

Annex A

Proposed Amendments to Chapter 1 and Chapter 9 of the Manual of Standards (MOS) Part 139 – Aerodromes

Proposed changes are divided into three categories:

- **E** = editorial/correction/clarification
- **O** = omission
- **S** = change made to existing standard

Changes are set out in three columns. The first column sets out the proposed changes which are shown in orange (on electronic/web based media). The second column denotes the category of change, and the last column provides the reasons for the change.



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PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
<i>Chapter 1, Section 1.2: Definitions</i>		
Visibility	S	Delete obsolete ICAO definition and replace it with current ICAO definition.
Visibility (V)		
		<p>The ability, as determined by atmospheric conditions and expressed in units of distance, to see and identify prominent unlit objects by day and prominent lit objects by night.</p> <p>Visibility for aeronautical purposes is the greater of:</p> <p>a) the greatest distance at which a black object of suitable dimensions, situated near the ground, can be seen and recognised when observed against a bright background;</p> <p>b) the greatest distance at which lights in the vicinity of 1,000 candelas can be seen and identified against an unlit background.</p> <p>Note: The two distances have different values in air of a given extinction coefficient and the latter b) varies with the background illumination. The former a) is represented by the meteorological optical range (MOR)."</p>

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
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<p>2: CASA has chosen to use the “upgrade” trigger, because the decision to conduct an upgrade is usually largely under the control of the aerodrome operator. Triggering the rectification of non-compliant facilities in this way gives aerodrome operators greater control over their budgeting and the timing of their expenditure.</p> <p>3: To provide some guidance on how CASA intends to interpret this standard, some examples are given:</p> <p>(a) if an approach lighting system required new light fittings to be installed, for example because the existing fittings could no longer be maintained due to unavailability of spare parts, this would be a trigger to bring all aspects of that approach light system into compliance. Not only would the photometric characteristics of the new approach lights have to comply, but any other non-compliance, for example the frangibility standards, would also have to be brought into compliance.</p> <p>(b) if a runway is lengthened to accommodate larger / heavier aircraft, the runway lights will of necessity have to be extended, and threshold and runway end lights relocated. If the existing runway lights, threshold lights, or end lights are not compliant with current standards, this development would act as a trigger to bring all the lighting on that runway into compliance with the current standards. It would not, of itself, trigger the upgrade of non-compliant runway lights on another runway at that aerodrome.</p>		

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
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<p>(c) if an apron is extended to accommodate more and / or larger aircraft, in addition to the actual apron work, resultant apron floodlighting work would be a trigger to bring all the apron floodlighting on that apron into compliance. It would not, of itself, trigger the upgrade of non-compliant apron floodlighting on a separate apron at that aerodrome.</p> <p>(d) routine maintenance pavement overlays would not, of itself, trigger the replacement of associated non-compliant visual aids.</p>		
<p>9.1.1.2 (d) Practicable. This term is used to allow CASA acceptance of variations to a standard due to insurmountable difficulties in the way of full compliance. If an aerodrome operator believes that compliance with a standard is impracticable, the onus rests with that operator to demonstrate the impracticability to the satisfaction of the relevant CASA office.</p>	E	Reflect internal CASA responsibilities.
<p>9.1.2.2 Pilot visual workload is best moderated by standardisation, balance and integrity of elements. A ragged system with many missing lights can break the pattern from the pilot's eye position, restricted as that position is by cockpit cut-off angles and possibly by patchy fog or other conditions.</p> <p>9.1.2.3 To ensure uniformity of visual appearance, light fittings with different photometric characteristics must not be mixed in a lighting system, as far as possible.</p> <p>Note: See also 9.1.12.3</p> <p>9.1.2.3 9.1.2.4 For some aerodrome lighting systems, etc.</p> <p>And re-number subsequent paragraphs 9.1.2.4 and 9.1.2.5.</p>	<p>No change</p> <p>E</p>	<p>Shown to indicate relationship with new para 9.1.2.3</p> <p>Explicitly state what was previously inferred.</p>

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
<p>9.1.4.1 (a) runways, taxiways and aprons intended for night use;</p> <p>(b) in the case of taxiways used only by aeroplanes of code A or B, taxiway reflective markers may be used in lieu of some taxiway lighting, however at least one taxiway from the runway to the apron must be provided with taxiway lighting;</p> <p>(c) (b) at least one wind direction indicator;</p> <p>(d) (c) if an obstacle within the applicable OLS area of the aerodrome is determined by CASA as requiring obstacle lighting, the obstacle lighting.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note: In the case of taxiways used only by aeroplanes of code A or B, taxiway reflective markers may be used in lieu of some taxiway lighting.</p> </div>	E	<p>Delete existing Note and re-state it as a standard. The status of “NOTE” is not appropriate.</p>
<p>9.1.5.3 If, at an aerodrome intended for use by aircraft with less than 10 passenger seats engaged in air transport operations, power supply cannot be supplied by normal reticulated electricity, the supply may be derived from stand-alone generators or solar charged batteries.</p> <div style="border: 1px solid orange; padding: 5px; margin-top: 10px;"> <p>Note: This type of installation is considered by CASA to be a permanent installation, and has to satisfy all the permanent aerodrome lighting standards such as light intensity, light colour, frangibility, etc. It is not treated as portable lighting.</p> </div>	E	<p>Note added to clarify intent.</p>

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<p>9.1.6.1 Where they are etc ... series current system.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Note: Inter-leaf circuitry is recommended for aerodromes intended for precision approach operations. Guidance on this may be found in ICAO Aerodrome Design manual Part 5.</p> </div> <div style="border: 1px solid orange; padding: 5px; margin: 5px 0;"> <p>Note: 1: Inter-leaf circuitry is recommended for aerodromes intended for precision approach operations. Guidance on this may be found in the ICAO Aerodrome Design Manual Part 5.</p> <p>2: Some operational credit is available to runways with inter-leaf circuits. See Aeronautical Information Publication AIP ENR 1.1-92, paragraph 72.4.8 Partial Runway Lighting Failure.</p> </div>	E	Expand on the existing NOTE, for clarification.
<p>9.1.8.1 (c) (vii) all stop bars - 1 second.</p> <p>9.1.8.2 One acceptable method of achieving very short switch-over times, but not the only one, is by “alerting” the generator(s). Prior to the commencement of low visibility, or when weather conditions indicate that the Supply Authority electricity may be susceptible to interruption, the generator(s) are started, and when they come up to speed, the electrical load is connected to them. In the unlikely event that a generator fails, the electrical system automatically re-connects the load to the Supply Authority power.</p> <p>9.1.8.3 Where alerting of the generators is the method adopted for meeting the switch-over times to support Precision Approach Cat II and III, and take-offs in RVR conditions less than a value of 800 m, real time information on the operating status of the generator set(s), and the Supply Authority power must be provided to ATC.</p>	O	Method of achieving 1 second switch-over has been a subject frequently referred to CASA for specific guidance and acceptable methods of achieving.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES			
Proposed Amendment		Code	Reasons
<p>9.1.10 Portable Lighting</p> <p>9.1.10.1 Portable lights are intended for use only on a temporary basis and are not suitable for permanent use. They are intended primarily for visual flight rules (VFR) operations.</p> <p>9.1.10.2 Portable lights are intended for emergency use:</p> <p>(a) for aerodromes that are intended for regular night operations, and therefore have a permanent lighting system installed, portable lights can be used to replace unserviceable lights of the permanent lighting system, until the permanent lights are repaired.</p> <p>(b) for aerodromes that are not intended for regular night use, and therefore do not have lights permanently installed, portable lights can be used for occasional emergency use, such as medical emergencies, emergency landings, or similar. The portable lights are deployed for that landing / departure.</p>	O	In the past, CASA has received many questions about what exactly Portable Lights were, and when they were appropriate for use.	
<p>9.1.10.1 9.1.10.3 Portable lights may comprise liquid fuel-burning flares or lamps, or battery powered electric lights, or other similar devices.</p> <p>9.1.10.4 Because of the variable technology permitted, there is no light intensity specified. The colour of the portable lights should conform to the colour for permanent lights, except that, where the provision of coloured lights at the threshold and the runway end is not practicable, all runway lights may be variable white or as close to variable white as practicable.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note: As an indication of adequate light intensity, under the weather conditions prevailing at the time of their use, portable runway lights should be visible from a distance of no less than 3 km.</p> </div>	E	Clarification of the existing standards.	

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<p>9.1.10.2 9.1.10.5</p> <p>When an aerodrome is notified in ERSA as provided with portable lighting, the portable lights must be kept in a state of readiness and serviceable condition with clean glasses, fuel tanks filled or fresh batteries available, and appropriate persons must be trained such that the lights can be deployed and put into operation without delay, when the need arises.</p> <p>Note: Due to the time required to deploy portable lights, the ERSA entry should include a notation that prior notice is required.</p>	O	These appropriate requirements were not previously specifically stated.
<p>9.1.10.3 9.1.10.6</p> <p>The portable lights must be placed at the same spacing as permanently installed lights, and level so that the vertical axis is true. The portable lights are to be so deployed such that an aircraft can land into the wind.</p> <p>Note: To allow speedy deployment, the locations of the portable lights should be clearly marked, and the surface appropriately treated and maintained.</p>	O	An industry member drew to CASA's attention the need for levelling; and also upgrading the Note about landing into wind to a standard.
<p>9.1.10.4 9.1.10.7</p> <p>When required, they must be lit or switched on at least 30 minutes before the estimated time of arrival.</p> <p>Note: The portable lights should be so deployed such that an aircraft can land into the wind.</p>	E	The NOTE has been incorporated into 9.1.10.6 above.
<p>9.1.10.5 9.1.10.8</p> <p>For aircraft departing, the portable lights must be lit or switched on at least 10 minutes before the time of departure and to be retained for at least 30 minutes after take-off take-off, or if air-ground communications do not exist, for at least one hour after take-off, in case the aeroplane aircraft needs to return to the aerodrome.</p>	E	Editorial consistent use of these words.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
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<p>9.1.11.1 All aerodrome light fixtures and supporting structures must be of minimum weight while being fit for function, and frangible.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Note: ICAO Aerodrome Design Manual Part 4 provides guidelines on frangibility for visual aids.</p> </div> <div style="border: 1px solid orange; padding: 5px; margin: 5px 0;"> <p>Note: 1: ICAO Aerodrome Design Manual Part 6 – Frangibility, provides a wealth of guidance and advice on all aspects of frangibility.</p> <p>2: ICAO Aerodrome Design Manual Part 4 – Visual Aids, at Chapter 15 Frangibility of Visual Aids, also provides some guidance material.</p> </div>	O	Add to the Note the reference to recently published ICAO Design Manual.
<p>9.1.12.2 (b) where it is not practicable to use elevated lights.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Note: Elevated lights are not practicable on pavements where aircraft or vehicles travel or in areas subject to significant jet blast.</p> </div> <p>9.1.12.3 Where some inset lights are included in a system of elevated lights, the photometric characteristics of the inset lights are to be as close as practicable to those of the elevated lights. It is accepted that some difference in photometric characteristics may be unavoidable, in which case some resultant non-uniformity of visual appearance of the lighting system is acceptable.</p> <div style="border: 1px solid orange; padding: 5px; margin: 5px 0;"> <p>Note: See also 9.1. 2.3.</p> </div> <p>9.1.12.3 9.1.12.4 Inset lights, also known as etc.</p> <p><i>Re-number subsequent paragraphs 9.1.12.4 and 9.1.12.5.</i></p>	E	Clarification. Aerodrome operators have expressed concern in the past that if inset lights have to be mixed with elevated ones, they were contravening the uniformity of photometric performance intent.

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<p>9.1.14.9 Where lighting systems are operated by ATS, or similar responsible person, such systems shall be monitored automatically so as to provide an immediate indication of:</p> <ul style="list-style-type: none"> (a) those lighting systems that are on; (b) the intensity of each lighting system; and (c) any fault in a lighting system. where lighting systems are used for aircraft control purposes, any fault which may affect the control function. (d) This information is to be automatically relayed to the operator position. This information must be automatically relayed to the operator position. <p>9.1.14.10 Where a change in the operational status of lights has occurred, the indication must be provided within two seconds for a stop bar at a runway-holding position and within five seconds for all other types of visual aids.</p> <p>9.1.14.10 9.1.14.11 At an aerodrome with Low Intensity Runway etc.</p>	S	Industry had advised existing requirements were onerous. ICAO Annex 14 standards proposed to be adopted, instead.
<p>Table 9.1.1</p> <p><i>Note 3 at the foot of the Table is to have same font and type face size as Notes 1 and 2, to reinforce that the three Notes all have equal status.</i></p>	E	Correct in-appropriate change in font and typeface size.

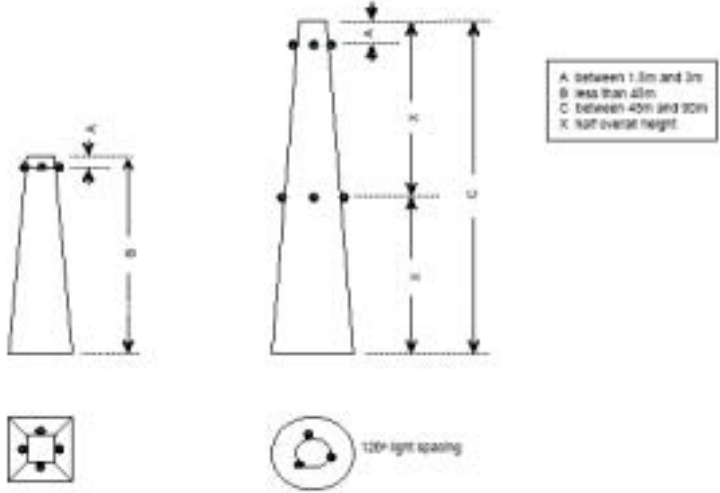
PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
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<p>9.1.15.1 Commissioning means the formal process <i>etc.</i></p> <p>(a) For ground check of compliance with electrical specifications and CASA standards - electrical engineer or licensed electrician.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Note: Evidence supplied by authoritative source that the light units are in compliance with the standards is acceptable.</p> </div> <p>(b) For flight checking of compliance with <i>etc.</i></p> <p>9.1.15.2 Evidence that light fitting types / model / version are in compliance with the standards for photometric characteristics, and other characteristics specified in this Chapter, must be in the form of test reports from a laboratory that is independently accredited by National Association of Testing Authorities (NATA) as having competence to carry out the type of measurement involved, or by a laboratory of another country that is accredited under a mutual recognition agreement with NATA.</p> <p>9.1.15.2 9.1.15.3 All aerodrome lighting systems must be commissioned <i>etc.</i></p> <p><i>Re-number subsequent paragraphs 9.1.15.3 to 9.1.15.8.</i></p> <p>9.1.15.3 9.1.15.4 The ground check of a visual approach slope <i>etc.</i></p> <p>9.1.15.4 9.1.15.5 The commissioning of the following lighting systems, in <i>etc.</i></p> <p>9.1.15.5 9.1.15.6 For a visual approach slope indicator system specified in Paragraph 9.1.15.4 9.1.15.5, that is provided for temporary use only, for <i>etc.</i></p>	<p>E and S</p>	<p>Clarification. The previous Note did not provide sufficient specificity. New specific requirement to be added to MOS.</p>

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
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<p>9.1.15.6 9.1.15.7 For those systems specified in Paragraph 9.1.15.4 9.1.15.5, the aerodrome operator shall forward etc.</p> <p>9.1.15.7 9.1.15.8 For those systems not specified in Paragraph 9.1.15.4 9.1.15.5, the aerodrome operator must use the duly certified ground check etc.</p> <p>9.1.15.8 9.1.15.9 At any time after commissioning, CASA may direct the ground checking and/or the flight checking of a lighting system specified in Paragraph 9.1.15.4 9.1.15.5, following substantial changes etc.</p> <p>(a) (b) (c) (d) removal and replacement of the receiver unit from a PAL.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note: Before a runway is opened for night use, the status of obstacles need to be assessed for obstacle lighting purposes, particularly if the obstacles are within 3 km of the aerodrome.</p> </div>	S	The status of this requirement changed from a Note to a standard – refer to 9.1.15.11.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
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<p>9.1.15.10 Copies of all ground check reports, flight check reports, and light fitting laboratory test reports must be filed in the Aerodrome Manual. These reports must be retained for as long as the relevant lighting system remains in service.</p> <p>9.1.15.11 Before a runway is opened for night use, the status of obstacles must be assessed for obstacle lighting purposes, particularly if the obstacles are within 3 km of the aerodrome.</p>	S	Formalising requirement to retain copies of documents supporting commissioning of visual aids.
<p>Chapter 9, Section 9.3: Pilot Activated Lighting Systems</p> <p>9.3.1.2</p> <p>(e) the appropriate changes from Day to Twilight to Night operation shall take place under the control of a light sensitive switch or similar device;</p> <p>(f) Day intensity shall be nominally 100%, Twilight intensity shall be nominally 10%, and Night intensity shall be nominally 1% of full intensity.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note: For guidance in setting up the light sensitive switch, the following values of background luminance are suggested. Other values may be used if they provide a better match to local visibility conditions. Background luminance above 500 cd/m² may be considered as Day; between 50 & 500 cd/m² may be considered as Twilight; and below 50 cd/m² may be considered as Night.</p> </div>	O	Although known within the industry, these values were not previously published in MOS.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
<p>Chapter 9, Section 9.4: Obstacle Lighting</p> <p>9.4.3.4 In the case of an extensive object or a group of closely spaced objects, top lights are to etc to indicate a line of lights.</p> <p>9.4.3.5 In the case of a wind farm where the turbines are required to be provided with obstacle lighting, the medium intensity lights are to be installed as follows:</p> <p>(a) where the wind turbines penetrate the OLS of an aerodrome, the top lights are to be arranged so as to mark the highest point reached by the rotating blades. As it is not practicable to install obstacle lights at the tip of the blades, these lights may be located on a separate structure adjacent to the wind turbine, at a height that is corresponding to the highest point of the rotating blade of the turbine.</p> <p>(b) at other locations, the top lights may be placed on top of the generator housing.</p> <p>(c) sufficient individual wind turbines must be provided with obstacle lights to indicate the general definition and extent of the wind farm, with intervals between lit turbines not to exceed 900 m.</p> <p>(d) all the obstacle lights on a wind farm must be synchronised so that they flash simultaneously.</p> <p>(e) shielding the downward component of light is permissible to either, or both, of the following, such that:</p> <p>(i) no more than 5% of the nominal intensity is emitted at or below 5° below horizontal;</p> <p>(ii) no light is emitted at or below 10° below horizontal.</p> <p>(f) to allow for shielding by the rotating blades, two lights are to be provided on top of the generator housing, such that at least one light can be seen from every angle in azimuth.</p>	S	The specific case of wind farms was not previously included. The recent proliferation of wind farms, and their unique properties necessitated new specific standards.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES

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<p>Figure 9.4-1.</p> <p><i>In the right hand figure, correct the typographical error, by changing “B” to “C”. Change drawing to more clearly illustrate the difference in height of the two objects.</i></p>  <p> A: between 1.5m and 3m B: less than 40m C: between 40m and 300m X: half overall height </p> <p>120° light spacing</p>	<p>E</p>	<p>Correct typographical error. Improve depiction of the differences in the two obstacles.</p>

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
Chapter 9, Section 9.6: Illuminated Wind Direction Indicator		
9.6.1.1	E	Clarification
Wind direction indicators must be provided in accordance with Section 8.7. At an aerodrome intended for night use, at least one wind direction indicator is to be lit.		
9.6.1.2		
If a WDI is provided in the vicinity etc.		
9.6.1.3		
The illumination of a wind direction indicator is to be achieved by providing floodlighting from above. by means of:		
9.6.1.4	S	New performance based standards added.
Illuminated wind direction indicators (IWDIs) installed after 1 January 2009, must be illuminated by at least four lamp units, providing between 200 and 500 lux illumination on any point of the horizontal plane passing through the top of the sleeve at the supporting pole end, for the full 360° swept area of the fully extended sleeve.		
<p>Note: An acceptable method of testing for compliance is to measure illumination levels on the horizontal plane passing through the top of the sleeve at the pole end. Measurements should be taken at 1 m intervals starting at the pole and working outwards on a radial to the pole, to a range equal to the length of the fully extended sleeve. The outermost interval on each radial may be less than 1 m to correspond with the actual length of the sleeve. The radials should be at 30° intervals. Each reading should be in the range 200 to 500 lux.</p>		
9.6.1.5		Transitional time frame for new standard specified.
IWDIs installed before 1 January 2009 may be illuminated in accordance with 9.6.1.4, or otherwise must be illuminated by:		
(a)	four 200 W 240 V tungsten filament etc.	
(b)	eight 120 W 240 V PAR 38 flood lamps etc.	
(c)	some other method of floodlighting which etc.	

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<p>Note: The standards prescribed above are equipment based. These may be replaced by photometric performance based standards later.</p>	E	This Note is deleted because the above change makes it redundant.
<p>9.6.1.4</p> <p>9.6.1.6 The floodlighting is to be aimed and shielded so as to not cause any glare or distraction to pilots. (a) not cause any glare or distraction to pilots; and (b) uniformly illuminate the maximum swept area of the wind sleeve.</p> <p>Note: A uniformity ratio in the horizontal plane through the mid height of the wind cone of not more than 4:1 (average to minimum) will be satisfactory.</p> <p>Note: An acceptable method of testing for compliance is from an observer's standing position on ground level with the base of the pole, there should be no glare at a range of 25 m or more. This need only be assessed from those directions likely to be viewed from landing, taking-off or taxiing aircraft.</p> <p>9.6.1.5</p> <p>9.6.1.7 If only one wind direction indicator etc.</p> <p><i>Re-number subsequent paragraphs 9.6.1.6 to 9.6.1.10.</i></p>	E	Re-wording to give consistency, and improve readability.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
<p>Chapter 9, Section 9.9: Visual Approach Slope Indicator Systems</p> <p>9.9.1.10. A visual approach slope indicator system must not be brought into service until it is appropriately commissioned and approved by CASA.</p>	E	Editorial. This is already stated elsewhere.
<p>Figure 9.9-6. Correct the typographical error by changing “METH” to “MEHT”.</p> <p>The diagram illustrates the geometry of a Visual Approach Slope Indicator (VASI) system. It shows a PAPI unit with four lights (red, white, red, white) and a distance D_1 from the threshold. A diagram illustrates the approach slope angle M and the maximum eye height over the threshold $MEHT$. A key defines the symbols: red, white, M (approach slope angle), D_1 (distance of PAPI from threshold), $MEHT$ (maximum eye height over threshold), and M (angle determining METH).</p>	E	Correct typographical error.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
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Chapter 9, Section 9.10: Runway Lighting		
<p>9.10.11.3 Aerodromes used predominantly for training and general aviation, may were previously permitted to choose to use an alternative pattern of low intensity or medium intensity runway threshold lights. Such aerodromes may continue to use the alternative pattern threshold for the foreseeable future. From 1 January 2009, no new alternative pattern thresholds are to be installed; all new installations are to be the standard threshold pattern in accordance with 9.10.11.1 and 9.10.11.2 above.</p>	S	Suggestion from Industry to simplify by deleted unnecessary standard, agreed to by CASA.
<p>9.10.17.1 (c) with respect to taxiways intended for exiting the runway, runway turning area, and other similar areas, be located such that an aircraft exiting the runway, turning, or otherwise manoeuvring, will not be required to cross the row of red lights comprising the runway end lights.</p>	E	Clarification of intent.
<p>9.10.24.1 Runway centreline lights must be provided on a precision approach runway Category II or III, and a runway intended to be used for take-off with an operating minimum below an RVR of the order of 400 m.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Note: Provision of runway centreline lights on a precision approach runway Category I, and a runway intended to be used for take-off with an operating minimum of an RVR of the order of 400 m or higher, where the width between the runway edge lights is greater than 50 m is recommended.</p> </div>	S	The take-off case was not previously specified. Add it to harmonise with ICAO Annex 14.
<p>9.10.24.2 Runway centreline lights must be located from the threshold to the end at longitudinal spacing of approximately:</p> <p>(a) 15 m on a runway intended for use in runway visual range conditions less than a value of 300 350 m; and</p> <p>(b) 30 m on a runway intended for use in runway visual range conditions of 300 350 m or greater.</p>	S	Change RVR values to harmonise with ICAO Annex 14.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
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Chapter 9, Section 9.13: Taxiway Lighting		
<p>9.13.1.1 Taxiway centreline lights must be provided on a taxiway intended for use in conjunction with an associated runway when the runway is used in precision approach Category II or III conditions runway visual range conditions less than a value of 350 m in such a manner as to provide continuous guidance between the runway centre line and apron, unless the aerodrome traffic density is light.</p> <p>9.13.1.2 Taxiway centreline lights must be provided on a taxiway intended for use in conjunction with an associated runway when the runway is used in precision approach Category I conditions at night in runway visual range conditions of between 350 m and 1200 m, unless the aerodrome layout is simple or the aerodrome traffic density is light.</p>	S	Change existing CAT II/III criteria to RVR criteria to harmonise with ICAO Annex 14.
<p>9.13.2.2 Where additional visual cues etc.</p> <p>(a)</p> <p>(b)</p> <p>(c) where the edge of the apron is difficult to distinguish from the surrounding area at night.</p>	E	Correct typographical error.
9.13.3 Taxiway Markers		
<p>9.13.3.1 For code letter A or B taxiways, reflective retroreflective taxiway centreline or edge markers may be used instead of taxiway centreline or edge lights, or to supplement taxiway lights. However, at least one taxiway from the runway to the apron must be provided with taxiway lighting.</p> <p>9.13.3.2 Taxiway centreline markers may be provided on any taxiway where taxiway centreline lights are not provided if there is a need to improve the guidance provided by the taxiway centreline marking; or to supplement taxiway edge markers or taxiway edge lights, for example on curves or intersections.</p> <p>9.13.3.3 Taxiway edge markers may be provided on any taxiway where taxiway edge lights are not provided if there is a need to improve the guidance provided; or to supplement taxiway centreline markers or taxiway centreline lights, for example on curves, intersections, or apron edges.</p>	S	To vary the emphasis in MOS to more accurately reflect the standards in ICAO Annex 14.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES				
Proposed Amendment			Code	Reasons
Table 9.13-1 Maximum spacing on straight sections of taxiway			S	Change existing CAT I/II/III criteria to RVR criteria to harmonise with ICAO Annex 14.
Type	General	Last 60 m before a runway or apron		
Taxiways used in conjunction with a non-instrument, non-precision, or a precision approach Category I runway intended for use in RVR conditions of 550 m or greater .	60 m	15 m		
Taxiways used in conjunction with a precision approach Category II runway runway intended for use in RVR conditions of less than a value of 550 m but not less than a value of 350 m.	30 m	15 m		
Taxiways used in conjunction with a precision approach Category III runway intended for use in RVR conditions of less than a value of 350 m.	15 m	7.5 m		
9.13.8.3	In the case of an entry taxiway a taxiway entering a runway, the last taxiway centreline light must not be more than 1 m outside the line of runway edge lights. The taxiway centreline lights may continue towards the runway centreline, ending no closer than 1.2 m before the runway centreline.		E	Clarify the intent of the standard.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES					
Proposed Amendment				Code	Reasons
Table 9.13-2 Maximum spacing on curved sections of taxiway					
Type	On curve with radius of 400 m or less	On curve with radius greater than 400 m	On straight section before and after the curve	S	Change existing CAT I/II/III criteria to RVR criteria to harmonise with ICAO Annex 14.
Taxiways used in conjunction with a non-instrument, non-precision, or a precision approach Category I or II runway intended for use in RVR conditions of 350 m or greater.	15 m See Note	30 m	No special requirement. Use same spacing as on the rest of the straight section.		
Taxiways used in conjunction with a precision approach Category III runway intended for use in RVR conditions of less than a value of 350 m.	7.5 m	15 m	Same spacing as on the curve is to extend for 60 m before and after the curve.		
Note: At a busy or complex taxiway intersection where additional taxiing guidance is desirable, closer light spacing down to 7.5 m should be used.					
9.13.11.5	Where the taxiway centreline lights cross a runway, the colour of the lights viewed by a pilot of an aircraft entering the runway must be green up to the runway centreline, and from the runway centreline exiting the runway, must be green and yellow alternately.			O	Although this standard is inferred from the MOS, it was not clearly stated.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
<p>9.13.12.3 On a taxiway intended for use in conjunction with a non-instrument, non-precision or precision approach Category I or II runway RVR conditions of 350 m or greater, taxiway centreline lights must comply with the specifications set out in Section 9.14, Figure 9.14-1 or Figure 9.14-2, whichever is applicable.</p> <p>9.13.12.4 On a taxiway intended for use in conjunction with a precision approach Category III runway RVR conditions of less than a value of 350 m, the taxiway centreline lights must comply with the specifications set out in Section 9.14, Figure 9.14-3, Figure 9.14-4 or Figure 9.14-5, whichever is applicable.</p>	S	Change existing CAT I/II/III criteria to RVR criteria to harmonise with ICAO Annex 14.
<p>9.13.16 Provision of Runway Guard Lights</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Note: Runway guard lights are sometimes colloquially referred to as “wig wags”. The effectiveness of this lighting system has been successfully proven in a number of countries and this lighting system has been adopted by ICAO as a standard. Provision of runway guard lights will bring Australian aerodrome lighting in line with international practices. To allow relevant aerodrome operators sufficient time to introduce this lighting system, a deferred effective date for this standard is prescribed. However, provision of runway guard lights at an earlier date is permissible, and indeed, encouraged.</p> </div> <div style="border: 1px solid orange; padding: 5px; margin: 10px 0;"> <p>Note:</p> <ol style="list-style-type: none"> 1: Runway guard lights are sometimes colloquially referred to as “wig wags”. 2: The purpose of runway guard lights is to warn pilots, and drivers of vehicles when they are operating on taxiways, that they are about to enter an active runway. 3: Runway guard light standards became applicable in Australia from 1 August 2004. </div> <p>9.13.16.1 Runway guard light standards are applicable from 1 August 2004.</p>	E	Update MOS to reflect the passing of the implementation date.

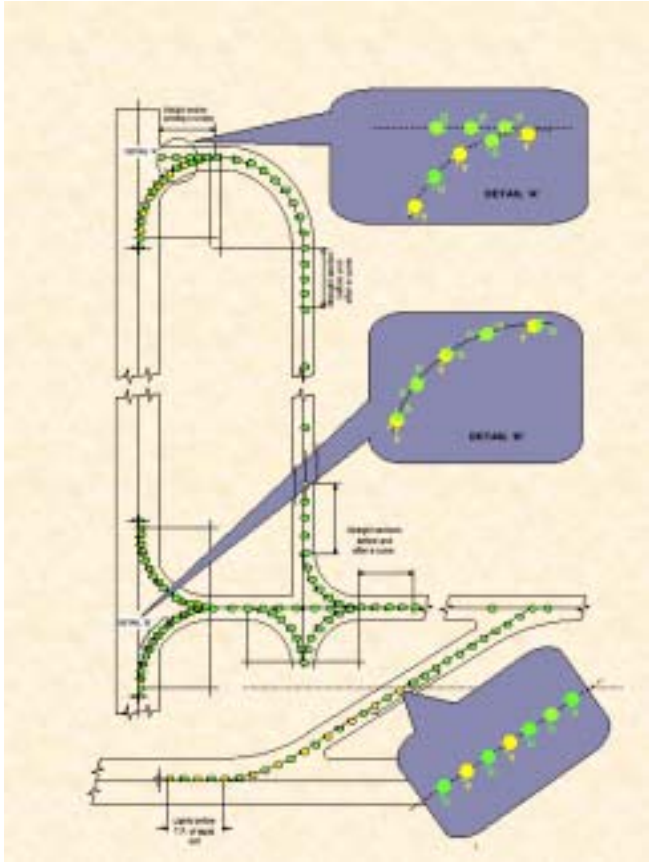
PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
9.13.16.4 Where a taxiway is used for exit only and cannot be used for entry to the runway, the runway guard lights do not have to be provided.	E	The contents of the Note are more correctly a standard.
9.13.16.5 At aerodromes that are not equipped with runway guard lights, if there is an identified runway incursion hot spot, notwithstanding 9.13.16.3 above, it is permissible to install runway guard lights at that hot spot only.	S	To allow installation of RGLs as runway incursion mitigator.
<p>9.13.23.1 A stop bar must be provided at every runway holding position serving a runway when it is intended that the runway will be used in Cat II or III conditions, if operational procedures at the aerodrome do not restrict the number of aircraft on the manoeuvring area to one at a time during Cat II or III conditions runway visual range conditions less than a value of 550 m, except where:</p> <p>(a) operational procedures exist to limit, in runway visual range conditions less than a value of 550 m, the number of:</p> <p>(i) aircraft on the manoeuvring area to one at a time; and</p> <p>(ii) vehicles on the manoeuvring area to the essential minimum; or</p> <p>(b) appropriate aids and procedures, as proposed by the aerodrome operator and agreed to by CASA, are available to assist in preventing inadvertent incursions of aircraft or vehicles onto the runway.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note: As stop bars require direct ATC control, an aerodrome operator needs to consult with ATC before planning for their introduction.</p> </div>	S	Change existing CAT II/III criteria to RVR criteria, to harmonise with ICAO Annex 14.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
<p>9.13.26 Taxiway Edge Markers</p> <p>9.13.26.1 Where used in lieu of taxiway edge lights on a taxiway with code letter A or B, taxiway edge markers must be provided at least at the locations where taxiway edge lights would otherwise have been provided.</p> <p>Taxiway edge markers must be used in accordance with 9.13.3. Taxiway edge markers must be installed at least at the same locations as would the taxiway edge lights had they been used.</p>	E	Clarification and consistency with ICAO Annex 14.
<p>9.13.27 Characteristics of Taxiway Edge Markers</p> <p>9.13.27.1 Taxiway edge markers must be retro-reflective retroreflective blue.</p>	E	Editorial. Consistent use of words.
<p>9.13.28 Taxiway Centreline Markers</p> <p>9.13.28.1 Taxiway centreline markers may be used on sections of the taxiway as a supplement to taxiway edge markers or taxiway edge lights, e.g. on curves or intersections. When used, taxiway centreline markers must not be spaced greater than the spacing for centreline lights.</p> <p>Taxiway centreline markers must be used in accordance with 9.13.3. Taxiway centreline markers must be installed at least at the same locations as would the taxiway centreline lights had they been used.</p>	E	Clarification and consistency with ICAO Annex 14.
<p>9.13.29 Characteristics of Taxiway Centreline Markers</p> <p>9.13.29.1 Taxiway centreline markers must be retro-reflective retroreflective green</p>	E	Editorial. Consistent use of words.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
<p><i>Chapter 9, Section 9.14: Isocandela Diagrams for Taxiway Lights</i></p> <p>Figure 9.14-1: Isocandela diagram Diagram for Taxiway Centreline Lights, and Stop Bar Lights on Straight Sections of Taxiways intended for use in conjunction with a Non-Precision or Precision Approach Category I or II Runway runway visual range conditions of 350 m or greater.</p>	S and E	<p>Change existing CAT I/II/III criteria to RVR criteria to harmonise with earlier amendments, and with ICAO Annex 14.</p> <p>Also editorial for consistent use of words.</p>
<p>Figure 9.14-2: Isocandela Diagram for Taxiway Centreline Lights, and Stop Bar Lights on Curved Sections of Taxiways intended for use in conjunction with a Non-Precision or Precision Approach Category I or II Runway runway visual range conditions of 350 m or greater.</p>	S	<p>Change existing CAT I/II/III criteria to RVR criteria to harmonise with earlier amendments, and with ICAO Annex 14.</p>

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
<p>Figure 9.14-3: Isocandela Diagram for Taxiway Centreline Lights, and Stop Bar Lights on Taxiways intended for use in conjunction with Precision Approach Category III Runway runway visual range conditions of less than a value of 350 m – for use on straight sections of taxiway where large offsets can occur. Also for Runway Guard Lights Configuration B.</p> <p>Note 1: These beam coverages are suitable for normal displacement of the cockpit from the centreline of up to 3 m allow for displacement of the cockpit from the centreline up to distances of the order of 12 m and are intended for use before and after curves.</p> <p>Note 2: See collective notes at Paragraph 9.14.1 for these isocandela diagrams.</p>	S and E	<p>Change existing CAT I/II/III criteria to RVR criteria to harmonise with earlier amendments, and with ICAO Annex 14.</p> <p>Also correct error in Note 1.</p>
<p>Figure 9.14-4: Isocandela Diagram for Taxiway Centreline Lights, and Stop Bar Lights for on Taxiways intended for use in conjunction with Precision Approach Category III Runway runway visual range conditions of less than a value of 350 m – for use on straight sections of taxiway where large offsets do not occur.</p>	S and E	<p>Change existing CAT I/II/III criteria to RVR criteria to harmonise with earlier amendments, and with ICAO Annex 14.</p> <p>Also editorial for consistent use of words.</p>

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
<p>Figure 9.14-5: Isocandela Diagram for Taxiway Centreline Lights, and Stop Bar Lights for on Taxiways intended for use in conjunction with Precision Approach Category III Runway runway visual range conditions of less than a value of 350 m – for use on curved sections of taxiway.</p>	S and E	<p>Change existing CAT I/II/III criteria to RVR criteria to harmonise with earlier amendments, and with ICAO Annex 14.</p> <p>Also editorial for consistent use of words.</p>

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
<p><i>Chapter 9, Section 9.15: Illustrations of Taxiway Lighting</i></p> <p>Figure 9.15-1</p> <p>Improve diagram to show straight section of taxiway lights at taxiway/taxiway intersection.</p> 	E	Clarification of diagram.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
<p>Chapter 9, Section 9.16: Apron Floodlighting</p> <p>9.16.4.8 If existing, or proposed new, floodlights cannot meet the requirements of Paragraph 9.16.4.7, auxiliary floodlighting etc.</p> <p>9.16.4.9 All minimum illuminance values specified in this Section are maintained illuminance, below which the actual value must never fall. Floodlight designers must design to a target value, which they determine allowing for a depreciation and maintenance factor chosen by them, appropriate for that particular apron floodlighting system. The design, installation, verification, and subsequent system management must be in accordance with Australian Standard AS/NZS 3827.1, <i>Lighting system performance – Accuracies and tolerances. Part 1: Overview and general recommendations.</i></p>	S	The intent of the standard was not reflected in previous words. Invoking the Australian standard also clarifies the intent.
<p>Chapter 9, Section 9.17: Visual Docking Guidance Systems</p> <p>9.17.7.3 A parking position identification sign is to consist of a numeric or alphanumeric inscription, in white on a black background. The inscription is to be outlined in neon tubing a continuous line of green light for illumination at night. Experience has shown that green neon tubing illumination has proved satisfactory.</p>	E	Editorial. Original words are clumsy.
<p>Chapter 9, Section 9.19: Other Lights on an Aerodrome</p> <p>9.19.1.1 Vehicle warning lights, as required by subsection 10.9.2, are must be provided to indicate to pilots and others the presence of vehicles or mobile plant on the movement area.</p>	E	Editorial. Use of standard words and expressions.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
<p>Chapter 9, Section 9.20: Monitoring, Maintenance and Serviceability of Aerodrome Lighting</p> <p>9.20.2.5 A lighting system is deemed to be on outage when:</p> <p>(a) (b) (c) (d) in the case of a lighting system comprising more than 13 lights, etc or two adjacent lights are on outage.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note: A lighting system here means lights used to illuminate a particular facility, e.g. all the lights used to mark a threshold or runway end, runway edge lights on a runway, taxiway lights on a length of taxiway between intersections a T-VASIS or a PAPI system.</p> <ul style="list-style-type: none"> - all the lights used to mark a threshold, or - all the lights used to mark a runway end, or - all the runway edge lights on a runway, or - all the taxiway centreline lights on a length of taxiway between intersections. </div>	E	Editorial. Present information in a clearer format.
<p>9.20.2.8 For a movement area guidance sign, no standard is specified for the critical number of lamps on outage in an illuminated sign. The legibility of the sign inscription is the significant factor. The failure of sign illumination is not subject to notification by NOTAM. Never the less, any detected lamp outage in a sign must be fixed as soon as practicable.</p> <p>9.20.2.8 9.20.2.9 At an aerodrome where the lighting system is provided with interleaf circuitry, the lighting system is deemed to be on outage when any one of the circuits fails.</p>	O	Previously, signs were not specifically addressed in this context.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
Chapter 9, Section 9.21: Lighting in the Vicinity of Aerodromes		
9.21.1 Advice to Lighting Designers	O	This reference should have been included in original MOS.
9.21.1.1 This Section supersedes a paper of the same name dated July 1988 and issued by the Civil Aviation Authority, and referred to in Australian Standard AS 4282-1997, <i>Control of the obtrusive effects of outdoor lighting</i> .		
9.21.2 Introduction	E	Clarification of the purpose of this Section of the MOS.
9.21.2 Purpose of this Section		
9.21.2.1 The purpose of this section is to provide advice to persons who may be involved in the provision and design of lighting systems on or in the vicinity of an aerodrome, to minimise the potential hazard to aircraft operations caused by the lights.		
9.21.2.2 When an aerodrome operator becomes aware that a lighting installation is being proposed to be installed in the vicinity of their aerodrome, it is in the aerodrome's interest to make sure that the person responsible for the lighting system is made aware of the contents of this section.		

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
<p>9.21.3 Legislative background</p> <p>9.21.2.4 9.21.3.1</p> <p>The Civil Aviation Safety Authority (CASA) has the power through regulation 94 of the Civil Aviation Regulations 1988 (CAR 1988), to require lights etc is reproduced below for reference:</p> <p>“Dangerous lights 94. (1)</p> <p>“94 Dangerous lights (1) <i>Whenever any light is exhibited at or in the neighbourhood of an aerodrome, or in the neighbourhood of an air route or airway facility on an air route or airway, and the light is likely to endanger the safety of aircraft, whether by reason of glare, or by causing confusion with, or preventing clear reception of, the lights or signals prescribed in Part XII 13 or of air route or airway facilities provided under the Air Services Act 1995, CASA may authorise a notice to be served upon the owner of the place where the light is exhibited or upon the person having charge of the light directing that owner or person, within a reasonable time to be specified in the notice, to extinguish or screen effectually the light and to refrain from exhibiting any similar light in the future.</i></p> <p>“(2) — If any owner or person on whom a notice is served under this regulation fails, without reasonable cause, to comply with the directions contained in the notice, the owner or person shall be guilty of an offence punishable, on conviction, by a fine not exceeding 25 penalty units.</p> <p>“(2) <i>An owner or person on whom a notice is served under this regulation must comply with the directions contained in the notice.</i> <i>Penalty: 25 penalty units.</i></p>	E	Consequential changes to reflect previously made changes to the head of power Regulation.

PROPOSED AMENDMENTS TO MANUAL OF STANDARDS (MOS) PART 139 – AERODROMES		
Proposed Amendment	Code	Reasons
<p>“(2A) <i>An offence against subregulation (2) is an offence of strict liability.</i> <i>Note For strict liability, see section 6.1 of the Criminal Code.</i></p> <p>“(2B) <i>It is a defence to a prosecution under subregulation (2) if the defendant had a reasonable excuse.</i> <i>Note A defendant bears an evidential burden in relation to the matter in subregulation (2B) (see subsection 13.3(3) of the Criminal Code).</i></p> <p>“(3) <i>If any owner or person on whom a notice under this regulation is served fails, within the time specified in the notice, to extinguish or to screen effectually the light mentioned in the notice, CASA may authorise an officer, with such assistance as is necessary and reasonable, to enter the place where the light is and extinguish or screen the light, and may recover the expenses incurred by CASA in so doing from the owner or person on whom the notice has been served.</i>”</p> <p>9.21.3 9.21.4 General Requirement</p> <p>9.21.3.1 9.21.4.1 Advice for the guidance of designers etc ...</p> <p><i>Then re-number subsequent paragraphs as necessary.</i></p>		

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