Placemaking NSW

The Rocks | Tallawoladah Lighting Strategy

JANUARY 2025

Acknowledgment of Country

We acknowledge Gadi Country, her lands, sea and sky, we acknowledge her custodians, the people of the Grass tree, their kin the Wangal, Bidjigal, Cabrogal and Cammeraygal who often visited this Country to connect and share. We offer our respect to their Elders both past and present.

We advise that this resource may contain images, or names of deceased persons in photographs of historical content.

It should be noted that the precinct names selected and applied for this document are known as The Sydney Language, names so for the purposes of Placemaking NSW's Reconciliation Action Plan. We acknowledge that there are numerous Aboriginal language place names, including Gadigal, Wangal, Cammeraygal and Dharawal, connected with these precincts.

The Rocks | Tallawoladah Lighting Strategy

Published by Placemaking NSW

First Published January 2025

More Information

The Rocks | Tallawoladah Lighting Strategy has been prepared by FPOV in collaboration with Placemaking NSW

Acknowledgements

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Executive Summary

What is The Rocks | Tallawoladah Lighting Strategy?

This strategy has been prepared to guide the strategic and considered design, delivery, maintenance and renewal of lighting across The Rocks.

Why is it useful?

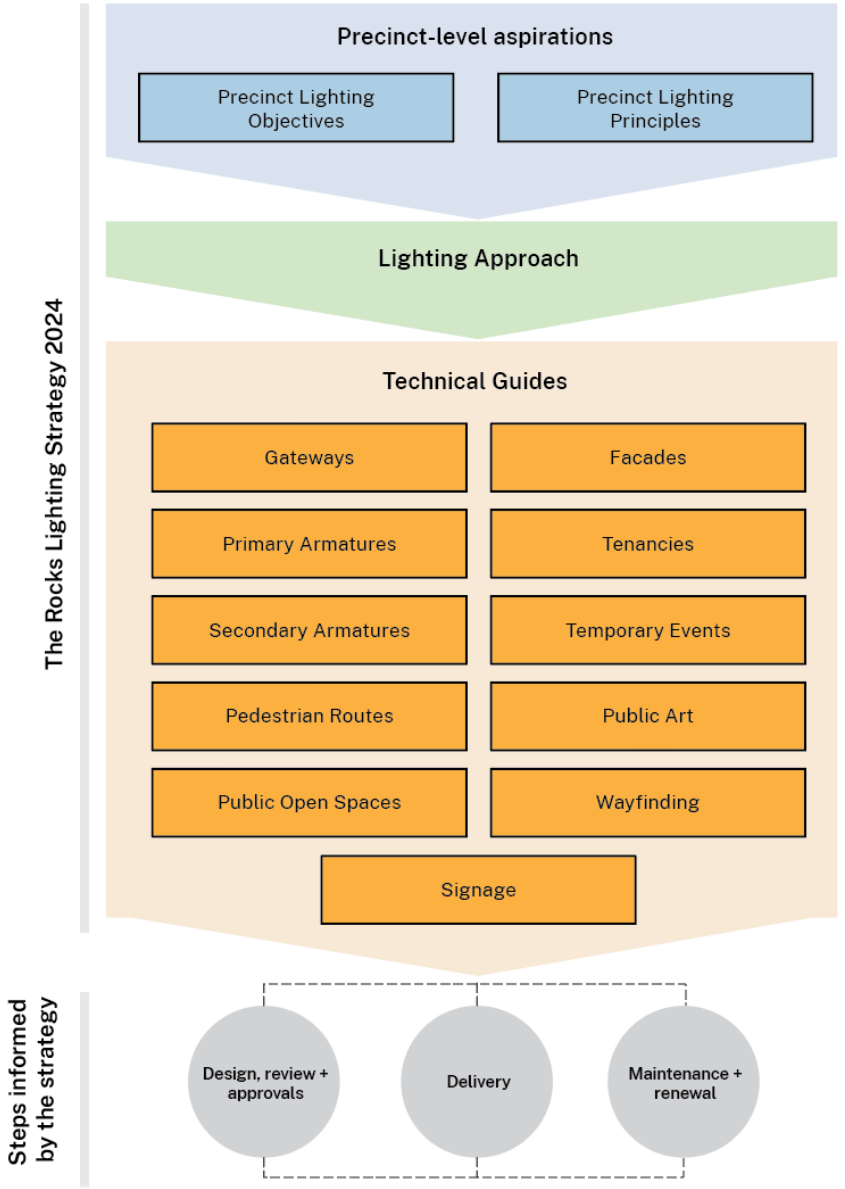
Consistent and coordinated public domain and external lighting is key in supporting the safe and inclusive use and activation of The Rocks. Lighting plays a crucial role in distinguishing the character of The Rocks from Sydney CBD and highlighting the unique stories of this place.

Who is this strategy for and when should it be used?

The strategy is to guide the development and delivery of lighting proposals for The Rocks, whether led by Placemaking NSW or partner organisations.

The objectives and recommendations of this strategy should be considered (but not limited to) when the following works are undertaken:

- Upgrade or refurbishment of existing buildings (internal and external facades)
- Significant building works to tenancies
- New building development
- Upgrades to the public domain including wayfinding
- Lighting renewal and upgrades including major maintenance.



Document structure and implementation steps

1 Introduction

1.1 The Character of The Rocks

The Rocks | Tallawoladah (The Rocks) is a distinctive and diverse precinct in the heart of Sydney, exemplified by its physical form as well as its dynamic community. It features a vibrant tourist profile, retail and cultural offerings, dining, recreation spaces and a lively night-time scene centred around food and beverage premises.

The precinct is steeped in a heritage context that is celebrated through architecture, tours, interpretation, and museum displays. The character of The Rocks is not a nostalgic pastiche, but rather a living and changing Australian place that bears unique marks of history and topography, including its Aboriginal and environmental heritage.

Its unique landforms, relationship to the harbour and urban fabric contribute to a visually rich visual and historic character. Due to its location and relationship to Sydney Harbour, Sydney Opera House, Sydney Harbour Bridge, and CBD, the precinct is a highly visited destination for regional and international tourists alike.

The Rocks is in a period of transition. While historically, the precinct has been known as a tourist destination, the future vision for The Rocks is focused on the creation of a cohesive and place-specific identity that attracts locals and regional visitors and drives repeat visitation. This is being facilitated through greater embedding stories of Country, renewal of the public domain, care of our heritage assets and environment and ongoing curation of retail and events.

The Rocks | Tallawoladah Lighting Strategy provides the opportunity to support and underpin this evolution with a coordinated and cohesive lighting approach, and robust infrastructure that provides the best opportunity to put on show the unique and historic characteristics of this place.

Events and activations within The Rocks are a key part of driving ongoing interest and visitation to the precinct. Amongst a weekly program of local events, key attractors to The Rocks also include some of Australia's most significant and iconic events including New Years Eve, Australia Day celebrations, and Vivid. This strategy acknowledges that these create temporary shifts in the character of the precinct and highlights opportunities to balance the vitality that these events bring, with a respect for the existing environment.

Figure 1.1 (top) The Rocks - Street view down George Street, Anna Kucera

Figure 1.2 The Rocks at Night, Anna Kucera

1.2 Overview

This document has been developed by Firefly Point Of View (FPOV) in collaboration with Placemaking NSW (PMNSW). This document identifies and defines exterior lighting objectives and strategies for The Rocks | Tallawoladah, with the aim of improving the public domain and the night-time illumination of The Rocks.

The strategy provides best practice guidelines, aspiring to:

- **Enhance the unique architectural** and **heritage character** of The Rocks at night-time to create an inviting and engaging destination that is **distinctly softer and warmer** than the surrounding CBD area.
- Provide **sufficient illumination** for public safety and amenity.
- Create a **cohesive public domain** using light and luminaires.
- Use **layers of light** for functional (task, ambient) and feature (accent, wayfinding) lighting to resolve current issues of uneven lighting and areas of high contrast that lead to feelings of poor safety.
- **Minimise glare** throughout the precinct.
- **Enable efficiency in management** and maintenance through rationalisation of luminaires and infrastructure.
- **Minimise environmental impacts** such as reducing sky glow through control of artificial lighting and keep energy usage to a minimum using efficient and latest lighting technology.

The guidance within this strategy establishes a clear lighting hierarchy to support a cohesive precinct identity. The strategy also intends to provide flexibility that allows design interpretation to suit the diverse character, conditions, and experiences within the precinct.

This strategy applies to those parts within the study area (shown to the right), including buildings, streets, and public open space.

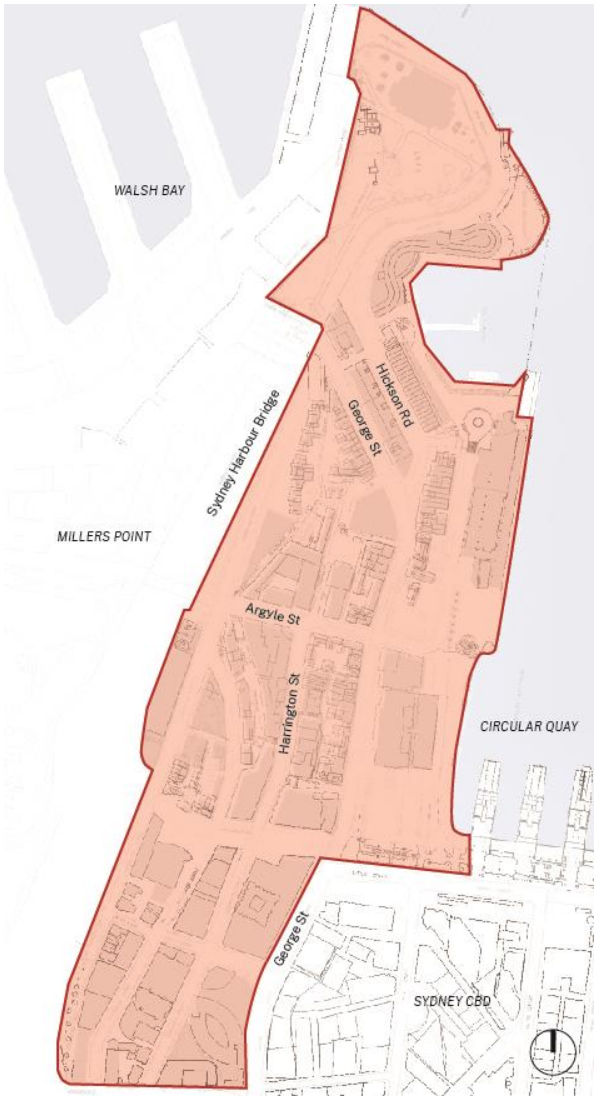


Figure 1.3: The Rocks Lighting Strategy Area.

1.3 Connecting with Country

Placemaking NSW is committed to the Government Architect's Connecting with Country Framework, which provides guidance on how to respond to Country in the planning, design, and delivery of built environment projects in NSW. It states:

'Healthy Country describes healthy, interconnected natural ecosystems, supported by regenerative and sustainable environmental practices.'

Our commitment to designing with Country is guided by the voices of First Nations people and an understanding and appreciation that Country should be at the heart of planning and placemaking.

Understanding the unique aspects and qualities of Country enables a deeper understanding of the landscape and natural processes, allowing us to plan to work with the land and climate, not against them, which leads to more sustainable outcomes.

This principle of regeneration and caring for Country is at the heart of how we approach the design and management of our places and guides the desire for a place that is resilient and integrated into the local and broader community in a meaningful way.

It also provides a richer narrative and understanding of specific places, reinforcing our role as caretakers of the land for future generations.

Lighting-related considerations should include:

- Selection of luminaires that are fit for purpose to ensure longevity of use, energy efficient and can be re-used or re-cycled at the end of its life.
- Consideration for locally sourced material or locally made luminaires to minimise environmental impact and support local economies.
- Minimise impact on the natural environment by minimising light spill into the sky or onto waterbodies.
- Highlighting and celebrating natural site features and heritage fabric to interpret stories of the past and its ongoing connection to the present.

Integration of lighting design as a core part of public domain projects that ensures Connecting with Country principles are embedded across all project disciplines.

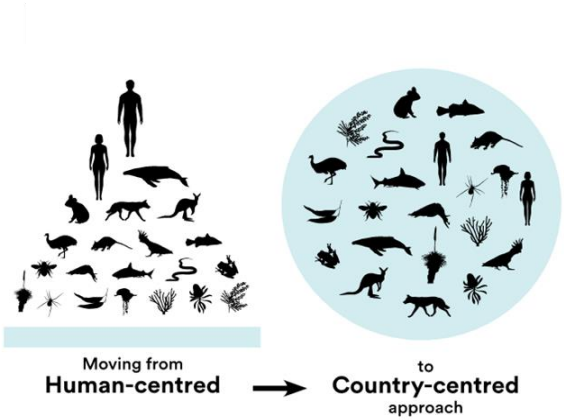


Figure 1.4 Taking a Country-centred approach; Connecting with Country Framework, GANSW

1.4 The Rocks | Tallawoladah Women's Safety Strategy (2024)

The Rocks | Tallawoladah Women's Safety Strategy (Women's Safety Strategy), created as part of NSW Government's Safer Cities Program, aims to:

- Improve real and perceived safety for women, girls, and gender-diverse people enhancing their ability to move freely within The Rocks.
- Revitalise the precinct as an engaging destination to explore.

Studies show that women prioritise safety over convenience when moving through and within public spaces. They feel safest in activated public spaces, where there are people around no matter what time of day. Good lighting, along with ease of navigation and public space that looks cared for, are the other major contributors to what makes public space feel safer for women.

The character of The Rocks (that is, heritage fabric, views to the water, and a sense of discovery) is a key attractor to women and girls in the daytime but the visibility of these features is lost at night.

For lighting to enhance the safety and mobility for women and girls in The Rocks, more needs to be done than simply meeting minimum functional lighting requirements or standards. Higher levels of illumination does not equate to an increased perception of safety. A consistent and layered lighting approach with multiple light sources and where surfaces with different reflective values, makes women feel most safe. Spaces with warmer colour temperatures and high-quality light that enables shapes and colours to be distinguished help to create a sense of safety.

Informed by workshops and technical assessments of 10 sites across The Rocks, The Women's Safety Strategy identifies these lighting-related actions to positively contribute to perceived safety:

- Highlighting the architectural features of the built heritage of The Rocks.
- A consistent lighting approach, reduced contrast between illuminated and non-illuminated areas.
- Improved accent and wayfinding illumination to support navigation and enable greater predictability when moving through the precinct e.g., task lighting towards stairs.
- Implementation of warmer and consistent colour temperatures.
- Replacement of faulty lights.
- Removal of harsh lighting (glare).
- Provision of tenancy lighting guidelines to include after-hours lighting.

Figure 1.5 Women at an event in The Rocks, Anna Kucera

1.5 Compliance with Environmental Guidelines

Urban ‘sky glow’ is the result of stray light, both direct and reflected, being scattered in the atmosphere, brightening the natural sky background level. It is in the national interest that no further degradation of the night sky over Sydney occurs.

In recent years, the City of Sydney has been active in trying to reduce sky glow with its *Exterior Lighting Strategy* (2000) and through the installation of full cut-off light fittings on major streets and many public spaces. Any significant increase in light pollution in the CBD and The Rocks will affect the operation of the Sydney Observatory.

A key objective of this strategy is to minimise light spilling into the night sky, whilst recognising the fact that the urban environment of a large city has competing interests in creating an inviting night-time environment for its residents, tenants, and visitors.

Much of the precinct sits within the Sydney Opera House Buffer Zone, as outlined in *Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005*. All lighting must be designed to avoid detracting from the views and vistas to the Sydney Opera House to preserve its visual prominence.

All lighting must respond to the relevant Conservation Management Plans to preserve and enhance The Rocks' unique heritage character.

Figure 1.6 Light pollution of Sydney as seen from Hawkesbury Lookout at Hawkesbury Heights, Wolter Peeters

1.6 Compliance with Australian Standards

All public lighting must facilitate safe use of the precinct at night through the application of appropriate light levels which includes vertical and horizontal illumination and lighting appropriate for CCTV.

All luminaires must adhere to the relevant Australian Standards for construction and safety. All installations, including street lighting for vehicles and pedestrians, feature lighting such as façade, signage illumination, and any decorative lighting, are to comply with:

- Australian Standard AS/NZS 1158.1.1: 2022 Lighting for Roads and Public Spaces
- Australian Standard AS/NZS 4282: 2019 Control of the Obtrusive Effects of Outdoor Lighting
- Australian Standard AS 1428.2-1992 Design for access and mobility

Lighting designers, engineers, and local authorities must follow these standards to ensure outdoor lighting meets safety and environmental requirements, delivering adequate illumination without causing excessive light pollution or discomfort to residents and the surrounding ecosystem.

The design process, including methods of calculation and software used, should be fully described and all information supplied with the development application. This includes copies of approved test reports by the National Association of Testing Authorities (N.A.T.A.) certified photometric laboratories.

Placemaking NSW may request the photometric data from the test reports for independent appraisals as well as a demonstration of the appropriate IP rating (for the proposed locations) to ensure appropriate durability, safety, and lifecycle efficiency.

1.7 Approval Procedures

The planning and approval pathway for lighting works will depend on their location, scale, type, and impact on heritage or archaeological fabric. All lighting works require the landowner's consent from Placemaking NSW.

The Rocks is an area of national heritage significance, with over 100 state and locally listed heritage assets. These assets are protected under the *NSW Heritage Act 1977*. Any work to historically significant fabric or proposed impacts to key views to or from a heritage site may be subject to the relevant heritage approval process under Section 60 (as an application) or Section 57 (as an exemption). If a Section 60 application is required, a Development Application must also be lodged with the relevant consent authority for assessment in accordance with the *Environmental Planning and Assessment Act 1979*.

State Environmental Planning Policy (Planning Systems) 2021 sets out that the City of Sydney will be the consent authority for development valued under $10 million that complies with the *Sydney Cove Redevelopment Authority Scheme*. The City of Sydney will therefore be the consent authority for most lighting works.

Applicants should seek advice from their property manager and a qualified urban planner to determine the appropriate planning and approval pathway for the proposed works.

1.8 Need for Specialist Design Advice

Applicants should engage qualified independent lighting designers, architects, urban designers, heritage consultants and planning consultants, as required, to assist in the preparation of their application for lighting. This should include a pre-lodgement discussion with the relevant landowner.

As well as considerations for the items outlined in this lighting strategy, the application is to specifically address the following:

- Building character
- Urban design context
- Ambient lighting levels
- Visibility from external vantage points
- Energy efficiency

In addition, a lighting study and lighting simulation will also be required to demonstrate that relevant Australian Standards have been achieved, and that light spill has been mitigated.

Photomontages of light fittings may also be required, to ensure that visual impacts in relation to historic facades and streetscapes are minimised, and that urban design objectives are achieved.

Specialist lighting advice should also be sought for upgrade or modification of existing lighting schemes to ensure that appropriate lighting levels and safety is maintained.

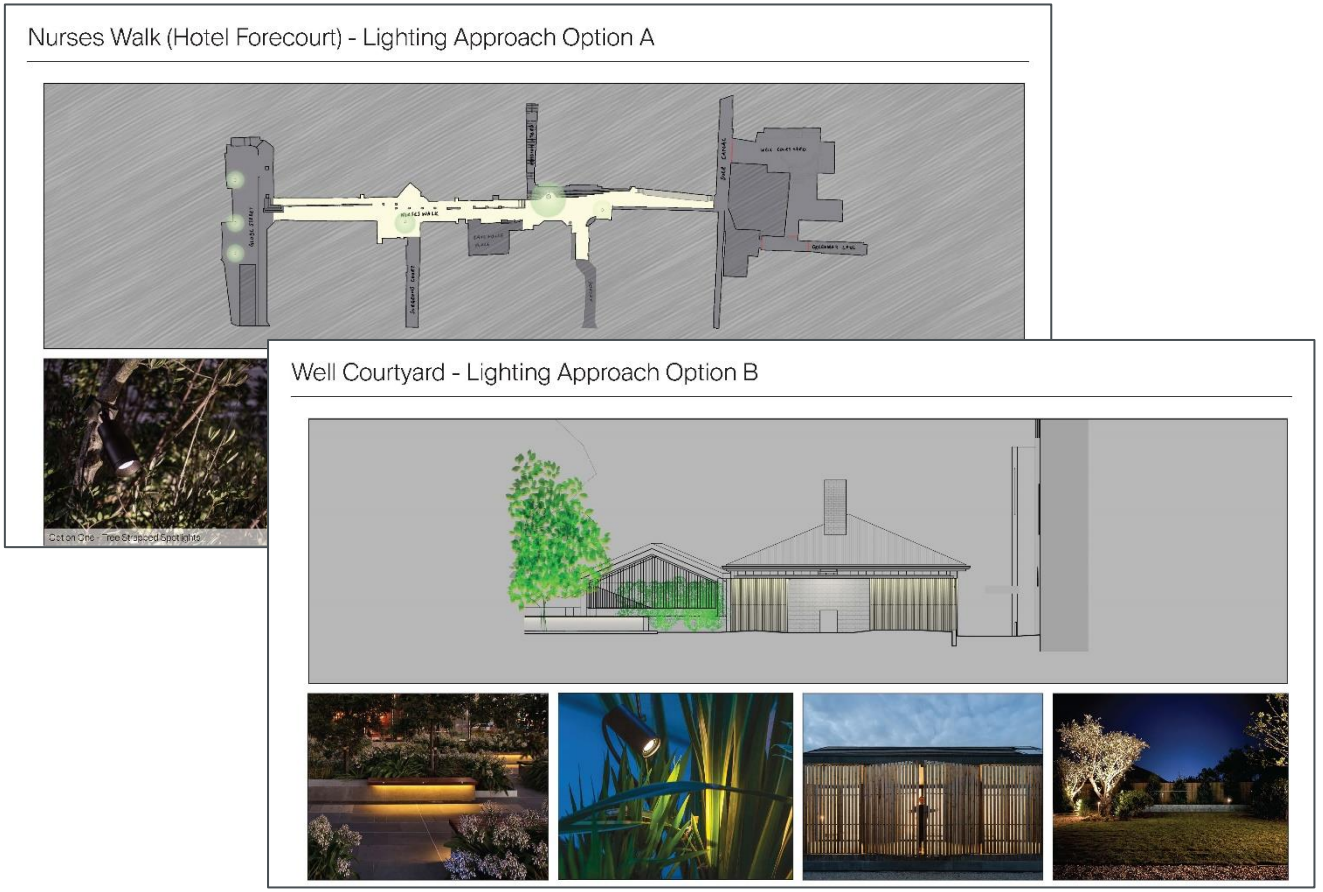


Figure 1.7 Example of specialist concept design advice, Light Practice

2

Glossary of Terms

The following terms are used regularly across this document.

Correlated colour temperature (CCT)

To identify where the perceived colour of a light source lies in the range from cool (bluish) to warm (yellowish), it is usual to quote its correlated colour temperature (CCT) in degrees kelvin, with the symbol K. A low CCT such as 2700K will have a warm appearance (yellowish) whilst 6500K will appear quite cold (bluish).

Colour rendering index (CRI)

The colour rendering index (CRI) relates to how accurately colours are revealed for any given light source. It is completely independent of the colour appearance of the light source. The CRI is generally quoted as Ra, where 100 is perfect and over 80 is very good.

Floodlight

A floodlight is a specific form of luminaire that emits light for widespread, general illumination over large areas.

Spotlight

A spotlight is intended for focused, controlled lighting on specific area, objects or features.

Glare

Glare is the sensation of discomfort or impairment of vision experienced when parts of the visual field (such as poorly or unshielded bright lamps or luminaires) are excessively bright in relation to the general surroundings. The extent or severity of this sensation can be classified as follows:

- Disability glare: glare that impairs the ability to see detail.
- Discomfort glare: glare that causes visual discomfort without necessarily impairing the ability to see detail.

Illuminance

Illuminance is the amount of light arriving on a surface and is measured with the unit lux (lx).

Illumination

Illumination is the result of throwing light onto a surface.

Ingress protection rating (IP)

Ingress protection ratings (IP) are used to define levels of sealing effectiveness of electrical enclosures against intrusion from foreign bodies (tools, dirt, etc.) and moisture.

Light spill (stray light)

Light spill is the light emitted by a lighting installation that falls outside the boundaries of a property or object to be lit and serves no purpose. If directed above the horizontal, light spill contributes directly to artificial sky glow.

Luminance

Luminance is the result of making a surface bright. This is measured in candela per square metre (abbrev. Cd/m^2). The same illuminance falling on a light-coloured surface will appear brighter than an identical amount of light falling on a dark surface.

Luminaire

The luminaire is the apparatus that distributes, filters or transforms the light transmitted from one or more lamps, including all the parts necessary for fixing and protecting the lamps (as well as the circuit auxiliaries for connecting to the electricity supply).

Lux

Lux is a unit of illumination, measured as lumen per square metre. The higher the lux, the brighter the perceived environment, however a uniformity of lux within an area or between areas is perceptually more important than the absolute level of lux.

Obtrusive light

Obtrusive light is light that, because of quantitative, directional or spectral attributes in a given context, gives rise to annoyance, discomfort, distraction, or a reduction in the ability to see essential information such as signs and traffic signals.

Sky glow

Sky glow is the brightening of the night sky that results from the reflection of radiation (visible and non-visible) in the direction of observation. It is scattered from the constituents of the atmosphere (gaseous, molecules, aerosols, land particulate matter).

It comprises two separate components:

- Natural sky glow – the part of the sky glow that is attributable to radiation from celestial sources and luminescent processes in the earth's upper atmosphere.
- Artificial sky glow – the part of the sky glow that is attributable to man-made sources of radiation (e.g. outdoor electric lighting), including radiation that is emitted directly upwards and radiation that is reflected from the surface of the earth.

3

Existing Lighting

3.1 Overview

The existing lighting across the precinct of The Rocks is inconsistent in approach, luminaire typology, colour rendering, colour temperature, and distribution. As the lighting approach across the precinct has developed over time, incrementally dealing with luminaire failures and dark areas, lighting has also been delivered layer by layer, resulting in a cluttered public realm.

Some of the existing luminaires create glare, are inefficient, display significant colour shifts, or have failed without being replaced. This exacerbates the overall inconsistency and the contrast between the bright and dark areas.

The precinct's unique and special attributes such as heritage facades, and architectural and natural features are not well-illuminated. The lack of ambient lighting, viewed against the high brightness of functional lighting emphasises contrasts and creates an unbalanced visual landscape.

The Rocks' heritage spaces are out scaled by the size of some of the luminaires, creating a dissonant contrast. This leads to visual clutter and diversion of attention away from the heritage facades and local architecture. Festoon lighting is used quite extensively, further contributing to visual chaos and distraction from the precinct's historical elements.

The wide variation of luminaires adds to the difficulty in management and maintenance.

The lack of tenancy guidance and management is enabling tenants to install and operate lighting as they wish. This has a significant effect on the night-time appearance and experience of the precinct.

The lack of 'feature' lighting in The Rocks means that landmarks, gateway points, or other significant features are 'hidden' after dark, which is detrimental to visitor orientation, wayfinding and reduces feelings of safety at night, especially for women, girls, and gender-diverse people.

In summary, these issues culminate in an inconsistent lighting experience that fulfills basic functional requirements but falls short of highlighting and harnessing The Rocks' unique attributes to their full potential. This inadequacy diminishes the creation of a welcoming and vibrant destination.

It is important that a multi-layered lighting approach is delivered that considers its surroundings. This will create an inviting, engaging, and safe environment. Rather than focusing solely on functional light and regarding feature lighting as less significant or optional, the approach should consider both equally from design through to delivery.

For more detailed information on the site audit, please refer to Appendix 9.4.

Figure 3.1 (top left) Unaccentuated "gateway “to the precinct under Sydney Harbour Bridge

Figure 3.2 (middle left) Cambridge Street - Colour temperature inconsistency

Figure 3.3 (bottom left) George Street – Variation in brightness and colour temperatures to tenancies

Figure 3.4 (centre top) Playfair Street – Festoon lighting wrapped around trees causes visual clutter

Figure 3.5 (centre middle) Suez Canal – Out of scale luminaires for size of the passageway

Figure 3.6 (centre bottom) Hickson Road, Metcalfe Bond – Unlit heritage façade

Figure 3.7 (above) Multi-coloured festoon lights distract from the heritage character and rock face behind

3.2 Existing Streetlights

Figure 3.8 Selection of existing streetlights

Several existing streetlights in The Rocks require careful consideration.

- **Historically significant luminaires** are to be retained and integrated into the overall lighting strategy. These include:
  - Reproduction lights along George Street, that are to be retained in their current locations and sympathetically upgraded to a modern standard.
  - Gas lights in several locations should be retained at their current locations and, if needed, restored to be functional. There are more gas lamps in storage which could potentially be reinstated in their original locations if considered appropriate.
- **Socially valued luminaires** : may be removed, or retained and upgraded to a modern standard, depending on the context. These include:
  - the “railway standard lights”, as seen in different locations in the precinct, e.g. along Longs Lane and off Gloucester Street.

Existing fittings with no historic significance or social value are to be assessed and, if unsuitable, removed and replaced with new luminaires.

4

Lighting Objectives

This chapter outlines design objectives for lighting within The Rocks. These establish the priorities and key aims for lighting the precinct, which should be considered at all stages from master planning, design, delivery and through to ongoing maintenance.

These objectives provide opportunities to support spaces both functionally and aesthetically by enhancing the distinct character and identity of The Rocks through lighting. It highlights the key design moves which will contribute to a visually coherent, welcoming and safe environment, responsive to the nuances of this place.

L

4.1 Enhance Public Space

Figure 4.1 Well-lit public domain, Marcos Azambuja

Lighting should enrich the experience of the public spaces within The Rocks by inviting visitors to engage with the night-time environment by encouraging people to dwell.

Rather than solely focusing on functional needs or relying on prescribed illumination levels, lighting is to have a multi-layered approach that considers function and feature in equal importance.

Feature lighting that complements the surroundings is key in creating a welcoming ambience and enhancing the feeling of safety. These elements will break up the existing monotonous approach, and establish a hierarchy of visible elements.

4.2 Enhance Unique Character

Figure 4.2 Highlighting heritage façade elements, IGuzzini

Lighting should enhance unique characteristics, diversity and richness in the architecture and natural features of The Rocks.

The intricate nature of the precinct calls for more finely scaled luminaires and a softer approach compared to the surrounding CBD area.

Lighting should increase the legibility of the precinct's thresholds, enhancing entries and connections between the precinct and adjoining areas.

4.3 Create a Cohesive Identity

Figure 4.3 Cohesive lighting design, Technilum

A coordinated approach to the lighting of The Rocks is critical in creating a clear, cohesive identity for the precinct.

This approach should be delivered through consideration of lighting attributes, rationalisation of luminaire selection, as well as a conscious effort to minimise visual clutter. The idea is to blend the infrastructure into the context, thereby the historical elements retain visual presence.

Moreover, rationalisation of luminaire types throughout the precinct will enable efficiency in management and maintenance.

Lighting also serves to enhance the hierarchy of public places across the precinct.

4.4 Reinforce Human Scale

Figure 4.4 Human-scaled luminaire placement, IGuzzini

The architecture in The Rocks is low in profile. This, coupled with the narrow lanes and passageways, creates an intimate, human scale to the precinct.

This scale should be reinforced through lighting equipment of an appropriate scale and light distribution.

4.5 Promote Intuitive Wayfinding

Figure 4.5 Façade light promoting wayfinding, Jonathan Maus

In addition to the primary and secondary armatures and thoroughfares, The Rocks has a complex network of courtyards and laneways. The lighting should encourage intuitive wayfinding and promote exploration of spaces within the precinct.

To support visitor orientation and movement, suitable illumination must be provided to signage or wayfinding elements as well as in accenting natural elements and select landmarks.

4.6 Minimise Glare and Visual Distraction

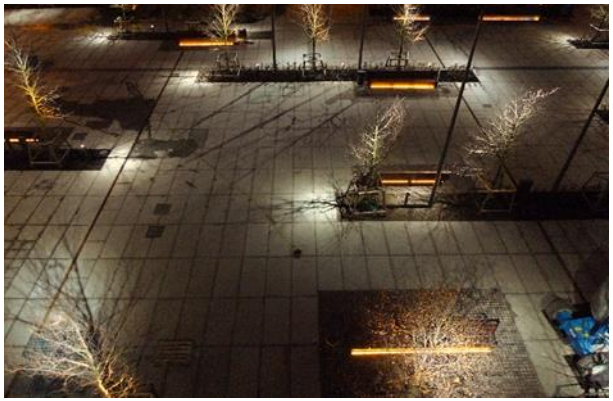


Figure 4.6 Lighting with good glare control, Sweco Architect

Glare from light sources prevents visitors from experiencing details of spaces, and harsh glare can also cause safety issues.

Glare from lighting is to be minimised in all applications through appropriate luminaire selection and positioning.

Lighting across The Rocks should be integrated into architecture and structures where possible to minimise visual distraction and obstructions both day and night.

To minimise visual distraction and reduce clutter across the public domain, existing redundant lighting is to be removed.

4.7 Sustainable in design and operation

Figure 4.7 Just enough light for adequate functionality, James Newton

Designs should only be implemented after a rigorous selection of fit-for-purpose luminaires that will result in well-performing lighting. This will reduce excess and waste of energy, minimising the need for maintenance or replacements.

Future lighting solutions should preserve and protect the night-time environment by minimising upward light pollution which contributes to the sky glow.

Lighting design and control will contribute to the sustainable use of energy through appropriate lighting technologies, dimming and switching to minimise energy use, and directing light to select objects of interest rather than a blanket approach.

The luminaires must feature proper optical controls and be precisely aimed at their intended targets.

5 Lighting Principles

This chapter intends to define the technical parameters that will govern the right lighting system for The Rocks.

These parameters must be considered during the selection of the luminaire and hardware to ensure a cohesive and optimal solution that is aligned with the character and historic elements of the precinct.

This chapter outlines lighting fundamentals. These elements will contribute to the quality of the lighting, and the efficiency of the luminaires, determine the longevity of the hardware, and contribute to the sustainability of the design.

The Lighting Principles include:

- Colour Temperature
- Colour Rendering
- Lighting Distribution
- Scale and Integration
- Luminaire Protection
- Safety and Amenity
- Maintenance
- Lighting Control
- Sustainability

5.1 Colour Temperature

Colour temperature (CCT) is a measure of the colour of light produced by a light source. It is usually expressed in degrees Kelvin (K) and describes the colour appearance of the light emitted by the source. Colour temperature serves as a visual tool for signaling the use of space.

Warmer temperatures have a cozy, yellowish, or reddish appearance, which is often associated with a comfortable and inviting atmosphere. Conversely, cooler temperatures have a brighter, bluish appearance and are often associated with alertness and productivity.

The colour temperature of lighting in The Rocks is to be applied through a consistent strategy appropriate to the usage of the space, materiality, and visual hierarchy.

- **Warmer colour temperature:** The precinct is to have a distinctively warmer colour temperature than the surrounding CBD area, ranging from 2700-3000K. This range is suitable for areas where a welcoming ambience and a sense of history are desired.
- **Highlighting features:** Carefully designed variations in colour temperature can be used to highlight features. A 3500K-4000K neutral white should be used only for accent or feature lighting to create visual interest and enhance specific elements within the space.

By following these colour guidelines, the lighting design in The Rocks will effectively create an inviting, historically resonant environment while maintaining functional and aesthetic balance.

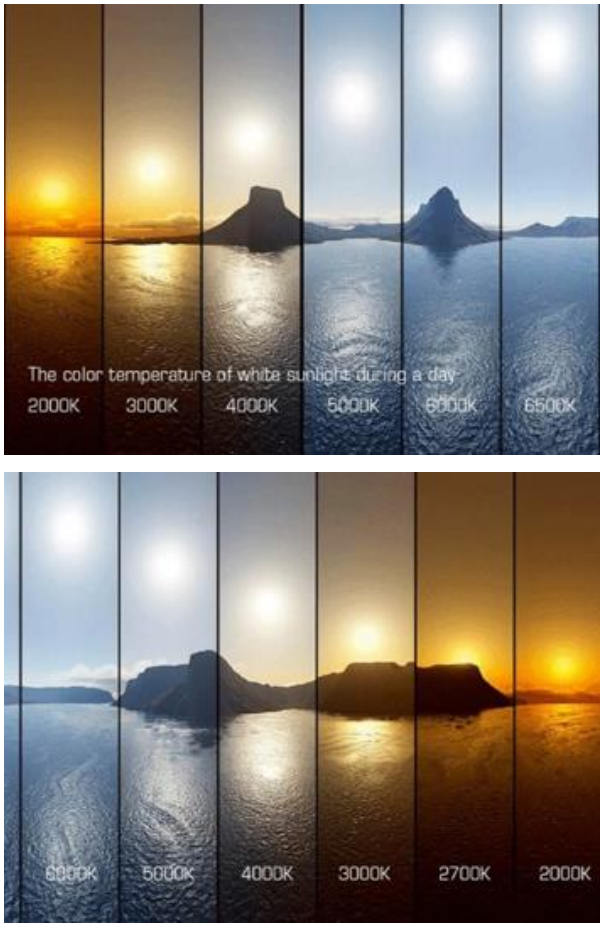


Figure 5.1 Demonstration of different colour temperatures, ECOLORLED

5.2 Colour Rendering

Colour rendering, often referred to as CRI (Colour Rendering Index), is a metric that measures the ability of a light source to accurately reproduce the colours of objects compared to sunlight. It quantifies how well a light source reveals the true colours of objects and is an essential consideration in lighting design.

The Rocks is known for its rich historical significance and unique architecture. Accurate colour rendering ensures that the lighting does not distort or compromise the visual appearance of historical buildings, artefacts, and materials. It helps maintain the authenticity of the area. It also improves visibility thereby helping in easy navigation and better safety to the users. Thus, the colour rendering characteristics of light sources throughout the precinct should be appropriate to the application.

Where enhancement of materiality is required, for example, illumination of building facades, sculptures and public plaza, higher colour rendering (CRI>90) should be used to reveal vibrancy and colours. In areas, such as car parking and loading zones, etc, where illumination levels are more critical than accurate colour rendition, lower colour rendering values are acceptable (CRI>80).

High CRI light sources have high longevity when compared to conventional solutions. This will significantly reduce the need for maintenance and replacement of luminaires.

Using high CRI luminaires not only enhances the visual appeal but also improves safety, experience and sustainability.

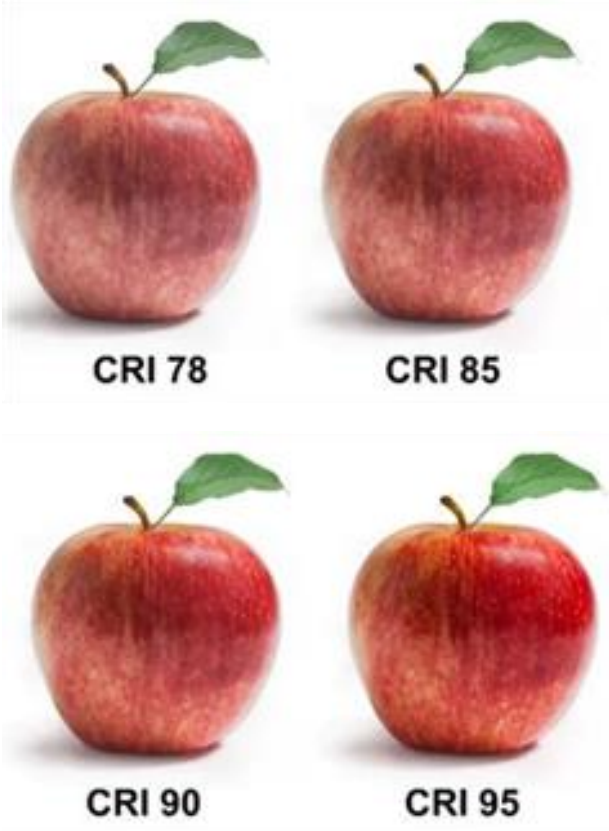


Figure 5.2 Demonstration of different colour rendering, Benel.eu

5.3 Light Distribution

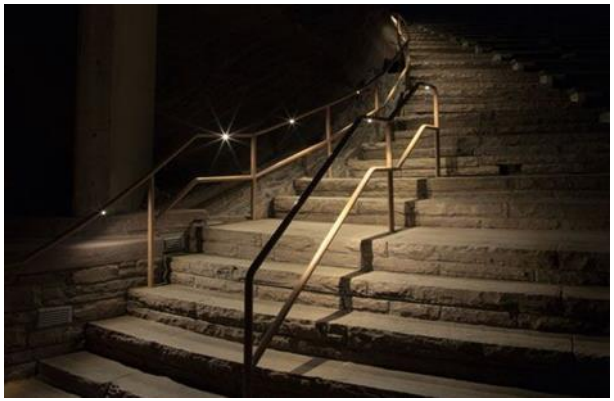


Figure 5.3: Controlled lighting distribution for targeted area, Red Rocks Park

Lighting distribution refers to how light is spread or dispersed in a given space. The optical distribution of the luminaire controls the direction of the light emitting from the hardware. An ideal luminaire will shine a light on the desired area without any spills into the surroundings, thereby achieving maximum efficiency. Lighting distribution plays a crucial role in achieving the desired illumination levels, uniformity and ambiance within a space.

Luminaires with suitable optical or beam distribution should be specified throughout the precinct and mounted appropriately to ensure light is directed only to where it is required, minimising any spill light, and maximising efficiency.

Luminaires will have the capability to incorporate glare control devices such as shields, and internal louvers as required. Whenever feasible, promote the use of luminaires featuring adjustable heads that can be flexibly repositioned to provide illumination to different areas.

5.4 Scale and Integration

Figure 5.4 Well integrated human-scale lighting design, Dezeen

An ideal luminaire should blend into its context without attracting attention to itself. It is important to balance the need for adequate illuminance and the character of the space. The luminaire should be proportional to the street width and height of the buildings, ensuring luminaires don't dominate the landscape or architecture.

In general, all luminaires should be of minimal size, as compact and unobtrusive as possible, allowing the heritage architecture and features of the precinct to be enjoyed without clutter or distraction.

5.5 Luminaire Protection

Figure 5.5 Robust outdoor step lighting, Bega

Luminaire protection refers to the measures and components used to safeguard luminaires from various environmental and physical factors that could damage or compromise their functionality.

Lighting throughout the precinct must be appropriately protected against weather, vandalism, and impact for the relevant mounting location.

Refer to **Appendix 9.3** for ingress protection rating information.

Luminaires within reach of the public must be safe to touch and should have an adequate heat system. Luminaires installed in the high-traffic area must be IK08 or more to prevent damage. Refer to **Appendix 9.4** for more information on IK rating. Special consideration must be taken for luminaires recessed into the ground plane with appropriate weight loadings for pedestrians and vehicles.

5.6 Safety and Amenity

Figure 5.6 Adequate outdoor lighting level for safe activity, Brett Boardman

Lighting safety and amenity are two important aspects of lighting design that focus on ensuring the well-being and comfort of people. This is particularly crucial in outdoor and public spaces where lighting plays a vital role in enhancing safety and the overall quality of life.

Lighting must facilitate safe use of the precinct at night, through the application of appropriate light levels and uniformity. This includes vertical and horizontal illumination and lighting appropriate for CCTV. Where street safety cameras are to be installed, all luminaires shall have a cut-off light distribution. Luminance levels are to be verified for camera operation requirements prior to the design and installation of lighting.

All the functional and feature lighting must comply with the required light levels for the relevant P (Pedestrian) or V (Vehicular) category as noted in *AS 1158.v1.1*:2022. It provides guidelines and requirements for the performance and design of lighting systems used on roads and public spaces. The standard ensures that these lighting systems meet safety, efficiency, and reliability criteria to enhance visibility and security for users.

Category V

- Purpose: Designed for vehicular traffic.
- Application: Major roads and highways where traffic volume and speed are high.
- Requirements: High levels of illumination, uniformity, and glare control to ensure safe driving conditions. These lighting systems are meant to enhance visibility for drivers and reduce the risk of accidents.

Category P

- Purpose: Designed for pedestrian traffic.
- Application: Residential streets, footpaths, cycle paths, and other public spaces where pedestrian activity is prominent.
- Requirements: Adequate lighting to ensure pedestrian safety and security, focusing on visibility for walking and other non-vehicular activities. These lighting systems often prioritize energy efficiency and environmental considerations while providing sufficient illumination for safety.

Classifications applied to The Rocks are outlined on the following page. These should be considered as a starting point for the basis of design with careful consideration given to the overall experience and impact of lighting elements as a whole. Design must recognise that the total illumination and light levels of a place are comprised of many integral components such as roads, footpaths and façade lighting.

Excerpts of AS1158 are included in the Appendix.

Table 5.1 AS1158 Lighting for Roads and Public Spaces - Categories for The Rocks

AS1158 – Lighting for Roads and Public Spaces			
Vehicular Categories – Lighting which is applied to roads on which the visual requirements of motorists are dominant			
Lighting Strategy Typology	**Recommended Lighting Level**	**Assumptions**	
Primary Armatures – Roadways	V1	Based on high traffic	
Secondary Armatures – Roadways	V3	Based on medium traffic	
Pedestrian crossings	PX2	Lighting for crossings, assuming posted speed limit (PSL) <=50km/h	
PP Categories - Pedestrian or cycle-oriented pathway e.g. footpaths, including those along local roads, and arterial roads, walkways, lanes, park paths, cycle paths			
Lighting Strategy Typology	**Recommended lighting level**	**Nighttime movements**	**Fear of crime**
Primary Armatures – Footpaths	PP2	High (pedestrian/cycle activity)	Medium
Foreshore walkways	PP2	High	Medium
Secondary Armatures – Footpaths	PP3	Medium	Medium
Major laneways	PP3	Medium	Medium
Parks	PP3	Medium	Medium
Awnings	PP3	Medium	Medium
Minor laneways	PP4	Medium	Low

Public Activity Areas (excluding car parks)				
		Assumptions		
Lighting Strategy Typology	**Recommended lighting level**	**Night-time movements**	**Fear of Crime**	**Need to enhance amenity**
First Fleet Park	PA2	Medium	Medium	Medium
Plazas	PA1-PA2	Medium	High/Medium	High/Medium
Courtyards	PA1-PA2	Medium	High/Medium	High/Medium
Other Elements				
Stairs	PE2	Lighting for outdoor connecting elements – stairs, ramps, footbridge, and subway		

Note: Recommended lighting levels should be considered as a starting point for the basis of design with careful consideration given to the overall experience and impact of lighting elements as a whole. Design must recognise that the total illumination and light levels of a place are comprised of many integral components such as roads, footpaths and façade lighting.

5.7 Maintenance

Figure 5.7 Street light maintenance, The Times

In the planning of lighting infrastructure, it is important to consider access to power, installation requirements, and maintenance needs.

Both the specification and mounting of luminaires are to be designed to ensure easy access for maintenance and replacement, with readily available components. Additionally, lighting components should prioritise characteristics such as ease of replacement, off-the-shelf availability, interchangeability, and modularity.

When considering maintenance programs, preference bulk replacement of lamps, necessary luminaire repairs, adjustments at the end of the effective lamp lifetime or adopting a case-by-case replacement approach.

This strategy is considered the most cost-effective approach, acknowledging the variability in light types and fittings within The Rocks.

Placemaking NSW's maintenance regime should include the following:

- Regular night-time inspections of the infrastructure across the precinct to proactively identify defects, in lieu of ad hoc notification of faults. This includes within the public domain, building facades and awnings.
- Tree and plant growth is to be monitored to ensure it is not affecting lighting output.
- Where there are defective or vandalised fittings, the equipment is to be made safe and repaired as soon as possible (this requirement is to apply to all private and public sector lighting installations).
- All upgrade works should be complemented by maintenance plans and regular audits that ensure lights are functional.

Proactive maintenance ensures the longevity of lighting installations and contributes to a consistently appealing and functional lighting environment.

5.8 Lighting Control

Figure 5.8 Sydney Town Hall pre-programmed RGB façade lighting, City of Sydney

Lighting control refers to the management and regulation of lighting systems to optimise and monitor their functionality, energy efficiency, and user comfort.

The lighting system should have appropriate controls to allow for automatic dimming according to different times of the day or be switched off when not needed. This is crucial to ensure efficient energy usage and minimise light pollution.

All public domain lighting should be connected back to the PMNSW central Zencontrol DALI lighting control system.

Lighting controls should also incorporate pre-programmed modes that allow for appropriate elevation of lighting such as use of prescribed RGB colours. These modes are to be programmed to a PMNSW-endorsed calendar to always ensure consistently high-quality lighting outcomes.

5.9 Sustainability

Figure 5.9 Public domain lighting should be focussed on the ground. Up spill into the sky must be controlled using specific optics, Roman Rember

Carbon Zero: PMNSW is committed to best practice sustainability and minimisation of any impacts on the surrounding environment and community.

In designing, installing and maintaining lighting within the precinct, the following principles should be adhered to:

- Electrical consumption: All lighting systems are to minimise electricity consumption to deliver on the *NSW Government Net Zero Targets* including:
    i. 50% reduction in greenhouse gas (scope 1 and 2) emissions by 2030.
    ii. Net zero (scope 1 and 2) emissions by 2035.
- Light Source: LED lighting sources are preferred for their sustainability owing to their energy efficiency, extended lifespan, diminished carbon footprint, dimmability, and durability. Alongside the efficient use of energy, opportunities to engage with the circular economy should be sought as part of luminaire selection.
- Supply: Preference locally made luminaires whenever possible, to minimise environmental impact. Local production often involves shorter supply chains, reducing transportation-related carbon emissions.
- Lighting Control: Appropriate dimming controls must be installed to identify the needs of the space. Smart lighting control is recommended to control the intensity and colour temperature based on real-time data based on traffic and seasons.
- Lifecycle & Maintenance: Priority should be given to luminaires with longer life, available spare parts and those that are fully repairable. It shall be possible to recycle a luminaire that reaches end of life and return the materials to reservoir. The aim is that materials have a longer life and re-enter the cycle when no longer needed, to minimise consumption of natural resources.
- Light Pollution: Special consideration must be taken to prevent light pollution. Artificial lights will impact nocturnal activities, migration, reproduction and habitat of animals. Studies have proved that artificial lights will influence the leafing and flowering timing of plants. Light pollution can be prevented by making sure no light spills into the sky and water body. Regulations must be implemented to control lighting installed near natural waterbodies.
- Environmental impact: To preserve the environmental balance without impacting functional needs, all outdoor general lighting must be warm (≤3000K).
- Furthermore, the lighting infrastructure should be supported by metering capabilities, enabling cost tracking back to Placemaking NSW or the tenant.

5.10 Hardware typologies

Different types of hardware may be used across The Rocks to provide functional and feature lighting.

These should be selected with consideration of the desired effect, its appropriateness for the location including visibility and scale, and ease of maintenance.

This section provides an overview of the hardware typologies which include:

- Pole-mounted lighting
- Wall-mounted lighting
- Catenary lighting
- Low-level and integrated lighting, and
- Inground lighting

Figure 5.10 Lighting at Campbell's Cove showcasing a mix of lighting types including in-ground and integrated lighting, pole lighting and backlit signage, Brett Boardman

5.10.1 Pole-Mounted Lighting

Pole-mounted lighting is a type of light fixture installed on poles, typically used to illuminate outdoor areas such as streets, parking lots, parks, and large open spaces.

Multiple sources may be employed from a single pole, minimising the infrastructure required and decluttering the landscape.

As well as conventional area lighting, poles provide the opportunity to use projected light to create visually interesting and evocative patterns such as dappled light through trees and accentuate architectural elements.

The poles themselves can be used as a feature element in their form, colour, texture, and arrangement.

Before proposing the installation of new poles, it is essential to evaluate the feasibility of using the existing lighting poles and consolidating infrastructure, which will help to minimise potential visual clutter.

The use of poles should also consider the ability for other required infrastructure to be seamlessly incorporated such as CCTV and 5G.

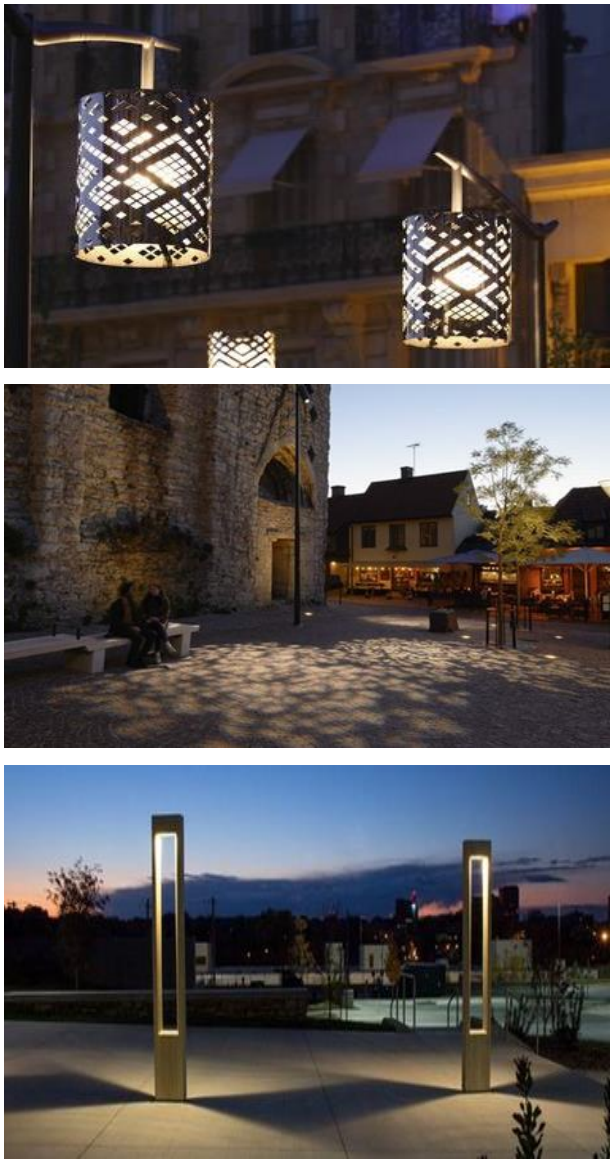


Figure 5.11 Examples of pole-mounted lighting, Light Zoom Lumiere - Signify – Structura

5.10.2 Wall-Mounted Lighting

Wall-mounted lighting is a type of lighting fixture that is attached to a wall, providing illumination for a specific area or accent to a facade.

Wall-mounted luminaires may be used to light facades, narrow laneways, stairs, or areas adjacent to buildings. Luminaires may be focusable for accenting or fixed to provide general circulation lighting.

For facades, preference wall-mounted luminaires to provide opportunities to highlight architectural details. The proximity of the luminaires to the surfaces being lit, rather than remote flood lighting, enables excellent beam control, minimising spill light.

Additionally, wall-mounted lighting can be employed to illuminate adjacent spaces and building facades. For heritage façades, an audit must be conducted with a heritage consultant to ensure feasibility with preference given to utilising existing wall penetrations where possible.

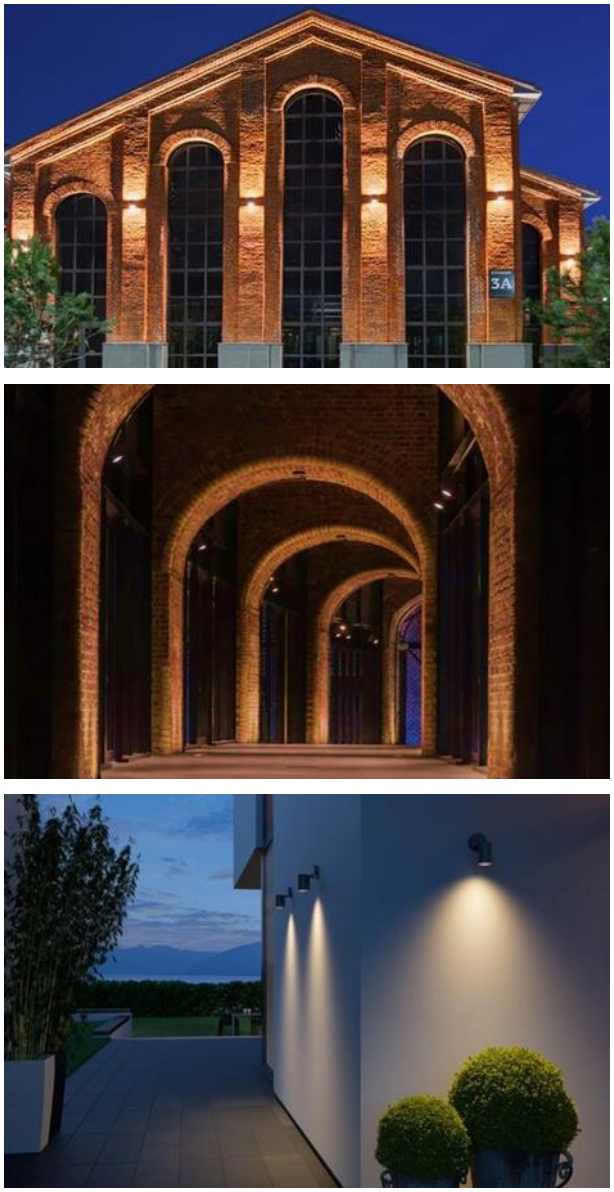


Figure 5.12 Examples of wall-mounted lighting, Ilya Melikhov - Simon Callagan – Steinel

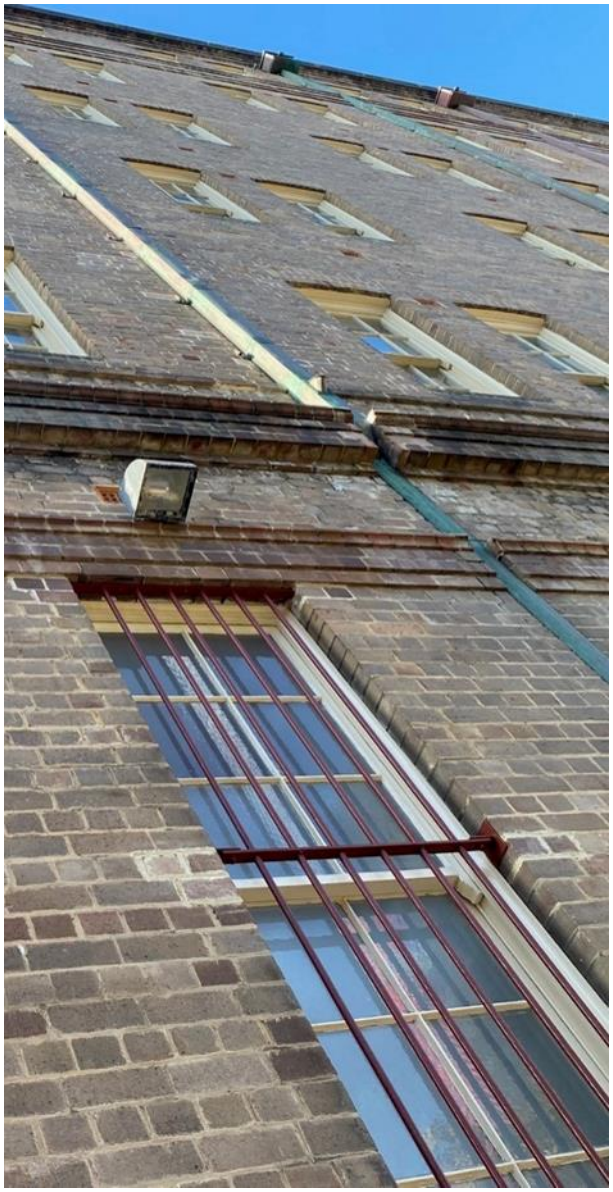


Figure 5.13 Existing wall-mounted lighting on Atherden St

5.10.3 Catenary Lighting

Catenary lighting is a type of lighting where fittings are suspended from a series of cables or wires strung between support structures, such as poles or buildings. This setup creates functional illumination over a given area. This does not include the temporary/casual use of festoon or fairy lights which provides a sparkling effect rather than providing significant illumination.

Catenary lighting provides the opportunity to light spaces without the obstructions of multiple poles, thereby minimising the interruption of the “open space” and reducing visual clutter. The luminaires may vary in form, size, shape, and distribution to suit the application.

A family of luminaires may be used to create a language within the precinct. More decorative fittings, shades, or forms can be used to enhance the identity or narrative of a space.

Catenary lighting should not be overused. Consideration must be given to attaching catenary lighting to buildings and utilising existing hooks and penetrations where available. It is important that catenary lighting does not impede access to roof spaces. To ensure sight lines along streets and heritage facades are preserved, it is important to be conscious that catenary lighting can create visual clutter, and the design approach for the lighting strategy is to minimise this.

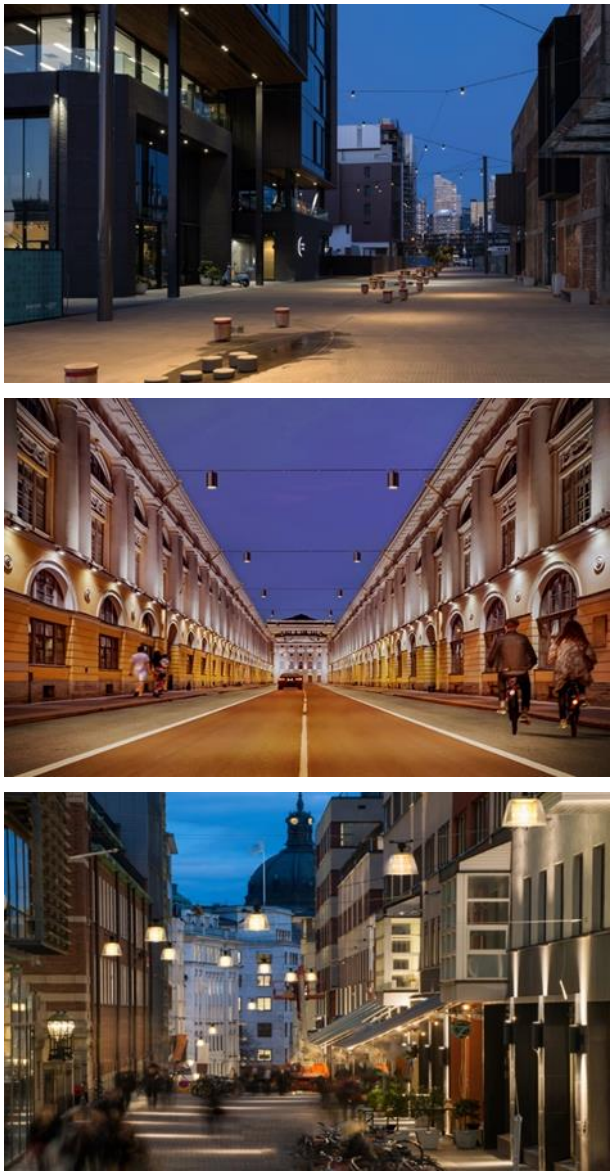


Figure 5.14 Examples of catenary lighting, Mark Scowen – we-ef – Zero Lighting

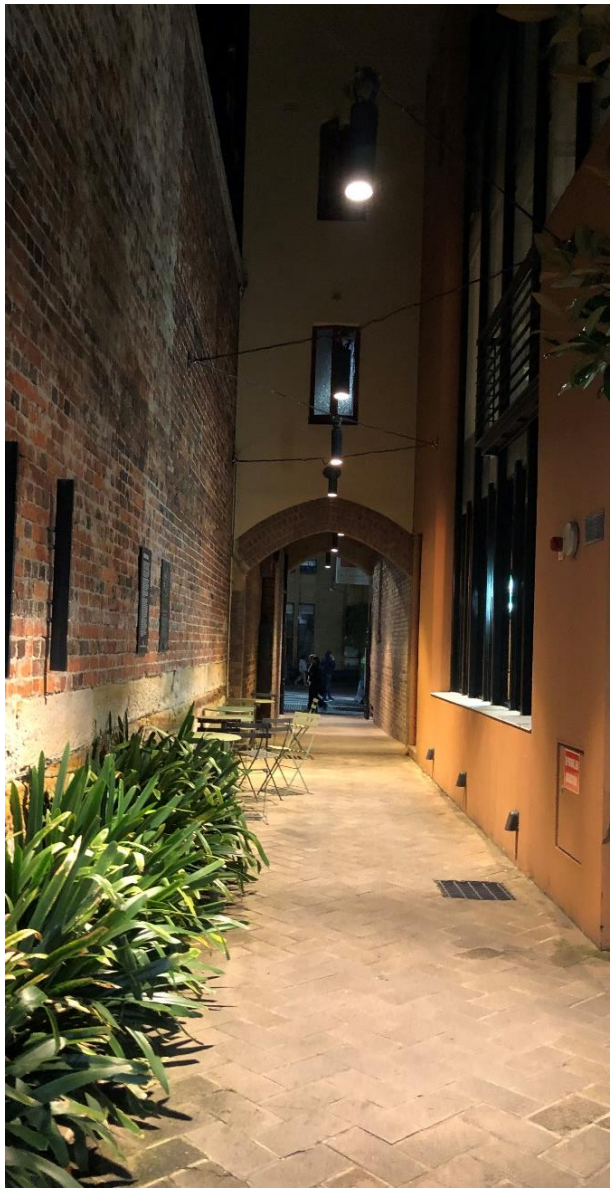


Figure 5.15 Existing Catenary lighting, Nurses Walk

5.10.4 Low-Level and Integrated Lighting

Low-level and integrated lighting is positioned at a low height to provide illumination close to the ground. It is often embedded directly into architectural elements, designed to be an integral part of the overall design.

Low-level and integrated lighting is an important component of lighting as it significantly contributes positively to the pedestrian experience of The Rocks.

As a minimum, low-level integrated lighting should:

- Provide a positive experience for people as they move through and enjoy the public domain.
- Promote intuitive wayfinding
- Provide safe circulation
- Create accents and highlights that enhance the human scale of the environment

Low-level and integrated lighting can be implemented through:

- Integration into street furniture
- Incorporation into stairs to illuminate steps or along handrails to wash ground surfaces
- Wall lights and bollards

Figure 5.16 Examples of low-level and integrated lighting, Inidital - Halkin Mason- iGuzzini

Figure 5.17 Example of low-level and integrated lighting into stairs, Campbell's Cove, Brett Boardman

5.10.5 Inground lighting

Inground luminaires are fixtures designed to be flush with the ground.

Inground lighting has two forms in terms of light distribution: diffuse and focused.

- **Diffused luminaires** are typically lower in output, deliberately visible and used to create a marker or patterns that can promote intuitive wayfinding. Care must be taken in the placement, control and output of luminaires to ensure no discomfort glare.
- **Focusable luminaires** use lenses or reflectors to direct light onto surfaces, structures, or natural features. The appearance of the lit object is more important than the luminaire and the aim is to use low glare or concealed fittings.

Proper installation is crucial for inground lighting, requiring more careful consideration and evaluation compared to other lighting methods in The Rocks. Explore alternative options in cases where inground installations are problematic.

Protecting elements of heritage significance is paramount, and in-ground lighting or conduiting may not be feasible in certain areas due to archaeological considerations.

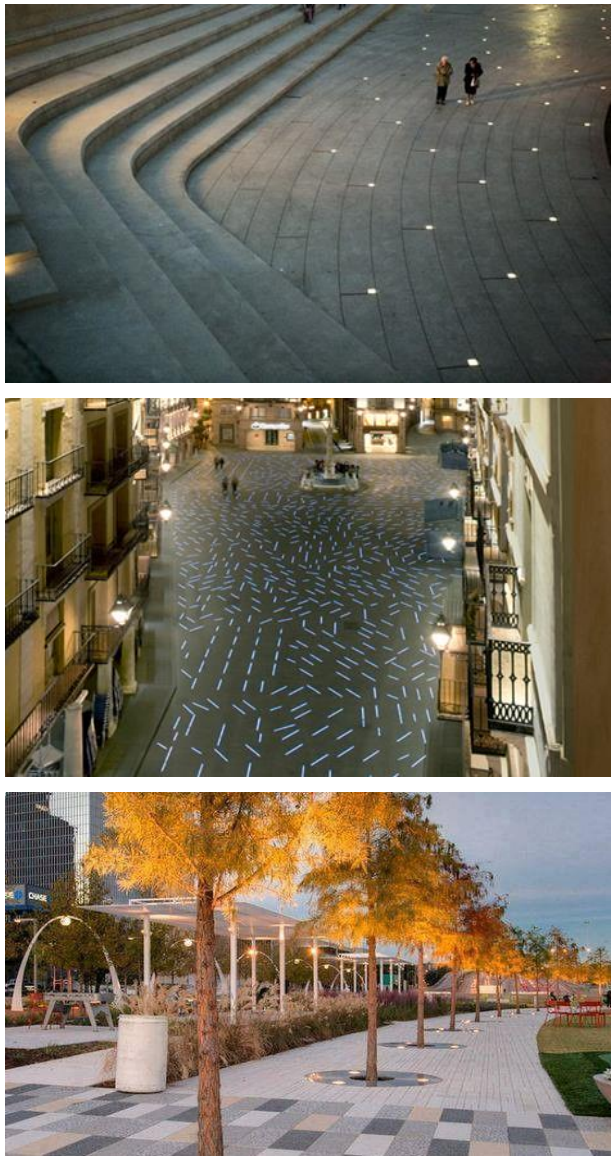


Figure 5.18 Examples of inground lighting, ARQA – Duccio Malagamba - Archello

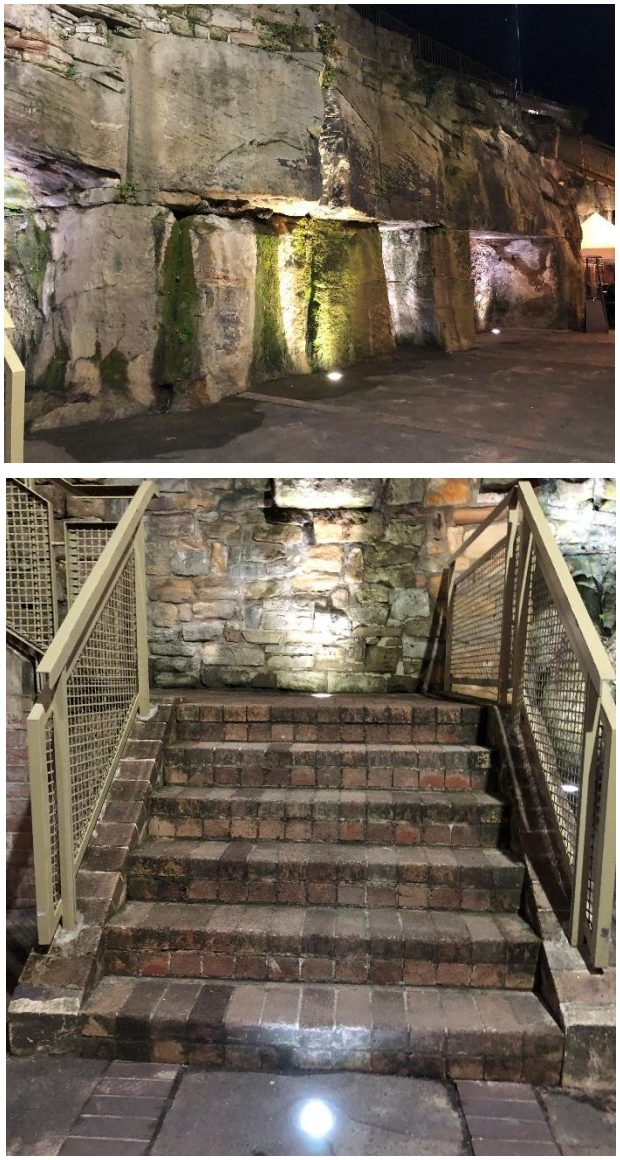


Figure 5.19 Existing inground lighting, Foundation Park

6

Lighting Approach

This chapter outlines different typologies of light that can be used to accentuate the experience of The Rocks. Layers of lighting, diverse scenarios and ambiances can be sculpted within this historic precinct. These can tell stories, encourage people into the precinct and support events and celebrations. These layers can enhance the experience of the spaces and boost functional lighting.

Careful integration of dynamic lighting systems with limited colours will enhance the beauty of the precinct and help engage visitors and encourage them to explore more of The Rocks.

The carefully considered use of colour can define the mood and character of different spaces within The Rocks.

6.1 Lighting Techniques

These lighting techniques are layers of lighting that can be deployed across The Rocks to create a rich and inviting environment

6.1.1 Feature Lighting

Figure 6.1 Integrated landscape lighting and façade lighting, Cubica - IGuzzini

Feature lighting is used to highlight specific façades, awnings, artworks, or structures. This provides an enhanced and unique night-time effect, contributes to the luminance required for public safety and minimises the need for additional overhead street lighting.

Feature lighting is indispensable in the creation of an inviting environment. Lighting can accent the form, texture, and materiality of selected elements to highlight the precinct's unique characteristics and activate public spaces. Feature lighting can support wayfinding by directing people's attention to signage and landmarks, which aids orientation, enables greater predictability, and increases the feeling of safety for visitors moving through the precinct.

Luminaires used for feature lighting will be concealed and mounted in a way that eliminates glare, responds to the subject to be lit, and has minimal impact on heritage fabric.

6.1.2 Functional Lighting

Figure 6.2 Pole lighting and bollard lighting, WE-EF

Functional lighting means the lighting used to comply with minimum luminance requirements for both pedestrians and vehicles.

Functional lighting to all public pathways and activity zones should be provided to the appropriate categories as stated in Australian standards *AS1158* and *AS4282* and support safe movement throughout the precinct. The application of categories must consider adjoining spaces and the provision of a level of consistency and predictability across the precinct.

The selection and mounting arrangements of luminaires needs to consider the size and scale of the area to ensure their harmony within the precinct.

Rather than providing blanket coverage of excessive light, attention needs to be taken to understanding targeted areas and ensuring appropriate lighting is provided.

6.1.3 Light Art as Feature

Figure 6.3 Luminaires as art piece bringing people together, Leo Villareal – Richard Glover

The lit appearance of luminaires and self-luminous objects can create a feature in a space or on the surface of a building or structure. Light artists work with various light sources, such as LEDs, neon, fluorescent bulbs, lasers, and projections, to create artworks that manipulate and harness light to convey artistic expressions.

Light art can cultivate a distinctive identity, tailored to a particular location or moment, and can activate a space by drawing the public together.

However, the installation of permanent light art should be limited to specific and appropriate locations, and not encompass all areas in The Rocks. The Public Art Strategy for The Rocks guides the development of all public art. Any approval for such installations will be guided by this process by PMNSW.

6.1.4 Colour as a Feature

Figure 6.4 Colour-changing lights at Martin Place and Sydney Town Hall, Vivid Sydney – City of Sydney

Coloured lighting may be used as an enhancement to the selected heritage building facades or areas, or to promote seasonal and special events. Coloured lighting should be limited to specific and appropriate locations, and not encompass all areas in The Rocks or all times of the year. Final approval of coloured lighting and colour palette will be finalised in consultation with PMNSW.

Careful consideration needs to be taken in the selection and intensity of colours, as well as the speed and frequency of any kinetic effects, to ensure appropriate application for the heritage and urban context.

As much as possible, colour-changing ability should be incorporated into permanent feature lighting, to avoid the need for additional luminaire or infrastructure for special events.

6.2 New Luminaire Key Considerations

New luminaires specified for the precinct should be consistent with the parameters noted below.

6.2.1 General considerations

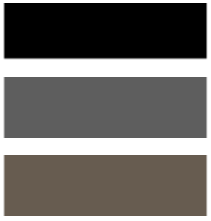
The following considerations apply to all luminaires across the precinct. These should not only be considered as part of new work but also as part of ongoing maintenance and renewal of existing exterior and public domain lighting

Appearance

Lighting equipment shall be minimal in its appearance unless intentionally used as a feature. Its form and finish shall be in harmony with the surrounding urban context and of an appropriate scale to its location (scale of building and street/laneway). Where the same applications of light are used across the precinct, the luminaires selected shall be of the same manufacturer and family for uniform appearance and easier maintenance.

Colour Palette

Selecting an appropriate colour palette for luminaires is crucial to complement the historic context while maintaining a visually pleasing atmosphere. The finish of luminaires, poles and accessories shall be in dark non-reflective colours, and should sit within the family of tones as required below:



Black

Charcoal

Bronze

The finish of wall-mounted luminaires must consider the building façade or structure that they are mounted onto. Collaboration with PMNSW and heritage consultants will ensure that the chosen lighting design respects and enhances the unique heritage character of the surrounds.

Materials

Materials must be selected which are fit for purpose for an external environment. Common materials include 316 marine-grade stainless steel, cast aluminum and copper.

Protection

Exterior luminaires shall have a minimum IP rating of:

- IP67 if uplighting,
- IP68 if immersed in water or,
- IP65 if downlighting.

Luminaires shall have an IK rating, against impact (vandalism), appropriate to the mounting location. Refer to **Section 9.4 Protection Against Impact**.

Quality Assurance

Luminaires selected shall be in accordance with AS/NZS 60598, AS1158, and AS4783. Luminaires shall be from reputable manufacturers and practice quality management systems in accordance with ISO standards (ISO 9001-2000).

Accessories and Flexibility

All accessories used shall be from the same manufacturer as the luminaire or as recommended by the manufacturer. Anti-glare accessories, including honeycomb, radial, angled louvres and snoots, shall be applied where appropriate.

Preference should be given to luminaires with the ability to incorporate interchangeable accessories or components (e.g. colour filter, spread lens, optical lens to change beam distribution).

Installation

All recommended installation and maintenance procedures from manufacturers should be adhered to.

Colour Rendering Index

Where enhancement of materiality is required (e.g. illumination of building facades, sculptures and public plazas), higher colour rendering (CRI>90) should be applied to reveal vibrancy and colours.

In areas where illumination levels are more critical than accurate colour rendition, lower colour rendering values are acceptable (CRI>80). This is because the primary focus is on providing sufficient light for visibility and safety rather than the accurate reproduction of colours. For instance, in spaces like parking lots, loading docks, etc, where the goal is to ensure that the area is well-lit to facilitate tasks and enhance safety.

Colour Temperature

The precinct shall have a distinctively warmer colour temperature than the adjacent Sydney CBD, ranging from 2700-3000K, where a welcoming ambiance and a sense of history are desired.

Carefully selected variations in colour temperature can be used to highlight specific features, with 3500K-4000K neutral white reserved for accent or feature lighting, to be considered on a case-by-case basis.

6.2.2 Wall Luminaires

Wall luminaires are light fittings fixed directly into vertical surfaces. The guidance below does not apply to catenary lighting.

Objectives:

Architectural wall lights:

- To satisfy exterior lighting codes stated in AS1158 and AS4828 to pedestrian pathway lighting where space/width is limited.
- To utilise the latest technology to provide maximum efficiency and precise lighting distribution to prevent light spill onto adjacent buildings and glare.

Decorative wall lights:

- Utilise decorative wall lights at entryways or special locations to enhance their prominence and support intuitive wayfinding.

Guidance

- Consider the impact of luminaires on the fabric of buildings both physically and visually. Luminaires should not protrude excessively from the mounting surface.
- Adjustable luminaires should have the ability to be 'locked off' once focused.
- Luminaires are to be located at an appropriate height, out of the reach of the public unless being used as low-level orientation lighting, in which case they shall be recessed or suitably rated against vandalism.
- For heritage buildings, consultation must be undertaken with a suitably qualified heritage consultant and the relevant landowner. Fixture and fixing points shall be carefully considered to minimise adverse impact on heritage fabric, with preference given to existing fixing points and penetrations as much as possible.

Figure 6.5 Examples of wall luminaires, Linea Lighting, McKay Lighting, Yao

6.2.3 Accent Luminaires

Accent luminaries are lighting fixtures specifically designed to highlight or draw attention to particular features, objects, or areas within a space. They are used to create visual interest and emphasise architectural elements, artwork, landscaping, or other focal points.

Objectives:

- To accent the form, texture, and materiality of selected elements to highlight the precinct's characteristics and activate public spaces.
- To use innovative techniques to control the obtrusive effects of exterior lighting and minimise excessive lighting spill into the night sky.

Guidance:

- Accent luminaires (including gobo projectors) include adjustable and directional, surface or spike-mounted luminaires. Once focused, luminaires shall be able to be 'locked off,' via specialist tools, to avoid tampering.
- Fixture and fixing points shall be carefully considered to minimise adverse impact on heritage fabric or natural elements.
- Ground-mounted accent luminaires shall be placed so they do not become a trip hazard and protected in vandal-proof cages for fittings accessible by the public.
- Spike-mounted luminaires shall be mounted to a small concrete plinth or metal bracket buried into the soil/turf to eliminate tampering.

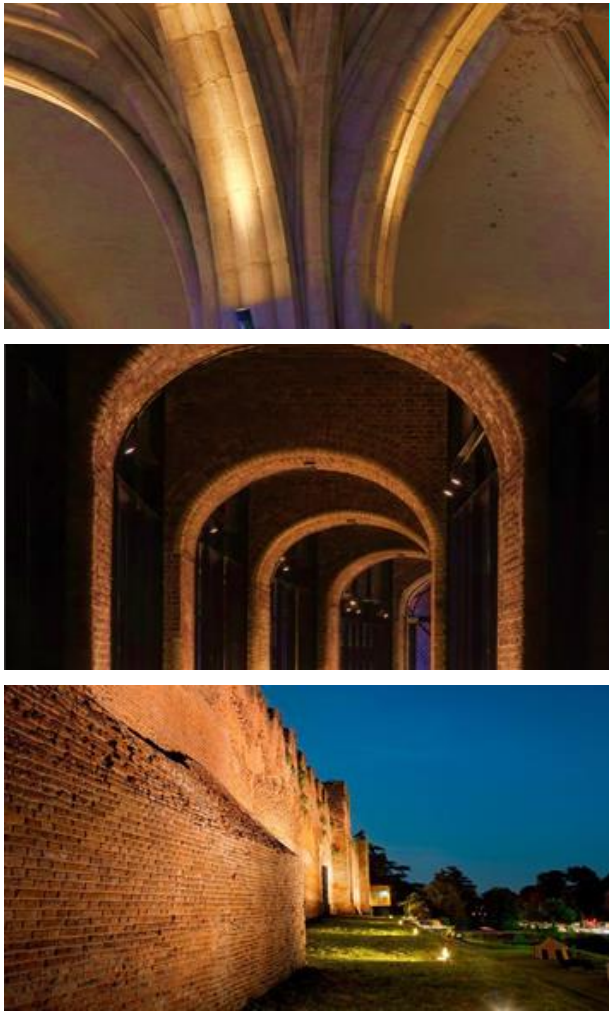


Figure 6.6 Examples of accent luminaires, iGuzzini - Simon Callagan - Linea Lighting

6.2.4 Linear LED Luminaires

Linear LED Luminaires are lighting fixtures that use LED technology in a long, narrow shape, making them ideal for various applications where uniform light distribution is required.

Objectives:

- To achieve a homogeneous wash or grazing lighting effect towards targeted elements to highlight the precinct's characteristics and activate public spaces.
- To utilise the latest technology to provide maximum efficiency and precise lighting distribution to prevent light spill onto adjacent buildings and glare.

Guidance:

- Linear LED luminaires suitable for use in external environments include rigid extrusions and flexible LED strips, with a minimum IP rating of IP65.
- Linear LED luminaires should be integrated into built elements as much as possible, minimising their visual impact. Where linear luminaires are directly visible, care must be given to minimise glare.
- Linear LED luminaires shall be securely fixed to ensure they cannot be tampered with and any potential for the luminaire to move or fall is negated.
- Fixture and fixing points shall be carefully considered to minimise adverse impact on heritage fabric or natural elements.

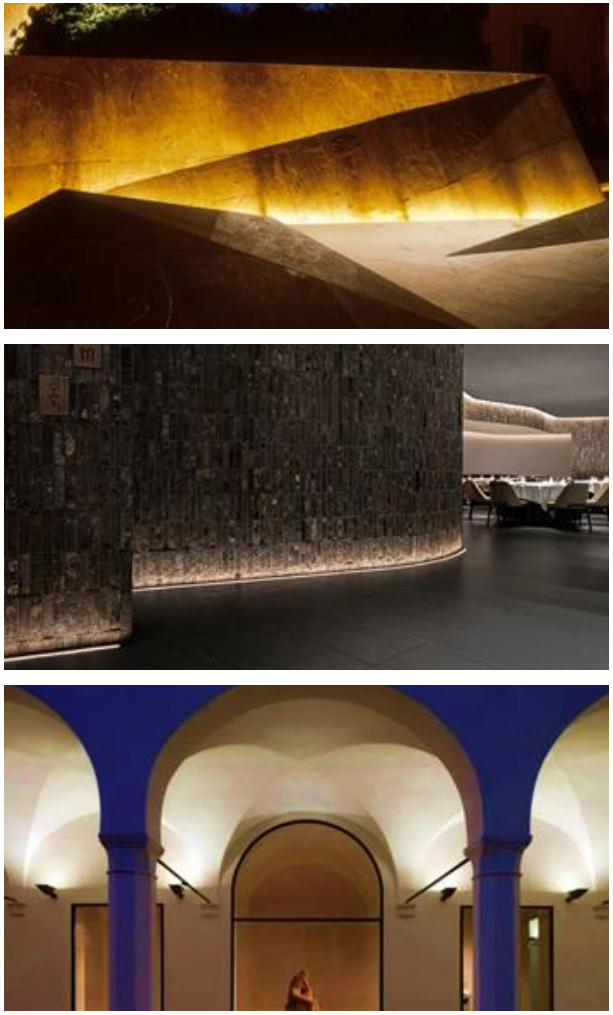


Figure 6.7 Examples of linear LED luminaires, Filippo Cannata - Zhen Yan – iGuzzini

6.2.5 Inground Luminaires

Inground Luminaires are lighting fixtures designed to be installed flush with the ground. They provide illumination while blending seamlessly into their surroundings.

Objectives:

- To achieve wash or grazing lighting effect towards targeted elements from ground level to highlight the precinct's characteristics and activate public spaces.
- To utilise the latest technology to provide maximum efficiency and precise lighting distribution to prevent light spill onto adjacent buildings and glare for pedestrians.

Guidance:

- Inground luminaires shall have a minimum IP rating of IP67 or IP68, if immersed in water. Luminaires shall utilise gaskets, cables glands and terminal housings to ensure accessibility for maintenance and installation as per the manufacturer's instruction.
- Luminaires should be fitted with suitable glare control accessories, where possible.
- Luminaires shall be adjustable, where appropriate, to enable precise aiming, minimising wasted light and light pollution.
- In areas of pedestrian traffic, luminaires shall be flush with floor surfaces or have chamfered edges with a maximum height of 5mm above ground. They shall have anti-slip coatings to eliminate trip and slip hazards.
- In areas where vehicular traffic is possible, luminaires shall be suitably rated to be driven over without compromising the luminaire integrity.
- Inground luminaires shall not be used in garden beds or locations where they may get covered in debris.

Figure 6.8 Examples of inground luminaires, Lucie Debelkova - Gavriil Papadiotis – MPLight

6.2.6 Miscellaneous Luminaires

Miscellaneous Luminaires are those that are not explicitly listed earlier in this chapter. They may include miniature frame luminaires, catenary luminaires, festoon lights, and custom luminaires.

Objectives:

- To satisfy exterior pedestrian lighting codes stated in AS1158 and AS4828 if it is considered as functional lighting.
- To achieve special lighting effects towards targeted elements to highlight the precinct's characteristics and activate public spaces.
- To utilise the latest technology to provide maximum efficiency and precise lighting distribution to prevent light spill onto adjacent buildings and glare.

Guidance:

- Miniature LED luminaires include those, such as frame luminaires that may be integrated into windowsills, arched artworks, etc. These shall be fixed securely with minimal impact on any heritage fabric. They shall have a minimum rating of IP66 and IK07. They should be used out of reach of the general public.
- Catenary luminaires and shades shall have an IP rating suited to the environment and application in which they are to be installed. All catenary luminaires and objects shall be securely fixed to the catenary system, mitigating any risk of falling.
- Custom luminaires shall meet all Australian Standards requirements and be suitable for the environment in which they are to be installed. Ease of maintenance shall be considered in the design of any custom luminaires. Fixture and fixing points shall be carefully considered to minimise adverse impact on heritage fabric or natural elements.
- Use of festoon light shall be considered on a case-by-case basis. Whilst its application can add a ‘festive’ mood to a space, it shall be limited to special events or at areas where its effect is contained and does not detract from the heritage façade. The cabling should be neatly concealed from view.
- Permanent neon light is not permitted for use in the precinct. Limited use may be allowed for signage, but it is subject to PMNSW approval.

Figure 6.9 Examples of miscellaneous luminaires, iGuzzini – Bega - Florian Groehn

7 Technical Guides

This chapter explores the preferred application of lighting for different types of spaces and to support different uses. It provides technical guidance supporting opportunities to implement creative lighting solutions from concept to practical application.

The aim is a balanced lighting approach to suit each environment within the precinct, acknowledging and responding to the unique characteristics and requirements of each application.

It establishes clear overarching objectives for different spatial typologies to ensure a consistent precinct-wide approach.

A series of typologies are addressed in this chapter, including:

Figure 7.1 George Street gateway

Gateways

Gateways are entryways into the precinct and provide opportunities to articulate a change in character between Sydney CBD, Millers Point and The Rocks.

Figure 7.2 George Street

Primary and secondary armatures

These are the key streets around which The Rocks is structured. They are key movement paths and places of activity that form an important part of people's experience of The Rocks.

- Primary armatures are main streets.
- Secondary armatures are lower-order streets, with less active street-facing land uses like outdoor dining and retail uses.

Figure 7.3 Cambridge Street

Pedestrian routes and stairs

Pedestrian-only routes and stairs are key unique characteristics of The Rocks, a result of the area's unique topography and intact historic urban fabric.

Due to their smaller scale and lack of clear sight lines, the lighting design of these spaces is especially key to ensuring the precinct feels safe and welcoming.

Figure 7.4 Foundation Park

Public open spaces

These are places where the public are encouraged to dwell, rather than move through. Varying in scale, they are important opportunities for planting, biodiversity that are free for use by the public.

Figure 7.5 Playfair Street

Facades

The Rocks houses a range of unique buildings with detailed facades which showcase the layered history of The Rocks.

While visible in the daytime, these facades are often not visible at night. The lighting of facades contributes greatly to the reading of The Rocks' character at night and supporting feelings of safety.

Figure 7.6 Shops on George Street

Tenancies and outdoor dining

Tenancies and outdoor dining are a key element that draws people into The Rocks and supports a lively atmosphere in the precinct. The lighting of these spaces affects the quality of adjacent public spaces.

Figure 7.7 The Rocks Market

Temporary events

The Rocks is the home a range of big to small events, from Australia Day to one-off activations. While temporary, they affect surrounding spaces and should contribute positively to the light character of the precinct.

Figure 7.8 Public Artwork, Playfair Street

Public Art, Wayfinding and Commercial Signage

The lighting of these finer elements is key to support a functional, visually interesting and consistent lighting approach to The Rocks.

7.1 Gateways

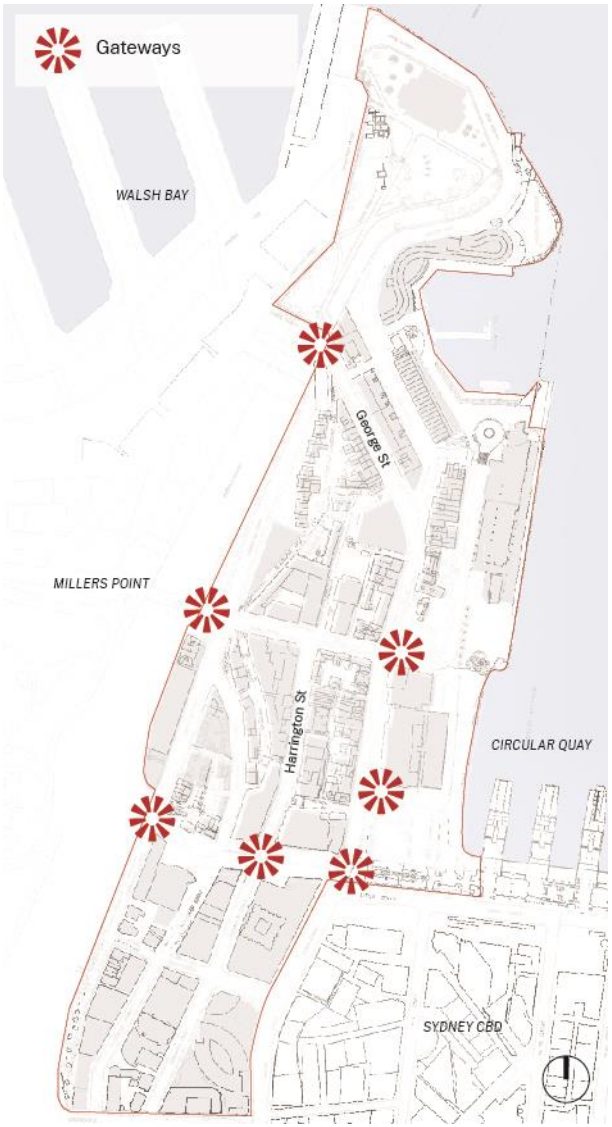


Figure 7.9 Key Plan – Gateways

Gateways are entry points into the precinct and provide opportunities to articulate a change in character between Sydney CBD, Millers Point and The Rocks.

Objectives:

- Physically and experientially mark visitors' arrival at the precinct.
- Establish a consistent lighting approach that can be integrated as part of a holistic public domain response at these key spaces.
- Emphasise primary gateways at First Fleet Park, Argyle Cut and under the Sydney Harbour Bridge.

Guidance:

- Functional lighting shall be provided to meet the standards for vehicular or pedestrian circulation appropriate to each gateway. Refer to **7.2 Primary Armatures** and **7.3 Secondary Armatures** for guidance. Opportunities for creative lighting layers are discussed in more detail in the following pages.
- Illuminate gateways with a bright and neutral white (3500K-4000K) light to emphasise its presence and differentiate thresholds from the broader city.
- Seek opportunities to enhance these gateways through the incorporation of public art, creating a distinctive and special ambiance. Colour-changing luminaires may be used to provide the opportunity to adjust and program the lighting to suit specific festivals or seasonal celebrations and unify the gateways.
- Red and green coloured lights shall not be used at gateways with vehicular access. Any dynamic installations must consider the amenity of vehicular traffic and nearby residents/tenancies.
- Collaborate with City of Sydney and TfNSW to ensure an integrated lighting response, especially where lighting is proposed to be attached to adjacent bridge structures or other elements outside of PMNSW ownership.

References

Figure 7.10 (top left) Il Vittoriale: accent uplighting to gateway announcing arrival to the estate, Germano Borrelli

Figure 7.11 (middle left): Dom Tower, Utrecht, The Netherlands – Inground linear uplighting in warm white highlights the structure, Speirs Major

Figure 7.12 (bottom left): Guangzhou, China – Lighting the inner structure of the bridge in a cooler white that the surrounds differentiate the form of the arch from the surrounds, Casey Swan

Figure 7.13 (top right): The Regent Bridge, Edinburgh, UK – Inground linear lighting washing the wall and archway, accentuating scale and texture, Murdo Eason

Figure 7.14 (middle right): Lynn Massachusetts, USA - Lighting to the underpass, creates visual interest and contributes to pedestrian safety, Warren Jagger

Figure 7.15 (bottom right): Infinity Bridge, Stockton-on-Tees, UK. Use of purple and blue hues provides contrast from warm white lighting, Greig Cranna

7.1.1 Gateway Opportunity - Under The Cahill Expressway

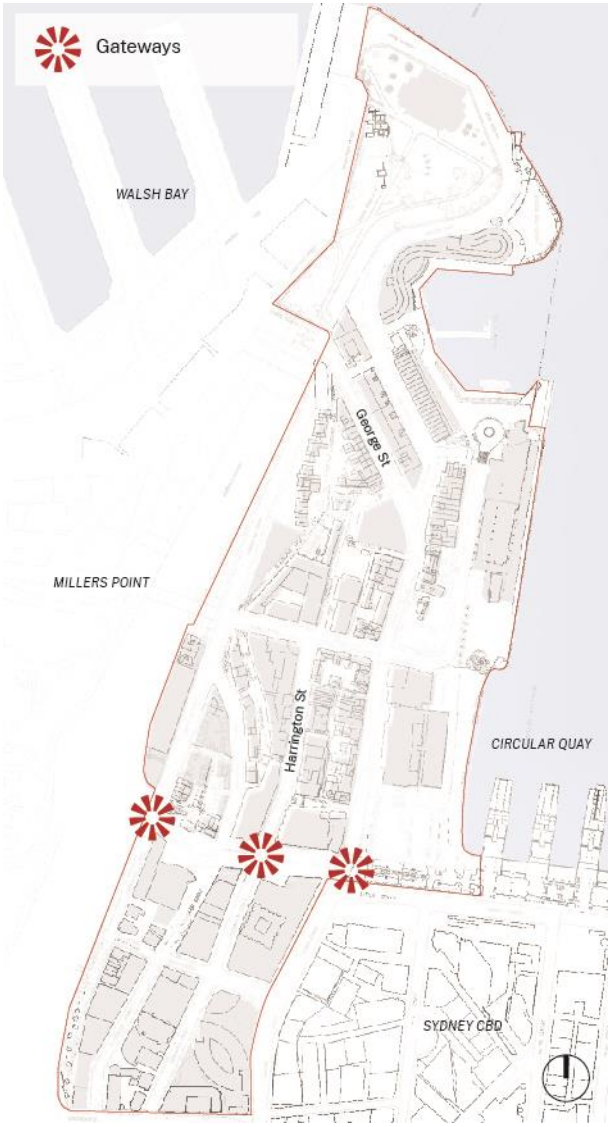


Figure 7.16 Key Plan – Gateways under the Cahill Expressway

Objectives:

- Highlight the George Street gateway as the priority gateway into The Rocks from the CBD.
- Use feature lighting to create visual interest and identify these thresholds.
- Continue to collaborate with TfNSW on the Circular Quay Renewal project to improve the southern threshold to The Rocks and the experience of the precinct.
- Ensure integration of the Circular Quay Renewal and the George Street North Streetscape upgrade projects to optimise place outcomes

Guidance:

- Installations should consider luminaires or luminous forms as the marker or insignia of the gateways and enhance the 'portal'.
- Ensure that human scale and pedestrian experience is at the forefront of design (not vehicles).
- Colour changing effect may be used, in unison with the other gateways, during special events.

Figure 7.17 Cumberland Street with Cahill Expressway overpass

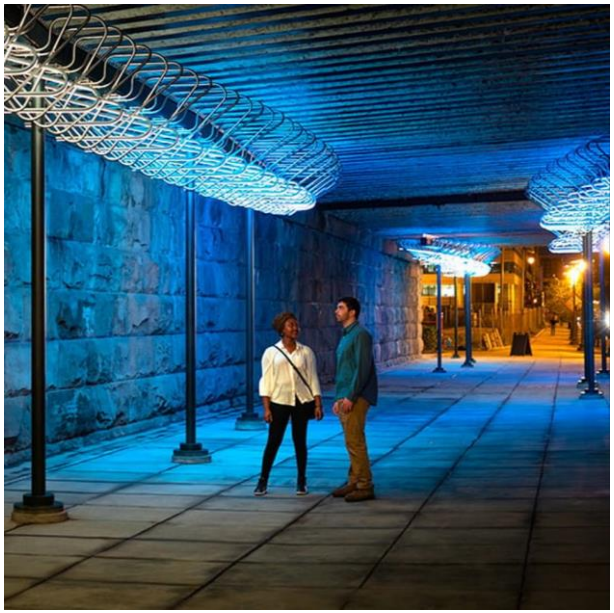
Figure 7.18 George Street with Cahill Expressway overpass

References

Figure 7.19 (top left): Spillepengen bridge, Sweden - use of cooler white and dramatic shaft of light enhances the appearance of portals under the bridge, Johan Moritz

Figure 7.20 (bottom left): Light weave by Future Forms, Washington DC, USA - immersive installation uses cooler white and blue light to contrast with the adjacent street, Sam Kittner

Figure 7.21 (top right): Zutphen tunnels by Herman Kuijer, The Netherlands - accent lighting to the tunnel structure includes subtle movement & change of hue to mark the gateway, Herman Kuijer



7.1.2 Gateway Opportunity – The Argyle Cut

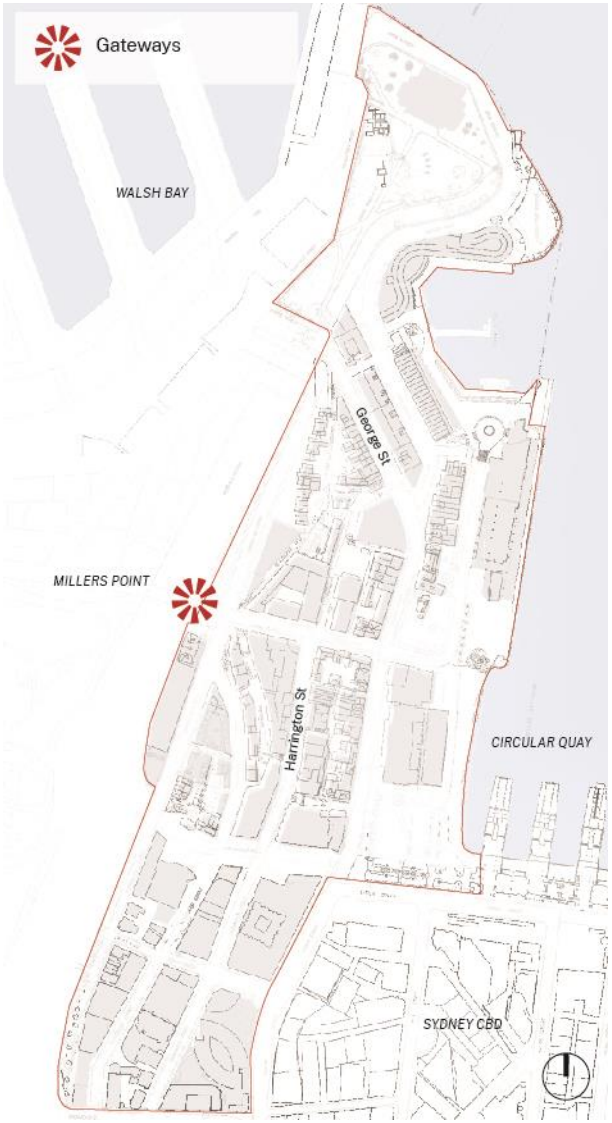


Figure 7.22 Key Plan – The Argyle Cut

Objectives:

- Celebrate the Argyle Cut as a prominent and recognisable gateway feature of The Rocks area and a great engineering feat.

Guidance:

- The form and volume of the tunnel shall be accentuated by lighting up into the barrelled ceiling via use of various lighting techniques.
- The various textures and characters of the cut can be illuminated at night to enhance the proportions, form, and texture of the tunnel.
- Colour changing effect may be used, in unison with the other gateways, during special events.
- Collaborate with City of Sydney and TfNSW on lighting proposals for this area as the relevant landowners.

Figure 7.23 Existing lighting condition at The Argyle Cut does not reveal the structure to its full potential

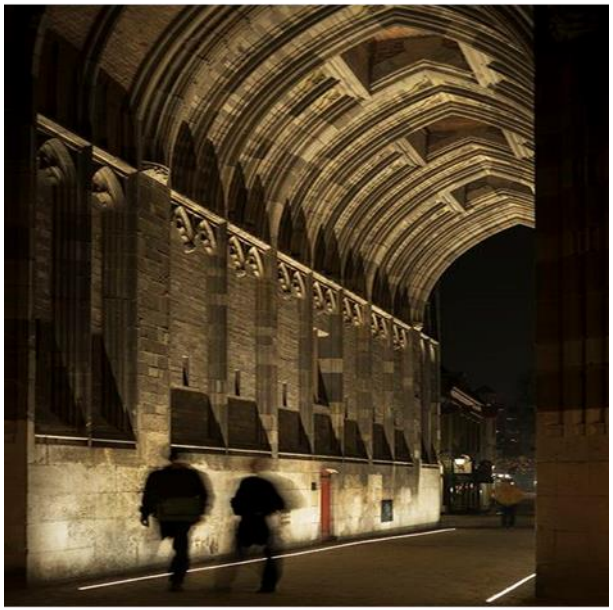
Figure 7.24 Argyle Cut during Vivid 2019, with traffic closure, Destination NSW

References

Figure 7.25 (top left) Use of cooler colour temperature at the gateway contrasts with the warmer precinct lighting

Figure 7.26 (bottom left) Opportunity for subtle colour changing effect for special occasions, Speirs Major

Figure 7.27 (top right) Dom Tower, Utrecht, The Netherlands – Inground linear uplighting in warm white highlights the gateway structure, iGuzzini



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7.1.3 Gateway Opportunity - Under the Sydney Harbour Bridge

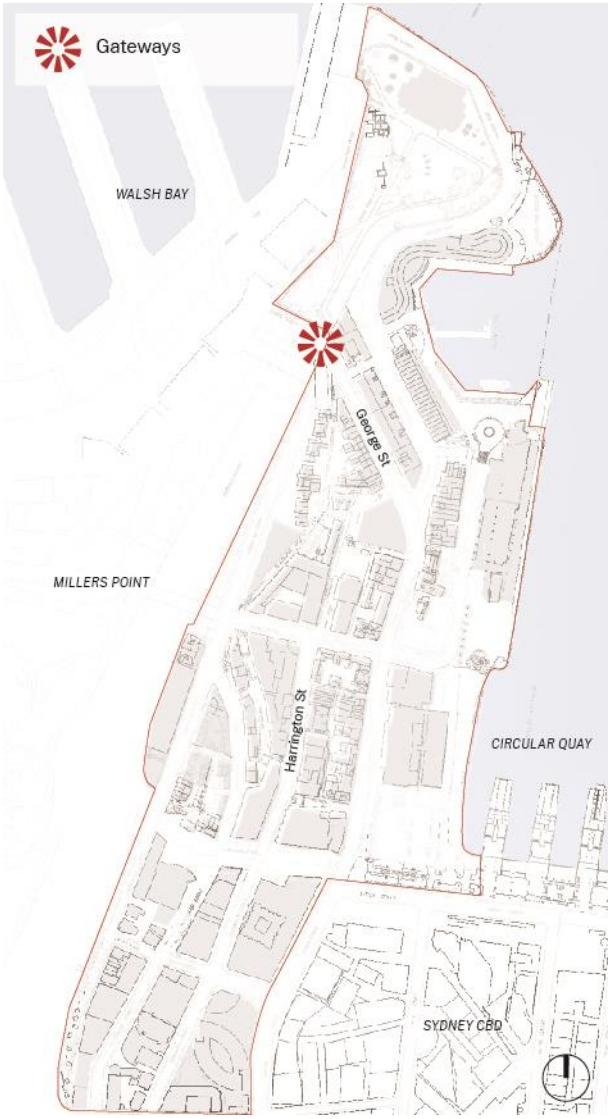


Figure 7.28 Key Plan – Under the Harbour Bridge

Objectives:

- Enhance the impressive scale of the Harbour Bridge gateway.
- Celebrate the iconic architectural structure.

Guidance:

- Care must be taken to ensure the broader view of the Sydney Harbour Bridge remains uncompromised. This can be achieved by minimising light spills and carefully managing brightness levels to prevent visual distraction.
- Lighting fixtures should be positioned and shielded to direct light precisely where needed, avoiding any unintended impact on the iconic structure.
- Collaborate with City of Sydney and TfNSW for lighting projects in Dawes Point Park or to the Harbour Bridge
- Use of cooler colour temperature (3500K-4000K) to enhance the steelwork
- Colour changing effect may be used, in unison with the other gateways, during special events.

Figure 7.29 Existing conditions under Sydney Harbour Bridge

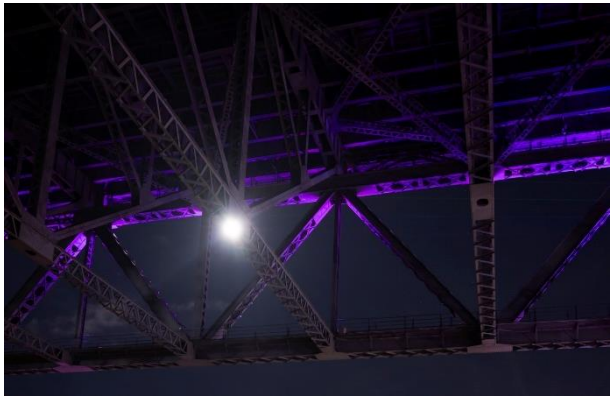


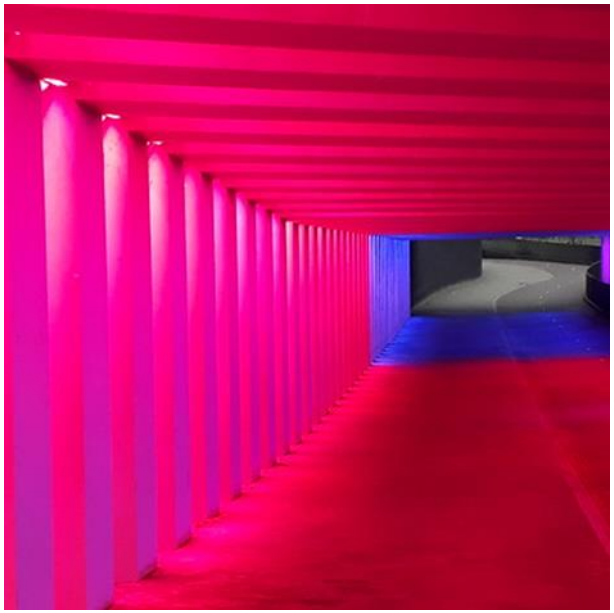
Figure 7.30 The Sydney Harbour Bridge, lit during Vivid 2024, Cassandra Hannagan

References

Figure 7.31 (top left) Tunnel in Zutphen - Examples that shows the composition of structural elements, Martien van Zijp

Figure 7.32 (bottom left) Lynn Massachusetts, USA - Example that renewals the impressive scale of the bridge, Warren Jagger

Figure 7.33 (top right) I-35W Saint Anthony Fall Bridge – Grey spaces beneath the bridge are brought to life through thoughtfully designed lighting, Scott Scoville



7.1.4 Gateway Opportunity - First Fleet Park

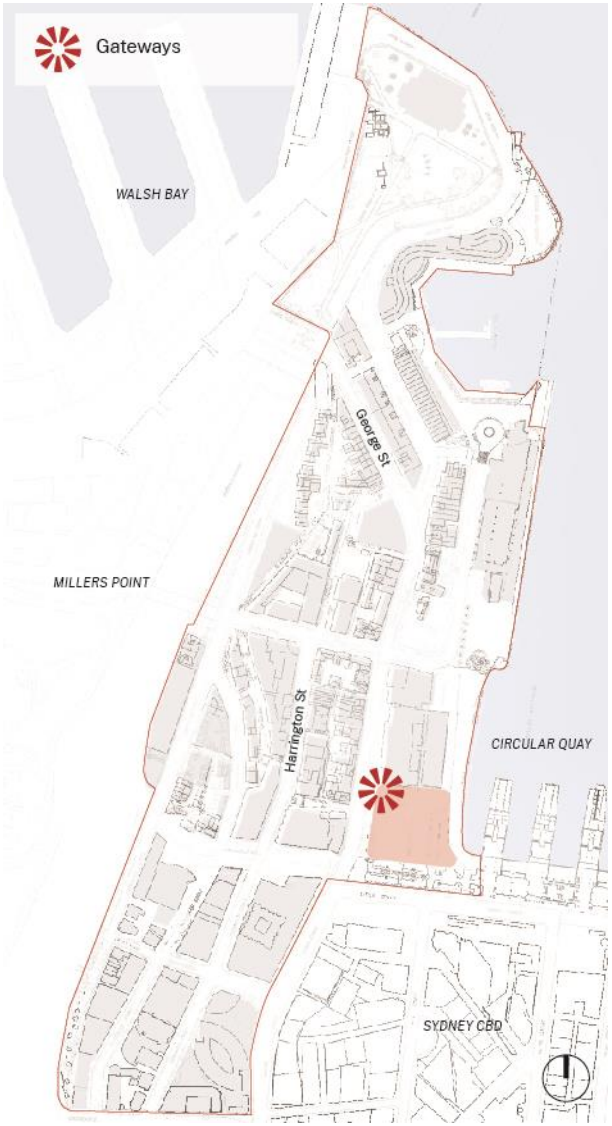


Figure 7.34 Key Plan - First Fleet Park

Objectives:

- Reinforce the connection between Circular Quay and George Street.
- Ensure safe movement with functional lighting.
- Enhance human scale with feature lighting to draw people in and through the park.
- Amplify visibility of the gateway from the foreshore walk and support sight lines between The Rocks and Circular Quay.
- Continue to collaborate with TfNSW on the Circular Quay Renewal project to improve the southern threshold to The Rocks and experience of the precinct.
- Ensure integration of the Circular Quay Renewal and George Street North Streetscape Upgrade projects to optimise place outcomes.

Guidance:

- Identification of this place as a gateway should be facilitated through landscape lighting and lighting to the sandstone wall adjacent to George Street.
- Use low level lighting integrated into landscape and furniture.
- Significant trees should be lit up to add drama to the visual experience.
- Functional lighting shall be achieved using pole-mounted luminaires, providing vertical and horizontal light levels in accordance with AS1158 for a category PA2 environment.
- Coloured lighting is not suggested at this location.

Figure 7.35 High contrast lighting at First Fleet Park

References

Figure 7.36 (top left): Integrated low-level lighting provides a human scale and welcoming atmosphere that encourages people to gather and relax, Speirs Major

Figure 7.37 (bottom left): Tree uplighting provides a brighter ambient light while enhancing the nightscape appearance, Speirs Major

Figure 7.38 (top right): Pole light to provide functional lighting, 02Landscape

Figure 7.39 (bottom right): Integrated linear for accenting the greenies, Idea Cubica

7.2 Primary Armatures

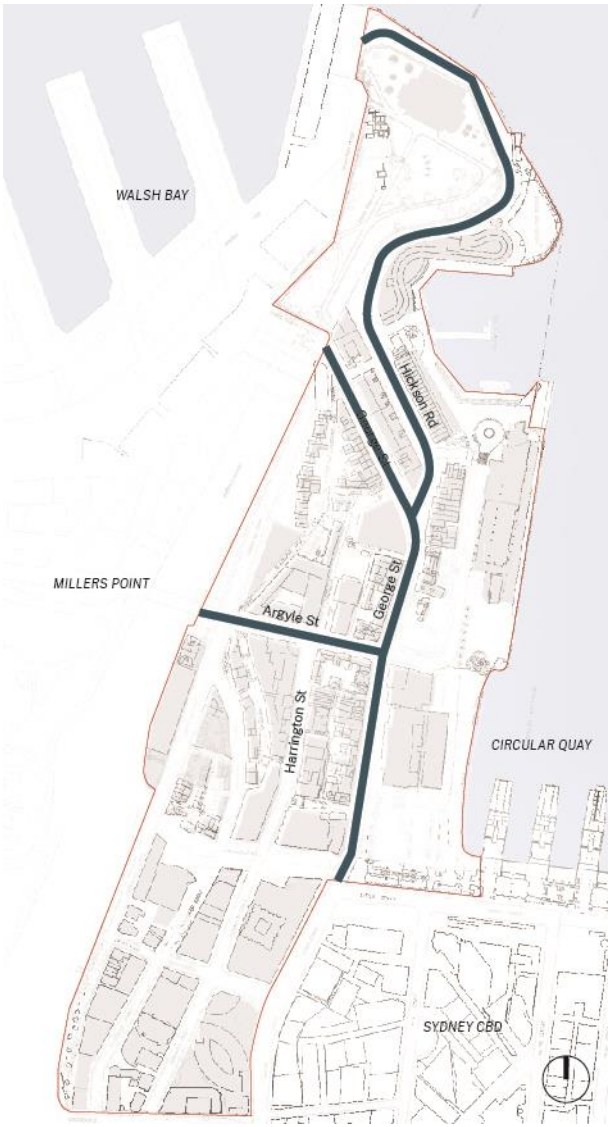


Figure 7.40 Key Plan - Primary armatures

7.2.1 General Considerations

Primary armatures are key streets around which The Rocks is structured. They are key movement paths and places of activity that form an important part of people's experience of The Rocks.

Objectives:

- Design lighting to emphasise primary armatures and the main thoroughfares through The Rocks with a focus on pedestrian experience and precinct exploration.
- Support safe pedestrian and vehicular use.
- Showcase the heritage character of the precinct.
- Design lighting to be consistent to articulate a strong identity for the precinct.

Guidance:

- Light distribution of the luminaires shall minimise spill light on adjacent buildings and create minimal glare to both pedestrians and motorists.
- The roadways shall be lit from poles as required to comply with AS1158 Category V1 and be 3000K warm white colour temperature
- Footpaths shall be lit from a range of lighting applications including poles, awning lights and façade lighting, comply with AS1158 Category PP2 and be 3000K warm white colour temperature.

Figure 7.41 Haphazard layered lighting approach on George Street

References

Figure 7.42 (top left) Regent St, London, UK - Primary armatures should be identifiable as the key routes through the precinct, Studio29

Figure 7.43 (middle left): Regent St, London, UK - Combination of repetitive façade lighting and streetlighting provides a coherent scheme along the length of this thoroughfare, Gordon Laing

Figure 7.44 (bottom left): Champs Elysees, Paris, France - illuminated trees and rhythm of streetlamp posts frame the main thoroughfare, Luna Marina

Figure 7.45 (top right) Lonsdale St, Dandenong, Australia - street furniture integrated light brings a human scale to the main route, World Architecture News

Figure 7.46 (middle right): Budapest, Hungary - façade lighting creates the important backdrop, Rutas Chile

7.2.2 Pole Lighting

Primary armatures include the main pedestrian and vehicular streets of The Rocks: George Street, Hickson Road and Argyle Street. In these locations, poles shall be primarily used for lighting the roadway and adjacent footpaths.

Any selected product should adhere to the following parameters:

- Poles should generally have a consistent appearance and be recessive in the landscape with heads which are low profile and uncomplicated in form.
- The pole finish should be from the PMNSW-approved colour palette and be consistent across the precinct unless specific site conditions warrant a different finish or type.

This strategy does not mandate a specific product for use along Primary Armatures due to ongoing technological and design advancements. Any selected product should adhere to the following parameters:

- Poles must satisfy vehicular lighting codes stated in AS1158 and AS4828 to roadways and pedestrian pathway lighting.
- Poles should utilise the latest LED technology, installed into a lens-based LED luminaire. This should provide maximum efficiency and precise lighting distribution to prevent light from spilling onto adjacent buildings and glare.
- Poles should accommodate other services, such as CCTV, 5G, PA systems, banners, and power provision for temporary events to reduce the need for additional infrastructure as much as possible.
- Lens-based LED luminaires.
- Colour temperature 3000K.
- CRI>90.
- Poles shall be no higher than 7200mm and have the capacity to mount one luminaire head for roadways and luminaires for footpaths. Luminaire heads for primary armature roadways shall be mounted no higher than 7200mm.
- *Special consideration*: The existing heritage poles on George Street hold both distinctive historical and aesthetic significance including their locations. To retrofit these poles, new LED luminaire sources should be installed. New luminaires should have a colour temperature of 3000K and feature enhanced glare control and efficiency.

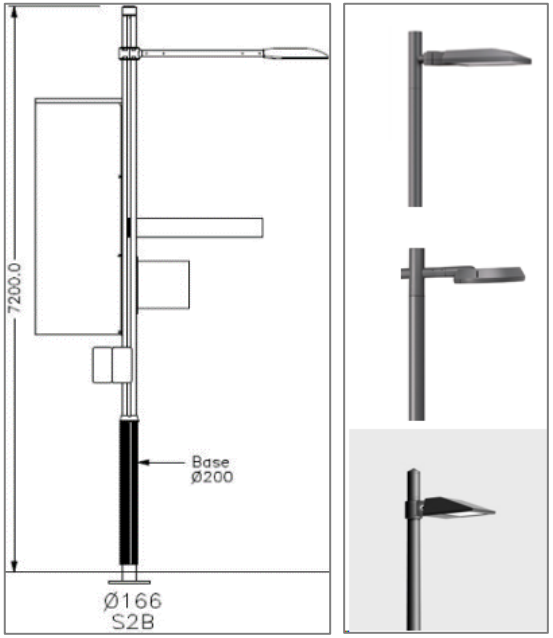


Figure 7.47 The general example for the rest of the armature roadside pole

Figure 7.48 View south down George Street

Figure 7.49 Existing heritage poles street poles for retention

7.2.3 George Street

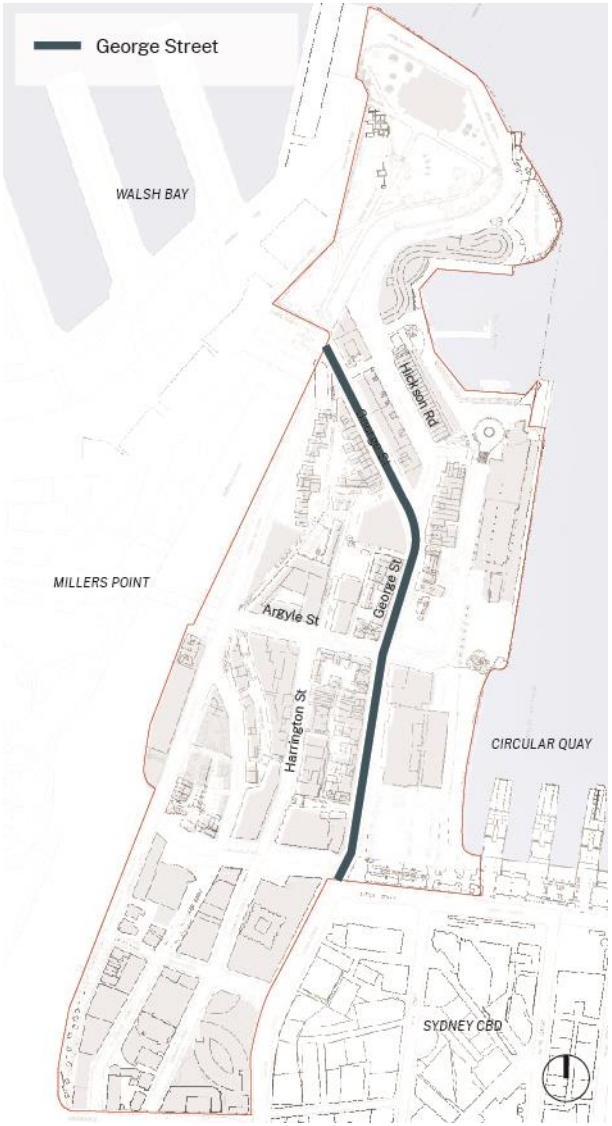


Figure 7.50 Key Plan - George Street

Objectives:

- Reflect the prominence of George St with prestigious and layered lighting including lighting of facades as a key feature.
- Support intuitive wayfinding along the length of George Street with consistently high-quality lighting that encourages pedestrian movement and exploration.
- Beautify the streetscape by lighting trees and other public domain
- features.
- Create a cohesive nightscape with light poles, façade, awning, and retail lighting that provides a welcoming night-time experience from early evening through to late night.
- Ensure compliant light levels on footpaths using ambient light sources.

Guidance:

- Retrofit heritage poles with LED sources for vehicular and pedestrian lighting, adjusting output for outdoor dining areas while maintaining the same luminaire appearance.
- Integrate low-level lighting into street furniture and built elements for a human scale, particularly in new outdoor dining areas.

Figure 7.51 View north up George Street near Cadman's Cottage

Figure 7.52 Existing Outdoor dining along George Street

References

Figure 7.53 (top left): Illuminated trees beautifying the streetscape, IGuzzini

Figure 7.54 (bottom left): Lighting of significant facades increases the streetscape prominence and can identify George St as the primary armature in the precinct, Studio29

Figure 7.55 (top right): Lighting to awning and outdoor dining contributes to the footpath lighting, Opalinedc

7.2.4 Argyle Street

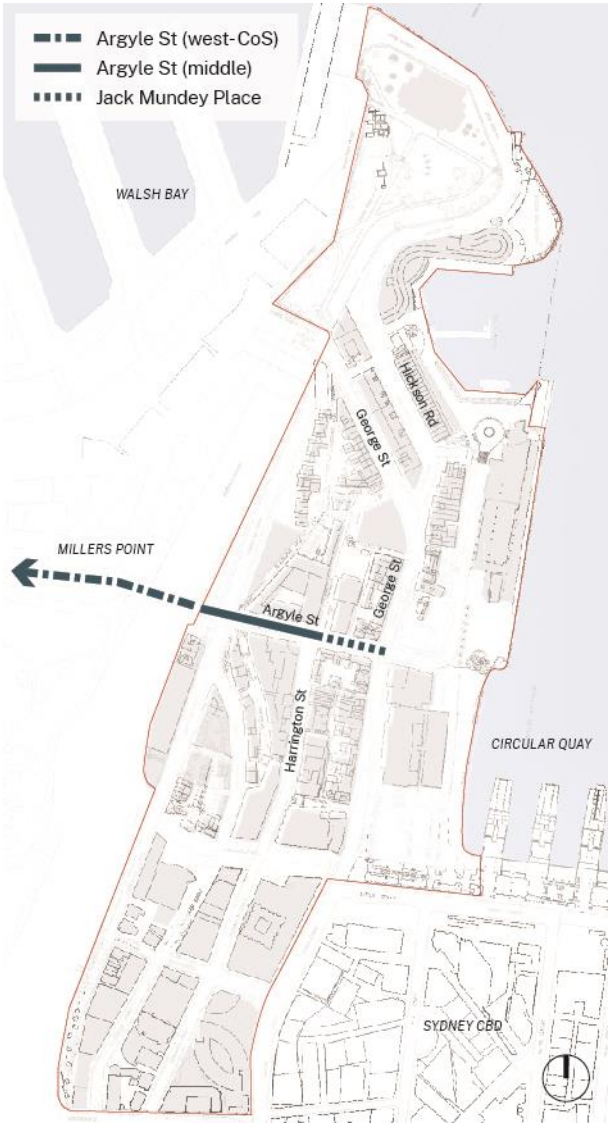


Figure 7.56 Key Plan - Argyle Street

Objectives:

- Ensure a connected lighting experience across Argyle St's three zones: Argyle Cut (west- CoS), Argyle Stores (middle-PMNSW) and Jack Mundey Place (east-PMNSW).
- Beautify the streetscape by lighting trees and other public domain features.
- Create a cohesive nightscape with light poles, façade, awning, and retail lighting that provides a welcoming night-time experience from early evening through to late night.

Guidance:

- Use roadside poles no greater than 7200mm high, evenly spaced and symmetrical, to provide vehicular and pedestrian lighting. Avoid poles within the Argyle Cut; consider wall-mounted luminaires if needed.
- Integrate low-level lighting into fixed street furniture to provide a unifying element at a human scale.

Figure 7.57 Jack Mundey Place with multiple types of pole types and festoon light creating visual clutter that detracts from the heritage character of the street

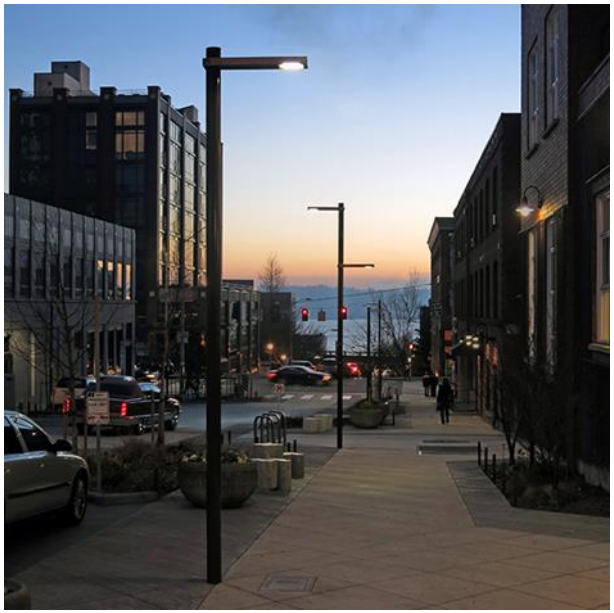
Figure 7.58 The Argyle Cut is barely visible from the intersection with Harrington Street

References

Figure 7.59 (top left): Simple pole-mounted lighting for functional lighting, All Urban

Figure 7.60 (bottom left): Uplighting to grand arched feature, Stuart Armitt

Figure 7.61 (top right): Catenary-mounted downlights can help highlight areas for pedestrians and create spaces for gathering, World Landscape Architecture



7.3 Secondary Armatures

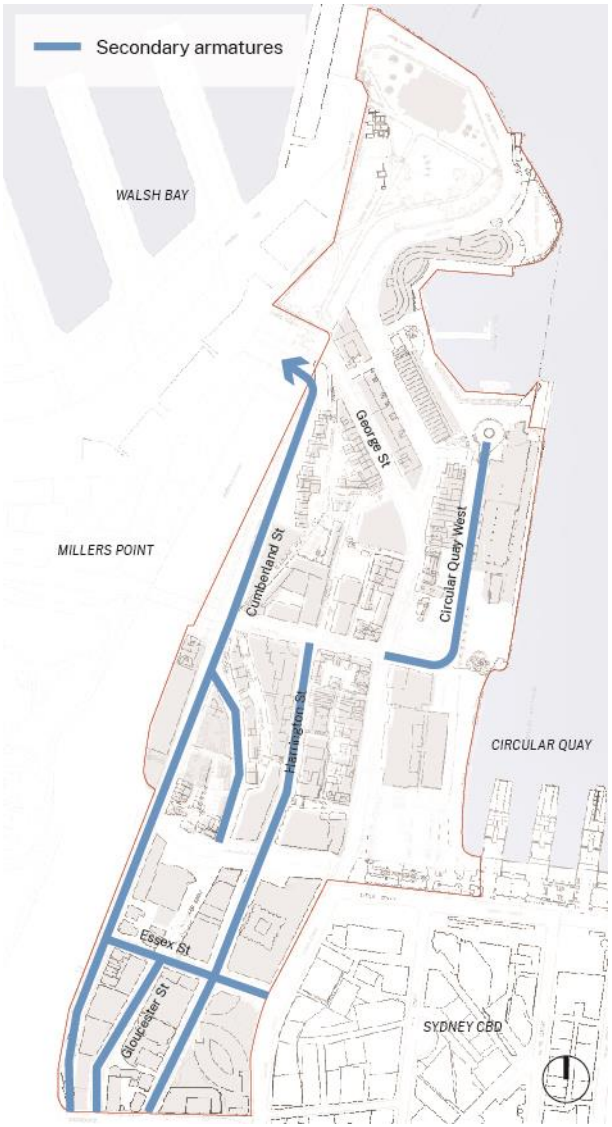


Figure 7.62 Key Plan - Secondary Armatures

7.3.1 General Considerations

Secondary armatures are lower-order streets that connect into primary armatures. They generally feature less active street-facing land uses like outdoor dining and retail uses.

Objectives:

- Create a coherent identity for The Rocks with consistent lighting along secondary armatures.
- Enhance heritage facades, murals, and stone walls with integrated lighting
- Minimise spill light to residences along secondary armatures.
- Ensure the lighting scheme aligns with the primary armatures and is proportional to the width and surrounding context of the street.

Guidance:

- Use consistent lighting techniques with primary armatures but on a smaller scale
- Light roadways with poles compliant with AS1158 Category V3, using 3000K warm white colour temperature
- Light footpaths with poles compliant with AS1158 Category PP3 using 3000K warm white colour temperature.
- Use integrated lighting for select features, including wall lights and focusable spotlights. Roadside poles shall be no greater than 4800mm high and evenly spaced on one side of the roadway to provide vehicular and pedestrian lighting. Poles shall be the same as those used on Argyle St. Consideration of pole locations shall be made to minimise visual distraction to heritage facades.
- Gateways to the precinct on Cumberland and Harrington Street shall be lit as per **Section 7.1**.
- Apply accent lighting to built elements that enhance the narrative of the precinct, such as rock walls at Cumberland and Harrington Street, and the mural at Gloucester Street on the Cahill Expressway structure.

Figure 7.63 Cumberland Street

References

Figure 7.64 (top left): Simple pole top luminaires with downward distribution directed to roadways and adjacent pedestrian routes, ll Urban

Figure 7.65 (middle left): Roma St Parklands, Brisbane, Australia - Simple small-scale pole top luminaire combined with tree uplighting to beautify the streetscape, we-ef Lighting

Figure 7.66 (bottom left): Unknown street, Lille, France - Simple small-scale pole top light, Technilum

Figure 7.67 (top right): Accent to heritage objects creates low-level interest along the street, DPA Lighting

Figure 7.68 (middle right): ATP Locomotive, Sydney, Australia - accent lighting to façade and heritage objects add to the narrative of the precinct, Jackie Chan

Figure 7.69 (bottom right): Deoksugung, Seoul, South Korea - Uplighting to stone wall highlighting topography, Korea Trip Tips

7.3.2 Pole Lighting

Secondary Armatures provide important links for pedestrians and vehicles. Poles will be used for lighting secondary armatures as well as footpaths adjacent to roadways.

Objectives

- Ensure appropriate lighting for vehicle and pedestrian routes stated in AS1158 and AS4828.

Guidance

- Poles shall be recessive in the landscape with heads which are low profile and uncomplicated in form.
- Pole finish and appearance shall be the same as the Primary armature roadside poles and be consistent across the precinct unless specific site conditions warrant a different finish in a given location.

Any selected product should adhere to the following parameters:

- Poles should generally have a consistent appearance and be recessive in the landscape with heads which are low profile and uncomplicated in form.
- The pole finish should be from the PMNSW-approved colour palette and be consistent across the precinct unless specific site conditions warrant a different finish or type.

This strategy does not mandate a specific product for use along Secondary Armatures due to ongoing technological and design advancements. Any selected product should adhere to the following parameters:

- Poles must satisfy vehicular lighting codes stated in AS1158 and AS4828 to roadways and pedestrian pathway lighting .
- Poles should utilise the latest LED technology to provide maximum efficiency and precise lighting distribution to prevent light spill onto adjacent buildings and glare.
- Poles should allow for the recessive attachment of other services (Banners, Wi-Fi, CCTV, PA system and power provision etc.) onto the pole. Ensure that the finish of these services is minimal in both size and colour to harmonise with the pole colour.
- Lens-based LED luminaires.
- Colour temperature 3000K.
- CRI>90.
- Luminaire heads shall be smaller in scale and output than those used for primary armature roadways. They shall be mounted no higher than 4800mm and have distribution which minimises spill onto adjacent buildings.
- *Special consideration:* Poles along Cumberland Street are to be set at a height of 5.5 meters. This responds to the width of the street and the relatively dimmed lighting conditions, as there is limited ambient light in the surroundings.

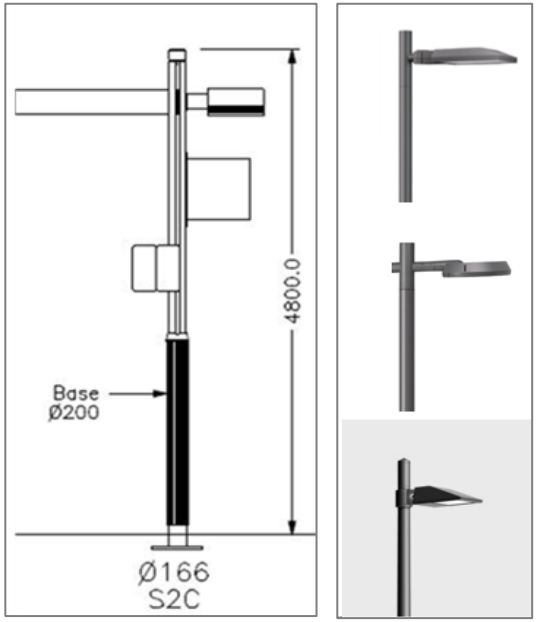


Figure 7.70 The general example for the rest of the secondary armature roadside poles

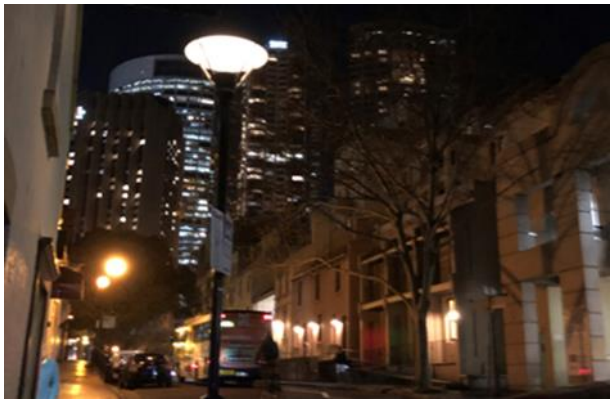


Figure 7.71 Existing street lights on Harrington Street

Figure 7.72 Existing street lights on Harrington St

7.4 Pedestrian Routes

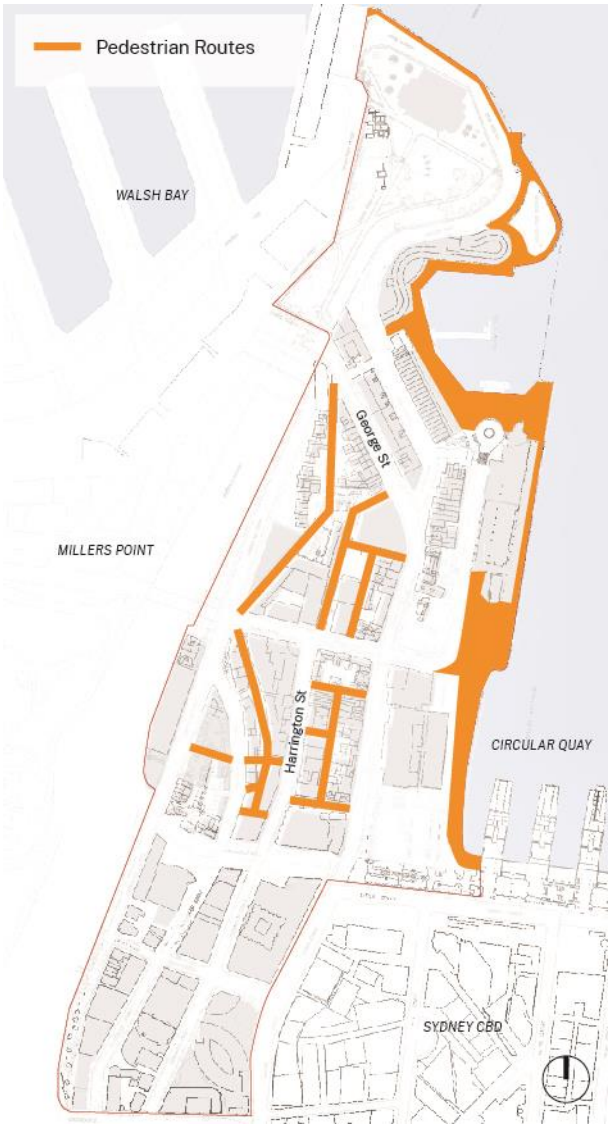


Figure 7.73 Key Plan - Pedestrian Routes

7.4.1 General Considerations

Pedestrian routes are pedestrian-only pathways that do not include a dedicated vehicular carriageway. These spaces particularly showcase The Rocks' unique topography, intact historic urban fabric and its relationship with Sydney Harbour.

Objectives:

- Ensure appropriate lighting for pedestrian routes, including laneways, open routes, stairs, and crossings, as per AS1158 recognising the unique characteristics of these places across the precinct.
- Enhance precinct characteristics and assist visitor orientation with accent lighting of feature landscape elements, mural walls, urban artworks etc.
- Use colour temperatures between 2700K and 3000K warm white on a case-by-case basis depending on the specific context.

Guidance:

- Apply lighting techniques suited to the urban context and activity level of each pedestrian route
- Select and mount luminaires to harmonise with the built environment with consideration of the area's size and scale
- Use architecture to accommodate lighting equipment, minimising additional infrastructure.
- Highlight forms and materials with accent lighting to activate public space and reduce the need for general area lighting.

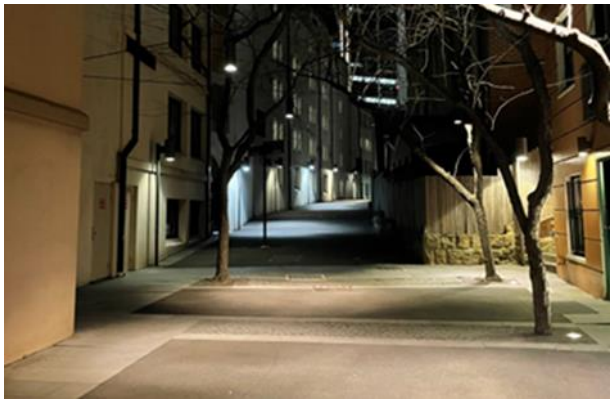


Figure 7.74 Inconsistent lighting temperatures on Cambridge Street

References

Figure 7.75 (top left): The High Line, New York, USA - Lighting to pedestrian routes shall provide well-defined and safe orientation, Travel Live Journal

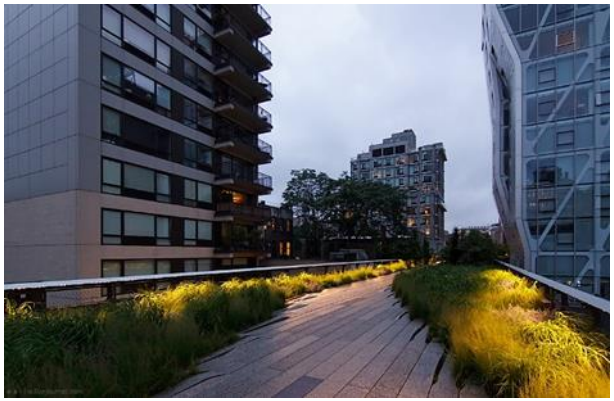
Figure 7.76 (middle left): Saltwater Country in Kendall Lane- decorative shades doubling up as functional light and public art, Artpharmacy

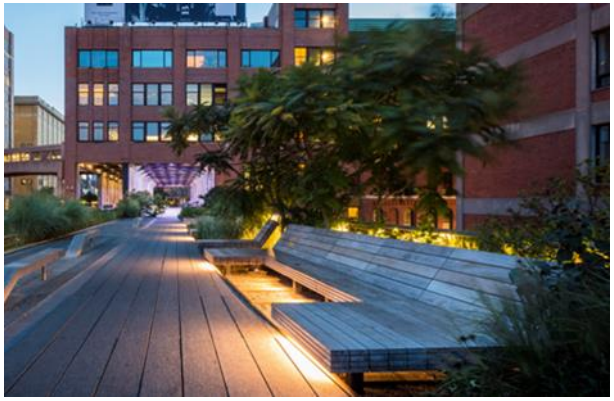
Figure 7.77 (bottom left): The High Line, New York, USA - Pedestrian pathways are clearly defined, with small pockets lit as rest points, Andrew Frazs

Figure 7.78 (top right): Queen Elizabeth Olympic Park, London, UK - Patterns from luminous balls provide a soft dappled light, complementing the tree-lined pedestrian route, James Newton

Figure 7.79 (middle right): Hamamyolu Urban Deck, Eskişehir, Turkey - use of lighting to aid wayfinding and as the unifying element along the route, Landezine

Figure 7.80: (bottom right) Southern Laneways, Sydney CBD, Australia - façade lighting contributes to welcoming feel of the laneway, Simon Wood





7.4.2 Pole Lighting

Where appropriate, consistent with advice in this strategy, pole lighting is to be used for pedestrian routes, and to work with varying conditions throughout The Rocks.

Objectives

- Ensure appropriate lighting for vehicle and pedestrian routes stated in AS1158 and AS4828.

Guidance:

- The design shall allow for the luminaire/lamp to be replaced or updated over time. Poles should be complemented with other forms of lighting including wall mounted to suit the individual site conditions.
- Poles may be more ornamental than the primary and secondary roadside poles and may include bespoke or custom-designed features. The appearance or lit effect of the poles/luminaire/lamp combination shall be in harmony with the urban context.
- Pole finish and appearance shall be the same as the surrounding roadside poles and consistent across the precinct unless specific site conditions warrant a different finish in a given location.

This strategy does not mandate a specific product for use along Pedestrian Routes due to ongoing technological and design advancements.

Any selected product should adhere to the following parameters:

- Poles must satisfy pedestrian lighting codes stated in AS1158 and AS4828 for pedestrian pathway lighting.
- Poles should utilise the latest LED technology to provide maximum efficiency and precise lighting distribution to prevent light from spilling onto adjacent buildings and glare.
- Lens-based LED luminaire.
- Colour temperature 2700K or 3000K subject to the context.
- CRI>90.
- The poles/luminaire/lamp combination shall be no greater than 4500mm in height and slender in form to reflect the pedestrian scale of the environment.
- Special cases, or use of a different type of pole for a specific route, could be considered on a case-by-case basis. For example: existing “railway standard lights” at Longs Lane, suits the smaller scaled heritage architecture and setting and may be retained and upgraded to a modern standard.

If there are challenges such as spatially compromised pedestrian spaces or difficulties with on-site trenching for pole lighting, wall luminaries may be more appropriate in that case. Please refer to **Section 6.2.2 Wall luminaires**.

Figure 7.81 Examples of pole lights

7.4.3 Foreshore Walkways

Figure 7.82 Key Plan - Foreshore Walkways

The eastern and northern edges of The Rocks feature foreshore walkways along Sydney Harbour, connected regionally to the east and west. These are highly visited spaces that provide important opportunities for connection with Water Country, topography and local views.

Objectives

- Enhance the safety, accessibility, and aesthetic appeal of these frequently visited areas by providing well-designed lighting and pathways.
- Ensure that lighting respects the ecological sensitivity of the foreshore buffer while enhancing connectivity to Water Country and showcasing local views of Sydney Harbour.

Guidance

- Ensure adequate, energy-efficient LED lighting for safe navigation, with poles compliant with AS1158 Category PP2.
- The light fixtures should meet marine standards and possess anti-corrosion properties, given their location right beside the waterfront.
- Implement clear wayfinding strategies that include features such as ramp and handrail integrated lighting, and clear signage that blend seamlessly with the overall lighting environment.
- Use lighting and landscaping that harmonise with the natural and historical context.
- Design strategic viewpoints and accessible connections to enhance user experience and showcase Sydney Harbour views.
- Respect the importance of the foreshore including the Sydney Opera House buffer zone regulations by using low-impact, sustainable materials and practices to protect local ecosystems, and limit light spill to the surrounding waterbodies and sky.

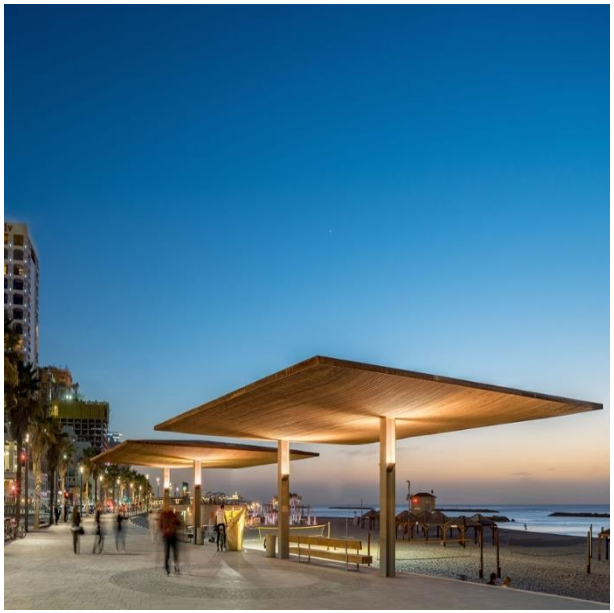
Figure 7.83 Sydney Foreshore Walkway near First Fleet Park and the MCA.

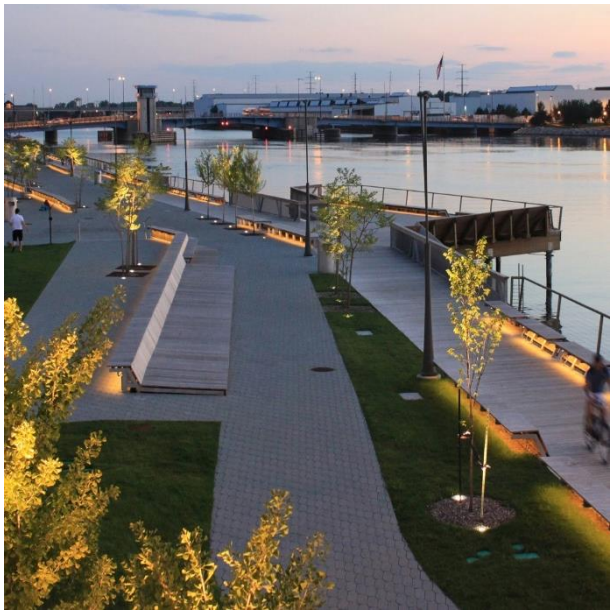
References

Figure 7.84 (top left): light to accent featured architectural elements along foreshore walkway, Landezine Awards

Figure 7.85 (bottom left): Integrated linear to subtly wash the steps, Dezeen

Figure 7.86 (top right): integrated bench lighting and spotlight only highlight the tree to avoid disturbing the surroundings, Archdaily





7.4.4 Major Laneways

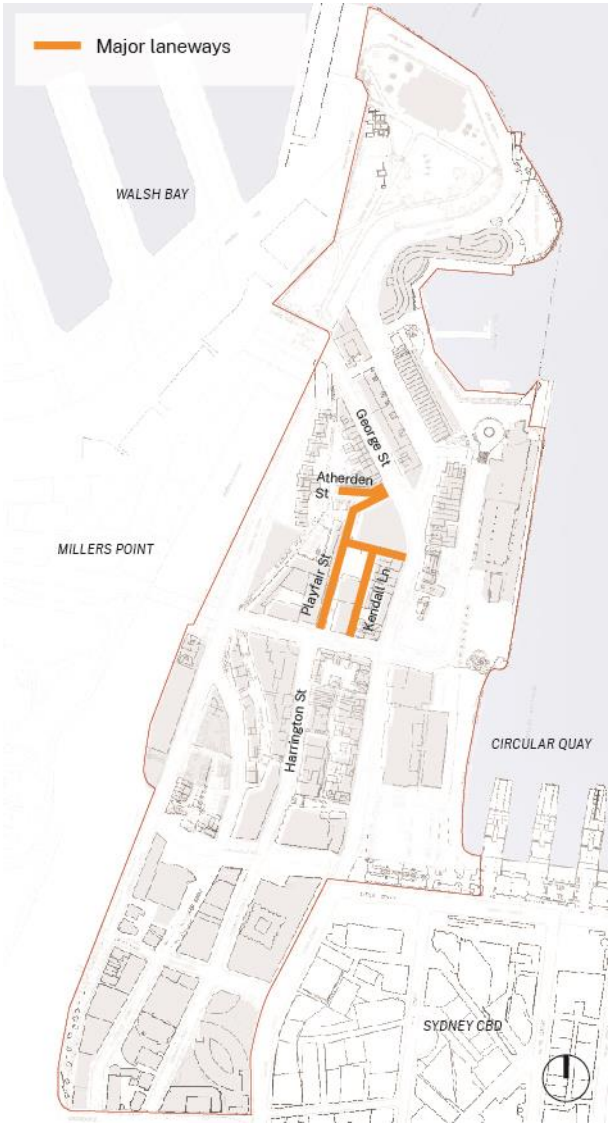


Figure 7.87 Key Plan – Major Laneways

Major laneways are wider, activated pedestrian pathways at the heart of the precinct.

Objectives:

- Support safety and security in major laneways through the use of appropriate lighting.
- Highlight natural features, significant trees, and public art to enhance the streetscape.
- Create intrigue and interest with colour-changing light elements for special events.

Guidance:

- Apply façade lighting to adjacent buildings as per **Section 7.6 Facades,** to maintain lit vertical surfaces and define extent.
- Minimise pole use to avoid obstructions along busy pedestrian routes that are less than 4m side
- Highlight natural features such as the sandstone rockface around Atherden Street, Sergeant Major's Row Courtyard, and below Foundation Park.
- Use controlled, low-glare uplighting for significant trees and public art.
- Consider backlighting low-level cellar windows with colour-changing lights for special occasions.
- Ensure lighting levels meet AS1158 Category PP3

Figure 7.88 Playfair Street

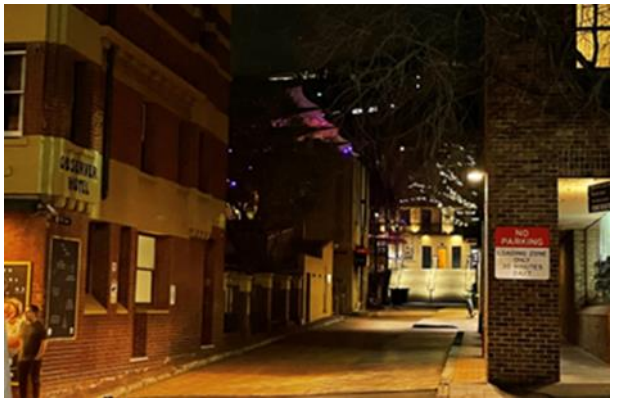


Figure 7.89 Mill Lane – showcasing varying conditions, from perceptively dark spaces with minimum lighting, to excessively bright areas, with differing colour temperatures resulting from different light sources and/or lamp/luminaire failure.

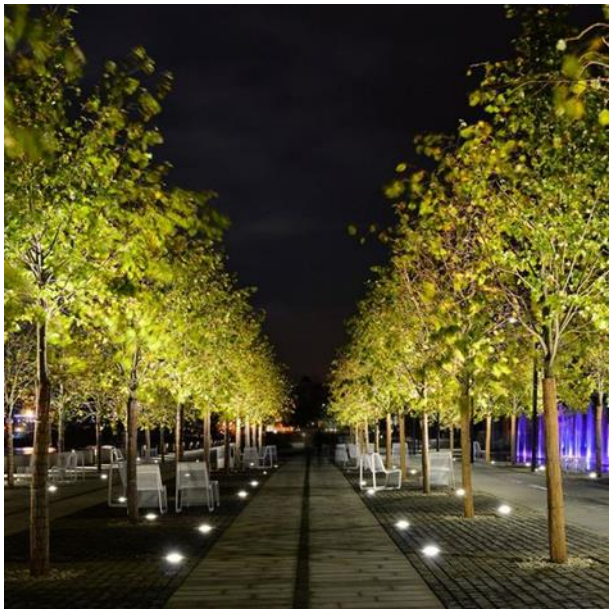
References

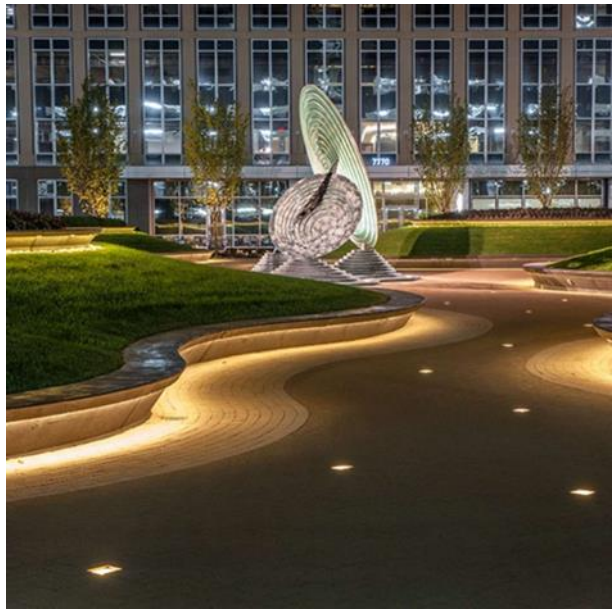
Figure 7.90 (top left): Illuminated façades create a backdrop & strengthen identity of an area, Archdaily

Figure 7.91 (bottom left): Uplighting to trees provides a brighter ambience and enhances the nightscape appearance, Architizer

Figure 7.92 (top right): Integrated lighting to urban fabric detailing, activates the area and draws visitors along it, Dion Robeson & Kurt McRae

Figure 7.93 (bottom right): Illuminated sculpture creates visual interest and acts as a reference point that aids orientation, Idei Club





7.4.5 Minor Laneways

Figure 7.94: Key Plan – Minor Laneways

Minor laneways are smaller pedestrian pathways, bounded by buildings. Their narrow width, changes in topography and non-linear arrangements both showcase the unique urban fabric of The Rocks, but also create short sightlines and poor feelings of safety, especially at night.

Objectives:

- Provide appropriate lighting for minor laneways to support safety and wayfinding.
- Enhances the experience of the precinct including storytelling narrative with accent and decorative lighting and provides a more intimate experience.
- Ensures safe movement through consistent lighting levels and very minimal obstructions.

Guidance:

- Use lower lighting levels than major laneways, meeting AS1158 Category PP4
- Utilise wall-mounted lighting, or catenary (limited use) lighting to minimise ground-level obstructions.
- Implement decorative lighting that creates patterns or accents to built and landscape elements
- Highlight select facades, such as brick and sandstone walls on Nurses Walk
- Light significant trees and public art with controlled, low-glare uplighting

Figure 7.95 Existing lighting on Nurses Walk

Figure 7.96 Existing lighting showcasing the intimate human-scale of the minor laneway

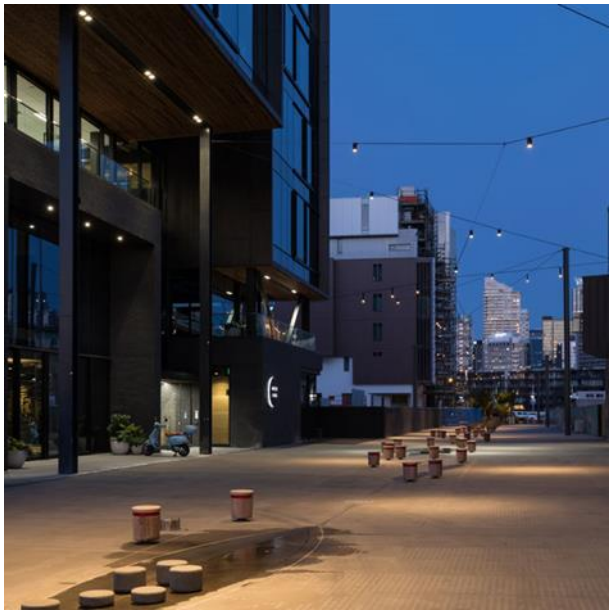
References

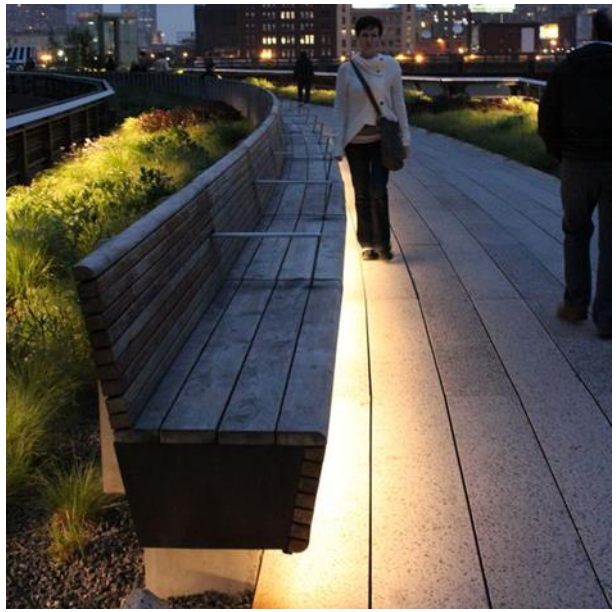
Figure 7.97 (bottom left): Downlight on the catenary system provide general lighting to the laneway, Mark Scowen

Figure 7.98 (bottom left): Downlight on the catenary system provide general lighting to laneway, Zero Lighting

Figure 7.99 (bottom right): Façade lighting contributing to the welcoming feel of the laneway, Simon Wood

Figure 7.100 (top right): Integrated lighting to seating provides a human scale and points to gather and relax, Eileen Busby





7.4.6 Stairs

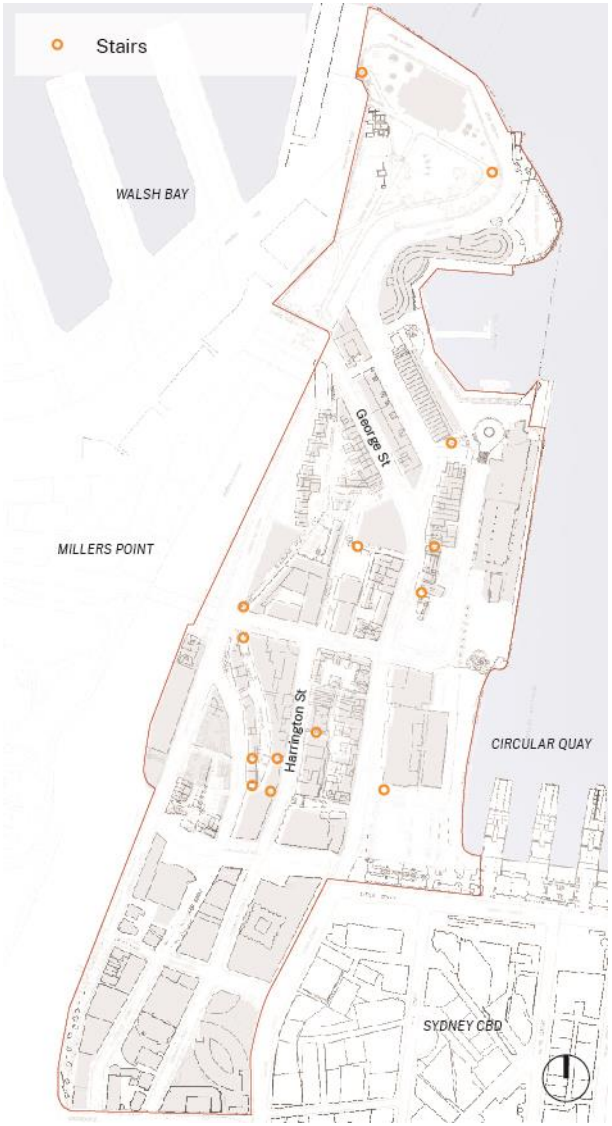


Figure 7.101 Key Plan - Stairs

The Rocks' steep topography can be traversed through several stairs across the precinct. Due to the topography's impact on sightlines, appropriate lighting of stairs is important for easy wayfinding and safe movement

Objectives:

- Ensure safe and compliant lighting for stairs.
- Minimise visual clutter while providing focused illumination.
- Enhance the visual relationship between topography and built form
- To satisfy AS1158 Category to stair lighting PE2 with consistent level lighting across the stair and its approaches.

Guidance:

- Ensure wayfinding signage is legible from stairs where required.
- Efficiently utilise lighting to structures such as handrails to minimise the need for other lighting elements in the public domain.
- Utilise the latest technology to provide maximum efficiency and precise lighting distribution to prevent light from spilling onto adjacent buildings and glare.

Stairs with handrail

- An integrated low-level lighting approach is always preferred in The Rocks for stairs. Miniature LED luminaires include those which may be integrated into handrails. They shall have a minimum IP rating of IP65 and be fitted with tamperproof screws. They shall not produce excessive heat and are safe to touch.
- Preference should be given to individual round light sources over strip lighting to reduce glare.

Stairs without handrail

- Where handrail lighting is not possible, low-level wall-mounted lighting with a shielded source should be used to ensure compliance and provide targeted illumination.
- In exceptional cases, where handrails and low-level wall lights are impractical, catenary luminaires or high-level spotlights mounted onto the façade can be explored. However, catenary lighting on additional poles is not recommended and the potential impact on heritage facades needs to be considered.

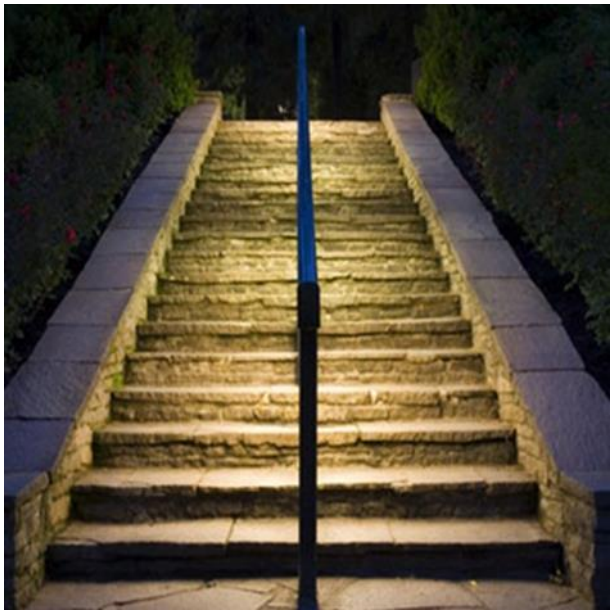
References

Figure 7.102 (top left): Integrated handrail lighting lights only the stairs, where it is required, Willie Dugan

Figure 7.103 (bottom left): Low-level wall lighting lights across the stair treads, John Cullen

Figure 7.104 (top right): Miniature round light sources under the handrail, Planet Lighting

Figure 7.105 (bottom right): Wall-mounted light to wash the steps, Erco



7.4.7 Pedestrian Crossings

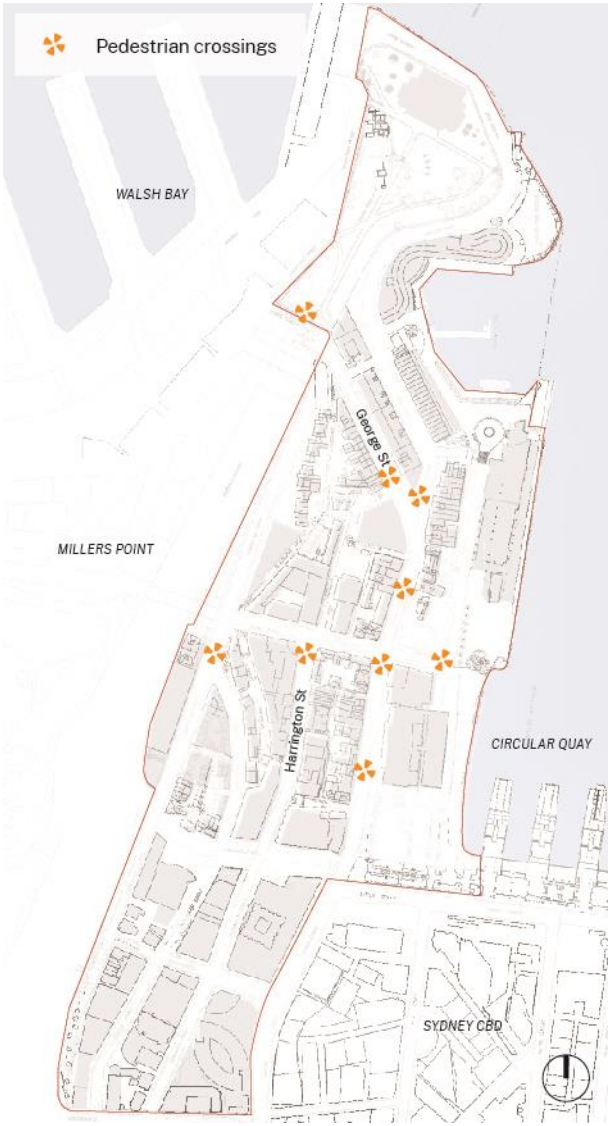


Figure 7.106 Key Plan - Pedestrian Crossings

Pedestrian crossings traverse primary and secondary armatures.

Objectives:

- Ensure safe and compliant lighting for pedestrian crossings including their approaches and immediate surrounds.
- Provide accurate colour rendition for pedestrian visibility.
- Minimise spill light and glare for both pedestrians and motorists.

Guidance:

- Comply with AS1158 Category PX2 for pedestrian crossings.
- Use pole-top lighting, preferably on shared poles with road lighting luminaires
- Use 3000K warm white luminaires with CRI>90.
- Ensure light distribution is specific to pedestrian crossings, minimising spill light and glare.

Figure 7.107 Existing crossing at George Street

Figure 7.108 Light distribution shall be specific to the pedestrian crossing

References

Figure 7.109 (top left): Pole light accentuates the pedestrian crossing, Schreder

Figure 7.110 (bottom left): glowing pedestrian crossing, Xacata

Figure 7.111 (top right): Pole-top light illuminates light on pedestrian crossing while minimizing glare, Mark Broyer

Figure 7.112 (bottom right): Pole-top light only focusing on the pedestrian crossing, Ecologic

7.5 Public Open Spaces

Figure 7.113 Key Plan - Public Open Spaces

Public open spaces comprise four key typologies:

1. **Parks**
2. **Plazas and courtyards**
3. **Archaeological Sites**

Objectives:

- Ensure appropriate lighting for public spaces to enhance safety and security
- Activate public spaces with a multi-layered lighting approach.
- Highlight notable features and structures within public spaces to tell the narrative of The Rocks and encourage people to dwell.

Guidance:

- Light parks, plazas, and courtyards per AS1158, according to the PA category suitable for each space's activity level.
- Use a combination of ambient and feature lighting to provide base illumination and accent select elements.
- Generally, use 2700K - 3000K warm white light, with deviations only for specific, considered locations e.g. lighting of the underside of the Sydney Harbour Bridge)
- Implement uplighting for significant trees with dense canopies, ensuring beam control and output define trunks and accent canopies. Ensure uplighting for deciduous trees can be switched off when bare.
- Use colour-changing luminaires at select locations for festivals or seasonal celebrations.
- Avoid festoon lighting to prevent visual clutter.

References

Figure 7.114 (top left): Layers of lighting elements, including functional and feature lighting, combine to activate and beautify the public realm, Network Rail

Figure 7.115 (middle left): Federation Square, Melbourne, Australia - Catenary lighting Minimises pedestrian obstructions and can provide a ‘ceiling’ to public spaces, Ronstan Tensile Architecture

Figure 7.116 (top right): Pole light to provide functional lighting, 02Landscape

Figure 7.117 (top right): Hyllie Plaza, Malmo, Sweden - Projected patterns and contrasting colour temperatures create visual interest and drama, Åke Eson Lindman

Figure 7.118 (middle right): Wharf Green, Swindon, UK - Integrated feature lighting to built and landscape elements generates depth and layers to a space, James Newton

Figure 7.119 (bottom right): Stora Torg, Eslov, Sweden - Well considered application of lighting layers create variation of lighting level between the high traffic circulation zone and the centre plaza, strengthening the visual hierarchy of the plaza and create a welcoming environment, Light Bureau

7.5.1 Parks

Figure 7.120 Key Plan - Public Open Spaces

Objectives:

- Enhance safety and elevate the aesthetics of parks through lighting that responds to the specific character of the place.
- Preserve harbour views by minimising lighting distractions while also creating safe places to enjoy views of the Harbour at night.
- Create inviting and welcoming spaces with human-scale lighting that promotes night-time use.

Guidance:

- Light parks per AS1158 Category PP3 using pole-mounted luminaires for pathway lighting.
- Shield or control lighting to avoid distractions to harbor views.
- Uplight significant trees with focused, low-glare luminaires to highlight their physical qualities.
- Integrate low-level lighting into landscape and furniture to activate the park and provide a human scale.
- Ensure park edges are seamlessly lit to integrate with surrounding pathways and the public domain.

Figure 7.121 Bligh and Barney Reserve in the daytime

Figure 7.122 Bligh and Barney Park and the adjacent roadway are dark and uninviting at night

Bligh and Barney Reserve

Objectives:

- Reinforce the connection between George Street and Circular Quay.
- Ensure safe movement through thoughtful provision of functional lighting.
- Ensure lighting reinforces the future cultural landscape plan for Bligh and Barney Reserve.

Guidance:

- Coloured lighting may not be appropriate. Instead, focus on variations of light intensity.
- Low-level lighting integrated into landscape and furniture shall be used to form part of the creative layer.
- Consider lighting the facades of surrounding structures to enhance the sense of safety and security when transitioning through the space.
- Functional lighting shall be provided at the end of the park using pole-mounted luminaires, providing vertical and horizontal light levels in accordance with AS1158 for a category PR3 environment.

Dawes Point Park

Objectives:

- Establish a layered lighting approach which highlights Sydney Harbour Bridge, the landscape and provides functional lighting to pathways through the park.
- Reinforce the Harbour Bridge gateway to The Rocks at the southern end of the park.

Guidance:

- Balance lighting with its impact on views of the harbour and The Rocks.
- Significant trees should be lit up to add drama to the visual experience and establish the park as a destination along the foreshore walk.
- Low-level lighting integrated into landscape and furniture shall be used to form part of the creative layer.
- Incorporate opportunities for dimmable and colour changing lighting to enable the park to better support activation and temporary events at night.

Hickson Rd Reserve

Objectives:

- Design lighting to be complementary with lighting along the foreshore walk.
- Use lighting to signal the park as a place to dwell.

Guidance:

- Low-level lighting integrated into landscape and furniture.
- Balance lighting with its impact on views of the harbour and marine habitats.
- Significant trees should be lit up to add drama to the visual experience and establish the park as a destination along the foreshore walk.
- Utilise lighting to draw people along the foreshore and dwell in the park.
- Minimise spill to adjacent uses.

7.5.2 Plazas and Courtyards

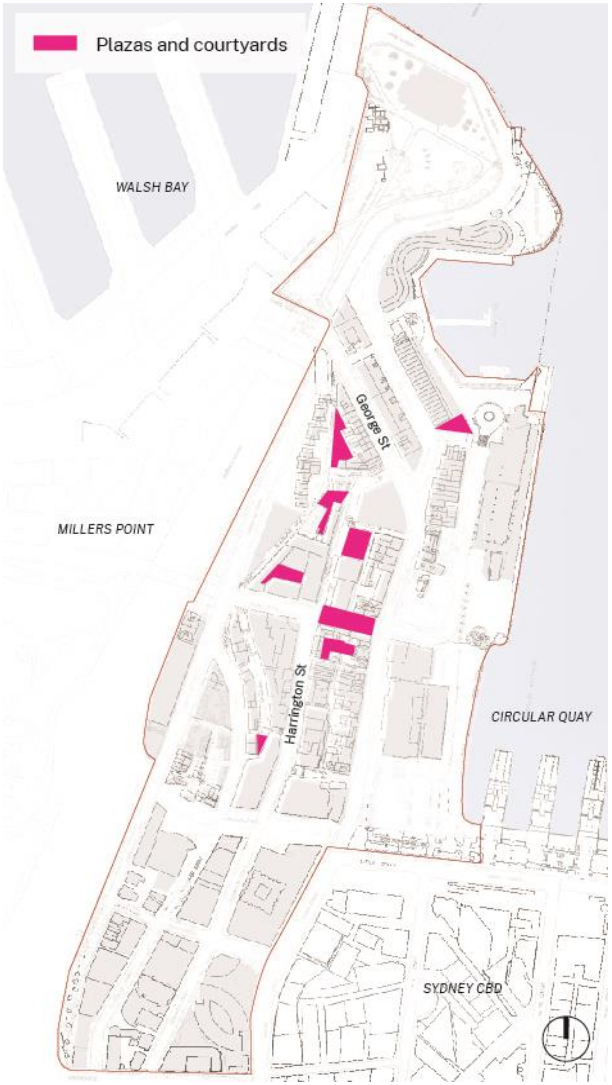


Figure 7.123 Key Plan - Plazas and Courtyards

Objectives:

- Ensure high-activity plazas are well-lit and inviting.
- Celebrate and enhance the unique character of each courtyard through lighting.
- Minimise additional infrastructure while providing flexible lighting solutions.
- Ensure safe and functional illumination.

Guidance:

Plazas

- Light plazas, including The Rocks Square and Jack Mundey Place, to Category.
- Use uplighting for general lighting in The Rocks Square, positioning luminaires above eye level.
- Integrate low-level lighting into built elements, street furniture, and landscape features to add visual interest.
- Ensure flexible control strategies to accommodate varied plaza uses and provide for additional event lighting.

Courtyards

- Light courtyards to Category PA1-PA3 standards.
- Use smaller scale, warmer, and lower brightness lighting.
- Highlight unique architectural or natural elements with low-level integrated lighting.
- Avoid poles unless ornamental and integral to the design of the space.
- Enhance the identity of the courtyard by considering feature lighting such as catenary lighting or “gobo” projection
- Ensure 24-hour accessible courtyards have dimmable motion-activated safety lights at night.

Figure 7.124 The Rocks Square

References

Figure 7.125 (top left): Catenary lighting may be considered, but should be more form or narrative-orientated than the larger plazas, Navid J

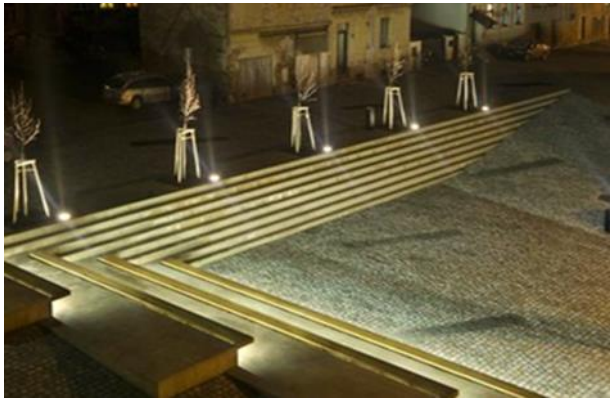
Figure 7.126 (middle left): Low level integrated lighting enhances the intimacy of the smaller public area, Ester Havlová

Figure 7.127 (bottom left): Accent to vertical surface define the boundary of the courtyard and enhance materiality, iDesignArch

Figure 7.128 (top right): Good example of festoon light at contained location, Archdaily

Figure 7.129 (middle right): Low level integrated linear to landscape elements, Ide Cubica

Figure 7.130 (bottom right): Spotlight adjustable to accent natural elements, Paggy



7.5.3 Archaeological Sites

Figure 7.131 Key Plan – Archaeological Sites

There are two key sites which showcase significant archaeological material in the public domain. They are The Big Dig, Cumberland Street and Foundation Park, Gloucester Walk.

Objectives:

- Ensure safe movement while preserving the dramatic ambiance of historically significant sites.
- Enhance the narrative and visual impact of the sites including opportunities for interpretation.

Guidance:

- Implement controlled, discreet circulation lighting for safe movement around steps and pathways.
- Use accent lighting to highlight natural and historical features, enhancing drama and storytelling opportunities.
- Apply low-level and integrated lighting to accentuate stone elements' form and texture.
- Consider coloured lighting, varying colour temperatures, and image projection to evoke an emotional connection and showcase historic stories in contained locations. The design of these elements should be considered as part of a heritage interpretation plan.

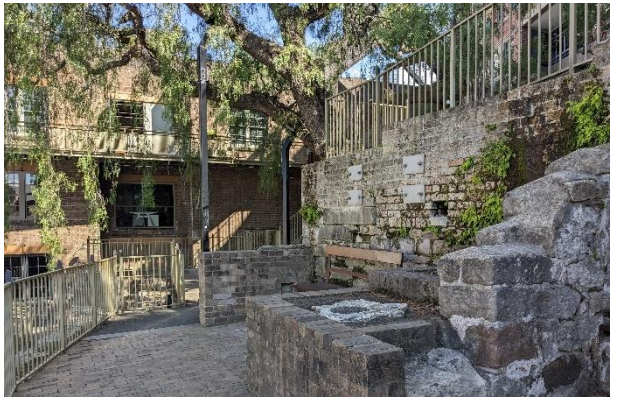


Figure 7.132 Foundation Park

Figure 7.133: The Big Dig with flood lighting provides a blanket wash of light onto the entire area, highlighting few items of visual interest

References

Figure 7.134 (top left): Pools of light create an intimate atmosphere and accentuate texture, David Perez

Figure 7.135 (bottom left): Controlled lighting at circulation zone, The Outdoor Lights

Figure 7.136 (top right): Intentional use of warm and neutral white colour temperatures may be used to create contrast and accentuate architectural elements, Estrella

Figure 7.137 (bottom right): Opportunity for projection image of historical references, designboom

7.6 Facades

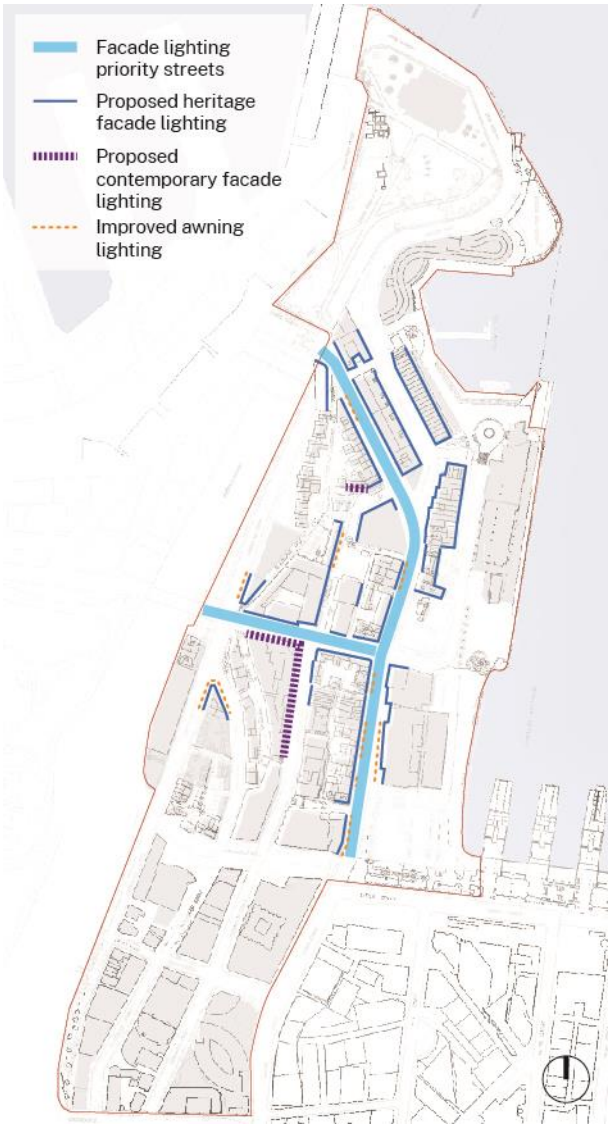


Figure 7.138 Key Plan - Facade Lighting

The lighting of facades to both heritage and modern buildings, are important to highlighting the character of The Rocks at night and providing ambient light to the public domain.

Objectives:

- Enhance the legibility of the precinct through selective façade lighting.
- Utilise façade lighting to reinforce the key axes through The Rocks: George Street and Argyle Street.
- Preserve energy and minimise the impact on heritage buildings.
- For the façade lighting on modern buildings, it is crucial to ensure that the lighting design harmonizes with the surrounding historical context, while subtly revealing the features of the façade at night.

Guidance:

- Light only iconic building facades to avoid over-lighting and excessive energy consumption.
- Carefully select and position luminaires to minimise impact on heritage fabric, reduce their visibility from street level and ensure accessibility for maintenance.
- Maintain consistency in colour temperature and technique for a coherent lighting scheme.
- Balance light and dark to create contrast and emphasise architectural details.
- Carefully consider uplighting to minimise light spills affecting Sydney Observatory and residents.
- Seek opportunities to double-duty existing infrastructure for special event lighting through the integration of colour-changing technologies.
- Consider the impact of internal lighting on the façade's nighttime appearance (refer to *7.7 Tenancies*).
- Where possible, connect external façade lighting to an external board for coordinated control by PMNSW, compatible with Zencontrol DALI.
- Avoid lighting detracting or poor quality building facades.

References

Figure 7.139 (top left): The appearance of luminaires shall be Minimised to ensure the architectural details and features are prominent, DPA Lighting

Figure 7.140 (middle left): St Louis Public Library, St Louis - Lighting the negative space (window arches) Minimises light spill and accentuates the form, Signify

Figure 7.141 (bottom left): Train Station, Frankfurt - Carefully positioned and integrated miniature lighting Minimises the visual impact of luminaires whilst highlighting the built form, iGuzzini

Figure 7.142 (top right): Imperial Forums, Rome, Italy - Uplighting to accentuate the textures of the stone, Quazhar

Figure 7.143 (middle right): Queen Victoria Building, Sydney, Australia - Subtle lighting to the retail awning provides a soft glow overhead, Queen Victoria Building

Figure 7.144 (bottom right): subtle façade lighting at the window sill, Luce&Light

7.6.1 Heritage Façades

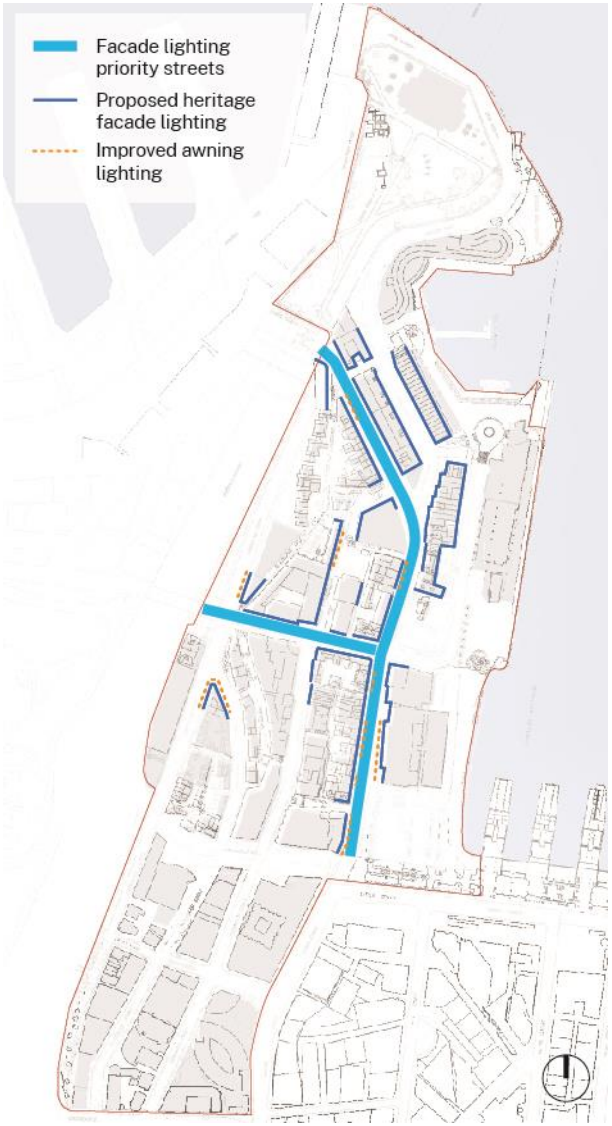


Figure 7.145 Key Plan - Heritage Facade and Awning Lighting

Objectives

- Illuminate key architectural elements and details of the heritage buildings to emphasize their historical significance and beauty in the Rocks.
- Create an inviting and visually appealing nighttime environment, enhancing the overall ambiance of The Rocks area.
- Use lighting to tell the story of the area's heritage, enhancing the educational and cultural experience for visitors.
- Implement energy-efficient lighting solutions that minimize environmental impact and ensure long-term sustainability.

Guidance

- Heritage facades shall be lit by mounting luminaires onto or adjacent to the fade to illuminate specific features. Heritage impacts need to be carefully considered.
- Modern lighting technology allows for small luminaires to be used, which shall be concealed on facades as much as possible to minimise their visual appearance. If visible, luminaires shall be of a finish which is in keeping with façade and surrounds.
- Generally, 2700K warm white luminaires shall be used to enhance the architectural heritage fabric. Limited application of different colour temperature white or colour changing lighting (coloured lighting used for special occasions only) may be considered on a case-by-case basis.
- Any colour changing ability should be incorporated into permanent feature lighting to avoid the need for additional luminaires or infrastructure for special events
- Colour rendering shall be high (CRI>90) to ensure an accurate rendition of the material.
- Use of dynamic lighting (flashing or moving) and festoon light are to be avoided.
- Any future lighting schemes and lighting detail development must be undertaken in collaboration with heritage consultants and are subject to approval.

7.6.2 Heritage façade luminaires

Guidance

- To ensure that heritage facades remain well-preserved and visually cohesive, existing contributory wall lights, pendant lights, and other integrated lighting fixtures should be preserved in-situ. If relocation is necessary, efforts should be made to reinstate them to their historic positions to preserve the facade's authenticity.
- Any replacements or repairs must maintain the original integrity and materiality of these heritage lamps. Lamps should be replaced proactively to avoid unlit luminaires, ensuring continuous illumination.
- The Correlated Colour Temperature (CCT) of all lighting should not exceed 3000K to maintain a warm and historically appropriate ambiance. The exact colour temperature (CCT) will be confirmed during the onsite mock-up.

By adhering to these guidelines, the heritage facades will maintain their historical significance while benefiting from modern lighting enhancements.

7.6.3 Brick and Sandstone Facades

Guidance

- Brick facades should be illuminated with luminaires that graze their surfaces with light to effectively enhance their unique texture and materiality.
- Detailing may be enhanced by luminaires mounted onto the façade.
- A warm colour temperature of 3000K maximum shall be used to enrich the red/brown tones of the brickwork. The exact colour temperature (CCT) will be confirmed during the onsite mock-up.
- Colour rendering shall be high (CRI>90) to ensure an accurate rendition of the material.

Figure 7.146 Existing round light fitting at The Russell Hotel, George Street

Figure 7.147 Accent lighting highlighting architectural features and grazing the surface of the brick and stone façade, DPA Lighting

7.6.4 The Rockface

Lighting shall enhance the historic natural rockface and walling elements around Foundation Park, Atherden Street and Sergeant Majors Row.

- The lighting design will emphasise the wall's significance and highlight its natural texture during nighttime.
- The rock wall should be lit sufficiently to highlight its features and importance.
- Lighting fixtures will not be mounted directly on top of the rocks to maintain the wall's natural appearance.
- A maximum colour temperature of 3000K will be used to enhance the natural tones of the rock. The exact colour temperature (CCT) will be confirmed during the onsite mock-up.
- The lighting will have a high Colour Rendering Index (CRI>90) to ensure an accurate and vibrant rendition of the rock's natural colours.

7.6.5 Terraces

Terraces in The Rocks are an important historical feature of the precinct. In many cases, they are functioning homes or businesses, so their privacy and right to darkness must be respected. Many of these terraces have wall-mounted luminaires. As part of the streetscape, their exterior lighting can be harnessed to provide benefits to the public domain and support the reading of the urban fabric,

- Lighting to the facades shall be incidental to the glow of ambient light of the surroundings.
- To maintain a cohesive appearance, it is recommended that the lamps used in these luminaires be a consistent 2700K warm white colour temperature, diffused in the quality of light and with concealed lamp/light sources.
- Where appropriate, the relevant lease agreements should outline the importance of the terrace facades and their lighting to the broader precinct.

Figure 7.148 Existing rockface at Foundation Park

Figure 7.149Accent lighting highlighting architectural features and grazing the surface of the brick and stone façade, Thomas Heyl

7.6.6 Awnings

Awnings shall be lit using a consistent technique to provide a coherent nighttime image and enhance the sense of safety.

- Luminaires shall be integrated within the awning structure, subject to any heritage consideration.
- Ensure lighting levels under awning meet AS1158 Category PP3
- Wherever possible, awnings should be up lit with concealed luminaires to provide indirect lighting onto the footpath below. Consideration shall be given to luminaire reflections in retail glazing.
- Luminaires shall be shielded to avoid glare and not be aimed directly towards the building façade.
- Under awning luminaires shall be easily accessible for maintenance. All associated cabling and conduits shall be concealed from view.
- Warm white 3000K colour temperature sources shall be used to unify all the awning lighting

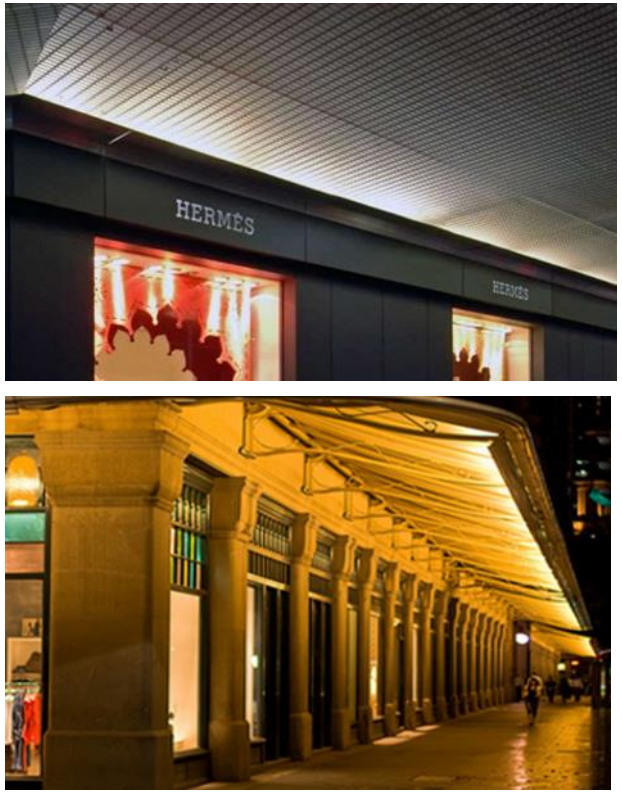


Figure 7.150 Concealed lighting gives a subtle glow to the awnings and provides indirect lighting to the footpath below, Rynek, Queen Victoria Building.

7.7 Tenancies

Street-facing tenancy lighting has a significant impact on the nighttime experience of The Rocks.

The current lighting from tenancies, especially shopfronts, is inconsistent resulting in glare, light spill, and a significant variation of light colour and the use of light.

It is recommended that the following lighting principles are integrated into *The Rocks Tenancy Fitout Guidelines*:

Objective

Establish a consistent approach to tenancy lighting that contributes positively to the streetscape and feelings of safety at night.

Guidance

Atmosphere and Functionality:

Tenancy lighting should create an inviting and comfortable atmosphere. For retail and fashion, lighting should highlight the product. on display. For hospitality, lighting should set the mood and overall experience.

Dimmability:

All tenancy lighting should be dimmable with an integrated dimming system or dimming switches.

Colour Temperature:

The colour temperature for the tenancy fit-out should range from 2700K to 3500K, depending on the nature of the business or branding. However, in the shop window: a colour temperature of 3000K should be nominated to introduce a unified aesthetic.

Shielding of Sources:

Luminaires should be installed with appropriate shielding accessories to ensure they do not cause glare to passing pedestrians, or spill light onto the pavement.

After-hours Window lighting:

The lighting should be controlled via a timer to ensure that only window lighting is left on after hours.

Figure 7.151 Various brightness and colour temperatures - George St. tenancies create an inconsistent look

Figure 7.152 Festoon light above the umbrellas, distracting from the heritage façade and not focused on the dining zone

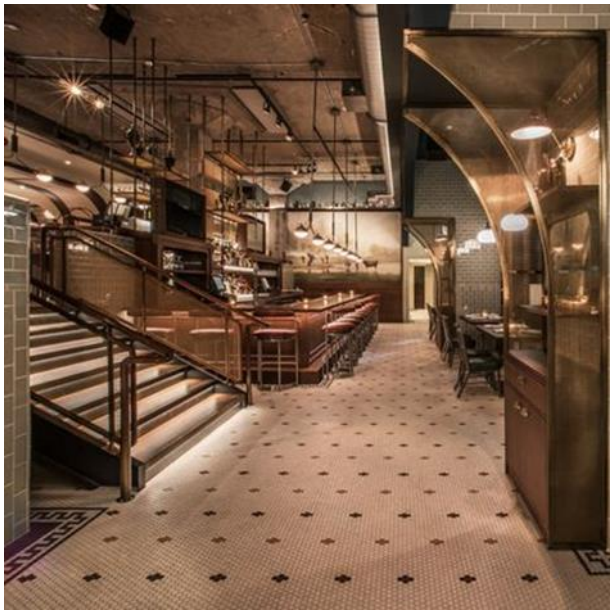
References

Figure 7.153 (top left): Utilizing multiple layers of lighting to achieve an elegant and sophisticated atmosphere, Boka Restaurant Group

Figure 7.154 (bottom left): Controlled and well-aimed window lighting minimizes glare and spills light onto the public realm, Tokyo Disney Resort

Figure 7.155 (top right): Mounted wall light to accentuate the façade. The lights serve to enhance architectural elements without overpowering the lighting inside, New Studio Architecture

Figure 7.156 (bottom right): Lighting to highlight the main feature of the architecture, Nacasa & Partners



7.8 Outdoor dining

Outdoor dining area lighting should include the following principles:

Objective

Establish a consistent approach to outdoor dining that contributes positively to the streetscape and feelings of safety at night.

Guidance

Atmosphere and Functionality:

Lighting in outdoor dining areas should set the mood for a pleasant outdoor dining experience. Use warm, soft lighting to create an intimate and inviting atmosphere.

As much as possible, lighting shall be integrated into any overhead-built elements, focused on task areas or at a low level to create an intimate feel and allow customers to read menus and enjoy their meals comfortably. Battery-operated lights are recommended.

Colour Temperature:

Consistent use of colour temperature 2700K is required.

On table battery-operated lamps can have a warmer colour temperature of 2000-2700K.

Operation:

Lighting should be operated outside daylight hours only and not interfere with or be detrimental to the surrounding (e.g., road users, adjacent circulation zone, or neighbours).

Weather-Resistant Fixtures:

Choose fixtures that can withstand outdoor conditions, including rain and temperature variations.

Low-level Boundary Lighting:

When appropriate, incorporate low-level lighting such as integrated LED Linear, mushroom bollards or lanterns etc. to mark the boundary of outdoor dining areas.

Figure 7.157 Tenancy with coloured flood light, creating glare and spill light onto the pavement on Playfair Street

Figure 7.158 Luminaire failure and incomplete causes an inconsistent effect at Campbell's Cove

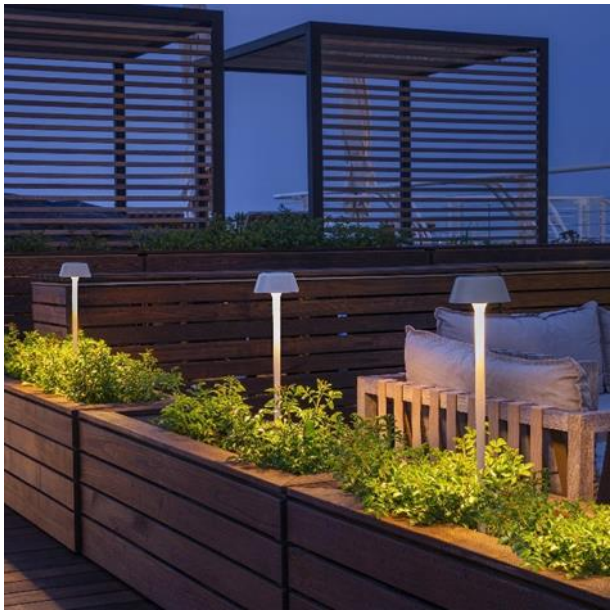
References

Figure 7.159 (top left): Controlled and well-aimed window lighting minimises glare and spills light onto the public realm, Opalinedc

Figure 7.160 (bottom left): Integrated lighting provides diffuse lighting to outdoor dining areas, Wen Studio

Figure 7.161 (top right): Low-level lighting accenting the outdoor dining boundary, Architonic

Figure 7.162 (bottom right): controlled intensity lighting, focusing to some elements without disturbing the surrounding, Sebastian Zachariah



7.9 Temporary Events

Temporary lighting is an important part of the delivery of high-quality and safe events and activations. This lighting needs to effectively co-exist with the lighting atmosphere and experience of the rest of the precinct.

Much of The Rocks sits within the Sydney Opera House Buffer Zone. Within this zone, all lighting must be designed to avoid detracting from the views and vistas to the Sydney Opera House and preserve its visual prominence.

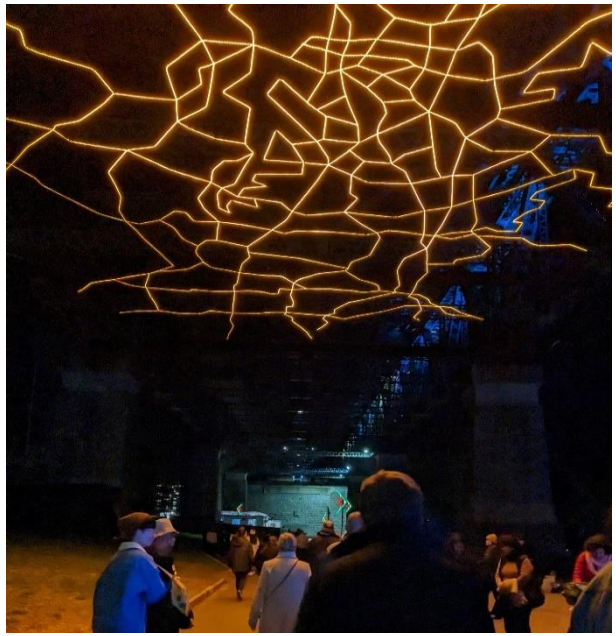


Figure 7.163 Artwork under the Sydney Harbour Bridge, Vivid 2023

The following principles should be considered as part of the design and delivery of temporary event lighting:

Adequate Illumination:

- Light key areas like entrances, exits, pathways, seating areas, and restrooms.
- Avoid excessive brightness or dark spots that could create safety concerns.
- It is important to note that any additional lighting that is installed should not exceed double the illuminance of the existing lighting scheme. This is to ensure that the lighting is not too bright and does not cause glare or visual distraction for pedestrians and visitors in the area. Maintaining a balanced and cohesive lighting scheme is crucial in enhancing the public space and promoting intuitive wayfinding while also ensuring the safety and amenity of the area.

Lighting Control:

Implement dimming and control systems to adjust lighting levels as needed, especially for events that transition from daytime to evening.

Time-Regulations

To safeguard the ecological balance and to prevent any potential disturbances, the lighting operation during events must be timed, thereby making sure that there is no unnecessary illumination beyond the stipulated event duration.

Containment of Lighting

The lights shall be strategically oriented, ensuring that they are specifically aimed and shielded to illuminate only the designated event area, thereby avoiding any unnecessary light pollution.

Consideration of waterbody

Utmost care must be taken to prevent any light pollution into nearby water bodies at the Harbour, ensuring the protection of aquatic species. Artificial lights have a huge impact on the life cycle of many aquatic species.

Vehicular and Pedestrian Safety

All lighting installations shall be meticulously planned to ensure that they do not compromise the safety of vehicles and users by causing any visual discomfort or obstruction to views.

Cultural and Heritage Respect

All light installations shall be carefully crafted and positioned to honour and respect the heritage significance of the locality. It is important to ensure that the installations are non-intrusive and culturally sensitive.

Control of Blue Lights

The use of blue lights, particularly during night-time, should be limited to avoid potential disruptions to the circadian rhythms and sleep patterns of nearby residents.

Strobe Light

The use of strobe lights should be managed and comply with health standards to protect users against potential health risks such as photosensitive epileptic seizures.

Laser Light Containment

The usage of laser lights should be controlled and contained within the event space and during restricted times. Under no circumstances, should they be directed toward the sky or residential buildings.

All temporary event lighting proposals are subject to relevant applications and approvals. This may require photomontages, lighting simulations, or computer modelling of the effects, a Statement of Environmental Impact, and full details of the equipment to be used, supported by quantified technical data required by the Australian Standard *AS4282 Control of the Obtrusive Effects of Outdoor Lighting*.

Placemaking NSW may require pilot testing before the granting of consent.

Luminaire appearance

The visibility and aesthetics of proposed lighting structures in the daytime should be considered during event design and selection of luminaires. Selected hardware should blend in with the surrounding architecture as much as possible.

Figure 7.164 Flood lighting is extensively used in activations at the Hickson Road and Campbells Cove. This creates light spillage into the sky and adjacent outdoor areas

Figure 7.165 The high brightness of digital screens can be a source of glare and discomfort, especially when viewed against dark surroundings. The example above is from the Mercantile Hotel during Women's World Cup 2023

References

Figure 7.166 (top left): Vivid Sydney, Sydney Life

Figure 7.167 (middle left): Christmas Event lighting, New York City, Cedric Letsch

Figure 7.168 (bottom left): Immersive lighting shows Light Cycles at illuminated Adelaide festival, Moment Factory

Figure 7.169 (top right): London Christmas Lights & Display, Corriere

Figure 7.170 (middle right) : Astra Lumina Los Angeles, Moment Factory

7.10 Public Art

Objectives:

- Light public art to ensure it can be enjoyed across the day and night and in keeping with the artist's intention for the work.
- Lighting should be directed to enhance the form, texture, and materiality of the installation.

Guidance

Direction and Angle

- Lighting is to be designed in collaboration with the artist.
- Ensure that light highlights the work's form, texture, and materiality while minimising light spill onto surrounding areas.
- Illuminate the work from multiple angles to enhance its three-dimensional quality and create interesting shadows where applicable.
- Position light fixtures carefully to minimise glare and reflections on the artwork.

Colour Temperature

Choose a colour temperature that complements the artwork on a case-by-case basis. (typically, 2700K-4000K). Limit the utilisation of RGB colour in The Rocks for permanent artworks.

CRI (Colour Rendering Index)

Use luminaires with a high CRI>90 to accurately represent the colours and details of the artwork.

Shielding of sources

Luminaires should be installed with appropriate shielding accessories to ensure they do not cause glare to passing pedestrians.

Weather-Resistant Fixtures

Use fixtures designed specifically for outdoor use and ensure fixtures have an appropriate Ingress Protection (IP) rating to protect against dust and moisture.

Figure 7.171 Artwork with integrated lighting elements, providing textured lighting, *Secret World of a Starlight Ember*, 2020, Lindy Lee

Figure 7.172 Integrated coloured linear LED to the wall featured of Suez Canal creates intrigue in the narrow passageway

References

Figure 7.173 (top left): Luminous Field, Luftwerk and Cloudgate, Anish Kapoor,

Figure 7.174 (bottom left): Sculpture at Hotel W Barcelona – Uplight to highlight the sculpture, Ricardo Bofill

Figure 7.175 (top right): Her Secret if Patience, Janet Echelman

Figure 7.176 (bottom right): Lighting to public artworks has a profound effect, Fred A Bernstein

7.11 Wayfinding

Public domain wayfinding forms an important part of supporting movement across the precinct. Improved accent and wayfinding illumination is required to support navigation and enable greater predictability when moving through the precinct.

Objectives

- Ensure all wayfinding elements clearly visible at night to support positive feelings of safety and ease of navigation
- Balance the visibility of wayfinding with its potential impact on the legibility of the character of The Rocks at night.

Guidance

Brightness

Nighttime signage brightness should be assessed in accordance with ambient light levels. For LED screens used during special events, the brightness during daytime should be limited between 5,000 to 10,000 nits. From twilight to dawn, this should be further brought down to 500 to 1,500 nits.

CRI (Colour Rendering Index)

Use lights with a high colour rendering CRI>90 that supports visibility without being overly bright.

Colour Temperature

The colour temperature of wayfinding signage should be limited within the range of 2700K to 3000K to maintain consistency with the exterior and public domain colour of the precinct.

Light Spillage

All wayfinding signage must be equipped with adequate shields or louvers to prevent light from spilling upward into the sky. Ensure that illumination is meticulously contained to the wayfinding sign, avoiding inadvertent light dispersion into adjacent areas.

Glare

Implement stringent glare control for signage at the human ocular level, ensuring visual comfort and safety.

Hardware integration

All lamps and cables must be concealed from the direct view of the user. The use of care lamps on signage must be avoided to control glare and light spills.

Figure 7.177 Temporary wayfinding signage at the end of Jack Mundey Place

References

Figure 7.178 (top left): Backlit signage creates subtle glow, Clear Sign

Figure 7.179 (bottom left): Subtle glow integrated at signage, Minaletatters

Figure 7.180 (top right): Gobo projection in static CCT, Angela Jimenez

Figure 7.181 (bottom right): Warm illumination box, a neutral material palette, Collider

7.12 Commercial Signage

Objectives

Ensure that commercial signage lighting in The Rocks is effective, respectful of the historical context, and minimally intrusive to the surrounding area.

Guidance:

Size

In general, the design and sizing of all signage must be restricted in The Rocks area to maintain its historical integrity and aesthetic. Static lighting should be used to illuminate signage without overwhelming the surroundings. Animation, moving, or laser advertising should be highly limited and controlled to prevent visual clutter and preserve the character of The Rocks.

Brightness

All signage should be dimmable to control the brightness by diurnal cycles and event-specific requirements. When the display's brightness surpasses 60% of ambient light, it leads to human eye discomfort and light pollution. Nighttime signage brightness should be assessed in accordance with ambient light levels.

Colour temperature

The colour temperature of commercial signage is recommended to be kept within the range of 2700K to 3000K to keep consistency within the precinct. However, this range may vary depending on the specific characteristics of the business and its branding.

Light Spillage

All commercial signage luminaires must be equipped with adequate shields or louvers to prevent light from spilling upward into the sky. Ensure that illumination is meticulously contained to the sign, avoiding inadvertent light dispersion into adjacent areas.

Glare

Implement stringent glare control for signage at the human ocular level, ensuring visual comfort and safety.

Hardware integration

All lamps and cables must be concealed from the direct view of the user. The use of care lamps on signage must be avoided to control glare and light spills.

Figure 7.182 Existing illuminated signage at The Rocks Square

Figure 7.183 Existing signage on George Street

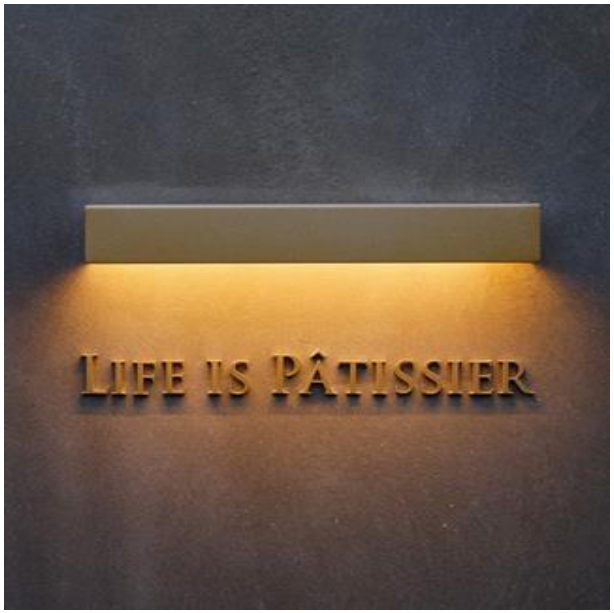
References

Figure 7.184 (top left): Soft indirect signage lighting, Yulia Ionova

Figure 7.185 (bottom left): Dedicated spotlight to accent signage, Hirono Craft

Figure 7.186 (top right): Uplight to highlight the signage, Pia Interior

Figure 7.187 (bottom right): Downlight to illuminate an object and will create intriguing shadows as signage, Artz Now



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8

Conclusion and next steps

Placemaking NSW is committed to the delivery of consistent and coordinated public domain and external lighting in The Rocks. This is key to supporting the safe and inclusive use and activation of the precinct. Lighting plays a crucial role in distinguishing the character of The Rocks from Sydney CBD and highlighting the unique stories of this place.

This Strategy functions as a guiding document for all future development, upgrades and activities that occur within the precinct. All public and private sector parties undertaking projects in The Rocks will be required to be consistent with the objectives, principles and guidance of the Strategy.

This includes through stages of design, delivery, maintenance and renewal.

An implementation plan is being prepared by Placemaking NSW to prioritise the delivery of actions against program and other priority projects.

Figure 8.1: The Rocks from the Cahill Expressway

9 Appendix

9.1 V Category Tables From AS1158

AS1158 is an Australian Standard that applies to lighting for roads and public spaces. Specifically, it provides guidelines and requirements for the design, installation, and performance of public lighting. The "V Category" tables within AS1158 refer to lighting categories that are applied to different types of roadways and public areas based on their usage and importance. V1 to V5: These categories applied to roads with varying traffic volumes, speeds, and pedestrian activity. They define specific lighting levels required to ensure safety and visibility.

TABLE 2.2

VALUES OF LIGHT TECHNICAL PARAMETERS FOR CATEGORY V LIGHTING

1	2	3	4	5	6	7	8	9	10
	Light technical parameters								
	For straight sections, curves and intersections						For intersections and other specified locations		For all applications
Lighting subcategory	Average carriageway luminance[c,d] $(\bar{L})$ cd/m²	Overall uniformity[a,d] (U_o)	Longitudinal uniformity[d] (U_L)		Threshold increment[e] (TI)	Surround verge illuminance[d] (E_s)	Point horizontal illuminance[c,d] (E_{Ph})	Illuminance (horizontal) uniformity[e] Cat V (U_{E1})	Upward waste light ratio[e] ($UWLR$)
			In Australia	In New Zealand	%	%	lx		%
V1	1.5	0.33	0.5	0.3	20	50	15	8	3
V2	1.0	0.33	0.5	0.3	20	50	10	8	3
V3	0.75	0.33	0.5	0.3	20	50	7.5	8	3
V4[b]	0.5	0.33	0.5	0.3	20	50	5	8	3
V5	0.35	0.33	0.5	0.3	20	50	3.5	8	3

Figure 9.1 Values of Light Technical Parameters for Category V Lighting

9.2 PR, PA, PP Category Tables from AS1158

The PR, PA, and PP categories in AS1158 pertain to different classifications of lighting for pedestrian and minor roadways. These categories are detailed in specific tables within the standard and help determine the appropriate lighting levels for different environments. Tables from the standard have been included below for reference.

TABLE 2.2
LIGHTING SUBCATEGORIES FOR PEDESTRIAN AND CYCLIST PATHS

1	2	3	4	5
Type of pathway		Selection criteria[a,b,c]		Applicable lighting subcategory
General description	Basic operating characteristics	Pedestrian/ cycle activity	Fear of crime	
Pedestrian or cycle orientated pathway, e.g. footpaths, including those along local roads[d] and arterial roads[e], walkways, lanes, park paths, cyclist paths	Pedestrian and or cycle traffic only	N/A	High	PP1[e]
		High	Medium	PP2[e]
		Medium	Medium	PP3
		Medium	Low	PP4
		Low	Low	PP5

[a] The selection criteria of Columns 3 to 4 should be separately evaluated. The highest level of any of the selection criteria that is deemed appropriate for the pathway will determine the applicable lighting subcategory.

[b] See Appendix A for guidance on choosing the applicable level of each selection criteria for the environment and purpose of a lighting scheme.

[c] Where there are vertical surfaces of high reflectance (e.g. light coloured walls bordering on an alleyway) alongside the pathway, the next lower lighting subcategory may be selected.

[d] Where the footpath is along a local road and subcategory PP1 or PP2 is selected, the light technical parameters for that subcategory should only apply to the formed footpath.

[e] Footpaths associated with arterial roads are deemed not to require separate lighting provided that—

(a) the road is lit to at least the applicable level of Category V lighting conforming to AS/NZS 1158.1.1; and

(b) the footpath is unshaded, e.g. there are no substantially continuous building awnings, trees (refer to AS/NZS 1158.1.2) and the footpath is contiguous with the roadway.

TABLE 3.4
VALUES OF LIGHT TECHNICAL PARAMETERS FOR PATHWAYS AND CYCLIST PATHS

1	2	3	4	5
	Light technical parameters (LTP)			
Lighting subcategory	Average horizontal illuminance[a,b] ($\bar{E}_h$) lx	Point horizontal illuminance[a,b,d] (E_{PH}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})	Point vertical illuminance[a,b] (E_{PV}) lx
PP1	10	2	5	1
PP2	7	1	5	0.3
PP3	3	0.5	5	0.1
PP4	1.5	0.25	5	0.05[e]
PP5	0.85	0.14	5	0.02[e]

[a] These values are maintained. See Clause 3.2 pertaining to lumen derating values for non-white light sources.

[b] Conformance is achieved by being greater than or equal to the applicable table value.

[c] Conformance is achieved by being less than or equal to the applicable table value.

[d] Conformance of 50% of E_{PH} shall also be demonstrated over an area of 5 m either side of the pathway—where a verge exists—or up to any structure/fence/property boundary that forms the edge of the pathway, unless deemed otherwise by the relevant authorities (see Clause 3.1.3.5).

[e] For luminaires with mounting heights of 1.5 m or less, the E_{PV} values need not be applied.

NOTES:

1 Validation of the values in Columns 2 to 5 is by calculation, not field measurement. This is particularly relevant to small values in Columns 2, 3 and 5, which will typically be difficult to validate by field measurements.

2 See Section 4 for the design methods and requirements for use in assessing conformance to the specified light technical parameters.

TABLE 2.1
LIGHTING SUBCATEGORIES FOR ROAD RESERVES IN LOCAL AREAS

1	2	3	4	5	6
Type of road or pathway		Selection criteria[a,b]			Applicable lighting subcategory[c,d]
General description	Basic operating characteristics	Pedestrian/ cycle activity	Fear of crime	Need to enhance amenity	
Collector roads or non-arterial roads which collect and distribute traffic in an area, as well as serving abutting properties	Mixed vehicle and pedestrian traffic	N/A	High	N/A	PR1
		High	Medium	High	PR2
		Medium	Low	Medium	PR3[f] or PR4[f]
		Low	Low	Low	PR5
Local roads or streets used primarily for access to abutting properties, including residential, commercial and industrial precincts		N/A	High	N/A	PR1
		High	Medium	High	PR2
		Medium	Low	Medium	PR3[f] or PR4[f]
		Low	Low	Low	PR5
		N/A	N/A	N/A	PR6[e]
Common area, forecourts of cluster housing		N/A	High	N/A	PR1
		High	Medium	High	PR2
		Medium	Low	Medium	PR3[f] or PR4[f]
		Low	Low	Low	PR5

[a] The selection criteria of Columns 3 to 5 should be separately evaluated. The highest level of any of the selection criteria that is deemed appropriate for the road will determine the applicable lighting subcategory.

[b] See Appendix A for guidance on choosing the applicable level of each selection criteria for the environment and purpose of a lighting scheme.

[c] All lighting subcategories apply across the whole of the road reserve width, including the footpath.

[d] Where there is a significant fear of crime or where required by the relevant authority, then, for enhanced lighting of the formed pathways, see Table 2.2.

[e] Use of subcategory PR6 shall be discretionary.

Generally, subcategory PR6 is only applied to the replacement of existing luminaires installed on existing electricity distribution poles or for the initial application of a lighting scheme where the cost to re-configure these poles limits or precludes conformance to subcategory PR4 and PR5 respectively.

TABLE 3.3
VALUES OF LIGHT TECHNICAL PARAMETERS FOR ROADS IN LOCAL AREAS

1	2	3	4
	Light technical parameters (LTP)		
Lighting subcategory	Average horizontal illuminance[a,b] ($\bar{E}_h$) lx	Point horizontal illuminance[a,b] (E_{PH}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})
PR1	7	2	8
PR2	3.5	0.7	8
PR3[e]	1.75	0.3	8
PR4[d,e]	1.3	0.22	8
PR5[d,e]	0.85	0.14	10
PR6[d]	0.7	0.07	10

[a] These values are maintained.

[b] Conformance is achieved by being greater than or equal to the applicable table value.

[c] Conformance is achieved by being less than or equal to the applicable table value.

[d] See Clause 3.2 pertaining to lumen derating values for non-white light sources.

[e] When the luminaires are to be supported on existing electricity reticulation poles, the subcategories PR3, PR4 and PR5 may be reduced to the next lower subcategory PR4, PR5 and PR6 respectively.

NOTES:

1 Validation of the values in Columns 2 to 4 is by calculation, not field measurement. This is particularly relevant to small values in Columns 2, and 3, which will typically be difficult to validate by field measurements.

2 See Section 4 for the design methods and requirements for use in assessing conformance to the specified light technical parameters.

3 Where there is a significant fear of crime or where required by the relevant authority then for enhanced lighting of the formed pathways, see Table 3.4.

4 The requirements for minimum obtrusive light specified in Clause 3.1.3 apply.

Figure 9.2 Values of light for outdoor areas

TABLE 2.2

LIGHTING SUBCATEGORIES FOR PEDESTRIAN AND CYCLIST PATHS

1	2	3	4	5
Type of pathway		Selection criteria[a,b,c]		Applicable lighting subcategory
General description	Basic operating characteristics	Pedestrian/ cycle activity	Fear of crime	
Pedestrian or cycle orientated pathway, e.g. footpaths, including those along local roads[d] and arterial roads[e], walkways, lanes, park paths, cyclist paths	Pedestrian and or cycle traffic only	N/A	High	PP1[c]
		High	Medium	PP2[c]
		Medium	Medium	PP3
		Medium	Low	PP4
		Low	Low	PP5

[a] The selection criteria of Columns 3 to 4 should be separately evaluated. The highest level of any of the selection criteria that is deemed appropriate for the pathway will determine the applicable lighting subcategory.

[b] See Appendix A for guidance on choosing the applicable level of each selection criteria for the environment and purpose of a lighting scheme.

[c] Where there are vertical surfaces of high reflectance (e.g. light coloured walls bordering on an alleyway) alongside the pathway, the next lower lighting subcategory may be selected.

[d] Where the footpath is along a local road and subcategory PP1 or PP2 is selected, the light technical parameters for that subcategory should only apply to the formed footpath.

[e] Footpaths associated with arterial roads are deemed not to require separate lighting provided that—

(a) the road is lit to at least the applicable level of Category V lighting conforming to AS/NZS 1158.1.1; and

(b) the footpath is unshaded, e.g. there are no substantially continuous building awnings, trees (refer to AS/NZS 1158.1.2) and the footpath is contiguous with the roadway.

TABLE 3.4

VALUES OF LIGHT TECHNICAL PARAMETERS FOR PATHWAYS AND CYCLIST PATHS

1	2	3	4	5
	Light technical parameters (LTP)			
Lighting subcategory	Average horizontal illuminance[a,b] ($\bar{E}_h$) lx	Point horizontal illuminance[a,b,d] (E_{PH}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})	Point vertical illuminance[a,b] (E_{PV}) lx
PP1	10	2	5	1
PP2	7	1	5	0.3
PP3	3	0.5	5	0.1
PP4	1.5	0.25	5	0.05[e]
PP5	0.85	0.14	5	0.02[e]

[a] These values are maintained. See Clause 3.2 pertaining to lumen derating values for non-white light sources.

[b] Conformance is achieved by being greater than or equal to the applicable table value.

[c] Conformance is achieved by being less than or equal to the applicable table value.

[d] Conformance of 50% of E_{PH} shall also be demonstrated over an area of 5 m either side of the pathway—where a verge exists—or up to any structure/fence/property boundary that forms the edge of the pathway, unless deemed otherwise by the relevant authorities (see Clause 3.1.3.5).

[e] For luminaires with mounting heights of 1.5 m or less, the E_{PV} values need not be applied.

NOTES:

1 Validation of the values in Columns 2 to 5 is by calculation, not field measurement. This is particularly relevant to small values in Columns 2, 3 and 5, which will typically be difficult to validate by field measurements.

2 See Section 4 for the design methods and requirements for use in assessing conformance to the specified light technical parameters.

TABLE 2.1

LIGHTING SUBCATEGORIES FOR ROAD RESERVES IN LOCAL AREAS

1	2	3	4	5	6
Type of road or pathway		Selection criteria[a,b]			Applicable lighting subcategory[c,d]
General description	Basic operating characteristics	Pedestrian/ cycle activity	Fear of crime	Need to enhance amenity	
Collector roads or non-arterial roads which collect and distribute traffic in an area, as well as serving abutting properties	Mixed vehicle and pedestrian traffic	N/A	High	N/A	PR1
		High	Medium	High	PR2
		Medium	Low	Medium	PR3[f] or PR4[f]
		Low	Low	Low	PR5
Local roads or streets used primarily for access to abutting properties, including residential, commercial and industrial precincts		N/A	High	N/A	PR1
		High	Medium	High	PR2
		Medium	Low	Medium	PR3[f] or PR4[f]
		Low	Low	Low	PR5
		N/A	N/A	N/A	PR6[e]
Common area, forecourts of cluster housing		N/A	High	N/A	PR1
		High	Medium	High	PR2
		Medium	Low	Medium	PR3[f] or PR4[f]
		Low	Low	Low	PR5

[a] The selection criteria of Columns 3 to 5 should be separately evaluated. The highest level of any of the selection criteria that is deemed appropriate for the road will determine the applicable lighting subcategory.

[b] See Appendix A for guidance on choosing the applicable level of each selection criteria for the environment and purpose of a lighting scheme.

[c] All lighting subcategories apply across the whole of the road reserve width, including the footpath.

[d] Where there is a significant fear of crime or where required by the relevant authority, then, for enhanced lighting of the formed pathways, see Table 2.2.

[e] Use of subcategory PR6 shall be discretionary.

Generally, subcategory PR6 is only applied to the replacement of existing luminaires installed on existing electricity distribution poles or for the initial application of a lighting scheme where the cost to re-configure these poles limits or precludes conformance to subcategory PR4 and PR5 respectively.

TABLE 3.3

VALUES OF LIGHT TECHNICAL PARAMETERS FOR ROADS IN LOCAL AREAS

1	2	3	4
	Light technical parameters (LTP)		
Lighting subcategory	Average horizontal illuminance[a,b] ($\bar{E}_h$) lx	Point horizontal illuminance[a,b] (E_{PH}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})
PR1	7	2	8
PR2	3.5	0.7	8
PR3[e]	1.75	0.3	8
PR4[d,e]	1.3	0.22	8
PR5[d,e]	0.85	0.14	10
PR6[d]	0.7	0.07	10

[a] These values are maintained.

[b] Conformance is achieved by being greater than or equal to the applicable table value.

[c] Conformance is achieved by being less than or equal to the applicable table value.

[d] See Clause 3.2 pertaining to lumen derating values for non-white light sources.

[e] When the luminaires are to be supported on existing electricity reticulation poles, the subcategories PR3, PR4 and PR5 may be reduced to the next lower subcategory PR4, PR5 and PR6 respectively.

NOTES:

1 Validation of the values in Columns 2 to 4 is by calculation, not field measurement. This is particularly relevant to small values in Columns 2, and 3, which will typically be difficult to validate by field measurements.

2 See Section 4 for the design methods and requirements for use in assessing conformance to the specified light technical parameters.

3 Where there is a significant fear of crime or where required by the relevant authority then for enhanced lighting of the formed pathways, see Table 3.4.

4 The requirements for minimum obtrusive light specified in Clause 3.1.3 apply.

TABLE 2.3

LIGHTING SUBCATEGORIES FOR PUBLIC ACTIVITY AREAS (EXCLUDING CAR PARKS)

1	2	3	4	5	6
Type of area or activity		Selection criteria[a,b]			Applicable lighting subcategory
General description	Basic operating characteristics	Night time vehicle movements	Fear of crime	Need to enhance amenity	
Areas primarily for pedestrian use, e.g. city, town, suburban centres, including outdoor shopping precincts, malls, open arcades, town squares, civic centres	Generally pedestrian movement only	N/A	High	High	PA1
		Medium	Medium	Medium	PA2
		Low	Low	N/A	PA3
Transport terminals and interchanges, service areas[c]	Mixed pedestrian and vehicle movement	High	High	High	PA1
		Medium	Medium	Medium	PA2
		Low	Low	N/A	PA3

[a] The selection criteria of Columns 3 to 5 should be separately evaluated. The highest level of any of the selection criteria that is deemed appropriate for the area type will determine the applicable lighting subcategory.

[b] See Appendix A for guidance on choosing the applicable level of each selection criteria for the environment and purpose of the lighting scheme.

[c] See Clause 1.1.1.

TABLE 3.5

VALUES OF LIGHT TECHNICAL PARAMETERS FOR PUBLIC ACTIVITY AREAS (EXCLUDING CAR PARKS)

1	2	3	4	5
	Light technical parameters (LTP)			
Lighting subcategory	Average horizontal illuminance[a,b] ($\bar{E}_h$) lx	Point horizontal illuminance[a,b] (E_{PH}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})	Point vertical illuminance[a,b,d] (E_{PV}) lx
PA1	21	7	8	7
PA2	14	4	8	4
PA3	7	2	8	2

[a] These values are maintained.

[b] Conformance is achieved by being greater than or equal to the applicable table value.

[c] Conformance is achieved by being less than or equal to the applicable table value.

TABLE 2.5

LIGHTING SUBCATEGORIES FOR OUTDOOR CAR PARKS (INCLUDING ROOF-TOP CAR PARKS)

1	2	3	4
Type of area	Selection criteria[a,c]		
	Night time vehicle and/or pedestrian movements	Fear of crime	Applicable lighting subcategory[b]
Parking spaces, aisles and circulation roadways	High	High	PC1
	Medium	Medium	PC2
	Low	Low	PC3
Designated parking spaces specifically intended for people with disabilities	N/A	N/A	PCD
For any designated areas for pedestrians to cross	N/A	N/A	PCX

[a] The selection criteria of Columns 2 to 4 should be separately evaluated. The highest level of any of the selection criteria that is deemed appropriate for the area type will determine the applicable lighting subcategory.

[b] Providing a lighting scheme that meets the requirements of more than one subcategory by the use of switching is permitted.

[c] Consider the use of adaptive lighting controls for variable night time utilization.

TABLE 3.7

VALUES OF LIGHT TECHNICAL PARAMETERS FOR OUTDOOR CAR PARKS (INCLUDING ROOF-TOP CAR PARKS)

1	2	3	4	5
	Light technical parameters (LTP)			
Lighting subcategory	Average horizontal illuminance[a,b] ($\bar{E}_h$) lx	Point horizontal illuminance[a,b] (E_{PH}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})	Point vertical illuminance[a,b] (E_{PV}) lx
PC1	14	3	8	3
PC2	7	1.5	8	1
PC3	3.5	0.7	8	—
PCD[d]	—	≥14 and ≥ $(\bar{E}_h)$[d]	—	—
PCX[e]	21	5	8	—

[a] These values are maintained.

[b] Conformance is achieved by being greater than or equal to the applicable table value.

[c] Conformance is achieved by being less than or equal to the applicable table value.

[d] E_{PH} shall be determined for each PCD area in the car park and, in each case, it shall be greater than the value stated and greater than the average for the overall car park.

[e] This level shall be used for any marked areas for pedestrians to cross.

Figure 9.3 Values of light for outdoor areas

TABLE 3.3

VALUES OF LIGHT TECHNICAL PARAMETERS FOR ROADS IN LOCAL AREAS

1	2	3	4
Lighting subcategory	Light technical parameters (LTP)		
	Average horizontal illuminance[a,b] ($\bar{E}_h$) lx	Point horizontal illuminance[a,b] (E_{Ph}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})
PR1	7	2	8
PR2	3.5	0.7	8
PR3[e]	1.75	0.3	8
PR4[d,e]	1.3	0.22	8
PR5[d,e]	0.85	0.14	10
PR6[d]	0.7	0.07	10

[a] These values are maintained.

[b] Conformance is achieved by being greater than or equal to the applicable table value.

[c] Conformance is achieved by being less than or equal to the applicable table value.

[d] See Clause 3.2 pertaining to lumen derating values for non-white light sources.

[e] When the luminaires are to be supported on existing electricity reticulation poles, the subcategories PR3, PR4 and PR5 may be reduced to the next lower subcategory PR4, PR5 and PR6 respectively.

NOTES:

1 Validation of the values in Columns 2 to 4 is by calculation, not field measurement. This is particularly relevant to small values in Columns 2, and 3, which will typically be difficult to validate by field measurements.

2 See Section 4 for the design methods and requirements for use in assessing conformance to the specified light technical parameters.

3 Where there is a significant fear of crime or where required by the relevant authority then for enhanced lighting of the formed pathways, see Table 3.4.

4 The requirements for minimum obtrusive light specified in Clause 3.1.3 apply.

TABLE 3.6

VALUES OF LIGHT TECHNICAL PARAMETERS FOR CONNECTING ELEMENTS

1	2	3	4	5
Lighting subcategory	Light technical parameters (LTP)			
	Average horizontal illuminance[a,b,d] ($\bar{E}_h$) lx	Point horizontal illuminance[a,b] (E_{Ph}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})	Point vertical illuminance[a,b] (E_{Pv}) lx
PE1	35	17.5	8	17.5
PE2	Same as for highest lighting subcategory applying to areas that abut the connecting element but, where forming part of a road or pathway, to be not less than subcategory PA3 in Table 3.5.			
PE3	Same as for highest lighting subcategory applying to areas that abut the connecting element but, where forming part of a road or pathway, to be not less than subcategory PP3 in Table 3.4.			

[a] These values are maintained.

[b] Conformance is achieved by being greater than or equal to the applicable table value.

[c] Conformance is achieved by being less than or equal to the applicable value.

[d] For steps, the requirements assume that the noses of the treads are clearly delineated by a contrasting stripe or other equally effective means. If this does not apply, the illuminance should be at least twice the value specified.

TABLE 3.4

VALUES OF LIGHT TECHNICAL PARAMETERS FOR PATHWAYS AND CYCLIST PATHS

1	2	3	4	5
Lighting subcategory	Light technical parameters (LTP)			
	Average horizontal illuminance[a,b] ($\bar{E}_h$) lx	Point horizontal illuminance[a,b,d] (E_{Ph}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})	Point vertical illuminance[a,b] (E_{Pv}) lx
PP1	10	2	5	1
PP2	7	1	5	0.3
PP3	3	0.5	5	0.1
PP4	1.5	0.25	5	0.05[e]
PP5	0.85	0.14	5	0.02[e]

[a] These values are maintained. See Clause 3.2 pertaining to lumen derating values for non-white light sources.

[b] Conformance is achieved by being greater than or equal to the applicable table value.

[c] Conformance is achieved by being less than or equal to the applicable table value.

[d] Conformance of 50% of E_{ph} shall also be demonstrated over an area of 5 m either side of the pathway—where a verge exists—or up to any structure/fence/property boundary that forms the edge of the pathway, unless deemed otherwise by the relevant authorities (see Clause 3.1.3.5).

[e] For luminaires with mounting heights of 1.5 m or less, the E_{Pv} values need not be applied.

NOTES:

1 Validation of the values in Columns 2 to 5 is by calculation, not field measurement. This is particularly relevant to small values in Columns 2, 3 and 5, which will typically be difficult to validate by field measurements.

2 See Section 4 for the design methods and requirements for use in assessing conformance to the specified light technical parameters.

TABLE 3.7

VALUES OF LIGHT TECHNICAL PARAMETERS FOR OUTDOOR CAR PARKS (INCLUDING ROOF-TOP CAR PARKS)

1	2	3	4	5
Lighting subcategory	Light technical parameters (LTP)			
	Average horizontal illuminance[a,b] ($\bar{E}_h$) lx	Point horizontal illuminance[a,b] (E_{Ph}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})	Point vertical illuminance[a,b] (E_{Pv}) lx
PC1	14	3	8	3
PC2	7	1.5	8	1
PC3	3.5	0.7	8	—
PCD[d]	—	≥14 and ≥($\bar{E}_h$)[d]	—	—
PCX[e]	21	5	8	—

[a] These values are maintained.

[b] Conformance is achieved by being greater than or equal to the applicable table value.

[c] Conformance is achieved by being less than or equal to the applicable table value.

[d] E_{Ph} shall be determined for each PCD area in the car park and, in each case, it shall be greater than the value stated and greater than the average for the overall car park.

[e] This level shall be used for any marked areas for pedestrians to cross.

TABLE 3.5

VALUES OF LIGHT TECHNICAL PARAMETERS FOR PUBLIC ACTIVITY AREAS (EXCLUDING CAR PARKS)

1	2	3	4	5
Lighting subcategory	Light technical parameters (LTP)			
	Average horizontal illuminance[a,b] ($\bar{E}_h$) lx	Point horizontal illuminance[a,b] (E_{Ph}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})	Point vertical illuminance[a,b,d] (E_{Pv}) lx
PA1	21	7	8	7
PA2	14	4	8	4
PA3	7	2	8	2

[a] These values are maintained.

[b] Conformance is achieved by being greater than or equal to the applicable table value.

[c] Conformance is achieved by being less than or equal to the applicable value.

Figure 9.4 : Values of light for outdoor areas

9.3 Ingress Protection Ratings

Ingress Protection (IP) ratings are used to specify the level of protection provided by an electrical enclosure against the intrusion of solid objects (like dust) and liquids.

An IP rating typically consists of two digits:

- -The first digit indicates protection against solid objects.
- -The second digit indicates protection against liquids.

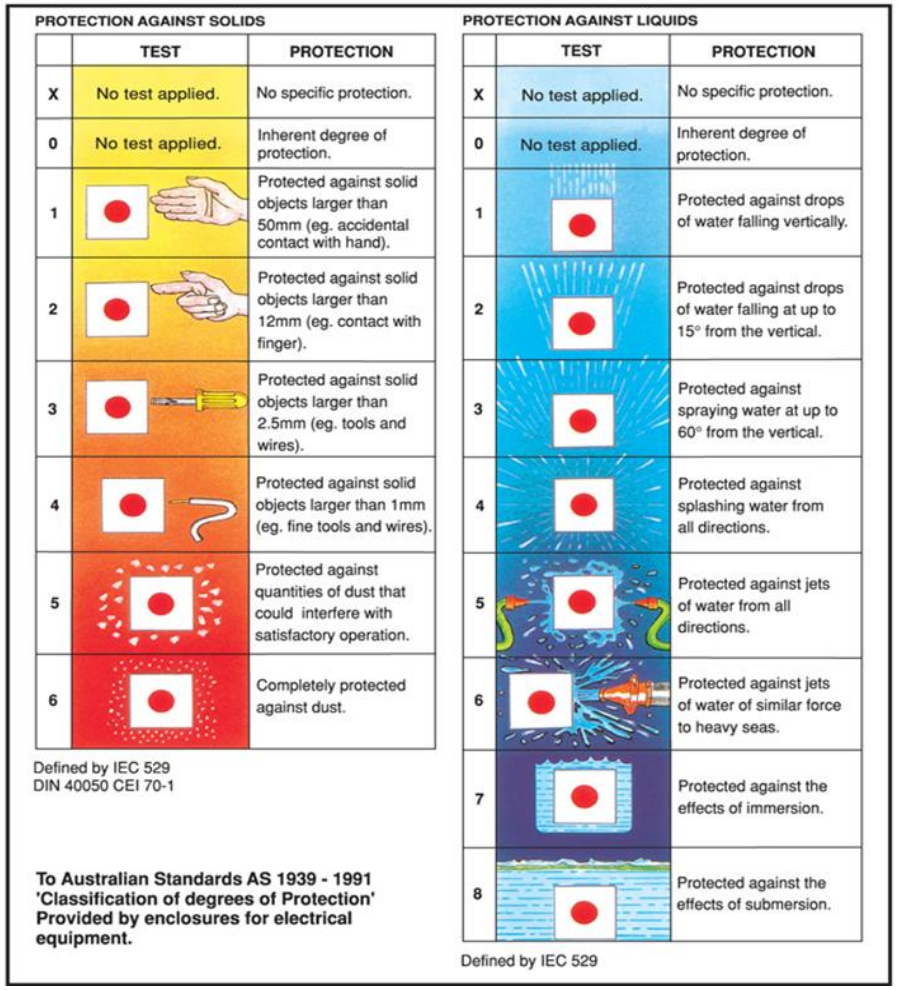

Figure 9.5: Australian Standards AS 1939-1991 - Classification od degrees of protection

9.4 Protection Against Impact

IK Ratings are an international numeric classification that indicate the degrees of protection provided by enclosures for electrical equipment against external mechanical impacts. It provides a means of specifying the capacity of an enclosure to protect its contents from external impacts in accordance with IEC 62262:2002 and IEC 60068-2-75:1997.

- -IK00 - No Protection
- -IK1 - Protected against 0.14 joules of impact. Equivalent to the impact of a 0.55 lb (0.25 kg) mass dropped from 2.2" (56 mm) above the impacted surface
- -IK2 - Protected against 0.2 joules of impact. Equivalent to the impact of a 0.55 lb (0.25 kg) mass dropped from 3.2" (80 mm) above the impacted surface
- -IK3 - Protected against 0.35 joules of impact. Equivalent to the impact of a 0.55 lb (0.25 kg) mass dropped from 5.5" (140 mm) above the impacted surface
- -IK4 - Protected against 0.5 joules of impact. Equivalent to the impact of a 0.55 lb (0.25 kg) mass dropped from 7.9" (200 mm) above the impacted surface
- -IK5 - Protected against 0.7 joules of impact. Equivalent to the impact of a 0.55 lb (0.25 kg) mass dropped from 11.0" (280 mm) above the impacted surface
- -IK6 - Protected against 1 joules of impact. Equivalent to the impact of a 0.55 lb (0.25 kg) mass dropped from 15.8" (400 mm) above the impacted surface
- -IK7 - Protected against 2 joules of impact. Equivalent to the impact of a 1.1 lb (0.5 kg) mass dropped from 15.8" (400 mm) above the impacted surface
- -IK8 - Protected against 5 joules of impact. Equivalent to the impact of a 3.75 lb (1.7 kg) mass dropped from 11.8" (300 mm) above the impacted surface
- -IK9 - Protected against 10 joules of impact. Equivalent to the impact of a 11.0 lb (5 kg) mass dropped from 7.9" (200 mm) above the impacted surface
- -IK10 - Protected against 20 joules of impact. Equivalent to the impact of a 11.0 lb (5 kg) mass dropped from 15.8" (400 mm) above the impacted surface

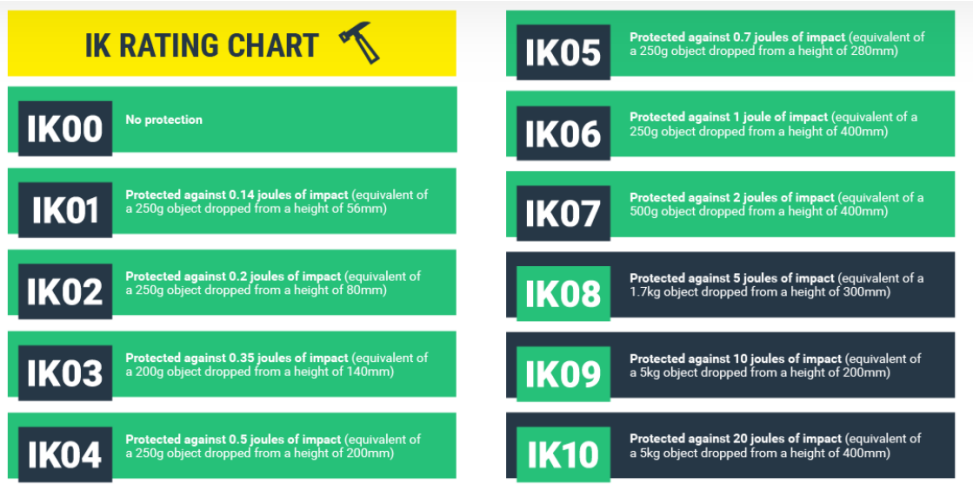

Figure 9.6 Protection against impact reference table

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NSW GOVERNMENT