



Sustainable Public Lighting Action Plan 2010

Sustainable Public Lighting Action Plan

The Moonee Valley *Environmental Sustainability Plan 2007-2012* seeks to protect our natural assets, use resources wisely and minimise our everyday environmental impacts. A key action in this plan is to develop a strategy for public lighting.

This *Sustainable Public Lighting Action Plan 2010* seeks to improve the sustainability of public lighting for Moonee Valley City Council. It focuses on energy avoidance, energy efficiency, improved design and renewable energy options.

This plan, when implemented, will reduce energy consumption from public lighting by up to 44 per cent. Key actions include:

- developing policy and guidelines to ensure all new lighting installations are sustainable
- acting as advocate for sustainable public lighting wherever possible
- installing necessary lighting only
- installing and upgrading to more energy efficient lighting
- adopting an asset management approach to better monitor and manage lighting.

Key drivers

Public lighting is a significant energy consumer for Moonee Valley City Council. Council's public lights are responsible for 55% of total greenhouse gas emissions from operations in 2007 and cost approximately \$1,000,000 per year to maintain and operate. For Council to meet its zero emissions by 2020 target, it is important that greenhouse emissions from street lighting are reduced.

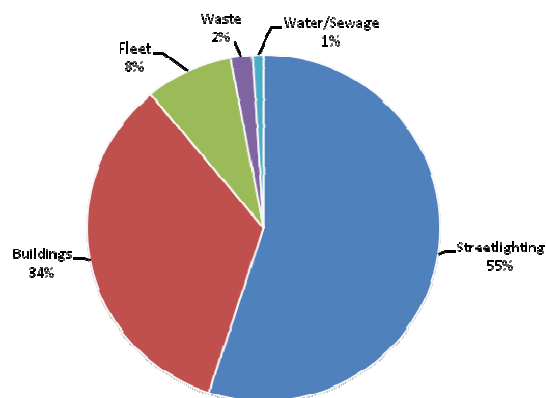


Figure 1: Breakdown of greenhouse emissions from Council operations in 2007

The majority of Council's public lighting is unmetered and managed by a lighting distributor. Under the *National Greenhouse Energy Reporting Act 2007*, this lighting is classified as Scope 3 as it is not in the direct operational control of Council. In contrast, the metered lighting managed by Council is classified as Scope 2 and Council has direct operational control.

Council has put forward a plan for both Scope 2 and Scope 3 lighting. Council has done this because distributors are not required to report on emissions from public lighting even though they have direct operational control. Council considers that it is important to take a leadership role in public lighting to achieve a reduction in greenhouse emissions.

In future years, Council will reflect its greenhouse emissions data according to Scope 1, 2 and 3 which will show street lighting as a smaller proportion of Council emissions given it is only responsible for mitigating Scope 1 and 2 emissions.



Figure 2: Classification of streetlighting greenhouse emissions in accordance with national frameworks

Public lighting in Moonee Valley—current situation

Public lighting within Moonee Valley consists of a variety of external lighting types including those located in streets, car parks, parks and sports grounds. Street lighting is the most common type of lighting in Moonee Valley, and is also the highest energy consumer and utility cost for Council.

The majority of lighting is delivered in Moonee Valley by:

- 80W mercury vapour (MV) lights—5,787 lights or 62% of all lighting
- 150W high pressure sodium (HPS) lights—2,465 lights or 26% of all lighting

Refer to Figure 3 below for an overview of the lighting types used in Moonee Valley

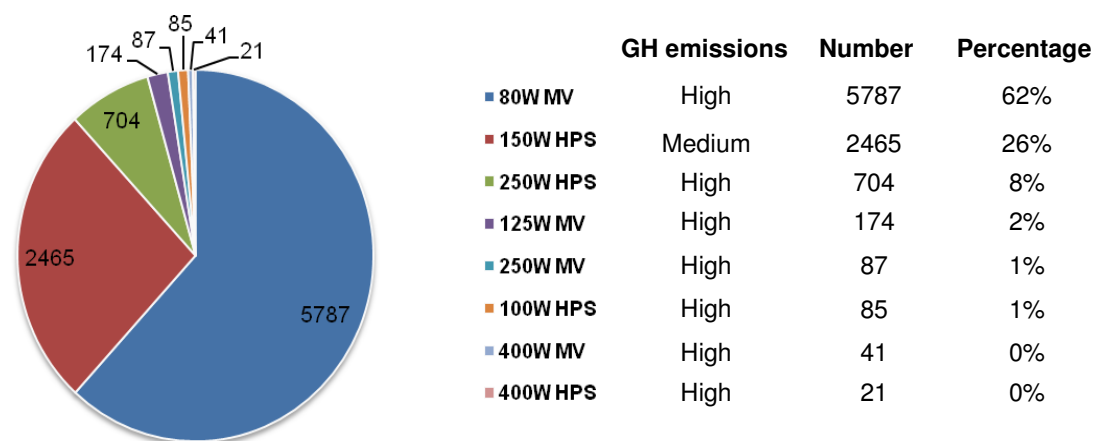


Figure 3: Moonee Valley City Council light types managed by distributor in 2007

Responsibility for public lighting in Moonee Valley

Public lights in Moonee Valley are owned and managed by Council and/or the lighting distributor, Jemena Electricity Networks (VIC) Ltd, as detailed in the table below¹

Table 1: Types of streetlighting in Moonee Valley

No	Type of lighting	Examples	Owned by	More information	NGERS ² Category
1.	Standard unmetered	Majority of street lighting in Moonee Valley	Distributor	Council pays a service charge to the distributor to maintain the light and pole over its life.	Scope 3
2.	Non standard unmetered	Decorative lighting in new developments	Council	Council is responsible for purchasing all non standard parts but pays a service charge to the distributor to maintain the light and pole over its life	Scope 3
3.	Metered	Lighting in parks	Council	Council manages these lights directly. Typically, sports facilities, car parks and open space reserves are connected to a meter to measure energy taken from the electricity network. Some street lighting in Moonee Valley—e.g. Puckle Street—is also metered. These lights may have their own meter or may be connected to a building, BBQ or other load.	Scope 2

¹ Refer to 'Appendix 1—Sustainable Public Lighting Guidelines'.

² National Greenhouse Energy Reporting Guidelines 2008

Achieving sustainable public lighting

Moonee Valley City Council will achieve its sustainable public lighting goals by:

- establishing policy and guidelines to ensure all new lighting installations are sustainable
- acting as advocate for sustainable public lighting wherever possible
- installing necessary lighting only
- installing and upgrading to more energy efficient lighting
- adopting an asset management approach to better monitor and improve lighting sustainability.

Policy and guidelines

In producing this plan, Council has researched other lighting policies and guidelines, including those developed by the International Cities for Local Environmental Initiatives program and Victorian Greenhouse Alliances. In addition to this, Council has also:

- audited the lighting it owns and operates
- audited the lighting that is owned and managed by the distributor
- reviewed the performance of current lighting stock and more efficient luminaires

In response, all public lighting in Moonee Valley will now consider the following guiding principles in line with Moonee Valley City Council's draft *Sustainable Public Lighting Guidelines*.

Table 2: Guiding principles for public lighting in Moonee Valley

No	Guiding principle	Description
1	Making better use of open space	Most people use public space during the day and early evenings. Lighting should support positive evening use but is generally not needed during all hours of the night.
2	Assisting walking, cycling, public transport and driving	Appropriate lighting will allow for higher visibility and encourage people in Moonee Valley to walk, cycle, take public transport and if necessary drive.
3	Showcasing urban features in an effective way	When people are visiting our city, they should see and enjoy our urban features—for example, monuments signs, and public art. Lighting can be an effective way of doing this in key locations.
4	Protecting habitat value areas	In some cases lighting deters native fauna from regular night time foraging and can be harmful to biodiversity.
5	Improving safety	Council will avoid creating a false sense of security by not installing lighting in remote or poorly surveyed locations. Lighting will be discouraged in sites where it promotes inappropriate behaviour after hours in accordance with the <i>Crime Prevention through Environmental Design Guidelines</i> .
6	Reducing greenhouse emissions	Council will install and manage lighting to minimise greenhouse emissions. This will be applied following the hierarchy of energy avoidance, energy efficiency and renewable energy sourcing.

Acting as advocate for sustainable public lighting

Public lighting is influenced by a wide range of regulations, policies and government agencies at regional, State and Federal level³.

Council has the opportunity to act as advocate to such agencies—in particular, the Australian Energy Regulator and VicRoads—encouraging them to adopt a sustainable approach to public lighting.

³ Refer to 'Appendix 2—Federal, State and regional stakeholders'.

Installing necessary lighting only

Lighting will only be installed if necessary, particularly for reserves and open space where lighting is not required late at night. And if lighting is to be installed, the greenhouse hierarchy will be considered.

For example, in Moonee Valley there are areas where lighting is above Australian standards. Initial analysis shows approximately 500 lights can be decommissioned, subject to a feasibility analysis and risk assessment. This will reduce ongoing energy use and reduce costs significantly.

Installing and upgrading to more energy efficient lighting

All new lighting installed in Moonee Valley will be more efficient than the current stock. Existing lighting will also be upgraded to more efficient alternatives or timers installed.⁴ For example:

- 80W mercury vapour (MV) lights make up 62% of Council's public lights and cost \$330,000 annually to maintain and illuminate. The majority of 80W MV street lights can be replaced with energy efficient lighting, such as twin T5 fittings
- The installation of timers to switch off lighting on Council owned metered public lighting schemes—for example, from 10.00pm to 5.00am during summer, and from 9.00pm to 5.00am during winter—is recommended, following the identification of suitable areas for this measure.

Once the recommended options are implemented, public lighting energy usage will reduce by approximately 44% of 2007 levels, saving Council \$190,000 per year in energy costs.

Refer to the table below for further solutions that ensure reduced greenhouse emissions.

Table 3: Solutions to reduce greenhouse emissions for lighting

No	Solutions	Description
1.	Ensuring optimum pole spacing and mounting heights	Optimum pole spacing and mounting heights can reduce capital costs as less poles and luminaires are required for lighting public areas. Increasing the mounting height of luminaires in minor roads, from 5 metres to 7 metres can result in about a 15% increase in the pole spacings with commensurate reductions in capital costs, maintenance and energy costs. Currently in new subdivisions the standard pole height is 5.5m, while in older transmission pole areas the height is around 7.5m.
2.	Using standard lighting	Standard lighting is typically more energy efficient than non-standard decorative lighting. Energy inefficiency may be caused by the use of non-standard decorative lighting, due to reduced mounting height and luminaire design. Energy requirements of non-standard decorative lighting, per linear metre of road, may typically be 15 – 30% more than standard lighting.
3.	Planning placement of street lights and trees	When trees are present they may cause shadowing and may render street lighting ineffective. A holistic approach needs to be taken when planning placement of street lights and trees to best meet environmental, safety and amenity needs of the community.
4.	Sourcing green energy	The simplest method to reduce greenhouse emissions is to purchase 100% accredited green energy (for example Renewable Energy Certificates or GreenPower).
5.	Generating renewable energy	The local installation of renewable energy systems such as solar lighting is an effective way of reducing greenhouse emissions.

Monitoring the performance of lighting

Council will continually monitor the performance of its lighting. This will include a regular inventory of upgrades to public lighting and associated financial and greenhouse savings.

⁴ Refer to 'Appendix 3—Energy efficient options'

Sustainable Public Lighting Action Plan

Policy

Table 4: Policy support for sustainable public lighting

No.	Action	Task breakdown	Timeline
1	Adopt the draft <i>Sustainable Public Lighting Guidelines</i> (Appendix 1) for Council-owned and managed lighting	Incorporate energy efficient: <ul style="list-style-type: none"> street lighting requirements in new development/subdivision guidelines public lighting in parks and open space 	2010 and beyond

Implementation

Table 5: Actions to make public lighting more energy efficient

No.	Action	Task breakdown	Timeline
2	Progressively retrofit Council-owned lights	Use the <i>Public Lighting Audit</i> to progressively retrofit Council-owned public lighting. This includes installation of efficient luminaires and decommissioning where appropriate	2009-2020
3	Implement program to improve the efficiency of distributor-owned lighting	<ul style="list-style-type: none"> Distributors to change 80W MV lamps to more efficient lighting. Consider additional upgrades in future years as technology becomes available. Subject to feasibility analysis and risk assessment, decommission lights where lighting output is above Australian Standards 	2010-2015
4	Install local renewable energy generation	Identify technology types, locations and resourcing requirements for local renewable energy generation.	2012 and beyond
5	Purchase 100% GreenPower for lighting	From 2020, purchase 100% accredited GreenPower to achieve zero net emissions if counted as abatement activity under national reporting schemes.	2020 and beyond

Monitoring and review

Table 6: Actions to monitor sustainable public lighting

No.	Action	Task breakdown	Timeline
6	Monitor performance of public lighting	Monitor and record all upgrades to Council-owned public lighting Monitor and record usage and energy costs of Council and Distributor owned public lights	2010 and beyond
7	Review and report on the <i>Sustainable Public Lighting Action Plan</i>	Specifically, review and report on: <ul style="list-style-type: none"> Progress on actions in this plan Greenhouse gas emissions for public lighting Community perceptions of public lighting Ongoing costs of public lighting 	Ongoing

Communication and advocacy

Table 7: Actions to communicate and advocate on sustainable public lighting

No.	Action	Task breakdown	Timeline
8	Consult with community	Advise the community on the reductions in carbon emissions and savings achieved.	Ongoing
9	Act as an advocate for street lighting issues	<p>Council, together with regional bodies such as Municipal Authority of Victoria (MAV) and Western Alliance for Greenhouse Action (WAGA), advocate to State and Federal Government seeking:</p> <ul style="list-style-type: none"> • a State Government contribution for changeover to energy efficient lighting • changes to the 'National Electricity Law' regulations that would require distributors to continually improve the efficiency of streetlight systems as new technology becomes available. • the banning of inefficient (80 watt mercury vapour) streetlights within Australia. <p>Act as advocate to:</p> <ul style="list-style-type: none"> • VicRoads—to incorporate energy efficiency in the management of major road lighting 	2009 and beyond
10	Maintain links to street lighting networks	<ul style="list-style-type: none"> • Maintain contact with trials and actions from other councils around Australia • Where opportunity arises, negotiate regionally for maintenance and design works for Council lighting installations 	<p>Ongoing</p> <p>2010</p>

Appendix 1—Sustainable Public Lighting Guidelines

1. Introduction

Public lighting helps make many of our public spaces more usable and enjoyable for all.

Moonee Valley City Council is committed to providing sustainable public lighting in public areas and has developed these *Sustainable Public Lighting Guidelines* to guide new installations.

These guidelines help decide where and when public lighting is needed, and if so, what sort of lighting should be installed. They assist engineers, landscape architects, urban designers, lighting designers and developers to choose the best lighting schemes for visibility and sustainability. All lighting in Moonee Valley needs to follow these guidelines.

Public lighting in Moonee Valley is designed to:

1. *Make better use of open space*
Allow for public spaces to be used by the community at appropriate times
2. *Create a safer night time environment for the community*
Safety and security is about “good” lighting and not necessarily “more” lighting
3. *Embrace Council’s commitment to sustainability*
Providing better lighting systems will reduce greenhouse gas emissions

These guidelines will help lighting installations for public spaces (including parks and reserves), new developments and subdivisions to incorporate energy efficiency principles as set out in the *Sustainable Public Lighting Action Plan 2010*.

As a complement to these guidelines, Council has audited the energy efficiency performance of all public lighting in Moonee Valley and will progressively retrofit existing lights to meet the above objectives.

The aim of these guidelines is to make sure new lighting is sustainable, well designed and located and meets the Australian Standards for lighting.

2. Defining public lighting

Public lighting in Moonee Valley is made up of street lighting and a variety of other external lighting types such as decorative, sportsground, security and feature lighting.

Street lighting

Street lighting found in residential streets and main roads has standard or non-standard poles, both containing the same basic parts.

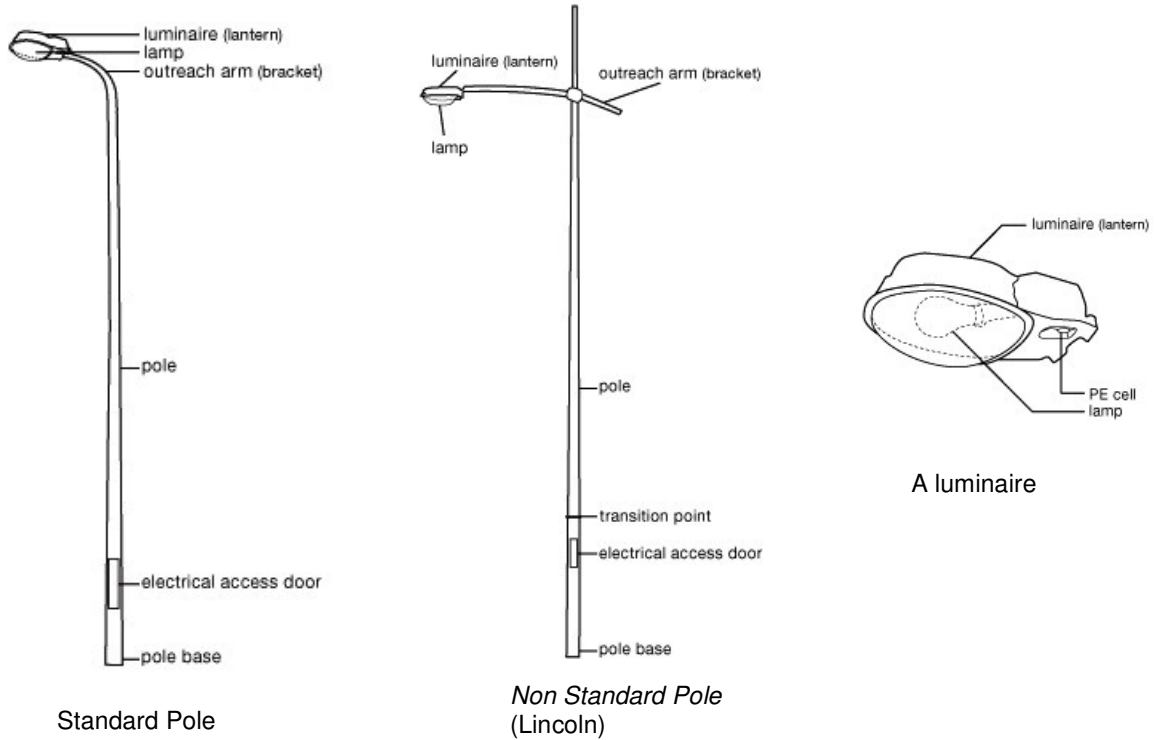


Figure 1: Diagrams of street lighting

1. *Luminaire (lantern)* – A device that distributes, filters or transforms the light given by a lamp or lamps and which includes all the items necessary for fixing and protecting these lamps. Examples of luminaires include 80 watt mercury vapour, high pressure sodium and T5.

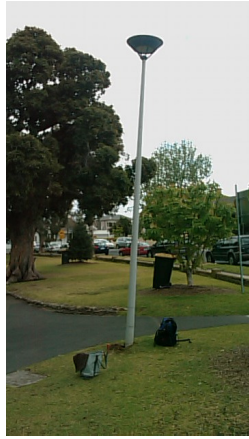


Figure 2: Different types of luminaires

2. *Lamp (globe)* – The lamp emits light and is located within the luminaire (lantern) For example, a T5 luminaire will host two T5 lamps.
3. *Photoelectric (PE) Cell* – A device that is normally incorporated in a luminaire that detects outside light levels to automatically switch the luminaire on and off as required.
4. *Pole*
 - *Base* – the lower section of the pole that is secured to the ground.
 - *Bracket- (outreach arm)* – the supporting connection from the pole to the luminaire.

Decorative lighting

Compliments streetscapes and open spaces.



Sportsground lighting

Enables recreation in the evenings



Building and security lighting

Lights surrounding pathways and car parks



Feature lighting

Enhances urban landscapes



Figure 3: Different types of public lighting

3. Responsibility for public lighting in Moonee Valley

Public lights in Moonee Valley are owned and managed by Council and/or the lighting distributor. There are three different lighting types including:

1. Standard Unmetered Lighting (majority of street lighting in Moonee Valley)

This lighting is owned and managed by the distributor. Council pays a service charge to the distributor to maintain the light and pole over its life.

Street lighting often needs to be installed in new residential subdivisions. Developers propose lighting schemes which then need to be approved by Council. If the developer chooses to use a standard pole then the distributor needs to approve the pole and luminaire.

For standard unmetered lighting, these guidelines provide:

- developers with guidance when proposing lighting schemes so that they can meet distributor and Council requirements
- council staff with tools to assess new lighting schemes.

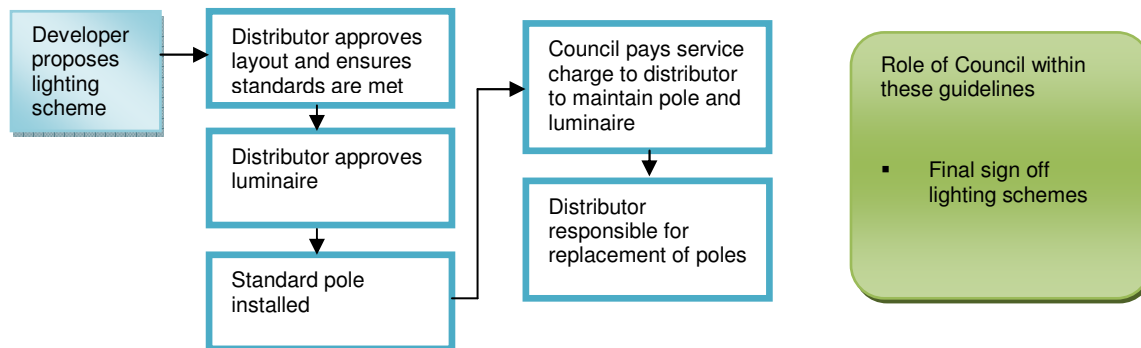


Figure 4: Ownership and management of standard unmetered lighting

2. Non Standard Unmetered Lighting

This lighting is owned by Council and managed by the distributor. Council pays a service charge to maintain the light and pole over its life and Council is responsible for purchasing replacement poles and lights.

This lighting typically occurs in new developments where the developers have requested a non standard pole or where Council installs new decorative street lighting. Council approves the lighting scheme and the pole and the distributor approves the luminaire.

For non-standard unmetered lighting, these guidelines provide:

- developers with guidance when proposing lighting schemes so that they can meet distributor and Council requirements
- developers with specifications for selecting pole and lights to ensure they are energy efficient
- council staff with tools to assess new lighting schemes.

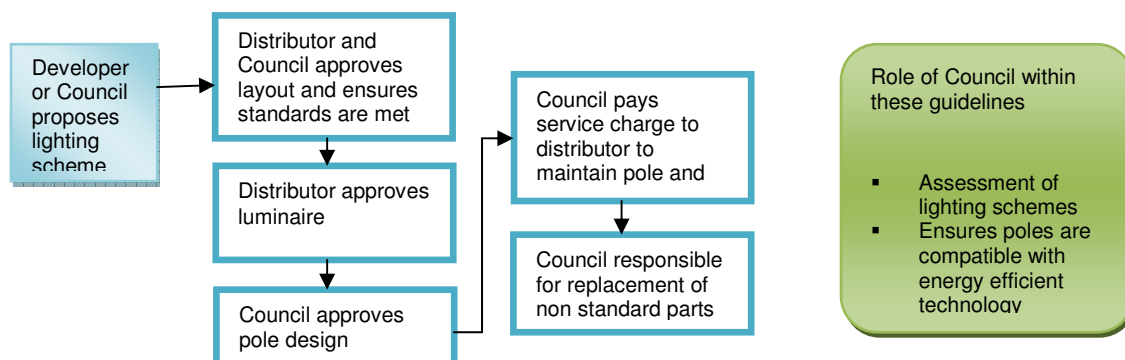


Figure 5: Ownership and management of non standard unmetered lighting

3. Metered lighting

This lighting is owned and managed by Council.

Commonly sports facilities, car parks and open space reserves are connected to a meter to measure energy taken from the electricity network. Some street lighting in Moonee Valley (e.g. Puckle St) is also metered. These lights can have their own meter or be connected to a building, BBQ or other electrical load.

For metered lighting, these guidelines provide:

- guidance when proposing lighting schemes to meet Council needs
- developers with specifications for selecting pole and lights to ensure they are compatible with energy efficient technology
- council staff with tools to assess new lighting schemes

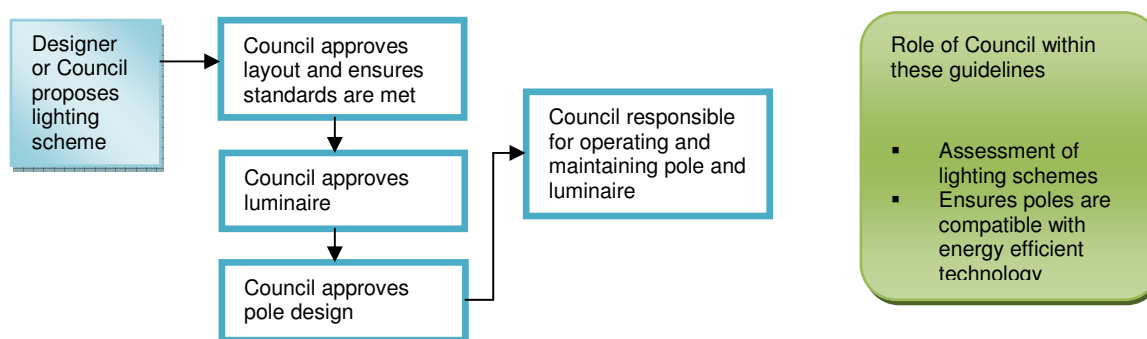


Figure 6: Ownership and management of metered lighting

Summary

Table 1: Summary of ownership and management for public lighting

Type	Pole and Light Ownership	Operation and Maintenance
Standard Unmetered Lighting	Distributor	Council pays service charge to distributor
Non Standard Unmetered Lighting	Council	Council pays service charge to distributor
Metered Lighting	Council	Council directly maintains

Legislation

- AS 1158.3.1:2005: Lighting for roads and public spaces - Pedestrian area (Category P) lighting - Performance and design requirements
- AS 3000:2007: Electrical Installations (known as the wiring rules)
- AS/NZS 1158.6:2004: Lighting for roads and public spaces - Luminaries

4. New public lighting in Moonee Valley

All public lighting in Moonee Valley will consider the following guiding principles:

Table 2: Guiding principles for public lighting in Moonee Valley

No	Guiding principle	More information
1	Making better use of open space	Most people use public space during the day and early evenings. Lighting should support positive evening use but is generally not needed during all hours of the night.
2	Assisting walking, cycling, public transport and driving	Appropriate lighting will allow for higher visibility and encourage people in Moonee Valley to walk, cycle, take public transport and if necessary drive.
3	Showcasing urban features in an effective way	When people are visiting our city, they should see and enjoy our urban features—for example, monuments signs, and public art. Lighting can be an effective way of doing this in key locations.
4	Protecting habitat value areas	In some cases lighting deters native fauna from regular night time foraging and can be harmful to biodiversity.
5	Improving safety	Council will avoid creating a false sense of security by not installing lighting in remote or poorly surveyed locations. Lighting will be discouraged in sites where it promotes inappropriate behaviour after hours in accordance with the <i>Crime Prevention through Environmental Design Guidelines</i> .
6	Reducing greenhouse emissions	Council will install and manage lighting to minimise greenhouse emissions. This will be applied following the hierarchy of energy avoidance, energy efficiency and renewable energy sourcing.

These principles relate to each site in Table 3 below.

Table 3: – Lighting requirements for specific locations in Moonee Valley

Sites/Applications	Requirements
Lighting in parks and reserves	
Regional reserves*	Lights may be installed with timers (see Table 2) in areas of high use. Regional reserves have a higher number of visitors and features that can benefit from lighting.
Nature conservation reserves*	Lighting is not appropriate as it will disrupt local flora and fauna.
Small Local reserves*	Lighting is not appropriate as there is little visitation in these reserves after dark.
Playgrounds	Lighting is not appropriate as playground activity is better suited to daylight hours.
Recreation areas including skate parks, basketball courts, BBQs	Lights may be installed with timers (see Table 2).
Sports facilities - inc. bowls, football, soccer, tennis	Lights may be installed with timers directly linked to time of use (operation hours in the lease or planning permit, or if not stipulated then at 9pm). To avoid environmental spill, sports clubs need to comply with AS4282 Obtrusive Lighting Code for Control Measure 1 for built up residential with no surrounding lights or Control measure 2 for sports fields next to commercial precincts.
Lighting for transport – walking, cycling, public transport and vehicles	

Transport nodes*	Lights may be installed with timers linked to operating hours of public transport. Train Station: set timers to turn lights off after 1am and on at 5am. Tram stops: set timers to turn lights off after 1am and on at 5am. Bus stops: set timers to turn the lights off after 11pm and on at 5am Nightrider bus stops: used on Saturday and Sunday mornings and where there are designated stops lighting may be required from 1:00am to 5:00am
Bike paths	Lights may be installed with timers (see Table 2) on popular commuter routes.
Car parks	Lights may be installed with timers set to the hours of operation of the associated site or building
Laneways	Lights may be installed where the laneway provides a logical shortcut for pedestrians.
Lighting around buildings	
Building security lighting	Lights may be installed with timers directly linked to the operating hours of the building and/or on motion sensors. Motion sensors for all new security lighting installations.
Shopping strip lighting schemes – additional lighting to street lighting	Lighting is not considered appropriate if public lighting already exists. Lighting may be considered if the lighting distributor agrees to remove existing public lighting.
General	
Uplighting/feature lighting of signs, trees, buildings, monuments, art	Lights may be installed with timers based on a needs assessment. Timers installed linked to operation hours of the associated site or building. Solar powered lights with minimal maintenance requirements are preferred.
Areas of High Vandalism	Lights may be installed, subject to trial in the following order: <ul style="list-style-type: none"> • turning lighting off to deter vandalism • using motion sensors • video cameras (inc. the use of dummy cameras) • increase lighting in accordance with the <i>Crime Prevention through Environmental Design Guidelines</i>

*As defined in Open Space Strategy

Use of timers for public lighting

In many of Council's open space areas, lighting does not need to be on all night. This depends on how the area is being used. New applications for lighting will need to specify the intended purpose of the lighting scheme in order to determine settings for timers. Table 2 guides the use of timers in lighting installations.

Currently timers are only able to be installed on Council owned metered public lighting schemes.

Table 4: Use of timers in open space

Open Space Use	Proposed Times		Rationale
	Winter	Summer	
Commuting – journey to work, public transport and cycling	Switch off at 1am Switch on at 5am	Switch off at 1am Switch on at 5am	Commuter routes are linked to operation times of public transport and venues.
Recreation – exercising, dog walking	Switch off at 11pm Switch on at 5am	Switch off at 12am Switch on at 5am	Activities such as exercising and dog walking usually occur prior to 11pm in winter months and 12am in summer months.
BBQ, picnics and social gatherings	Switch off at 9pm	Switch off at 10pm	Turning lights off after 10pm will discourage alcohol consumption and encourage people to move elsewhere.

Requirements for new public lighting in Moonee Valley

Council will support lighting installations that meet these guidelines.

Final approval for additional lighting will be decided after considering proof of need, sustainability and community feedback where necessary

When proposing a new lighting scheme in Moonee Valley, please submit the relevant checklists as specified in flow chart below:

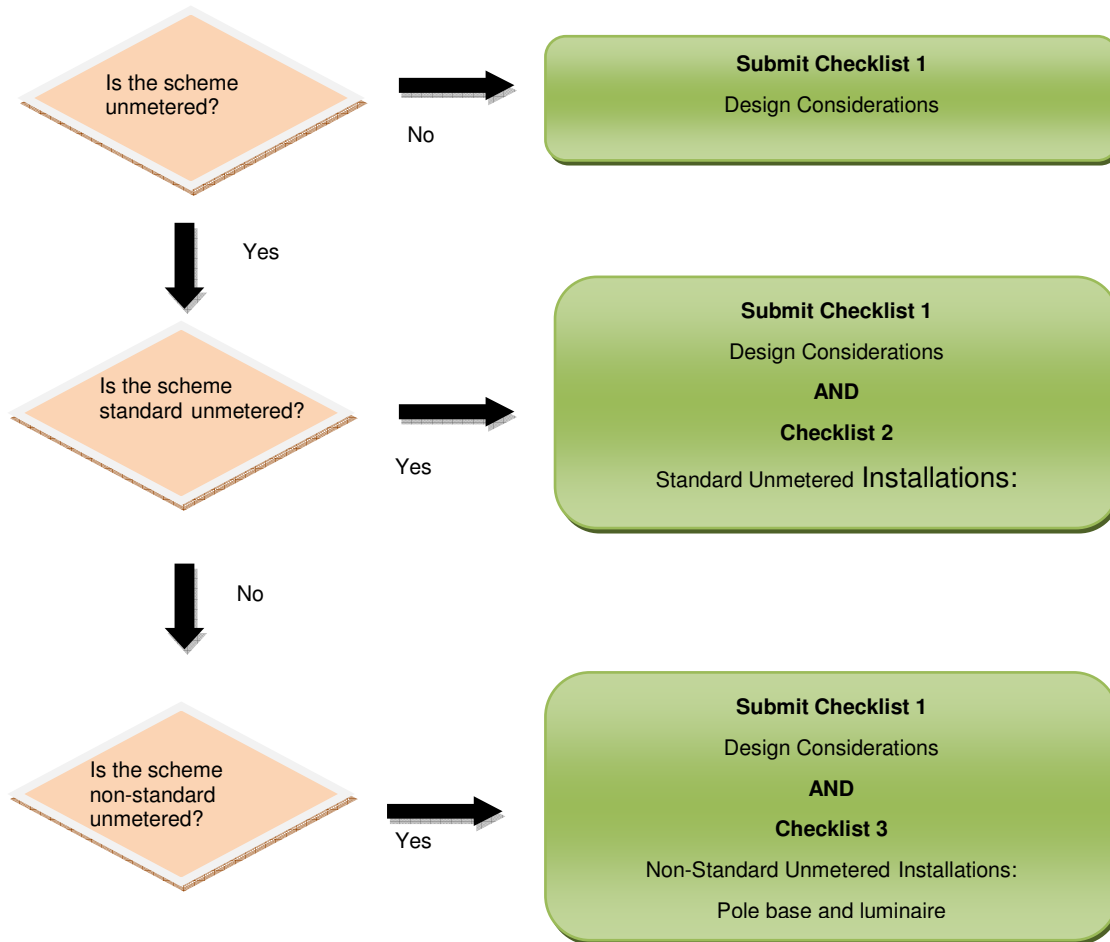


Figure 7: User flowchart for new public lighting proposals

Checklist 1 – Design Considerations

Applicant Name

Site Name

Site Details (intended use of site).....

Attachments	
<input type="checkbox"/>	Has a lighting plan been submitted?
<input type="checkbox"/>	Have “as built” drawings including details of make and model numbers of lamps been submitted?

All new lighting installations in Moonee Valley must address the following requirements.

1. Assess the need for lighting	
<input type="checkbox"/>	Is there a need for lighting according to the Australian Standards?
<input type="checkbox"/>	If there is a need in the Australian Standards, has the designer used the correct category i.e. not lighting above the necessary level required for a particular area?
<input type="checkbox"/>	Does the lighting scheme meet requirements of Table 1 of these guidelines?
2. Efficient lighting scheme design	
<input type="checkbox"/>	Do any timers being installed meet the requirements of Table 2 of these guidelines?
<input type="checkbox"/>	Does the scheme avoid street light spill and overlap in design?
<input type="checkbox"/>	Is the proposed luminaire energy efficient?
3. Life cycle considerations	
<input type="checkbox"/>	Are long lasting materials being used?
<input type="checkbox"/>	Can the proposed materials be recycled or reused at end of life?
4. Additional Information	
<input type="checkbox"/>	<p>If the proposed lighting scheme is not aligned with these guidelines, then an application needs to be made Council identifying a clear need for the variation.</p> <p>Submissions will be considered more favourably if the following criteria are addressed:</p> <ul style="list-style-type: none"> • best practice energy efficiency • community need • potential for generation of onsite renewable energy to match lighting energy needs. <p>Where applications do not follow the requirements set out in these guidelines, applicants may be required to provide</p> <ul style="list-style-type: none"> • itemised estimate of annual energy consumption arising from the project • itemised estimate of annual maintenance costs arising from the project. <p>Comments</p>

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Internal Use Only

Facilities Management Approval Yes / No
Hold points required during construction Yes / No Details
Signed
Date

Project Manager Approval Yes / No
Signed
Date

Checklist 2 – Requirements for Standard Unmetered installations

All new standard unmetered installations must address the following requirements

Pole design

The following pole requirements are for new public lighting installations categorised under P1-4 of Australian /New Zealand Standard (AS/NZS) 1158.3.1:2005 and AS 3000:2007.

Is the mounting height for bracket installation no less than 6.5m above ground level?

Increasing the pole heights, increases pole spacing (particularly when road reserve widths are over 18m). Light numbers can be reduced resulting in reduced maintenance costs, energy costs and greenhouse emissions.

Light spill into areas outside road reserves is undesirable and needs to be evaluated in areas that are sensitive to this, including narrow road reserves or laneways and areas of ecological significance

Increasing the pole heights also reduces vandalism.

Is the pole design a distributor approved Standard URD design?

Does the pole allow compatibility for a side entry installation for the light fitting?

Side entry poles allow for a wider range of light fittings (luminaires) including energy efficient lineal fluorescent luminaires to be fitted.

Modular poles with removable outreach arms can allow refitting of a top entry arm to allow side entry lights.

For major lighting, where typically higher wattage lighting (e.g. 150W MH/HPS etc.) is used, this recommendation is not relevant because lineal fluorescents do not perform as well at these lighting levels.

Coating Systems

Will the pole be coated?

Uncoated galvanised steel poles aren't recommended for use in marine environments. Exposure forms zinc salts/oxides which lead to early corrosion.

Luminaire requirements

The following luminaire requirements and comments are for new public lighting installations categorised under P1-5 of Australian /New Zealand Standard (AS/NZS) 1158.3.1:2005 and AS 3000:2007.

Have the luminaires been approved by the local distributor?

Proof can include a copy of the approval letter for luminaire.

Does the lamp have an efficacy of no less than 60 lumens per watt after 4 yrs of lamp life?

See Appendix 1 for more details on the main lighting types and efficacy.

This eliminates energy inefficient light types such as the 80W Mercury Vapour (MV).

Note for Category V lighting HPS lights are recommended as currently the most cost and energy effective⁵.

Does the lamp provide a spectral component that includes blue end light?

Light sources providing blue end light provide the best seeing conditions in low light situations (such as parks and residential streets).

Are the PE cells electronic?

Electronic PE cells are more accurate, last longer and use less energy than basic thermal D2 cells. For further details of PE cell analysis contact Ironbark Sustainability (www.ironbarksustainability.com.au)

Internal Use Only

Engineering Department Approval Yes / No

Signed

Date

Project Manager Approval Yes / No

Signed

Date

⁵ Roadway lighting guide to traffic engineering practice part 12', AUSTRROADS.

Checklist 3 – Requirements for Non Standard unmetered (decorative) installations

All new non standard-unmetered installations must address the following requirements

Pole design

The following pole requirements are for new public lighting installations categorised under P1-4 of Australian /New Zealand Standard (AS/NZS) 1158.3.1:2005 and AS 3000:2007.

- Is the mounting height for bracket installation no less than 6.5m above ground level?**
 - *Increasing the pole heights, increases pole spacing Light numbers can be reduced resulting in reduced maintenance costs, energy costs and greenhouse emissions.*
 - *Light spill into areas outside road reserves is undesirable and needs to be evaluated in areas that are sensitive to this, including narrow road reserves or laneways and areas of ecological significance*
- Is the pole either Lincoln or Standard URD design?**
- Is the pole modular in construction with at least three main components – the base, straight pole and bracket arm?**
 - *The base and straight pole will be the same across Councils asset base and the bracket can be used to differentiate different design sectors.*
 - *If a section of the pole is damaged, it can easily be replaced, reducing future maintenance costs and material wastage.*
- Does the pole allow compatibility for a side entry installation for the light fitting?**
 - *Side entry poles allow for a wider range of light fittings (luminaires) including energy efficient lineal fluorescent luminaires to be fitted.*
 - *Modular poles with removable outreach arms can allow refitting of a top entry arm to allow side entry lights.*
 - *For major lighting, where typically higher wattage lighting (e.g. 150W MH/HPS etc.) is used, this recommendation is not relevant because lineal fluorescents do not perform as well at these lighting levels.*

Coating systems

- Is the coating finished with a matt paint using the colour ‘Sparkling Aluminium’?**
- Will the coating system ensure a long service life with reduced maintenance?**
 - *A heavy duty zinc protective coating or two pack adhesion promoting primer over a sand blasted, galvanised steel pole to prevent corrosion, followed by two coats of two pack aliphatic polyurethane⁶*
 - *Surface scratches can be repainted with the recommended finishing coat. If rust is present, it must be removed and the affected area repainted in accordance with the recommended method for new poles.*

Base

- Where the pole is located in parks, gardens and shopping centres, is the base on a rag bolt assembly secured into a reinforced concrete base?**
 - *This shall be done in accordance with manufacturer’s specifications and local site conditions.*
- Where the pole is located in any other area, is the base of the pole mounted onto a base plate mounted to the pole?**
 - *The base plate must be either stainless steel or concreted into the ground for the entire base length to ensure base strength and longevity*

Luminaire requirements

The following luminaire requirements and comments are for new public lighting installations categorised under P1-5 of Australian /New Zealand Standard (AS/NZS) 1158.3.1:2005 and AS 3000:2007.

- Have the luminaires been approved by the local distributor?**

Proof can include a copy of the approval letter for luminaire.
- Does the lamp have an efficacy of no less than 60 lumens per watt after 4 yrs of lamp life?**

This eliminates energy inefficient light types such as the 80W Mercury Vapour (MV).

Note for Category V lighting HPS lights are recommended as currently the most cost and energy effective⁷.
- Does the lamp provide a spectral component that includes blue end light?**

Light sources providing blue end light provide the best seeing conditions in low light situations (such as parks and residential streets).
- Are the PE cells electronic?**

Electronic PE cells are more accurate, last longer and use less energy than basic thermal D2 cells. For further details of PE cell analysis contact Ironbark Sustainability (www.ironbarksustainability.com.au)

Internal Use Only

Engineering Department Approval Signed Date	Yes / No
Project Manager Approval Signed Date	Yes / No

⁶ Examples of products recommended include (Wattyl) Sigma EP universal primer/Epinamel primer 250 and Sigadur400/Poly U400 or Dulux 2 Pak Acrathane IF paint for the finishing coats.

⁷ Roadway lighting guide to traffic engineering practice part 12'. AUSTRROADS.

Appendix 2—Federal, State and regional stakeholders

No.	Stakeholder	Role
Federal		
1	Australian Energy Regulator (AER)	The AER is a Federal Government regulatory authority and is responsible for ensuring that public lighting pricing and management is fair and reasonable. It has responsibility for the <i>Public Lighting Code</i> .
2	Council of Australian Governments (COAG)	In June 09, COAG signed off on the <i>National Strategy of Energy Efficiency</i> and has recognised the importance of increasing the energy efficiency of street lighting. COAG are currently considering the introduction of mandatory standards for lighting energy efficiency while considering cost implications for local government.
State		
3	Department of Sustainability & Environment (DSE)	DSE has established a public lighting taskforce that aims to create a more transparent technology review pathway for energy efficient lighting and a more open dialogue between customers—local government, VicRoads and the electricity distributors. As part of the above public lighting taskforce, DSE committed to lead a financial and policy analysis project for more efficient street lighting on local roads. The project will directly inform the Victorian Government on potential policy intervention, including funding contributions.
4	VicRoads	VicRoads is responsible for major roads in Victoria. The street lighting on these roads is jointly funded by councils and VicRoads. VicRoads are currently assessing the technical and financial implications of using active reactors in major road lighting.
Local		
5	Municipal Authority of Victoria (MAV)	The MAV is the peak representative body for Victorian councils. The MAV Public Lighting Customer Innovation Committee will assess all new lighting technologies before final assessment is made by an approvals board chaired by DSE.
6	Greenhouse Alliances	Moonee Valley City Council is a founding member of the Western Alliance for Greenhouse Action (WAGA), which also includes the cities of Brimbank, Hobsons Bay, Maribyrnong, Melton, Moonee Valley Moorabool and Wyndham. WAGA is one of six greenhouse alliances that represent around 50% of Victorian councils. Sustainable public lighting has been identified as a key issue for WAGA.
7	Moonee Valley City Council	Council pays a public lighting operations and maintenance charge to a distributor. In Moonee Valley, the current distributor is Jemena Electricity Networks (VIC) Ltd. Council also purchases electricity for street lights from an energy retailer—currently AGL.
Other		
8	Distributor	The majority of public street lights in Victoria are maintained by distributors—namely, SP-Ausnet, Powercor/Citipower, United Energy and Jemena Electricity Networks (VIC) Ltd. Jemena Electricity Networks (VIC) Ltd is required to provide this service for Moonee Valley and is required to abide by the <i>Public Lighting Code</i> in the provision of these services. Council's relationship with Jemena Electricity Networks (VIC) Ltd is critical in implementing sustainable street lighting. All new unmetered street lighting must meet the approval of its distributor, Jemena Electricity Networks (VIC) Ltd.

Appendix 3—Energy efficient options

Preferred energy efficient options to improve the sustainability of Moonee Valley’s public lighting stock include:

1. Twin 14W and 24W T5 lights—for low wattage lighting, Category P road lighting and ≤ 150W
2. 32W compact fluorescent lights—for low wattage lighting, Category P road lighting and ≤ 150W
3. 150W metal halide (MH) or high pressure sodium (HPS) lights
4. active reactors on high wattage lighting—Category V road lighting and ≥150W
5. time control options.

Refer to the table below for more information on each option.

No	Energy efficient options	More information
1	Twin T5 lamps	<p>Twin 14W and 24W T5 lamps are linear fluorescent lights that have been accepted for use in Victoria. These lights provide a high quality light for residential streets, parks and car parks and reduce energy consumption by:</p> <ul style="list-style-type: none"> • 68% compared to an 80W MV • 53% when replacing a 50W MV <p>These fittings can also fit 24W tubes which provide a similar service as the 125W MV luminaires⁸.</p> <p>Their maintenance and failure rates are similar to the existing 80W MV with the exception of an electronic ballast which is likely to require replacing at 8 – 12 years.</p> <p>Note that the 80W MV ballast does not require changing.</p>
2	32W compact fluorescents	<p>Compact fluorescents (CFL) are currently being trialled in Victoria as a replacement option for 80W MV lamps.</p> <p>The major benefit of CFLs is their suitability for any luminaire. They provide a high quality light for residential streets and reduce energy consumption by 49%. However, CFLs:</p> <ul style="list-style-type: none"> • are not yet approved for use in Victoria • have the same issue as twin T5 lamps in regards the need to replace their electronic ballast.
3	150W MH or HPS lamps	<p>250W and 125W MV lamps are inefficient and can be replaced with more energy efficient options such as 150W MH or HPS lamps.</p> <p>There is further opportunity to enhance this efficiency with the inclusion of the active reactor in the new MH and HPS units.</p>
4	Active reactors	<p>Active reactors are an electronically-controlled magnetic ballast. They can control the power to all higher wattage MH, HPS and MV lamps in the power range 150W-2000W, which includes street lighting, car park lighting and many floodlighting applications such as sports grounds.</p> <p>Active reactors save around 17.5% of the energy over the life of the luminaire of a standard MH fitting and 22.5% for standard HPS lamps.</p>

⁸ Note that the spacing for the T5 is slightly greater than the 80W MV and the spacing for the 24W T5 is slightly smaller than the 125W MV. Analysis of each 125W light would need to be completed prior to a change over being recommended.

No	Energy efficient options	More information
		<p>The units are expensive—currently around \$240 on top of the luminaire cost. However, lamp change over costs will be reduced as the lamp life is significantly improved—around 30% extra life for a standard MH lamp and 50% for HPS lamps.</p> <p>The active reactor is currently not approved for use on streetlights managed by Jemena Electricity Networks (VIC) Pty Ltd.</p>
5	Time control options	<p>A trial conducted by Banyule City Council from 2004 to 2006 on the different types of photo-electric cells concluded that more efficient photo-electric cells can save around 0.3 hours daily—that is, around 3% of energy usage.</p> <p>Other time control options include intelligent sensing such as timers that turn lighting off after a set time and reduce the lighting levels to different categories.</p> <p>For further information on light quality and energy consumption on the lights listed above, refer to the <i>Sustainable Public Lighting Report 2006</i>, prepared by Agility.</p> <p>Timers are not authorised for use on streetlights managed by Jemena Electricity Networks (VIC) Pty Ltd.</p>

Estimated savings

Refer to the table below for the estimated savings that Council will receive by implementing more energy efficient options. Before a bulk change, a design assessment needs to be completed to identify the requirements and energy savings of the new energy efficient lighting scheme.

Qty	Current type	Preferred replacement option	Annual greenhouse savings if replaced	Annual energy savings if replaced (kWh)	Annual energy cost savings if replaced*	% energy reduced
174	125W MV	Twin 24W T5	85.2	68,834	\$5,369	65%
2311	150W HPS	Same with Active Reactor	425.6	343,831	\$26,819	20%
154	150W HPS	Same with Active Reactor	9.4	7,561	\$590	20%
651	250W HPS	Same with Active Reactor	189	152,842	\$11,922	20%
53	250W HPS	Same with Active Reactor	5	4,106	\$320	20%
87	250W MV	Same with Active Reactor	25	20,426	\$1,593	20%
1	2x20W Fluorescent	Twin 14W T5	0	84	\$7	39%
21	400W HPS	Same with Active Reactor	10	7,946	\$620	20%
41	400W MV	250W HPS with Active Reactor	48	39,068	\$3,047	50%
1	40W Fluorescent	Twin 14W T5	0	84	\$7	39%
2	50W MV	Twin 14W T5	0	297	\$23	53%
5787	80W MV	Twin 14W T5	2012	1,624,932	\$126,745	68%
Avoid overlighting—additional to savings above if completed			113	86,338	\$6,734	86%
Totals			2922	2,356,349	\$183,796	44%