

City of Geraldton-Greenough

WONTHELLA OVAL LIGHTING PROJECT

DRAFT REPORT
May 2010



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1 EXECUTIVE SUMMARY

Introduction

The City of Geraldton-Greenough (CGG) engaged A Balanced View (ABV) Leisure Consultancy Services to conduct the “Wonthella Oval Lighting Project.”

A need has been identified for a lit multi-purpose outdoor venue that is capable of hosting State and National level competitions in various sports and enhance the City’s capacity to hold large community events.

The aim of this Project is to undertake necessary consultation, research and analysis to allow the City to make an informed decision on the appropriate lighting infrastructure for Wonthella Oval.

This report analyses three lighting infrastructure options and selects a preferred option that best meets the requirements of the City of Geraldton-Greenough.

Background

Wonthella Oval is the main football and cricket ground in Geraldton and is also used for concerts, festivals and various other special events. It is the principle ground used for football finals and has also hosted State and international cricket matches. It is also used for major regional carnivals.

Lighting of the oval was identified as a priority in the Geraldton Greenough Sporting Facilities Master Plan (2005).

The CGG wishes to enhance Wonthella Oval by way of the provision of competition standard lighting for football, cricket and potentially various other night time sports, with potential to hold major events such as preseason AFL matches.

In terms of community acceptance of lighting, several facilities in Eighth Street are already used extensively at night, therefore, residents are familiar with night time sporting activity in the precinct. The alternative site considered for lighting upgrade, the Recreation Ground, is not preferred as it is surrounded by residential properties, is a lower priority in the future GNFL plans and has parking limitations.

Consultation

Consultation with potential user groups reveals that the lighting would be primarily used for Australian rules football for regular training and competition. The lights would also be used for cricket games during the summer.

At a national level, there is potential the AFL could schedule preseason games under lights at the Oval if Australian Standards for professional football are met. The WAFC has indicated strong support for holding preseason AFL matches in Geraldton if adequate lighting is provided. Perth Glory (Soccer) and Western Force (Rugby) are unlikely to play any games under lights in Geraldton. The Hyundai A League Soccer pre-season is held in winter and does not require lights to host a match in Geraldton, and the Western Force are contracted to play all games in Perth.

There is no Australian Standard for lighting for cricket and the WACA has been unable to comment on the likelihood of a high level cricket match being held at Geraldton under lights. Consultation with the Greater Shepparton City Council however, reveals they hosted a high level cricket match featuring a number of Australian players on an oval lit to 500 lux.

Relevant Standards

Two sources of lighting standards have been utilised as the basis of the three lighting options that have been developed. They are the Australian Standards and the Abacus Sports Lighting Solutions standards published on:

<http://www.lighting4sport.com/sportlighting.asp?sport=sn07>

The relevant Australian Standards for this project are AS2560.1-2002, AS2560.2.3-2007, AS2560.2.6-1994, AS2560.2.6-1994/Amdt 1-1994, and AS4282-1997. They cover all football codes and diamond sports. Notably, Australian Standards does not cover cricket lighting requirements.

Cricket lighting requirements are covered in the standards published on the Abacus Sports Lighting Solutions website. These standards are used by Cricket NSW to guide their lighting requirement specifications.

ABV has utilised the Australian Standards and Abacus Standards combined to formulate three lighting options that meet the needs of various levels of cricket and football competition on a shared oval.

Lighting Options

These options are considered the most rational levels of flood lighting for the purpose of developing Wonthella Oval as a regional venue for major sporting and community events. They are as follows:

Lighting Option	Area	Intensity	Uniformity
Option 1 300/250	Wicket Area	300 lux	0.9
	Outfield/Full Oval	250 lux	0.7
Option 2 500/500	Wicket Area	500 lux	0.9
	Outfield/Full Oval	500 lux	0.7
Option 3 750/500	Wicket Area	750 lux	0.9
	Outfield/Full Oval	500 lux	0.7

Option 1 provides lighting for a low level cricket competition and high grade football competition (all codes) to a semi-professional standard.

Option 2 provides lighting for high grade community cricket competition, and professional level football competition such as AFL preseason games (non televised)

Option 3 provides lighting for professional level cricket competition (non televised) and professional level football competition (non televised).

Each of the three Options would enhance the City's ability to host community events such as festivals and circuses through the provision of high level lighting and access to three phase power outlets.

Option 3 is the preferred option as it is in keeping with the needs identified by the City of Geraldton-Greenough for a regional multi-purpose venue capable of hosting high level sporting matches and community events.

Financial Analysis

Cost Estimates

The cost estimates for the three options have been provided with both 38m and 50m pole heights. They are as follows:

Lighting Option	38m Pole Height	50m Pole Height
Option 1 300/250	\$1,465,000	\$1,545,000
Option 2 500/500	\$1,520,000	\$1,600,000
Option 3 750/500	\$1,590,000	\$1,670,000

These costings show that there is minimal difference between Options 1 – 3, and between 38m and 50m poles. The 50m pole height is preferred because it not only meets all Australian Standard requirements, it also meets the professional competition *recommendations* (i.e. not a strict requirement).

Due to the low cost difference between Options 1 – 3, there is little value in installing Option 1 or 2 and then upgrading to Option 3 at a later date (with higher costs in doing so at a later date).

Life Cycle Costing

Over the course of a 25 year period, the total lifecycle cost of the proposed Wonthella Oval lighting system (Option 3, 50m pole) is \$1,734,500. This includes bulb replacement and cleaning costs.

This equates to approximately \$224 per hour of use, based on an estimated 310 hrs use per year.

Electricity use charges depends on the light setting used and ranges from \$7.60 per hour for the 50 lux full field setting, to \$65.15 p/h for the full 750/500 lux setting.

With the recent trend of substantial electricity price increases continuing, it seems unlikely the community sporting groups will be willing to pay much more than the cost of the electricity to utilise the lights.

Potential income from large events such as preseason AFL games could be expected to be offset by the costs of preparing the grounds and repatriation afterwards, however, significant indirect economic benefits to the wider community could be anticipated.

Recommendations

It is recommended that the City of Geraldton – Greenough:

- 1. Receive the draft Wonthella Lighting Project report.**
- 2. Consider the lighting options listed within this report, noting Option 3 with 50m poles as the preferred lighting development option which will significantly enhance Wonthella Oval's role as a regional multi-purpose sporting and community facility for the Mid West region.**
- 3. Seek funding from relevant funding agencies including the Department of Sport and Recreation and the Mid West Development Commission to assist with the capital costs of the proposed lighting system development.**

2 INTRODUCTION

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3 BACKGROUND

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4 DEMOGRAPHIC REVIEW

The demographic summary of the City of Geraldton – Greenough and WA reveals a number of differences in key social indicators.

Geraldton / Greenough Demographic Summary

	Geraldton*	Greenough*	WA
Population	18,916	14,036	1,959,086
Median age	36.2	34.3	36.2
Median Household Income (Gross Weekly)	\$650 - \$799	\$1,000 – \$1,199	\$1,000 - \$1,199
Born Overseas	11.4 %	11.7 %	27 %
Median Household Size	2.7	3.2	2.8
Index of Socio-Economic Advantage and Disadvantage	Percentile Ranking 21 [#]	Percentile Ranking 82 [#]	50

Source: Australian Bureau of Statistics, Census of Population and Housing, 2006
Australian Bureau of Statistics, Regional Population Growth 2005/2006 (cat no. 3218.0)

* LGA statistical area prior to merger

[#] Compared to other West Australian LGA's, Geraldton ranks in the 52st percentile and Greenough in the 82nd (1 being the lowest, 100 being the highest).

The following observations can be made:

- Geraldton has a similar median age and median household size to the WA average, whilst Greenough's population is 1.9 years younger.
- Geraldton's median household income is significantly lower than that of the Greenough and WA average.
- Geraldton and Greenough have a significant smaller proportion of persons born overseas.
- Geraldton has a low ranking in the Index of Socio-Economic Advantage and Disadvantage whilst Greenough has a high ranking. This indicates that in general, Greenough residents are significantly more affluent than Geraldton residents. This is supported by the median household income statistics.

(Adapted from Eadon Clarke Reserve Sport and Recreation Facilities Master Plan, ABV, City of Geraldton – Greenough, June 2008).

Population Projection

The population of the City of Geraldton–Greenough (CGG) at the time of the 2006 Census was 33,000. The population is expected to grow to approximately 50,000 by 2015 due to the resources boom bringing workers and their families to the region (GIOA, 2007). This is supported by the number of new residential lots planned and currently being developed, and could potentially be considered conservative. Since 2007, several new large iron ore and other mining projects have started that have the potential for many thousands of additional workers and their families to the area.

Assuming that the population growth is evenly spread during the period between 2006 – 2015 the population can be expected to grow according to the following table:

City of Geraldton-Greenough Population Growth 2006 - 2015

	2006	2009	2012	2015	Growth
Geraldton-Greenough	33,000	38,650	44,300	50,000	52%

Source: Geraldton Iron Ore Alliance. *Mining expansion in the Mid-West: Economic and Social Benefits*. Available www.gioa.com.au [viewed 3/07/2007].
City of Geraldton – Greenough Officers.

Beyond 2015, the CGG has potential to grow much larger. In a media statement from CGG released September 29, 2009, *Geraldton – a new regional metropolis*, Tony Brun, Chief Executive Officer of CGG states that he believes that “Geraldton is on the cusp of a major transformation.” Tony Brun believes Geraldton is well placed to become a regional super city to help accommodate the major population growth Western Australia is expected to have over the next few decades.

The new residential developments that will attract the projected population increase within the City of Geraldton-Greenough is likely to attract more families with young children, the typical demographic type that is attracted to new developing areas. Therefore, future planning should consider that an increased proportion of young adults and young children will be represented in the Geraldton-Greenough area.

(Adapted from Eadon Clarke Reserve Sport and Recreation Facilities Master Plan, ABV, City of Geraldton – Greenough, June 2008)

5 RELEVANT INDUSTRY TRENDS

There are a number of key trends in the leisure industry that are pertinent to the Wonthella Oval Lighting Project. These include societal, participation and facilities trends. The key trends listed below have been identified in the most recent sport and recreation facilities master plans being: Geraldton Greenough Sporting Facilities Master Plan 2005, Eight Street Sporting Precinct Master Plan 2007 and the Eadon Clarke Reserve Sport and Recreation Facilities Master Plan 2008; and more recent trends research conducted by ABV.

5.1 Societal

- The structure of the labour force is changing, with more women in the workforce. There is also a changing trend that many of these women and indeed the entire workforce are employed in part time and casual employment¹.
- The concept of the five day working week is gradually changing with more people either required to or opting to work a six or seven day week. In Geraldton, a large proportion of the workforce is employed in shift work in the mining industry.
- Australian society has become convenience orientated. People want the flexibility to do things at their convenience.

With changes in working hours, Australians will increasingly want to participate in sport and recreation activities outside of the traditional times. For example, weeknight competition may become an increasingly popular option for people who are required to work on weekends. Lit sporting facilities will be required to accommodate this trend.

¹Trends in Sport and Recreation, Recreation Planning Framework for North West Tasmania, June 2001.

5.2 Participation

Adult Physical Activity Participation

Research over the past five to ten years indicates that Australians are gradually lifting their physical activity levels. This correlates with the strong emphasis government and health organisations have placed on increasing physical activity levels as a means for reducing the obesity and its related illnesses.

The Exercise, Recreation and Sport Survey (ERASS) has been conducted by the Standing Committee on Recreation and Sport, Australian Government, annually since 2001, with the 2008 report being the latest release. ERASS collects information from persons aged 15 and over.

Key findings from organised and club based physical activity are provided below.

Organised Physical Activity

- The regular participation rate for organised physical activity was 12.1% in 2008 having increased by almost 30% from 2001 (9.4%).
- On average men and women are equally likely to participate in regular organised physical activity.
- Regular participation in organised physical activity is highest amongst the 15-24 year olds. Male participation tends to decline with age, however female participation stays relatively the same in the 25+ age groups.

Club Based Physical Activity

- The regular participation rate for club based physical activity was 6.3% in 2008.
- Between 2001 and 2008 participation increased by over 30% from 4.8% to 6.3% of the population.
- 15 – 24 year olds had the highest regular participation in club based activities.
- The strongest increases in total participation have been Australian rules (39%), soccer (35%) and outdoor cricket (28%) over the 2001-2008 period. These increases in club based physical activity correspond with increased in organised participation as reported on the previous page.

These statistics provide further supporting evidence that total participation in key sports that utilise floodlighting for night training and games are likely to increase as the CGG population grows.

Note: in the recently released Future of Sport in Australia report¹ (Crawford report) by the Australian Government, the author is of the view that ‘mainstream’ sports should be prioritised for funding over lesser known sports to achieve maximum participation results from public expenditure. If future Federal Government funding reflects this view, then the mainstream sports that would likely utilise floodlighting at Wonthella Oval would benefit.

¹Independent Sport Panel (2009). *The Future of Sport in Australia*. Commonwealth of Australia, Canberra.

Children’s Physical Activity Participation

The Children’s Participation in Cultural and Leisure Activities report (ABS, Cat. 4901.0, April 2009) measured the participations rates of children aged 5-14 years across a variety of cultural and leisure activities.

The study found that organised sport participation has increased slightly amongst both boys and girls from 59% in 2000 to 63% in 2009. This rate has remained steady since 2003. Boys recorded higher organised sport participation (70%) than girls (56%). 30% of children played two or more organised sports during the 12 month period.

Outdoor soccer remains the most popular organised sport for boys with a participation rate of 19.9% remaining consistent over the survey period. Girls’ participation in soccer more than doubled.

Boys’ participation in Australian Rules football has recorded a strong increase of 27% between 2000 and 2009 whilst cricket has remained relatively the same.

These statistics show that national children’s participation in the key field sports relevant to this project are steady or growing including football, soccer, rugby union and cricket. Lighting benefits children’s participation by increasing the hours available for training and games. Week night competitions are becoming more popular in Perth due to increasing lighting availability. In warmer climates, lighting assists in getting kids out of the summer sun.

5.3 Facilities

ABV note the following trends from research conducted across numerous sport and recreation facility projects.

- There are increasing demands for improved sports and recreational facilities including those that are able to host national and international events.
- Joint provision and shared use of facilities continue to remain an important and necessary aspect for facility development and viability.
- Community needs are constantly changing resulting in the requirement of more flexible facility design.
- Participants have an expectation that recreation facilities will be developed and equipped to a reasonably high quality.
- Optimum use of facilities is necessary to cover increased capital costs and scarce resources.
- Australia has the highest incidence of skin cancer in the world with skin cancer being the most common form of cancer in Australia¹. Leisure providers have a responsibility to provide services and facilities that support this health concern. ABV notes a trend Local Government Authorities north of Perth reviewing lighting provision with a view to enabling a greater proportion of participation to occur out of the hot sun.

These facilities trends indicate a need for improved levels of floodlighting will be required as more emphasis is placed on high quality, flexible facility design. Floodlighting that caters for multiple sports enabling a high standard of competition as well as regular community use will become increasingly sought after.

¹Trends for Sport and Recreation, Department of Sport and Recreation, December 2003.

6 CURRENT FLOODLIGHTING AVAILABILITY

The table below provides an overview of the current floodlighting infrastructure available in the City of Geraldton – Greenough.

City of Geraldton – Greenough Floodlighting Infrastructure

Sporting Fields	Lighting
Eadon Clarke (Brigades Oval)	Training level lighting, two poles (AFL)
Hockey Grounds, Wonthella	Competition level lighting on both synthetics, 6 poles each (Hockey)
La Fiamma Soccer/Athletics Field	Competition level lighting for internal soccer field only, 6 poles. (Soccer)
La Fiamma Soccer Main Pitch	Competition level lighting, 4 poles (Soccer)
Recreation Ground	No light poles. Two small training lights mounted on grandstand (AFL)
Utakarra Ball Park	Competition level lighting, 6 poles (Softball/Tball)
Wonthella Oval	No poles. Two small training lights mounted on grandstand. (AFL)
Alexander Park	Training level lighting, 4 poles (Soccer)
Greenough Oval	Training level lighting, 3 poles (AFL)

Source: City of Geraldton – Greenough

The information provided in the table above reveals there is no competition level floodlighting for Australian rules football in Geraldton, despite the sport having one of the highest participation rates. Furthermore, the level of lighting at each of the AFL grounds are unlikely to meet current Australian Standards for community level training.

There are three lit soccer fields, however the Midwest Soccer Association reports that the lighting on the main pitch at La Fiamma is only suitable for training, whilst Alexander Park is used for some night games. The secondary field at La Fiamma is suitable for games also.

There are no options for semi-professional or professional football (all codes) nor are there any options for night cricket in Geraldton.

Eadon Clark Reserve Proposed Lighting Upgrade

There are significant lighting upgrades proposed for Eadon Clarke Reserve as part of the overall facility developments. The Brigades Oval is proposed to be lit to 200-250 lux and four soccer/touch fields are proposed to be lit to 100-150 lux. The lighting upgrade is likely to be a latter stage project to occur around 2011/12. Confirmation of funding is required from the State Government Royalties for Regions Program and the Federal Government Regional and Local Community Infrastructure Program.

These proposed Eadon Clarke lighting upgrades will significantly enhance night time game/training opportunities for community level large ball sports, however cricket and professional level football needs will not be met.

7 CONSULTATION

Extensive consultation was undertaken for this Master Plan that included input from City staff, community sporting groups and associations, State sporting associations and industry professionals. The detailed Consultation document can be seen as Appendix 2 to this report. The Consultation document highlights the following key issues:

- Football would likely be the predominant regular user of floodlighting at Wonthella Oval using the lighting for both training and regular games. Cricket would also use the Oval for some night games.
- Both football and cricket would benefit from enhanced scheduling flexibility including week night competition. Cricket also expects to benefit from the novelty factor of playing at night, and may attract older players who do not like playing during hot days.
- Soccer is unlikely to utilise lighting at Wonthella Oval as they have their own lit grounds.
- Touch Football may seek to use the lighting until Eadon Clarke Reserve lights are developed.
- 500 lux lighting designed to Australian Standards for professional football would be adequate for the AFL to schedule a night preseason match at Wonthella Oval. The WAFC would be strongly supportive of preseason games being held in Geraldton if adequate lighting is provided.
- Perth Glory (Soccer) would not hold a preseason match under non televised standard lighting, however, as their preseason occurs during the winter it would not be necessary for a preseason game in Geraldton to be held at night time.
- The Western Force Rugby Football Club are contracted to play all their preseason games at ME Bank Stadium, and thus could not schedule a game at Geraldton regardless of the lighting levels. Australian Standards for professional football would suffice if it were ever to occur in the future.
- The full Australian Standards for baseball lighting cannot be achieved on a football/cricket oval. Low grade baseball could be played on a well lit oval, however serious baseball competition would be restricted to a dedicated field with baseball specific lighting.
- WACA does not have any specifications for night cricket lighting and there is no Australian Standard for Cricket. Cricket Victoria, QLD and NT do not have specifications either. Cricket NSW recommends the Class II standard (500 lux wicket area, 300 lux outfield) published on the Abacus website <http://www.lighting4sport.com/sportlighting.asp?sport=sn07>

8 COMPARATIVE ANALYSIS

This Study has researched other Local Government Authorities in WA and Australia that have ovals with lighting sufficient for high level football competition and play or have the potential for small ball sports (with similar sized populations in regional locations). There were few examples of such locations with ovals lit for regular community cricket competition. One Victorian and two West Australian Local Government Authorities were identified, the findings are detailed below.

Shire of Broome

Rod McGrath reports that Broome has one oval lit to 500 lux, Father McMahon's Sports Field and caters for Australian rules, soccer and touch football. It does not currently have small ball sports played on it.

The local cricket association is seeking to have a concrete wicket installed however there are issues surrounding this proposal as other user groups such as soccer and football are opposed to it due to safety issues, and the cricket association may not have the finances to afford to pay for full use of the lighting at the current Shire fees. A further complication for cricket is that a concrete wicket would also need to be removed prior to a preseason AFL match being played there and replaced afterwards.

Current fees for the lighting of grounds are \$55 per hour for 250 lux and \$110 per hour for 500 lux. This pricing is intended to cover the costs of electricity, relamping and associated maintenance. Actual cost recovery is unknown as the electricity is not separately metered for the light towers.

The Shire has collected \$13,500 for the 2009/10 financial YTD (May 11) and expects to raise approximately \$14,500 by the end of the financial year. This equates to approximate 260 hours of use per annum.

Football uses the lights (250 lux) for 1hr training 3 nights per week and 2.5 hours for games every second week. Touch football uses the lights (250 lux) for 2.5 hours one night per week during the winter season and the first part of the summer season ending in December.

Almost all light usage is at 250 lux as this is more than sufficient for local competition. There is no option for lower levels of lighting which is seen as one of the deficiencies.

Shire of Roebourne

The Shire of Roebourne has three ovals lit to 250 lux. Jenni Brown, Manager Community Facilities at the Shire reports that football, cricket, softball, rugby and touch rugby are regularly played on the Bulgarra and Millers Well ovals.

All sports are played at night (including cricket and softball) due to the excessive temperatures experienced during the day.

The softball and cricket user groups are generally quite happy with the level of lighting and have not reported any issues regarding insufficient lighting or otherwise.

The Bulgarra and Roebourne ovals have 3 phase power outlets installed on some poles to provide for heavy duty equipment used during concerts and events. The outlets have been placed high up on the pole so they are not easily accessible (due to vandalism concerns).

The use of a token system has increased the amount of income collected by the Shire compared to the previous honour system. The token system is very simple to use, and requires payment prior to use. It is less expensive to install compared to other systems.

The only drawbacks to the token system the Shire has found are that the tokens that are available may not provide the club with the exact amount of time they require, i.e. a club may only wish to train for 45 minutes but must purchase a 1hr token, and also that there are times when two clubs wish to train at the same time – the clubs must organise between themselves to share the cost of the token. These are only relatively minor problems and overall Jenni reports that the token system works very well.

The Shire previously had a touch screen/pin code system for Bulgarra Oval however this was prone to occasionally failing to work which was frustrating for user groups, and it was easily vandalised (possibly out of frustration from a user for failing to work) and very expensive to replace.

The Shire charges \$12 for a small token and \$36 for a large token. The small token purchases 20 mins of lighting time and the large token purchases 1hr of full lighting. In 2008/09 the Shire received a lighting fee income of approximately \$10,000 each from the Bulgarra and Millars Well ovals. Total cost recovery % is unknown. Some ovals have partial lighting options (for training) and the tokens will generally last twice as long if these options are chosen. Approximately 70% of usage is with full lights and 30% with partial lights.

Greater City of Shepparton

Shepparton is located 180km north of Melbourne and has a population of 60,000, therefore bearing some similarity to the City of Geraldton-Greenough.

Brendan Gosstray, Manager Recreation and Parks advises the City installed a 500 lux system on Deakin Reserve in early in 2008 at a total cost of \$440,000. The infrastructure consists of 4 x 33m towers each with 20 x 2kw light fittings. The oval is relatively short at 155m in length, and is 133m wide. The City received \$250,000 from the State Government and promised gate takings for two pre-season AFL matches held in 2008 and 2009. The resident cricket and football clubs also made a contribution.

The City maintains control of the lighting system, with user groups making bookings based on estimated hours of use and lighting level sought. Key locks have been placed on each level of lighting to guard against user groups using a higher level of illumination than booked.

An hourly rate is charged for each lighting level booked. The charge is determined by the current cost of power consumption per hour, and estimated proportion of annual service fees and the cost of future lamp replacement after 1000 hours of operation.

Organisations that have not provided capital funds to the construction of the lights are charged an additional \$15 per hour as a levy to accommodate reactive maintenance and to ensure an adequate reserve of funds to contribute to future upgrades or enhancements.

Hourly Rates as at October 1 2008

Standard	Level	Foundation Groups*	Other Groups
Training	100 lux	\$13.30/hour	\$28.30/hour
Competition	200 lux	\$ 26.00/hour	\$41.00/hour
Professional	500 lux	\$66.50/hour	\$81.50/hour

* Foundation Groups – those groups who committed capital funds to lighting system

Source: Deakin Reserve AFL Floodlighting Project, Greater City of Shepparton, 2008.

In March 2008 Deakin Reserve hosted a preseason AFL match and the Crusty Demons motocross stunt group attracting approximately 16,500 persons. The City's Economic Department estimates these events provided an indirect economic benefit of \$850,000.

It is expected that the availability of the new lights will see one to two major events each year that will be expected to provide significant economic activity for the region.

The Shepparton Cricket Association schedules regular one day and 20/20 fixtures under lights at Deakin Reserve and are fully satisfied with the lighting levels.

On 18th March 2009 a night game of 20/20 cricket was held at Deakin Reserve, Shepparton between the ACA Masters (including several contracted Australian cricketers) and the Shepparton Cricket Association Invitational XI.

Information was unable to be obtained from the City in regards to the exact lux levels over the wicket area or what the uniformity levels are, however it is assumed that the whole oval would be lit to 500 lux with a minimum to average 0.7 uniformity to meet the Australian Standards for professional football.

It is noted that the light towers do not meet the recommended height as per the Australian Standards for professional football or even community level football. The lowest lights on the tower should be on at least a 25 degree angle from the centre of the ground for professional level football, and at least 20 degrees for anything less. The Deakin lights are on an 18 degree angle which creates glare problems. This may impact on the ability of the ground to attract major sporting events in the future as it depends on how strictly the national football leagues require grounds to comply to the Australian Standards.

9 SPORTS LIGHTING STANDARDS

Most sports have an Australian Standard for sports field floodlighting requirements for various levels of competition. Cricket, however, does not have a current Australian Standard. This may be due to cricket field lighting being very uncommon outside of the major sports stadiums of capital cities in Australia. For this reason, this study has researched lighting standards used internationally and precedents that have been set by a West Australian and a Victorian LGA that both have lighting for night cricket.

Firstly, to understand the Standards a basic knowledge of the two key terms *Lux* and *Uniformity* must be understood.

Lux

Lux refers to the intensity or brightness of the light. A high lux level means the field is brighter and objects/persons are easier to see than under low lux levels. The intensity of light in a typical living room is approximately 50 lux, whereas full daylight can be over 10,000 lux.

Lux levels can be measured both horizontally and vertically. Most standards are solely concerned with horizontal lux levels, however certain sports also have vertical lux level requirements. Where lux levels are referred to throughout this report, they refer to the horizontal luminance. In general, vertical lux levels are well within the recommended range when the appropriate pole heights and positions are utilised from the Australian Standards.

Lux levels of lights decrease over time. Throughout the report, the lux levels refer to the *maintained illuminance*. This is the minimum illuminance the lighting system will fall to until the next major maintenance period when the system is re-lamped.

Some systems will achieve this by beginning with higher than required lux level having sufficient allowance to decrease over time whilst still achieving acceptable illuminance.

More sophisticated systems are over designed as in the previous example, however the power to each lamp is adjustable so that at the beginning of their lifespan they start with lower power which then gradually increases over time so that a constant lux level is maintained. Electricity savings over the course of the life of the lamps can be in the order of 10-20%.

Uniformity

Uniformity refers to how evenly the field is lit. Whilst a field may be lit to an average of 100 lux, there may be points where it is up to 150 lux and points where it is as low as 50 lux for a relatively average uniformity level of approximately 0.5. Uniformity is measured on a scale of 0.0 to 1.0. Low uniformity means there is greater variation from point to point. This can make the ability of a player to track and catch or hit a ball more difficult. The difficulty is increased for small ball sports. High uniformity allows the player to more easily track the ball through the air or across the ground as in daylight conditions. 0.7 is generally considered quite high and is the minimum standard for small ball sports infield areas.

Uniformity is affected by the number of poles, their height and setback distance and also the quality of the light fittings. Higher quality light fittings have greater options in how narrow or wide they can throw the light on to the field.

High uniformity in excess of the minimum standards should be sought where practical as it is known that uniformity can decrease over time. The lights should be re-aimed at the major maintenance period where re-lamping occurs.

Australian Standards

The basic Australian Standard information of lux and uniformity levels for each of the key sports that are being considered for Wonthella Oval are presented in the table below. Note: there is no current Australian Standard for cricket.

	Level of Competition	Area	Intensity* (ave over whole ground)	Uniformity (Minimum to Average)
Football (all codes)	Community Comp	Whole Ground	100 lux	0.5
	Semi Professional Comp Professional Practice	Whole Ground	200 lux	0.6
	Professional Comp	Whole Ground	500 lux	0.7
Baseball*	Community Comp/Training	Infield	250 lux	0.7
		Outfield	150 lux	0.5
	AAA Comp/Training	Infield	750 lux	0.7
		Outfield	500 lux	0.5

In addition to illuminance and uniformity levels, the Australian Standards also cover other factors related to lighting including colour rendering, glare control, minimum pole height, pole locations and spill light control. Full details of these standards are available for purchase from the Standards Australia website www.standards.org.au. The relevant standards for sports field lighting are:

AS2560.1-2002

Sports Lighting – General Principles

AS2560.2.3-2007

Sports lighting - Specific applications - Lighting for football (all codes)

AS2560.2.6-1994

Guide to sports lighting - - Specific recommendations - Baseball and softball
&

AS2560.2.6-1994/Amdt 1-1994

Guide to sports lighting - Specific recommendations - Baseball and softball

AS4282-1997

Control of the obtrusive effects of outdoor lighting

*Baseball – It is important to note that whilst certain aspects of the Australian Standards for Baseball can be achieved on a football oval, there are other aspects that cannot be. Lighting towers are required to be positioned in specific positions around the diamond and outfield to ensure optimal lighting from all angles.

These required angles cannot be achieved where the same poles are also required to provide lighting for a football/cricket oval. Therefore it is suggested that whilst low grade baseball could be played under lights on a well lit football oval, high grade competition (i.e. A grade or above) should only be played under lights on a dedicated baseball field. Otherwise competition should be restricted to daylight hours.

Cricket Standards

The Western Australian Cricket Association (WACA) does not yet have an official position on required lighting standards for various levels of competition and there is no Australian Standard. It is assumed that the WACA and other State Cricket Associations will adopt a similar approach to Cricket NSW and utilise the standards for cricket as defined on the Abacus Sports Lighting Solutions website <http://www.lighting4sport.com/sportlighting.asp?sport=sn07>.

Cricket NSW recommends Class II as the minimum for community competition and Class III for training.

These Standards are summarised in the table below:

Abacus Sports Lighting Solutions Recommended Cricket Lighting Standards

Level of Competition	Area	Lux	Uniformity
Class III Community Training, low grade Competition.	Wicket Area	300	0.5
	Outfield	200	0.3
Class II Community Competition	Wicket Area	500	0.7
	Outfield	300	0.5
Class I Professional Competition	Wicket Area	750	0.7
	Outfield	500	0.5

Source: <http://www.lighting4sport.com/sportlighting.asp?sport=sn07> [11/5/2010]

Without an Australian Standard for cricket, these Standards are considered a satisfactory substitute.

Small Ball Sports on Football Oval Precedents

Small ball sports are played on a number of ovals to the north of the State (Shire of Roebourne) where daytime temperatures are too hot to play under (see Section 8 Comparative Analysis).

Community level cricket, softball and t-ball are played in the Shire of Roebourne on football ovals lit to 250 lux.

Whilst certain aspects such as the horizontal lux levels for diamond sports may meet the Australian Standards, it is almost certain that other aspects such as the angles of lighting around the diamond are not.

Consultation with the Shire of Roebourne that the user groups are satisfied with the levels of lighting available and have not reported any significant issues from playing under lighting designed for a football oval.

Baseball

Based on these experiences, it would appear reasonable that low grade baseball competition which generally has lower ball speeds, could be played on an oval with similar or greater lighting levels.

Any serious level of night baseball competition (18+, A grade +) should be played on a field with lighting dedicated for baseball to ensure that the City is meeting its duty of care obligations to the user groups. Otherwise any serious level of baseball competition should be restricted to daylight hours.

Cricket

The lighting levels of the ovals used for cricket in the Shire of Roebourne are similar to the Class III standard as proposed by Abacus Sports Lighting Solutions.

It is also noted that Deakin Reserve, Shepparton Victoria (180km north of Melbourne) has had a relatively high level game played on an oval of 500 lux. On 18th March 2009 a night game of 20/20 cricket was held at Deakin Reserve, Shepparton between the ACA Masters (including several contracted Australian cricketers) and the Shepparton Cricket Association Invitational XI.

It is unknown what the exact lux levels over the wicket area or what the uniformity levels are, however it is assumed that the entire oval would be lit to 500 lux with a minimum to average 0.7 uniformity to meet the Australian Standards for professional football for which it was designed. This would meet the wicket area requirements for Class II cricket competition and exceed the outfield requirements.

10 LIGHTING OPTIONS

Three lighting options are presented below for consideration. The three options have been chosen after careful consideration of the needs of the sports and the levels of competition. These options are considered the most appropriate levels of flood lighting for the purpose of developing Wonthella Oval as a regional venue for both major sporting and community events. They are as follows:

Lighting Option	Area	Intensity	Uniformity
Option 1 300/250	Wicket Area	300 lux	0.9
	Outfield/Full Oval	250 lux	0.7
Option 2 500/500	Wicket Area	500 lux	0.9
	Outfield/Full Oval	500 lux	0.7
Option 3 750/500	Wicket Area	750 lux	0.9
	Outfield/Full Oval	500 lux	0.7

The levels of competition that can be achieved under each option are detailed below.

Option 1 **300 lux Wicket Area** 0.9 minimum to average uniformity
 250 lux Outfield/Full Oval 0.7 minimum to average uniformity

This level of lighting exceeds the lighting requirements for semi-professional football competition and it meets/exceeds lighting levels currently provided in the north of the State under which low grade community diamond sports and cricket are played.

In addition to these proposed lux and uniformity levels, the lighting design must meet all other criteria for semi-professional football included in the Australian Standard AS2560.2.3-2002.

Lux Levels

- The Wicket Area lux level of 300 lux meets the Class III standard for cricket.
- The Outfield/Full Oval lux level of 250 lux:
 - Exceeds the Class III standard for cricket (200 lux).
 - Meets the Australian Standard for community level diamond sports (infield and outfield).
 - Exceeds the Australian Standard for semi professional football (all codes 200 lux).

Uniformity Levels

- The Wicket Area uniformity level of 0.9 exceeds the minimum requirement for Class III cricket (0.7). This level has been chosen because it is achievable (as it is a relatively small area) and provides greater safety for users. With no current Australian Standard for cricket, it is appropriate to set a high standard for uniformity.
- The Outfield uniformity level of 0.7:
 - Exceeds the requirements as set out in the Australian Standards for semi professional football (all codes 0.6).
 - Meets the Australian Standard for diamond sports (infield and outfield).
 - Exceeds the Class III requirements for cricket (0.5).

It should be noted that whilst these lux and uniformity levels meet the Australian Standard for diamond sports, the lighting angles that are required cannot be met for a diamond situated on a football oval, thus it is suggested that only low level competition diamond sports are played on football ovals.

Option 2	500 lux Wicket Area	0.9 minimum to average uniformity
	500 lux Outfield/Full Oval	0.7 minimum to average uniformity

This level of lighting meets/exceeds the requirements for professional level football competition and Class II cricket. It exceeds the lighting levels provided in the north of the State under which low grade community diamond sports and cricket are played.

In addition to these proposed lux and uniformity levels, the lighting design must meet all other criteria for professional football included in the Australian Standard AS2560.2.3-2002.

Lux Levels

- The Wicket area lux level of 500 lux meets the Class II standard for cricket.
- The Outfield lux level of 500 lux:
 - Meets the Australian Standard for Professional Football (non televised) and is appropriate for preseason AFL games or other national level football codes.
 - Exceeds the requirement for Class II Cricket (300 lux)
 - Exceeds the Australian Standard for community level diamond sports (infield 250 lux).

Uniformity Levels

- The Wicket Area minimum to average uniformity level of 0.9 exceeds the minimum requirement for Class II cricket (0.7). This level has been chosen because it is achievable and provides greater safety for users. With no Australian Standard for cricket, it is appropriate to set a high standard for uniformity.
- The Outfield/Full Oval minimum to average uniformity level of 0.7
 - Meets the Australian Standard for Professional football.
 - Exceeds the requirement for Class II Cricket (0.5).
 - Meets the Australian Standard for community level diamond sports (infield and outfield).

It should be noted that whilst these lux and uniformity levels meet/exceed the Australian Standard for diamond sports, the lighting angles that are required cannot be met for a diamond situated on a football oval, thus it is suggested that only low level competition diamond sports are played on football ovals.

Option 3	Wicket Area 750 lux	0.9 minimum to average uniformity
	Outfield/Full Oval 500 lux	0.7 minimum to average uniformity

This level of lighting meets the requirements for professional level football (all codes) and Class I cricket. It exceeds the lighting levels provided in the north of the State under which low grade community diamond sports and cricket are played.

In addition to these proposed lux and uniformity levels, the lighting design must meet all other criteria for professional football included in the Australian Standard AS2560.2.3-2002.

Lux Levels

- The Wicket Area lux level of 750 lux meets the requirements for Class I cricket.
- The Outfield/Full Oval lux level of 500 lux:
 - Meets the Australian Standard for Professional Football (non televised) and is appropriate for preseason AFL games or other national level football codes.
 - Meets the requirement for Class I Cricket.
 - Exceeds the Australian Standard for community level diamond sports (infield 250 lux).

Uniformity Levels

- Wicket Area minimum to average uniformity level of 0.9 exceeds the requirements for Class I cricket (0.7). This level has been chosen because it is achievable and provides greater safety and quality of play for users. With no Australian Standard for cricket, it is appropriate to set a high standard for uniformity.
- The Outfield/Full Oval minimum to average uniformity level of 0.7
 - Meets the Australian Standard for Professional football.
 - Exceeds the requirement for Class I Cricket (0.5).
 - Meets the Australian Standard for community level diamond sports (infield and outfield).

It should be noted that whilst these lux and uniformity levels meet/exceed the Australian Standard for diamond sports, the lighting angles that are required cannot be met for a diamond situated on a football oval, thus it is suggested that only low level competition diamond sports are played on football ovals.

NOTE:

Each of the three options should include three phase power outlets to at least 2 poles to enable the operation of large equipment such as amusement rides or stage lighting for concerts.

A table of the three options is provided on the following page.

Wonthella Oval Lighting Options

Sport	Level of Competition	OPTION 1 300 / 250	OPTION 2 500 / 500	OPTION 3 750 / 500
Cricket	Social & Low Grade Community Training / Competition	✓	✓	✓
	Intermediate & High Grade Community Training / Competition		✓	✓
	Professional Training / Competition (Non Televised)			✓
Baseball	B & C Grade Training / Competition	✓	✓	✓
	A Grade or higher Training / Competition			
Australian Rules	Community Training / Competition	✓	✓	✓
Soccer	State League Training / Competition	✓	✓	✓
Rugby	National Level Training	✓	✓	✓
Touch	National Level Competition (Non Televised)		✓	✓

Preferred Option

Option 3 is considered the option best suited to meeting the requirements of local sporting clubs and for providing the ability to host professional cricket and football matches (all codes). This is in keeping with the needs identified by the City of Geraldton-Greenough for a regional multi-purpose venue capable of hosting high level sporting matches and community events. Such a facility is not currently available in the Mid West Region; the nearest facilities with these capabilities being located in Perth.

Option 1 allows for competition up to a State level for football (all codes) such as WAFL games. It also would accommodate low level cricket and baseball – being more of a social nature as opposed to serious competition. This level of lighting would be sufficient for the primary user – football. It does not, however, allow for preseason AFL games to be hosted in Geraldton. Preseason games are held during the end of summer/early autumn and thus the weather can be very hot. Sufficient lighting is required to enable matches to be played at night when it is cooler.

This level of lighting is also not considered sufficient for regular cricket competition, thus its benefits for sports beyond football is limited.

Option 2 allows for professional football competition (non televised) and high grade community cricket competition. The sporting and general community would benefit socially and economically from large events being held in Geraldton such as a Dockers/Eagles preseason match.

Cricket competition can also be played under this level of lighting and will significantly expand and increase flexibility in times that cricket can be played, opening up the sport to a greater proportion of the community.

Option 3 is similar to Option 2, however, it has enhanced lighting to the cricket wicket area. The only additional capability of this Option is that it meets the internationally recognised standard for professional cricket competition (non televised). This option would effectively give the City the capability to host national/international level football and cricket competition.

This option would also ensure that the Geraldton's cricket competition has access to the very highest level of lighting available outside of the WACA and would be a major attraction for high level regional cricket events.

The next level of lighting beyond Option 3 is for televised lighting. The cost would be in the order of \$4 million+ for lighting infrastructure that meets the latest televised standards and is not considered feasible or appropriate for Geraldton at the current time.

Each of the three Options would enhance the City's ability to host community events such as festivals, concerts and circuses through the provision of high level lighting and access to three phase power outlets.

11 ISSUES

There are a number of key issues that are worthy of note for any proposed major floodlighting development at Wonthella Oval. These issues are highlighted below. Further information on important issues to consider in any lighting project can also be found in the Department of Planning and Community Development Victoria document *Football and Netball Lighting Guide*, August 2008¹, and the Department of Sport and Recreation WA document *Focus Paper: Indoor and Outdoor Lighting*, June 2009².

Switching Options

Several light switching options should be made available for any new high level lighting system as the vast majority of usage will only require lower levels of lighting (i.e. community level training and competition). It is suggested that a 500 lux system also have switching options for 250 lux, 100 lux and 50 lux.

Lifespan of Globes

Manufacturers make varying claims on the lifespan of their globes. It should be noted, however, that the lifespan of globes are often affected by the average number of hours they are left on for at a time (commonly known as 'start up' time). Many models of globes are started with a strong pulse of electricity. Each start up decreases the lifespan of the globe by a small amount. Therefore globes that are frequently switched on for short periods of time will have less hours of operation than globes left on for long periods of time. Some fittings do not have the same 'pulse' start and instead are 'soft starting' and therefore are less affected by average start up times.

Some manufacturers quote the lifespan of their globes based on 10 hour start up times. A more realistic average start up time would be around 1.5 - 3 hours for most community sporting reserves. Therefore the actual lifespan of the globes would be significantly less than quoted in the manufacturers' literature which can read 5,000+ hrs.

In assessing various manufacturers light fittings, lifespan details should be provided based on 1.5 – 3 hour start up times to allow a more accurate comparison.

Cockatoos

Cockatoos are an issue in Geraldton and have been observed in the thousands at the Eighth St Sports Precinct. Cockatoos will perch on top of a light tower and can be particularly destructive towards any exposed wiring. All wiring should be fully encased to protect from cockatoo damage.

Warranties

Warranties are commonly 12 months on light fittings, however, longer warranties of up to 10 years can now be obtained by certain sports lighting companies. Whilst a long warranty may result in a higher overall capital cost for a new floodlighting system – it removes the burden of maintenance from the LGA.

Switchgear Housing

The switch gear for each light pole should be kept in a secure weatherproof cabinet attached to the exterior of the light tower. It is cheaper to house part or all of the switch gear inside each pole, however the poles generate significant heat and condensation which can have a detrimental effect.

Collapsible poles

Collapsible poles are designed to enable the head of the tower to be lowered to the ground to allow easy maintenance of the light fittings. It should be noted however, that collapsible towers add significant expense to the capital costs (estimated 50% greater than fixed poles) and additional maintenance issues. Collapsible towers utilise hydraulics which can seize up with extended periods of not being utilised. There are very few examples of collapsible poles in utilisation in Australia. (It is reported that the City of Adelaide installed a collapsible pole system which failed soon after installation).

Lighting Standards

There are two main standards that apply to sports field floodlighting:

AS2560 for specific lighting requirements including lux levels, height of poles, uniformity etc; and

AS4282 for control of the obtrusive effects of outdoor lighting.

Adherence to these standards will have the effect of ensuring that the tenderer uses quality fittings as most cheaply made fittings do not meet these standards. Adherence to these standards will assist the City of Geraldton – Greenough in meeting its duty of care obligations to users of the lighting and minimise any glare affecting nearby residents.

The tender brief for any new lighting project should specify *strict* adherence to these Australian Standards to ensure the tenderer complies. A letter of guarantee should be obtained from the supplier that guarantees the outputs of the system conforms to specifications within the Australian Standards

Power Supply

Inspection of the power supply by an electrician reveals that a new transformer will be required for the development of a new flood lighting system for Wonthella Oval. The cost will be in the region of \$60,000 to \$100,000.

3 Phase Power

The installation of a new lighting system is an opportune time to include the provision of 3 phase power outlets on one or more poles. This will be of significant benefit for concerts, circuses and other large events where equipment that requires 3 phase power is utilised, thus negating the need to run large diesel generators.

Pole Height

One of the key factors determining the amount of glare affecting players and spectators is the height of the pole. Excessive glare can negate the benefits of high lux and uniformity values.

The minimum recommended height of the lowest light fitting sitting on the poles is determined by the measuring the distance of the pole from the centre of the ground. (Table 2, AS2560.2.3-2002). These calculations must allow for the loss of height associated with mounting multiple rows of light fittings (headframe). These recommendations also form part of the AFL's *Lighting Guidelines* which can be seen as Appendix 1 to this report.

For professional football the recommended minimum height is determined by the calculation $0.47 \times \text{distance}$ in metres plus the height of the headframe. A pole height of approximately 48m would be required to meet this recommendation.

For semi-professional football or less the minimum height is determined by the calculation $0.36 \times \text{distance}$ in metres plus the height of the head frame. A pole height of approximately 38m would be required to meet this recommendation.

It should be noted that the Australian Standard for pole heights is a recommendation, not a requirement. If the other factors of illuminance, glare, colour rendering and uniformity are still met, this would appear to be satisfactory for the purposes of Wonthella Oval which would hope to attract the occasional professional level preseason football or cricket game.

Geoff Glass, Director of Facilities and Planning for the WAFC has stated that the primary concerns for lighting for a preseason AFL match are the illuminance, uniformity and glare control. If these can be achieved with less than the recommended pole heights for professional football then this would not affect their recommendation to the AFL for recommending a venue to host a preseason game.

It is noted that in recent times, AFL preseason matches have been played under lights on ovals with less than the recommended pole height for professional football including Deakin Reserve, Shepparton Victoria (installed 2008) and the Narredera Sports Ground, Ballarat Victoria (installed 2005).

Pole Location

Light poles have a very limited area around the ground in which they can be placed to achieve high level lighting requirements. If future upgrades/additions to the Oval are effected they must be considerate of the required pole locations to enable cost effective, efficient lighting.

It is not feasible to place poles on top of a building as the structural requirements will be excessive. A pole cannot be placed too far away from the playing surface as the pole height requirements become non-feasible and there may be issues with shading if there is a building between the pole and the oval.

The only reasonable way to move the location of the poles would be to rotate the oval. It is noted that Wonthella Oval is very large (approximately 185m from goal to goal and 145m wide) whereas the ideal AFL oval length is 165m x 135m. Therefore there could be scope at Wonthella to reduce the oval size and rotate the oval whilst still achieving ideal dimensions. If this were to occur some savings would result from fewer light fittings and smaller pole heights being required.

Ken Gannon, AFL Community Facilities Development Manager reports that a preseason match would not be held on a field larger than 165m x 135m in order to protect the players. As such, if Wonthella was to host a preseason match it would need to bring in the goals and boundaries to meet this requirement.

¹ *Football and Netball Lighting Guide*, August 2008, Department of Planning and Community Development, Government of Victoria.

² *Focus Paper: Indoor and Outdoor Lighting*, June 2009. Department of Sport and Recreation WA, Government of Western Australia.

12 FINANCIAL ANALYSIS

The financial details in this section are based on costings provided by Lightbase Pty Ltd, one of the major sports lighting suppliers/installers in Western Australia.

12.1 Cost of 3 options

The cost of the three lighting options have been provided for 38m and 50m. The 50m poles meet the Australian Standard recommendation for pole heights for all professional competition (requiring at least 48m pole height), and the 38m poles meet the recommendations for all lower levels of competition.

The structural requirements of the poles and footings are based on wind classification information provided by the City. The City advises that the wind classification for Wonthella Oval is Region B, Terrain 2. This requires significantly sturdier, and subsequently more expensive poles and footings than Perth, which is classified Region A.

These costings cover the full lighting project development including supply, installation and commissioning of the lighting infrastructure.

Cost Estimates for Wonthella Oval Lighting Options

Lighting Option	38m Pole Height	50m Pole Height
Option 1 300/250	\$1,465,000	\$1,545,000
Option 2 500/500	\$1,520,000	\$1,600,000
Option 3 750/500	\$1,590,000	\$1,670,000

The following should be noted:

- Options 1 & 2 are fully upgradeable to Option 3.
- All Options include \$100,000 for power upgrade. A power upgrade is necessary of all three lighting options.
- Prices are current, allow 5% cost escalation per year.
- Prices are based on average soil quality. If the soil quality is poor, allow an additional 5% for increased footings specifications.

Costings Key Findings/Issues

- There is little difference between the costings for Option 1 and Option 3. This is because the majority of the cost is in the electrical cabling and pole/footings supply and installation which remains the same. The only difference in cost is the price of the fittings, and even this is lessened because there is considerable expense involved in attaching the lights to the pole once already erected as opposed to installing the lights whilst the pole is still on the ground.

Therefore, there is little value in staging the project as the difference in price between Option 1 and Option 3 is less than 10%.

- The high cost of each of the options is a result of the footings required for the light poles. Geraldton has a relatively high wind classification and because of the large number of fittings that are required for the desired lux levels, the wind loading is significant. The structural requirements of the footings for both the 38m and 50m poles are the same, thus there is little price difference between the two options (approximately 5% difference).

Therefore, it would be prudent of the City to opt for the 50m poles as opposed to the 38m pole as it will provide a higher standard of lighting that meets all Australian Standards requirements and recommendations for professional competition.

DRAFT

12.2 Life Cycle Costing

The maintenance costs associated with a lighting system over the course of a 25 year lifespan are significant and must be taken into consideration when assessing the financial implications of a new lighting project.

Life cycle costing for a new lighting system needs to take into account bulb replacement costs, cleaning costs and electricity charges.

Assumptions

Preferred Option

The life cycle costings are based on the preferred option – Option 3, with the 50m poles. The cost difference between Options 1 – 3 and the 38m and 50m poles are relatively low.

Life cycle costing differences between the options would also have correspondingly low variation due to the similar infrastructure replacement costs. Electricity usage would also be similar as each of the options are able to have multiple switching options and most usage would likely occur at lower settings.

Lifespan

For the purposes of life cycle costing, a 25 year life span has been utilised for the lighting infrastructure. After 25 years the City will need to consider replacement of all the light fittings.

The light poles are likely to still be suitable for many years of further utilisation depending on their condition. Correct installation will minimise corrosion problems at the base of the pole.

Whilst it is possible that the light fittings and light poles will still be serviceable beyond 25 years, continuing advances in technology will mean that there is a significant probability that replacement with a new lighting system would be a preferable option to extending the life of the existing.

Annual Usage of the Lighting System

The annual usage of the proposed lighting system is estimated to be approximately 310hrs. This is based on consultation with the key potential user groups and usage of lit ovals from other municipalities.

An average 10hrs of use per week for Australian rules football training (7.5hrs) and competition (2.5hrs) is estimated for a period of 6 months throughout the year totalling 260 hrs per year

Up to 50hrs of use for cricket competition and other events throughout the year. This would allow for up to 20 games of cricket based on 2.5hrs of use per game.

Most usage would occur at the 250lux setting or below for football training and competition. Cricket would utilise the 750/500 lux setting. Modern light switching systems alternate the bulbs that are used for lower lux settings, thus spreading the usage evenly over all the bulbs. For the purposes of estimating annual light bulb usage hours, it is calculated that each bulb will be required for 50% of the total annual usage.

Therefore, each bulb is estimated to be used for approximately 155hrs per year, based on total usage of the lighting system of 310 hrs per year.

Warranty

A 10 year warranty (or 5,000 hrs, whichever comes first) on the full lighting system applies to the Musco lighting system as quoted on by Lightbase Pty Ltd. At the major bulb changeover time, the new bulbs will have a 10 year or 5,000 hr warranty.

It is highly unlikely 5,000hrs would be used within a 10 year period as this would require 500 hrs use per year. This would require 10+ hrs use per week over the full year which would be very difficult to achieve unless lighting usage fees were made very low and an additional user to cricket could be found during the summer months

Relamping

Relamping of the full system is scheduled to occur at the half way point of the 25 year lifespan (12 years) including full cleaning of the glass covers and reflectors. This is just out of the 10 year warranty period, however, the bulbs are likely to have a considerable amount of useable life left even with higher than anticipated usage (potentially 3,000+ hrs).

The cost of relamping the full system based on current prices of \$200 per bulb, and 3 days labour and crane hire. The total estimated relamping cost is \$45,000.

Cleaning Costs

Cleaning at 6 yearly intervals have been allowed for in this life cycle costing estimate. In Perth, which is not considered a dusty area, cleaning is generally not required. Further north in the Pilbara region where it is considered dusty, cleaning of the glass covers is recommended every two years and cleaning of the reflectors at the bulb change over period.

Full cleaning of all glass covers and reflectors at a 6 yearly interval is considered sufficient to maintain the minimum required illumination over the life of the proposed lighting system for Wonthella Oval.

The estimated current cost of a full clean including 2 days labour and crane hire is \$6,000. Two cleans would be required at years 6 and 18 (as a clean is included with the relamping costs at 12 years). The total estimated cleaning costs is \$12,000.

Bulb Replacement During Out of Warranty Years

It is considered unlikely that any bulbs would need replacing during the out of warranty years (Yrs 11,12 & 23 – 25) due to low number of total hours that each bulb would be used. Theoretically, each bulb should have a life span of approximately 30 years based on approximately 155 hours use of each bulb per year.

It is considered prudent, however, to factor in one replacement per year whilst the bulbs are out of warranty. Out of the 25 year life span, five years will be out of warranty. Five bulb replacements at an estimated \$1,500 replacement cost each (including crane hire, labour and bulb cost) equals a total cost of \$7,500.

Electricity Charges

A peak electricity rate of 25.25 cents per kw/hr is calculated as of July 2010.

Lifecycle Total, Annual & Hourly Cost

The lifecycle costs on a total, annual and hourly rate based on the construction and maintenance costs of the proposed Wonthella Oval lighting system over a 25 year period are as follows:

Item	Cost (Excl GST)
Supply, Installation and Commissioning	\$1,670,000
Relamping at 12 years	\$45,000
Cleaning	\$12,000
Bulb Replacement	\$7,500
Total Life Cycle Cost	\$1,734,500
Annual Life Cycle Cost (25 yr lifespan)	\$69,380
Hourly Life Cycle Cost (310 hrs per year)	\$224

Electricity Usage Charges

Electricity usage charges are in addition to the life cycle costs. The amount of electricity used depends on the number of lights that are used for each particular light setting. The following electricity usage charges are based on the settings that are proposed to be included in the lighting system.

Switching Options	Number of Lights Used	Total Wattage	Electricity Charges per hour (excl GST)
50 lux full field	20	30kw	\$7.60
100 lux full field	36	54kw	\$13.65
250 lux full field	76	114kw	\$28.80
500 lux full field	144	216kw	\$54.55
750 lux wicket area 500 lux outfield	172	258kw	\$65.15

These charges will increase as electricity prices are increased. WA has experienced recent significant electricity price increases with more are expected to follow in the coming years.

Relamping Costs for Other Lighting Systems

There are many other lighting systems commonly used in WA and Australia that provide a standard 12 month warranty on the lighting system and replacement bulbs.

Relamping costs on systems that are not covered by extended warranties are more difficult to provide an accurate figure as there are many bulbs of varying cost and quality. The following information provides an indication of the range of costs that could be anticipated for bulb replacements including full lamp changeovers at regular intervals and individual bulb replacements in-between.

Ovals lit to 500 lux or greater will most often be used at a lower lux level. It is highly advantageous to use a switching system that alternates between different lights to provide the desired lux level (i.e. 250 lux) each time it is turned on. In this way the usage is spread evenly across the globes.

The Shire of Broome advises that the 500 lux system they have installed (2008) has not yet lost any bulbs. They anticipate undertaking a complete changeover of the bulbs after 7-8 years.

Depending on the types of bulbs used, the cost of approximately 160 bulbs (based on 2kw light fittings) at \$200 - \$400 each could total \$32,000 - \$64,000 plus an additional three days labour and crane hire of approximately \$8,000. Total cost for relamping could total approximately \$40,000 to \$72,000 at today's costs.

Over a 25 year lifecycle, two to three relampings would be required. Two relampings would cost \$80,000 to \$144,000 and three relampings \$120,000 to \$216,000.

These bulb change over costings highlight the significant variance in total cost depending on the price of the bulbs and their lifespan. Ideally a light fitting will have low bulb replacement costs with long bulb lifespans. These costs should be carefully compared prior to choosing the light fittings for any new sports field lighting development.

It is suggested that a typical bulb used frequently with short start up times will last for 1000-1,500hrs. Deakin Reserve have calculated their lighting fees based on replacement of globes after 1,000 hrs. It is estimated that each bulb on the proposed Wonthella Oval system would reach approximately 1,000hrs use after 6.5 years.

Occasionally a bulb could be expected to expire prior to the expected change over date. \$1,500 is a reasonable figure for a bulb replacement cost including labour and crane hire. Out of warranty (most bulb warranties are 12 months), one replacement per year would appear a reasonable allowance, however this may increase closer to the scheduled full change over date.

12.3 Potential Income

Community User Groups

The local football and cricket sports clubs are anticipated to be the primary users of lighting at Wonthella Oval.

The Towns Football Club has indicated it would be prepared to pay approximately \$80 for lighting fees for a game. The electricity usage cost for 2.5hrs of lighting at 250 lux is \$72 (as of July 2010).

The Geraldton Regional Cricket Board has indicated it would be prepared to pay \$100 - \$150 for lighting fees for a game. The electricity usage cost for 2.5 hrs of lighting at 750/500 lux is \$163.

Lighting fees charged in other municipalities including the Shire of Roebourne, Shire of Broome and Greater Shepparton City Council suggest that their fees are recovering 100 – 150% of electricity costs.

If the recent trend of significant increases in electricity prices continues, it is anticipated that the City of Geraldton – Greenough community sporting groups would be unwilling to pay much more than 100% of electricity charges for use of the lighting system.

Large Events

Large events such as preseason AFL games would be able to be held in Geraldton if the proposed lighting system is developed. Geoff Glass of the West Australian Football Commission has indicated that five games could be expected to be played in Geraldton over the course of 25 years, with the gate takings to be retained by the City.

The potential gate takings of a preseason AFL game could be significant, however can vary considerably depending on the teams playing and whether the game is for the preseason cup or is just a practice match.

The Greater Shepparton City Council estimated an income of \$25,000 from the 2009 practice match that was held at Deakin Reserve under lights. The net outcome for the City is unknown, however it is likely that there would have been considerable expenses involved in preparing the venue for an AFL match.

Overall, the City of Geraldton – Greenough may not expect to generate a significant profit from hosting large events due to the significant preparation costs and / or ground repair costs, however, a significant indirect economic benefit to the community could be anticipated. The Greater Shepparton City Council estimates that the hosting of an AFL Practice Match and Crusty Demons stunt motorcycle group in March 2008 under lights at Deakin Reserve attracted approximately 16,500 persons and had a combined indirect economic benefit of \$850,000.

Details of how the indirect benefit was calculated were unable to be obtained, however, it is reasonable to assume that hosting of large events such as AFL preseason games will not only have a significant positive social impact on the community, but also provide significant flow on economic benefits to the community in the areas of accommodation, food, drinks, entertainment and tourism.

Overall Life Cycle Cost Recovery

Given the substantial and increasing costs of electricity, the City should not expect to recover any significant sum of money towards capital replacement and maintenance costs of the lighting system from community sporting groups as they may find it difficult to pass on these costs to their members.

Whilst there is a possibility that the City could directly profit from large community events requiring high level lighting, overall, a conservative approach would be to estimate that the costs of preparing for large events (or repatriating afterwards) would match the income received.

In summary, it is not expected that the City would receive any significant net income to offset the lifecycle costs of the proposed lighting system for Wonthella Oval.

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13 SOCIAL IMPACT

Sports field floodlighting is widely considered to have a positive social impact for the community. Good lighting allows clubs to maximise use of their facilities and playing surfaces through providing more opportunities to train and play, supporting year round activity and encouraging more people to participate. Some clubs have reported increased membership since installing lights and also increased gate takings. Social functions are also enhanced by being able to provide a lit area for children to play safely¹.

The increased flexibility of use provided by lighting leads to greater use of the facilities which in turn leads to increased participation rates in the community and promotes health benefits such as reducing childhood obesity and reducing crime and vandalism².

Overall, provision of a high standard of lighting will likely have a positive effect on sustainability of the sporting clubs thus increasing the City's social capital, and provide health benefits to new participants.

13.1 Impact on Neighbouring Residents and Sporting Groups

The only residential housing bordering Wonthella Oval is located to the north of the Oval on Eighth Street. There is 90m distance from the end of the oval to the nearest house which is a considerable buffer from spill lighting. Strict adherence to the Australian Standard AS4282 *Control of the obtrusive effects of outdoor lighting* will further ensure that these residents are not adversely impacted from lighting for Wonthella Oval.

Other sporting clubs at the Eighth Street Sporting Precinct already have lighting for their own specific purposes including bowls, hockey and soccer. There is no reason to suggest lighting of Wonthella Oval would negatively impact on these groups if spill lighting and glare are adequately controlled.

¹ *Football and Netball Lighting Guide*, August 2008, Department of Planning and Community Development, Government of Victoria.

² *Focus Paper: Indoor and Outdoor Lighting*, June 2009. Department of Sport and Recreation WA, Government of Western Australia.

14 MANAGEMENT

Currently within the City of Geraldton-Greenough, the management of sports field lighting is the responsibility of the lessee of the ground. Given the extensive capital infrastructure proposed for Wonthella Oval, it is recommended that the City manage bookings for use of the lighting in this instance.

There are a number of ways the lights can be controlled. The most sophisticated lighting systems can be controlled remotely over the internet. At its simplest, user groups are given keys and manually control the lighting. A middle of the road option is the use of token systems. A brief summary of the advantages / disadvantages of these options is provided below:

Control Via Internet

Advantages

- The City has full control of the lighting from Council Offices.
- Users must book with the City to use the lights. Conflict between user groups will be minimised.
- User groups cannot use the lighting more than has been booked, nor at a higher level. Remote control of the lighting ensures 100% payment.

Disadvantages

- The software required to implement such a system can be expensive and typically has annual licence fees. Generally more appropriate for very large LGA's.
- All lighting usage is after hours. Any technical issues (i.e. lights not coming on) would be difficult to resolve at the time the club needs it.

Token System

Advantages

- Prepayment is required ensuring 100% payment for usage.
- It is a simple system that is easily understood by all user groups.
- High reliability.
- Moderate expense.

Disadvantages

- Tokens provide a set amount of time, which may not conform exactly to the user group's requirements.
- Simultaneous usage of the oval by two groups (i.e. half oval each) would require co-ordination between the two groups to share lighting costs.
- The City does not retain 100% control of the lighting. Usage could occur out of booked hours.

Key System

Advantages

- It is a simple system that is highly reliable.
- No additional expense to the cost of lighting infrastructure.

Disadvantages

- Relies on user group honesty that they are using the lighting as per their booking arrangements. Payment will likely be less than 100% of actual usage.
- The City does not retain 100% control of the lighting. Usage could occur out of booked hours.

It is suggested that the City of Geraldton-Greenough consider the key system for the proposed Wonthella Oval lighting development. A token or internet based system would be more appropriate if the City were to implement the system across each of the City's lit sporting facilities, streamlining the management of lit facilities across the municipality.

A key system is the simplest to lighting control system to implement. Certain measures can be taken to provide a degree of control by the City such as having separate keys for individual lighting levels (i.e. a key for 50 lux, a key for 100 lux, a key for 250 lux etc). A meter that records hours of use of the lights would also enable the club's and the City are able to monitor actual usage which is also useful for maintenance purposes. Seasonal, high frequency user groups (principally the Towns Football Club) would require their own key during the on-season. Other occasional/casual users would be required to pick up a key before the event and return it afterwards.

Upgrade to a token or internet based control system can be easily retrofitted at a later date, thus it may be practical for the City to monitor the success of the key system before deciding on whether a more sophisticated system is required.

15 FUNDING AND GRANTS

There are a number of funding sources that may provide funding opportunities for this project. The timing of funding applications will depend on a number of factors including; the agreed level of overall development, the timing and potential staging options and the financial capacity of the City.

15.1 City of Geraldton Greenough

The City of Geraldton-Greenough (CGG) will most likely be responsible for the majority of funding for any lighting development at Wonthella Oval. This could occur via a number of methods including utilising financial reserves, general rates, loan borrowings or sale of assets.

Apart from the City's reserves and borrowings, the following Funding and Grant opportunities have been identified. These funding and grant options should be pursued by the City as soon as a commitment to any scope of development is defined and planned.

15.2 Department of Sport & Recreation

Community Sport and Recreation Facilities Fund (CSRFF)

CSRFF is administered by the Department of Sport and Recreation (DSR) and "aims to increase participation in sport and recreation with an emphasis on physical activity, through rational development of sustainable, good quality, well designed and well utilised facilities".

The State Government invests approximately \$20 million annually (via CSRFF) towards the development of quality physical environments in which people can enjoy sport and recreation. There are three types of grants available: Small Grants, Annual Grants and Forward Planning Grants.

Small Grants

\$2,500 - \$50,000 will be allocated to projects involving a basic level of planning. The total project cost for Small Grants must not exceed \$150,000.

Annual Grants

\$50,000 - \$166,666 will be allocated to projects with a planning and construction process that will be complete within 12 months. The total project cost for Annual Grants is between \$150,000 and \$500,000.

Grants given in the Small Grants and Annual Grants categories must be claimed in the financial year following the date of approval.

Forward Planning Grants

\$166,667 up to \$4.0 million will be allocated to the large scale projects where the total project cost exceeds \$500,000 and may require an implementation period of between one and three years. Grants given in this category may be allocated in one or a combination of the years in the triennium.

The following information currently appears on the DSR website -
<http://www.dsr.wa.gov.au/index.php?id=163>

Priority will be given to projects that lead to facility sharing and rationalisation. Multipurpose facilities reduce infrastructure required to meet similar needs and increase sustainability.

Applicants must be either a local government authority, not for profit sport, recreation or community organisation and incorporated under the WA Associations Incorporation Act 1987. Clubs must demonstrate equitable access to the public on a short term and casual basis.

The types of projects which will be considered for funding include:

- Upgrade and additions to existing facilities where they will lead to an increase in physical activity or more rational use of facilities.
- Construction of new facilities to meet sport and recreation needs.
- New or replacement (not resurfacing) of synthetic surfaces. Where an application is made for a new or synthetic surface, evidence of long-term planning for all nearby facilities is required.
- Floodlighting projects – where an application is made for floodlighting projects, evidence must be provided that demonstrates if a transformer upgrade is required.

Development Bonus

Some applications may be eligible for up to 50% funding of the total project cost. Projects must meet one or more of the following criteria to be considered:

- Location - Regional, Remote or Growth areas
- Co-location of sports and facilities
- Sustainability Initiatives - Water Saving, Energy reduction etc
- Increased Participation - New users, increased participation from existing users, special interest groups participation etc.

Note: It is essential that grant applicants discuss their eligibility for a development bonus with their local DSR office before applying to determine eligibility.

DSR advises that multisport development should consider the need for utility upgrades support the potential development (i.e. power and water supply). The issue of water supply to the area should be explored fully, especially in light of current climate change considerations.

It is also important for DSR to understand how this potential regional development fits in with other regional priorities. Potential applicants must contact their local DSR office to discuss projects before lodgement.

15.3 Mid West Development Commission

The Regional Grants Scheme (RGS) is one of three funding programs launched under the new State Government's Royalties for Regions program. RGS is managed by each respective Regional Development Commission. RGS offers the most obvious correlation to, and localised opportunity for, funding support for sport and recreation projects.

It is reported that decisions are made regionally and if sport and recreation projects are deemed regionally significant they have equal chance of support as any other project put forward for funding. One of the main caveats of the RGS is that funding will not be allocated to projects that are considered core business of other government departments. This issue should be fully explored with the Mid West Development Commission (MWDC) before submitting an application.

Mid West Regional Grants Scheme

RGS was launched by the Minister for Regional Development Brendon Grylls on 12 February 2009 as "one of a series of funding initiatives designed to make regional areas including the Mid West Region an even better place to live, work and grow".

RGS' focus is the improvement of economic and community infrastructure and services in the region, with priority afforded to projects that attract investment, increase employment and/or enhance the quality of life in the region. The Scheme's broad objectives are to:

1. Increase capacity for local strategic planning and decision-making.
2. Retain and build the benefits of regional communities.
3. Promote relevant and accessible local services.
4. Assist communities to plan for a sustainable economic and social future.
5. Enable communities to expand social and economic opportunities.
6. Assist regional communities to prosper through increased employment opportunities, business and industry development opportunities, and improved local services.

The second round of the program closed on 10 February 2010. Up to \$3.5 million will be allocated to regional community projects. No announcements have been made on a third round. A third round will likely depend on outcomes from the current round (and the balance of funds available) and will be confirmed by the MWDC.

All projects should be discussed with a project manager from the MWDC. Organisations should also make a start on identifying and securing other applicable funding sources as this is an important assessment criterion for the Scheme. MWDC are able to assist in this regard also.

Guidelines and application forms are available from:
<http://www.mwdc.wa.gov.au/RegionalGrantsScheme.aspx>

16 RECOMMENDATIONS

It is recommended that the City of Geraldton – Greenough:

1. **Receive the draft Wonthella Lighting Project report.**
2. **Consider the lighting options listed within this report, noting Option 3 with 50m poles as the preferred lighting development option which will significantly enhance Wonthella Oval’s role as a regional multi-purpose sporting and community facility for the Mid West region.**
3. **Seek funding from relevant funding agencies including the Department of Sport and Recreation and the Mid West Development Commission to assist with the capital costs of the proposed lighting system development.**

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17 APPENDICES

Appendix 1. Australian Football League Lighting Guidelines

Appendix 2. Consultation

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