



LIGHT IMPACT ASSESSMENT

SINGLE STOREY NEW BUILD TIMBER-FRAMED GARAGE ST PETERS WELL, LODSWORTH

1. Objectives

This lighting impact assessment has been prepared to assess the potential effects from obtrusive light that may arise from the proposed development at West Dean College, West Dean PO18 0QZ.

The key objectives of the assessment are to:

- Identify potential existing obtrusive light sources within and around the development site;
- Quantify the baseline lighting conditions;
- Quantify the potential effect of the development on sensitive receptors as a result of light spill from the proposed development;
- Provide advice on measures to minimise obtrusive light from the development.

2. The Development

The proposal for development is to provide appropriate LED external lighting to the perimeter of the hard-standing area, recessed and concealed into the retaining walls, as well as down lighting over the separate garage bays for safe access and use of the external garaging.

3. Policy and Guidance

3.1 National Planning Policy

National Planning Policy Framework (Revised February 2019)

The revised National Planning Policy Framework sets out government's planning policies for England and how these are expected to be applied.

Paragraph 180, under Ground conditions and Pollution, states that planning policies and decisions should ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.

Amongst other pollution sources, planning policies are required to (c) "limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation".

3.2 Regional Planning Policy

South Downs Local Plan – Adopted 2 July 2019

Section 5.3 of the Local Plan includes five strategic policies, which relate to the landscape and associated special qualities of the National Park. These set a positive strategy for conserving and enhancing landscape character, and of particular interest is (SD8 – page 55) which states:

1. Development proposals will be permitted where they conserve and enhance the intrinsic quality of dark night skies and the integrity of the Dark Sky Core as shown on the Policies Map.

2. Development proposals must demonstrate that all opportunities to reduce light pollution have been taken, and must ensure that the measured and observed sky quality in the surrounding area is not negatively affected, having due regard to the following hierarchy:

- a) The installation of lighting is avoided; and
- b) If lighting cannot be avoided, it is demonstrated to be necessary and appropriate, for its intended purpose or use:
 - i. Any adverse impacts are avoided; or
 - ii. If that is not achievable, then adverse impacts are mitigated to the greatest reasonable extent.'

3. Lighting which is proposed to be installed must meet or exceed the level of protection appropriate to the environmental zone, as shown on the Policies Map, as set out in the table below.

4. Outdoor lighting proposals are required to provide a statement to justify why the proposed lighting is required.

Location	Requirements for level of protection				
	ILP guidance ³⁵	Landscape impact	Maximum Lux level (suggested 10 Lux)	Preferred lights-off curfew	Astronomical darkness curfew
E0 Dark Sky Core and areas outside this zone with a SQM ³⁶ of 20.5+	✓	✓	✓		✓
E1(a) 2km Buffer Zone and areas outside this and the above zone which are of intrinsic rural darkness with a SQM range of 20 to 20.5	✓	✓	✓	✓	
E1(b) Transition Zone and areas outside this and the above zones with a SQM range of ~15 to 20	✓	✓	✓		
E3/4 Urban zone with an SQM of <15	✓	✓			
4. Outdoor lighting proposals are required to provide a statement to justify why the proposed lighting is required.					

Figure 1 – Extract of validation criteria and assumed Environmental Zone (Policy SD8)

3.4 Best Practice Guidance

The following guidance documents have been referenced whilst undertaking this assessment:

- The Institute of Lighting Professionals (ILP formally the ILE), GN01:2020 Guidance note on the reduction of obtrusive light.
- South Downs National Park – Dark Skies Technical Advice Note (April 2018)

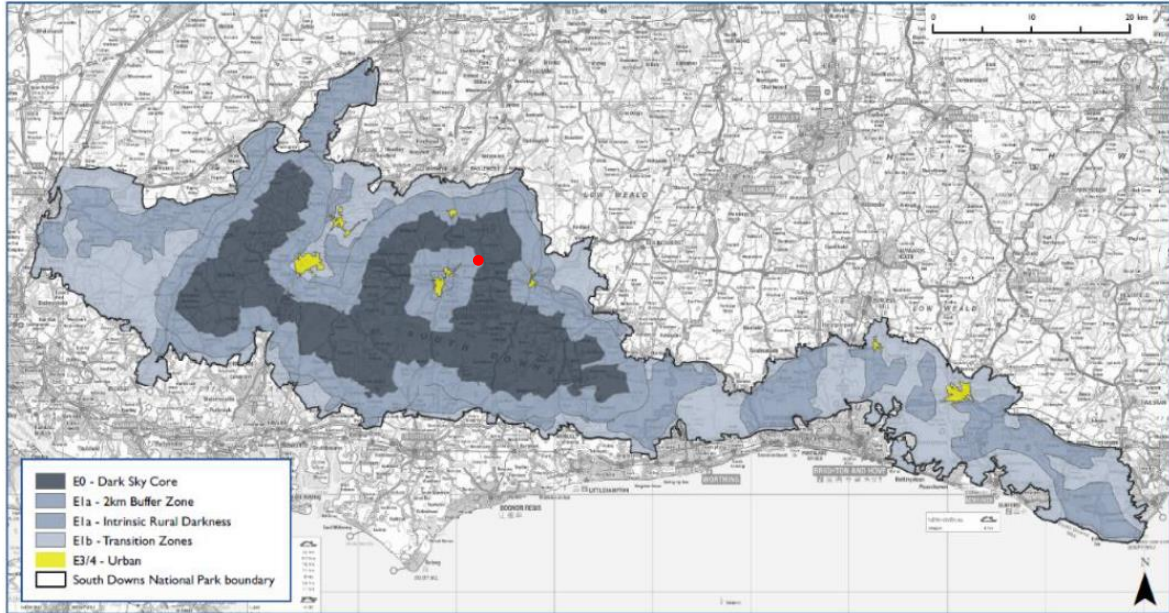


Figure 2 – Extract of validation criteria and assumed Environmental Zone (Policy SD8)

4. Assessment Methodology

4.1 Baseline Conditions

Lodsworth resides under skies that measure within 20-20.5 magnitudes per arcsecond² for a 'bronze level' of dark sky designation, which is consistent with the International Dark Skies Core. As the skies are of local and national importance the site should be assessed against the sky quality measurements SDNPA Policy Zoning E1 (a) – Intrinsic Rural Darkness and buffer guidance for lighting designs.

Zone	Description	SQM Range	8.1 Obtrusive Light	8.2 Design Impact	8.3 Max Lux	8.4 Preferred 'lights-off' curfews		
						Night Usage	Evening	Astronomical
E0	Dark Sky Core	20.5+	✓	✓	✓			✓
E1(a)	Intrinsic Rural Darkness and buffer	20 to 20.5	✓	✓	✓		✓	
E1(b)	Transition	~15 to 20	✓	✓	✓*	✓		
E3/E4	Urban	< 15	✓	✓		✓		

TABLE 1- ZONAL LIGHTING POLICIES

* Subject to design. See section 8.3

"E1 (a) 2km Buffer Zone and (b) Transition Zone – areas that lie between the larger urban settlements and the surrounding darker skies notably vulnerable to light pollution. These areas are generally in the buffer zones and rural transition areas. Generally this will be where the sky quality changes from poor to the edge of an intrinsic dark sky zone typically with SQM* values of 10 Lux." – p.56 SDLP, 2 July 2019.

*A Sky Quality Meter measures the brightness of the night sky in magnitudes per square arcsecond.

4.2 Requirements for Lighting Assessments in Dark Sky Zones

chapter 7 of the South Downs National Park – Dark Skies Technical Note states that minor light fittings on buildings do not usually require planning permission.

The proposal seeks permission for low-energy recessed LED pedestrian and security lighting to the perimeter of the retaining wall, forming the hard-standing, and down lights to the front of the garage building over the separate garage bay doors. Therefore this assessment is to demonstrate that the proposals do not result in any adverse impact with regards to light spill or obtrusive light.

Strategic Policy SD8 of the Pre-Submission South Downs Local Plan sets out the criteria for lighting assessments. The purpose of Policy SD8 is to ensure that development does not harm the quality of dark night skies. It also encourages enhancement of the dark night skies of the National Park, for the benefit of people and wildlife. The policy seeks to do this by ensuring that proposed lighting is necessary, and by reducing the unnecessary light spill that is often a result of poor design, in order to minimise the overall impact of light.

The ILP Environmental Zone classification determines the obtrusive light limitations for exterior lighting installations for each particular zone. The key objectives being to:

- Limit values for vertical illuminance on windows of neighbouring dwellings;
- Limit values for light source intensity in a potentially obtrusive direction such as towards a house or garden;
- Limit values on the luminance of floodlit buildings;
- Limit values on upward light ratio from the installation, in order to reduce upward light that causes sky glow, making it difficult to see the stars.

From Table 3 (p.8 - ILP/GN01/20) it can be seen that the concept of a curfew is introduced, where lighting is switched off or reduced at set times. Guidance suggests typical curfew times between 23:00hrs and dawn to save energy when lighting is not actually needed. However, for the more sensitive environmental zones, the curfew time for the control of obtrusive light is defined as the point of astronomical darkness. The time of astronomical darkness varies throughout the year, but marks the point at which dark skies are defined. In intrinsic skies a value of 20 to 20.5 Lux is often used as a threshold for the evening curfew. During the summer months where astronomical darkness is not achieved, then 9pm is typically used as the curfew time.

5. Assessment Methodology

Baseline Conditions

The site and existing buildings are currently used as a residential dwelling, with existing high-level general area halide floodlighting that are fixed around the main house as well as to the existing out-building to the south-east of the site at the driveway entrance and hard-standing area.

With the proposed new garage building a comprehensive external lighting scheme is required to for a new low-energy fitting that points downwards to the pedestrian areas and is designed to standards and reduce the impact on the dark skies.

6. The Proposed Lighting Scheme

6.1 Performance Criteria

Development proposals located in the E1 (a) Environmental Zone are required to meet the specific ILP Guidance Criteria set out in the Strategic Policy SD8 of the South Downs Local Plan. These are defined as follows:

- Upward light ratio (fraction of light going directly to the sky) = 0%
- Maximum source (luminaire) intensity when viewed from a neighbouring house or garden = 2,500 cd pre-curfew and 0.0 cd post-curfew
- Average luminance of a building façade = <0.1 cd/m²

6.2 Scheme Description

The proposals are to remove the existing high-level general area halide floodlighting fixed to the driveway entrance and parking hard-standing area and to replace these with downward direction low-energy LED lighting for pedestrian areas to the perimeter of the hard-standing area as well as above the separate garage bay doors.



Photo 1 – Proposed surface fixed wall style fitting with 2W 3000K warm white light in marine grade stainless steel finish – to be installed into the masonry retaining walls around the hard-standing parking area for safe pedestrian access and security.



Photo 2 – Proposed recessed LED soffit downlights with 4000k warm white light in marine grade stainless steel finish – to be installed into the timber soffit 1 no. over each separate garage bay door for safe pedestrian access and security.

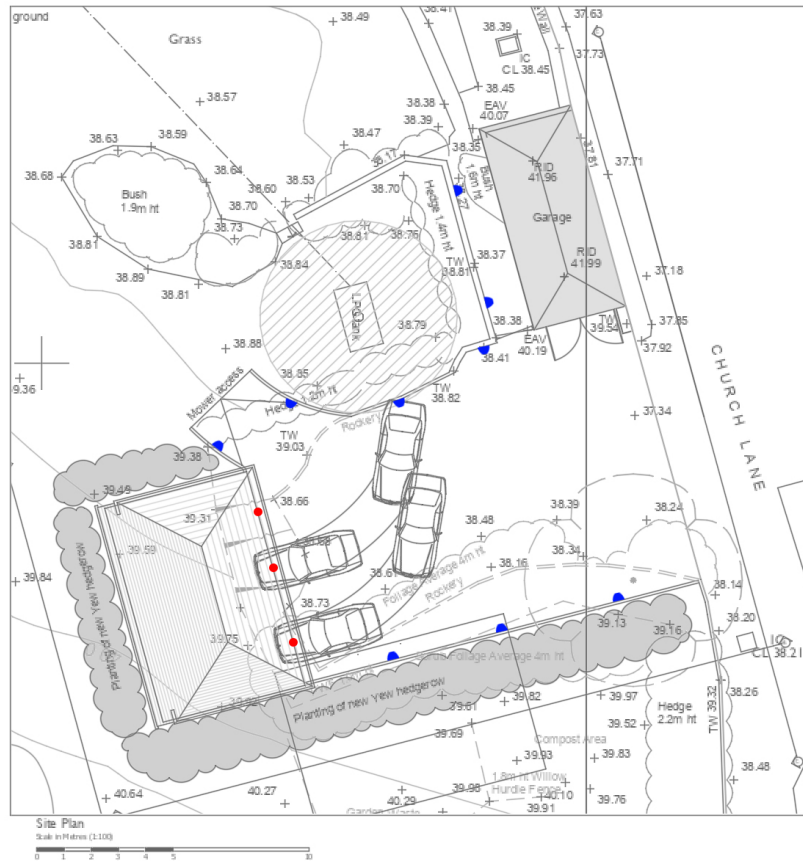


Figure 3 – Proposed new build timber-framed garage plan showing the location of recessed wall down lights and recessed soffit down lights.

Acknowledging the fact that the site is located within an Environmental Zone E1 (a) – Intrinsic Rural Darkness and buffer, the primary objective of the proposed replacement lighting is therefore to reduce and minimise the light pollution and obtrusive light.

The guiding design principles are therefore to satisfy the performance criteria set out in 5.1 above.

6.3 Lighting Control

The control of the lighting will be on timers to ensure that the illuminance levels meet with the post-curfew values of <math><0.1\text{lx}</math>. It is determined that proximity sensors are not recommended due to the sporadic triggering of the lights continually which may create a strobe effect that could be more harmful to the dark skies than if left on until the appropriate curfew time.

6.4 Lamp Type

LED lighting offers benefits over the existing halide light fittings in controlling pollution as follows:

- No warm up time – instantly on.
- Can turn on and off without needing additional warm up time, which allows for smart lighting uses.
- Down light LED's reduce the need for additional shielding.
- Reduced daytime impact due to smaller fixtures

The proposed lighting fittings will be 2W & 9W LED provide an effective design and installation producing the most efficient and cost effective design.

6.5 Lamp Colour and Temperature

It is recommended that all lights are 4000° Kelvin CCT (correlated colour temperature) in a warm white finish to avoid high penetrative lighting effects.

6.6 Fitting Type

The fittings chosen are recessed LEDs with no upward dispersion of the light flow, no photo-biological risk, fully programmable in terms of luminous flux emissions and midnight inclusions. The proposed light fitting is asymmetric so that the light output is solely directed downwards on to the specific areas required for safe pedestrian access.

6.7 Upward Light Ratio

The criterion seeks to limit the fraction of light going directly to the sky as 0%. Typically this is achieved through the exclusive use of full-cut off luminaires used in the external lighting scheme, thus achieving the 0% ratio.

6.8 Maximum source (luminaire) intensity

This criterion seeks to limit the intensity of light from any given luminaire when viewed from a neighbouring house or garden. The threshold for pre-curfew is 2,500cd* (candela) and post-curfew is 0.0cd.

*1cd (candela) = 12.566lm (lumen) = 0.01lx (lux). Therefore 2,500cd = 31,415lm (pre-curfew)

- Surface mounted wall down light = has a lumen (lm) source of 82lm (or 6.56cd) per fitting. 9no. wall surface mounted down lights = 732lm or 59.1cd
- Recessed soffit down light = has a lumen (lm) source of 510lm (or 40.8cd) per fitting. 3no. soffit recessed down lights = 1530lm or 122.4cd
- Total intensity of light from proposed driveway and garaging lighting scheme = 181.5cd (pre-curfew).

Therefore the above fittings all fall within the limit of light intensity from any given luminaire and therefore this requirement will be met and the impact will be negligible.

7. Conclusions

This assessment has been carried out in line with the best practice methodologies set out within industry guidelines and the Strategic Policy SD8 of the South Downs Local Plan.

Given that the proposed development seeks for new LED low-energy downward facing floodlighting the focus has been on the light spill from the external lighting scheme only. This has been tested against the requirements for development in Zone E1 (a) and analysis demonstrates that the proposal seeks to better the existing external lighting and light spill situation.

The potential for light spill from the external lighting proposal to contribute to sky glow has been identified. It is however, understood that the proposals will provide much less impact than some of the existing flood lights on the main house and elsewhere in the village. The proposed external lighting will incorporate a timer to switch the external lighting off at curfew potentially switching over to movement sensors directed towards the immediate area only, which would mitigate any impacts from this source. Therefore, the overall impact of the proposed development on its neighbours, ecology and visual amenity of the South Downs National Park is considered to be negligible, and provide less impact compared to other examples of external lighting.