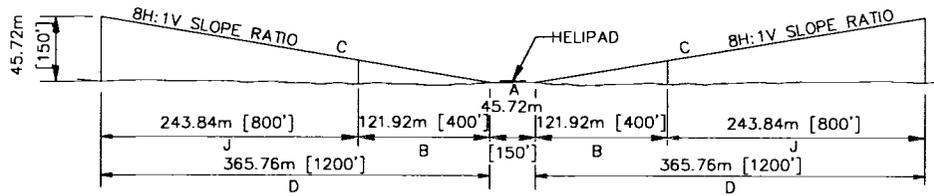
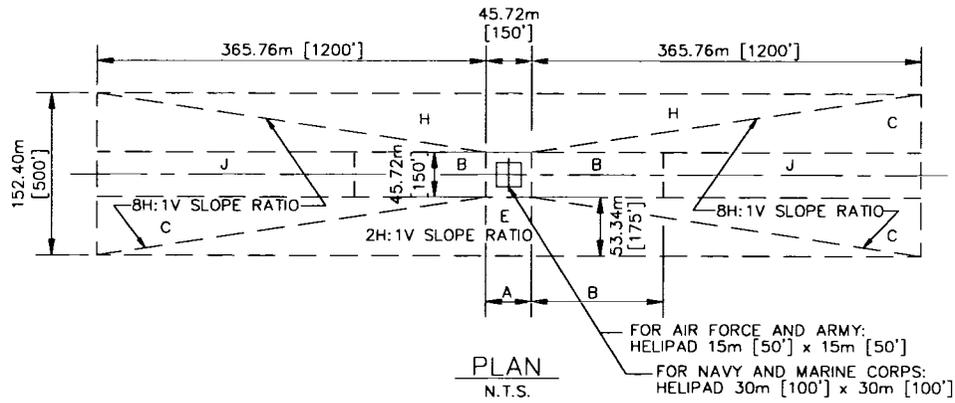


- LEGEND
- A PRIMARY SURFACE
  - B CLEAR ZONE SURFACE
  - C APPROACH-DEPARTURE CLEARANCE SURFACE (SLOPE)
  - D APPROACH-DEPARTURE CLEARANCE SURFACE (HORIZONTAL)
  - E NOT USED
  - F NOT USED
  - G NOT USED
  - H TRANSITIONAL SURFACE
  - I NOT USED
  - J ACCIDENT POTENTIAL ZONE (APZ 1)



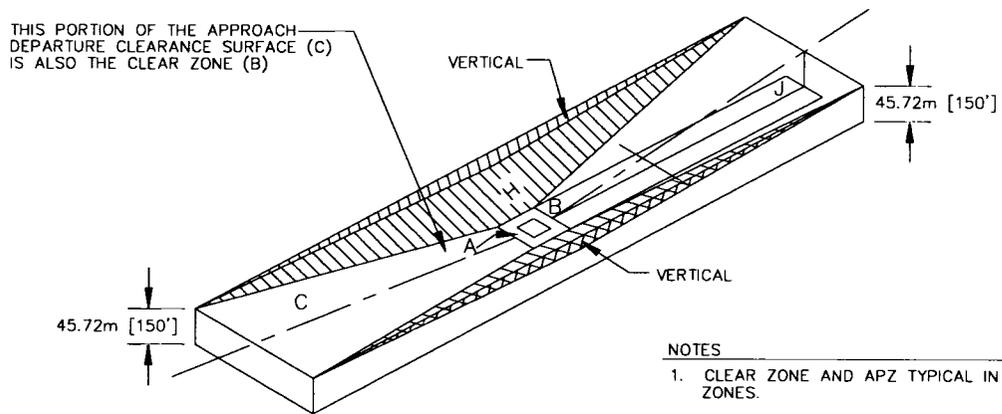
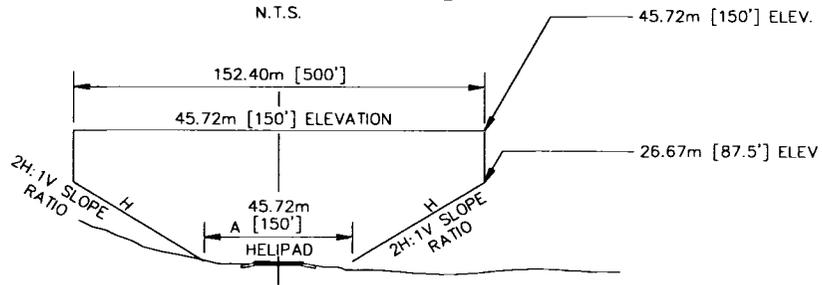
NOTE  
APPROACH-DEPARTURE CLEARANCE SURFACE (C), CLEAR ZONES (B), AND APZ'S (J) APPLICABLE TO BOTH ENDS OF RUNWAY.

**Figure 4.5. Standard VFR Helipad for Navy and Marine Corps and Limited Use VFR Helipad for Army and Air Force.**



**LEGEND**

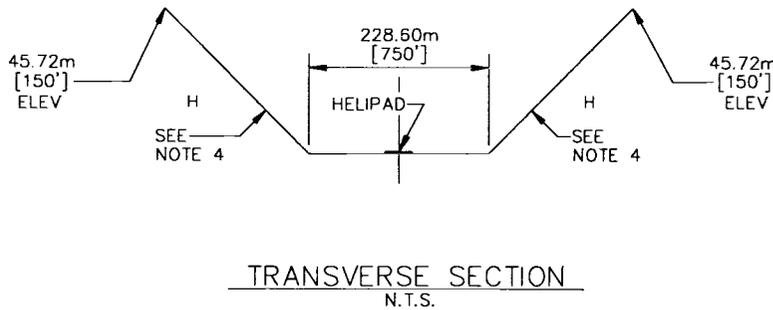
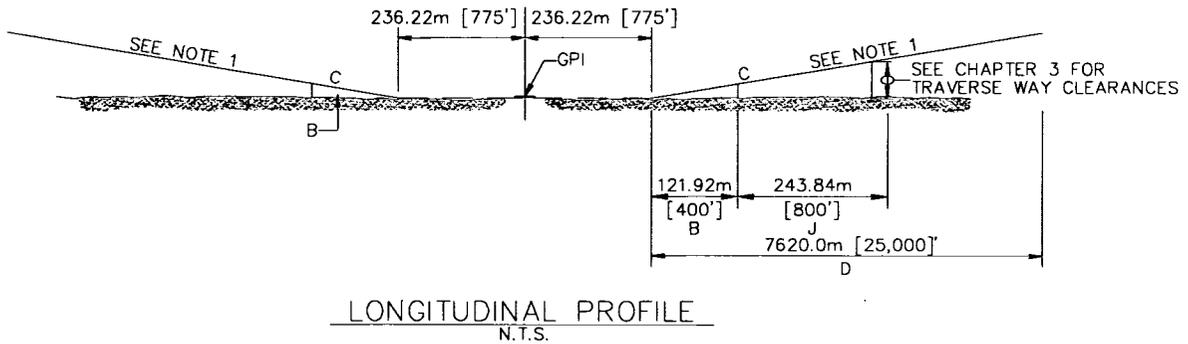
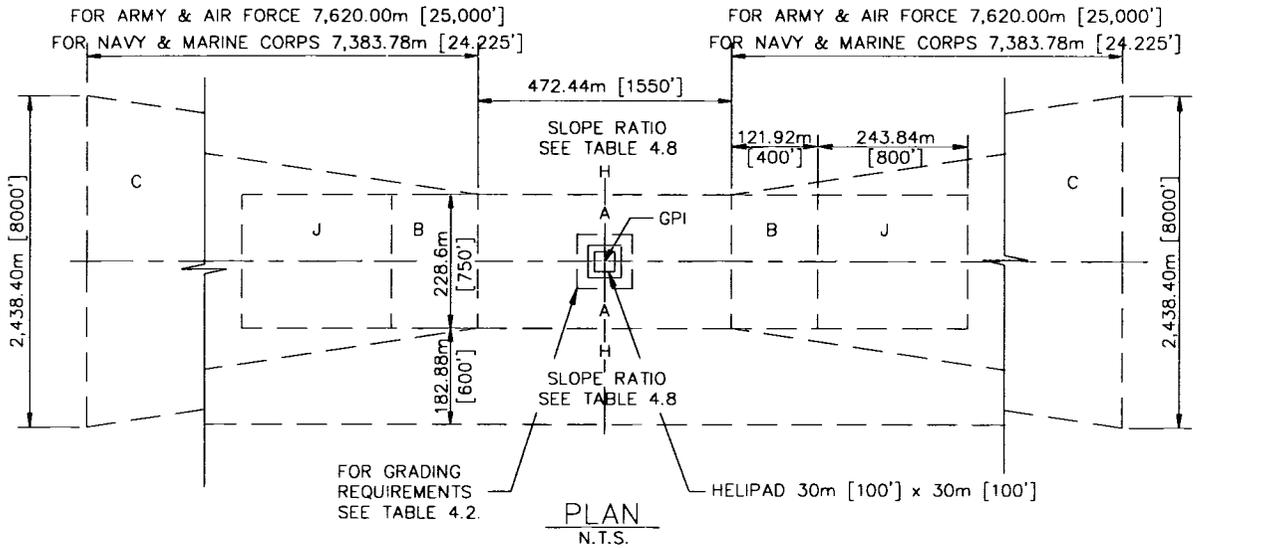
- A PRIMARY SURFACE
- B CLEAR ZONE SURFACE
- C APPROACH-DEPARTURE CLEARANCE SURFACE (SLOPE)
- D APPROACH-DEPARTURE CLEARANCE SURFACE (HORIZONTAL)
- E NOT USED
- F NOT USED
- G NOT USED
- H TRANSITIONAL SURFACE
- I NOT USED
- J ACCIDENT POTENTIAL ZONE (APZ 1)



**NOTES**

1. CLEAR ZONE AND APZ TYPICAL IN BOTH APPROACH ZONES.
2. APPROACH-DEPARTURE CLEARANCE SURFACE (C), CLEAR ZONES (B), AND APZ'S (J) APPLICABLE TO BOTH ENDS OF THE HELIPAD.

**Figure 4.6. Standard IFR Helipad.**



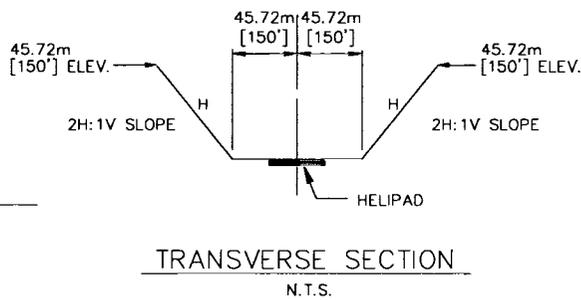
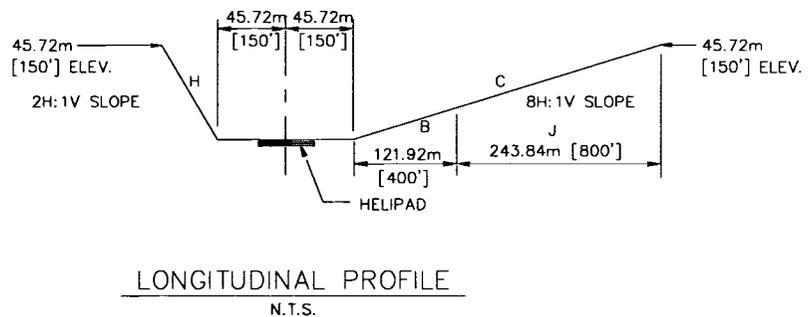
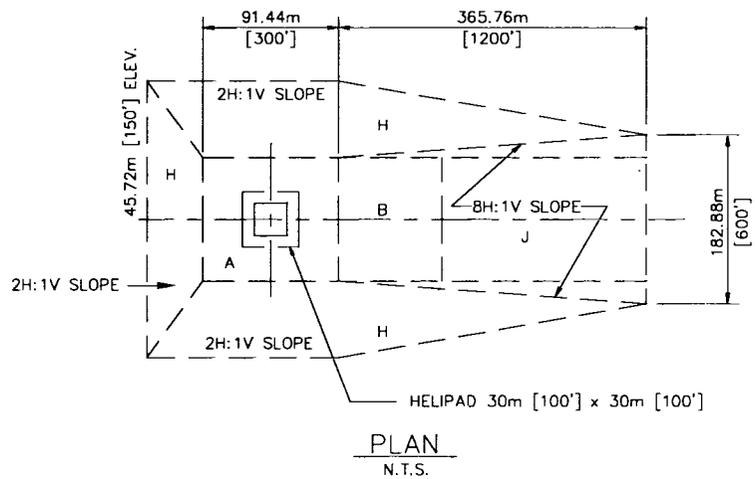
**LEGEND**

- A PRIMARY SURFACE
- B CLEAR ZONE SURFACE
- C APPROACH-DEPARTURE CLEARANCE SURFACE (SLOPE) SEE NOTE 1
- D APPROACH-DEPARTURE CLEARANCE SURFACE (HORIZONTAL)
- E INNER HORIZONTAL SURFACE (NOT SHOWN)
- F NOT USED
- G NOT USED
- H TRANSITIONAL SURFACE
- I NOT USED
- J ACCIDENT POTENTIAL ZONE (APZ 1)

**NOTES**

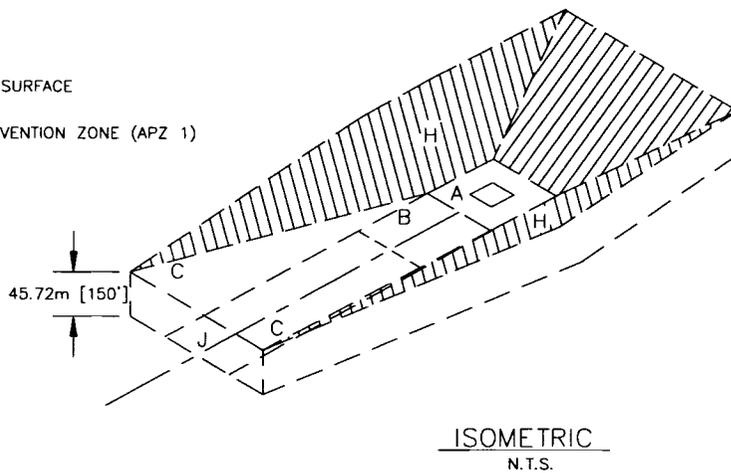
1. APPROACH-DEPARTURE CLEARANCE SURFACE SLOPE RATIO IS 34H:1V FOR ARMY AND AIR FORCE AND 25H:1V FOR NAVY AND MARINE CORPS.
2. CLEAR ZONE & APZ TYPICAL AT BOTH ENDS OF RUNWAY.
3. FOR ISOMETRIC, SEE FIGURE 4.3.
4. TRANSITIONAL SURFACE SLOPE RATIO IS 7H:1V FOR ARMY AND 4H:1V FOR ALL OTHERS.

**Figure 4.7. Army and Air Force VFR Helipad with Same Direction Ingress/Egress.**

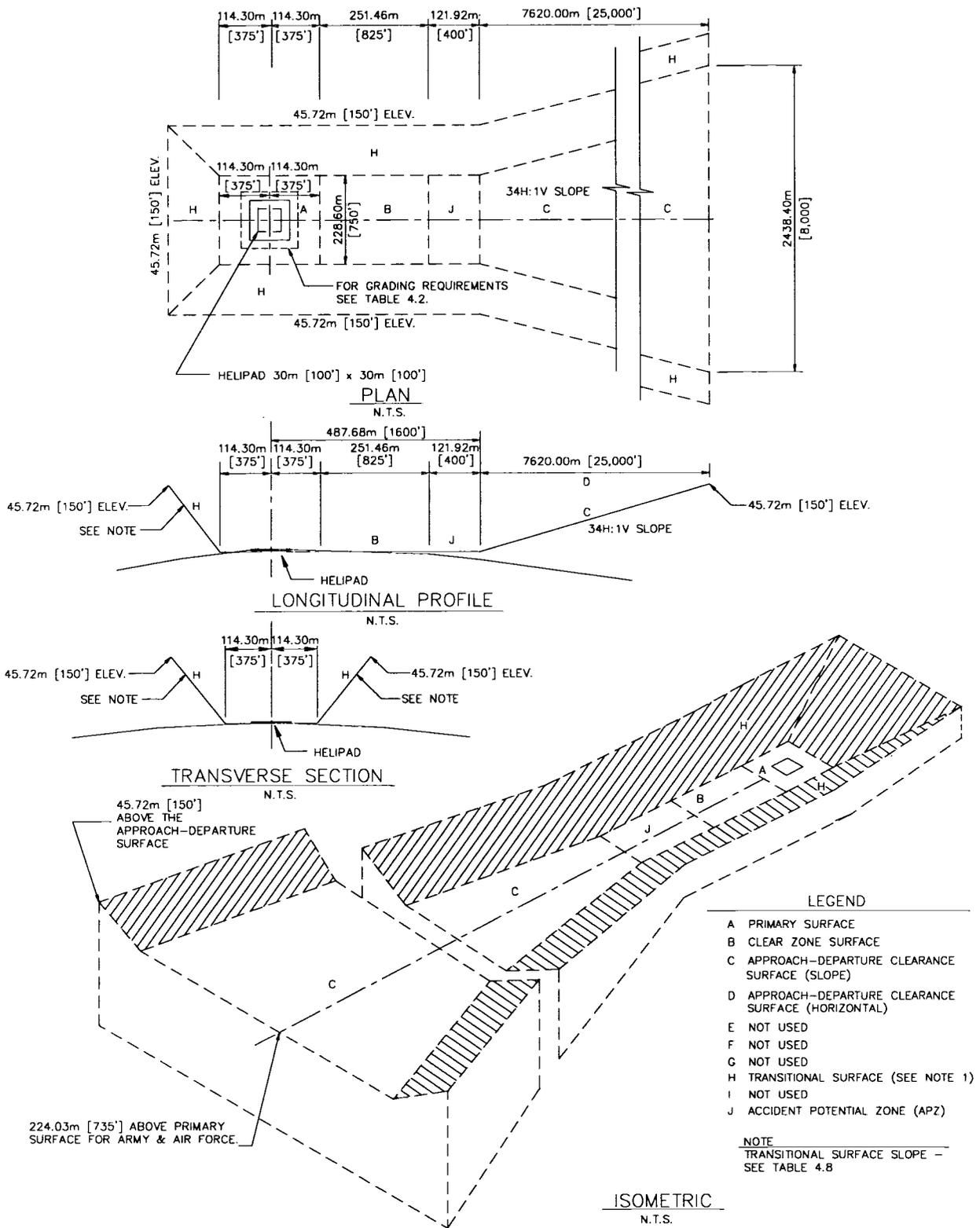


**LEGEND**

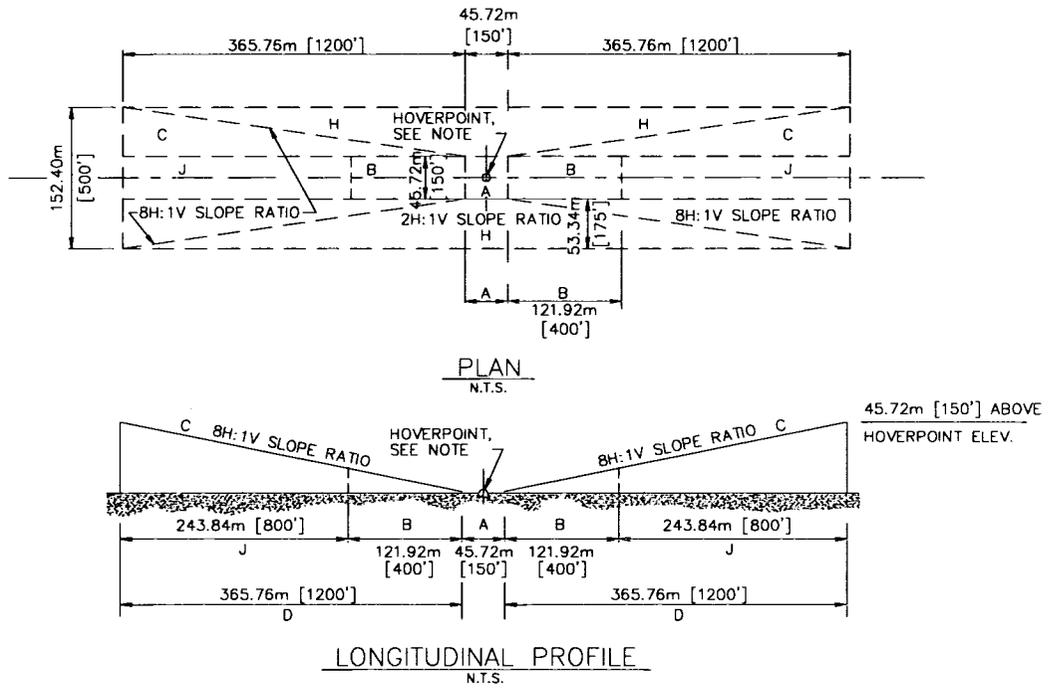
- A PRIMARY SURFACE
- B CLEAR ZONE SURFACE
- C APPROACH-DEPARTURE CLEARANCE SURFACE (SLOPE)
- D NOT USED
- E NOT USED
- F NOT USED
- G NOT USED
- H TRANSITIONAL SURFACE
- I NOT USED
- J ACCIDENT PREVENTION ZONE (APZ 1)



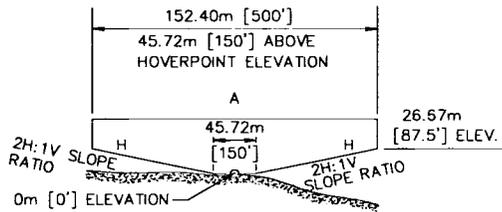
**Figure 4.8. Army and Air Force IFR Helipad with Same Direction Ingress/Egress.**



**Figure 4.9. Helicopter Hoverpoint.**

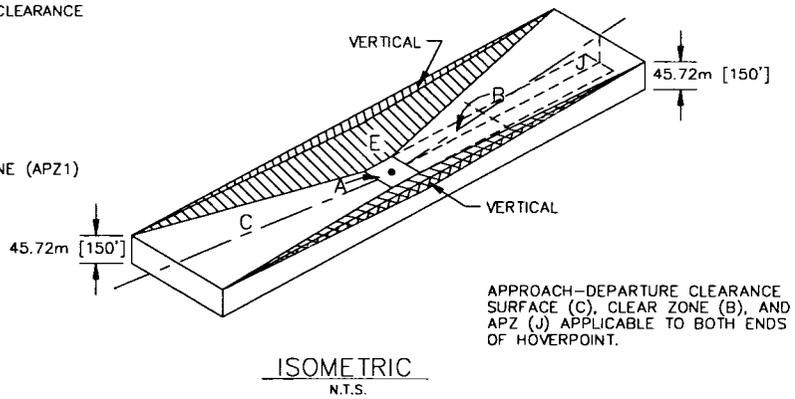


**NOTE**  
A HOVERPOINT CONSISTS OF A PAVED AREA 9m [30'] IN DIAMETER, DOMED TO A 150mm [6"] HEIGHT AT THE CENTER.



**LEGEND**

- A PRIMARY SURFACE
- B CLEAR ZONE SURFACE
- C APPROACH-DEPARTURE CLEARANCE SURFACE (SLOPE)
- D APPROACH-DEPARTURE CLEARANCE SURFACE (HORIZONTAL)
- E NOT USED
- F NOT USED
- G NOT USED
- H TRANSITIONAL SURFACE
- I NOT USED
- J ACCIDENT POTENTIAL ZONE (APZ1)



4.7.1. Requirements for a Landing Lane. Occasionally there are situations at airfields or heliports when a high density of helicopters are parked on mass aprons. When this occurs, there is usually a requirement to provide landing and take-off facilities that permit more numerous rapid launch and recovery operations that otherwise could be provided by a single runway or helipad. Increased efficiency can be attained by providing one or more of, but not necessarily limited to, the following:

4.7.1.1. Multiple helipads or hoverpoints.

4.7.1.2. A rotary-wing runway of length in excess of the criteria in Table 4.1.

4.7.1.3. Helicopter landing lanes.

4.7.2. Landing Lane Location. Landing lanes are located in front of the paved apron on which the helicopters park, as shown in Figure 4.9.

4.7.3. Touchdown Points. The location at which the helicopters are to touchdown on the landing lane are designated with numerical markings.

4.7.4. Dimensions. Table 4.3 presents dimensional criteria for the layout and design of rotary-wing landing lanes.

4.7.5. Layout. A layout for rotary-wing landing lanes is illustrated in Figure 4.10.

**4.8. Air Force Helicopter Slide Areas or “Skid Pads.”** VFR helicopter runway criteria described in Table 4.1 and shown in Figures 4.1 and 4.3 (in terms of length, width, grade, and imaginary surfaces) are suitable for slide areas. The forces associated with helicopters landing at a small (but significant) rate of descent, and between 10 and 30 knots of forward velocity, require that slide area surfaces have both good drainage and some resistance to rutting. However, these landing surfaces need not be paved. Refer to AFJMAN 32-1014, *Pavement Design for Airfields*, for helicopter slide area structural criteria.

**4.9. Shoulders for Rotary-Wing Facilities.** Unprotected areas adjacent to runways and overruns are susceptible to erosion caused by rotor wash. The shoulder width for rotary-wing runways, helipads and landing lanes, shown in Table 4.4, includes both paved and unpaved shoulders. Paved shoulders are required adjacent to all helicopter operational surfaces including runways, helipads, landing lanes and hoverpoints. The unpaved shoulder must be graded to prevent water from ponding on the adjacent paved area. The drop-off next to the paved area prevents turf, which may build up over the years from ponding water. Rotary-wing facility shoulders are illustrated in Figures 4.1 through 4.10.

**4.10. Overruns for Rotary-Wing Runways and Landing Lanes.** Overruns are required at the end of all rotary-wing runways and landing lanes. Table 4.5 shows the dimensional requirements for overruns for rotary-wing runways and landing lanes. The pavement in the overrun is considered a paved shoulder. Rotary-wing overruns for runways and landing lanes are illustrated in Figures 4.1, 4.2 and 4.9.

**4.11. Clear Zone and Accident Potential Zone (APZ).** The Clear Zone and APZ are areas on the ground, located under the Rotary-Wing Approach-Departure surface. The Clear Zone and APZ are required for Rotary-Wing runways, helipads, landing lanes and hoverpoints.

**Table 4.3. Rotary-Wing Landing Lanes.**

<b>Item No.</b>	<b>Item Description</b>	<b>Requirement</b>	<b>Remarks</b>
1	Length	480 m [1,600 ft] to 600 m [2,000 ft]	Landing Lane length based on the number of touchdown points. Evenly space touchdown points along the landing lane.
2	Distance Between Touchdown Points on Landing Lane, Center-to-Center	120 m, min [400 ft, min]	Provide a number of equally spaced "touchdown" or holding points with adequate separation.
3	Width	23 m [75 ft]	
4	Paved Shoulders		See Table 4.4.
5	Distance Between Centerlines of Rotary-Wing Landing Lanes	60.96 m [200 ft]  91.44 m [300 ft]	For operations with an active operational air traffic control tower.  For operations without an active operational air traffic control tower.
6	Landing Lane Lateral Clearance Zone (corresponds to half the width of primary surface area)	45.72 m [150 ft]	VFR facilities.  Measured perpendicularly from centerline of runway to fixed or mobile obstacles. See Table 4.1, item 6 for obstacles definition.
		114.3 m (375 ft)	IFR facilities.  Measured perpendicularly from centerline of runway to fixed or mobile obstacles. See Table 4.1, item 6 for obstacles definition.
7	Grades Within the Primary Surface Area in Any Direction	Min 2.0% Max 2.0%	Exclusive of pavement and shoulders.
8	Overrun	See Remarks	See Table 4.5
9	Clear Zone*	See Remarks	See Table 4.6.
10	APZ I*	See Remarks	See Table 4.6.
11	Distance Between Centerlines of a Fixed-Wing Runway and Landing Lane	See Table 4.1, Item 9	
		213.36 m min [700 ft min]	

\* The clear zone area for Landing Lanes corresponds to the clear zone land use criteria for fixed-wing airfields as defined in DoD AICUZ standards. The remainder of the approach-departure zone corresponds to APZ I land use criteria similarly defined. APZ II criteria are not applicable for rotary-wing aircraft.

**NOTES:**

1. Metric units apply to new airfield construction and where practical modification to existing airfields and heliports, as discussed in paragraph 1.4.4.
2. The criteria in this manual are based on aircraft specific requirements and are not direct conversions from inch-pound (English) dimensions. Inch-pound units are included only as a reference to the previous standard.
3. Airfield and heliport imaginary surfaces and safe wingtip clearance dimensions are shown as a direct conversion from inch-pound to SI units.

**Table 4.4. Shoulders for Rotary-Wing Facilities.**

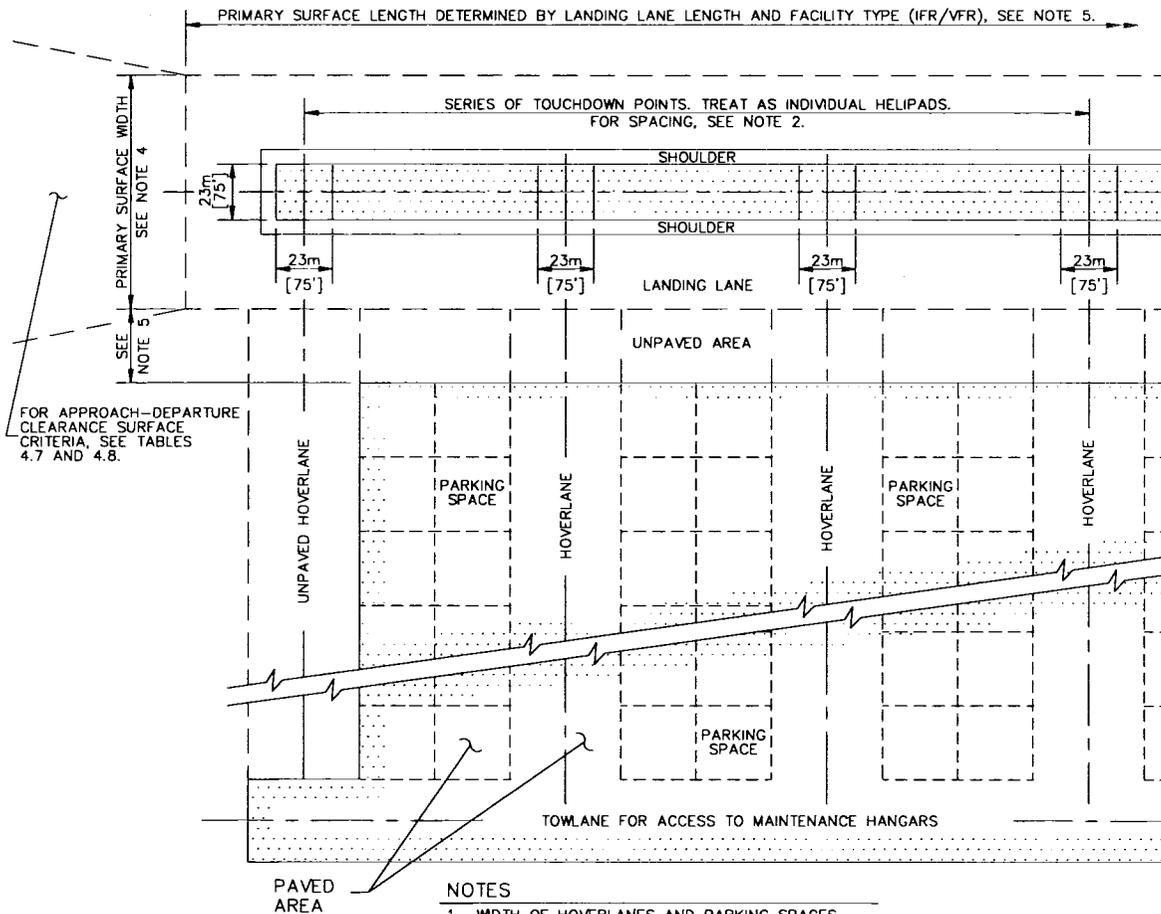
No.	Item Description	Requirement	Remarks
1	Total Width of Shoulders (Paved and Unpaved) Adjacent to All Operational Pavements	7.5 m [25 ft]	May be increased when necessary to accommodate dual operations with fixed-wing aircraft.
2	Paved Shoulder Width Next to All Operational Pavements	7.5 m [25 ft]	For Army and Air Force.
		0 m [0 ft]	For Navy and Marine Corps, except as noted.
3	Longitudinal Grade	Variable	Conform to the longitudinal grade of the abutting primary pavement.
4	Transverse Grade	2.0% min 4.0% max	Slope downward from edge of pavement.
5	Grade (adjacent to paved shoulder)	(a) 40 mm [1½ inch] drop off at edge of paved shoulder (b) 5% slope first 3 m [10 ft] Primary Surface criteria apply beyond this point.	Slope downward from edge of shoulder.  See Table 4.1, Item No. 7 and Table 5.3, Item No. 5.

**NOTES:**

1. Metric units apply to new airfield construction and where practical modification to existing airfields and heliports, as discussed in paragraph 1.4.4.

- The criteria in this manual are based on aircraft specific requirements and are not direct conversions from inch-pound (English) dimensions. Inch-pound units are included only as a reference to the previous standard.
- Airfield and heliport imaginary surfaces and safe wingtip clearance dimensions are shown as a direct conversion from inch-pound to SI units.

**Figure 4.10. Rotary-Wing Landing Lane.**



**NOTES**

- WIDTH OF HOVERLANES AND PARKING SPACES ARE DETERMINED BY THE TYPE OF HELICOPTER USED AND THE CLEARANCES REQUIRED.
- THE DISTANCE BETWEEN TOUCHDOWN POINTS IS DETERMINED BY THE DISTANCE BETWEEN HOVERLANES' CENTERLINES AND IS USUALLY NOT LESS THAN 120m [400'] CENTER-TO-CENTER.
- SIZE AND LAYOUT OF THE PARKING APRON VARIES WITH THE TYPE OF HELICOPTER USED AND THE MISSION REQUIREMENTS.
- PRIMARY SURFACE WIDTH IS 91.44m [300'] FOR VFR FACILITIES AND 228.60m [750'] FOR IFR FACILITIES.
- PRIMARY SURFACE LENGTH IS THE LANDING LANE LENGTH PLUS 68.60m [225'] FOR AIR FORCE, NAVY, AND MARINE CORPS VFR LANDING LANES. FOR ARMY LANDING LANES AND AIR FORCE, NAVY, AND MARINE CORPS IFR LANDING LANES, THE PRIMARY SURFACE LENGTH IS THE LANDING LANE LENGTH PLUS 121.92m [400'] OR 472.44m [1550'] WHICHEVER IS GREATER.
- MINIMUM DISTANCE BETWEEN THE PRIMARY SURFACE AND THE APRON IS DETERMINED BY THE TRANSITIONAL SURFACE CLEARANCE TO PARKED AIRCRAFT. TRANSITIONAL SURFACE SLOPES ARE SHOWN IN TABLES 4.7 AND 4.8.

**LEGEND**



**Table 4.5. Overruns for Rotary-Wing Runways and Landing Lanes.**

No.	Item Description	Requirement	Remarks
1	Total Length (paved and unpaved)	23 m [75 ft]	
2	Paved Length of Overrun	7.5 m (25 ft)	Air Force and Army only.
3	Width	38 m [125 ft]	Width of runway plus paved shoulders.  A minimum width of 45 meters [150 feet] for airfields which regularly accommodate H-53 aircraft (30 meter [100 feet] runway and 7.5 meter [25 feet] shoulders).
4	Longitudinal Centerline Grade	Max. 1.0%	Changes in longitudinal grade in overrun or between overrun and runway should not exceed 0.167% per 30 linear meters [100 linear feet].
5	Transverse Grade (paved and unpaved)	Min. 2.0% Max. 3.0%	Warp to meet runway and shoulder grades.

**NOTES:**

1. Metric units apply to new airfield construction and where practical modification to existing airfields and heliports, as discussed in paragraph 1.4.4.
2. The criteria in this manual are based on aircraft specific requirements and are not direct conversions from inch-pound (English) dimensions. Inch-pound units are included only as a reference to the previous standard.
3. Airfield and heliport imaginary surfaces and safe wingtip clearance dimensions are shown as a direct conversion from inch-pound to SI units.

4.11.1. Clear Zone Land Use. The Clear Zone for Rotary-Wing facilities must be free of obstructions, both natural and manmade, and rough-graded to minimize damage to an aircraft that runs off or lands short of the end of the landing surface. In addition, the Clear Zone permits recovery of aircraft that are aborted during take-off. The Clear Zone should be either owned or protected under a long term lease. Land use for the Clear Zone area for rotary-wing facilities corresponds to the Clear Zone land use criteria for fixed-wing airfields as defined for DoD AICUZ standards, and as discussed in Chapter 3 and Attachment 4.

4.11.2. Accident Potential Zone (APZ). Land use for the APZ area at rotary-wing facilities corresponds to the APZ land use criteria for fixed-wing airfields as defined in DoD AICUZ standards, and as discussed in Chapter 3 and Attachment 4. Ownership of the APZ is desirable but not required. If ownership is not possible, land use should be controlled through long-term lease agreements or local zoning ordinances.

4.11.3. Dimensions. Table 4.6 shows the dimensional requirements for the Clear Zone and APZ. These dimensions apply to rotary-wing runways, helipads, landing lanes and hoverpoints, depending on

whether they support VFR or IFR operations. Layout of the Clear Zone and APZ are shown in Figures 4.1, 4.2 and 4.4 through 4.9.

**4.12. Imaginary Surfaces for Rotary-Wing Runways, Helipads, Landing Lanes and Hoverpoints.**

Rotary-wing runways, helipads, landing lanes, and hoverpoints have imaginary surfaces similar to the imaginary surfaces for fixed-wing facilities. The imaginary surfaces are defined planes in space which establish clearance requirements for helicopter operations. An object, either manmade or natural, which projects through an imaginary surface plane is an obstruction to air navigation. Layout of the rotary-wing airspace imaginary surfaces are shown in Tables 4.7 and 4.8 and Figures 4.1 through 4.10. Rotary-wing airspace imaginary surfaces are defined in the glossary and summarized below:

- 4.12.1. Primary Surface.
- 4.12.2. Approach-Departure Clearance Surface (VFR).
- 4.12.3. Approach-Departure Clearance Surface (VFR Limited Use Helipads).
- 4.12.4. Approach-Departure Clearance Surface (IFR).
- 4.12.5. Horizontal Surface (IFR).
- 4.12.6. Transitional Surfaces.

**Table 4.6. Rotary-Wing Runway and Landing Lane Clear Zone and Accident Potential Zone (APZ).**  
(See Notes 1 and 2.)

No.	Item Description	Requirement	Remarks
1	Clear Zone Length	121.92 m [400 ft]	Clear Zone begins at the end of the primary surface.
2	Clear Zone Width (center width on extended runway/landing lane centerline)  (corresponds to the width of the primary surface)	91.44 m [300 ft]	VFR rotary wing runways and landing lanes.  See Note 2.
		228.60 m [750 ft]	IFR rotary-wing runways and landing lanes.  See Note 2.
3	Grades in Clear Zone in Any Direction	2.0% Min. 5.0% Max.	Clear Zone only. Area to be free of obstructions. Rough grade and turf when required.
4	APZ I Length	243.84 m [800 ft]	See Notes 2 and 3.
5	APZ I Width	91.44 m [300 ft]	VFR rotary wing runways and landing lanes.  See Notes 2 and 3.
		228.60 m [750 ft]	IFR Rotary-Wing Runways and Landing Lanes.  See Notes 2 and 3.

**NOTES:**

1. The clear zone area for rotary wing runways and landing lanes corresponds to the clear zone land use criteria for fixed-wing airfields as defined in DoD AICUZ standards, and summarized in Attachment 4. The remainder of the approach-departure zone corresponds to APZ I land use criteria similarly defined. APZ II criteria is not applicable for rotary-wing aircraft.
2. Exceptions to these widths are permissible based on individual service analysis of highest accident potential area for specific rotary-wing runway/landing lane use and acquisition constraints.
3. No grading requirements for APZ I.
4. Metric units apply to new airfield construction and where practical modification to existing airfields and heliports, as discussed in paragraph 1.4.4.
5. The criteria in this manual are based on aircraft specific requirements and are not direct conversions from inch-pound (English) dimensions. Inch-pound units are included only as a reference to the previous standard.
6. Airfield and heliport imaginary surfaces and safe wingtip clearance dimensions are shown as a direct conversion from inch-pound to SI units.

**Table 4.7. Rotary-Wing Imaginary Surface for VFR Approaches.**

Item No.	Item Description	Legend in Figures	Helicopter Runway and Landing Lane	Helipad		Remarks
				Air Force and Army VFR Standard	Air Force and Army VFR Limited Use; Navy and Marine Corps Standard Helipad and Hoverpoints (see note 1)	
1	Primary Surface Width	A	91.44 m [300 ft]	91.44 m [300 ft]	45.72 m [150 ft]	Centered on the GPI.
2	Primary Surface Length	A	Runway or landing lane length plus 22.86 m [75 ft] at each end	91.44 m [300 ft] centered on facility	45.72 m [150 ft] centered on facility	Runway or landing lane length plus 30.48 (100 ft) at each end for Navy and Marine Corps facilities.
3	Primary Surface Elevation	A	The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline or at the established elevation of the landing surface.			

4	Clear Zone Surface	B	See Table 4.6	See Table 4.2	See Table 4.2	
5	Start of Approach-Departure Surface	C	22.86 m [75 ft] from end of runway or landing lane	45.72 m [150 ft] from GPI	22.86 m [75 ft] from GPI	
6	Length of Sloped Portion of Approach-Departure Surface	C	365.76 m [1,200 ft]	365.76 m [1,200 ft]	365.76 m [1,200 ft]	Measured horizontally.
7	Slope of Approach-Departure Surface	C	8:1	8:1	8:1	Slope ratio is horizontal to vertical. 8:1 is 8 meters [feet] horizontal to 1 meter [foot] vertical.
8	Width of Sloped Portion of Approach-Departure Surface at Start of Sloped Portion	C	91.44 m [300 ft]	91.44 m [300 ft]	45.72 m [150 ft]	Centered on the extended center-line, and is the same width as the primary surface.
9	Width of Sloped Portion of Approach-Departure Surface at End of Sloped Portion	C	182.88 m [600 ft]	182.88 m [600 ft]	152.40 m [500 ft]	Centered on the extended center-line.
10	Elevation of Approach-Departure Surface at Start of Sloped Portion	C	0 m [0 ft]	0 m [0 ft]	0 m [0 ft]	Above the established elevation of the landing surface.
11	Elevation of Approach-Departure Surface at End of Sloped Portion	C	45.72 m [150 ft]	45.72 m [150 ft]	45.72 m (150 ft)	Above the established elevation of the landing surface.
12	Length of Approach-Departure Zone	D	365.76 m [1,200 ft]	365.76 m [1,200 ft]	365.76 m [1,200 ft]	Measured horizontally from the end of the primary surface and is the same length as the Approach-Departure Clearance Surface length.

13	Start of Approach-Departure Zone	D	22.86 m [75 feet] from end of runway	45.72 m [150 ft] from center of helipad	22.86 m [75 ft] from center of helipad	Starts at the end of the primary surface.
14	Transitional Surface Slope	H	2H:1V See Remark 1	2H:1V See Remark 1	2H:1V See Remark 2	(1) The transitional surface starts at the lateral edges of the primary surface and the approach-departure clearance surface. It continues outward and upward at the prescribed slope to an elevation of 45.72 m (150 ft) above the established airfield elevation.  (2) The transitional surface starts at the lateral edges of the primary surface and the approach-departure clearance surface. It continues outward and upward at the prescribed slope to an elevation of 26.67 m (87.5 ft) above the established airfield elevation. It then rises vertically to an elevation of 45.7 m (150 ft) above the established airfield elevation.  See Figures 4.5 and 4.10 for shape of transitional surfaces.
15	Horizontal Surface	G	Not Required	Not Required	Not Required	

**NOTES:**

1. Navy and Marine Corps do not have criteria for same direction ingress/egress.
2. Metric units apply to new airfield construction and where practical modification to existing airfields and heliports, as discussed in paragraph 1.4.4.
3. The criteria in this manual are based on aircraft specific requirements and are not direct conversions from inch-pound (English) dimensions. Inch-pound units are included only as a reference to the previous standard.
4. Airfield and heliport imaginary surfaces and safe wingtip clearance dimensions are shown as a direct conversion from inch-pound to SI units.

**Table 4.8. Rotary-Wing Imaginary Surfaces for IFR Approaches.**

Item No.	Item Description	Legend in Figures	Helicopter Runway and Landing Lanes	Helipad		Remarks
				Standard	Air Force and Army same direction ingress/egress; See Remarks.	
				Standard	Air Force and Army same direction ingress/egress; See Remarks.	Navy and Marine Corps do not have criteria for unidirectional ingress/egress.
1	Primary Surface Width	A	228.60 m [750 ft]	228.60 m [750 ft]	228.60 m [750 ft]	Centered on helipad.
2	Primary Surface Length	A	The greater distance of: runway length plus 60.96 m [200 ft] at each end; or 472.44 m [1,550 ft]	472.44 m [1,550 ft] centered on GPI	114.3 m [375 ft] centered on GPI	
3	Primary Surface Elevation	A	The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway or landing lane centerline or established elevation of the helipad.			
4	Clear Zone Surface	B	See Table 4.6	See Table 4.2	See Table 4.2	
5	Start of Approach-Departure Surface	C	Measured from the center of the runway, the greater distance of: ½ runway length plus	236.22 m [775 ft] from GPI	487.68 m [1,600 ft] from GPI	Army and Air Force facilities.

			60.96m [200 ft]; or 236.22m [775 ft]			
			236.22 m [775 ft] from GPI.	236.22 m [775 ft] from GPI.	NA	Navy and Marine Corps facilities.
			See Remarks	See Remarks	See Remarks	Starts at the end of the primary surface.
6	Length of Sloped Portion of Approach-Departure Surface	C	7,620.00 m [25,000 ft]	7,620.00 m [25,000 ft]	7,620.00 m [25,000 ft]	For Army and Air Force facilities.
			7,383.78 m [24,225 ft]	7,383.78 m [24,225 ft]	NA	For Navy and Marine Corps facilities.
			See Remarks	See Remarks	See Remarks	Measured horizontally
7	Slope of Approach-Departure Surface	C	34:1	34:1	34:1	For Army and Air Force Facilities.
				Standard	Air Force and Army unidirectional ingress/egress; See Remarks.	Navy and Marine Corps do not have criteria for unidirectional ingress/egress.
			25:1	25:1	NA	For Navy and Marine Corps facilities.
			See Remarks	See Remarks	See Remarks	Slope ratio is horizontal to vertical. 34:1 is 34 meters [feet] horizontal to 1 meter [foot] vertical.
8	Width of Approach-Departure Surface at Start of Sloped Portion	C	228.60 m [750 ft]	228.60 m [750 ft]	228.60 m [750 ft]	Army and Air Force facilities.
			228.60 m [750 ft]	228.60 m [750 ft]	NA	Navy and Marine Corps facilities.
			See Remarks	See Remarks	See Remarks	Centered on the extended centerline and is the same width as the primary surface.

9	Width of Approach-Departure Surface at End of Sloped Portion	C	2,438.60 m [8,000 ft]	2,438.60 m [8,000 ft]	2,438.60 m [8,000 ft]	Army and Air Force facilities.
			2,438.60 m [8,000 ft]	2,438.60 m [8,000 ft]	NA	Navy and Marine Corps facilities.
			See Remarks	See Remarks	See Remarks	Centered on the extended centerline.
10	Elevation of Approach-Departure Surface at Start of Sloped Portion	C	0 m [0 ft]	0 m [0 ft]	0 m [0 ft]	Army and Air Force facilities.
			0 m [0 ft]	0 m [0 ft]	NA	Navy and Marine Corps facilities.
			See Remarks	See Remarks	See Remarks	Above the established elevations of the landing surface.
				Standard	Air Force and Army unidirectional ingress/egress; See Remarks.	Navy and Marine Corps do not have criteria for unidirectional ingress/egress.
11	Elevation of Approach-Departure Clearance Surface at End of Sloped Portion	C	224.03 m (735 ft)			Air Force and Army.
			295.35 m (969 ft)	N/A		Navy and Marine Corps.
			See Remarks			Above the established elevation of the landing surface.
12	Transitional Surface Slope	H	7:1	7:1	7:1	Army
			4:1	4:1	7:1	Air Force
			4:1	4:1	N/A	Navy and Marine Corps
			See Remarks			See Figures 4.2, 4.6, 4.7, and 4.8 for shape of Transitional Surface. The Transitional Surface starts at the lateral edges of the primary surface and the approach-departure clearance surface. It continues outward and upward at the prescribed slope to 45.72 m (150 ft) above the established airfield elevation.

13	Horizontal Surface Radius	E	1,143 m [3,750 ft] for 25:1 approach-departure surfaces	N/A	N/A	An imaginary surface located 45.72 m [150'] above the established heliport elevation, formed by scribing an arc about the end of each runway or landing lane, and inter-connecting these arcs with tangents.
			1,554.48m (5,100 ft) for 34:1 approach-departure surfaces	N/A	N/A	
			N/A	1,402.08 m [4,600 ft]	1,402.08 m [4,600 ft]	Circular in shape, located 45.72 m [150 ft] above the established heliport or helipad elevation, defined by scribing an arc with a 1,402.08 m [4,600 ft] radius about the center point of the helipad.
14	Elevation of Horizontal Surface	H	45.72 m [150 ft]	45.72 m [150 ft]	45.72 m [150 ft]	

**NOTES:**

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2. The criteria in this manual are based on aircraft specific requirements and are not direct conversions from inch-pound (English) dimensions. Inch-pound units are included only as a reference to the previous standard.
3. Airfield and heliport imaginary surfaces and safe wingtip clearance dimensions are shown as a direct conversion from inch-pound to SI units.

**4.13. Obstructions and Airfield Airspace Criteria.** If the imaginary surface around a rotary-wing runway, helipad, landing lane, and hoverpoint is penetrated by manmade or natural objects as defined in Attachment 6, the penetrating object is an obstruction. Determination and dealing with obstructions are further discussed in Attachment 6.