



STREET LIGHTING

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Highway Lighting

Cinderella of Highway Works

Valuable Asset

Necessary Inconvenience

Did the Roads Designer ask for lighting

Facts & Figures

- Lighting Columns 7.4m
- Lighting columns over 30 years old 2.32m
- Lighting columns over 40 years old 1.17m
- Hourly energy consumption 640,000kw hrs
- Hourly energy cost £64,000
- Annual energy cost £260m
- Annual CO₂ emissions 1.3m Tonnes

Highway Lighting

Why Light ?

How do we light?

How do we keep the lights on?

Barriers to Lighting

What of the future?

Why Light?

- Prevent Night time Accidents
- Help Reduce Crime
- Reduce Fear of Crime
- Promote Sustainable Transport
(cycling / walking)
- Free up streets after dark
- Safe access to evening learning facilities

Highway Authority Duties & Powers

- Power to provide lighting – not a duty
- Act reasonably in exercising powers
- Take Crime & Disorder Act (S17) into consideration

Crime



Fear of Crime



Well Being



How do we light

Design

Process

Equipment

Sustainability

The Pitfalls/ Barriers

Light Pollution

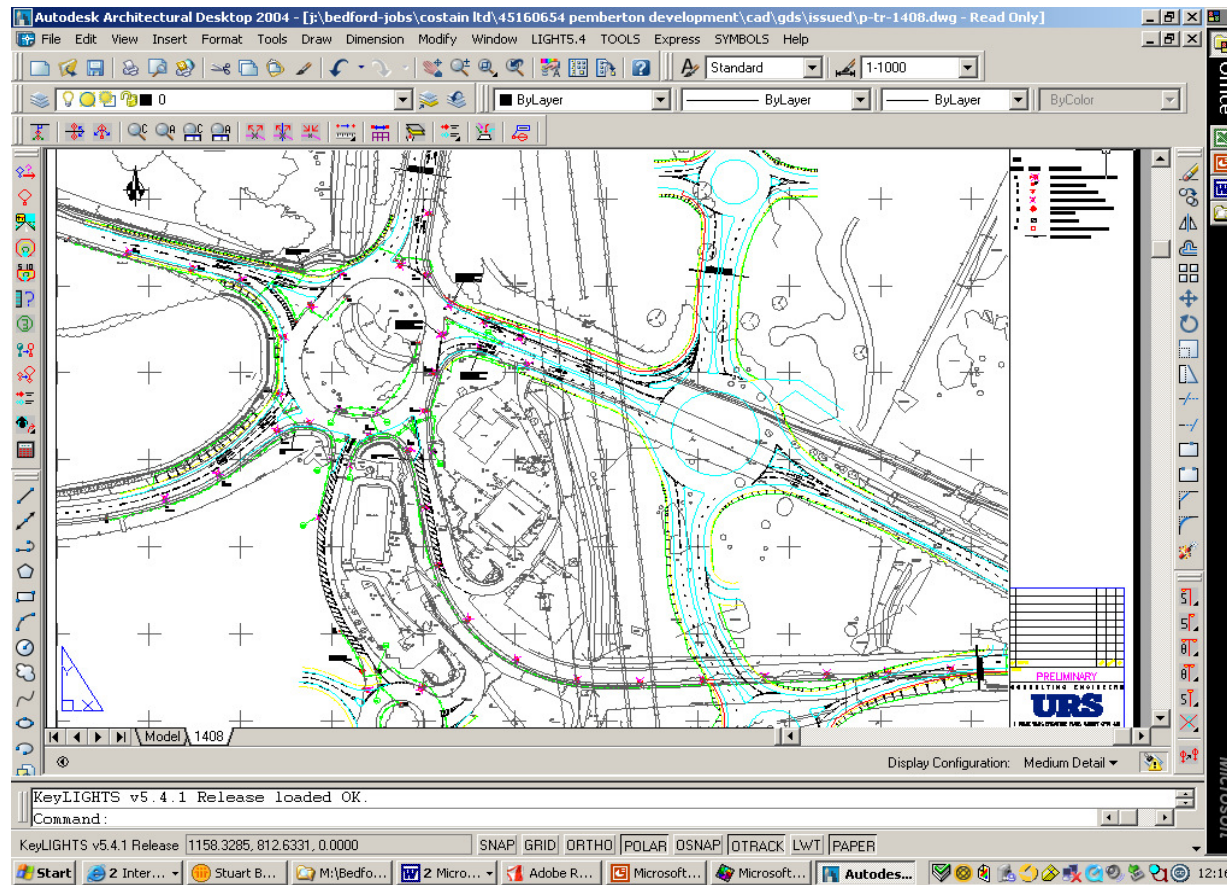
Carbon Reduction

Design Process

- Computer Techniques
 - Lighting Reality/ Calculux
 - KeyLights – one stop shop

Design Process

KeyLights/ Lighting Reality



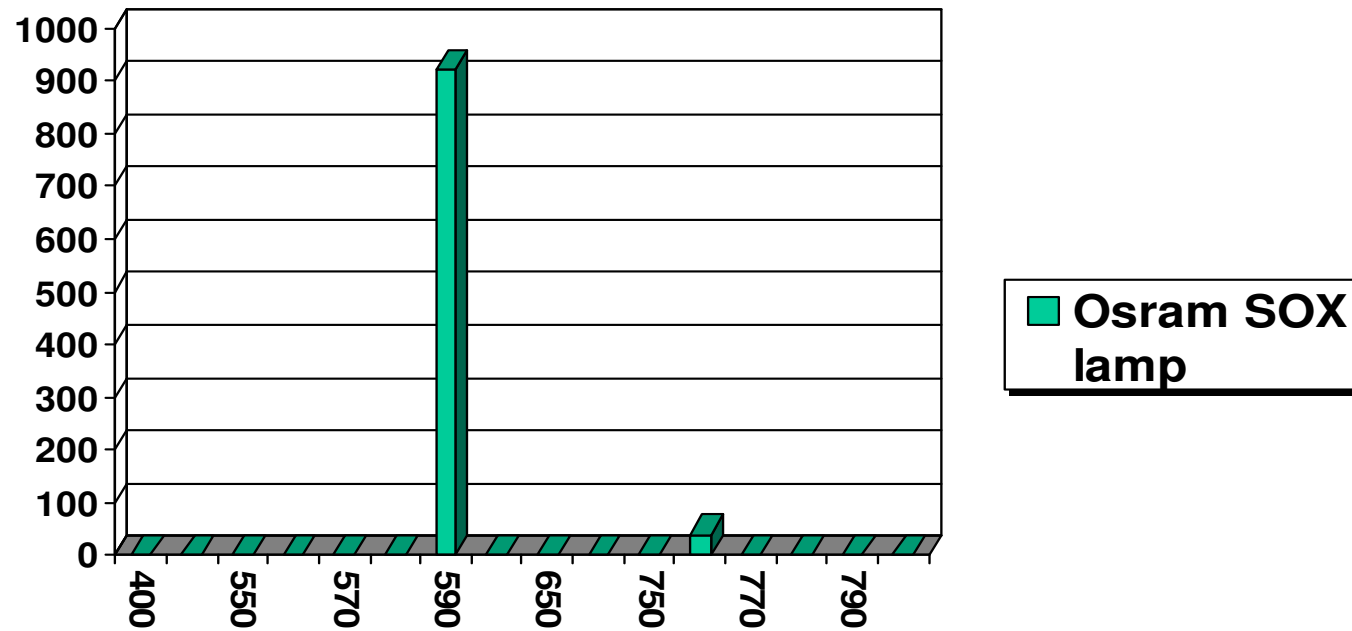
Design Process

New BS EN 5489:2003

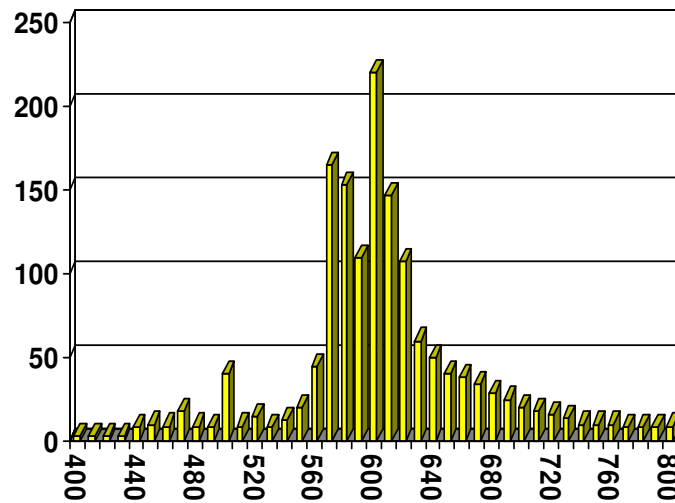
Based on EN13201: 2003

- **Environmental Considerations**
- **Traffic Volumes – opens the way to dimming**
- **Considers Crime Levels**

Equipment - SOX Spectrum



Equipment - SON Spectrum



■ Osram NAV
Standard



Equipment - Modern Light Source



Cosmopolis

by Phillips

Return to White
Light

Equipment – Lighting Columns

- **Passive Safety – Electrical disconnection**
- Significant increase in cost over standard lighting column
- **Materials**
 - Tubular Steel
 - Stainless Steel
 - Aluminium
 - Fibre Glass / Composite

Sustainability



Sustainability



Sustainability - Westminster 1998



The most expensive column replacement ever (allegedly)

Sustainability - Private Finance Initiative

- Already over 20 street lighting PFI projects
- Seven currently under procurement
- Will increase lighting stock – at odds with climate change policy

The Pitfalls

- Over lighting
 - Waste energy
 - Increased carbon footprint
- Light Pollution
- Clean Neighbourhoods & Environment Act 2005

Light Pollution - Earth at Night



Light Pollution

Design to correct standards –don't over light

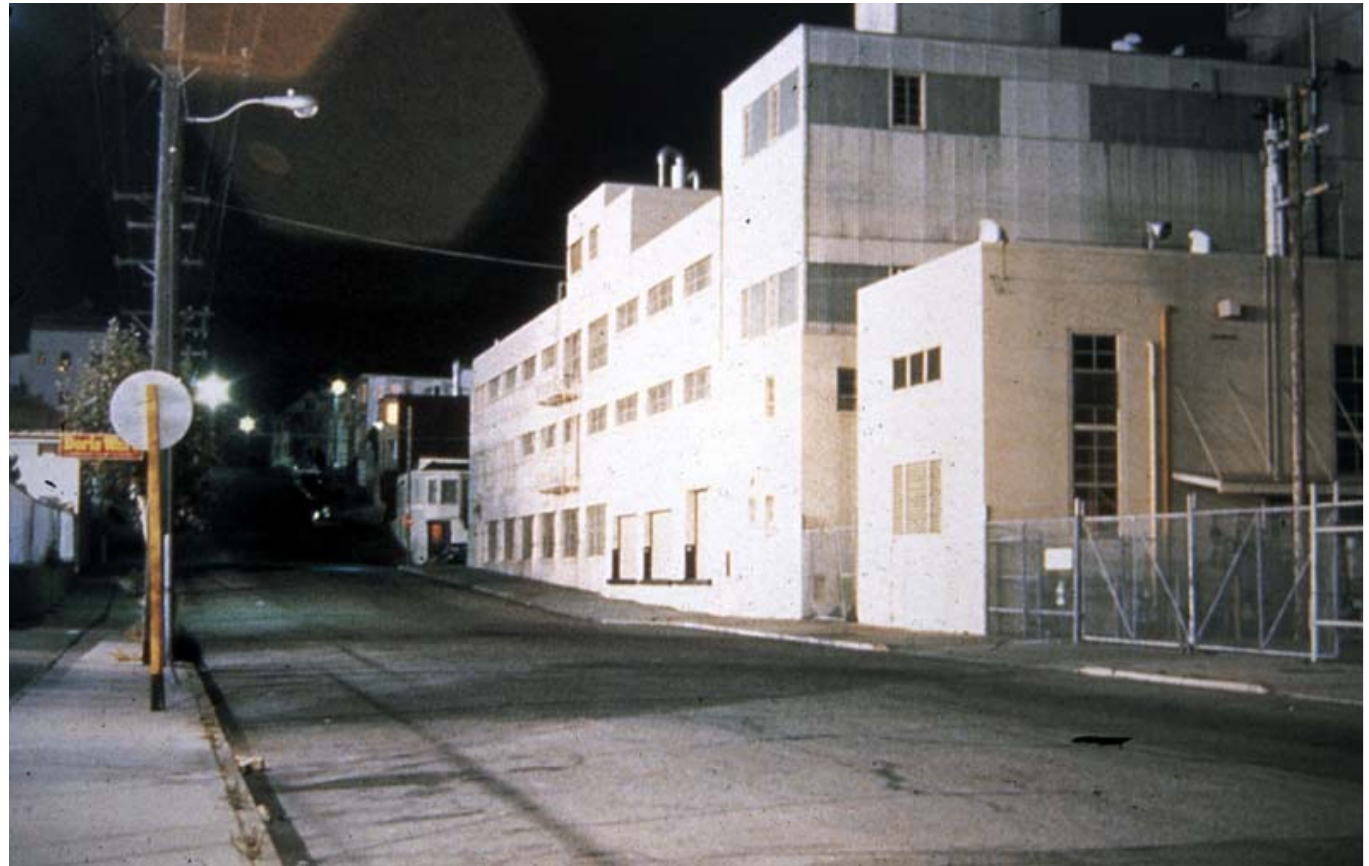
Use only Qualified
& Competent
Highway Lighting
Engineers

ILE Competence
Matrix



Light Pollution

**Sports facility
lighting**



Light Pollution General Picture

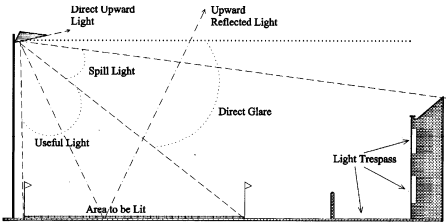


The Institution of Lighting Engineers

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GUIDANCE NOTES FOR THE REDUCTION OF LIGHT POLLUTION

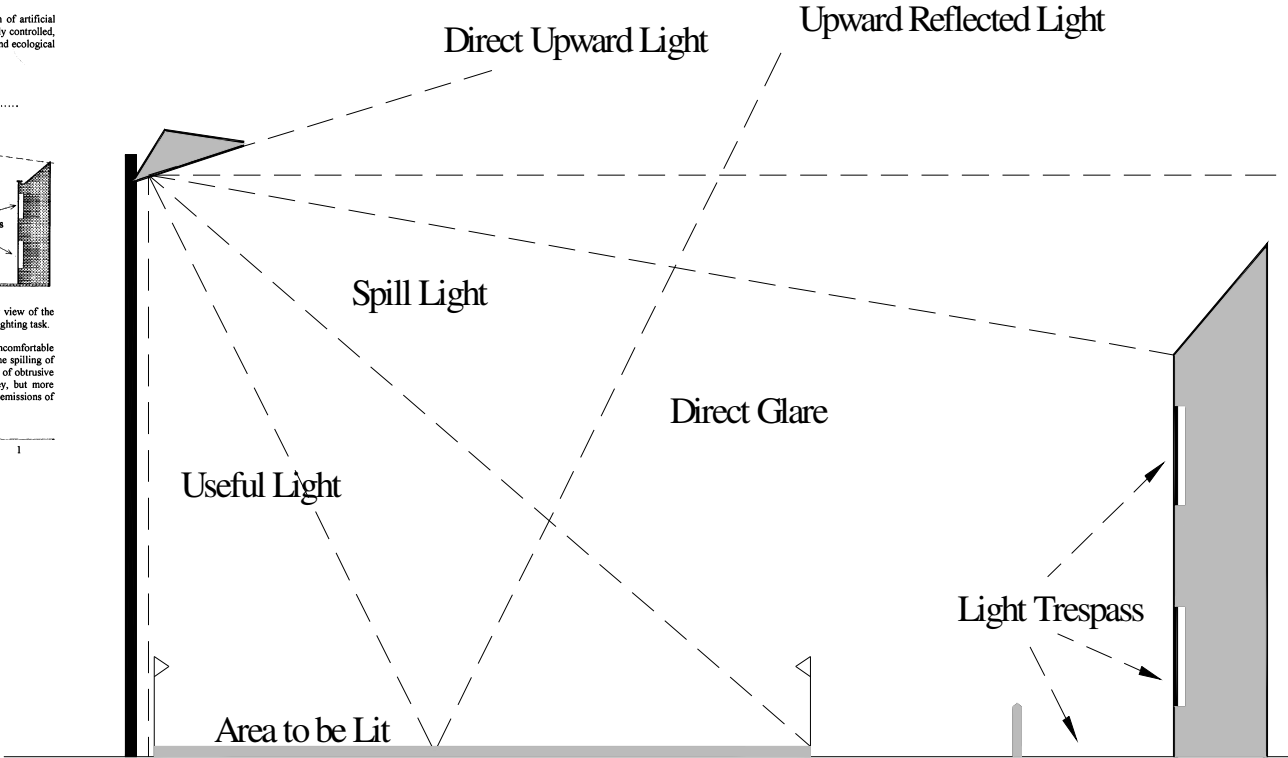
ALL LIVING THINGS adjust their behaviour according to natural light. Man's invention of artificial light has done much to safeguard and enhance our night-time environment but, if not properly controlled, obtrusive light (commonly referred to as light pollution) can present serious physiological and ecological problems.



Light pollution, whether it keeps you awake through a bedroom window or impedes your view of the night sky, is a form of pollution and could be substantially reduced without detriment to the lighting task.

Sky glow, the brightening of the night sky above our towns and cities, Glare, the uncomfortable brightness of a light source when viewed against a dark background, and Light Trespass, the spilling of light beyond the boundary of the property on which the light source is located, are all forms of obtrusive light. This is not only a nuisance, it wastes electricity and thereby large sums of money, but more importantly it helps destroy the Earth's finite energy resources, resulting in the unnecessary emissions of greenhouse gases.

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Light Pollution - Solutions



**When a Globe is
not a Globe**

Light Pollution - Solutions



Control vs. Pollution



Efficient Lighting



Barriers to Lighting

Significant rise in energy costs during 2006 – 2008 – prices as high as 12p/unit – 100% rise in 2years

- Some Authorities switch off
- Carbon footprint give as a convenient reason
- **Cost a major factor**

Barriers to Lighting

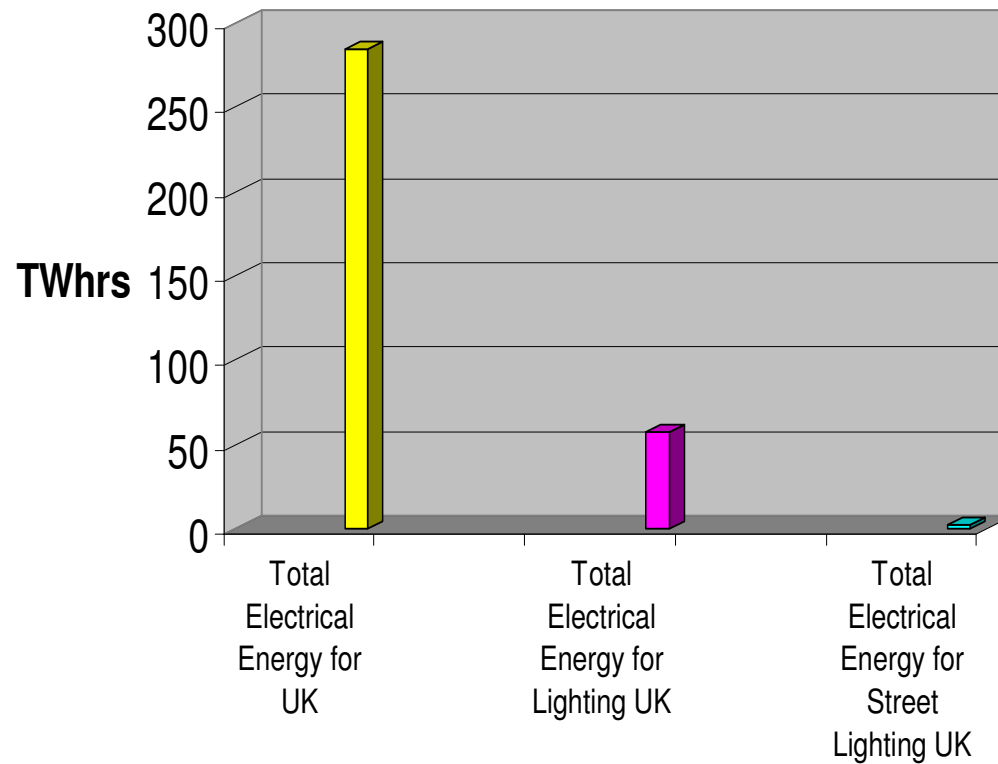
Focus on CO₂ emissions

- Climate Change Act 2009
- Energy Act 2009
- Planning Act 2009
- European Directives

- National imperative to reduce emissions by 80% by 2050 (relative to 1990 baseline)

Barriers to Lighting The Bigger Picture

Electrical Energy Comparison UK



What are we trying to achieve



Implications of switch off

Coroner calls for street lighting review after pensioners death

- **“The driver had no chance at all”**
- **“He was deprived of the opportunity to see here and to do something about it”**

Invest to Save

ILE/CSS/Lighting Board

Advice Note – Invest to Save

Why do we light?

Highway Authority Powers & Duties

Implications of 'Switch Off'

What can we (Lighting Profession) do

Invest to Save

- Modelling of potential efficiencies from variable lighting levels and other options for a wide range of street lighting scenarios.
- Several case histories illustrate what can be achieved.
- Recommendations given



Invest to Save

Trim – Switch on later / Switch off earlier
Currently 70 Lux on 35 Lux off

Dimming – lighting level relationship to traffic volumes
Switch to 75% or even 50%

Energy Procurement – Half Hourly metering
Purchase by Consortia

Invest to Save

Central Management Systems

Control of lighting system

Virtual electricity meter

Early warning of lamp failure remove scouting

Inventories

Penalties for inaccurate information on energy usage

10% for CRC

Back charging by DNO – up to 14 months

Invest to Save

- Part Night

switch off at midnight

switch on at 5am

Remove Lighting

Has the road been bypassed

Is the lighting still necessary

Invest to Save - What can we do

Northants C.C. showed the possibilities



Invest to Save – the future?

New Innovations



Light Emitting Diodes
(still in its infancy)

Conclusion

- Highway Lighting is under constant change –
 - To provide sustainability
 - To achieve its original aims
 - To reduce energy consumption
 - To please the Dark Skies Lobby

A lot to do - with little or no funding

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- Thank you for listening