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Manly Lagoon Reserve Pathway Lighting

Prepared by:

Lighting, Art and Science

for

Northern Beaches Council



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1. Introduction

Lighting Art & Science have been engaged to review Council's proposed pathway lighting as alternatives to a Philips luminaire.

The proposed lighting is specifically for lighting the shared pathway corridor for its users, and will provide adequate lighting for safe use of the shared path corridor but minimising the obtrusive light to the surroundings. The pathway runs through the Manly Lagoon reserve connecting Pittwater Road to Manly Beachfront (Figure 1).



Figure 1 – Manly Lagoon Reserve pathway

2. Background

Public lighting serves many functions after dark:

- To increase the accessibility and use of the park
- To provide a path of safe passage where people with normal vision can pass with minimal risk of trips and falls
- To provide security or the perception of security for people using the park
- To create a comfortable, pleasant and interesting environment for people using the park

There is an Australian Standard AS/NZS 1158.3.1 *Lighting of roads and public spaces, Part 3.1 Pedestrian area (Category P) lighting – performance and design requirements*, that has relevance to some of the park's activities. It should be noted that compliance with the Standard is not mandatory, nor will it guarantee a pleasant or interesting environment. Compliance with the standard however would likely be used as an indication of a duty of care should an incident occur.

The major technical parameters are:

- Average and minimal illumination
- Minimum vertical illumination 1.5 metres above the ground
- Upward Waste Light Output Ratio

To create a comfortable space the following additional parameters should be considered:

2.1 Glare

Glare is lighting that reduces rather than assists vision. Glare results when the brightness of the source is high in comparison with the background illumination. If the light sources are too bright then the eye over compensates for the brightness of the light and the space appears darker than it is. In addition the bright sources prevent vision beyond the source. This makes the space appear claustrophobic and reduces the perception of security as a person is surrounded by darkness beyond the light. Glare is always a greater problem with exterior lighting as the background is often not illuminated/dark.

2.2 Obtrusive Lighting

Outdoor lighting, no matter how well designed, will generally have some effects on the environment in which it is installed. If the spill light is not controlled properly, it may cause negative impacts on residents living nearby and surrounding riparian corridors. Therefore, the light fixtures should be selected and positioned properly to control the spill light, minimising the environmental impacts on residential properties and surrounding riparian areas.

2.3 Colour Appearance

The colour appearance of a light source is usually expressed in terms of the temperature of an equivalent blackbody. A corrected colour temperature of less than 3000K gives a warm coloured light. A colour temperature greater than 5000K will give a cold light and will look bluish if associated with other warmer light sources.

Luminaires with 3000K colour appearances should be used to avoid the harsher light of a cooler light (higher colour temperature) source.

2.4 Colour Rendering

Colour rendering is the ability of the light to accurately render the appearance of colours. Different light sources have a different spectral make up. Unless the light source emits all the colours required to make up the colour of the object, the object colour will not look correct. For example lamps that do not render skin tones well make people look sick and therefore the space is more uncomfortable. Colour rendering is generally independent of colour appearance.

Figures 2 & 3 indicate the difference between a high colour rendering, warm light source with full glare cutoff on the left and a low colour rendering, cold light source with minimal glare control on the right in figure 3. Note that the installation in figure 2 is more visually interesting but it is also important the field of view is much greater so people can have more confidence that the space is safe to enter.

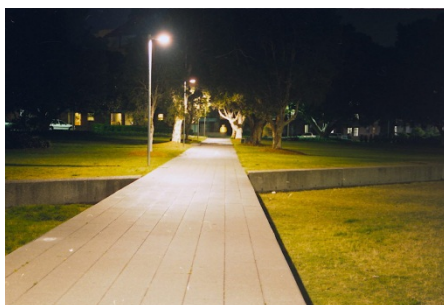


Figure 2 – High colour rendering low glare



Figure 3 – Low colour rendering high glare

These lighting requirements need to be achieved while balancing the requirements of energy, efficiency, maintenance requirements, aesthetics and cost.

3. Luminaire Options

The pathway lighting review has been conducted on five Light Emitting Diode (LED) luminaires in total, which are listed below:

SUPPLIER/MANUFACTURE	LUMINAIRE TYPE	PRODUCT CODE
Gerard / Disano	Mini Stelvio	330470
Zumtobel / Bega	99556	99556 K3
Zumtobel / Bega	77911	77911 K3
Light Culture / We-Ef	VFL530	108-1556-(175mA)
Light Culture / We-Ef	PFL230	108-1779

Table 1 Luminaire Options Summary

Lighting, Art & Science requested samples of the luminaires used in this review. From the five luminaire options three samples were able to be delivered during the preparation of this report. They were:

- Disano Stelvio – the mini was not available, however the sample was dimmed to match the output of the mini fixture
- Bega 99595 – the 99556 was not available
- We-Ef VFL520 – the VFL 530 was not available

From the samples the quality of light was reviewed under evening conditions at 5.4m mounting height. Of the three samples reviewed the VFL520 presented the least glare to an occupant of the space below. The Bega 77911 fitting was unavailable but as it has a diffuse light emitting surface this is considered a suitable measure to reduce glare from the LEDs.

3.1 Disano Mini Stelvio LED Luminaire

The Disano Mini Stelvio luminaire utilises lens based technology for light distribution. The fixture is rated to IP66 and IK09.

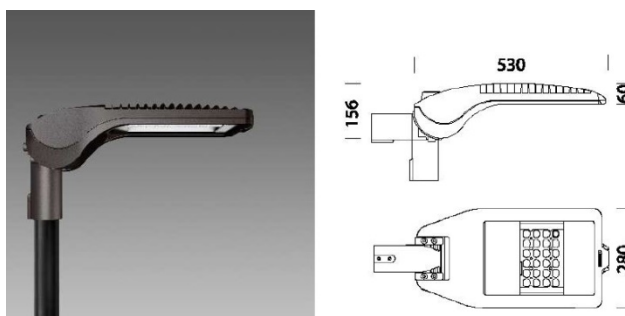


Figure 4 – Disano Mini Stelvio LED

3.2 Bega 99556 LED Luminaire

The Bega post-top luminaire utilises LEDs housed in specular reflectors for light distribution. The fixture is rated IP66 and IK08.

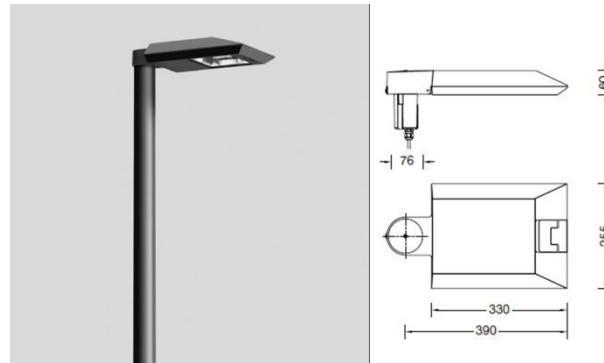


Figure 5 – Bega Post-top Luminaire

3.3 We-Ef VFL530 LED Luminaire

The We-Ef VFL530 luminaire utilises lens based technology for light distribution. The fixture is rated to IP66 and IK08.

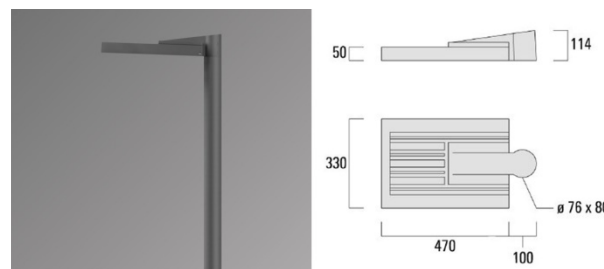


Figure 6 – Weef VFL530 LED

3.4 We-Ef PFL230 LED Luminaire

The We-Ef PFL230 luminaire utilises lens based technology for light distribution. The fixture is rated to IP66 and IK08.

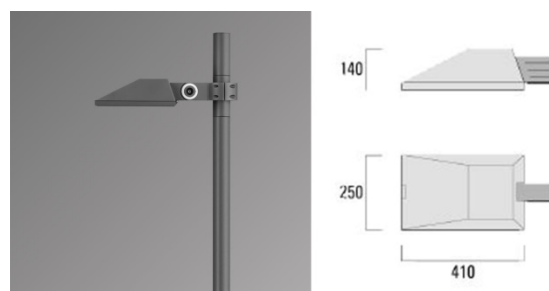


Figure 7 – Weef PFL230 LED

3.5 Bega 77911 LED Luminaire

The Bega 77911 luminaire utilises a diffuser and reflector hood for light distribution. The fixture is rated to IP65 and IK10.



Figure 7 – Bega 77911 luminaire

4. Light Poles

Light pole come in a number of styles for pathway lighting, those typically used for the luminaire options are:

- Straight round pole
- Tapered round pole
- Hexagonal/octagonal tapered pole
- Step base pole

The preferred pole styles for the luminaires options is a tapered round pole, with the exception of the Bega 77911 which is complemented by a base pole.

5. Luminaire Performance

The luminaire performance was analysed and compared in terms of the following categories:

- Pole spacing
- Energy efficiency
- Glare
- Obtrusive (spill) lighting
- Aesthetics

5.1 Pole Spacing

Photometric data for each of the luminaires was obtained from the manufacturers and lighting calculations set up in calculation software AGI32 for a typical section of the path. The calculation criteria were:

- Path width 2.5m
- Path length 100m
- Light pole setback from path 0.5m
- Luminaire mounting height 6m

The luminaire pole spacing was the calculated to lighting category P3 from AS1158.3.1.

The calculated lighting pole spacings for achieving Category P3 for the luminaire options are presented in the appendix.

5.2 Energy Efficiency

Based on luminaire power consumption and typical pole spacings to achieve category P3, the power consumption per 100m of illuminated pathway were calculated and are below:

Luminaire	Luminaire Power (W)	Pole Spacing (m)	Power Per 100m of Path (W/100m)
Disano Mini Stelvio	27	21	129
Bega 99556	35	25	140
Bega 77911	43	25	172
Weef VFL530	14	20	70
Weef PFL230	14	20	70

Table 2 Power per length of path

The calculated results indicates that VFL530 and PFL230 are the best options in terms of energy efficiency for the path lighting.

As comparison the Philips luminaire of the original design used 124W/100m.

5.3 Glare

The further the pole spacings and the resultant lower number of poles are required for achieving P3 Category (Refer to Section 4.1). In order to achieve these larger spacings the luminaires have to have more light directed at high angles near the horizontal to achieve the calculated vertical illuminances of a category P3 pathway. When combined with a small light source this contributes to discomfort glare for people walking on the pathway may experience if the light distribution is too wide (Figure 8 & 9).

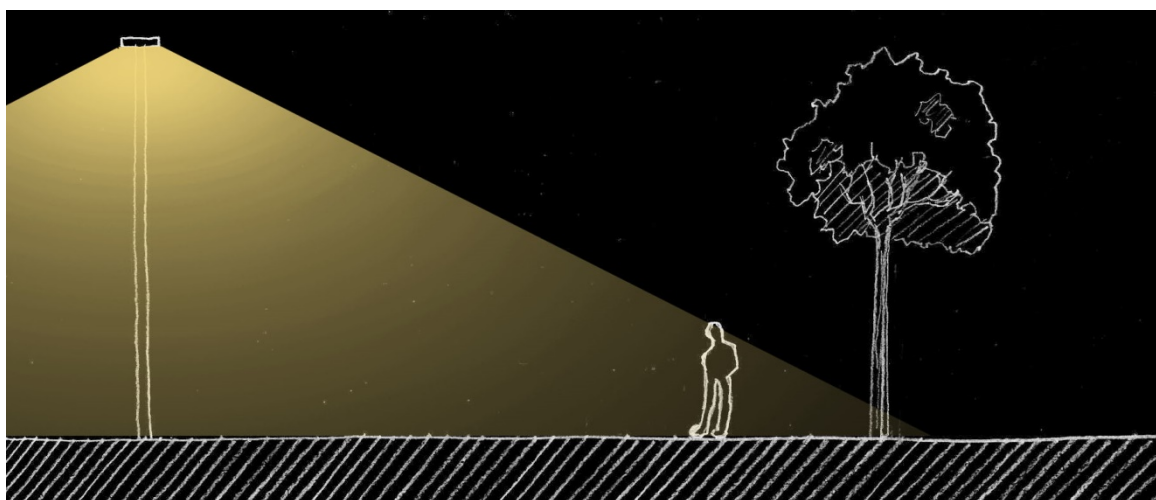


Figure 8 – Less glare impact on pathway users

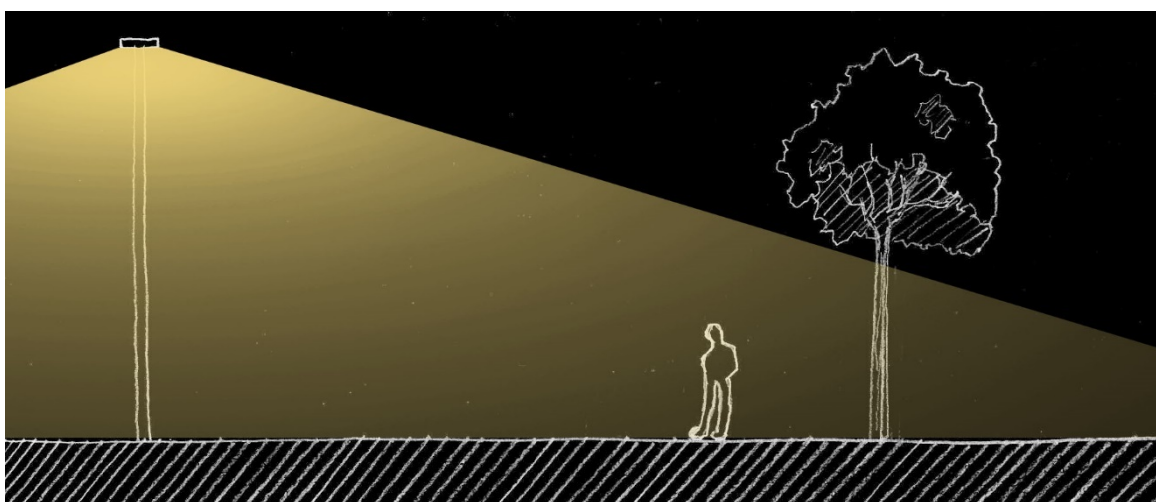


Figure 9 – Higher glare impact on pathway users

Lens based LED act to increase the size of the light source and reduce glare. A large lens is preferable to a small lens. A diffuser below the LED also aids in reducing glare. LEDs housed in reflectors have higher glare at certain angles than lens or diffused LED type luminaires.

5.4 Obtrusive Lighting

The closest property boundary was utilised for calculating obtrusive lighting. The results are shown below:

LUMINAIRE	Maximum Illuminance (lux)
Disano Mini Stelvio	0.7
Bega 99556	0.2
Bega 77911	0.9
We-Ef VFL530	0.2
We-Ef PFL230	0.2

Table 3 Obtrusive lighting calculation results

From Table 3, all the luminaire options are able to comply with the AS 4280 – 1997 *Control of the obtrusive effects of outdoor lighting* standard, but VFL530 and PFL230 have the best performance in terms of reducing obtrusive light spill.

5.5 Aesthetics

The selection of a luminaire involves more than the lighting performance and is often based on aesthetics. This is largely a subjective decision for Council. In terms of looking least like a streetlight for contemporary styled luminaires the PFL230 would be most suitable, if heritage styling is required then the Bega 77911.

6. Lighting Control System

The most basic form of lighting controls is a sunset switch that turns lighting on when natural light levels drop at sunset and switches lighting off at sunrise. Further to this timeclocks can be added to restrict lighting operation to certain hours, e.g. sunset to midnight, the time clock allows the off time to be adjusted.

Further controls can be added to reduce the light output of the luminaires at a point in time from category P3 to P4. Alternatively this switching between illumination levels can be done via motion sensors at the luminaires, it is noted that not all luminaires are suitable for mounting a motion sensor within.

7. Conclusions and Recommendations

7.1 Luminaire Selection

Our review of the luminaire options has found that none of the luminaires is able to replace the Philips luminaire on a one for one basis as the pole spacings (29m) are considered excessive, meaning a high likelihood of glare from these luminaires for path users. Additional poles will be required regardless of which luminaire option is chosen.

From the factors that have been discussed above, two luminaires for consideration are the following:

- We-Ef VFL530 luminaire
- Bega 77911 luminaire

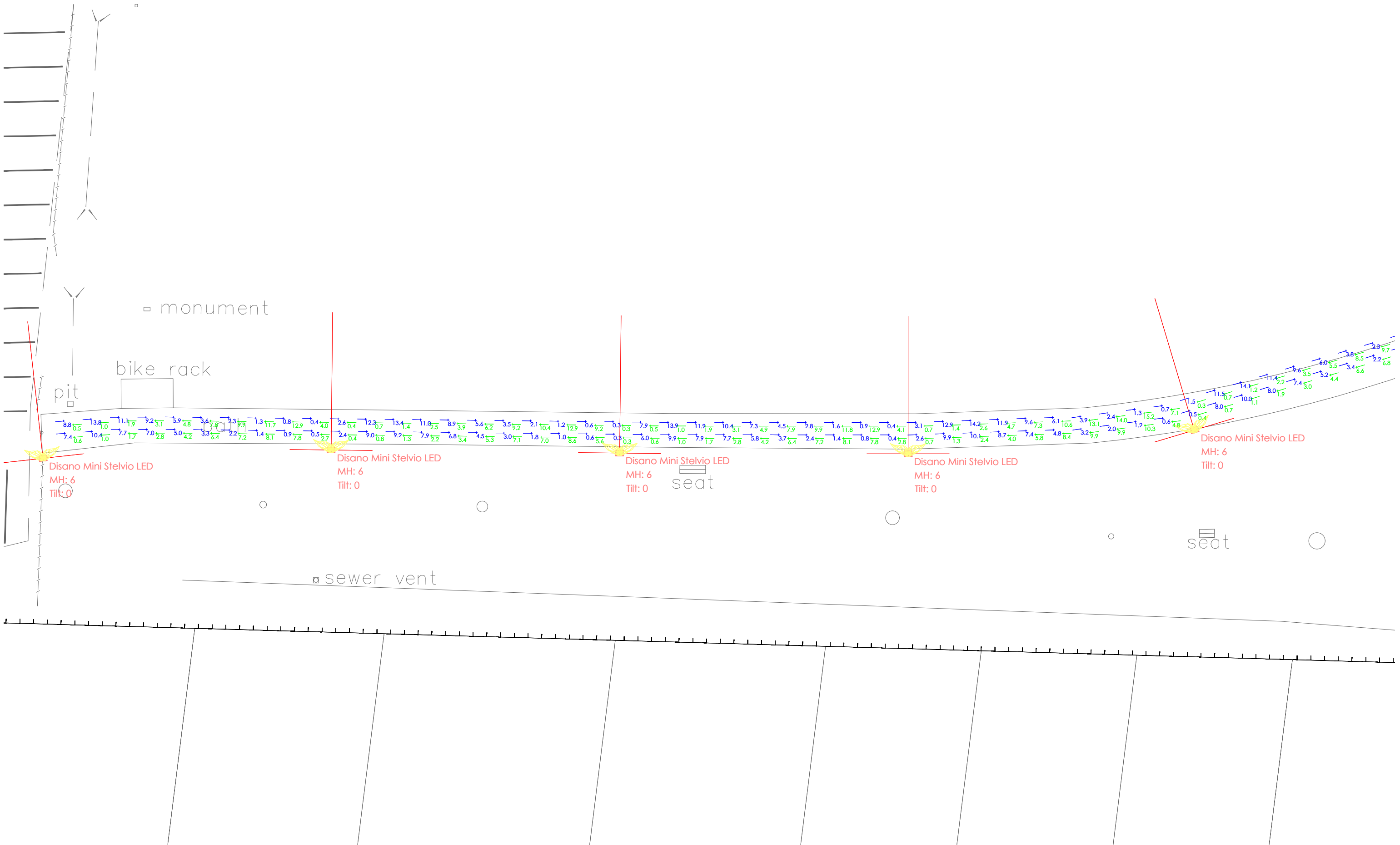
The Bega 77911 has an advantage in terms of pole spacing but has a higher energy usage in order to achieve this. As such LA&S recommends the We-Ef VFL530 luminaires are used for illuminating this pathway, when considered from the five luminaire options,



the VFL530 has good visual comfort for path occupants, best energy efficiency & least spill light to neighbouring residences.

8. Appendices

- a) Pathway lighting spacing plots for luminaire options
- b) Luminaire Datasheets



Issue	Amendment
P1	PRELIMINARY ISSUE

Date
13-09-18



0 2.5 5.0 7.5 10.0 12.5m 1:250@A3

Calculation Point Legend	
Symbol	Description
→ 1.0	Vertical calculation point at 1.5m high to East
← 0.7	Vertical calculation point at 1.5m high to West

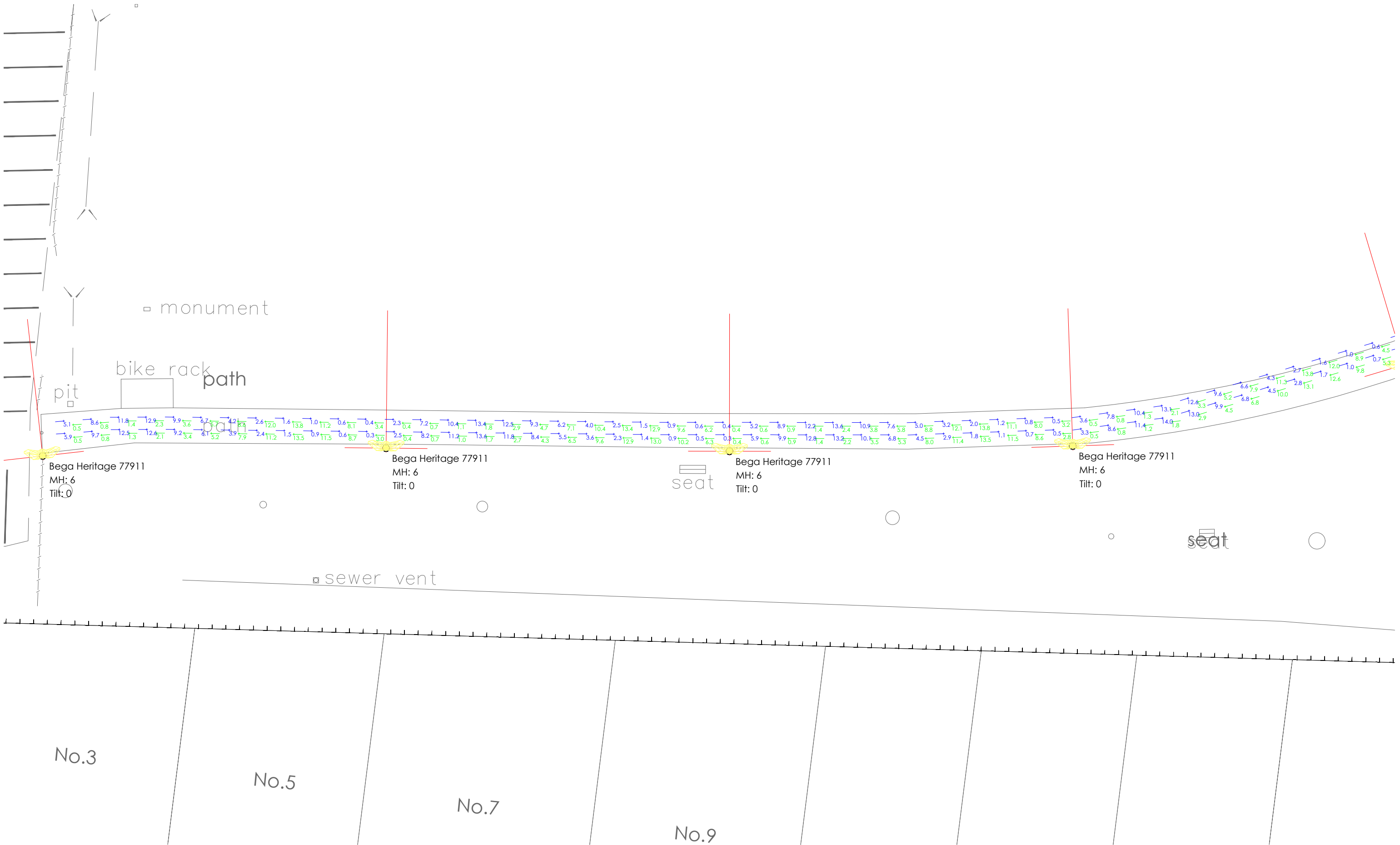
- Notes:
- Please zoom into digital PDF to view illuminance values
 - Horizontal illuminance values not shown for clarity of vertical illuminance values
 - Lighting Technical Criteria from AS/NZS 1158.3.1:2005 - for Roads and Footpaths - Category P3:
 - Average Horizontal Illuminance > 1.75 lx
 - Point Horizontal Illuminance > 0.3 lx
 - Horizontal Uniformity Max/Avg < 10
 - Point Vertical Illuminance > 0.3 lx

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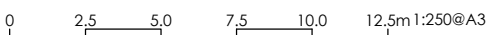
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Project	MANLY LAGOON PATHWAY LIGHTING			
Drawing	PATHWAY LIGHTING			
Disano Mini Stelvio				
Drawn MZ	Apprv. RM	Date SEP 2018	Scale 1:250@A3	
Project No	Drawing No		Rev	
L155R	CL-01		P1	



Issue	Amendment
P1	PRELIMINARY ISSUE

Date
13-09-18



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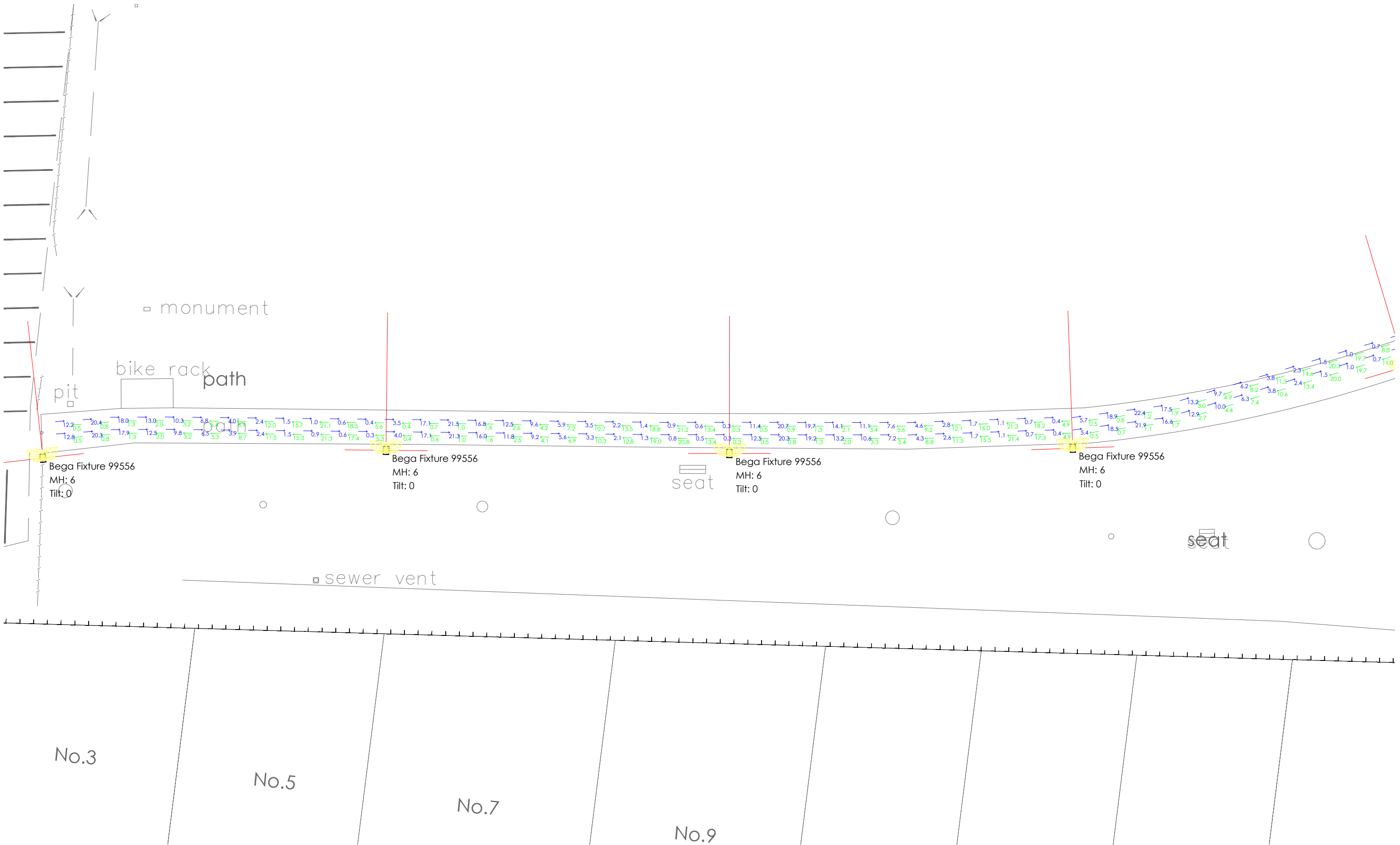
- Notes:
- Please zoom into digital PDF to view illuminance values
 - Horizontal illuminance values not shown for clarity of vertical illuminance values
 - Lighting Technical Criteria from AS/NZS 1158.3.1:2005 - for Roads and Footpaths - Category P3:
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Project	MANLY LAGOON PATHWAY LIGHTING			
Drawing	PATHWAY LIGHTING			
	BEGA 77911			
Drawn	MZ	Apprv.	RM	Date SEP 2018
Project No	L155R	Drawing No	CL-02	Scale 1:250@A3
				Rev P1



Issue	Amendment	Date
P1	PRELIMINARY ISSUE	13-09-18



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Symbol	Description
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1.7	Vertical calculation point at 1.5m high to West

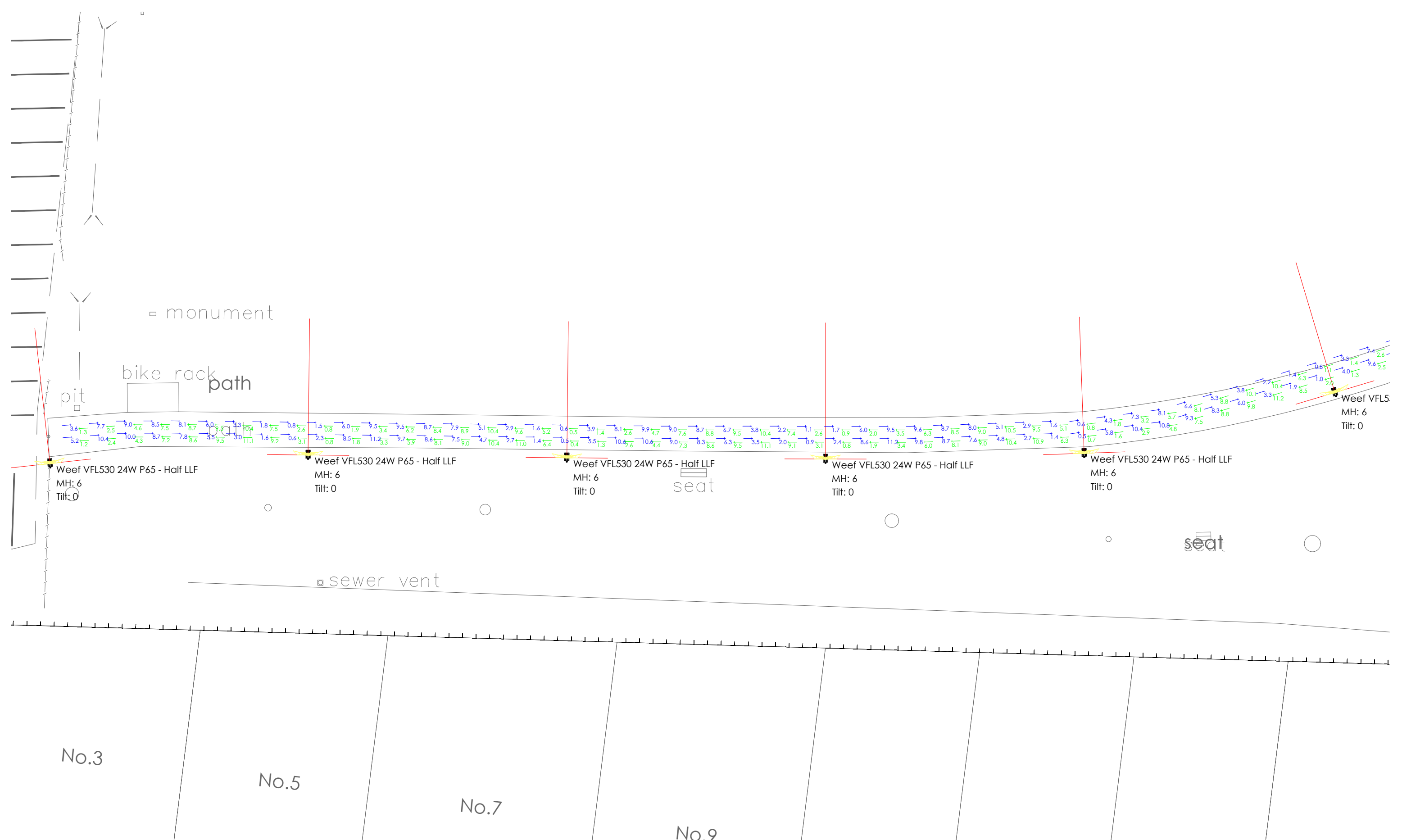
- Notes:
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 - Horizontal illuminance values not shown for clarity of vertical illuminance values
 - Lighting Technical Criteria from AS/NZS 1158.3.1:2005 - for Roads and Footpaths - Category P3:
 - Average Horizontal Illuminance > 1.75 lx
 - Point Horizontal Illuminance > 0.3 lx
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Project	MANLY LAGOON PATHWAY LIGHTING			
Drawing	PATHWAY LIGHTING			
Drawn	MZ	Approved	RM	Date SEP 2018
Project No	L155R	Drawing No	CL-03	Scale 1:250@A3
				Rev P1



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Calculation Point Legend

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←	Vertical calculation point at 1.5m high to West

Notes:

1. Please zoom into digital PDF to view illuminance values

2. Horizontal illuminance values not shown for clarity of vertical illuminance values

3. Lighting Technical Criteria from AS/NZS 1158.3.1:2005 - for Roads and Footpaths - Category P3:

- Average Horizontal Illuminance > 1.75 lx
- Point Horizontal Illuminance > 0.3 lx
- Horizontal Uniformity Max/Avg < 10
- Point Vertical Illuminance > 0.3 lx

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Project

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Drawing

PATHWAY LIGHTING

Drawn

MZ

Approved

RM

Date

SEP 2018

Scale

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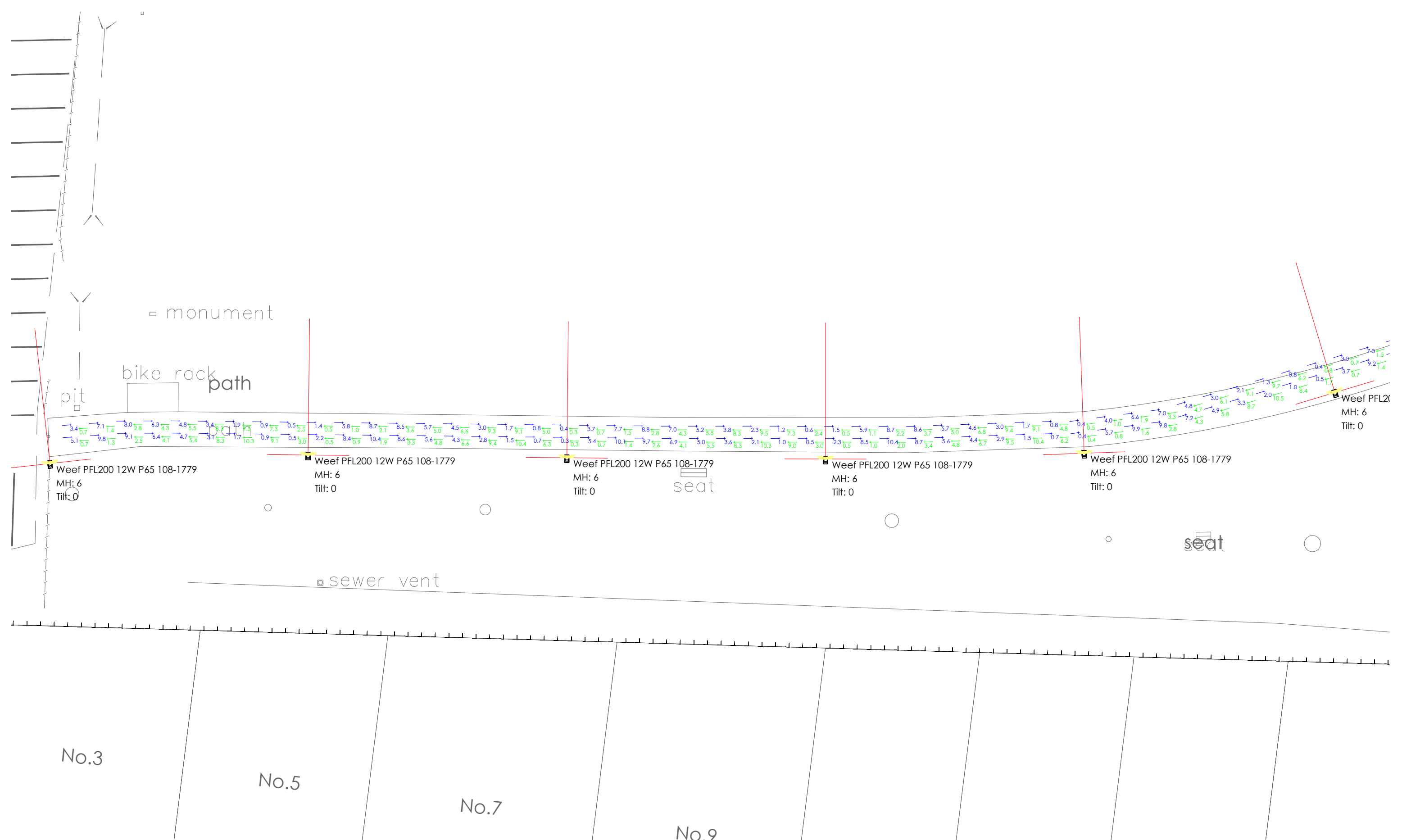
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Symbol

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Vertical calculation point at 1.5m high to West

Notes:

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- Horizontal Uniformity Max/Avg < 10
- Point Vertical Illuminance > 0.3 lx

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Project

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Drawing

PATHWAY LIGHTING

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Date

SEP 2018

Scale

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Project No

L155R

Drawing No

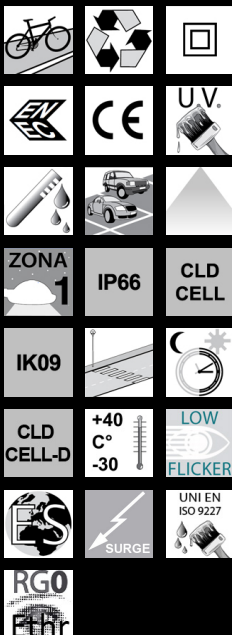
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Download

DXF 2D
- 3275.dxf

3DS

- disano_3275_ministelvio_24led.3ds
- disano_3275_ministelvio_36led.3ds
- disano_3275_ministelvio_48led.3ds

3DM

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- disano_3275_ministelvio_36led.3dm

Montaggi

- stelvio_ministelvio.pdf
- stelvio_ministelvio.pdf



3275 Mini Stelvio - street type

Housing and cover: in die-cast aluminium and designed with a very small surface exposed to wind. Cooling fins are integrated into the cover. Pole connection: in die-cast aluminium and with gaskets to secure the frame according to different inclinations. Adjustable ranges: between 0° and 15° for side mount; and between 0° and 10° for mast-top mounting. Inclination pace: 5°. Suited for poles with a diameter 63-60mm. Diffuser: clear, tempered glass, 4 mm thick, resistant to thermal shock and impacts (UNI-EN 12150-1 : 2001). Coating: the standard powder coating consists of a first metal surface pre-treatment stage and of single layer of UV-stabilised, corrosion and salt resistant polyester powder coating. Standard supply: Automatic temperature control inside the device with automatic resetting. Electronic safety device to protect the LED module and the related ballast compliant with EN 61547. It works in two modes: - differential mode: surge between power cables and between the phase and neutral. - common mode: surge between power, L/N and ground cables or between the fixture's body if it is of class II and installed on a metal pole. Upon request: for Class II fixtures, protection up to 10KV. Equipment: complete with IP67 airtight connector for mains connection. Supplied with double insulation switch that cuts off electricity when the cover is opened. Energy-saving: the possibility to choose the correct drive current for LEDs will allow you to have the right power under specific design conditions, and also help you deal with maintenance and retrofitting problems. Using a lower current will improve the efficiency of fixtures and therefore increase energy savings, whilst a higher current will result in a higher light flux so that you can reduce the number of fixtures. Optics: in PMMA, highly resistant to temperature and UV radiation.

Ta-30+40°C life 80%: 80.000h (L80B10).

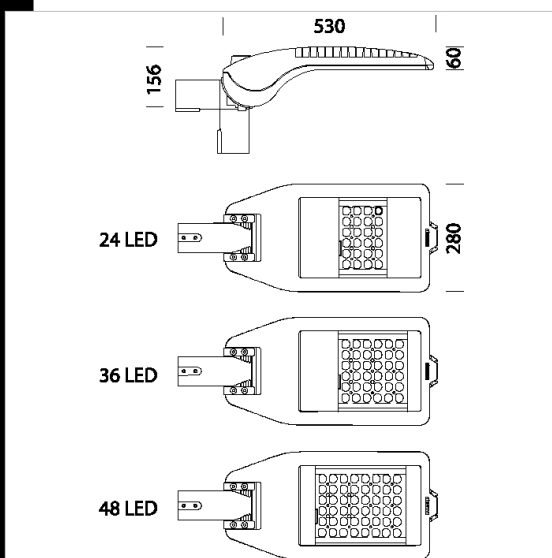
Power factor >0.9

Regulations: Produced according to applicable EN60598-1 CEI 34-21 standards, degree of protection according to EN 60529 standards.

Upon request:

- with power supply 1-10 V dimmable with subcode 12.
- with power supply DIG dimmable with subcode 0041.
- with virtual midnight subcode 30.
- power line carrier remote control systems subcode 0078.
- Coating compliant with UNI EN ISO 9227 Corrosion tests in artificial atmospheres for aggressive environments.

Wind surface: L:139cm² F:400cm².



Code	Gear	Kg	Lumen Output-K-CRI	WTot	Colour	Surge
330360-00	CLD CELL	7.56	LED-5424lm-700mA-4000K-CRI>70	51 W	ANTRACITE	6/8kV
330361-00	CLD CELL	7.94	LED-8135lm-700mA-4000K-CRI>70	76 W	ANTRACITE	6/8kV
330362-00	CLD CELL	8.04	LED-10848lm-700mA-4000K-CRI>70	101 W	ANTRACITE	6/8kV
330470-00	CLD CELL	8.08	LED-2948lm-350mA-4000K-CRI>70	25 W	ANTRACITE	
330471-00	CLD CELL	8.08	LED-4422lm-350mA-4000K-CRI70	37 W	ANTRACITE	
330472-00	CLD CELL	8.24	LED-5897lm-350mA-4000K-CRI>70	50 W	ANTRACITE	
330473-00	CLD CELL	7.96	LED-4316lm-530mA-4000K-CRI>70	39 W	ANTRACITE	
330474-00	CLD CELL	8.56	LED-6475lm-530mA-4000K-CRI>70	57 W	ANTRACITE	
330475-00	CLD CELL	8.14	LED-8635lm-530mA-4000K-CRI>70	78 W	ANTRACITE	

Accessories



- 504 - Single arm



- 508 - Double arm

Posts



- 1508 fluted pole ø120 with base



- 1509 fluted pole ø120



- 1481 tapered steel lighting pole to be buried



- 1480 tapered steel lighting pole with base



- 1494 pole with base

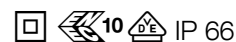


- 1492 poles to be sunk into the ground

The reported luminous flux is the flux emitted by the light source with a tolerance of $\pm 10\%$ compared to the indicated value. The W tot column indicates the total wattage absorbed by the system without exceeding 10% of the indicated

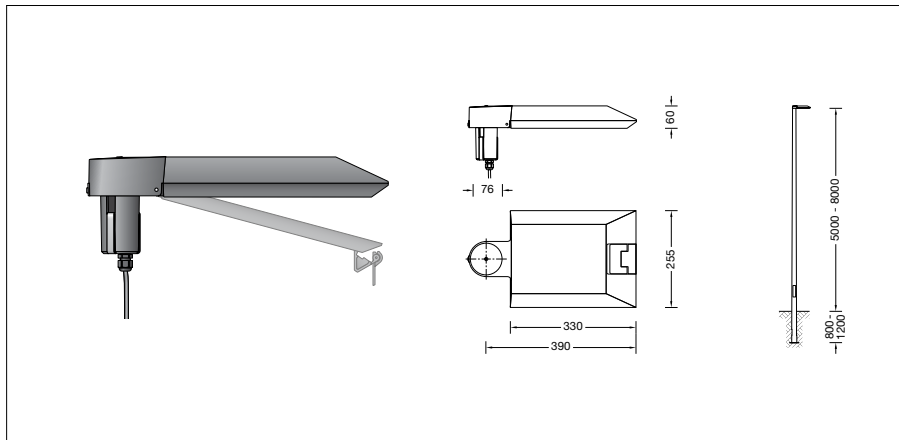
BEGA**99 556**

Pole top luminaire



Project · Reference number

Date



Product data sheet

Application

LED pole top luminaire with asymmetrical flat beam light distribution.
For mounting heights 5000 - 8000 mm.

Product description

Luminaire made of aluminium alloy,
aluminium and stainless steel
Safety glass
Silicone gasket
Reflector made of pure anodised aluminium
Toolless closure
For pole top \varnothing 76 mm
Inner diameter of the pole min.62 / max.70 mm
Slip fitter insert depth 90 mm
Connecting cable X05BQ-F 4 x 1²
Cable length 8 m
LED power supply unit
220-240 V ~ 0/50-60 Hz
DC 176-264 V
Dimmable 1-10 V

SELV (safety extra-low voltage)

A basic isolation exists between power cable
and control line
Luminaire: Protection class IP 66
Dust-tight and protection against strong water
jets

Safety class II

Impact strength IK08

Protection against mechanical
impacts < 5 joule

– Safety mark

– Conformity mark

Wind catching area: 0.03 m²

Weight: 4.6 kg

Lamp

Module connected wattage	31.4 W
Luminaire connected wattage	35 W
Rated temperature	$t_a = 25^\circ\text{C}$
Ambient temperature	$t_{a\text{ max}} = 35^\circ\text{C}$

On request we can offer you modifications for
environments with higher temperatures as a
customized product.

99 556

Module designation	2x LED-0847/840
Colour temperature	4000 K
Colour rendering index	$R_a > 80$
Module luminous flux	5850 lm
Luminaire luminous flux	4667 lm
Luminaire luminous efficiency	133,3 lm/W

99 556 K3

Module designation	2x LED-0847/830
Colour temperature	3000 K
Colour rendering index	$R_a > 80$
Module luminous flux	5710 lm
Luminaire luminous flux	4555 lm
Luminaire luminous efficiency	130,1 lm/W

Lifetime of the LED

Ambient temperature $t_a = 15^\circ\text{C}$
– at 50,000 h: L90B10
– at > 500,000 h: L70B50

Ambient temperature $t_a = 25^\circ\text{C}$
– at 50,000 h: L90B10
– at > 500,000 h: L70B50

max. ambient temperature $t_a = 35^\circ\text{C}$

– at 50,000 h: L90B10
– at 481,000 h: L70B50

Inrush currentInrush current: 5 A / 100 μs

Maximum number of luminaires of this
type per miniature circuit breaker:

B10A:	27 luminaires
B16A:	44 luminaires
C10A:	27 luminaires
C16A:	44 luminaires

Article No. 99 556

Colour temperature 4000 K.
Also available with 3000 K on request.
4000 K – article number
3000 K – article number + **K3**

Colour graphite or silver
graphite – article number
silver – article number + **A**

Accessories

Tapered aluminium poles,
lacquered with access door and C-clamp

70915	Pole with anch.section	H 5000 mm
70916	Pole with anch.section	H 6000 mm
70917	Pole with anch.section	H 7000 mm
70726	Pole with anch.section	H 8000 mm

Cylindrically stepped aluminium poles,
lacquered with access door and C-clamp

70903	Pole with anch.section	H 5000 mm
70905	Pole with anch.section	H 6000 mm

Cylindrically stepped aluminium poles,
lacquered with door und C rail

70902	Pole with baseplate	H 5000 mm
70904	Pole with baseplate	H 6000 mm

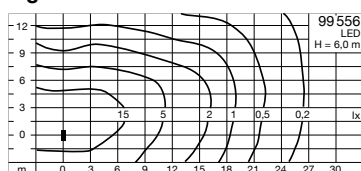
Tapered steel poles without visible welding
seam - hot-dip galvanised and lacquered
- with access door and C-clamp

70886	Pole with anch.section	H 5000 mm
70834	Pole with anch.section	H 6000 mm
70835	Pole with anch.section	H 7000 mm
70836	Pole with anch.section	H 8000 mm

Tapered steel luminaire poles
longitudinally seam-welded · hot-dip galvanised
and lacquered with access door and C rail

71002	Pole with anch.section	H 6000 mm
71004	Pole with anch.section	H 7000 mm
71006	Pole with anch.section	H 8000 mm

For suitable connection boxes please see the
instructions for use of the luminaire poles.

Light distribution

BEGA**77 911**

Pole top luminaire



Project · Reference number

Date

Product data sheet

Application

LED pole top luminaire with asymmetrical flat beam light distribution.
For mounting heights 4000 - 6000 mm.

Product description

Luminaire made of aluminium alloy,
aluminium and stainless steel
Synthetic cover with optical structure
Silicone gasket
Reflector made of pure anodised aluminium
For pole top \varnothing 76 mm
Slip fitter insert depth 135 mm
Connecting cable X05BQ-F 5 G 1[□]
Cable length 8 m
LED power supply unit
220-240 V \sim 0/50-60 Hz
DC 176-264 V
During DC operation the LED power
is reduced to 50%
Dimmable 1-10 V
A basic isolation exists between power cable
and control line
Luminaire: Protection class IP 65
Dust-tight and protection against water jets
Safety class I
Impact strength IK10
Protection against mechanical
impacts < 20 joule
 – Safety mark
 – Conformity mark
Wind catching area: 0.22 m²
Weight: 12.5 kg

Inrush current

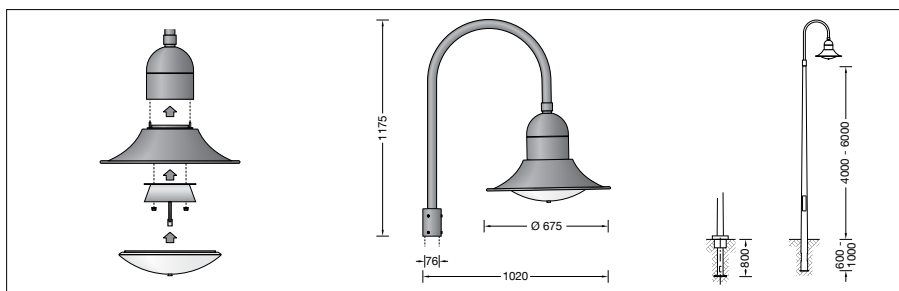
Inrush current: 5 A / 100 μ s
Maximum number of luminaires of this
type per miniature circuit breaker:

B 10A: 27 luminaires
B 16A: 44 luminaires
C 10A: 27 luminaires
C 16A: 44 luminaires

Lamp

Module connected wattage 38 W
Luminaire connected wattage 43 W
Rated temperature $t_a = 25^\circ\text{C}$
Ambient temperature $t_{a\text{ max}} = 40^\circ\text{C}$

On request we can offer you modifications for
environments with higher temperatures as a
customized product.



77 911 K4

Module designation 2x LED-0275/840
Colour temperature 4000 K
Colour rendering index CRI > 80
Module luminous flux 4750 lm
Luminaire luminous flux 3569 lm
Luminaire luminous efficiency 83 lm/W

77 911 K3

Module designation 2x LED-0275/830
Colour temperature 3000 K
Colour rendering index CRI > 80
Module luminous flux 4420 lm
Luminaire luminous flux 3321 lm
Luminaire luminous efficiency 77,2 lm/W

Lifetime of the LED

Ambient temperature $t_a = 15^\circ\text{C}$
– at 50,000 h: L 90 B 10
– at > 500,000 h: L 70 B 50

Ambient temperature $t_a = 25^\circ\text{C}$
– at 50,000 h: L 90 B 10
– at 410,000 h: L 70 B 50

max. ambient temperature $t_a = 40^\circ\text{C}$
– at 50,000 h: L 90 B 10
– at 280,000 h: L 70 B 50

Light technique

Luminaire data for the light planning program
DIALux for outdoor lighting, street lighting and
indoor lighting as well as luminaire data in
EULUMDAT- and IES-format you will find on the
BEGA web page www.bega.com.

Article No. 77 911

LED colour temperature optionally 4000 K
or 3000 K
4000 K – Article number
3000 K – Article number + **K3**

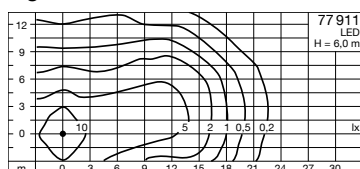
Accessories

Tapered aluminium poles,
lacquered with access door and C-clamp

70914 Pole with anch.section H 4000 mm
70725 Pole with anch.section H 4500 mm
70915 Pole with anch.section H 5000 mm
70916 Pole with anch.section H 6000 mm
70928 Pole with baseplate H 4200 mm
70926 Pole with baseplate H 5000 mm

For suitable connection boxes please see the
instructions for use of the luminaire poles.

Light distribution



VFL530 LED

108-1556

1/6

we-ef



Description

IP66, Class I or Class II. IK08. Marine-grade, die-cast aluminium alloy. 5CE superior corrosion protection including PCS hardware. Silicone CCG® Controlled Compression Gasket. RFC® Reflection Free Contour main lens. Integral EC electronic converter in thermally separated compartment. CAD-optimised optics for superior illumination and glare control. OLC® One LED Concept. Factory installed LED circuit board. The luminaire is factory-sealed and does not need to be opened during installation. Recommended mounting height 3.0-6.0 m, depending on lamp type selected.

Beam Type	asymmetric, side-throw beam [P65]
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Lamp Type	LED-24/24W / 350 mA - 3000 K
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CRI	80
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Gear Type	EC
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Nominal Luminous Flux (lm)

LED Lumens	134.5 lm
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LEDs	24
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Total Lumens	3228 lm
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Tj	85 °C
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Rated Luminous Flux (lm)

LED Lumens	123.5 lm
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Total Lumens	2964.7 lm
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Ta	25 °C
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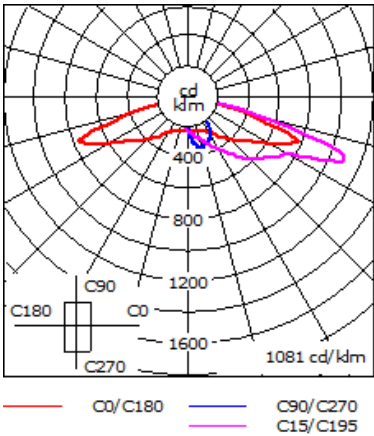
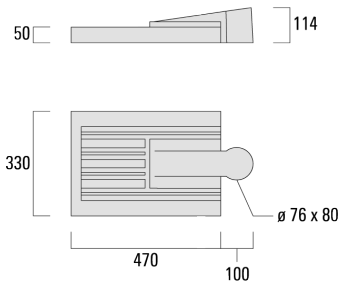
Rated Input Power	27 W
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VFL530 LED



108-1556

2/6



Material Specification

Body:	Marine-grade, die-cast aluminium alloy
Weight (kg):	6.60
Lens:	RFC® Reflection Free Contour technology
Gasket:	Silicone CCG® Controlled Compression Gasket
Fasteners:	PCS Polymer Coated Stainless Steel Hardware
Ingress protection:	IP66
Impact protection:	IK08
Corrosion protection:	5CE
Surge protection:	6/6 kV (optional SP10)
Finish:	Powdercoat finish in RAL7016, RAL9004, RAL9006, RAL9007 and RAL9016
Windage (EPA):	0.04 m²

Electrical Specification

Power supply:	220-240V / 50-60 Hz
Power factor:	> 0.9
Ballast:	Integral EC electronic converter

Lifetime

LED >60,000 h Ta 25°(L70/B10) Control gear >50,000 h Ta 25°

PFL230 LED

108-1729

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Description

IP66, Class I. IK08. Marine-grade die-cast aluminium alloy. 5CE superior corrosion protection including PCS hardware. Silicone rubber gaskets. Safety glass lens, hinged. PMMA OLC® optics for superior illumination and glare control.

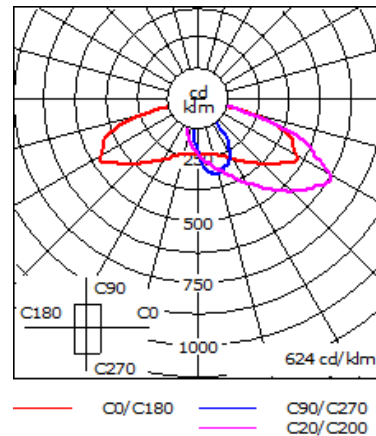
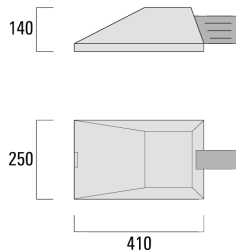
Beam Type	asymmetric, side-throw beam [P65]
Lamp Type	LED-18/36W / 700 mA - 3000 K
CRI	80
Gear Type	EC
Nominal Luminous Flux (lm)	
LED Lumens	245.9 lm
LEDs	18
Total Lumens	4427 lm
Tj	85 °C
Rated Luminous Flux (lm)	
LED Lumens	186.2 lm
Total Lumens	3351.7 lm
Ta	25 °C
Rated Input Power	43 W

PFL230 LED

108-1729

2/12

we-ef



Material Specification

Body:	Marine-grade, die-cast aluminium alloy
Weight (kg):	10.00
Lens:	Safety glass lens, hinged
Gasket:	Silicone CCG® Controlled Compression Gasket
Fasteners:	PCS Polymer Coated Stainless Steel Hardware (unpainted)
Ingress protection:	IP66
Impact protection:	IK08
Corrosion protection:	5CE. 5CE+Primer optional
Surge protection:	In-pole surge protection SP10 device supplied, dimensions 58x90x18mm (note: dimensions for dimmable versions may vary). Please refer to WE-EF installation instructions for details. Integral surge protection on request.
Finish:	Powdercoat finish in black RAL9004, grey aluminium RAL9007, white aluminium RAL9006 or white RAL9016

Electrical Specification

Power supply:	230V / 50 Hz
Power factor:	> 0.9
Ballast:	Integral EC electronic converter
Cable:	Pre-wired with 6 m cable in standard

Lifetime

LED >60,000 h Ta 25°(L70/B10) Control gear >50,000 h Ta 25°

Warranty

The product is supplied with 10-year warranty. Please refer to the LED Warranty Statement located on www.we-ef.com for further details.