

LIGHTING ANALYSIS & DESIGN

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A Brief Response to the Proposed Cobbora Coal Environmental Assessment Project Application Number 10_0001

By Reginald Wilson trading as Lighting Analysis & Design

Introduction

This office has been actively promoting good outdoor lighting practice with emphasis of preserving the night sky by reducing light pollution for many years. This action also reduces energy waste and through elimination of glare and light trespass improves health and increases safety. Glaring and waste upward light also has a detrimental effect on the astronomical observations at the Siding Spring Observatory situated to the North of the proposed mine..

Mitigating Light Pollution

This proposed project is supported by this office providing that maximum attention is given to the design of all artificial lighting being installed for a 24x7 operation is carefully designed to meet approved reduction of light pollution. One of the main requirements is already required by the State Planning Department in that all luminaires (lighting fittings) installed in mining operations must have full cut off (FCO) light distribution. This type of luminaire used in floodlighting etc is not a new design and can be seen at a number of recent sports lighting installations in this local government area. Not just floodlighting should be FCO but all exterior lights must have this characteristic. Where practical vehicles should have their headlamps on "dip" beam especially when driving in the direction of the Observatory ie North.

In Coonabarabran Ovals No. 1 and No.3 are excellent examples as is Victoria Park Oval in Dubbo. Tennis court lighting in Tooraweenah (quite close to the Observatory), Dubbo and Coonabarabran are also extremely good examples of full cut off floodlighting. To assist in understanding what such installations look like and their effect at night several photographs are attached. These show that with careful luminaire selection, detailed design and installation light pollution can be reduced dramatically.

It should be mentioned that in using sports lighting as an example it will be noted that "white light" is employed. Unfortunately the lamps which provide this colour of light also emit a quantity of blue light, which has a adverse effect on astronomical observations and for an "all night" operation instead of just a few hours the colour quality of light on this project must have a minimum of blue light such as high pressure sodium (HPS) which produce a warm yellowish light'. If LEDs are being considered as a prime light source it should be noted that special amber coloured "chips" are available.. This is mentioned as current "white" LEDs emit large quantities of blue light which, as mentioned above, has a negative effect for the Observatory..

It has probably been drawn to your attention that dust from mining operations and on roadways can cause problems for the Observatory. Dust can present problems especially where it originates from light coloured overburden being worked in that it causes a considerable amount of reflected light into the night sky where it occurs in the beam of floodlights. Hence efforts to keep dust generation to a minimum is important.

Control of Light Pollution by installing Full Cut-Off Luminaires for Sports Lighting.

The following photographs show how the correct application of luminaires with FCO light distribution can most effectively increase efficiency by only lighting areas as required with no waste light. In Industrial applications this system can increase safety as well as reducing light pollution generally. Sports lighting has been selected to illustrate this method of exterior lighting as application is more readily understood than possible industrial applications

Photo 1 This is Oval #3 at Coonabarabran as originally lit by general purpose floodlighting luminaires with a minimum of light control. The waste light from this installation was enough to show a shadow on the dome of the Anglo Australian Telescope at Siding Spring Observatory (20km away).

Photo 2 The same oval with new FCO luminaires using similar power (2000W) to the original but with new poles. Note virtually no glare from the luminaires and strict control of light outside of the oval fence. The large "light" in the photo is from the Moon under a fine cloud...

Photo 3 Oval #1_ Also in Coonabarabran but is larger than Oval #3 and is lit for competition play with 3 times the number of luminaires. Note the light being directed down with no direct up light. This installation has switching to reduce the lighting for club play and training.

Photo 4 .This is the head frame for a pole in Oval #1 showing all FCO luminaires all carefully designed and aimed to just light the oval area.

Photo 5 Coonabarabran Tennis Courts in the Shire Sports Complex. Note the lighting is restricted to just illuminate the Courts and not outside of the playing area. This point is important as the area is immediately adjacent to the Newell Highway.

Photo 6 A general picture of the Courts Note that the lighting is restricted just the inside of the fence line and that there is no glare from the FCO luminaires.

Photo 7 This a headframe for one of the poles at Dubbo's Victoria Park Oval..This installation is designed to allow play for Colour TV. Note the lack of glare and nil upward light. from the 2000W FCO luminaires.

Photo 8 In Dubbo – looking across Darling Street towards Victoria Park with all of the sports lighting switched on. Note the total lack of glare from three of the 4 large headframes (less than the HPS street lighting luminaire in the centre of the photo).

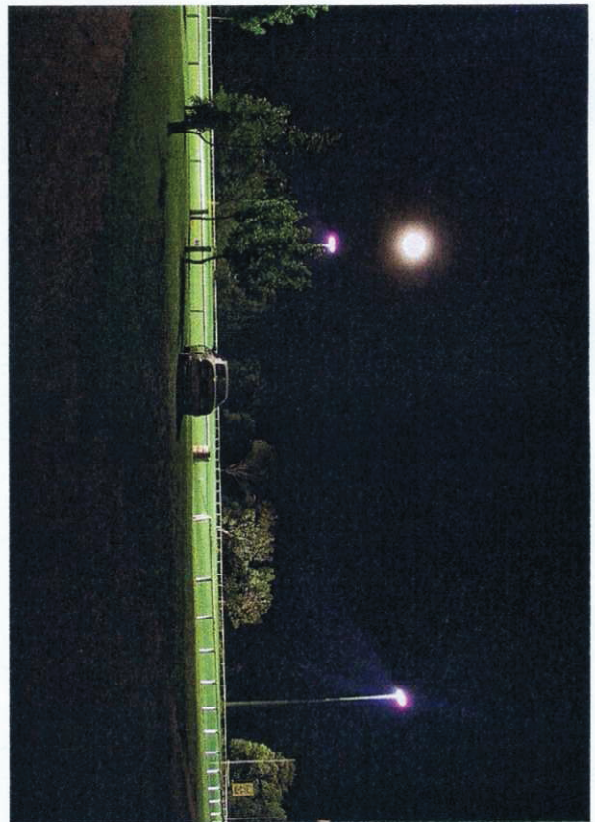
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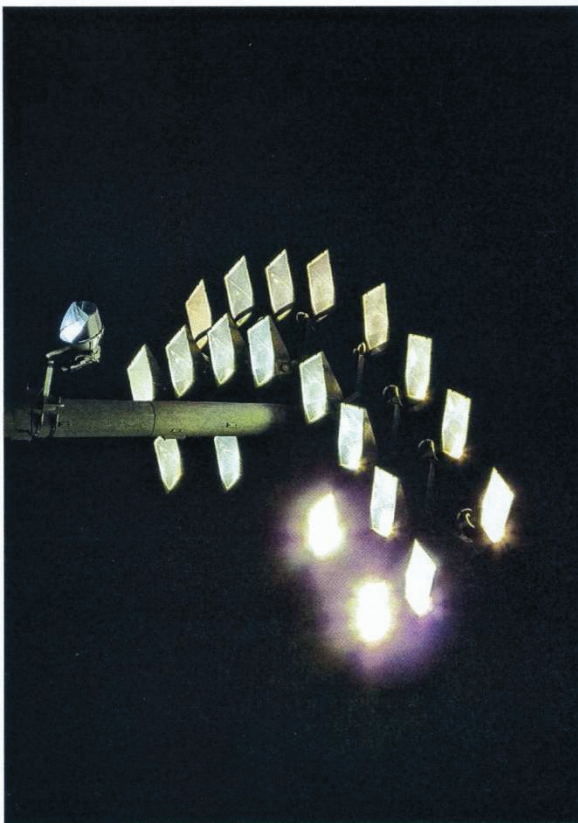
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