Technical Note

Project:	Camden Carriage Sidings		
Subject:	Lighting Assessment Technical Note		
Author:	Liam Balfour		
Date:	30/09/2021	Project No.:	5208767
Distribution:	Rob Doolan Dele Ajiboye	Representing:	Network Rail Atkins

Document history

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
A01	For Information	L. Balfour	S. Mann	B. Renton	L. Irving	07/10/21
						

Client signoff

Client	Network Rail
Project	Camden Carriage Sidings
Project No.	5208767
Client signature / date	

1. Scope

Camden Carriage Sidings consists of nine service roads located in the down cess of the London Euston to Rugby Trent Valley Junction line. Location details for the site are as follows:

ELR	LEC1
Mileage	1 Mile 250 Meters
Nearest Postcode	NW1 8JA

Table 1-1 – Camden Carriage Sidings location details

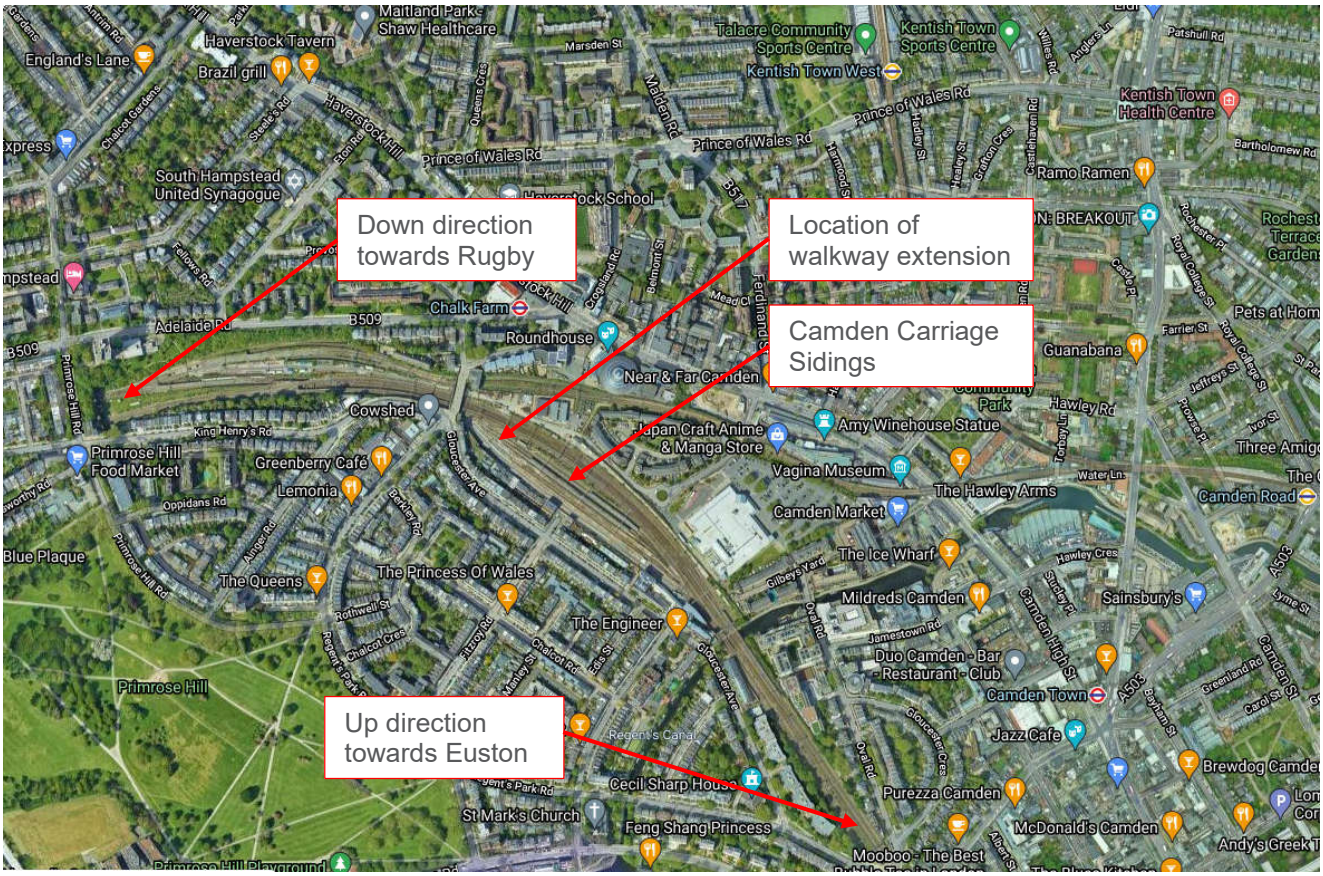


Figure 1-1 - Camden Carriage Sidings and surrounding area

An extension to the carriage sidings was carried out in 2018 consisting of an extension to service roads 6 and 8 as well as an extension to the associated access walkways. This work included the provision of bollard and ground mounted luminaires to illuminate the extended walkways. The lighting installation was based on a design package prepared by Aecom on behalf of the S&C South Alliance. Refer to document 158157-AEC-FOB-EPT-000002 Rev C02 “Camden Carriage Sidings Extension E&P Extended Walkway Lighting Design Final Stage Works AFC Report” for details of the completed works.

This technical note is provided to assess the impact of the installed walkway extension lighting in terms of obtrusive lighting on buildings adjoining Camden Carriage Sidings. Two cases are considered in this assessment; firstly, the carriage sidings lighting columns which predate the carriage sidings extension project are modelled so that their impact alone can be considered. Secondly, the carriage sidings walkway extension lighting installation is included in the aforementioned case in order to assess the incremental impact that the project has had on the adjoining buildings.

The assessment is based on a desktop study using a combination of as-built drawings, previous design documentation produced as part the carriage sidings extension works, the luminaire manufacturer’s provided photometry data and the Dialux lighting modelling package.

2. Executive Summary

As a result of this impact assessment, a number of areas of non-compliant obtrusive lighting have been identified. Table 2-1 lists the areas of non-compliant intrusive lighting that existed prior to the carriage sidings extension project and Table 2-2 lists the areas of non-compliant intrusive lighting that exist following the completion of the project:

Building	Applicable Standard	Permitted Obtrusive Lighting	Actual Obtrusive Lighting
Building 3	ILP GN01/21 Table 3 Environment E4	5 Lux	5.81 Lux
Building 4			8.88 Lux
Building 5			9.59 Lux
Building 6			8.81 Lux
Building 7			7.54 Lux
Building 8			8.04 Lux
Building 9			7.85 Lux

Table 2-1 – Non-compliant obtrusive lighting levels existing prior to the completion of the Carriage Sidings Walkway Extension project. Refer to Figure 5-1 for building locations.

Building	Applicable Standard	Permitted Obtrusive Lighting	Actual Obtrusive Lighting
Building 2	ILP GN01/21 Table 3 Environment E4	5 Lux	5.51 Lux
Building 3			6.13 Lux
Building 4			8.94 Lux
Building 5			9.58 Lux
Building 6			8.83 Lux
Building 7			7.55 Lux
Building 8			8.05 Lux
Building 9			8.44 Lux

Table 2-2 – Non-compliant obtrusive lighting levels that exist following the completion of the Carriage Sidings Walkway Extension project. Refer to Figure 5-1 for building locations.

3. Reference Documents

This Technical Note has been prepared using the following reference documents:

Document Number	Title	Revision
158157-AEC-FOB-EPT-000002	Camden Carriage Sidings Extension E&P Extended Walkway Lighting Design Final Stage Works AFC Report	C02
HS2_157926-3125-LEC1-ZN19-DDR-E-030005	Camden Carriage Sidings - Final Works Site Plan E&P LV & Lighting	Z01
HS2_157926-3125-LEC1-ZN19-DDR-E-030101	Camden Carriage Sidings - Final Works Site Layout - Sheet 1 of 3	Z01
HS2_157926-3125-LEC1-ZN19-DDR-E-030102	Camden Carriage Sidings - Final Works Site Layout - Sheet 2 of 3	Z01
HS2_157926-3125-LEC1-ZN19-DDR-E-030103	Camden Carriage Sidings - Final Works Site Layout - Sheet 3 of 3	Z01
00-E-100-01	Camden LMD Sidings Lighting & Electrical Installation – As Built LV Distribution Schematic	Z01

Table 3-1 - Reference Documents

4. Existing Installation

Figure 4-1 shows Camden Carriage Sidings walkway extension lighting installation assessed by this technical note:

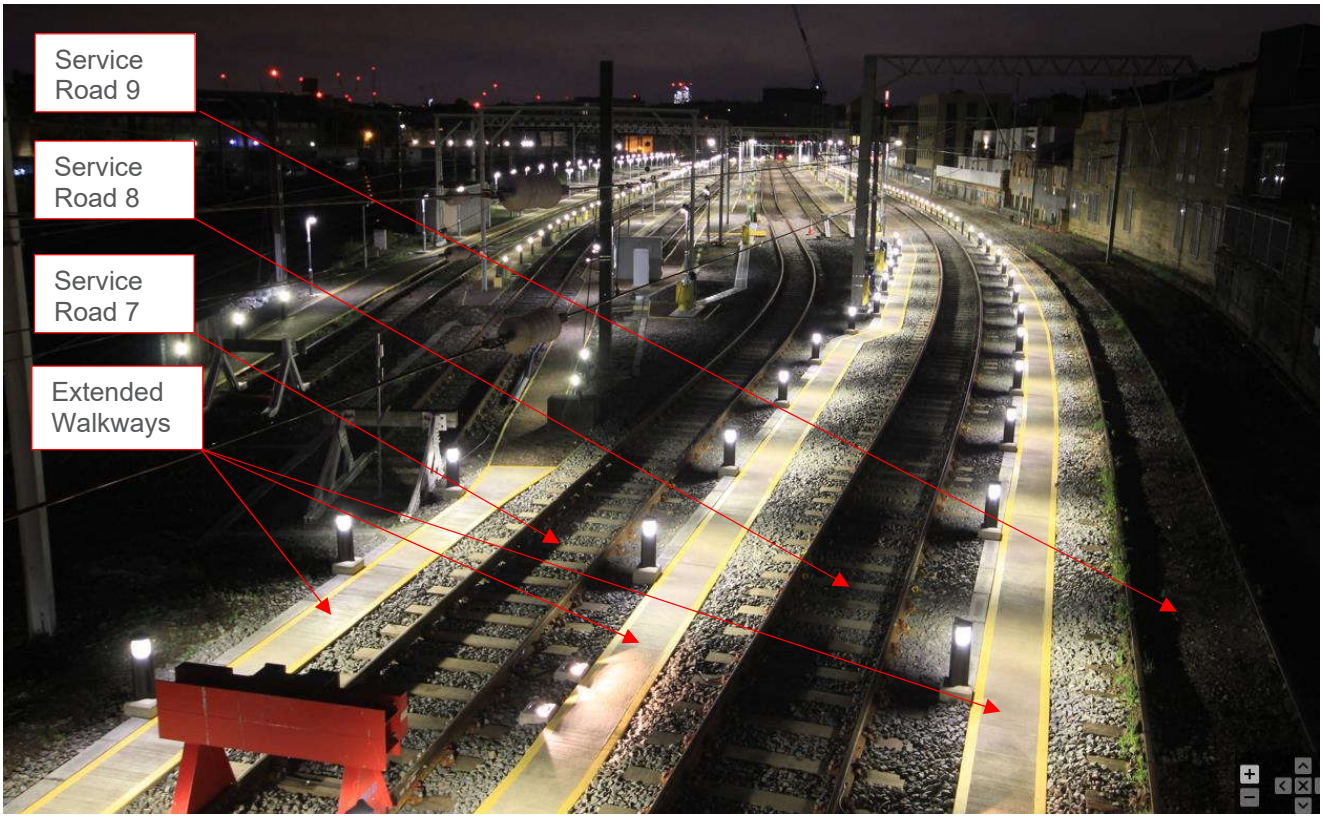


Figure 4-1 - Camden Carriage Sidings walkway extension lighting installation

The lighting equipment installed by the Camden Carriage Sidings extension project consists of the following:

- 14 No. Holophane 35W Platek ground-mounted luminaires installed towards the bufferstop ends of the access walkway extensions adjacent to service roads 7, 8 and 9
- 32 No. Holophane 12W Denver Elite LED luminaires mounted on 750mm bollards spaced along the full length of the walkway extensions adjacent to service roads 7, 8 and 9.

The locations of the above luminaires are shown in drawing HS2_157926-3125-LEC1-ZN19-DDR-E-030101 Rev Z01 “Camden Carriage Sidings – Final Works Site Layout – Sheet 1 of 3”.

The associated lighting circuits are supplied from a 24-Way TP&N distribution board labelled “DBL1” located in the Camden Wash Switchroom. The location of the Camden Wash Switchroom is shown on drawing HS2_157926-3125-LEC1-ZN19-DDR-E-030102 Rev Z01 “Camden Carriage Sidings – Final Works Site Layout – Sheet 2 of 3”. The submain cable supplying DBL1 is emanates from an 8-way TP&N panelboard labelled “PB1” located in the Camden Wash Switchroom.

Lighting control is implemented by way of controller comprising photocell and timeclock functions. No information is available pertaining to the make/model of controller installed or the settings applied. The lighting controller energises DBL1 via a 63A rated three pole contactor.

5. Impact Assessment

The carriage sidings lighting installation was modelled in Dialux version 4.13 to ascertain the obtrusive light levels incident on the buildings adjoining the carriage sidings as specified in the offer of service document. Two Dialux calculation runs were conducted. Firstly, the carriage sidings lighting columns which predate the carriage sidings extension project are modelled so that their impact alone can be considered These lighting columns are shown in the three layout drawings referenced in Table 3-1. Secondly, the carriage sidings walkway extension lighting installation is included in the previous case in order to assess the incremental impact that the project has had on the adjoining buildings. The carriage sidings walkway extension lighting installation is shown in drawing HS2_157926-3125-LEC1-ZN19-DDR-E-030101 “Camden Carriage Sidings - Final Works Site Layout - Sheet 1 of 3”. Refer to the Appendix for a full copy of the Dialux calculation output.

Each of the buildings adjoining the walkway extension were defined as separate calculation surfaces and numbered as shown in Figure 5-1:

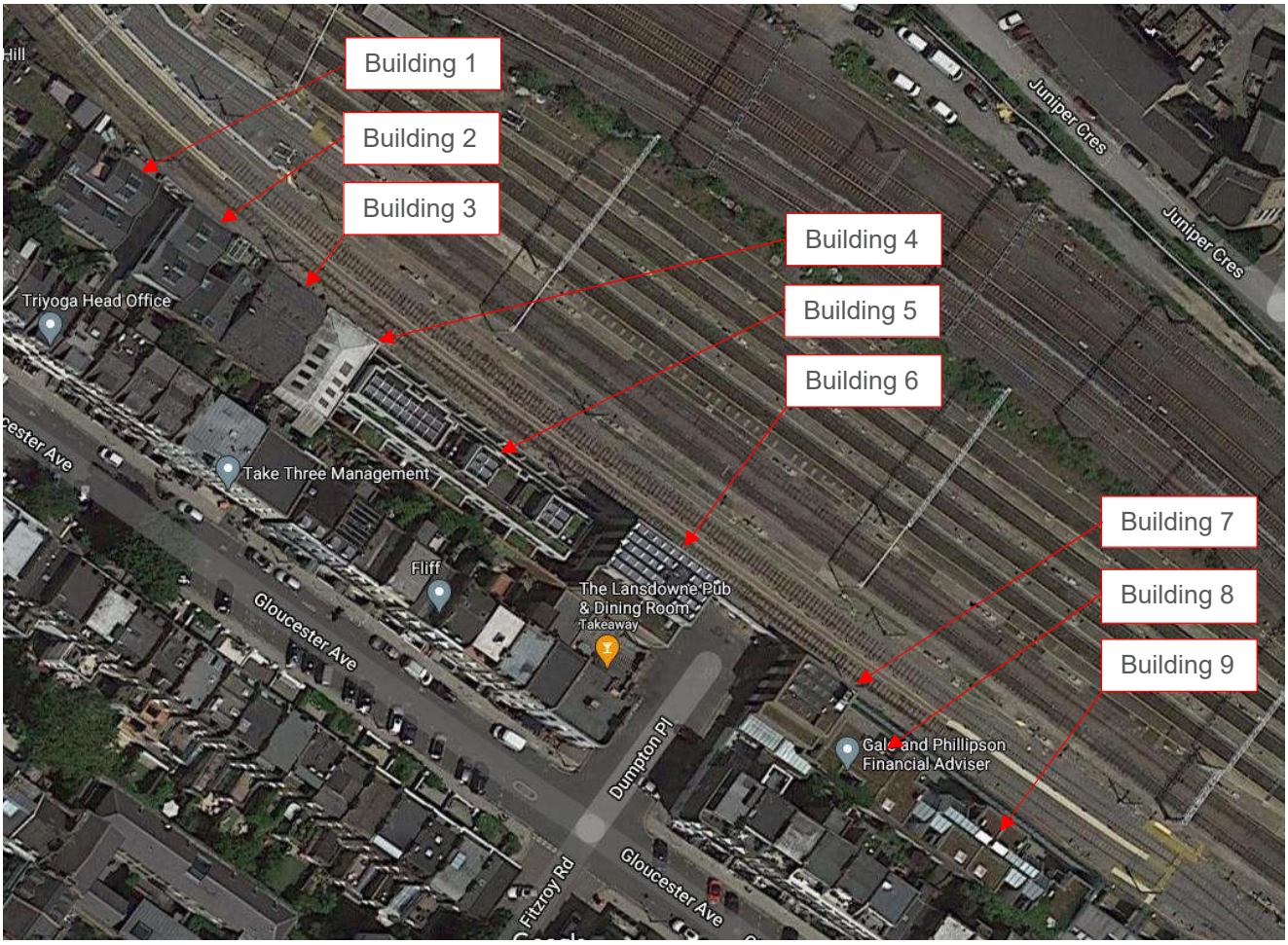


Figure 5-1 - Adjoining properties assessed for obtrusive lighting

Obtrusive lighting levels calculated by this impact assessment are shown in Table 5-1 and Table 5-2:

Calculation Surface	E_{AV} (Lux)	E_{Min} (Lux)	E_{Max} (Lux)	u0	E_{Min}/E_{Min}
Building 1	2.87	1.67	5.01	0.583	0.333
Building 2	4.39	2.18	13	0.496	0.172
Building 3	5.81	3.31	15	0.571	0.219
Building 4	8.88	3.87	15	0.436	0.259
Building 5	9.59	3.83	21	0.399	0.185
Building 6	8.81	3.68	25	0.417	0.148
Building 7	7.54	3.83	25	0.509	0.153
Building 8	8.04	4.40	25	0.547	0.179
Building 9	7.85	4.22	27	0.538	0.157

Table 5-1 – Obtrusive lighting levels on adjoining buildings – lighting columns pre-dating the Carriage Sidings Walkway Extension project only

Calculation Surface	E_{AV} (Lux)	E_{Min} (Lux)	E_{Max} (Lux)	u0	E_{Min}/E_{Min}
Building 1	4.66	3.58	8.53	0.768	0.420
Building 2	5.51	3.68	14	0.667	0.268
Building 3	6.13	3.60	15	0.586	0.239
Building 4	8.94	4.15	15	0.465	0.279
Building 5	9.58	3.99	20	0.416	0.198
Building 6	8.83	3.58	25	0.406	0.144
Building 7	7.55	3.91	25	0.517	0.159
Building 8	8.05	4.31	24	0.536	0.182
Building 9	8.44	4.61	27	0.546	0.172

Table 5-2 – Obtrusive lighting levels on adjoining buildings – Carriage Sidings Walkway Extension lighting installation included

6. Conclusion

This technical note presents the impact assessment of the Camden Carriage Sidings walkway extension lighting installation on the buildings adjoining the site.

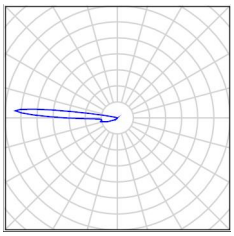
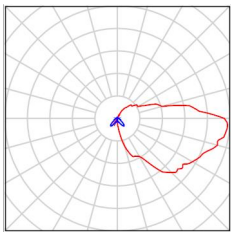
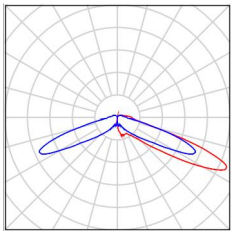
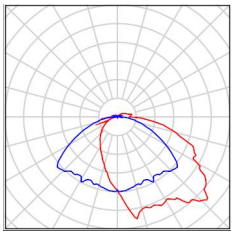
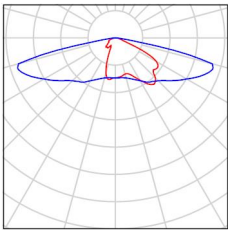
The obtrusive lighting assessment presented in Section 5 highlights a number of areas of non-compliant obtrusive lighting as defined in ILP GN01/21.

In total seven of the nine buildings considered by this assessment were found to be subject to non-compliant obtrusive lighting levels which pre-date the Carriage Sidings Walkway Extensions project. When the lighting bollards and ground-mounted luminaires installed by the project are included in the calculation, an additional building was found to be subject to non-compliant obtrusive lighting levels.

Appendix – Dialux Calculations

Operator
Telephone
Fax
e-Mail

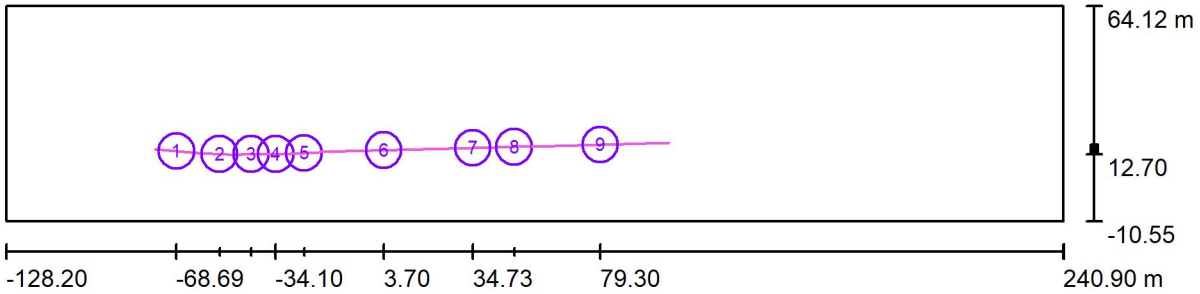
Camden Carriage Sidings / Luminaire parts list

23 Pieces	1000 8131081 2100 Medio RO 1 finestra HIT-C (Type 1) Article No.: 8131081 Luminous flux (Luminaire): 214 lm Luminous flux (Lamps): 3600 lm Luminaire Wattage: 35.0 W Luminaire classification according to CIE: 40 CIE flux code: 02 09 39 40 06 Fitting: 1 x User defined (Correction Factor 1.000).	See our luminaire catalog for an image of the luminaire.	
81 Pieces	HOLOPHANE EUROPE LIMITED DBL.26PL4.LYA.SO DENVER BOLLARD (Type 1) Article No.: DBL.26PL4.LYA.SO Luminous flux (Luminaire): 406 lm Luminous flux (Lamps): 1800 lm Luminaire Wattage: 26.0 W Luminaire classification according to CIE: 75 CIE flux code: 16 43 71 75 22 Fitting: 1 x User defined (Correction Factor 1.000).	See our luminaire catalog for an image of the luminaire.	
50 Pieces	Holophane Europe Ltd DEB.L014.PAY.DO DENVER ELITE BOLLARD Article No.: DEB.L014.PAY.DO Luminous flux (Luminaire): 815 lm Luminous flux (Lamps): 815 lm Luminaire Wattage: 12.0 W Luminaire classification according to CIE: 91 CIE flux code: 08 32 83 91 100 Fitting: 1 x LED C.1000LM - 4000K (Correction Factor 1.000).	See our luminaire catalog for an image of the luminaire.	
3 Pieces	Holophane Europe Ltd DEW.LA024.NR.PGL Denver Elite Wall Article No.: DEW.LA024.NR.PGL Luminous flux (Luminaire): 1988 lm Luminous flux (Lamps): 1988 lm Luminaire Wattage: 24.0 W Luminaire classification according to CIE: 95 CIE flux code: 32 67 91 95 100 Fitting: 1 x LED C.2000LM - 4000K (Correction Factor 1.000).	See our luminaire catalog for an image of the luminaire.	
87 Pieces	Holophane Europe Ltd FTS.2.LA074.NR FACTOR SMALL STREETLIGHT Article No.: FTS.2.LA074.NR Luminous flux (Luminaire): 7075 lm Luminous flux (Lamps): 7075 lm Luminaire Wattage: 52.0 W Luminaire classification according to CIE: 100 CIE flux code: 30 62 91 100 100 Fitting: 1 x LED C.7000LM-4000K (Correction Factor 1.000).	See our luminaire catalog for an image of the luminaire.	

DIALux
23.09.2021

Operator
Telephone
Fax
e-Mail

Camden Carriage Sidings / Extension New Lights Off / Calculation surfaces (results overview)



Scale 1 : 2639

Calculation Surface List

No.	Designation	Type	Grid	E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
1	Building 1 (15mx16mH)	perpendicular	16 x 16	2.87	1.67	5.01	0.583	0.333
2	Building 2 (15mx16mH)	perpendicular	16 x 16	4.39	2.18	13	0.496	0.172
3	Building 3 (7mx16mH)	perpendicular	16 x 8	5.81	3.31	15	0.571	0.219
4	Building 4 (10mx6.5mH)	perpendicular	8 x 8	8.88	3.87	15	0.436	0.259
5	Building 5 (10mx6.8mH)	perpendicular	16 x 16	9.59	3.83	21	0.399	0.185
6	Building 6 (45mx10mH)	perpendicular	64 x 16	8.81	3.68	25	0.417	0.148
7	Building 7 (17mx15mH)	perpendicular	32 x 32	7.54	3.83	25	0.509	0.153
8	Building 8 (12mx14mH)	perpendicular	16 x 16	8.04	4.40	25	0.547	0.179
9	Building 9 (48mx15mH)	perpendicular	64 x 32	7.85	4.22	27	0.538	0.157

Summary of Results

Type	Quantity	Average [lx]	Min [lx]	Max [lx]	u0	E_{min} / E_{max}
perpendicular	9	7.12	1.67	27	0.23	0.06

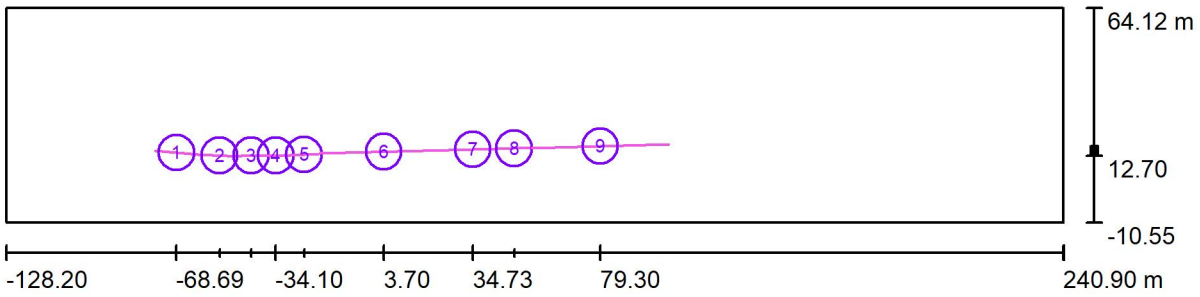
Operator
Telephone
Fax
e-Mail

Camden Carriage Sidings / Luminaire parts list

23 Pieces	1000 8131081 2100 Medio RO 1 finestra HIT-C (Type 1) Article No.: 8131081 Luminous flux (Luminaire): 214 lm Luminous flux (Lamps): 3600 lm Luminaire Wattage: 35.0 W Luminaire classification according to CIE: 40 CIE flux code: 02 09 39 40 06 Fitting: 1 x User defined (Correction Factor 1.000).	See our luminaire catalog for an image of the luminaire.
81 Pieces	HOLOPHANE EUROPE LIMITED DBL.26PL4.LYA.SO DENVER BOLLARD (Type 1) Article No.: DBL.26PL4.LYA.SO Luminous flux (Luminaire): 406 lm Luminous flux (Lamps): 1800 lm Luminaire Wattage: 26.0 W Luminaire classification according to CIE: 75 CIE flux code: 16 43 71 75 22 Fitting: 1 x User defined (Correction Factor 1.000).	See our luminaire catalog for an image of the luminaire.
50 Pieces	Holophane Europe Ltd DEB.L014.PAY.DO DENVER ELITE BOLLARD Article No.: DEB.L014.PAY.DO Luminous flux (Luminaire): 815 lm Luminous flux (Lamps): 815 lm Luminaire Wattage: 12.0 W Luminaire classification according to CIE: 91 CIE flux code: 08 32 83 91 100 Fitting: 1 x LED C.1000LM - 4000K (Correction Factor 1.000).	See our luminaire catalog for an image of the luminaire.
3 Pieces	Holophane Europe Ltd DEW.LA024.NR.PGL Denver Elite Wall Article No.: DEW.LA024.NR.PGL Luminous flux (Luminaire): 1988 lm Luminous flux (Lamps): 1988 lm Luminaire Wattage: 24.0 W Luminaire classification according to CIE: 95 CIE flux code: 32 67 91 95 100 Fitting: 1 x LED C.2000LM - 4000K (Correction Factor 1.000).	See our luminaire catalog for an image of the luminaire.
87 Pieces	Holophane Europe Ltd FTS.2.LA074.NR FACTOR SMALL STREETLIGHT Article No.: FTS.2.LA074.NR Luminous flux (Luminaire): 7075 lm Luminous flux (Lamps): 7075 lm Luminaire Wattage: 52.0 W Luminaire classification according to CIE: 100 CIE flux code: 30 62 91 100 100 Fitting: 1 x LED C.7000LM-4000K (Correction Factor 1.000).	See our luminaire catalog for an image of the luminaire.

Operator
Telephone
Fax
e-Mail

Camden Carriage Sidings / Calculation surfaces (results overview)



Scale 1 : 2639

Calculation Surface List

No.	Designation	Type	Grid	E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0	E_{min} / E_{max}
1	Building 1 (15mx16mH)	perpendicular	16 x 16	4.66	3.58	8.53	0.768	0.420
2	Building 2 (15mx16mH)	perpendicular	16 x 16	5.51	3.68	14	0.667	0.268
3	Building 3 (7mx16mH)	perpendicular	16 x 8	6.13	3.60	15	0.586	0.239
4	Building 4 (10mx6.5mH)	perpendicular	8 x 8	8.94	4.15	15	0.465	0.279
5	Building 5 (10mx6.8mH)	perpendicular	8 x 8	9.58	3.99	20	0.416	0.198
6	Building 6 (45mx10mH)	perpendicular	64 x 16	8.83	3.58	25	0.406	0.144
7	Building 7 (17mx15mH)	perpendicular	32 x 32	7.55	3.91	25	0.517	0.159
8	Building 8 (12mx14mH)	perpendicular	16 x 16	8.05	4.31	24	0.536	0.182
9	Building 9 (48mx15mH)	perpendicular	64 x 32	8.44	4.61	27	0.546	0.172

Summary of Results

Type	Quantity	Average [lx]	Min [lx]	Max [lx]	u0	E_{min} / E_{max}
perpendicular	9	7.63	3.58	27	0.47	0.13