Water Lane Regeneration
Exeter

Lighting Strategy

Project No. IN380
Issue 3
April 2024

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Revision	Description	Prepared By	Date
Issue 1	Issue for Comment	CE	19/07/2023
Issue 2	Issue for Comment	CE	28/07/2023
Issue 3	Updates for Planning	CE	09/04/2024

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1.0 EXECUTIVE SUMMARY

This report has been produced, taking into account all ecologist and council comments. This report has also been created to show a considered and sensitive approach to the artificial illumination of the site in compliance with all relevant standards and guidance documentation for both internal and external lighting.

The types of luminaire and associated control strategies have been carefully selected to minimise light pollution from buildings and external lighting installations, with particular attention paid to the impact on the local wildlife and the dark corridors along both the railway and canal on the site boundaries, as raised by Richard Green Ecology.

Residential building internal lighting shall utilise bulkhead or recessed luminaires with automated blackout blinds, timeclock, presence, daylight sensors to reduce light spill. Luminaires in rooms with external glazed walls will utilise only low output luminaires with narrow beams to ensure minimal light spill demonstrated by the light spill contours calculated by the detailed design 3D model.

Commercial and educational internal lighting shall generally be recessed or surface linear and modular luminaires with downward only trajectory output. Luminaires shall also utilise narrow beams where possible and will be inset by a minimum of 1.5m from the perimeter of the building where glazing is present. Lighting will only be provided to serve the task areas as required, with hours of operation taken into account and control philosophies in place to reduce or completely shut off artificial illumination with the provision of motorised blackout blinds to further mitigate artificial light spill from the properties.

Luminaire selections and lighting control measures shall also greatly reduce energy usage.

External lighting shall be designed in line with dark sky principles, and with close control of light spill and colour temperatures. The external lighting installation shall comprise of wall mounted building luminaires, lamp posts and bollards. This will be to provide illumination of both vehicular roads, footpaths and building egress. These luminaires shall utilise photocell technology, presence detection and timeclock control to reduce light spill completely prior to reaching the dark corridor areas.

Although 0.5 lux is the target, the proposed installation methods mentioned above should achieve nearer to 0 lux at the dark corridor boundaries.

Drawings IN380(632)001 and IN380(632)002 show an indicative layout with illuminance contours to show lux levels will be kept to below 0.5 lux at the ecologically sensitive habitats by the canal and the railway. Further drawings IN380(632)003 and IN380(632)004 have been created to indicate existing lux levels at the site.

2.0 INTRODUCTION

Inform Consulting Engineers have been appointed to provide advice on the principles for retaining dark corridors and propose a lighting strategy that will be sympathetic to the ecological challenges presented at the Water Lane redevelopment site.

This report details the lighting strategies to be considered to ensure minimal impact on the existing wildlife, whilst maintaining comfort and safety for the local population.

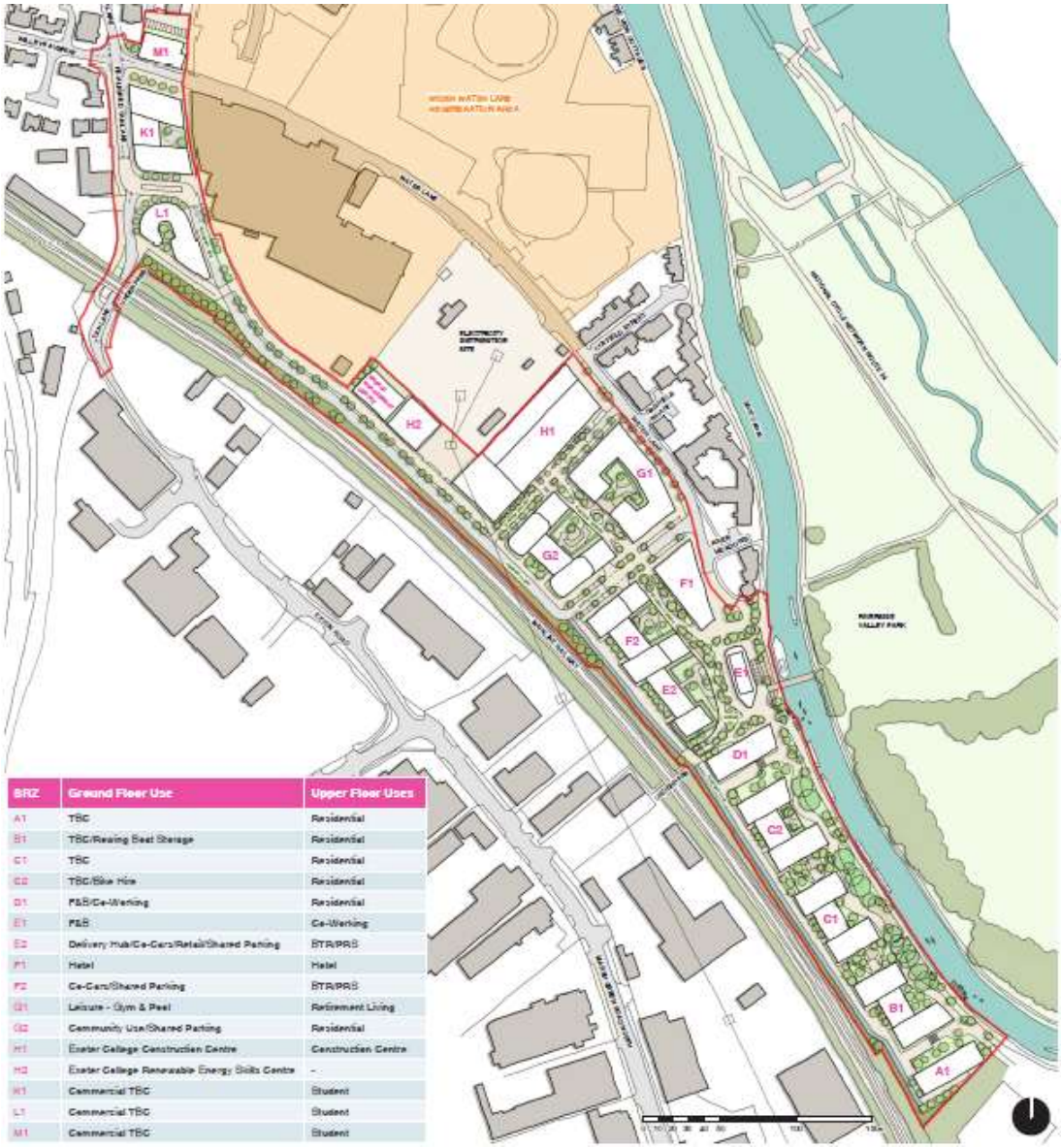
The project is currently at outline planning stage, and as such is subject to layout, sale, appearance and landscaping changes. For the purposes of this report, the current set of parameter plans and illustrative materials have be used.

Site Address:

Water Lane,
Exeter,
EX2 8BU,
NGR SX

Site Location:

Proposed Layout:



BRZ	Ground Floor Use	Upper Floor Uses
A1	TBC	Residential
B1	TBC/Rowing Boat Storage	Residential
C1	TBC	Residential
C2	TBC/Bike Hire	Residential
D1	F&B/Co-Working	Residential
E1	F&B	Co-Working
E2	Delivery Hub/Co-Cars/Retail/Shared Parking	BTR/PRS
F1	Hotel	Hotel
F2	Co-Cars/Shared Parking	BTR/PRS
G1	Leisure - Gym & Pool	Retirement Living
G2	Community Use/Shared Parking	Residential
H1	Exeter College Construction Centre	Construction Centre
H2	Exeter College Renewable Energy Skills Centre	-
K1	Commercial TBC	Student
L1	Commercial TBC	Student
M1	Commercial TBC	Student

3.0 LIGHTING STRATEGY CONSIDERATIONS

3.1 Existing Site Conditions

To ascertain the existing site conditions, a lux level survey was undertaken on Monday, 3rd July. The conditions were dry, slightly overcast, with a full moon.

The existing lux level reads have been recorded on drawing numbers IN380(632)003 and IN380(632)004.

The following observations were noted that may affect the lux levels recorded;

1. Lux level readings to the South of the site are high due to wall mounted luminaires and LED lamp posts. The proposed dark corridor will reduce these external influences and improve this area.
2. Lux level readings near the canal are high due to wall mounted luminaires and LED lamp posts both within and outside the site boundary. Once the luminaires within the site boundary are stripped out as part of these works and new lighting installed, the lux levels will be reduced.
3. To the North of the site, external luminaires were identified within private property but were not in operation. It has been assumed these work off timeclock and photocell controls and are already configured to suit a light sensitive arrangement.

3.2 Ecology

Richard Green Ecology Ltd have provided an ecology report on the site, and this should be referred to alongside this report. Should there be any discrepancies pertaining to the ecology of the site, the Richard Green report takes precedence.

The proposed development site has a wide range of habitats, inhabited by a variety of animals and insects. The preparation of the lighting strategy has taken these into account to mitigate any adverse effect on the existing and future wildlife.

Careful consideration has also been taken to provide the dark corridors required to maintain the existing wildlife population as much as possible.

The canal is a habitat of principle importance with the most important ecology including the poplar trees. Bats, otters, dragon fly etc can also be found in this area.

The railway is a wildlife corridor with mixed scrub along the site boundary. The railway needs to be maintained as a dark corridor.

The following recommendation has been provided by the ecologist to inform the lighting strategy;

It is recommended that a sensitive lighting plan be developed to ensure a dark corridor, i.e., no more than 0.5 lux (or above existing baseline levels) of lighting encompassing the Exeter Canal/canal path in the south-east part of the site and the train line

vegetation along the south-west boundary of the site, with a buffer/transitional zone 5-10 m (<3 lux) between the development and these areas.

3.3 Lighting Design Guidance

The following documents have been considered in the production of this report;

- SLL Lighting Guide 5: Lighting for Education
- SLL Lighting Guide 6: The Exterior Environment
- SLL Lighting Guide 7: Offices
- SLL Lighting Guide 9: Lighting for Communal Residential Buildings
- SLL Lighting Guide 10: Daylighting
- SLL Lighting Guide 12: Emergency Lighting
- SLL Lighting Guide 17: Lighting for Retail Premises
- SLL Lighting Guide 21: Protecting the Night-Time Environment
- ILP guidance note 08/18
- International Dark-Sky Association five principles for responsible outdoor lighting

3.4 The International Dark-Sky Association

The International Dark-Sky Association (IDA) is the recognised authority on light pollution and is the leading organisation combating light pollution worldwide.

IDA's Fixture Seal of Approval program certifies outdoor lighting fixtures as being Dark Sky Friendly, meaning that they minimise glare while reducing light trespass and skyglow.

It is proposed that all external lighting throughout the development shall be Dark Sky certified.

4.0 INTERNAL LIGHTING

The proposed Water Lane site contains a mixed community of homes, community spaces, workplaces and facilities, each with their own particular requirements.

There will be an element of light spill from each of these new buildings that will need to be considered during the detailed design development from both a technical and Architectural standpoint.

Consideration needs to be had for the use of black-out blinds/curtains, presence detection, daylight dimming, timeclock, and photocell controls to reduce the amount of light pollution.

The use of automated motorised blackout blinds and curtains reduces the light spill to nearly 0%, by ensuring that these are closed when the internal electric lighting is in use.

4.1 Residential Units

Internal lighting to the residential units generally utilises 3000K . For the Water Lane development, it is recommended that the colour temperature to the residential units is kept to a maximum of 3000K, including to the landlord/communal areas, this also suits guidance put in place for biodiversity.

The residential units will generally consist of ceiling mounted recessed luminaires, set back from windows, with 3000K colour output within the dwellings. Lux levels shall meet the requirements of SLL Lighting Guide 9.

The landlord/communal areas will generally consist of ceiling mounted low angle beam circular recessed luminaires, with 3000K colour output.

To avoid unnecessary light spill, and reduce energy usage, all communal areas shall be controlled via automatic PIR detection and daylight dimming controls.

The use of blinds and curtains shall be encouraged throughout the private dwellings to reduce the light spill from windows during the evenings. Where windows directly face the ecologically sensitive areas, blackout blinds shall be installed and linked to timeclock controls to eliminate light pollution outside daylight hours. The timeclock shall be of the astronomical type to prevent the need for seasonal re-programming.

4.2 Commercial Units

The commercial units will generally consist of ceiling mounted modular and low angle beam circular recessed luminaires, with 4000K colour output. The lighting design and lux levels shall meet the requirements of SLL Lighting Guide 7, 10, 12 and 17 as applicable.

To avoid unnecessary light spill, and reduce energy usage, electronic lighting shall be controlled via automatic PIR and daylight dimming controls where possible, with

timeclock for out-of-hours overrides. Manual switching should not be used anywhere in the buildings.

The use of electronic lighting outside trading hours should be discouraged to prevent adverse effect of feature lighting on the local wildlife and environment. This can be further controlled via timeclock and contactors.

Consideration should be made for the use of motorised blinds and/or curtains, linked to timeclock controls to reduce the light pollution from these buildings outside daylight hours. The timeclock shall be able to be pre-set astronomical types, allowing for seasonal time changes. Where windows face the ecologically sensitive areas, these measure shall be enforced to their fullest.

At the time of this report it is not clear as to the usage pattern of any of the commercial properties, and if any of these are to be accessible 24/7.

4.3 Educational Units

The educational buildings will generally consist of a mixture of ceiling mounted modular luminaires, suspended and pendant type luminaires, and surface mounted luminaires, with 4000K colour output. The lighting design and lux levels shall meet the requirements of SLL Lighting Guide 5, 10, and 12 as applicable.

To avoid unnecessary light spill, and reduce energy usage, electronic lighting shall be controlled via automatic PIR controls and daylight dimming where possible. Manual switching should not be used anywhere in the buildings.

The use of electronic lighting outside teaching hours shall be discouraged to prevent adverse effect of lighting on the local wildlife and environment.

The use of timeclock override controls should be considered to reduce the potential for light pollution. This can include reducing the colour temperature and illuminance levels outside teaching hours.

Consideration should be made for the use of motorised blinds and/or curtains, linked to timeclock controls to reduce the light pollution from these buildings outside daylight hours. The timeclock shall be able to be pre-set astronomical types, allowing for seasonal time changes. Where windows face the ecologically sensitive areas, these measure shall be enforced to their fullest.

At the time of this report it is not clear as to the usage pattern of any of the educational facilities, and if any of these are to be accessible 24/7.

5.0 EXTERNAL LIGHTING

The external lighting will have the biggest impact on the ecology of the site, and therefore careful consideration is needed by the whole design team.

The design of the external lighting installation shall follow the five principles for responsible outdoor lighting, as prescribed by the IDA. These are as follows;

External lighting shall not be provided unless absolutely necessary to reduce the amount of light pollution created by the redevelopment of the site and minimise impact on the local environment and wildlife. This should also aid in providing dark corridors along the canal and railway.

Directional and shielded luminaires shall be utilised to ensure there is no unintended light spill to residential units or ecologically sensitive areas. Where possible, there will be no element of uplighting, with all luminaires directing light down and horizontal. All external luminaires shall be Dark Sky certified.

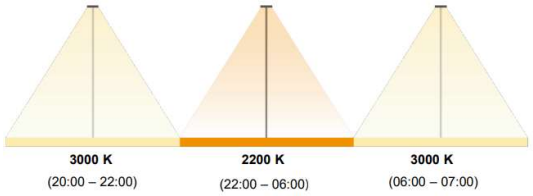
Lux levels shall be kept to a minimum and provided to the appropriate levels as indicated in the SLL lighting guides. The calculated lux levels at the canal and railway habitats shall be 0.5 lux maximum.

The use of timeclocks and motion sensors shall be considered to control the external lighting. Where possible an adaptive lighting solution such as WE-EFs “Wild-Light” technology shall be utilised.

Wild-Light luminaires attempt to minimise the impact on wildlife, whilst securing safe lighting for people. Extremely warm-coloured light, circa 2,200K, with a minimised blue component is particularly kind to animals, insects, or nocturnal mammals.

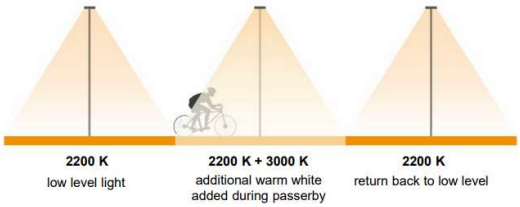
However, the colours and contrasts of such light are not as good for the human eye as conventional LEDs in warm white with 3,000K.

These can be controlled via pre-set automatic dimming, or by motion control, as illustrated below;



Wild-Light Advanced

fully automatic dimming preset, starting the night with warm white **(3000 K from 20:00 to 22:00)**, reduced to biodiversity friendly in the heart of the night **(2200 K from 22:00 to 06:00)**, and returning back to warm white in the early morning **(3000 K from 06:00 to 07:00)**. This is the easiest solution to implement.



Wild-Light Motion

the biodiversity friendly 2200 K is on throughout the night on a low level, preserving wildlife and saving energy. At the presence of a pedestrian or cyclist, additional warm white 3000 K switches on, and will immediately return back to only 2200 K when no one is around. This is the solution to prefer for optimal wildlife preservation and maximised energy savings.

https://www.we-ef.com/uk/environment/wild-life

The external lighting shall consist of;

Lamp post luminaires mounted at 4m height, with integral smart photocell, time clock and motion sensors and 0% upward light. Luminaires shall be able to be dimmable in 5% intervals, with 2200K and 3000K colour temperature outputs. Where lamp posts back on to dark corridors, shields shall be provided to prevent light spill towards these areas.

Medium level bollard type luminaires with directional, asymmetric distribution and 0% uplight. Controlled via centralised timeclock controls and 3000K maximum colour temperature output.

Wall mounted luminaires to entrance and egress positions to all buildings, and along walkways to a place of safety with 0% upward light. Controlled via photocell, timeclock and integral presence detection to ensure minimal lighting pollution.

Drawing numbers IN380(632)001 and IN380(632)002 show an indicative lux level assessment of the proposed development taking the recommendations in this report into account.

External Emergency Lighting

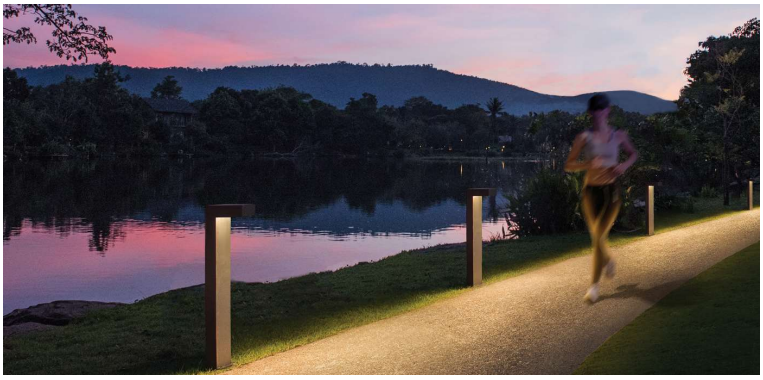
There will be an element of external emergency lighting to the proposed new buildings. The emergency lighting only operates in the event of a power outage to provide safe egress of the occupants from the building in the event of a fire/power outage. The emergency luminaires are non-maintained and will not illuminate in a standard situation, during day or night. The luminaires only operate in the event of a power failure for up to 3 hours or shut off automatically once power is restored.

5.1 Exeter Canal and Railway Line

As per the ecological report, the canal and railway line are ecologically sensitive areas, and should be retained as a dark corridors. As such, no light shall be allowed to spill on to the canal bank, the canal itself or the railway line.

This shall be achieved with close control of the direction of the light being emitted from luminaires in the vicinity of the canal and railway line. There will also be no lighting to the canal path itself.

Footpaths that are required to be illuminated and have potential for the light to spill in the direction of the canal or railway line shall be illuminated with dark sky compliant illuminated bollards, with asymmetric distribution, and face 'away' from the designated dark corridor.



WE-EF PSY400 bollard

Control of the lighting direction shall mean canal and railway habitats shall not experience light levels of above 0.5 lux, whilst maintaining a safe environment for the footpath users.

5.2 Roads

Foundry Lane, Garton Street and King Street require street lighting for vehicular access and pedestrian safety.

The lamp posts to these roads shall be a maximum of 4m in height to reduce light spill, with dark sky certified luminaires mounted to them and be provided with light shields where light spill lux levels are calculated to be above the required values.

Foundry Lane needs particular consideration given its proximity to the ecologically sensitive railway habitats, and the need to provide a dark corridor in this area. Here it is proposed Wild-Light technology be utilised to reduce the impact on wildlife by use of dimming and colour temperature control.

We-ef AFL120-WL

The road names used in this report are those shown on the current illustrative site master plan and are not formally agreed names, therefore subject to change.

5.3 Building Mounted Lighting

The proposed new buildings will have wall mounted wall lights for illuminating building entrances, exits and walkways to a place of safety.

All building mounted luminaires shall be dark sky certified, asymmetric distribution and have no uplighting element. These luminaires shall be controlled via timeclock, photocell and integral presence detection to minimise light pollution.

We-ef PLS420

6.0 REPORT LIMITATIONS

The following points shall be considered when considering this report;

- Lighting calculations have not taken into account existing or new flora or fauna. These will have a dampening effect on lux levels, therefore lux levels expected to be lower than calculated at these positions.
- Luminaire output colour within the calculations is fixed and a worst case scenario has been provided.
- Assumptions have been made as to the positions of building entrances, exits and walkways to a place of safety.
- Scheme is subject to detailed design development and changes are likely. Calculations provided are currently indicative only.