

Cambridge South East Transport (CSET) Scheme

Construction Lighting

Rev	Date	Prepared by	Reviewed by	Approved by	Remarks
1	24/12/2020	Samuel Okello	G Hayat	G Hayat	
2	16/303/2021	Samuel Okello	G Hayat	G Hayat	Amended following MM comments
3	13/05/2021	Samuel Okello	G Hayat	G Hayat	Minor changes and amendments by MM for Skanska approval
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1.0. Introduction

This Lighting report has been developed to cover the construction phase of the CSET scheme. The assessment has been undertaken based on the scheme design details and programme. A Lighting Impact Assessment of the operational scheme and a high-level review of potential construction lighting has been completed, including site surveys, a desk-based review of policy, guidance, published landscape character assessments and is included in the Environmental Statement.

This report provides information of intended lighting during construction of the CSET scheme, locations of compound areas, susceptible receptors, and possible mitigation measures to reduce potential light spill, glare, and sky glow throughout the construction phase of the CSET scheme.

1.1. Aims and objectives

- Provide guidance for construction lighting that reduces the amount of excessive light outside of the construction areas
- Provide a list of lighting types to be used and the approximate locations.
- Outline the mitigation measures that must be implemented and managed.

1.2. Site description.

The scheme is in rural Cambridgeshire, it lies south east of Cambridge and runs for approximately 8.5kms between the A1307/A11/A505 junction and CBC, skirting the eastern edges of Sawston, Stapleford and Great Shelford. It entails building a new segregated and guided public transport route, with public transport priority measures between the A11 and A1307 junction and Cambridge Biomedical Campus (CBC). To avoid general traffic congestion a new Travel Hub with car parking services will be constructed to facilitate interchange with the High-Quality Public Transport (HQPT) and high-quality non-motorised user facilities.

1.3. Environment Zones

The classification of Environmental Zones enables an appropriate lighting limit for areas to be determined. The identification of ambient night-time Environmental Zones is crucial to the process of lighting assessment. The CSET scheme route runs through areas classed as an E2 zones; these surrounding areas are predominantly rural with low light pollution.

Table 1: Environment Zones

Zone	Surrounding	Lighting environment	Example
E0	Protected	Dark	UNESCO Starlight Reserves, International Dark Skies Award Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, AONBs.
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations
E3	Sub urban	Medium district brightness	Small town centres or suburban locations

E4	Urban	High district brightness	Town/city centres with high levels of night-time activity
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2.0. Lighting Guidelines/Legislative framework.

The Management of Health and Safety at Work Regulations 1999 (MHSW) requires employers to have arrangements in place to cover health and safety. This includes lighting which needs to be suitable and adequate to meet the requirements of the workplace (Health, Safety and Welfare) regulations 1992.

For all construction activities where mobile or fixed lighting¹ is required for the project, the contractor shall ensure at all times that the control of the lighting is in accordance with relevant legislation, policy and best practice guidance as set out in Section 7: References.

The operation of any temporary lighting along the scheme route shall be restricted to works that cannot be completed within standard traffic management. These activities will be conducted during night shifts under the process for approving night works set out in the CoCP and CEMP documents. They will take into consideration the management and mitigation of obtrusive artificial light, and the Contractor shall institute a means of regular inspection to ensure this requirement is met.

3.0. Susceptible Receptors and Proposed compound sites

Views of construction of the CSET route and Travel hub will be likely possible from residential areas on the edge of Cambridge, Great Shelford, Stapleford, Sawston, Babraham and properties on or near Hinton Way and Haverhill Road. However, majority of these views will be largely filtered through intervening vegetation.

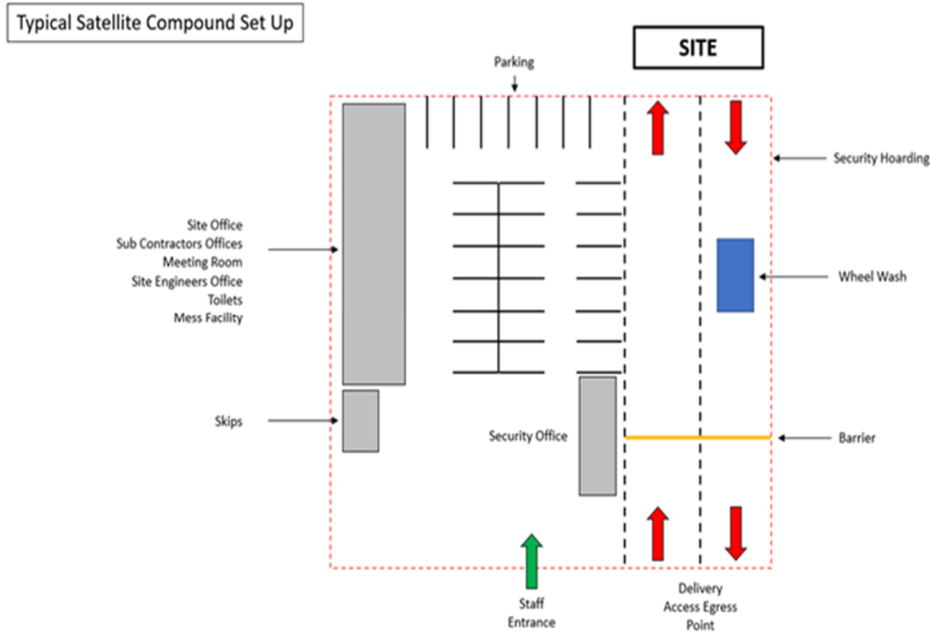
The landscape between Addenbrooke's Road and Babraham is open and there is likely to be long views of the CSET Scheme across the open farmland from Magog Down, Hinton Way, the PRoW network, the A1307, High Street Babraham and Sawston Road. PRoW network views will be possible from the areas around Magog Down (Little Tree Hill), Nine Wells and the biomedical campus at Addenbrooke's Hospital.

Woodland belts at Nine Wells near Hinton Way, Wandlebury and the rolling landform south-east of Sawston garden vegetation will potentially screen most views of the Scheme from residential properties in the area.

The impacts of the compounds (shown in figures below) have been assessed in the Lighting Impact Assessment reported in the main ES for the Scheme.

¹ Compound utility connections such as electrical feeder posts may be utilized to serve site compound lighting. Where practicable mobile lighting towers will be solar power or use generators.

Figure 1: Site Compound Lay out



3.1. Proposed Site Compound Locations

Figure 2: Compound 1

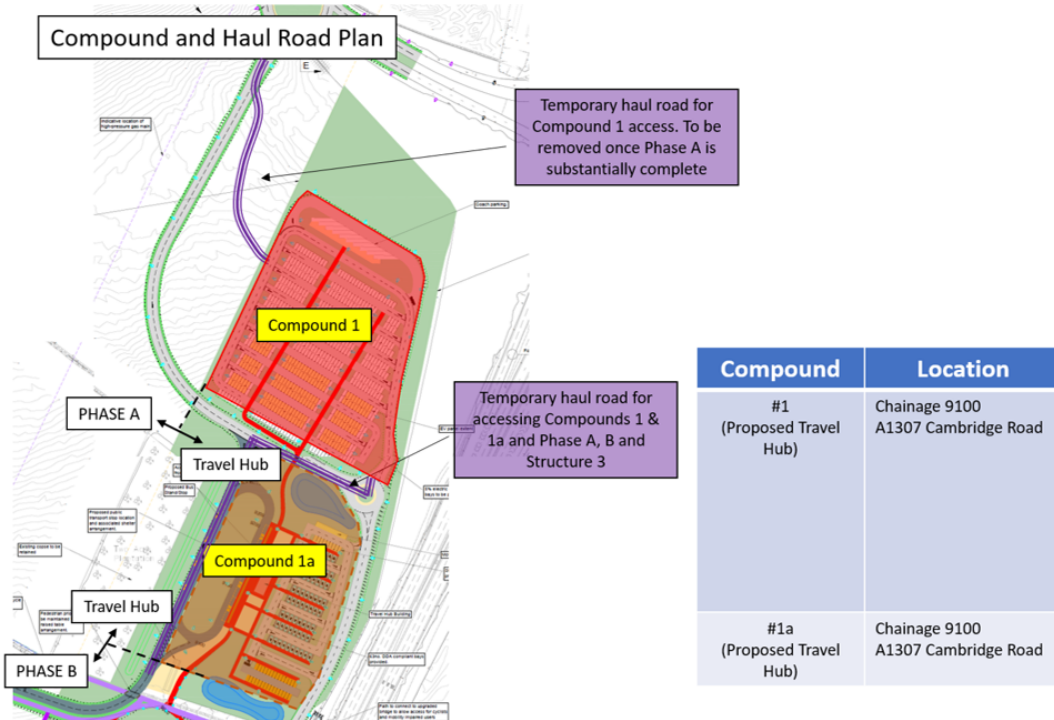


Figure 3: Compound 2

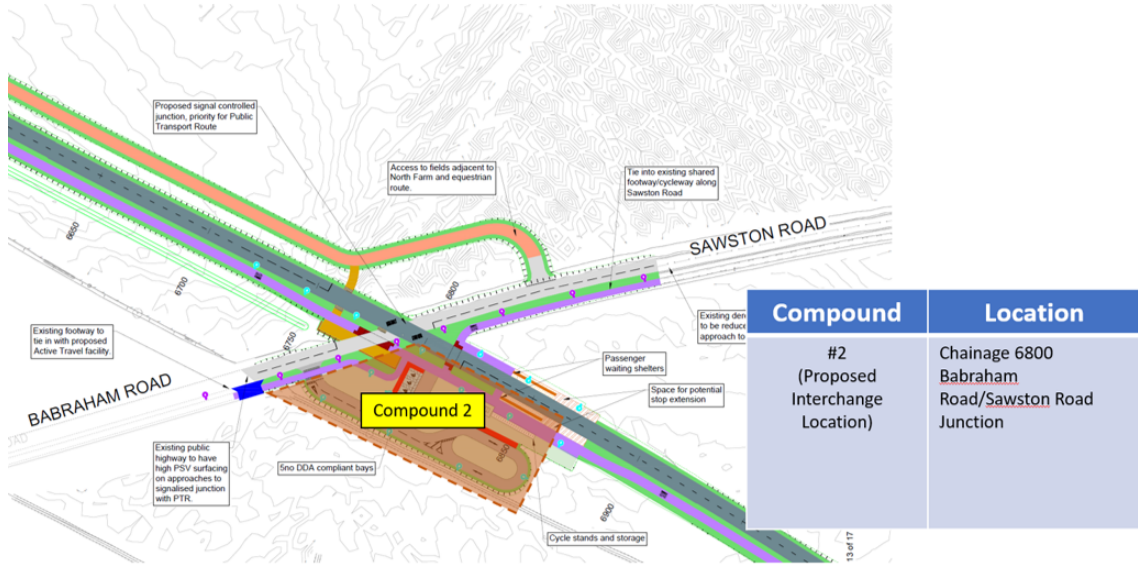


Figure 4: Compound 3
Not used

Figure 5: Compound 4

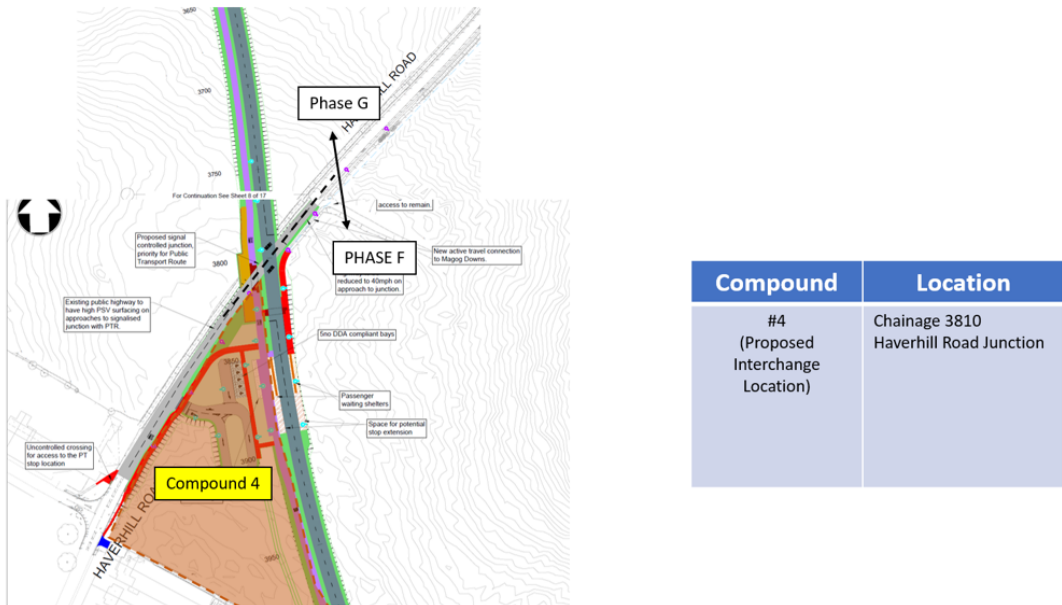
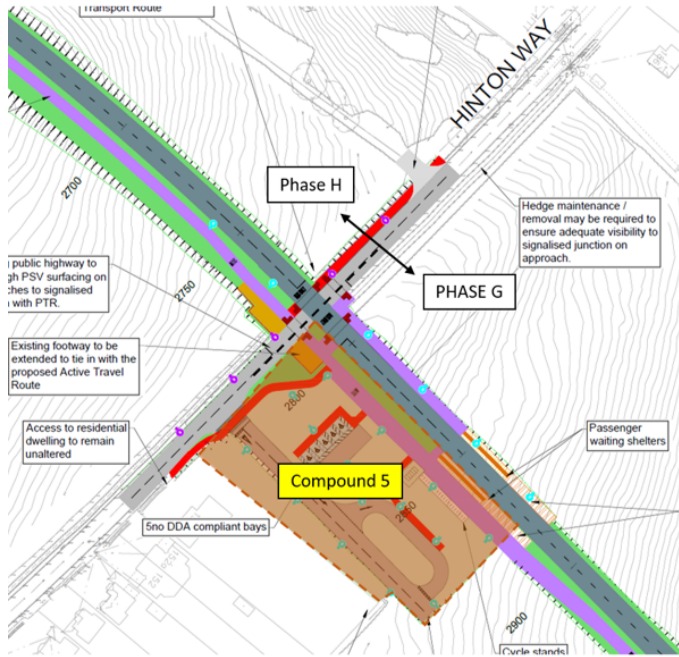
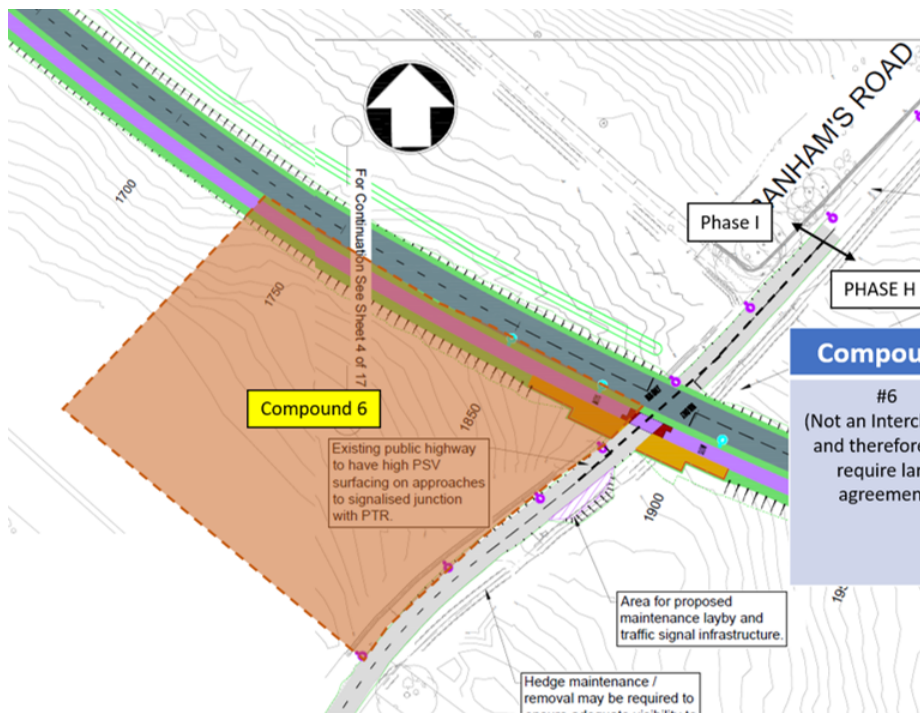


Figure 6: Compound 5



Compound	Location
#5 (Proposed Interchange Location)	Chainage 2790 Hinton Way Junction

Figure 7: Compound 6



Compound	Location
#6 (Not an Interchange and therefore will require land agreement)	Chainage 1900 Granham's Road Junction

Figure 9: Illustration of Security Lighting Option.
BGP627 DM10 Lamp LED-HB 4S/740



4.1.2. Vehicle access points.

Lighting at vehicle access points and wheel wash stations will be required to be capable of illuminating vehicles at a point outside the vehicle barriers. The typical lighting levels will be between 50 - 150lux in directional floodlight LED luminaires.

4.1.3. Plant and machine Inspection points.

The plant or machine inspection areas will be provided with lighting between 100 and 150lux considering light reflection from hardstanding's or road surface, colour rendition and the use of mirrors for under vehicle inspections. Except for perimeter lighting, which is required for security and safety purposes, lighting for plant inspections will be switched off when not required.

4.2. Construction route and plant lighting.

Where practicable the construction lighting will be designed to comply with guidance for reducing obtrusive light in Environmental Zone E2 areas. Even though the construction works will be temporary in nature, lighting will be required for.

- Lighting the immediate work areas along the route scheme.
- Lighting to enable safe movement of operatives and visitors around the site.
- Illumination for construction of specific structures.
- Lighting for refuelling and materials or plant loading areas.

The general lighting for the main construction areas will be between 50lux - 100lux. This will be achieved with a maximum luminaire mounting height of 6m, directed at the ground with 0° tilt. LED lighting will be used as it allows the human eye to work more efficiently and is energy efficient.

For ease of deployment and use most of the construction lighting will be mobile and focused on providing the widest coverage of light from the fewest units possible.

For earthworks, an average of 50lux will be required within the construction zone for any working in the dark.

Figure 10: Illustration of lighting for Mobile and short duration works zones.

LBS 110M

Prolectric Pro Light 7.5m LED Solar Lighting Tower



The construction plant parking areas² will be lit to comply with the current BS 5489-1:2020 (Design of road lighting. Lighting of roads and public amenity areas. Code of practice) and HSG 38 (Lighting at Work) at an average of 5lux with a 0.25% overall uniformity. Units will be mounted at a height of 6m to minimise impacts on nearby receptors. The Photocell sensors on the lights will switch on during hours of darkness depending on the season.

² Each construction section is expected to have its own compound and plant parking/ car park area as illustrated in the diagrams above. These will only be lit during hours of darkness depending on the season.

Figure 11: Illustration of lighting for site compound parking areas

LUMA BGP627 T25 1 XLED320-4S/740 DM12 BGP620



5.0. Potential Effects

The principal lighting impacts which are often associated with construction sites and would be relevant at this location are light spill and glare towards surrounding residential receptor areas. This will mainly arise because of glare from temporary floodlighting particularly during the winter months, temporary security lighting, lights at height associated with construction of the travel hub and bridge structure on river Granta, lights in the site compound and car parking areas.

6.0. Mitigations measures

The key opportunities to mitigate lighting impacts will be by implementing best practices during construction. These will include:

- Specified working hours uses of lighting, location of temporary floodlights and construction compound to be agreed with the Local Authority.
- Lighting to be switched off when not required specifically for construction activities, security or health and safety.
- The programme of works will consider the location of sensitive receptors, particularly around the River Granta area.
- Lighting should be directed so it does not intrude outside of the immediate working area.
- Sufficient lighting units used to avoid the need for tall, wide beam lighting units to illuminate large areas.
- Plant and vehicle lights should be properly directed, and lenses must be intact to prevent unnecessary glare and breakout of obtrusive light.
- The use of infrared floodlighting and CCTV systems should be considered for security.
- All lighting related to the works will be designed and fitted to minimise light intrusion onto any sensitive habitat such as hedgerows, mature trees, and woodland.
- Safe access for pedestrians on the PRow could be needed during site preparation. This may require fencing and temporary lighting until the permanent lighting can be installed.

7.0. References

The proposed lighting will be designed in accordance with but not limited to the following European and British standards and guidance documents.

- BS 5489-1:2020, Code of practice for the design of road lighting Part 1: Lighting of roads and public amenity areas (2020)
- BS EN 13201-2:2015, Road lighting – Part 2: Performance requirements (2015)
- BS EN 12464-1:2011, Light and Lighting – Lighting of workplaces Part 1: Indoor workplaces (2011)
- BS EN 12464-2:2014, Light and Lighting – Lighting of workplaces Part 2: Outdoor workplaces (2014)
- BS 8300-1:2018, Design of an accessible and inclusive built environment – Part 1: External environment – Code of practice (2018)
- CIE 150:2017 Commission Internationale de L’Eclairage, Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations, 2nd Edition (2017)
- CIE 115:2010 Commission Internationale de L’Eclairage, Lighting of Roads for Motor and Pedestrian Traffic, 2nd Edition (2010)
- Institution of Lighting Professionals (ILP) Guidance Notes for the Reduction of Obtrusive Light, GN01 (2020)
- ILP – Professional Lighting Guide 02: The application of conflict areas on the highway, PLG02 (2013)
- ILP – Professional Lighting Guide 03: Lighting for Subsidiary Roads, PLG03 (2012)
- ILP – Technical Report 12: Lighting of Pedestrian Crossings, TR12 (2007)
- ILP – Professional Lighting Guide 05, The Brightness of Illuminated Advertisements PLG05 (2014)
- ILP – Professional Lighting Guide 04, Guidance on Undertaking Environmental Lighting Impact Assessments PLG04 (2013)
- ILP and Bat Conservation Trust Guidance Note 08/18 Bats and Artificial Lighting in the UK, Bats and the Built Environment series (2018)
- Bats and Lighting – Overview of Current Evidence and Mitigation. Stone, Emma (2014)
- Chartered Institution of Building Service Engineers (CIBSE), LG06 Lighting Guide 6: The exterior environment (2016)
- The Society of Light and Lighting (SLL) Code for Lighting (2012)
- CCC Street Lighting Development Specification Revision 3 (2016)
- Design Brief – CCC – Cambridge South East – Public Transport Project (2020)
- BREEAM UK New Construction – Non-domestic buildings – England (2018)
- All-Party Parliamentary Group for Dark Skies (APPG) Ten Dark Sky policies for the government (2020)