

Lighting Report

Kenavon Drive



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Issue Status: Planning Application

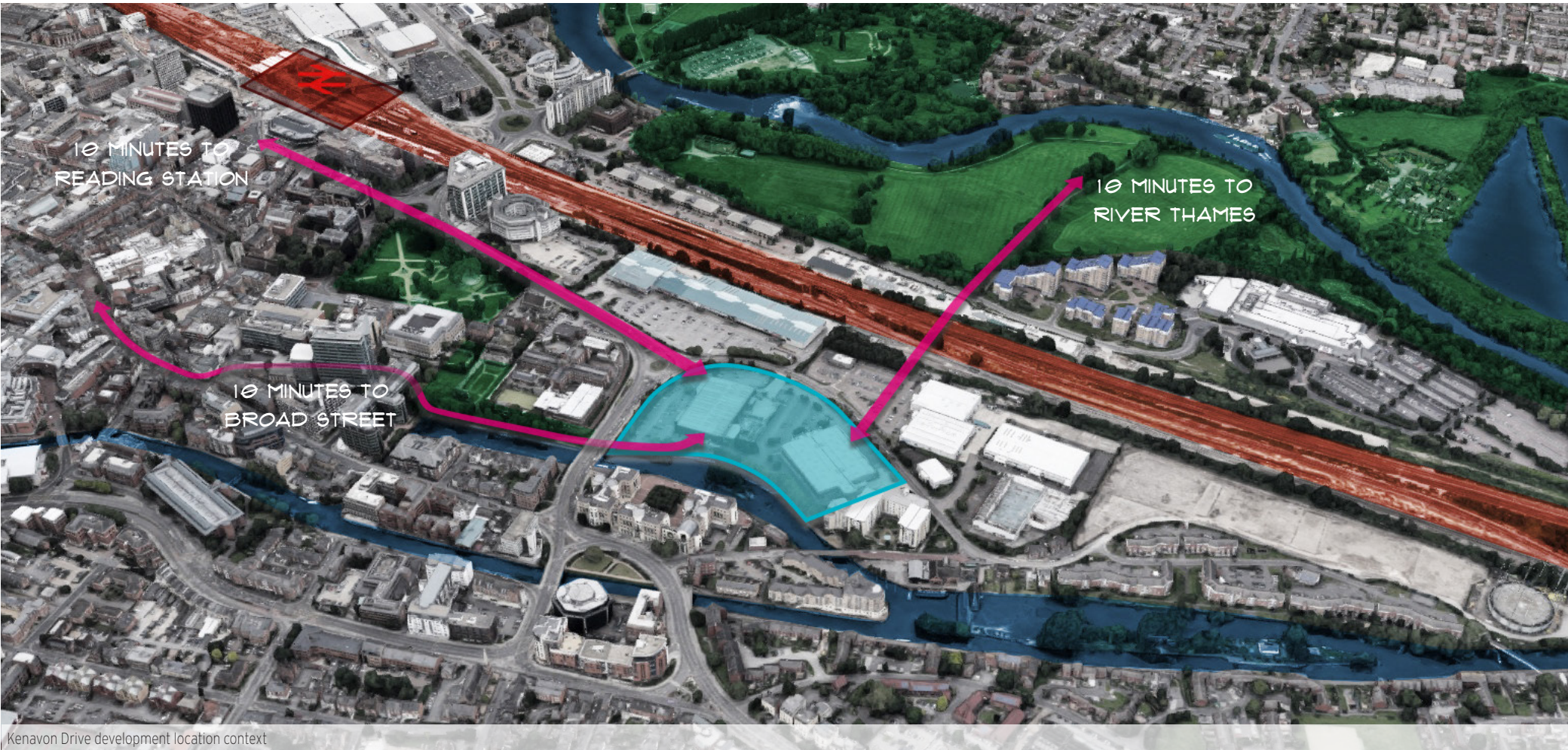
Project Number: 0956

Date: 01/07/20

Client: Berkeley Homes

LB_0956_LS_02_RevF

1. Introduction



Introduction

This document outlines Light Bureau’s exterior lighting strategy for the planned Kenavon Drive development in the centre of Reading. The presented site-wide strategy aims to optimise development’s prime central location and future amenities, as well as add further value to the development by drawing visitors and creating a thriving space for businesses and an enjoyable, vibrant location for its new residents.

Site Context

The development’s position within this rapidly changing area of central Reading is perfectly situated within short walking distance from numerous areas of local significance, such as River Thames, Reading train station, and the shopping quarter. With direct connections to both nature and commercial amenities, the site location will present an inviting destination for future residents and visitors, offering both interesting and green public spaces and currently-lacking food and beverage offer. Amenity and feature lighting will aim to enhance the architecture and landscape, thus encouraging nocturnal activity and drawing visitors and potential residents to the area. In addition, the proximity to the river Kennet with its diverse ecosystem will impose certain lighting restrictions along the southern edge of site. These ecological considerations along with the resident requirements for privacy will require carefully planned and considerate lighting interventions with a very high degree of optical control.

Based on the current site context and planned development configuration, following analysis pages outline the key strategic aspects and important considerations forming the basis of this lighting strategy.



Architecture offers great opportunities for establishing local landmark



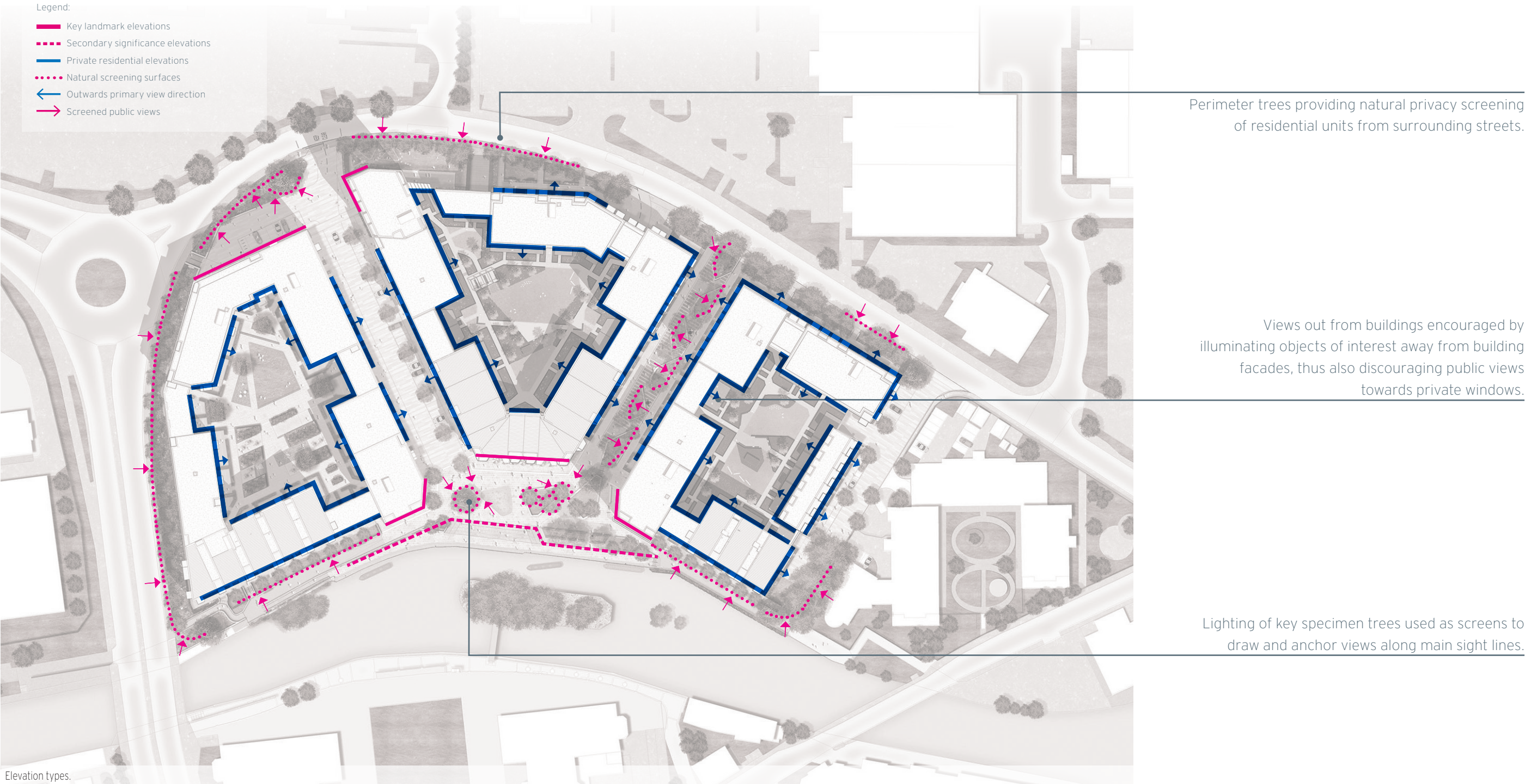
Development establishes new local centre and lighting should support this function



Green qualities and features encourage interesting lighting interventions

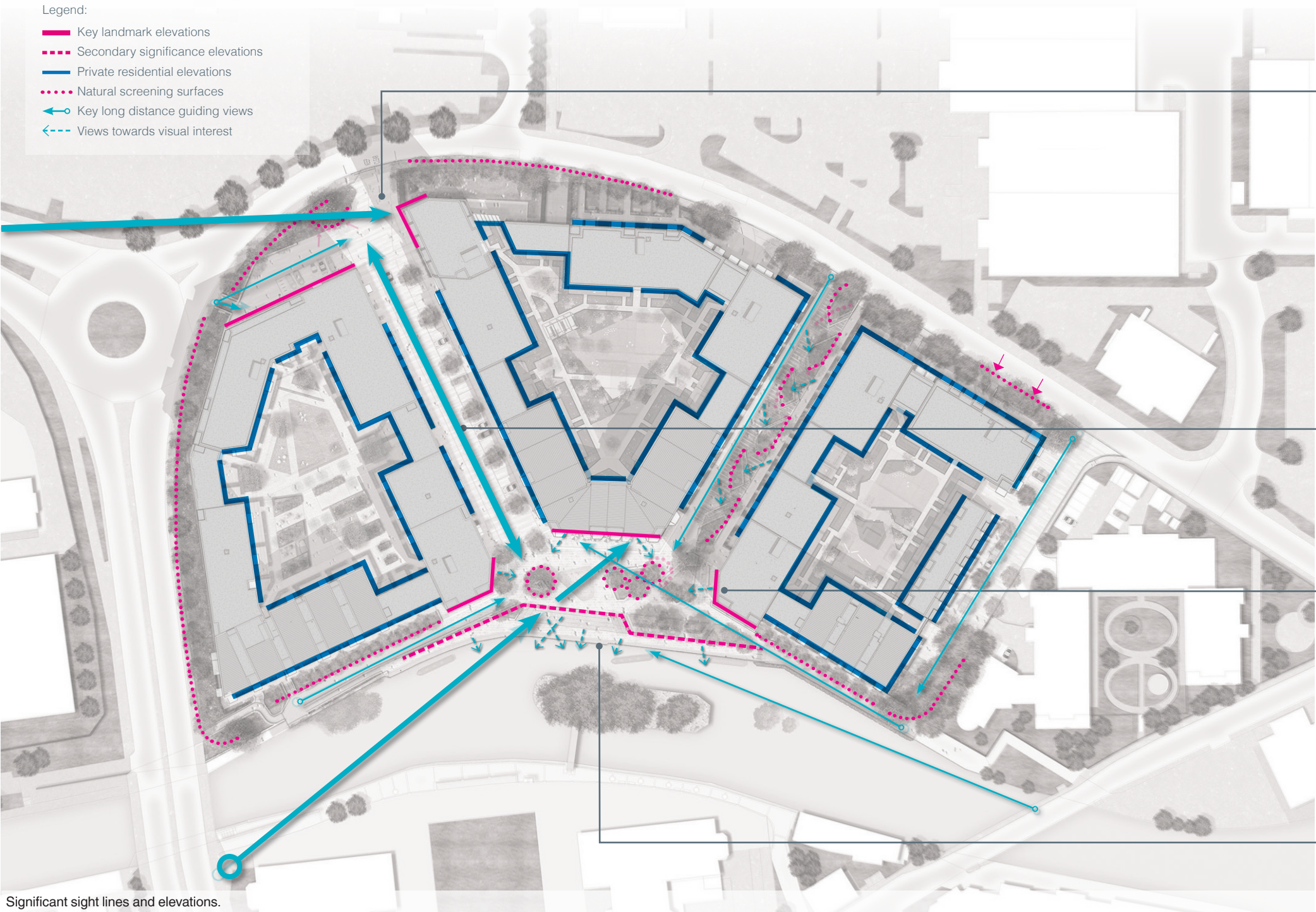
2. Site Analysis

2.1 Elevations



2. Site Analysis

2.2 Views



Corner of Northern tower with large-scale Kenavon Drive signage to form local significance landmark and draw long distance views from centre of Reading and train tracks. Totem poles identifying site entrances to anchor medium distance views and aid way-finding.

Visual connection between arrival square and riverside square emphasized to encourage visitor flow and draw attention away from residential elevations.

Elevations facing riverside square to draw views from across and along the river. Lighting along these elevations can be used to give general sense of brightness within square.

The open views towards river Kennet and towpath from the main square are to be kept clear to utilize this natural site advantage. Lighting equipment with shielded light source and high degree of optical control to be used to minimize glare and reduce contrast with darker river backdrop.

2. Site Analysis

2.3 Area Types



- Open Areas**

Signature areas defining character and feel of the development. Higher horizontal brightness with reduced uniformity to create interest. Feature accent lighting to draw attention and reveal architecture/landscape.
- Public Walkways & Driveways**

Transitional spaces with focus on creating comfortable and safe environment with limited light spill towards residential units. Reduced horizontal brightness compared to open areas with higher levels of uniformity to reveal objects and people.
- Key Pathway & Roadway Nodes**

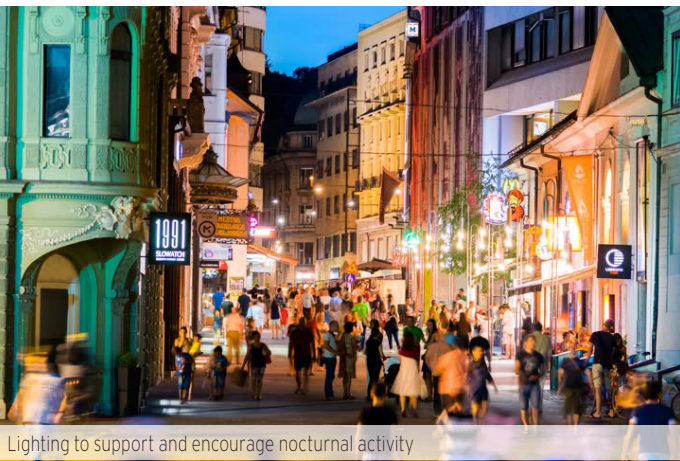
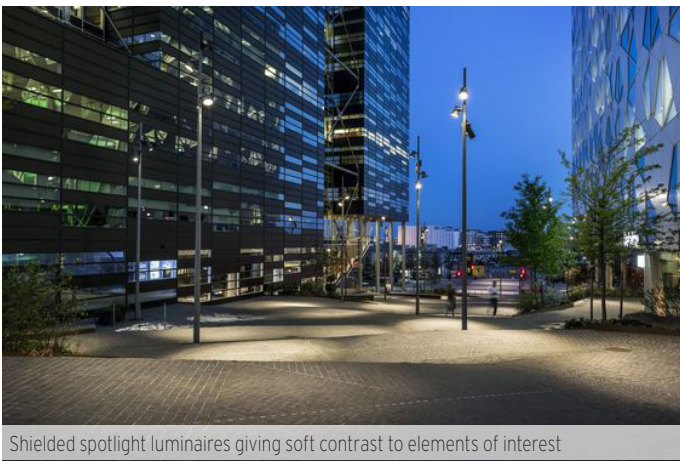
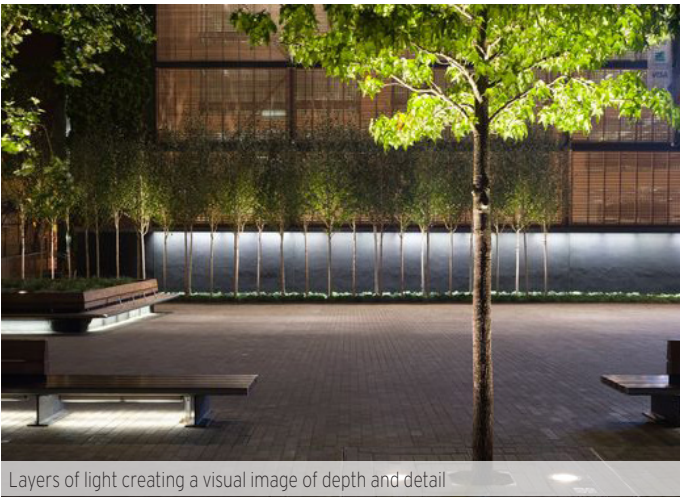
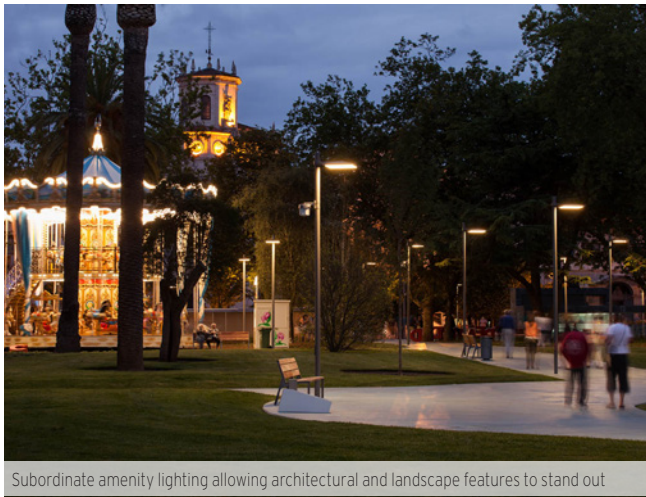
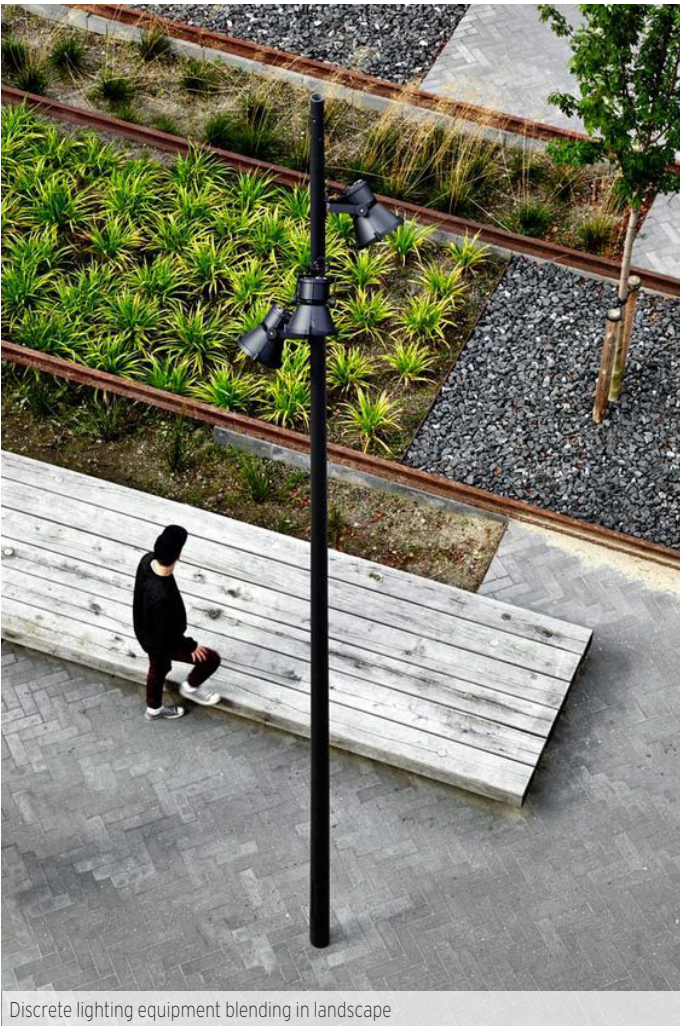
Significant intersection points along pedestrian pathways punctuating journey and aiding way-finding by revealing junctions ahead. Notably elevated pool of horizontal brightness differentiating node from rest of the pathway.
- Public Routes of Interest**

Calmer pedestrian routes with nature views or objects of interest/play. Lighting to encourage interaction and create pleasant environment to linger. Focus on feature landscape elements and views of nature with shielded, low brightness functional lighting and distinctive accents.
- Resident Common Areas**

Private areas accessible only to development residents with more delicate and relaxed atmosphere. Low level and shielded lighting to reveal landscape elements. Low uniformity and horizontal brightness guiding residents along route or towards entrances/exits.

2. Site Analysis

2.4 Lighting Approach and General Considerations



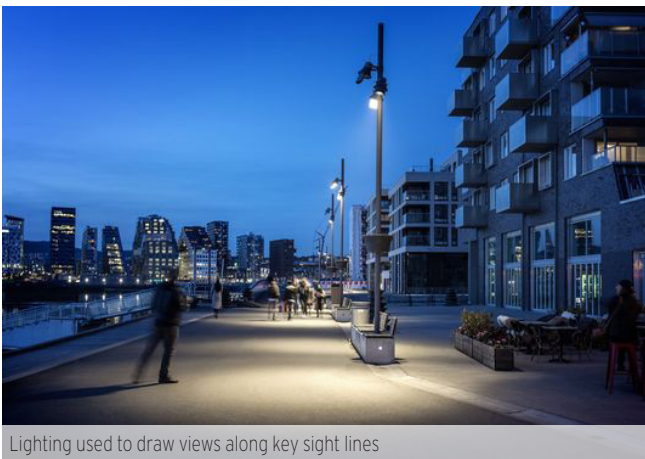
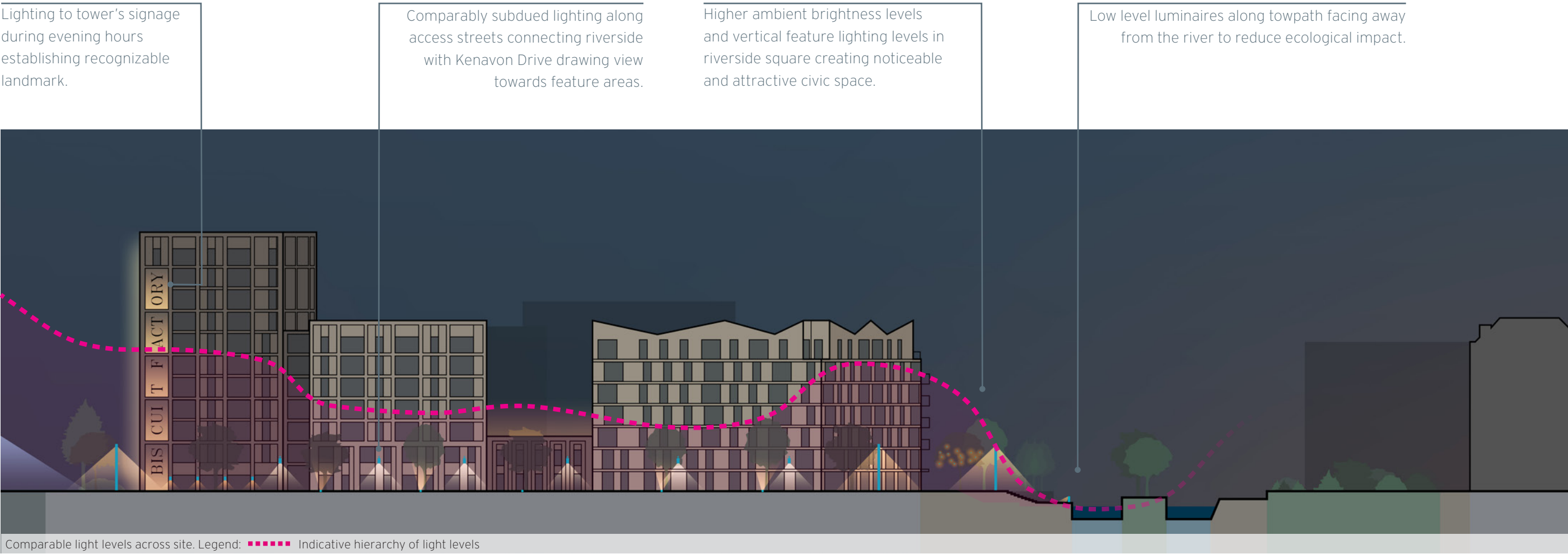
Based on the introduced Kenavon Drive development context analysis, the overall lighting approach is guided by the following fundamental principles:

- Artificial lighting is implemented following clear hierarchy depending on area type and function guiding light levels and luminaire scale, type;
- Lighting equipment is to be implemented in manner that is least visually obtrusive allowing direct views through site and of any notable elements/elevations;
- Strict lighting control strategy is to be implemented to minimize light pollution, trespass, and over-illumination, particularly along river Kennet, as well as ensuring privacy for development’s residents;
- Well shielded, warm-white colour temperature light sources that do not emit ultra violet (UV) wave-lengths are proposed for all amenity and safety lighting to prevent negative ecological impact;
- Lighting equipment selection to form a visually consistent palette fostering sense of connected community and unifying areas of different types;
- Soft accent is placed upon key trees and natural landmarks emphasizing the green qualities of development;
- Human-scale and integrated low level lighting is to be utilised in seating and relaxing areas to create comfortable environment encouraging visitors to linger and enjoy the offered amenities;
- Optional festoon feature lighting is suggested for riverside square to draw attention along access streets and provide an element of sparkle and interest. In addition, the unique landscape design along Palmer street axis is to be revealed and emphasized through feature lighting creating a more playful route giving visitors a sense of journey;
- Lighting of development’s large-scale signage positioned on the north tower facade to create a local significance landmark and draw long distance views.

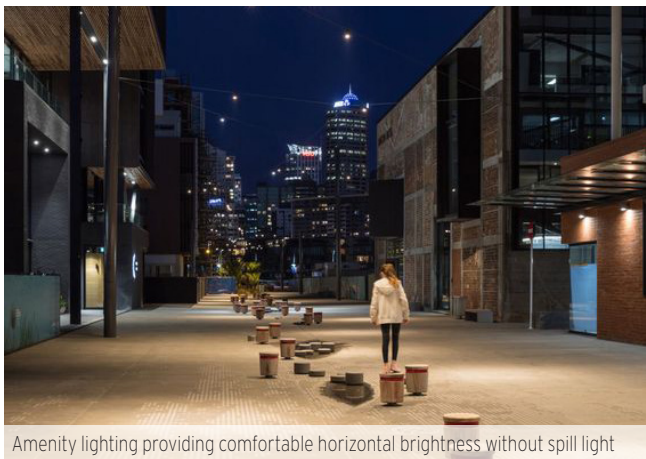
The lighting design proposal is developed and shown in the included lighting layouts LB_0956_LL_01-04 and corresponding Luminaire specification LB_0956_LS_01.

3. Lighting Balance

3.1 Lighting Control Strategy



Lighting used to draw views along key sight lines



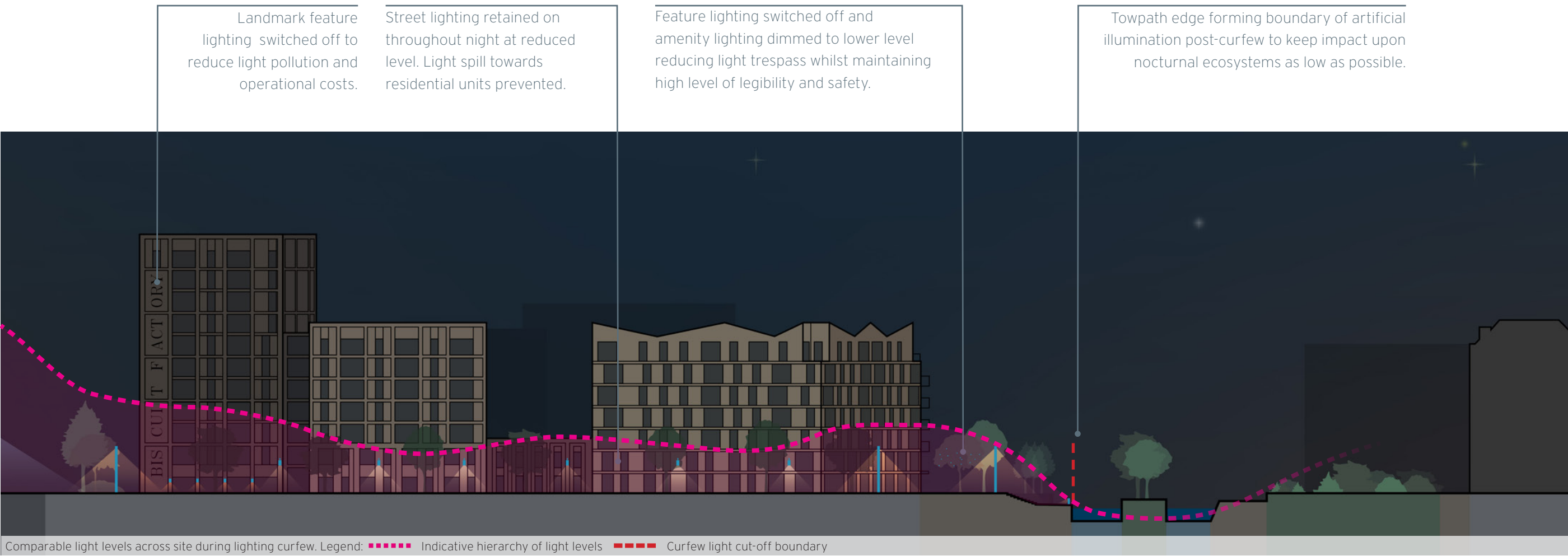
Amenity lighting providing comfortable horizontal brightness without spill light

Centralised exterior lighting controls system is proposed for the entire Kenavon Drive development, allowing to establish balanced visual hierarchy between the various areas of site to draw views and encourage visitor interaction. To achieve this stronger emphasis is placed on arrival experience and the riverside square with routes connecting and leading to these areas feeling calmer and more subordinate. Furthermore, in order to prevent any negative impact towards wellbeing and privacy of residents living in the development, lighting curfew is proposed affecting

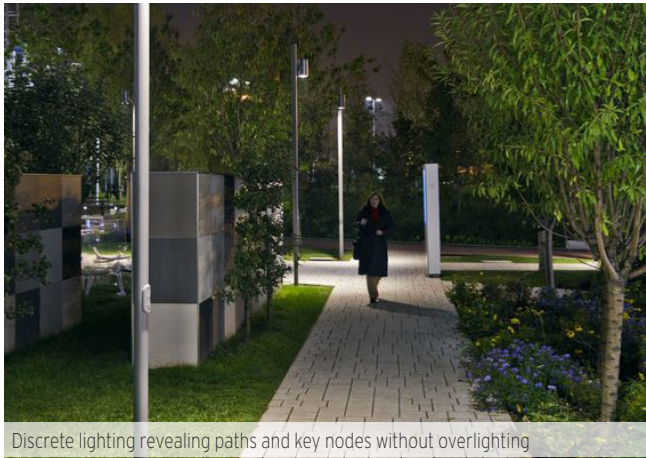
all public amenity and feature lighting across site. As part of this, all external ambient and feature lighting would be controlled separately from amenity street and pathway lighting, thus allowing to reduce overall site brightness during nighttime while still maintaining high level of safety and ease of navigation. Presence detection (PIR) control is recommended for local common entrances only to dim light fittings when these spaces are not in use.

3. Lighting Balance

3.2 Post-Curfew Considerations



Shielded luminaires providing controlled horizontal brightness



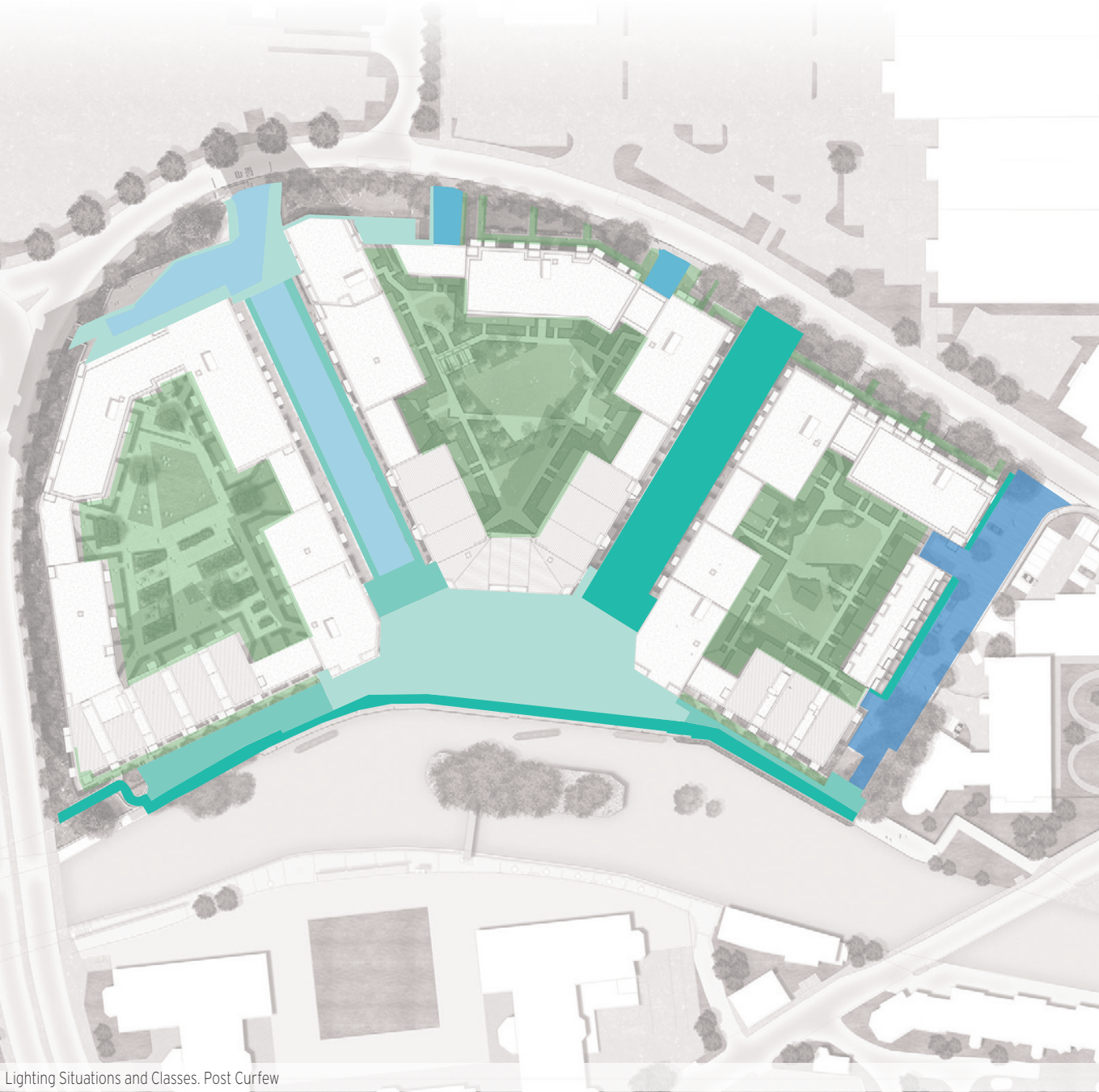
Discrete lighting revealing paths and key nodes without overlighting

Lighting strategy proposed for Kenavon Drive development is aimed to create a lit environment where residents and visitors can feel safe and secure whilst minimizing disturbance to private units, neighbours, and nocturnal animals and ecology. Site conditions imply that particular emphasis must be placed on balancing the lighting that is added against the comparatively dark Southern site boundary with towpath and river Kennet. Furthermore, the lighting strategy introduced in this document is guided by the prescriptions in Bat & Bird Box Specification Report

as well as the recommendations given in SLL Lighting Guide for the Exterior Environment (appendix 4: Artificial Lighting and its effect on animal and plant ecology). Therefore, all suggested amenity lighting would utilise well shielded luminaires with high degree of optical control that do not emit light above the horizontal plane and employ the latest LED light sources in warm colour temperature compatible with aforementioned guides. Special care is taken when planning the lighting along routes identified as bat corridors.

3. Lighting Balance

3.3 Safety and Security



Area Name	Lighting Situation	Traffic Flow*	Ambient Illum.*	Light Class	E _{avg} (lux)	E _{min} (lux)
Arrival square parking and vehicle access	D4	normal	high	S3/P3	7.5	1.5
Huntley street vehicle access and parking	D3	normal	medium	S3/P3	7.5	1.5
Kenavon drive - vehicle access	D3	normal	high	S4/P4	5.0	1.0
Joplin Mews vehicular access	E2	normal	low	S3	7.5	1.5
Arrival square pedestrian areas along the buildings	E1	normal	high	S3/P3	7.5	1.5
Huntley street pedestrian walkways	E1	normal	medium	S4/P4	5.0	1.0
Kenavon drive residential alleys	N/A (no public access - private gated area)					
Palmer Street	E1	normal	low	S5/P5	3.0	0.6
Joplin Mews pedestrian walkways	adjacent to CE5 carriageway	normal	low	S3/P3	7.5	1.5
Riverside square	E1	normal	high	S3/P3	7.5	1.5
Riverside towpath	E1	normal	low	S5/P5	3.0	0.6
Riverside walk residential walkways	E1	normal	medium	S4/P4	5.0	1.0
Podium Gardens	N/A (no public access - private gated area)					

Post-Curfew Light Level Considerations

Before curfew the lighting design aims to activate the space and create an attractive and pleasant environment for the residents and guests of the development. However, to comply with the aforementioned post-curfew considerations the lighting after a predetermined curfew hour will be reduced.

To ensure a safe and secure transition and use of the publicly accessible areas the post-curfew lighting

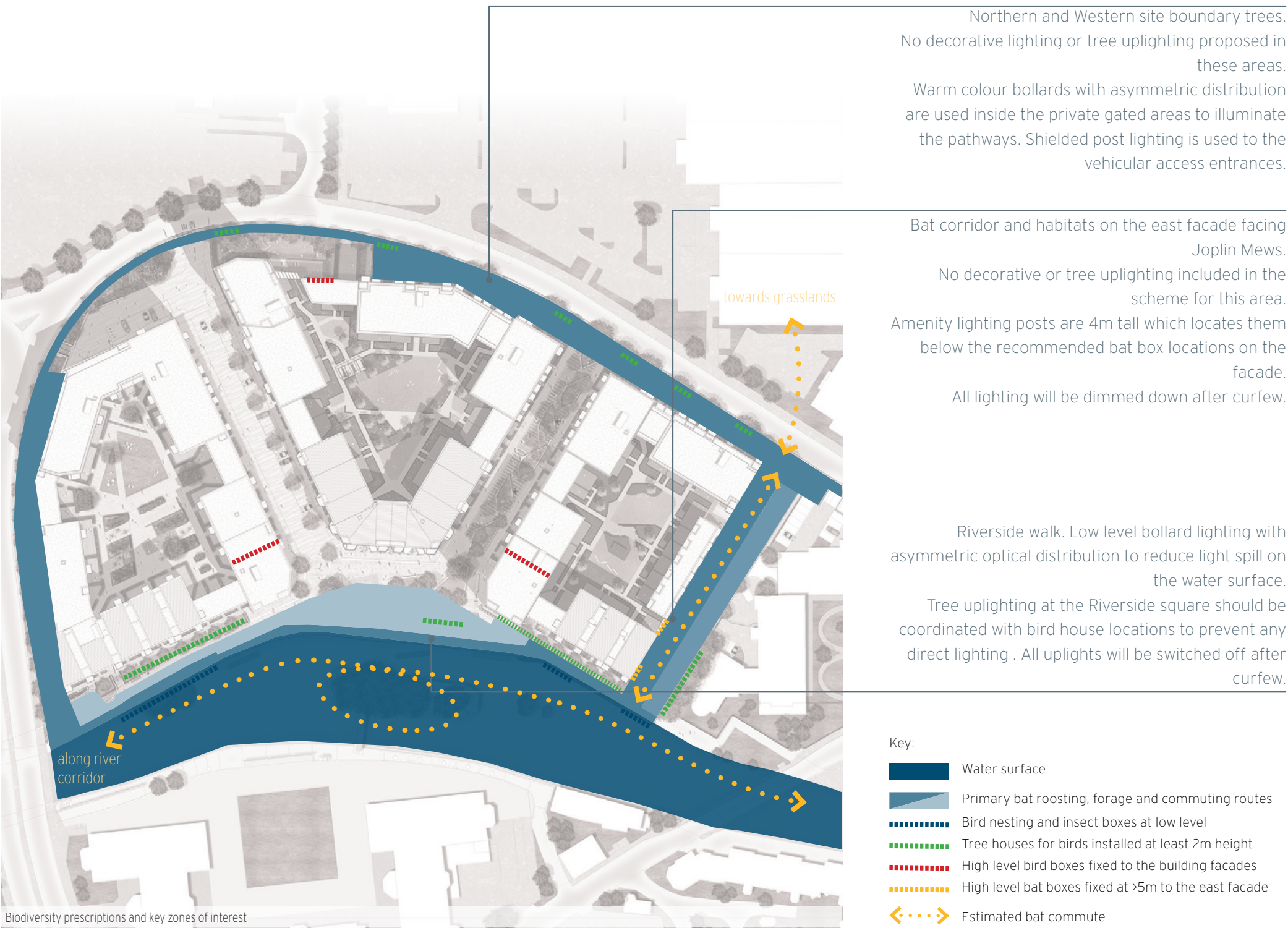
scheme has been developed to comply with the prescriptions of BS EN 13201 and BS 5489-1.

The following assumptions have been made when determining the relevant lighting situations and classes:

- Normal crime risk, facial recognition - necessary, normal difficulty of navigational task.
- Traffic calming measures are not taken into consideration.
- Ambient illumination and traffic flow marked with star(*) above are assumed.

3. Lighting Balance

3.4 Biodiversity



Bats and Birds Considerations

The proposed lighting strategy aims to create a balanced safe environment considering the need to minimise potential adverse effect on the local wildlife. Therefore, after curfew the lighting scheme targets the minimum prescribed values for safety and security, specifically along the primary bat roosting, forage and commuting routes as identified in the 'Bat & Bird Box Specification Report'. As per the latter the areas deserving special attention are the trees along the northern and western site boundaries, Riverside Walk and Joplin Mews.

- Additionally the following principles are incorporated:
- All decorative and feature lighting including upward pointing light fixtures will be switched off after curfew;
 - The selected luminaires have warm colour temperature (3000 Kelvin) light sources that do not emit ultra violet (UV) light. This avoids potential ecological impact by ultra violet light as it is known to attract flying insects and moths;
 - Height of lighting columns along the areas of primary bat commute is limited to 4m. Overall maximum lighting posts' height is up to 6m.

Special care should be taken when installing tree mounted bird boxes along Kenavon drive vehicular driveways, Riverside walk and Riverside square using the tree trunks and orientation as natural means of shielding to avoid close proximity to amenity lighting posts. Fixing the bird boxes above the height of the light posts (4m) is recommended if possible.

3. Lighting Balance

3.5 Obtrusive Light

Environmental Zone and Light Restrictions

Following "GN01:2020 Lighting Professionals Guidance Notes for the Reduction of Obstructive Light" we've considered the area of the development as E4 zone with the following limitations applied.

- Minimal light trespass into windows kept with the right control strategy below 25 lux pre-curfew. Post-curfew (23.00hrs) we recommend to reduce the luminaire output to achieve vertical illuminance of <5 lux.
- Minimal Upward Light Ratio of the overall installation. All columns have shielded sources and accessories in order to reduce direct upward light. Wall mounted luminaires and bollards have shielded sources, directing their light flux down. The lighting strategy includes some feature tree uplights, low decorative bollards and facade uplighting which are controlled separately and should be switched off after curfew.
- The specified light fittings are equipped with dimmable sources that can be adjusted to match the local authorities requirements.

Impact on the Neighbouring Railway Infrastructure

All amenity and accent light sources along Kenavon drive are directed away from the railway and/or shielded to prevent direct glare and avoid the risk of being perceived as signal lighting.

All facade and sigh lighting is dimmable and allows for luminance levels to be balanced accordingly to conform with Table 2.

TABLE 1 _ ENVIRONMENTAL ZONES		
Environmental Zone	Lighting Environment	Examples
E0_Protected	Dark (SQM 20.5+)	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1_Natural	Intrinsically dark (SQM 20 to 20.5)	National Parks, Areas of Outstanding Natural Beauty, etc
E2_Rural	Low district brightness (SQM ~15 to 20)	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 nigh time activity

Table 2 - Environmental Zones - ILP Guidance Notes for the Reduction of Obtrusive Light GN01:2020

TABLE 2 _ OBTRUSIVE LIGHT LIMITATIONS FOR EXTERIOR LIGHTING INSTALLATIONS						
Environmental Zone	Building Fa- cade Lumi- nance [Max cd/m²] (1)	Sky Glow ULR [Max %] (2)	Light Intrusion (into win- dows) Ev (lux) (3)		Luminaire Intensity I (candelas) (4)	
			Pre-curfew	Post-curfew	Pre-curfew	Post-curfew
E0_Protected	<0.1	0	0	0	0	0
E1_Natural	<0.1	0	2	0 (1*)	2,500	0
E2_Rural	5	2.5	5	1	7,500	500
E3_Suburban	10	5	10	2	10,000	1,000
E4_Urban	25	15	25	5	25,000	2,500

Based on Tables 3,4,6 and 8 - Obtrusive Light Limitations for Exterior Lighting Installations
ILP Guidance Notes for the Reduction of Obtrusive Light GN01:2020

SQM = Sky Quality Measurements referenced by the International Dark-Sky Association (IDA), the criteria for E01 being revised in mid 2019 but not retrospective
ULR = Upward Light Ratio of the Installation is the maximum permitted percentage of luminaire flux that goes directly into the sky.
Ev = Vertical Illuminance in Lux - measured flat on the glazing at the centre of the window.
I = Light Intensity in Candelas (cd)
L = Luminance in Candelas per Square Metre (cd/m2)
Curfew = the time after which stricter requirements (for the control of obtrusive light) will apply; often a condition of use of lighting applied by the local planning authority. If not otherwise stated - 23.00hrs is suggested.
* = Permitted only from Public Road Lighting Installations
(1) Maximum permitted building facade luminance - Taken as the product of the design average luminance and reflectance divided by n.
(2) Upward Light Ratio - Some lighting schemes will require the deliberate and careful use of upward light, e.g. ground recessed luminaires, ground mounted floodlights, festive lighting, to which these limits cannot apply. However, care should always be taken to minimise any upward waste light by the proper application of suitably directional luminaires and light controlling attachments.
(3) Light Intrusion (into Windows) - These values are suggested maxima and need to take account of existing light intrusion at the point of measurement. In the case of road lighting on public highways where building facades are adjacent to the lit highway, these levels may not be obtainable. In such cases where a specific complaint has been received, the Highway Authority should endeavour to reduce the light intrusion into the window down to the post curfew value by fitting a shield, replacing the luminaire, or by varying the lighting level.
(4) Luminaire Intensity - This applies to each luminaire in the potentially obtrusive direction, outside of the area being lit. The figures given are for general guidance only and for some sports lighting applications with limited mounting heights, may be difficult to achieve.

4. Lighting Calculations

4.1 Light Character

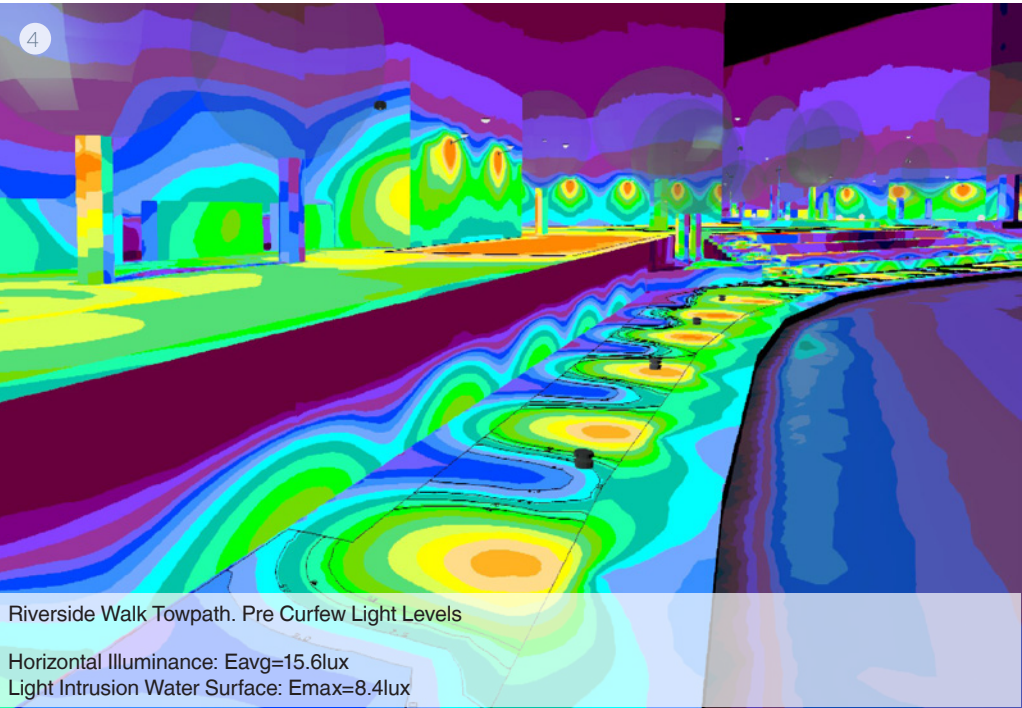
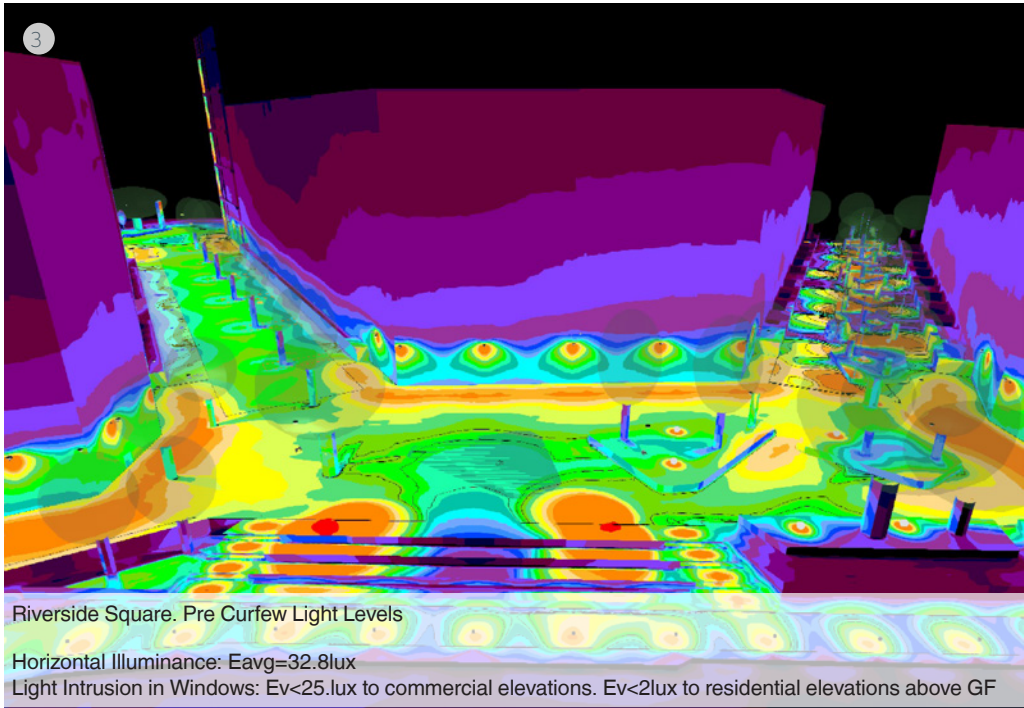
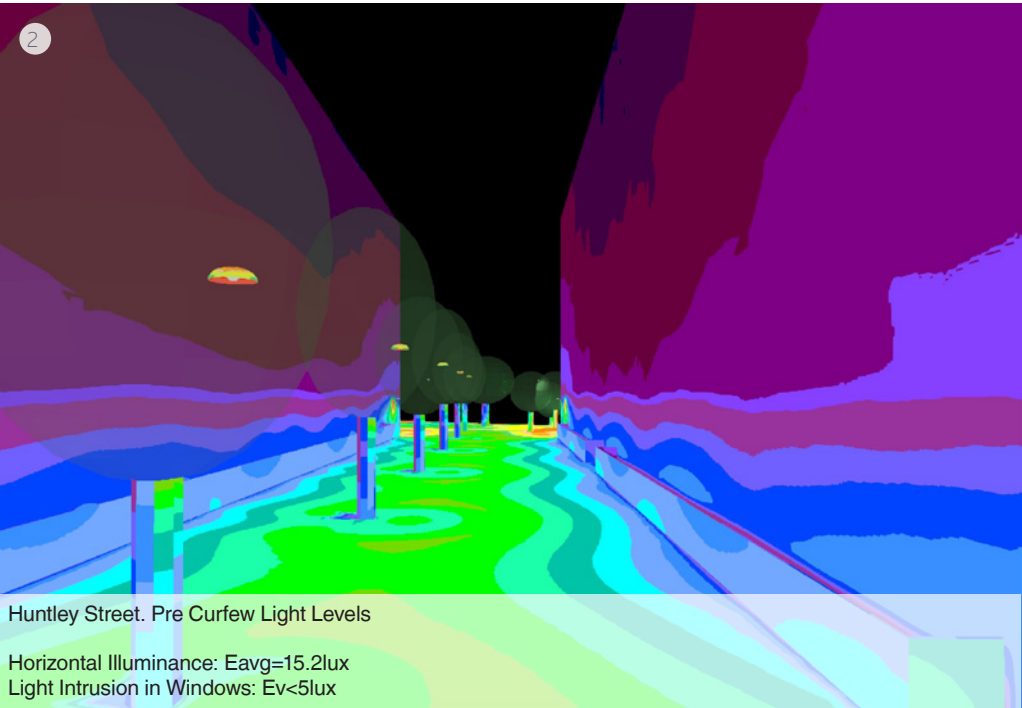
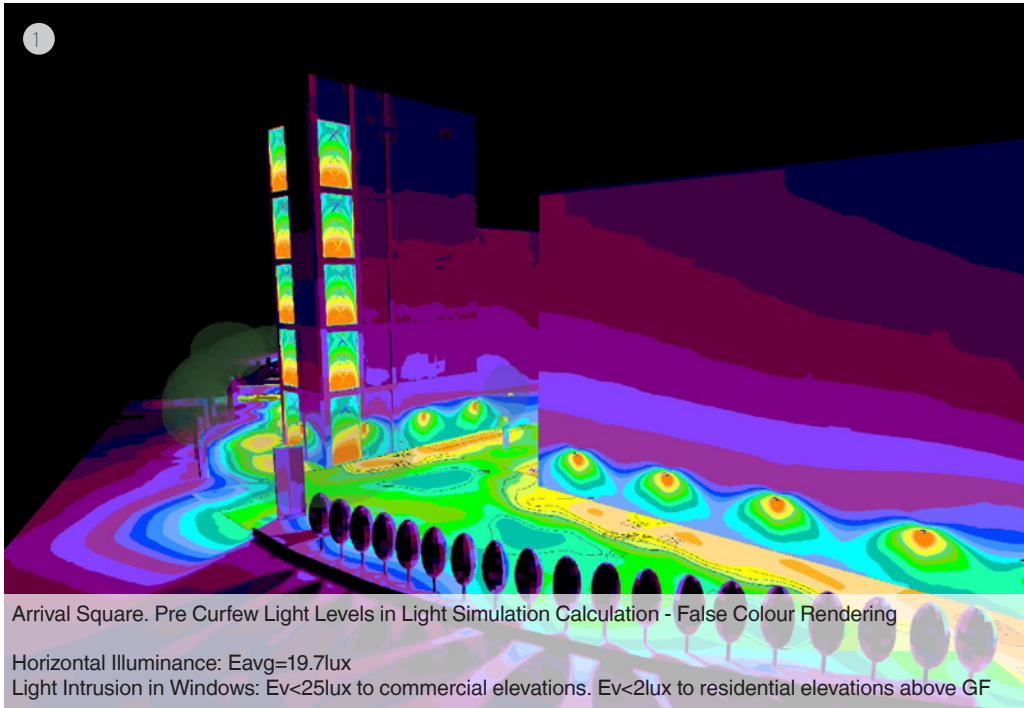
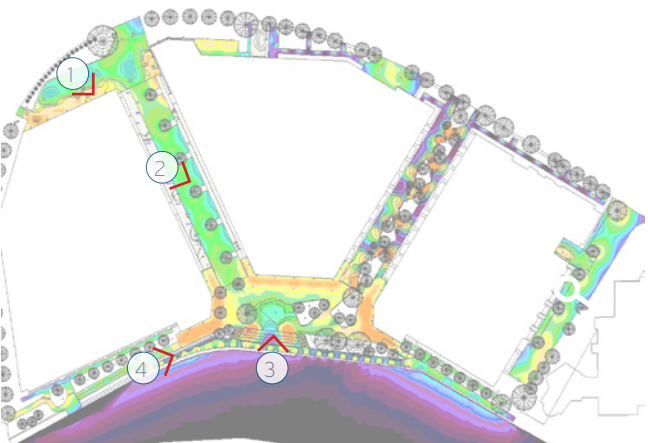
Pre Curfew

Key characteristics of the lighting scheme are the uniformity and brightness of the different spaces. Although overall light levels are kept around an average of 15-20 lux, important circulation nodes and areas of particular interest are highlighted to draw attention and aid orientation. The wall lights along the perimeter of the two squares and the accent lighting in the amphitheatre are good examples of this principle. These levels allow for the key illuminated verticals of the facade to stand out without the need to apply of too much light.

In the case of Palmer street and the Riverside towpath walk the reduced uniformity contributes to an experience defined by the proximity to nature and, in the case of Palmer street, to a playful expression of the landscape features.

Good optical control luminaires are used to reduce to a minimum vertical light spill into residential windows as well light spill onto the water surface of the natural South boundary.

*All light levels will be adjusted and balanced on site during commissioning.



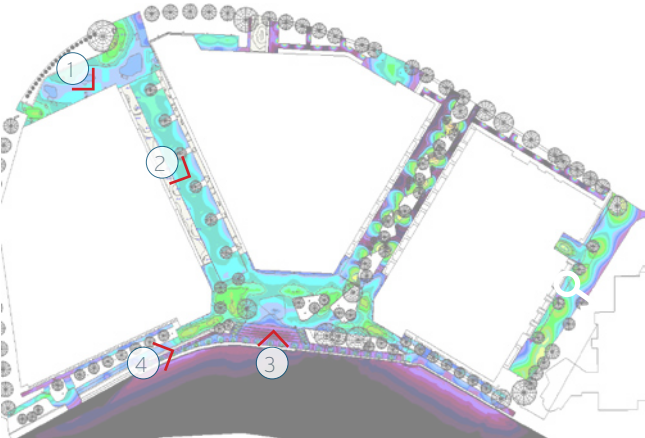
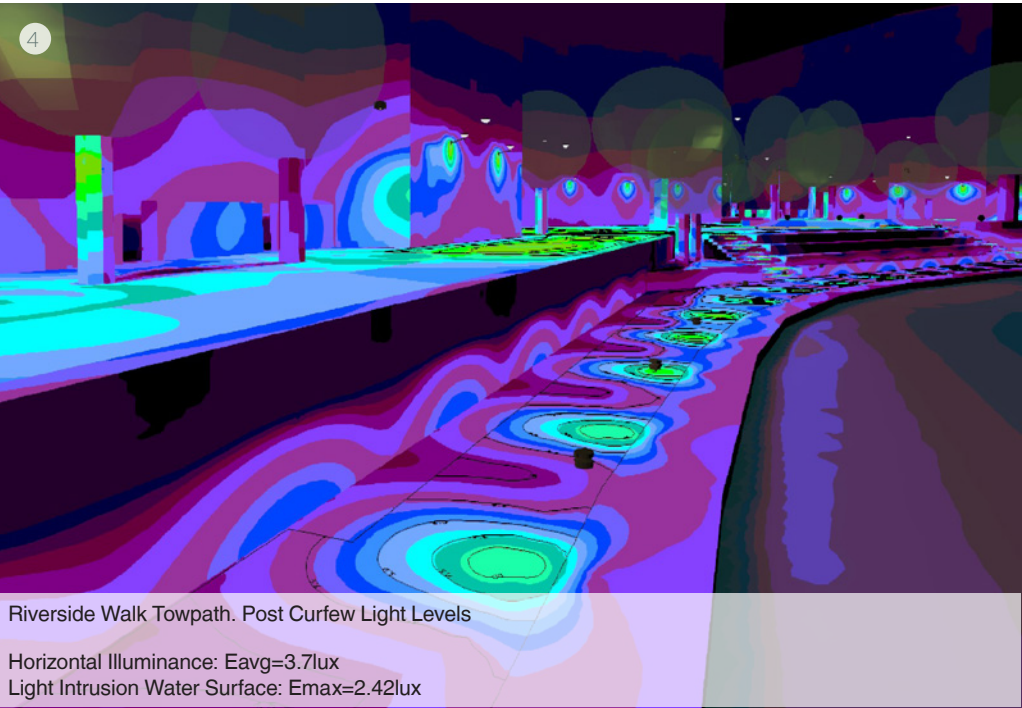
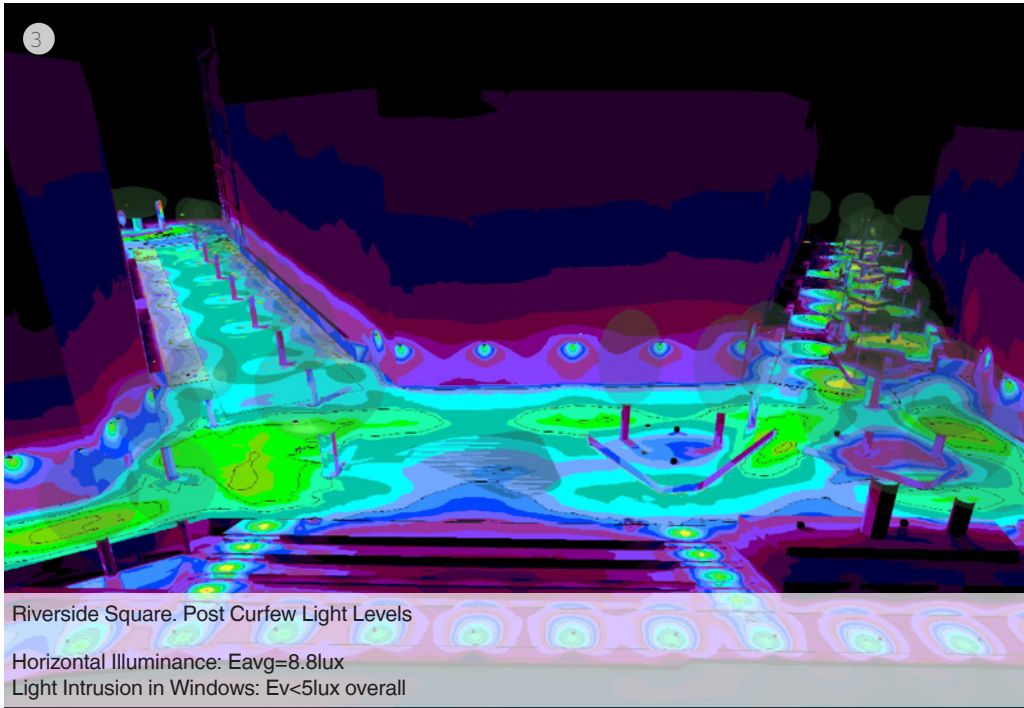
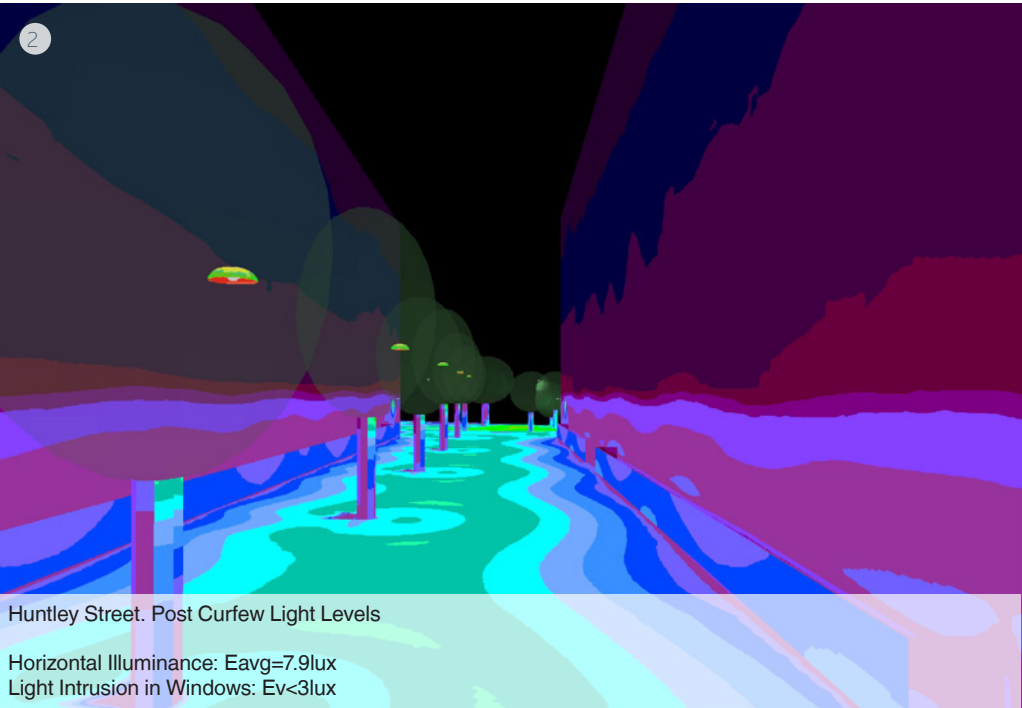
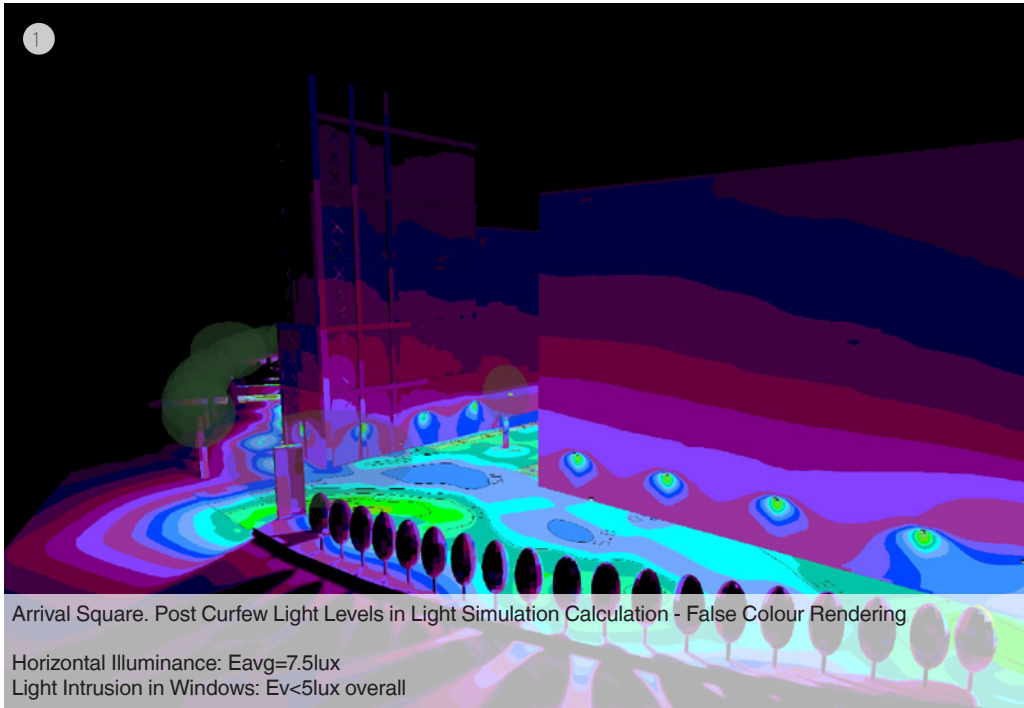
4. Lighting Calculations

4.1 Light Character

Post Curfew

The overall hierarchy of the spaces is preserved after curfew with significantly reduced light levels driven by ecological, environmental, safety and security considerations.

*All light levels will be adjusted and balanced on site during commissioning.



4. Lighting Calculations

4.2 Curfew Lighting

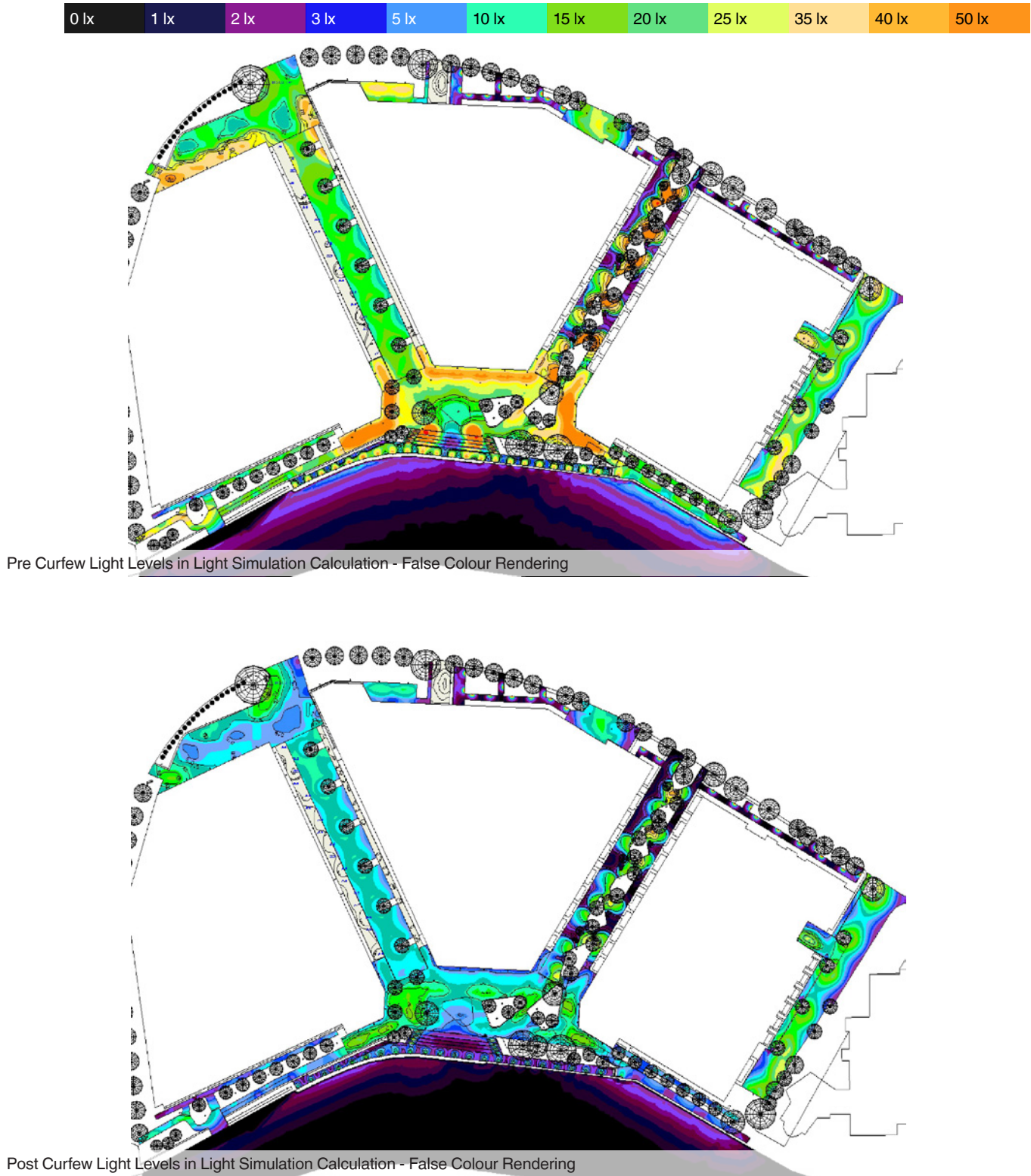
Light Levels

As indicated by lighting calculation the achieved lighting effect follows the principles outlined in lighting strategy and establishes a visual distinction between the different type areas of the development through comparable brightness levels and scale lighting.

The proposed lighting control system activates a reduced light level preset scene after lighting curfew. Average light levels should be in the range of 5-10lux. Additional lighting scenes can be programmed for day-to-day use and special events.

Post-Curfew Dimming of Luminaires								
PRODUCT	Area 1: Arrival Square	Area 2: Kenavon Drive	Area 3: Huntley Street	Area 4: Riverside Square	Area 5: Riverside Walk	Area 6: Palmer Street	Area 7: Joplin Mews	Area 8: Podium Gardens
Amenity High Pole Mounted Lighting (S1, S6)	100%	-	65%	65%	-	-	-	-
Amenity Medium High Pole Mounted Lighting (S3, S4)	-	30%	-	30%	30%	-	65%	-
Riverside Pathway Lighting - Bollards (B1)	-	-	-	-	25%	-	-	-
Amenity Pole Mounted Spotlights (S2)	-	-	-	Off	-	20%	-	-
Accent Pole Mounted Spotlights (S2, S5)	-	-	-	Off	-	Off	-	-
Amenity Wall Mounted Lighting (W1, W2)	20%	-	-	10%	-	-	55%	-
Residential Entrances Lighting-Path lights (B2, B2a)	-	100%	-	-	100%	-	-	75%
Residential Entrances Lighting-Wall Lights (W3)	-	50% (PIR)	50% (PIR)	-	50% (PIR)	50% (PIR)	50% (PIR)	-
Amenity Handrail Recessed Lighting (H2)	-	-	-	20%	-	-	-	-
Accent Facade Lighting (L1, L2, L3, L4)	Off	-	-	-	-	-	-	-
Amenity Wall Recessed Lighting (B3a)	-	-	-	-	15%	-	-	-
Accent Bench Integrated Lighting (L6)	-	-	-	Off	-	-	-	-
Tree Uplighting (U1, U4)	-	-	Off	Off	-	-	-	Off
Accent Lighting to Water Feature (U2)	-	-	-	Off	-	-	-	-
Decorative Planter Lighting (U3)	-	-	-	Off	-	Off	-	-
Optional Decorative/Seasonal or Festive Lighting (WP)	-	-	-	Off	-	-	-	-

*Please note the dimming values above are indicative and should be determined on site during commissioning. Light levels to be coordinated with District's standards



4. Lighting Calculations

4.3 Impact on Neighbouring Buildings

Light Trespass to Neighbouring Developments

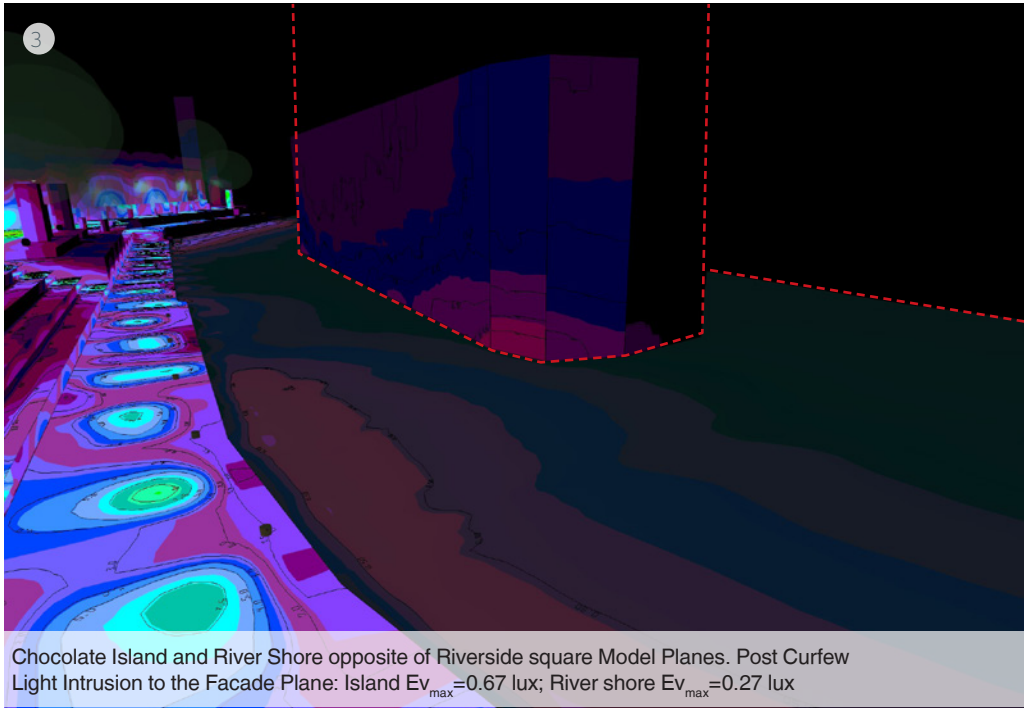
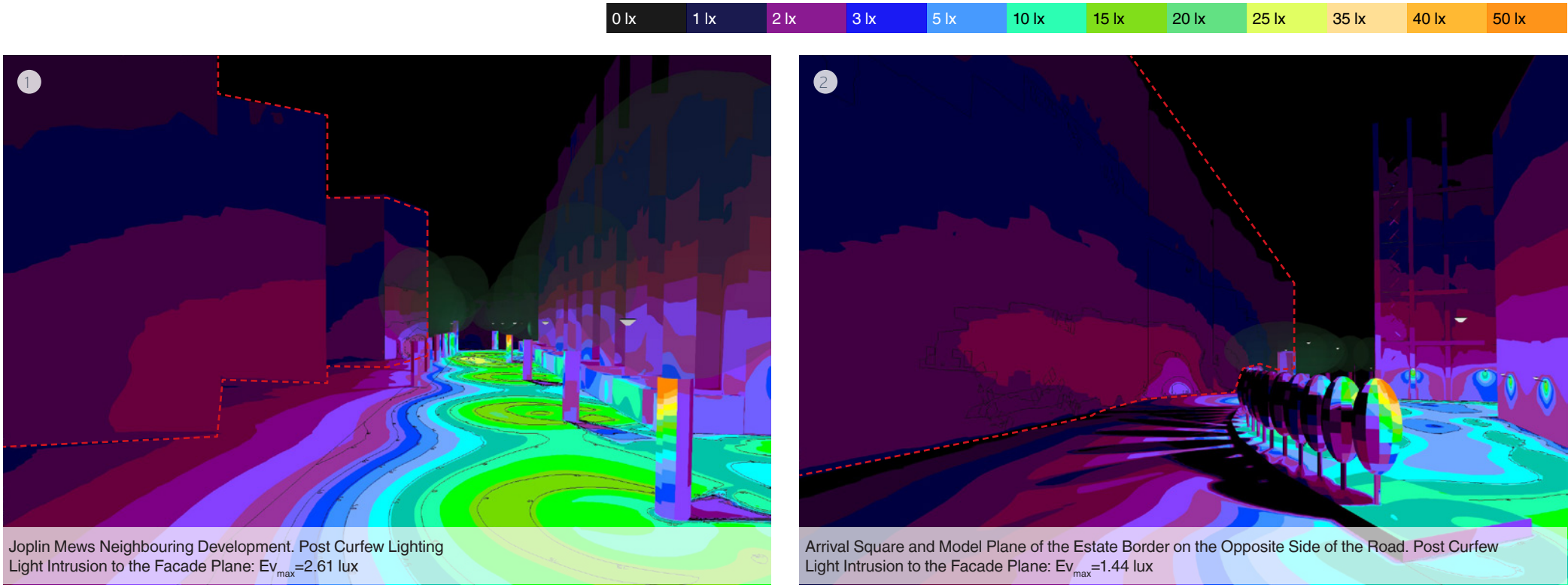
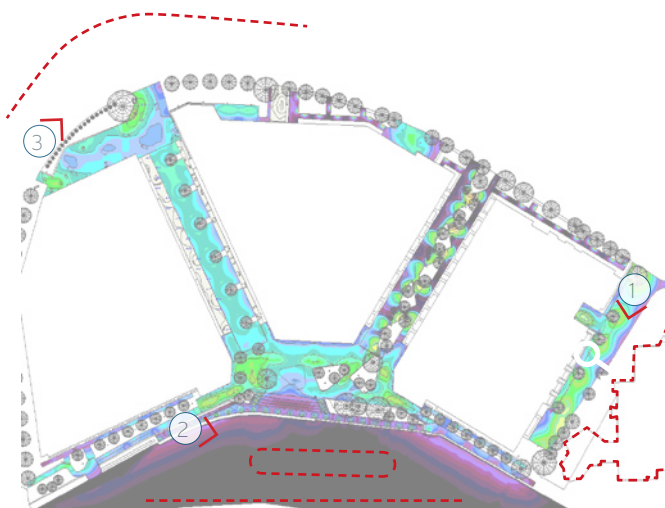
Three elevations have been identified as potential areas where light from the proposed Kenavon Drive lighting scheme could have an impact.

These are:

- The development east from Kenavon drive facing Joplin Mews;
- Chocolate island and the opposite river shore;
- The area across Kenavon drive road opposite Arival Square, currently used as parking for the existing retail park.

Post curfew light calculations show maximum amount of light intrusion on the modelled surfaces that is well below the maximum of 5 lux as defined by GN01:2020 Lighting Professionals Guidance Notes for the Reduction of Obstructive Light.

*Please note the light spill from existing road lighting has not been included in this simulation.



LIGHT BUREAU

Light Bureau Limited
7F Hewlett House
Havelock Terrace
London SW8 4AS
United Kingdom
Phone +44 (0)20 7498 6111
mail@lightbureau.com

Light Bureau
C/o AFRY
Lilleakerveien 8
0283 Oslo
Norway
Phone +47 454 78 101
mail@lightbureau.com

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