



Federal Aviation
Administration

A QUICK REFERENCE:

AIRFIELD STANDARDS

Second Edition, October 2011*



*Supersedes previous edition, September 2009

PURPOSE

This publication provides a quick reference to several FAA standards as detailed in the current FAA Advisory Circulars (AC) as of the date of this publication. This guide is not all inclusive and the applicable ACs should be consulted for more comprehensive information.

TABLE OF CONTENTS*

Airfield Markings	4
Glass Beads	5
Black Outlines.....	5
General Guidelines for Determining Light-Colored Pavement	6
Runway Marking Elements	7
Pairs of Touchdown Zone Markings Required When Installed From One Threshold	8
Pairs of Touchdown Zone Markings Required When Installed From Both Thresholds	9
Runway Threshold Stripes.....	10
Runway Marking Dimensions	11
Precision Instrument	11
Non-Precision Instrument.....	12
Visual	13
Displaced Threshold Markings	14
Taxiway Aligned With a Runway	15
Blast Pad Marking	16
Taxiway and Displaced Threshold Preceding a Runway	17
Blast Pad and Displaced Threshold Preceding a Runway	18
Enhanced Taxiway Centerline Marking	19
Surface Painted Holding Position Signs for Taxiway Widths Greater Than Thirty Five Feet	20
Surface Painted Holding Position Sign for Taxiway Widths Equal to or Less Than Thirty Five Feet.....	21
Narrow Taxiway Stacked Surface Painted Holding Position Signs	22
Runway Holding Position Markings	23
ILS Holding Position Marking.....	23
Airfield Lighting	24
Runway Edge Light Spacing.....	24
Visual Runway End/Threshold Lights	26
Runway End/Threshold Lights installed with HIRLs	27
Runway with a Taxiway at the End.....	28
Runway with a Blast Pad.....	29
Runway with a Displaced Threshold.....	30
Normal Runway with a Taxiway.....	31
Runway Centerline Lights with a Displaced Threshold.....	32
Greater than 700'	32
Less than 700'.....	33
Runway with a Stopway.....	34
Runway with a Displaced Threshold and Stopway	35

*Cover - Asheville Regional Airport (AVL)

Runway with End Taxiway.....	36
Runway with a Displaced Threshold and End Taxiway	37
Taxiway Lead-off Lights.....	38
Taxiway Centerline Lights Crossing a Runway.....	39
Taxiway Centerline Lighting Configuration for Acute - Angled Exits	40
Runway End Identifier Lights REILs	41
Construction Safety	42
Safety Areas and Work Limits	43
Construction Reminders	43
Barricades	44
Temporarily Closed Runways	45
Marking Temporarily Relocated or Displaced Runway Threshold	46
Lighting Temporarily Relocated or Displaced Runway Thresholds.....	47
Procedures for Opening an Unmarked Runway	48
Temporarily Closed Taxiways.....	49
Fuel Fire Safety	50
Wildlife	54
Aircraft Rescue and Fire Fighting (ARFF).....	55
ARFF Training	56
Pedestrians and Ground Vehicles	57
References.....	58

Airfield Markings

Glass Beads	5
Black Outlines	5
General Guidelines for Determining Light-Colored Pavement	6
Runway Marking Elements.....	7
Pairs of Touchdown Zone Markings Required When Installed From One Threshold.....	8
Pairs of Touchdown Zone Markings Required When Installed From Both Thresholds.....	9
Runway Threshold Stripes.....	10
Runway Marking Dimensions	11
Precision Instrument.....	11
Non-Precision Instrument.....	12
Visual.....	13
Displaced Threshold Markings	14
Taxiway Aligned With a Runway	15
Blast Pad Marking.....	16
Taxiway and Displaced Threshold Preceding a Runway.....	17
Blast Pad and Displaced Threshold Preceding a Runway	18
Enhanced Taxiway Centerline Marking.....	19
Surface Painted Holding Position Signs for Taxiway Widths Greater Than Thirty Five Feet. 20	
Surface Painted Holding Position Sign for Taxiway Widths Equal to or Less Than Thirty Five Feet.	21
Narrow Taxiway Stacked Surface Painted Holding Position Signs	22
Runway Holding Position Markings	23
ILS Holding Position Marking	23

Airfield Markings

Glass Beads

Where Required	Where Optional
<ul style="list-style-type: none">• Runway Designation• Runway and Taxiway Centerline• Threshold Markings and Bar• Aiming Point Marking• Touchdown Zone• Hold-Short Markings• Geographic position marking• Surface painted signs• Non-movement area boundary markings	<ul style="list-style-type: none">• Runway Side Stripes• Taxiway Side Stripes• Displaced threshold markings• Demarcation bar

Black Outlines

Where Required*	Where Optional
<ul style="list-style-type: none">• Hold-Short Markings• Enhanced Twy Centerlines• Non-movement area boundary markings• SMGCS TWY Centerlines• Surface Painted Holding Signs• Intermediate Holding position• Geographic position marking	<ul style="list-style-type: none">• All Runway markings• Taxiway centerlines• Taxiway edge markings• Chevrons• Shoulder markings

*On all "light" colored pavements (includes fading asphalt.) See table on next page.

Airfield Markings
General Guidelines for Determining Light-Colored Pavement

Painting a Black Border*

Pavement Surface Type	Age of Pavement Surface		
	New	Up to 2 years old	Over 2 years old
Portland Cement Concrete Surfaces	Yes	Yes	Yes
Asphalt Concrete Surfaces	No	No	Yes
Asphalt Treated Surfaces	No	No	Yes

*This table serves only as a general guide since an existing asphalt pavement at one airport location may not experience the same rate of surface color deterioration as at another airport location.

Airfield Markings
Runway Marking Elements

Runway Surface Marking Scheme	Threshold Approach Category		
	Visual Approach	Non-precision Approach (Approaches with vertical guidance not lower than 0.75 statute mile visibility)	Precision Approach (Approaches with vertical guidance lower than 0.75 statute mile visibility)
Landing Designator	X	X	X
Centerline	X	X	X
Threshold	Note 1	X	X
Aiming Point	Note 2	Note 3	X
Touchdown Zone			X
Side Stripes	Note 4	Note 4	X

Note 1: Required on runways serving approach categories C and D airplanes and for runways used, or intended to be used by international commercial air transport.

Note 2: Required on 4,200 foot or longer runways serving approach categories C and D airplanes.

Note 3: Required on 4,200 foot or longer instrumented runways.

Note 4: Used when the full runway pavement width may not be available for use as a runway.

Airfield Markings
**Pairs of Touchdown Zone Markings
 Required When Installed From One Threshold**

Distance Between Thresholds (or displaced thresholds) Feet	Markings for Precision Approach End (includes displaced threshold)	Other Runway End Visual or Non-precision
6,065 or greater (Note 1)	Full set of markings	Aiming point markings
5,565 - 6,064	Less one pair of rectangular bar markings (Note 2)	Aiming point marking
5,065 - 5,564	Less two pairs of rectangular bar markings	Aiming point marking
4,565 - 5,064	Less three pairs of rectangular bar markings	Aiming point marking

Note 1: The value of 6,065 feet is derived as follows: For the non-precision or visual runway end, the table assumes the 900 foot “no marking zone” criterion plus the length of a preferred aiming point marking, which starts 1,020 feet from the start of the threshold to obtain a length of 1,920 feet. Add to this the length of the aiming point marking. The length of the aiming point marking is either 150 or 100 feet. This table uses a length of 150 feet because all the entries in column 1 are greater than 4,200 feet. Therefore, adding 150 feet to 1,920 feet obtains a length of 2,070 feet. For the precision end, which equals 3,995 feet, it assumes the 900 foot “no marking zone” followed by the standard 75 foot long rectangular bar for a total length of 975 feet. Add to this value the full 3,000 foot touchdown zone marking scheme and the 20 foot separation between the actual starting point of the runway threshold (or displaced threshold) and the bottom edge of the threshold marking to obtain 3,995 feet. Summing the values 3,995 and 2,070 yields 6,065 feet.

Note 2: Each reduction in a pair of rectangular bar markings from the precision end equates to a 500 foot reduction between the thresholds.

The painting rationale for this table is to ignore the midpoint between the thresholds so the precision instrumented landing is favored over non-precision or visual landings. The length of the non-precision or visual side of the runways always remains at 2,070 feet in length to promote the painting a full set of touchdown zone markings.

Airfield Markings

Pairs of Touchdown Zone Markings Required When Installed From Both Thresholds

Distance Between Thresholds (or displaced thresholds) Feet	Markings for Each Threshold (or displaced threshold)
7,990 or greater (Note 1)	Full set of markings
6,990 - 7989	Less one pair of rectangular bars from each side nearest to the runway midpoint (Note 2)
5,990 - 6,989	Less two pairs of rectangular bars from each side nearest to the runway midpoint (Note 2)
4,990 - 5,989	Less three pairs of rectangular bars from each side nearest to the runway midpoint (Note 2)

Note 1: The value of 7,990 feet is derived as follows: Proceed from the runway midpoint in one direction and you will have the 900 foot “no marking zone” criterion followed by the standard 75 foot long rectangular bar for a total length of 975 feet. Add to this value the full 3000 foot touchdown zone marking scheme plus the 20 foot separation between the actual starting point of the runway threshold (or displaced threshold) and the edge of the threshold marking to obtain 3,995 feet. Double this value for both directions to obtain 7,990 feet.

Note 2: Each reduction in a pair of rectangular bar markings from both sides equates to a 1,000 foot reduction between the thresholds.

The painting rationale for this table is to preserve the midpoint between the thresholds, thereby promoting an equal treatment of painting pairs of rectangular bar markings for both sides.

Airfield Markings

Runway Threshold Stripes

Runway width	Number of stripes
60 feet	4
75 feet	6
100 feet	8
150 feet	12
200 feet	16

Airfield Markings

Runway Marking Dimensions

Precision Instrument

Runway marking	100' Wide	150' Wide	200' Wide
Designation	60'L	60'L	60'L
Centerline ¹	120'Lx36"W	120'Lx36"W	120'Lx36"W
Edge	36" wide	36" wide	36" wide
Threshold Bar	10' wide	10' wide	10' wide
Threshold Markings	150'Lx5.75'W	150'Lx5.75'W	150'Lx5.75'W
Aiming Point	150'Lx20'W	150'Lx30'W	150'Lx30'W
Touchdown Zone	75'Lx4'W	75'Lx6'W	75'Lx6'W
Demarcation ²	3' wide	3' wide	3' wide



¹ Gaps are 80 feet in length. Adjustments to the length of the stripes and gaps, where necessary to accommodate the runway length, are made near the runway midpoint.

² A demarcation bar delineates a runway with a displaced threshold from a blast pad, stopway or taxiway that precedes the runway and is not usable pavement. A demarcation bar is yellow in color.

Airfield Markings

Non-Precision Instrument

Runway marking	100' Wide	150' Wide	200' Wide
Designation	60'L	60'L	60'L
Centerline³	120'Lx18"W	120'Lx18"W	120'Lx18"W
Edge (optional)⁴	36" wide	36" wide	36" wide
Threshold Bar	10' wide	10' wide	10' wide
Threshold Markings	150'Lx5.75'W	150'Lx5.75'W	150'Lx5.75'W
Aiming Point⁵	150'Lx20'W	150'Lx30'W	150'Lx30'W
Demarcation⁶	3' wide	3' wide	3' wide



³ Gaps are 80 feet in length. Adjustments to the length of the stripes and gaps, where necessary to accommodate the runway length, are made near the runway midpoint.

⁴ Used when the full pavement width may not be available as a runway.

⁵ Required on 4,200 feet or longer instrumented runways. Note: Aiming Point markings may be reduced to 100 feet in length for runways under 4200 feet.

⁶ A demarcation bar delineates a runway with a displaced threshold from a blast pad, stopway or taxiway that precedes the runway and is not usable pavement. A demarcation bar is yellow in color.

Airfield Markings

Visual

Runway	100' Wide	150' Wide	200' Wide
Designation	60'L	60'L	60'L
Centerline⁷	120'Lx12"W	120'Lx12"W	120'Lx12"W
Edge (optional)⁸	36" wide	36" wide	36" wide
Threshold Bar	10' wide	10' wide	10' wide
Threshold Markings⁹	150'Lx5.75'W	150'Lx5.75'W	150'Lx5.75'W
Aiming Point¹⁰	150'Lx20'W	150'Lx30'W	150'Lx30'W
Demarcation¹¹	3' wide	3' wide	3' wide



⁷ Gaps are 80 feet in length. Adjustments to the length of the stripes and gaps, where necessary to accommodate the runway length, are made near the runway midpoint.

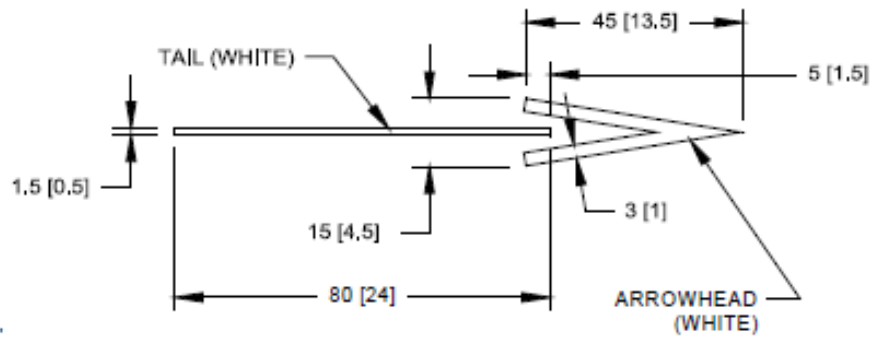
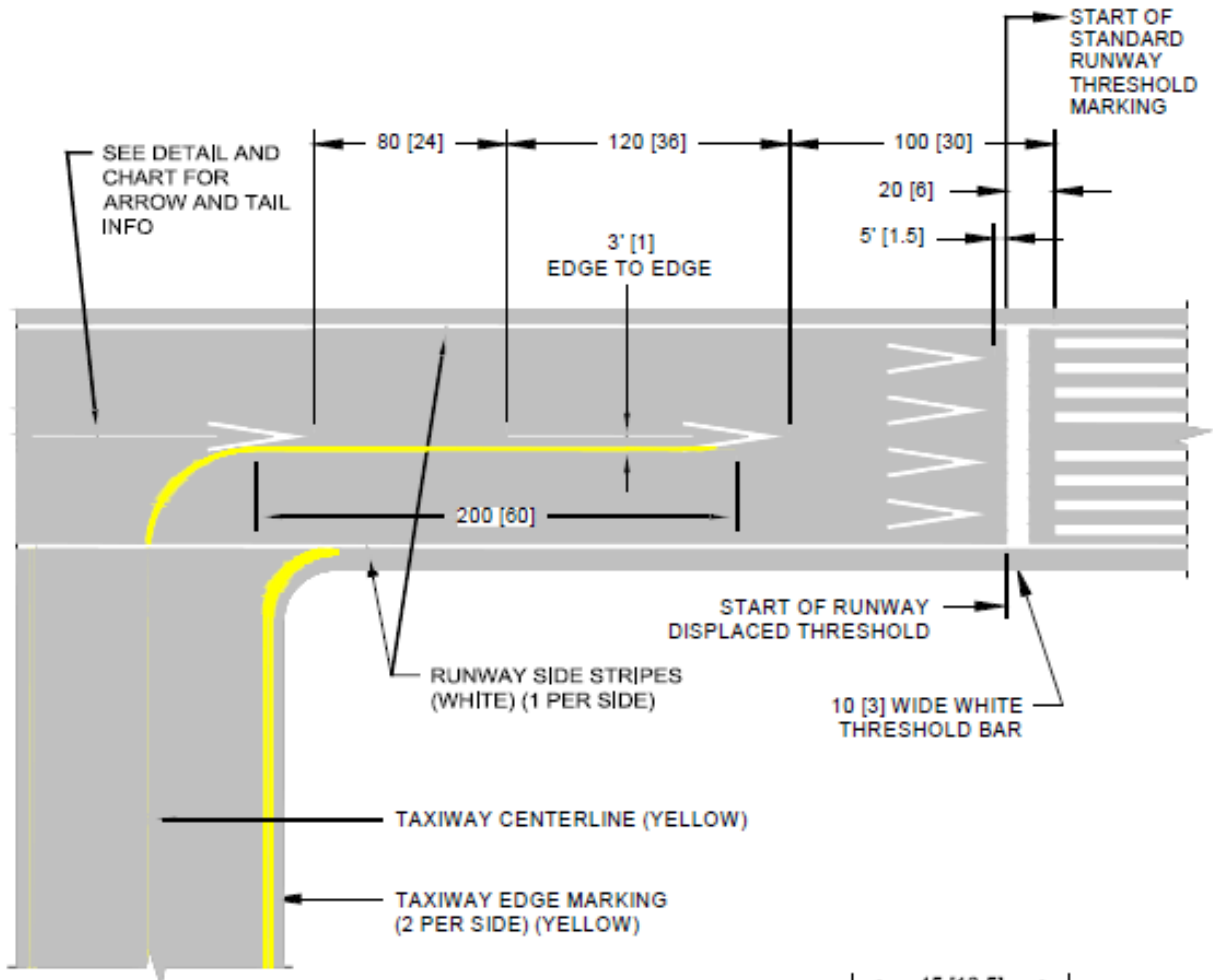
⁸ Used when the full pavement width may not be available as a runway.

⁹ Required on runways serving approach category C and D airplanes or on runways used by international commercial transport.

¹⁰ Required on runways 4,200 feet or longer used by approach category C and D aircraft. Note: Aiming Point markings may be reduced to 100 feet in length for runways under 4200 feet.

¹¹ A demarcation bar delineates a runway with a displaced threshold from a blast pad, stopway, or taxiway that precedes the runway and is not usable pavement. A demarcation bar is yellow in color.

Displaced Threshold Markings



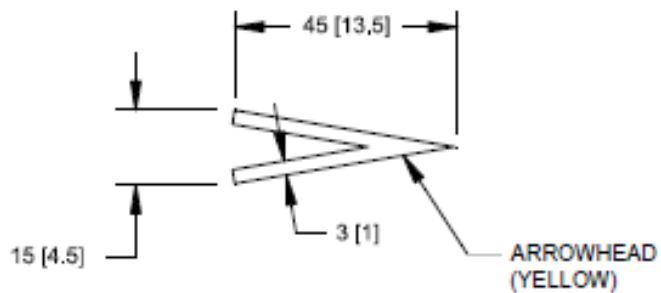
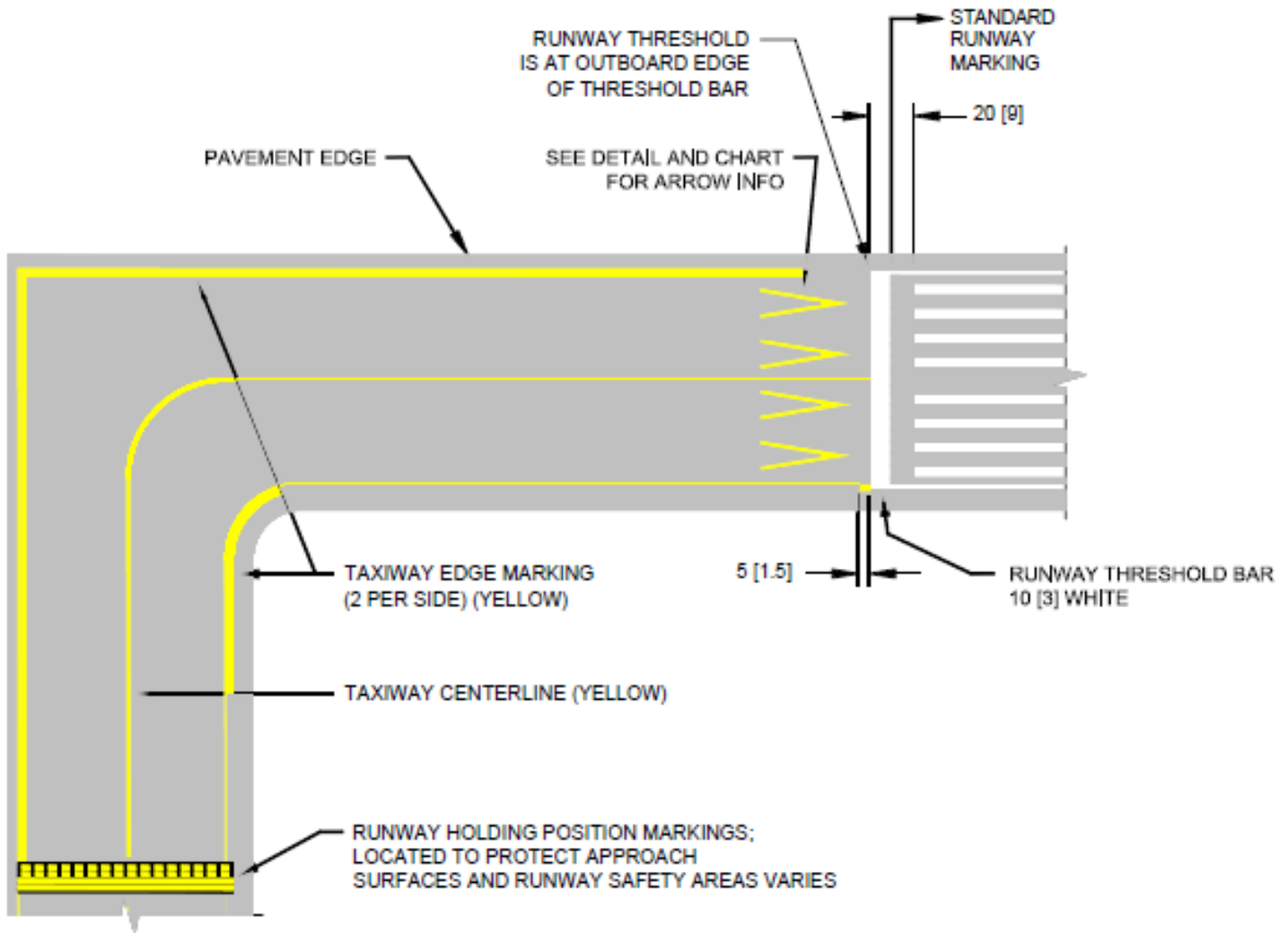
NOTES:

1. DIMENSIONS ARE IN: FEET [METERS]
2. RUNWAY SIDE STRIPES, WHEN USED ON THE RUNWAY, EXTEND INTO THE DISPLACED AREA.
3. RUNWAY MARKINGS (EXCEPT HOLDING POSITION MARKINGS) INCLUDING THOSE IN THE DISPLACED THRESHOLD ARE WHITE.

RUNWAY WIDTH	NUMBER OF ARROWHEADS	SPACING BETWEEN ARROWHEADS (W = RUNWAY WIDTH)	SPACING TO RUNWAY EDGE
≥ 100 [30]	4	W/4	W/8
< 100 [30]	3	W/3	W/6
< 60 [18]	2	W/2	W/4

Airfield Markings

Taxiway Aligned With a Runway

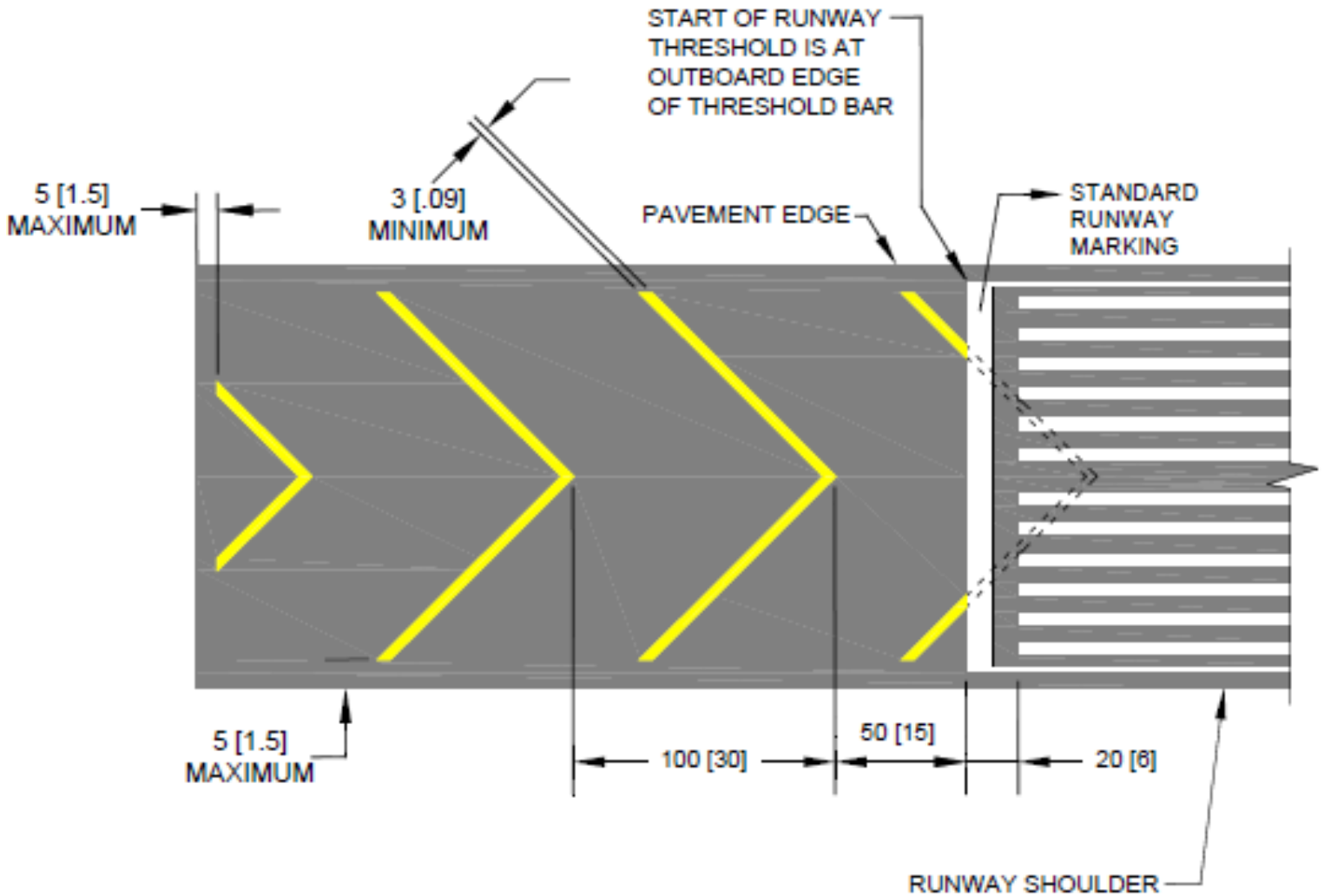


NOTES:

1. DIMENSIONS ARE IN:
FEET [METERS]

RUNWAY WIDTH	NUMBER OF ARROWHEADS	SPACING BETWEEN ARROWHEADS (W = RUNWAY WIDTH)	SPACING TO RUNWAY EDGE
≥ 100 [30]	4	W/4	W/8
< 100 [30]	3	W/3	W/6
< 60 [18]	2	W/2	W/4

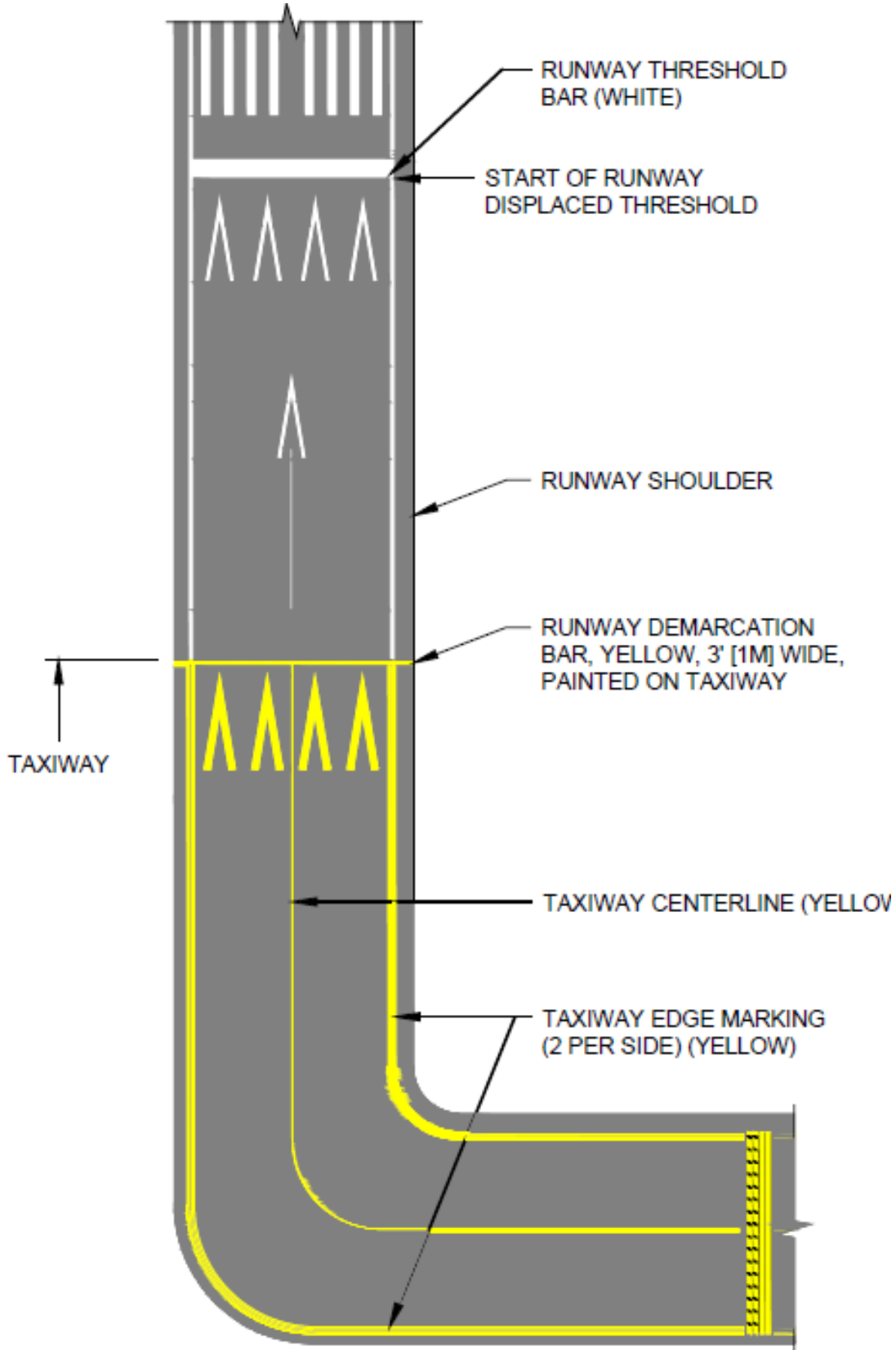
Blast Pad Marking



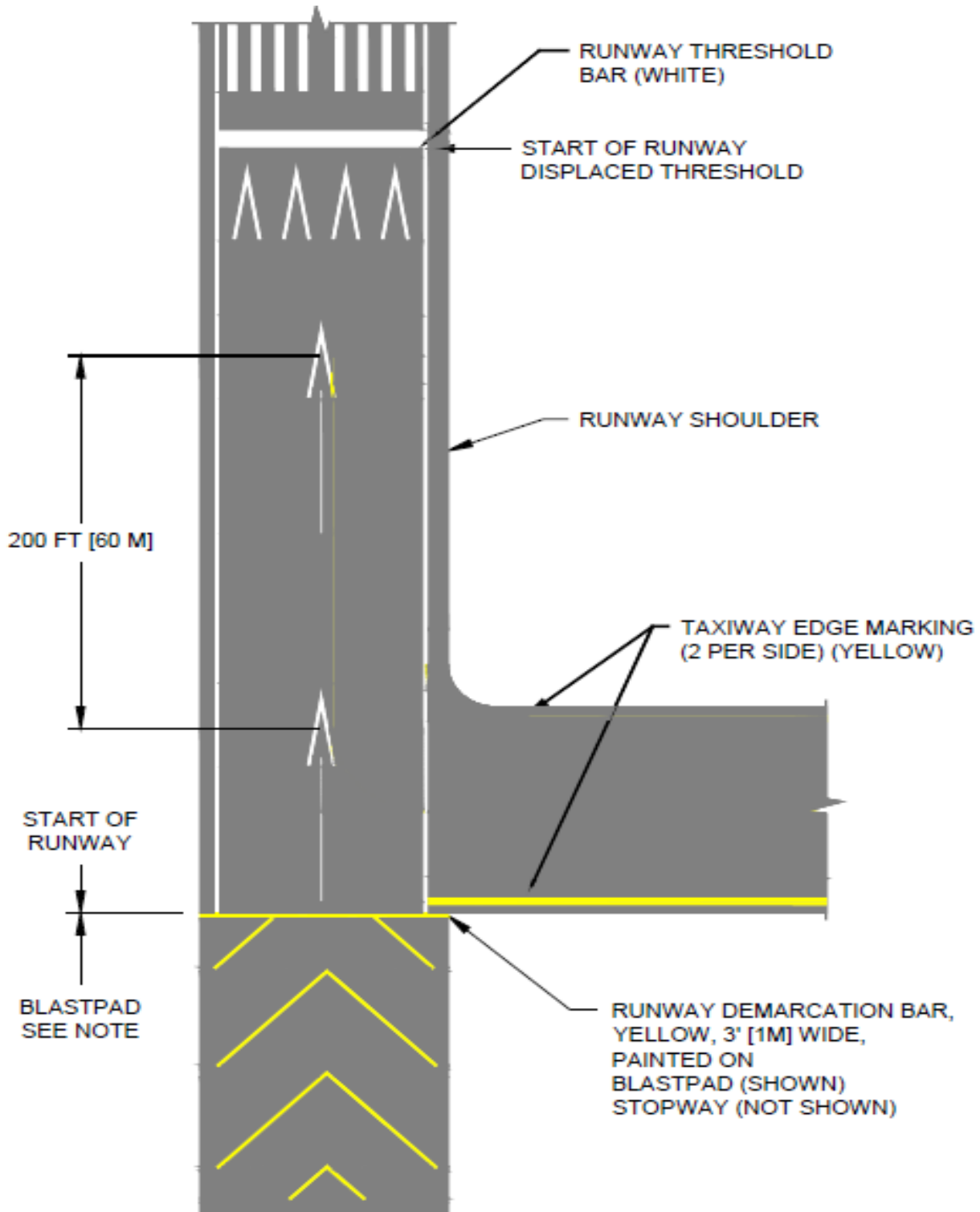
Notes:

1. Dimensions are in feet [meters].
2. The widths of the stopways and blast pads are not the same. Stopways equal runway width; blast pads equal runway width plus runway shoulders.
3. 50 foot spacing may be used when length of area is less than 250 feet in which case the first full chevron starts at the index point (intersection of runway centerline and runway threshold).
4. Chevrons are painted yellow and at an angle of 45 degrees to the runway centerline.
5. Chevron spacing may be doubled if length of are exceeds 1000 feet.

Taxiway and Displaced Threshold Preceding a Runway



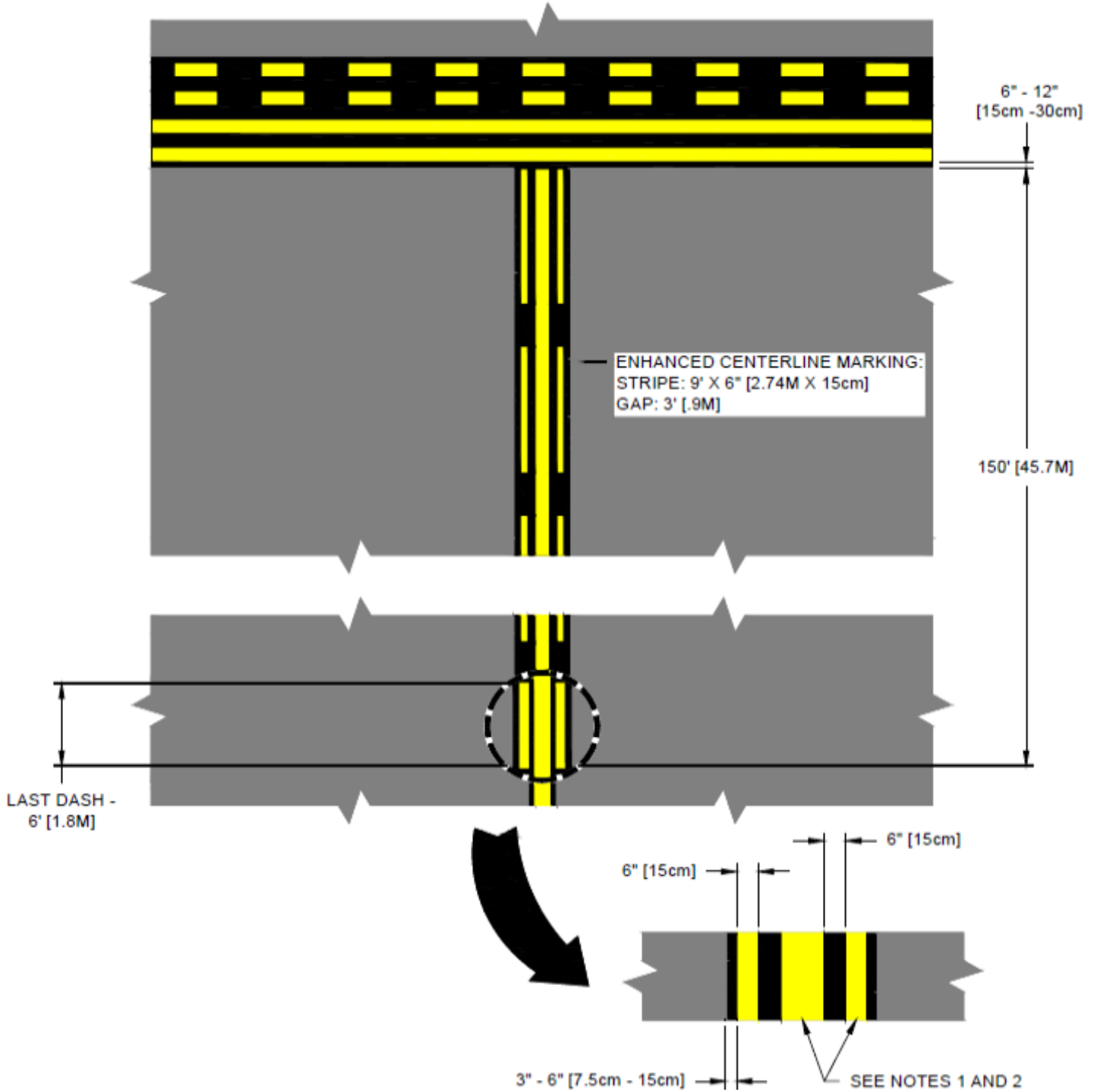
Blast Pad and Displaced Threshold Preceding a Runway



Note: Demarcation bars are 3 feet wide and NOT part of the useable pavement. Stopway width equals runway width. Blast pad width equals runway width plus runway shoulders.

Airfield Markings

Enhanced Taxiway Centerline Marking

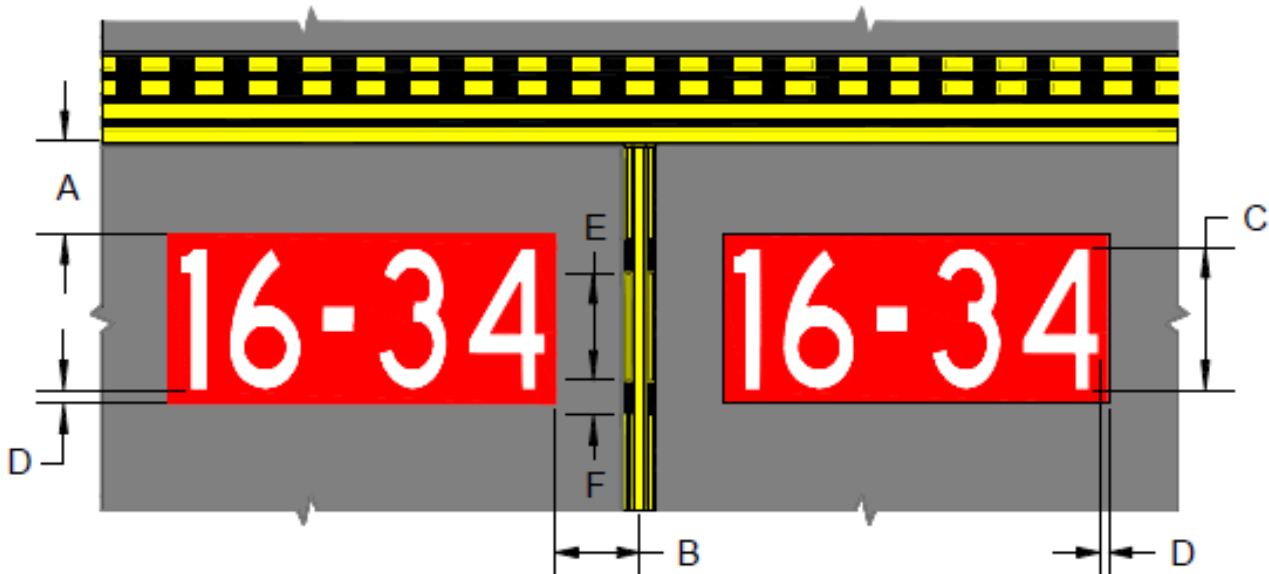


Notes 1: Dashed lines for the enhanced taxiway centerline marking are 6 inches in width and separated by 6 inches from the taxiway centerline. This applies to both 6 inch and 12 inch taxiway centerline markings

Note 2: The taxiway centerline markings may be shifted left or right to avoid interference with the taxiway centerline lights.

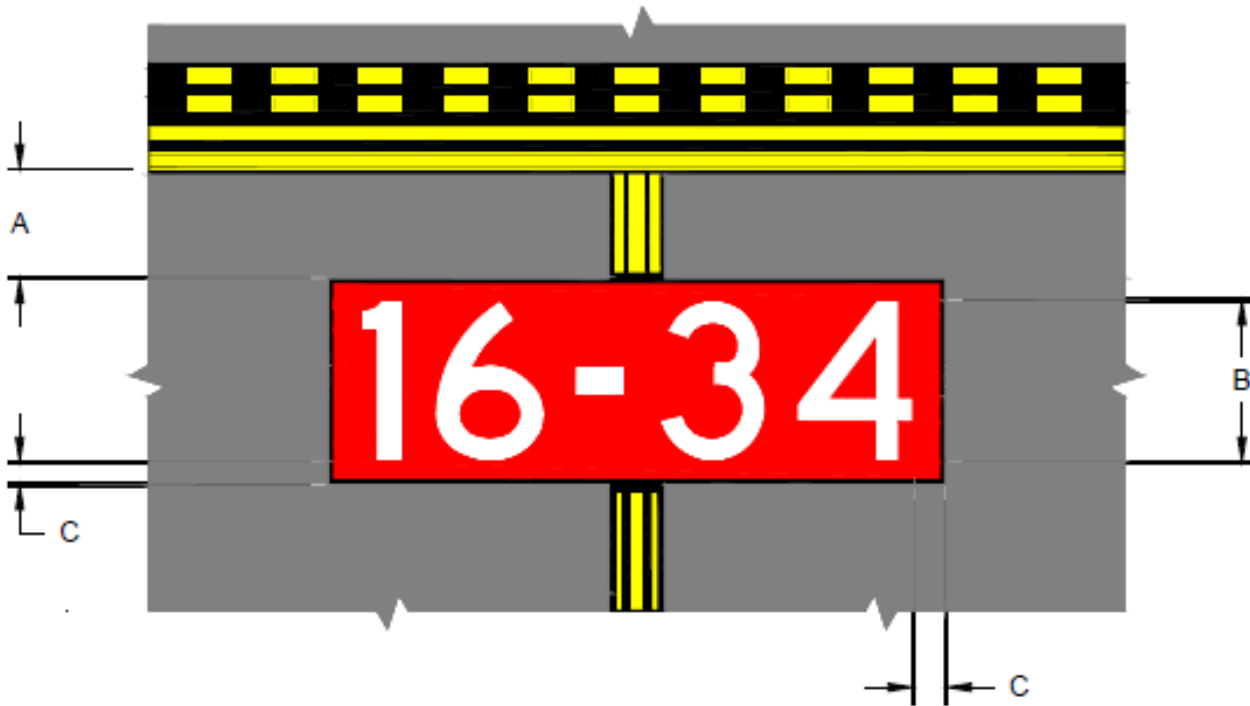
Airfield Markings

Surface Painted Holding Position Signs for Taxiway Widths Greater Than Thirty Five Feet



Dimension Letter	Dimension feet	Notes
A	2-4	
B	3-10	
C	9-12	Inscriptions must have a height of 12 feet; however, the height may be reduced as necessary, to the minimum height of 9 feet. In special situations, the surface painted marking may be reduced to less than 9 feet in order to fit the marking appropriately. Examples of special situations include taxiways with widths narrower than 75 feet or taxiways that need to display multiple runway designations with arrows. In all cases, inscriptions follow the Advisory Circular, Appendix A, inscription criteria. All other taxiway entrances to the same runway not needing the reduction are to maintain the 12 foot height dimension. For practicality, the lowest height reduction is 6 feet. In all cases the dimension D is not reduced.
D	15 inches	
E	9	
F	3	

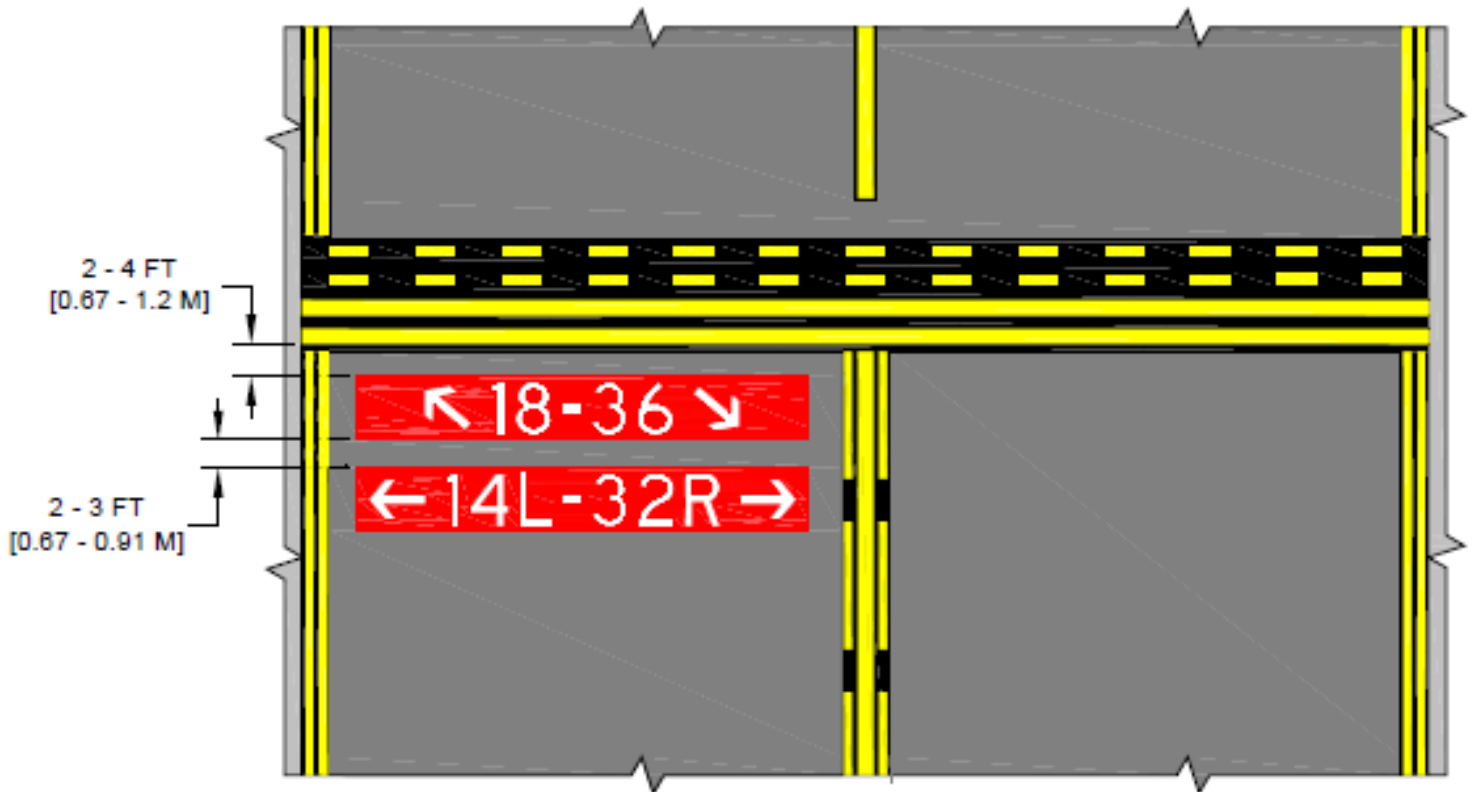
Surface Painted Holding Position Sign for Taxiway Widths Equal to or Less Than Thirty Five Feet.



Dimension Letter	Dimension feet	Notes
A	2-3	
B	6	<p>Inscriptions follow the Advisory Circular, Appendix A, inscription criteria. The size of the sign inscription is scaled to fit taxiways 35 feet or less in width for Airplane Design Group I and II. Reference AC 150/5300-13.</p> <p>In special situations the surface marking may be reduced to less than 6 feet in order to fit the marking appropriately. Examples of special situations include taxiways that need to display multiple runway designations with arrows. In all cases, the inscriptions follow the Advisory Circular, Appendix A, inscription criteria. All other taxiway entrances to the same runway not needing the reduction are to maintain the 6 foot height dimension.</p> <p>For practicality, the lowest height reduction is 3 feet.</p>
C	7.5 inches	

Note: The dimensions for the enhanced taxiway centerline are in Figure C-1 of the Advisory Circular. The spacing between the enhanced taxiway centerline and the surface painted holding position sign is 6-12 inches.

Narrow Taxiway Stacked Surface Painted Holding Position Signs

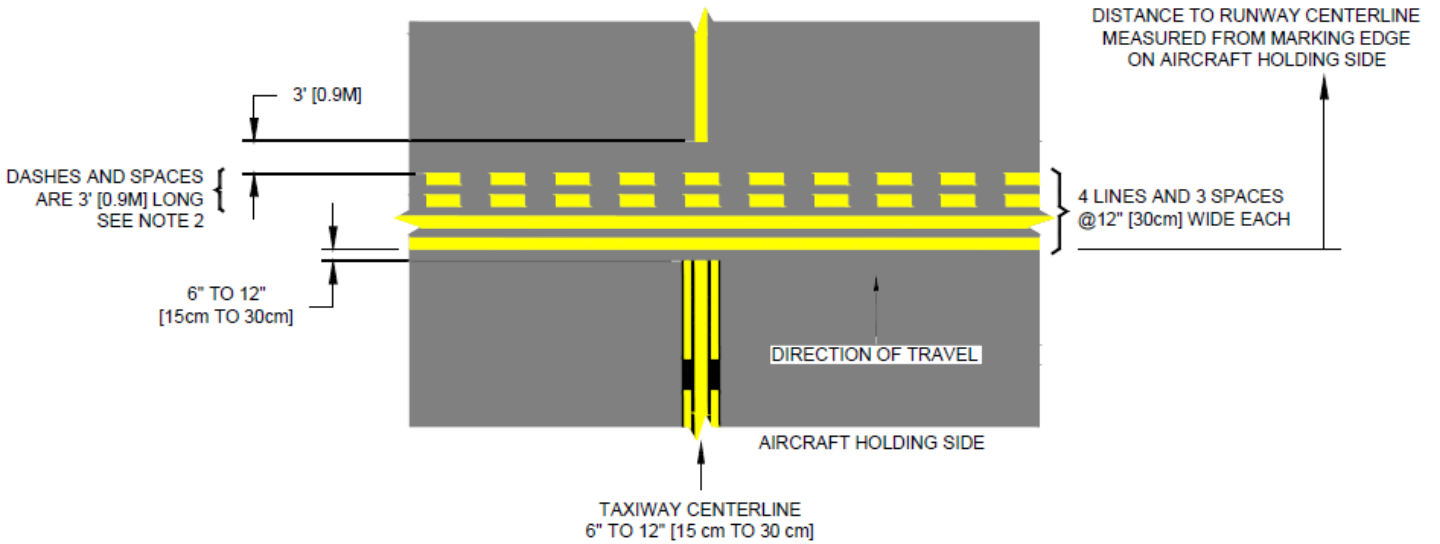


Notes:

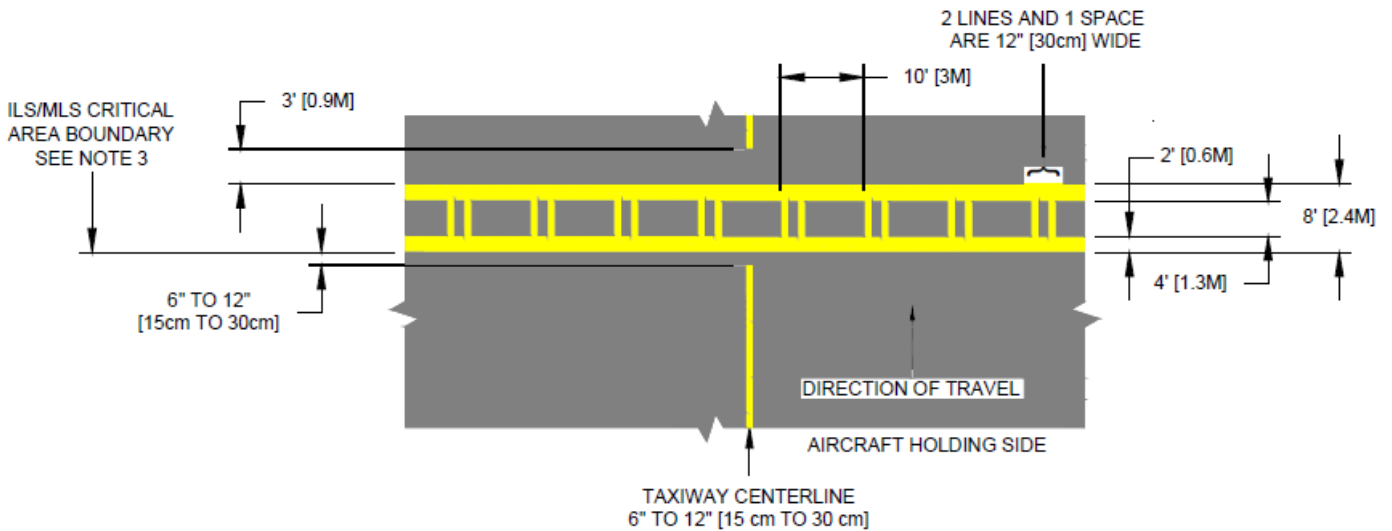
1. Stacked surface painted holding position signs for narrow taxiways- Only to be used per AC 150/5340-1, Paragraph 4.5(d)(1)(ii).
2. The recommended order of appearance is as follows:
 - (A) If the "stacked" surface painted holding position signs are for a taxiway that clearly accesses one runway (for example, Runway 14L-32R) before another runway (Runway 18-36), then the order of appearance is from "bottom up" as shown above.
 - (B) If the "stacked" surface painted holding position signs are for a taxiway that equally offers access to two or more runways, then follow a "clockwise" order of appearance as viewed for the holding position. Hence, the bottom surface painted holding position sign is the first runway as viewed from the holding position. This practice follows the signage convention.

Airfield Markings

Runway Holding Position Markings



ILS Holding Position Marking



Airfield Lighting

Runway Edge Light Spacing.....	25
Visual Runway End/Threshold Lights.....	26
Runway End/Threshold Lights installed with HIRLs	27
Runway with a Taxiway at the End.....	28
Runway with a Blast Pad.....	29
Runway with a Displaced Threshold.....	30
Normal Runway with a Taxiway.....	31
Runway Centerline Lights with a Displaced Threshold.....	32
Greater than 700'	32
Less than 700'	33
Runway with a Stopway	34
Runway with a Displaced Threshold and Stopway.....	35
Runway with End Taxiway	36
Runway with a Displaced Threshold and End Taxiway	37
Taxiway Lead-off Lights	38
Taxiway Centerline Lights Crossing a Runway.....	39
Taxiway Centerline Lighting Configuration for Acute - Angled Exits	40
Runway End Identifier Lights REILs	41

Runway Edge Light Spacing

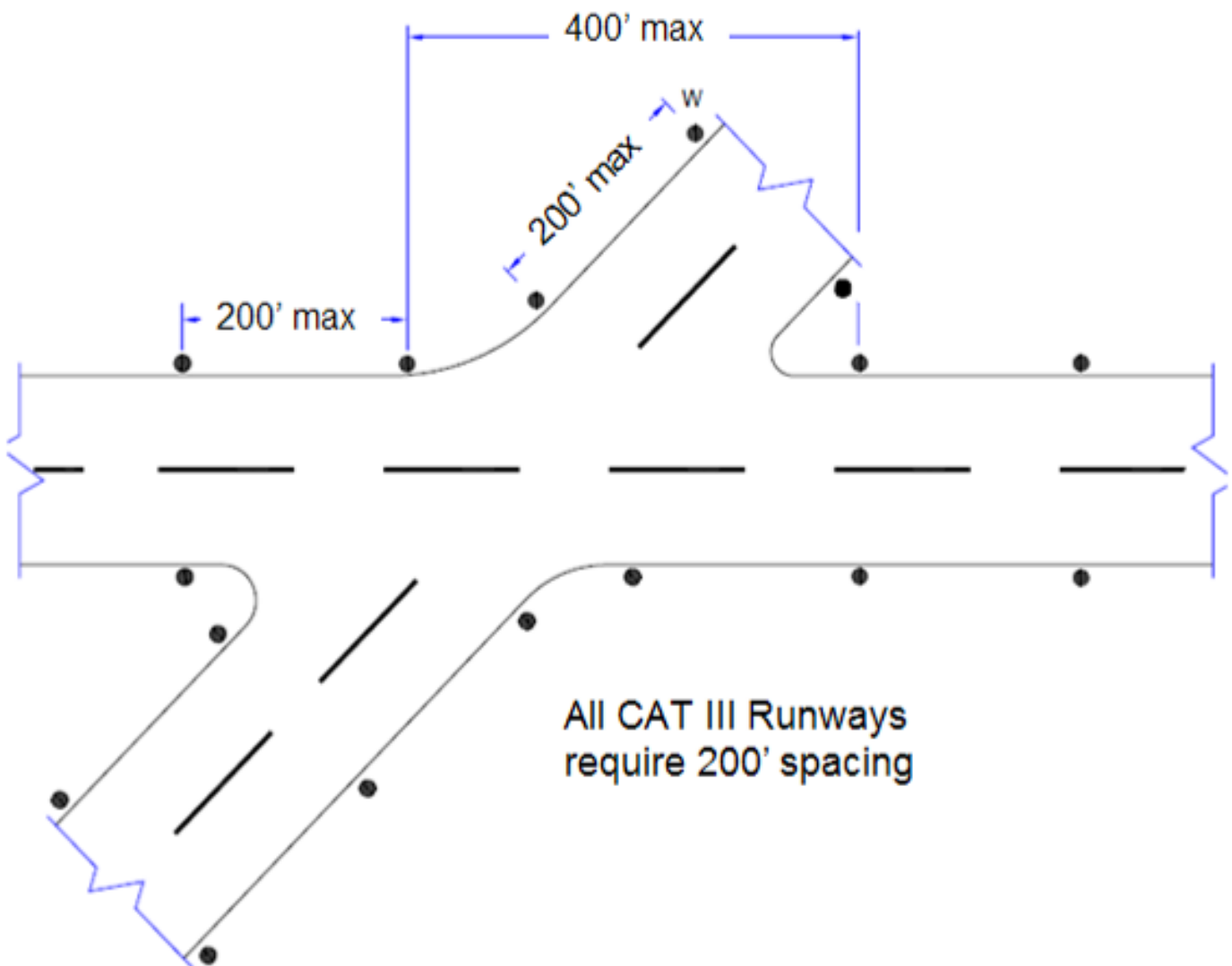
2' minimum – 10' maximum from the runway edge (full strength pavement).

Longitudinal Spacing: 200' maximum

At taxiway and runway intersections:

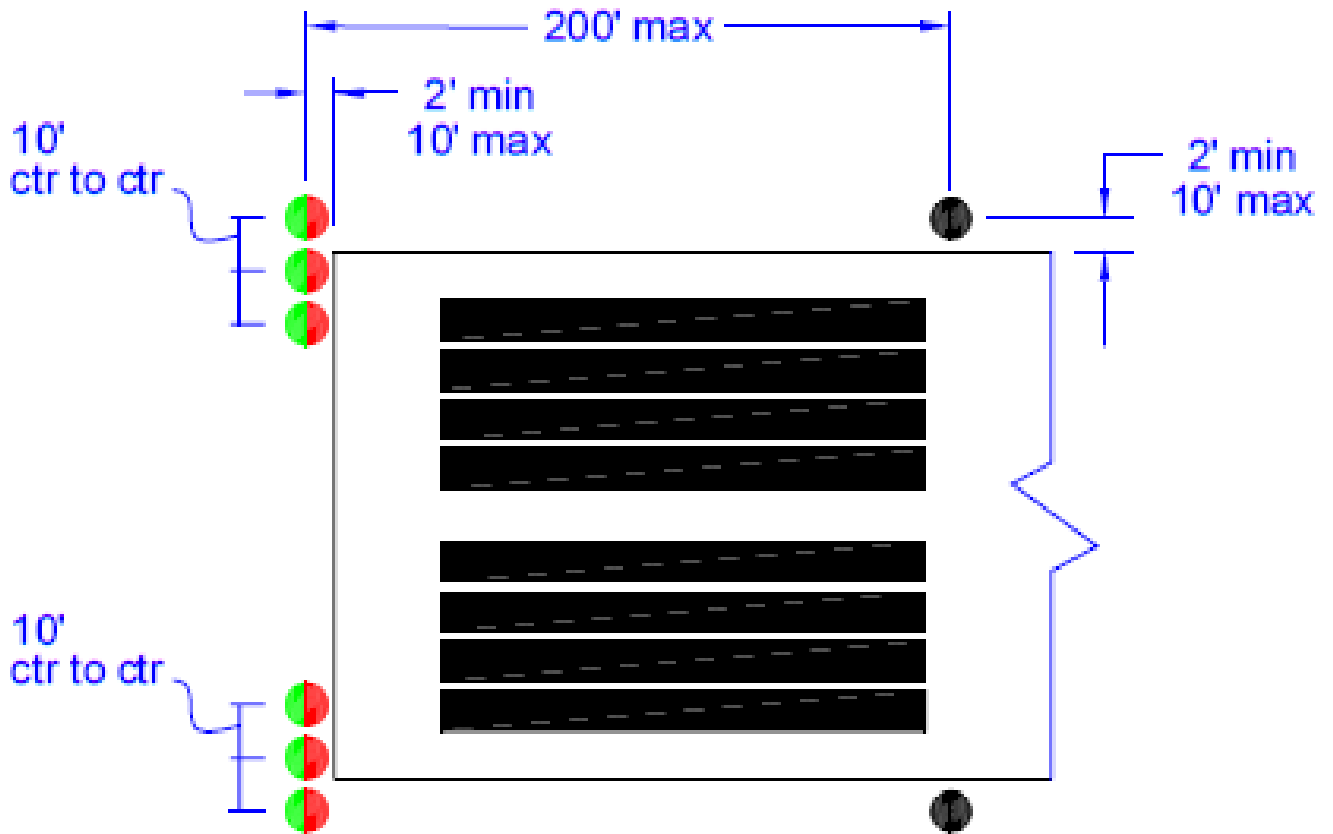
Up to a 400' gap is allowed (except CAT III runways)

CAT III runways require uniform spacing from threshold to threshold, not to exceed 200'. Install in-pavement lights at intersections, as needed.



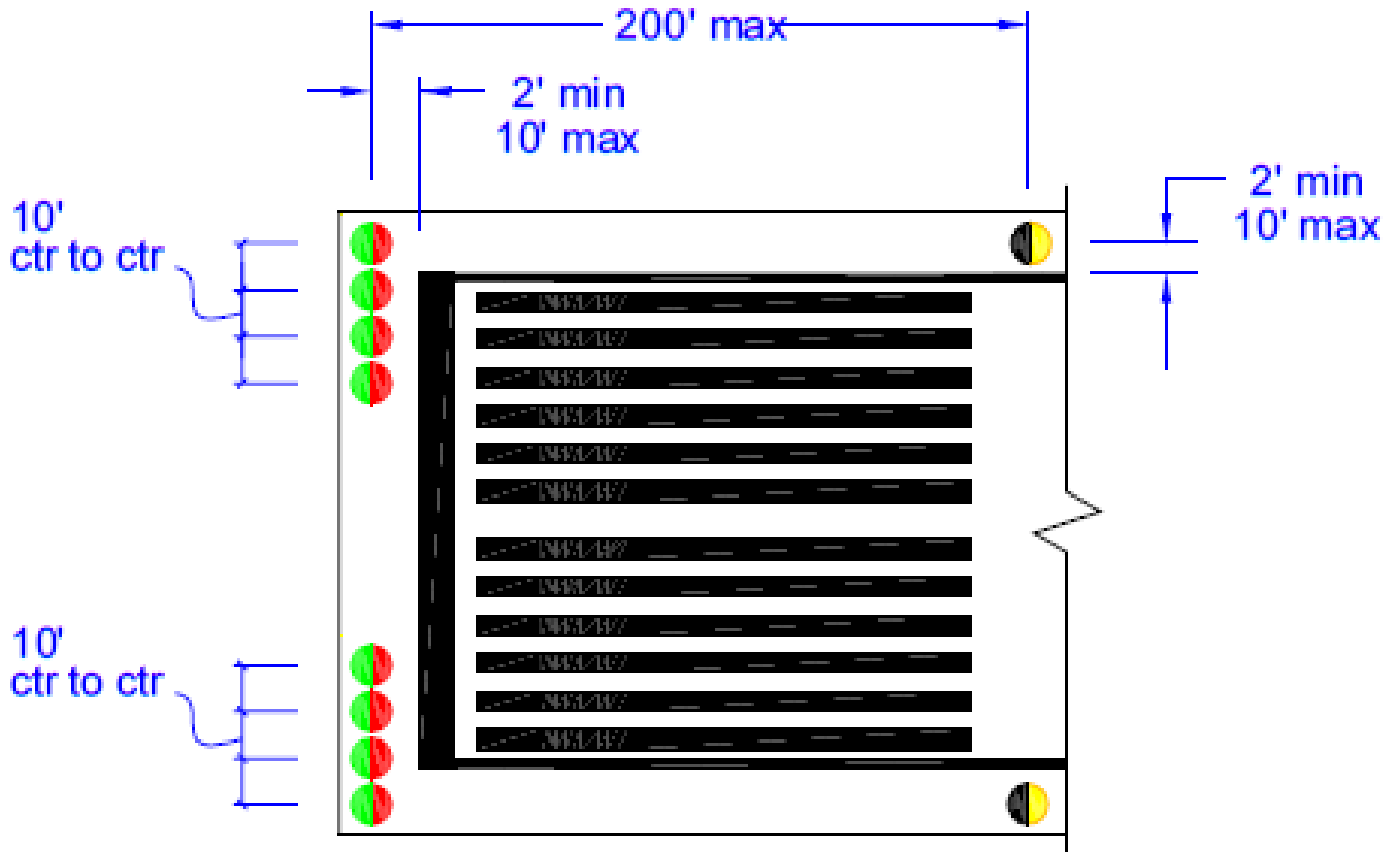
Airfield Lighting

Visual Runway End/Threshold Lights



LEGEND
Ctr: center

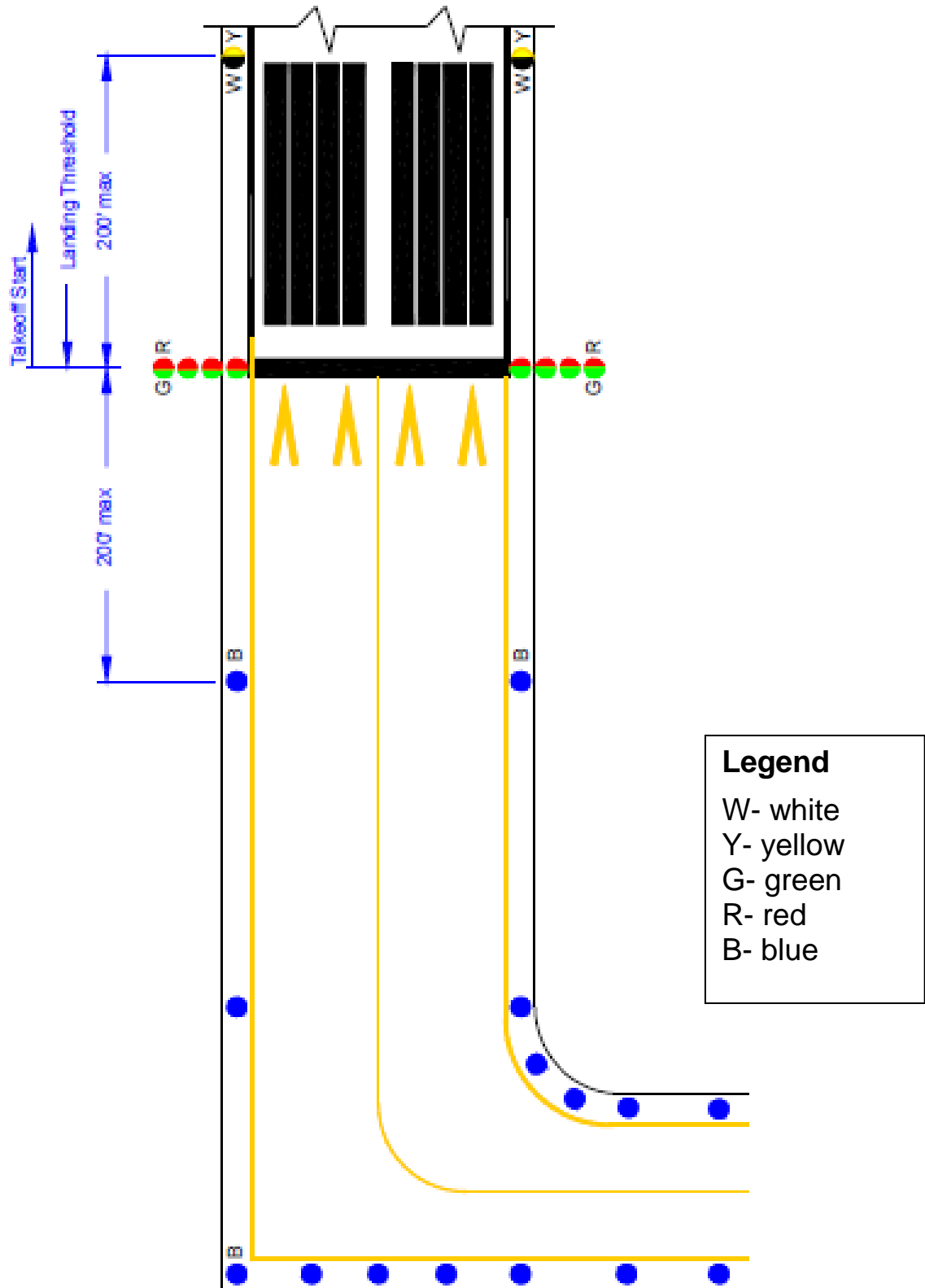
Runway End/Threshold Lights installed with HIRLs



Legend
Ctr: Center

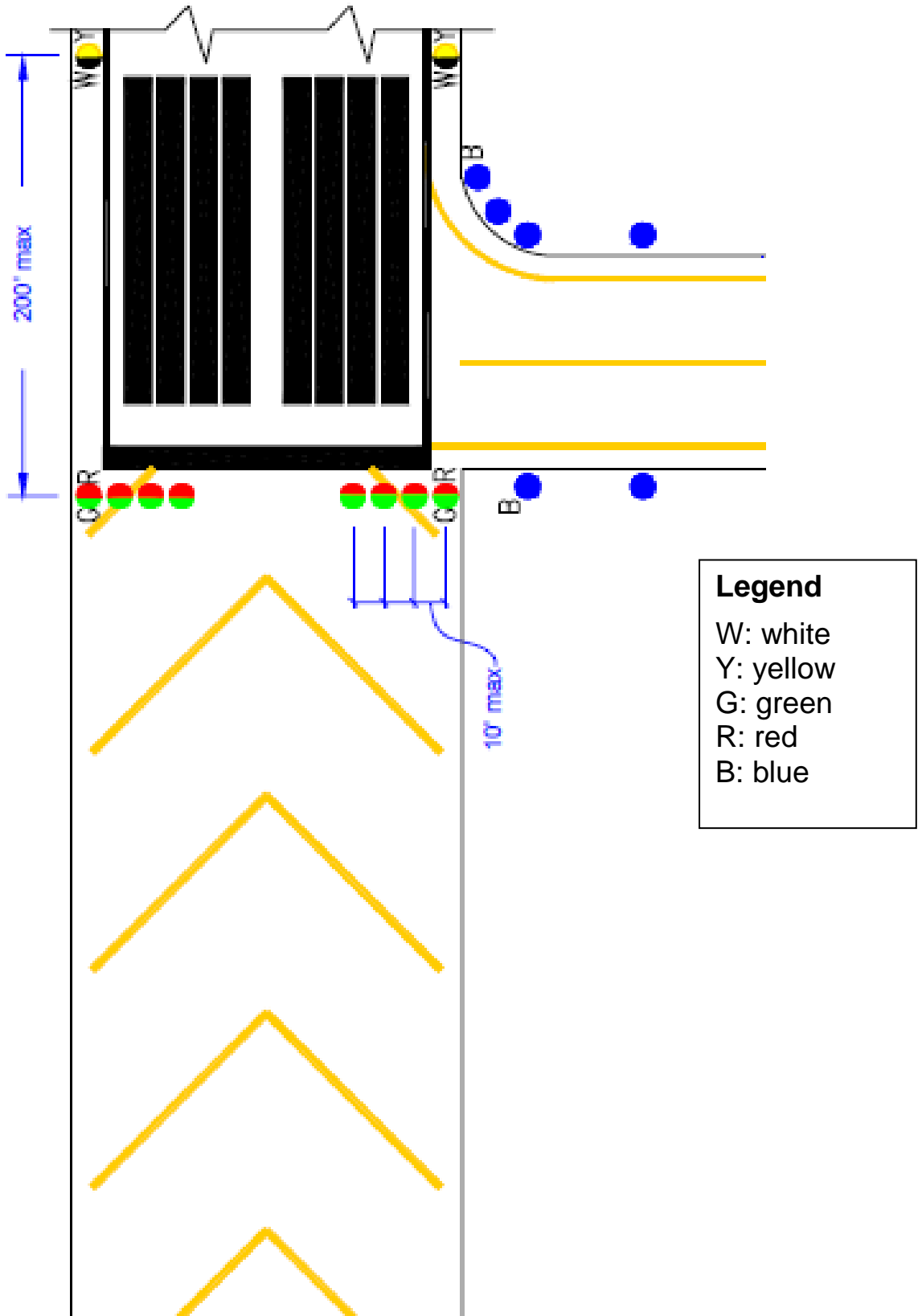
Airfield Lighting

Runway with a Taxiway at the End

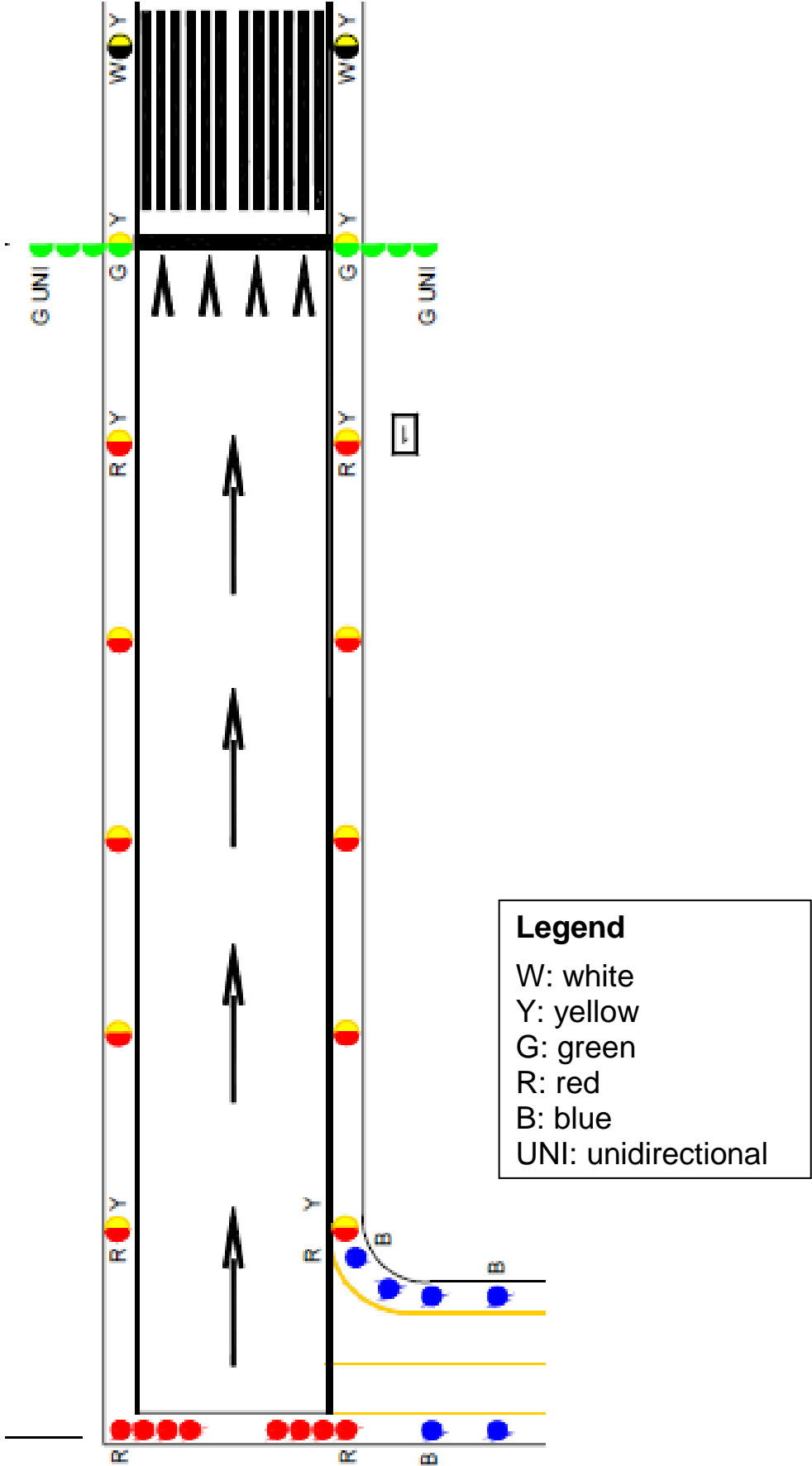


Airfield Lighting

Runway with a Blast Pad

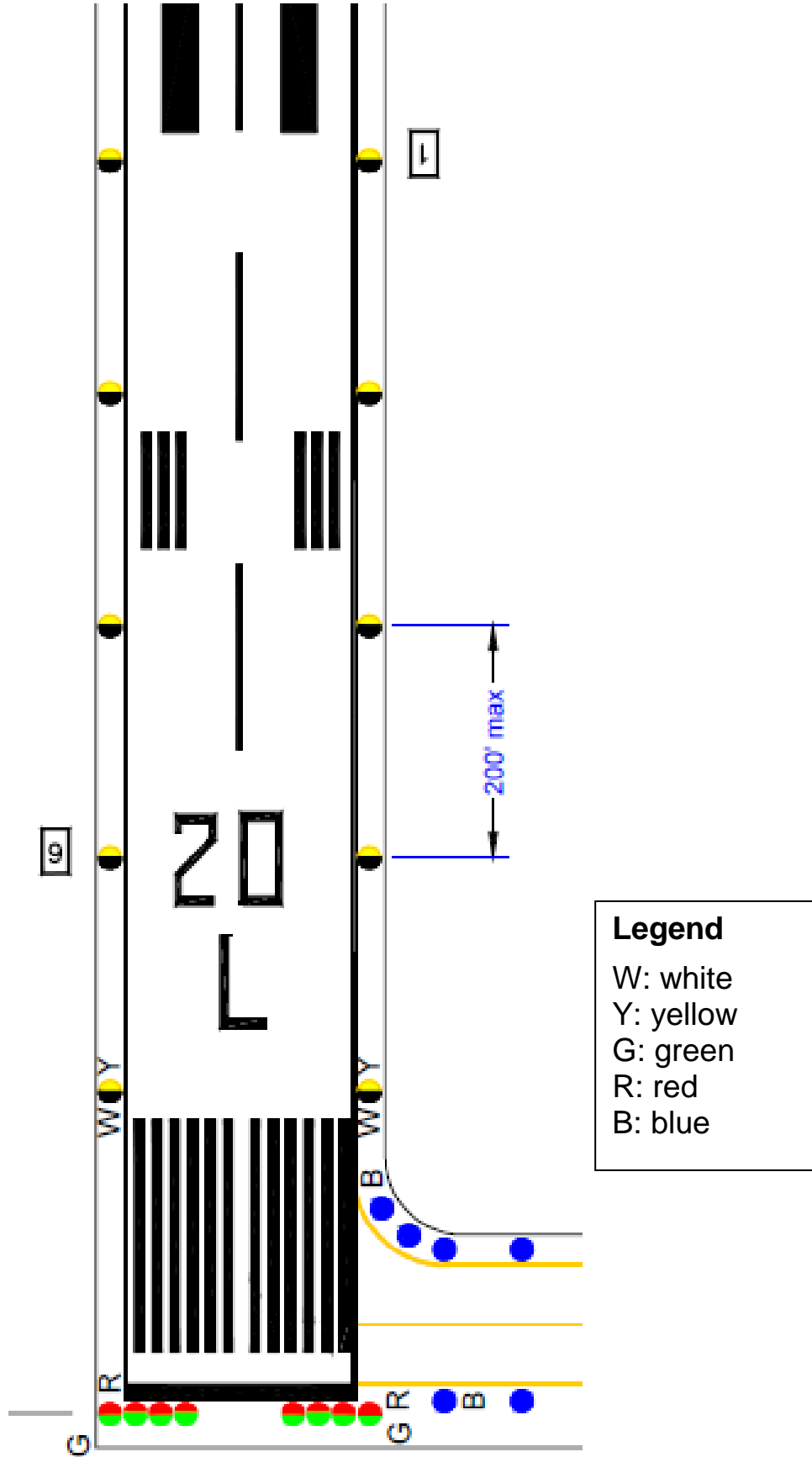


Airfield Lighting
Runway with a Displaced Threshold

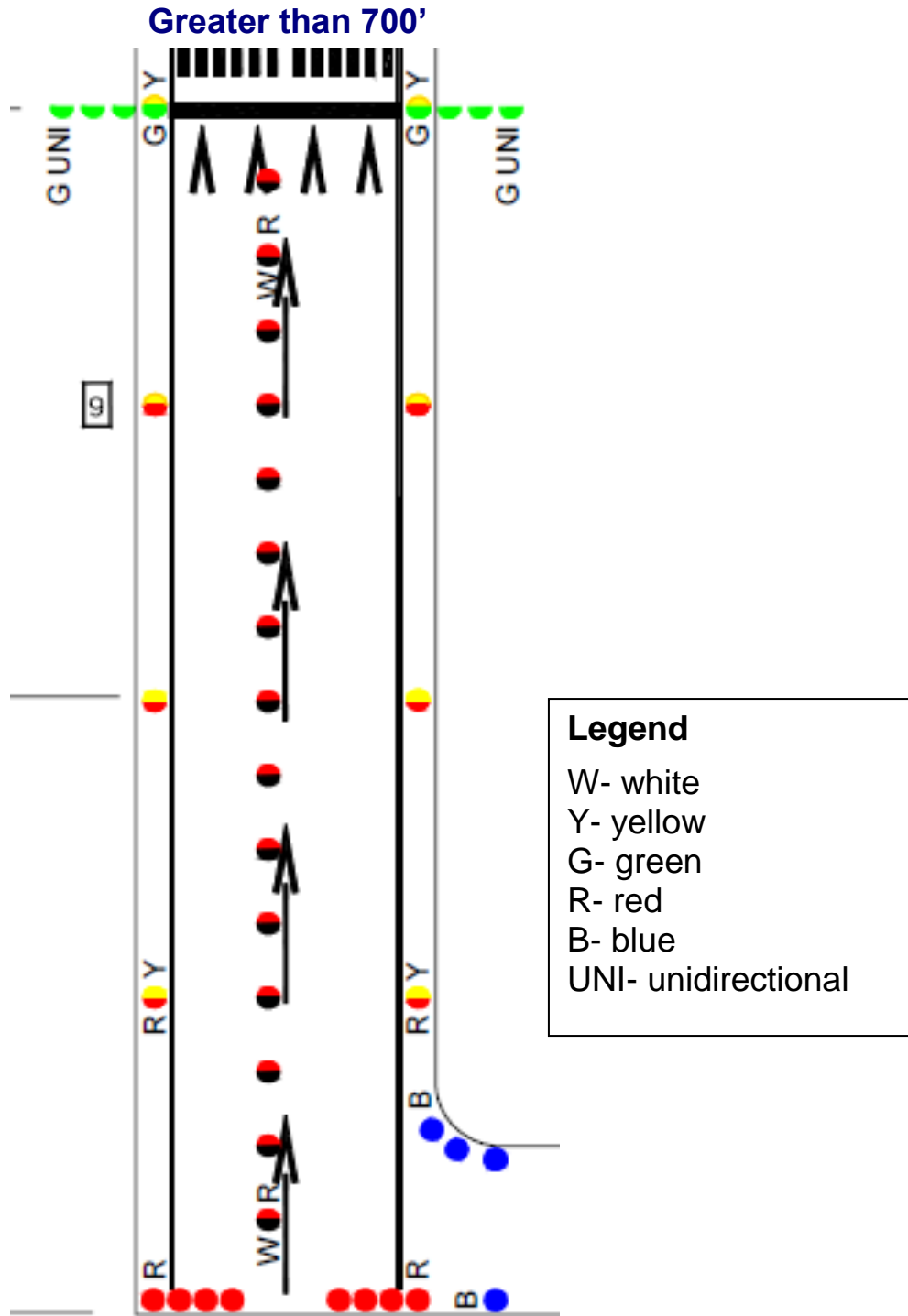


Airfield Lighting

Normal Runway with a Taxiway

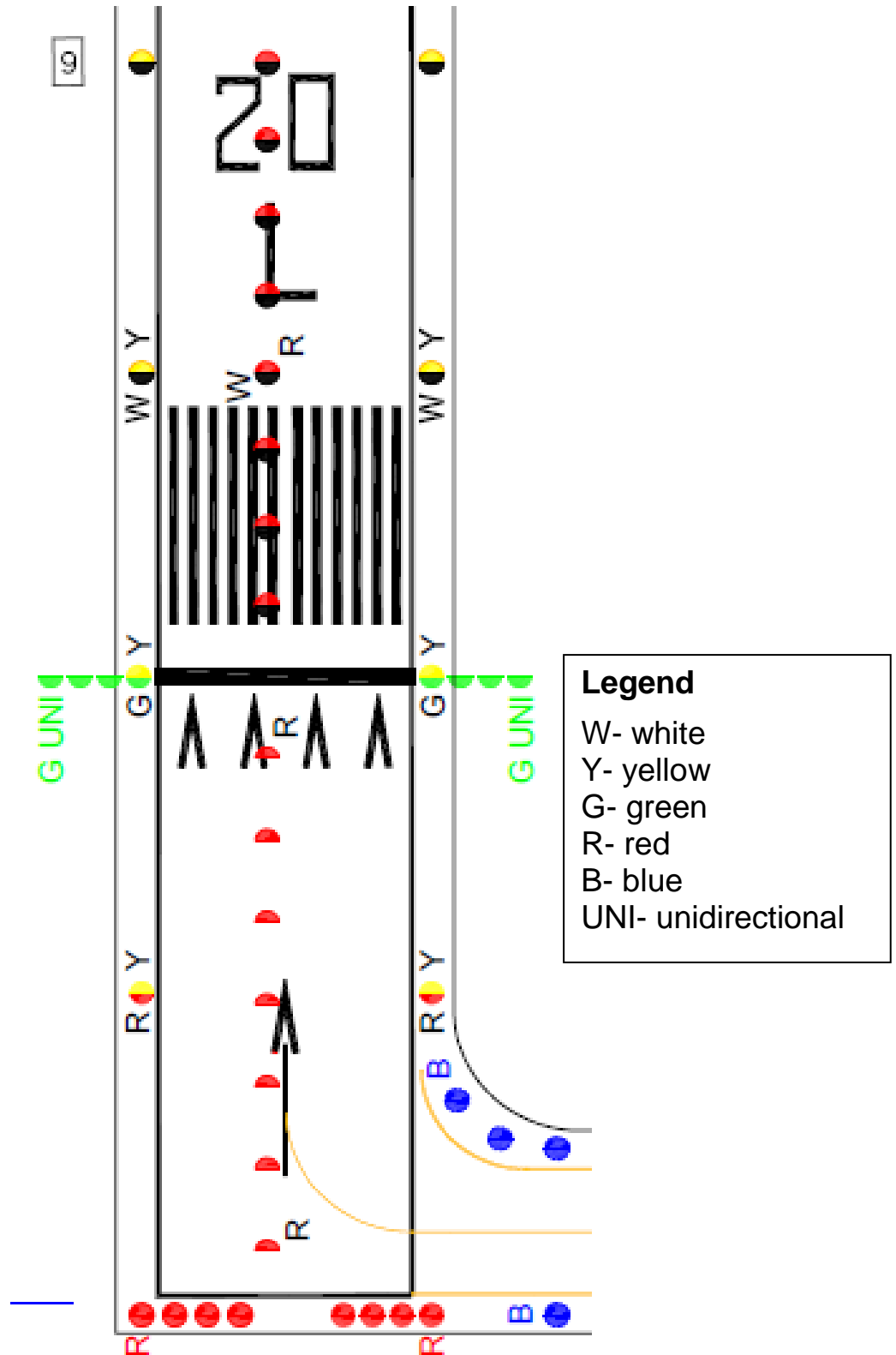


Runway Centerline Lights with a Displaced Threshold



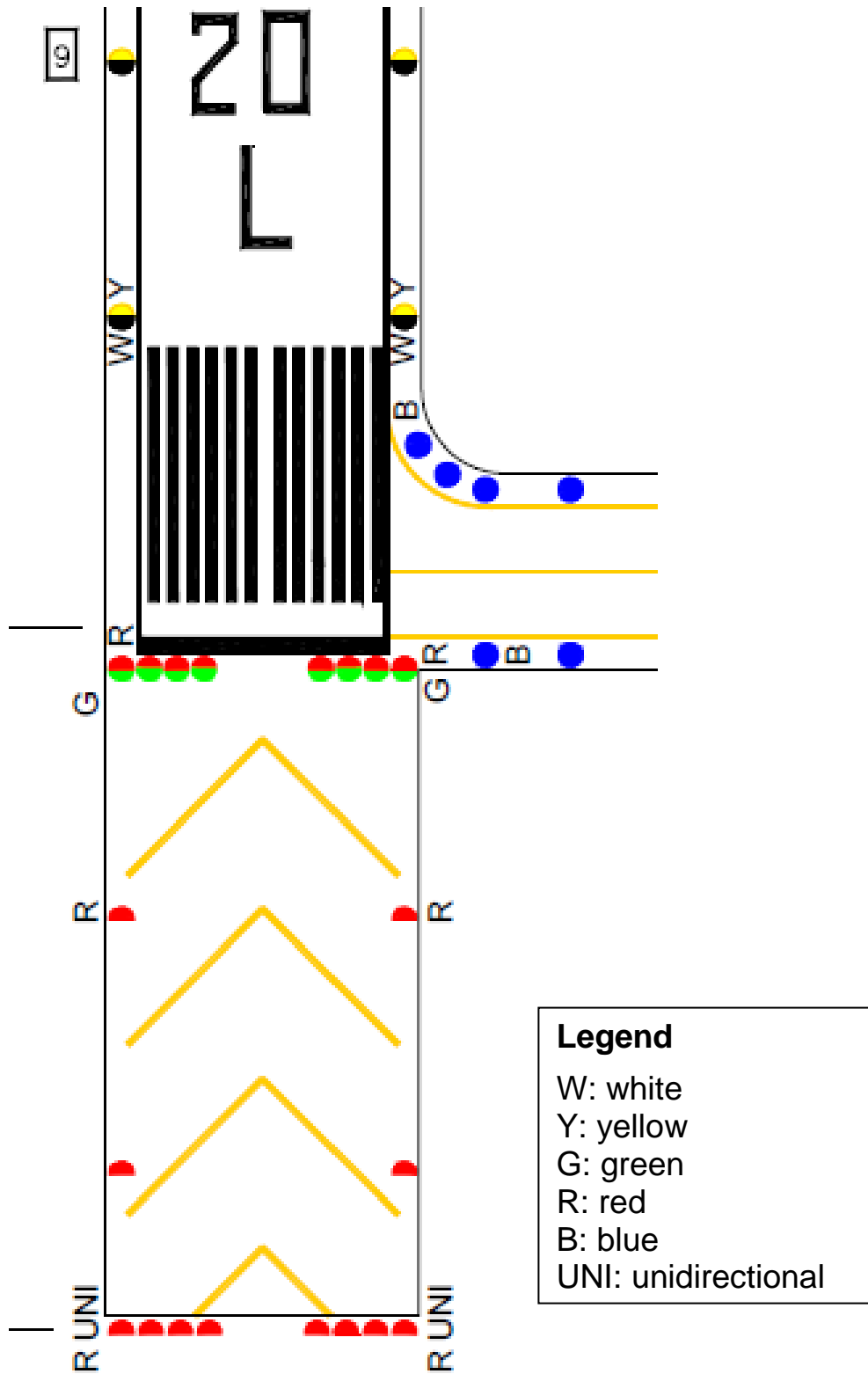
Note: The centerline lights in the displace area should be circuited separately from the non-displaced area to permit turning-off during landing operations (not required if approach lights are high intensity).

Runway Centerline Lights with a Displaced Threshold Less than 700'



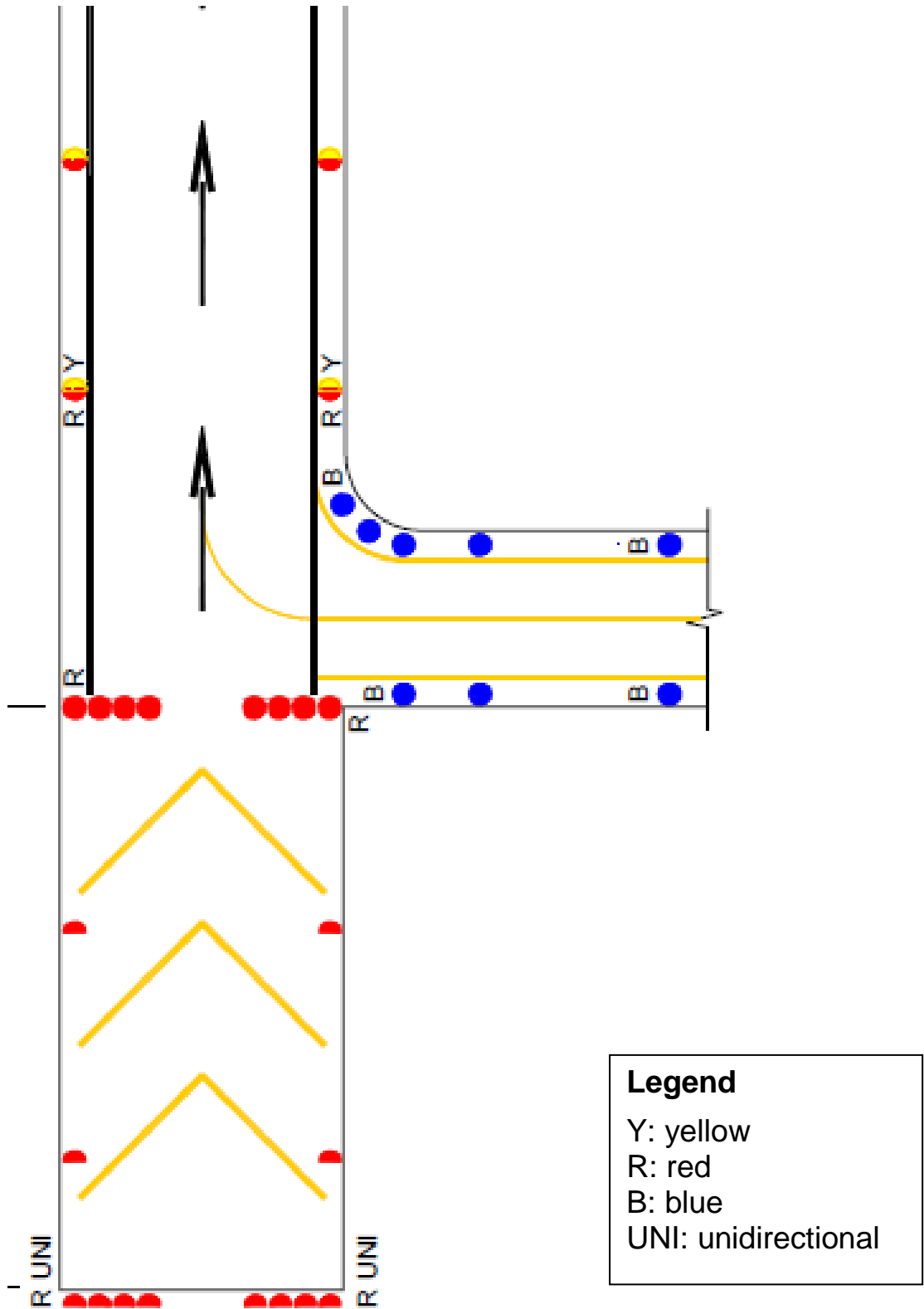
Note: The centerline lights in the displaced threshold are blanked out in the approach direction.

Runway with a Stopway

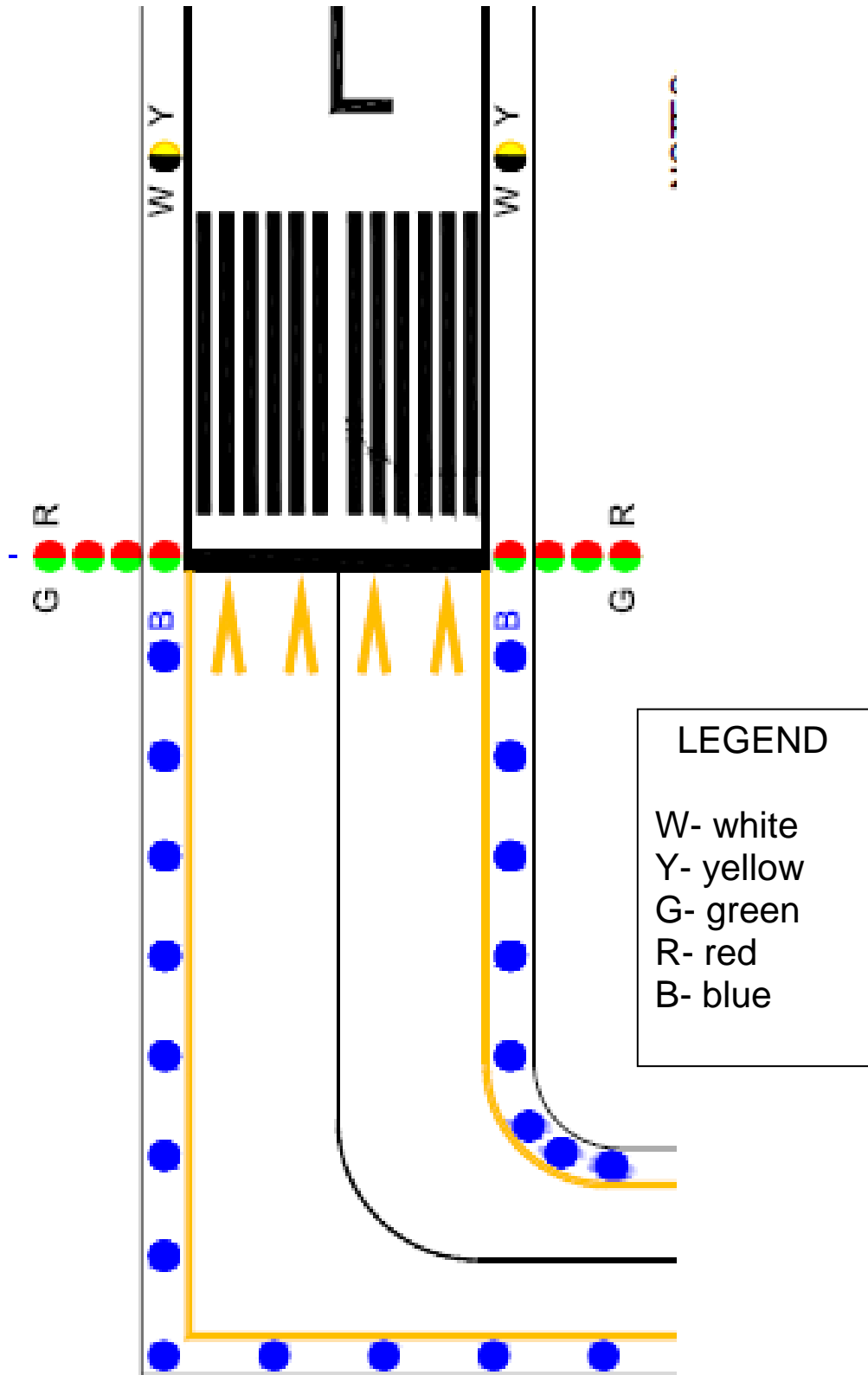


Note: Stopways look like blast pads but are considered full-strength pavement and are suitable to support aircraft during an aborted take-off.

Runway with a Displaced Threshold and Stopway

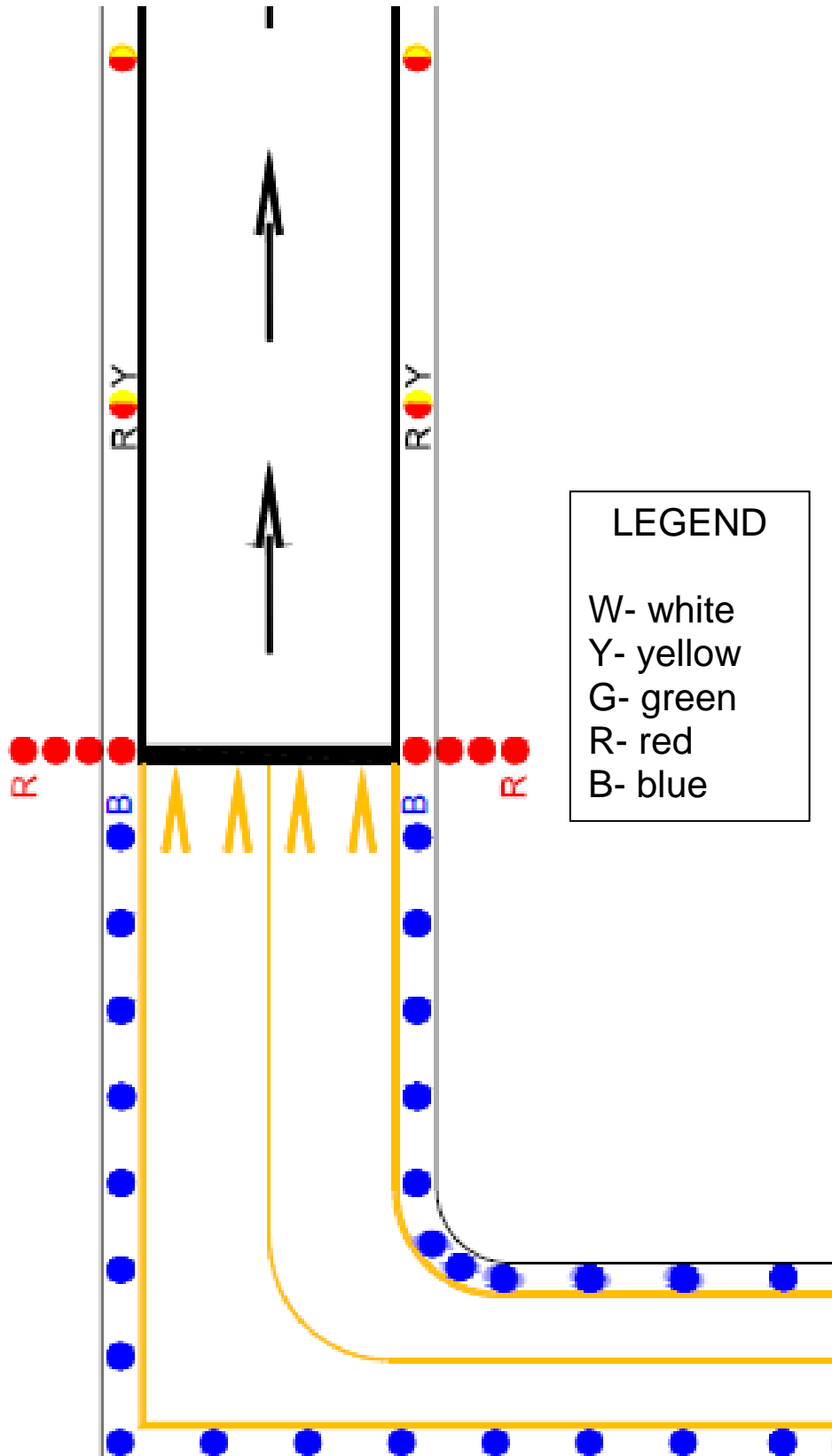


Runway with End Taxiway



Airfield Lighting

Runway with a Displaced Threshold and End Taxiway

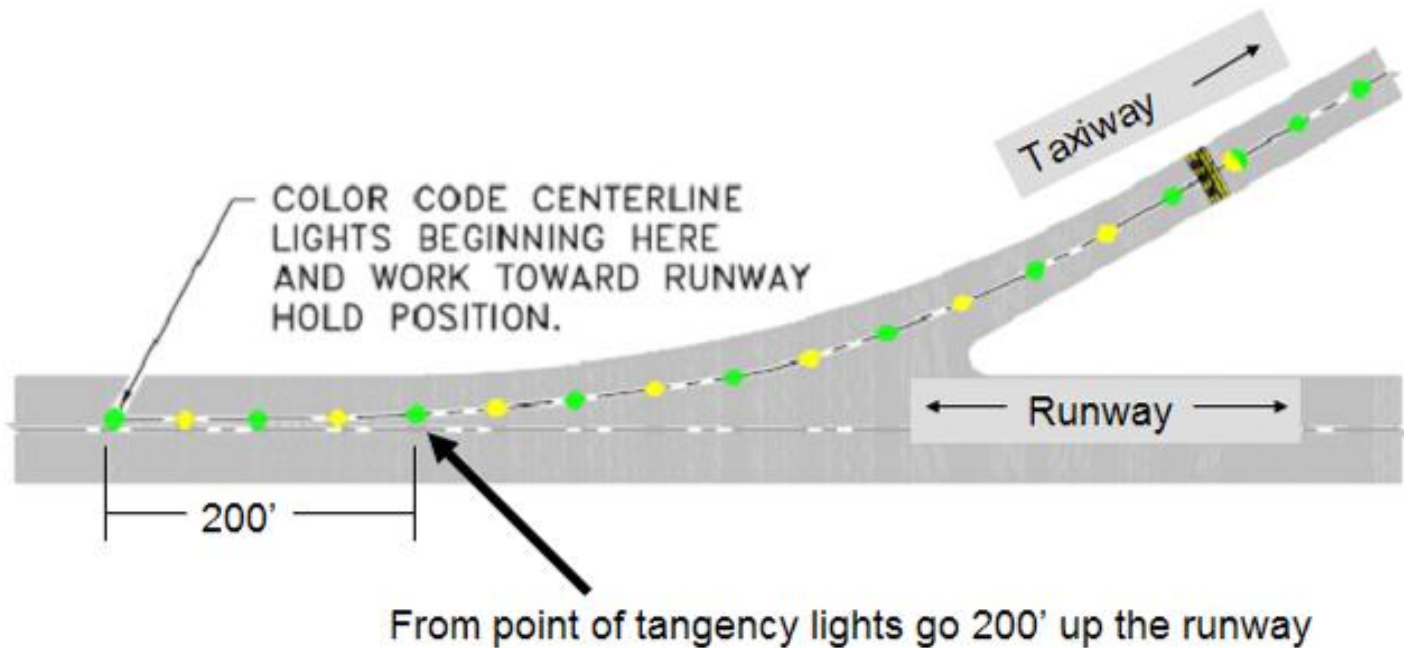


Taxiway Lead-off Lights

Note 1: If there is an ILS critical area present beyond the runway holding position, the color-coded lights continue to the ILS critical area holding position.

Note 2: When exiting the runway the first fixture past the hold position marking should be bidirectional to show yellow on the runway-side and green on the holding-side.

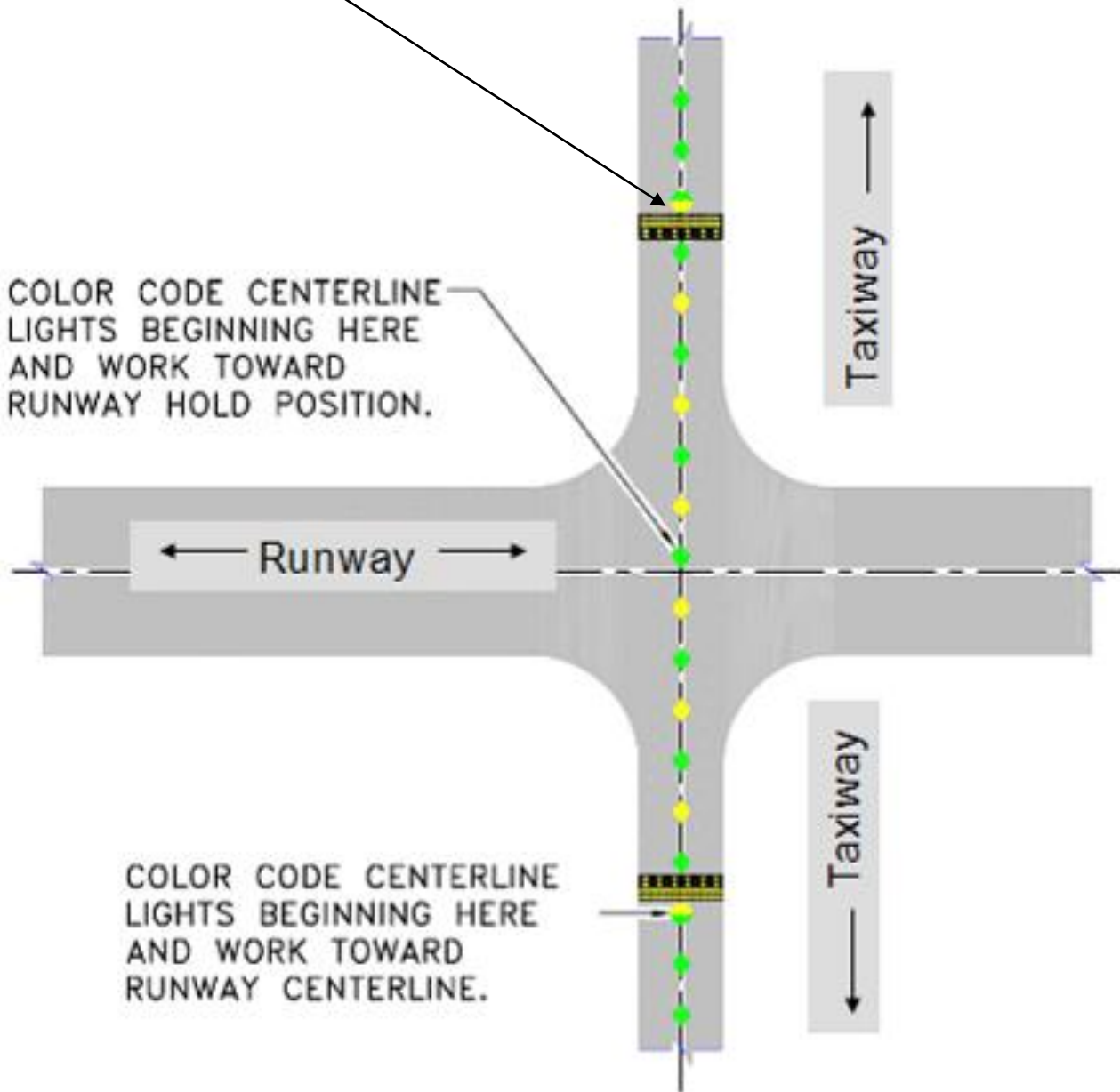
Note 3: The first light on the runway is green. If there are an odd number of color-coded lights, the first two lights should be green.



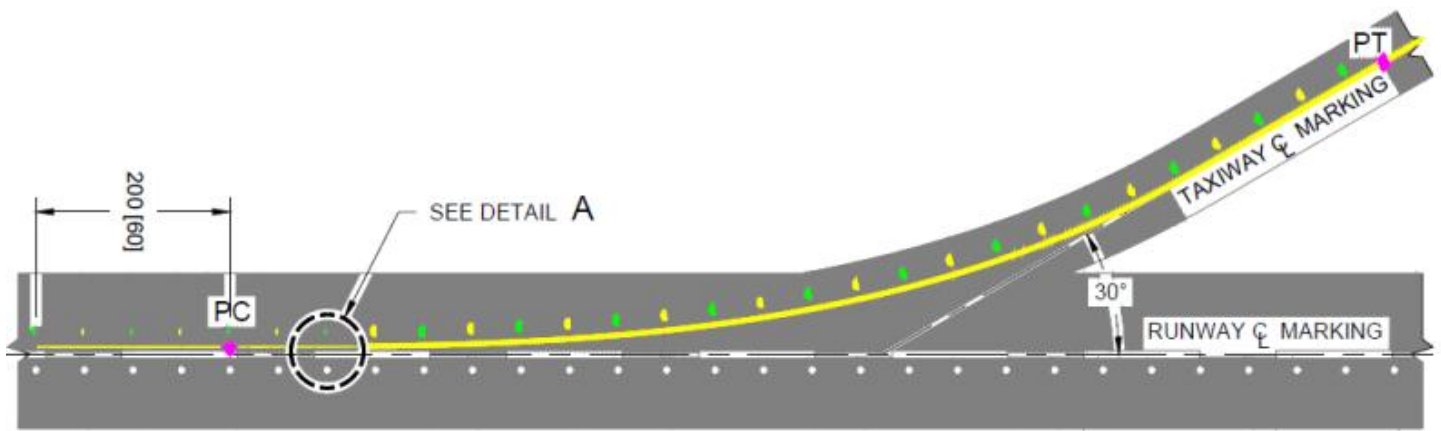
Taxiway Centerline Lights Crossing a Runway

Note 1: If the layout of the lights results in an odd number of lights, make the two lights near the runway centerline green.

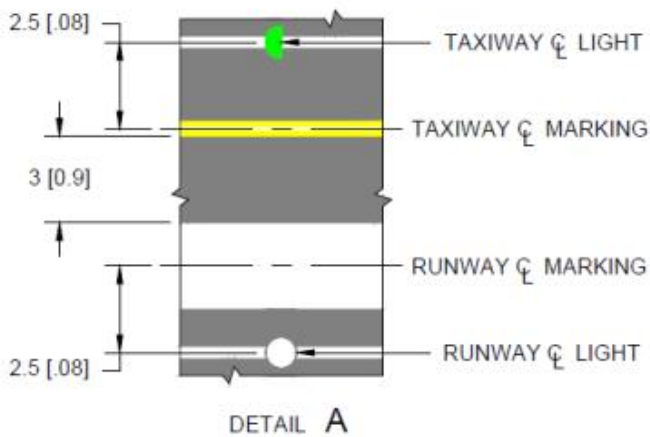
Note 2: The fixture prior to the runway hold-position must always be green when approached from the taxi direction and yellow when approached from the runway direction (bi-directional).



Taxiway Centerline Lighting Configuration for Acute - Angled Exits



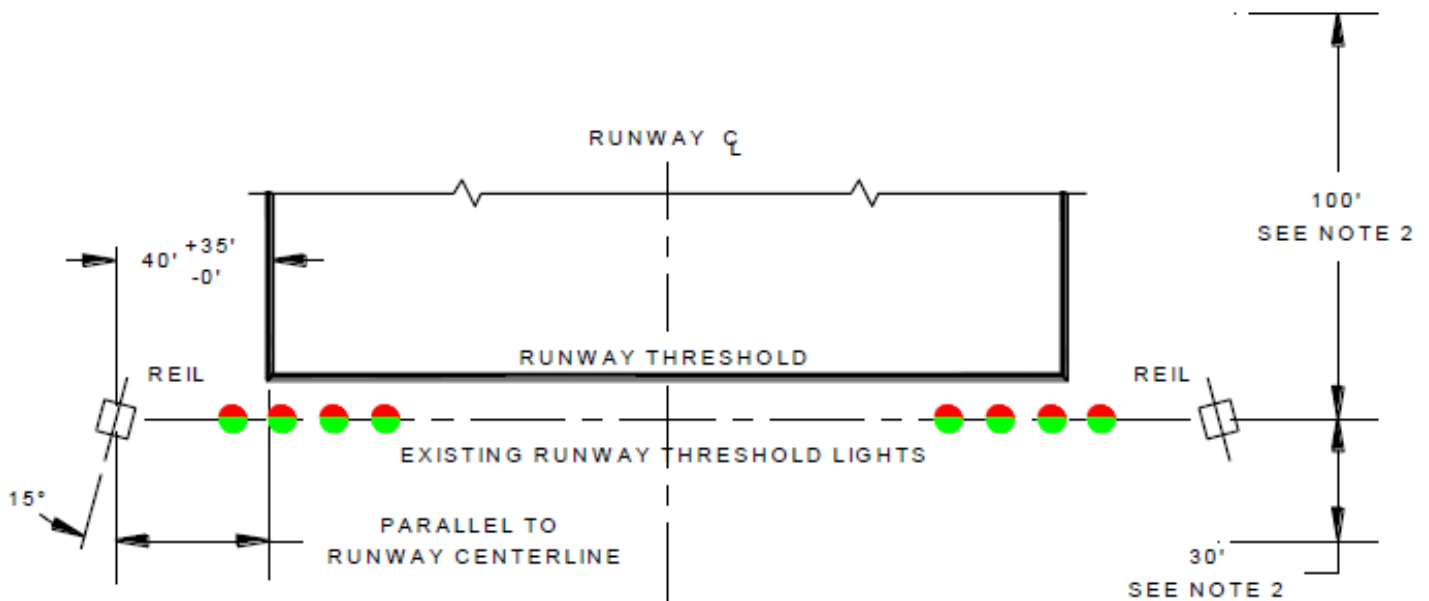
ACUTE-ANGLED EXIT TAXIWAY (TYPICAL)



NOTES:

1. DIMENSIONS ARE EXPRESSED AS FEET [METERS].
2. THE TAXIWAY CENTERLINE "LEAD OFF" LIGHTS SHOULD BE INSTALLED ON THE RUNWAY EXIT SIDE OF THE TAXIWAY CENTERLINE MARKING AT 50 [15] SPACING.
3. THE TAXIWAY CENTERLINE "LEAD OFF" LIGHTS ARE INSTALLED IN RELATION TO THE CURVE DESIGNATED AS THE TRUE CENTERLINE OF THE TAXIWAY PATH.
4. THE ORIENTATION OF THE LIGHT BEAMS SHALL BE AS SPECIFIED IN PARAGRAPH 4.3.i.

Runway End Identifier Lights REILs



Notes:

1. The optimum location for each light unit is in line with the runway threshold at 40 ft. from the runway edge.
2. A 100 ft. upwind and a 30 ft. downwind longitudinal tolerance is permitted from the runway threshold in locating the light units.
3. The light units shall be equally spaced from the runway centerline. When adjustments are necessary the difference in the distance of the units from the runway centerline shall not exceed 10 ft.
4. The beam centerline (aiming angle) of each light unit is aimed 15 degrees outward from a line parallel to the runway centerline and inclined at an angle 10 degrees above the horizontal. If angle adjustments are necessary, provide an optical baffle and change the angles to 10 degrees horizontal and 20 degrees vertical.
5. Locate the ADL equipment a minimum distance of 40ft from other runways and taxiways.
6. If REILs are used with VASI, install REILs at 75 ft. from the runway edge. When installed with other glideslope indicators REILs shall be installed at 40 ft. from the runway edge unless there are concerns with jet blast and wing vortices.
7. The elevation of both units shall be within 3 ft. of the horizontal plane through the runway centerline.

Construction Safety

- Safety Areas and Work Limits 43
- Construction Reminders 43
- Barricades 44
- Temporarily Closed Runways 45
- Marking Temporarily Relocated or Displaced Runway Threshold 46
- Lighting Temporarily Relocated or Displaced Runway Thresholds 47
- Procedures for Opening an Unmarked Runway..... 48
- Temporarily Closed Taxiways..... 49

Safety Areas and Work Limits

- Construction activities are prohibited in safety areas while the associated runway or taxiway is open to ALL aircraft.
- Only the airport operator may initiate or cancel NOTAMs on airport conditions, and is the only entity that can close or open a runway.
- Stockpiled materials and equipment storage are not permitted within the runway safety area and object free zone, and if possible should not be permitted within the object free area of an operational runway.
- Stockpiling material in the object free area requires submittal of a 7460-1
- Open trenches or excavations are not permitted in the Taxiway Safety Area.

Construction Reminders

- Establish procedures for the immediate notification of users and the FAA of any condition adversely affecting safety.
- Develop a good, specific Construction Safety Plan. Update during the project, as needed.
- Conduct periodic safety meetings with contractors and tenants.
- Continually review NOTAMs.
- Don't forget to include the aircraft rescue and firefighting department in all construction planning and updates and NOTAM notification.
- Penalties for non-compliance established in construction contracts are useful in ensuring contractor compliance with safety procedures.
- Remember to use sweepers to control FOD from construction vehicles at movement area crossings.
- Inspect construction areas completely before opening/re-opening any airport surfaces.
- Use a "start-up/shut-down" checklist.
- Train, train, train, all employees and contractors who move around the Airport Operations Area.
- Check construction barricades and other lighting during the night inspection.
- Coordinate all construction at the planning stage with the Air Traffic Control Tower to determine if a Safety Risk Management Document (SRMD) is needed.

Barricades



IN MOVEMENT AREAS

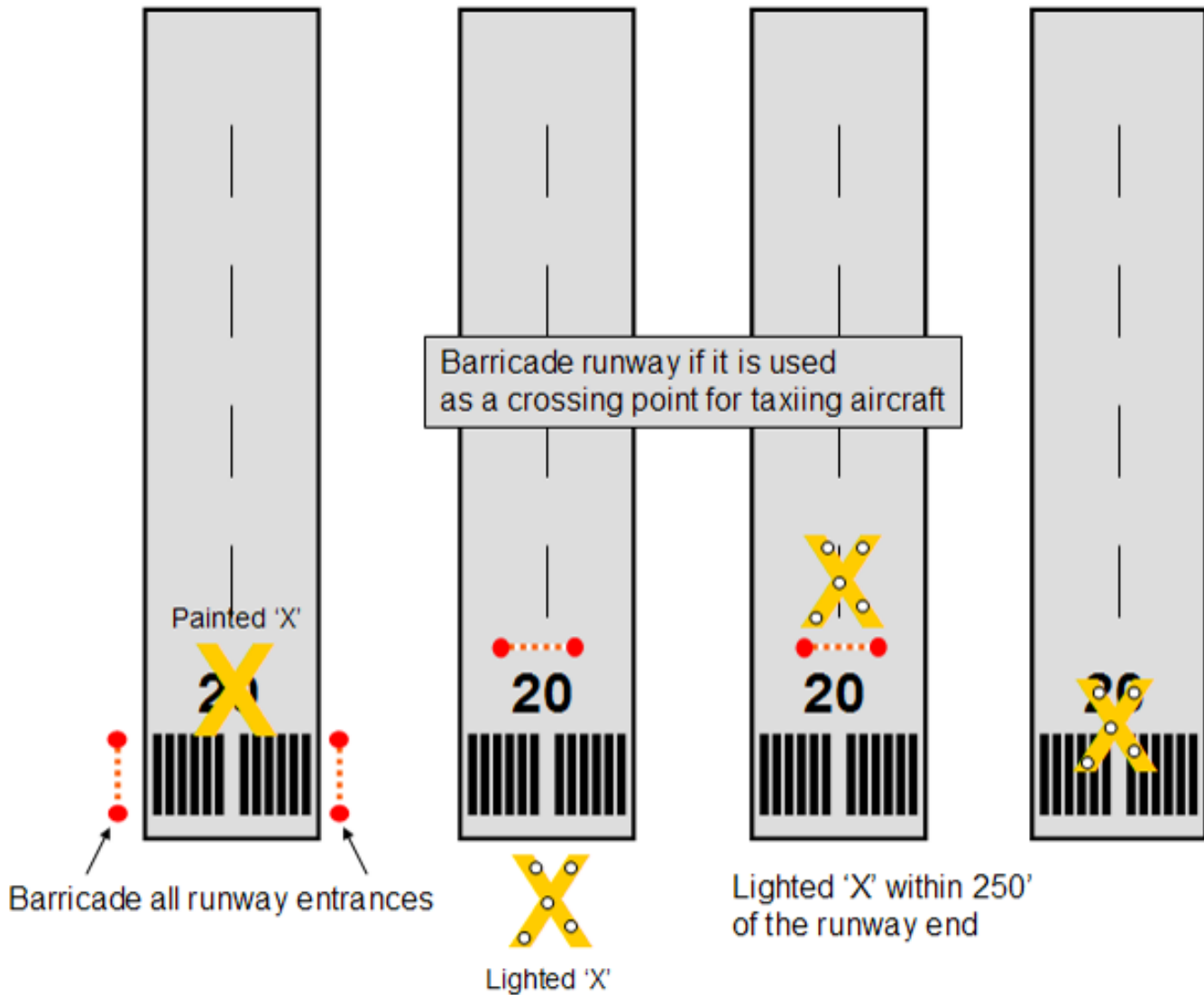
YES	NO
<ul style="list-style-type: none"> • low mass and height • weighted(if exposed to jet blast) • easily collapsible • retro-reflective orange and white in color • frangible(if attached) • weighted traffic cones • orange/white flags attached • Red lights(flashing or steady burning) 	<ul style="list-style-type: none"> • railroad ties • cement blocks • tall barrels or metal drums • jersey(cement) barriers • amber(yellow) lights • wooden saw horses • heavy, metal A-frames • concrete filled buckets

ALL closed areas must be appropriately barricaded, especially taxiways and closed runway entrances.

- The spacing of barricades must be such that a breach is physically prevented barring a deliberate act. For example, if barricades are intended to exclude vehicles, gaps between barricades must be smaller than the width of the excluded vehicles, generally 4 ft. Provision must be made for ARFF access if necessary. If barricades are intended to exclude pedestrians, they must be continuously linked. Continuous linking may be accomplished through the use of ropes, securely attached to prevent FOD.
- Supplement barricades with signs; "No Entry" "No Vehicles" (optional)
- Barricades are not permitted in any active safety area.
- Even for closures of relatively short duration, close all taxiway/runway intersections with barricades. The use of traffic cones is appropriate for short duration closures.
- All barricades adjacent to any open runway or taxiway, taxilane, safety area, or apron must be as low as possible to the ground, and no more than 18 inches high, exclusive of supplementary lights and flags.

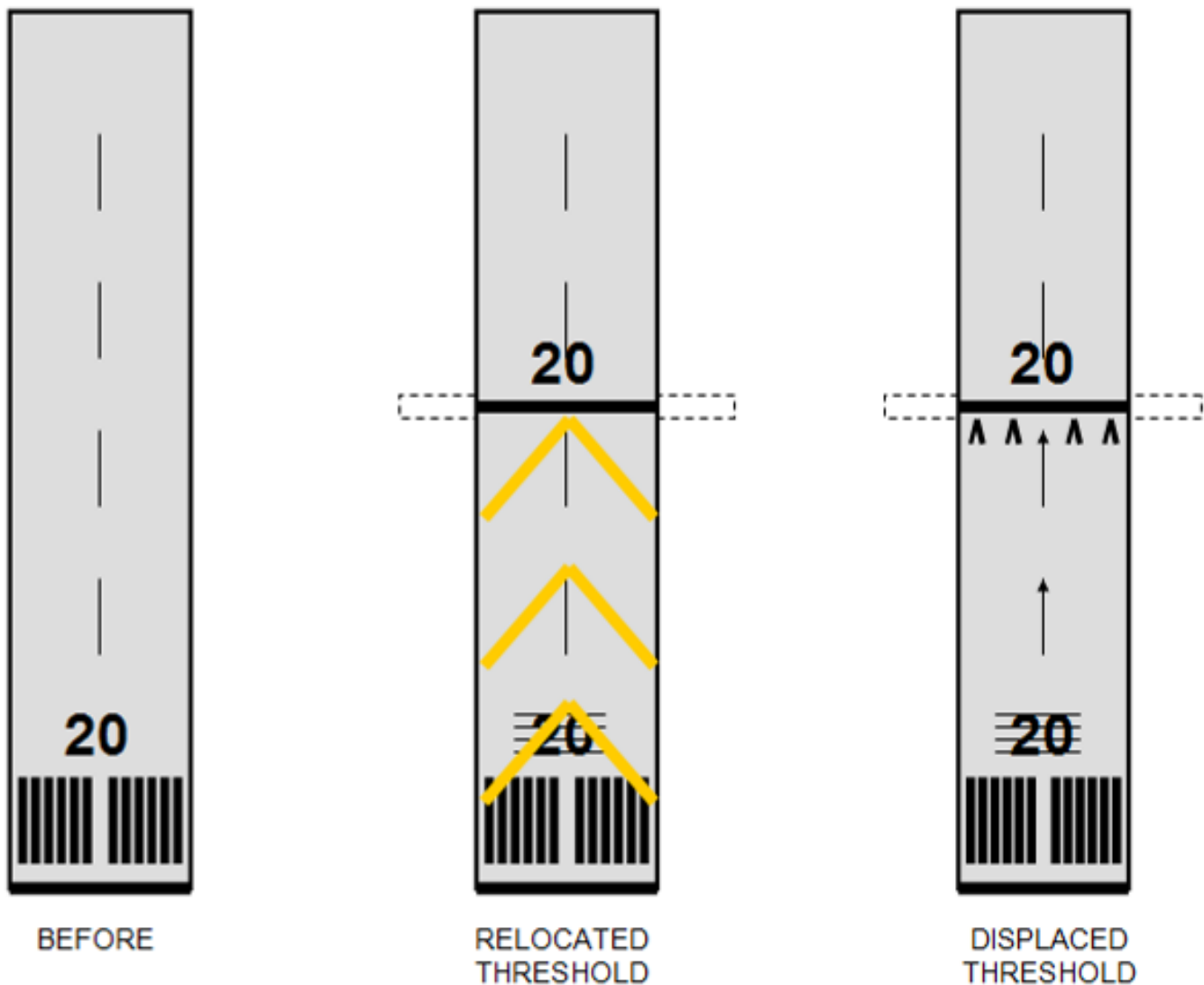
Temporarily Closed Runways

- Turn off runway lights and approach lights.
- Turn-off PAPIs or VASIs.
- Issue NOTAMS.
- Should be marked with a yellow “X”, painted on the surface or made of a double-layered snow fence, plywood, colored plastic or other materials. A lighted ‘X’ is the preferred method (AC 150/5345-55).
- The use of a lighted X is required at night if the runway lights need to be on.



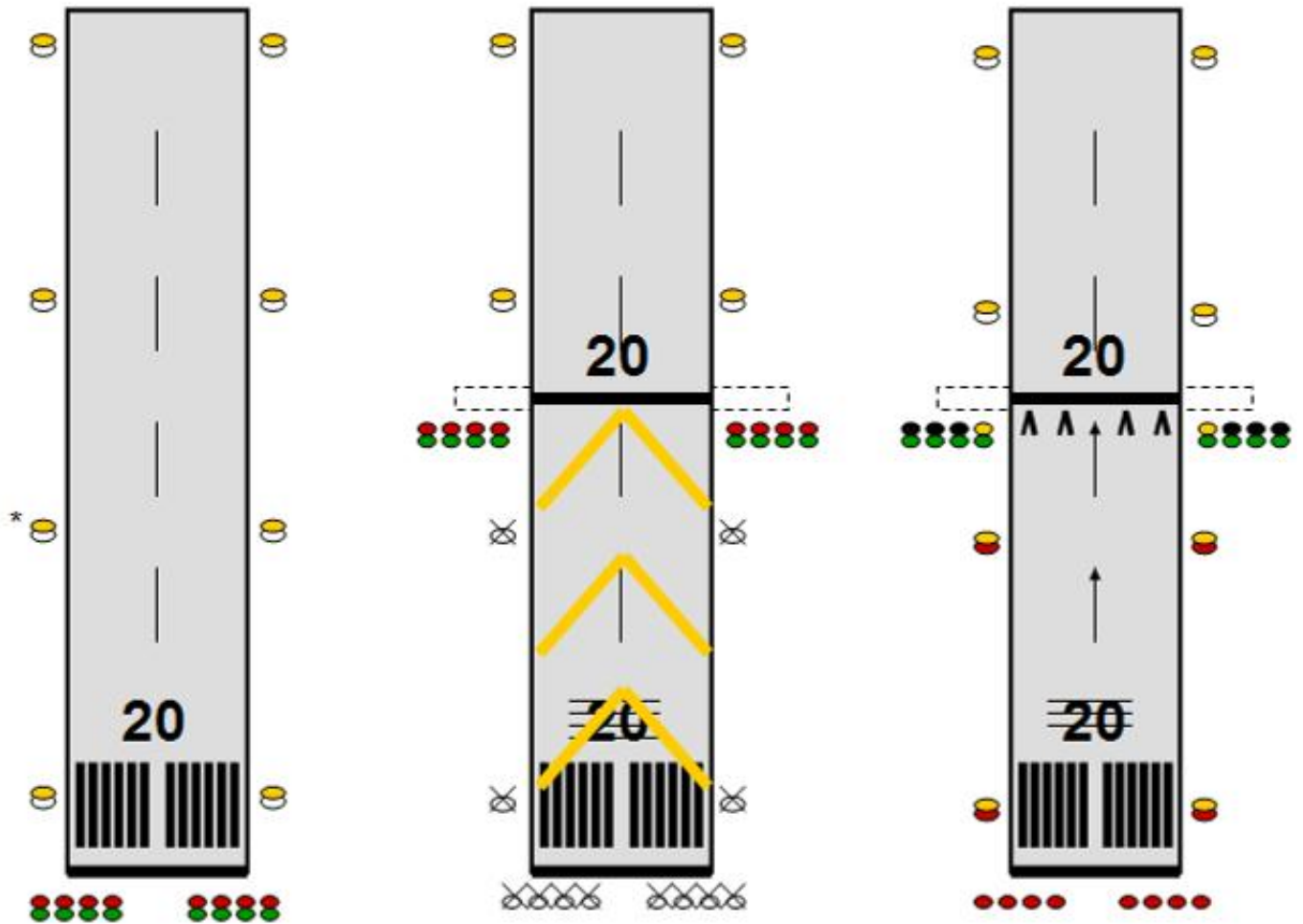
Marking Temporarily Relocated or Displaced Runway Threshold

- Closed portions of the runway, not suitable for take-off or landing, must be marked with yellow chevrons. These can be painted or double-layered snow fence, plywood, colored plastic or other materials.
- Runway numeral, in the closed portion, should be covered or removed.
- A temporary runway threshold bar should be provided. This can be painted at the new runway end or use the elevated or flush type, mounted outboard of the pavement edge.
- Full runway safety area must be maintained for the relocated threshold or aircraft type should be restricted as appropriate.
- Runway numeral should be painted at new threshold.
- NOTAM with Declared Distances is an option for the decreased runway length.



Lighting Temporarily Relocated or Displaced Runway Thresholds

- Lighting in a closed area should be shut-off or covered.
- Removal of lamps from the fixture is not recommended since it may damage regulators.
- Temporary threshold light wires may run above ground with lamps weighted with sandbags or mounted on frangible couplings.
- Amber lights on instrument runways must be adjusted.
- Runway End Identifier Lights or relocated VASI/PAPI may be used.
- Distance Remaining Signs must be adjusted or covered.



* Amber last 2000' of instrument runway

X= OFF

Procedures for Opening an Unmarked Runway

- Exhaust all efforts to mark the runway in accordance with AC 150/5340-1, Standards for Airport Markings, prior to opening.
- Coordinate with your assigned Airport Certification/Safety Inspector and the Airports District Office.
- Runways with basic visual approaches ONLY are acceptable with limited markings.
- Runways with instrument approaches must have designation markings, centerline markings, and aiming point markings unless otherwise coordinated with the FAA Airports Division.
- NOTAM and limit the approaches to the unmarked runway as “visual approaches only”.

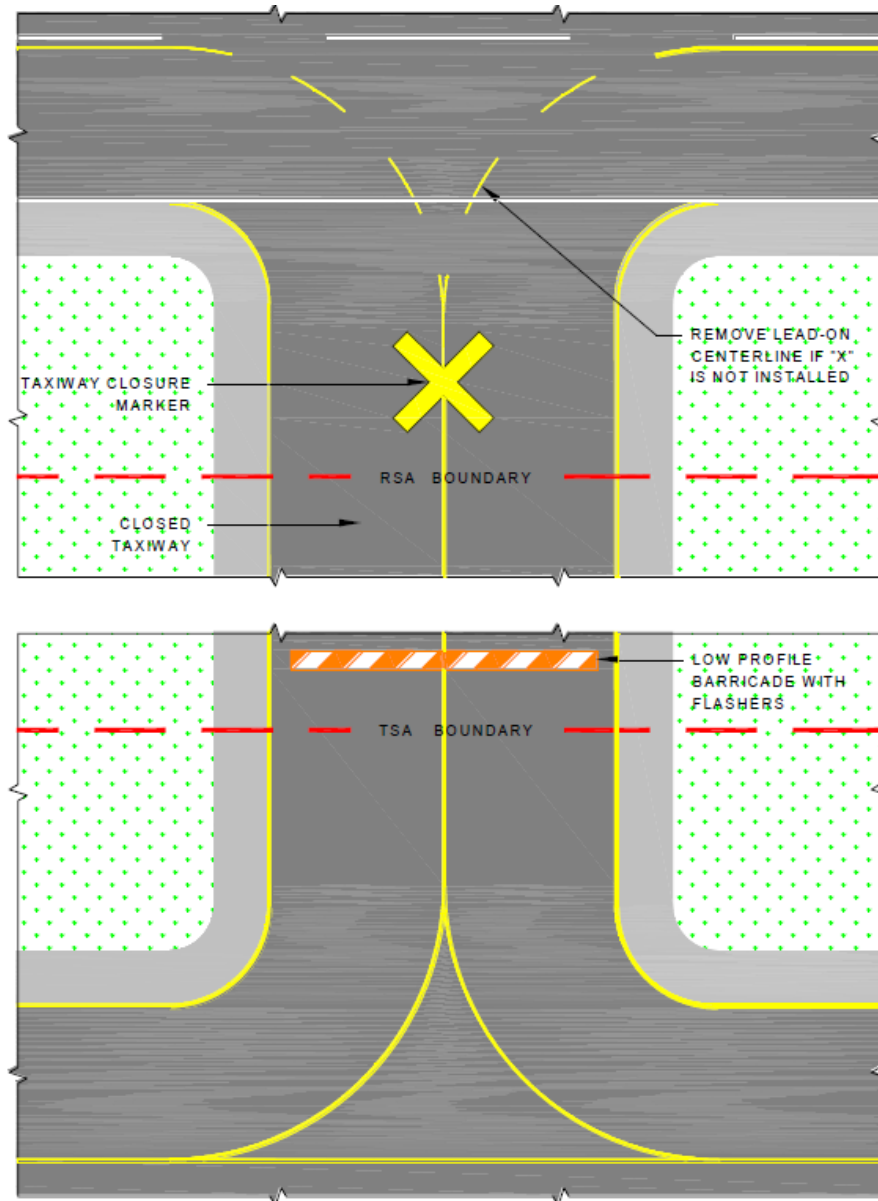


For Basic Visual Approaches ONLY

Temporarily Closed Taxiways

- Taxiway lighting should be shut-off or covered.
- Taxiway centerlines that lead into closed areas should be removed if the project has a long duration.
- Place barricades outside the safety area of intersecting taxiways or runways.
- For runway/taxiway intersections, place an X at the entrance to the closed taxiway from the runway.
- If the taxiway will be closed for an extended period of time remove lead-on/off markings leading to the closed section.
- Notices To Airmen (NOTAMS) must be issued.

CAUTION: Removal of lamps from the taxiway edge light fixtures is not recommended. This may cause damage to the regulators. Shut off or cover them, instead.



Fuel Fire Safety

Reference:

NFPA 407 - Standard for Aircraft Fuel Servicing- 2012 Edition

National Fire Protection Association
1 Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101
1-800-344-3555

<http://www.nfpa.org/catalog>



FAA CertAlert 11-01, Fuel Fire Safety Training (includes list of acceptable trainers)

A few NFPA 407 standards include the following:

- 4.1.3 Entrances to fueling areas shall be posted with “no smoking” signs.
- 4.3.6.6 Gasoline-powered engines on fuel servicing vehicles shall be provided with flame and spark-arresting exhaust systems.
- 4.3.6.7 Non-turbo-charged diesel engines on fuel servicing vehicles shall be equipped with flame and spark-arresting exhaust systems.
- 4.3.9.1 Each aircraft fuel servicing tank vehicle shall have two listed fire extinguishers, each having a rating of at least 20-B:C with one extinguisher mounted on each side of the vehicle. Multipurpose dry chemical (ammonium phosphate) should not be selected due to corrosion concerns relative to the agent. Carbon dioxide extinguishers should not be selected due to their limited range and effectiveness in windy conditions.
- 4.3.9.3 Extinguishers shall be readily accessible from the ground. The area of the paneling or tank adjacent to or immediately behind the extinguisher(s) on fueling vehicles or carts shall be painted with a contrasting color.
- 4.3.11.2 Smoking equipment such as cigarette lighters and ash trays shall not be provided. If a vehicle includes such equipment when initially procured, it shall be removed or rendered inoperable.
- 4.4.5.7 Airport Fuel Systems- Each emergency fuel shutoff station shall be placarded EMERGENCY FUEL SHUTOFF in letters at least 2 inches high. Placards shall be weather resistant, shall be located at least 7 feet above grade, and shall be positioned so that they can be seen readily from a distance of at least 25 feet.
- 5.1.3 Aircraft fueling vehicles shall be marked with the name of the operator or the responsible organization.
- 5.1.3.1 The marking shall be approved, legible signs on both sides of the exterior of the vehicle.
- 5.2.3 Fuel nozzles shall not be dragged along the ground.
- 5.3.4 Emergency fuel shutoff systems shall be operationally checked at intervals not exceeding 6 months. Each individual device shall be checked at least once during every 12-month period.
- 5.3.5 Suitable records shall be kept of tests required by this section.
- 5.8.5 Personnel shall not carry lighters or matches on their person while engaged in fuel servicing operations.
- 5.8.6 Lighters or matches shall not be permitted on or in fueling equipment.
- 5.9.1 Fuel servicing operations shall be suspended where lightning flashes are in the immediate vicinity of the airport.
- 5.13.6 Fuel servicing personnel shall be trained in the use of the available fire extinguishing equipment they could be expected to use.
- 5.15.2 Fuel flow shall be controlled by use of a deadman control device. The use of any means that defeats the deadman control shall be prohibited.
- 5.17.2 Leaking vehicles or carts shall be removed from service, defueled, and parked in a safe area until repaired.

QUARTERLY INSPECTION – AIRCRAFT FUEL SERVICING VEHICLES

Inspector: _____ Fueling Agent: _____ Date: _____

S – Satisfactory U – Unsatisfactory R – Remark Below	Truck Number Type Fuel									
		S	U	R	S	U	R	S	U	R
Fuel trucks parked 50' from bldgs and 10' apart										
Fuel trucks marked with operator name on both sides										
No Fuel Leaks										
Vehicle Exhaust System -Shielded/Leak free/spark arrestor if required										
No Smoking sign-cab/No evidence of smoking/No ashtray										
Flammability/Product signs sides-back/Haz Mat placards all sides										
Bonding cables provided and clips/plugs functional										
2 extinguishers on sides /BC/Insp/1 exting.-Hydrant veh/Carts										
Deadman Control for all nozzles/Not bypassed										
Integral system for nozzles to be stowed before moving fuel vehicle										
Brake interlock system for bottom loading coupler/Overwing nozzles										
Emergency fuel shutoffs operable and properly placard/1 each side										
Acft fueling hose/No blistering, cracking, saturation, separation										
Dry break couplers/adaptors are installed										
Aviation fueling hose used/No Kinks										
Explosion proof electrical/Light lens intact										
Dome cover seals intact with forward mounted hinge										
Truck cabinets have grating type flooring or open flooring										
Vehicle DPF Regeneration Area meets standards, if Applicable										
Proper Fueling Procedures Observed										
Remarks:										

Checklist Based on the 2012 NFPA Fire Code for Airport Fueling Operations

Fuel Fire Safety
QUARTERLY INSPECTION – AIRPORT FUEL SYSTEMS

Inspector: _____ Fueling Agent: _____ Date: _____

S - Satisfactory U - Unsatisfactory R – Remark Below	Jet A Section			100LL Section		
	S	U	R	S	U	R
Entrances to fueling areas posted with No Smoking signs						
No evidence of smoking						
All tanks, machinery, piping is bonded or grounded						
Areas around tanks are free of weeds, trash or combustible materials						
Emergency fuel shutoffs provided for each fueling system/Outside spill area						
Proper EMERGENCY FUEL SHUTTOFF placards /7 ft above grade						
Emergency fuel shutoffs kept clear and tested every 6 months						
Fuel servicing equipment properly maintained free of leaks						
Procedures for prevention & control of spills and notification to fire dept						
Bonding connections available for loading stations						
Deadman controls available for loading stations/ Not bypassing deadman						
Dry break couplers/adaptors installed						
Aircraft fuel hose/blistering, cracking, carcass saturation, separation, kinks						
Fueling hydrants, pits, cabinets located 50' from bldg excpt loading bridges						
Portable fire extinguishers at fuel storage areas and loading stations						
Portable fire extinguishers on aircraft servicing ramps/aprons						
At least 1 wheeled extinguisher if >200 gpm aircraft fueling system or equip						
Explosion proof electrical equipment						
Above ground fuel piping on acft movement area protected by barrier guard						

Remarks:

Checklist Based on the 2012 NFPA 407 Fire Code for Airport Fueling Operations

QUARTERLY INSPECTION – SELF-SERVICE FUEL STATIONS

Inspector: _____ Fueling Agent: _____ Date: _____

S - Satisfactory U - Unsatisfactory R – Remark Below	100LL Section			Jet A Section		
	S	U	R	S	U	R
Entrances to fueling areas posted with No Smoking signs						
Controlled access to dispensing equipment						
All tanks, machinery, piping is bonded or grounded						
Areas around tanks are free of weeds, trash or combustible materials						
Emergency fuel shutoff provided/Incorporating a thermally actuated device						
Emergency fuel shutoff located more than 20' but less than 100' fm dispens.						
Proper EMERGENCY FUEL SHUTTOFF placards /7 ft above grade						
Dispensing devices located on an island/Protected by pipe bollards/guards						
Dispensing equipment properly maintained free of leaks						
Instructions provided for notification to fire dept by emergency fuel shutoff						
Bonding connections available for dispensing equipment						
Deadman controls available for dispensing equipment						
1 extinguisher at dispenser and 1 extinguisher at emergency fuel shutoff						
Aircraft fueling hose/No blistering, cracking carcass saturation, separation						
Fueling hydrants, pits, cabinets located 50' from bldg excpt loading bridges						
Emergency Instructions posted in dispensing area						
Operating Instructions posted						
Explosion proof electrical equipment						

Remarks:

Checklist Based on NFPA 407 for Airport Fueling Operations

Wildlife

Each certificate holder must take immediate action to alleviate wildlife hazards whenever they are detected.

A Wildlife Hazard Assessment must be conducted by a qualified Wildlife Damage Management Biologist if:

An air carrier aircraft experiences:

- Multiple wildlife strikes
- Substantial damage from striking wildlife
- Engine ingestion of wildlife
- Wildlife in size, or in numbers, capable of causing one of the above, is observed to have access to airport flight patterns or movement areas.

An assessment will identify if a Wildlife Hazard Management Plan is needed.

Wildlife Hazard Management Plan:

- Must meet all requirements of 14 CFR part 139
- Must be approved by the FAA and become a part of your Airport Certification Manual.
- Must be reviewed and valuated every 12 consecutive calendar months or following a trigger event (above).
- A training program conducted by a qualified wildlife damage management biologist must be provided to all personnel responsible for implementing the plan.

Aircraft Rescue & Fire Fighting (ARFF)

Aircraft Rescue and Fire Fighting (ARFF)

Index	Aircraft Length (feet)
A	Less than 90
B	At least 90 but less than 126
C	At least 126 but less than 159
D	At least 159 but less than 200
E	At least 200

This table is for quick reference ONLY. Refer to 14 CFR part 139.317 for complete requirements.

Index	Equipment	500 lbs sodium-based dry chemical, halon 1211, or clean agent	450 lbs potassium-based dry chemical and water with a commensurate quantity of AFFF to total 100 gallons for simultaneous dry chem and AFFF application	Minimum gallons of water and the commensurate quantity of AFFF for foam production carried by ALL vehicles combined
A	One vehicle	X or	X	
B	(option 1) One vehicle: or (option 2) Two vehicles: Vehicle 1: Vehicle 2:	X or	X	1500 1500 Water/AFFF
C	(option 1) Three vehicles: Vehicle 1: Vehicle 2: Vehicle 3: or (option 2) Two vehicles: Vehicle 1: Vehicle 2:	X or	X	3000 Water/AFFF Water/AFFF 3000 (Note 1) Water/AFFF
D	Three vehicles Vehicle 1: Vehicle 2: Vehicle 3:	X or	X	4000 Water/AFFF Water/AFFF
E	Three vehicles Vehicle 1: Vehicle 2: Vehicle 3:	X or	X	6000 Water/AFFF Water/AFFF

Note 1: Vehicle 1 must carry at least 1500 gallons of water and the commensurate quantity of AFFF for foam production.

ARFF Training

14 CFR part 139.319(i)2)

The curriculum for initial and recurrent training must include at least the following areas:

- Airport Familiarization, including airport signs, marking, and lighting.
- Aircraft familiarization.
- Rescue and firefighting personnel safety.
- Emergency communications systems on the airport, including fire alarms.
- Use of the fire hoses, nozzles, turrets, and other appliances required for compliance with this part.
- Application of the types of extinguishing agents required for compliance with this part.
- Emergency aircraft evacuation assistance.
- Firefighting operations.
- Adapting and using structural rescue firefighting equipment for aircraft rescue and firefighting.
- Aircraft cargo hazards, including hazardous materials/dangerous goods incidents.
- Familiarization with firefighters' duties under the airport emergency plan.
- Live fire drill

Note: Any other subject area, as assigned in the Airport Certification Manual must be included. Example: Airport Safety Self-Inspection, NOTAM procedures, etc...

Pedestrians and Ground Vehicles

- Anyone with unescorted access to the Airport Operations Area must be trained.
- Initial and recurrent training must include airport procedures, safety, work area limits, security, and radio communications and must be airport-specific.
- This training can be delegated to tenants and contractors but must be acceptable to and reviewed by the airport operator and records must be kept.
- Construction traffic should use only designated haul routes or roads.
- All vehicles must be appropriately marked and lighted.
- Aircraft always have the right of way!

BE ALERT – READBACK



Types of Incidents:

V/PD - Vehicle or Pedestrian Deviation

PD - Pilot Deviation

OE/OD - Operational Error or Deviation

Runway Incursion: Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft.

Surface Incident: Unauthorized access to the movement area, excluding the runway.

References

FAA Advisory Circulars

Subject	AC 150/
Airport Design	5200-13
Construction	5370-2
Des/Inst Details for Arpt Vis Aids	5340-30
Foreign Object Debris Management	5210-24
Fuel Storage, Handling, and Dispensing	5230-4
Ground Vehicle Ops	5210-20
Ground Vehicle Marking/Lighting	5210-5
Landfill/ Waste	5200-34
Lighted 'X'	5345-55
Maintenance of Airport Visual Aids	5340-26
Markings	5340-1
NOTAMs	5200-28
PAPI	5345-28
Portable Rwy/Twy Lights	5345-50
Retroreflective Markers	5345-39
Self-Inspection	5200-18
Signs	5340-18
Safety Management Systems (SMS)	5200-37
Wildlife	5200-33
Wildlife Biologist	5200-36
Winter Operations	5200-30

More Advisory Circulars are available at:

http://www.faa.gov/airports/resources/advisory_circulars/

Prepared by: FAA Southern Region
 Airport Certification & Safety Team
 October 2011