

Appendix C5

Lighting Assessment

P e l l F r i s c h m a n n

Barnham Eastergate Westergate, Strategic
Site

Lighting Assessment

This report is to be regarded as confidential to our Client and is intended for their use only and may not be assigned except in accordance with the contract. Consequently, and in accordance with current practice, any liability to any third party in respect of the whole or any part of its contents is hereby expressly excluded, except to the extent that the report has been assigned in accordance with the contract. Before the report or any part of it is reproduced or referred to in any document, circular or statement and before its contents or the contents of any part of it are disclosed orally to any third party, our written approval as to the form and context of such a publication or disclosure must be obtained.

Report Ref.		Bew Lighting Assessment Report 28062021				
File Path		\\LON-FILE-01\Engineering\133--\A13394-VAA Barnham Eastergate Westergate\30 Technical\39 Lighting\BEW Lighting Assessment Report 28062021.docx				
Rev	Suit	Description	Date	Originator	Checker	Approver
D1		Draft for Client Review	26.08.2021	GL	TM	PS
D2		Updated after Client Review	10.11.2021	GL	TM	PS
D3		Client update	14.01.2022	GL	TM	PS
Ref. reference. Rev revision. Suit suitability.						

Prepared for

BEW Consortium
CC Projects, Ashmarden Ltd and
Hanbury (PM) Ltd

Prepared by**Pell Frischmann**

5th Floor, 85 Strand
London Wc2R 0DW

Pell Frischmann

Contents

Executive summary

1	Introduction	3
1.1	Context.....	3
1.2	The Site.....	3
2	Impact of Artificial Lighting	5
2.1	Potential Effects from Artificial Light	5
2.2	National Policy and Legislation	7
2.3	Guidance for Implementation.....	8
3	Receptor and Baseline Assessment.....	9
3.1	Methodology	9
3.2	Site Classification and Significance Criteria	9
3.3	Site Specific Sensitivities	12
3.4	Site Limitations.....	12
3.5	Consultations	12
3.6	Assessment Methodology.....	12
4	Development Proposals.....	14
4.1	Proposed Solution	14
5	Lighting Assessment.....	16
5.1	Anticipated Impacts	16
5.2	Construction.....	16
5.3	Operation	16
5.4	Ecology	19
6	Summary.....	20

Figures

Figure 1.1: Strategic site location plan	4
Figure 1.2: Obtrusive light diagram	8

Tables

Table 1 Obtrusive light criteria relating to each Environmental Zone	6
Table 2 Classification of Environmental Zones	6
Table 3 Criteria for Receptor Sensitivity	10
Table 4 Criteria for Magnitude of Change	10
Table 5 Sensitivity of Receptor Matrix	11
Table 6 Significance Criteria.....	11
Table 7 Key Lighting Receptor Viewpoints.....	13
Table 8 Proposed lighting details	15
Table 9 Assessment Table	16

Appendices

Appendix A Street Lighting Layout Drawings

1 Introduction

1.1 Context

Pell Frischmann has been commissioned by CC Projects, Ashmarden Ltd and Hanbury (PM) Ltd (promoting the site together as 'The Southern Consortium') to provide transport planning and highways consultancy services in connection with emerging masterplan proposals for a strategic residential-led mixed use development on land forming part of the site allocation at Barnham/ Eastergate/ Westergate, (BEW), West Sussex. The application site comprises land south of Barnham Road and north of the railway as well as the route of the A29 realignment including the early connection referred to as the Hanbury Link (the 'Site'). The development is referred to as BEW Parcel SC1

1. The Development Site is allocated in the Arun Local Plan 2011-2031 under policy H SP2c, as strategic allocation SD5 Barnham/Eastergate/Westergate.

This report has been prepared as part of an outline planning submission (with all matters reserved except for the A29 realignment) for the demolition of existing structures and mixed use development to provide residential dwellings (Use Class C3), care home/senior living accommodation (Use Classes C2/C3), flexible retail and community floorspace (Use Classes E/F2/sui generis), a primary school, plus associated open space, landscaping, drainage and all other associated ancillary works; and realignment of the A29 and early connection to existing A29, including construction of a new road carriageway, junctions and associated infrastructure.

Along with the local centre, which will produce only internal trips. The rest of the allocation's elements will be delivered either by application submitted by another applicant, or by a later planning application for the southern part of the allocation.

This document is provided in regard to the submission of a detailed planning application on behalf of BEW Southern Consortium for the realignment of the southern section of the A29 on land south of Barnham Road, shown in **Figure 1.1**.

In support of the planning application Pell Frischmann have been appointed to undertake a lighting assessment regarding the impact of artificial highway lighting associated with the realignment of the A29.

1.2 The Site

The Site is located within arable fields, woodland, orchard and areas of managed grassland, joining the Barham Road in Eastergate and the A29 south of the Lidsey Bends on Lidsey Road. The city of Chichester is located approximately 8.5km to the west and the towns of Bognor Regis and Worthing are located 6km to the south and 10km to the south-east respectively.

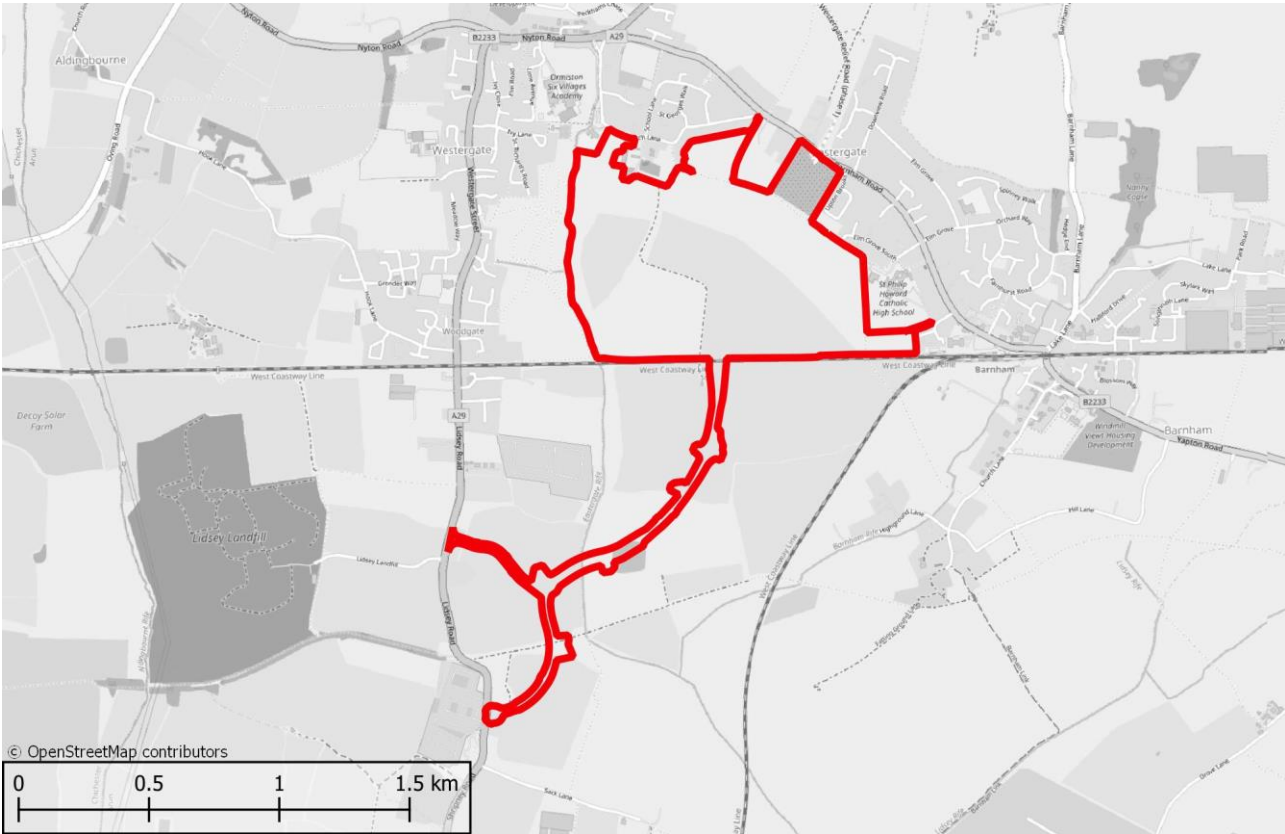
The area surrounding the Site contains a mixture of rural and suburban areas consisting of residential and commercial buildings which are surrounded by agricultural land.

To the West and south of the Site, the existing A29 of Westergate and Lidsey Road are unlit; areas to the south including the B2233 Barnham Road along with adjacent residential roads are within street lit areas.

Public Rights of Way (PRoW) Footpath (Number 200_1) following the course the old Chichester Arundal Canal crosses the Site.

- Chapter 2 – covers Impact of Artificial Lighting
- Chapter 3 – Receptors and Baseline Assessment
- Chapter 4 – Development Proposals, outlines the development proposals.
- Chapter 5 – Lighting Assessment
- Chapter 6 – summarises and concludes the report.

Figure 1.1: Strategic site location plan



2 Impact of Artificial Lighting

2.1 Potential Effects from Artificial Light

There are a limited number of potential effects from artificial lighting, and these are as follows:

- **Effect on residents from light intrusion through windows.**
This is the result of light spilling beyond the boundary or area being lit. The ILP Guidance Notes places a limit on vertical illuminance which falls upon the centre of a dwelling window. The suggested values quoted are in relation to the measured baseline without the obtrusive light source.
- **Effects from viewed source intensity.**
Table 1 below sets out the advised limits of luminaire intensity or viewed source intensity to an observer. Generally, these instances occur due to the poor siting or aiming of floodlights or security lights and or lighting positioned too close to adjacent properties.
- **Effects from upward light.**
Light emitted above the horizontal directly from a luminaire or indirectly as reflected light has the potential to cause sky glow. Guidance on the limits of the percentage of direct upward light from a luminaire in their installed attitude and applied environmental zone can be found in the ILP 'Guidance Notes for the Reduction of Obtrusive Light' and **Table 1** below.
Indirect upward light is dependent on the reflective properties and textural finish of associated surfaces, this is not an assessment criterion in the ILP guidance notes.
- **Effects from disability glare on transport users.**
Disability glare reduces the contrast between objects and their background so that their visibility is decreased. The proposed lighting strategy includes requirements for lighting to be installed such that glare is minimised in accordance with the ILP guidance notes.
- **Effects from light spill on ecology.**
Light spill has the potential to affect both flora (plants etc) and fauna (from insects through to reptiles, wild and domestic animals). Light spill can disrupt feeding patterns and force ecological receptors to leave their habitat. The lighting strategy will seek to mitigate light spill where there are potential ecological receptors that could be adversely affected. This will be sought through guidance provided by the ILP for the reduction of obtrusive light.
- **Effects from high energy consumption.**
Lighting installations have the potential to consume high quantities of energy and they should be carefully designed by a competent lighting professional. Where lighting is proposed to replace existing lighting, the proposed lighting should aim to improve upon the energy and optical performance of the existing equipment. This can be achieved in a variety of ways, but good practice would be to implement an LED based lighting solution, with a suitable lighting control system that is applicable to the application.

Environmental Zones	Sky Glow ULR (Max %)	Light Trespass (into Windows) E_v (lux)		Source Intensity I (k_{cd})		Building Luminance Average, Pre-curfew
		Pre- Curfew	Post- Curfew	Pre- Curfew	Post- Curfew	Average L (cd/m^2)
E0	0	0	0	0	0	0
E1	0	2	0 (1*)	2.5	0	0
E2	2.5	5	1	7.5	0.5	5
E3	5	10	2	10	1.0	10
E4	15	25	5	25	2.5	25

Notes to Table:

- **ULR (Upward Light Ratio)** is the maximum permitted percentage of luminaire flux that goes directly into the sky;
- **E_v** is Vertical Illuminance in Lux;
- **I** is Light Intensity in Candelas;
- **L** is Luminance in Candelas per square metre; and
- **Curfew** refers to a time when the local planning authority has agreed that the lighting installation should be switched off; this typically refers to 23h00 – 07h00.
- (*) Permitted only from Public road lighting installations.

Table 1 Obtrusive light criteria relating to each Environmental Zone

Table 2 Classification of Environmental Zones

Zone	Surrounding	Lighting Environment	Examples
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

2.2 National Policy and Legislation

2.2.1 [Environmental Protection Act 1990 / Clean Neighbourhoods and Environment Act 2005](#)

Since 2005, artificial light was incorporated as a potential statutory nuisance. An amendment to section 79 of the Environmental Protection Act 1990, contained within the Clean Neighbourhoods and Environment Act 2005 states:

“Artificial light emitted from premises so as to be prejudicial to health and nuisance constitutes a ‘Statutory Nuisance’ and it shall be the duty of every local authority to cause its area to be inspected from time to time to detect any statutory nuisances which ought to be dealt with under section 80 and, where a complaint of a statutory nuisance is made to it by a person living within its area, to take such steps as are reasonably practicable to investigate the complaint”.

2.2.2 [National Planning Policy Framework: 2021 DCLG](#)

The National Planning Policy Framework (NPPF) sets out the governments planning policies for England and how they are expected to be applied and provides a framework for local plans. Under the broad heading of “Achieving Sustainable Development”, Chapter 11 “Conserving and enhancing the natural environment” deals with obtrusive light in clause 125 which states”

“By encouraging good design, planning policies and decisions should limit the impact from artificial light on local amenity, intrinsically dark landscapes and nature conservation.”

In the glossary, “Pollution” is defined as

“...anything that affects the quality of land, air water or soils which might lead to an adverse impact on human health, the natural environment or general amenity. Pollution can arise from a range of emissions including...light”

2.2.3 Local Policies

The Arun Local Plan covers the period 2011-2031 for the area of Arun District (excluding the area covered by the South Downs National Park Authority) and was adopted on the 18th of July 2018.

Emphasis is made withing the local plan of light pollution on the local and wider environment and the requirements to mitigate any negative impact through careful design in line with current national guidelines and standards.

Relevant Arun District Council policies are:

Policy QE DM2 - Light pollution

Planning permission for proposals which involve outdoor lighting must be accompanied by a lighting scheme prepared according to the latest national design guidance and relevant British Standards publications. Outdoor lighting schemes will be considered against the following criteria:

- a. No adverse impact on neighbouring uses or the wider landscape, particularly within the South Downs International Dark Sky Reserve designation.
- b. Light levels being the minimum required for security and working purposes.
- c. Minimising the potential glare and spillage; and
- d. The degree to which outdoor lighting can be powered by on-site renewable sources.

Where appropriate, the Local Planning Authority will seek to control the times of illumination.

Policy GI SP1 - Green Infrastructure and development

The Green Infrastructure Policy identifies a District wide network of green spaces and Green Infrastructure Corridors valued for their tranquillity. Tranquil spaces play a multifunctional role as part of the Green Infrastructure network. Light pollution intrudes upon intrinsically dark landscapes and nature conservation and can have an impact upon the tranquillity of a place. The Green Infrastructure policy has identified the importance of tranquil spaces which will be protected from light pollution to ensure that areas defined by their tranquillity are protected from the negative effects of light in development.

Policy LAN DM1- Protection of landscape character

Development within the setting of the South Downs National Park must have special regard to the conservation of that setting, including views into and out of the Park, and will not be permitted where there would be harmful effects on these considerations.

The Barnham and Eastergate Neighbourhood Plan 2014-2029 provides a further planning policy with regards to lighting. Policy HDQ9: Comprehensive attention to detailing from the start of the design process states that lighting must be considered at an early stage and goes on to provide a requirement for “Lighting schemes that prevent light spillage and glare and face inwards away from open landscapes.

2.3 Guidance for Implementation

Guidance Note 01/20 for the Reduction of Obtrusive Light; 2020 Institution of Lighting Professionals (ILP)

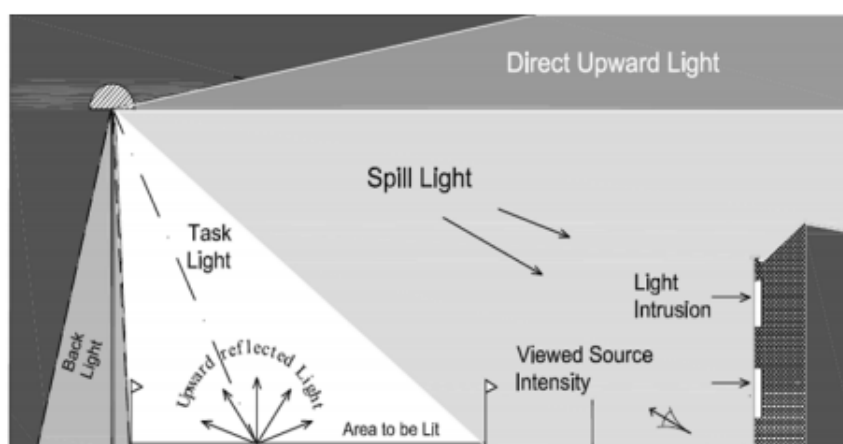
This guidance note has been revised to reflect the changes in international guidance regarding obtrusive light as detailed in CIE 150:2017 Guide on the limitation of the effects of obtrusive light from outdoor lighting installations.¹ It also considers industry comment regarding the assessment and definition of obtrusive lighting.

Guidance notes produced by the Institution of Lighting Professionals are among the most referenced guidance notes for good practice within the lighting design industry.

Obtrusive light (or sometimes referred to as light pollution) refers to any light emitted in a direction in which it is not required or wanted and as such is detrimental to other users. The assessment has been carried out in accordance with the published guidance documents from the ILP. This includes the intrusion of light into bedroom windows. Sky glow refers to the brightening of the sky above towns cause by direct or reflected upward light.

Glare refers to the uncomfortable brightness of a light source when viewed against a dark background. Figure 1 illustrates the different types of obtrusive light.

Figure 1.2: Obtrusive light diagram



3 Receptor and Baseline Assessment

3.1 Methodology

The methodology employed for this assessment was appropriate to the location of the application site. It included a desk-top survey to assess the baseline conditions, due to COVID restrictions site visits were not conducted prior to the production of this report. In addition, the potential effects of the proposed lighting were evaluated using appropriate assessment criteria.

The methodology takes guidance from the Institution of Lighting Professionals PLG 04 document “Guidance on Undertaking Environmental Lighting Impact Assessments”. This sets out good practice which was followed during the assessment.

The desk-top study involved research into relevant local and national legislation, policy and guidance relating to obtrusive light, studying ordnance survey maps, plans and aerial photography views to identify likely receptor locations.

3.2 Site Classification and Significance Criteria

The criteria used to provide a baseline for the impact of lighting on the surrounding environment are drawn from GN01, based on the derived Environmental Zone. The five potential zones are provided in **Table 1** with clarification of each zone detailed in **Table 2**.

The significance of an effect from artificial lighting will be based upon the sensitivity of the receptor and the magnitude of change at that receptor due to the revised conditions.

The sensitivity of the receptor has been classified as High, Medium, or Low according to the descriptions provided in **Table 3**.

The magnitude of change is determined as being High, Medium, Low or Negligible and descriptions for each are provided in **Table 4**.

The significance criteria are derived from the combination of the relevant receptor sensitivity and the magnitude of change which that receptor will experience as an effect from the lighting of the application site. These significance criteria are shown in **Table 6** and they can be either beneficial or adverse effects.

Table 3 Criteria for Receptor Sensitivity

Sensitivity	Description of Criteria
High	The environment is fragile and an impact is likely to leave it in an altered state from which recovery would be difficult or impossible. Human (Amenity) – receptors which are sensitive to a change in lighting such that the quality of life would be affected (i.e. lighting is designated a statutory nuisance) Human (Safety) - receptors where a change in the lighting has the potential to either dramatically improve or reduce safety (for pedestrians, drivers or workers). Ecological – where a change in the lighting affects the habitats, breeding or feeding of fauna (e.g. protected habitats or other special areas) or growth patterns of fauna / crops.
Medium	The environment has a degree of adaptability and resilience and is likely to accommodate the changes caused by an impact, although there may still be some residual modification as a result. Human (Amenity) – receptors which are sensitive to a change in lighting however not such that the quality of life would be affected. Human (Safety) - receptors where a change in the lighting has the potential to either improve or reduce safety (for pedestrians, drivers or workers). Ecological – where a change in the lighting affects the movement or feeding patterns of fauna but the receptor can adapt.
Low	The environment is adaptable and is resilient to change. Nearly all impacts can be absorbed within it without modifying the baseline conditions. Human (Amenity) – receptors which would not noticeably be aware of a change in lighting. (i.e. in areas of medium to high luminance) Human (Safety) - receptors where a change in the lighting has limited potential to affect safety (for pedestrians, drivers or workers). Ecological – area with limited wildlife.
Negligible	Receptor has little or no night-time activity

Table 4 Criteria for Magnitude of Change

Magnitude of Change	Description of Criteria
High	A large change compared to the natural variations in background levels. A clear breach of limits and standards may occur. For example, levels of obtrusive light in the form of sky glow, light trespass or glare towards a receptor which exceeds the limits set within the ILP guidance for a higher environmental zone might classify as a high magnitude of change.
Medium	Change which is noticeable and may be a breach of limits and standards. In terms of the limits set in the ILP guidance this might equate to exceeding the limit but within the limits set for the next Environmental Zone.
Low	Change which, when compared to background levels, is only just noticeable.
Negligible	Change is not noticeable.

Table 5 Sensitivity of Receptor Matrix

Magnitude of Change	Sensitivity of Receptor				
		High	Medium	Low	Negligible
	High	Major	Major	Moderate	Negligible
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Table 6 Significance Criteria

Significance Criteria	Significance Criteria
Major beneficial	Substantial reduction in obtrusive light at sensitive receptors and/or users of the application site such that large scale improvements to visual amenity, human safety or health is delivered. Significantly improves ecological habitats
Moderate beneficial	Moderate reduction in obtrusive light at sensitive receptors and/or users of the application site such that noticeable improvements to visual amenity, human safety or health are delivered. Improves ecological habitats
Minor beneficial	Minor reduction in obtrusive light at sensitive receptors and/or users of the application site such that perceptible improvements to visual amenity, human safety or health is delivered; perceptible improvement to ecological habitats.
Neutral/Not significant	No appreciable effect on sensitive receptors. Effects are reversible.
Minor adverse	Minor increase in obtrusive light at sensitive receptors and / or users of the application site such as an increase in Glare, Light Trespass to properties, increase in Sky Glow or effects on flora and fauna. Effects are reversible or temporary.
Moderate adverse	Moderate increase in obtrusive light at sensitive receptors and / or users of the application site such as an increase in Glare, Light Trespass to properties, increase in Sky Glow or effects on flora and fauna. Requires monitoring and local remedial work. For example, lighting which is visible and causes nuisance to a sensitive receptor outside the application site.
Major adverse	Major increase in obtrusive light at sensitive receptors and / or users of the application site such as an increase in Glare, Light Trespass to properties, increase in Sky Glow or effects on flora and fauna. Requires extensive remedial works. For example a floodlighting installation which directs light into the eyes of oncoming motorists causing disability glare and potential reduction in visual performance leading to an increased risk of collision.

3.3 Site Specific Sensitivities

This report focuses on the southern section of the proposed A29 re alignment and its associated highway lighting, future new settlement and urban extensions are not included. The proposed route of the A29 link road from Barnham Road to Lidsey Road runs centrally within the allocation boundary and will be at its closest to existing properties at the northern and southern extents.

Site-specific sensitive locations which have the potential to be adversely affected by lighting, have been identified as part of a desk study of the Site. These are shown on Viewpoint /Receptor Location Plans and Table 7. Key Lighting Receptor Viewpoints.

3.4 Site Limitations

The limitations imposed on exterior lighting for Environmental Zone E2 are as follows (from GN01). Further guidance on limitations and how these are calculated are provided in CIE 150:2017.

Where a curfew is included, this refers to the time after which stricter requirements for the control of obtrusive light will apply, as stipulated by the local planning authority. If not otherwise stated, 23:00 to 05:00 hours are suggested.

3.4.1 Ecology

An Environmental Statement has been produced by Ecology Solutions Ltd in which the baseline conditions, potential effects, mitigation, and residual effects are described in detail.

The statement includes the potential effects and impact of artificial lighting on flora and fauna and results of surveys to record the presence of roosting and foraging bats. Within the application site all trees and buildings were assessed for the potential to support roosting bats, only one building was identified as having the potential but no roosting bats were recorded. Activity surveys of the application site recorded limited registrations of foraging bats, there were of a number of species but most frequently Common Pipistrelle and Soprano Pipistrelle bats. The highest recorded activities were along the site boundaries, the reservoir and most frequently at the Lidsey Rife stream.

3.5 Consultations

Comments received as part of the Northern Section Consultation with Arun District Council Environmental Health Officers (EHO) have been employed and the items of note are reflected below:

The baseline methodology to be used in the absence of on-site assessments and lighting measurements.

- Locations of viewpoint locations which will be used as the basis for the assessment.
- The lighting proposals will be reviewed against the requirements of ILP GN01 (2020).
- Environmental zone classification E2.

3.6 Assessment Methodology

The methodology employed for this assessment was appropriate to the location of the application site. It included a desk-top survey to establish the baseline conditions, due to COVID restriction on site surveys were not conducted.

The methodology takes guidance from the Institution of Lighting Professionals PLG 04 document “Guidance on Undertaking Environmental Lighting Impact Assessments”. This sets out good practice which was followed during the assessment.

The desk-top study involved research into relevant local and national legislation, policy and guidance relating to obtrusive light, it also involved the study of ordnance survey maps, plans and aerial photography views to identify receptor locations.

Research undertaken during the desk-top study was used to clearly define the assessment locations, baseline conditions were also assessed in these locations, along with the extent of any receptor viewpoints in the direction of existing artificial lighting and potential artificial lighting, associated with the application site.

Table 7 Key Lighting Receptor Viewpoints

Survey viewpoint location number	Drawing reference number	Description of location	Receptor(s)
1	A13394-PF-ZZ-XX-DR-CD-00602	Residential property Fox House, Lidsey Road	Residents
2	A13394-PF-ZZ-XX-DR-CD-00602	Residential/Commercial property Headholme Cottage & Kennels, Lidsey Road	Residents
3	A13394-PF-ZZ-XX-DR-CD-00602	Residential properties 1-7 Headhone Barns, Lidsey Road	Residents
4	A13394-PF-ZZ-XX-DR-CD-00602	Residential properties 1-3 Headhone Farm Cottages, Lidsey Road	Residents
5	A13394-PF-ZZ-XX-DR-CD-00602	Residential property Headhone Farm, Lidsey Road	Residents
6	A13394-PF-ZZ-XX-DR-CD-00602	Residential property Southwell Cottage, Lidsey Road	Residents
7	A13394-PF-ZZ-XX-DR-CD-00602	Residential property Peartree Cottage, Lidsey Road	Residents
8	A13394-PF-ZZ-XX-DR-CD-00602	Residential property The Old Bridge House, Lidsey Road	Residents
9	A13394-PF-ZZ-XX-DR-CD-00602	Residential property The Old Cottage, Lidsey Road	Residents
10	A13394-PF-ZZ-XX-DR-CD-00602	Residential/Commercial property Lidsey Farm, Lidsey Road	Residents
11	A13394-PF-ZZ-XX-DR-CD-00602	Residential properties Lidsey Caravan Park, New England Barn, Tithe Barn, The Granary, Lidsey Barns, The Stables, The Cooperage & The Coach House, Lidsey Road	Residents
12	A13394-PF-ZZ-XX-DR-CD-00602	Residential property Mapsons, Lidsey Road	Residents
13	A13394-PF-ZZ-XX-DR-CD-00602	Residential property Pond Cottage, Lidsey Road	Residents
14	A13394-PF-ZZ-XX-DR-CD-00602	Residential property The Grange, Sack Lane	Residents
15	A13394-PF-ZZ-XX-DR-CD-00601	Residential property Willows Caravan Park, off Lidsey Road	Residents
16	A13394-PF-ZZ-XX-DR-CD-00601	Commercial Property Woodgate Centre, off Woodgate Road	Workforce

4 Development Proposals

4.1 Proposed Solution

Lighting to be designed in accordance with the Lighting of Developer Promoted Highway Schemes in West Sussex (West Sussex County Council, 2019), as well as other industry and site-specific documents dealing with lighting. Pertinent standards and guidance include:

- BS 5489-1:2020 Code of practice for the design of road lighting – Part 1: Lighting of roads and public amenity areas (BSI, 2012)
- BS EN 13201 (all parts) Road lighting (BSI, 2014-2015)
- BS EN 12464-2:2014 Light and lighting – Lighting of workplaces – Part 2: Outdoor workplaces (BSI, 2014)
- Institution of Lighting Professionals Professional Lighting Guide PLG 02, The application of conflict areas on the highway. (PLG 02) (ILP, 2013)

4.1.1 Likely Construction

Task lighting may be required during construction particularly during winter months when the agreed site working hours contain periods of low natural lighting levels below that deemed safe for the tasks in hand.

Minimum lighting recommendations for the health and safety of employees can be found in the Health and Safety Executive document HSG38 Lighting at Work.

Specifically, construction-related lighting would:

- Be required to provide the correct levels of lighting to ensure the safety of workers and general users of the site.
- Be designed such that, where practicable, all luminaires are installed internal to the site (such as on the inside of hoarding) and are directed towards the working area.
- Be operational only during construction works, except where lighting is required for out-of-hours security or safety reasons.
- Adhere to industry best practice, including guidance from industry bodies (such as the Construction Industry Research and Information Association, CIRIA). CIRIA guidance, for example, notes that lighting on construction sites is typically required for security and safety, while at the same time being required to minimise impact on the surrounding environment in accordance with current best practice.
- Be mindful of temporary impact on sensitive flora and fauna and limit the intensity and duration of lighting to the minimum required.

4.1.2 Operational

A street lighting design has been prepared by Pell Frischmann on behalf of the CC Projects, Ashmarden Ltd and Hanbury (PM) Ltd (BEW Southern Consortium) to form part of the planning application for a strategic residential-led development at land at Barnham/ Eastergate/ Westergate, (BEW), West Sussex (the 'Site').

In accordance with West Sussex County Council's requirements the proposed lighting scheme will deliver continuous lighting along this section of realigned A29 from the B2233 Barnham Road to the A29 Lidsey Road and include all roundabouts and associated footway/cycleways.

The principles of the design are summarised below.

- Design is in accordance with BS5489-1:2013.
- LED luminaires are as specified in 'Lighting of Developer-Promoted Highway Schemes in West Sussex' equipment for traffic routes.
- Luminaires to be post top mounted at zero degrees tilt from horizontal on 8m columns to minimise daytime visual impact.
- LED colour temperature to be 4000K Neutral White.
- Lighting control is via a Central Management System (CMS), lighting is operational from dusk until dawn but may be dimmed by 40% between midnight and 5.30am in accordance with 'Lighting of Developer-Promoted Highway Schemes in West Sussex'
- Illuminated signs will be installed as required.

Table 8 Proposed lighting details

Location	Applied Lighting Class	Target Lighting Levels	Column Height
Realigned A29	M4 – Traffic Route	• L-0.75 Cd/m² • Uniformity 0.4 • Lane Uniformity 0.6 • Threshold Increment 15% • Surround Lighting 0.3	8m
Footway/Cycleway (Lit via main carriageway lighting)	P4 – Subsidiary Road Lighting	• 5.0 lux Eav • 1.0 lux min	8m
Roundabouts	C3 – Conflict Area	• 15 lux Eav • Uniformity 0.4	8m
Roundabout approaches on A29 Lidsey Road. To be lit for 111m in accordance with ILP PLG02 Table 2, five second rule at 50mph.	M4 – Traffic Route	• L-0.75 Cd/m² • Uniformity 0.4 • Lane Uniformity 0.6 • Threshold Increment 15% Surround Lighting 0.3	8m

Notes

1. Eav is the average horizontal illuminance, Emin is the minimum horizontal illuminance
2. L is the average road surface luminance
3. Uniformity is the ratio between minimum and average values
4. Threshold increment is the maximum percentage of contrast increase needed to make an object visible as a consequence of disability glare.
5. Surround lighting is the ratio of lighting required for adjacent areas
6. Subsidiary road lighting classes are intended for pedestrian areas, footpaths and cycle tracks (BS 5489-1:2020, BSI 2020)

5 Lighting Assessment

5.1 Anticipated Impacts

The assessment of potential effects identifies site specific receptors and how they may be impacted by the lighting proposal. These are based on the planning submission with assumed baseline condition information, re-assessment is recommended on verification of baseline conditions and the development of a detailed lighting design.

5.2 Construction

Any residual effects from construction lighting can be mitigated by implementing the guidelines in the Health and Safety Executive document HSG38 Lighting at Work.

5.3 Operation

The lighting scheme is split into two distinctive areas, the construction of two new roundabouts on the line of the existing A29 Lidsey Road and the realignment of the A29 through open farmland providing access to development land.

The existing A29 is currently unlit at the sites of the proposed roundabouts, whose introduction will require full lighting to the roundabouts and their approaches. The baseline ambient lighting levels in these areas is low, the lighting scheme will have a significant effect on night-time lighting levels.

The lighting of the proposed A29 realignment through this rural location may have a localised negative impact but is significantly separated from the existing residential areas of Lidsey, Woodgate and Westergate which are served by public lighting. Future development may provide additional screening to the proposed lighting via the proposed primary green corridor running north/south between the existing villages and the proposed development.

Table 9 Assessment Table

Receptor viewpoint location number and description	Baseline Conditions	Predicted Impacts
1 View from residential property Fox House, Lidsey Road	The property has frontage to an unlit section of the A29 with views over open farmland to the rear. The A29 and adopted residential streets in Woodgate to the immediate north are served by public lighting. Floodlighting at the Lidsey Oil Field and adjacent Southern Water Treatment plant may be visible during operation, hours of operation unknown.	- Lighting proposals are within the ILP guidelines for obtrusive light. - The introduction of highway lighting on the approach to and the proposed roundabout will impact on the night-time scene. Potential moderate adverse effect due to proposed lighting of currently unlit carriageway.
2 View from residential/commercial property Headholme Cottage & Kennels, Lidsey Road	The property has frontage to an unlit section of the A29 with views over open farmland to the rear. The A29 and adopted residential streets in Woodgate to the immediate north are served by public lighting. Floodlighting at the Lidsey Oil Field and adjacent Southern Water Treatment plant may be visible during operation, hours of operation unknown.	- Lighting proposals are within the ILP guidelines for obtrusive light. - The introduction of highway lighting on the approach to and the proposed roundabout will impact on the night-time scene. Potential moderate adverse effect due to proposed lighting of currently unlit carriageway.
3	Single storey property adjacent to an unlit section of the A29 with views over open farmland.	Lighting proposals are within the ILP guidelines for obtrusive light.

View from Residential properties 1-7 Headhone Barns, Lidsey Road	The A29 and adopted residential streets in Woodgate to the immediate north are served by public lighting. Floodlighting at the Lidsey Oil Field and adjacent Southern Water Treatment plant may be visible during operation, hours of operation unknown.	2. The introduction of highway lighting on the approach to and the proposed roundabout will impact on the night-time scene. Potential moderate adverse effect due to proposed lighting of currently unlit carriageway.
4 View from Residential properties 1-3 Headhone Farm Cottages, Lidsey Road	These properties are adjacent to an unlit section of the A29. The A29 and adopted residential streets in Woodgate to the immediate north are served by public lighting. Floodlighting at the Lidsey Oil Field and adjacent Southern Water Treatment plant may be visible during operation, hours of operation unknown.	1. Lighting proposals are within the ILP guidelines for obtrusive light. 2. The introduction of highway lighting on the approach to and the proposed roundabout will impact on the night-time scene. Potential moderate adverse effect due to proposed lighting of currently unlit carriageway.
5 View from Residential property 1-3 Headhone Farm, Lidsey Road	The property is located behind the farm cottages and has open views to farmland at the rear. The A29 and adopted residential streets in Woodgate to the immediate north are served by public lighting. Floodlighting at the Lidsey Oil Field and adjacent Southern Water Treatment plant may be visible during operation, hours of operation unknown.	1. Lighting proposals are within the ILP guidelines for obtrusive light. 2. The introduction of highway lighting on the approach to and the proposed roundabout will impact on the night-time scene. Potential moderate adverse effect due to proposed lighting of currently unlit carriageway.
6 View from Residential property Southwell Cottage, Lidsey Road	The property has frontage to an unlit section of the A29 with views over open farmland to the front and rear. The A29 and adopted residential streets in Woodgate to the immediate north are served by public lighting. Floodlighting at the Lidsey Oil Field and adjacent Southern Water Treatment plant may be visible during operation, hours of operation unknown.	1. Lighting proposals are within the ILP guidelines for obtrusive light. 2. The introduction of highway lighting on the approach to and the proposed roundabout will impact on the night-time scene. Potential minor adverse effect due to proposed lighting of currently unlit carriageway.
7 View from Residential property Peartree Cottage, Lidsey Road	The property has frontage to an unlit section of the A29 with views over open farmland to the front and rear. The A29 and adopted residential streets in Woodgate to the immediate north are served by public lighting. Floodlighting at the Lidsey Oil Field and adjacent Southern Water Treatment plant may be visible during operation, hours of operation unknown.	1. Lighting proposals are within the ILP guidelines for obtrusive light. 2. The introduction of highway lighting on the approach to and the proposed roundabout will impact on the night-time scene. Potential minor adverse effect due to proposed lighting of currently unlit carriageway.
8 View from Residential property The Old Bridge House, Lidsey Road	The property is adjacent to an unlit section of the A29. The road is obscured by coniferous trees and deciduous shrubs. Lighting on caravan park may be visible especially during winter months. Floodlighting at the Lidsey Oil Field and adjacent Southern Water Treatment plant may be visible during operation, hours of operation unknown.	1. Lighting proposals are within the ILP guidelines for obtrusive light. 2. The introduction of highway lighting on the approach to and the proposed roundabout will impact on the night-time scene. Potential moderate adverse effect due to proposed lighting of currently unlit carriageway.
9 View from Residential property The Old Cottage, Lidsey Road	The property is set back from the unlit A29 behind a small embankment and deciduous trees. There is open farmland to the rear obscured by a large hedge and trees. Lighting on caravan park may be visible especially during winter months. Floodlighting at the Lidsey Oil Field and adjacent Southern Water Treatment plant may be visible during operation, hours of operation unknown.	1. Lighting proposals are within the ILP guidelines for obtrusive light. 2. The introduction of highway lighting on the approach to and the proposed roundabout will impact on the night-time scene. Potential minor adverse effect due to proposed lighting of currently unlit carriageway.
10 View from Residential/Commercial property Lidsey Farm, Lidsey Road	The property has frontage to an unlit section of the A29 with views obscured to open farmland at the rear by a large barn type building. Lighting on caravan park may be visible especially during winter months. Floodlighting at the Lidsey Oil Field and adjacent Southern Water Treatment plant may be visible during operation, hours of operation unknown.	1. Lighting proposals are within the ILP guidelines for obtrusive light. 2. The introduction of highway lighting on the approach to and the proposed roundabout will impact on the night-time scene. Potential moderate adverse effect due to proposed lighting of currently unlit carriageway.
11	The holiday caravan park is set back from the unlit A29, there are several lighting columns within the site.	1. Lighting proposals are within the ILP guidelines for obtrusive light.

View from Residential properties Lidsey Caravan Park, New England Barn, Tithe Barn, The Granary, Lidsey Barns, The Stables, The Cooperage & The Coach House, Lidsey Road	Lighting on caravan park may be visible especially during winter months. Floodlighting at the Lidsey Oil Field and adjacent Southern Water Treatment plant may be visible during operation, hours of operation unknown.	2. The introduction of highway lighting on the approach to and the proposed roundabout will impact on the night-time scene. Potential minor adverse effect due to proposed lighting of currently unlit carriageway.
12 View from Residential property Mapsons, Lidsey Road	The property is set back from the unlit A29 behind coniferous and deciduous trees. There is open farmland to the rear obscured by a large hedge and trees. Lighting on caravan park may be visible especially during winter months. Floodlighting at the Lidsey Oil Field and adjacent Southern Water Treatment plant may be visible during operation, hours of operation unknown.	1. Lighting proposals are within the ILP guidelines for obtrusive light. 2. The introduction of highway lighting on the approach to and the proposed roundabout will impact on the night-time scene. Potential minor adverse effect due to proposed lighting of currently unlit carriageway.
13 View from Residential property Pond Cottage, Lidsey Road	The property is adjacent to an unlit section of the A29. The view to the rear is obscured by a large hedge and trees. Lighting on caravan park may be visible especially during winter months. Floodlighting at the Lidsey Oil Field and adjacent Southern Water Treatment plant may be visible during operation, hours of operation unknown.	1. Lighting proposals are within the ILP guidelines for obtrusive light. 2. The introduction of highway lighting on the approach to and the proposed roundabout will impact on the night-time scene. Potential moderate adverse effect due to proposed lighting of currently unlit carriageway.
14 View from Residential property The Grange, Sack Lane	Obscured views over farmland to rear of property due to hedge and trees. Lighting on caravan park may be visible especially during winter months. Floodlighting at the Lidsey Oil Field and adjacent Southern Water Treatment plant may be visible during operation, hours of operation unknown.	1. Lighting proposals are within the ILP guidelines for obtrusive light. 2. The introduction of highway lighting on the approach to and the proposed roundabout will impact on the night-time scene. Potential minor adverse effect due to proposed lighting of currently unlit carriageway.
15 View from Residential property Willows Caravan Park, off Lidsey Road	Notional lighting on site, unobscured views to open farmland at rear. Floodlighting at the Lidsey Oil Field and adjacent Southern Water Treatment plant may be visible during operation, hours of operation unknown.	1. Lighting proposals are within the ILP guidelines for obtrusive light. 2. The introduction of highway lighting on the approach to and the proposed roundabout will impact on the night-time scene. Potential moderate adverse effect due to proposed lighting of currently unlit carriageway.
16 View from Commercial Property Woodgate Centre, off Woodgate Road	Floodlighting at the Lidsey Oil Field and adjacent Southern Water Treatment plant may be visible during operation, hours of operation unknown.	1. Lighting proposals are within the ILP guidelines for obtrusive light. 2. The introduction of highway lighting on the approach to and the proposed roundabout will impact on the night-time scene. Potential moderate adverse effect due to proposed lighting of currently unlit carriageway.

The Proposed Scheme is subject to further design development and possible mitigation measures, the levels of effect should be reassessed once these measures have been incorporated within the Proposed Scheme.

5.4 Ecology

The proposed lighting equipment consists of LED luminaires with a sharp cut off and zero light emitted above horizontal, a lower column mounting height throughout the scheme has been utilised to reduce the light footprint.

Identified potential fauna receptors such as foraging bats were detected as part of the Environmental Assessment with the highest detection rate being along the Lidsey Rife stream. In the Barnham Eastergate & Westergate Framework Masterplan the stream is to be retained within the primary green corridor. The identified bats were Common Pipistrelle and Soprano Pipistrelle bats which are less light sensitive than other species.

Lighting operation on traffic routes may be dimmed by 40% between midnight and 5.30am in accordance with 'Lighting of Developer-Promoted Highway Schemes in West Sussex', this would further reduce any negative impact of the artificial lighting.

6 Summary

This document is provided to identify and assess the impact of artificial lighting in regard to the submission of an outline planning application on behalf of BEW Southern Consortium for the realignment of the southern section of the A29 on land south of Barnham Road to support a residential development.

The area is situated to the east of Woodgate and Westergate and to the south of Eastergate and is generally rural in nature. The main traffic routes through these towns being the A29 and the B2233 are lit as are the adopted residential streets. The area can be described as an area of low district brightness which is indicative of an E2 Environmental Zone.

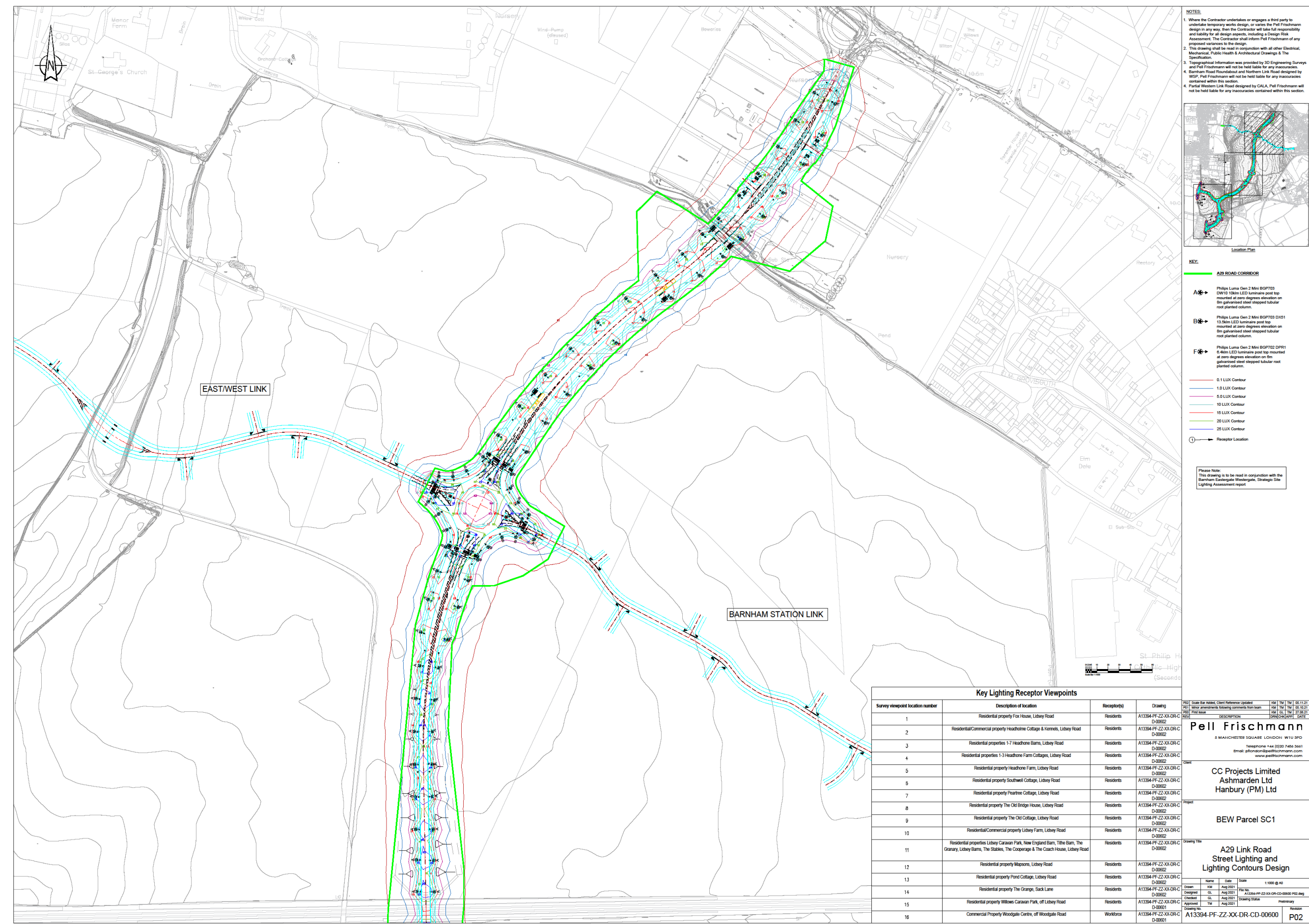
The proposed lighting will be continuous throughout the length of the scheme and will include lighting for the conflict areas at the roundabouts and the currently unlit sections of the A29 which will form the approaches to the two new roundabouts. The footway/cycleways will be illuminated by the main carriageway lighting which will reduce the number of columns thus reducing both daytime and night-time visual appearance.

When considered in isolation the proposed realignment of the A29 and its associated lighting could potentially have a marked impact to the night-time scene due to its alignment through the site. With the accompanying development identified in the masterplan both daytime and night-time visual impact will be reduced for the identified receptors.

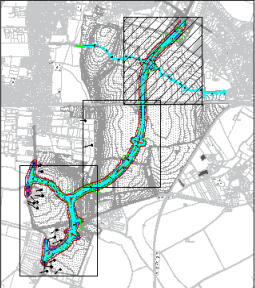
Overall, it is anticipated that there will be **minor adverse effect** from the proposals but there are specific locations where **moderate adverse effects** may be evident. These are to residential properties located on the at present unlit A29 where some level of light intrusion may be perceived.

Lighting operation on traffic routes may be dimmed by 40% between midnight and 5.30am in accordance with 'Lighting of Developer-Promoted Highway Schemes in West Sussex', this would further reduce any negative impact of the artificial lighting

Appendix A Street Lighting Layout Drawings



- NOTES:
- Where the Contractor undertakes or engages a third party to undertake temporary works design, or varies the Pell Frischmann design in any way, then the Contractor will take full responsibility and liability for all design aspects, including a Design Risk Assessment. The Contractor shall inform Pell Frischmann of any proposed variances to the design.
 - This drawing shall be read in conjunction with all other Electrical, Mechanical, Public Health & Architectural Drawings & The Specification.
 - Topographical Information was provided by 3D Engineering Surveys and Pell Frischmann will not be held liable for any inaccuracies.
 - Barnham Road Roundabout and Northern Link Road designed by WSP, Pell Frischmann will not be held liable for any inaccuracies contained within this section.
 - Partial Western Link Road designed by CALA, Pell Frischmann will not be held liable for any inaccuracies contained within this section.



- KEY:
- A29 ROAD CORRIDOR**
- A** → Philips Lumina Gen 2 Mini BGP703 DW10 10km LED luminaire post top mounted at zero degrees elevation on 8m galvanneal steel stepped tubular root planted column.
- B** → Philips Lumina Gen 2 Mini BGP703 DX51 13.5km LED luminaire post top mounted at zero degrees elevation on 8m galvanneal steel stepped tubular root planted column.
- F** → Philips Lumina Gen 2 Mini BGP703 DPR1 6.4km LED luminaire post top mounted at zero degrees elevation on 8m galvanneal steel stepped tubular root planted column.
- 0.1 LUX Contour
1.0 LUX Contour
5.0 LUX Contour
10 LUX Contour
15 LUX Contour
20 LUX Contour
25 LUX Contour
- Receptor Location

Please Note:
This drawing is to be read in conjunction with the Barnham Eastergate Westergate, Strategic Site Lighting Assessment report

Key Lighting Receptor Viewpoints				Scale Bar Added, Client Reference Updated	
Survey viewpoint location number	Description of location	Receptor(s)	Drawing	1:500	1:1000
1	Residential property Fox House, Lidsley Road	Residents	A13394-PF-ZZ-XX-DR-C D-00002	1:500	1:1000
2	Residential/Commercial property Headstone Cottage & Kennels, Lidsley Road	Residents	A13394-PF-ZZ-XX-DR-C D-00002	1:500	1:1000
3	Residential properties 1-7 Headstone Barns, Lidsley Road	Residents	A13394-PF-ZZ-XX-DR-C D-00002	1:500	1:1000
4	Residential properties 1-3 Headstone Farm Cottages, Lidsley Road	Residents	A13394-PF-ZZ-XX-DR-C D-00002	1:500	1:1000
5	Residential property Headstone Farm, Lidsley Road	Residents	A13394-PF-ZZ-XX-DR-C D-00002	1:500	1:1000
6	Residential property Southwell Cottage, Lidsley Road	Residents	A13394-PF-ZZ-XX-DR-C D-00002	1:500	1:1000
7	Residential property Peartree Cottage, Lidsley Road	Residents	A13394-PF-ZZ-XX-DR-C D-00002	1:500	1:1000
8	Residential property The Old Bridge House, Lidsley Road	Residents	A13394-PF-ZZ-XX-DR-C D-00002	1:500	1:1000
9	Residential property The Old Cottage, Lidsley Road	Residents	A13394-PF-ZZ-XX-DR-C D-00002	1:500	1:1000
10	Residential/Commercial property Lidsley Farm, Lidsley Road	Residents	A13394-PF-ZZ-XX-DR-C D-00002	1:500	1:1000
11	Residential properties Lidsley Caravan Park, New England Barn, Title Barn, The Granary, Lidsley Barns, The Stables, The Cooperage & The Coach House, Lidsley Road	Residents	A13394-PF-ZZ-XX-DR-C D-00002	1:500	1:1000
12	Residential property Mapsons, Lidsley Road	Residents	A13394-PF-ZZ-XX-DR-C D-00002	1:500	1:1000
13	Residential property Pond Cottage, Lidsley Road	Residents	A13394-PF-ZZ-XX-DR-C D-00002	1:500	1:1000
14	Residential property The Grange, Sack Lane	Residents	A13394-PF-ZZ-XX-DR-C D-00002	1:500	1:1000
15	Residential property Willows Caravan Park, off Lidsley Road	Residents	A13394-PF-ZZ-XX-DR-C D-00001	1:500	1:1000
16	Commercial Property Woodgate Centre, off Woodgate Road	Workforce	A13394-PF-ZZ-XX-DR-C D-00001	1:500	1:1000

Pell Frischmann
8 MANCHESTER SQUARE LONDON W1U 3PD
Telephone +44 (0)20 7486 3661
Email: pfrischmann@pellfrischmann.com
www.pellfrischmann.com

Client
CC Projects Limited
Ashmarden Ltd
Hanbury (PM) Ltd

Project
BEW Parcel SC1

Drawing Title
A29 Link Road
Street Lighting and
Lighting Contours Design

Name	Date	Scale
Drawn	10/08/2021	1:500 @ A0
Designed	05/08/2021	
Checked	05/08/2021	
Approved	10/08/2021	

Drawing No: A13394-PF-ZZ-XX-DR-CD-00000 P02.dwg
Drawing Status: Preliminary
Revision: 0
P02

