

Castlefield Viaduct | Phase 2

RIBA Stage 3 - Lighting Design Report

JN 282210-00

Rev 01 | 15 August 2024 |

CVI-ARUP-ZZ-ZZ-RP-E-6301

1 Intro

The report includes the Work Stage 3 lighting strategy for Phase 2 of the Castlefield Viaduct project.

The report includes the following:

- Phase 1 Lighting Summary
- Lighting Concept - Phase 2
- Lighting Zones
- Lighting Approach
- Ecology and Biodiversity
- Typical Luminaire Schedule
- Typical Lighting Layout

1.1 Design Objectives

The key design objectives for the lighting design of Castlefield Viaduct are:

- Continuation of the Phase 1 lighting scheme for visual continuity and ease of maintenance.
- Create a magical experience at night.
- Create pocket spaces with different experiences and storytelling which provides a different perspective in the hours of darkness.
- Use the lighting treatment to differentiate between the different zones along the viaduct.
- Consider the viewpoints looking onto the viaduct and create intrigue for onlookers.
- Interact with visitors.
- Re-purpose lighting elements from Phase 1 into the Phase 2 scheme; circular lighting principles.
- Protect the local ecology by minimising obtrusive light effects.
- Welcome visitors to the Viaduct by incorporating safe and inviting lighting principles to the egress point.

1.2 Design Criteria

1.2.1 Artificial Lighting Guidance

The lighting will be designed with reference to with the following guides and standards, where appropriate:

- CIBSE SLL Code for Lighting
- CIBSE SLL Lighting Guide 6: Exterior environments
- CIBSE SLL Lighting Guide 14: Control of electric lighting
- British Standard EN 12464-2: Light and Lighting- Lighting of outdoor work places
- ILP Guidance Notes for the Reduction of Obtrusive Light GN01: 2021
- BS 8300-1 2018 Design of an accessible and inclusive built environment

1.2.2 Technical Requirements

The following technical requirements will be incorporated into the lighting scheme:

- Minimise luminaire fixings to the structure.
- Minimise light obtrusion to nearby receptors by adopting a control system, applying light in a downward direction and keeping lighting at a low mounting level.
- Use luminaires of a suitable protection (IP) rating for longevity.
- Minimise distraction to tram and train drivers by using low glare light sources and carefully positioning luminaires.
- Prevent lighting being seen from ground level.
- Protect the local ecology by utilising warm colour temperature light sources, applying light with a downward distribution and keeping illumination levels to the minimum requirement.

1.2.3 Lighting Requirements

- **Walkway** Eav 5 lux
- **Ramp** Eav 30lux
- **Staircase** Eav 30lux
- **Lift entrance** Eav 30lux

Transitional lighting levels will apply to allow a seamless lighting journey between zones illuminates to contrasting levels.

2 Phase 1 Lighting Summary

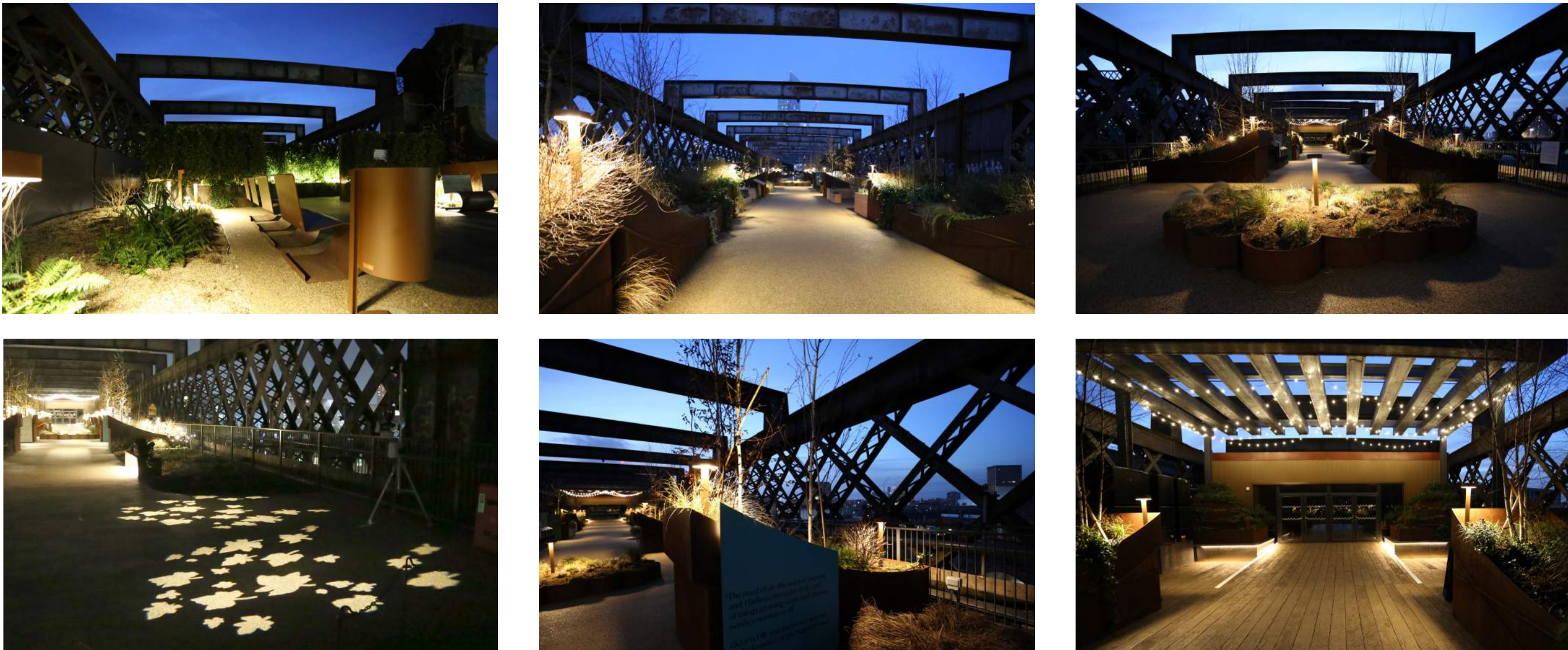


Figure 1: Phase 1 Lighting Scheme (as installed)

The Phase 1 lighting concept explored the history of the viaduct and aimed to bring in the movement from the trains which once travelled along the route.

When arriving at the viaduct the user enters the Naked Viaduct which is illuminated to low levels of light to enable the user to appreciate the darkness with leaf patterned gobo projections leading the user forward.

Once at the planters, small bollards highlight the planting but also illuminate the path towards the event space.

On approaching the Engagement Centre a catenary system provides soft lighting and a transition between the low level lighting to the viaduct and the increased brightness of the Engagement Centre, helping with light adaptations for users.

The Engagement Centre is illuminated from catenary lighting for flexibility.

3 Lighting Concept - Phase 2

The lighting concept is formed by following elements:

1 Continuity

The Phase 1 principles of warm colour temperature and low level lighting will continue into the Phase 2 scheme. Luminaires from the same lighting family will be installed for ease of ongoing maintenance.

2 Playfulness

Playfulness is brought to the spaces through colour, texture and interactive lighting. Cruising along the viaduct, the lighting elements will enrich the user experience with mystery and excitement.

3 Sensory Experience

The Gardens will have pockets of different activities and interaction bringing a sensory experience through lighting that stirs the emotion of the viewer through sight, sound and touch.

4 Tranquillity

The lighting will transform the space into a different atmosphere in the hours of darkness. A subtle, low level lighting approach will provide a haven from the busy, bright city skyline.

5 Identity

The stairs and the lift mark the approach to the Viaduct and will provide a visual connection from high to low level.

6 Sustainability and Ecology

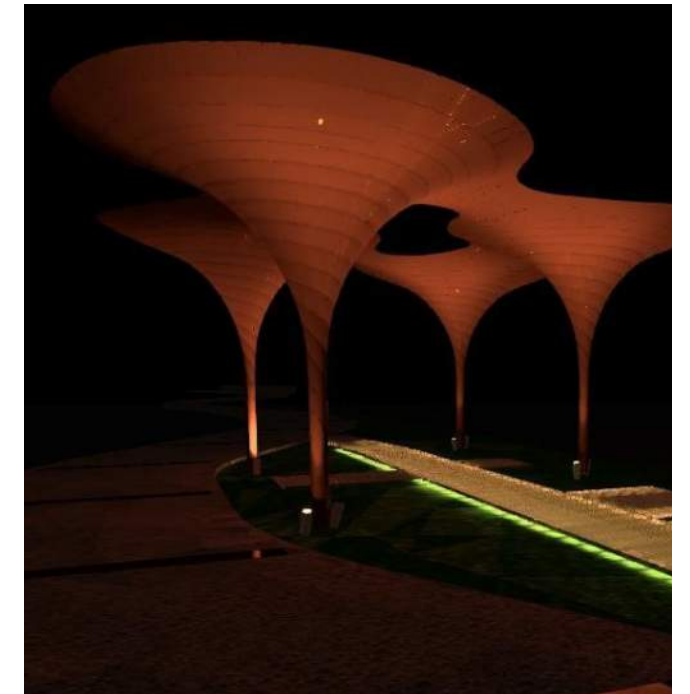
The lighting scheme will be sensitive to nearby residents and ecology by using a warm colour temperature and low level lighting with minimal upward light element.



1 Continuity from Phase 1 lighting scheme



2 Exciting, fun lighting elements



3 Lighting that provides a unique experience



4 A nocturnal escape from the city



5 Communicate the identity of the viaduct from ground level



6 Sustainability and protection of ecology at forefront of lighting design

4 Lighting Zones

The following diagram shows the different zones along the viaduct requiring a unique lighting treatment.

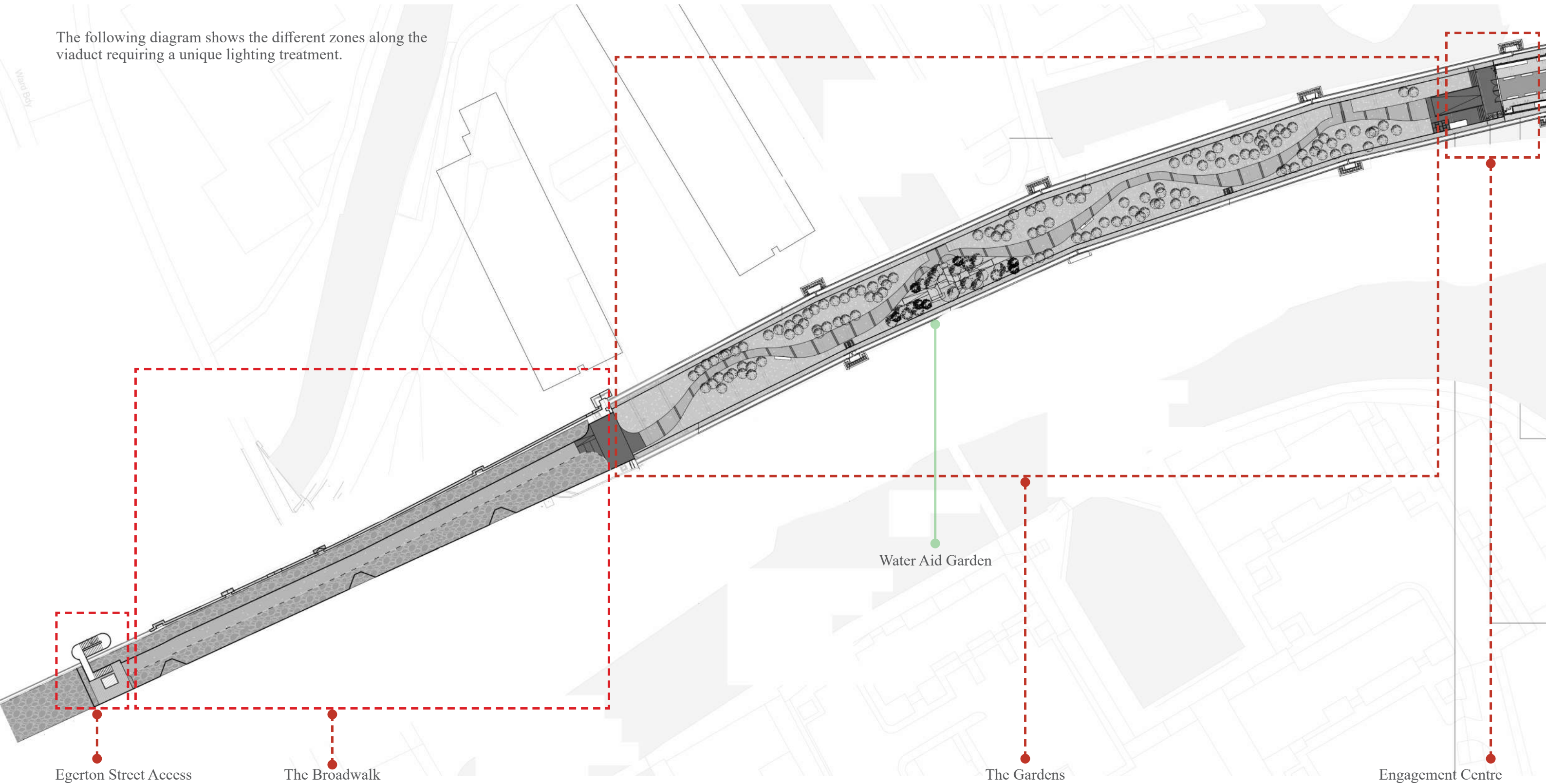


Figure 2: Lighting zones across Phase 2

5 Lighting Approach

5.1 Egerton Street Access

The Egerton Street Access provides the first impressions of the Viaduct as the visitor transitions from street level either by the lift or staircase.

The lighting will provide the following:

- Reveal the bold elements of the structure.
- Provide lighting for safe movement.
- Enable way-finding in the hours of darkness.
- Provide a visual connection from street level to the viaduct.
- Enhance the immediate surroundings with fun but functional lighting that discourages anti-social behaviour.

The lighting elements will comprise:

- Localised lighting on the staircase provided from either integrated handrail lighting or soffit-mounted downlights to each landing.
- Integrated lighting within the lift structure to illuminate the lift car.
- Spotlights mounted to the underside of the arches to illuminate the ground surrounding the lift and stair entrance.
- Spotlights will also wash colour-changing light or project patterns onto the wall of the arch to add interest and promote the Phase 2 scheme.

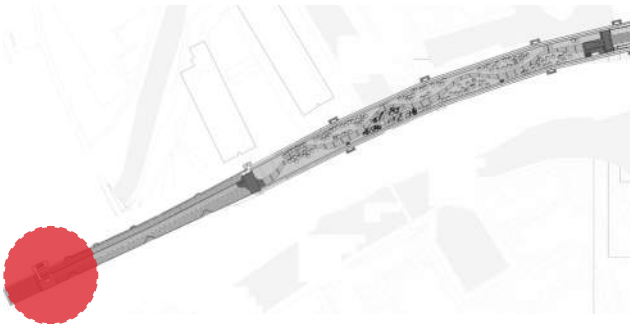


Figure 3: Key plan



Figure 4: Revealing the structure of the lift and staircase at night



Figure 5: Safely illuminate the stairs

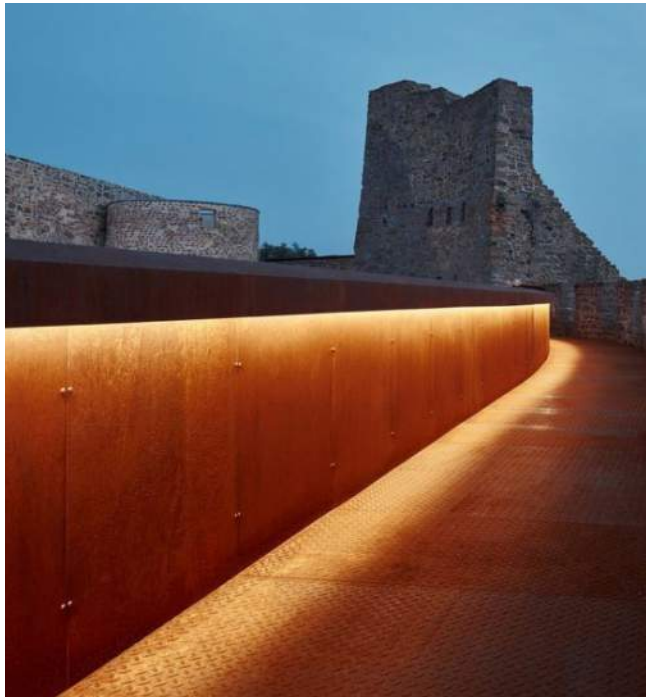


Figure 6: Integrate lighting within the structure



Figure 7: Lighting the surroundings for increased safety



Figure 8: Lighting the surroundings for increased safety



Figure 9: Highlighting the street art and provide a sense of identity

5.2 The Broadwalk

Lighting of this part of the Viaduct will follow similar principles to the Phase 1 Naked Viaduct scheme, with a simple lighting strategy of preserving the views out to the city.

The lighting will:

- Illuminate the path for safe movement from low level lighting using bollards.
- Re-purpose the Phase 1 lights which were removed from the scheme to add interest to the Broadwalk.
- Integrate spotlights within the retained biodiversity to reveal materiality and texture.

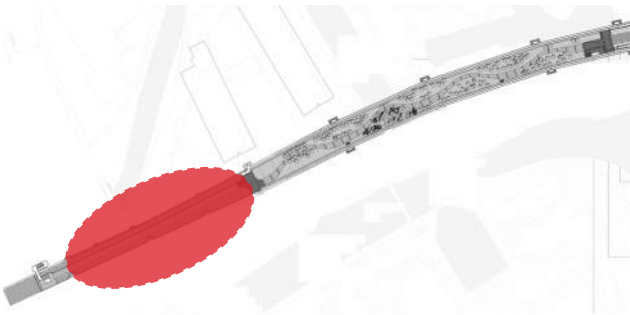


Figure 10: Key Plan



Figure 14: Lighting visual of The Broadwalk



Figure 11: Lighting providing guidance



Figure 12: Re-purposing Phase 1 lights

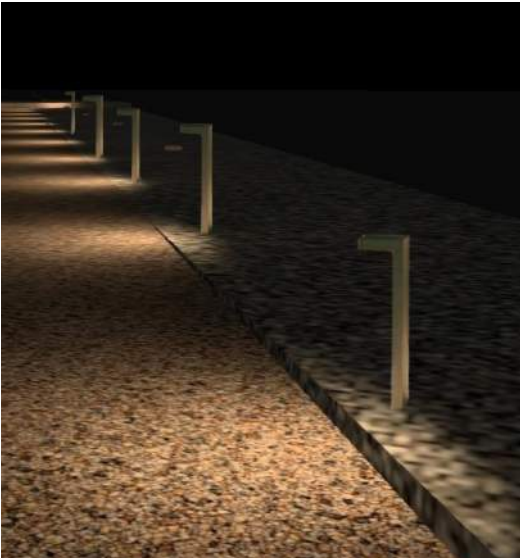


Figure 13: Lighting calculation visual

5.3 The Garden

The Garden will celebrate the cultural diversity and vibrancy of the community of Manchester.

Three zones of planting are identified in BDP's Planting Strategy, the lighting will coordinate with this. The zones are:

Zone 1: Horticulture and Meadow Mounds

Lighting will incorporate amenity and experience layers.

Zone 2: Water Aid Garden

Zone 3: Gravel Mosaic

Lighting will incorporate amenity layer only.

Lighting elements within the space will include the following:

- There will be an amenity layer of light throughout for safe movement and way-finding which will be integrated within all three zones.
- An experience layer of light in pockets of spaces will add elements of mystery, sensory play and tranquillity which will be integrated within Zone 1.
- The WaterAid Garden will be the focal point with accent illumination to the pavilion which is defined as Zone 2 in BDP's Planting Strategy and will have its own unique lighting strategy.

The following pages go into more detail for each of the lighting layers and their corresponding Zones.



Amenity Layer (Zone 1 and 3)



Experience Layer (Zone 1)



Water Aid Garden (Zone 2)

5.3.1 Amenity Layer

The amenity layer provides the lighting requirements for safe movement and way-finding. This will be integrated within all three zones of The Gardens.

The amenity lighting will consist of the following elements:

- Low level bollards to illuminate the walkways.
- Within the Gravel Mosaic (Zone 3) the amenity lighting will be the sole source of illumination.
- The lighting bollards will distribute light in a downward direction with no upward light spill.

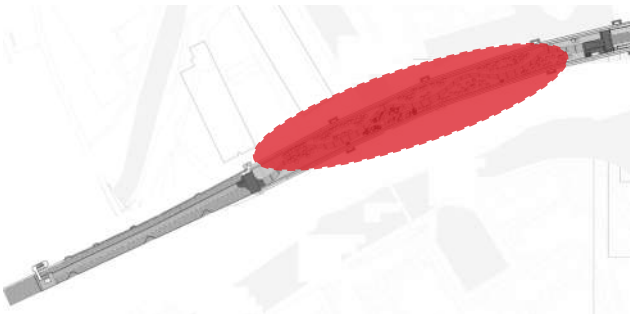


Figure 15: Key Plan



Figure 16: Lighting Visualisation



Figure 17: Low level spotlights on spike



Figure 18: Low level spotlights on spike



Figure 19: low level bollards to illuminate the walkway

5.3.2 Experience Layer

The experience layer of light will add elements of mystery, sensory play and tranquillity using focused illumination that explores gentle movement.

Lighting to this area will be a combination of solar lighting and electric lighting installations.

The lighting elements will be as follows:

- Re-purpose the Phase 1 lights which were removed from the scheme to add interest. These will be controlled to slowly fade on and off in sequence throughout the night.
- Solar lighting will be incorporated within the planting to add colour and patterns. The locations will be coordinated with the final planting strategy.
- The Gabion benches will have linear lighting mounted to the underside of the seat to graze light down the stone wall. This will add focal illumination along The Gardens.
- All lighting within the experience layer will have a low brightness and will be aimed in a downward direction to minimise the upward light spill.

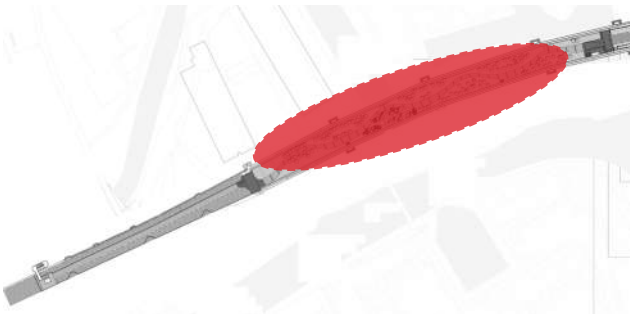


Figure 20: Key Plan



Figure 24: Lighting Visualisation



Figure 21: Lighting to benches for dwell time



Figure 22: Re-purposed Phase 1 lighting



Figure 23: Planting illumination

5.3.3 Water Aid Garden

The Water Aid Garden will have the most concentrated lighting treatment within the Phase 2 scheme. The pavilion will be the focal point along The Garden.

The lighting elements will be as follows:

- Low level linear lighting concealed beneath the mesh ramped path to aid with way-finding and safe-movement.
- Two spotlights per column of the pavilion will be mounted at ground level to uplight the underside of the structure and provide a canopy of illumination.
- Subtle spotlights will be integrated within the planting to reveal the textures and patterns of the greenery.

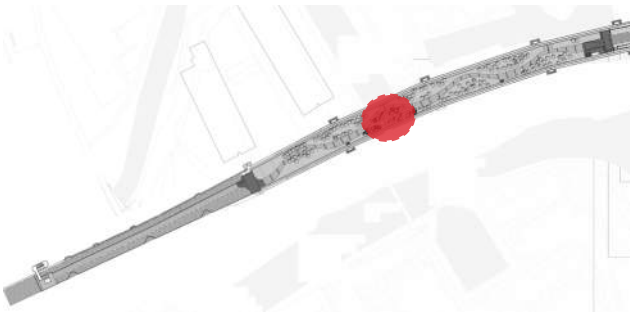


Figure 25: Key Plan



Figure 29: Lighting Visualisation



Figure 26: Back-lit mesh walkways



Figure 27: Planting illumination



Figure 28: Pavilion uplight

5.4 Entrance to Engagement Centre

The space immediately outside of the engagement centre will follow a similar approach to the Phase 01 scheme.

The lighting elements will be as follows:

- Soft lighting from catenary mounted to structure above to provide general illumination levels.
- Some existing lanterns from Phase 01 to be placed at the entrance to the Engagement Centre to keep the playful approach of self discovery through the journey
- Integrated linear lighting within the ramp and steps for a soft lighting effect that provides the required illumination levels.

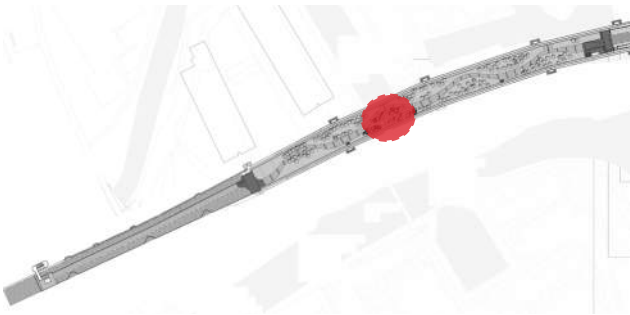


Figure 30: Key Plan



Figure 33: Lighting Visualisation



Figure 31: Catenary lighting



Figure 32: Existing portable lanterns



Figure 34: Lighting integrated to steps

6 Ecology & Biodiversity

An ecosystem is a complex and delicate network involving the interaction between living organisms and their physical environment. While ecosystems provide critical services to sustain life, their functioning can easily be disrupted through light trespass, sky glow, lighting levels and light source wavelengths. Even within dense urban environments a complex ecological system can exist and any negative impact of artificial lighting should be mitigated.

Within the urban environment, the most common night-time active species are bats. The application of lighting can have several detrimental impacts on these species. In the case of the site, there is an ecology report from 2021 which recorded bat activity to the underside of the viaduct.

The external lighting scheme shall be designed in line with guidance presented within the Institution of Lighting Professionals (ILP) ‘Guidance Note 08 - Bats and Artificial Lighting in the UK’ and Lighting mitigation of ‘Preliminary Ecological Appraisal’ from Urban Green

The lighting strategy will include the following principles:

- Only illuminate task areas and avoid over-illumination by designing to the relevant design guidance.
- Incorporate warm light sources (2700K) to avoid blue spectral components which negatively impact ecology
- Specify luminaires with zero upward light and good optical control.
- Use of integrated fittings that effectively contain light spill from unintended areas.
- The luminous intensity of all luminaires shall comply with the recommended limits in ILP GN:01 Table 4.
- Avoid direct illumination of any bat habitats particularly the Bridgewater Canal.

Refer to the Bat Survey and the Preliminary Ecological Appraisal from Urban Green for more information.



Figure 35: Warm colour temperature



Figure 36: Considered lighting approach to preserve dark skies



Figure 37: Directional lighting to avoid upward lighting

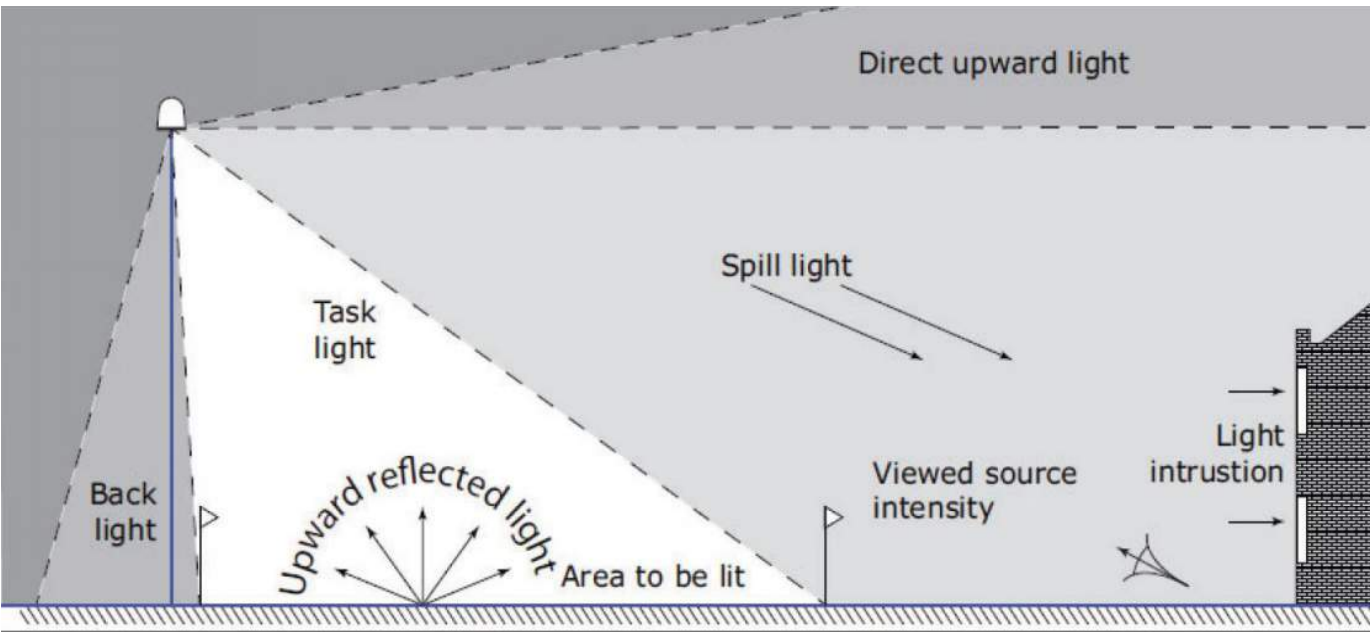


Figure 38: Light spill diagram

7 Typical Luminaire Schedule

Luminaire Reference	Mounting Location(s)	Image	Indicative Description	Typical Product Reference	Dimensions	Lamp Type & Light Colour	Typical Lumen Output	Optic
Type B1	Pathways		Low level ground-mounted bollards	Linea Light Peak	750mm H x 120mm x 90mm	LED 2700K	1265lm	Asymmetric
Type C1	Within planting		REPURPOSED - multiheaded spike-mounted luminaire	Linea Light Blum	1010mm H x 100mm dia	LED 2700K	600lm	n/a
Type S1	Water Aid pavilion		Spike-mounted spotlights	Linea Light Gardener	253mm H x 108mm dia	LED 2700K	2700lm	Medium Flood
Type S2	Within planting		Spike-mounted spotlights	Linea Light Clivo 2	71mm H x 33mm dia	LED 2700K	250lm	Wide flood
Type S3	Below viaduct, arch soffit		Ceiling-mounted spotlights	We-ef FLC240-CC	190mm H x 340mm dia	LED RGBA	4200lm	Wall-wash
Type U1	Engagement Centre entrance		Catenary Lights	MaxiLED Small Globe Series	Each node: 54mm H x 34mm dia Spaced at 300mm c/c along catenary wire	LED 2700K	45lm per globe	n/a
Type H1	Staircase handrail		Integrated handrail puck lighting	Wila Puck	Each puck: 15mm H x 18mm dia Spaced at 1000mm along handrail	LED 2700K	170lm per puck	Asymmetric
Type L1	Benches, ramps and stair treads		Surface-mounted continuous linear luminaire	Linea Light PU_C Plus	12mm W x length to suit	LED 2700K	450lm/m	n/a

8 Typical Lighting Layout

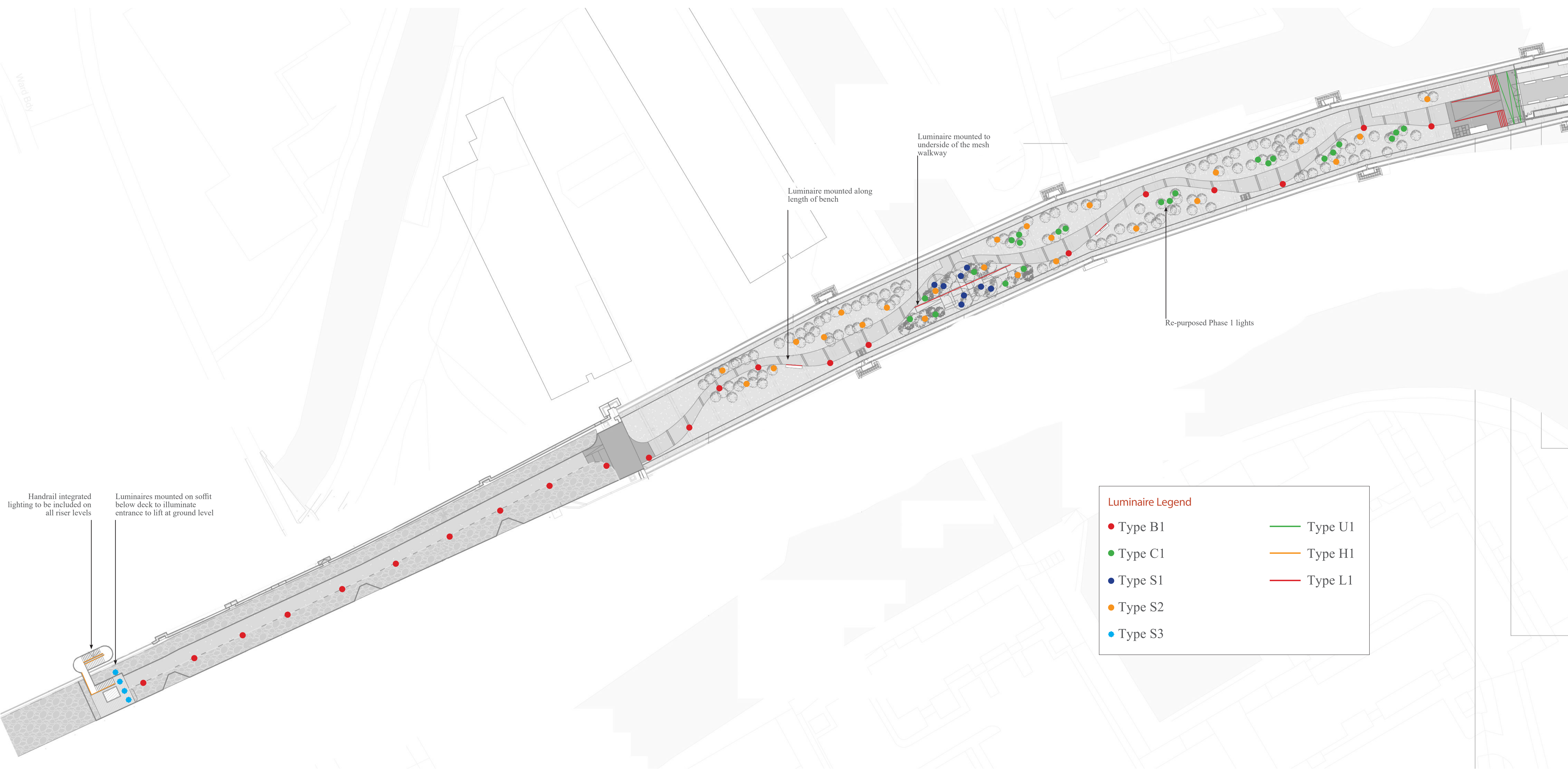


Figure 39: Typical Lighting Layout