



## Product Overview

Overhead pedestrian lighting, architecturally designed to enhance public spaces whilst providing reliability, performance, and control.

Avero® Solar Lighting Systems are designed to provide exceptional illumination results for suburban and rural level compliance with AS/NZS 1158.3.1:2020 pathway subcategories.

Avero® Solar Lighting Systems achieve superior illumination results through the integration of five advanced technologies:

- Cree® Extreme high-power LED's.
- LEDiL® multi-lens directional optics.
- Lithium Iron Phosphate (LiFePO4) Battery Systems.
- Multi-Directional monocrystalline photovoltaic modules.
- Programmable PIR sensory adaptive lighting controls.

Designed in Australia by Orca Solar Lighting

## Performance Summary

**Lumen Output:** Up to 2,061 Lumens

**Luminaire Efficacy:** Up to 149 Lumens per Watt (LPW)

**Colour Rendering Index:** Minimum 80 CRI (Colour Rendering Index)

**Colour Temperature (CCT):** 3000K / 4000K

**Solar Power:** 60W Monocrystalline

**Battery:** LiFePO4 32Ah 12.8V (410 Wh)

**Autonomy/Battery Backup:** Up to 5 days

**Warranty:** 5 Year Limited Warranty with Performance Guarantee

Specification Selection Criteria										
Project name:						Type/Label Reference:				
Configuration Code:										
Example: AVE-6M-2T4HR14W-3W-PE-T2-30K-BP1.0-BK										
Product	Pole Height	Power Setting *		PIR	Optic Distribution	Luminaire Colour Temp. (CCT)	Footing Type ^	Finish	Power Profile +	
Avero [AVE]	4m [4M]	Adaptive		PIR Enabled	Type II [T2]	4000K [40K]	Bored Pier 1.0m Cage	Black	Dusk to Dawn	
	5m [5M]	High Mode	Low Mode	[PE]		3000K [30K]	[BP1.0]	[BK]	[D2D]	
	6m [6M]	14W [14W]	3.5W [3W]	PIR Disabled		[PD]		Bored Pier 1.5m Cage	Silver	2 Timers
		12W [12W]	5.0W [5W]							[2T_HR_W-_W]
		11W [11W]								3 Timers
		10W [10W]								[3T_HR_W-_W-_HR_W]
Dusk to Dawn						[SF400]		Other / Custom		
8W [8WD2D]						Custom/Other		[_]		
6W [6WD2D]						[_]				
5W [5WD2D]										
Notes										

\* Power setting availability may be subject to location conditions. Please consult your sales representative for assistance on suitable power options to suit your project.

+ Power Profile setting availability may be subject to location conditions. Please consult your sales representative for assistance on suitable power profile options to suit your project.

^ Footing types are subject to site soil testing and engineered footing design. Please consult your sales consultant for advice on footing design options.

~Option may only be available as a special order and may incur additional lead time for delivery and may be subject to minimum order quantities.

### Power Profile Definitions:

Dusk to Dawn [D2D] – Runs the luminaire at static power level from dusk through to dawn

2 Timers [2T..] – Operates the luminaire from dusk for pre-set time frame at one power level, then runs the light at a second power setting for the remainder of the night (example: 4 hours at 14W, dim to 3.5W for the rest of the night)

3 Timers [3T..] – Operates the luminaire from dusk for pre-set time frame at one power level, then runs the light at a second power setting and then for a third timer and power level (example: 2 hours at 14W, dim to 3.5W, return to 14W prior to dawn).

Other [T..] – Orca Solar can program systems for dimming level and or running time according to project requirements.

Please refer to Page 2 for more information on power profiles or consult your sales representative for assistance on suitable profile options to suit your project.

Avero® Solar Lighting Systems are designed in accordance with AS/NZS 4509.2:2010 – Stand-alone Power Systems (System Sizing Reports available upon request). All products supplied by Orca Solar Lighting adhere to AS/NZS 4509, AS/NZS 5033, AS/NZS 5139 and AS/NZS 3000 electrical, battery and photovoltaic safety standards where applicable.

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# AVERO® SOLAR LIGHTING SYSTEM

Stand-alone Pathway LED Solar Lighting



## Functionality

### Multi-Directional PV for Optimal Solar Collection

Avero® Solar Lighting Systems feature a pole-top mounted photovoltaic module which enables full flexibility of orientation and tilt angle adjustment to ensure that regardless of which way the luminaire is aimed, solar collection will be optimal.

The full 360° orientation and 0-60° locking tilt adjustment allows the PV module to collect the optimal amount of energy with the PV facing North and tilted to the appropriate angle to suit the install location relative to the sun's tracking path.



PV Tilt Angle:	
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PV Module Tilt Angle Guide - Australia



### Programmable PIR Sensor and Power Profiles

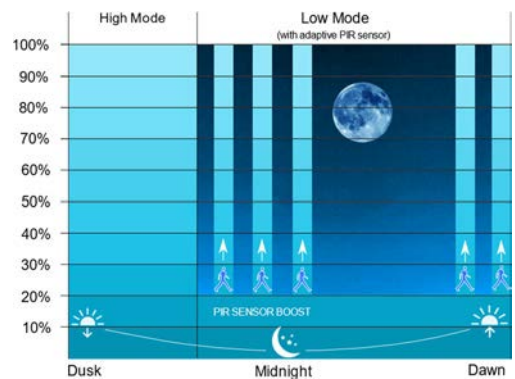
Avero® Solar Lighting Systems feature a programmable PIR sensors which allow the user to set light output modes and timers.

Light output modes offer the ability to control the lighting so that high light levels can be applied when needed and reduce to low light levels when not needed.

The PIR Sensor can be enabled to increase light levels when pedestrian movements are detected.

This functionality reduces light pollution and assists with compliance of Obtrusive Light Limitations (AS/NZS 4282) and International Dark Sky Association recommendations.

Light Output Modes and Timers can be adjusted from the ground using the 2.4Ghz Remote Control.



Dusk to Dawn	
Power	PIR Boost
	Timer PIR

2 Timers		
Power 1	Power 2	PIR Boost
Timer 1	Timer 2	Timer PIR

3 Timers			
Power 1	Power 2	Power 3	PIR Boost
Timer 1	Timer 2	Timer 3	Timer PIR

### Parameter Setting and Diagnostics

The Avero® Solar Lighting Systems 2.4Ghz multi-function remote control allows the user to adjust system parameters including light output profiles and timer settings. In addition, the remote control reads current and historic system status data including battery and solar performance for fast and easy diagnostic reporting.

<b>Parameter settings</b> 01 Battery type: Lithium 12V 14 Sensing delay: No 15 PV wake up: Yes	<b>Load settings</b> 01 First time: 00:30 02 First power: 100% 03 Second time: 02:00	<b>Running data</b> 01 Running state 02 Past data 03 Single battery voltage	<b>Running state</b> 01 System state: Discharging 02 Battery voltage: 12.3V 03 PV voltage: 17.5V
<b>Parameter settings</b> 01 Battery type: Lithium 12V 02 Sensing delay: 10S 03 PV wake up: Yes	<b>Load settings</b> 01 First time: 00:30 02 Power with people sensed: 100% 03 Power with people sensed: 50%	<b>Running data</b> 01 Running state 02 Past data 03 Single battery voltage	<b>Past data</b> -----> 1 day before <----- 02 Min. Voltage: 11.3V 03 Max. Voltage: 12.5V



### Precision Pathway Application Optics

Avero® Solar Lighting Systems utilise advanced optical light distribution technology through multi-overlay Dow Corning® silicone lenses.

The optical design platform paired with Cree's XHP Series Extreme High-Power LED chips delivers the highest efficiency and control using full cut-off IESNA Type II distributions.

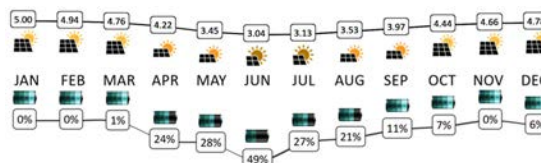
Avero® Solar Lighting Systems deliver high uniformity, precise light distribution, enhanced visual comfort, zero upward waste light and full compliance to glare limitations guaranteeing a better lighting outcome for municipalities, pathway users and surrounding ecological areas.



### Autonomy

Avero® Solar Lighting Systems are designed in accordance with the methodologies of AS/NZS 4509.2 to ensure the photovoltaic module is adequately sized and the discharge continuity of the battery system is balanced year-round.

This process ensures extended life of the premium battery systems used in Avero® Solar Lighting System. Calculation reports can be supplied upon request to verify solar and battery system sufficiency.



\*Example for illustrative purposes only – Autonomy calculations are subject to location conditions.



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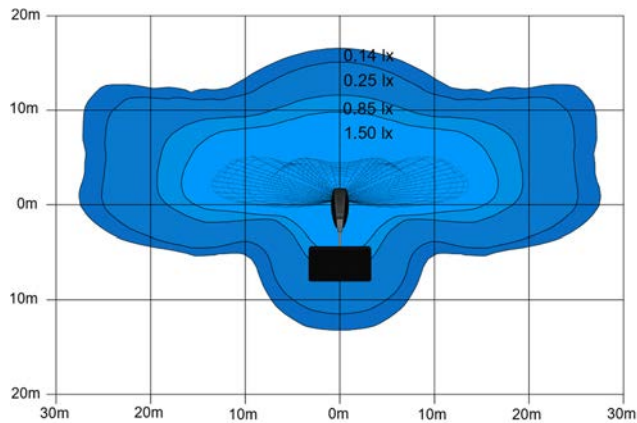
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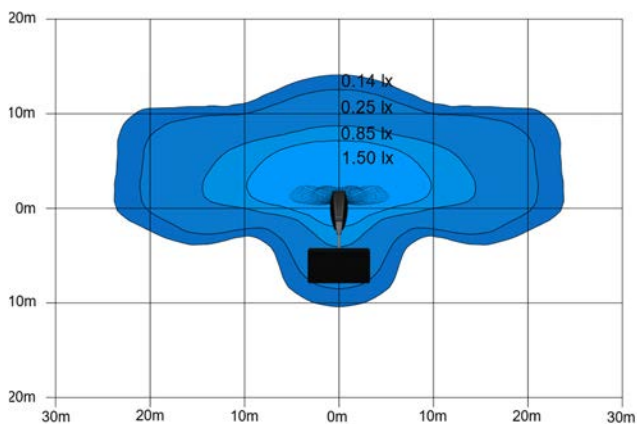
## Photometric Performance

### ISO Plot – High Mode (14W)



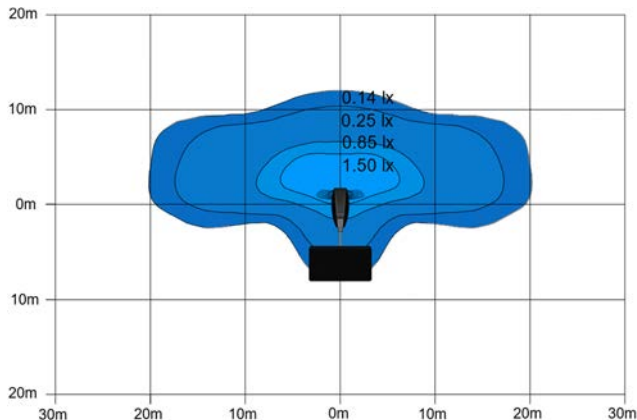
Avero 14W 3000K 1924 Lumens at 6m Mount Height

### ISO Plot – Dusk to Dawn Mode (6W)



Avero 6W 3000K 810 Lumens at 6m Mount Height

### ISO Plot – Power Save Mode (3.5W)



Avero 3.5W 3000K 385 Lumens at 6m Mount Height

### Lumen Output

Setting (%)	Nominal Power (W)	3000K	4000K
100%	14.0	1,924	2,061
90%	12.5	1,733	1,854
80%	11.0	1,530	1,648
70%	10.5	1,348	1,442
60%	9.0	1,156	1,236
50%	8.0	962	1,030
40%	6.0	810	867
30%	5.0	577	618
20%	3.5	385	412

\* Lumen output as per NATA test report data for the LED package and in-situ luminaire testing (Ref. LL22171-R01 and LL22172-R01 Light Lab International, accreditation No. 2258)

### Recommended Lumen Maintenance Factors

Temp °C	Initial LMF	50,000 Hr	100,000 Hr
15°C	1.02	0.95	0.88
20°C	1.01	0.94	0.87
25°C	1.00	0.93	0.86

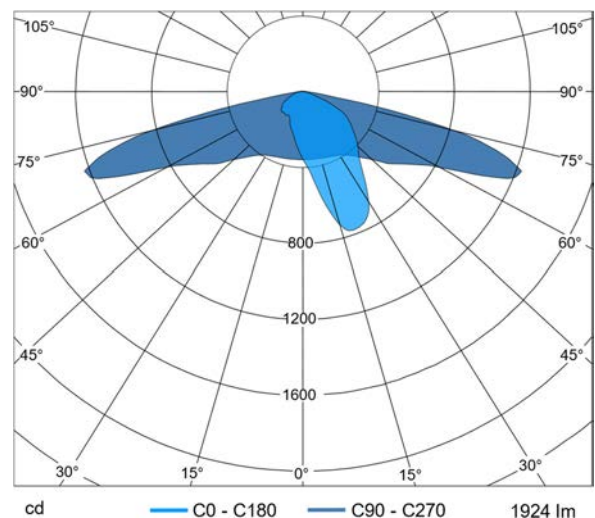
Lumen maintenance values are calculated per TM-21 based on IESNA LM-80 data collected in an ISO 17025:2005 accredited test facility.

(1) Projected Value represents interpolated value based on the time duration which is within six times the IESNA LM-80-08 total test duration (in hours) for the packaged LED chip (12,096 Hours)

(2) In accordance with IESNA TM-21-11, Calculated Value represented is for a time duration that exceeds six times the IESNA LM-80-08 total test duration for the packaged LED chip

It is recommended that additional maintenance factors shall be applied for consideration of dirt depreciation and where luminaires are to be installed in higher ambient temperature environments.

### Polar Candela Distribution



**AVERO® SOLAR LIGHTING SYSTEM**  
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**Electrical and Mechanical Specifications**



<b>Mechanical (Luminaire and PV Module Assembly)</b>			
Construction Material	Aluminium Alloy (<1.0% Cu) with E-Coat Dual Powder Coat Finish		
Fixings	316 Stainless Steel		
Dimensions	560 x 752 x 50 (Solar/PV Module)	530 x 212 x 92 (Luminaire Housing)	500 x 50 x 30 (Outreach Arm)
Weight	26 kg		
Ingress Protection Rating(s)	IP67 (LED Module and Optics)		IP67 (Electronics & Connections)
Impact Rating(s)	IK08 (LED Optical Lens)		IEC 61215 Hail Impact (Solar Module)
Solar/PV Directionality	0-60° tilt at 15° Increments, full 360° Orientation		
Packaging	Packaging Type: Single Carton	Weight: 30 kg	Dimensions: 925 x 400 x 735
Standards Compliance and Testing	Lighting System Body: AS 1874 (Aluminium) – ISO 12944-5:2007 (Paint Finishes) and ISO 9227 (Corrosion) IEC 60529 (Ingress Protection) Pole(s): AS/NZS 4100 (Steel Structures), AS/NZS 3679 (Structural Steel), AS/NZS 1163 (Cold-formed structural steel hollow sections)		

<b>Luminaire</b>			
LED Type	Cree Extreme High Power XHP70B		
LED Current	810mA (Maximum)		150mA (Minimum)
LED Power	14.0W (Maximum)		3.5W (Minimum)
LED Lifespan	L90B10 > 100,000hrs at 25°C T <sup>a</sup> (TM-21-2011 @ 12,000 Hrs on LM80 report)		
Lumen Output	Maximum Power Setting		Minimum Power Setting
	2,061 (4000K)	1,926 (3000K)	412 (4000K)      385 (3000K)
Correlated Colour Temperature (CCT)	3000K / 4000K		
Colour Rendering Index (CRI)	80+ CRI		
Optics / Distribution Type	IESNA Type II Medium		
Optical Material	Dow Corning® MS-1002 Silicone LEDiL® Multi-Lens		
Operating Temperature Range	-40°C to +50°C		
Standards Compliance and Testing	LM80-08-2008, IES TM-21-2011 & IEC/EN62717 (LED Lifespan at 12,000 Hours), NATA ISO/IEC 17025 (Photometric).		

<b>Photovoltaic / Solar Engine</b>	
Cell Type	Monocrystalline with 3.2mm Tempered Glass
Cell Count	36
Rated Power Output (Pmax)	60W
Maximum Power Voltage (Vmp)	18.0V
Open Circuit Voltage (Voc)	21.22V
Short Circuit Current (Isc)	3.75A
Maximum Power Current (Imp)	3.34A
Standards Compliance and Testing	IEC 61730 (Photovoltaic Module Safety), IEC 61215 (Photovoltaic Modules Design)

<b>Battery System</b>	
Chemistry Type	Lithium Iron Phosphate (LiFePO4)
Rated Capacity	32 Ah (Ampere Hours)      410 Wh (Watt Hours)
Rated Voltage	12.8V
Operating Temperature Range	-20°C to +60°C
Rated Depth of Discharge (DoD)	80%
Rated Cycle Life @ 0.2C	≥ 4,000 Cycles at 0.2C to 80% DoD      ≥ 6,000 Cycles at 0.2C to 50% DoD
Standards Compliance	IEC 62133 (Lithium Battery Systems)

<b>Electrical and Control</b>	
Controller Type	Pulse Width Modulation (PWM) with integrated step-up LED driver
System Voltage	12V
Maximum Input Voltage	55V
Maximum Charge Current	20A
Load Conversion Efficiency	90-96%
Load Current Accuracy	<3%
Maximum Load Power	60W
Load Current Range	50mA to 4000mA
Load Voltage Range	15-60V
Operating Temperature Range	-35°C to +65°C
Motion Sensor	Programmable Infrared >6m Range at 6m Height (12m Radius)
Remote Control	2.4Ghz WIFI Remote Control – (Parameter Setting and Diagnostic Reporting)
Standards Compliance and Testing	CE, RoHS (Restriction of Hazardous Substances), IEC 62109-1 (Safety of Power Converters), IEC 60529 (Ingress Protection), EN 60590 (Safety of Information Technology Equipment).

<b>Poles</b>	
Material	Hot Dip Galvanized Steel (dual powder coat or marine finishes optional)
Height Options	4m, 5m, 6m
Foundation Bolt Arrangement	4 x M20 x 233mm PCD
Spigot Size	Solar/PV Array
	∅ 60mm x 108mm      Luminaire Outreach
Standards Compliance and Testing	AS/NZS 1170 (Structural Design Actions), AS 4100 (Steel Structures), AS/NZS 4600 (Cold-Formed Steel Structures).
Wind Rating	Region A, B, C (subject to pole foundation type and soil conditions)

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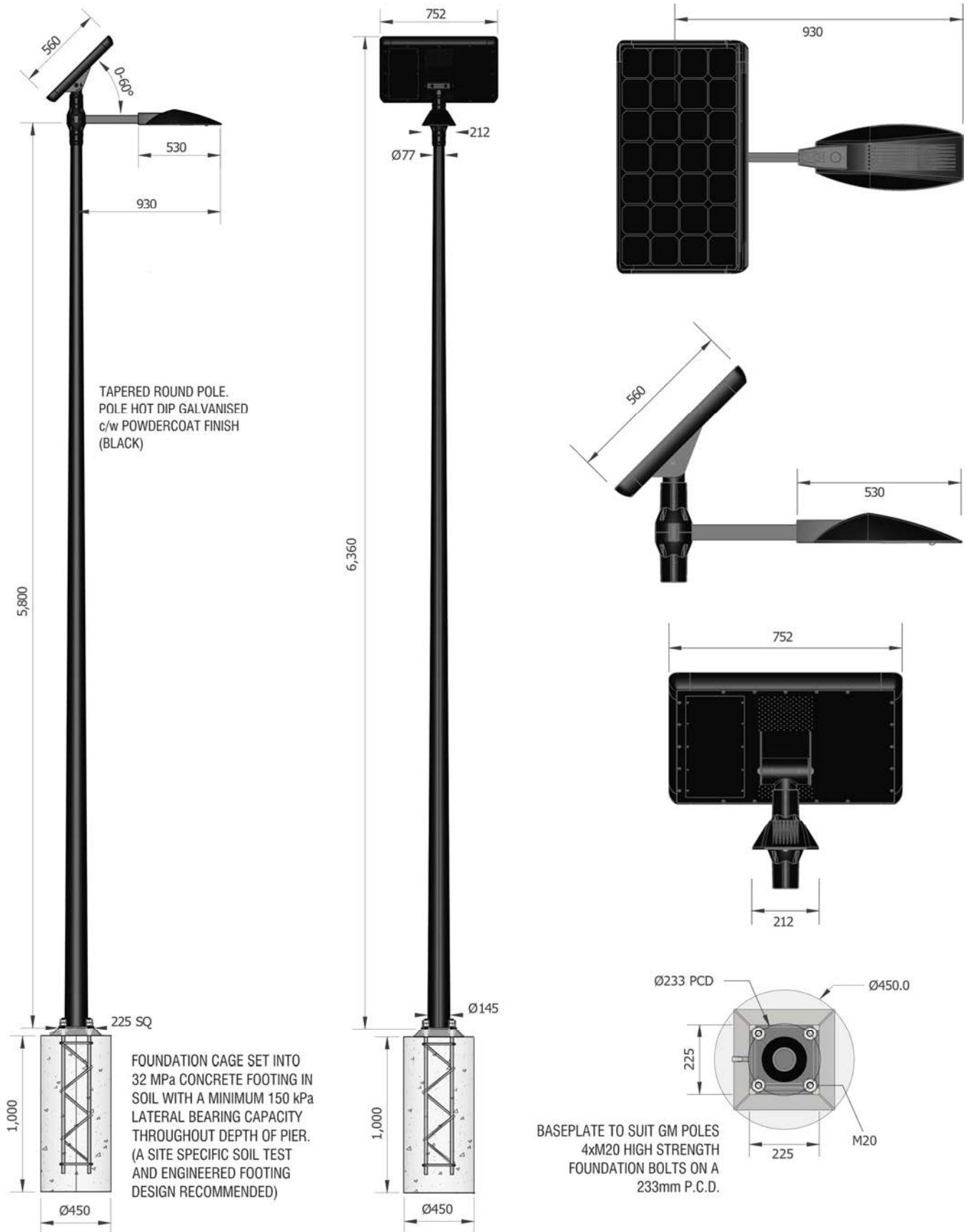
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Stand-alone Pathway LED Solar Lighting

## General Arrangement Detail





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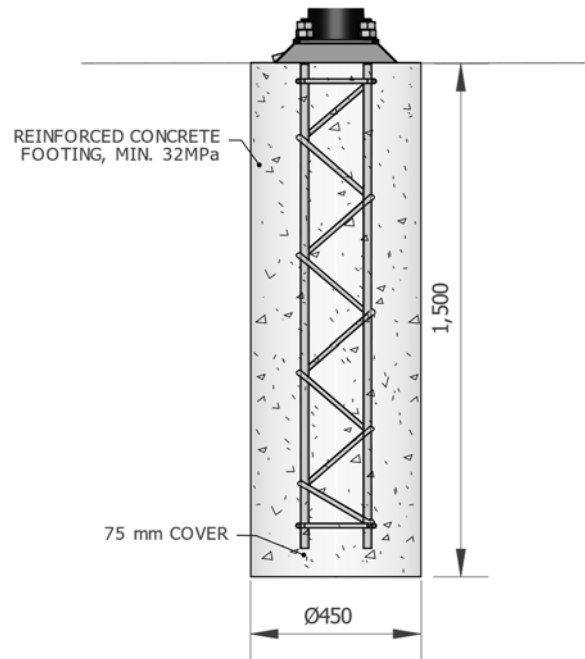
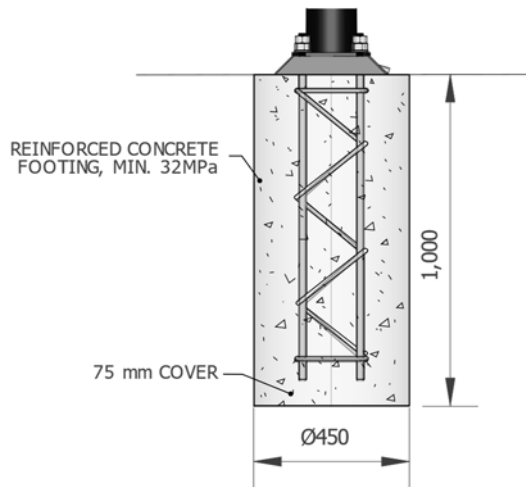
## Footing Options



### Bored Pier Footings

**BP1.0** – Suitable for Wind Regions A and B

**BP1.5** – Suitable for Wind Region C



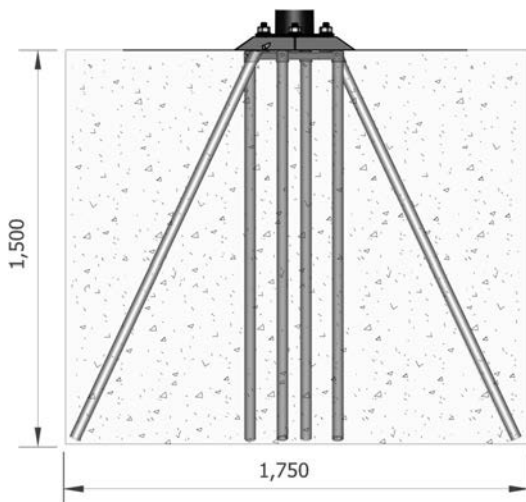
Depth: 1,000mm  
 Diameter: Ø450mm  
 Foundation Bolts: 4 x M20 x 233mm P.C.D.  
 Steel Reinforcing: 4 x N 20  
 Bending Moment: 12.0 kNm  
 Shear Force: 2.8 kN  
 Pole Weight: 53 kg  
 Soil Bearing Capacity: 150 kPa

Depth: 1,500mm  
 Diameter: Ø450mm  
 Foundation Bolts: 4 x M20 x 233mm P.C.D.  
 Steel Reinforcing: 4 x N 20  
 Bending Moment: 12.0 kNm  
 Shear Force: 2.8 kN  
 Pole Weight: 53 kg  
 Soil Bearing Capacity: 150 kPa

### Surefoot (Concrete-Free)

**SF400** – Suitable for Wind Regions A and B

For more information visit <https://bmsanchoring.com.au/surefoot-footings/>



Minimum Embedment Depth: 1,500mm  
 Pile Size: 1630mm x 32mm NB x 2.6  
 Foundation Bolts: 4 x M20 x 233mm P.C.D.  
 Material: 70 uM 500g/m<sup>2</sup> Hot Dip Galvanised  
 Bending Moment: 12.0 kNm  
 Shear Force: 2.8 kN  
 Pole Weight: 53 kg  
 Soil Bearing Capacity: 150 kPa

#### NOTICE:

Footing options are detailed for indication purposes only, subject to final design and analysis of footings based on actual site soil conditions and engineering certification by a qualified geotechnical and structural engineer.

All foundations should only be installed by suitably qualified persons.