



**Fiji** Roads Authority

# **ROAD LIGHTING DESIGN STANDARDS FOR CURRENT AND FUTURE UPGRADES**

**March 2019**

**PLANNED UPDATE AND DISTRIBUTION CONTROL**

Date	Principal Changes

**UPDATES ADVISED**

Date	To

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# FRA's Road Lighting Design Standards for Current and Future Upgrades

## Updates Record

Rev. No. Date Released	Section/s Update	Description of Revision	Authorised By
Rev 2 – 20 Jul 18	General	General Formatting removed AS table and provided reference	

**Acknowledgement:** FRA gratefully acknowledges the generosity of the Association of Australian and New Zealand Transport and Traffic Authorities(Austrroads) in allowing FRA, to use and reference much of the material used in this *Guide*.

Unless specifically identified in the *Guide*, all diagrams and tables have been sourced from the various VicRoads, NZTA and Austrroads Design Guides and relevant Australian Standards.



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## 1 Introduction

This document provides a set of site specific design requirements that shall be applied to all (current and future) road lighting upgrades. The designer shall follow all of the design criteria contained within these design standards and any deviations shall require FRA approval. The designer shall also carry out the detailed design in accordance with the FRA Road Lighting Design Guide.

There appears to be a lack of historical information regarding what standards were applied in the past therefore the FRA has decided to apply the road lighting standards used in New Zealand and Australia and align them with the particular environmental conditions in Fiji with the aim of achieving consistent standards and practices.

Note that this design guide is a live document subject to periodic review and may be amended at any time as and when directed by the FRA.

All references to the FRA within this document mean the FRA or their nominated representative.

In summary this document (design standards) outlines what the specific design requirements are (for each particular road) and the FRA Road Lighting Design Guide describes how to complete the detailed design and calculations required for compliance.

## 2 Reference Documents

The FRA Road Lighting Design Guide.

## 3 Applicable Standards and Regulations

Refer to the FRA Road Lighting Design Guide for a list of applicable standards and regulations.

## 4 Road Lighting Categories

### 4.1 Category V Roads

Currently there is a general lack of information on critical arterial roads therefore judgement based assessments have been made (based on experience and available road use data) to provide the following road lighting categories.

Road Name	Town	Vehicle Counts (Vehicles Per Day)	Category
Aimatai Street	Lautoka		
Cakau Street	Lautoka		
Dravuni Street	Lautoka		
Hollander Road	Lautoka		

<b>Road Name</b>	<b>Town</b>	<b>Vehicle Counts (Vehicles Per Day)</b>	<b>Category</b>
Kaunitoni Street	Lautoka		
Kings Road	Lautoka		
Link Road	Lautoka		
M N Naidu Road	Lautoka		
Marine Drive	Lautoka		
Nadovu Road	Lautoka		
Namoli Avenue	Lautoka		
Narara Parade	Lautoka		
Naviti Street	Lautoka		
Navutu Road	Lautoka		
Nede Street	Lautoka		
Queens Road	Lautoka		
Razak Road	Lautoka		
Sukanaivalu Road	Lautoka		
Tavakubu Road	Lautoka		
Tavewa Avenue	Lautoka		
Thomson Crescent	Lautoka		
Tukani Street	Lautoka		
V M Pillay Road	Lautoka		
Vakabale	Lautoka		
Veitari Street	Lautoka		
Vidilio	Lautoka		
Vitogo Parade	Lautoka		
Vomo Street	Lautoka		
Walu Street	Lautoka		
Waterfront Road	Lautoka		
Waya Street	Lautoka		
Yasawa Street	Lautoka		
Yawini Street	Lautoka		

Road Name	Town	Vehicle Counts (Vehicles Per Day)	Category
Andrews Road	Nadi		
Koroivolu Avenue	Nadi		
Market Road	Nadi		
Nadi Back Road	Nadi		
Queens Road (Denarau RB to Wailoaloa Rd)	Nadi		V3
Raniga Street	Nadi		
Ratu Naevo Road	Nadi		
Sagayam Road	Nadi		
Sukuna Road	Nadi		
Vunavau Road	Nadi		
Davuilevu Road / Waila 3A	Nasinu		
Kings Road	Nasinu		
Dunstan Street	Nausori		
Gulab Nabi Street	Nausori		
Princess Road	Nausori		
Ross Street	Nausori		
Verrier Street	Nausori		
Wainibokasi Road (Nausori Airport)	Nausori	>20,000	V3
Amy Street	Suva		
Bau Street	Suva		
Brown Street	Suva		
Cakobau Road	Suva		
Cunningham Road	Suva		
Duncan Road	Suva		
Edinburgh Drive	Suva		
Fletcher Road	Suva		
Foster Road	Suva		



Road Name	Town	Vehicle Counts (Vehicles Per Day)	Category
Gaji Road	Suva		
Gladstone Road	Suva		
Golf Link Road	Suva		
Gordon Street	Suva		
Grantham Road	Suva		
Harris Road	Suva		V3
Hercules Street	Suva		
Holland Street	Suva		
Jerusalem Road	Suva		
Karsanji Street	Suva		
Khalsa Road	Suva		
Kings Road	Suva		
Knollys Street	Suva		
Laucala Bay Road	Suva	6,500 to 15,000	V3
Macharthur Street	Suva		
McGregor Road	Suva		
Mead Road	Suva		
Milverton Road	Suva		
Muanikau Road	Suva		
Nailuva Road	Suva		
Nairai Road	Suva		
Nokonoko Road	Suva		
Pender Street	Suva		
Princess Road	Suva		
Queen Elizabeth Drive	Suva		
Queen Elizabeth Road	Suva		
Queens Road	Suva		
Ratu Dovi Road	Suva	6,500 to 15,000	V3
Ratu Mara Road	Suva		

Road Name	Town	Vehicle Counts (Vehicles Per Day)	Category
Ratu Sukuna Road	Suva		
Renwick Road	Suva		
Reservoir Road	Suva		
Rewa Street	Suva		
Rodwell Road	Suva		
Scott Street	Suva		
Selborne Street	Suva		
Service Street	Suva		
Southern Cross Road	Suva		
Thurston Street	Suva		
Victoria Parade	Suva		
Vuya Road	Suva		
Waimanu Road	Suva		

Note that vehicle counts have been included for information only and final category selection is also based on other road use data including speed limits, traffic composition (mixture of cars/pedestrians/cyclists) and locations (central city, transport hubs, shopping centres, residential, rural, etc.).

## 4.2 Category P Roads

The category of residential category P roads (including new subdivisions, townships and villages) shall be P3 or P4, based on expected or known traffic counts and road use data.

Refer to the following table that provides an informative guide to determine the road lighting classifications for category P roads and public activity areas.

Road / Area	Traffic Counts (Vehicles Per Day)	Category
Minor Roads	500 to 3,500	P3
Minor Roads	<500	P4
Cycleway	NA	P3
Public Activity	NA	P6, P7 and P8
Car Parks	NA	P11a, P11b, P11c and P12

Following an assessment of each category P road and public activity area the FRA shall confirm which category shall be applied.

## 5 Pedestrian Crossings

Pedestrian crossing lighting shall be designed in accordance with the New Zealand requirements of AS/NZS 1158.4 and the category of lighting shall be X1.

The preferred luminaire mounting height shall be 6m with a 0.9m long curved outreach arm, and the poles shall be located within 2m of each end of the painted crossing on the vehicle approach side of the carriageway.

## 6 Flag Lighting

Where there are safety concerns flag lighting shall be provided at normally unlit isolated intersections located on category V arterial roads. Flag lighting is not intended to illuminate the intersection to any particular standard but rather to alert the approaching motorists to the presence of the intersection from a safe distance away.

For such applications, one or more strategically placed luminaires shall be installed to highlight the location of the intersection, but in doing so care shall be taken to minimise glare to motorists on the otherwise unlit approaches.

The preferred luminaire and mounting arrangements shall be as follows based on what category of lighting would be applied to the main road if it were to be lit.

Category	Lamp Size	Mounting Height (m)
V4 and V3	150W	10.5
V3 and V2	250W	10.5 to 12.0
V2 and V1	400W	>12.0

If there are more serious safety concerns at a normally unlit intersection then full lighting shall be provided at the intersection, in accordance with the illuminance requirements of AS/NZS 1158.1.1 (section 3.4); and at least two spans of lighting on each road leading into the intersection, in accordance with the luminance requirements of AS/NZS 1158.1.1 (section 3.2).

The FRA shall confirm what level of lighting (flag lighting or full illuminance/luminance) shall be provided at normally unlit intersections on a case by case basis.

## 7 Preferred Equipment and Suppliers

All new poles shall be tapered octagonal steel complete with curved outreach arms and any new luminaires shall be IP66 rated units. Refer to the FRA Road Lighting Design Guide for a more detailed description of the equipment performance requirements and a list of the preferred luminaires and poles that shall be used on all FRA road lighting upgrades.

There may be some locations (such as high prestige areas) where more expensive decorative or heritage style poles and/or luminaires may be specified, and in such cases the designer shall obtain FRA approval prior to final equipment selection.

## 8 Pole Setback Locations

The preferred location for all street lighting poles (excluding pedestrian crossing poles) is behind the footpath provided the poles are not located within the following exclusion zones:

- (i) For kerbed road - normally 0.7m beyond the kerb but extending to 1.0m at intersections.
- (ii) For un-kerbed road - not more than 1.0m beyond the edge of the carriageway.

## 9 Preferred Luminaire Mounting Arrangements

The preferred luminaire mounting arrangements are listed in preferential order as follows:

- (i) New lighting poles in a single sided arrangement.
- (ii) New lighting poles in a staggered arrangement (1).
- (iii) New lighting poles in an opposite arrangement (1).
- (iv) New lighting poles centrally located within raised medians.
- (v) Mixture of new lighting poles and existing power poles.

**Footnote (1):** On wide roads a staggered arrangement is preferred however on very wide roads an opposite arrangement may be more economical as less poles may be required. On the wider roads (e.g. four lane roads with wide central medians) different arrangements (staggered and opposite) may need to be modelled to determine the optimal arrangement.

Where there are new signal poles being added at signalised intersections any new luminaires required, as part of a wider lighting upgrade, shall be mounted on joint use mast arm (JUMA) or joint use signal poles (JUSP).

There may be sites containing predominantly overhead electrical reticulation on existing power poles where it may be impractical (or unsafe) to try and install new standalone lighting poles. In these situations luminaires shall be attached to the existing power poles using suitable hot dip galvanised outreach arms, and only if absolutely necessary.

Any work required to be carried out on existing power poles shall be undertaken by FEA approved contractors.

The preferred maximum luminaire tilt angle (when installed) is 0° or 5°, however tilts of up to 10° may be used in exceptional circumstances such as very wide carriageways or locations where smaller tilt angles do not provide the necessary illuminance and/or luminance levels.

## 10 Preferred Luminaire Mounting Heights

The following table from AS/NZS 1158.1.2 provides the preferred mounting heights for high pressure sodium and metal halide luminaires on category V roads.

**Table 8 from AS/NZS 1158.1.2 – Indicative mounting heights and lighting category for luminaires with high pressure sodium and metal halide lamps**

## 11 Standard Pole Sizes and Outreach Arm Lengths

The following table lists the standard pole sizes (mounting heights) and outreach arm lengths that shall be used on the FRA network.

<b>Luminaire Mounting Height (m)</b>	<b>Maximum Bracket Outreach (m)</b>
12.00	4
10.50	4
9.00	3
7.50	3

Where possible the above standard mounting heights shall be used, however there may be special circumstances where a non-standard mounting height is required, and in such cases FRA approval shall be obtained prior to pole selection.

