MOOR LANE SERVICE STATION, SOUTH SHIELDS, NE34 6BZ

EXTERNAL LIGHTING STATEMENT

Client:

SRJ Energy Limited

Issue/revision	0	A	B	C
Remarks	Issue for Planning Approval			
Date	13/12/2023			
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Project number	23/4446			
File Location	https://ddawf5.sharepoint.com/sites/rapleys/shared documents/moor lane service station 23-4446/k reports/moor lane service station - external lighting statement.docx			

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1.00 INTRODUCTION

This document details the RIBA Stage Two engineering proposals for the external lighting to the proposed redevelopment of Moor Lane Service Station (8 - 12 Moor Ln, South Shields NE34 6BZ).

The proposals in this report are based upon the following core values:

- Energy efficient systems to reduce carbon emissions and running costs.
- Simple and efficient construction.
- Reduced lighting spill to neighbouring areas.
- Intuitive and simple operation of services for staff.

1.01 LOCATION

The service station is located in an area of mixed use, with shops nearby, Harton Cemetery and St Peter's Church on the opposite side of the road and semi-detached houses to the West.



1.02 DESCRIPTION OF THE OVERALL DEVELOPMENT

Redevelopment of existing service station comprising a newly built store and associated forecourt with 4 fuel pumps and 4 parking spaces.

1.03 BASELINE CONDITION

The lighting on the public highway at the front of the site is provided by 3no. directional lanterns mounted on 8m columns **(green)** and it is deemed acceptable for the purpose of this assessment.





View of existing service station from Moor Lane heading towards Sunderland Road

2.00 EXTERNAL LIGHTING DESIGN

2.01 RELEVANT LEGISLATION

Several documents lay down the best practice and guidance on providing sufficient and appropriate external lighting. These guide us in the provision of relevant and nonintrusive lighting.

The main documents that have been used to complete the design are:

- BS5489-1:2020 Design of road lighting. Part 1: Lighting of roads and public amenity areas – Code of practice.
- BS EN 12464-2:(2014). Light and lighting - Lighting of workplaces. Part 2: Outdoor workplaces
- CIBSE Lighting Guide 6. The exterior environment
- Society of Light and Lighting (SLL) Code for Lighting
- In accordance with the requirements of the ILP Guidance notes.

Guidance Note 1 for the Reduction of Obtrusive Light (2021) published by the Institute of Lighting Professionals describes 5 Environmental Zones according to their distinctive lighting environment:

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

The design solution in this report meets the criteria of Environmental Zone E3.

The appendix lighting plan has been modelled to meet the illuminance requirements for fuel filling stations set by BS EN 12464-2:2014

Table 5.6 — Fuel filling stations

Ref. no.	Type of area, task or activity	$\overline{E}_m$ lx	U_o –	R_{GL} –	R_a –	Specific requirements
5.6.1	Vehicle parking and storage areas	5	0,25	50	20	
5.6.2	Entry and exit driveways: dark environment	20	0,40	45	20	
5.6.3	Entry and exit driveways: light environment	50	0,40	45	20	
5.6.4	Air pressure and water checking points and other service areas	150	0,40	45	20	
5.6.5	Meter reading area	150	0,40	45	20	

2.02 LIGHTING APPROACH FOR EACH AREA

The lighting at the service station should have a comprehensive approach, taking into consideration the canopy lighting, convenience store lighting and environmental lighting.

The under-canopy luminaire selected to provide lighting in the forecourt (Canolux LED) has been specifically designed for this application and has a low glare ratio (UGR). An average illuminance of 400 lux at ground level is considered adequate. Additionally, a vertical illuminance of 150 lux is to be achieved at each pump.

The entrance to the service station and the air, water and vacuum area are illuminated by wall-mounted floodlights (Starbeam LED) at 4m height and 5° tilt to avoid light spilling towards the neighbouring houses. The selected lantern is designed to have 0% upward light to reduce the light pollution of the night sky.

The customer parking is also the crossing area between the pumps and the store. The perception of detail required in this area is lower so an average of 200 lux is deemed acceptable.

The walkway to the side of the shop is adequately illuminated by the public highway lighting described in paragraph 1.03.

The store entrance is deemed sufficiently illuminated by the high-level forecourt luminaires and the light cast from the inside of the store. This concept should be reviewed when an internal lighting scheme for the store is designed.

The storefront signage is assumed to be illuminated by LED trough lights, but they are not relevant for the purpose of this report.

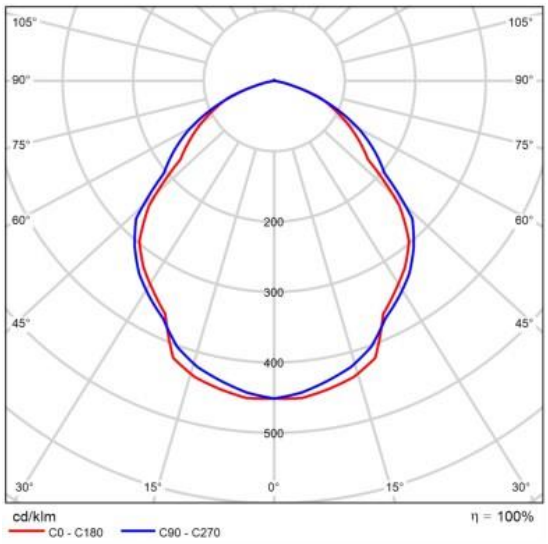
3.00 PROPOSED LIGHTING EQUIPMENT

3.01 CANOLUX LED

Thorlux Lighting - Canolux LED Recessed SMARTSCAN - 116W



Article No.	CX14642
P	125.0 W
Φ_{Lamp}	15100 lm
$\Phi_{Luminaire}$	15100 lm
η	100.00 %
Luminous efficacy	120.8 lm/W
CCT	4000 K
CRI	70



LED luminaires with zinc coated steel body and 2.8mm thick acrylic front cover. Recessed or surface mounting options. “Intelligent” SMARTSCAN options with integral presence detection.

Applications: petrol station forecourts.

Glare evaluation according to UGR

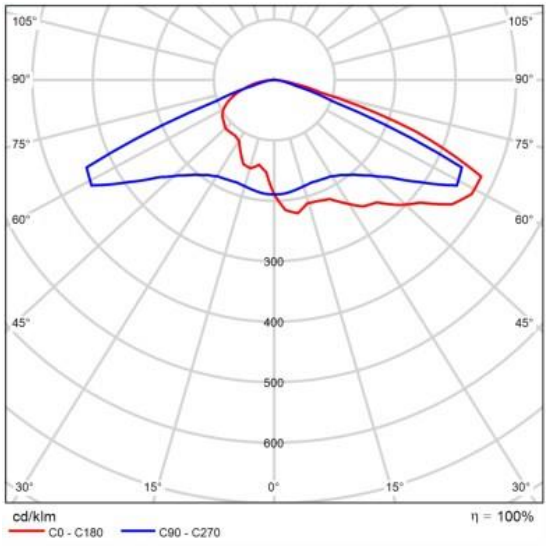
ρ Ceiling		70	70	50	50	30	70	70	50	50	30
ρ Walls		50	30	50	30	30	50	30	50	30	30
ρ Floor		20	20	20	20	20	20	20	20	20	20
Room size X	Y	Viewing direction at right angles to lamp axis					Viewing direction parallel to lamp axis				
2H	2H	25.0	26.1	25.2	26.3	26.6	26.2	27.3	26.5	27.5	27.8
	3H	26.4	27.5	26.7	27.7	28.0	27.1	28.2	27.4	28.4	28.7
	4H	26.6	27.6	27.0	27.9	28.2	27.3	28.3	27.6	28.5	28.8
	6H	26.7	27.6	27.0	27.9	28.2	27.3	28.2	27.6	28.5	28.8
	8H	26.6	27.5	27.0	27.8	28.1	27.2	28.1	27.6	28.4	28.7
	12H	26.6	27.4	27.0	27.7	28.1	27.2	28.0	27.6	28.4	28.7
4H	2H	25.4	26.3	25.7	26.6	26.9	26.4	27.4	26.7	27.6	27.9
	3H	26.9	27.7	27.3	28.1	28.4	27.4	28.2	27.8	28.6	28.9
	4H	27.2	27.9	27.6	28.2	28.6	27.6	28.4	28.0	28.7	29.1
	6H	27.2	27.9	27.6	28.2	28.6	27.6	28.3	28.1	28.7	29.1
	8H	27.2	27.8	27.6	28.2	28.6	27.6	28.2	28.1	28.6	29.0
	12H	27.2	27.7	27.6	28.1	28.6	27.6	28.1	28.0	28.5	29.0
8H	4H	27.2	27.8	27.6	28.2	28.6	27.6	28.2	28.1	28.6	29.0
	6H	27.2	27.7	27.7	28.2	28.6	27.7	28.2	28.1	28.6	29.0
	8H	27.2	27.7	27.7	28.1	28.6	27.7	28.1	28.1	28.5	29.0
	12H	27.2	27.6	27.7	28.1	28.6	27.6	28.0	28.1	28.5	29.0
12H	4H	27.1	27.7	27.6	28.1	28.5	27.6	28.1	28.0	28.6	29.0
	6H	27.2	27.6	27.7	28.1	28.6	27.6	28.1	28.1	28.5	29.0
	8H	27.2	27.6	27.7	28.1	28.6	27.6	28.0	28.1	28.5	29.0
Variation of the observer position for the luminaire distances S											
S = 1.0H		+0.5 / -0.5					+0.4 / -0.4				
S = 1.5H		+0.7 / -1.1					+0.5 / -0.9				
S = 2.0H		+1.4 / -1.4					+1.3 / -2.4				
Standard table		BK03					BK03				
Correction summand		9.5					10.3				
Corrected glare indices referring to 15100lm Total luminous flux											

UGR diagram (SHR: 1.00)

3.02 STARBEAM LED

Thorlux Lighting - Starbeam LED - Area Distribution - 88W - 4000K

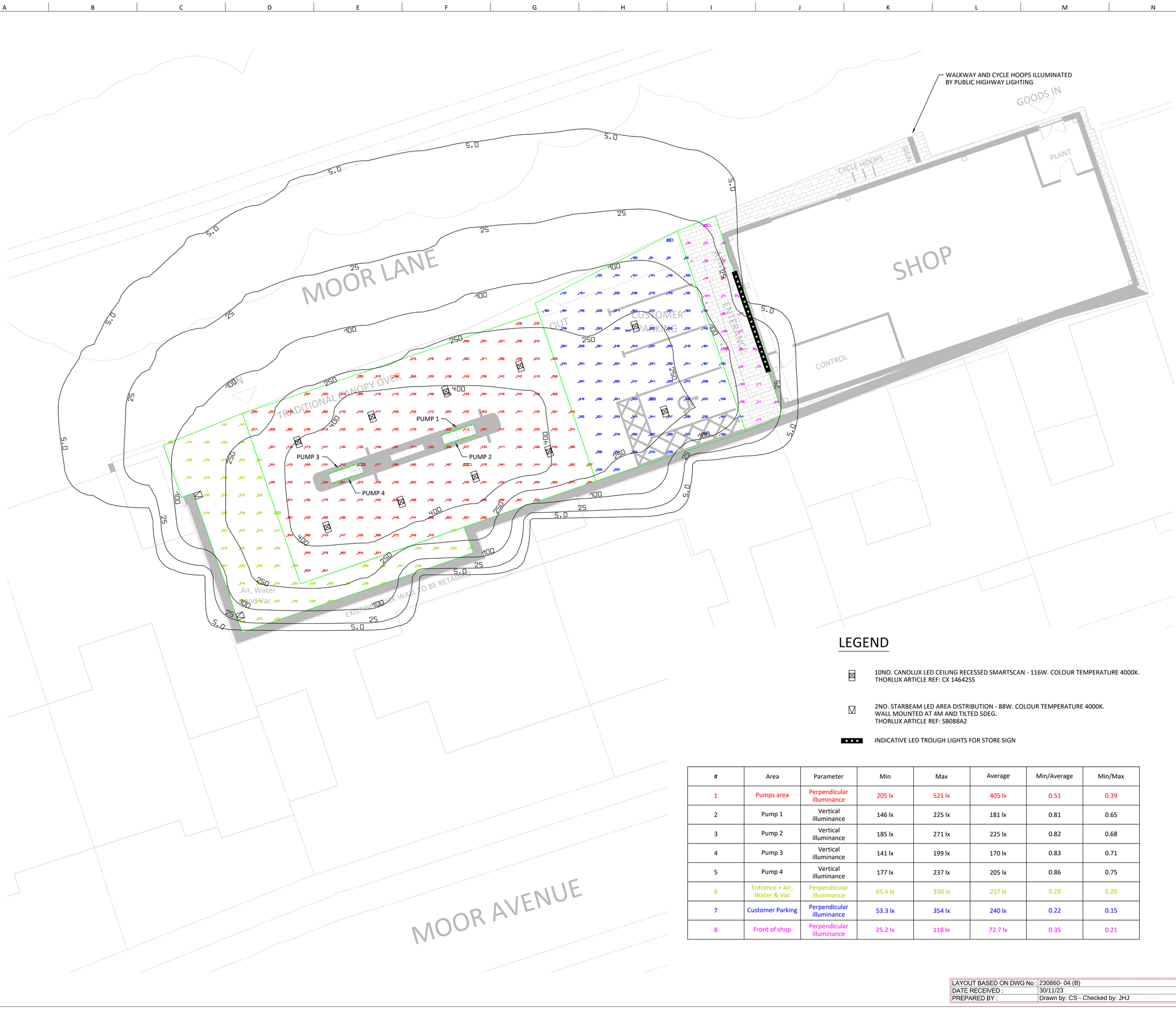




Article No.	SB088A2
P	95.0 W
Φ_{Lamp}	12570 lm
$\Phi_{Luminaire}$	12570 lm
η	100.00 %
Luminous efficacy	132.3 lm/W
CCT	4000 K
CRI	70

Supremely efficient long life IP66 pole top and wall mounted LED luminaires with aluminium cast body and wiring box and polycarbonate cover.

APPENDICES



LEGEND

- ☒ 10NO. CANOLUX LED CEILING RECESSED SMARTSCAN - 116W. COLOUR TEMPERATURE 4000K. THORLUX ARTICLE REF: CX 14642SS
- ☑ 2NO. STARBEAM LED AREA DISTRIBUTION - 88W. COLOUR TEMPERATURE 4000K. WALL MOUNTED AT 4M AND TILTED 5DEG. THORLUX ARTICLE REF: SB088A2
- ▪▪▪▪ INDICATIVE LED TROUGH LIGHTS FOR STORE SIGN

#	Area	Parameter	Min	Max	Average	Min/Average	Min/Max
1	Pumps area	Perpendicular illuminance	205 lx	521 lx	405 lx	0.51	0.39
2	Pump 1	Vertical illuminance	146 lx	225 lx	181 lx	0.81	0.65
3	Pump 2	Vertical illuminance	185 lx	271 lx	225 lx	0.82	0.68
4	Pump 3	Vertical illuminance	141 lx	199 lx	170 lx	0.83	0.71
5	Pump 4	Vertical illuminance	177 lx	237 lx	205 lx	0.86	0.75
6	Entrance + Air, Water & Vac	Perpendicular illuminance	65.4 lx	330 lx	237 lx	0.28	0.20
7	Customer Parking	Perpendicular illuminance	53.3 lx	354 lx	240 lx	0.22	0.15
8	Front of shop	Perpendicular illuminance	25.2 lx	118 lx	72.7 lx	0.35	0.21

LAYOUT BASED ON DWG No :	230860- 04 (B)
DATE RECEIVED :	30/11/23
PREPARED BY :	Drawn by: CS - Checked by: JHJ

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SAFETY, HEALTH & ENVIRONMENTAL INFORMATION

Refer to the DDA Ltd project specific risk assessment and design criteria for the M&E services installation. The installing contractor must prepare method statements for the installation works and agree all works in advance with the main contractor.

It is assumed that all works associated with this drawing will be carried out by competent operatives working, where appropriate, to an approved method.

NOTES

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE MOOR LANE SERVICE STATION EXTERNAL LIGHTING STATEMENT

Rev	Date	Description	Eng
0	11-12-23	For Planning	RP

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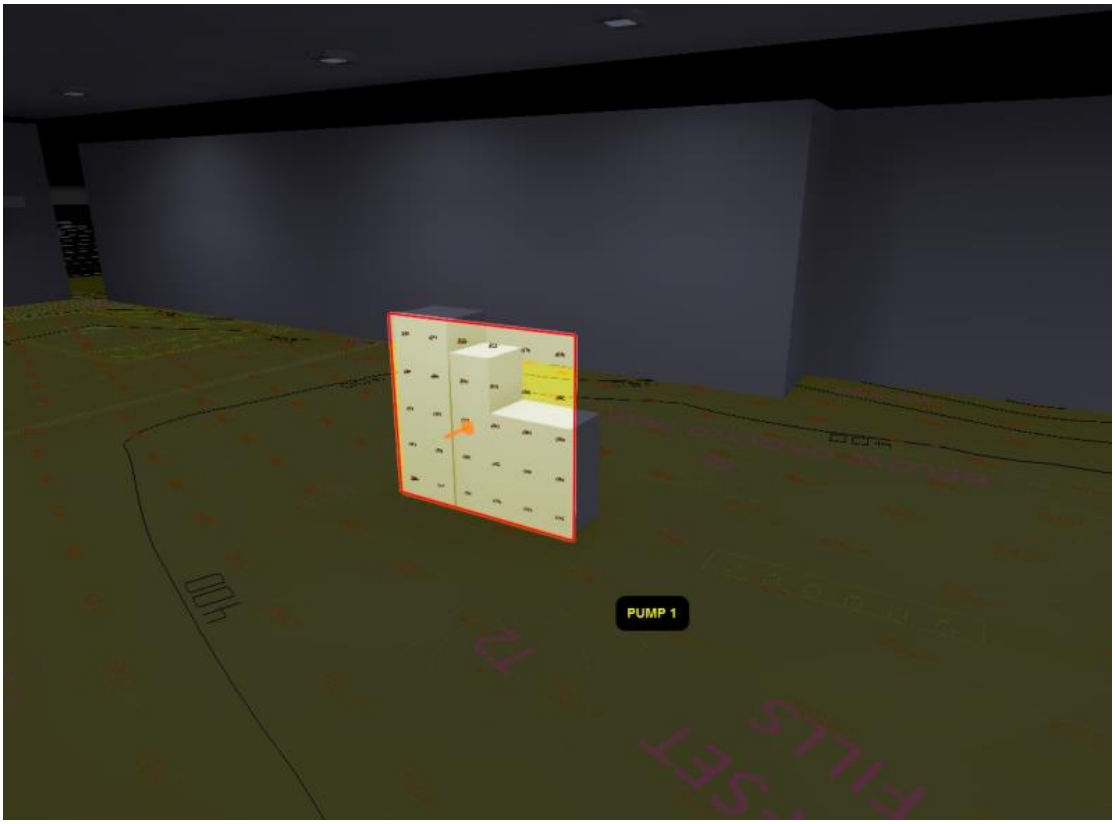
Project
MOOR LANE SERVICE STATION

Drawing Title
EXTERNAL LIGHTING PLAN

Scale at A1: 1:100	Date: 11/12/2023
Drawn: R. PEREZ	Engineer: R.PEREZ
Status: FOR PLANNING	Checked: S. OGDEN
Drawing No.: 23/4446/E63/EX01	Rev: 0

Do not scale

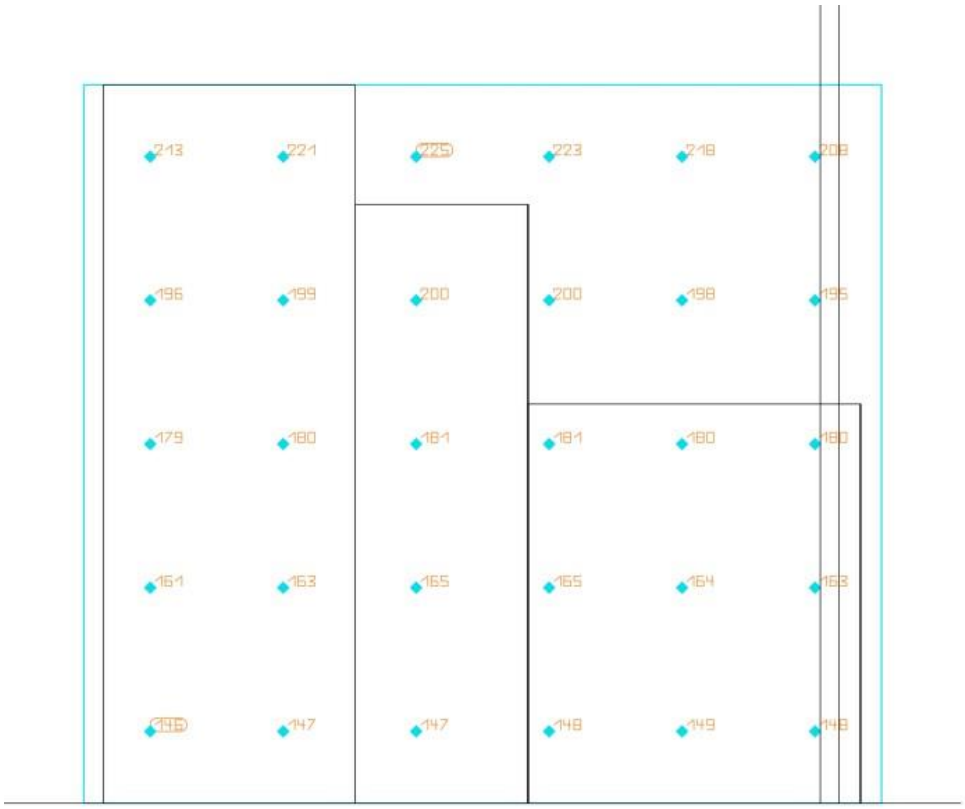
Vertical illuminance on pumps 1 to 4



(Light scene 1)

Vertical illuminance Pump 1



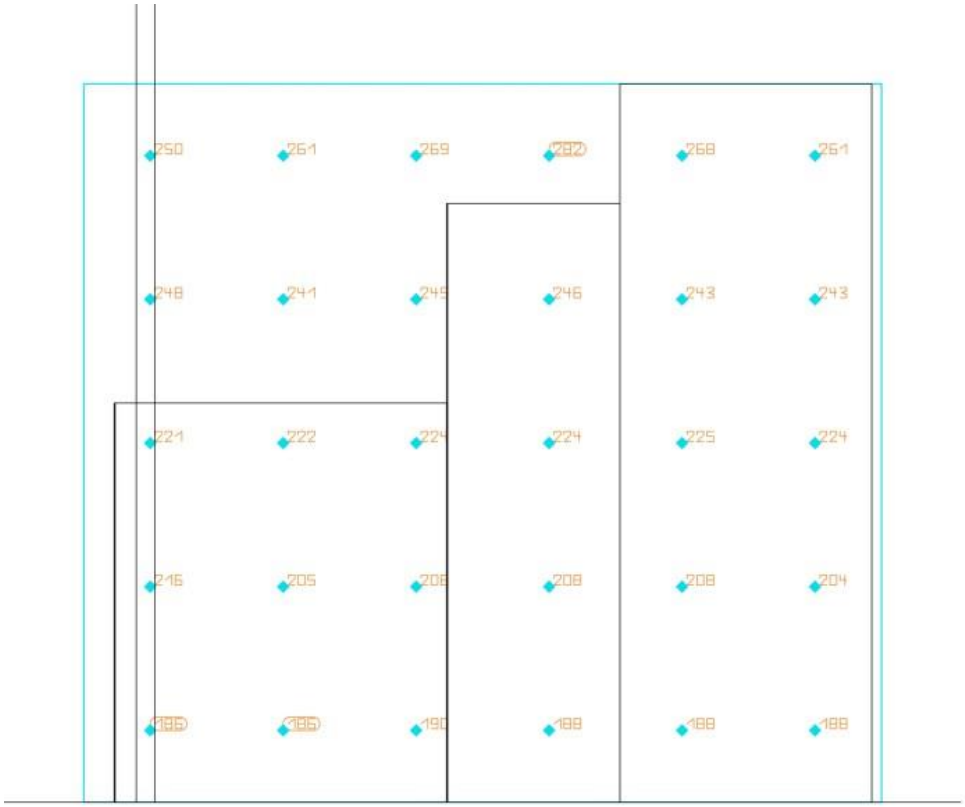


Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2
Vertical illuminance Pump 1 Perpendicular illuminance Height: 0.900 m	181 lx	146 lx	225 lx	0.81	0.65

(Light scene 1)

Vertical illuminance Pump 2



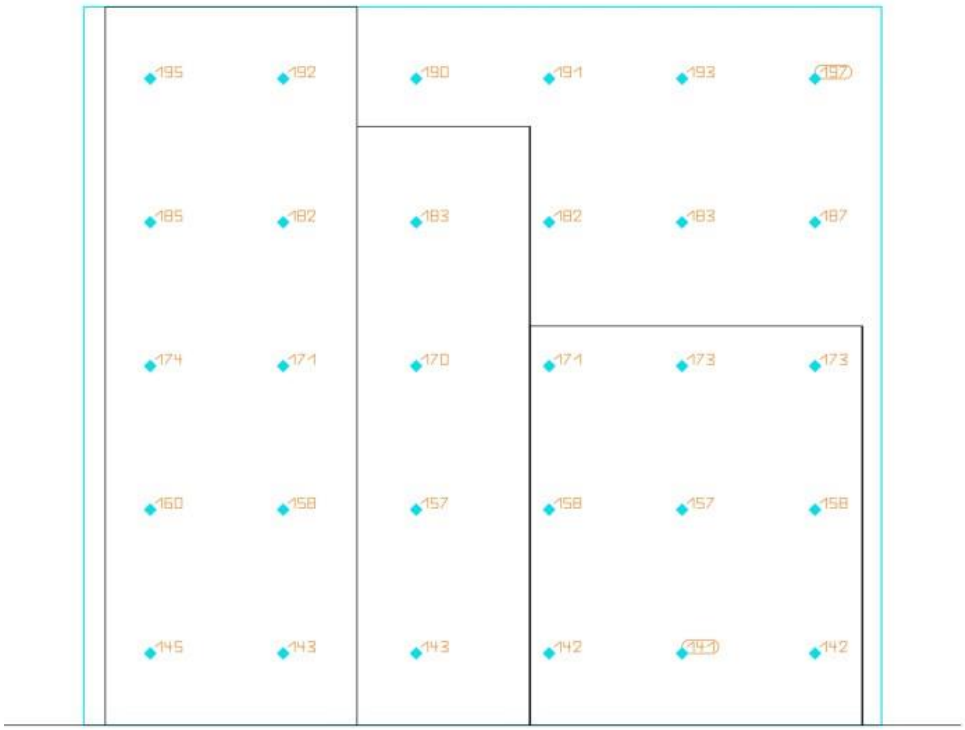


Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2
Vertical illuminance Pump 2 Perpendicular illuminance Height: 0.900 m	226 lx	186 lx	282 lx	0.82	0.66

(Light scene 1)

Vertical illuminance Pump 3



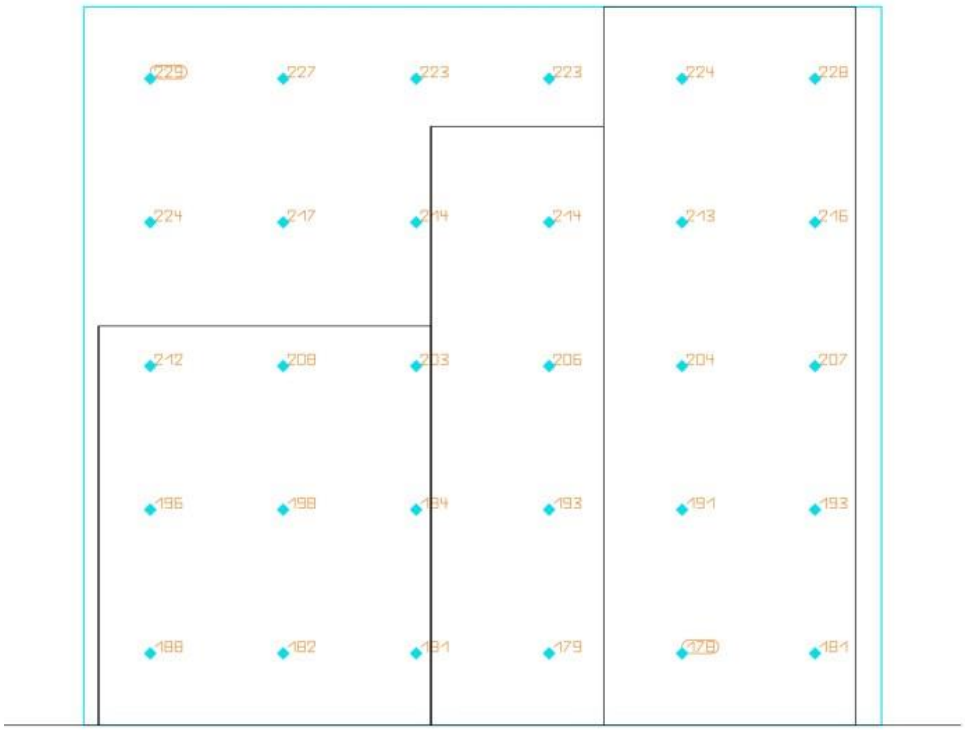


Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2
Vertical illuminance Pump 3 Perpendicular illuminance Height: 0.900 m	170 lx	141 lx	197 lx	0.83	0.72

(Light scene 1)

Vertical illuminance Pump 4





Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2
Vertical illuminance Pump 4 Perpendicular illuminance Height: 0.900 m	205 lx	178 lx	229 lx	0.87	0.78