

# Milltown Park, Sandford Road, Dublin 6

Design Book 10 - Lighting Report

PTL - 762

August 2021

**Pritchard Themis**

38 Bocking Street  
London E8 3FP

## Site Awareness



*Example of residential development in parkland - Marga in Senftenberg Brieske Garden City, Brandenburg*

The site sits within a very leafy residential area of Dublin and in many ways will remain parkland - part of a green world of trees, lawns and playing fields that define the area. The site is currently closed to the public and will be opened up for the public to utilise.

As we approach the lighting design we have been cognisant of this fact and look for the right balance between the need for freshness and efficiency and the desire to find commonality with the surrounding community.

All lighting has been designed in accordance with the environment zone classifications set out in the Institute of Lighting Professionals Guidance and the associated illuminance levels from the European Standards EN: 13201-2.

## Ecology Considerations 1

The ecological impact on the site and its inhabitants has been taken into consideration, with specific reference to the protection of the bats and the impact artificial lighting can have on their habitats. With a residential development comes the need for artificial light but mitigation measures will be taken to minimise the effect lighting will have, the site can be considered with different levels of zoning, including having dark zones to create a corridor for commuting and foraging bats.

Light sources and equipment will be selected to meet specific recommendations from the CIBSE Bats & Lighting in the UK - Bats and the Built Environment series Guidance Note 08/18.

To maximise tolerability to bats, light sources will be UV free LED sources and have a colour temperature no higher than 3000K and peak wavelength greater than 550nm.

Lighting equipment specification will have to meet optical requirements to ensure controlled optical control with no upward light spill:

- Street lighting will be flat glass with full cut-off with no upward light component.
- Pedestrian amenity fittings with angled projectors will be fitted with cowls to avoid upward lighting.
- Bollards will all have downward light distribution.
- Feature lighting of buildings and trees will be limited and be set to turn off at an agreed curfew time in the evenings no later than 10:30pm all year round. Lighting in the formal garden area behind the chapel will be set to turn off at this curfew during summer months May to September inclusive.
- All upward light sources will be fitted with baffles to control the unwanted upward light spill.

Timer controls will switch on lighting at the appropriate time during hours of darkness, but ensure adherence to curfews where required.

The lighting designers responsible for the internal lighting will be required to design a sensitive lighting scheme to ensure internal light spill from the interiors of the proposed buildings via windows/entrances along the buffer zone as per Figure 1 will be minimised through selective lighting measures, such as fittings set back into the room as per Figure 3 taken from Internal Lighting Guidance Diagram adapted from ILP (2018).

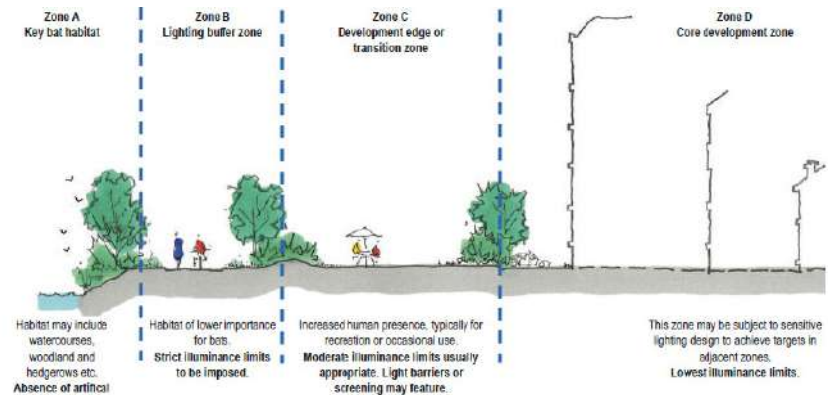


Figure 1. Example of illuminance limit zonation - ILP Guidance note 08/18 Bats and artificial lighting in the UK

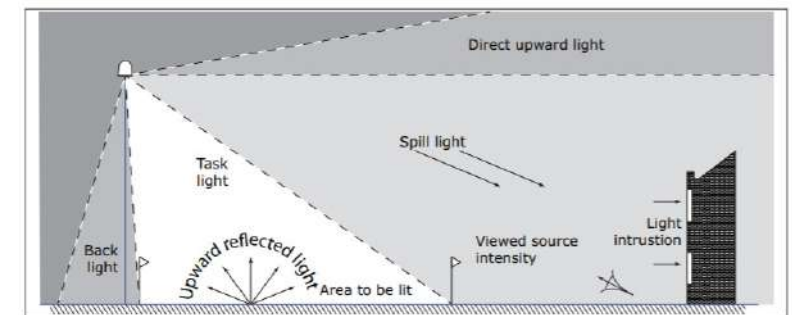


Figure 2. Types of Obtrusive light - ILP Guidance note 01/21 The reduction of obtrusive light

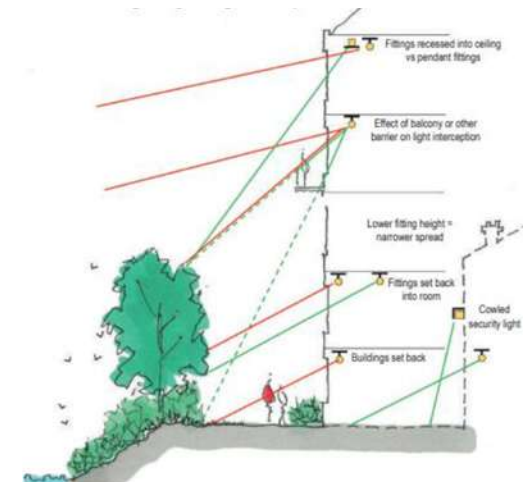


Figure 3. Internal lighting mitigation options - ILP Guidance note 08/18 Bats and artificial lighting in the UK



## Ecology Considerations 2

Working closely with JBA Consulting we have designed the exterior lighting to acknowledge and support the bat ecology zoning that has been defined, following the recommendation outlined in Chapter 8.0 Biodiversity of EIAR, completed by JBA Consulting, the project ecologist.

The design avoids putting any lighting in the key bat habitat Dark Zone areas and has limited any lighting within buffer zones to amenity lighting only with no upward glow component. The preserve wildflower garden to the west of Tabor House will have all lighting within it turned off during the summer months.

Light fittings in the buffer zones will have lower output levels pre-set within the drivers to ensure levels comply with the lower lux levels required. These levels shall still be acceptable for any road or pathway that they light and still in compliance with the levels and band of performance defined for such areas in standard EN: 13201-2.



JBA Consulting plan outlining dark zones and buffer zones across the site. The Pritchard Themis lighting design adheres to this survey with Dark Zone areas kept dark at night and buffer zones operating with a lower level of lighting than other vehicular and pedestrian routes.

### Colour Temperature - New and Existing



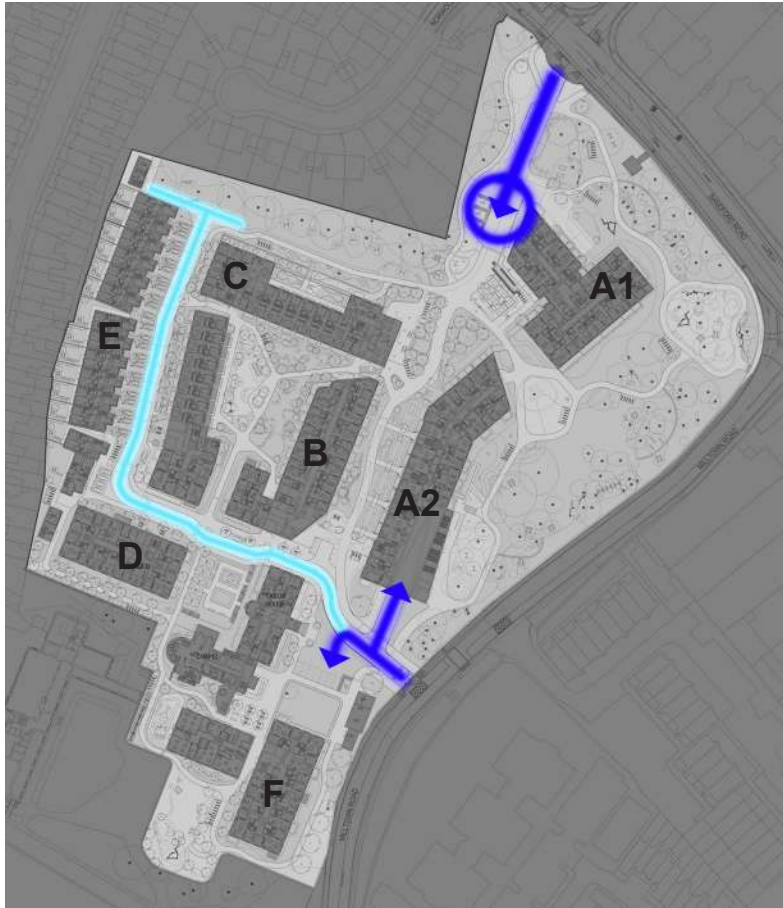
Current street lighting surrounding the site is warm and suburban in scale. It is mostly still sodium and metal halide sources set at a height of 6-8 metres. It would be important to retain this quality of warmth into the site, albeit using a more efficient and better colour rendering LED source.

A warm white light source with a colour temperature of 3000 Kelvin and good colour rendering will be the ideal solution as this creates a welcoming and comfortable environment for a residential area.





## Streets Hierarchy - Vehicular Routes

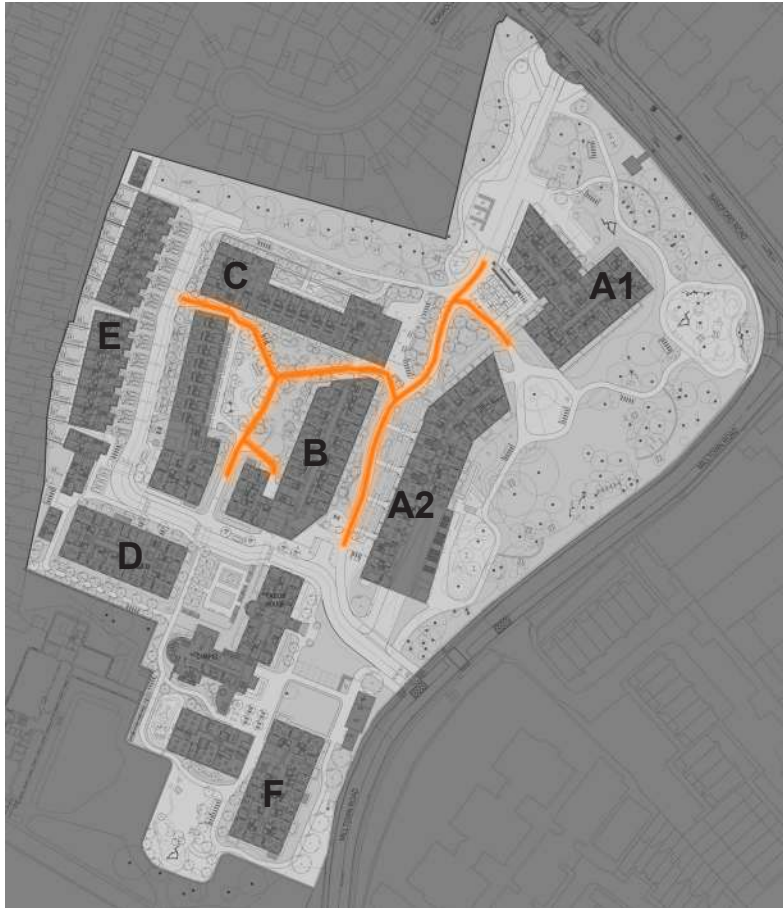


The main traffic routes in the site will be lit by a column mounted luminaire with a good road lighting optic, providing a functional and uniformly lit route into and around the site.

Columns will be 6 metres high, with a warm white LED light source. Luminaires will be selected for their efficiency, optics and glare control to ensure road lighting is lit to lux levels suitable for a vehicular road within a residential development. Lighting levels will be higher along the entrance approach roads, marked in dark blue. This will emphasise the higher vehicular numbers in these areas as cars enter the site to access the underground car park and taxi drop off for visitors, for example.



### Streets Hierarchy - Primary Pedestrian Route



The central pedestrian route, plaza & central courtyard need a focus of light that sets them at the scheme's heart; a celebration route that links the site's recreational centres.

A 6 metre high multi-head column, using controlled and cowled optics, will define the main areas of the route. The quality of light from controlled optics is more specific than the uniform light a roadway would require and the effect is to make the pathway read as a more enhanced route for the pedestrians and to specifically brighten key stopping areas. The use of low level lighting bollards light pathway entrances to houses, creating a hierarchy of lighting. Lighting levels shall comply with requirements set out by DAC consultant from TGD Part M or BS8300.





## Undercroft Illumination

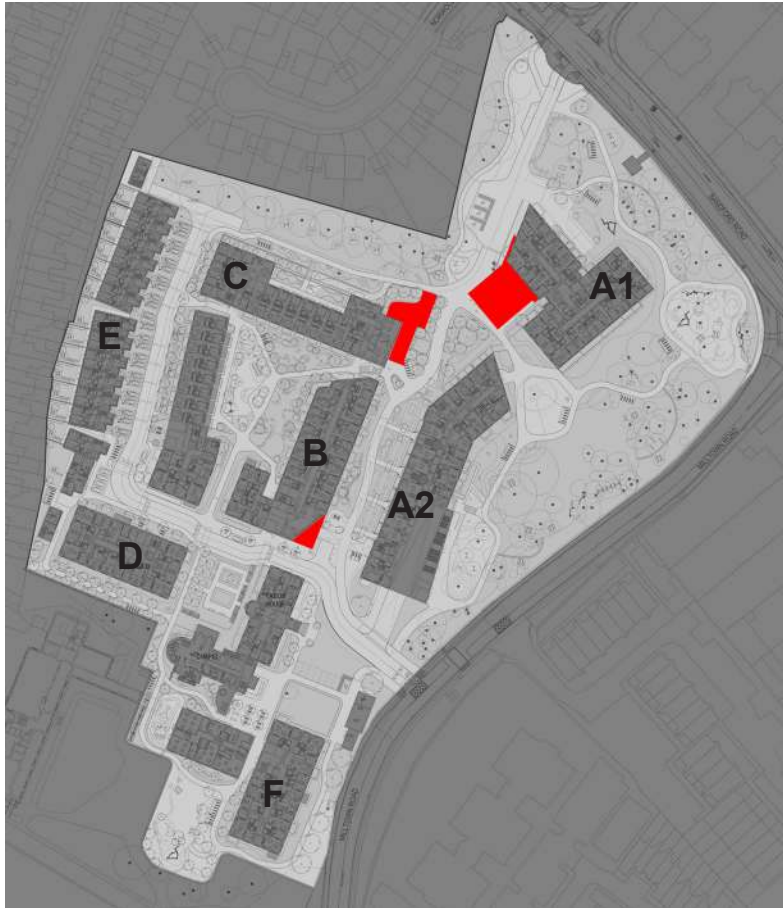


The undercrofts of the buildings are lit to provide bright and safe routes for the pedestrians. They also provide a good opportunity as features that can be lit without being distracting to residents within the development.

In certain instances key walls and soffits will be highlighted to enhance their distinct elements: In the Block A undercroft it will be the columns that are highlighted with downlights set in close to their surfaces; under Block C the green wall is washlit.

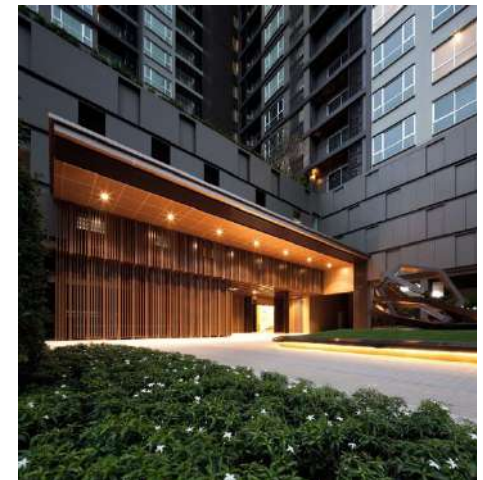


## Resident's Outside Areas

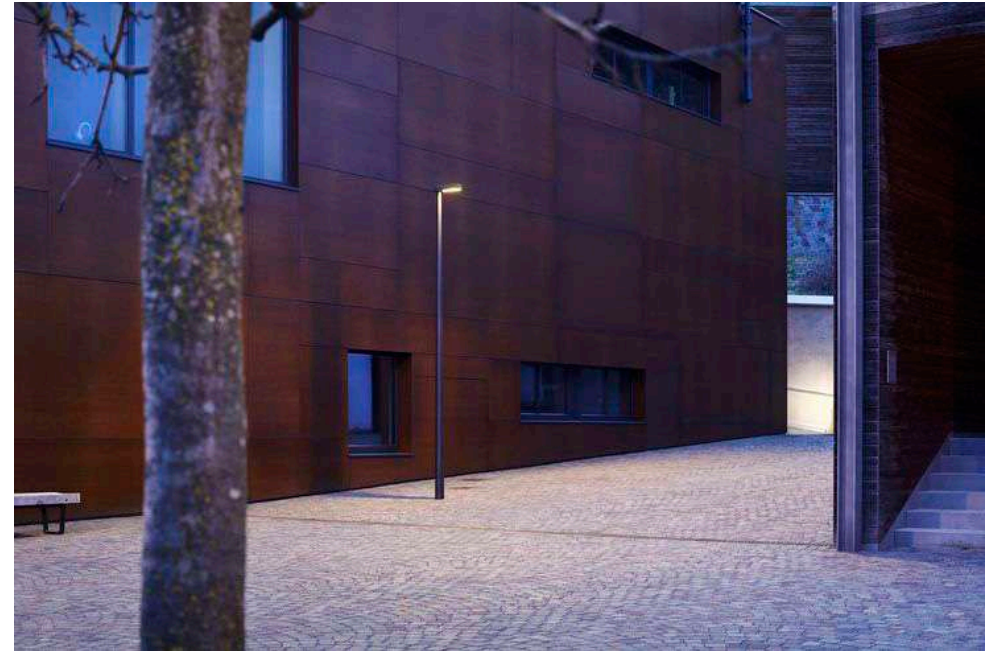


At three key external residents' areas the lighting works to create increased definition. This will involve both an additional level of light from high quality downlighting sources but also zone specific enhancements such as uplighting of column features seating lighting details.

At the Block A zone a decorative grid of lighting, suspended within the canopy of the trees, extends the lounge space out into the landscape.



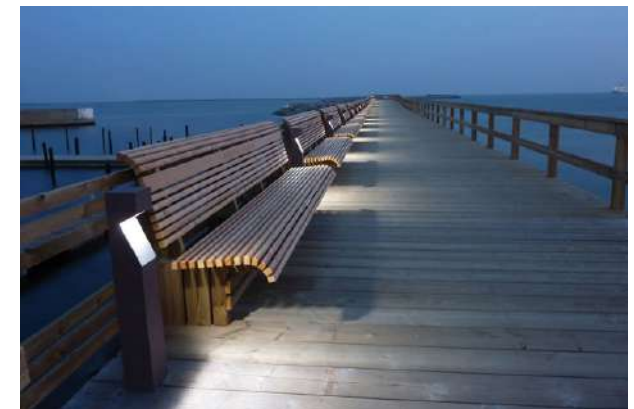
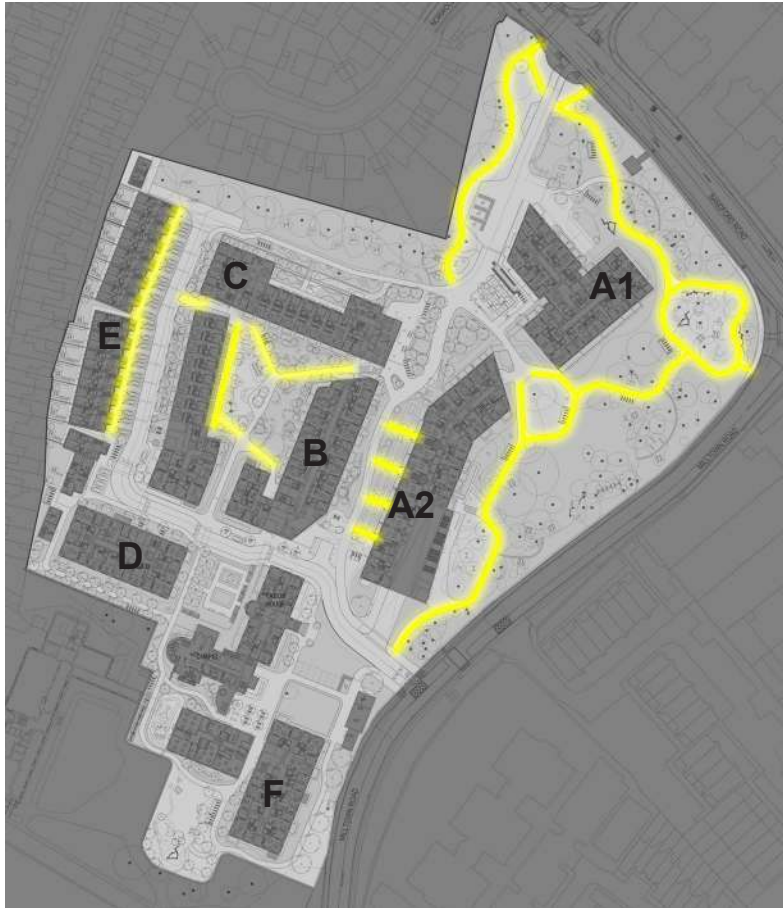
Streets Hierarchy - Secondary Pedestrian Routes - Amenity Columns



Along secondary pedestrian pathways a shorter, 4 metre high column provides illumination to key access points within the site. In areas to the south of the site, where ecology buffer zones are crossed by these paths, lights will be set with lower outputs to provide for the lower lux levels required. Lighting levels shall comply with requirements set out by DAC consultant from TGD Part M or BS8300.



## Streets Hierarchy - Pedestrian Routes - Bollards



Where more informal play areas or quieter routes through the trees need identification at night, without specific sustained light levels, a bollard will be used to set out pools of light around these areas. Any areas where ecology buffer zones are crossed by these paths will have bollards with lower outputs and lower set drivers to provide for the lower lux levels required.

Certain entrance points to buildings are also marked out with the light from a bollard.

## Handrails to Stairs & Ramps



Certain stairs and ramps for pedestrian use will have an additional handrail lighting detail to provide both increased illumination but also as a way-finding enhancement.

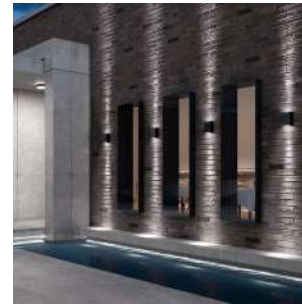
Any light source would be designed to light downwards and would provide a soft and uniform quality of light. Lighting levels shall comply with requirements set out by DAC consultant from TGD Part M or BS8300.



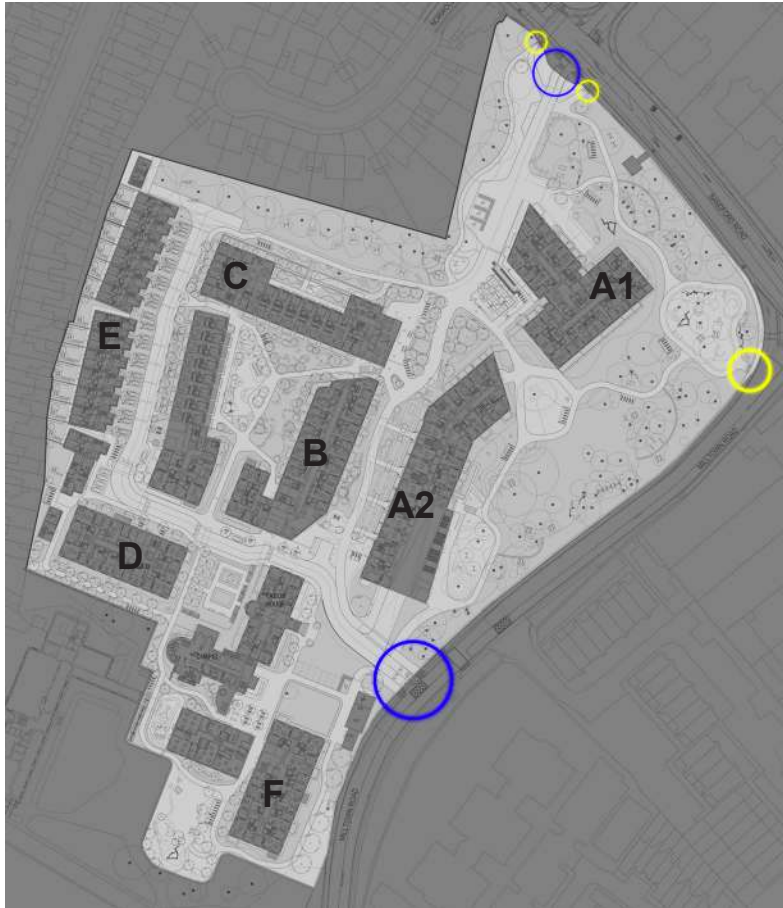
## Heritage Zone



A heritage zone is identified where specific existing buildings will want to be gently highlighted and any amenity lighting close to these sites will want a more historic feel. This lighting, around Tabor House and the Chapel, will be sympathetic to the age and look of the zone with appropriately sourced lanterns and building mounted up/down lighting fittings. Any lighting of the buildings themselves will be close in to minimise any risk of glare into rooms, bearing in mind that Tabor House is residential.



## Entrance Gates



The entrances into the site will be lit with downlighting either side of the gateway.

This treatment would be at both main traffic route entrances, the pedestrian entrances flanking the Sandford Road vehicular entrance, and on the pedestrian-only entrance to the north-east of the site as well.



## Landscape Lighting Interventions - Trees & Planting

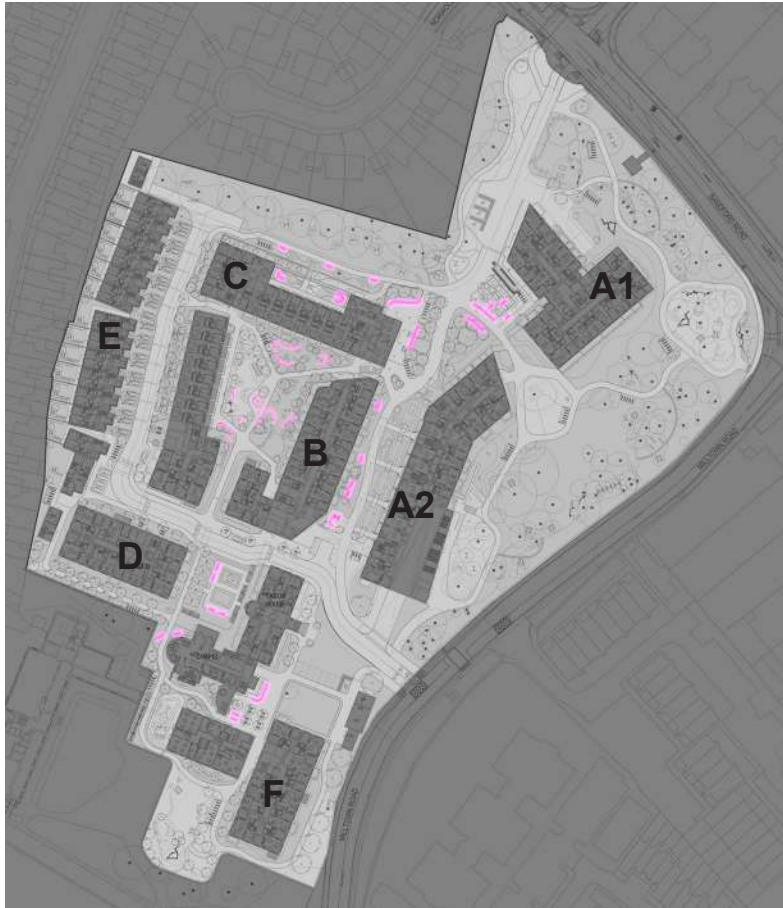


To celebrate the landscaped areas of the site selected trees within the core of the site will be uplit by ground recessed fittings fitted with louvres and glare guards to mitigate light spill.

Trees will be picked out at key points on the site, but not in the dark zones or buffer zones prescribed by the project ecologist. Lighting of the trees will be set to switch off at the 10.30pm curfew time.



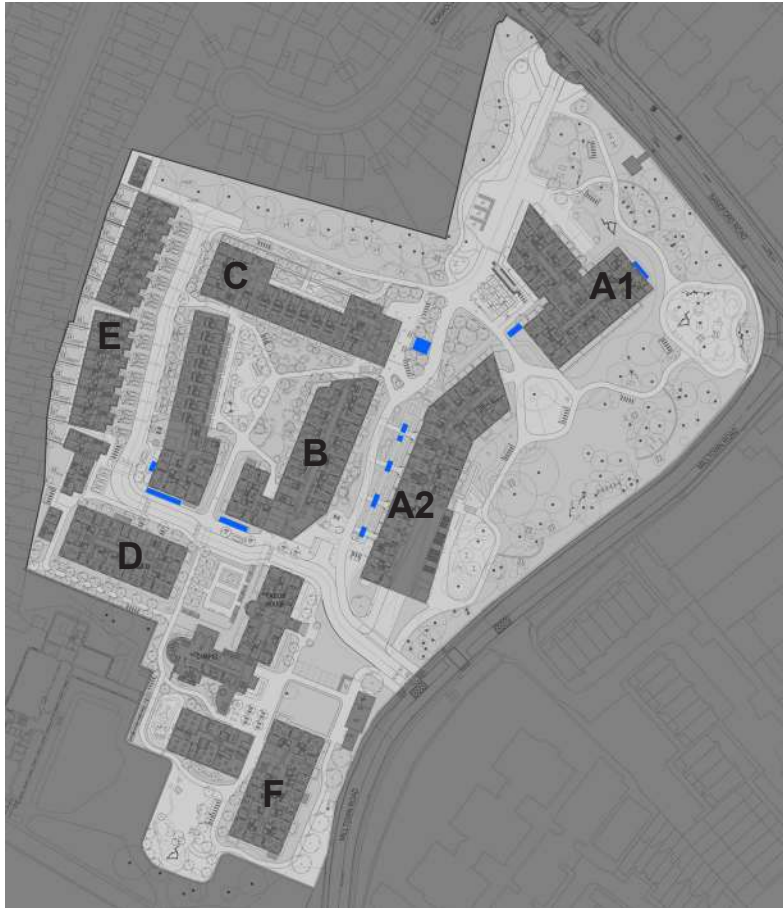
## Landscape Lighting Interventions - Benches



Where appropriate, additional low level details set into seating units help define stopping points in the landscape. Where the bench design allows, these will be continuous linear details hidden under seat edgings. The light from such sources will always be designed to light downwards and not spill directly upwards.

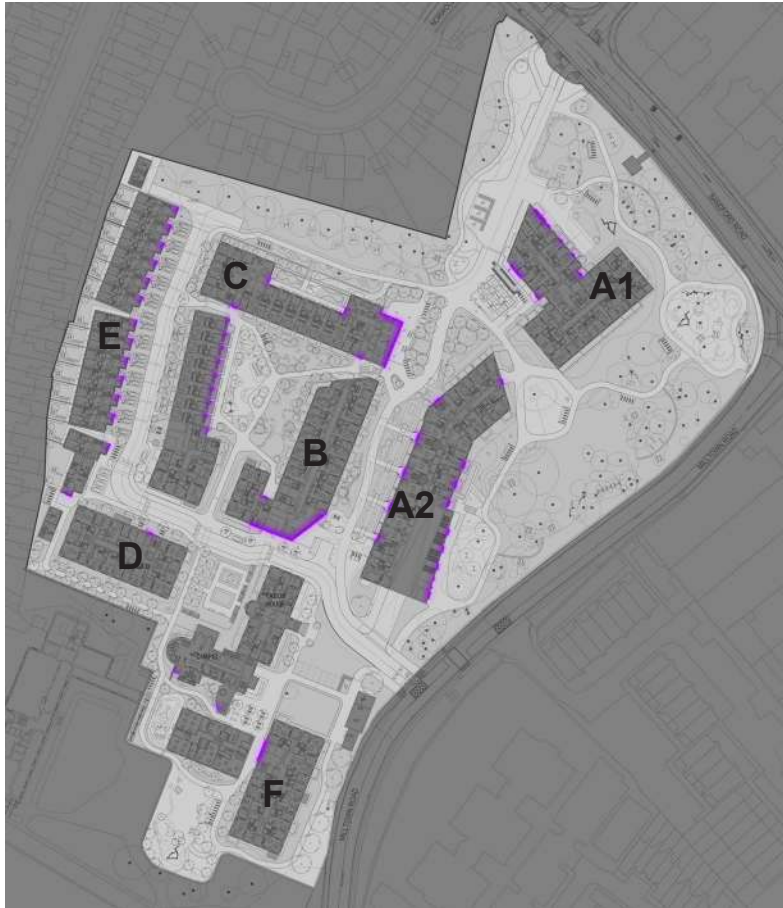


Landscape Lighting Interventions - Natural Ventilation



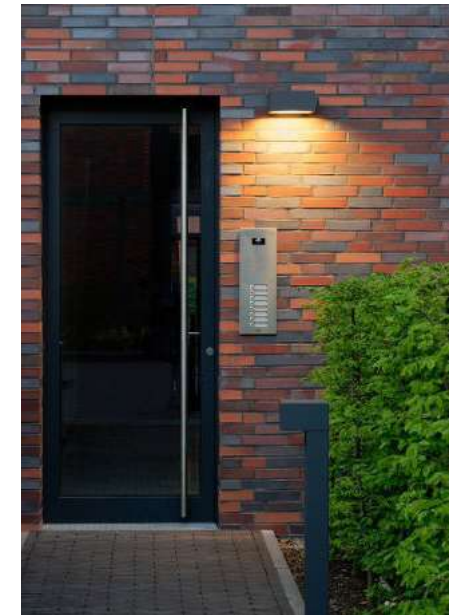
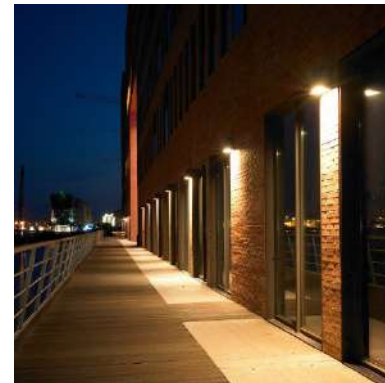
The natural ventilation grilles from the car park will likely be a source of inadvertent brightness across the site. These will be addressed with specific lighting details which gently illuminate or outline the visible upper structure of the vents.

## Building Entrances



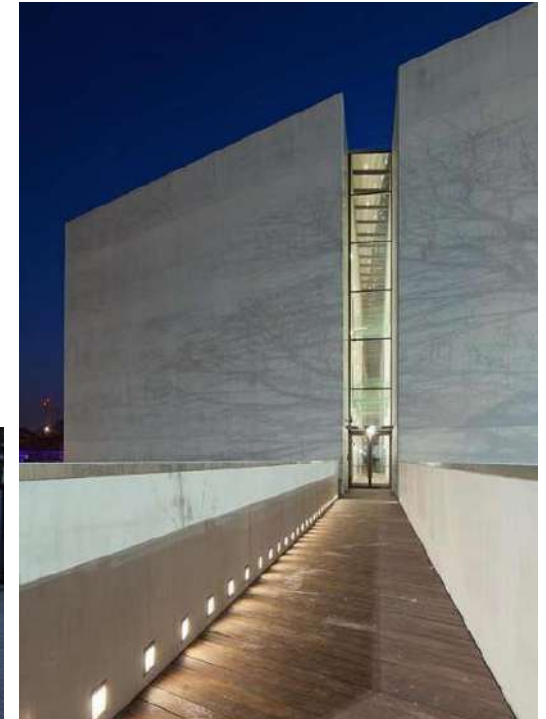
As part of the lighting strategy it is important to consider the entrances to the buildings to ensure sufficient light at and leading up to each entrance. While these are building mounted and form part of the architectural lighting rather than landscape lighting, these have been identified both as private and communal on the plan to complete the lighting strategy of this residential development and will provide emergency lighting. Final locations of emergency escape routes to be coordinated with the Fire Safety consultant taking guidance from requirements set by DCC during detail design stage.

Such sources will always be of a downlight form to ensure there is no direct upward light component from these lights.



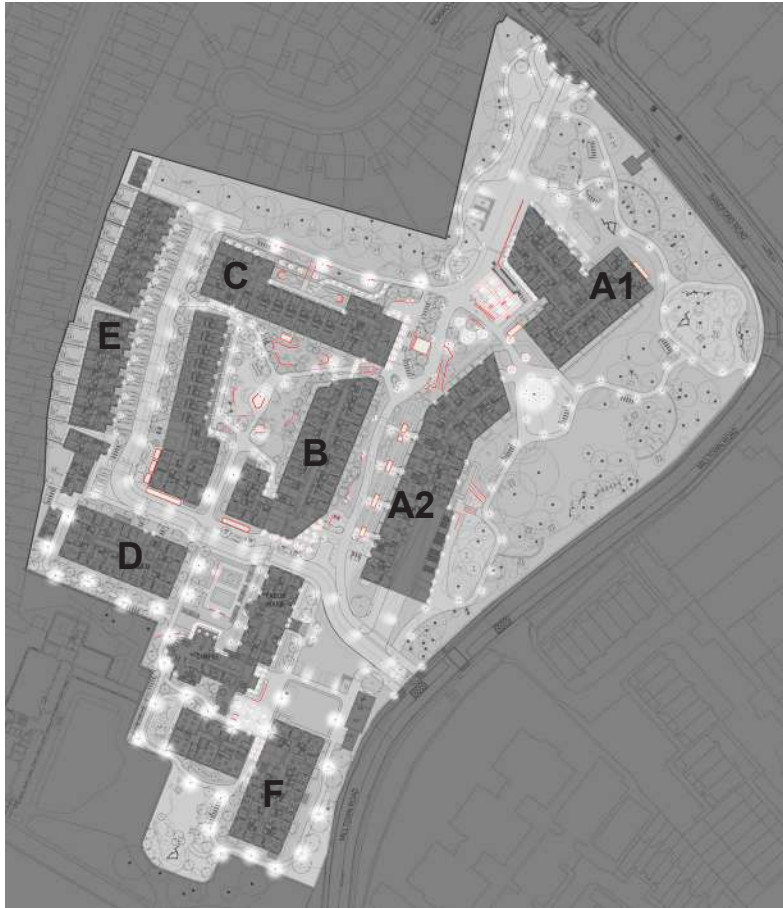


## Cycle Ramp



The cycle ramp adjacent to Block C will require a wall mounted light source to illuminate the route and guide cyclists to the underground cycle parking area. These lights will be set low level along a wall with all light direct down to the ground in each instance.

## Site-Wide Lighting: Implementation of the Concept



Across these next pages we indicate how the concept design fundamentals set out thus far will be extrapolated across the site using the relevant standards guidance and plot calculations to indicate how light levels will be achieved ecologically sensitive areas kept dark and how the design will set out brighter zones at the heart of the site and set out more uniform and purposeful levels along roadways.

Lighting has been designed in accordance with the guidelines detailed on the following page, any further certification requirements can be designed into the scheme as part of design development through specification of lighting equipment.



*Lighting calculation simulation - Site-wide lighting*



Vehicular Routes - Performance Guidance



Tables from ILPGN01:2011

Table 1 – Environmental Zones			
Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO Starlight Reserves, TDA Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty etc.
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town/city centres with high levels of night-time activity

Table 2 – Obtrusive Light Limitations for Exterior Lighting Installations – General						
Observers	Environment	Sky Glow	Light Intrusion (into Windows)		Luminaire Intensity	
al Zone		ULR [Max %] <sup>(1)</sup>	E <sub>v</sub> [lux] <sup>(2)</sup>		I [candelas] <sup>(3)</sup>	
			Pre-curfew	Post-curfew	Pre-curfew	Post-curfew
			Average, L [cd/m <sup>2</sup> ] <sup>(4)</sup>			
E0		0	0	0	0	0
E1		0	2	0 (1*)	2,500	0
E2		2.5	5	1	7,500	500
E3		5.0	10	2	10,000	1,000
E4		15	25	5	25,000	2,500

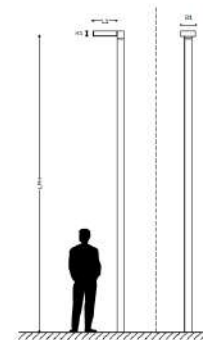
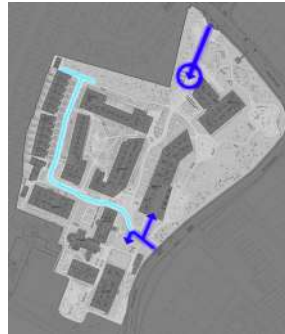
Tables from European Standard: EN13201-2

Table 2 — CE-series of lighting classes		
Class	Horizontal illuminance	
	$\bar{E}$ in lx [minimum maintained]	$U_0$ [minimum]
CE0	50	0,4
CE1	30	0,4
CE2	20	0,4
CE3	15	0,4
CE4	10	0,4
CE5	7,5	0,4

Using the CIBSE guidelines in conjunction with Secure by Design document the parameters for the lighting criteria have determined lighting levels across the site. These will need to be reviewed and approved, pending any requests from planning or roads department we will need to respond to, but we believe them to be a reasonable response to the levels suggested in guidance documents.

Using the guidance of the Institute of Lighting Professionals and using the European Standard EN: 13201-2 we determine that the site will classify as an E3 class zone. Any roadways will therefore be designed to provide a minimum average of 15 lux with a 0.4 uniformity and with the appropriate glare control ratings.

## Vehicular Routes - Street Column Locations

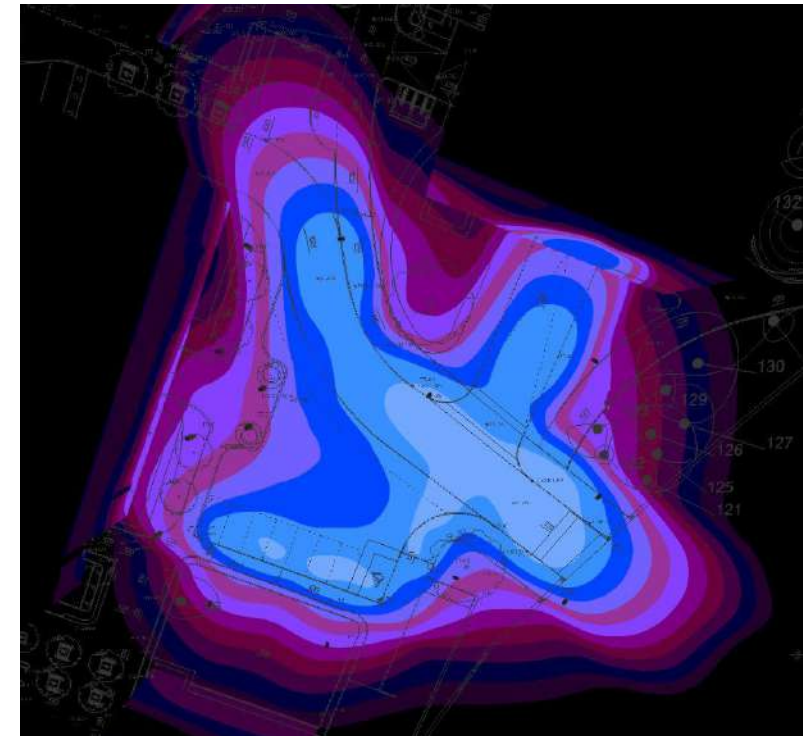


Lighting columns will be 6 metres height using a root mounted fixing and a flat glass, full cut-off optic LED lantern with roadway performance, DALI dimmability and no upward light component to reduce nighttime light pollution. Light source will be 3000 kelvin warm white and will be set to soft start at dusk to avoid a sharp and sudden spike in light levels.

Preliminary calculations have been undertaken to show that we can achieve the 15 lux averages and 0.4 uniformity in the specific road zones of the site. These have been broken down for ease of presentation into four areas on the following pages.



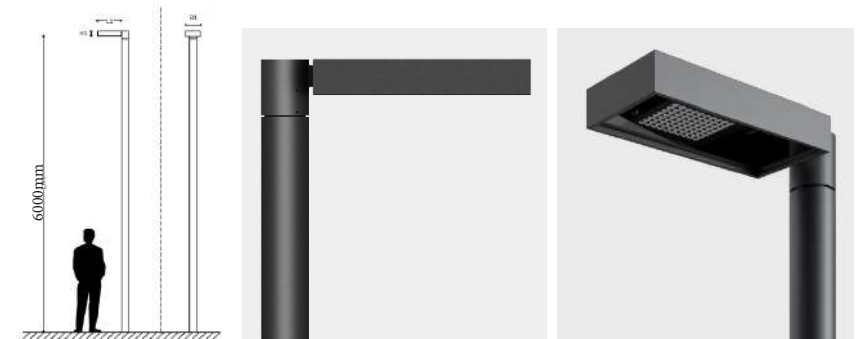
## Vehicular Routes - Street Column Location - Area 1



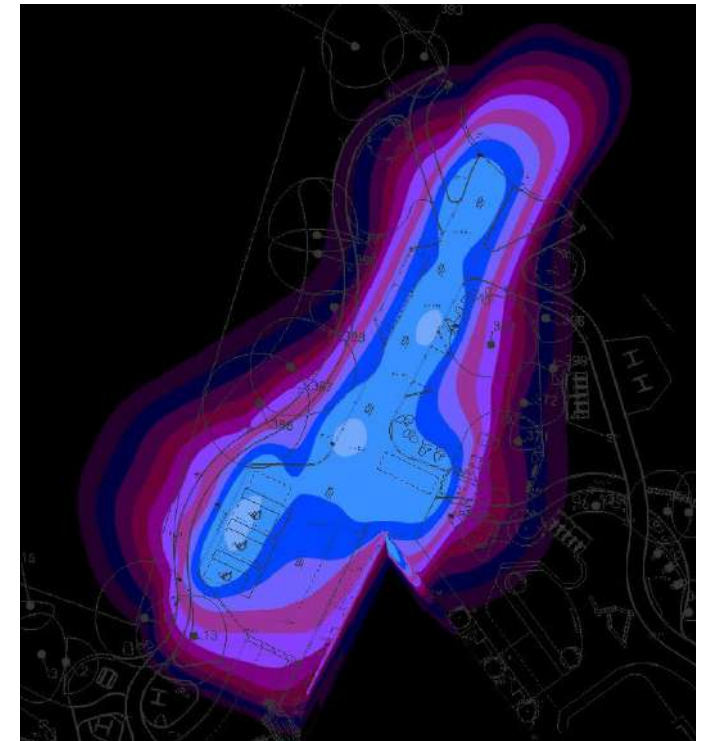
Key to Lux Level Colours

## Area 1 - Milltown Road Entrance

Light levels are higher at the entrance and in this busier road area leading to the car park ramp. Behind the car parking spaces to the south two columns illuminate the parking and the road in front of it but in most instances columns are kept to the north side of the road.



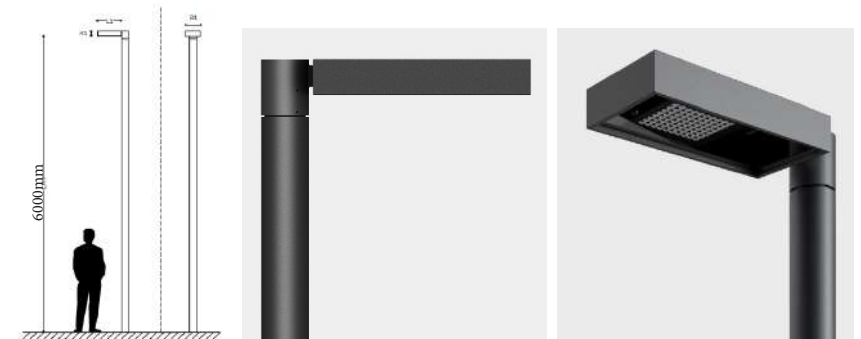
Vehicular Routes - Street Column Location - Area 2



Key to Lux Level Colours

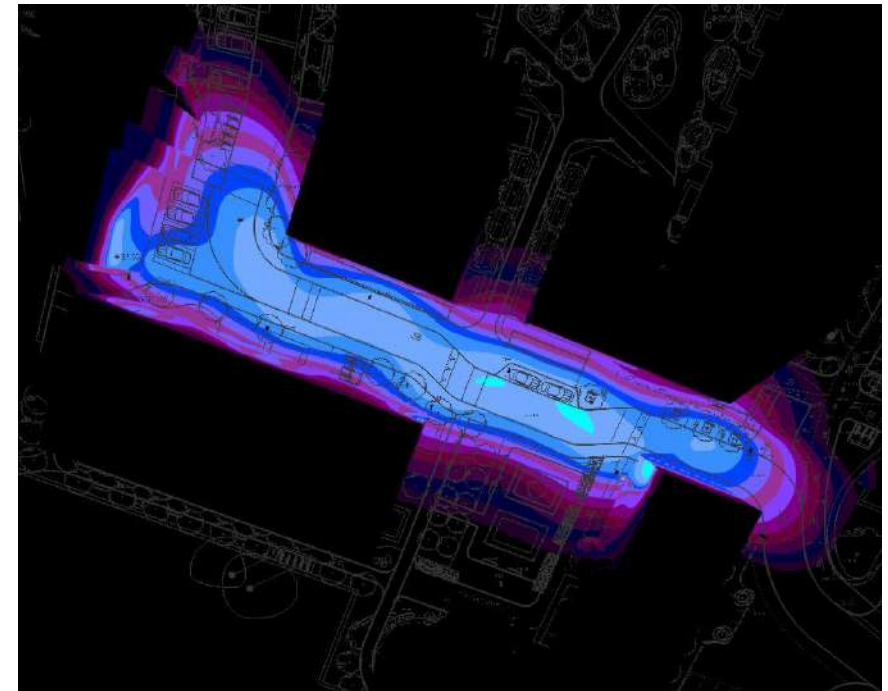
Area 2 - Sandford Road Entrance

A staggered arrangement of columns along the Sandford Road secondary entrance road leads up to the parking area and taxi turn around zone.





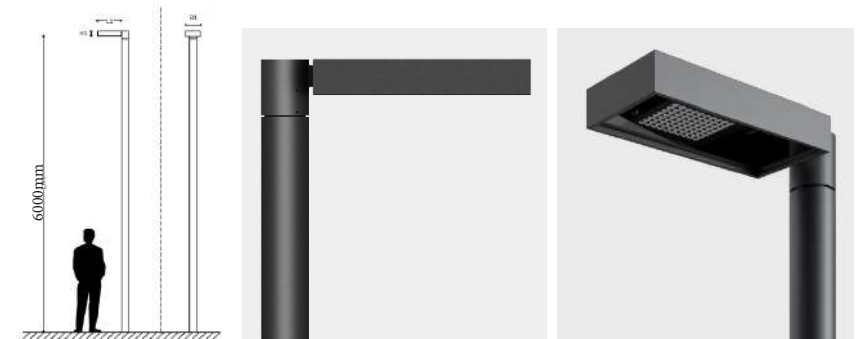
### Vehicular Routes - Street Column Location - Area 3



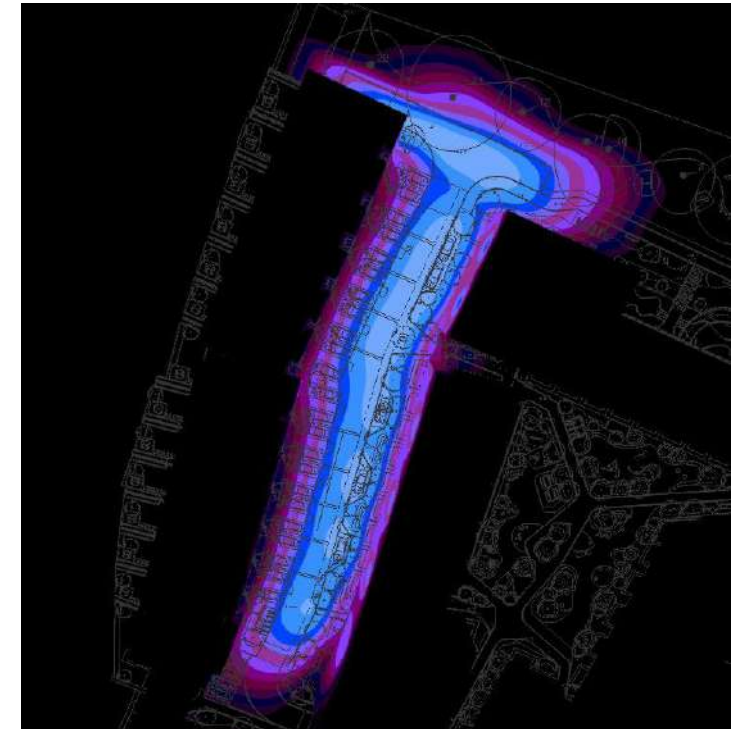
Key to Lux Level Colours

### Area 3 - Block B & D Road

A staggered arrangement along this stretch of the road ensure crossing areas can be more evenly illuminated and that pathway on both sides of the road can be well illuminated.



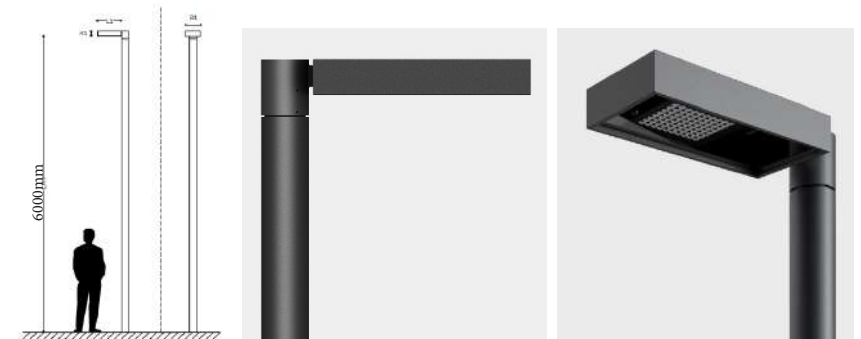
## Vehicular Routes - Street Column Location - Area 4



Key to Lux Level Colours

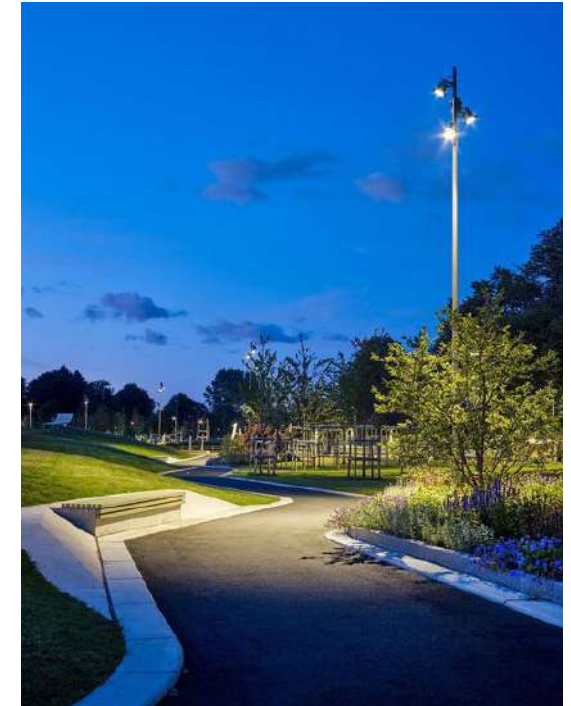
### Area 4 - West End Mews Road

Columns are located along the east side of the street, away from the houses themselves. Columns are also set in between trees on the most part to mitigate the risk of glare in this quieter, more residential end of the site - average light level is lower here than along other roads on the site to take this into account.



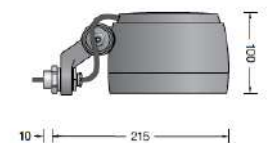
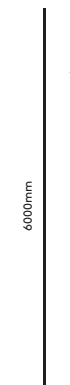


## Streets Hierarchy - Pedestrian Routes - Multi Head Columns

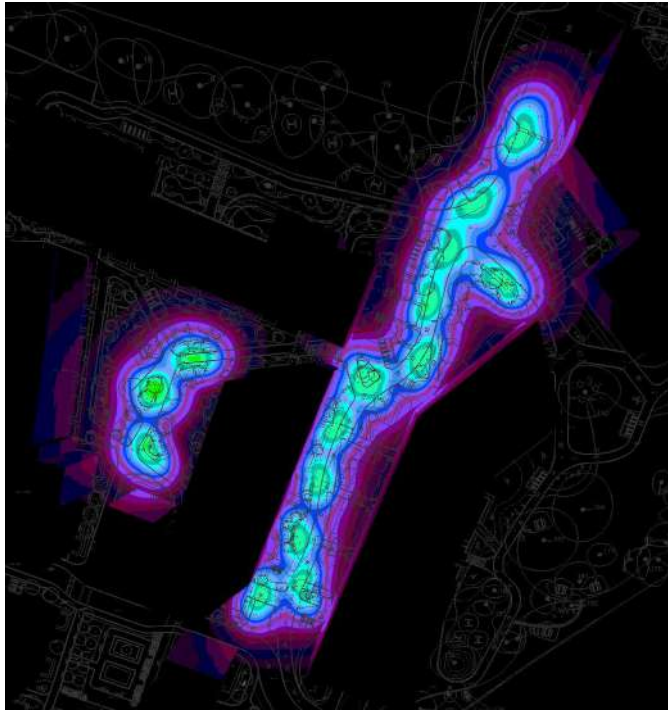


Primary pedestrian routes use a multi-headed column at 6 metres height - some columns with 3no fittings and others with 4no fittings as befits the path layout below them

The projector source is cowled and provides a very controlled and defined quality of light.



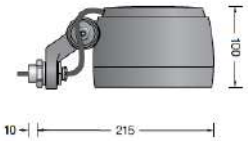
Primary Pedestrian Routes - Multi-head Columns



Key to Lux Level Colours

1.00	2.00	3.00	5.00	7.50	10.0	20.0	30.0	50.0
------	------	------	------	------	------	------	------	------

Along the main section of the route the multi-head columns with versions using 3no and 4no projectors depending on the layout of the pathway below. All columns are 6 metres height and all lights are cowled and adjusted on site to light the pathway or incidental resting areas.





## Undercrofts - Downlighting



Across the undercrofts of Blocks A, B and C, and at Building F a set of downlights are used to provide a higher level of sustained light.

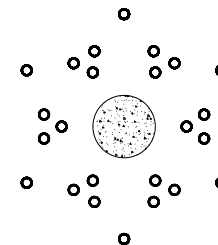
In the Block A zone these downlights are set radially around the columns to both illuminate downwards as well as highlighting the column faces. Under Block C these fittings become washlights, providing a sustained level of light on the living wall as well as good levels down onto the pathway below.



## Undercrofts - Uplighting



Uplights are set around the columns in the Block A undercroft. These are multiple arrays of circular RGBW colour changing sources set out in a selected pattern around the base. No one source is too bright but the effect is to produce subtle colour change effects on the soffit by night whilst also creating constant changing patterns in the floor by day.





## Residents' Outside Areas - Downlighting & Uplighting



The same downlights used on the link undercrofts will be installed where canopies allow to provide a good, consistent level of light.

In addition a set of inground uplights provide feature lighting to the columns of Blocks B and C and help announce these zones of key interest.

These areas are extensions of residents internal amenities and as such need to feel welcoming and pleasant for the night-time user.

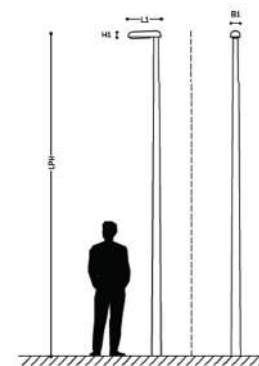
Residents' Outside Areas - Block A - The Garland Garden



A formal square of trees and benches sits as an extension to the Building A residents' lounge and it is provided with an additional feature lighting element - a festoon of lights, set in between the trees. The garland of lights illuminates both the trees and the area around them and will act as a visual focal point to the site.

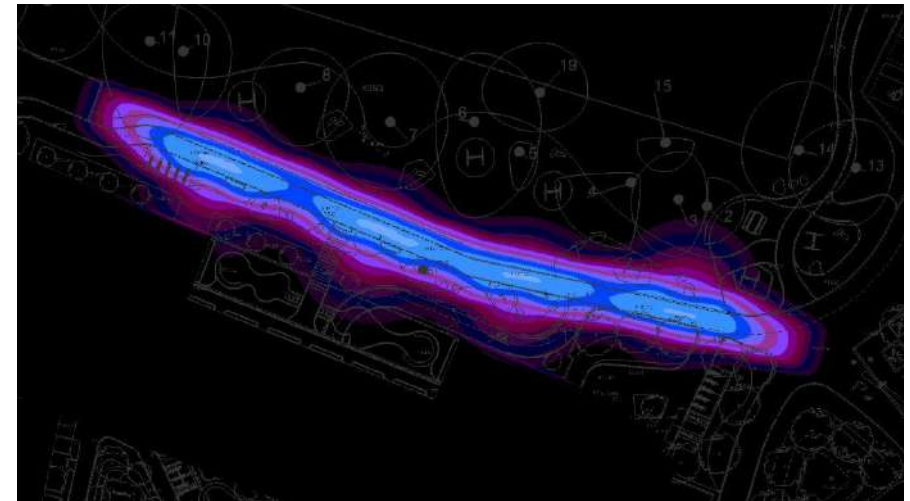
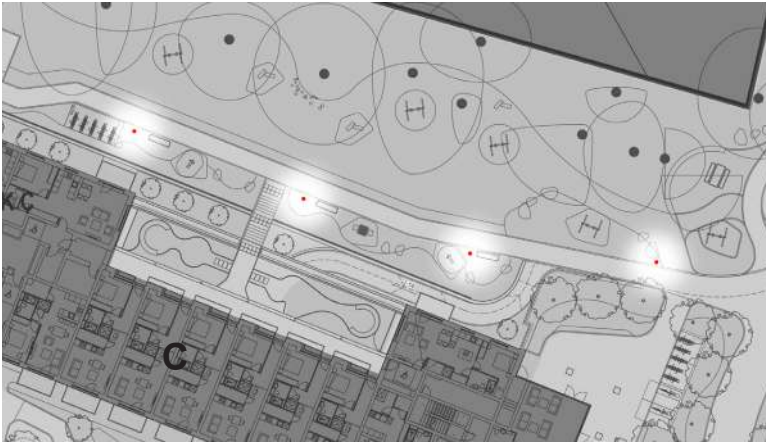


## Secondary Pedestrian Routes - Columns - 4 metres



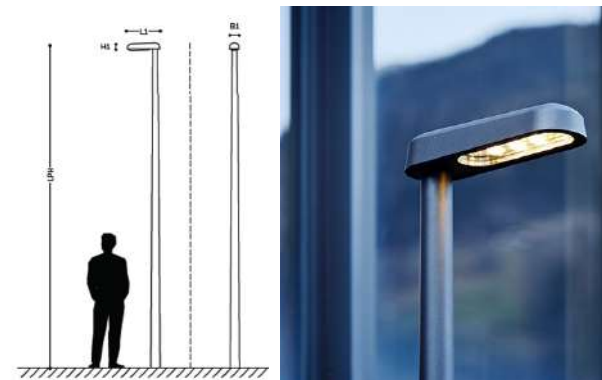
Secondary pedestrian routes require good levels of illumination but at lower levels and at lower height frequencies along pathways. Routes towards the potential future routes to the south and the link pathway across the north of the site have been highlighted with a four metre high lighting post with a small full cut-off lantern to provide pathway lighting. In areas where these paths cross ecology buffer zones the luminaires will be restricted in their output by dimming or by the use of down-rated drivers to limit light output in line with the levels required by the EIAR Chapter 8.0 Biodiversity prepared by JBA Consulting. Lights have been broken down into the two areas shown above.

Secondary Pedestrian Routes - Columns - 4 metres - Area 1



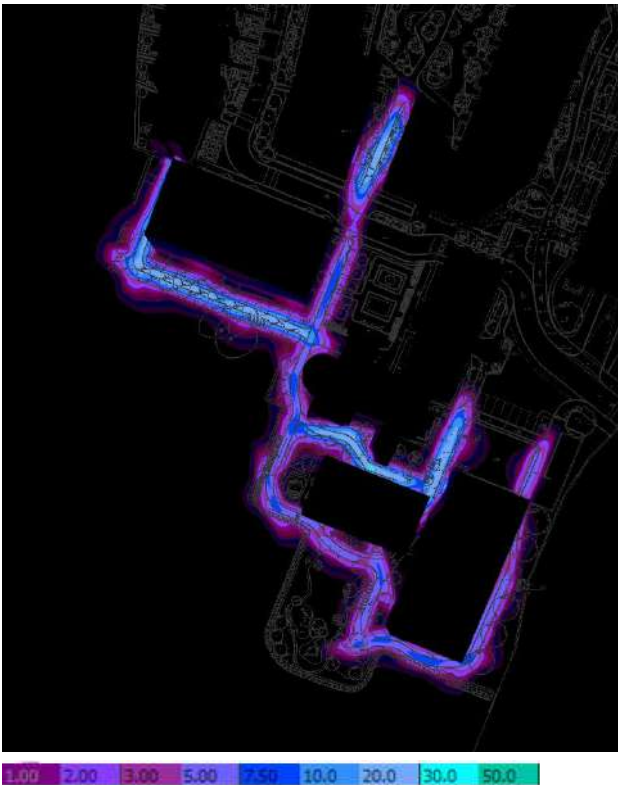
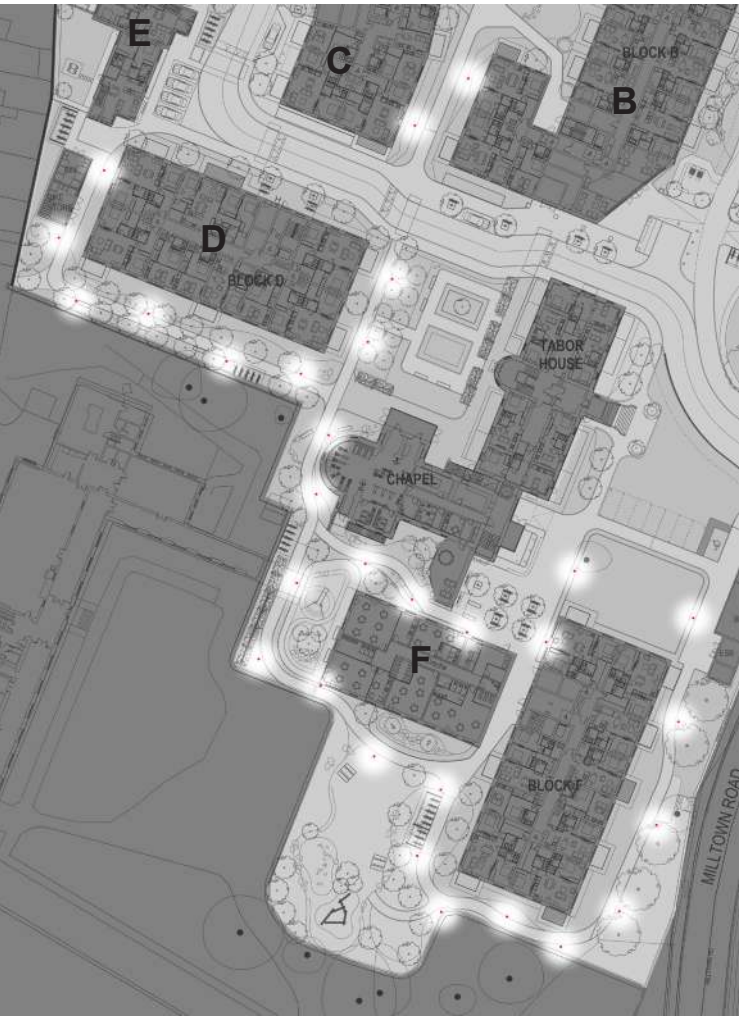
Key to Lux Level Colours

Area 1 consists of the pathway along the north edge of the site running east/west. The four metre column is used to connect the plaza area with the north end of the "Home Zone" street, as well as providing light for residents to guide them to Block C.





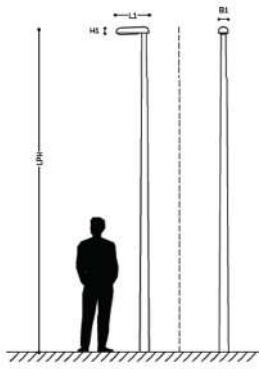
Secondary Pedestrian Routes - Columns - 4 metres - Area 2



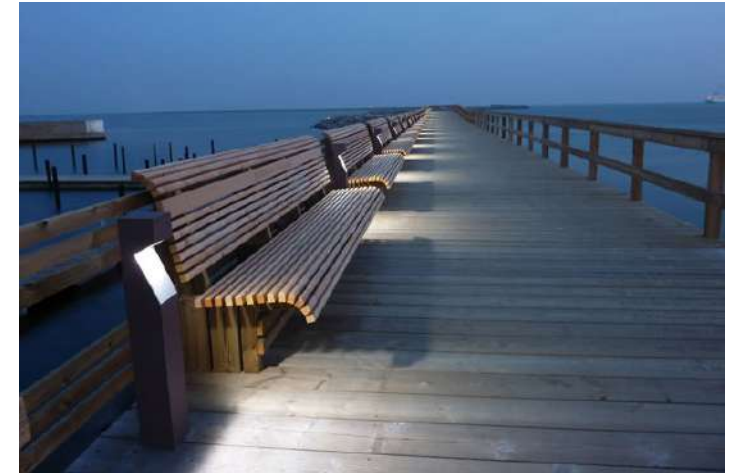
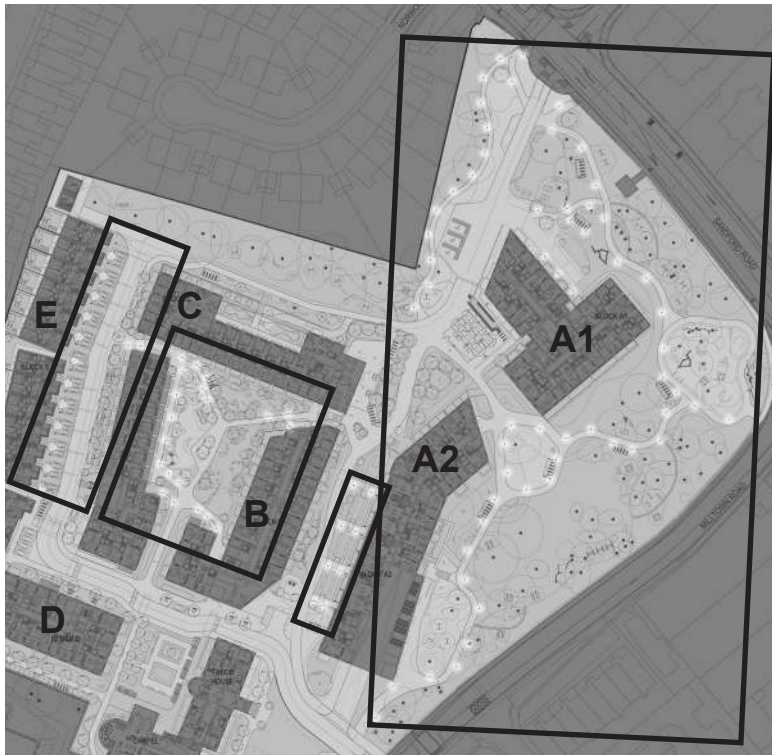
Key to Lux Level Colours

Area 2 spans the various paths running around Buildings D and F, and between Blocks B and C.

The area to the south behind Building F sits within an ecology buffer zone and lighting will set to average a maintained average of 5 lux.



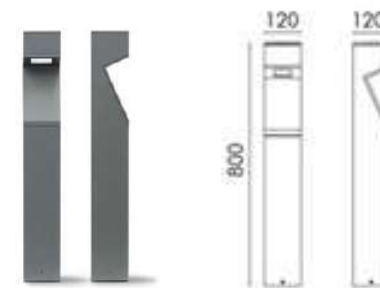
## Tertiary Pedestrian Routes - Bollards



Bollards are used where supplemental light is available from other nearby lights or where pathways are more informal. They define 'stepping-stones' in the visual landscape: seat locations, building entrances are points along the quieter pathways. The bollard suggested is 800mm height and a mid style form with an LED source that is low glare and designed to light directly down to avoid any upward light spill.

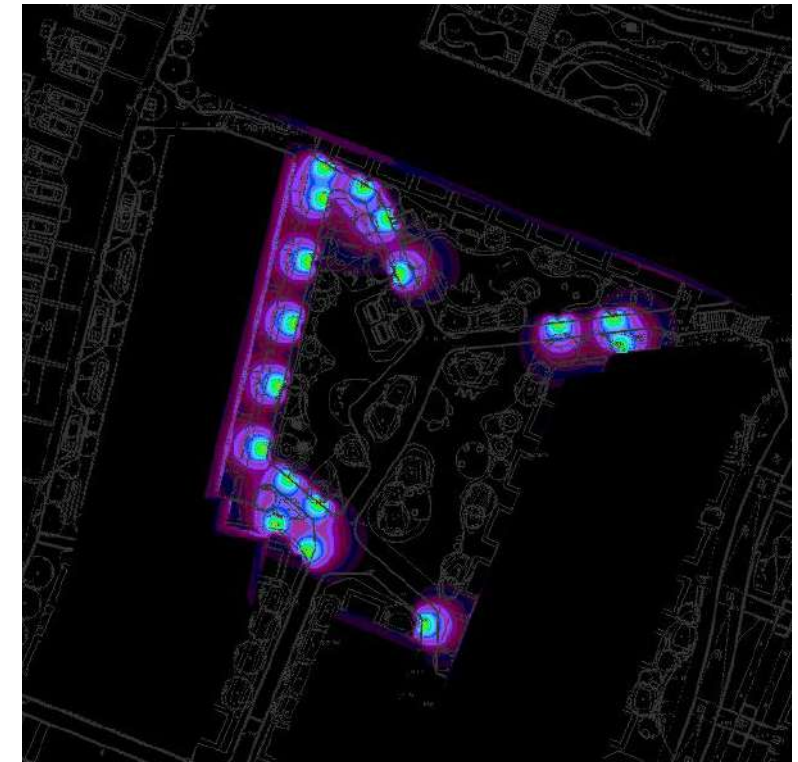
In areas where these paths cross ecology buffer zones to the east the luminaires will be restricted in their output by dimming or by the use of down-rated drivers to limit light output in line with the levels required by the Biodiversity EIAR Chapter prepared by JBA Consulting.

Lights have been broken down into the four areas shown above.



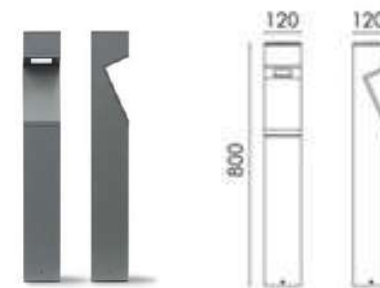


Tertiary Pedestrian Routes - Bollards - Area 1

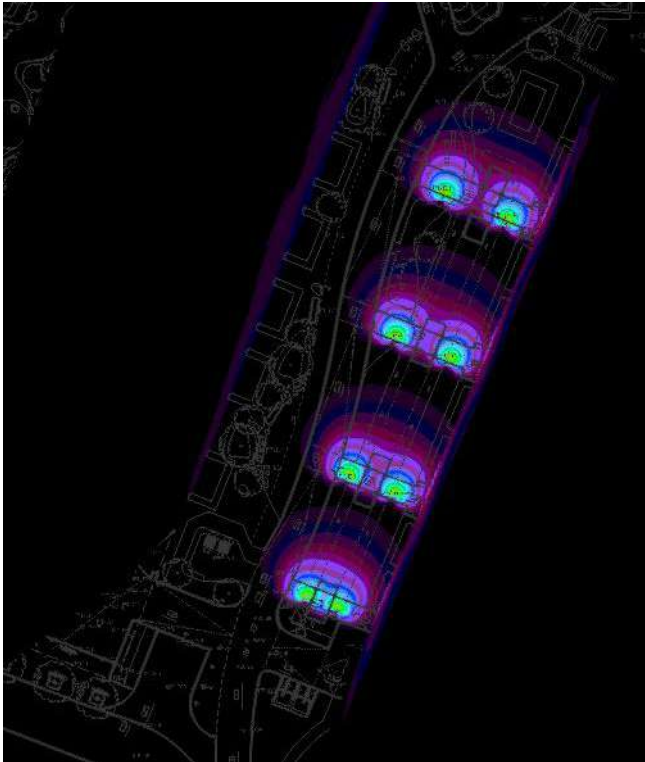


Key to Lux Level Colours

Area 1 - courtyard between Buildings B & C. 6 metre height columns are used in the centre of this area but bollards lead us into the centre from the three access paths and also identify certain bench areas.

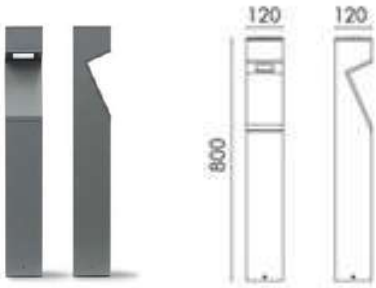


Tertiary Pedestrian Routes - Bollards - Area 2



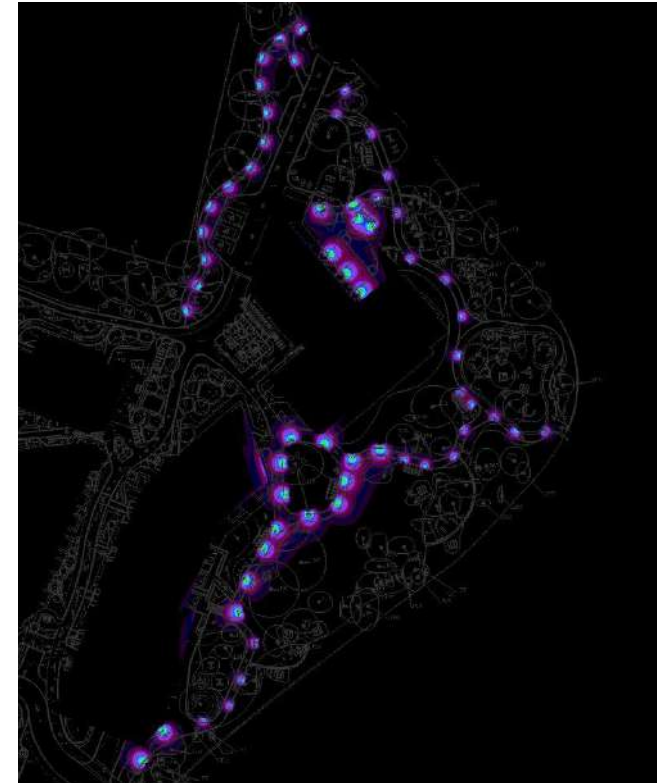
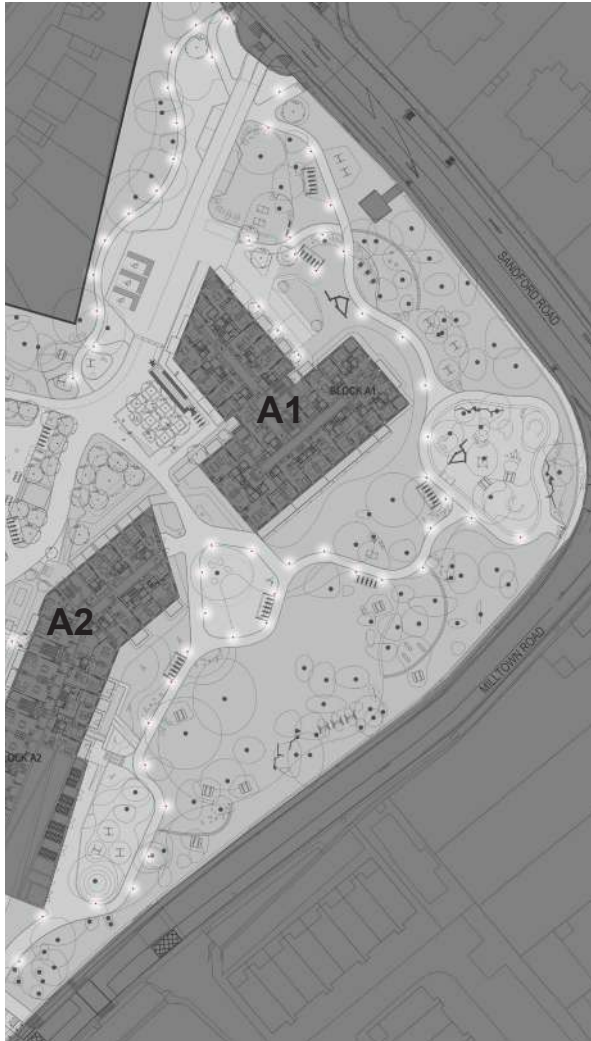
Key to Lux Level Colours

Area 2 - Building A Paths - Bollards work as markers to lead pedestrians up to the building entrances.

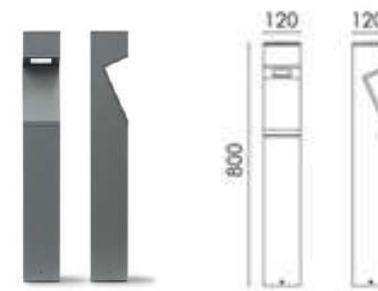




### Tertiary Pedestrian Routes - Bollards - Area 3

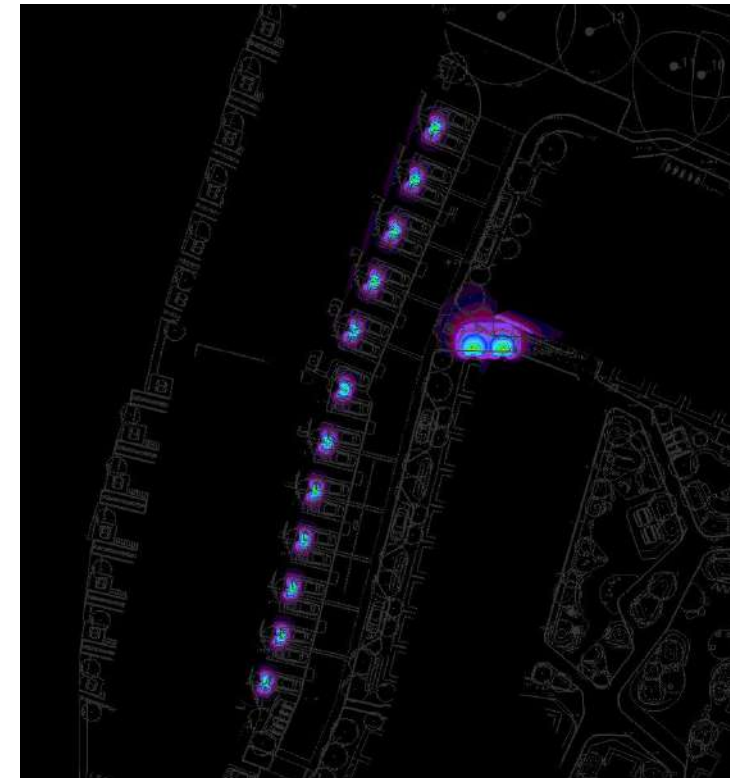


Key to Lux Level Colours

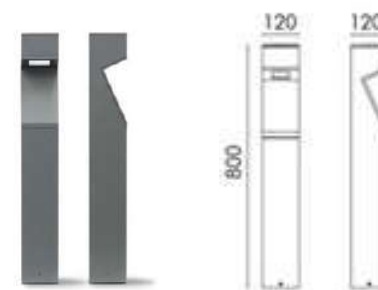


Area 3 - Parkland to the south of Building A - bollards define the route but are much wider spacing for informality and to keep this area of the parkland visually quieter after dark. Bollards are nominally spaced at 9-13 metres apart. Light output in bollards that sit within the ecology buffer zone will be set to a down-rated driver to ensure a lower lux level.

## Tertiary Pedestrian Routes - Bollards - Area 4



Key to Lux Level Colours

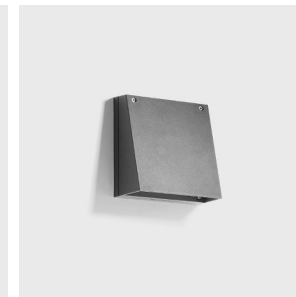
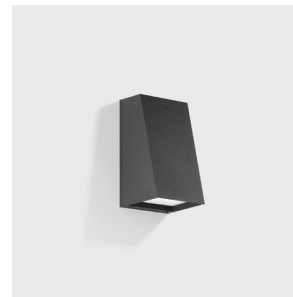
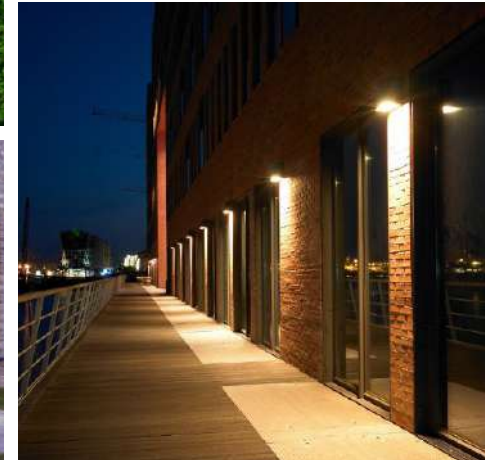
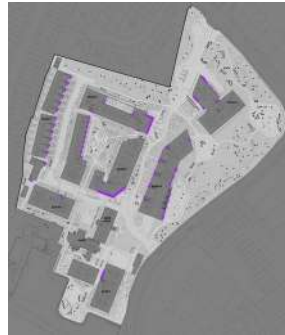


Area 4 - Residential and parking areas next to Block E duplexes and apartments. Bollards are set out in relation to parking zones for the individual maisonettes to provide some zonal lighting for residents.

In addition a few additional bollards mark out the route across to the Building B/C courtyard.



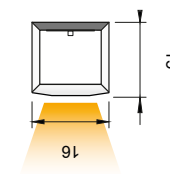
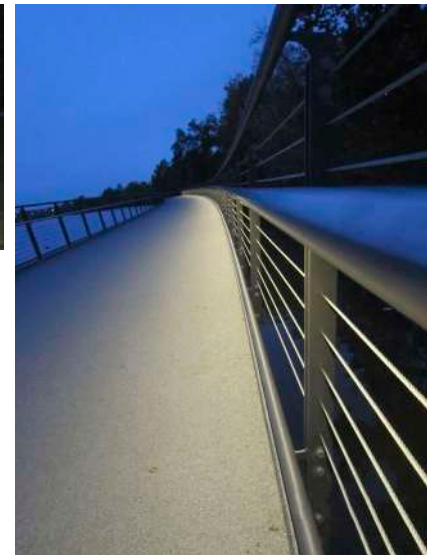
## Residential Entrances - Private and Communal



Communal entrances are to have a light outside to highlight entry points but also to illuminate final points of exit light from buildings in emergency conditions.

The private entrances to individual units, such as on Buildings A, C and E may use a luminaire from the same family of fitting but on a smaller scale, and without the need for emergency lighting. Refuse stores and cycle entrances will also have a dedicated light outside of them. These lights will run as the light starts to fade an hour before dusk till two hours after dawn.

## Handrails to Stairs & Ramps



Handrail lighting provides additional focus and illumination on key stairs leading into the Building B/C courtyard; the route up to the Block C Belvedere Gardens; the ramp into the Building A1 lounge entrance and to those dwellings in Block A2 with their own entrances.

The source will be an integrated solution - either a diffuse linear source or individual point sources depending on the handrail design. All lighting will be downward lighting to avoid direct upward light spill. These lights will run from dusk till dawn.

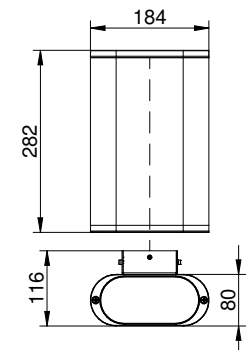
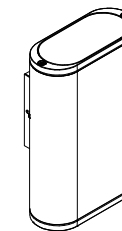


## Heritage Zone - Facade Lighting



Illumination of the east and west facades of Tabor House and the west and north sides of the Chapel with a building mounted up/down lighting source with integral control gear. Units will to be RAL finished to special colour to be sympathetic with the stone finish of the building and will be mounted between window openings and at middle glazing height of the entry level floor.

On the west side of the buildings, these lights are to switch off at a curfew of 10:30pm, to minimise disturbance to bats, following the recommendation outlined in Chapter 8.0 Biodiversity of EIAR, completed by JBA Consulting, the project ecologist.



Heritage Zone - Entrance Wall Lighting



The building entrance and stairs will be lit with heritage style wall lights either side of the door. Light source will be LED and optics will be selected to maximise light onto the stairs.

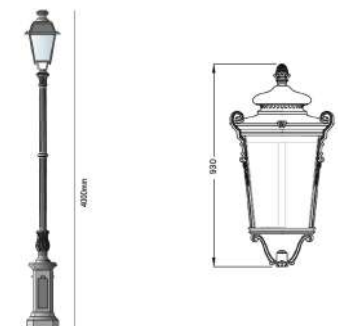


## Heritage Zone - Amenity Columns

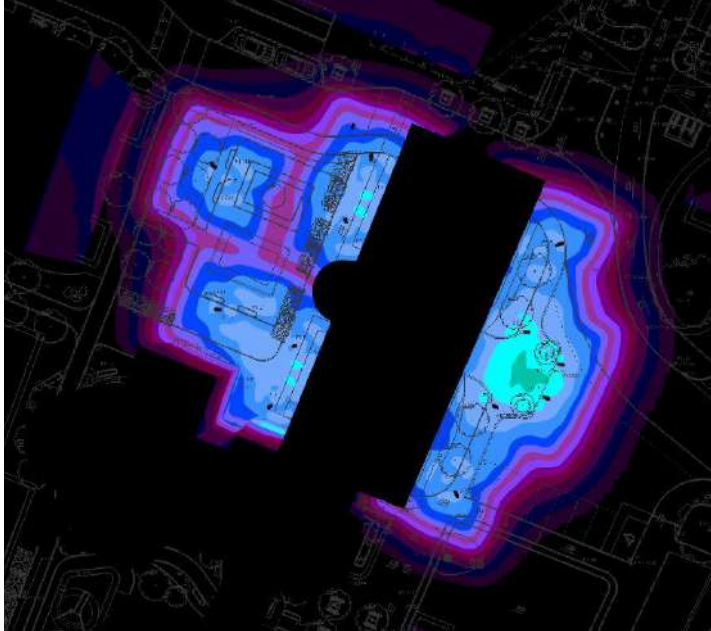


In front of the main building a set of 4 metre tall heritage lanterns with an LED source are set either side of the front of the facade of Tabor House. On the back side of the building this same fitting is set out in a similar pattern of symmetry to provide local amenity lighting in these zones.

Two columns provide local lighting to benches in the formal garden area. These lights are to switch off at a curfew of 10:30pm during summer months May to September inclusive, to minimise disturbance to bats, following the recommendation outlined in Chapter 8.0 Biodiversity of EIAR, completed by JBA Consulting, the project ecologist.



Heritage Zone - Amenity Columns



Key to Lux Level Colours

1.00	2.00	3.00	5.00	7.50	10.0	20.0	30.0	50.0
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Light levels from these heritage amenity columns are set higher closer in to the building perimeter and will be softened by the building facade illumination. Source is dimmable and an allowance for decorative detail painting of the base will be allowed for.





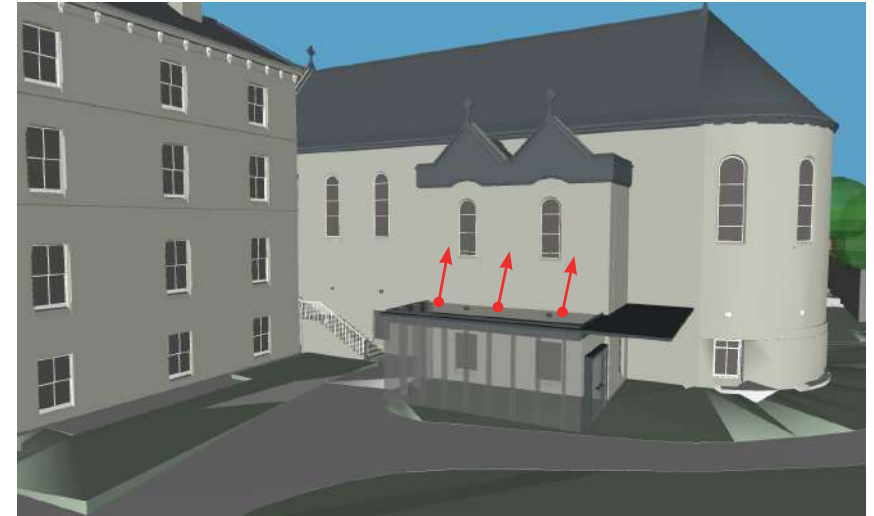
## Heritage Zone - Chapel Entrances - ALLOWANCE AT THIS STAGE



The entrances to the chapel, to the east and north will be given an enhanced level of lighting. This will take the form of lighting mounted to the underside of canopies, where the architecture allows, or miniature wall-mounted projectors to illuminate the perimeter routeways where there is no canopy.

The intent is to see this lighting as both illuminating the thresholds as well as brightening the near landscape areas.

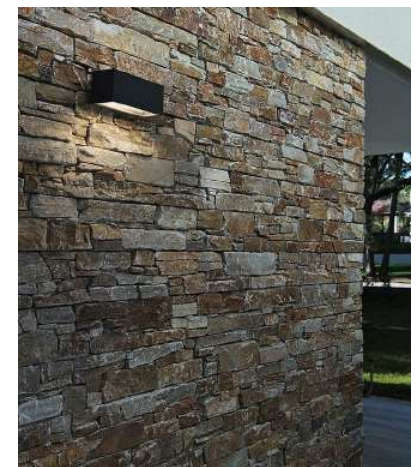
Heritage Zone - Facade Uplighting - ALLOWANCE AT THIS STAGE



To complete the facade lighting of the chapel surface mounted projectors are proposed on the north side on the roof of the new extension to uplight the facade, which will provide illumination to the area of facade without up/down wall mounted fittings to be installed across the rest of the facade.



Gates - ALLOWANCE AT THIS STAGE

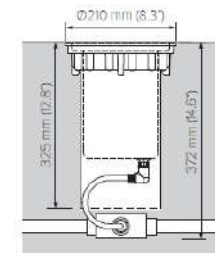


An allowance at present for wall mounted downlights at the two vehicular entrance gates, the pedestrian gates flanking the Sandford Road vehicular entrance, and the pedestrian entrance in the north-east corner of the site.

## Trees - ALLOWANCE AT THIS STAGE



Inground uplights set into the soft and hard landscaping to illuminate key trees, selected in consultation with project Ecologist to avoid the prescribed dark corridor shown on page 4 of this report. Supported by ecological enhancements on the site, such as bat boxes, bird boxes, and insect hotels. Following the recommendation outlined in Chapter 8.0 Biodiversity of EIAR, completed by JBA Consulting, the project ecologist.





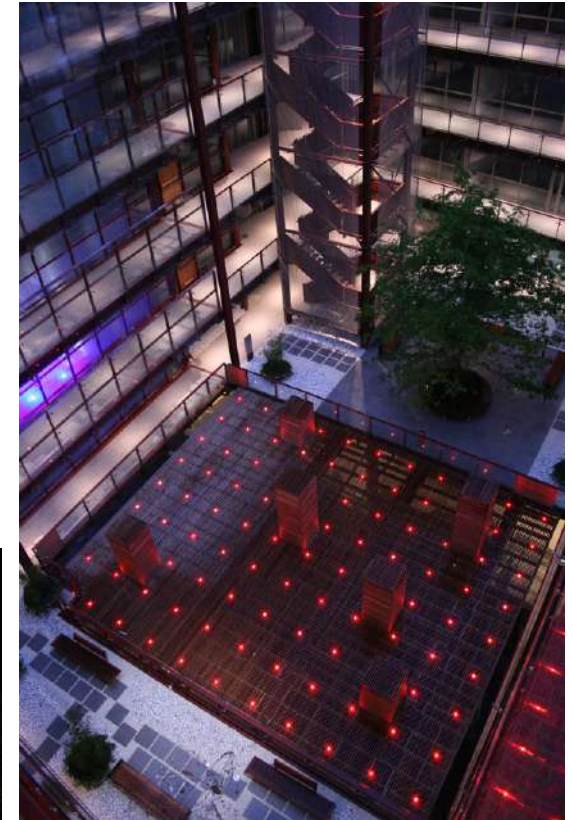
Benches - ALLOWANCE AT THIS STAGE



An allowance is made for limited bench illumination. This is proposed to be an integrated linear lighting detail, to be co-ordinated with final bench designs. Lighting will always light downward to avoid any direct upward light spill.



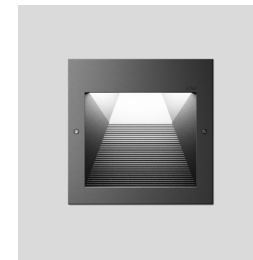
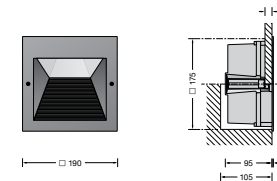
## Car Park Vents - ALLOWANCE AT THIS STAGE



An allowance is made at this stage for some limited lighting integrated into or under the vent structures. More design details of the vents will be required prior to a final design, but the proposal will be to gently illuminate visible elements.



## Cycling Ramp - ALLOWANCE AT THIS STAGE



The cycle ramp down to the underground cycle parking area has a provision for wall recessed wall lights to guide cyclists down the ramps.