190493 Tallawong Station Precinct South Rouse Hill

Specialist Lighting Concepts May 2020



This document covers the following;

- 1. Design Parameters
- AS/NZS 1158 : Lighting for roads and public spaces
 AS/NZS 4282 : Control of the obtrusive effects of outdoor lighting
- 2. Crime Prevention Extracts
- 3. Nominated Pedestrian Category
- 4. Preliminary Lighting Design Concepts & Luminaire Typologies
 Village Green
 Playscape
 Private/Shared Street

 - Western Plaza
 - Southern Plaza
 - Schofields Road Entry



KEY PLAN - SCOPE OF WORKS



CRIME PREVENTION ANALYSIS

The following extracts highlight the potential crime risk caused by the proposed mixed use development within Rouse Hill. The following data are extracts from BRS's crime prevention report and serves to assist in identifying specific crimes prevalent in an area.

The purpose of this analysis has aided the proposed lighting categories that JHA deems to be appropriate for the proposed public domain areas within Tallawong Station Precinct and are highlighted in the subsequent pages.

Table 1: Threat levels in the Rouse Hill suburb and Blacktown LGA (2018 - 2019)

Level of Crime	Crime Type	Crime Type by Location			
	Rouse Hill	Blacktown LGA			
HIGHEST LEVEL CRIME	No relevant crimes	Robbery Steal from Motor Vehicle			
HIGH LEVEL CRIME	No relevant crimes	Assault (Domestic) Assault (Non- domestic) Steal from Person			
MEDIUM LEVEL CRIME	No relevant crimes	Steal from Dwelling Break and Enter (Dwelling) Malicious Damage to Property			
LOW LEVEL CRIME No relevant crimes		No relevant crimes			
LOW LEVEL CRIME No relevant crimes Steal from Dwelling Break and Enter (Dwelling) Assault (Domestic) Assault (Non - domestic) Malicious Damage to Property Steal from Person Robbery Steal from Motor Vehicle		No relevant crimes			

EXTRACTS FROM BARKER RYAN STEWART'S CRIME PREVENTION REPORT

★ SITE LOCATION

Steal from Dwelling



Figure 3: Steal from Dwelling (2015)

Figure 4: Steal from Dwelling (2019)

Malicious Damage to Property



Figure 6: Malicious Damage to Property (2015)

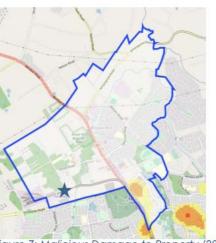


Figure 7: Malicious Damage to Property (2019)

Assault (Non - domestic)



Figure 9: Assault (Non-domestic) (2015)

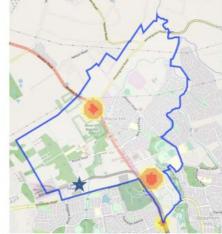


Figure 10: Assault (Non - domestic) (2019)

EXTRACTS FROM BARKER RYAN STEWART'S CRIME PREVENTION REPORT



PEDESTRIAN AND CYCLIST PATHS

The following highlighted subcategories are a recommended parameter by JHA.

Final selection of sub-categories to be client and end-user approved prior to design development and cross checked against any crime and night time movement statistics available.

TABLE 2.2
LIGHTING SUBCATEGORIES FOR PEDESTRIAN AND CYCLIST PATHS

1	2	3	4	5
Type of pathway		Selection criteria ^{a,b,c}		Applicable
General description	Basic operating characteristics	Pedestrian/ cycle activity	Fear of crime	lighting subcategory
Pedestrian or cycle orientated	Pedestrian and or cycle traffic only	N/A	High	PP1°
pathway, e.g. footpaths, including those along local roads ^d and arterial roads ^e , walkways, lanes, park paths,		High	Medium	PP2c
		Medium	Medium	PP3
cyclist paths		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.
- 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.

EXTRACTS FROM AS/NZS 1158.3.1 - 2020 LIGHTING FOR ROADS AND PUBLIC SPACES.

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 $\left(ar{E}_{ ext{h}} ight)$	Point horizontal illuminance a,b,d (E_{Ph})	Illuminance (horizontal) uniformity ^c Cat. P	Point vertical illuminance ^{a,b} (E _{Pv})	
	lx	lx	$(U_{\rm E2})$	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°	
PP5	0.85	0.14	5	0.02e	

- ^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 $E_{\rm ph}$ 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.



KEY PLAN - SCOPE OF WORKS



ROAD RESERVES IN LOCAL AREAS

The following highlighted subcategories are a recommended parameter by and Blacktown City Council.

The following criteria shall be incorporated into the design.

TABLE 2.1
LIGHTING SUBCATEGORIES FOR ROAD RESERVES IN LOCAL AREAS

1	2	3	4	5	6
Type of road or j	Se	Selection criteria ^{a,b}			
General description	Basic operating characteristics	Pedestrian/ cycle activity	Fear of crime	Need to enhance amenity	Applicable lighting subcategory ^{c,d}
Collector roads or non-		N/A	High	N/A	PR1
arterial roads which collect and distribute		High	Medium	High	PR2
traffic in an area, as well		Medium	Low	Medium	PR3f or PR4f
as serving abutting properties	Mixed vehicle and pedestrian traffic	Low	Low	Low	PR5
Local roads or streets		N/A	High	N/A	PR1
used primarily for access to abutting properties,		High	Medium	High	PR2
including residential,		Medium	Low	Medium	PR3 ^f or PR4 ^f
commercial and industrial precincts		Low	Low	Low	PR5
]	N/A	N/A	N/A	PR6e
Common area, forecourts		N/A	High	N/A	PR1
of cluster housing		High	Medium	High	PR2
		Medium	Low	Medium	PR3f or PR4f
		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 reconfigure these poles limits or precludes conformance to subcategory PR4 and PR5 respectively.

NOTE: It is also appropriate to use one subcategory lower to take advantage of the cost reductions available when utilizing electricity distribution poles rather than dedicated lighting columns, i.e. if the desired subcategory is PR3, PR4 or PR5 and if electricity distribution poles are used then levels PR4, PR5 or PR6 respectively, may be used.

However, it is recognized that, for some authorities, there may be some specific lighting tasks where subcategory PR5 could be deemed to be excessive in terms of providing adequate level of service and meeting with community expectations. In this case subcategory PR6 may be used.

f Category PR3 is generally used in Australia and Category PR4 is generally used in New Zealand.

EXTRACTS FROM AS/NZS 1158.3.1 - 2020 LIGHTING FOR ROADS AND PUBLIC SPACES.

VALUES OF LIGHT TECHNICAL PARAMETERS FOR ROADS IN LOCAL AREAS

1	2	3	4		
	Light technical parameters (LTP)				
Lighting subcategory	Average horizontal illuminance $^{\mathrm{a,b}}$ $\left(\bar{E}_{\mathrm{h}}\right)$	Point horizontal illuminance a,b ($E_{ m Ph}$)	Illuminance (horizontal) uniformity Cat. P (U_{E2})		
	lx	lx	(==/		
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.
- 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.



KEY PLAN - SCOPE OF WORKS



OUTDOOR CAR PARKS

The following highlighted subcategories are a recommended parameter by JHA.

Final selection of sub-categories to be client and end-user approved prior to design development and cross checked against any crime and night time movement statistics available.

TABLE 2.5
LIGHTING SUBCATEGORIES FOR OUTDOOR CAR PARKS
(INCLUDING ROOF-TOP CAR PARKS)

1	2	3	4
		Selection criteria ^{a,c}	
Type of area	Night time vehicle and/or pedestrian movements	Fear of crime	Applicable lighting subcategory ^b
	High	High	PC1
Parking spaces, aisles and circulation roadways	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.

EXTRACTS FROM AS/NZS 1158.3.1 - 2020 LIGHTING FOR ROADS AND PUBLIC SPACES.

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 $\left(ar{E}_{ ext{h}} ight)$	Point horizontal illuminance a,b (E_{Ph})	Illuminance (horizontal) uniformity ^c Cat. P	Point vertical illuminance a,b (E_{Pv})		
	lx	lx	$(U_{\rm E2})$	lx		
PC1	14	3	8	3		
PC2	7	1.5	8	1		
PC3	3.5	0.7	8	_		
PCD^d	_	≥ 14 and $\geq (\overline{E}_h)^d$	_	_		
PCXe	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.



KEY PLAN - SCOPE OF WORKS



CONNECTING ELEMENTS

The following highlighted subcategories are a recommended parameter by JHA.

Final selection of sub-categories to be client and end-user approved prior to design development and cross checked against any crime and night time movement statistics available.

TABLE 2.4
LIGHTING SUBCATEGORIES
FOR CONNECTING ELEMENTS

Type of area	Applicable lighting subcategory
Subways, including associated ramps or stairways	PE1
Steps and stairways, ramps, footbridges, pedestrian ways	PE2
Ramps and footbridges associated with low use pathways (e.g. in parks and reserves)	PE3

NOTE: Subways are listed as a separate subcategory because of a fear of crime.

TABLE 3.6

VALUES OF LIGHT TECHNICAL PARAMETERS
FOR CONNECTING ELEMENTS

1	2	3	4	5	
	Light technical parameters (LTP)				
Lighting subcategory	Average horizontal illuminance $(\bar{E}_{\rm h})$	Point horizontal illuminance a,b (E_{Ph})	Illuminance (horizontal) uniformity ^c Cat. P	Point vertical illuminance ^{a,b} (E _{Pv})	
	lx	lx	$(U_{\rm E2})$	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			

^a These values are maintained.

EXTRACTS FROM AS/NZS 1158.3.1 - 2020 LIGHTING FOR ROADS AND PUBLIC SPACES.



^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.

OBTRUSIVE PARAMETERS

The following highlighted zones have been selected by JHA and are deemed appropriate for this application.

Final selection of zone to be approved by client and end-user prior to design development to ensure the obtrusive effects of outdoor lighting have been applied within this precinct.

TABLE 3.1 ENVIRONMENTAL ZONES

Zones	Description	Examples
A0	Intrinsically dark	UNESCO Starlight Reserve. IDA Dark Sky Parks. Major optical observatories No road lighting -unless specifically required by the road controlling authority
A1	Dark	Relatively uninhabited rural areas No road lighting - unless specifically required by the road controlling authority
A2	Low district brightness	Sparsely inhabited rural and semi-rural areas
A3	Medium district brightness	Suburban areas in towns and cities
A4	High district brightness	Town and city centres and other commercial areas Residential areas abutting commercial areas
TV	High district brightness	Vicinity of major sports stadium during TV broadcasts
V	Residences near traffic routes	Refer AS/NZS1158.1.1
R1	Residences near local roads with significant setback	Refer AS/NZS 1158.3.1
R2	Residences near local roads	Refer AS/NZS 1158.3.1
R3	Residences near a roundabout or local area traffic management device	Refer AS/NZS 1158.3.1
RX	Residences near a pedestrian crossing	Refer AS/NZS 1158.4

NOTE: Recreational areas are not considered commercial.

EXTRACTS FROM AS/NZS 4282 - 2019 CONTOL OF THE OBTRUSIVE EFFECTS OF OUTDOOR LIGHITNG.

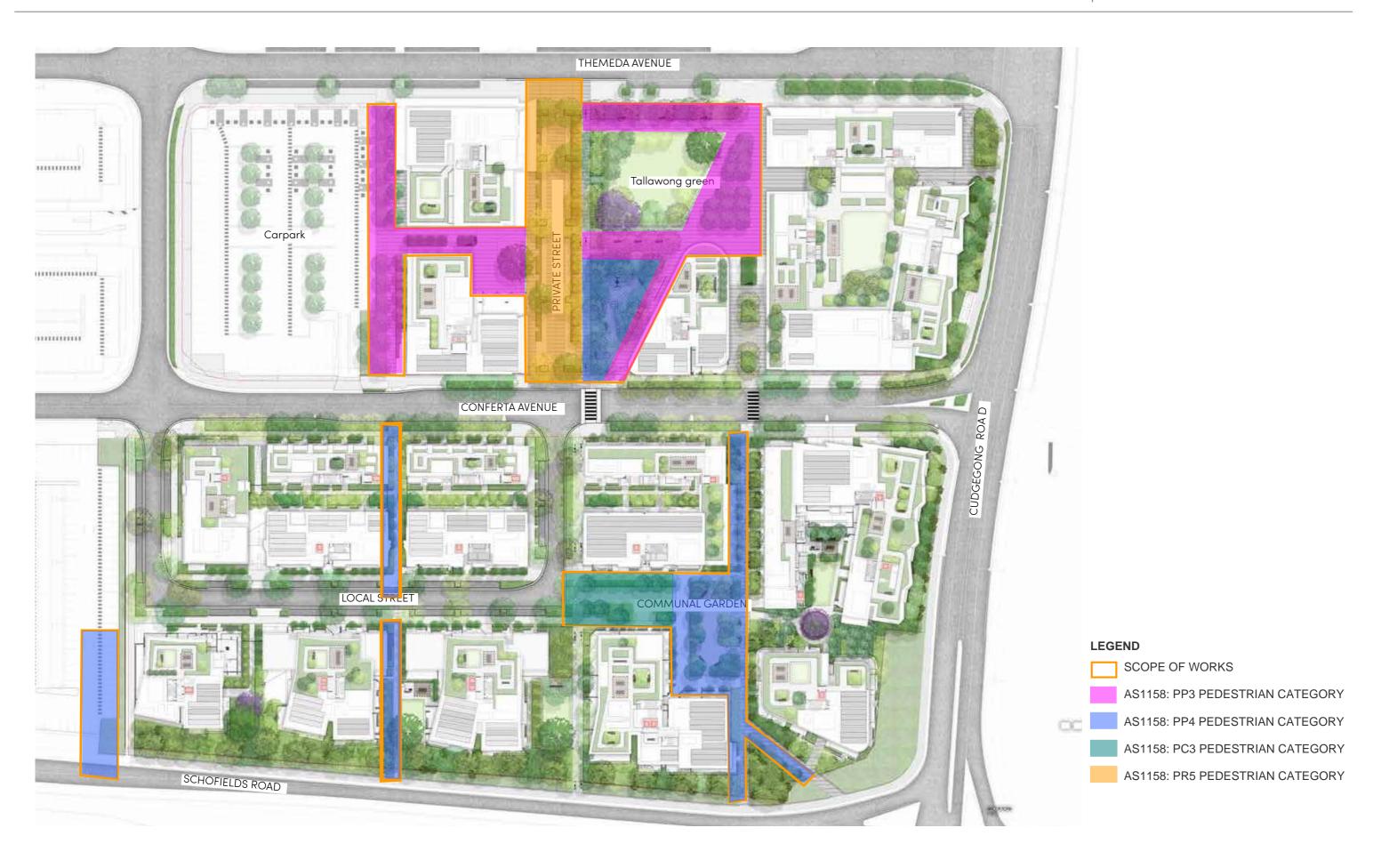
TABLE 3.2
MAXIMUM VALUES OF LIGHT TECHNICAL PARAMETERS

7	Vertical illuminanc (E _v) lx		Threshol	d increment (<i>TI</i>)	Sky glow
Zones	Non-curfew	Curfew	%	Default adaptation level $(L_{ m ad})$	Upward light ratio
A0	See Note 1	0	N/A	N/A	0
A1	2	0.1	N/A	N/A	0
A2	5	1	20%	0.2	0.01
A3	10	2	20%	1	0.02
A4	25	5	20%	5	0.03
TV	See Table 3.4	N/A	20%	10	0.08
V	N/A	4	Note 2	Note 2	Note 2
R1	N/A	1	20%	0.1	Note 3
R2	N/A	2	20%	0.1	Note 3
R3	N/A	4	20%	0.1	Note 3
RX	N/A	4	20%	5	Note 4

NOTES:

- 1 For A0, Ev shall be as close to zero as practicable without impacting safety considerations.
- 2 Refer to AS/NZS 1158.1.1.
- 3 Refer to AS/NZS 1158.3.1.
- 4 Refer to AS/NZS 1158.4.
- 5 N/A means 'Not Applicable'.
- 6 For an internally illuminated sign in an A2 zone, L_{ad} ≤ 0.25 cd/m².







- 1. To activate the village green to encourage social interactions within the Tallawong community.
- 2. Lighting to provide enough illuminance for safe movement however, provide an aesthetically pleasing ambience to suit all intended modes and activities, such as an outdoor cinema and other forms of entertainment.
- 3. Increase visual interest of the landscape and prestige in an unobtrusive manner.
- 4. Lighting to be conscious of residential surrounds as well as the night sky and the spill light that may be associated with proposed luminaires.



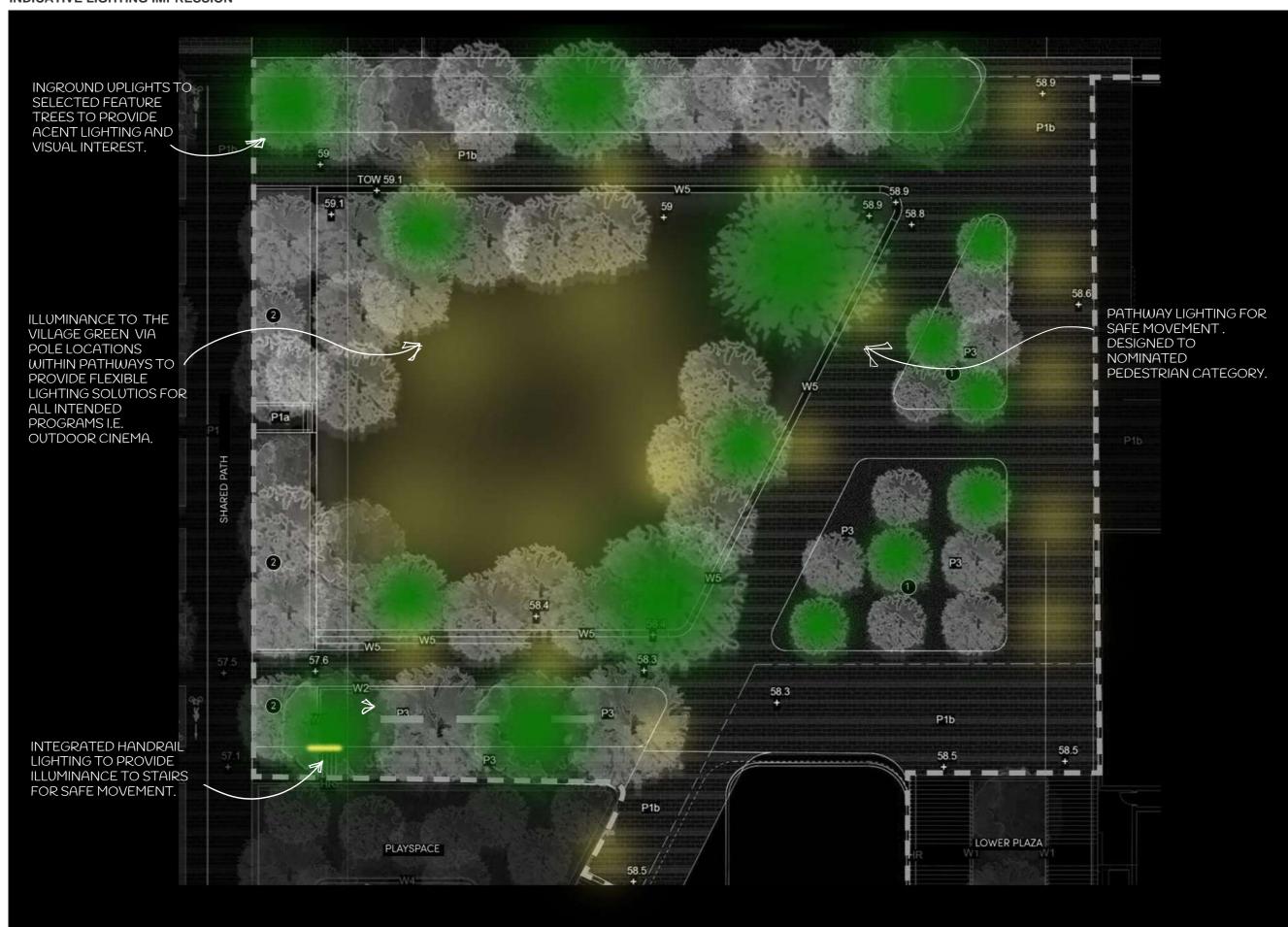
KEY PLAN

MOOD IMAGES

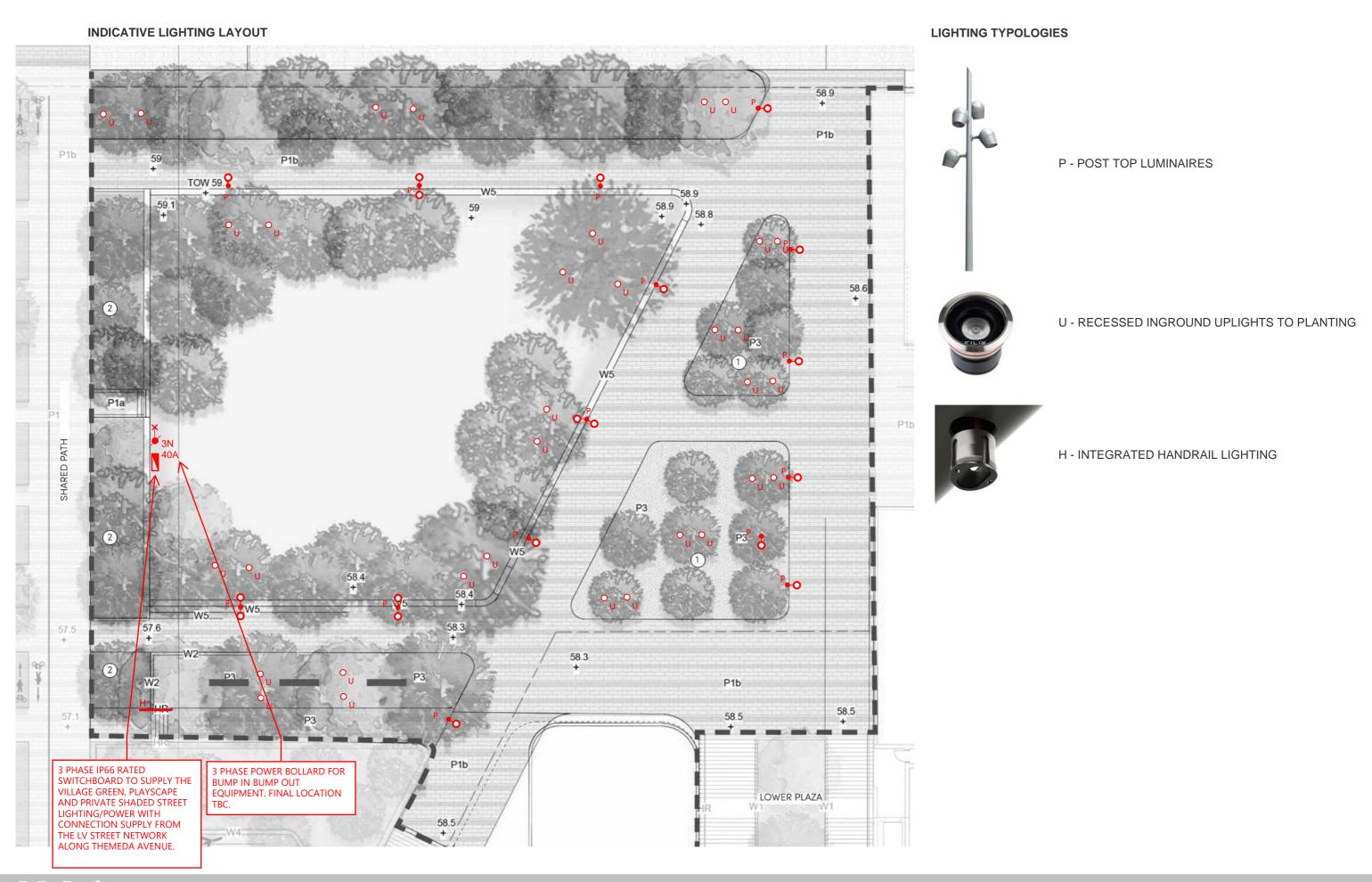




INDICATIVE LIGHTING IMPRESSION









- 1. To activate and increase visual interest within the playscape to encourage play.
- 2. Lighting to provide enough illuminance for safe movement particularly around play equipment and potential trip hazards.
- 3. Increase visual interest of the landscape and prestige in an unobtrusive manner.
- 4. Lighting proposed at low level, to bring visual interest to a scale appropriate for children.
- 5. Lighting to be conscious of residential surrounds as well as the night sky and the spill light that may be associated with proposed luminaires.



KEY PLAN

MOOD IMAGES

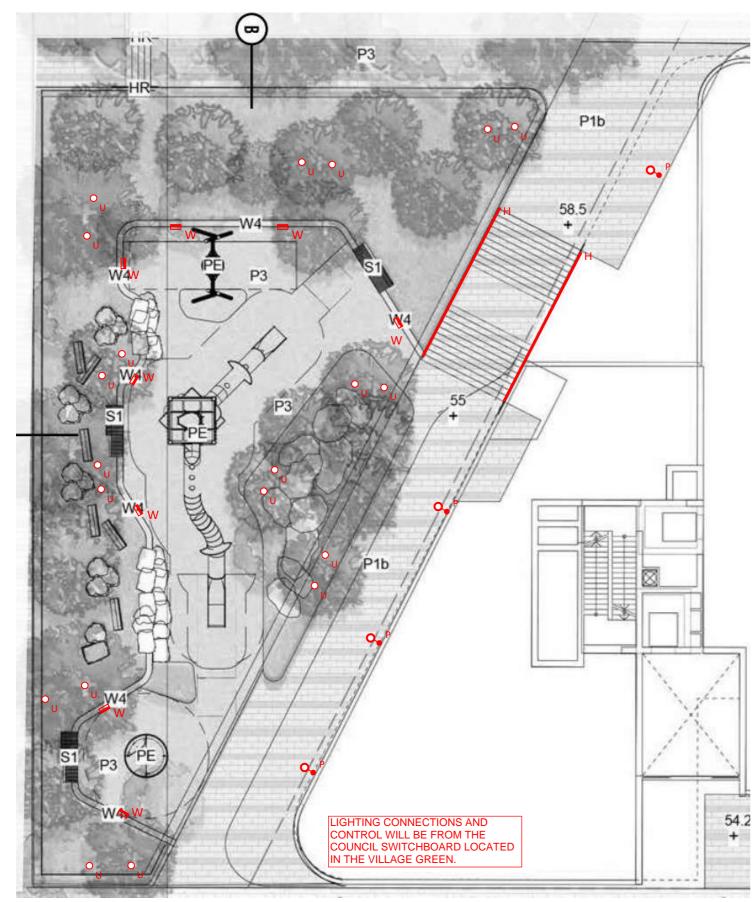




INDICATIVE LIGHTING IMPRESSION







LIGHTING TYPOLOGIES



P - POST TOP LUMINAIRES



U - RECESSED INGROUND UPLIGHTS TO PLANTING



H - INTEGRATED HANDRAIL LIGHTING



W - SURFACE MOUNTED OR RECESSED WALL LIGHTS AT LOW LEVEL



- 1. Lighting to provide enough illuminance for safe movement for vehicles, cyclists and pedestrians.
- 2.. Lighting to be conscious of the obtrusive effects into residential dwellings as well as pedestrians, cyclists and motorists.
- 3. Lighting to increase visual interest as well as the prestige of landscape.



KEY PLAN

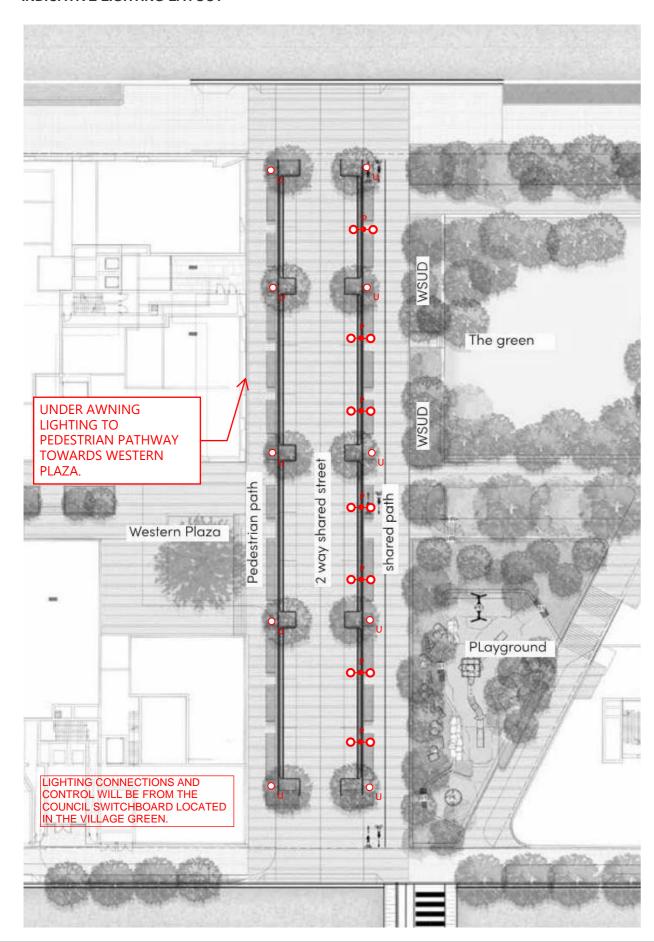


MOOD IMAGES









LIGHTING TYPOLOGIES



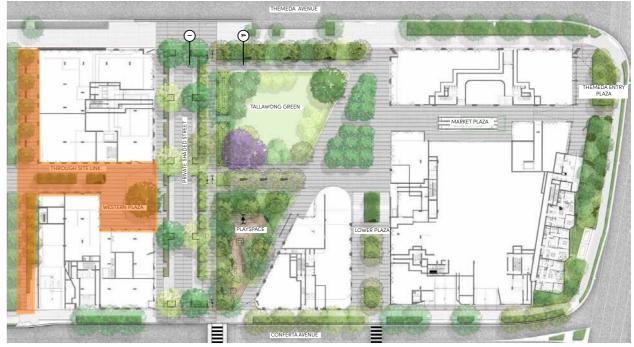
P - POST TOP LUMINAIRES



U - RECESSED INGROUND UPLIGHTS TO PLANTING



- 1. Lighting to provide enough illuminance for safe movement for pedestrians
- 2. Lighting to be conscious of the obtrusive effects into residential dwellings as well as pedestrians
- 3. Lighting to increase visual interest as well as the prestige of landscape.



KEY PLAN





MOOD IMAGES







O_{W2} 1:20 W2 58.00W2 58.61 1:50 W2 59.00 TOW B1 * 1:22 P1b - ·TOW 58.00 W1 TOW 58.60 58.00 58.39 P1b P3 56.84 NTROL WILL BE FROM THE OUNCIL SWITCHBOARD LOCATED ITHE VILLAGE GREEN. **DOWNLIGHTS TO** UNDERSIDE OF AWNING.

LIGHTING TYPOLOGIES



P - POST TOP LUMINAIRES



U - RECESSED INGROUND UPLIGHTS TO PLANTING



U - RECESSED INGROUND UPLIGHTS TO PLANTING



W - SURFACE MOUNTED OR RECESSED WALL LIGHTS AT LOW LEVEL



- 1. Lighting within Garden Plaza to activate and encourage social interaction within the Tallawong community.
- 2. Lighting to provide an aesthetically pleasing ambience for residents and public to enjoy the amenity.
- 3. Lighting to provide enough illuminance for safe movement for pedestrians and motorists.
- 4. Lighting to be conscious of the obtrusive effects into residential dwellings as well as pedestrians
- 5. Lighting to increase visual interest as well as the prestige of landscape as well as assist in way finding.



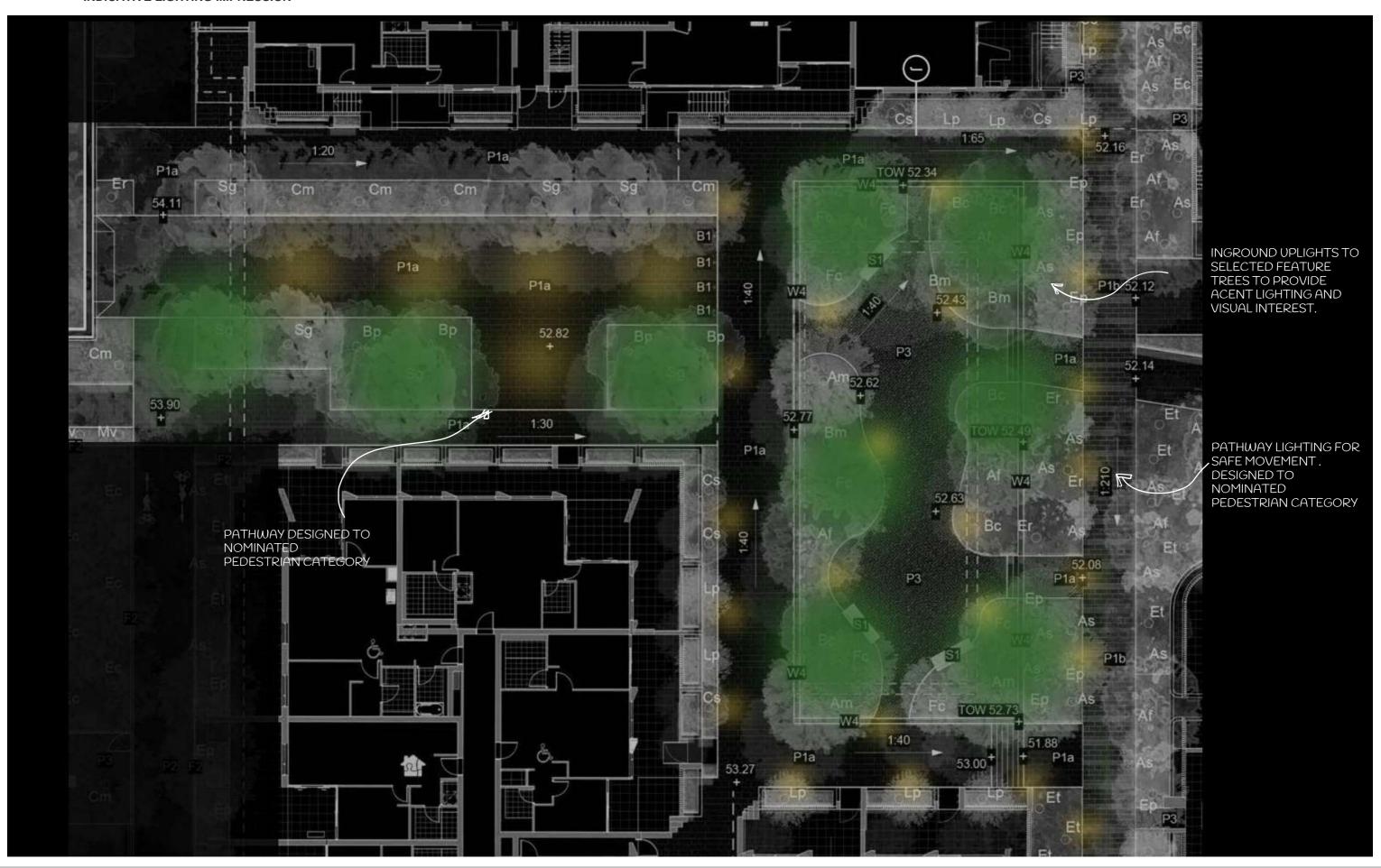
KEY PLAN



MOOD IMAGES



INDICATIVE LIGHTING IMPRESSION







LIGHTING TYPOLOGIES



B - BOLLARD, LOW LEVEL PATHWAY LIGHTING



U - RECESSED INGROUND UPLIGHTS TO PLANTING



H - INTEGRATED HANDRAIL LIGHTING

3 PHASE IP66 RATED SWITCHBOARD FOR LIGHTING/POWER SUPPLIES, CONNECTED TO THE LV STREET NETWORK ALONG NEW LOCAL STREET.

- 1. Lighting to provide enough illuminance for safe movement for pedestrians.
- 2. Lighting to be conscious of the obtrusive effects into residential dwellings as well as pedestrians
- 3. Lighting to increase visual interest as well as the prestige of landscape as well as assist in way finding.



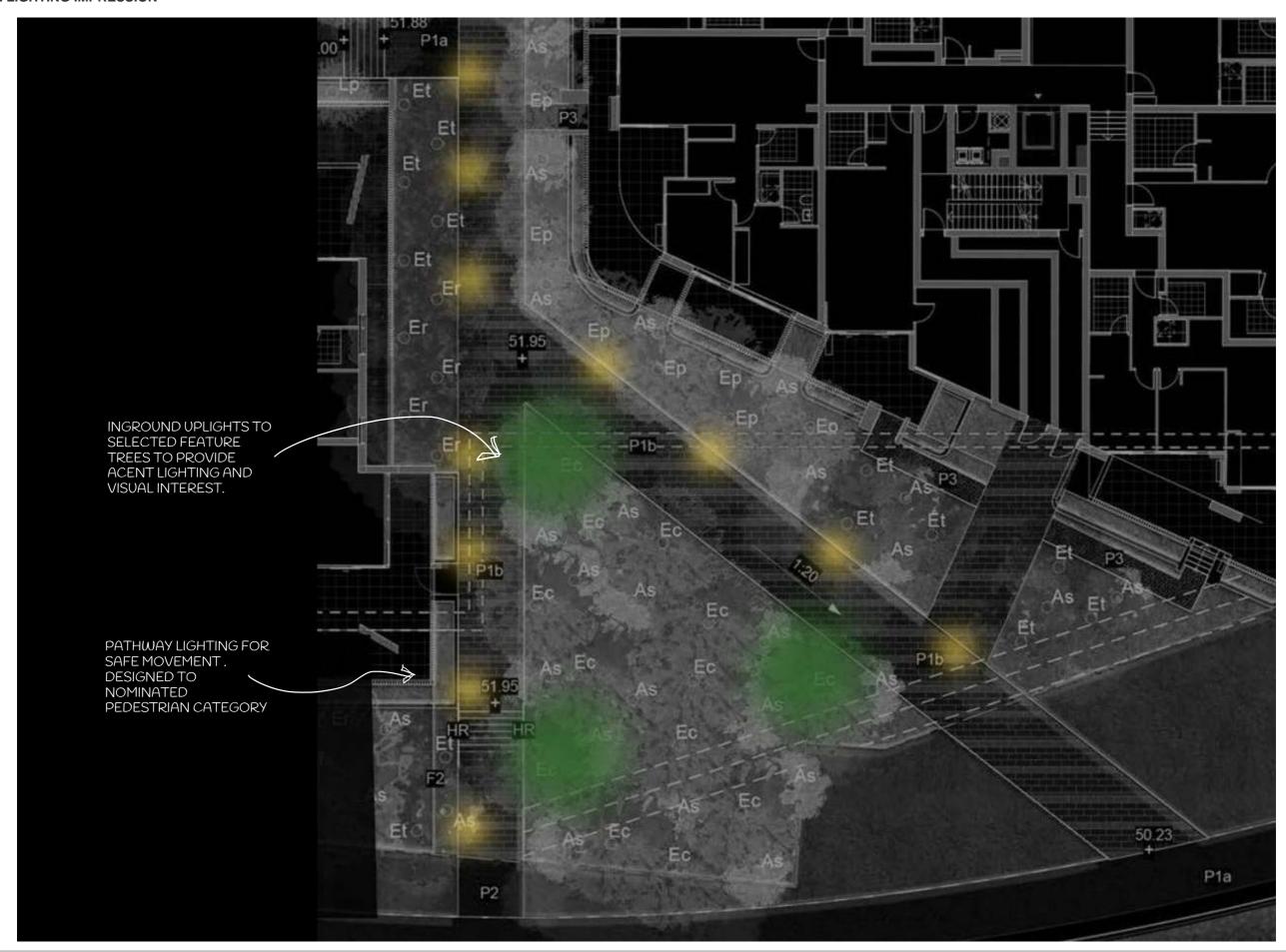
KEY PLAN



MOOD IMAGES



INDICATIVE LIGHTING IMPRESSION







LIGHTING TYPOLOGIES



B - BOLLARD, LOW LEVEL PATHWAY LIGHTING



U - RECESSED INGROUND UPLIGHTS TO PLANTING



- 1. Lighting to provide enough illuminance for safe movement for pedestrians.
- 2. Lighting to be conscious of the obtrusive effects into residential dwellings as well as pedestrians
- 3. Lighting to increase visual interest as well as the prestige of landscape as well as assist in way finding.



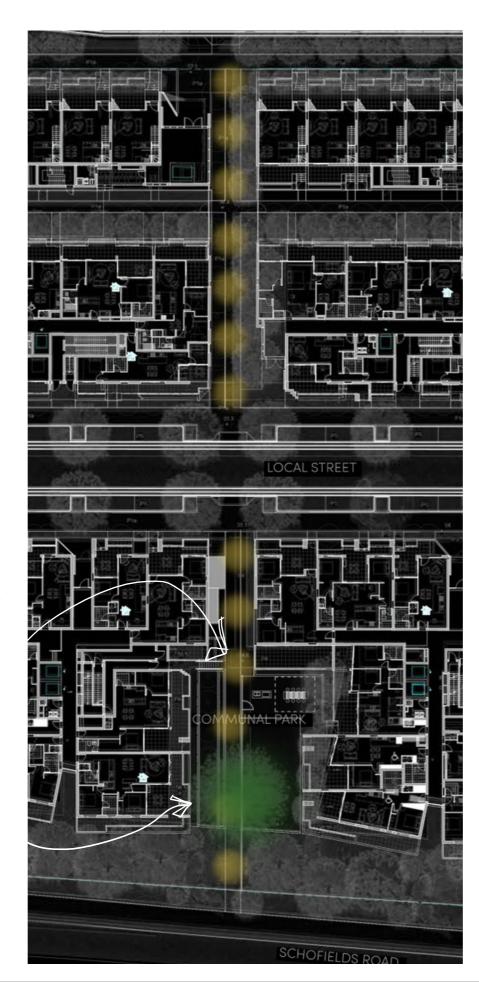
KEY PLAN



MOOD IMAGES

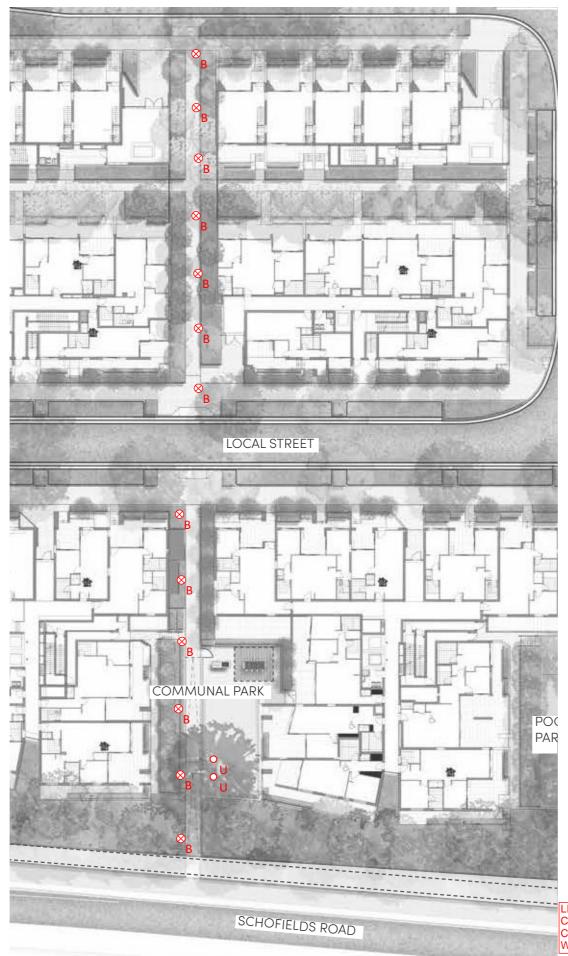


INDICATIVE LIGHTING IMPRESSION



PATHWAY LIGHTING FOR SAFE MOVEMENT. DESIGNED TO NOMINATED PEDESTRIAN CATEGORY

INGROUND UPLIGHTS TO SELECTED FEATURE TREES TO PROVIDE ACENT LIGHTING AND VISUAL INTEREST.



LIGHTING TYPOLOGIES



B - BOLLARD, LOW LEVEL PATHWAY LIGHTING



U - RECESSED INGROUND UPLIGHTS TO PLANTING

LIGHTING CONNECTIONS AND CONTROL WILL BE FROM THE COUNCIL SWITCHBOARD LOCATED WITHIN THE SOUTHERN PLAZA.

STREETLIGHT CONCEPT