Appendix 4.3
Lighting Assessment

Great Wilsey Park, Haverhill

Prevention of Lighting Impacts on Bats

VC-101955-LI-RP-0001

August 2015

Contents

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1 Glossary

Illuminance – total luminous flux incident on a surface, per unit area. It is a measure of how much the incident light illuminates the surface.

Lux – unit of measurement of illuminance. 1 lux is roughly equivalent to the brightest overhead full moon on a clear night, while 0.1 lux is typical of a half-moon.

LED – Light Emitting Diode. A solid state light source which is gaining widespread use in all forms of lighting due to its efficiency, compactness and good colour rendering properties.

Light spill – light falling where it is not wanted.

2 Introduction

2.1 Vanguardia have been asked to advise on the provision and design of external lighting for the proposed development at Great Wilsey Park, Haverhill, Suffolk, with a view to preventing any adverse impacts on bats.

2.2 Bat surveys have identified a number of locations on the existing site where bats are active. The intention is to ensure that the development does not adversely impact on bat activity, but accommodates existing bat routes and indeed enhances the opportunities for bats where possible.

2.3 Artificial lighting that spills onto a route used by bats can deter them. This report shows how this will be prevented whilst allowing the appropriate artificial lighting for the amenity and safety of residents and users of the Development.

2.4 All roads on the Development will need to be illuminated. There will be some locations where bat routes cross lit roads. At those points bat hop overs will be provided to assist bats to cross the road undeterred. This report sets out a typical design for such a bat hop over.

2.5 For this report it has been assumed that all hedgerows will be reasonably dense and no less than two metres in height when first planted.

2.6 In analysing lighting impacts, lighting for roads and footpaths/cyclepaths and internal light spilling from windows have all been taken into account. However, vehicle lights, which are transient, have been excluded. Suffolk County Council was consulted regarding adoptable highway lighting and the analysis is based on their requirements.

2.7 This report is based on the Illustrative Masterplan shown on drawing no. 5055-L-111 dated April 2015. Although the constructed layout may be different, the same principles will apply and therefore the analysis and proposals in this report remain relevant and applicable.

3 Suffolk County Council lighting requirements

3.1 Suffolk County Council's requirements for lighting on adoptable roads and footpaths/cyclepaths are as follows:

- Lighting unit: Philips-Indal Stela B Long with 14 LED light source. These units have a particularly sharp optical cut-off, thus containing light spill very well. They emit all of their light downwards; there is no light above the horizontal plane.
- Mounting height: 6 metres.
- Hours of use: Dusk to midnight, then switched off at midnight until 5 a.m.
- Lighting levels: 5 lux, and in sensitive areas 3 lux or 2 lux. Specific local amenity and environmental requirements will be considered at detailed design stage when selecting the lighting level for each street and footpath/cyclepath.
- Control: Telensa county-wide remote management system – remote setting of light level (dimming) and switching times, down to individual streets and lighting units. Enables any identified light pollution problem to be mitigated in the future.

3.2 These requirements are intended to bring maximum whole life value for money for the Council, with the added benefit of minimised energy use – and associated CO_2 emissions – and environmental impact. It is the environmental impact benefits of Suffolk's requirements that are of interest for this Development in relation to preventing adverse effects on bats. Midnight switch-off is actually of minimal benefit since bats tend to become active shortly after sunset. However, the low illuminance requirements, the possibility of dimming even further when and where necessary, and the excellent optical cut-off characteristic of the preferred lighting unit, all combine to make it much easier to create a lighting solution that has no impact on bats.

4 Areas requiring illumination

4.1 For the purposes of this analysis, it has been assumed that all roads and accesses will be adoptable. This is a worst case assumption. Should any roads or accesses be non-adoptable they will be lit with low powered illuminated bollards powered from private residential properties, giving sufficient illumination for way finding – this will result in much less light spill in those locations.

4.2 It has also been assumed that some footpaths/cyclepaths associated with amenities such as schools will need to be lit, as shown in figure 1.

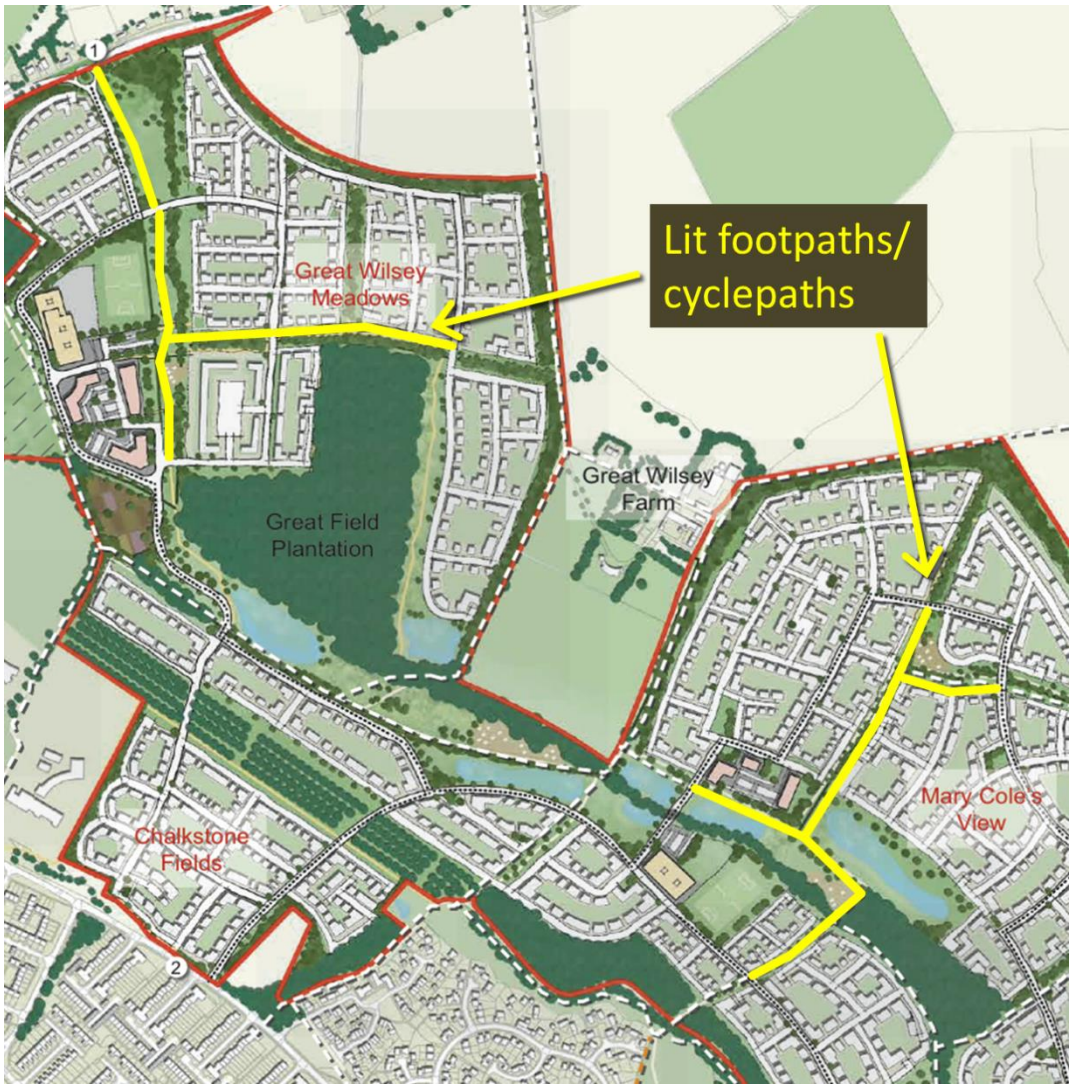

Figure 1: Illuminated footpaths/cyclepaths.

5 Artificial lighting limits in relation to bats

5.1 It is widely agreed that impacts on bats can be prevented by reducing light spill below 1 lux along routes used by bats. This criterion governs the design where bat routes run close to lit development. Details of how this will be achieved for this Development are given in sections 6 and 7 of this report.

5.2 However, where bat routes cross a lit road in a built-up area it is not possible to achieve this without affecting safety and amenity for road users and pedestrians. In these instances the solution is to provide a bat hop over to encourage bats to raise their flying height above the level of nearby lighting units and thus continue to fly in a dark space. Details of a typical bat hop over are given in section 8 of this report.

5.3 When considering lighting impacts it is important to recognise that bats tend to fly close to hedgerows and along woodland edges. This means that the spaces of sensitivity are situated immediately either side of a hedgerow and immediately outside woodland edges.

5.4 It is worth noting that for a perimeter hedgerow, the side of the hedgerow facing away from the Development will face undeveloped land and will be completely screened from all artificial lighting on the developed side. This will guarantee a naturally dark space for bats, regardless of whether or not a dark space can be created on the Development side of the hedgerow.

6 Street lighting for roads and footpaths/cyclepaths adjacent to sensitive ecological areas

6.1 Figure 2a shows the street lighting arrangement for roads and lit footpaths/cyclepaths that run parallel and close to bat routes. This situation typically occurs at the site perimeter where new hedgerows will be planted or existing ones reinforced, such as parcels A2, A3 and A10. It also applies to any situation where roads or lit footpaths/cyclepaths run close to existing woodland.

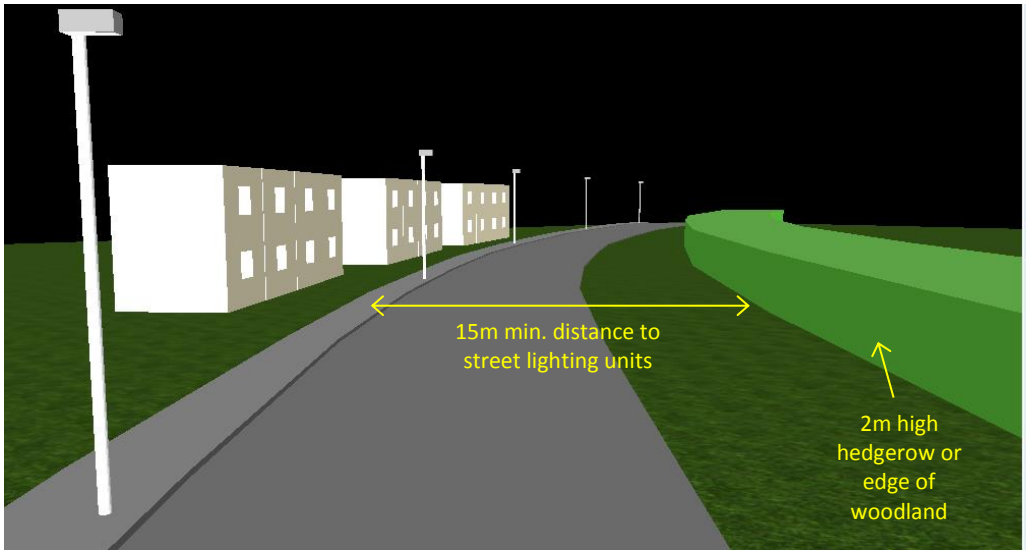

Figure 2a: Street lighting arrangement near bat routes

6.2 Figure 2b shows the lighting result, which also takes into account light spilling from every property window (curtains/blinds open), a worst case scenario.

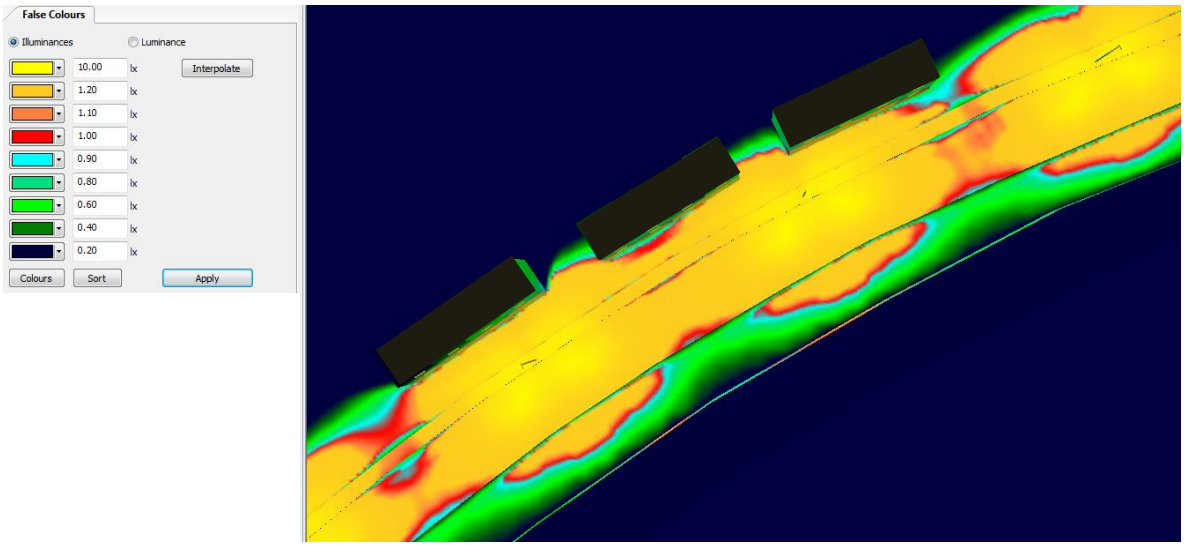

Figure 2b: Light spill from street lighting and properties near bat routes. This is a screen shot from a 3D model, showing light spill in false colour. The scale is shown on the left, red representing 1 lux and blue/green below 1 lux.

6.3 Figure 2b shows that light spill from street lighting to the Suffolk CC specification is very tightly contained. It means that the same benefits will be achieved wherever there are ecological sensitivities, including locations where roads and lit footpaths/cyclepaths are adjacent to water bodies.

6.4 There is an ecological corridor running NE to SW between parcels A12 and A13 on the Illustrative Masterplan. This corridor follows the route of a stream and will contain an unlit footpath/cyclepath. The principles outlined above and in section 7 will prevent light spill from roads and properties in A12 and A13 from causing adverse impacts on this corridor. Nevertheless, it will be even more beneficial if two hedgerows can be planted here, one either side of the space to be kept dark. This will create an ideal dark environment for bats using this route.

7 Property lighting close to sensitive hedgerows and woodland

7.1 Figure 3a shows the arrangement for properties that back onto bat routes. This situation typically occurs at the site perimeter where new hedgerows will be planted or existing ones reinforced, such as at parcels A11 and A13 on the Illustrative Masterplan. It also applies to any situation where properties back onto existing woodland.

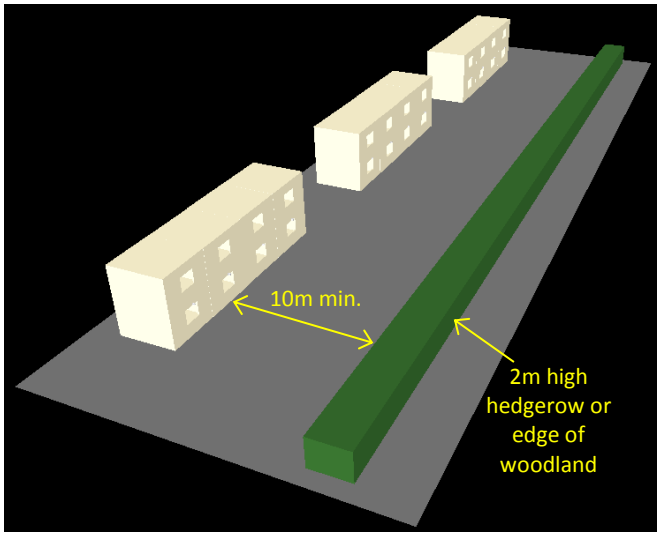

Figure 3a: Properties backing onto bat routes

7.2 Figure 3b shows the light spill from property lighting, assuming the worst case scenario of all rooms lit and all curtains/blinds open. In addition, security lighting has been included at the back of the properties. This is of the low wattage LED type that illuminates sufficient of the immediate surround of the property for safety and security. It should be noted that this must be provided at construction in order to forestall a future homeowner from installing an ill-chosen floodlight that might have an adverse impact on bats.

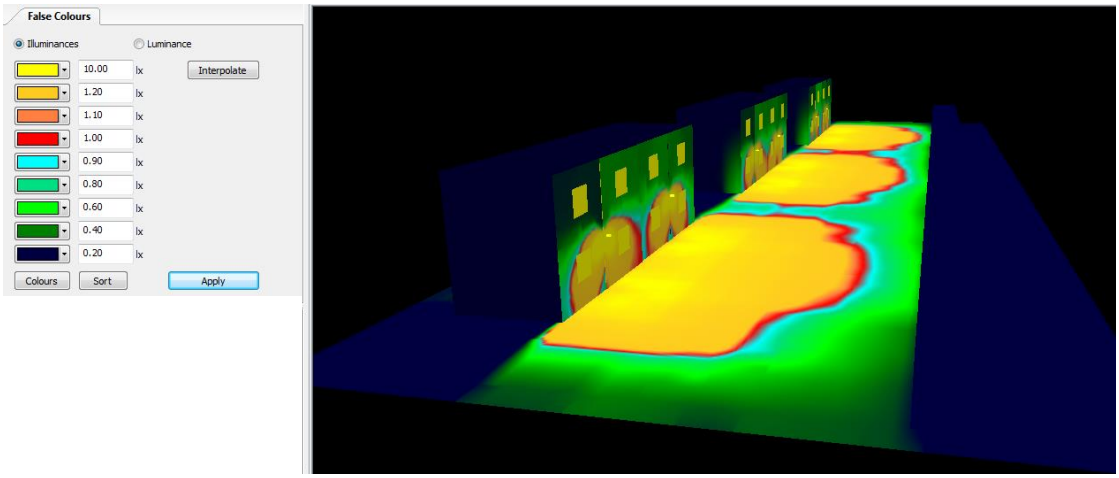

Figure 3b: Light spill from properties backing onto bat routes. This is a screen shot from a 3D model, showing light spill in false colour. The scale is shown on the left, red representing 1 lux and blue/green below 1 lux.

7.3 Figure 3b shows that light spill from properties will not affect bat routes provided the back of the property is no closer than 10 metres to the hedgerow/woodland.

8 Bat hop overs at lit crossing points

8.1 Figure 4 shows a typical bat hop over arrangement where an ecological corridor crosses a road or lit footpath/cyclepath. The principle can be readily adapted for a woodland situation – the hop over need only be provided at the exposed edge(s) of the woodland, since that is where bats are most likely to be flying.

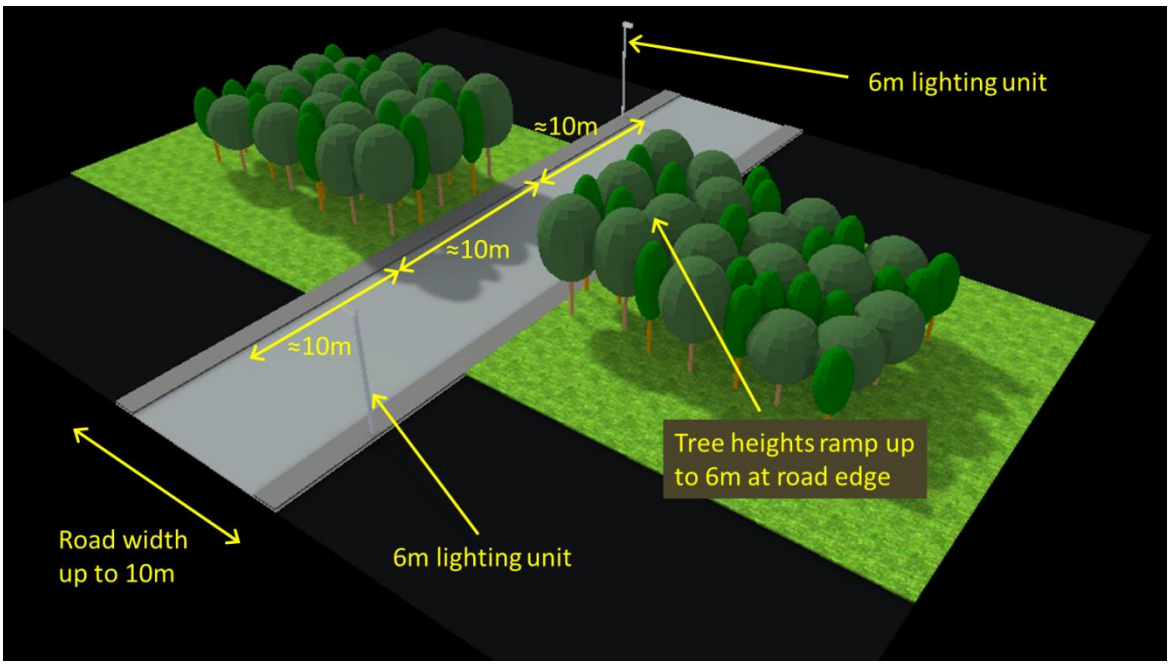

Figure 4: Typical bat hop over arrangement

9 Summary and conclusions

9.1 Suffolk County Council's street lighting requirements facilitate the avoidance of adverse impacts on bats and the environment generally.

9.2 Light spill from development close to hedgerows and woodland can readily be kept below the level where there might be adverse impacts on bats. This can be done simply through appropriate design, as outlined in this report. This includes providing low pollution security lighting where properties back onto a sensitive hedgerow or woodland, in order to forestall the future misguided installation of inappropriate floodlighting by a homeowner.

9.3 Where a bat route crosses a road or lit footpath/cyclepath a bat hop over will be needed. This will elevate their flying height above the level of the lighting and enable them to cross in darkness.

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