Annex 2

TONBRIDGE RIVERSIDE ROUTE

Stage 2 Lighting Feasibility Report

Tonbridge and Malling Borough Council

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Created by
Jade Edwards-Samuels
jade.edwards-samuels@projectcentre.co.uk

PROJECT CENTRE

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Job Number	Issue	Description	Originator	Checked	Authorised
1000010583-PCL-LRP-2-01-V00	V00	Lighting Feasibility Report	Jade Edwards-Samuels 07/04/2025	Anas Muhamed 08/04/2025	Herbie Barnieh 17/04/2025

Executive Summary

Project Centre (PC) has been commissioned by the Tonbridge & Malling Borough Council (TMBC) to undertake a lighting feasibility study for a riverside route located in Tonbridge, Kent. The aim of the study is to understand how lighting can be introduced to improve safety and general experience for users, whilst minimising environmental and ecological impacts along the route and immediate surroundings.

On 18th March 2025, PC met with representatives from TMBC on site, and after, PC carried out a site survey for the existing riverside route between Vale Road and Medway Wharf Road. The route is split into two Phases. Phase 1 is from Vale Road to the edge of the Gas Holders development site. Phase 2 is the remaining riverside route to Medway Wharf Road. The priority is to install lighting in Phase 1 in the first instance, due to there being no existing lighting present. Improvements to enhance the existing lighting in Phase 2 is to be considered at a later stage.

The Gas Holders development is within local authority pre-commencement conditions. It is anticipated for this development to increase the footfall along the riverside route.

Tasks carried out for the assessment include, a lighting class risk assessment, a review of current guidelines and standards and a lighting calculation.

Considering the project requirements, site constraints, and the condition of the existing illuminated bollards in the Phase 2 section near Medway Wharf Road, we consider that it is both justifiable and feasible to install dedicated street lighting to illuminate Phase 1 of the riverside walk. A well-designed street lighting installation for this route, will improve the perception of safety for the public whilst being sensitive to its surroundings and ecology.

We recommend that 5m or 6m hinge type lighting columns are installed to provide a good level of lighting that allows for good recognition of users at head height. In accordance with the lighting standards, a P4 lighting class with Eav 5.00-7.50 lux and minimum 1.00 lux has been assessed and determined suitable for the riverside route. Any street lighting that is introduced should minimise spill light as much as possible with full cut off luminaires to reduce effects to wildlife including control of when lighting is on and dimming. The colour temperature for any new lighting would need to be a warm temperature, with a preference for maximum of 2700K.

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1. Introduction

1.1.1 Tonbridge and Malling Borough Council (TMBC) commissioned Project Centre (PC) to review the riverside route in Tonbridge for feasibility of a new lighting system.

1.1.2 The riverside route identified is an approximate length of 400m, its eastern end starting at Vale Road meandering along the riverside to the west where it ends at Medway Wharf Road.

1.1.3 The riverside route consists of asphalt and gravel areas, the make up of the area varies at different positions. The route starts with a steep decline from the footway of Vale Road, this area is wide with grass areas, an asphalt path and large mature trees. At the back of the path is a wire fence backing onto warehouse buildings. As the route progresses west, the path narrows and there is a retaining wall. Towards the area by Medway Wharf Road the riverside route is open with trees and bollard lighting in front of the residential building. The river is wide and deep with a lock at Medway Wharf Road.

1.1.4 The riverside route has been identified as an area that would benefit from the introduction of a lighting system, due to the majority of the riverside route being completely dark at night with minimal or no spill light from the surroundings. Most of the riverside route is unlit with low ambient lighting around, on some sections, due to the position near warehouse buildings and little residential spill light. The large mature tree canopies during the summer months are expected to create dark areas due to the foliage blocking out moonlight and other light that may be present.

1.1.5 This report aims to:

- Outline site constraints
- Make recommendations on lighting improvements
- Provide next steps

2. Site Observations

2.1 Overview

2.1.1 Following discussions with TMBC the riverside route has been assessed in two phases. The section from the eastern end at Vale Road is Phase 1, which has no existing lighting. The remaining length of the riverside route up to Medway Wharf Road is Phase 2. In Phase 2 there is low-level bollard lighting present which does provide wayfinding lighting for the public. Any proposed lighting under Phase 1 shall include enabling works for Phase 2 e.g. ducts, cable sizing and feeder pillars. The phases can be seen in Figure 2.1.

Figure 2.1 – Map of riverside route and phases, Map from Bing

2.2 Phase 1

2.2.1 Phase 1 currently has no existing lighting where Phase 2 possess existing low-level bollard lighting. From our discussions with TMBC, the priority is to install lighting in Phase 1 in the first instance and improvements to enhance lighting in Phase 2 to be considered at a later stage.

2.2.2 Phase 1 is approximately 260m in length and starts at Vale Road where there is a steep decline to the riverside route from the footway level, as seen in Figure 2.2. This area is wide with grass, trees and shrubbery. The riverside route at this point is predicted to have contributions of spill light from the street lighting columns along Vale Road.

Figure 2.2 – Steep decline from footway level to riverside route

2.2.3 There are many mature trees on both sides of the riverside route and the edges of the asphalt path can't always been seen due to shrubs and mud. There is a wide area towards the back of the footpath and a wire fence that separates the riverside route and the land to the warehouses and the trading estate. This can be seen in Figure 2.3

Figure 2.3 – Wide area at eastern end of the riverside route

2.2.4 Moving further to the west the path narrows where there is a retaining wall at the back of the pathway which becomes taller with a wooden fence. As seen in Figure 2.4. The boundary of Phase 1 ends where the retaining wall and fence stop. As seen in Figure 2.5.

Figure 2.4 – Retaining wall and wooden fence

Figure 2.5 – Narrowing of the riverside route

2.3 Phase 2

2.3.1 Phase 2 is approximately 130m in length. This phase is outside a residential building that has an internal car park. This area has 11No. existing illuminated bollards aligning the pathway. The existing illuminated bollards are between small trees to provide an aesthetic view along this part of the riverside route. The existing low-level illuminated bollards will provide wayfinding lighting in addition to spill lighting from windows of the residential building. We understand that the illuminated bollards are privately owned and maintained by the developer. Due to Phase 2 already possessing lighting, this area is not a priority as is Phase 1 which has no existing lighting. Therefore, this phase can be considered for improvement in the future.

2.3.2 The riverside route within Phase 2 is split into two with the developers of the residential building owning the brick pavers and land towards their building. This includes the grass area, trees and the illuminated bollards, shown by the orange arrow in Figure 2.6. The area on the other side of the brick pavers to the river's edge is unregistered land ownership as discussed with TMBC. The land ownership can be seen in Figure 2.6 with the private ownership shown with the orange arrow and the unregistered by the pink arrow.

Figure 2.6 – Land ownership, pink unregistered, orange private ownership

2.3.3 The location of the electrical supply for the illuminated bollards was not clear during the site visit, however, it is assumed they are supplied from within the residential building.

2.3.4 The illuminated bollards along Phase 2 appear to be in an old condition. They show visible signs of water ingress and the foundations are not completely sound and were physically moving in the ground. There are 11No. illuminated bollards along Phase 2, they come in three different finishes, which gives the impression that they have been replaced at different points in time. Typical bollards can be seen in Figure 2.7 and 2.8

Figure 2.7 and 2.8 – Typical illuminated bollards on the riverside route Phase 2

2.4 Electrical Supply

2.4.1 As seen in the provided stats information, there are low voltage cables present in the footway. The nearby lighting columns on Vale Road are DNO supplied, also confirming the underground low voltage cables.

3. Lighting Standards, Guidelines and Specifications

The street lighting strategy and design for this project are based on the following standards, guidelines, and specifications:

- BS 5489-1:2020 Code of practice for the design of road lighting, Part 1: Lighting of roads and public amenity areas
- ILP GN01;2021 Guidance Notes for the reduction of obtrusive light
- ILP GN08-2023 Guidance Note 8 Bats and Artificial Lighting

4. Data received

4.1.1 TMBC have provided PC with the following information to assist with this feasibility report.

- OS map
- Gas Holders development plan – 15772-102 Rev F
- Stats information for Gas, Electric, Water, Virgin and Water.
- Public Right of Way information
- Land ownership information

5. Lighting Class Selection

5.1.1 Typical lighting today for the illumination of highways and amenity spaces, BS 5489-1:2020 provides guidelines. The standard aids in ensuring that designers choose the appropriate illumination levels for a variety of places based on pedestrian usage, surrounding facilities, and transportation routes. The selection of lighting should consider, but not be limited to:

- Applying more uniform lighting
- Selecting appropriate light colour temperature
- Installing lighting columns at specific locations
- Lighting to reduce crime and consideration for CCTV
- Ambient Lighting
- Environment

5.1.2 In addition to the lighting class selection, it is important to select the correct environmental zone. Referring to current standards and ILPGN01 guidelines, the project extents fall into the category of zone E3 - Area of Medium District Brightness and lighting will generally be provided in accordance with the British standards. Although the area is considered E3, the site location is dark and features the river.

5.1.3 PC undertook a lighting class risk assessment to establish the lighting class suitable for the riverside route this can be seen in Appendix A.

5.1.4 The lighting class stipulated by the BS 5489-1:2020 Table A.5 for Lighting classes for subsidiary roads is P5, the table can be seen in Figure 5.1. However, following further assessment by PC the lighting class is prudent to be raised to P4. This lighting class is recommended due to the frequency of use of the area with, nearby shops and trading estates and the low ambient luminance. P4 lighting levels provide an average lux 5.00-7.50lux and a minimum lux level of 1lux, shown in Table 1. P class lighting does not require a minimum uniformity level however, when looking at the positioning of lighting columns and the light splay from the luminaires, lighting columns would need to be installed in strategic locations to avoid dark spots.

Table A.5 — *Lighting classes for subsidiary roads*

Traffic flow	Lighting class		
	E1 to E4[A)]	E1 to E2[A)]	E3 to E4[A)]
	Pedestrian and cyclists only	Speed limit $v \leq 30$ mph	Speed limit $v \leq 30$ mph
Busy [B)]	P5	P4	P3
Normal [C)]	P5	P5	P4
Quiet [D)]	P6	P5	P4

Figure 5.1 - BS 5489-1:2020 Table A.5

Lighting Class Benchmark Levels	Lux Range	Lux minimum
P4	5.00-7.50 lux	1.00 lux

Table 1 – Existing lighting levels, using assumed optics.

6. Considerations

6.1 Should this area be lit?

6.1.1 It is important to consider why this area would need to be lit and whether lighting the riverside route is necessary. See Table 2 below for reasons for and against lighting the riverside route.

Reasons to light	Reasons not to light
• Frequency of use, in PC's short time on site, midday Tuesday, it was noticed that the riverside route was used regularly by the public • More light can improve the feeling of safety during nighttime hours • Anticipated increase in pedestrian usage following the new Gas Holders development • Provides an access route to the trading and retail estates towards the east and residential areas and high street to the west • Increase pedestrian usage	• Spill light on the river • May affect wildlife in the vicinity • Spill light into nearby residential buildings

Table 2 – Reasons to light and not light the riverside route

6.2 Wildlife

6.2.1 The riverside route is, currently, largely unlit therefore, considerations of the type of lighting that would be put in place in a previously dark area is important. The natural wildlife in the area will be affected by the introduction of lighting, therefore, it is best to use lighting that reduces the disturbance and to only light areas that are necessary.

6.2.2 The colour temperature would need to be a warm temperature as bats and other animals are affected by blue wavelengths of light. 2700K or 3000K luminaires should be considered for the riverside route.

6.2.3 The lighting should illuminate the path for users of the riverside route and reduce the amount of light spreading across the path into the river and behind the lighting columns. Full cut off luminaires can be used to reduce the amount of spill light and physical shields can be placed on the lanterns to reduce spill light further.

6.2.4 Within a feasibility study of the whole riverside route through Tonbridge carried out by Lloydbore, it was highlighted that there is need for bat friendly lighting. Red lighting has been installed in other areas in the UK where bat activity has been identified. Red lighting has a reduced effect on the natural behaviour of bats in comparison to white light. However, as the aims of the introduction of lighting on the riverside route is to improve the feeling of safety for pedestrians using this route in the hours of darkness, lighting with a red hue may not achieve this directive.

6.3 Site constraints

6.3.1 As mentioned above ecology and wildlife is important to be considered when introducing lighting into a previously unlit area.

6.3.2 There is an existing low voltage cable running along Vale Road which can be used to feed a feeder pillar that can supply potential lighting assets along the riverside route. The existing DNO service on Medway Wharf Road is on the southern footway, which is a distance from the riverside route. This is unlikely to be an option for the supply to the feeder pillar.

6.3.3 The length of the riverside route is approximately 400m. This is a long stretch to feed all lighting columns from one feeder pillar or on one cable run, due to the voltage drop along the distance. If a single feeder pillar is used to supply all the lighting columns on the riverside route it is likely to need two circuits supplying every other lighting column. This would prevent all the luminaires shutting off if there is a fault on the line.

6.3.4 The positioning of the columns would need to be considered due to the width of the riverside route varying along its length. As touched on above, some land in Phase 2 is privately owned, therefore further talks will be required to understand if TMBC lighting assets can be placed in private land. Another option would be to place lighting columns in the middle of the path with a circular post top luminaire used to illuminate the area around the column.

6.3.5 There is an existing retaining wall running along some areas within Phase 1. The retaining wall is planned to be renewed as part the Gas holder development and therefore lighting assets adjacent to the Gas holder site should be installed within NAL sockets to allow for easier re-positioning if required.

6.3.6 The area has been identified as an area that can flood. This may cause problems for a standard lighting column foundation and may require lighting columns to be fitted on concrete plinths to raise above the ground level to prevent adverse effects from flooding. This may not be the aesthetic look that is desired for the riverside route lighting system.

6.3.7 There has been a report of antisocial behaviour in the area which has prompted the desire for lighting along the riverside route. The natural layout of the path meanders causing corners and darker areas. This will need to be considered when looking at the potential layout of lighting columns. It is important to reduce as much dark areas as possible to provide a better feeling of safety at nighttime.

7. Introduction of Lighting on the riverside route

7.1 General

7.1.1 The introduction of lighting assets on the riverside route has been expressed as a desire by TMBC to improve the feeling of safety. Below are recommendations for lighting assets that can be installed along the route to provide illumination.

7.2 Illuminated Bollards vs Lighting columns

7.2.1 Two different approaches are considered below for the lighting assets that can be put in place along the riverside route. Bollard lighting is approximately 1m in height and is a more architecturally aesthetic option than lighting columns. Bollard lighting would be in place for wayfinding only. Lighting columns in this area would be 5/6m in height and would be more functional than illuminated bollards. Lighting columns would provide overhead lighting which would illuminate more of the riverside route than illuminated bollards and make facial recognition easier for pedestrians.

7.2.2 Table 3 shows reasons for and against bollards and lighting columns.

Low-level illuminated Bollards	Lighting Columns
PROS • Smaller and aesthetically less intrusive than lighting columns. • Initial cost of materials cheaper than lighting columns and luminaries	PROS • Lower maintenance cost than bollards • Above head hight lighting allows for better facial recognition • 15+ year life of lighting column • Less assets needed to provide compliant lighting levels
CONS • Higher maintenance costs • Lighting to waist height • Much more likely to need replacing much sooner than lighting columns • Prone to water ingress and vandalism • Many assets needed to achieve compliant lighting levels	CONS • Larger than illuminated bollards • Higher initial cost

Table 3 – Low-level illuminated bollards vs Lighting columns

7.3 Solar Lighting

7.3.1 Solar powered lighting has been considered on the riverside route. However, due to the large canopies of the existing mature trees which would block the solar panels in the summer months, solar lighting is unlikely to be a feasible option.

7.4 Positioning of lighting assets

7.4.1 The ideal location for the lighting columns would be at the back the path in both Phases 1 and 2. In Phase 2 the lighting column being in the grass area at a similar set back to the existing bollards would be a desirable location.

7.4.2 The first potential lighting column in Phase 2 to be at the edge of the bush leading into the riverside route way as shown in Figure 7.1.

Figure 7.1 – Example of location of lighting columns

7.4.3 Phase 2 may require for lighting columns to be in the 'middle' of the path, (back of the unregistered land). In this eventuality round area luminaires would make this look more aesthetic than traditional luminaires.

7.4.4 The ideal location for the feeder pillar location would be in a position to receive a connection from a nearby DNO line. Close to Vale Road at the eastern side of the riverside route has been identified as good location.

7.5 Control

7.5.1 The proposed lighting column luminaires would need to be controlled on site to illuminate at desired times of the day.

7.5.2 To reduce energy usage and only have lighting when needed, the luminaires could be controlled by PiR sensors. With sensors the luminaires would only illuminate when motion is detected, or they can be dimmed and brightened when motion is detected.

7.6 Materials

7.6.1 For lighting column materials, raise and lower hinged type columns would enable ease of maintenance as they will not require a vehicle or cherry picker. With a raise and lower lighting column, the luminaires can be maintained at ground level.

7.6.2 TMBC have stipulated that proposed lighting columns may need to be relocated where the Gas Holders development will be built. In this section of the route lighting columns installed in NAL socket foundations would be desirable to allow for easier removal and relocation of the lighting columns when the development is complete.

7.6.3 Kent County Council (KCC) specification or similar to KCC specification is desired to make it easier for integration and potential future adoption of the equipment.

7.6.4 Back or side shields can be installed on the luminaires in the future if there is need for further spill light to be reduced.

8. Lighting Calculations

8.1.1 PC have completed a high-level lighting calculation to understand the requirements for lighting the riverside route.

8.1.2 The lighting calculation models the riverside route with 15No. 6m lighting columns with 3000K warm white, G4 glare rating full cut off, CU Phosco LED luminaires, similar to KCC specification. With approximate spacings of 25-30m.

8.1.3 The lighting columns have been modelled at the back of the path and in Phase 2, with a similar setback to the existing illuminated bollards.

8.1.4 Further options that can be explored moving forward are additional shields on the luminaires to reduce spill light, and 2700K luminaries if a warmer colour temperature is preferable. 5m lighting columns could be used, this would increase the intensity, however, it would lower the uniformity.

8.1.5 As discussed above the lighting class assessed for the lighting of the riverside route is P4 which has a minimum lighting level of 1lux. The calculation meets these levels. The lighting calculation report can be seen in Appendix B and C and the lighting calculation results can be seen in Table 4.

Area	Benchmark Lighting Class	Average Lux	Minimum Lux
P4 Riverside route	Eav 5.00-7.50 lux Emin 1.00 lux	7.27	1.36

Table 4 – Lighting levels achieved in lighting calculation.

9. Indicative Costs

9.1 Supply Costs

9.1.1 Indicative construction costs are shown in Table 5.

Description	Unit Price (£)	Quantity (No.)	Total (£)
6m hinged lighting column, install and supply	£1,300	15	£19,500
LED lantern, install and supply	£877	15	£13,155
Isolator, install and supply	£235	15	£3,525
Feeder pillar, install and supply	£510	1	£510
Isolator in feeder pillar, install and supply	£240	1	£240
New private supply	£210	15	£3,150
Supply & Install SWA cable in PVC duct	£40	400	£16,000
Trial holes	£250	15	£3,750
New DNO metered supply	£3,000	1	£3,000
Fit new unit numbers	£10	15	£150
6 Pin Nema Socket	£10	15	£150
Hand digging trench for lighting (allowance)	£10,000	1	£10,000
Traffic and pedestrian management	£5,000	1	£5,000
Total			£78,130
Total +15% contingency			£89,850

Table 5 – Indicative installation costs

9.2 Ongoing Maintenance Costs

9.2.1 The life span of a lighting column is approximately 25 years and for a luminaire is approximately 100,000 hours. Indicative ongoing maintenance costa are shown in Table 6.

Description	Unit Price (£)	Quantity (No.)	Total (£)
Electrical Test for lighting columns 4 times over 25+ year life span of lighting column (16 LCs x 4 tests)	£200	60	£12,000
Structural Test for lighting columns 4 times over 25+ year life span of lighting column (16 LCs x 4 tests)	£400	60	£24,000
Electrical Test for feeder pillar 4 times over 25+ year life span of feeder pillar (16 LCs x 4 tests)	£500	4	£2,000
Total over 25 years			£38,000
Total per year			£1,520

Table 6 – Ongoing maintenance costs

9.3 Costs to supply the lighting columns

9.3.1 A high-level estimate for the cost to supply the lighting columns is based on 4000 annual burning hours (UK average) multiplied be the cost of electricity in kWh (e.g. £0.256) = £1,024 per year.

9.4 Design Costings for Stage 4

9.4.1 The cost of a Stage 4 design would be approximately £12,000 and would take approximately 4-6weeks to complete.

9.4.2 Stage 4 tasks would include but not limited to,

- Site Visit - further understand location of trees, retaining wall, width of path etc.
- Proposed lighting calculations - 5 and 6m lighting columns, 2700/3000K colour temperature
- Electrical calculations
- Feeder pillar schematics
- Equipment specifications
- Designers Risk Assessment
- Series 1300 – proposed lighting layout sheets using AutoCAD software
- Series 1400

10. Recommendations

PC recommendations for the installation of lighting assets along the riverside route are shown below.

- Installation of lighting columns in Phase 1
- P4 lighting levels
- Warm colour temperature 2700/3000K
- Lighting columns to be 6m raise and lower columns with full cut off luminaires
- Luminaires to be controlled on site
- Luminaires to be similar to KCC specification for ease of future adoption
- Lighting columns to be installed in NAL sockets for ease of removal and relocation at area where Gas Holders Development will be built.
- Feeder pillar installed near Vale Road and lighting columns to be fed on two circuits
- Hand dug trenching throughout

11. Next Steps

Below are next steps that should be considered following this Feasibility study.

11.1 Engage in a Stage 4 - Detailed Design

- Calculation to be refined with site measurements
- Understanding, with more accuracy, locations of large trees, mapping the trees
- Contact manufacturer and model with 2700K colour temperature, possibly with shields

11.1.1 Other

- Decision whether to move forward with improved lighting in Phase 2
- Discussions on planning
- Liaising with housing development

Appendix A - Lighting Class Risk Assessment

Risk Assessment	Tonbridge Tow Path			
CIE 115:2010		**Selection of 'P' lighting class**		
Parameter	**Options**	**Weighting Value***	**Vw Selected**	
Speed	Very High	N/A	- -	
	High	N/A	- -	
	Moderate	N/A	- -	
	Low	1	1	Pedestrian and cyclists only
	Very low (walking speed)	0		
Traffic Volume	Very high	1		
	High	0.5		
	Moderate	0		
	Low	-0.5	0.5	Low in terms of vehicles, but high pedestrian footfall
	Very Low	-1		
Traffic Composition	Mixed with high proportion of non-motorized users	N/A	- -	
	Mixed	N/A	- -	
	Motorized only	N/A	- -	
	Pedestrians, cyclists and motorized traffic	2		
	Pedestrians and motorized traffic	1		
	Pedestrians and cyclists	1	1	Pedestrian and cyclists only
	Pedestrians only	0		
	Cyclists only	0		
Separation of Carriageways	No	N/A	- -	
	Yes	N/A	- -	
Intersection Density	High	N/A	- -	
	Moderate	N/A	- -	
Parked Vehicles	Present	0.5		
	Not Present	0	0	No vehicles present
Ambient Luminance	High	1		
	Moderate	0		
	Low	-1	-1	Very little existing lighting
Visual Guidance /Traffic Control	Poor	N/A	- -	
	Moderate to Good	N/A	- -	
Facial Recognition	Necessary	Additional requirements		
	Not necessary	No additional requirements		
Sum of Weighted Values		Vws3	1.5	
Lighting class (P)		P=6-Vws3	P4	

Table is from the BS 5489-1 2020 Road Lighting: Table A.5

Table A.5 — *Lighting classes for subsidiary roads*

Traffic flow	Lighting class		
	E1 to E4[A)]	E1 to E2[A)]	E3 to E4[A)]
	Pedestrian and cyclists only	Speed limit $v \leq 30$ mph	Speed limit $v \leq 30$ mph
Busy [B)]	P5	P4	P3
Normal [C)]	P5	P5	P4
Quiet [D)]	P6	P5	P4

Risk Assessment	Description of risk	Associated	Prudent to
Accidents	Within the last 5 years there has been 1 slight severity collision reported on the highway at the edge of the scope	CrashMap	No
Traffic composition:	Pedestrians and cyclist only, no vehicles using the path		No
Ambient luminance or environmental zone:	Shown above	-	No
Visual guidance / traffic control:	Shown above	-	No
Crime	Lower boundary when compared with similar areas	Police.uk Compare your area	No

Parked vehicles, bus stops, pedestrians crossing	No vehicles	-	No

Considering BS 5489-1- table A.5, the lighting class suitable for this road is P5. However, after conducting the lighting class risk assessment the lighting class achieved is P4. Due to the nearby trading and retail estates and frequency of use witnessed on site. Also, following the proposed development, a high footfall is expected in this area. Therefore the towpath has been assessed to be a P4 lighting class.

P4

Prepared by: Jade Edwards-Samuels Date: 21/03/2025
Approved by: Herbie Barnieh Date: 21/03/2025

Appendix B – Lighting Calculation Report

DATE:	**11 April 2025**
DESIGNER:	**Jade Edwards-Samuels**
PROJECT No:	**1000010583-PCL-LCP-2-P01-01-V00**
PROJECT NAME:	**Tonbridge and Malling Riverside Route**

PROJECT CENTRE

Riverside Route
Lighting modelled as follows:
P4
Eav (min) - 5.00 to 7.50 Lux
Emin 1.00 Lux

Environmental Zone E3,
Maintenance Factor 0.79 using CU Phosco P852K
72 months, 6m=<, CCT 3000K
MF = LLMF × LSF × LMF
MF = 0.95 x 0.995 x 0.84 = 0.79

Outdoor Lighting Report

Layout Report

General Data

Dimensions in Metres Angles in Degrees

Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Grid 1 - Horizontal P4	559335.25	146354.56	376.00	168.00	1.50	1.50
2	Grid 2 - Vertical Riversid...	559365.20	146397.09	19.50	9.00	1.50	1.50
3	Grid 3 - Vertical Riversid...	559385.19	146397.17	63.00	9.00	1.50	1.50
4	Grid 4 - Vertical Riversid...	559447.11	146385.26	18.00	9.00	1.50	1.50
5	Grid 5 - Vertical Riversid...	559465.81	146388.81	40.50	9.00	1.50	1.50
6	Grid 6 - Vertical Riversid...	559501.43	146415.97	69.00	9.00	1.50	1.50
7	Grid 7 - Vertical Riversid...	559575.55	146412.70	54.00	9.00	1.50	1.50
8	Grid 8 - Vertical Riversid...	559627.00	146436.31	21.00	9.00	1.50	1.50
9	Grid 9 - Vertical Riversid...	559641.48	146453.92	43.50	9.00	1.50	1.50
10	Grid 10 - Vertical BoF	559365.16	146391.93	19.50	9.00	1.50	1.50
11	Grid 11 - Vertical BoF	559384.75	146391.57	63.00	9.00	1.50	1.50
12	Grid 12 - Vertical BoF	559449.24	146378.93	18.00	9.00	1.50	1.50
13	Grid 13 - Vertical BoF	559467.17	146382.44	18.01	9.00	1.50	1.50
14	Grid 14 - Vertical BoF	559481.86	146397.48	18.00	9.00	1.50	1.50
15	Grid 15 - Vertical BoF	559495.51	146409.29	18.01	9.00	1.50	1.50
16	Grid 16 - Vertical BoF	559513.76	146411.77	34.50	9.00	1.50	1.50
17	Grid 17 - Vertical BoF	559547.58	146404.34	33.00	9.00	1.50	1.50
18	Grid 18 - Vertical BoF	559580.83	146408.04	61.50	9.00	1.50	1.50
19	Grid 19 - Vertical BoF	559636.13	146436.53	51.00	9.00	1.50	1.50
20	Grid 20 - Vertical BoF	559667.44	146478.52	36.00	9.00	1.50	1.50

Luminaires

Luminaire B Data

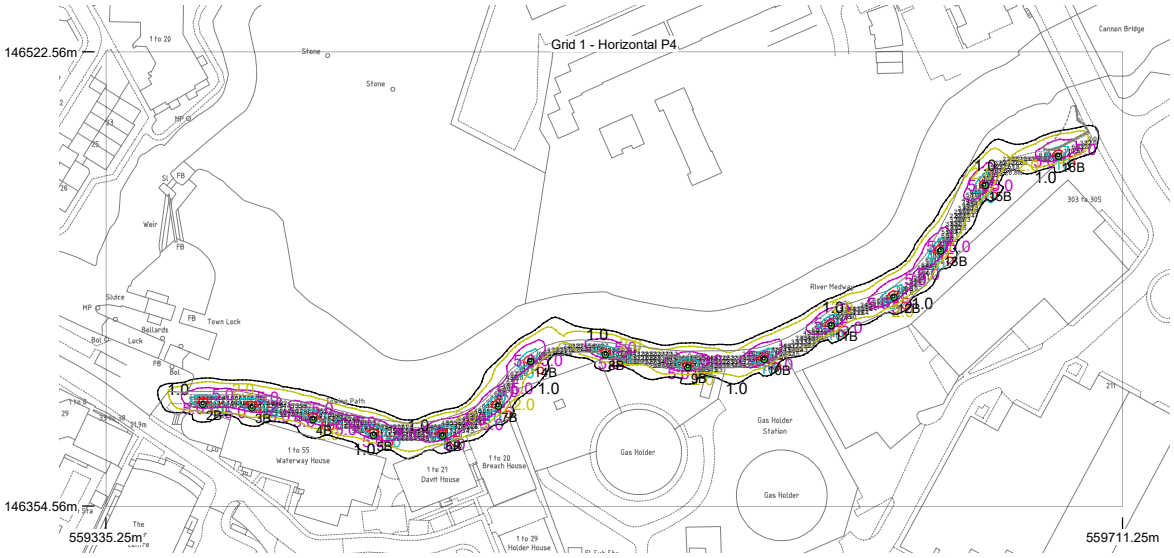
Supplier	C U Phosco
Type	P852K-12-P4-WW-CA0450-18W
Lamp(s)	730C WW
Lamp Flux (klm)	2.15
File Name	P852K-12-P4-WW-CA0450-18W.ies
Maintenance Factor	0.79
Lum. Int. Class	G1
No. in Project	15

Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
2	B	559371.15	146392.22	5.00	89.92	0.00	0.00	0.40			
3	B	559389.22	146390.90	5.00	84.00	0.00	0.00	0.40			
4	B	559411.86	146386.59	5.00	74.00	0.00	0.00	0.40			
5	B	559434.15	146380.81	5.00	75.00	0.00	0.00	0.40			
6	B	559459.74	146380.56	5.00	107.00	0.00	0.00	0.40			
7	B	559480.33	146391.59	5.00	131.00	0.00	0.00	0.40			
8	B	559519.89	146410.58	5.00	79.00	0.00	0.00	0.40			
9	B	559550.44	146405.82	5.00	93.25	0.00	0.00	0.40			
10	B	559578.64	146408.78	5.00	117.00	0.00	0.00	0.40			
11	B	559603.39	146421.37	5.00	121.00	0.00	0.00	0.40			
12	B	559626.66	146431.83	5.00	122.00	0.00	0.00	0.40			
13	B	559643.87	146448.90	5.00	144.00	0.00	0.00	0.40			
14	B	559492.35	146408.13	5.00	129.00	0.00	0.00	0.40			
15	B	559660.32	146473.18	5.00	144.00	0.00	0.00	0.40			
16	B	559687.42	146484.01	5.00	108.00	0.00	0.00	0.40			

Horizontal Illuminance (lux)

Grid 1 - Horizontal P4



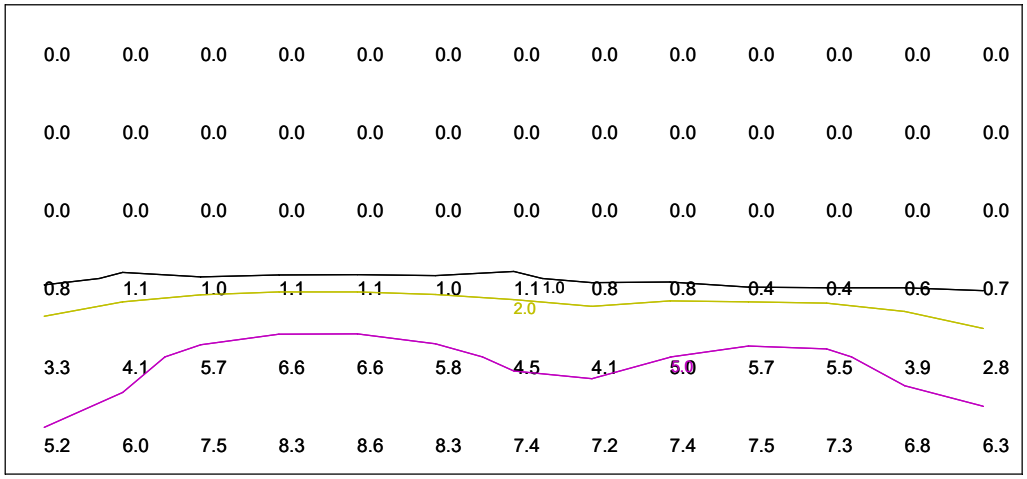
Results

Eav	7.27
Emin	1.36
Emax	19.11
Emin/Emax	0.07
Emin/Eav	0.19

97502596

Illuminance (lux)

Grid 2 - Vertical Riverside



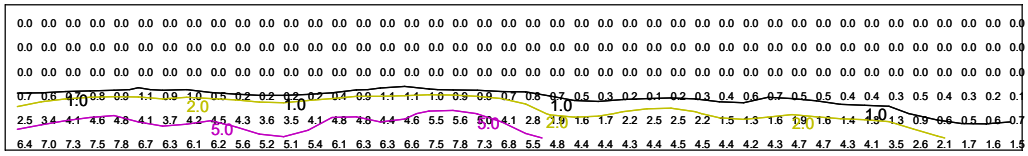
Results

Eav	2.16
Emin	0.00
Emax	8.60
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Illuminance (lux)

Grid 3 - Vertical Riverside



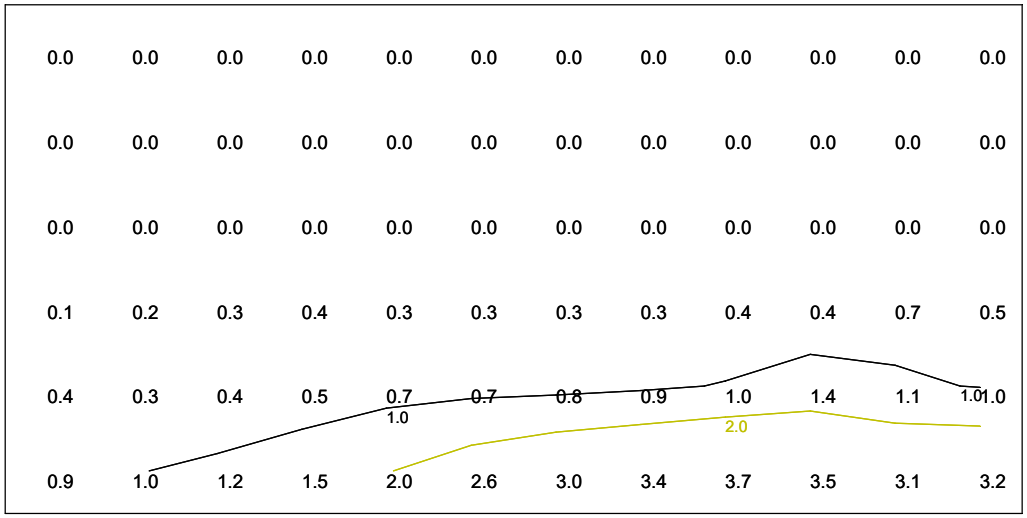
Results

Eav	1.44
Emin	0.00
Emax	7.78
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Illuminance (lux)

Grid 4 - Vertical Riverside



Results

Eav	0.58
Emin	0.00
Emax	3.67
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Illuminance (lux)

Grid 5 - Vertical Riverside

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	0.1	0.2	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.3	0.2	0.2	0.6	2.2	9.7	18	19	32	26	13	13	5.9	1.3
0.8	0.8	0.6	0.5	0.6	0.7	0.8	0.7	0.7	0.8	0.9	0.8	0.8	1.1	1.7	2.8	4.2	6.2	10	14	16	19	18	14	12	8.5	5.2
2.0	1.7	1.6	1.6	1.8	2.1	2.6	2.9	2.9	3.0	2.9	2.6	2.4	2.5	2.7	3.2	3.9	4.8	6.1	7.3	7.8	8.3	7.9	6.9	6.0	4.6	3.4

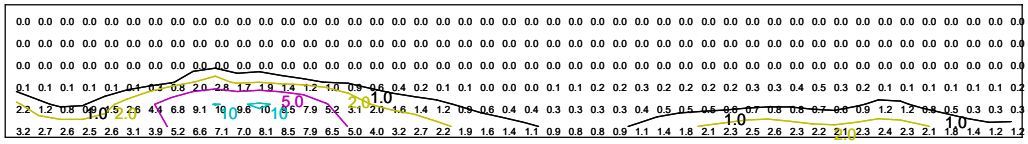
Results

Eav	2.43
Emin	0.00
Emax	31.51
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Illuminance (lux)

Grid 6 - Vertical Riverside



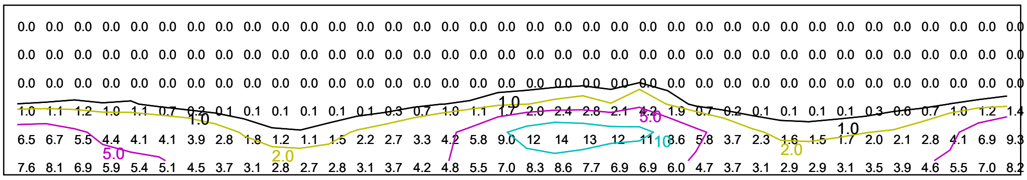
Results

Eav	0.96
Emin	0.00
Emax	10.44
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Illuminance (lux)

Grid 7 - Vertical Riverside



Results

Eav	1.87
Emin	0.00
Emax	14.20
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Illuminance (lux)

Grid 8 - Vertical Riverside

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.1	0.7	0.5	0.2	0.1	0.1	0.1	0.2	0.4	0.7	0.9	1.2	1.3	1.3
6.5	3.6	2.1	1.5	1.4	1.6	1.9	2.3	2.4	2.7	3.5	5.2	8.0	9.3
4.5	3.8	3.3	3.0	2.7	2.7	3.0	3.4	4.0	4.4	5.1	6.3	7.9	8.2

Results

Eav	1.47
Emin	0.00
Emax	9.31
Emin/Emax	0.00
Emin/Eav	0.00

Illuminance (lux)

Grid 9 - Vertical Riverside

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.9	0.7	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.4	0.4	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.0	0.0
3.4	2.0	1.3	1.0	1.0	0.9	0.7	0.7	0.8	1.1	1.2	0.9	0.5	0.5	0.6	0.6	0.5	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1
5.2	4.0	3.2	2.7	2.4	2.3	2.3	2.6	2.8	2.9	2.6	2.3	1.8	1.7	1.7	1.8	1.7	1.5	1.2	0.9	0.8	0.7	0.5	0.4	0.3	0.3	0.2	0.3	0.2

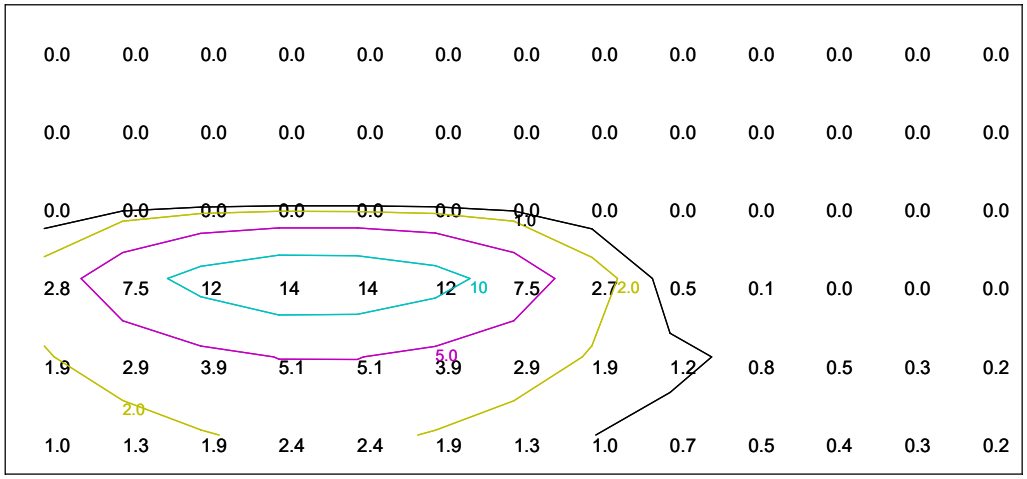
Results

Eav	0.45
Emin	0.00
Emax	5.17
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Illuminance (lux)

Grid 10 - Vertical BoF



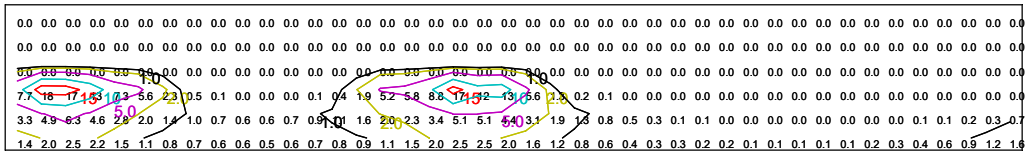
Results

Eav	1.53
Emin	0.00
Emax	14.25
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Illuminance (lux)

Grid 11 - Vertical BoF



Results

Eav	0.98
Emin	0.00
Emax	17.62
Emin/Emax	0.00
Emin/Eav	0.00

97502596

PROJECT CENTRE

Illuminance (lux)

Grid 12 - Vertical BoF

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.1	0.3	1.1	3.1	9.8	8.9	2.5	0.9	0.3	0.1
0.3	0.2	0.3	0.3	0.5	0.8	1.4	1.4	0.7	0.4	0.3	0.3
1.2	0.9	0.7	0.6	0.5	0.5	0.6	0.7	0.7	0.8	1.0	1.2

5.0 2.0 1.0

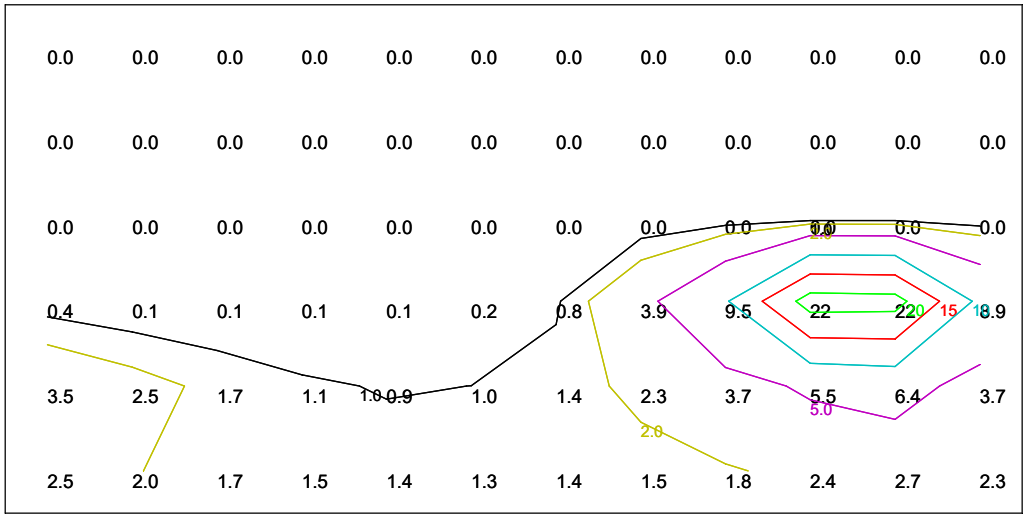
Results

Eav	0.61
Emin	0.00
Emax	9.79
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Illuminance (lux)

Grid 13 - Vertical BoF



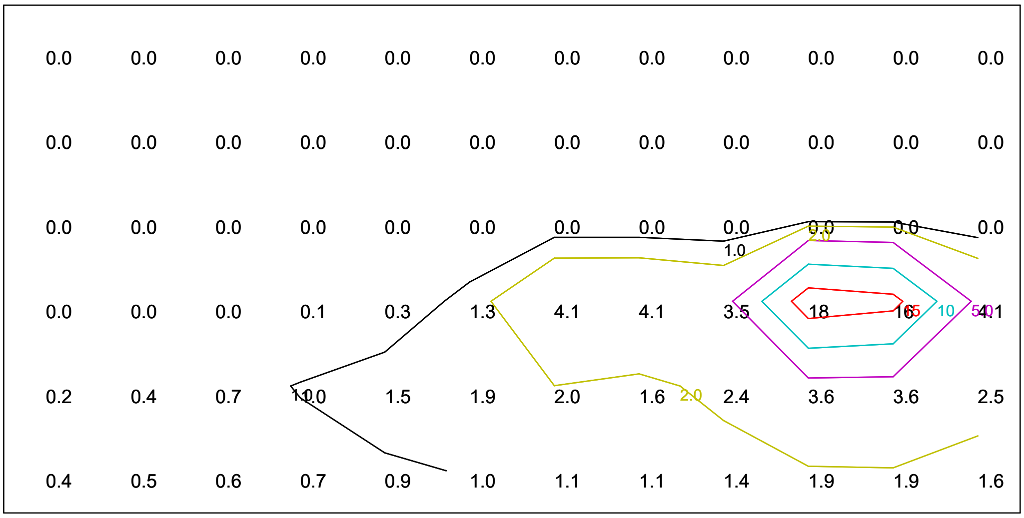
Results

Eav	1.73
Emin	0.00
Emax	22.18
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Illuminance (lux)

Grid 14 - Vertical BoF



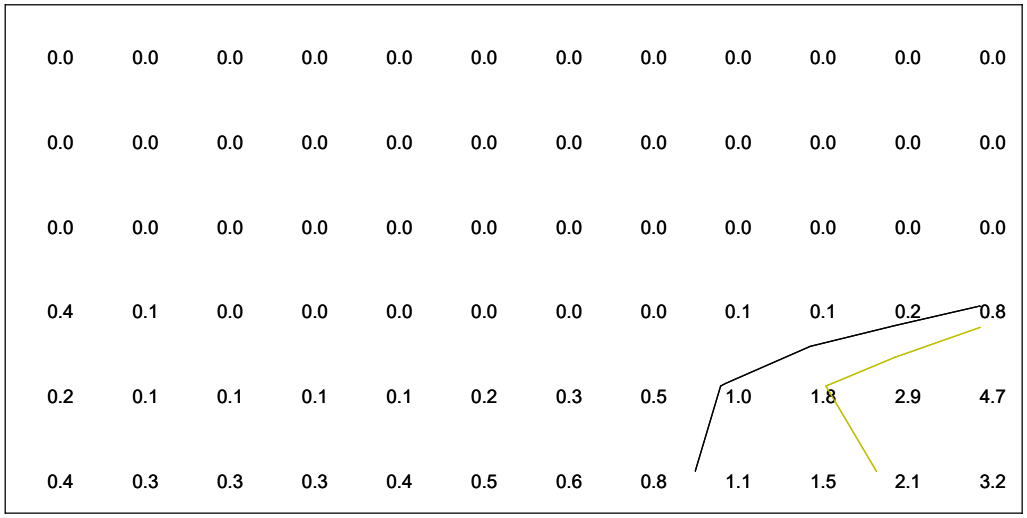
Results

Eav	1.20
Emin	0.00
Emax	17.89
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Illuminance (lux)

Grid 15 - Vertical BoF



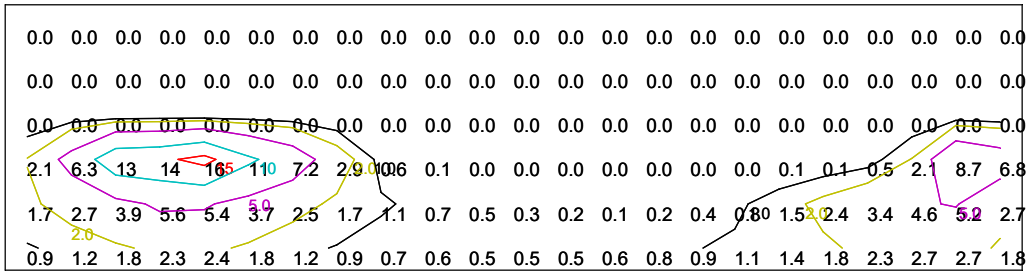
Results

Eav	0.35
Emin	0.00
Emax	4.73
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Illuminance (lux)

Grid 16 - Vertical BoF



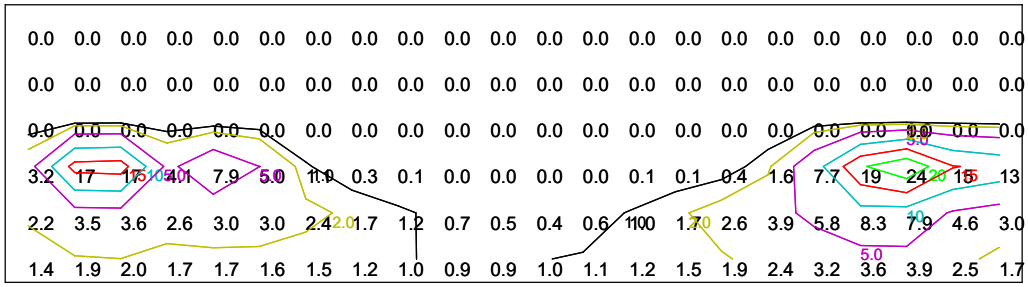
Results

Eav	1.27
Emin	0.00
Emax	16.49
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Illuminance (lux)

Grid 17 - Vertical BoF



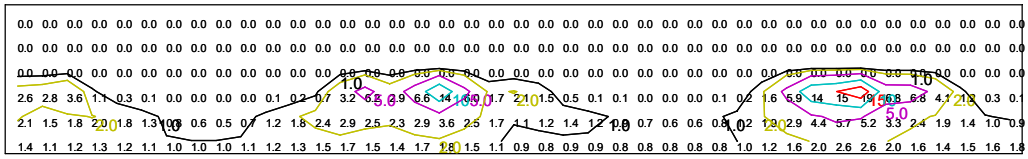
Results

Eav	1.83
Emin	0.00
Emax	24.33
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Illuminance (lux)

Grid 18 - Vertical BoF



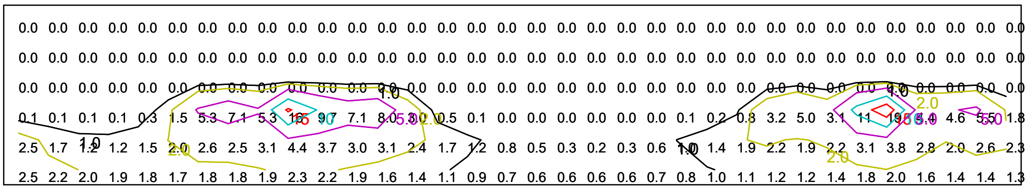
Results

Eav	1.07
Emin	0.00
Emax	18.62
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Illuminance (lux)

Grid 19 - Vertical BoF



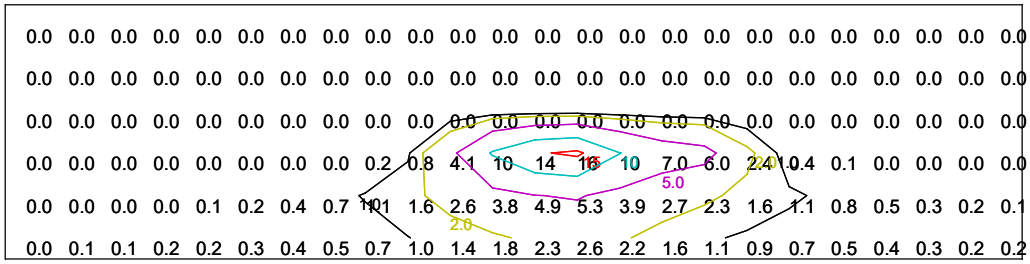
Results

Eav	1.18
Emin	0.00
Emax	18.61
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Illuminance (lux)

Grid 20 - Vertical BoF



Results

Eav	0.87
Emin	0.00
Emax	15.82
Emin/Emax	0.00
Emin/Eav	0.00

97502596

Appendix C – Lighting Calculation, Plot to scale

	Luminaire B 
Supplier	C U Phosco
Type	P852K-12-P4-WW-CA0450-18W
Lamp(s)	730C WW
Lamp Flux (klm)	2.15
Maintenance Factor	0.79
No. in Project	15

PROJECT CENTRE

PROJECT NAME:
Tonbridge and Malling Riverside Route

PROJECT No:
1000010583-PCL-LCP-2-P01-01-V00

SCALE:	DATE:
1:1000	**11 April 2025**

CALCULATION:
Horizontal Illuminance (lux)

DESIGNER:
Jade Edwards-Samuels

Riverside Route
Lighting modelled as follows:
P4
Eav (min) - 5.00 to 7.50 Lux
Emin 1.00 Lux

Environmental Zone E3,
Maintenance Factor 0.79 using CU Phosco P852K
72 months, 6m=<, CCT 4000K
MF = LLMF × LSF × LMF
MF = 0.95 x 0.995 x 0.84 = 0.79

PREPARED BY:

FILE NAME
G:\Project Centre\Project-BST\1000010583 - Tonbridge & Malling BC Riverside Lighting\2 Project Delivery\5 Design & WIP\Lighting\1 Photometric Design\1000010583-PCL-LCP-2-P01-01-V00.rtma

Results Grid 1 - Horizontal P4	
Eav	7.27
Emin	1.36
Emax	19.11
Emin/Emax	0.07
Emin/Eav	0.19

97502596

Appendix D – Lighting Drawing

TONBRIDGE AND MALLING RIVERSIDE ROUTE
- The riverside route is approximately 400m in length
- Stretching from Medway Wharf Road to Vale Road
- Lighting class assessed to be P4
- Lighting levels would provide an average lux of 5.00-7.50lux and a minimum lux level of 1lux

Small trees present at the back of the footway, bollard lighting installed on the same line

The riverside route narrows at and the retaining wall starts at this point

The riverside route widens here with a wire fence at the back of the footway

Steep incline from the riverside route up to footway level
This area is prone to flooding in heavy rain events

Low voltage cables present under Vale Road footway
Feeder Pillar location is desirable at this end of the riverside route

Large mature trees are present within Phase 1
The trees may cause the area to feel dark in the summer months when foliage is dense.

PHASE 1
- 260m approximately
- Location of the initial focus due to no existing lighting being present
- Assumed unregistered land ownership
- Large mature trees present
- Retaining wall present in some sections

PHASE 2
- 130m approximately
- Existing bollard lighting present
- Private owned land and unregistered land

11No. Existing bollard lighting units present in 3No. different finishes

GAS HOLDERS DEVELOPMENT
At this point proposed lighting columns would require to be installed in NAL sockets for easy removal and relocation

Retaining wall ends at this point
The retaining wall may cause a problem when installing lighting column foundations. Integrity of the wall must be maintained

WILDLIFE
- A previously unlit area will have effects to the local wildlife when introducing illumination
- A warm lighting temperature of 3000/2700K will be required
- Full cut off luminaires required to reduce the amount of light spreading across the path into the river and behind the lighting columns where possible
- Physical shields can further reduce spill light

LIGHTING MATERIALS
- 5m or 6m lighting columns for the footpath
- Installing raise and lower lighting columns will allow maintenance from ground level
- NAL sockets outside the Gas Holders development
- Similar specification luminiares to KCC specification to allow for adoption at a later date
- Shields attached to the luminiare can be installed to reduce spill light

LEGEND
- Phase 1
- Phase 2
- Indicative location of 6m lighting column Qty: 15No.
- FP — Indicative location of feeder pillar Qty: 1No.

Rev	Date	Description	Drn	Chk	App
0	17/04/2025	ORIGINAL	JES	AM	HB

This drawing has been specifically prepared to meet the requirements of the named client and may contain design and innovative features which differ from conventional design standards.

PROJECT CENTRE
www.marstonholdings.co.uk/projectcentre

Client: TONBRIDGE & MALLING BOROUGH COUNCIL www.tmbc.gov.uk

Project: RIVERSIDE ROUTE LIGHTING

Drawing Title: LIGHTING FEASIBILITY SHEET 1 OF 1

Drawing Status: FOR INFORMATION

Drawn	Designed	Date	Scale	Size
JES	JES	APR 2025	NTS	A1

Drawing No.: 1000010583-2-1300-01 Rev: 0

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Quality

It is the policy of Project Centre to supply Services that meet or exceed our clients' expectations of Quality and Service. To this end, the Company's Quality Management System (QMS) has been structured to encompass all aspects of the Company's activities including such areas as Sales, Design and Client Service.

By adopting our QMS on all aspects of the Company, Project Centre aims to achieve the following objectives:

- Ensure a clear understanding of customer requirements;
- Ensure projects are completed to programme and within budget;
- Improve productivity by having consistent procedures;
- Increase flexibility of staff and systems through the adoption of a common approach to staff appraisal and training;
- Continually improve the standard of service we provide internally and externally;
- Achieve continuous and appropriate improvement in all aspects of the company;

Our Quality Management Manual is supported by detailed operational documentation. These relate to codes of practice, technical specifications, work instructions, Key Performance Indicators, and other relevant documentation to form a working set of documents governing the required work practices throughout the Company.

All employees are trained to understand and discharge their individual responsibilities to ensure the effective operation of the Quality Management System.

TONBRIDGE & MALLING BOROUGH COUNCIL
www.tmbc.gov.uk

PROJECT CENTRE

Award Winning

CIHT Awards 2021 WINNER Employer of the Year
THE INVESTORS IN PEOPLE AWARDS 2021
ice Awards 2020 Winner
LANDSCAPE INSTITUTE AWARDS 2020 WINNER
british parking awards 2019 WINNER
british parking awards 2020 WINNER
british parking awards 2021 WINNER

Certifications

bsi ISO/IEC 27001 Information Security Management CERTIFIED
bsi ISO 14001 Environmental Management CERTIFIED
bsi ISO 9001 Quality Management Systems CERTIFIED
bsi ISO 45001 Occupational Health and Safety Management CERTIFIED

Accreditations

CIHT Diversity & Inclusion Charter
POSITIVE ABOUT DISABLED PEOPLE
INVESTORS IN PEOPLE™ We invest in people Platinum
constructionline
URBAN DESIGN GROUP REGISTERED PRACTICE
New Civil Engineer 100 COMPANIES OF THE YEAR 2018 RANKED COMPANY

Memberships

PLEDGE TO NET ZERO
CIHT Corporate Partner
ice Institution of Civil Engineers
nec GOLD
RoSPA Member
Landscape Institute Registered practice
BPA MEMBER OF THE BRITISH PARKING ASSOCIATION
MEMBER OF CIRAS

info@projectcentre.co.uk • www.marstonholdings.co.uk/projectcentre
London • Slough • Kent • Brighton • Manchester • Edinburgh