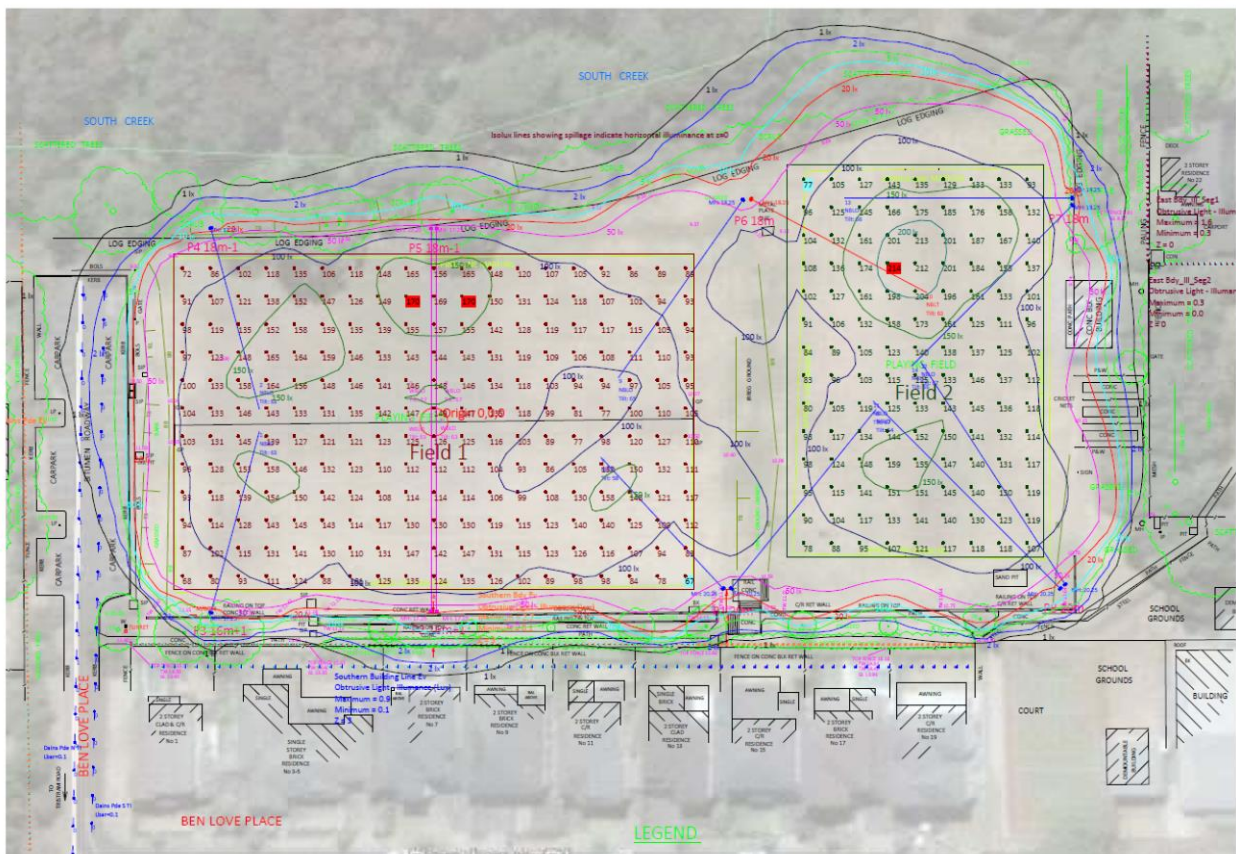


TECHNICAL REPORT DRAFT

7/3/2018

Tristram Reserve, Beacon Hill Sports Field Lighting Upgrade

Northern Beaches Council



Prepared by John Hellyar

2. Design Brief and Australian Standards

This lighting design is based on lighting levels required for illuminating two proposed playing fields set out to 100 lux club competition and with the option to dim (DALI) to 50lux training and individually illuminate each field at club competition(100lux) and match practice(50lux) (amateur level).

- AS2560.2.3-2007, Lighting for Football (all Codes)
- AS4282-1997, Control of the Obtrusive Effects of Outdoor Lighting

AS2560.2.3-2007:

The specification required lighting levels of 100 lux and 50 lux, maintained average, over the field of play.

Australian Standard, 2560.2.3-2007, table 1, specifies two levels of play for Football; namely, amateur - club competition and match practice (100 lux), amateur - ball and physical training (50 lux).

This lighting proposal is designed to achieve a Maintained Average of 100lux and 50lux, with uniformities to suit amateur levels of play.

Uniformity Ratio's – AS2560.2.3:2007, Amateur Level of Play:

100lux

- Minimum Horizontal Uniformity (Min /Avg) - 0.50
- Minimum Horizontal Uniformity (Min /Max) - 0.30

50lux

- Minimum Horizontal Uniformity (Min /Avg) - 0.30
- Minimum Horizontal Uniformity (Min /Max) - N/A

AS4282-1997:

Listed below are the essential lighting parameters that must be met to satisfy the requirements of the Obtrusive Light Standard AS4282- 1997.

- Maximum vertical illuminance at a residential boundary at the relevant height of the effected dwelling is 10 lux. Generally, this is measured from 1m above ground level to a maximum height of 10 m.

Light technical parameter Obtrusive Light – 100lux Tristram				
Below are the values of spill light around the greatest effected area's				
Description Levels	Calculated Max	Calculated Avg	Specified	Results
7 Ben Love Pl	2.7 lux	N/A	10 lux	Complies
9 Ben Love Pl	2.1 lux	N/A	10 lux	Complies
22 Egan Pl	1.5 lux	N/A	10 lux	Complies

Table 1 Lighting Criteria AS2560.2.3-2007

Level of Play	Maintained average horizontal illuminance lux	Minimum horizontal uniformities	
		Min / Avg	Min / Max
Recreational level			
Touch and tag	50	0.3	n/a
Amateur level			
Ball and physical training	50	0.3	n/a
Club competition and match practice	100	0.5	0.3
Semi-professional level			
Ball and physical training	50	0.3	n/a
Match practice	100	0.5	0.3
Semi-professional competition	200	0.6	0.4
Professional Level			
Ball and physical training	100	0.5	0.3
Match practice	200	0.6	0.4
Professional competition	500	0.7	0.5

9. Report Summary

The following is a summary of the information and calculations provided throughout the report.

- The Philips OptiVision LED BVP525 NB & WB with internal louvers to minimise spill has been proposed for the sports lighting upgrade at Tristram.
- A total of 14x floodlights are required for the 100 lux. These are spread over 2x 16m, 4x18m and 2x 20m poles, with 1-2x floodlights per pole.
- All the Dali dimming modes achieve the required lighting levels and uniformity ratios as set out in AS2560.2.3-2007.
- Pole heights of 16m, 18m and 20m achieve the required lighting parameters in accordance with AS2560.2.3-2007. These locations are based on the recommendations from AS2560.2.3-2007.
- Spill light complies with the residential parameters of AS4282-1997 assuming pre-curfew conditions.
- Luminous Intensity has been achieved for Level 1 control. Level 1 control being the strictest form of control for luminous intensity.

11. Glossary of Technical Terms

Below is a brief description of the codes, terminology and how they relate to this project.

AS2560.2.3-2007 Sports Lighting, Part 2.3:Lighting for football (all codes)

This code sets out recommendations for minimum lighting requirements for different sporting codes. As different sporting codes vary, so too does the requirements and level of lighting. Using different size balls (baseball – football), played at different heights and speeds (AFL- hockey), varying amounts of contact (rugby – tennis) and at different levels (amateur to professional).

The code, as it relates to this project quantifies the minimum amount of:

Average Horizontal illuminance:

The average lighting levels over the playing surface calculated at ground level. This is calculated at 5 m intervals over the playing area and is quantified in lux.

Uniformity:

An optimal floodlighting installation would have a totally even spread of light over the entire playing surface, with no variation in lighting levels. This would equate to a uniformity of 1. The poorest of floodlighting installations have high concentrations of light in one area, with low levels of light in others. As an example, this could be in the range of 0.1 or lower.

Uniformity Min/Max:

This is the ratio of the minimum lighting level on the playing field to the maximum lighting level on the playing field. A higher figure corresponds to a higher quality of light distribution. The code sets out a minimum of 0.3 (max of 70% difference) at 100 lux.

Uniformity Min/Avg:

This is the ratio of the minimum lighting level on the playing field to the average lighting level on the playing field. A higher figure corresponds to a higher quality of light distribution. The code sets out a minimum of 0.5 (max of 50% difference) at 100 lux.

AS4282-1997 Control of obtrusive effects of outdoor lighting:

Essentially, this code sets out minimum requirements that must be met for the control of light outside the boundaries of the property in which the floodlighting is installed. The code, as it relates to this project quantifies the maximum amount of:

Spill light permissible to a residential boundary:

10 lux vertical at the property boundary at a relevant height.

Maximum threshold increment:

The effects the floodlighting has on adjacent roads (disability glare to motorists). Higher values equal greater disability. The maximum threshold increment as per the code is 20%.

Maximum luminous intensity:

Essentially, this relates to the direct view of bright luminaires from normal viewing directions causing annoyance, distraction or discomfort. Most people would term this "glare". This is measured in Candela's, and as it pertains to this project, Level 1 control is set at a maximum of 7,500 Candela's in the control direction.