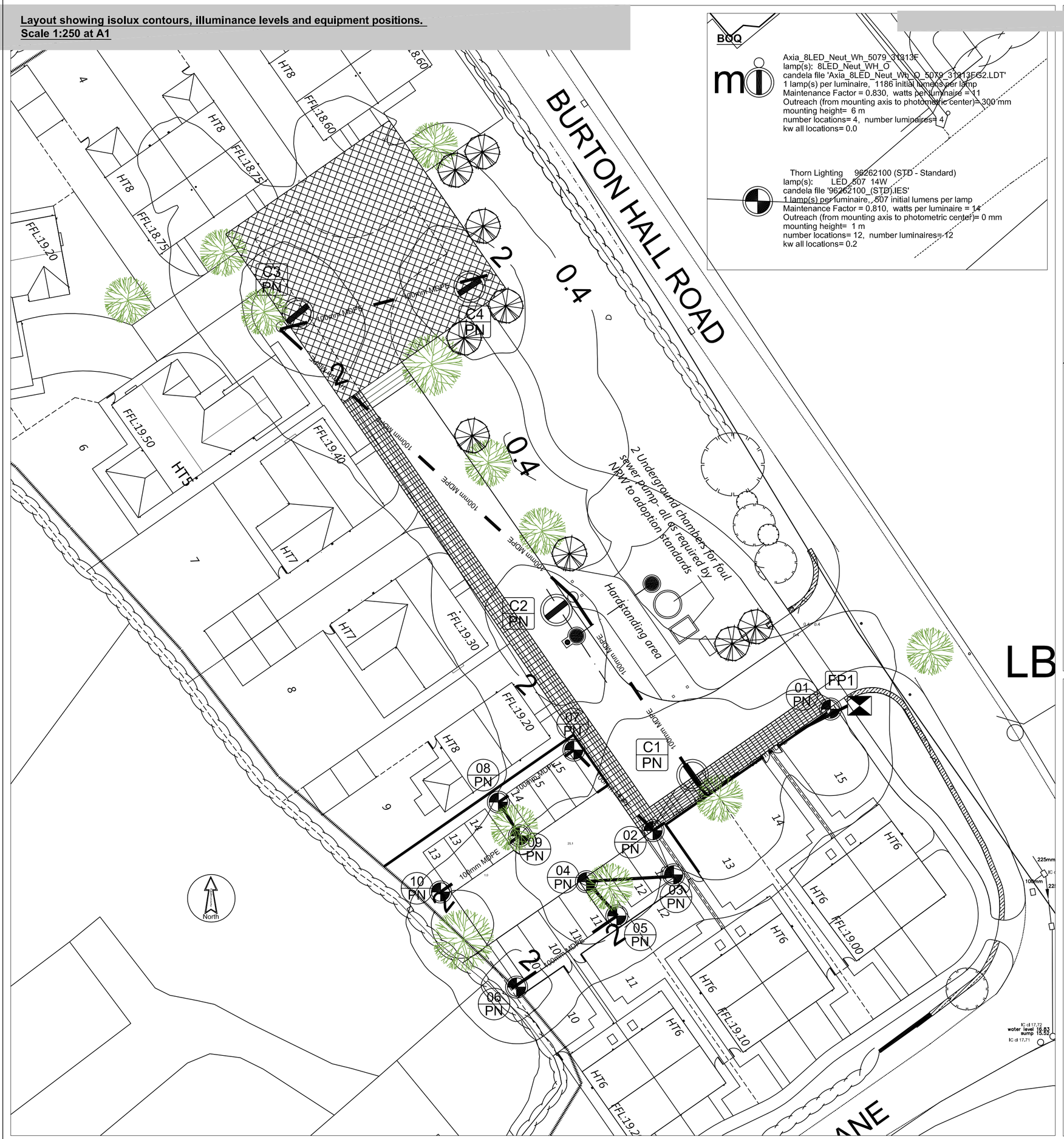
Layout showing isolux contours, illuminance levels and equipment positions.
Scale 1:250 at A1

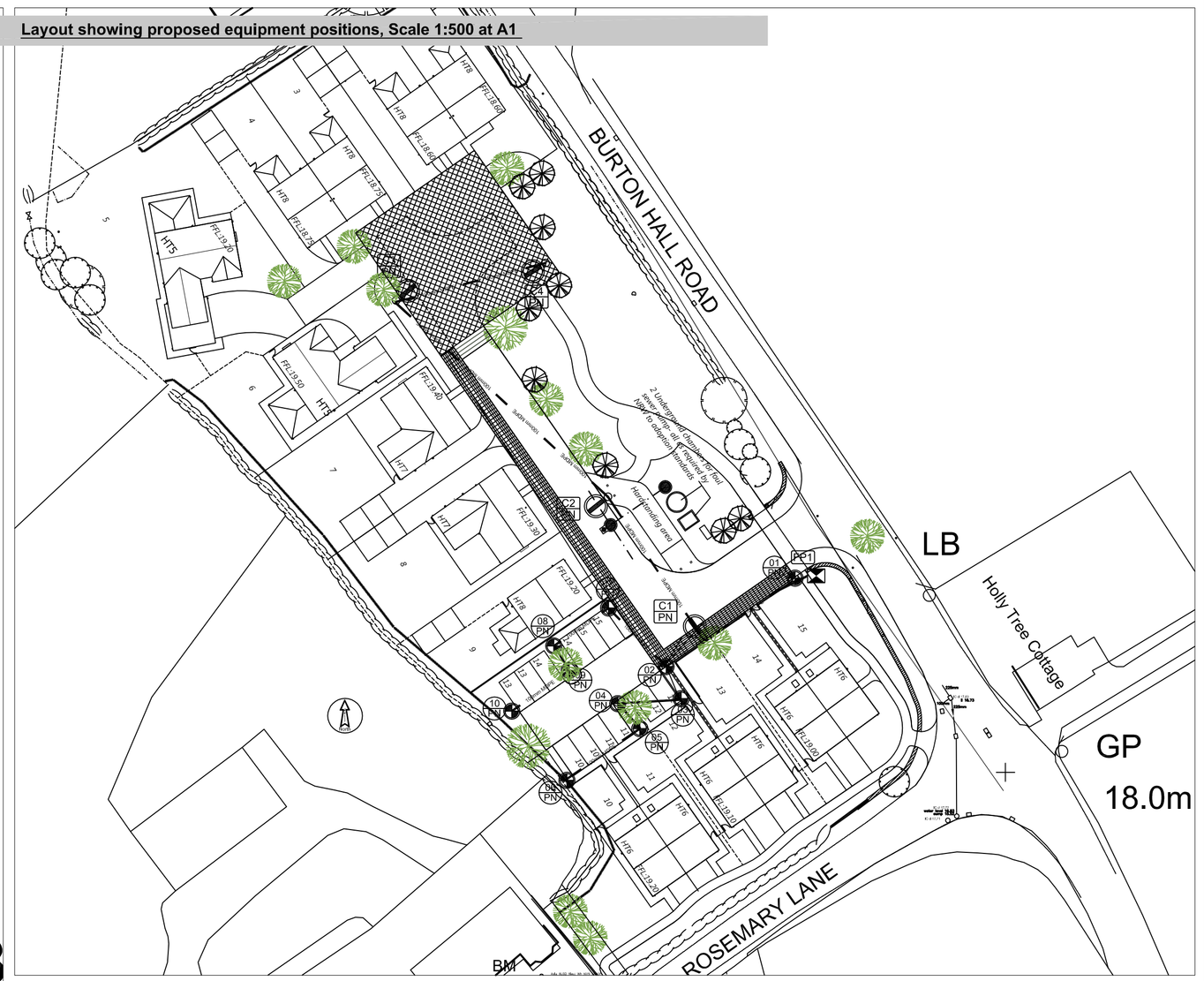


BOQ

Axia_8LED_Neut_Wh_5079_31313F
lamp(s): 8LED_Neut_WH_O
candela file 'Axia_8LED_Neut_Wh_O_5079_31313FG2.LDT'
1 lamp(s) per luminaire, 1186 initial lumens per lamp
Maintenance Factor = 0.830, watts per luminaire = 11
Outreach (from mounting axis to photometric center) = 300 mm
mounting height= 6 m
number locations= 4, number luminaires= 4
kw all locations= 0.0

Thorn Lighting 96262100 (STD - Standard)
lamp(s): LED_607 14W
candela file '96262100_(STD).IES'
1 lamp(s) per luminaire, 607 initial lumens per lamp
Maintenance Factor = 0.810, watts per luminaire = 14
Outreach (from mounting axis to photometric center) = 0 mm
mounting height= 1 m
number locations= 12, number luminaires= 12
kw all locations= 0.2

Layout showing proposed equipment positions, Scale 1:500 at A1



Key

12 — Proposed
Bollard: Thorn D-CO 1m Aluminium powder coated grey 900.
Lantern: 14W LED
Reference: Thorn Lighting 96262100 (STD - Standard)
Candela File: '96262100_(STD).IES'
Other: controlled via a PECU mounted on column C1



Thorn D-CO
(For Illustrative use only)

04 — Proposed
Column: 6m galvanised steel column with single door and bitumen coated planted root
Lantern: Urbis Axia 8 LED lantern
Mounting: post top at 0° tilt
Reference:
Candela file:
"Axia_8LED_Neut_Wh_O_5079_31313FG2.LDT"
Other: integral driver
PECU: miniature PECU 35lux/18lux
Other: PECU on C1 used to switch bollard lighting



Urbis Axia
(For Illustrative use only)

100mm MDPE — 100mm MDPE
4mm² 3 core PVC/SWA/PVC in 100mm orange MDPE duct including draw cord at 750mm across highway and car park and 450mm cover in footway and service strip.

Proposed Feeder Pillar
Manufacturer: Ritherdon
Model: R460
Supply in: DNO metered supply
Supply out: 3 x BS88 fused cable

FP1 — Feeder pillar reference number.

C1 PN — Proposed column scheme number

01 PN — C1 = Proposed Column Number
01 = Proposed bollard
PN = Private Network

2.0 lux iso contour line (illustrative)

0.4 lux iso contour line (illustrative)

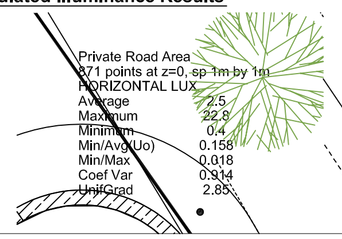
Notes

1. The installation contractor must be aware of any overhead obstructions. Advice should be sought from the developer's engineering representative.

2. Prior to excavation works the installation contractor must be aware of underground services or hazards which may be encountered in the installation of the lighting system. Advice should be sought from the developer's engineering representative.

3. All wiring including component labelling to be in accordance with BS7671.

Calculated Illuminance Results



Private Road Area
671 points at z=0, sp 1m by 1m
HORIZONTAL LUX

Average	2.5
Maximum	22.8
Minimum	0.4
Min/Avg(Uo)	0.158
Min/Max	0.018
Coef Var	0.914
UnifGrad	2.85

Car p
237 points at z=0, sp 1m by 1m
HORIZONTAL LUX

Average	5.1
Maximum	25.1
Minimum	1.0
Min/Avg(Uo)	0.196
Min/Max	0.040
Coef Var	1.036
UnifGrad	4.38

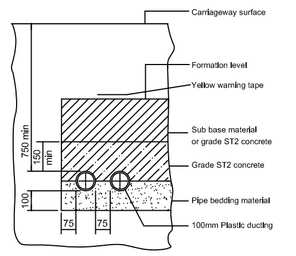
Maintenance Factor

A maintenance factor of 0.81 has been used in these calculations for the LED bollard lighting.

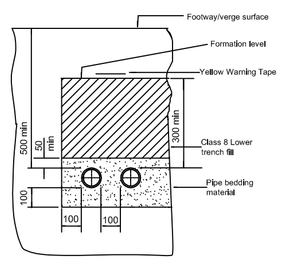
A maintenance factor of 0.83 has been used in these calculations for the Urbis Axia lanterns as to Urbis recommendations.

NTS

Type A
Ducts Laid Under Carriageway



Type B
Ducts Laid Under Footway and Verges



Notes

1. All dimensions are in millimeters unless otherwise stated.
2. All private street lighting ducts to be orange coloured polyethylene.
3. Pipe bedding material maximum aggregate size 2mm eg washed sand.

Schematic Diagram, NTS

Incoming DNO Supply

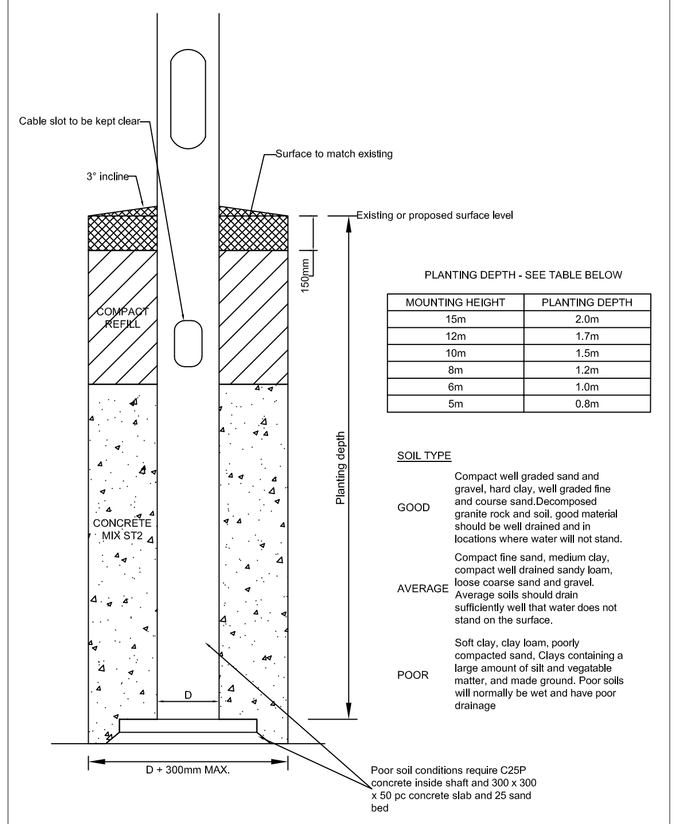
FEEDER PILLAR FP1

All protective devices BS88 fuses. Changing to other devices may cause the circuit to not conform to BS7671

16A Circuit 1	16A Circuit 2	16A Circuit 3
4mm² 3 core PVC/SWA/PVC	4mm² 3 core PVC/SWA/PVC	4mm² 3 core PVC/SWA/PVC
02 PN	01 PN	C1 PN
04 PN	03 PN	C2 PN
06 PN	05 PN	C3 PN
08 PN	07 PN	C4 PN
10 PN	09 PN	
12 PN	11 PN	

Notes
1. Bollards to be switched using PECU mounted on first column (C1).

Typical Column Installation, NTS



PLANTING DEPTH - SEE TABLE BELOW

MOUNTING HEIGHT	PLANTING DEPTH
15m	2.0m
12m	1.7m
10m	1.5m
8m	1.2m
6m	1.0m
5m	0.8m

SOIL TYPE

GOOD — Compact well graded sand and gravel, hard clay, well graded fine and course sand.Decomposed granite rock and soil, good material should be well drained and in locations where water will not stand.

AVERAGE — Compact fine sand, medium clay, compact well drained sandy loam, loose coarse sand and gravel. Average soils should drain sufficiently well that water does not stand on the surface.

POOR — Soft clay, clay loam, poorly compacted sand, Clays containing a large amount of silt and vegatable matter, and made ground. Poor soils will normally be wet and have poor drainage

Outdoor Car Parks

Table 5 - Lighting levels for outdoor car parks

Type of area and usage	E	Uo
Light traffic, e.g. parking areas of shops, terraced and apartment houses, cycle parks.	5	0.25
Medium traffic, e.g. parking areas of department stores, office buildings, plants, sports and multipurpose building complexes.	10	0.25
Heavy traffic, e.g. parking areas of schools, churches, major sports and multipurpose sports and builing complexes.	20	0.25

BS5489-1:2013: Table A.7 - Variation of maintained lighting level with S/P ratio of light source

Lighting Class	Benchmark (e.g. R_a < 60 or when S/P ratio of light source is not known or specified)		S/P ratio = 1.2 and $R_a \geq 60$ (e.g. some types of warm white lamp such as metal halide)		S/P Ratio = 2 and $R_a \geq 60$ (e.g. some types of cool white compact fluorescent or LED)	
	$\bar{E}$	E_{min}	$\bar{E}$	E_{min}	$\bar{E}$	E_{min}
P1 or S1	15.0	3.0	13.4	2.7	12.3	2.5
P2 or S2	10.0	2.0	8.6	1.7	7.7	1.5
P3 or S3	7.5	1.5	6.3	1.3	5.5	1.1
P4 or S4	5.0	1.0	4.0	0.8	3.4	0.7
P5 or S5	3.0	0.6	2.2	0.4	1.8	0.4
P6 or S6	2.0	0.4	1.4	0.4	1.1	0.4

Based upon Table A.6, for a low light level (environmental zone E2) and quiet traffic flow. S/P ratio of 1.9 for neutral white light (4400K).

REV	DESCRIPTION	DATE	DRN	APP
A	Include private road Amend car park	23/05/14	MP	PDL

DRAWING NO: 14625-D-01 — REV: A

DRAWING STATUS: DESIGN

PROJECT: Burton Hall Road, Rossett, Wrexham

TITLE: Proposed Lighting and Installation Design Layout

SCALE: As Indicated — DESIGNED BY: SJM 19/05/14

SHEET NO: Sheet 1 of 1 — APPROVED BY: PDL 19/05/14

Harttron
synergy in light
www.harttron.com
CONSULTATION, DESIGN & INSTALLATION
E. info@harttron.com
T. 01625 850855 F. 01625 850856

HARTTRON DESIGNS ARE THE PROPERTY OF HARTTRON LIMITED, COPIES IN PART OR WHOLE ARE NOT PERMITTED WITHOUT WRITTEN AUTHORISATION. (C) COPYRIGHT.