



Federal Aviation
Administration
Southern Region
Airports Division

A Quick Reference to

Airfield Standards



This September 2019 edition supersedes all prior editions

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PURPOSE

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

Cover photo – Miami International Airport (MIA)

Chapter 1 - Airfield Markings

Reference: AC 150/5340-1M

Use of Glass Beads

Where Required	Where Recommended
<ul style="list-style-type: none"> Runway designation Runway and taxiway centerline Threshold markings and bar Aiming point marking Touchdown zone All holding position markings Geographic position markings Surface painted signs Non-movement area boundary markings 	<ul style="list-style-type: none"> Runway edge markings Taxiway edge markings Displaced threshold markings Demarcation bar

Note: Glass beads are never to be used in black paint.

Type I beads must be used in the red or pink background paint on SPHPS

Use of Black Borders

Black borders are required on all “light” colored pavements (including fading asphalt). The table on the next page has guidelines for determining light-colored pavements.

Where Required	Where Recommended
<ul style="list-style-type: none"> All holding position marking Enhanced Twy centerlines Non-movement area boundary markings SMGCS Twy centerlines Surface painted holding signs Intermediate holding position Geographic position marking All runway markings <i>except</i> edge markings 	<ul style="list-style-type: none"> Runway edge markings Runway demarcation bar Taxiway centerlines Taxiway edge markings Chevrons Shoulder markings




General Guidelines for Painting a Black Border

Paint a Black Border

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

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)
Runway diagram			
Landing Designator	Required	Required	Required
Centerline	Required	Required	Required
Threshold	Note 1	Required	Required
Aiming Point	Note 2	Note 3	Required
Touchdown Zone	(not applicable)	(not applicable)	Required
Edge Markings	Note 4	Note 4	Required

Notes:

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.
2. Required on 4,200 foot or longer runways serving approach categories C and D airplanes.
3. Required on 4,200 foot or longer instrumented runways.
4. Used when the full runway pavement width may not be available for use as a runway.

Groupings 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 grouping of rectangular bar markings (Note 2)	Aiming point marking
5,065 - 5,564	Less two groupings of rectangular bar markings	Aiming point marking
4,565 - 5,064	Less three groupings of rectangular bar markings	Aiming point marking

Notes:

1. Derive the value of 6,065 feet as follows:
 - a. 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.
 - b. **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.
 - c. **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.
 - d. **Summing** the values 3,995 and 2,070 yields 6,065 feet.
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.

Groupings 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 grouping of rectangular bars from each side nearest to the runway midpoint (Note 2)
5,990 - 6,989	Less two groupings of rectangular bars from each side nearest to the runway midpoint (Note 2)
4,990 - 5,989	Less three groupings of rectangular bars from each side nearest to the runway midpoint (Note 2)

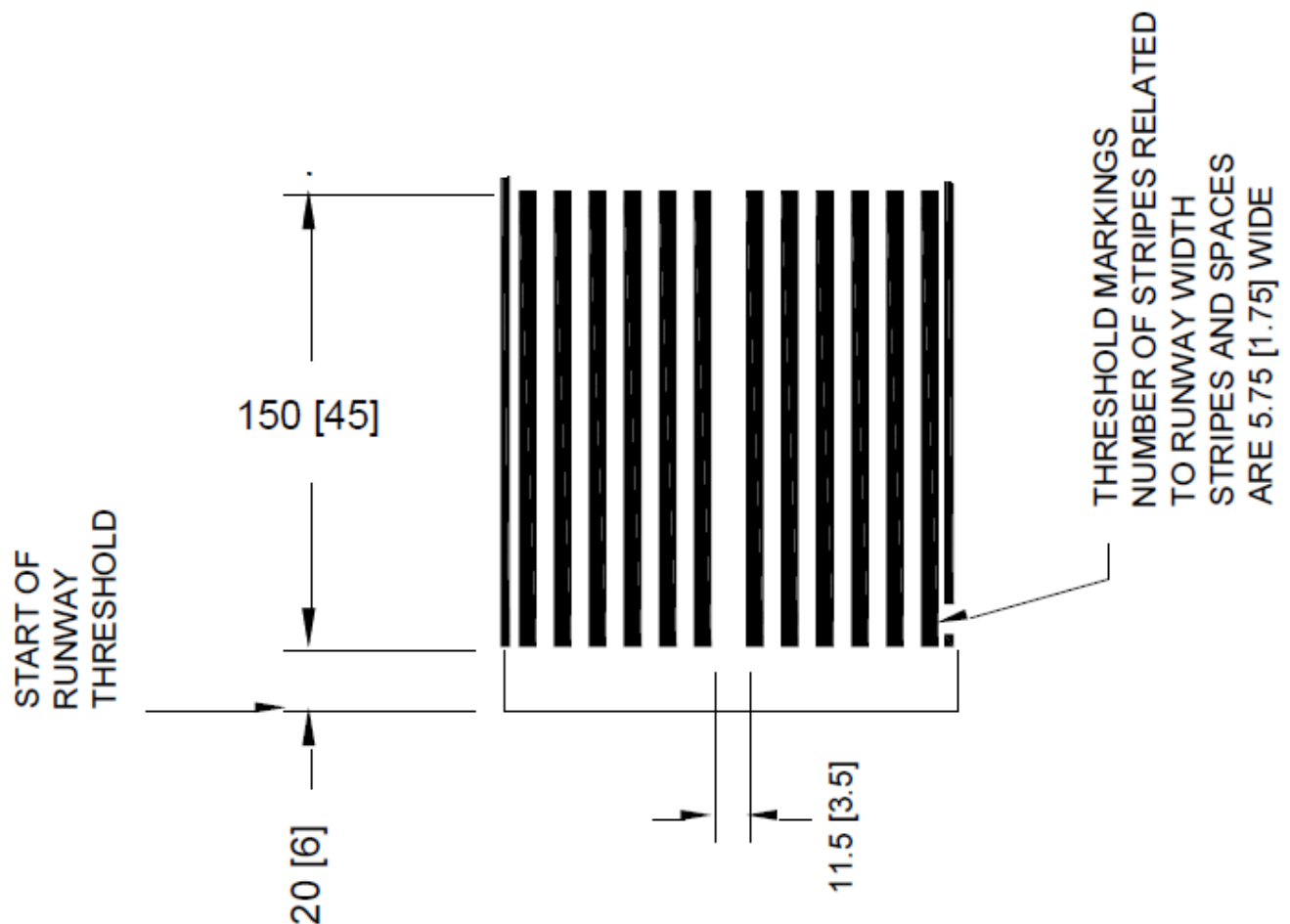
Notes:

1. The value of 7,990 feet is derived as follows:
 - a. 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.
 - b. 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.
 - c. Double this value for both directions to obtain 7,990 feet.
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.

Runway Threshold Stripes for Standard Runway Widths

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

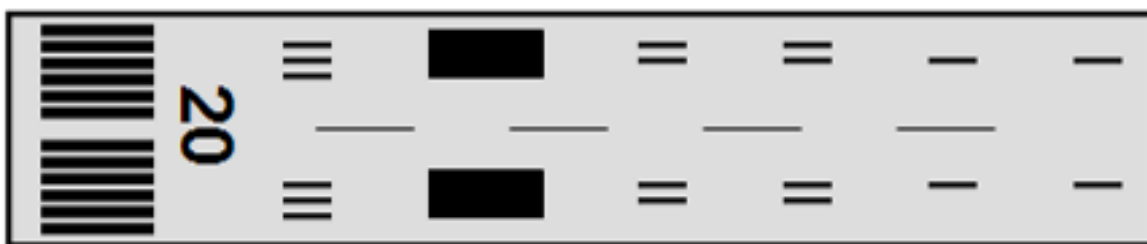


150-foot-wide runway

Runway Marking Dimensions

Precision Instrument

Runway marking	100' Wide	150' Wide	200' Wide
Designation	60'L	60'L	60'L
Centerline (note 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 (note 2)	3' wide	3' wide	3' wide



Notes:

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.

Non-Precision Instrument

Runway marking	100' Wide	150' Wide	200' Wide
Designation	60'L	60'L	60'L
Centerline (note 1)	120'Lx18"W	120'Lx18"W	120'Lx18"W
Edge (optional) (note 2)	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 (note 3)	150'Lx20'W	150'Lx30'W	150'Lx30'W
Demarcation (note 4)	3' wide	3' wide	3' wide

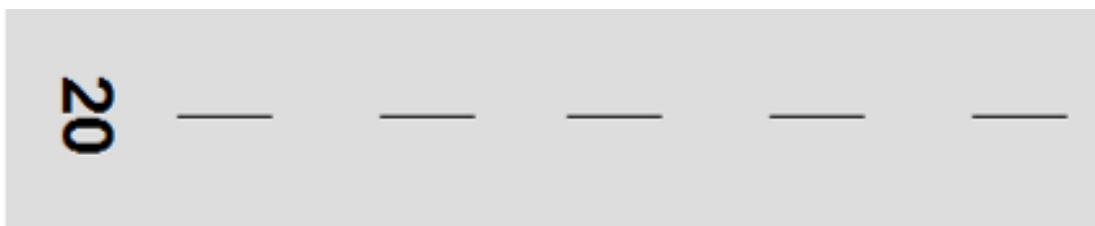


Notes:

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. Used when the full pavement width may not be available as a runway.
3. 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.
4. 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.

Visual

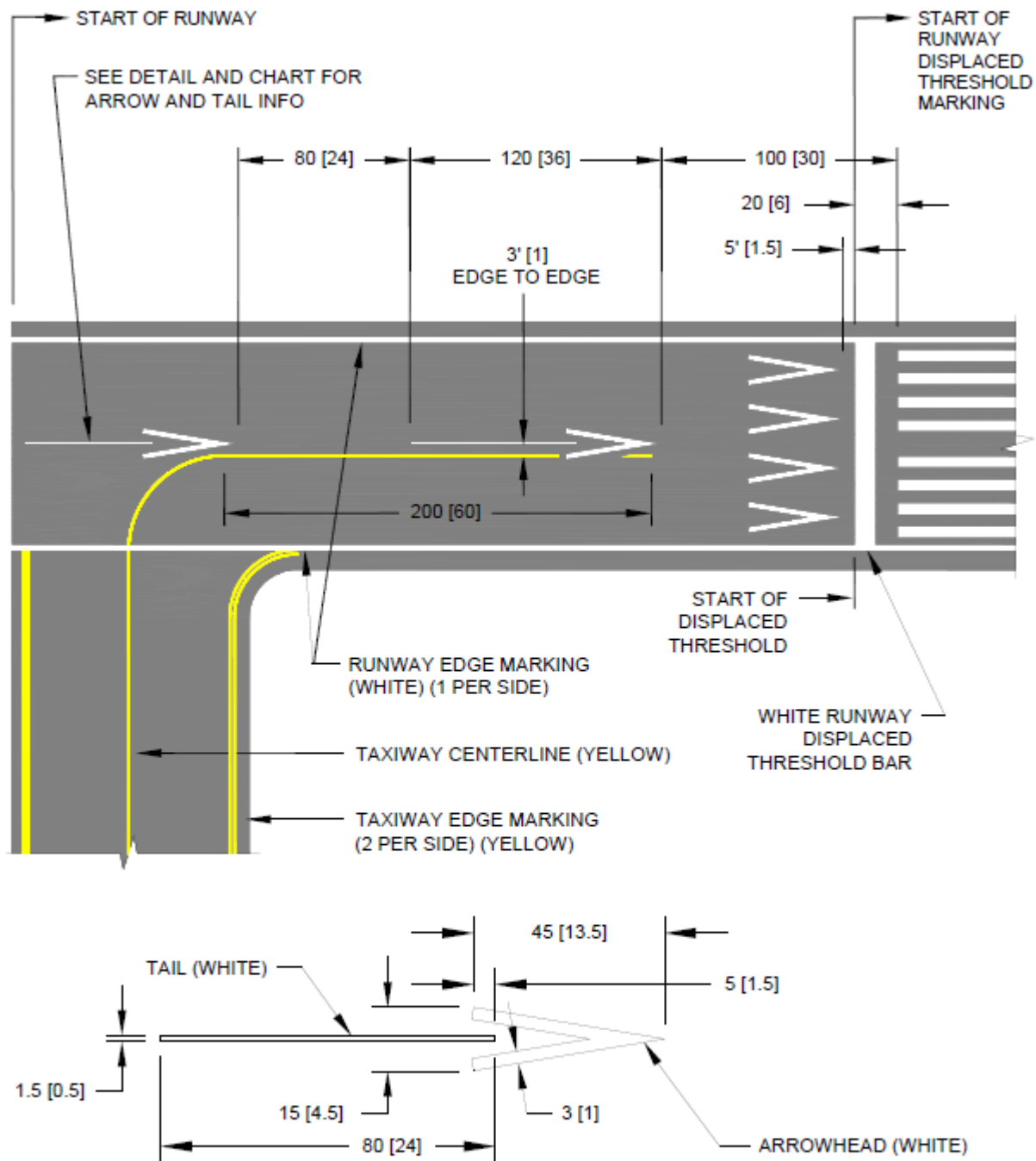
Runway	100' Wide	150' Wide	200' Wide
Designation	60'L	60'L	60'L
Centerline (note 1)	120'Lx12"W	120'Lx12"W	120'Lx12"W
Edge (optional) (note 2)	36" wide	36" wide	36" wide
Threshold Bar	10' wide	10' wide	10' wide
Threshold Markings (note 3)	150'Lx5.75"W	150'Lx5.75"W	150'Lx5.75"W
Aiming Point (note 4)	150'Lx20"W	150'Lx30"W	150'Lx30"W
Demarcation (note 5)	3' wide	3' wide	3' wide



Notes:

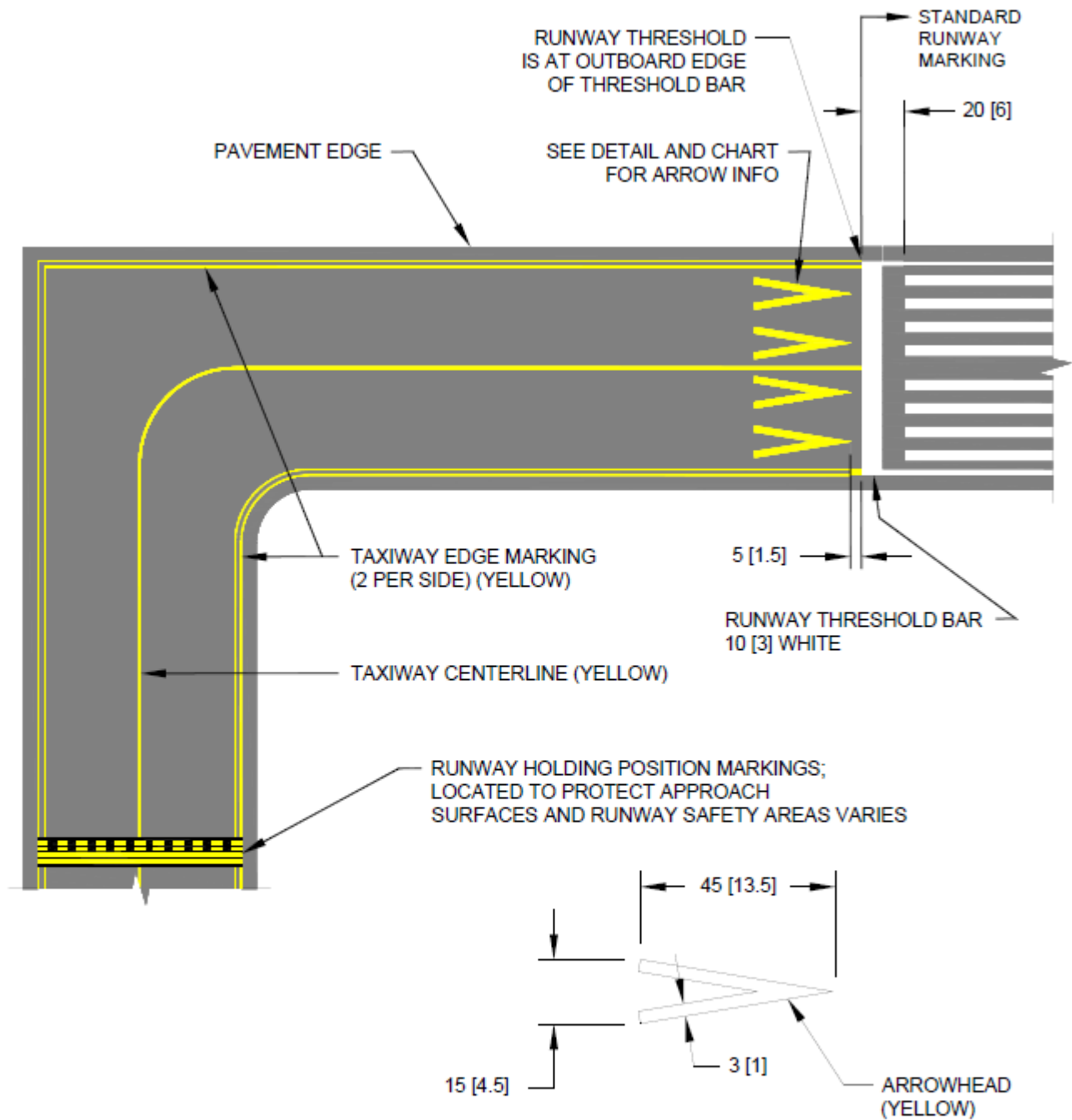
1. Gaps are 80 feet in length. Adjustments to the length of the stripes and gaps, where necessary to accommodate the runway length, are made near the runway midpoint.
2. Used when the full pavement width may not be available as a runway.
3. Required on runways serving approach category C and D airplanes or on runways used by international commercial transport.
4. 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.
5. 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



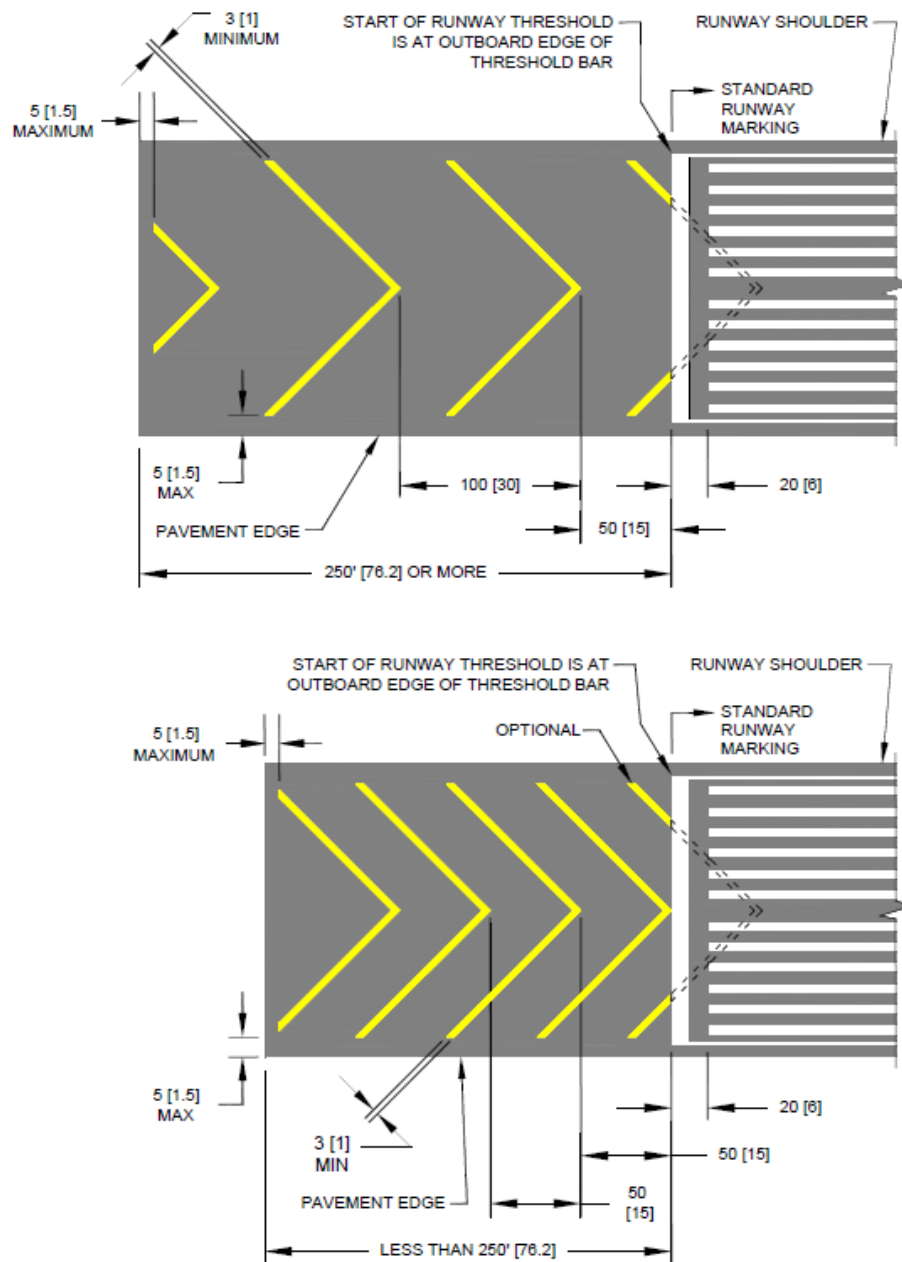
RUNWAY WIDTH	NUMBER OF ARROWHEADS	SPACING BETWEEN ARROWHEADS (W = RUNWAY WIDTH)	SPACING TO RUNWAY EDGE
≥ 100 [30]	4	W/4	W/8
< 100 [30]	3	W/3	W/6
< 60 [18]	2	W/2	W/4

Taxiway Aligned with a Runway



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

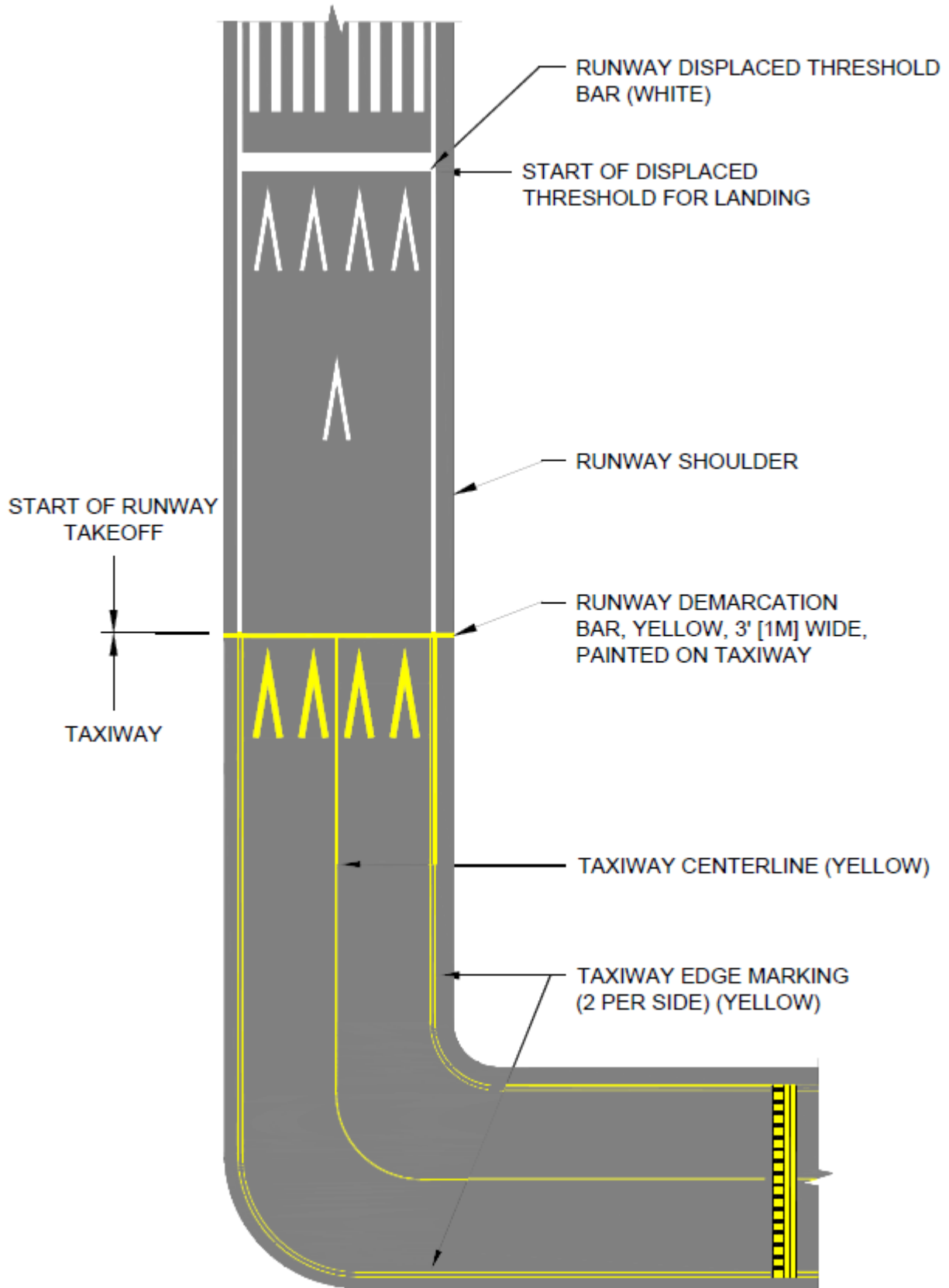
Blast Pad Markings



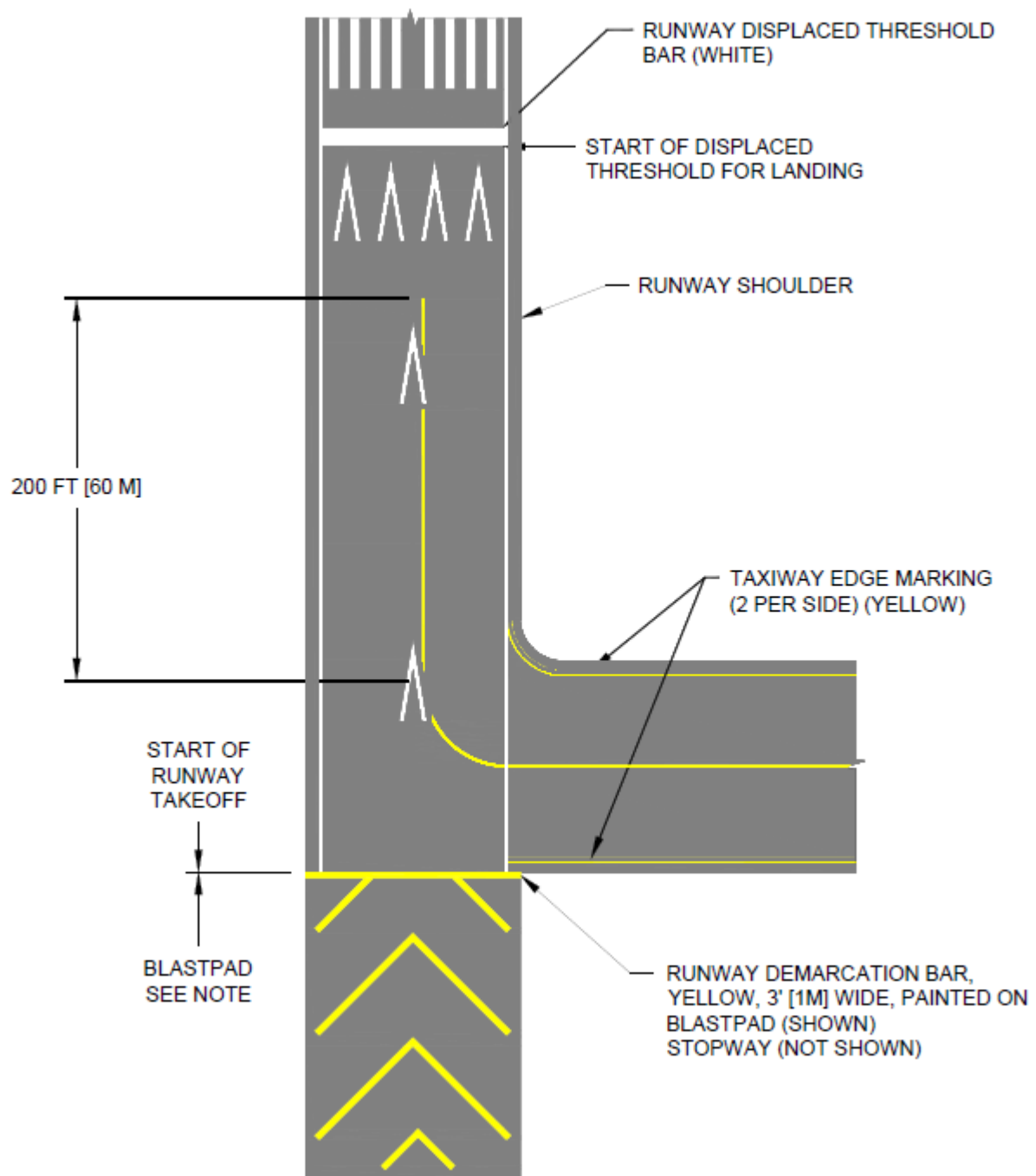
Notes:

- Dimensions are expressed in feet (meters).
- The widths of the stopways and blast pads are not the same. Stopways equal runway width. Blast pads equal runway width plus runway shoulders.
- 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).
- Chevrons are painted yellow and at an angle of 45 degrees to the runway centerline.
- Chevron spacing may be doubled if length of area exceeds 1000 feet.
- For stopways of less than 250 feet in length, full chevrons are required with the option to paint partial chevrons

Aligned Taxiway Preceding a Displaced Threshold

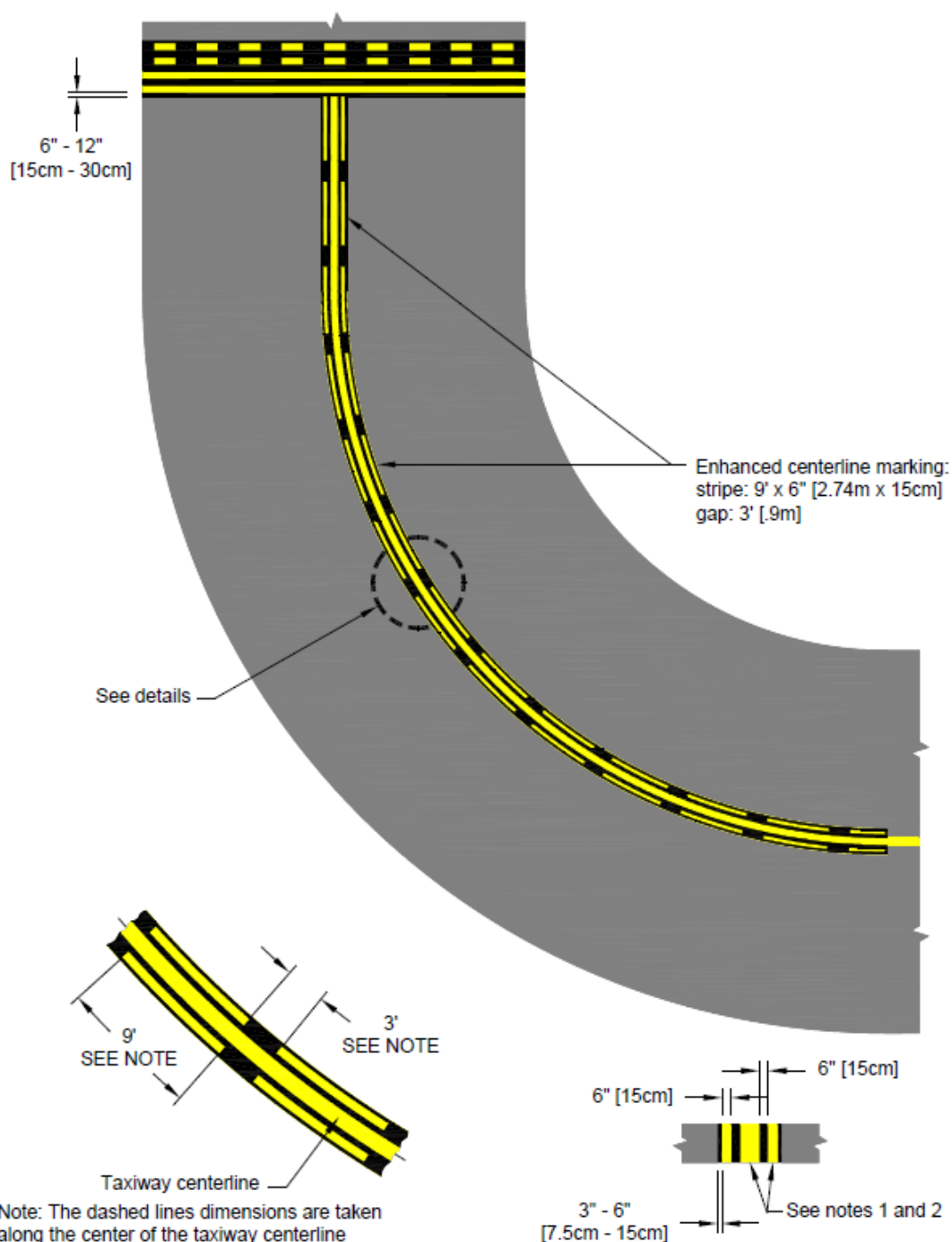


Blast Pad Preceding a Displaced Threshold



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.

Enhanced Taxiway Centerline Marking

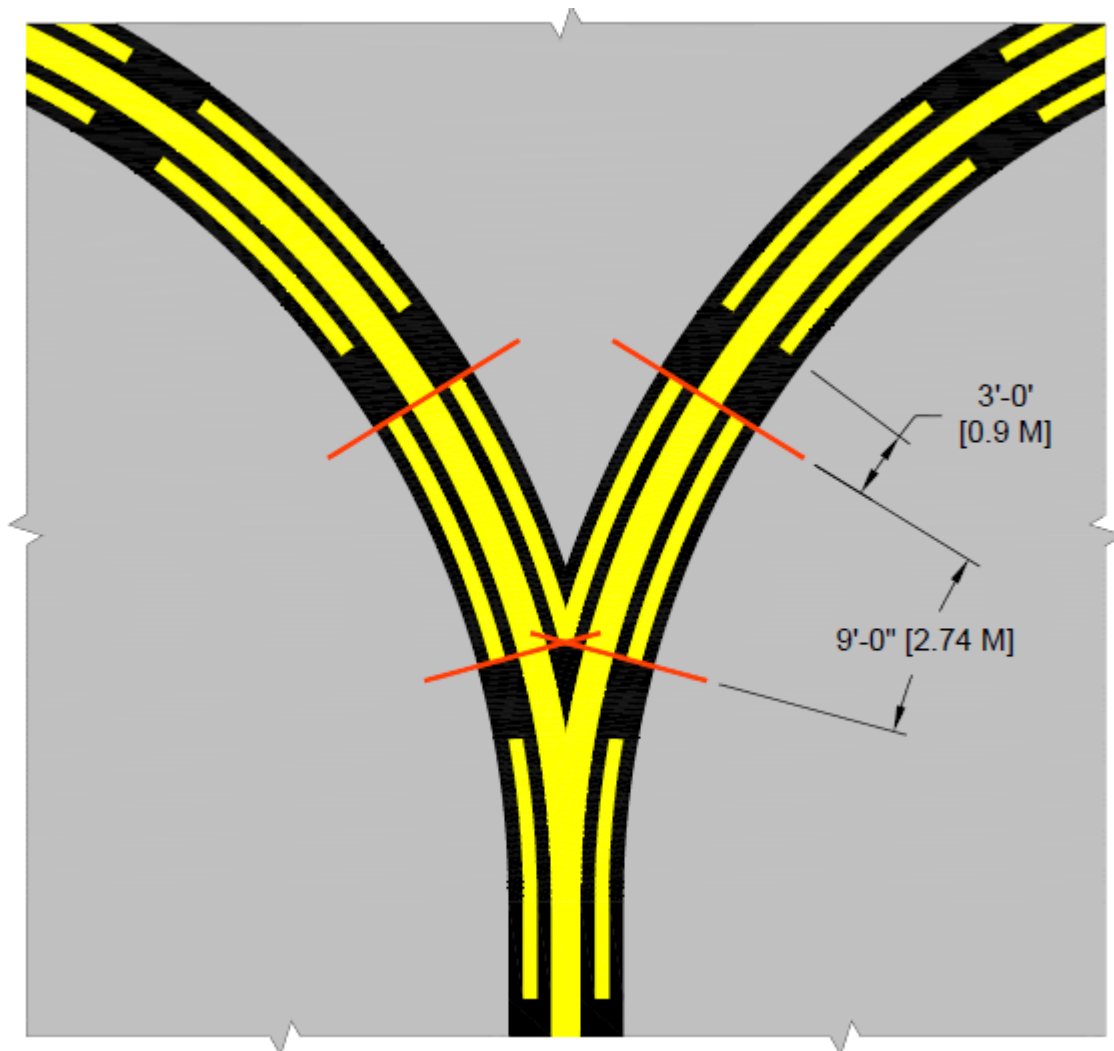


TYPICAL ENHANCED TAXIWAY MARKING SPACING

Notes:

- 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
- The taxiway centerline markings may be shifted left or right to avoid interference with the taxiway centerline lights or lights and their housing can be covered up temporarily during the painting process.

Dashed Lines at Converging Taxiway Centerlines

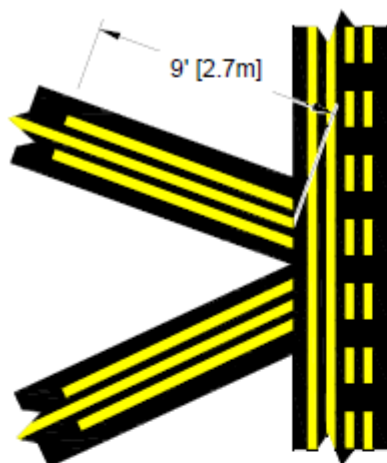


Notes:

- As shown in this case, the V-shaped inner dashes start and stop with the outside 9-foot dashes. However, this may not always be the case for the inner dashes. If the V-shaped are less than 5 feet, they may be omitted.
- Measurements are taken along the center of the centerline stripe.

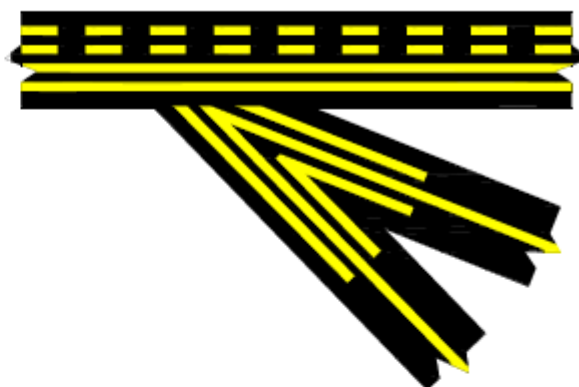
Enhanced Taxiway Centerlines Intersecting with Holding Position Marking

PARTIAL INNER DASHES INCLUDED BECAUSE THEY EXCEED 5 FEET IN LENGTH. ACCEPTABLE TO OMIT ANY DASHES THAT ARE LESS THAN 5' [1.5m] IN LENGTH.



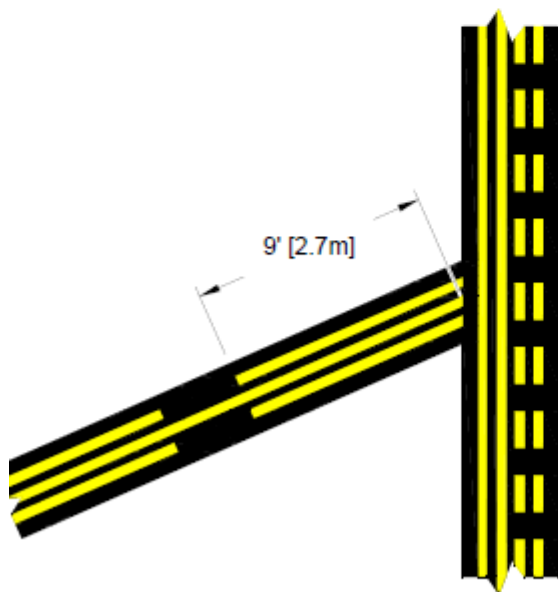
DETAIL A

Example of two straight enhanced taxiway centerline markings intersecting the runway holding position marking.



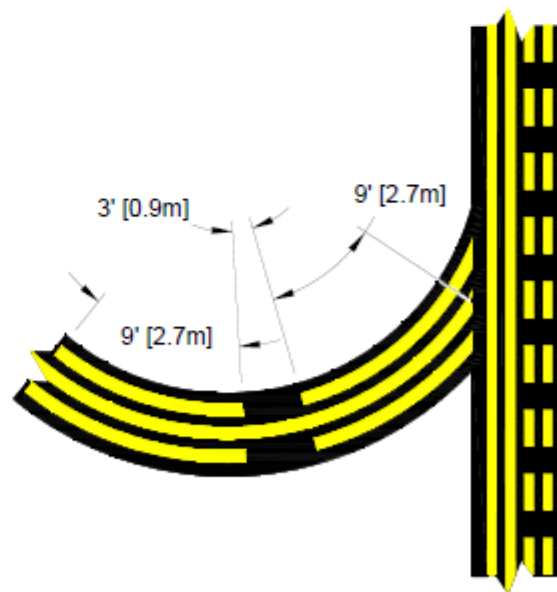
DETAIL B

Example of converging enhanced taxiway centerline markings intersecting at an angle of less than 90° with runway holding position marking.



DETAIL C

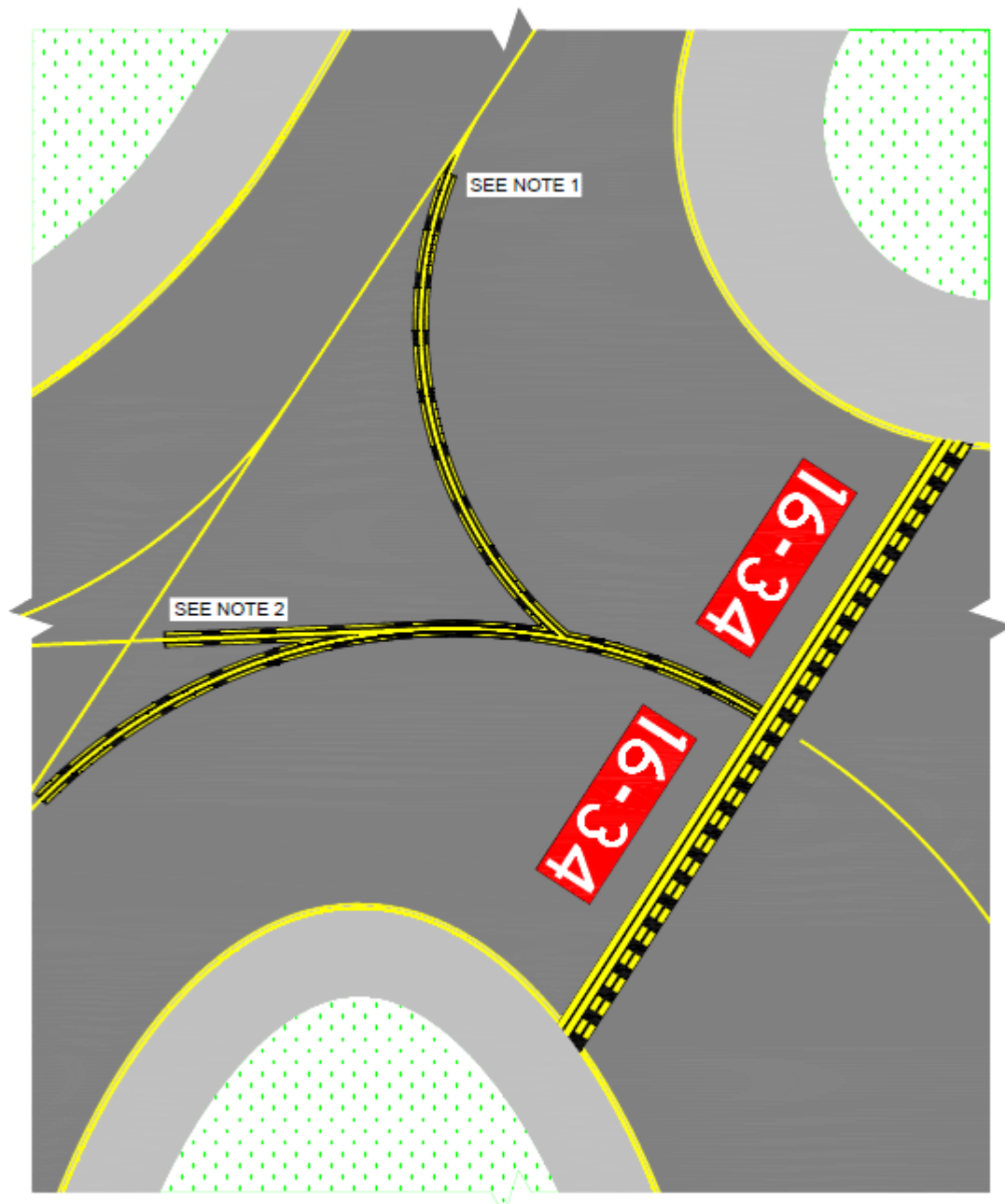
Example of straight enhanced taxiway centerline markings intersecting with runway holding position marking.



DETAIL D

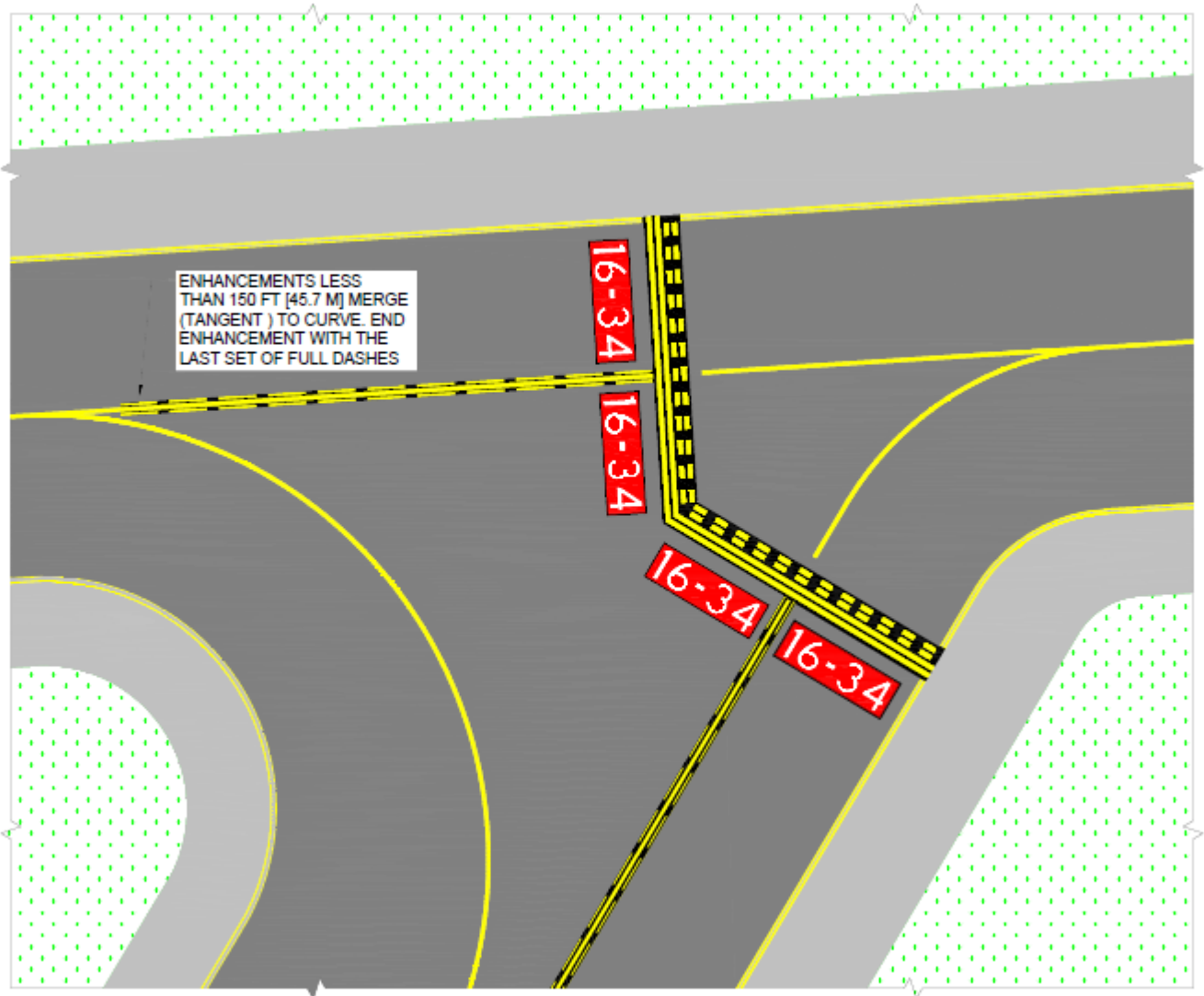
Example of curved enhanced taxiway centerline markings intersecting with runway holding position marking.

Note: All measurements are taken along the center of the centerline.



Notes:

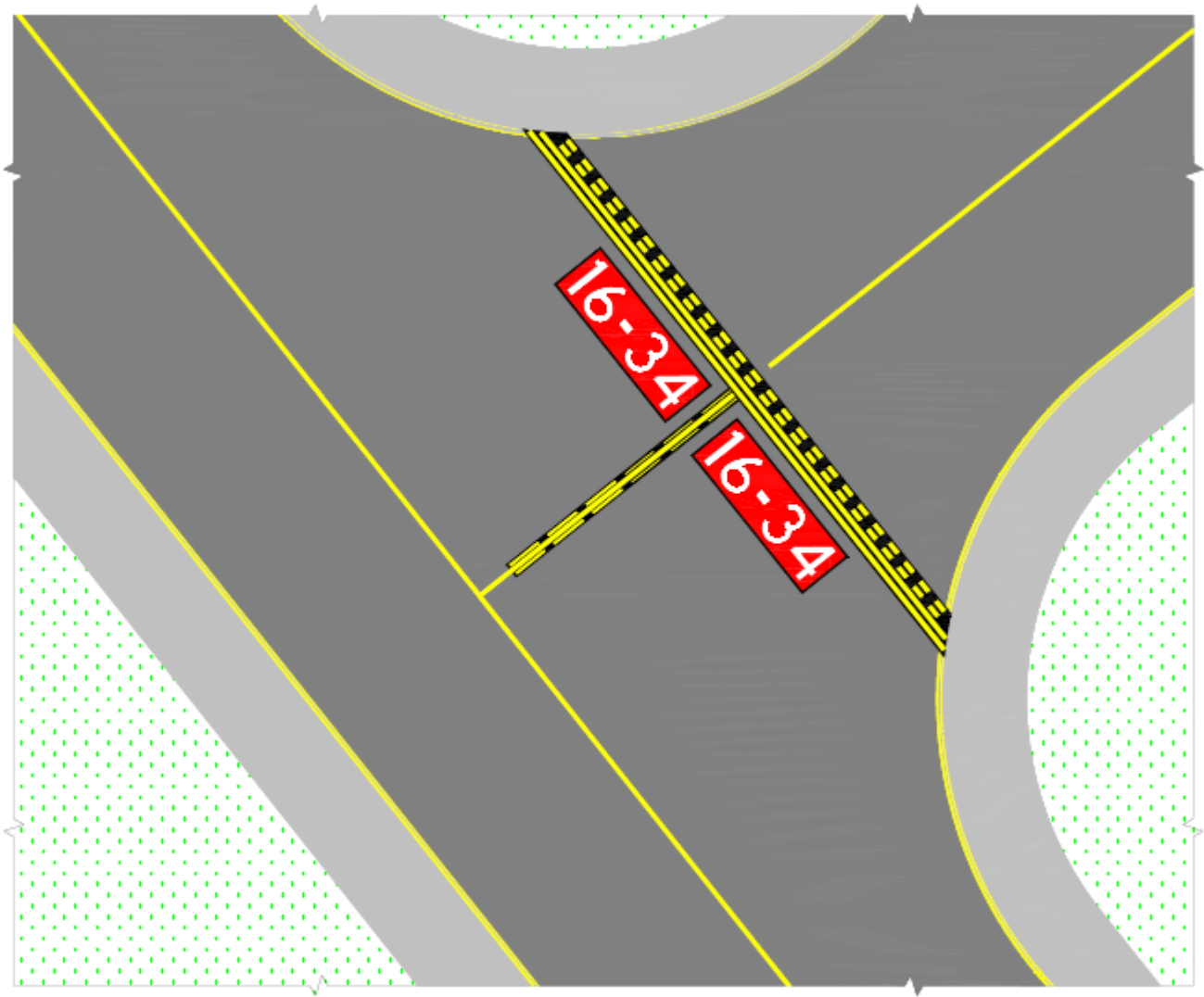
1. Enhancement is tangent to merging curve.
2. Enhancement terminates 5 feet (1.5 m) from intersection.



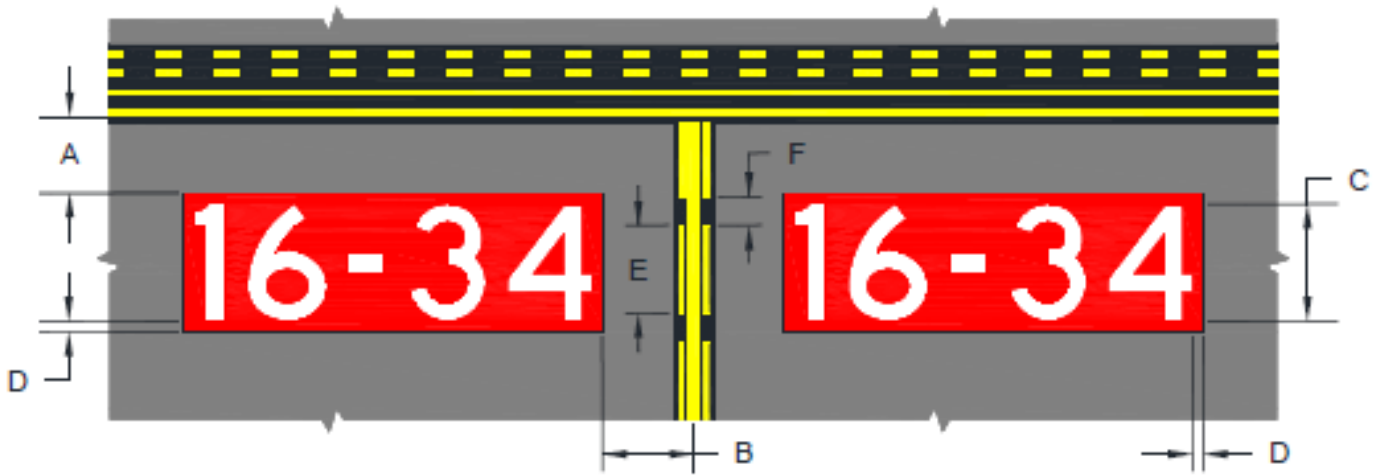
Notes:

- Enhancements less than 150 feet merge (tangent) to the curve
- End enhancement with the last set of full dashes

Note: The enhancement terminates 5 feet from the taxiway/taxiway intersection.



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



Notes: Dimensions are expressed in feet.

A = 2-4 feet

B = 3-10 feet

C = 9-12 feet

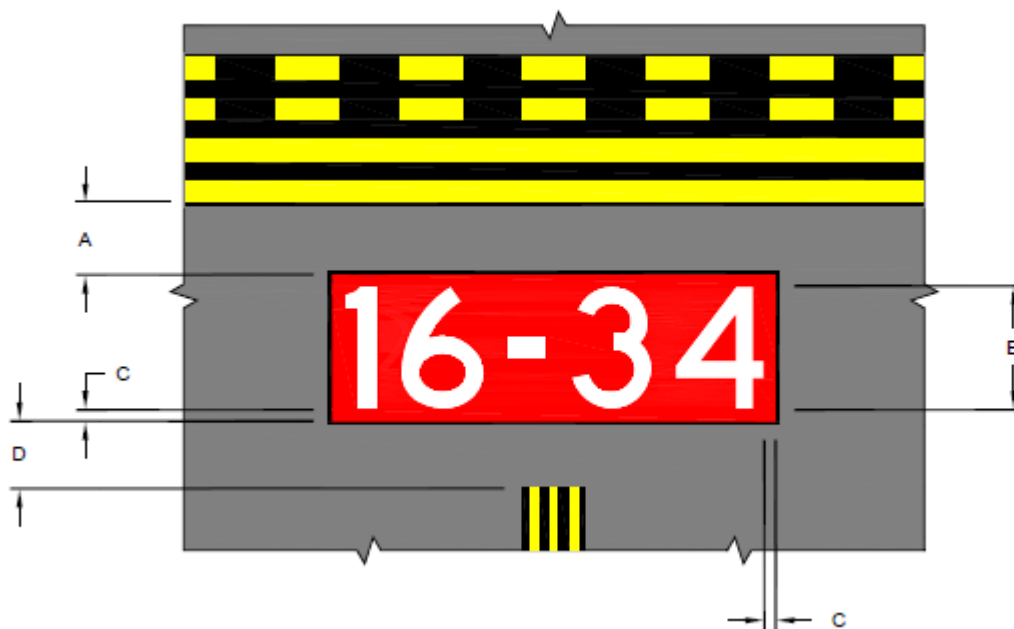
Inscriptions must have a height of 12 feet; however, the height may be reduced as necessary, to the minimum height of 9 feet. In special situations, the surface painted marking may be reduced to less than 9 feet in order to fit the marking appropriately. Examples of special situations include taxiways 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 feet

F = 3 feet

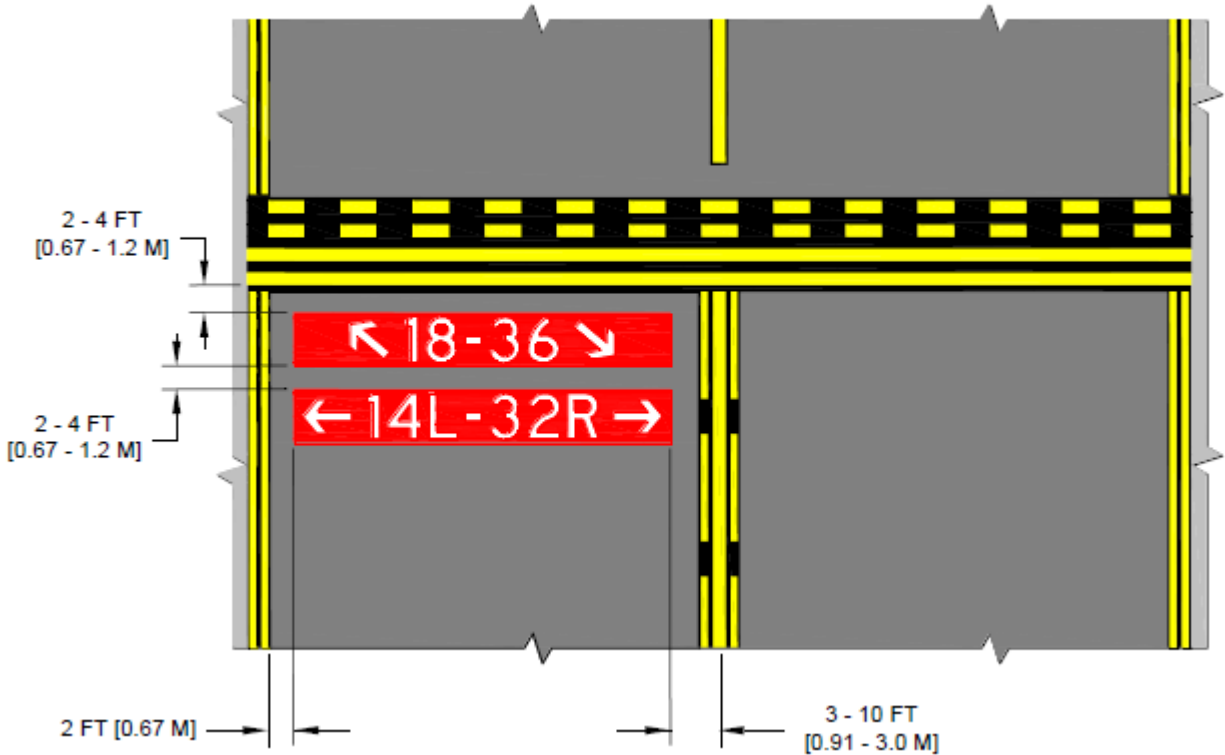
Surface Painted Holding Position Sign for Taxiway Widths Equal to or Less Than 35 Feet



Dimension letter (in image above)	Dimension (feet)	Notes
A	2-3	(none)
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	(none)
D	36 inches	The dimensions for the enhanced taxiway centerline are in Figure D-1.

Note: The dimensions for the enhanced taxiway centerline are in Figure D-1 of the Advisory Circular.

Narrow Taxiway Stacked Surface Painted Holding Position Signs



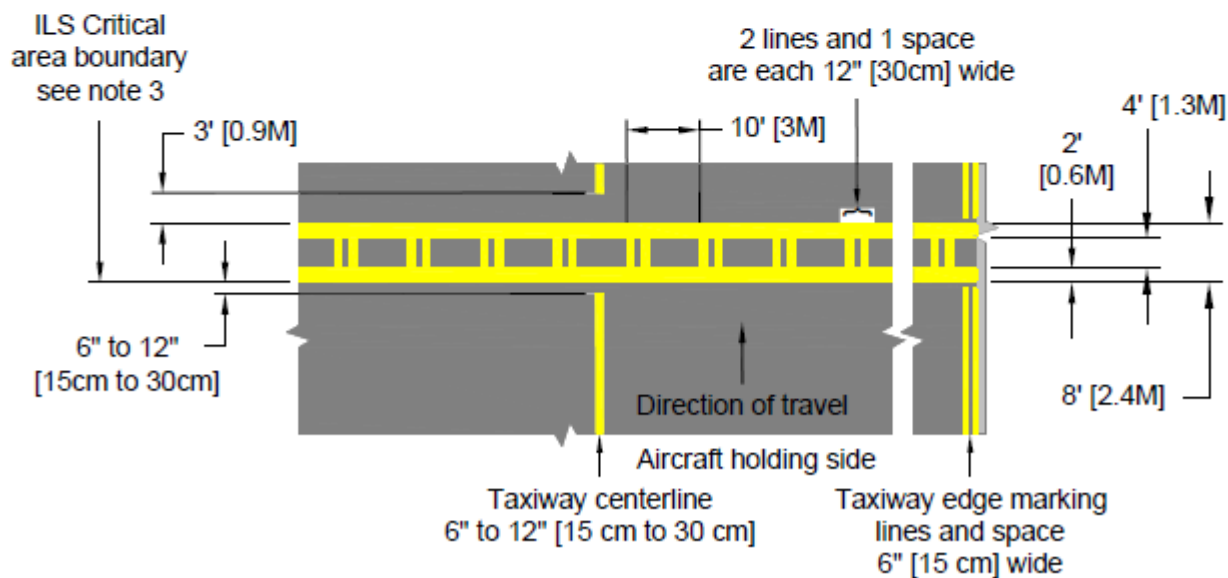
Notes:

1. Stacked surface painted holding position signs for narrow taxiways.
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.
3. For taxiways less than or equal to 35 feet wide, the stacked surface painted signs are located centered on the taxiway in accordance with the figure on the previous page.

Updated September 2019



Pattern B - ILS Holding Position Marking









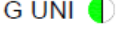



Chapter 2 – Airfield Lighting

Legend and General Notes

Reference: AC 150/5340-30J

The table below shows the lighting color symbols and associated letters that are used in images in the rest of this chapter.

Edge lighting color code	Description
	Runway threshold / End lights Green (G) / Red (R)
	Runway edge light (see note 3) Yellow (Y) / White (W)
	Runway edge light White (W)
	Runway edge light (in-pavement) White (W)
	Runway threshold / End light Red (R)
	Taxiway edge light Blue (B)
	Runway edge light at displaced threshold Yellow (Y) / Red (R)
	Threshold / Runway edge lights at displaced threshold Green (G) / Yellow (Y)
	Runway threshold light with a unidirectional green (G UNI)
	Runway Centerline, LAHSO White (W) / Red (R)

Notes:

- Light fixtures for the lights identified in the color code chart are specified in AC 150/5345-46.
- White lights are shown as black.
- For an instrument runway, install yellow runway edge lights on the last 2000 ft. or one-half the runway length, whichever is less.
- Pavement markings shown on the drawing in AC 150/5340-30H are for reference only.
AC 150/5340-1 describes the detailed marking specifications.

Runway Lighting Configuration (HIRL Precision Instrument Approach - Runway Centerline Not Shown for HIRL. Non-Precision Instrument Approach for MIRL)

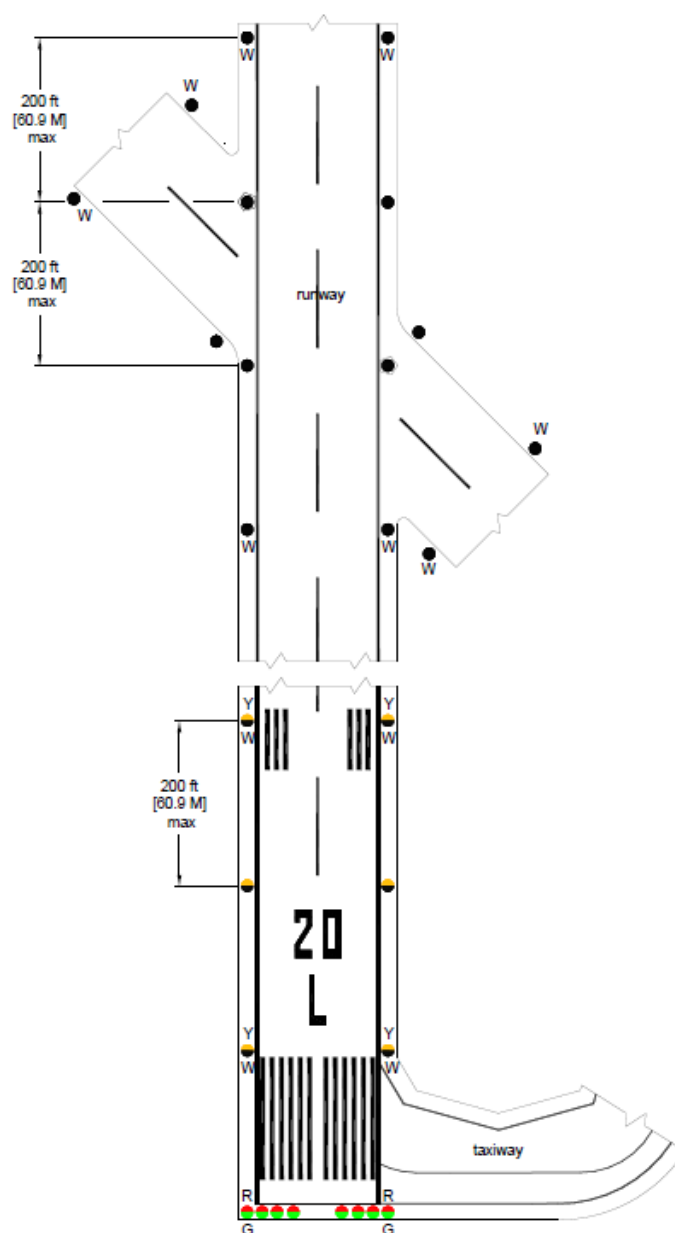
2' minimum – 10' maximum from the runway edge (full strength pavement).

Longitudinal Spacing: 200' maximum

At taxiway and runway intersections:

For HIRLs when the gap exceeds 400 feet install an in-pavement fixture to maintain uniform spacing.

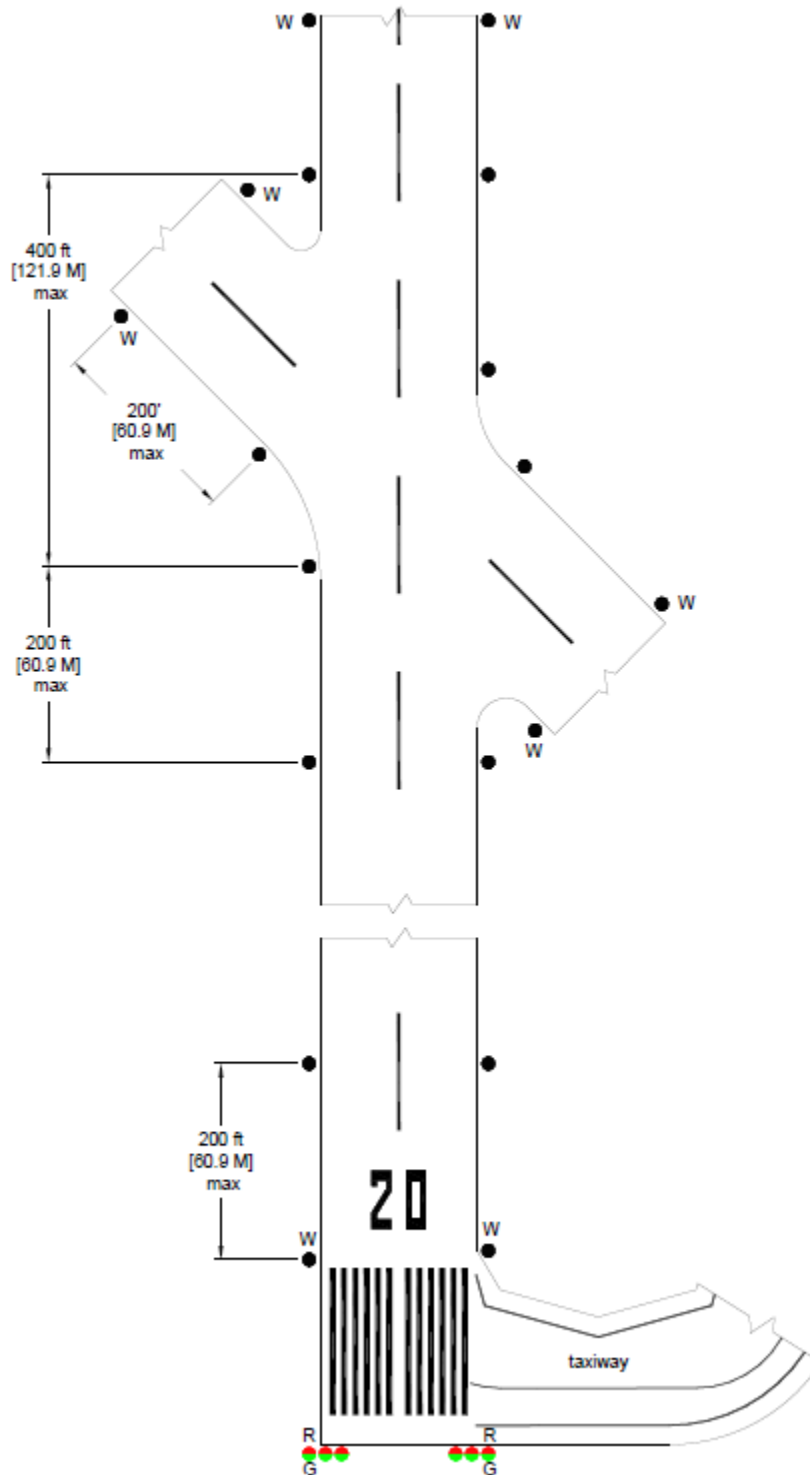
CAT III operations require uniform spacing from threshold to threshold, not to exceed 200'. Install in-pavement lights at intersections, as needed.



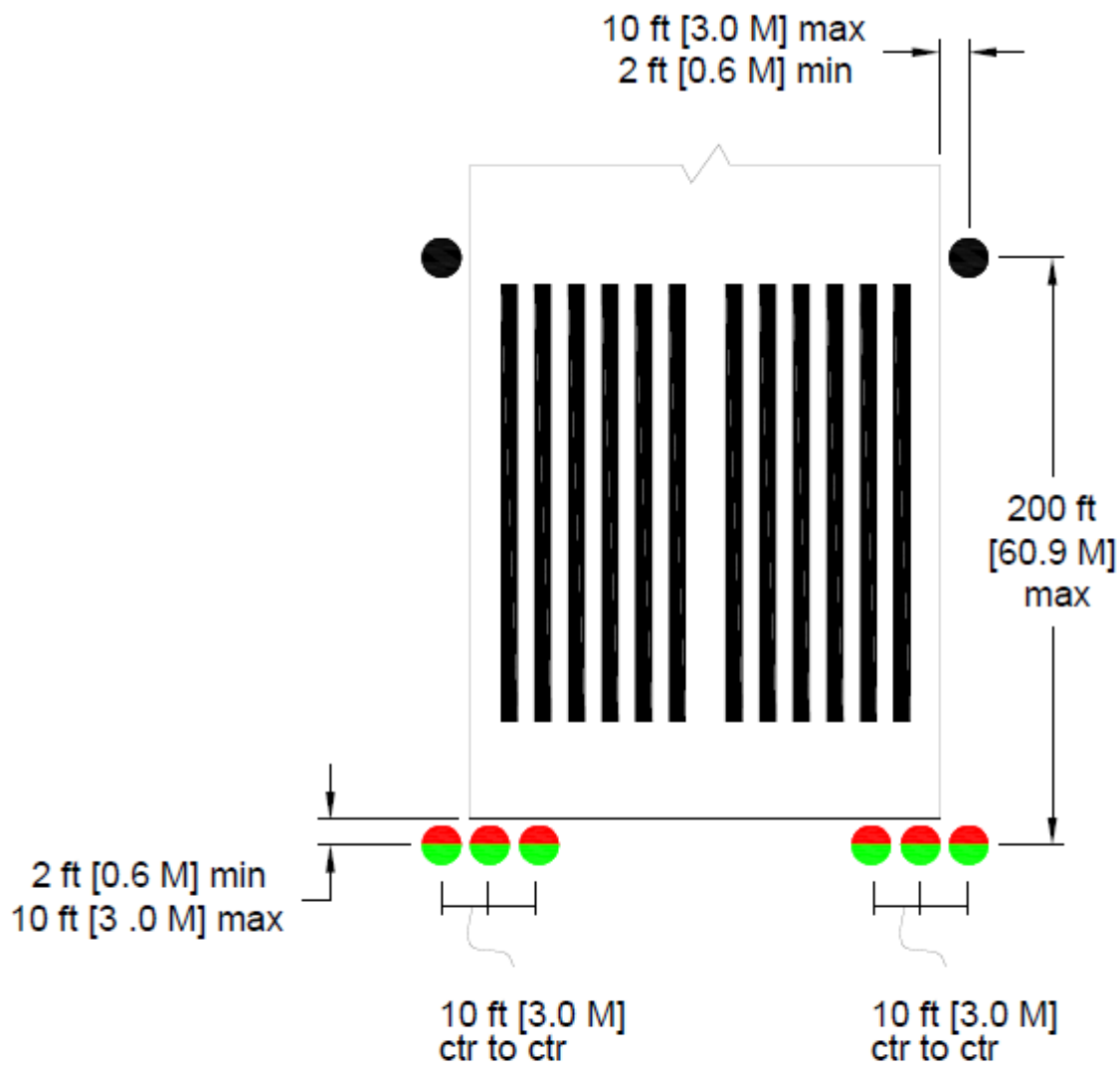
Runway Lighting Configuration (LIRL Runways and MIRL Visual Runways)

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

Gaps between lights on a single side of the runway must not exceed 400 feet.



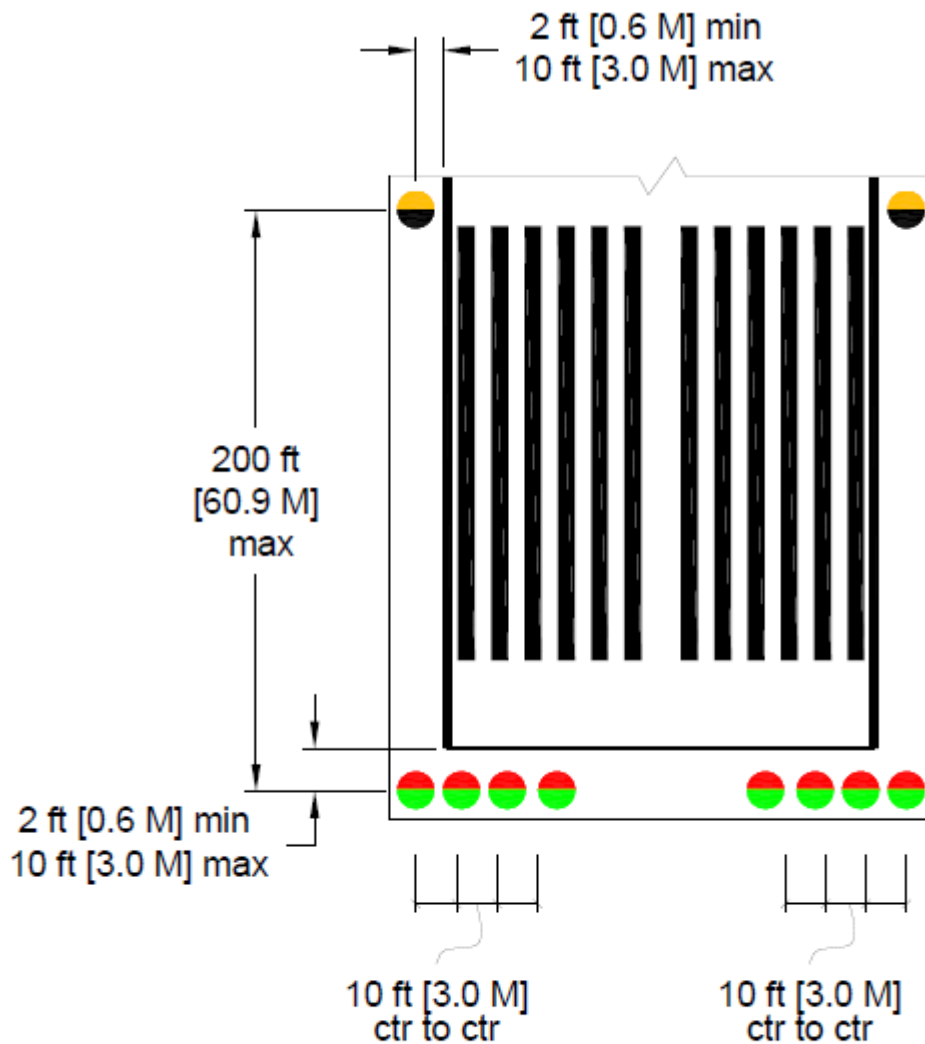
Threshold / Runway End Lights Installed with LIRLs and MIRLs



Legend: ctr = center

Note: Install **six** threshold lights on visual runways.

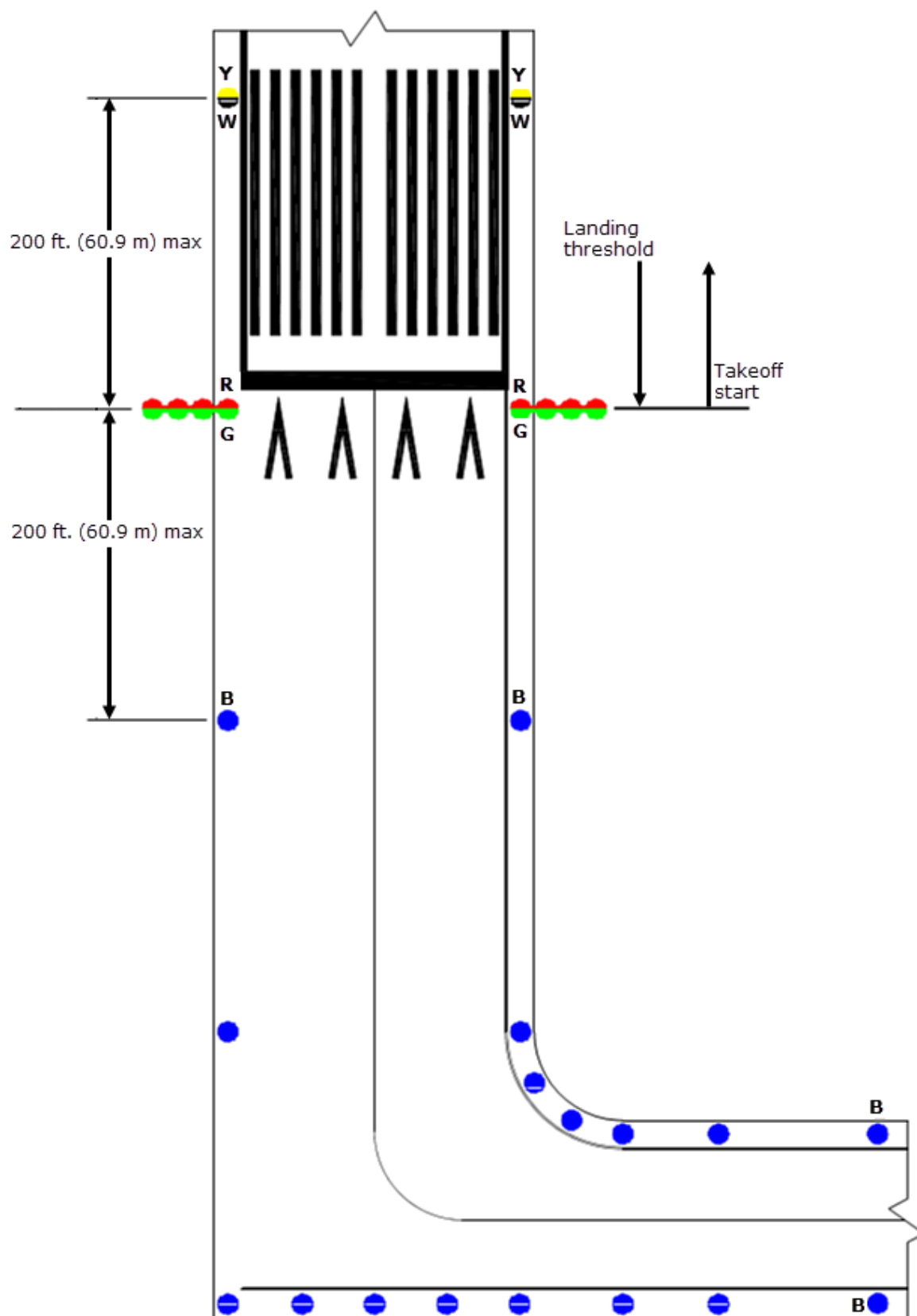
Threshold / Runway End Lights installed with HIRLs



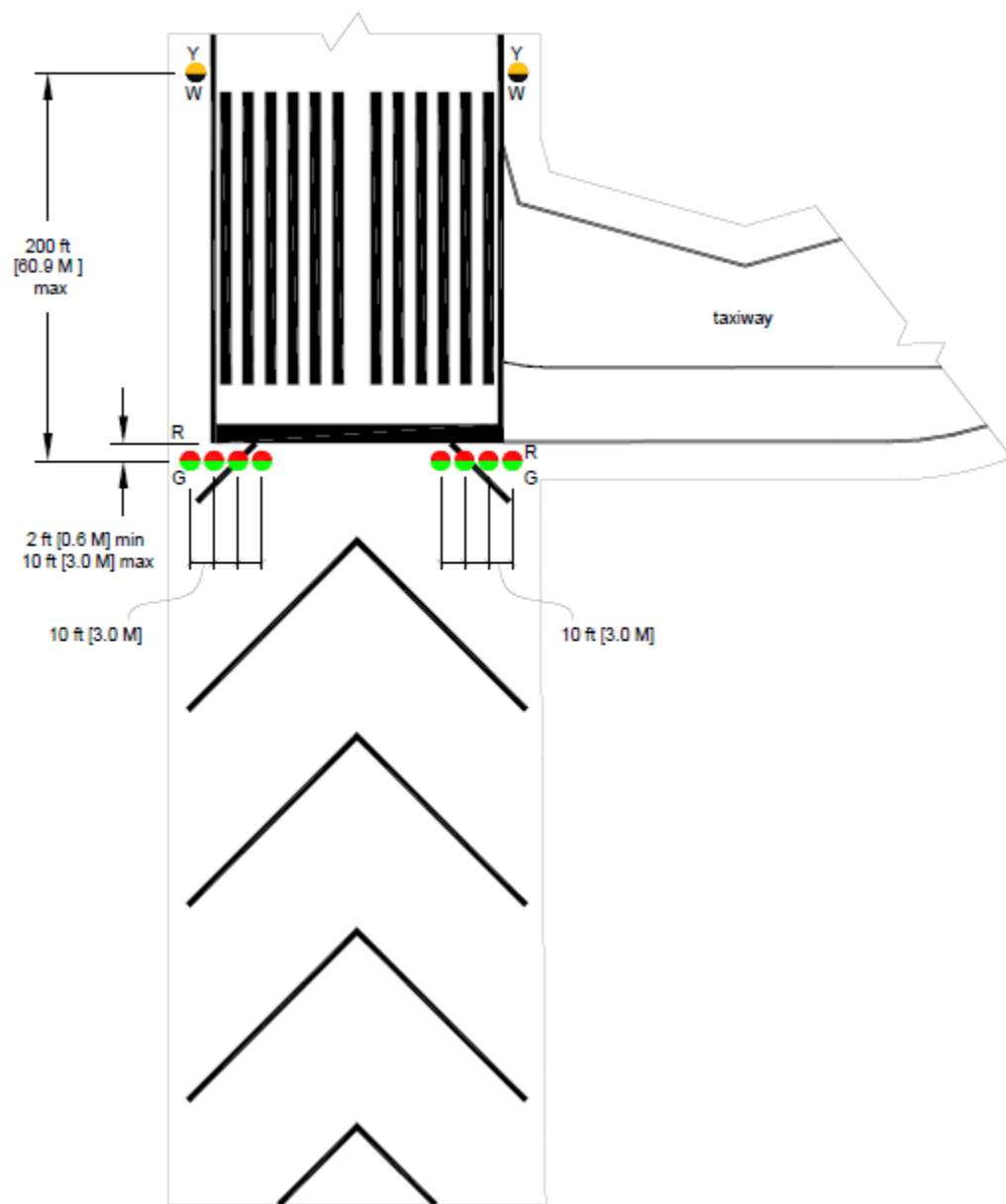
Legend: ctr = center

Note: Install **eight** threshold lights on instrument runways.

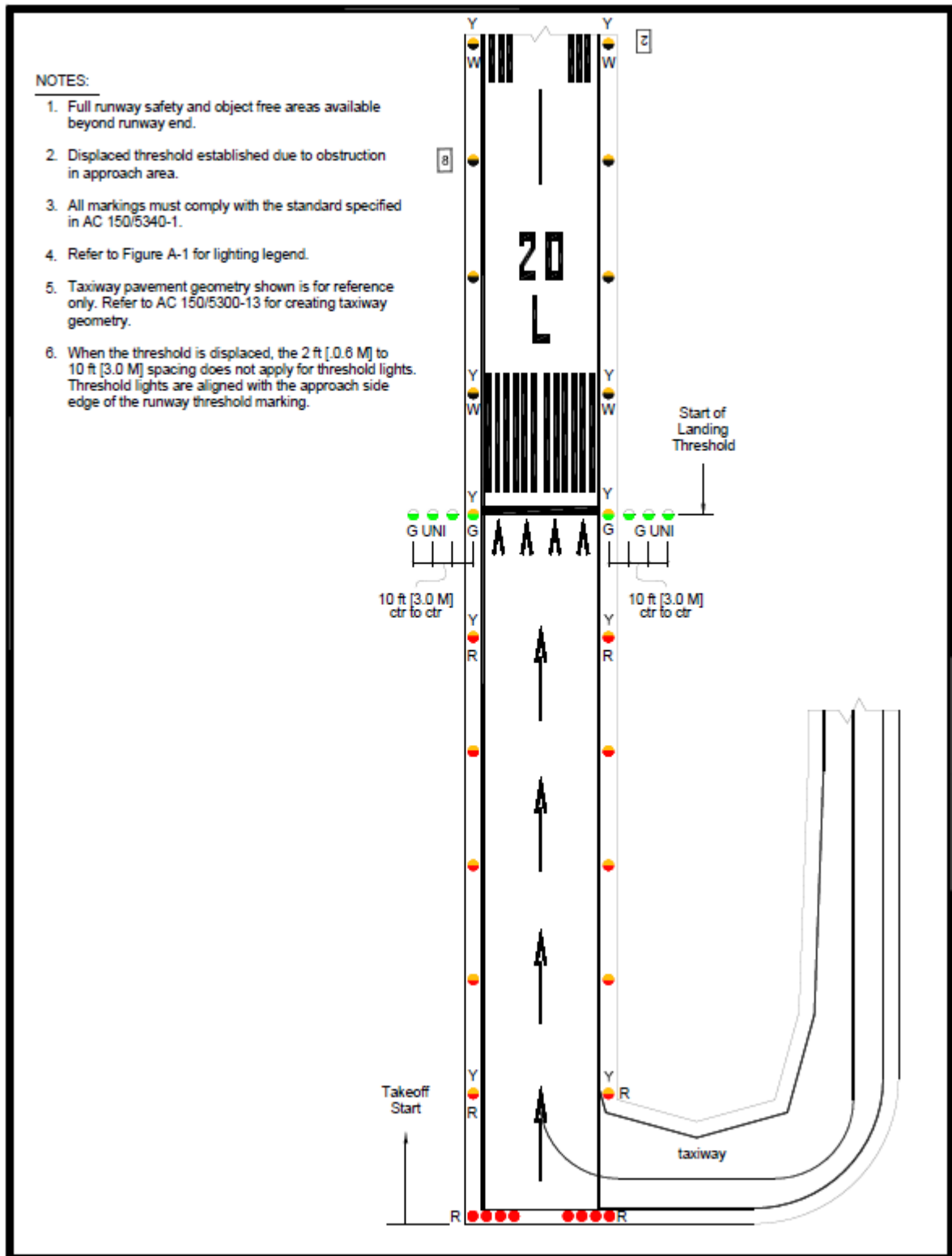
Runway with a Taxiway at the End



Runway with a Blast Pad



Lighting for Runway with a Displaced Threshold

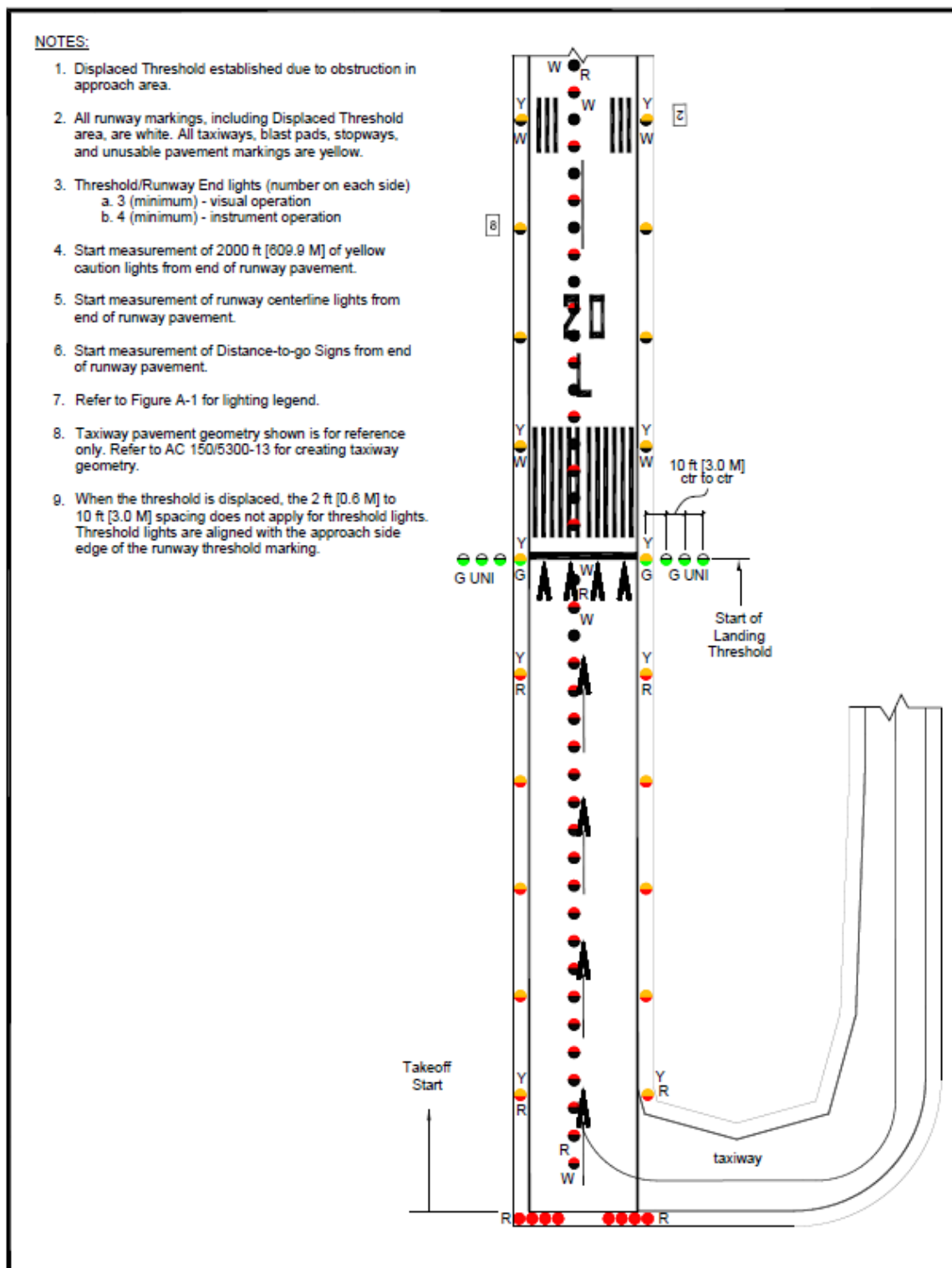


Updated September 2019



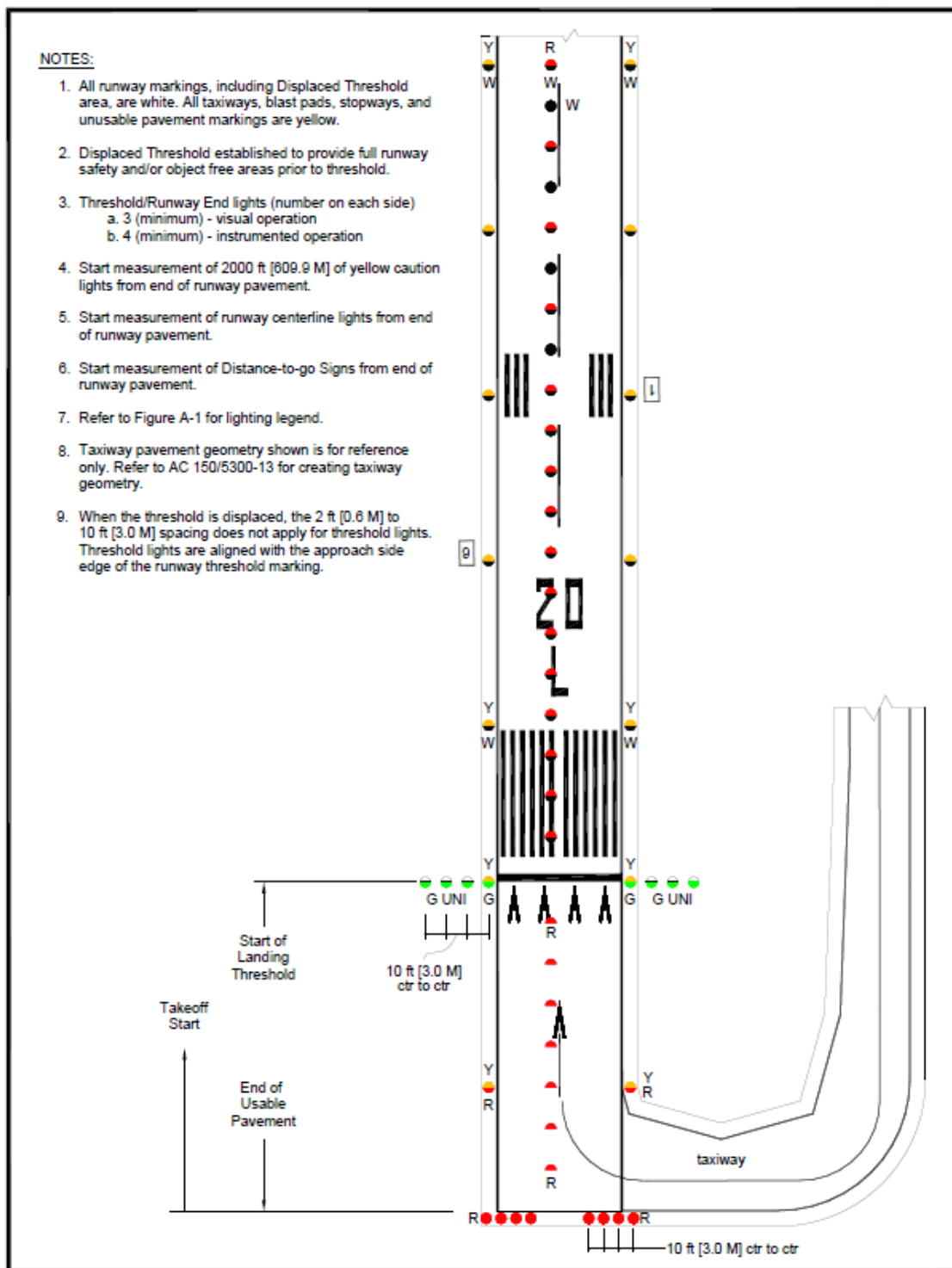
Lighting for Runway with Displaced Threshold Greater than 700'

Note: The centerline lights in the displaced 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).



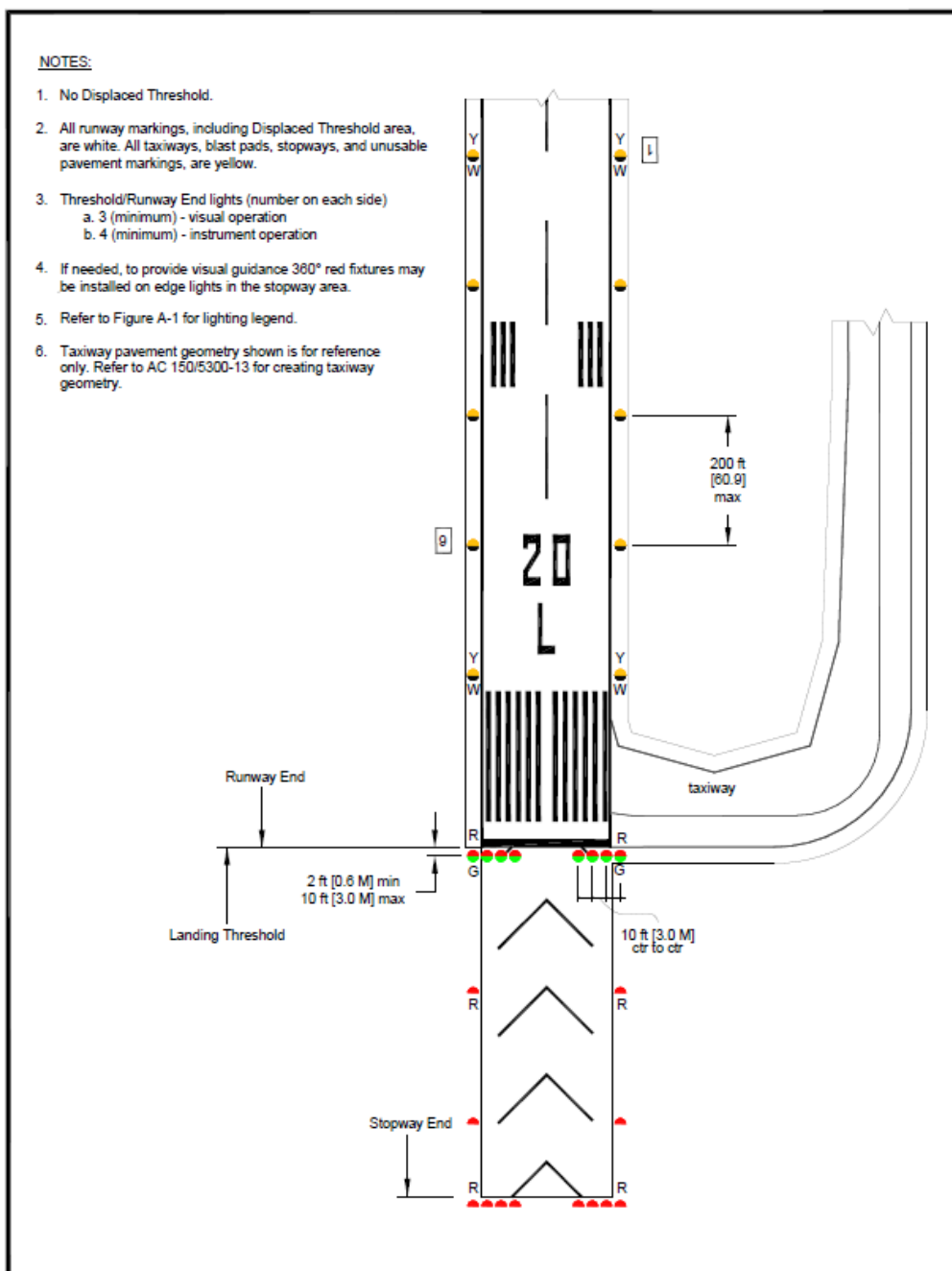
Lighting for Runway with Displaced Threshold Less than 700'

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

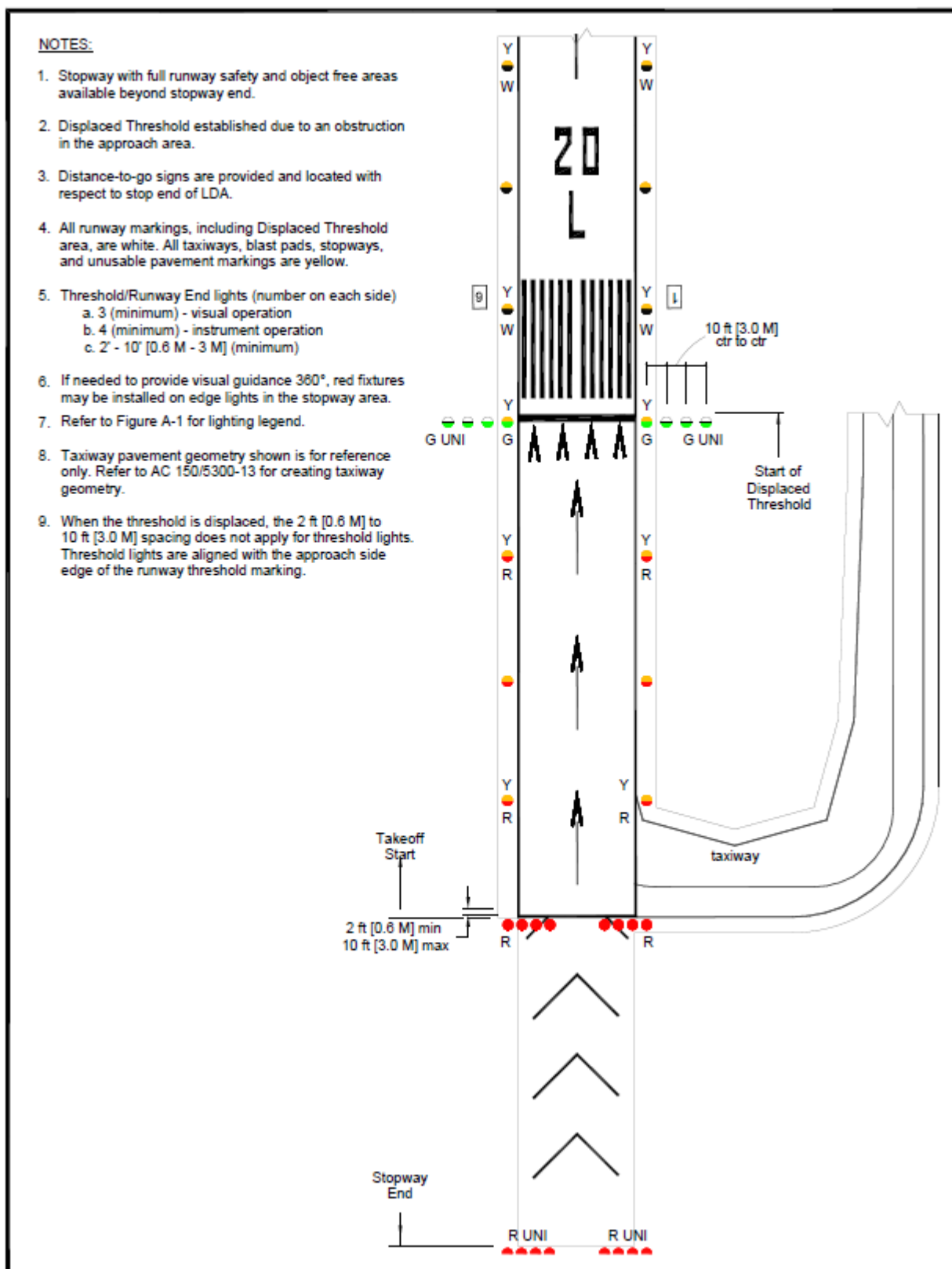


Lighting for Runway with Stopway

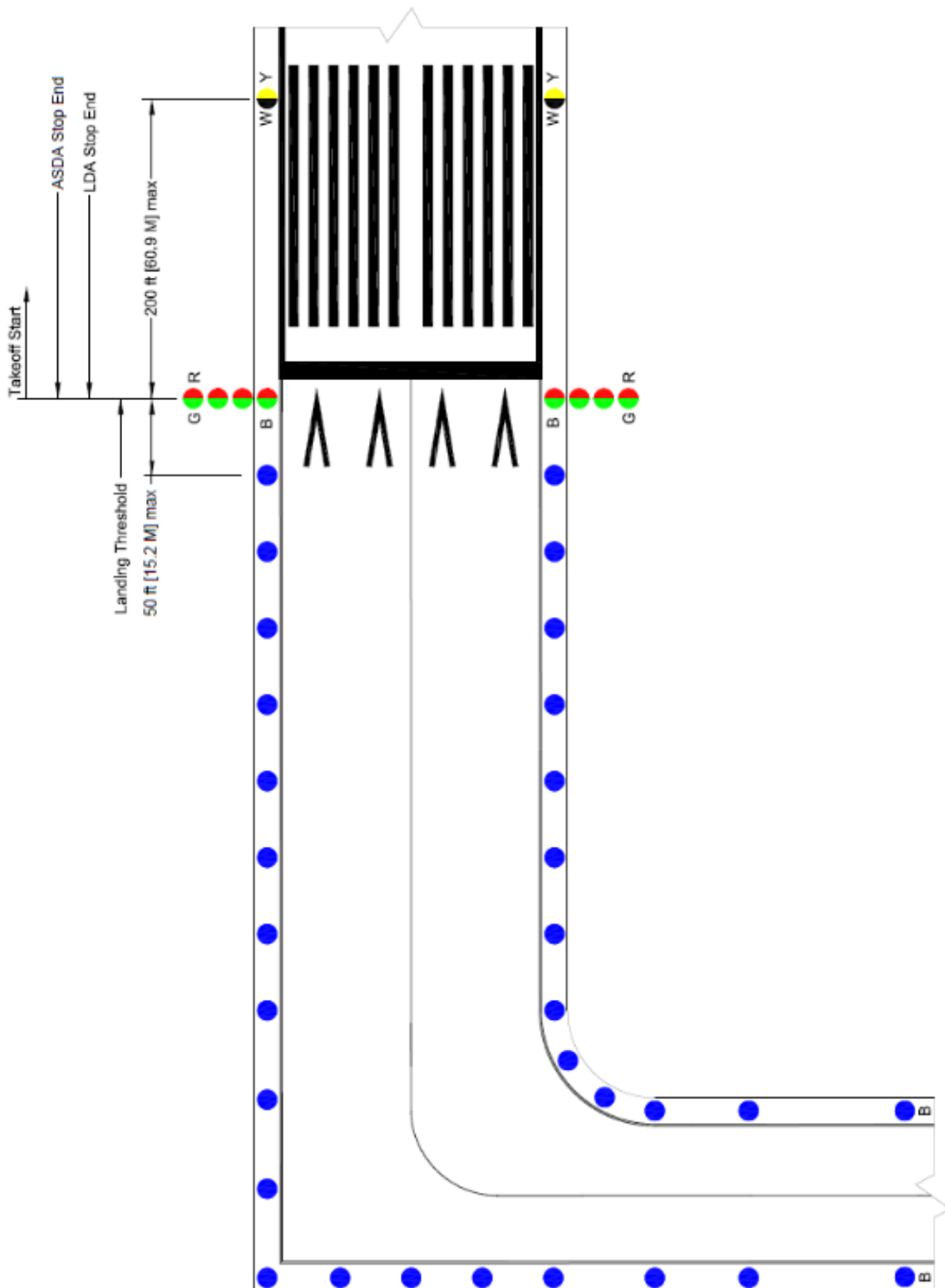
Note: Stopways look like blast pads but are considered full-strength pavement and are suitable to support aircraft during an aborted take-off. If needed, to provide visual guidance, 360-degree red fixtures may be installed on edge lights in the stopway area.



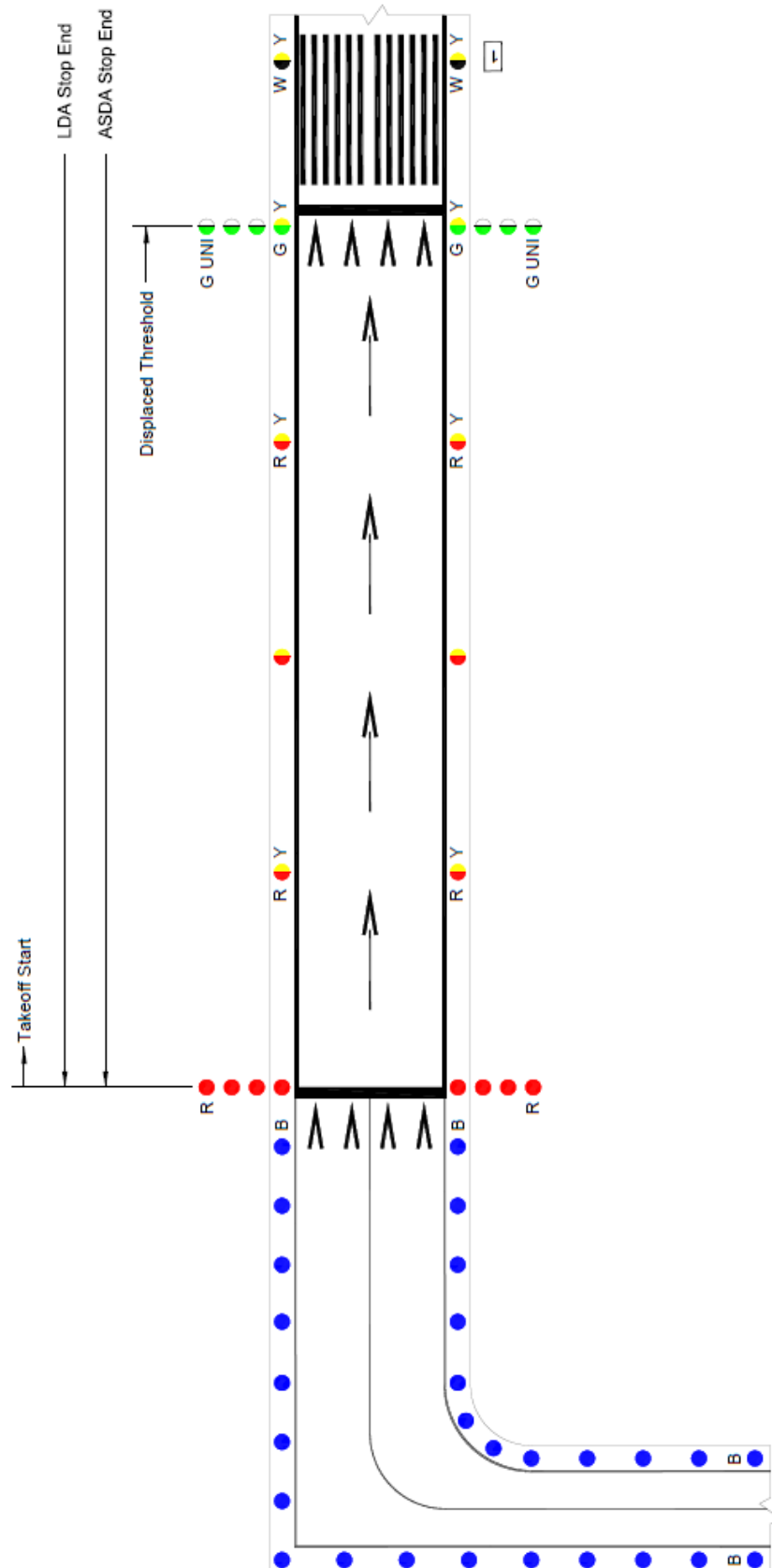
Lighting for Runway with Displaced Threshold and Stopway



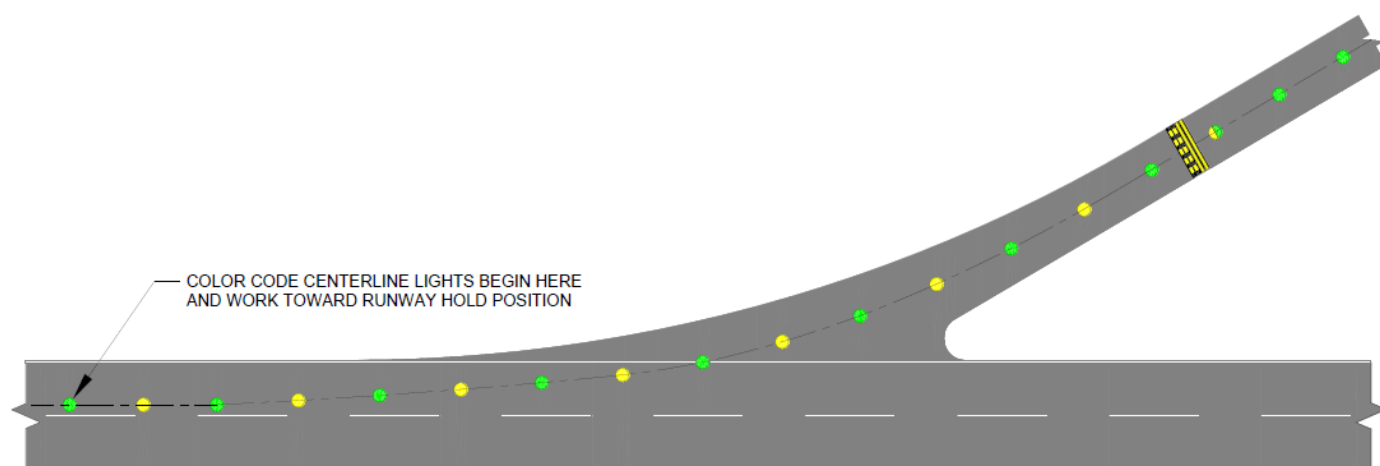
Runway with End Taxiway



Lighting for Runway with End Taxiway and Displaced Threshold

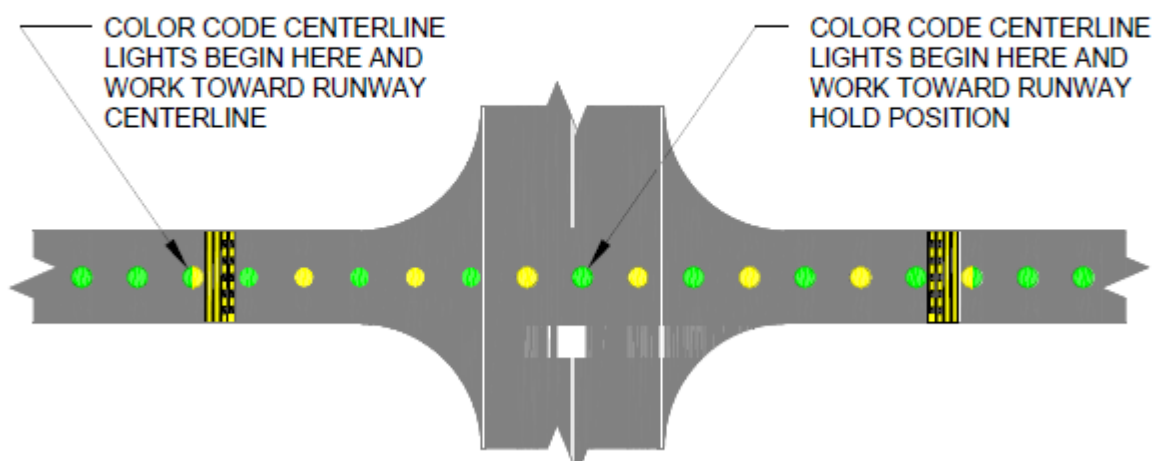


Color-coding of Exit Taxiway Centerline Lights

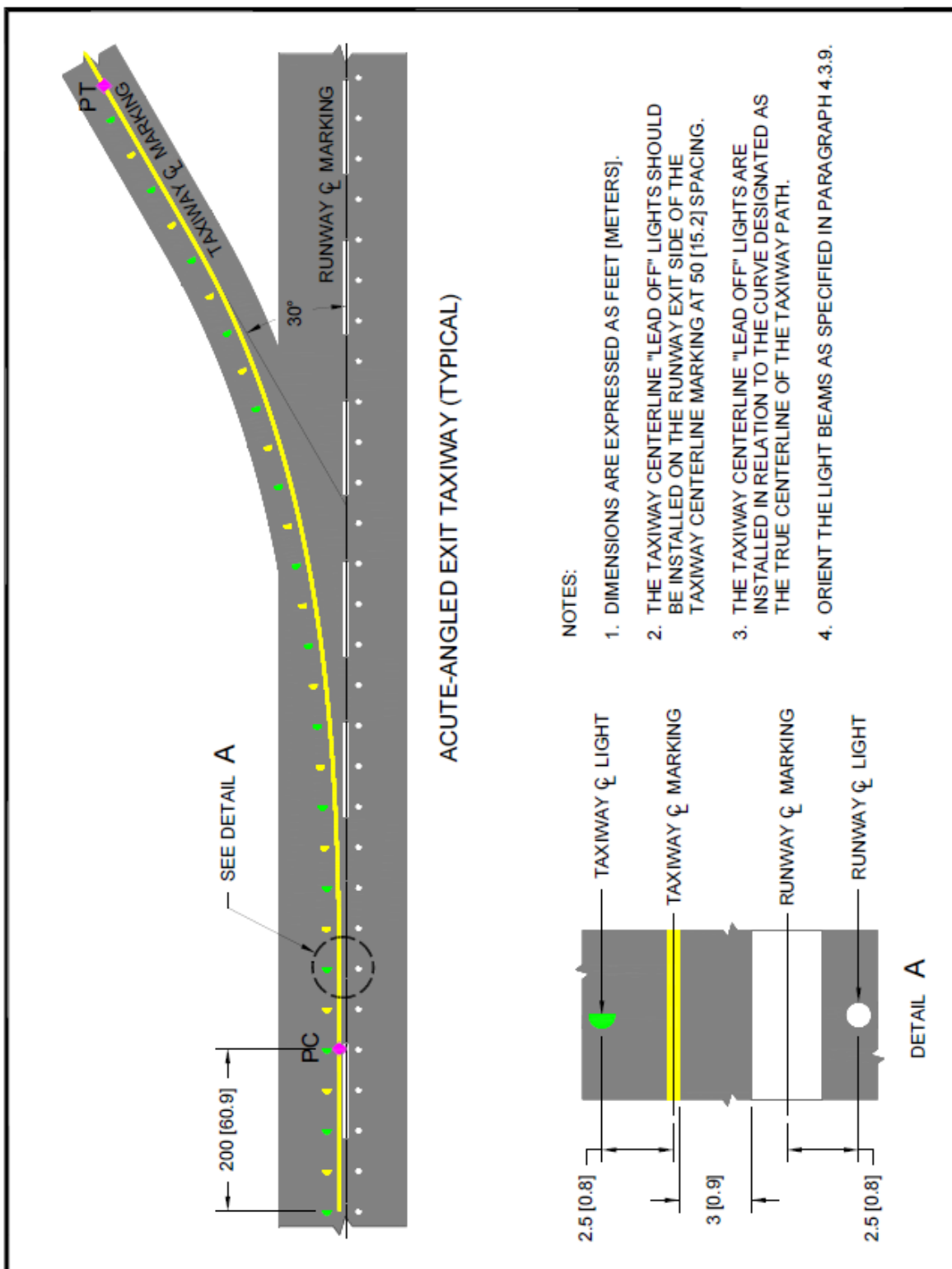


Notes:

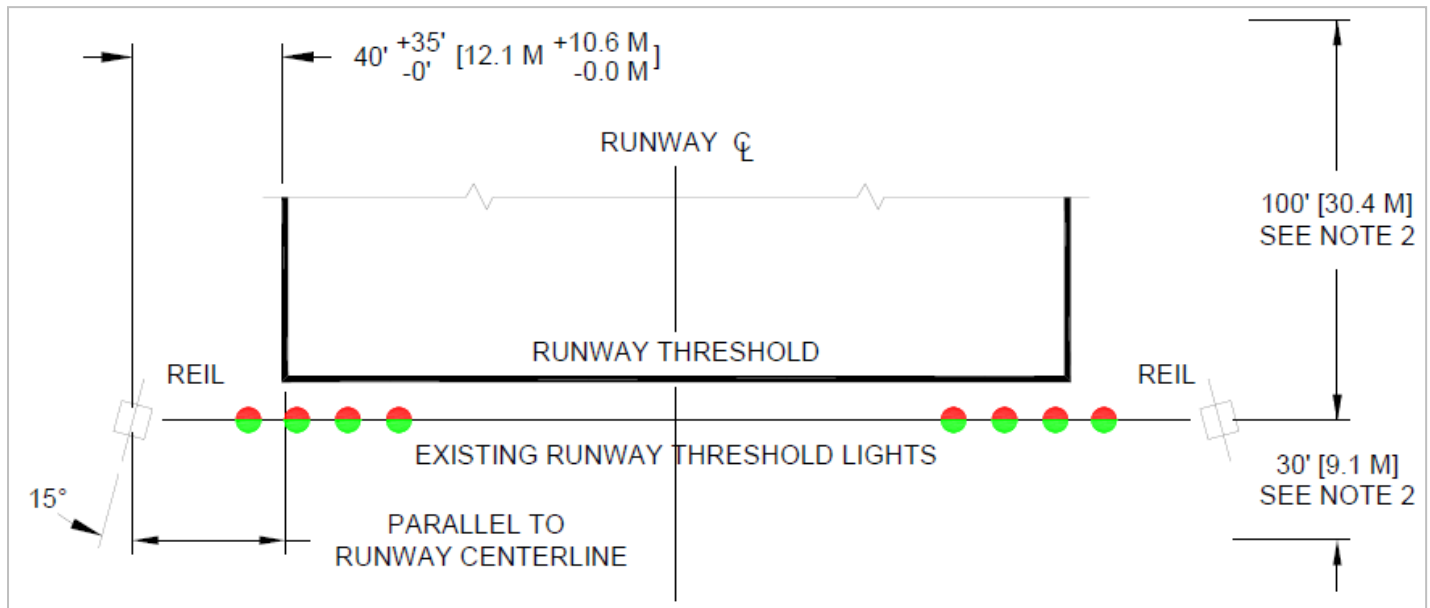
- The first light on the runway is green. If there is an odd number of color-coded lights, the first two lights should be green.
- The fixture used prior to the runway hold or ILS hold position must always be bidirectional: green when approached from the taxiway direction and yellow when approached from the runway direction (bidirectional).
- 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 with the last yellow light similarly located beyond the critical area holding position.



Taxiway Centerline Lighting Configuration for Acute - Angled Exits



Typical Layout for Runway End Identifier Lights (REILs)



Notes:

- The optimum location for each light unit is in line with the runway threshold at 40 ft. from the runway edge.
- A 100 ft. upwind and a 30 ft. downwind longitudinal tolerance are permitted from the runway threshold in locating the light units.
- 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.
- 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.
- 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.
- The elevation of both units shall be within 3 ft. of the horizontal plane through the runway centerline.

Chapter 3 – Construction Safety

Reference: AC 150/5370-2G

Safety Areas and Work Limits

- Construction activities are prohibited in safety areas while the associated runway or taxiway is open to **ANY** aircraft. In the past, this prohibition applied only to air carriers.
- 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 while the taxiway is open. In rare circumstances where the section of taxiway is indispensable for aircraft movement, open trenches or excavations may be permitted in the Taxiway Safety Area subject to the following restrictions:
 - a. Taxiing speed is limited to 10 mph.
 - b. Appropriate NOTAMs are issued.
 - c. Marking and lighting standards that meet the provisions of paragraphs 2.18 and 2.20 of AC 150/5370-2G are implemented.
 - d. Low mass, low-profile lighted barricades are installed.
 - e. Appropriate temporary orange construction signs are installed.

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 and Phasing Plan. Update during the project, as needed.
- Conduct periodic safety meetings with contractors and tenants.
- Continually review NOTAMs.
- Remember to include the aircraft rescue and firefighting department in all construction planning, 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.
- Continuously 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.
- Outbound destination signs are to be covered for closed runways.
- If a sign does not serve its normal function or provides conflicting information, then it must be covered or removed to prevent misdirecting pilots.
- Information signs identifying a crossing taxiway continue to perform their normal function even if the crossing taxiway is closed.

Construction 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 using 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.

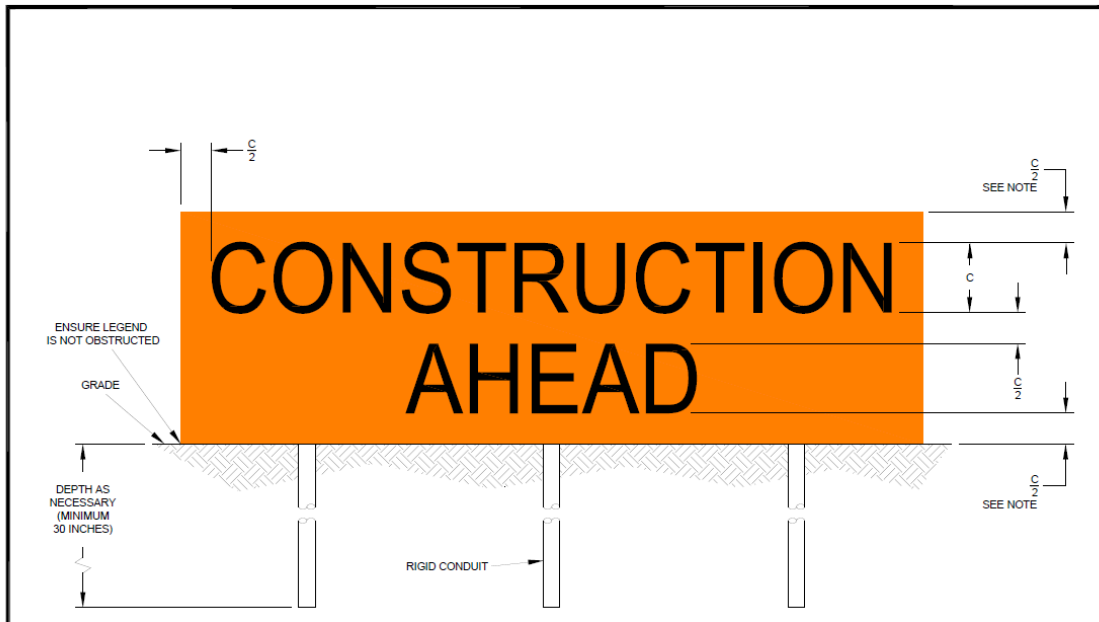
Temporary Signs



The airport operator may choose to introduce temporary construction signs with a black message on an orange background.

- Signs that need to be located in a runway or taxiway safety area must be mounted on frangible supports.
- Temporary signs must meet FAA Engineering Brief 93, Guidance for the Assembly and Installation of Temporary Orange Construction Signs.
- Temporary signs must be included in the Construction Safety Phasing Plan.
- Signs must withstand 100 mph winds and jet blast without bending or changing shape.
- The background color of the signs must be fluorescent orange meeting the requirements of ASTM D 4956, Specification for Retroreflective Sheeting for Traffic Control, for Type III and Type IV sheeting.

Figure 1. Details for CONSTRUCTION AHEAD Sign

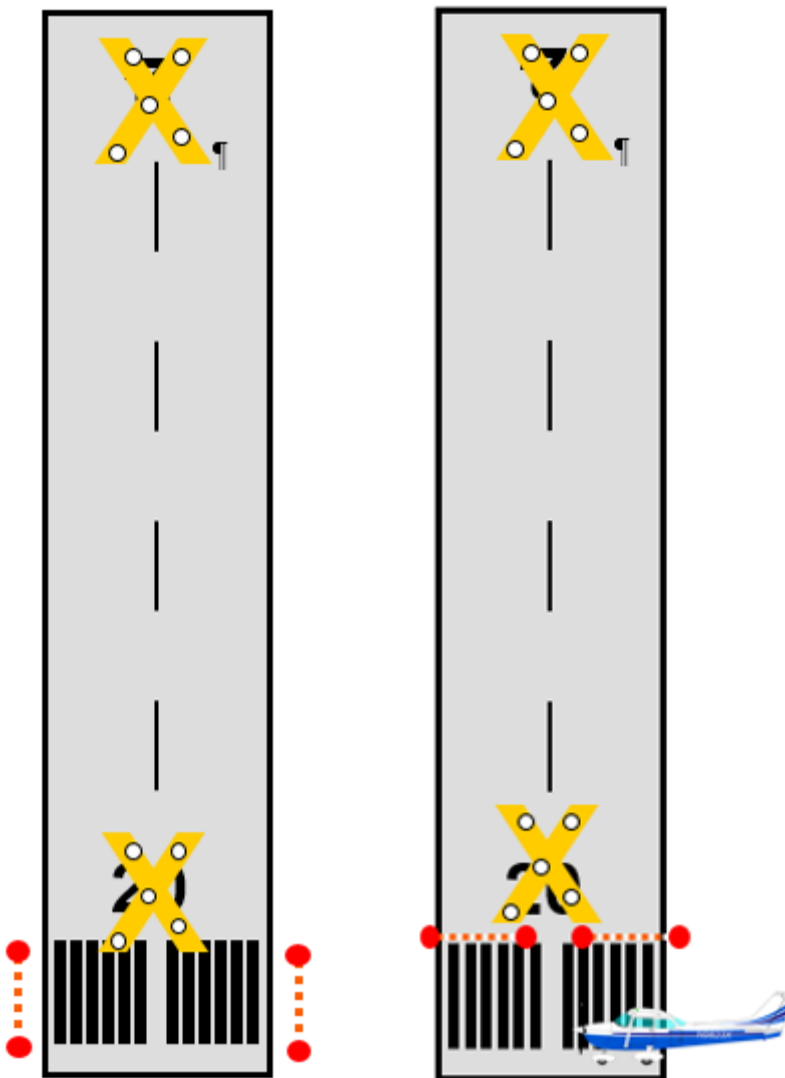


Note: For 9-inch characters, reduce top and bottom borders by $\frac{3}{4}$ -inch so the height of the sign face equals 30 inches.

Temporarily Closed Runways

When temporarily closing runways:

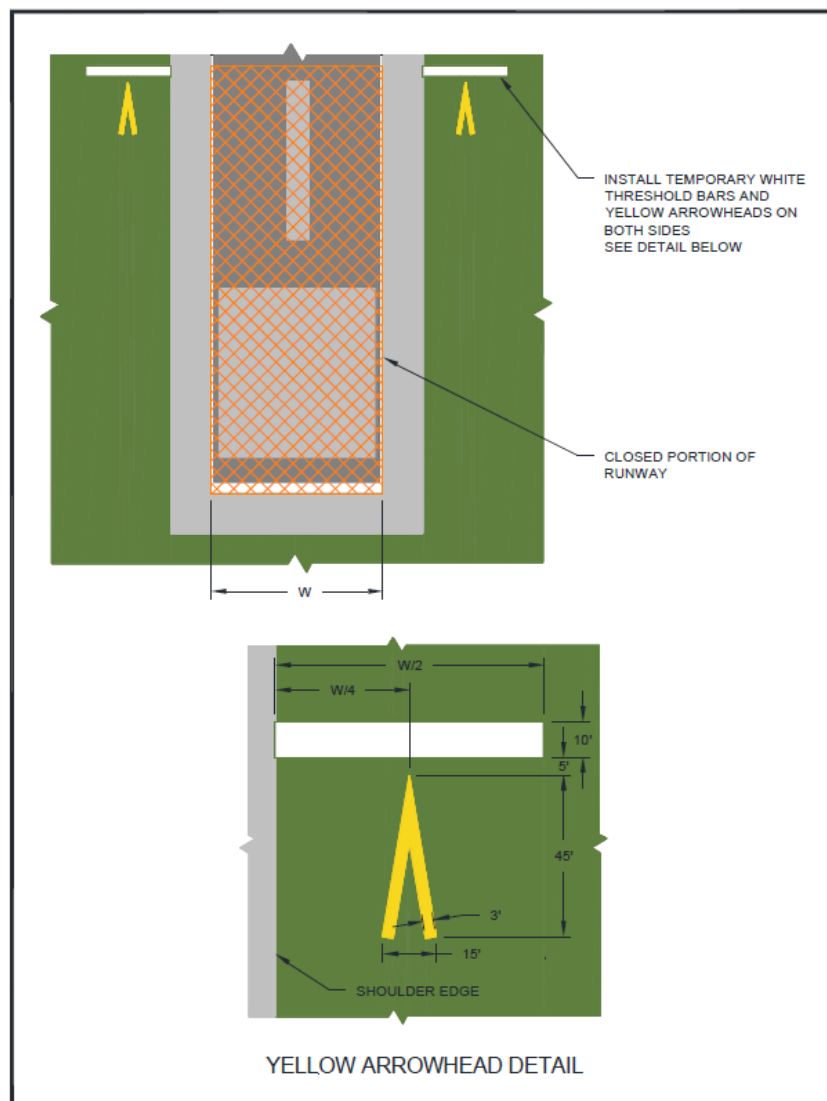
- Turn off runway lights and approach lights.
- Turn off PAPIs or VASIs.
- Issue NOTAMs.
- Place an X at each end of the runway directly on or as near as practical to runway numbers. X's can be painted, double-layered snow fence, plywood, yellow-colored plastic, or other materials.
- If available, use lighted X's, both at night and during the day. Lighted X's are required at night if runway lights are to remain on.
- If a lighted X is used, it **MUST** be illuminated at all times that it is on the runway.



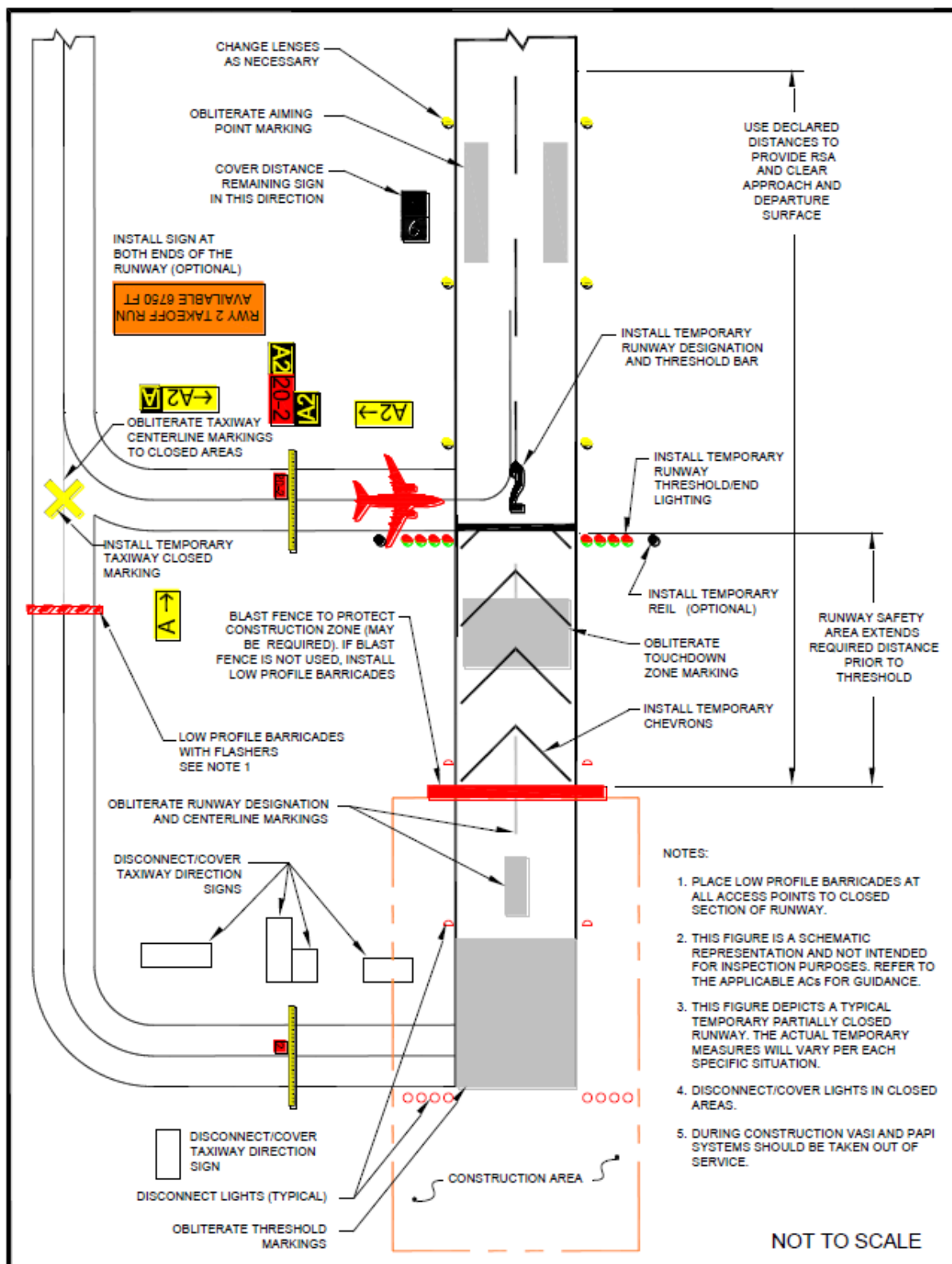
Partially Closed Runway

- Closed portions of the runway, not suitable for take-off or landing, must be marked with yellow chevrons. These can be painted, double-layered snow fence, plywood, yellow-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. Existing touchdown zone markings may remain.
- Issue appropriate NOTAMs regarding any nonstandard markings.

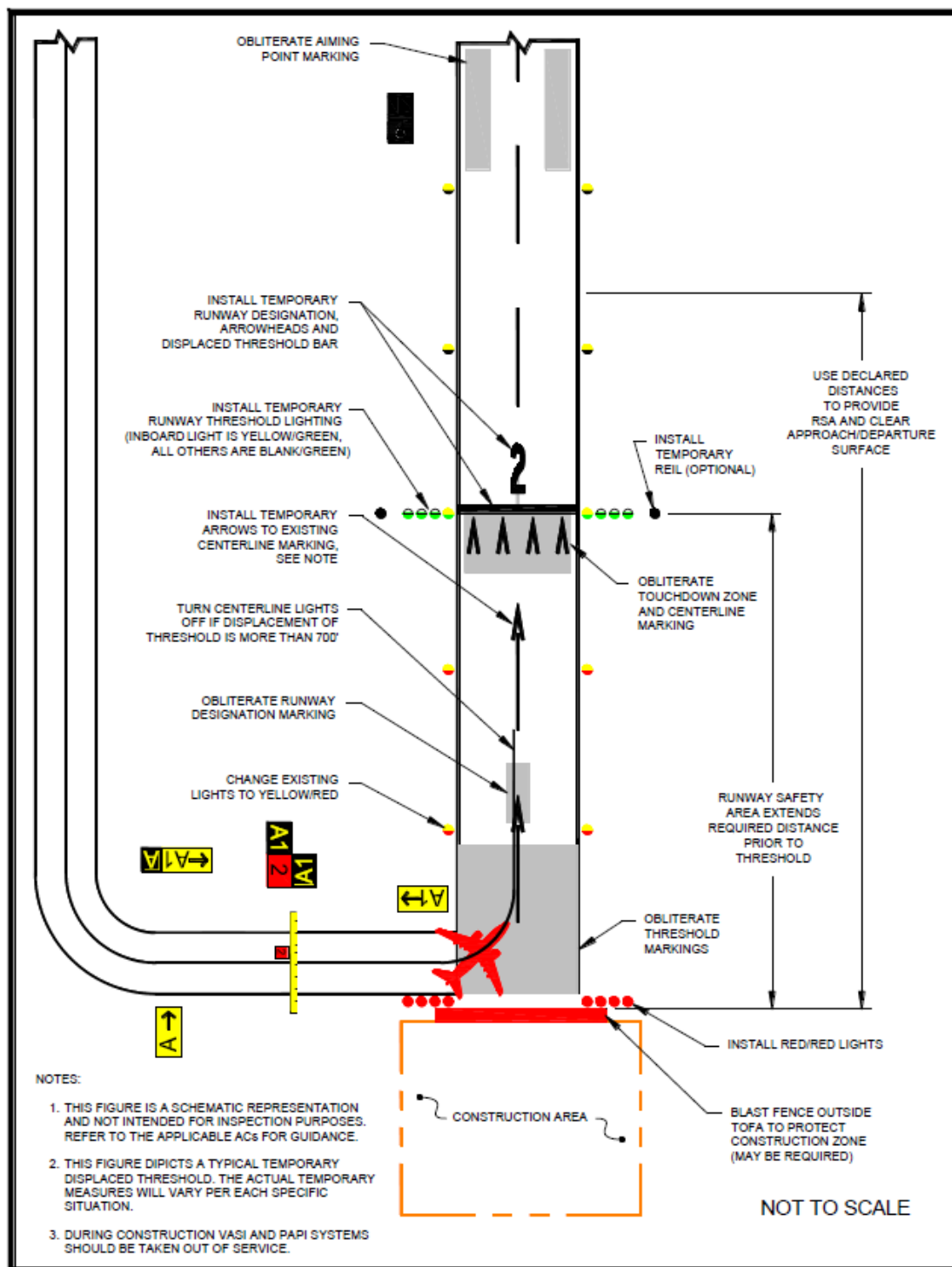
Figure 2-5. Temporary Outboard White Threshold Bars and Yellow Arrowheads



Temporary Partially Closed Runway

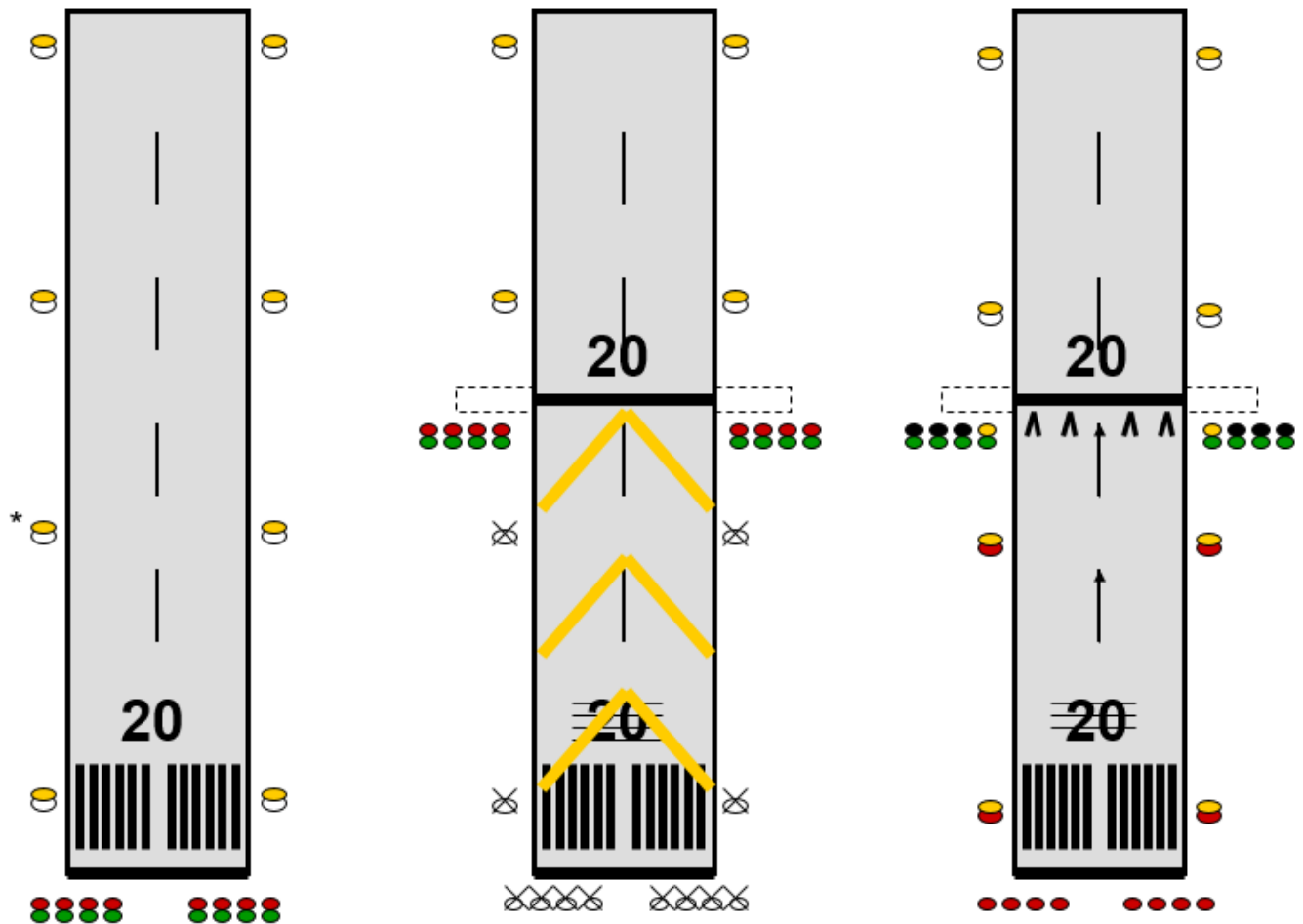


Temporary Displaced Threshold



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.
- Temporary runway threshold/end light bases are to be installed at grade. The standard height above ground for the fixtures is 14 inches.
- 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.
- At towered, Part 139 airports, holding position signs are required to be illuminated on open taxiways crossing to closed or inactive runways. If the holding position sign is installed on the runway circuit for the closed runway, install a jumper to the taxiway circuit to provide power to the holding position sign for nighttime operations. Where it is not possible to maintain power to signs that would normally be operational, install barricades to exclude aircraft.

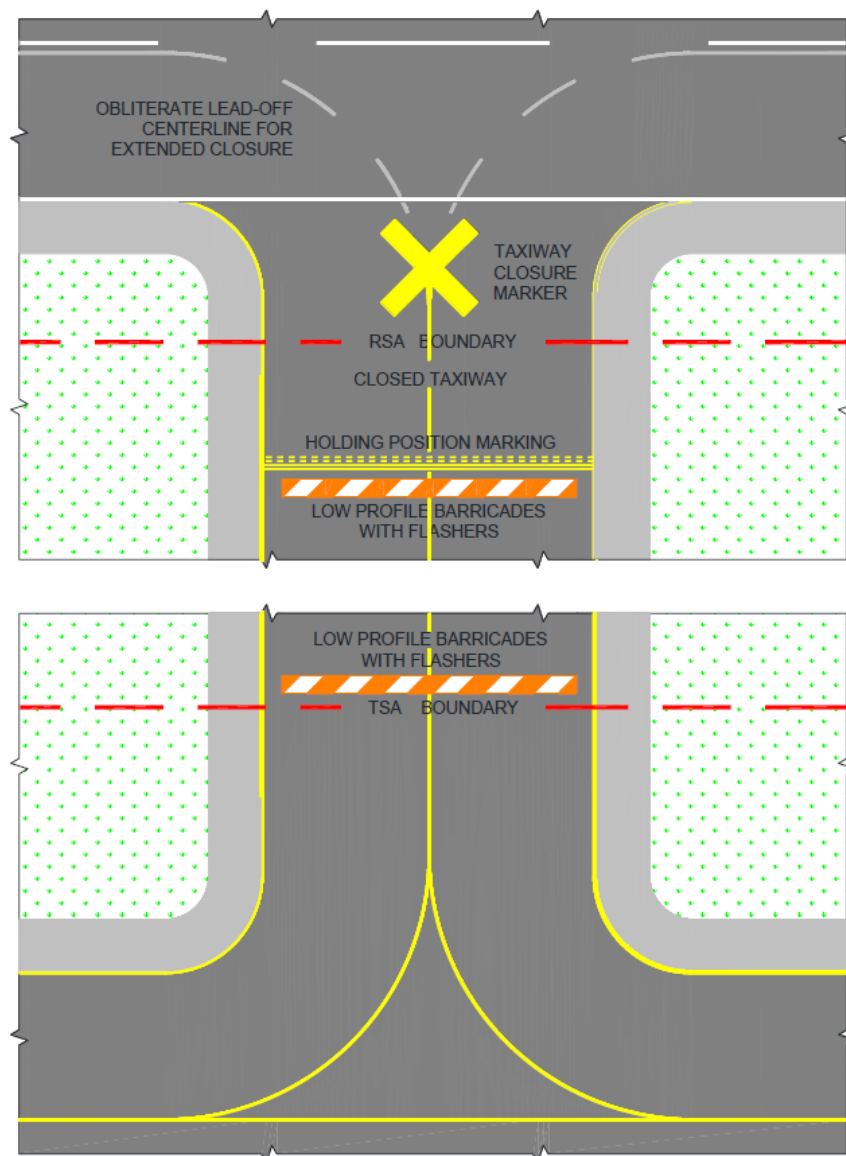


* Amber last 2000' of instrument runway X= OFF

Temporary Taxiway Closure

- 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.
- Runway exit signs are to be covered for closed runway exits.
- If the centerline marking will be reused upon reopening the taxiway, it is preferable to paint over the marking.
- 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.



Chapter 4 - Fuel Fire Safety

References:

- AC 150/5230-4B
- Addendum for AC 150/5230-4B, Aircraft Fuel Storage, Handling, Training, and Dispensing on Airports
- NFPA 407 - Standard for Aircraft Fuel Servicing- 2017 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/>



Fueling Supervisor and Personnel Training

Reference:

AC 150/5230-4B

- Part 139.321 requires that at least one supervisor with each fueling agent must complete an aviation fuel training course in fire safety that is authorized by the administrator prior to initial performance of duties or enrolled in an authorized aviation fuel training course that will be completed within 90 days of initiating duties and receive recurrent instruction at least every 24 consecutive calendar months.
- All employees who fuel aircraft, accept fuel shipments, or otherwise handle fuel must receive at least initial on-the-job training and recurrent instruction every 24 consecutive calendar months from the trained supervisor.
- The fueling supervisor must receive hands-on, hand-held fire extinguisher training within 60 days of completion of the supervisory training course in fire safety, if not provided concurrently with the course.
- Records of supervisory and line service personnel training must be maintained by the fueling agent for 24 consecutive calendar months.

Fuel Training Certificates

- Certificates must differentiate between supervisor training and line service training
- Supervisor certificates must have the following wording: Name of the company doing the training, Name of individual who completed “fuel safety supervisor” training, **“Has successfully completed all classroom and practical application for the requirements of 14 CFR part 139.321(b)(1) through (b)(6) and 139.321(e)(1)”**, date of completion.
- Line training certificates must have the following wording: Name of the company doing the training, Name of individual who completed “line fuel service” training, **“Has successfully completed all classroom and practical application for the requirements of 14 CFR part 139.321(b)(1) through (b)(7) and 139.321(e)(2)”**, date of completion.
- Certificates of completion for courses that do not include hand held fire extinguisher training must include a statement indicating **“excluding hands-on fire extinguisher training.”**

Sample Fueling Supervisor Training Certificate

The image shows a sample certificate for Fuel Safety Supervisor training. It is a rectangular document with a double-line border. At the top, it says "(Name of Company conducting Training)" in blue, with "(as listed in the addendum to AC 150/5230-4B)" in smaller text below it. The title "Certificate of Training" is in a large, italicized blue font, followed by "Fuel Safety Supervisor" in a slightly smaller, italicized blue font. Below this, the supervisor's name is indicated by "(Supervisor's Name)" in a large, bold, blue font. The main body of the certificate contains the text: "Has successfully completed all classroom and practical application for the requirements of 14 CFR part 139.321(b)(1) through (b)(6) and 139.321(e)(1), excluding hands-on fire extinguisher training." in blue. At the bottom, there are two lines for signatures: "Signature of Company Trainer" on the left and "Date of Completion" on the right, both in blue. A small "(company logo)" is centered below the trainer's signature line. A large, diagonal "SAMPLE" watermark is visible across the center of the certificate.

Sample Checklist- Fuel Vehicles

Fueling Inspection – Aircraft Fuel Servicing Vehicles

Inspector: _____ **Fueling Agent:** _____ **Date:** _____

In the checklist below, **S** =Satisfactory, **U** = Unsatisfactory, **R** = See remarks below. Check the appropriate boxes.

Checkpoint	Rating for Truck number: Type fuel:			Rating for Truck number: Type fuel:			Rating for Truck number: Type fuel:		
	S	U	R	S	U	R	S	U	R
Fuel trucks/trailers parked 50' from buildings 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-all 4 sides/No evidence of smoking/No ashtray/lighter									
Flammability/Product signs all 4 sides of fuel trucks/carts									
Hazmat placards all 4 sides of fuel trucks/carts									
Bonding cables provided and clips/plugs functional									
Fuel Trucks - Two 40-B:C extinguishers on sides /No ABC DC Ext.									
Hydrant vehicles and carts - One 40-B:C extinguisher									
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/Over-wing nozzles									
Emergency fuel shutoffs operable and properly placard/1 each side									
Aircraft fueling hose/No blistering, cracking, saturation, separation									
Dry break couplers and 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									
Proper Fueling Procedures Observed									
Remarks:									

This Checklist is based on the 2017 NFPA 407 Fire Code for Airport Fueling Operations

Sample Checklist- Fuel Farm

Fueling Inspection – Airport Fuel Systems

Inspector: _____ **Fueling Agent:** _____ **Date:** _____

In the checklist below, **S** =Satisfactory, **U** = Unsatisfactory, **R** = See remarks below. Check the appropriate boxes.

Checkpoint	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						
Diamond hazard placards installed on fuel tanks IAW AHJ						
Emergency fuel shutoff provided for airport fueling system/Outside spill area						
Emergency fuel shutoffs provided for each tank vehicle loading station						
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 department						
Bonding connections available for loading stations						
Deadman controls available for loading stations/Not bypassing Deadman						
Dry break couplers and adaptors installed						
Aircraft fuel hose/blistering, cracking, carcass saturation, separation, kinks						
Fueling hydrants, pits, cabinets located 50' from bldg. except loading bridges						
40-B:C fire extinguishers at fuel storage area, usually at EFSO						
40-B:C rated extinguisher at each fuel vehicle loading station						
No A:B:C rated DC extinguishers within 500 ft. of aircraft operating areas						
Wheeled extinguishers on aircraft servicing aprons at gates or 200 ft. apart						
Explosion proof electrical equipment						
Above ground fuel piping on aircraft movement area protected by barrier guard						

Remarks:

This checklist is based on the 2017 NFPA 407 Fire Code for Airport Fueling Operations

Sample Checklist - Self-Serve

Fueling Inspection – Self-Service Fuel Stations

Inspector: _____ **Fueling Agent:** _____ **Date:** _____

Type Fuel: _____

In the checklist below, **S** =Satisfactory, **U** = Unsatisfactory. Check the appropriate box.

Checkpoint	Rating		Remark
	S	U	
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			
Diamond hazard placards installed on fuel tanks IAW AHJ			
Emergency fuel shutoff provided/Incorporating a thermally actuated device			
Emergency fuel shutoff located more than 20' but less than 100' from dispenser			
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 40 BC extinguisher at dispenser/1 40 BC at EFSO-No ABC DC			
Aircraft fueling hose/No blistering, cracking carcass saturation, separation			
Self-Fueling Station located 50' from any buildings			
Emergency Instructions posted in dispensing area			
Operating Instructions posted			
Explosion proof electrical equipment			
Additional Remarks:			

This checklist is based on the 2017 NFPA 407 Fire Code for Airport Fueling Operations

Chapter 5 - Wildlife

Reference: AC 150/5200-33B; AC 150/5200-38; AC 150/5200-32B

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

Triggering Events:

An air carrier aircraft experiences:

- Multiple wildlife strikes
- Substantial damage from striking wildlife
- Engine ingestion of wildlife; or
- 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.

A documented review of the Wildlife Hazard Management Plan is required following a triggering event

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 triggering event (above)
- A training program conducted by a qualified wildlife damage management biologist must be provided to all personnel responsible for implementing the plan
- Included copies of all Depredation Permits in the Wildlife Hazard Management Plan

Chapter 6 - Aircraft Rescue and Fire Fighting (ARFF)

Reference: 14 CFR Part 139

ARFF Vehicles

The information below is for quick reference *only*.
Refer to 14 CFR part 139.317 for complete requirements.

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

Index A. One vehicle carrying one of the following:

- 500 pounds of sodium-based dry chemical, halon 1211, or clean agent; **or**
- 450 pounds of potassium-based dry chemical and water with a commensurate quantity of AFFF to total **100** gallons for simultaneous dry chemical and AFFF application

Index B. Either of the following:

- **One vehicle** carrying at least 500 pounds of sodium-based dry chemical, halon 1211, or clean agent and **1,500** gallons of water and the commensurate quantity of AFFF for foam production
- **Two vehicles:** One with the extinguishing agents specified for Index A and one vehicle carrying water and AFFF so the total carried by both vehicles is at least **1,500** gallons.

Index C. Either of the following:

- **Two vehicles:** One vehicle carrying at least 500 pounds of sodium-based dry chemical, halon 1211, or clean agent and 1,500 gallons of water and the commensurate quantity of AFFF for foam production and one vehicle carrying water and AFFF so the total carried by both vehicles is at least **3,000** gallons.
- **Three vehicles:** One with the extinguishing agents specified for Index A and two vehicles carrying water and AFFF so the total carried by all vehicles is at least **3,000** gallons.

Index D. Three vehicles:

- One with the extinguishing agents specified for Index A and two vehicles carrying water and AFFF so the total carried by all vehicles is at least **4,000** gallons.

Index E. Three vehicles:

- One with the extinguishing agents specified for Index A and two vehicles carrying water and AFFF so the total carried by all vehicles is at least **6,000** gallons.

ARFF Training

References: AC 150/5210-17C, 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. Examples include Airport Safety Self-Inspection, Fuel Fire Safety Inspection, and NOTAM procedures.

AIRPORT NAME
ARFF TRAINING
200X (CALENDAR YEAR)

NAME: _____													
SUBJECT: _____													
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	HOURS
AIRPORT FAMILIARIZATION													0
AIRCRAFT FAMILIARIZATION													0
ARFF PERSONNEL SAFETY													0
EMERGENCY COMMUNICATIONS													0
USE OF HOSES, NOZZLES, TURRETS													0
APPLICATION OF EXTINGUISHING AGENTS													0
EMERGENCY AIRCRAFT EVACUATION													0
FIREFIGHTING OPERATIONS													0
ADAPTING STRUCTURAL EQUIPMENT TO ARFF													0
AIRCRAFT CARGO HAZARDS													0
FAMILIARIZATION WITH FIREFIGHTER DUTIES IN AEP													0
LIVE FIRE TRAINING													0
TOTAL TRAINING HOURS	0	0	0	0	0	0	0	0	0	0	0	0	0

Chapter 7 - Pedestrians and Ground Vehicles

References:

AC 150/5210-5

AC 150/5210-20

- 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!

PARK YOUR CELL PHONE(S) - DO NOT TEXT AND DRIVE!

Types of Incidents:

- **V/PD** - Vehicle or Pedestrian Deviation
- **PD** - Pilot Deviation
- **OI** - Operational Incident

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

Chapter 8 – References

FAA Advisory Circulars

Subject	AC 150/
Airport Design	5300-13
Construction	5370-2
Design and Installation Details for Airport Visual Aids	5340-30
Foreign Object Debris Management	5210-24
Fuel Storage, Handling, and Dispensing	5230-4
Ground Vehicle Marking/Lighting	5210-5
Ground Vehicle Operations	5210-20
Landfill/ Waste	5200-34
Lighted 'X'	5345-55
Maintenance of Airport Visual Aids	5340-26
Markings	5340-1
Notice to Airmen (NOTAM)	5200-28
Precision Approach Path Indicator (PAPI) Systems	5345-28
Retro-reflective Markers	5345-39
Safety Management Systems (SMS)	5200-37
Self-Inspection	5200-18
Signs	5340-18
Specification Portable Runway and Taxiway Lights	5345-50
Wildlife	5200-33
Wildlife Biologist	5200-36
Winter Operations	5200-30

More Advisory Circulars are available online at

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

Aircraft Rescue Firefighting information

https://www.faa.gov/airports/airport_safety/aircraft_rescue_fire_fighting/

Patrick Rogers, Lead Inspector, FAA Southern Region, prepared this Quick Reference