

Combined Multi-Trades and Digital Technology Hub + Multi Storey Carpark

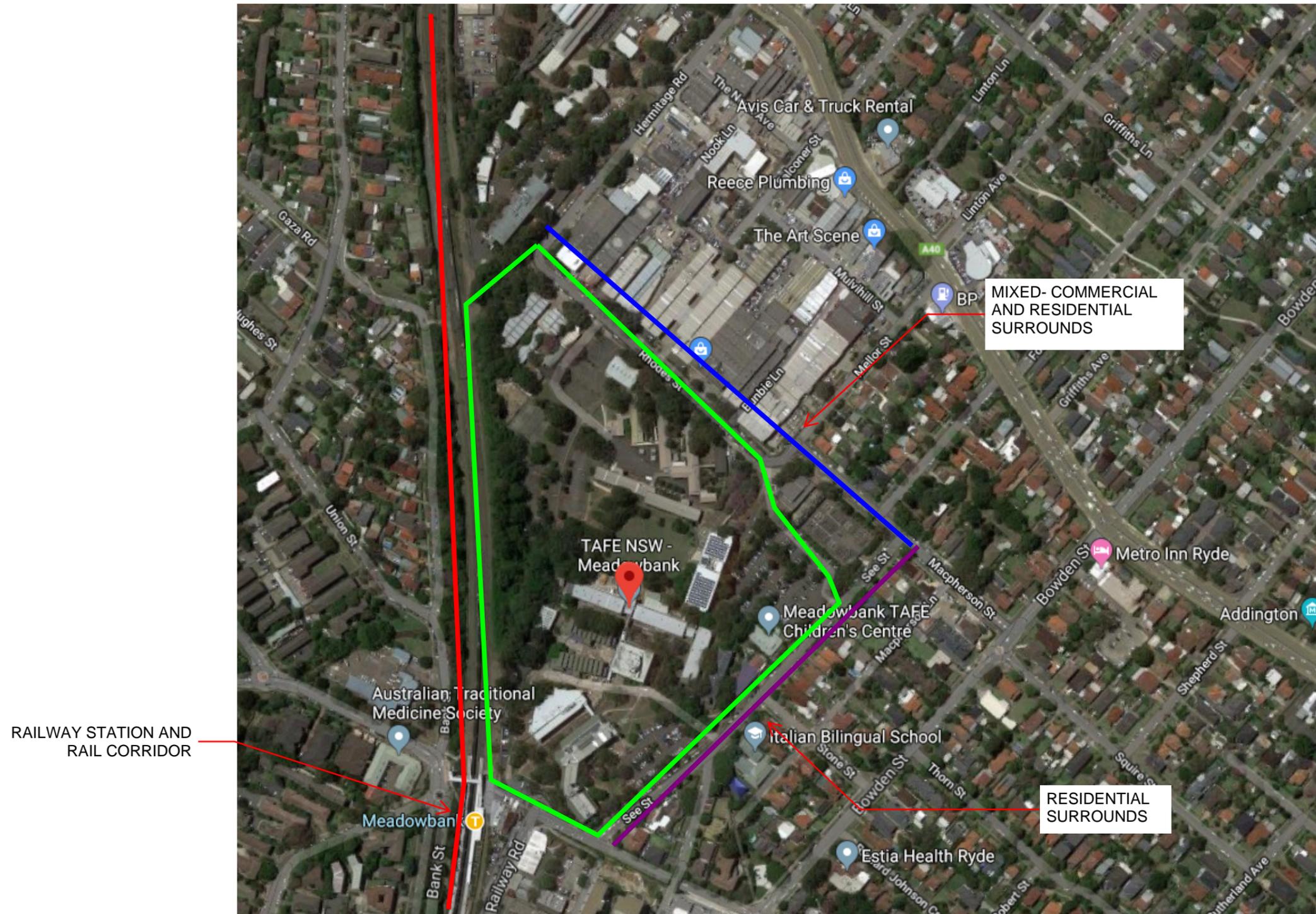
# EXTERNAL LIGHTING + MULTI STOREY CARPARK LIGHTING DESIGN PRINCIPLES

SPECIALIST LIGHTING REPORT

20.04.2020 REV D

# EXTERNAL LIGHTING

# SITE SURROUNDS STUDY



Lighting design aims to reduce adverse effects to nearby residents e.g. hotels, houses, hospitals, users of adjacent roads- vehicle drivers, pedestrians cyclists, transport signalling systems- air, rail and marine and astronomical observations venues

# PROPOSED EXTERNAL LIGHTING

We anticipate the development exterior lighting is likely to be required to the areas listed below. The proposed lighting may include general landscape lighting, P-category pedestrian lighting, façade lighting and potential security lighting to the following areas;

- Street Entrance

The street entrance may include subtle illumination of Welcome signage. The driveway may consist of pole lighting or low level bollard lighting leading to the carpark to facilitate safe pedestrian and vehicular movement. For any use of light poles, the placement shall be positioned facing away from residential properties to provide the required illumination to the road set out in AS/NZS 1158(2010) Lighting for Roads and Public Spaces with minimum light spill to adjacent properties. As such, subsequent assessment shall be undertaken to ensure that lighting in this area is not providing a nuisance to neighbouring properties, and is compliant with AS4282.

- Landscaped Areas

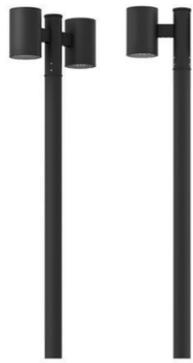
For landscape lighting will include low level intimate lighting concealed into the planting and urban fabric.

- Building Facade

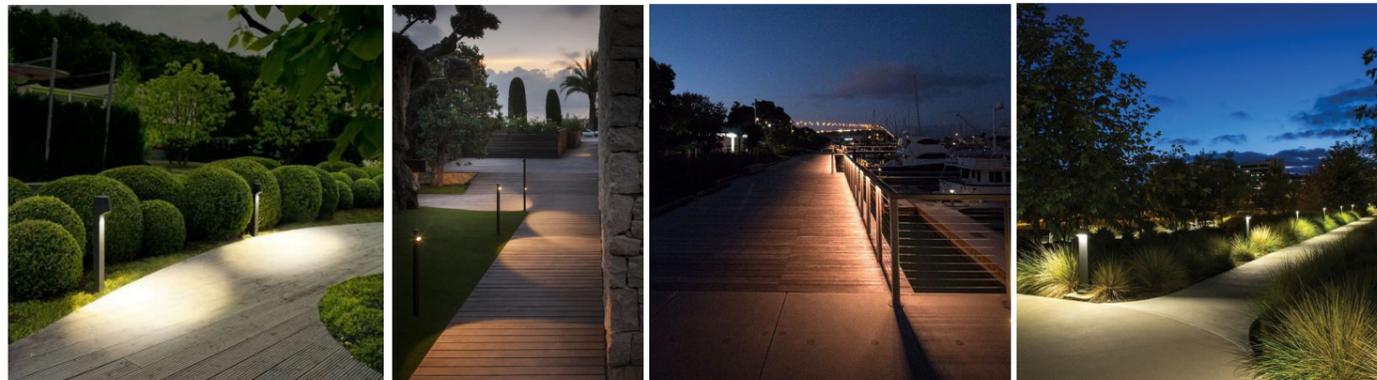
For facade lighting, should up-lighting be required- it will be rationalised and focused onto architectural surfaces thereby minimising spill onto the night skies. The use of luminaire accessories will be used to reduce and manage spill light and contain the effect within the building fabric.

# TYOLOGIES

## POST TOP LUMINAIRES



## BOLLARDS



## ACCENT LIGHTING



### Luminaire Specification

As part of the proposed lighting design careful selection of luminaires will aid in minimising the effects of obtrusive lighting. Below is a summary of the proposed minimum specification requirements for minimising the effects of obtrusive lighting;

- Specification of luminaires to ensure that appropriate products are specified.
- Ensure appropriate location position and aiming of luminaires to reduce spill light and glare including lenses, optics, distribution, CCT and glare accessories.
- Use specifically designed lighting equipment that will minimise the upward spread of light near or above the horizontal plane. The most sensitive/critical zones for minimising upward lighting are between 90 degree and 100 degree.
- Upward lighting ratio should not be more than 3%.
- Whilst a detailed lighting design has not yet been proposed for the lighting installation it is understood that where applicable, light fixtures will include relatively low level LED luminaires to avoid flood or broad area high intensity lighting where it's not required.
- Specification to comply with requirements set out in AS4282:2019 standards

### Installation

- Keep glare to a minimum by ensuring that the main beam angle of all lights is directed towards any potential observer is not more than 70 degree. Higher mounting heights allow lower main beam angles, which can assist in reducing glare. In areas with low ambient lighting levels glare can be very obtrusive and extra care should be taken when positioning and aiming lighting equipment.
- Specification to comply with requirements set out in AS4282:2019 standards
- Comply with the requirements to control glare and keep threshold increment within the standards as defined in AS4282 for the safety of road users.
- When lighting vertical structures direct light downwards wherever possible. If there is no alternative to up-lighting, the use of shields, baffles and louvres will help reduce spill light around and over the structure.
- For Road lighting installations light near to and above horizontal should normally be minimised to reduce glare and keep upward light ratio at less than 3%.
- Where an area is to be illuminated and this area lies on the boundary of two zones, the obtrusive light limitation values used should be those applicable to the most rigorous zone. Where lighting is required adjacent to residential locations the use of shields, baffles and louvres will help reduce spill light.

# EXTERNAL LIGHTING METHODOLOGY

## OUTDOOR WORKSHOPS



Short term handling of large units and raw materials, loading and unloading of solid bulk goods or continuous handling of large units and raw materials, loading and unloading of freight, lifting and descending location for cranes, open loading platforms. The illumination strategies to the outdoor workshop spaces will assist in creating a functional outdoor environment after-hours and in low lighting conditions. Special consideration will be applied to eliminate glare and shadowing around task areas. Lighting treatments to improve surface illumination will be explored.

## ARCHITECTURE PORTAL



Utilise spot up-lights and/or linear luminaires to highlight the building, provide a strong geometry statement and framing views while keeping glare to a minimum and avoiding spill lights over to the neighbouring areas.

# EXTERNAL LIGHTING METHODOLOGY

## LANDSCAPE LIGHTING



The landscape lighting design will provide external ambiance to the surroundings, visibility to its users for way finding but also potential social activities that may occur before and after sessions held within the building. In order to create these opportunities, the external lighting will allow for pockets of light in areas that create a space that is inviting but will also allow a sense of security for the users.

## FACADE LIGHTING



The lighting intent for the façade is to highlight the architectural form in a subtle but considerate way, giving it an inviting night-time presence while maintaining a sophisticated aesthetic. This requires ambient lighting in the surrounding environment and accent lighting to highlight architectural features. E.g. Awnings. All light sources will be directional and as concealed as possible to achieve low glare and designed in accordance with AS4282 the Australian standard for obtrusive light recommendations.

# EXTERNAL LIGHTING METHODOLOGY

## SUMMARY

External lighting will be LED type light sources. Lighting will be controlled via a combination of photo electric cells and timers, control system with a manual override control. Light fittings are to be provided with a finish to the Architect's colour scheme requirements. Only low-level safety lighting will be allowed for.

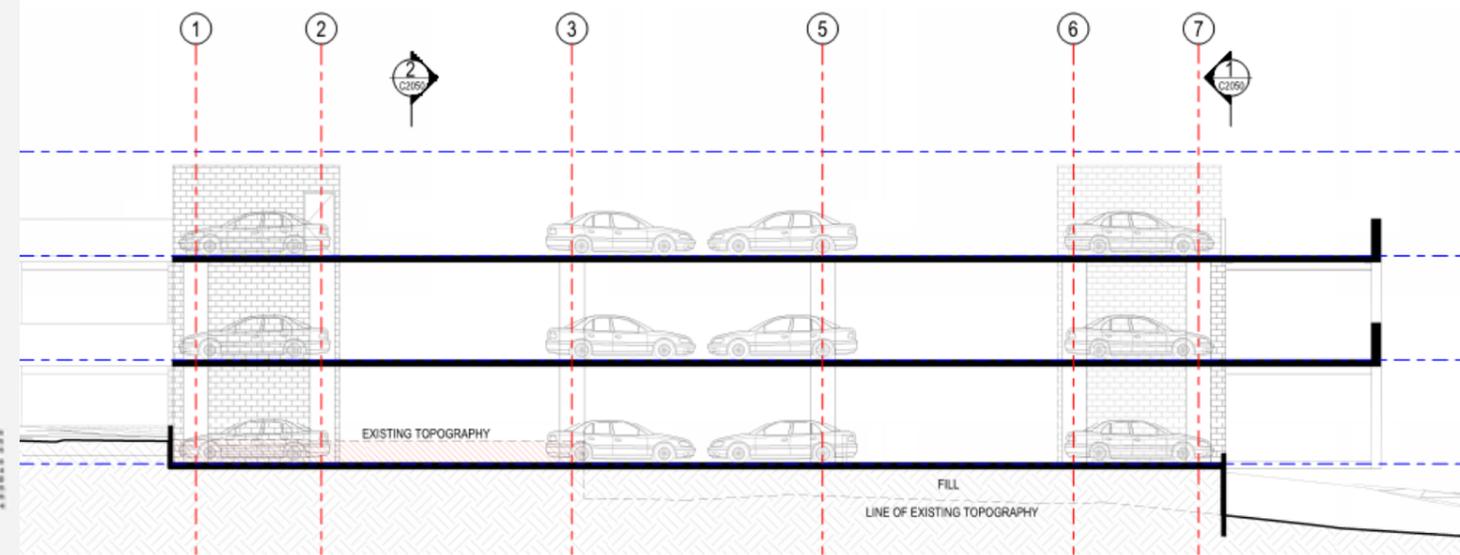
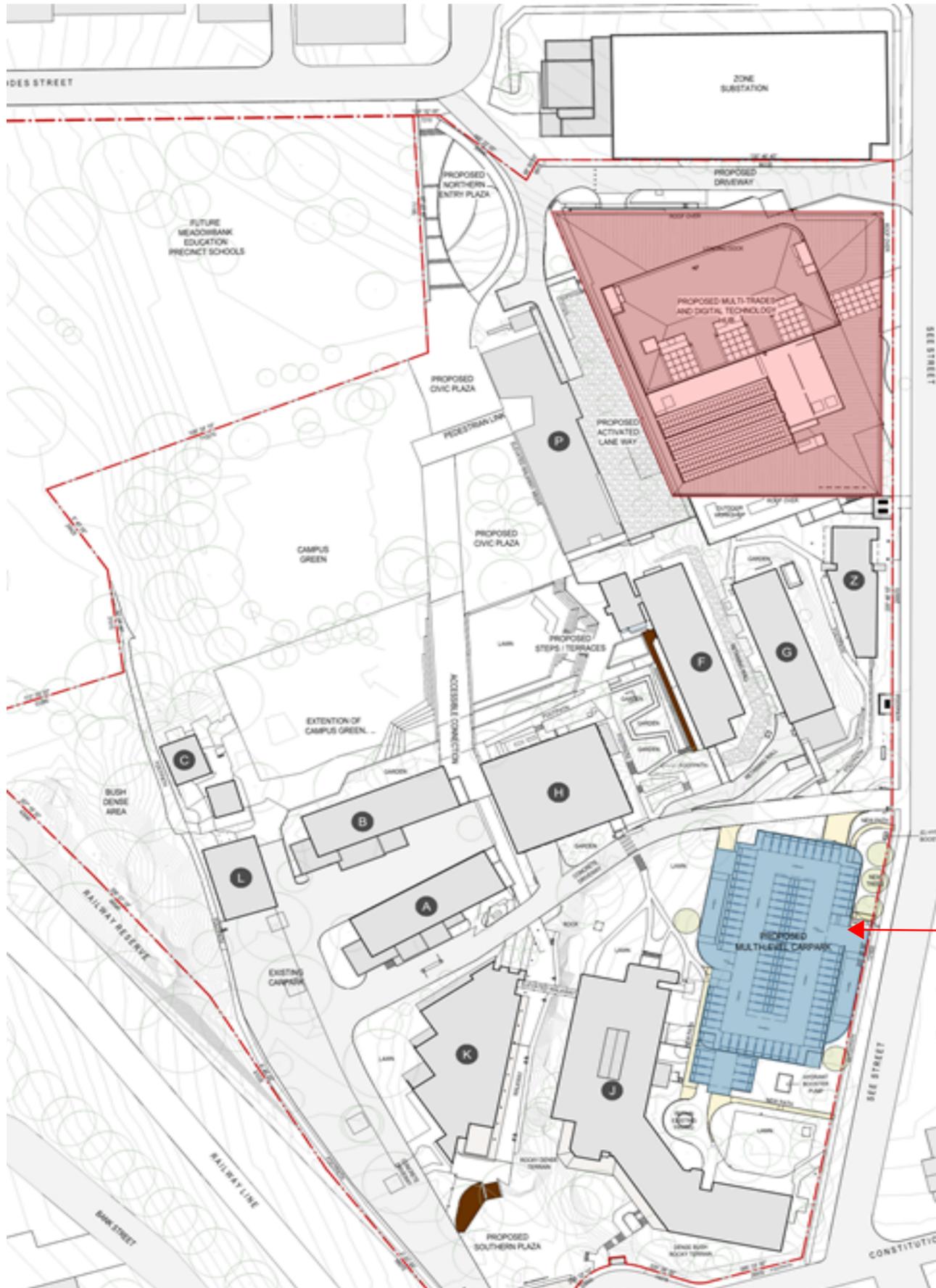
Lighting will generally be low height, low intensity and discreetly positioned so as to avoid spill lighting and compliance with AS1158.1 and AS4282.

Obtrusive lighting will be carefully considered during the external lighting design to ensure compliance with AS4282 and to minimize any spill onto neighbours or to the night sky.

JHA understand the sensitivity of the residential neighbours as such will consider obtrusive lighting with care.

# MULTI STOREY CARPARK LIGHTING

# MULTI STOREY CARPARK



PROPOSED MULTI STOREY CARPARK

Lighting design of the proposed multi storey carpark aims to reduce adverse effects to nearby residents and ensure that the vehicle drivers have a smooth transition from the high external illuminance to the lower illuminances within the interior to the carpark.

# PROPOSED MULTI STOREY CARPARK LIGHTING

All luminaires within the multi storey carpark development are proposed to be LED type, utilising high colour rendering (colour corrected) lamps for enhanced lighting output and quality. All the luminaires will have 4000K colour temperature. All lighting shall generally be designed to comply with the requirements of AS1680. The proposed lighting may include general lighting, P-category pedestrian lighting, façade lighting and potential security lighting to the following areas;

- Street Lighting

The driveway leading towards the multi storey carpark may consist of pole lighting or low level bollard lighting to facilitate safe pedestrian and vehicular movement. For any use of light poles, the placement shall be positioned facing away from residential properties to provide the required illumination to the road set out in AS/NZS 1158(2010) Lighting for Roads and Public Spaces with minimum light spill to adjacent properties. As such, subsequent assessment shall be undertaken to ensure that lighting in this area is not providing a nuisance to neighbouring properties, and is compliant with AS4282.

- Carpark Entrances

The first 15 meters of the carpark entrance may consist of low bay lighting in order to achieve a minimum of 800lux during daytime to facilitate adaptation of drivers from high external illuminances. The next 4 meters of the carpark entrance may consist of low bay lighting or linear lights to achieve a minimum of 160lux. This enhanced entry lighting provides a transition for vehicle drivers to the lower illuminances within the interior of the carpark. During night time, the enhanced entry lighting within the carpark entrance shall automatically be reduced by dimming the luminaires down to 160lux.

- Interior of the carpark

Interior of the carpark including but not limited to the parking spaces, aisles, ramps, circulating roads and pedestrian crossings may consist of linear lighting or batten lighting to achieve a minimum of 40lux.

- Building Facade

For facade lighting, should up-lighting be required- it will be rationalised and focused onto architectural surfaces thereby minimising spill onto the night skies. The use of luminaire accessories will be used to reduce and manage spill light and contain the effect within the building fabric.

## TYOLOGIES

### STREET LIGHTING



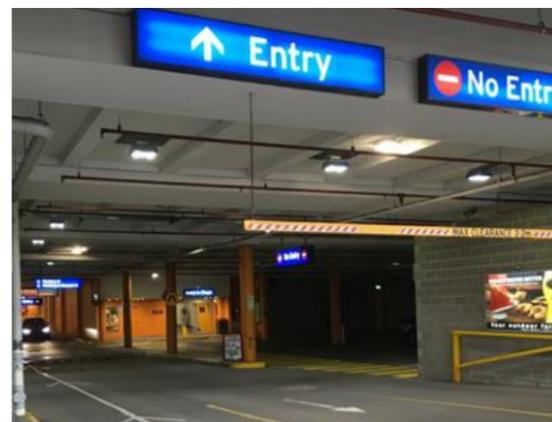
POLE LIGHTING



BOLLARD LIGHTING

### CARPARK ENTRANCES

LOW BAY LIGHTS

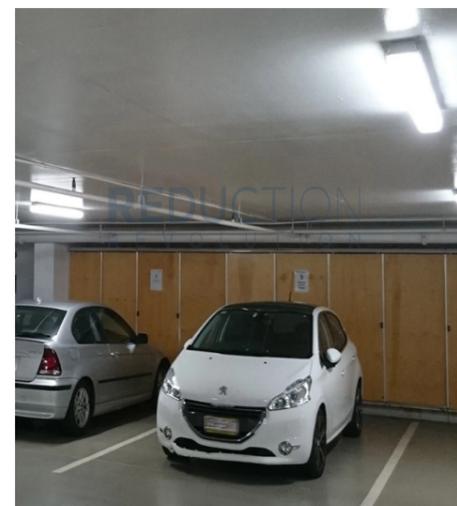


### INTERIOR OF CARPARK

LINEAR LIGHTS



BATTEN LIGHTS



### Luminaire Specification

As part of the proposed lighting design careful selection of luminaires will aid in minimising the effects of obtrusive lighting yet create a safe and comfortable environment for the users.

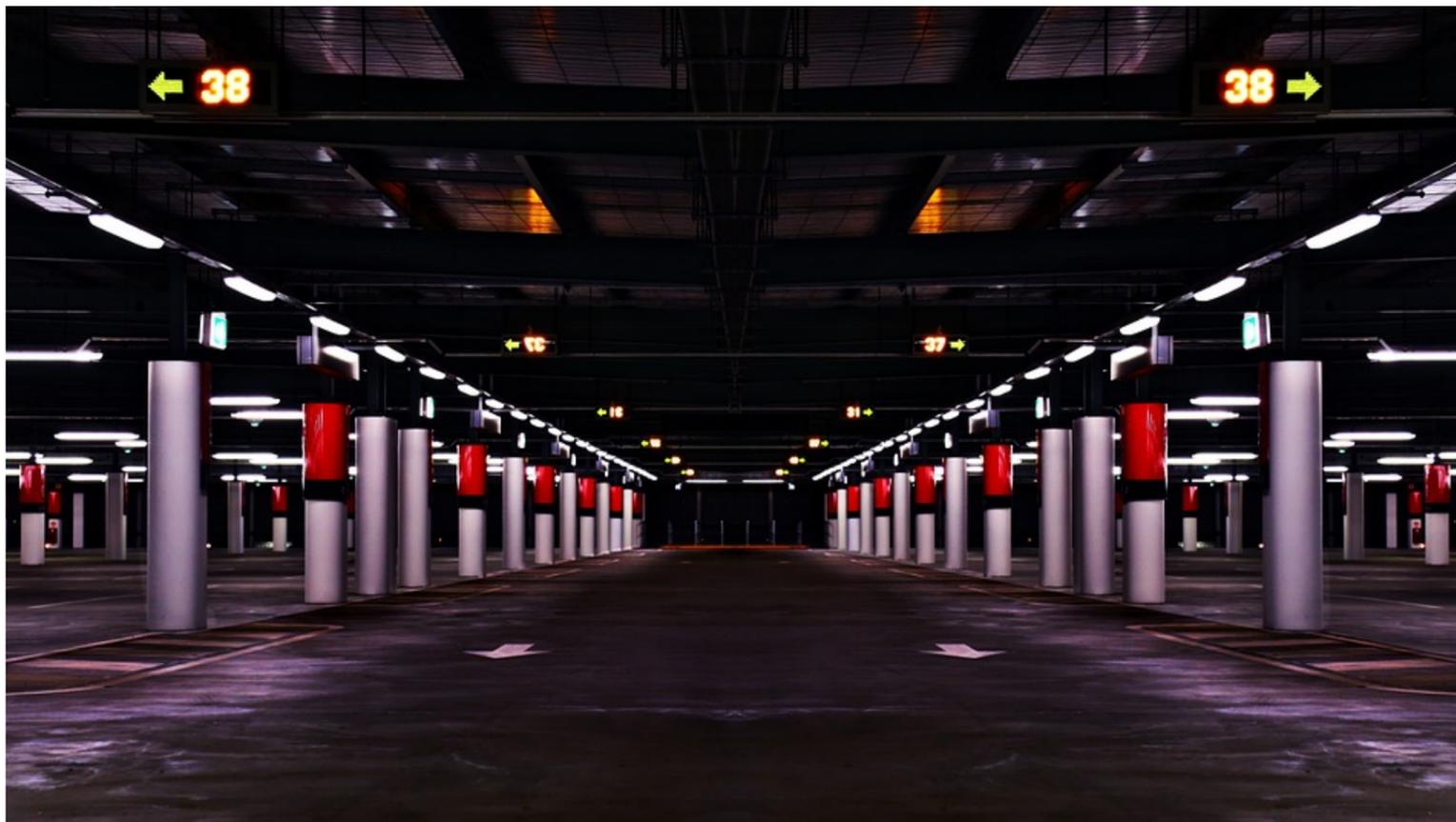
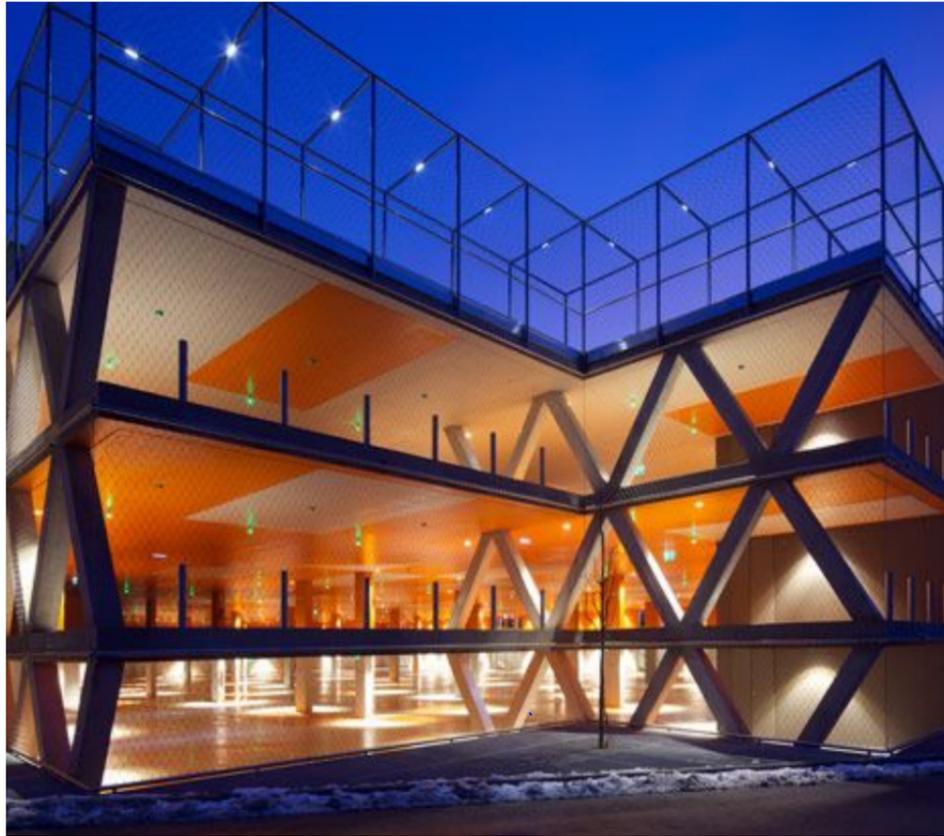
Below is a summary of the proposed minimum specification requirements for minimising the effects of obtrusive lighting;

- Specification of luminaires to ensure that appropriate products are specified.
- Ensure appropriate location position and aiming of luminaires to reduce spill light and glare including lenses, optics, distribution, CCT and glare accessories.
- Use specifically designed lighting equipment that will minimise the upward spread of light near or above the horizontal plane. The most sensitive/critical zones for minimising upward lighting are between 90 degree and 100 degree.
- Upward lighting ratio should not be more than 3%.
- Whilst a detailed lighting design has not yet been proposed for the lighting installation it is understood that where applicable, light fixtures will include relatively low level LED luminaires to avoid flood or broad area high intensity lighting where it's not required.
- Specification to comply with requirements set out in AS4282:2019 standards

### Installation

- Keep glare to a minimum by ensuring that the main beam angle of all lights is directed towards any potential observer is not more than 70 degree. Higher mounting heights allow lower main beam angles, which can assist in reducing glare. In areas with low ambient lighting levels glare can be very obtrusive and extra care should be taken when positioning and aiming lighting equipment.
  - Specification to comply with requirements set out in AS4282:2019 standards
  - Comply with the requirements to control glare and keep threshold increment within the standards as defined in AS4282 for the safety of road users.
  - When lighting vertical structures direct light downwards wherever possible. If there is no alternative to up-lighting, the use of shields, baffles and louvres will help reduce spill light around and over the structure.
  - For Road lighting installations light near to and above horizontal should normally be minimised to reduce glare and keep upward light ratio at less than 3%.
  - Where an area is to be illuminated and this area lies on the boundary of two zones, the obtrusive light limitation values used should be those applicable to the most rigorous zone.
- Where lighting is required adjacent to residential locations the use of shields, baffles and louvres will help reduce spill light.

# MULTI STOREY CARPARK METHODOLOGY



The illumination strategies to the multi storey carpark will assist in creating a safe environment for the users, ensuring users feel safe leaving their cars within the carpark while using the TAFE facilities, attending classes etc. The illumination strategies will also ensure the carpark is lit to avoid crimes and vandalism from happening. Special consideration will be applied to eliminate glare and shadowing throughout the carpark. Lighting treatments to improve surface illumination will be explored.

Utilise spot up-lights and/or linear luminaires to highlight the building, provide a strong geometry statement and framing views while keeping glare to a minimum and avoiding spill lights over to the neighbouring areas.

# MULTI STOREY CARPARK LIGHTING METHODOLOGY

## SUMMARY

The multi storey carpark lighting will be LED type light sources complete with weatherproof and vandal resistant luminaires. Lighting will be controlled via time clock and occupancy sensors. Outside the time clock zone, the occupancy sensors will switch on relevant lighting zones for a predetermined time (30min-2hours) before the lights are switched off automatically. 24 hour lights during unoccupied hours will dim to 50% where possible with minimum safety lighting requirements being met at all times. Light fittings are to be provided with a finish to the Architect's colour scheme requirements.

Street lighting will generally be low height, low intensity and discreetly positioned so as to avoid spill lighting and compliance with AS1158.1 and AS4282.

Obtrusive lighting will be carefully considered during designing the lights to the facade of the building to ensure compliance with AS4282 and to minimize any spill onto neighbours or to the night sky.

JHA understand the sensitivity of the residential neighbours as such will consider obtrusive lighting with care.