

Broadfield Slopes

Architectural Lighting

Planning Report

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1.0 EXECUTIVE SUMMARY

The Stage 3 report outlines the architectural lighting strategy for the Broadfield Slopes project adjacent to Rochdale Town Hall.

Target light levels are derived from various lighting guides and regulations unless otherwise stated. Confirmation of specialist requirements will be required from other parties including the project ecologist, CCTV consultant and client to steer the design process.

The exterior lighting proposals take careful consideration of the various standards, guidance, and stipulations with the aim to create a lit environment that follows and exceeds best practice.

Since the NLHF R1 submission there has been on-going design and cost savings have been proposed. The cost savings proposed consist of:

- Handrail lighting has been deleted and replaced with wall mounted fittings to illuminate the packer spout steps
- The deletion of the cascade lighting
- The deletion of the allowance for event lighting

Savings have also been made during the design process. These saving consist of a rationalisation and reduction of column and wall lights to illuminate the pathways and packer spout area.

After liaison with Rochdale Borough Council's Environmental Management department, it was decided to increase overall light levels on the paths to enable maintenance to be carried out at levels of 20 lux average with every-day light levels on the paths though the slopes being 5 lux average. This has resulted in the re-specification of the column fittings to a luminaire with a higher lumen output.

2.0 EXTERNAL LIGHTING

2.1 Introduction

This report demonstrates the external lighting strategy for Broadfield slopes.

The external lighting strategy will be sympathetic to the historic architecture, vibrant site location and covers functional lighting to aid wayfinding and architectural lighting to subtly enhance the public realm environment.

Lighting levels are to be based on recommended target illuminance levels in accordance with CIBSE/SLL guides unless otherwise stated.

Other design consideration and regulation standards applicable to the lighting strategy include:

- **ILP Guidance Note 01/21 – The reduction of obtrusive light:** Minimising light pollution, obtrusion, and trespass
- **ILP Guidance Note 08/18 – Bats and artificial Lighting:** Mitigating light pollution affecting local ecology
- **CIBSE Lighting Guide 6 – The exterior environment:** Lighting strategies and guidance
- **BS 8300-2/2018 – Design of an accessible and inclusive built environment:** Lighting strategies for inclusive design
- **Secured by Design – Lighting against crime:** Recommended lighting strategies to improve safety
- Responsibly designed lighting scheme sourcing economically viable products that are fit for purpose and best practice.

2.2 Reduction of obtrusive light

The exterior concept is to provide safe, functional lighting to aid wayfinding and legibility of the landscape whilst enhancing the space. To provide this amenity without excessive impact to the local environment, ecology, and night sky we instil best practice and the latest guidance. There are several aspects to light pollution and ways to mitigate its impact. These are set out in the **ILP Guidance Note 01/21 – The reduction of obtrusive light** guidance documents and summarised here:

Key guidance notes:

- Provide adequate levels of light to external areas, allowing spaces to be used effectively and safely, while avoiding “over-lighting” by turning off or dimming lights at times when they are not required.
- Limit visible light source intensity to minimise glare by reducing the angle of the luminaire to no greater than 70° from a downward vertical position. Where the design requires fittings that do not intrinsically comply with this requirement are necessary, using the building or other fixed structures to obstruct spill light can aid glare reduction.
- Limit light spill above the horizontal plane that causes “Sky Glow”.
- Limit illuminance of adjacent buildings to an acceptable level.
- Reduce the levels of light trespass after a curfew.

The following extracts are taken from the **ILP Guidance Note 01/21 – The reduction of obtrusive light** and offers guidance on the reasonable constraints for external lighting installations in a range of different environmental classifications. The site is situated in central city location and surrounded by significant buildings including Rochdale Town Hall and St Chads parish church. It is part of a significant area of parkland and the desire is for the new slopes project to become a key public amenity restoring the pedestrian link between the river and the parish church. Ecology and public safety must be balanced and so for the purposes of classification it can be considered as environmental **Zone E3** – A suburban area with medium district brightness. Some lower footfall routes particularly adjacent to residential accommodation, maybe more appropriately considered **Zone E2**.

After liaison with Rochdale Borough Council’s Environmental Management department, it was advised that light levels across Broadfield Slopes should be capable of being raised to a higher light level than previously advised to enable maintenance to be carried out. An average light level of 20 lux was deemed suitable for these purposes. This results in the area being classified as an E2-E3 environmental zone. Normal day to day light levels will be 5 lux ave. but with the capability of being raised to 20 lux ave by overriding the central management system.

Table 1: Environmental zones

Zone	Surrounding	Lighting environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres of suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity

Table 2 (CIE 150 table 2): Maximum values of vertical illuminance on premises

Light technical parameter	Application conditions	Environmental zone				
		E0	E1	E2	E3	E4
Illuminance in the vertical plane (E_v)	Pre-curfew	n/a	2 lx	5 lx	10 lx	25 lx
	Post-curfew	n/a	<0.1 lx*	1 lx	2 lx	5 lx

Table 3 (CIE 150 table 3): Limits for the luminous intensity of bright luminaires

Light technical parameter	Application conditions	Luminaire group (projected area A_p in m^2)					
		$0 < A_p \leq 0.002$	$0.002 < A_p \leq 0.01$	$0.01 < A_p \leq 0.03$	$0.03 < A_p \leq 0.13$	$0.13 < A_p \leq 0.50$	$A_p > 0.5$
Maximum luminous intensity emitted by luminaire (I in cd) ^s	E0 Pre-curfew Post-curfew	0 0	0 0	0 0	0 0	0 0	0 0
	E1 Pre-curfew Post-curfew	0.29 d 0	0.63 d 0	1.3 d 0	2.5 d 0	5.1 d 0	2,500 0
	E2 Pre-curfew Post-curfew	0.57 d 0.29 d	1.3 d 0.63 d	2.5 d 1.3 d	5.0 d 2.5 d	10 d 5.1 d	7,500 500
	E3 Pre-curfew Post-curfew	0.86 d 0.29 d	1.9 d 0.63 d	3.8 d 1.3 d	7.5 d 2.5 d	15 d 5.1 d	10,000 1,000
	E4 Pre-curfew Post-curfew	1.4 d 0.29 d	3.1 d 0.63 d	6.3 d 1.3 d	13 d 2.5 d	26 d 5.1 d	25,000 2,500

Table 4 (CIE 150 table 5): Maximum values of upward light ratio (ULR) of luminaires

Light technical parameter	Environmental zones				
	E0	E1	E2	E3	E4
Upward light ratio (ULR) / %	0	0	2.5	5	15

The illustration below demonstrates a glossary of terms used in the guidance whilst highlighting potential issues of light pollution from outdoor lighting installations.

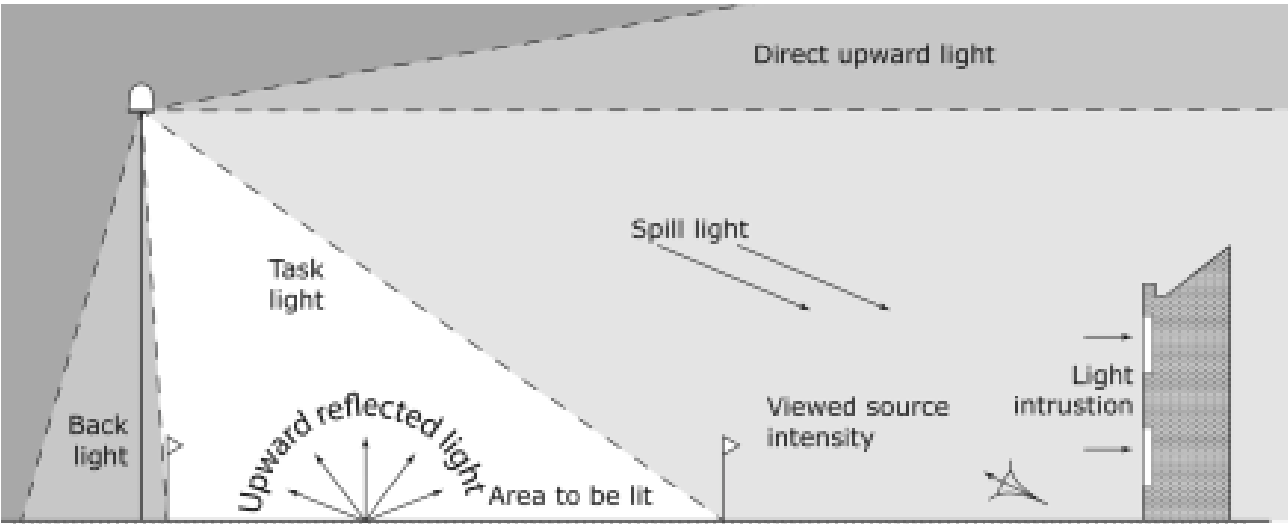


Figure 1Types of Obtrusive Light

2.3 Mitigating effects of light pollution on ecology

The scheme aims to minimise the impact on flora and fauna, whilst specifically taking consideration in the protection of bats (subject to confirmation from an ecologist report to determine the presence of bats and other fauna).

Key guidance notes:

- Using LED light sources with no UV, as insects are attracted to light sources which emit UV radiation.
- Careful application of light ensuring it is only where required, fit for purpose (not over illuminated), and minimising spill light onto adjacent properties.
- Limiting the times that lights are on to provide some dark periods for wildlife. Dimmable lighting presence detection and/or timed control will be used to ensure lighting is only operating when required.

The following guidance outlined by ILP Guidance Note 08/18 – Bats and artificial Lighting in the UK will be considered:

- Use of LED luminaires with controlled performance specifications (output, optics, LEDs attributes).
- Use of controlled directional luminaires.
- Use of lights with 0% upward light ratio where possible.
- LEDs to have a peak wavelength greater than 550 nm.
- Warm white spectrum < 3000K (Ideally <2700K).

2.4 Design illuminance levels

The lighting levels for the external areas have been informed by the following guidance documents:

- ILP Guidance Note 01/21 – The reduction of obtrusive light
- ILP Guidance Note 08/18 – Bats and artificial Lighting
- CIBSE Lighting Guide 6 – The exterior environment
- BS 8300-2/2018 – Design of an accessible and inclusive built environment
- Building regulations L2A
- Secured by Design – Lighting against crime

The extract below is taken from BS 8300-1:2018 Design of an accessible and inclusive built environment Part 1: External environment – Code of practice.

All values in average maintained illuminance (lux)		
Application	Average illuminance	Minimum illuminance
Statues	>50	—
Flags	50	—
Pedestrian routes in the external environment	5	—
Pedestrian routes adjacent to the entrances/exits of buildings	—	100
Cycleways	10	—
Subways (open) (night)	50	25
Subways (enclosed) (night)	100	50
Subways (enclosed) (day)	350	150
Footbridges (open) (night)	30	15
Footbridges (enclosed) (night)	100	50
Footbridges (enclosed) (day)	350	150
Stairways and ramps (open) in the external environment.	30	15
Stairways and ramps (open) adjacent to the entrances/exits of buildings	—	100
Outdoor car parks:	—	—
Light traffic	5	—
Medium traffic	10	—
Heavy traffic	20	—
Public transport	—	—
Bus stops	20	—
Tram platforms	20	—
Reading signs	50	—
Conflict areas	—	5 to 15
Pedestrian crossings	—	10 to 15

NOTE 1 Values in this table are drawn from CIBSE publication LG06/16 [30] and the SLL code for lighting [32].

NOTE 2 The values given for reading signs would be adequate for the illumination of entry barrier controls and car park ticket machines.

Table 5 The artificial lighting of specific applications

Based on the guidance documents above, the illuminance levels for external lighting at Broadfield slopes have been designed to the following target levels:

- Pedestrian pathways – 5 lx ave.
- Steps – 30 lx ave.
- Ramps – 30 lx ave.

2.4.1 Design Progress

After liaison with Rochdale Borough Council’s Environmental Management department, it was advised that light levels across Broadfield Slopes pathways should be able to be increased to enable maintenance to be carried out. An average light level of 20 lux was deemed suitable to enable maintenance to occur. Normal day to day operation of the lighting across the slopes would maintain walkways at 5 lux ave, but with the capability of Environmental Management or First Response being able to override the central CMS to bring light levels up to 20 lux ave..

PUBLIC SPACES
Design specifications and values

The lighting of public places and amenity areas or privately owned land to which the public have access will be the responsibility of Local Authorities or private land lords respectively but the lighting principles will remain the same.

GOOD
Adequate illuminance levels
Good uniformity
Low light pollution
Good aesthetic appearance
Regular maintenance
Vandal resistant equipment and materials

BAD
Incorrect choice of luminaire
Light pollution / trespass
Unprotected column positions
Poor maintenance



Good lighting promotes safety in the 24-hour city

The aesthetic value of a lighting installation is an important consideration as the day time street scene suffers greatly if fittings, materials or paint finishes are of lesser quality. The shabby appearance of lighting street furniture can send the wrong signals to the community and contribute to a cycle of grime, crime and decline.

Average levels of Illuminance in Lux	
Pedestrian only traffic	20 Lux*
Mixed vehicular and pedestrian	30 Lux*
Bus station passenger areas	25 Lux*
Urban large car park	
Short stay	30 Lux
Long stay	15 Lux
Urban small car park	
Short stay	20 Lux
Long stay	15 Lux
Urban local car park	10 Lux
Rural large car park	
Short stay	15 Lux
Long stay	15 Lux
Rural small car park	
Short stay	10 Lux
Long stay	10 Lux
Rural local car park	05 Lux
Sports stadium and similar venues (Escape,Anti Panic)	30 Lux**

The new agreed levels are as follows:

- Pedestrian pathways – 5 lux average with the capability of being increased to 20 lx ave. for maintenance.
- Steps – 30 lx ave.
- Ramps – 30 lx ave.

2.5 Design strategy

The external lighting strategy is as follows:

- Pathways through the landscape to be illuminated via column mounted lanterns with column top luminaire with no upwards light spill to 5 lux average with the capability of being dimmed upto 20 lux average.
- Walkways and steps within the Packer Spout area to be illuminated via re-instating historic obelisk mounted lanterns supplemented by lighting recessed or surface mounted to walls. Close liaison required with historic lantern manufacturer to ensure light spill is minimised whilst keeping design of historic lantern intact.
- Market cross to be illuminated via a spotlight concealed within a new replacement lantern located on top of existing stone obelisk

2.6 Controls

The exterior lighting is to be operated from a lighting controls system. The lighting control system will operate with an astronomic clock scheduled to function from dusk to dawn or within any stipulated curfews by the local planning authority.

With lighting control automation, the exterior lighting scheme only operates as and when required so the lighting can be dimmed/off outside of core hours. This can be adjusted when occupancy of the space and required light levels are better understood.

2.7 Summary

The target light levels are derived from the various lighting guides and regulations unless otherwise stated. Confirmation of specialist requirements will be required from other parties including the project ecologist, CCTV consultant and the client.

3.0 LIGHTING STRATEGY

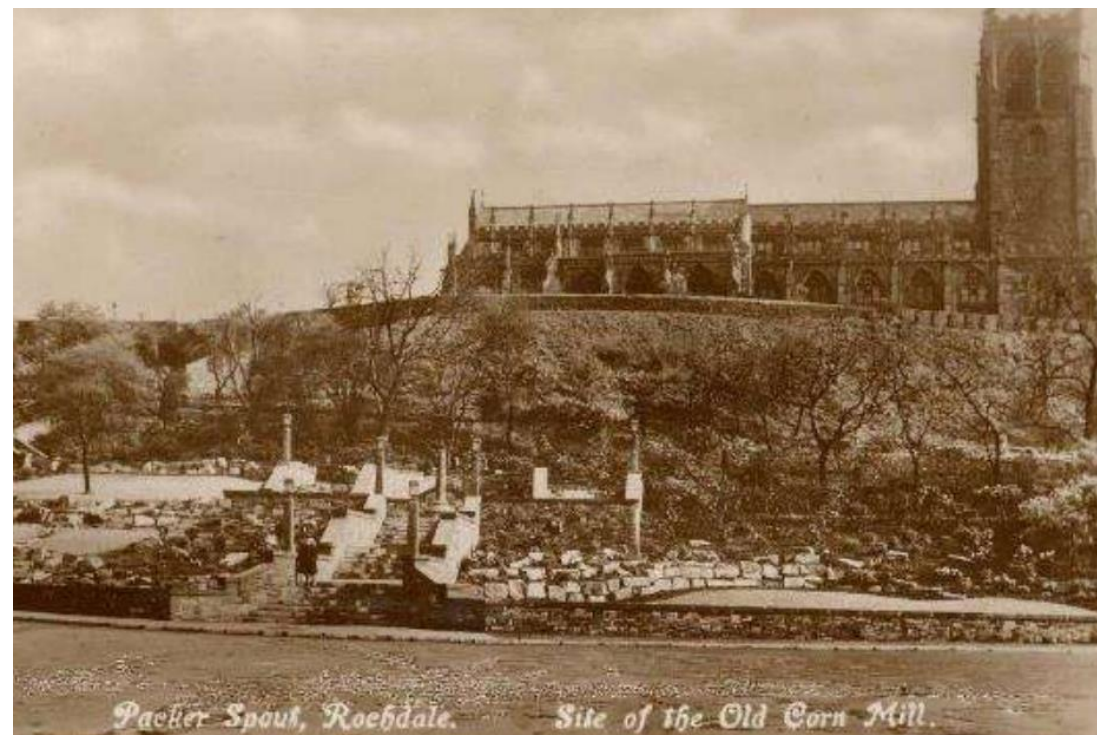
3.1 Heritage

It is the intention to reinstate the historic lighting features within the Packer Spout area of the project. Lanterns are proposed to be mounted to the remaining and re-instated stone obelisks.

There is the opportunity, with the re-instatement of the historic lantern fittings, that small spotlights can be concealed within the 'cap' of 2 of the lanterns to illuminate the Market Cross.



Packer Spout with St Chads in background, lanterns clearly visible on top of stone obelisks



Packer Spout steps with St Chads in background, stone obelisks with lanterns visible to foreground

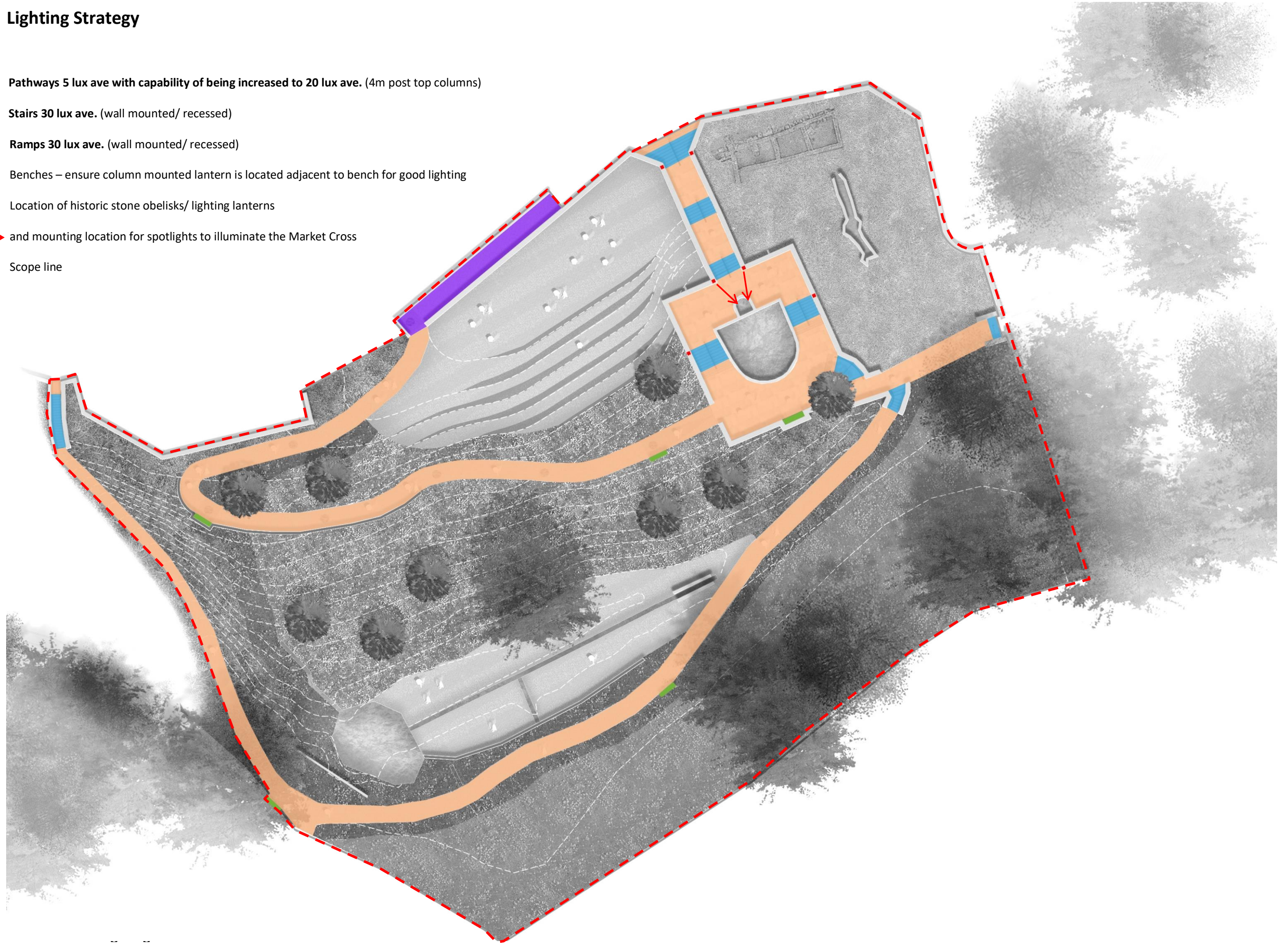


Condition of remaining stone obelisks and location of replacement lanterns. Spotlights to illuminate the Market Cross can be integrated within the new lanterns.

3.2 Lighting Strategy

Key:

- Pathways 5 lux ave with capability of being increased to 20 lux ave. (4m post top columns)
- Stairs 30 lux ave. (wall mounted/ recessed)
- Ramps 30 lux ave. (wall mounted/ recessed)
- Benches – ensure column mounted lantern is located adjacent to bench for good lighting
- Location of historic stone obelisks/ lighting lanterns
- and mounting location for spotlights to illuminate the Market Cross
- Scope line



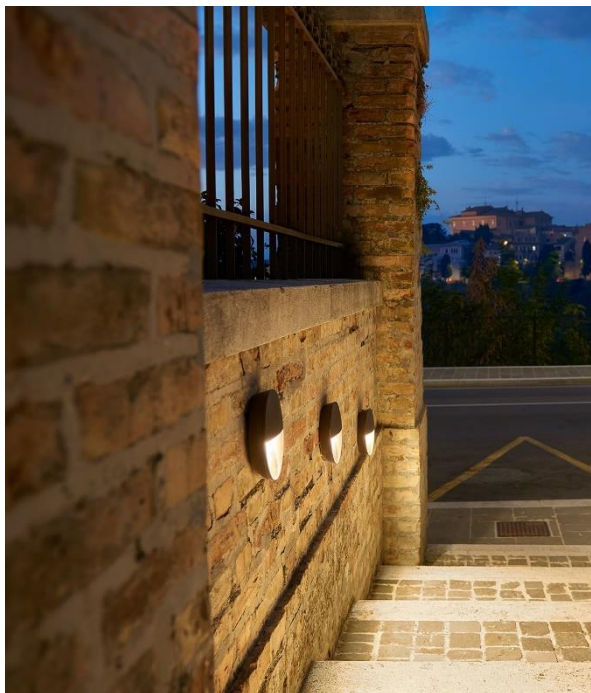
3.3 New Lighting Equipment



Column mounted lanterns illuminate pathways



Holophane Signature post top used in adjacent Rochdale Town Hall project, to be used to illuminate pathways through the landscape



Wall lights illuminate ramp adjacent to car park and packer spout steps



Recessed/ surface mounted wall light