

19 November 2013

Lukas Madar
Lend Lease Project Manager
30 Hickson Road,
Millers Point,
Sydney NSW 2000

Dear Lukas,

Subject; Barangaroo South Precinct Public Realm Lighting Stage 1

We hereby certify that the design of the lighting for the Barangaroo South Precinct Public Realm will comply and meet with the requirements of;

- AS4282 – 1997. Control of the obtrusive effects of outdoor lighting.
- AS1158.3.1 – 2005. Pedestrian Area Lighting.
- AS1158.1.1 – 2005. Lighting for Roads and Public Spaces.
- AS1158.4 – 2009. Lighting for Pedestrian Crossings.
- The BDA requirements.

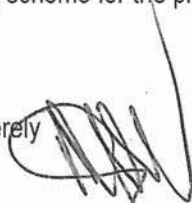
The category P & V ratings for each area will be as outlined on the attached plan and as indicated on the supporting material.

The proposed lights and lamps utilized for the project will be efficient, sustainable and use BAT (best available technology).

The control of the luminaires shall be via the building automation system with inputs from photo electric cells, time functions and motion detection.

The lighting scheme for the project will be carried out by a certified professional lighting designer.

Yours sincerely



Michael Sparrow MIES RLP IALD PLDA
Senior Design Engineer – Lighting, Design/Building
Lend Lease

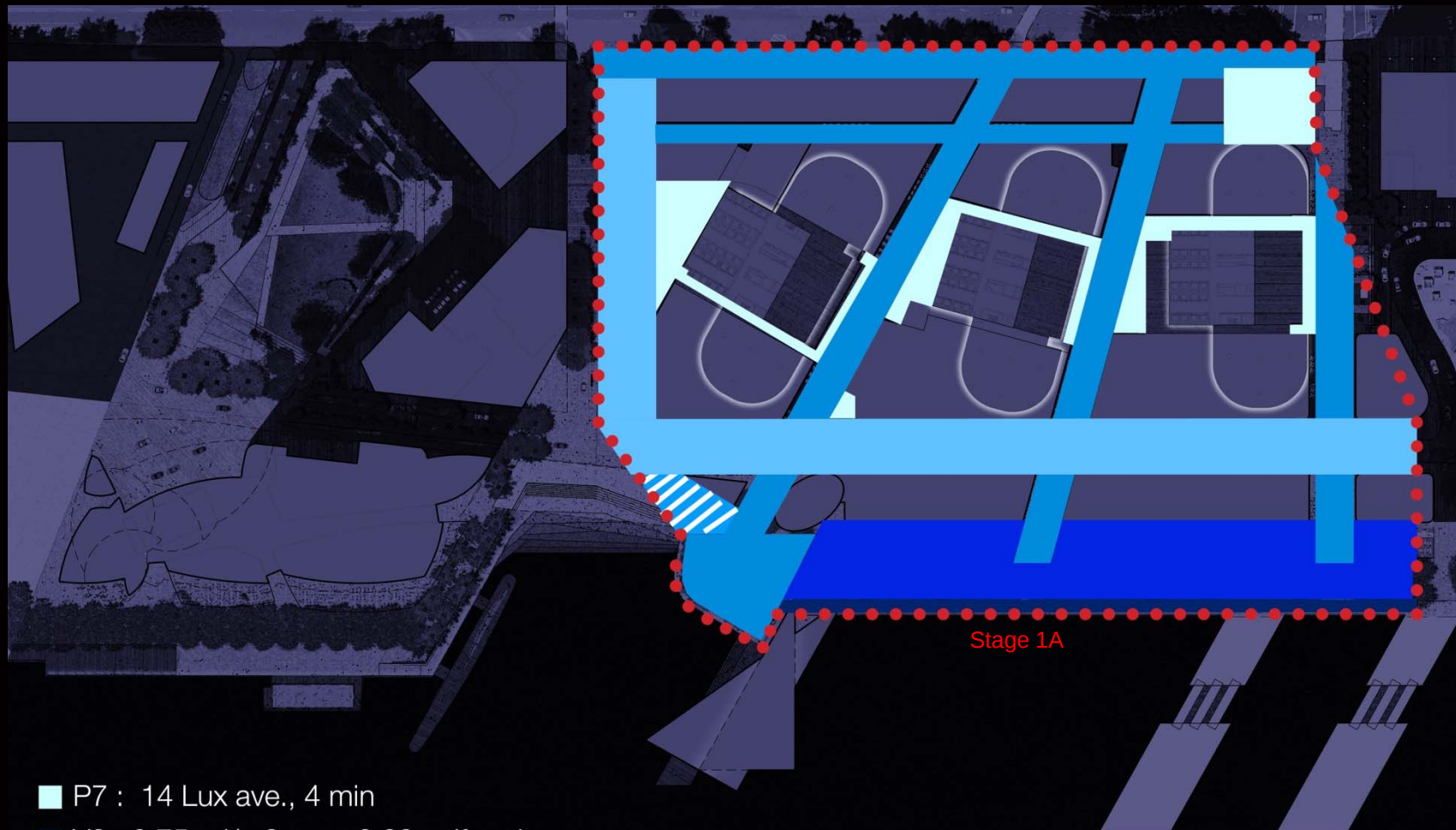
Barangaroo Public Realm Lighting/ Design Development/15/04/14

Principles/Light/

Lighting Masterplan Stage 1A



Lighting Masterplan – Light Levels according to AS/NZS 1158.3.1:2005

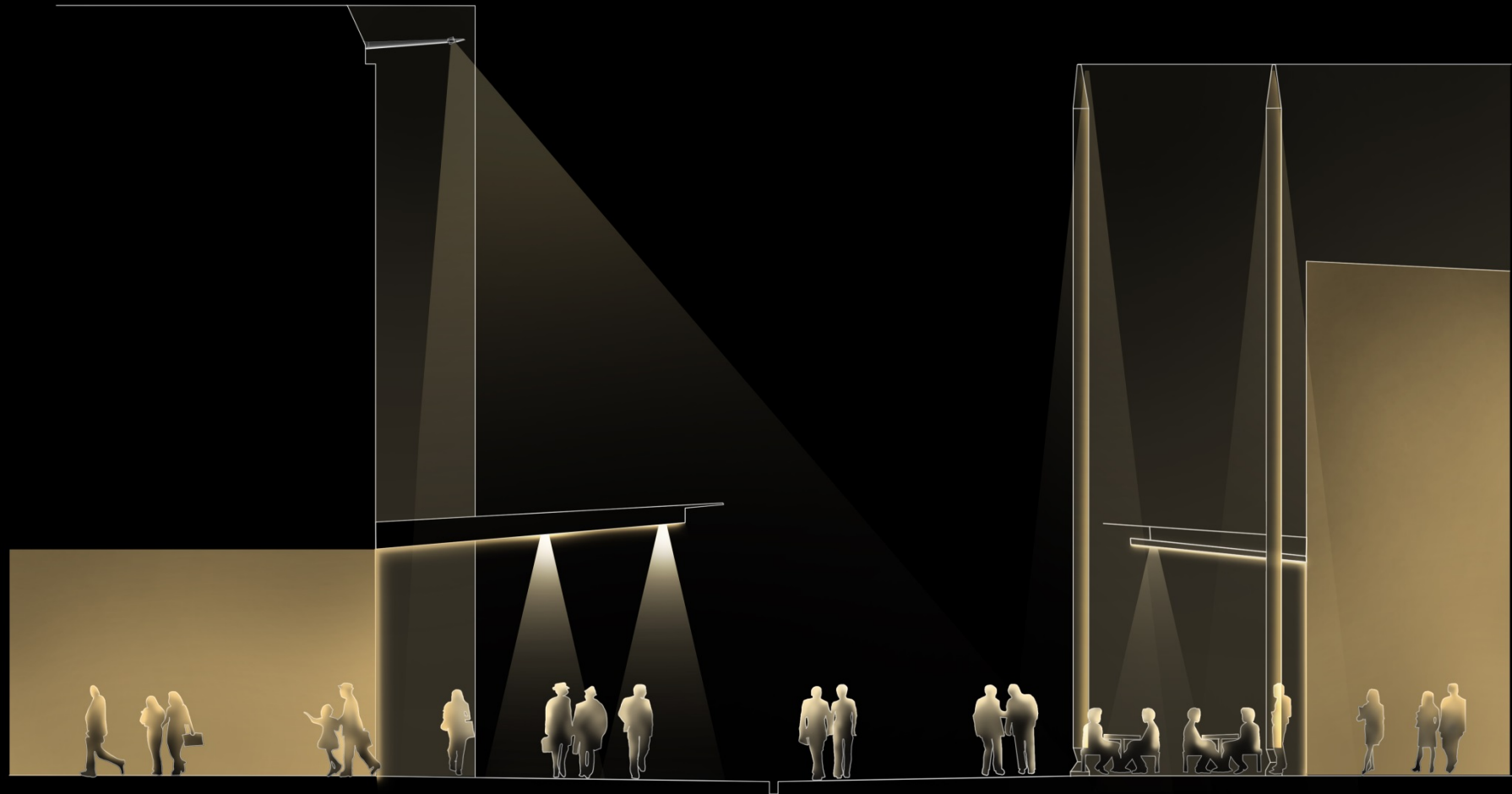


Stage 1A

- P7 : 14 Lux ave., 4 min
- V3 : 0.75 cd/m² ave., 0.33 uniformity
- P8 : 7 Lux ave., 2 min
- P3 : 1.75 Lux ave., 0.3 min → P8 : 7 Lux ave., 2 min
- P5 : 0.5 Lux ave., 0.07 min

Union + City Walk/

Lighting Concept



Shelley Lane/

Shelley Lane/

Lighting Concept

SPEIRS+MAJOR



Waterfront/

Light Levels and Uniformity

Target average horizontal illuminance level: 5-7 lux
Target minimum horizontal illuminance level: 0.3 lux



A diagram consisting of a large right-facing curly bracket on the left, with an arrow pointing from its center to the text 'Australian Lighting Class between P3 and P8'.

Australian Lighting Class between P3 and P8

Dappled, Non-Uniform Light

The design seeks to achieve a 'dappled moonlight' effect and so is deliberately non-uniform to create a textured appearance.

Horizontal vs Vertical Illuminance

Horizontal illuminance levels as defined by the standards refer to illumination specifically on the ground plane. Whilst horizontal illuminance will be minimised and non-uniform to achieve a dappled effect, the canopies and trunks of trees will be illuminated to provide vertical illumination that improves legibility, way-finding and levels of perceived brightness and security.

High Scotopic/Photopic ratio of Moonlight Blue Light

Cool white/blue light is perceived as being disproportionately brighter than neutral and warm white light sources, allowing illuminance levels to be reduced whilst maintaining sufficient perceived brightness after dark. By example, the latest British Standard (2013) allows light levels to be reduced by approx. 20% in pedestrian areas when using cool white and blue light sources.

Precedents for Low Horizontal Illuminance



Trafalgar Square, London
7.5 - 10 lux average horizontal
illuminance



Queen's Walk, London Southbank
3 - 5 lux average horizontal
illuminance



Sackler Crossing, Kew Gardens, London
0 - 1 lux average horizontal illuminance

Lighting levels proposed for Barangaroo South

Lighting not proposed for
Barangaroo South

Minimised Illuminance Levels/ Precedents



Darling Quarter, Sydney
14 lux average horizontal illuminance on retail area
5 - 7 lux average horizontal illuminance area



Federation Square, Melbourne
3 - 5 lux average horizontal illuminance

Precedents for Low Uniformity



Olympic Park, London



'Promenade of Light', Old Street, London



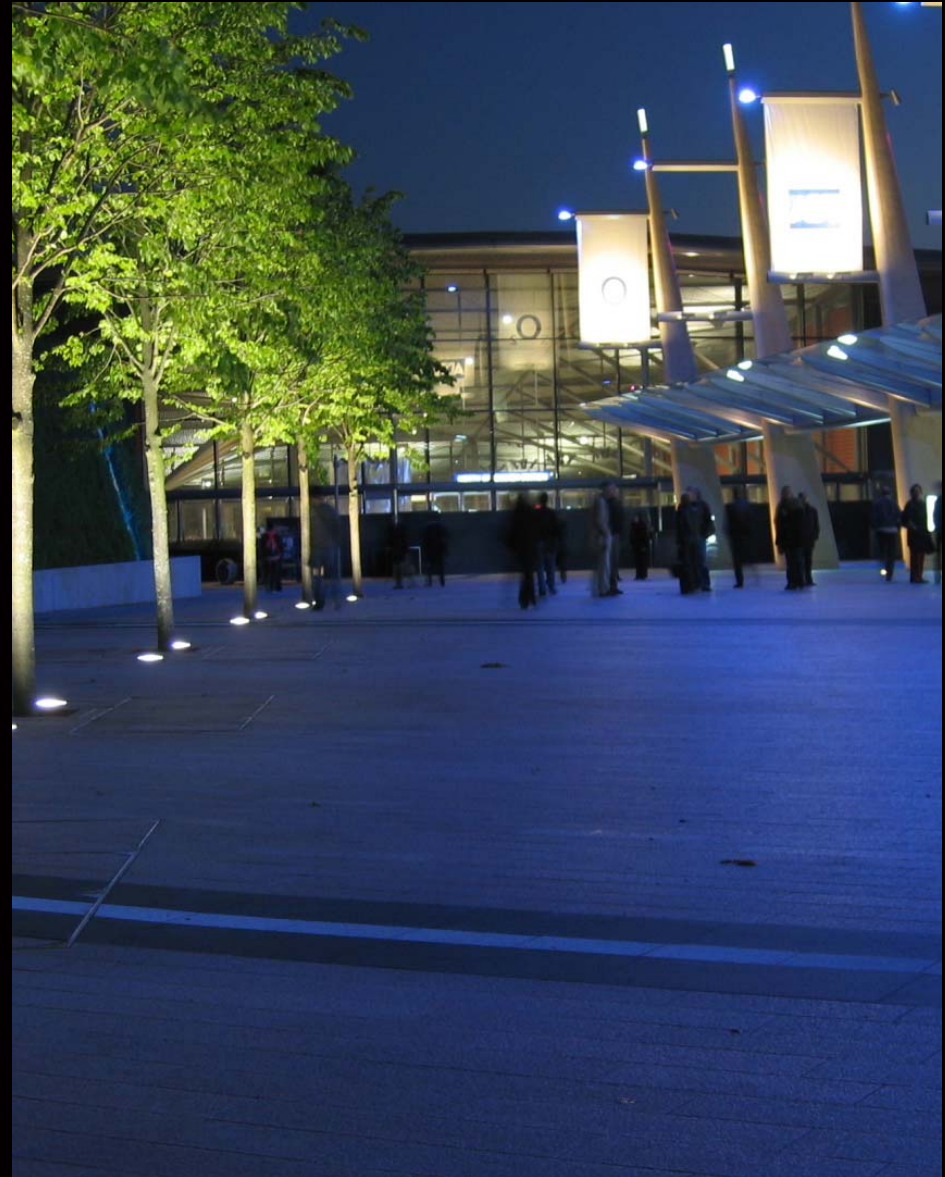
Use of 'Moonlight Blue' Coloured Light

- High perceived brightness of blue light allows illuminance levels to be reduced.
- Cool blue light contrasts with surrounding warm white lit interiors, making them appear more warm and welcoming.
- Cool blue dappled light echoes a 'moonlit' quality.
- Contrasting colour of ambient light creates a sense of place and atmosphere distinct and different to surrounding streetscape.

Precedents for use of 'Moonlight Blue' Coloured Light



Devonshire Square, London



Peninsula Square, London

Waterfront Promenade/Section

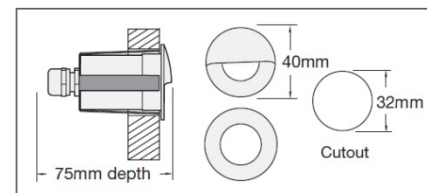
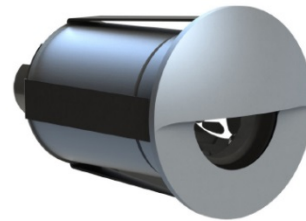


Waterfront Promenade	
Lighting Class	P3 to P8
Light Source	LED
Colour Temperature	4000K–pale blue, variable
Colour Rendering	N/A
Mounting	Column
Height	+7m/tree canopy height
Approx. Spacing	12m (staggered)

Waterfront Timber Deck



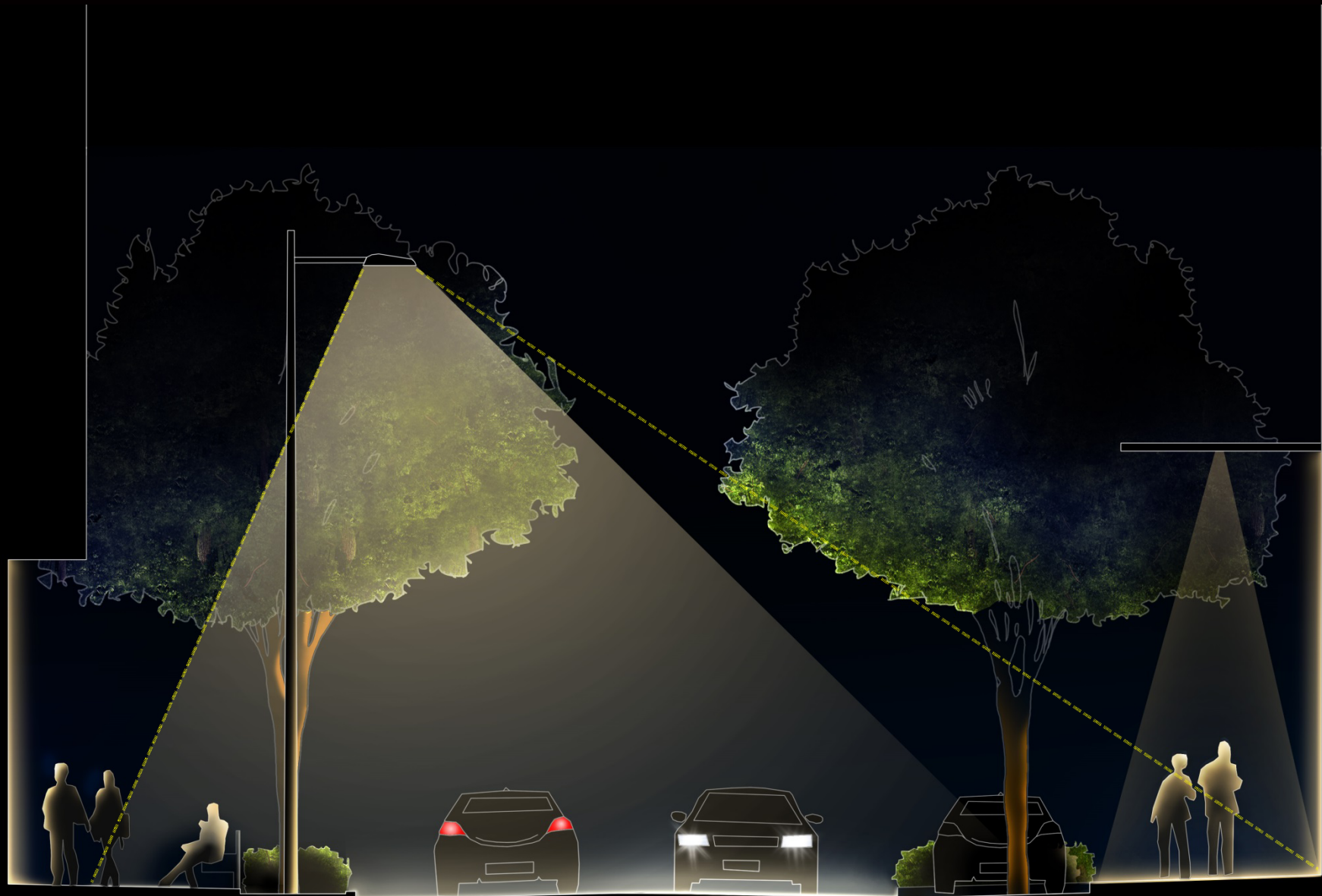
Section



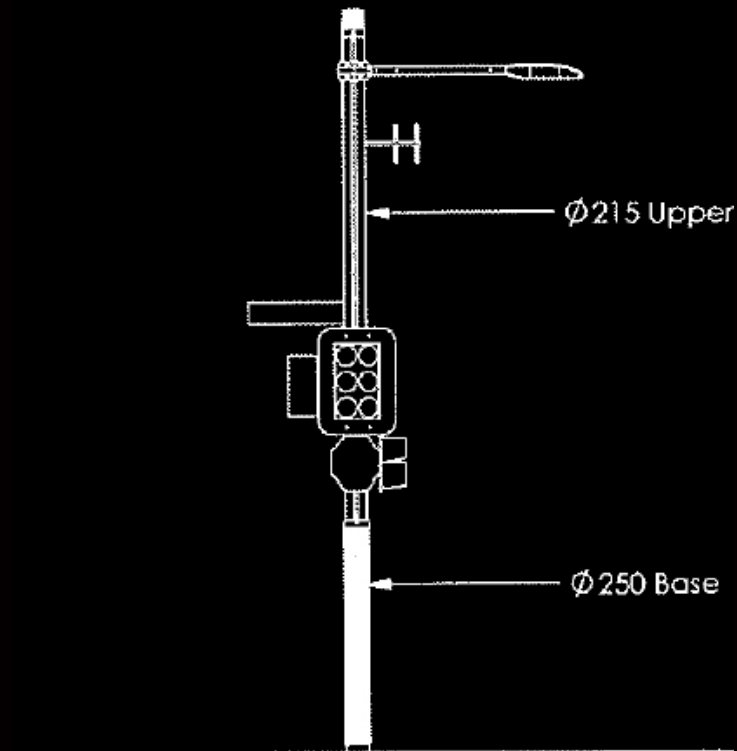
Fixture

Lime Street/

Lighting Concept



Street Lighting – Smart Pole



S1B 7.2m
CoS Type C

Estimated Total Load Weight: 346 kg

Weight includes: Pole + LOR + Luminaire +
2-Off 6 Aspect Traffic Lanterns + Pedestrian Lantern +
Sundries (incl. termination boards, fixings, signage & brackets)

Accessories and Components

Introduction

A range of accessories and components are designed specifically for use with Smartpoles.

Requirements

The following Smartpole accessories and components are to be installed as standard on each each installation, unless determined otherwise by the City of Sydney.

Banners

Banner arms should be installed on each Smartpole to suit the street layout. Generally banner arms shall be double wherever possible.

Services

The services requirements of the relevant authorities must be met in each Smartpole installation. Typically the range of possible services include:

1. Street lighting services
2. Traffic signals and services
3. Communications microcells, fibre optic cabling and/or aerials
4. CCTV

Street Lighting – Light Fitting

ROAD LIGHTING (Globe & Lime St):

Design considerations:

Mounting height as 7.2 meters

Outreach arm length as 2.5 meters

Pole spacing ranges from 20 to 28 meters

Tilt angle +5 degrees

IP65

Fitting Type:

XAA – GE Eco Evolve LED R250 150W (Target) , 3000K, Asymmetric, Wide fixtures



PEDESTRIAN CROSSING

Design considerations:

Mounting height as 5.0 meters

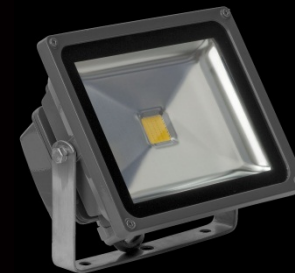
Outreach arm length as 2.5 meters

Poles located in each side of the road on car's approaching direction side

IP65

Fitting Type:

XB5 – Flood LED 150W (Target), 3000K, Asymmetric



www.speirsandmajor.com/