

Doc. Ref.	21412_CALC_0201
Sheet	1 of 13
Engineer	Nathan Allen
Date	09.01.2024
Revision	-

DESIGN CALCULATIONS FRONT SHEET

SCHEME	Gaul Road, March
CLIENT	Burmor Construction
ASPECTS OF SCHEME TO BE DESIGNED	Section 38 Lighting Design
CODES OF PRACTICE, DESIGN SPECIFICATIONS & BRITISH STANDARDS	BS 5489-1:2020 & BS EN 13201-2:2015
DESIGN CONSIDERATION NOTES	<p>Making sure design meets CCC Street Lighting Design Brief G59.2727 31st August 2023</p> <ul style="list-style-type: none"> • Lighting colour 3K for the main road. • Ensure column numbers are kept to a minimum to enhance sustainability. • No illuminated signs or bollards specified. • Design constraints included <ul style="list-style-type: none"> - Ensuring no driveways are block - Proposed trees • Lighting to class P5 (Eav 3.0Lux to 4.5Lux, Emin 0.60) • Utilise DW Windsor column height 6m • 0 degree tilt, 0.3m outreach • Street lighting layout shown on engineering drawing ref. 21412_02_100_01 • Using Lighting Reality design software

INDEX

Pages	Calculations	Checked by	Date
2-6	P5 Lighting Reality Design Calculation – Area	DMH	09.01.2024
7-11	P5 Lighting Reality Design Calculation – Road	DMH	09.01.2024
12-13	Design Risk Assessment	DMH	09.01.2024

DATE: 9 January 2024
DESIGNER: Nathan Allen
PROJECT No: 21412
PROJECT NAME: Gaul Road, March



SCHEME DESIGNED IN ACCORDANCE WITH BS5489-1:2020 &
BS EN 13201-2:2015

Gaul Road, March

S38 Street Lighting Layout

P5- Eav 3.0lux - 4.5lux Emin 0.60lux

Outdoor Lighting Report

Layout Report

General Data

Dimensions in Metres Angles in Degrees
Grid Origin 540519.2m x 296498.4m
Area 226.7m x 223.4m
Sample Spacing 1.50m x 1.50m

Luminaires



Luminaire A Data

Supplier	D W Windsor
Type	KIRIUM PRO MINI 16LED 3k A1 250mA UM SUG 42 0012 0000 100
Lamp(s)	16 x 3k LED
Lamp Flux (klm)	1.68
File Name	KIRIUM PRO MINI 16LED 3k A1 250mA U MSUG 42 0012 0000 100.ies
Maintenance Factor	0.86
Imax70,80,90(cd/klm)	741.4, 276.3, 0.0
No. in Project	11



Luminaire B Data

Supplier	D W Windsor
Type	KIRIUM PRO MINI 16LED 3k A1 300mA UM SUG 42 0013 0000 100
Lamp(s)	16 x 3k LED
Lamp Flux (klm)	2.04
File Name	KIRIUM PRO MINI 16LED 3k A1 300mA U MSUG 42 0013 0000 100.ies
Maintenance Factor	0.86
Imax70,80,90(cd/klm)	741.2, 276.2, 0.0
No. in Project	1



Luminaire C Data

Supplier	D W Windsor
Type	KIRIUM PRO1 32LED 4k A2 450mA UMSU G 42 0037 0000 100
Lamp(s)	32 x 4k LED
Lamp Flux (klm)	6.72
File Name	KIRIUM PRO1 32LED 4k A2 450mA UMSU G 42 0037 0000 100.ies
Maintenance Factor	0.86
Imax70,80,90(cd/klm)	629.3, 57.7, 0.0
No. in Project	3

Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	A	540670.80	296672.25	6.00	169.00	0.00	0.00	0.30			
2	A	540654.16	296641.37	6.00	350.00	0.00	0.00	0.30			
3	A	540651.68	296623.17	6.00	2.00	1.00	0.00	0.30			
4	A	540664.44	296589.32	6.00	158.00	0.00	0.00	0.30			
5	A	540641.25	296577.54	6.00	321.00	0.00	0.00	0.30			
6	A	540629.09	296548.91	6.00	144.00	0.00	0.00	0.30			
7	A	540621.60	296579.59	6.00	42.00	0.00	0.00	0.30			
8	A	540599.00	296600.67	6.00	61.00	0.00	0.00	0.30			
9	A	540572.75	296605.15	6.00	323.00	0.00	0.00	0.30			
10	A	540586.85	296633.45	6.00	168.00	0.00	0.00	0.30			

Layout Continued

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
11	A	540596.90	296663.16	6.00	162.00	0.00	0.00	0.30			
12	B	540593.14	296677.58	6.00	248.00	0.00	0.00	0.30			
13	C	540691.76	296676.17	8.00	81.00	0.00	0.00	0.30			
14	C	540640.20	296685.46	8.00	79.00	0.00	0.00	0.30			
15	C	540669.16	296692.25	8.00	265.00	0.00	0.00	0.30			

Horizontal Illuminance (lux)

Grid 1



Results

Eav	3.71
Emin	0.75
Emax	17.71
Emin/Emax	0.04
Emin/Eav	0.20

Horizontal Illuminance (lux)

Grid 1



Results

Eav	3.71
Emin	0.75
Emax	17.71
Emin/Emax	0.04
Emin/Eav	0.20

DATE: 9 January 2024
DESIGNER: Nathan Allen
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SCHEME DESIGNED IN ACCORDANCE WITH BS5489-1:2020 &
BS EN 13201-2:2015

Gaul Road March

S38 Street Lighting Road Calc - 12m -3m footpath left & right

P5- Eav 3.0lux - 4.5lux Emin 0.6lux

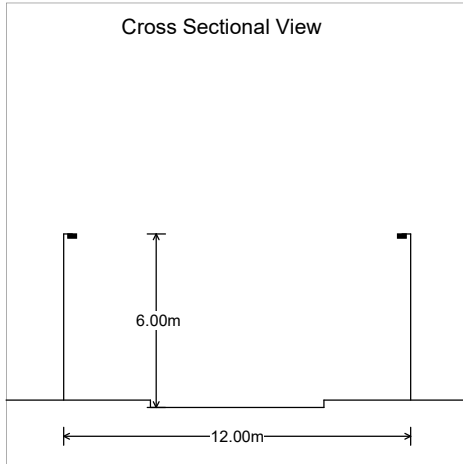
Max spacing - 32.00m

Min Spacing - 21.50m

Roadway Lighting Report

Roadway Report Summary

Layout



Road Data

Calculation Grid	BS5489:1 2020
Width (m)	12.00
No. of Lanes	2
Road Surface	C2
Q0	0.07
Left Footpath(m)	3.00
Right Footpath(m)	3.00

Main Lighting

Column Data

Configuration	Staggered
Spacing (m)	32.00
Height (m)	6.00
Tilt (deg)	0.00
Left Setback (m)	3.00
Left Outreach (m)	0.30
Left Overhang (m)	-2.70
Right Setback (m)	3.00
Right Outreach (m)	0.30
Right Overhang (m)	-2.70

Luminaire Data



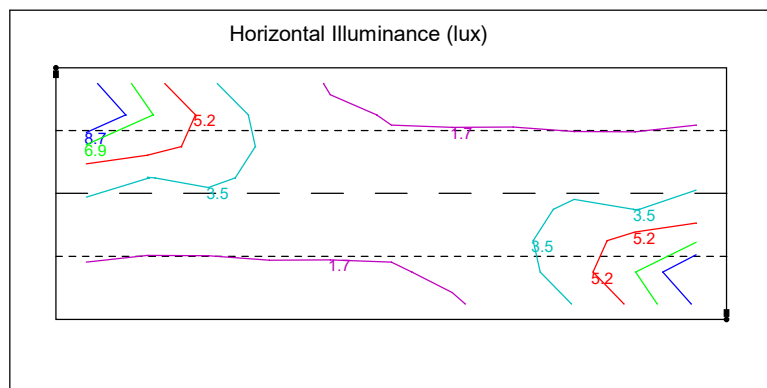
Supplier	D W Windsor
Type	KIRIUM PRO MINI 16LED 3k A1 250mA UM SUG 42 0012 0000 100
Lamp(s)	16 x 3k LED
Lamp Flux (klm)	1.68
File Name	KIRIUM PRO MINI 16LED 3k A1_250mA U MSUG 42 0012 0000 100.ies
Maintenance Factor	0.86
Lum. Int. Class	None

Results

Main

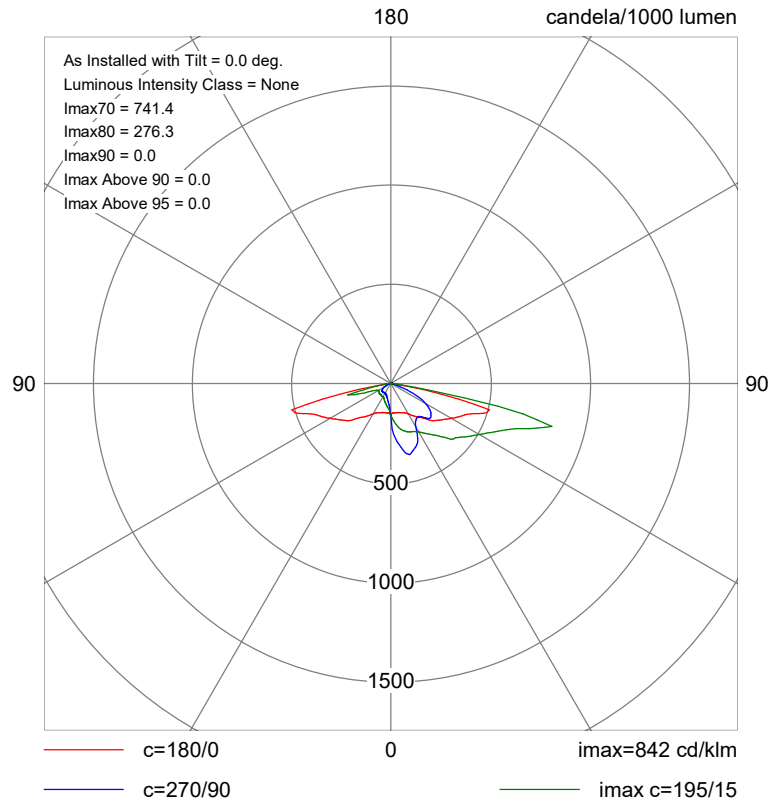
Complies with P5

Eav	3.00
Emin	0.88
Emax	11.26
Emin/Emax	0.08
Emin/Eav	0.29

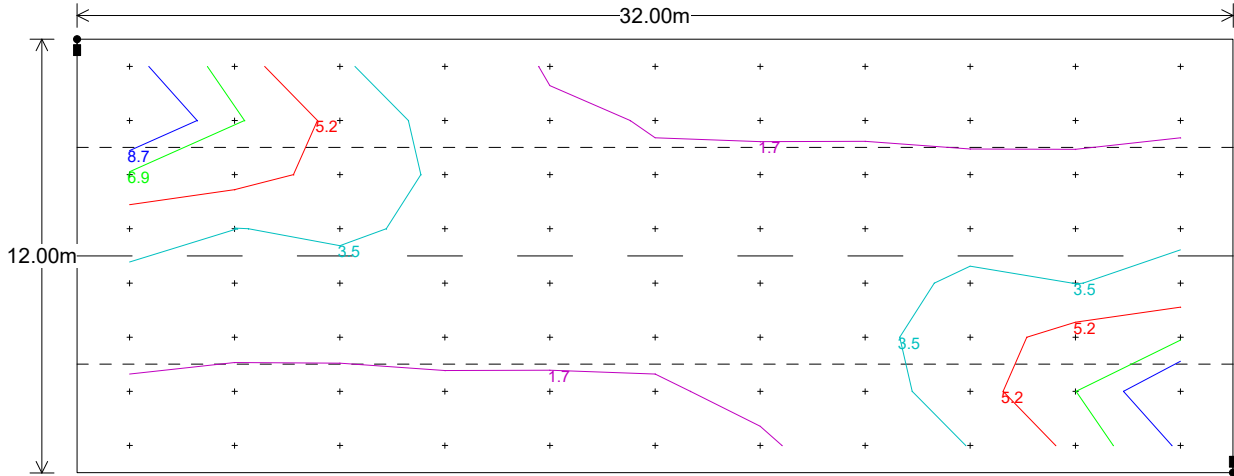


Polar Diagram

Main Luminaire KIRIUM PRO MINI 16LED 3k A1 250mA UMSUG 42 0012 0000 100



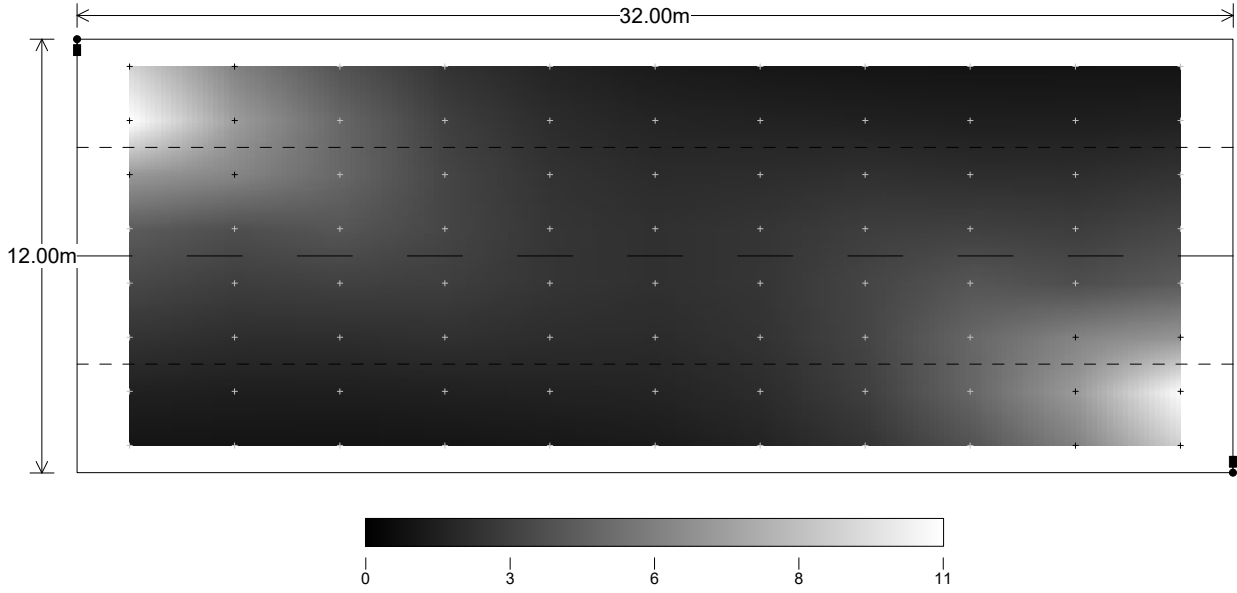
Horizontal Illuminance (lux)



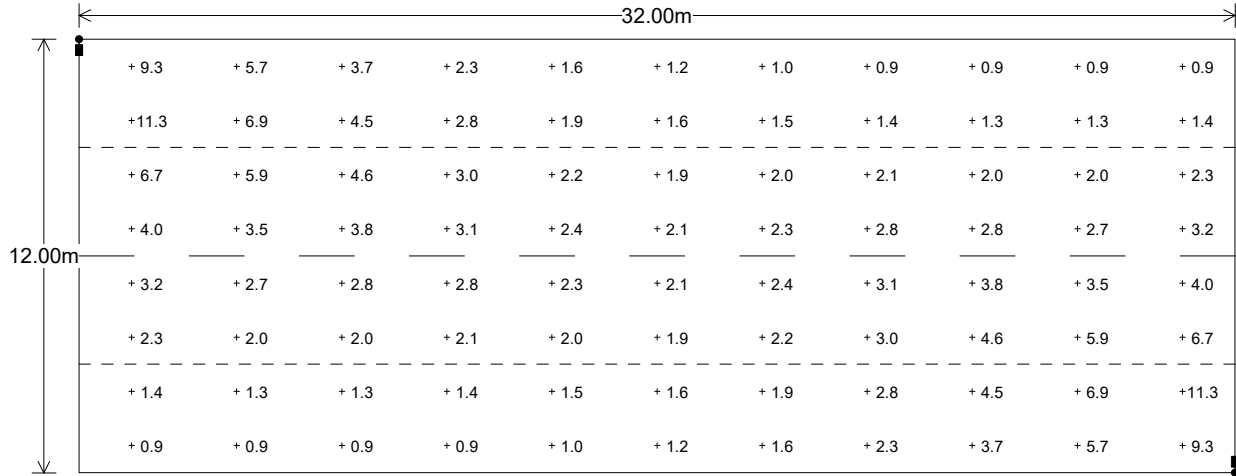
Main Results

Eav	3.00
Emin	0.88
Emax	11.26
Emin/Emax	0.08
Emin/Eav	0.29

Horizontal Illuminance (lux)



Horizontal Illuminance (lux)



STREET LIGHTING DESIGN RISK ASSESSMENT



MEC

Development Technical
Consultants

Project		Gaul Road, March					
Ref.		21412		Client		Burmor Construction	
Engineer		N. Allen		Date		09.01.2024	
Ref. No	Activity/ Element	Potential Hazards	Those at Risk	Risk Rating LOW/ MED/ HIGH	Elimination Or Reduction Through Design	Possible Control Options (Contractors)	
1.1	Installation and removal of street lighting	Erection and removal of lighting columns and signs	Contractor Visitors Public	MED	Works cannot be eliminated through design. Number of required columns minimised to reduce extent of works, existing columns retained where possible.	Safety zone to be maintained between column erection and other site users/pedestrians. Comply with Well-maintained Highways Code of Practice and all requirements for manual handling of columns, refer to The Manual Handling Operations Regulations 1992. Reflective jackets and safety equipment to be worn at all times. Traffic management to be carried out in accordance with Chapter 8. When removing existing apparatus carry out appropriate safety checks to ensure supply is disconnected. Existing street lighting to be maintained in accordance with appropriate BS EN 13201:2015 (BS 5489) Code of practice or as specified by engineer, during construction process. Maintained minimum 0.5m safety zone from overhead lines at all times. The use of impact tools must be limited. For the installation of raise/lower columns, the contractor should consider the use of a carrying cradle. Due to the proximity of the bus route and nearby playground safe pedestrian routes around the works should be provided.	
1.2	Excavation for the Installation and removal of street lighting	Buried services may exist that have not been identified on the record and survey information resulting in risk of potential electrocution, damage to cables, damage to ducting system and damage to gas mains/water mains.	Site operatives and persons permitted within site. Public	MED	Lighting design has taken into account a combined services survey drawing to reduce this risk but risk cannot be eliminated through design. Utilities information to be provided to contractor	Collate service records from ALL major utility companies with equipment within the vicinity before starting work. All holes to be excavated by hand digging to minimise risks. CT scan to locate buried obstructions. Safety zone to be maintained between other site users / pedestrians. Comply with HSG47 – Avoiding danger from underground services and all requirements for manual handling of equipment (Manual Handling Techniques). Reflective jackets and safety equipment to be worn at all times. Traffic management to be carried out in accordance with Chapter 8. When removing existing apparatus carry out appropriate safety checks to ensure supply is disconnected. The use of impact tools must be limited or appropriate road closure/diversions set up. All works involved with the removal and disconnection of column S15 should follow the HSE work near electricity guidelines.	
1.3	Electrical Installation /Testing	Electrocution	Contractor	MED	Design has minimised the number of required connections.	All electrical work to be carried out in accordance with the latest BS 7671:2018 18th Edition, The electricity at work regulations, Health and safety at work Act and CDM. Reflective jackets and safety equipment to be worn at all times. Traffic management to be carried out in accordance with Chapter 8. Existing street lighting to be maintained in accordance with appropriate BS EN 13201:2015 (BS 5489) Code of practice or as specified by engineer, during construction process. When removing	

						existing apparatus carry out appropriate safety checks to ensure supply is disconnected.
1.5	Working at heights	People falling and objects falling	Contractor Visitors Public	MED	Risk Reduced as lighting columns designed to be low as practically possible at 6m.	Avoid working at heights where it's reasonably practicable to do so. Minimise the distance and consequences of a fall, by using the right type of equipment where the risk cannot be eliminated. Keep loose materials and stacking or storing materials well back from edges. Contractor to comply with work place regulations and also the personal protective equipment at work regulations 1992
1.6	Lifting operations near live carriageway	Objects falling	Contractor Visitors Public	MED	Works cannot be eliminated through design; however, the height of columns has been minimised.	Contractor to provide method statements and detailed risk assessment to cover this operation. Ensure clear working area is provided by using barriers to prevent public being in close proximity to the works.
1.7	Working in the vicinity of LV or HV overhead power lines	Coming into contact with live power lines	Contractor Visitors Public	HIGH	Risk has been reduced as lighting columns have been designed with the combined services survey drawing in mind.	Operative to be G39 trained and have knowledge of identification of overhead line voltage cables. Work in accordance with the ILP document GP10 – safety during the installation and removal of lighting columns and similar street furniture in the proximity of overhead lines.
1.8	Removal of DNO fuse carriers	Electrocution	Contractor	MED	Works cannot be eliminated through design, however the number of required connections have been minimised.	Only electricians holding a G39 certificate allowed to perform this task