

TECHNICAL REPORT

Kent International Gateway proposal

This technical report reviews the lighting calculations carried out using AGI32 lighting software in conjunction with the information and the drawings provided for the Kent International Gateway.

The proposal is based in the combined use of high performance “flat glass” floodlights and road lighting lanterns, due to its wide range of lamp options and low light pollution optics for application in large areas and traffic routes.

CRITERIA AND REQUIREMENTS

Designed to EN 12464 “Lighting of work places - Part 2: Outdoor work places”, the BS 5489-1:2003 “Code of practice for the design of road lighting” and the ILE “Guidance Notes for the Reduction of Obtrusive Light”

| | |
|--------------------|-------|
| Maintenance Factor | 0.80 |
| Environmental zone | E1/E2 |
| Road Surface | C2 |

DESIGN CRITERIA

Minimise light pollution

Maximum uniformity in product range and mounting heights

AREAS CLASSIFICATIONS – As confirmed by NEP Lighting

| | | |
|----------------------|---------------------------------------------------|----------------------------------------------|
| Car parks | Medium traffic parking lots as in EN 12464 | $E_{av} \geq 10 \text{ lux}$ $U_o \geq 0.25$ |
| Loading areas | Industrial sites and storage areas as in EN 12464 | $E_{av} \geq 50 \text{ lux}$ $U_o \geq 0.25$ |
| Roads | General circulation areas as in EN 12464 | $E_{av} \geq 10 \text{ lux}$ $U_o \geq 0.25$ |

ADDITIONAL INFORMATION

| | |
|-------|--------------------------------|
| Lamps | High pressure sodium – tubular |
|-------|--------------------------------|

THORN

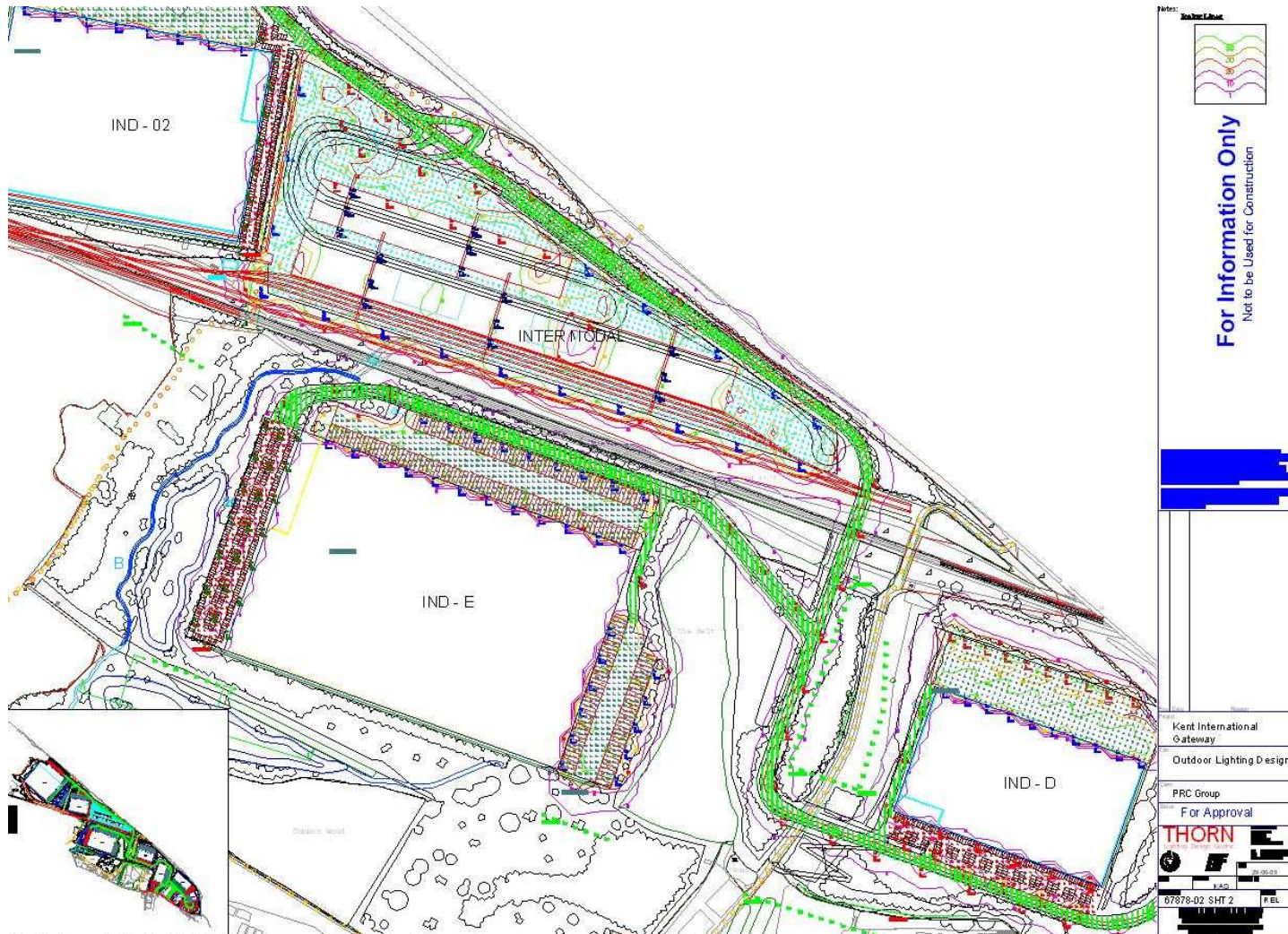
Scheme Design – IND 01 & 2

THORN



THORN

Scheme Design – IND E & D



THORN

Scheme Design – IND C, B & A



Results and Luminaire Schedule

| Calculation Summary | | | | | |
|---------------------|-------|------|------|---------|---------|
| Label | Avg | Max | Min | Min/Avg | Min/Max |
| Major Road 1 | 14.98 | 88.8 | 3.1 | 0.21 | 0.03 |
| Major Road 2 | 12.26 | 73.2 | 2.7 | 0.22 | 0.04 |
| Major Road 3 | 13.03 | 77.9 | 2.8 | 0.21 | 0.04 |
| Inter Modal | 56.98 | 180 | 11 | 0.19 | 0.06 |
| Loading Area 5 | 49.58 | 91 | 13 | 0.26 | 0.14 |
| Loading Area 7 | 52.45 | 89 | 15 | 0.29 | 0.17 |
| Car Park 12 | 9.48 | 25.6 | 2.1 | 0.22 | 0.08 |
| Loading Area 6 | 50.04 | 89 | 15 | 0.30 | 0.17 |
| Car Park 6 | 9.11 | 33.8 | 1.5 | 0.16 | 0.04 |
| Car Park 13 | 9.71 | 29.4 | 1.7 | 0.18 | 0.06 |
| Car Park 2 | 14.23 | 66.6 | 2.6 | 0.18 | 0.06 |
| Car Park 3 | 11.16 | 34.8 | 3.3 | 0.30 | 0.09 |
| Loading Area 2 | 53.34 | 89.3 | 16.5 | 0.31 | 0.18 |
| Car Park 10 | 9.77 | 32.2 | 1.8 | 0.18 | 0.06 |
| Car Park 11 | 13.00 | 39.7 | 3.3 | 0.25 | 0.08 |
| Car Park 8 | 12.38 | 61.9 | 2.6 | 0.21 | 0.06 |
| Car Park 9 | 9.32 | 26.7 | 2.0 | 0.21 | 0.07 |
| Loading Area 8 | 55.95 | 87.1 | 21.5 | 0.38 | 0.25 |
| Car Park 7 | 12.64 | 52.6 | 2.3 | 0.18 | 0.04 |
| Car Park 5 | 14.70 | 68.3 | 1.9 | 0.13 | 0.03 |
| Car Park 4 | 12.08 | 41.1 | 3.2 | 0.26 | 0.08 |
| Loading Area 3 | 58.74 | 93.5 | 25.2 | 0.43 | 0.27 |
| Loading Area 4 | 58.71 | 93.5 | 16.8 | 0.29 | 0.18 |
| Eventical B | 0.72 | 5.9 | 0.0 | N.A. | N.A. |
| Eventical A | 3.89 | 10.2 | 0.3 | 0.08 | 0.03 |
| Eventical I | 1.99 | 4.4 | 0.3 | 0.15 | 0.07 |
| Eventical H | 0.93 | 2.8 | 0.3 | 0.32 | 0.11 |
| Eventical G | 0.22 | 0.7 | 0.0 | N.A. | N.A. |
| Eventical C | 0.00 | 0.0 | 0.0 | N.A. | N.A. |
| Eventical D | 1.69 | 2.9 | 0.4 | 0.24 | 0.14 |
| Eventical E | 0.24 | 1.5 | 0.0 | N.A. | N.A. |
| Eventical F | 0.06 | 0.2 | 0.0 | N.A. | N.A. |
| Eventical J | 0.02 | 0.1 | 0.0 | N.A. | N.A. |
| Eventical K | 0.46 | 0.9 | 0.1 | 0.22 | 0.11 |
| Eventical L | 0.00 | 0.0 | 0.0 | N.A. | N.A. |
| Car Park 1 | 12.38 | 36.9 | 2.7 | 0.22 | 0.08 |
| Car Park 14 | 13.44 | 39.0 | 2.7 | 0.20 | 0.07 |
| Lorry Park 1 | 52.01 | 112 | 16.0 | 0.29 | 0.13 |

| Luminaire Schedule | | | | | | |
|--------------------|-----|-------|-------------|--------|-------|-----------------------------|
| Symbol | Qty | Label | Arrangement | Lumens | LLF | Description |
| + | 27 | A | SINGLE | 33000 | 0.800 | ORACLE 2C 250W HST EFL V7L6 |
| + | 160 | B | SINGLE | 90000 | 0.800 | TROIKA 600W HST V2 |
| + | 181 | C | SINGLE | 6600 | 0.800 | ORACLE 1W 70W HST EFL V6L6 |
| + | 30 | D | SINGLE | 130000 | 0.800 | CHAMPION 1KW HST E40 V4 |
| + | 100 | E | SINGLE | 14000 | 0.800 | ORACLE 2C 150W HST EFL-V3L2 |

Lanterns

Type A: Total - 27

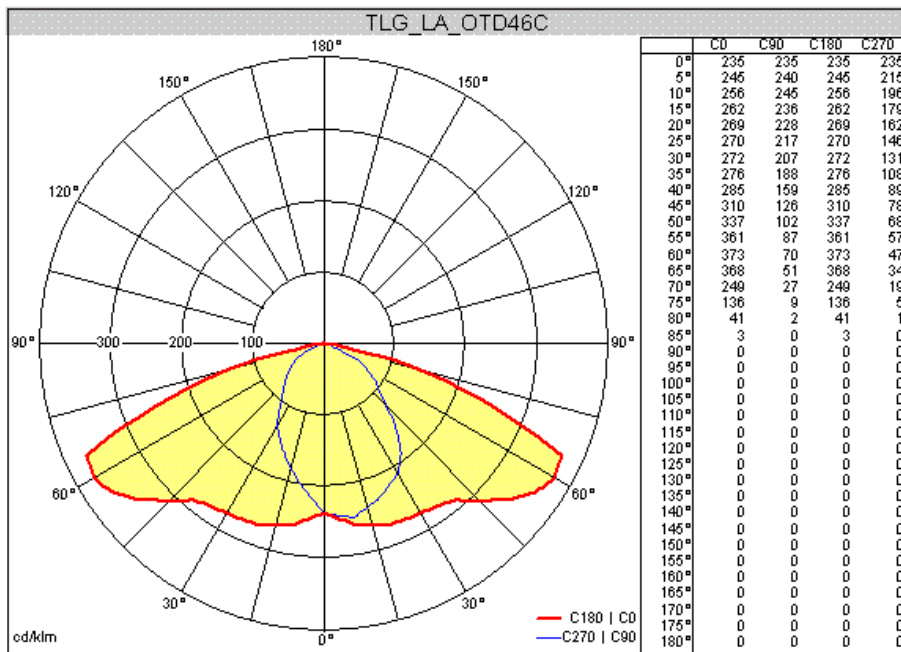
Oracle 2C Flat Glass 250W HPS



High Performance Street and road lighting in a timeless design

- High precision optical system for lighting performance
- Offers a wide variety of solutions to control and reduce light wastage.
- Offers minimised installation and maintenance costs and maximised energy savings.
- A choice of 2 optics (Wide and Comfort) for improved visibility and reduced obtrusive light.
- Available in complementary larger size. This size with a power range from 42 to 150W.
- Durability and recyclability with its high quality materials
- Wide range of applications.
- Fully complies with the WEEE RoHS requirements
- Vandal proof, vibration proof and suitable for use in harsh environments.
- Various mounting options for post-top or side entry allow choice of appearance.

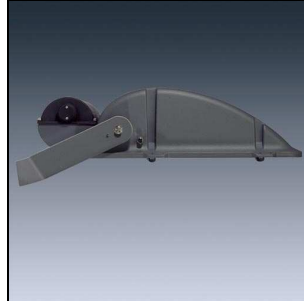
Photometry



| Light output ratio | | Glare Evaluation | | Classification | |
|--------------------|--------------|--------------------|------------|----------------|--------|
| LOR | 76 % | X = 4 H, Y = 8 H | S = 1.00 H | LTG | A40 |
| ULOR | 0 % | Reflection factors | 70/50/20 | LG7 | |
| DLOR | 76 % | UGR transversal | >28 | BZ | |
| FFR | 0.00 (0:100) | UGR axial | <25 | UTE | 0.76 E |

Type B: Total - 160

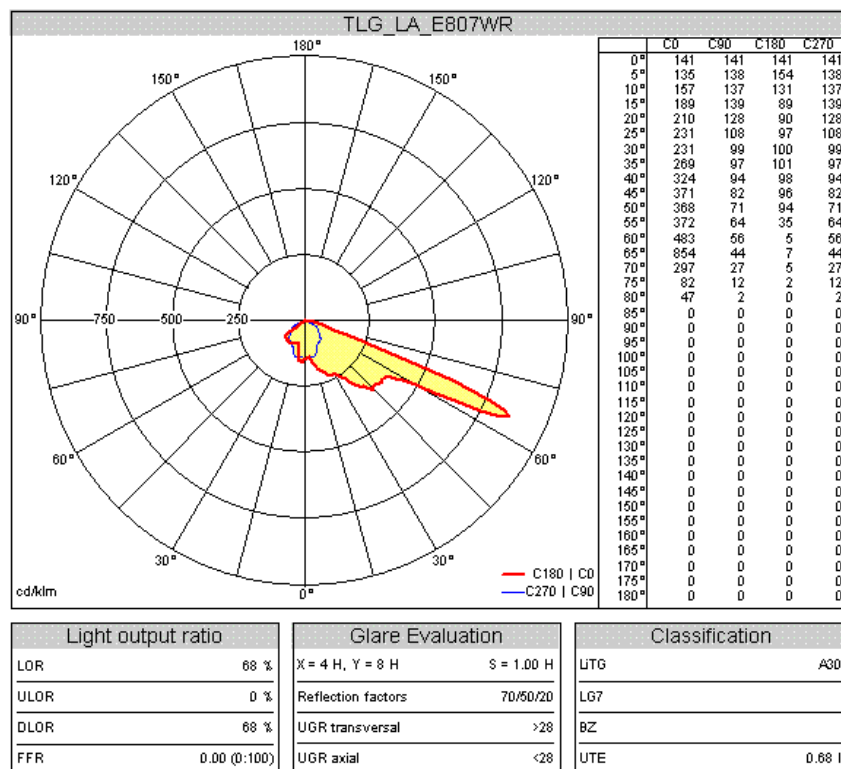
Troika Flat Glass 600W HPS



An asymmetric 'flat glass' floodlight for 250-600W discharge lamps, using adjustable lampholders

- Ideal for sports, functional and architectural applications
- Wide choice of lamp types
- Innovative reflector optimises performance and adjustable lampholder offers a variety of light distributions
- Light output is finely controlled to minimise light pollution
- Four different light distributions for each lamp option. Troika Variable (60°-70°) uses a reflector in conjunction with a variable position lampholder, providing three distributions varying in intensity, beam width and peak angle intensity (I peak).
- Ideal for tennis courts, sports applications and car parks. Troika Fixed has a fixed lamp position with a nominal 45° I peak angle. Ideal for swimming pools and uplighting.
- Broad selection of attachments, including a Lux Guillotine. This adjustable vertical light shield enables the light beam to be cut-off exactly where required and is therefore suitable for areas of extreme sensitivity to light spill

Photometry



Type C: Total – 161

Oracle 1W Flat Glass 70W HPS



Oracle 1 is a road lighting lantern with IP66 optical and gear compartment, SC1 class, suitable for a wide range of different applications. Its light grey aluminium body, flat glass enclosure, and high quality materials ensure durability and recyclability.

The luminaire can be side entry (up to 60mm) and post-top (up to 76mm) mounted through an integral rotating spigot and it can be fixed with 2 screws and bolts to secure the initial position.

The optibloc system with Comfort concept for 70W HST/HIT lamp and equipped with a magnetic ballast delivers uniform lighting distribution precisely where it is needed according to the application and lighting standards (EN 13201).

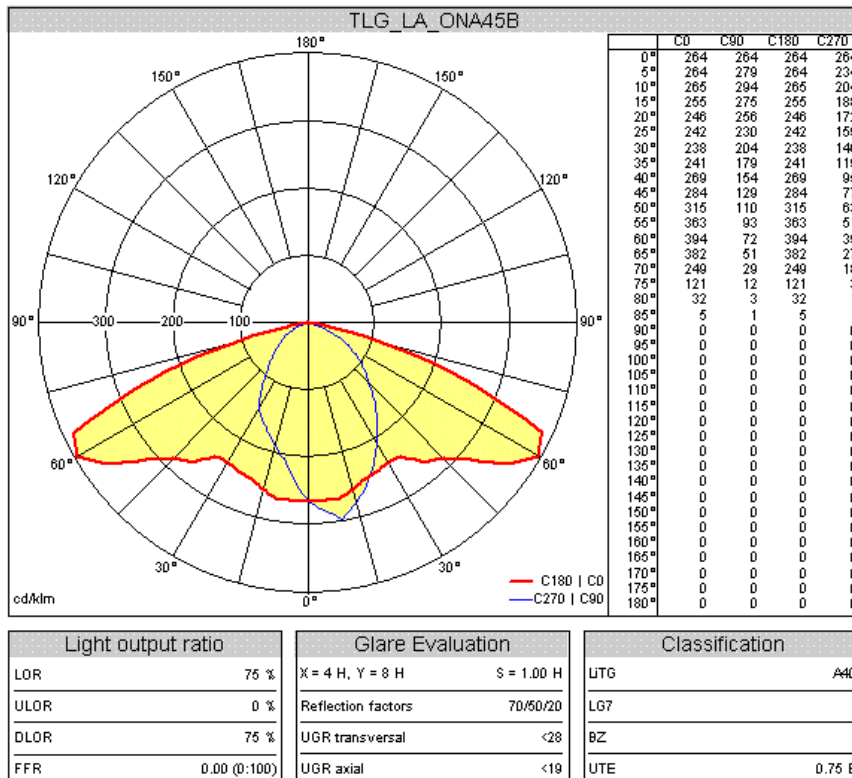
Oracle resolves the major issue of the Energy resources and offers the perfect solution reducing the Energy costs:

Dimensions : 714 x 345 x 187 mm

Total power : 82 W

Weight: 12.83 kg

Photometry



Type D: Total - 30

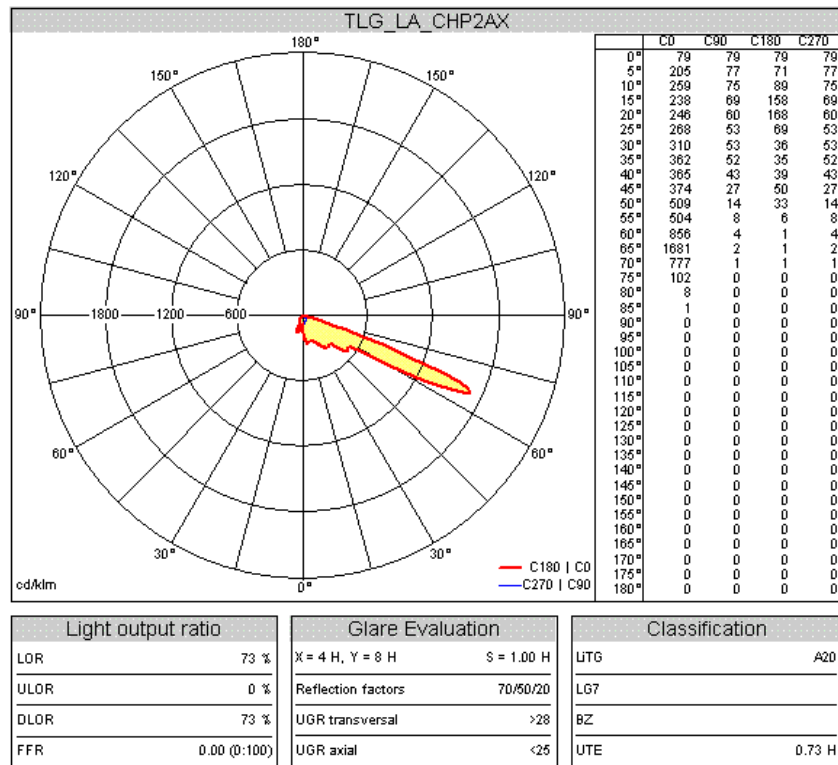
Champion 1000W HPS Full Cut Off



Number one solution to floodlighting small sports stadia and general areas where the control of obtrusive light is critical.

- installation and maintenance both simple and safe.
- additional accessories for increased control of obtrusive light available
- excellent glare control with unique optical construction
- use of metal halide lamps
- minimum of 4 lamp positions, adjustable on-site, from just one installed position.
- new standards for providing 'on-pitch' performance.
- provides a 'virtual' light emitting surface.
- front glass inclined inside the floodlight
- Champion combines many of the performance features of classic 'projectors' with those of 'flat glass' projectors.
- Asymmetric floodlight for 1 & 2 kW lamps, incorporating an innovative design concept.

Photometry



Type E: Total - 100

Oracle 2C Flat Glass 150W HPS



High performance street and road lighting in a timeless design

- High precision optical system for lighting performance
- Offers a wide variety of solutions to control and reduce light wastage.
- Offers minimised installation and maintenance costs and maximised energy savings.
- A choice of 3 optics (Access, Wide, Comfort) for improved visibility and reduced obtrusive light.
- Available in 2 sizes, with a power range from 42 to 600W.
- Durability and recyclability with its high quality materials
- Wide range of applications.
- Fully complies with the WEEE RoHS requirements
- Vandal proof, vibration proof and suitable for use in harsh environments.
- Various mounting options for post-top or side entry allow choice of appearance.

Photometry

