Claverton Neighbourhood Plan

Dark Skies
Light Pollution

Controlling light spill for the benefit of the environment, the economy and health

Claverton does not have any street lights and therefore enjoys a good view of the night sky.

Isabelle Flicker

A. INTRODUCTION : Cotswold AONB

- Claverton is in the Cotswold Area of Natural Beauty (AONB)

- The AONB forms the setting to the World Heritage City of Bath

- The City of Bath forms the setting to the AONB

- 50% of the AONB is in the sky

Supporting the Cotswold Conservation Board (CCB)

As part of the CAONB, Claverton aims to support the CCB in:

- Conserving and enhancing the natural beauty of the AONB

- Increasing understanding and enjoyment of the special qualities of the AONB

Loss of the night sky

Our ability to see the stars is affected by sky glow from:

- surrounding towns and villages

- lights at the university (campus and sports fields)

- Warleigh Manor

- outdoor domestic lighting

- skylights

Cumulative impact of lighting

"The cumulative impact of local lighting schemes ... i.e. security, leisure activities, street lighting, floodlighting, ... can lead to the loss of dark skies"

**N.B. :**   Light emitted from buildings also contributes to ambient lighting

The Cotswold Conservation Board (CCB)   Position Statement on Tranquillity and Dark Skies

Lighting & Environmental Zones

Zone	Surrounding	Lighting Environment	Examples
Table 1 – Environmental Zones			
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty etc
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town/city centres with high levels of night-time activity

The parish is in E1/E2 and aims to be in E1.

The Night Sky above Claverton
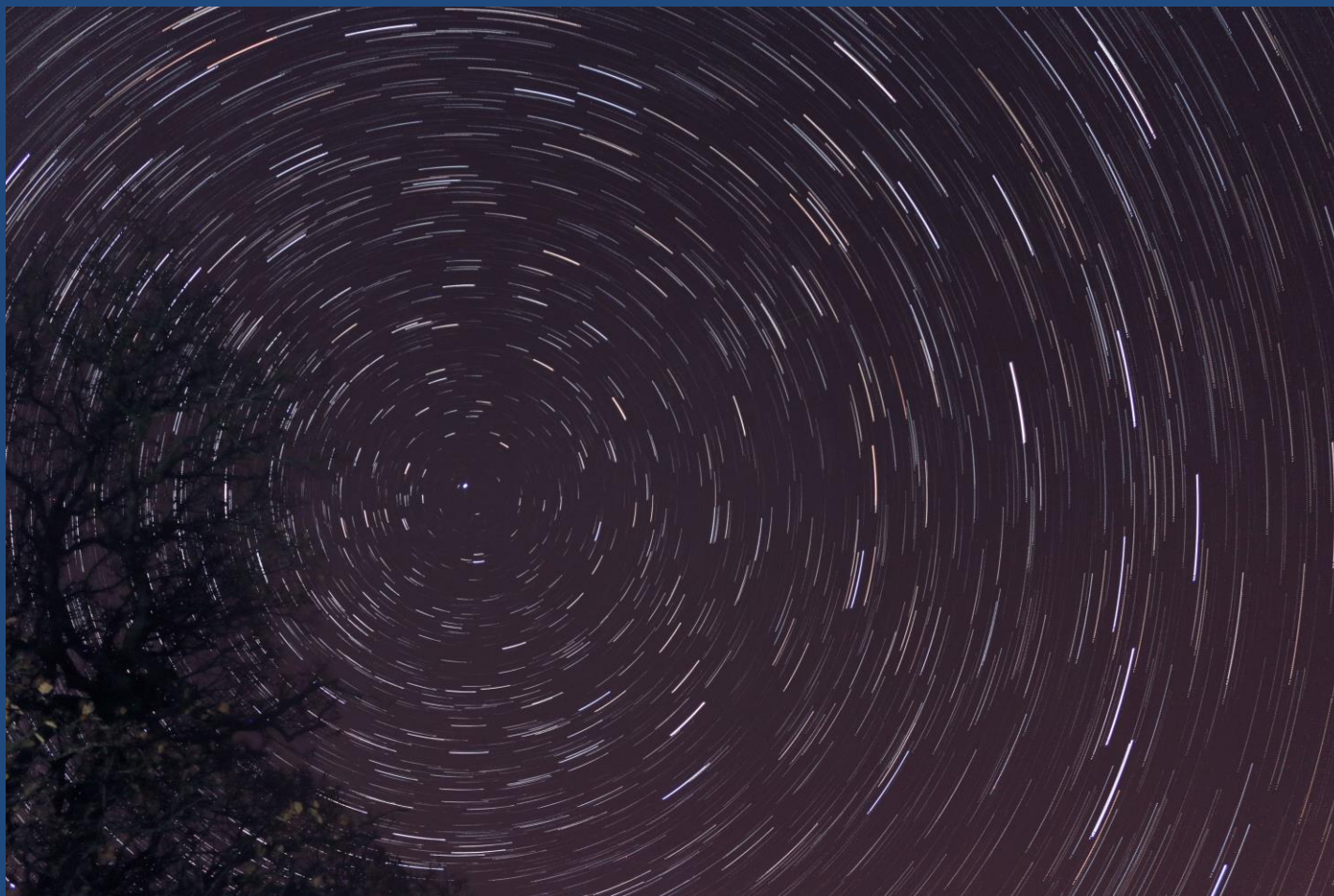
Darkness and Night-time Ecology

THE NIGHT SKY IS VITAL TO THE ECOLOGY OF THE AREA. LIGHT AFFECTS :

- **MOTHS AND INSECTS**

  loss of and impact on insectivorous birds, amphibians and mammals i.e. bats etc

- **NIGHT-TIME FEEDING BIRDS AND MAMMALS i.e. Owls and Bats** delayed feeding and change in foraging habits; vulnerability to predators)

- **SLUGS AND SNAILS**

   increase in numbers

- **TREES AND OTHER FLORA**

  dependence on nocturnal creatures; early bud break, late Autumn

Darkness, Human Health and Melatonin

Light at night (particularly blue-rich lighting) can harm health by suppressing melatonin.

MELATONIN has antioxidant properties and :

- Induces sleep
- Boosts the immune system
- Lowers cholesterol
- Helps the functioning of the thyroid, pancreas, ovaries, testes and adrenal glands

SUPPRESSION OF MELATONIN can increase the risk for *inter alia*

- Obesity
- Depression
- Sleep disorders
- Diabetes
- Breast and prostate cancer

Key to CPRE Night Blight Map
measured in NanoWatts/cm²/sr

Categories	Brightness values (in nw/cm²/sr)[17]
Colour band 1 (Darkest)	<0.25
Colour band 2	0.25-0.5
Colour band 3	0.5-1
Colour band 4	1-2
Colour band 5	2-4
Colour band 6	4-8
Colour band 7	8-16
Colour band 8	16-32
Colour band 9 (Brightest)	>32

The map is a composite of photographs taken over several nights in September 2015 at 1.30 a.m.   Sports field lights are consequently not on.

Light pollution in and around Bath
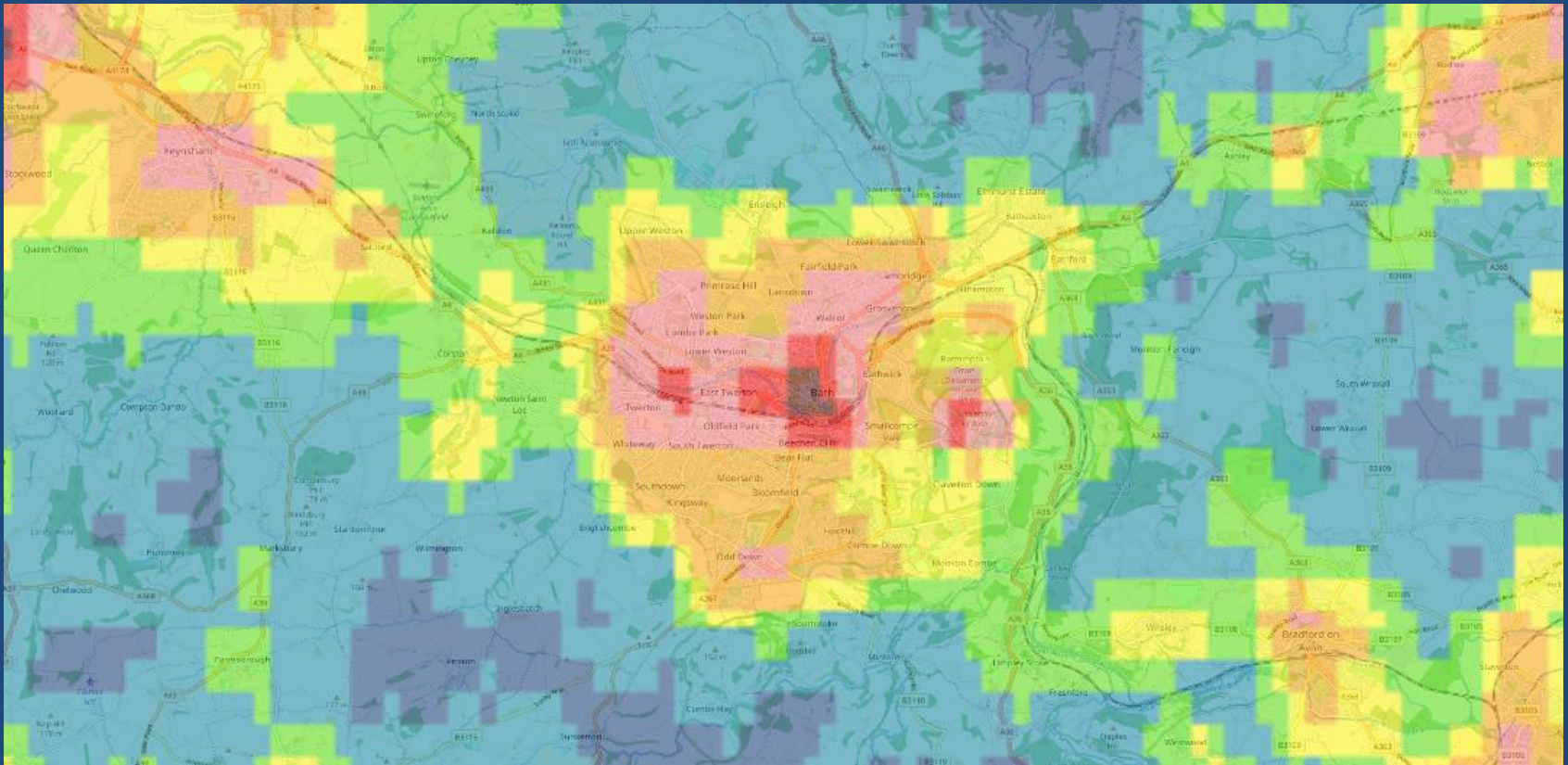
Acting to protect the night sky
for present and future generations by :

- working with the university

- working with the owners of Warleigh Manor

- opposing inappropriate lighting in new developments in the parish

- encouraging 'starlit sky' lighting within the parish

- working with the Bath Starlit Skies Conference which aims to reduce light pollution in and around Bath

Principles of good external lighting

Starlit Skies Alliance

The 5-Star principles of good external lighting are :

1.   DESIGN EXCELLENCE :   ★

   seek innovative lighting design solutions to light responsibly

2.   DOWNWARD AND SHIELDED :   ★ ★

   light only when and where it is needed

3.   USE WARM LIGHTING HUES :   ★ ★ ★

   be good to ourselves and the rich biodiversity around us

4.   LIMIT BRIGHTNESS :   ★ ★ ★ ★

   dazzle is detrimental to safety, health, and our environment

5.   ACTIVELY MANAGE: ★ ★ ★ ★ ★

   sign up to a culture of continuous improvement in environmental management.

B. BATH UNIVERSITY

- lighting on the campus is not just the result of lighting from the sports fields

- there are problems, but there are also solutions

For more background and supporting evidence please refer to the evidence base

C. DOMESTIC LIGHTING

The Good Neighbour Principle

A significant amount of light pollution comes rom the University of Bath, Warleigh Manor and surrounding towns and villages.

These are options

However, the cumulative effect of domestic lighting, however, can also take away our view of the stars.

There are options which can be used to retain our dark skies.

Good and Bad Light Fixtures (1)

Diagrams : NELPAG (New England Light Pollution Advisory Group)

BAD : Yard Light

waste light goes up and sideways
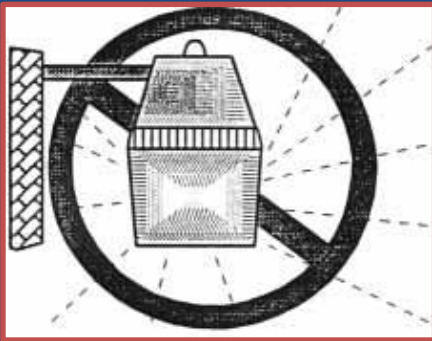
GOOD : Opaque Reflector (light inside)

directs all light down
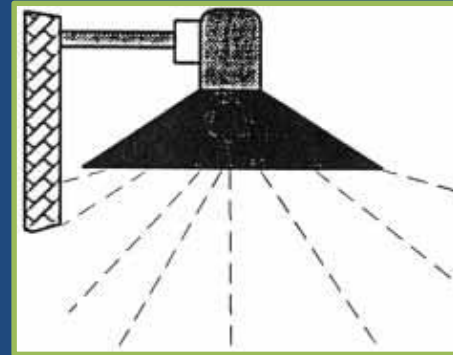
Good and Bad Light Fixtures (2)

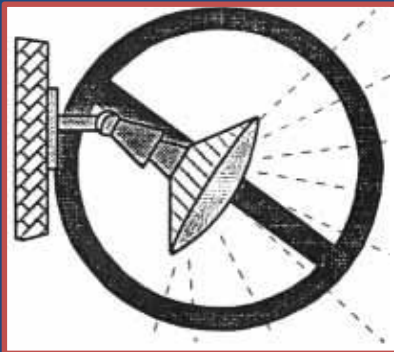**BAD : Wall Pack**
waste light goes up and sideways
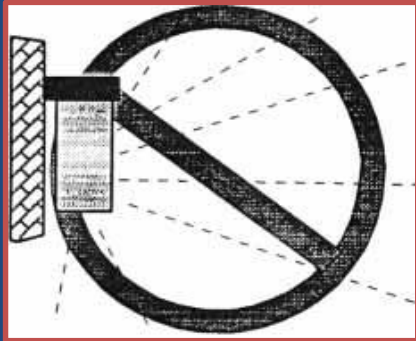
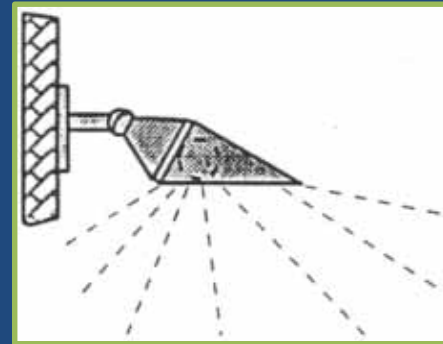**GOOD : Shoe Box (forward throw)**
directs all light down
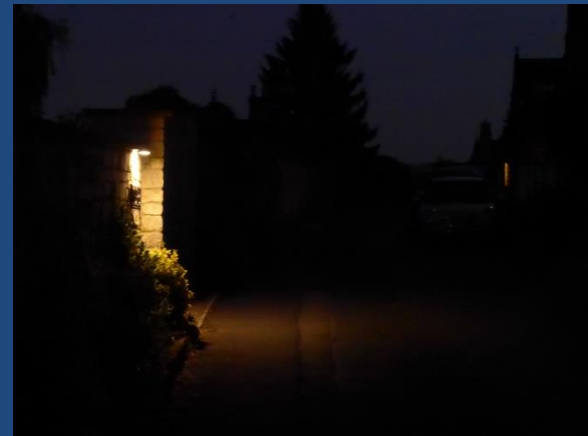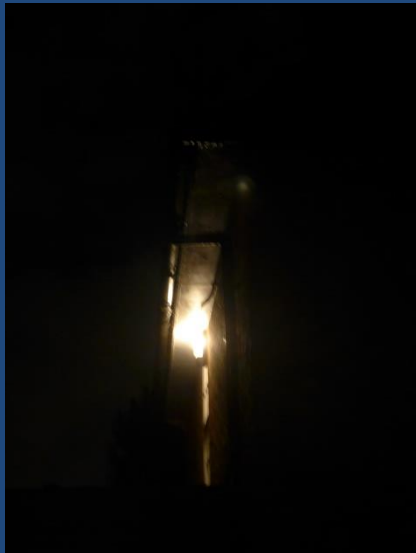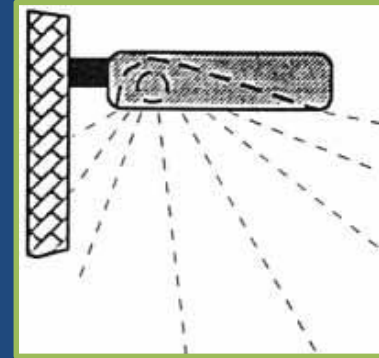
Good and Bad Light Fixtures (3)

BAD : Area Floodlight
waste light goes up and sideways

GOOD : Area Floodlight with Hood
directs all light down

Good and Bad Light Fixtures (4)

unshielded uplighters send light up into the night sky and into the eyes of passers-by
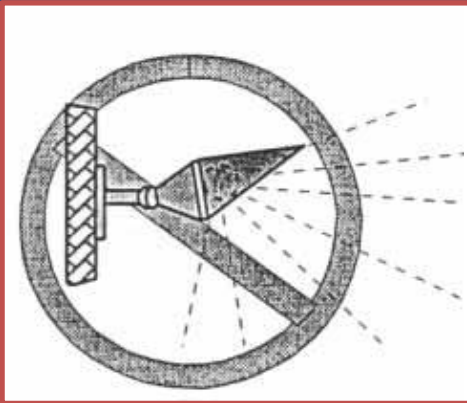
BAD : <u>Uplighter</u>

Unshielded, sends light up
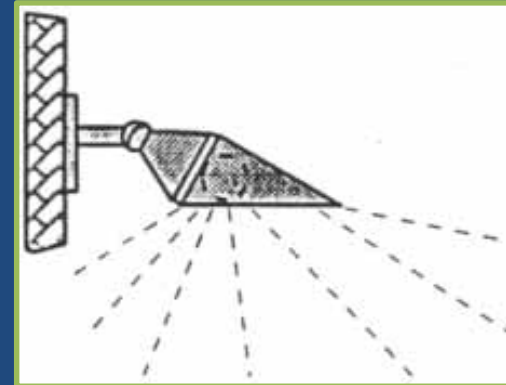
GOOD : Remove!

These lights are not necessary!

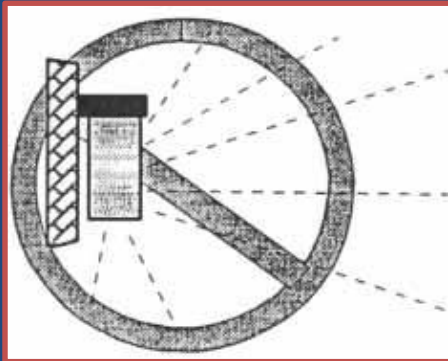# Modifying existing fittings (1)

Change this…
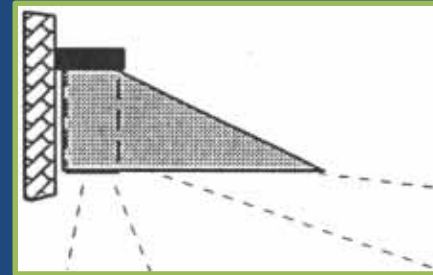

To this (aim downward)
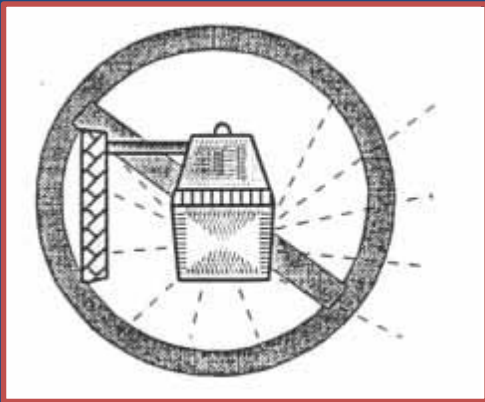
Modifying existing fittings (2)

Change this…

to this (install visor)
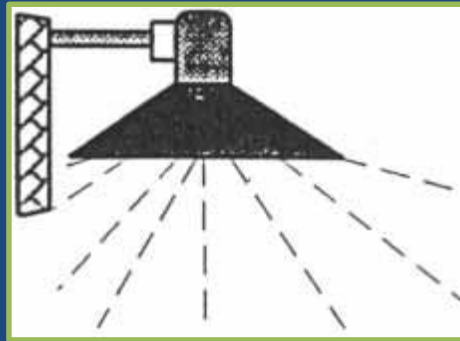
Modifying existing fixtures
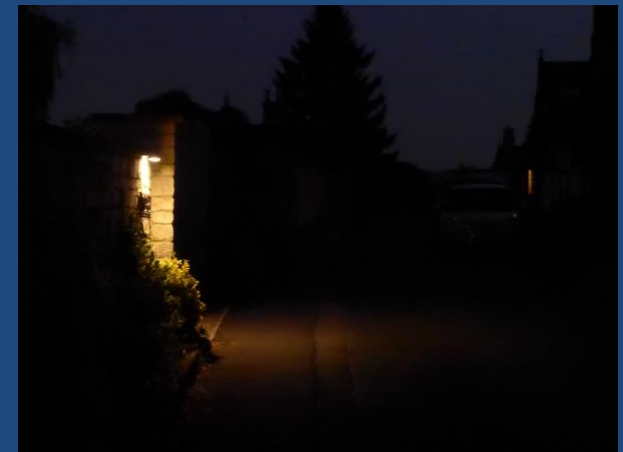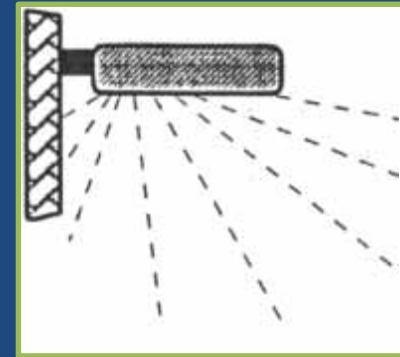
Change this...   to this...   or this

Skylights and Blinds

- Left to right : (1) no blind; (2) internal venetian blind; (3) internal venetian blind and external blind

Light Pollution and the Law

- Exterior lighting is subject to the same criminal law as noise and smells. (Environmental Protection Act 1990)

- It applies to "artificial light emitted from premises so as to be prejudicial to health or a nuisance."

D. LEDs
Advantages

LEDs are :

- energy efficient

- cost less

- last longer

- easily remotely controlled

- switch on instantly

In addition, they

- come in a wide range of colours and colour temperatures

- are dimmable

- do not produce noxious substances when discarded

LEDs : Disadvantages

Often blue-rich and brighter than needed (ie > 3000K).
This is:

- harmful to flora and fauna
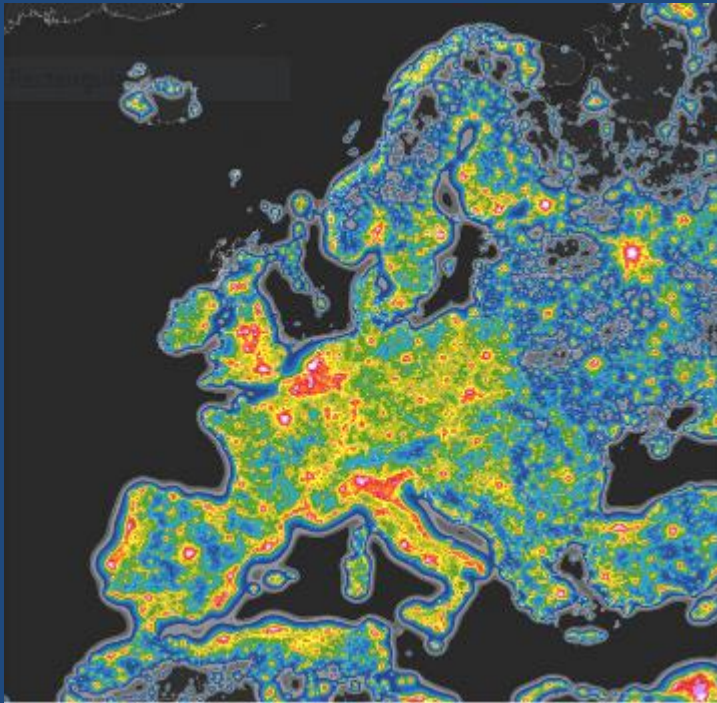
- harmful to human health

and has led to :

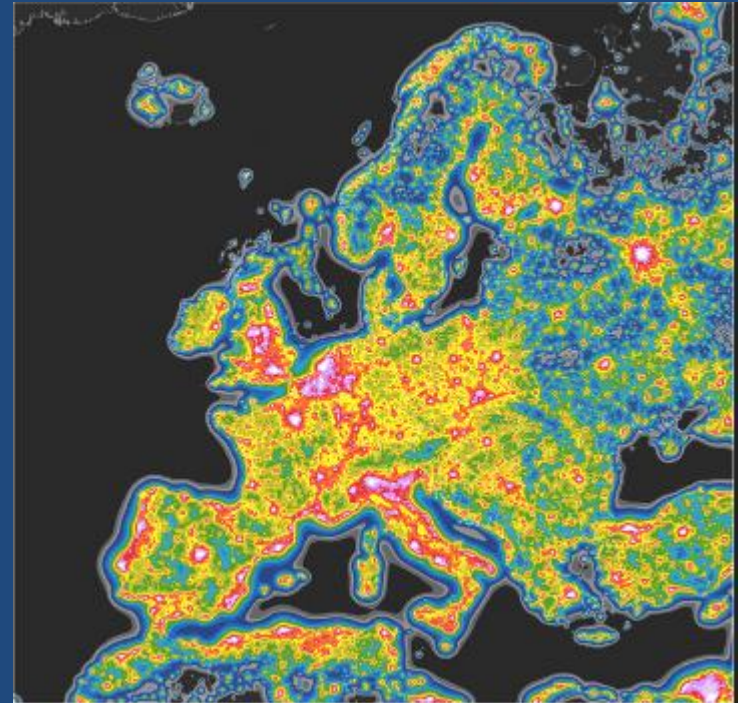- a 2.2% p.a. increase in light pollution globally between 2012 and 2016

Increase in light pollution 2012-2016

(Light pollution increased at a rate of 2.2% per annum) (Science Advances, Vol. 3, No. 11, 22.11.17 Falchi et al)

Pre-4000K LEDs

Post-4000K LEDs

Watts, Lumens and Kelvins

- **Watts** = measure of power consumption (W)

- **Lumens** = measure of total light output (L)

- **Kelvins** = measure of colour temperature (K)

Outdoor lighting should not exceed 3000K. Blue-rich lighting is bad for health and the environment

Think lumens and kelvins **<u>not</u>** Watts!

18W, 4000K

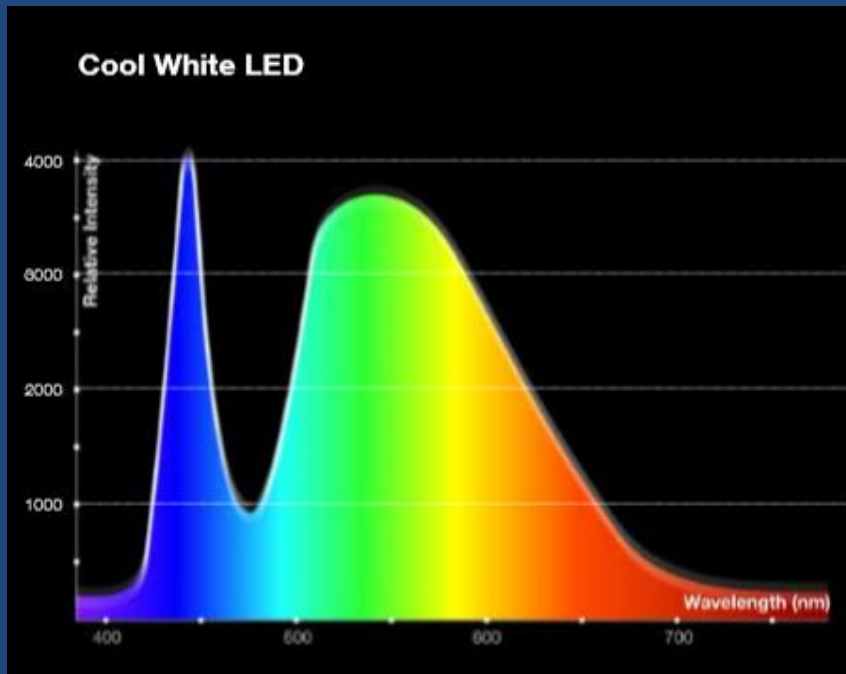**Brighter than is needed for the task**

18W, 2700K :

Choose less than 3000K

Watt and Lumens
aka Watt equivalence

Old Watts	Approx Lumens
25 W	230 - 270 lamp
35 W	250 - 280 spotlight
	200-300 Useful Lumens (spotlight)
	390 - 410 lamp
40 W	440 - 460 lamp
50 W	330 - 400 spotlight
	350-450 Useful Lumens (spotlight)
60 W	800 - 850 lamp
75W	1000-1100 lamp
100W	1500-1600 lamp

Colour temperature (Kelvins)

2500K	2700K	3000K	3500K	4000K	6500K
EXTRA WARM WHITE	WARM WHITE	WARM WHITE/WHITE	WHITE	COOL WHITE	DAYLIGHT

Cool White

Warm White

Warm White LED

Potential Custom 'Bath' LED
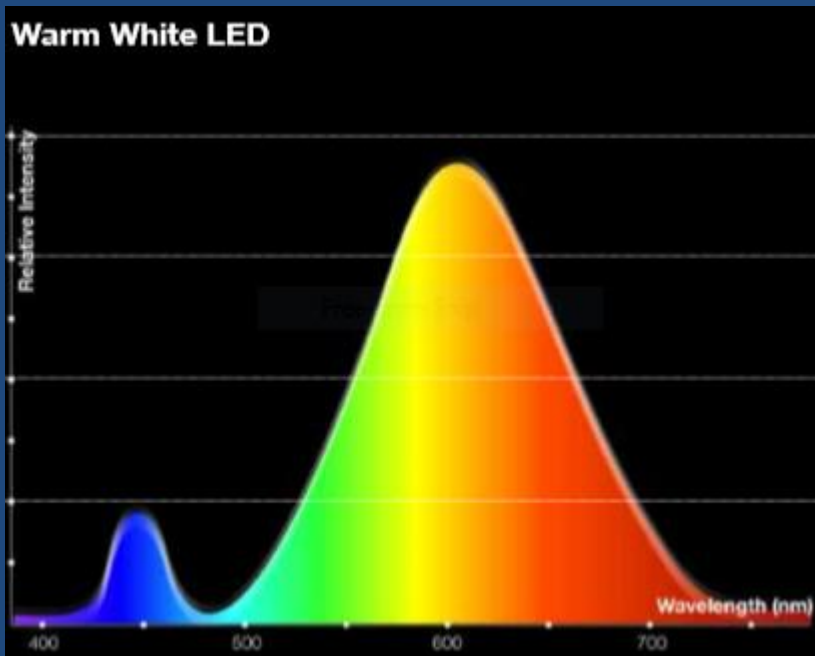
Potential Custom 'Bath LED'

Cool, warm and custom LEDs

Let's do it!

Galloway Forest Park Dark Skies - we can all share such beautiful skies if we work together to cut sky-glow
Photo James Hilder