



LONDON SQUARE DEVELOPMENTS LTD

**FORMER GREGGS BAKERY SITE
TWICKENHAM
TW2 6RT**

**Exterior Lighting Assessment
Supplementary Report:
Minimising the Impact of Lighting
on Nocturnal Wildlife**

Desco (Design & Consultancy) Ltd

AMP House
Dingwall Road
Croydon
CR0 2LX

Telephone: 020 8686 5583

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03	17/06/2019	COMMENTS FROM ASSAEL ARCHITECTURE INCORPORATED	ACh	JC
04	16/10/2019	UPDATED TO LATEST LANDSCAPE LAYOUTS	ACh	JC



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1.0 INTRODUCTION

Following input from the Environmental Agency (EA), Friends of the River Crane Environment (FORCE) and Richard Graves Associates in relation to the River 'Dark Corridor' and Bat (and other nocturnal wildlife) activity in this corridor, this supplementary report outlines the mitigation measures employed to minimise environmental impact and provides an assessment of the contribution of the apartment lighting and revised low level lighting design for the riverside car park to the proposed residential development at the former Greggs Bakery site in Twickenham. The project comprises construction of 51 new townhouses and 65 new apartments. Also included in the proposal is car parking, vehicle access roads, cycle and refuse storage and two storeys of commercial space at the south of the site.

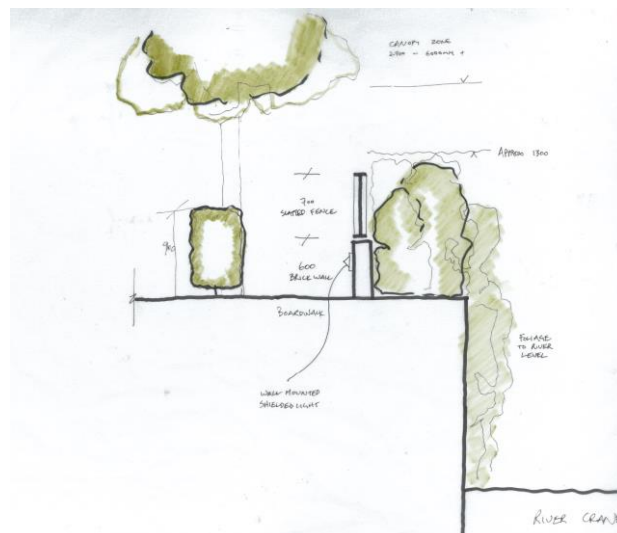
The site is located within the London Borough of Richmond upon Thames and is situated in the centre of an established low-rise residential area mainly comprising townhouses. The development is accessible via both Gould and Crane Road, and Twickenham station sits approximately 900 metres due East of the site.

2.0 LIGHTING DESIGN

Planning objections were raised with regards to the amount of likely illumination the development would cause to the 'Dark Corridor' of the river. We have modelled the external illumination from the apartments based on a 70% occupancy at any one time with 60% of apartments having curtains closed when lighting is on in living rooms and bedrooms. Balcony lights have since been omitted from the model as advised by the Architect.

We have also modelled with the undercroft/car park with the garage door open and lighting on.

One of the mitigation measures referred to in the 'Protecting bats in waterside development'¹ document is to restrict the amount of light spill reaching the sensitive area by providing light barriers which can be in the form of walls, bunds or fences. We understand from Assael Architecture Ltd the construction build-up along the river edge will comprise a 600mm brick wall with 700mm slatted fence above. A continuous hedge, circa 1300mm high will also be planted behind the fence on the riverside to try to reduce light spill onto the river from the new development and effectively creating a 2700mm 'bat flight zone'.



SKETCH SHOWING RIVERSIDE WALL BUILD-UP

¹ The Environment and Design Team (2018) WaterSpace Design Guidance Protecting Bats in Waterside Development

**REVISED RIVERSIDE EXTERNAL LIGHTING WITH APARTMENT CONTRIBUTION
LOOKING WEST**

Other mitigation measures referred to in that document are:

- i) To use recessed luminaires in the apartments and set these back from the windows.
- ii) To use LED lamps.
- iii) To use shielded external lights.

We have modelled the riverside car park scene to include the wall build-up as discussed above.

The original external lighting design submitted for planning comprised LED street luminaires mounted on 4000mm high columns around the car park adjacent to the river. We have replaced these columns with wall mounted eyelid bulkhead luminaires mounted on the development side of the perimeter wall and low level bollards to minimise light spill across the river.

Lighting in the apartments will be recessed LED downlights set back approximately 1000mm from windows with the colour temperature being a mixture of 3200k and 4000k, however we cannot fully control the angle of the refracted and emitted light from the apartment windows.

All car park lighting will utilise LED lamps and comprise integral louvres to control light distribution and reduce upward light spill.

The existing site comprises warehouse/factory buildings overlooking the existing riverside wall with windows at high level above the wall which would cause localised illumination pollution to the river 'Dark Corridor'. There is also a property on the opposite bank with windows and doors within about 2m of and overlooking the bank.

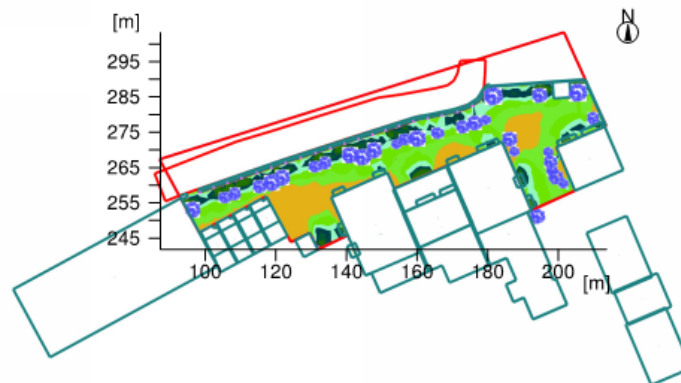
The apartment blocks and houses in the proposed development are set back approximately 15000mm from the edge of the river. There would be an improvement on the current factory situation in relation to maintaining and creating the river 'Dark Corridor'.

The proposed external lighting has been modelled using lighting design software, the calculation outputs of which are shown below. This has enabled lighting levels and spill across the space and the river to be predicted, thus ensuring that light is not provided to areas which do not require illumination and does not impact the 'Dark Corridor'.

There is no proposed uplighting to trees and other landscape features, both new and existing, which will avoid illuminating bat foraging and commuting habitats.

The revised lighting design no longer conforms to Secured by Design (SBD), however having the wall and hedge adjacent the riverside will discourage congregation in the area. The Client, in consultation with local authorities and authorities having jurisdiction (AHJ's), would need to undertake a risk assessment, balancing the risk of nuisance and crime against the environmental issues and the risk of refusal of planning permission.

REVISED RIVERSIDE EXTERNAL CAR PARKING LIGHTING LUX LEVELS WITH APARTMENT CONTRIBUTION (COLUMNS OMITTED AND LOW LEVEL LED LIGHTING SUBSTITUTED)



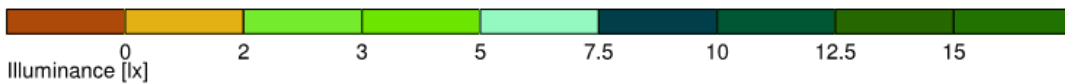
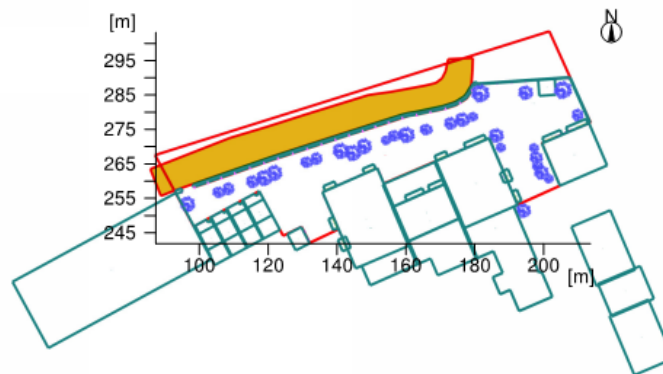
General

Calculation algorithm used	Average indirect fraction with light colours
Height of evaluation surface	0.00 m
Maintenance factor	0.75
Light flux factor (see maintenance plan)	0.90
Total luminous flux of all lamps	94960 lm
Total power	5474 W
Total power per area (3399.71 m ²)	1.61 W/m ²

Illuminance

Average illuminance	Eav	4.3 lx
Minimum illuminance	Emin	0.3 lx
Maximum illuminance	E _{max}	29.4 lx
Uniformity U _o	E _{min} /E _m	1:14.6 (0.07)
Diversity U _d	E _{min} /E _{max}	1:100 (0.01)

ILLUMINANCE LEVELS APPROX 1300mm ABOVE RIVER SURFACE LEVEL BEHIND PERIMETER WALL AND HEDGE PLANTING



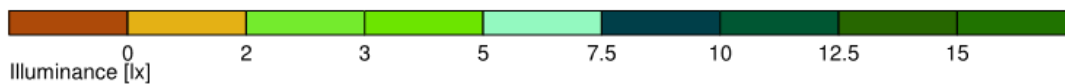
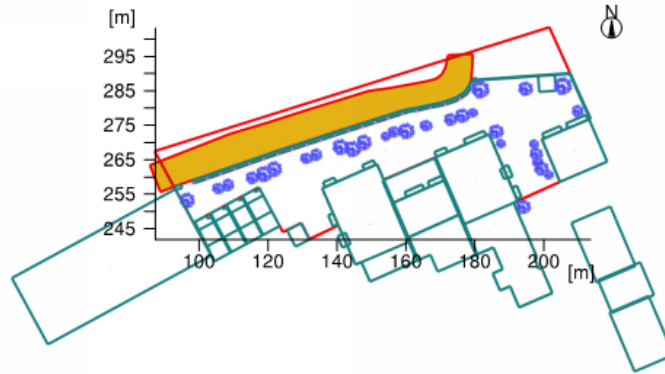
General

Calculation algorithm used	Average indirect fraction with light colours
Height of evaluation surface	1.30 m
Maintenance factor	0.75
Light flux factor (see maintenance plan)	0.90
Total luminous flux of all lamps	94960 lm
Total power	5474 W
Total power per area (3399.71 m ²)	1.61 W/m ²

Illuminance

Average illuminance	Eav	0.39 lx
Minimum illuminance	Emin	0.01 lx
Maximum illuminance	Emax	0.87 lx
Uniformity U _o	Emin/Em	1:34.8 (0.03)
Diversity U _d	Emin/Emax	1:78.5 (0.01)

ILLUMINANCE LEVELS APPROX 50mm ABOVE RIVER SURFACE LEVEL BEHIND PERIMETER WALL AND HEDGE PLANTING



General

Calculation algorithm used	Average indirect fraction with light colours
Height of evaluation surface	0.05 m
Maintenance factor	0.75
Light flux factor (see maintenance plan)	0.90

Total luminous flux of all lamps	94960 lm
Total power	5474 W
Total power per area (3399.71 m ²)	1.61 W/m ²

Illuminance

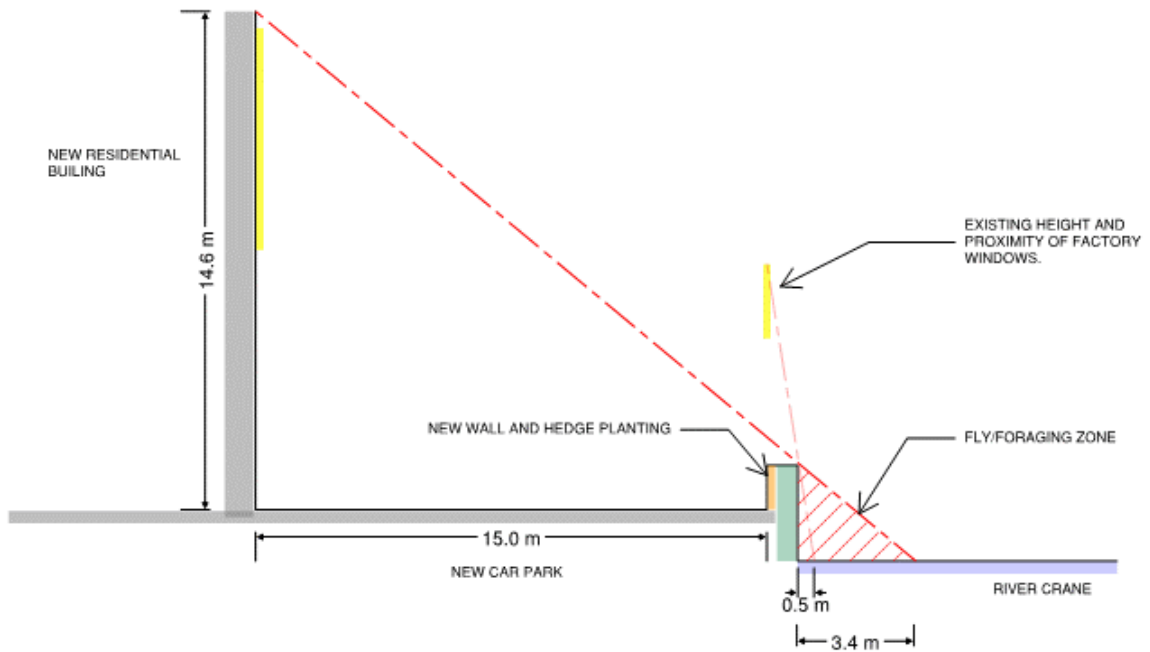
Average illuminance	Eav	0.45 lx
Minimum illuminance	Emin	0 lx
Maximum illuminance	Emax	1.31 lx
Uniformity U _o	Emin/Em	1:--- (---)
Diversity U _d	Emin/Emax	1:--- (---)

3.0 CONCLUSION

The results obtained from the lighting calculations indicate that the illuminance from the apartments, houses and the riverside car park revised lighting do not significantly impact the river 'Dark Corridor' and improve upon the existing conditions. Although our model indicates that we will not be achieving the <0.1 lux across the entire river, nor to the opposite bank as outlined in the 'Protecting bats in waterside development' document, the team have introduced mitigation measures for the proposed development and lighting scheme to limit light spill. With all of the mitigation applied, residual light spill on the river corridor will be of the order of 0.45 lux, which is similar to that experienced on a clear full moon (0.25 - <1 lux).

With the development set back approximately 15000mm from the river's edge, the introduction of a 600mm brick wall complete with 700mm slatted fence above and substantial hedge planting along the river frontage, combined with the river surface being approximately 1200 – 1500mm below ground level, the proposal provides for a darker, deeper and wider fly/foraging zone than currently exists. This is demonstrated in the diagram below which shows a new 3400mm dark foraging zone across on the river's surface. This is far greater than the estimated 500mm wide zone that exists with the boundary wall and factory building high level windows.

DIAGRAM OF LIGHT SPILL/DARK CORRIDOR



**PHOTOGRAPH OF EXISTING RIVER CORRIDOR SHOWING FACTORY WINDOWS AT
HIGH LEVEL AND PROPERTY ON OPPOSITE BANK**

