12.0 A LIGHTING

A1 Chapter Alterations

A.1.1 This chapter of the ES Addendum updates the ES with respect to the following:

- **Assessment of the lighting proposed updated with reference to updated lighting parameters set out in Chapter 4A and the inclusion of a 4m opaque barrier around the Application Site on the security fence to reduce light spill still further;**
- **Three new figures (Figures 12.1, 12.2 and 12.3) have been included which show the lux levels emanating from the Proposed Development based on the lighting parameters; and**
- **Mitigation measures section updated to include cowling on lights.**

Introduction

12.1 This chapter of the ES assesses the likely significant effects of the Proposed Development (Wisborough Green-1) in terms of the proposed lighting that will be installed

12.2 The chapter describes the assessment methodology; the baseline conditions currently existing at the ~~Assessment~~ **Application** Site (Hookhurst Farm) and surroundings; the likely significant environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been employed. This chapter has been prepared by Royal HaskoningDHV.

Planning Policy Context

National Planning Policy

National Planning Policy Framework (Ref 12.1)

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

12.4 Section 11 addresses 'conserving and enhancing the natural environment' and states that:

> **"The planning system should contribute to and enhance the natural and local environment by: preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of….pollution"**

Planning Practice Guidance for Onshore Oil and Gas (2013)

12.4a The Planning Practice Guidance for Onshore Oil and Gas was published by DCLG in July 2013 and Annex D identifies a series of model planning Conditions for hydrocarbon developments. This includes lighting;

> **"Prior to the commencement of development, details of proposed lighting, including siting, height, design and position of floodlights, shall be submitted to and approved in writing to the Local Planning Authority. The lighting shall be implemented in accordance with these details and no other form of floodlighting shall be implemented on the application site without the prior written approval of the Local Planning Authority. "**

Planning Practice Guidance (2014)

12.4b The Planning Practice Guidance (PPG) was published by DCLG in March 2014 and updates previous practice guidance in light of the NPPF. The PPG accepts that artificial lighting provides valuable benefits to society but can cause light pollution unless the best use of artificial lighting is made by getting "the right light, in the right place and providing light at the right time". The PPG accepts that lighting schemes can be costly and difficult to change so getting the deisng right and setting approrpaite Conditions is

important. Planning Authorities may need to consider where and whenthelight shines, how much and any possible ecological impacts.

12.4c Light spill can be managed through good design, correct installation and maintenance combined with the positioning and use of lighting that is suitable for the purpose and does not exceed requirements, bearing in mind both safety and ecological impacts.

Clean Neighbourhoods and Environment Act (CNEA) 2005 (Ref 12.2)

12.5 The Clean Neighbourhoods and Environment Act 2005 (Sections 101-103) is the only UK legislation in existence which applies some statutory regulation over the environmental impact of light pollution and nuisance glare. This act extended the statutory monitoring and enforcement duties of WSCC as the local environmental health authority to include monitoring and enforcement of nuisance glare. The Act requires the environmental health authority to complete periodic assessment to identify:

> **"Artificial light emitted from premises [where]… prejudicial to health or a nuisance".**

Local Planning Policy

Chichester District Council Local Plan (adopted 1999) (Ref 12.3)

12.6 The Chichester District Council Core Strategy is due for Public Consultation from August to September 2012. The Local Plan is currently the development plan for the District. The Chichester District Local Plan does not contain any specific policies relating to lighting.

West Sussex Minerals Local Plan (adopted July 2003) (Ref 12.4)

12.7 The West Sussex Local Plan does not contain any specific policies relating to lighting. However the Plan does contain "saved" policies (policies 10-22) that are relevant for the Proposed Development and aim to protect the environment. The Minerals Local Plan also contains a policy relating directly to the potential exploration of oil and gas (Policy 26) which states that the Local Authority will pay particular attention to the means of protecting nearby residents and amenities from the effects of the operations.

West Sussex Minerals and Waste Core Strategy (January 2007) (Ref 12.5)

12.8 The West Sussex Minerals and Waste Core Strategy covers the period to 2021 sets out a vision, strategic objectives, a strategy for minerals and waste planning, and a monitoring and implementation framework. It also contains policies against which proposals for minerals and waste development will be assessed. The Core Strategy includes one policy relating to lighting (Policy CSG8: Public Amenity) and states that proposals for mineral and waste development will be permitted provided that:

"Appropriate measures are incorporated to control the impact of lighting"

Design Guidance

12.9 Relevant design guidance includes the following documents:

- BS-EN 12464-2:2007 – Lighting of work places. Outdoor work places (Ref 12.6).
- Chartered Institute of Building Services Engineers (CIBSE) Lighting Guide 6:1992 – Outdoor Environment (Ref 12.7). This document provides guidance on workplace lighting requirements.
- Defra (2001) Lighting in the Countryside: Towards Good Practice (Ref 12.8). The guide covers all forms of lighting, including lighting for mineral extraction and lighting of rural roads, junctions, services and parking areas. Its key objectives are

to identify good practice in the planning and design of lighting in rural areas, and to advise on how it can be achieved.

- Institution of Lighting Professionals (ILP formerly ILE) Guidance Notes for the reduction of Light Pollution. This is particularly relevant to the design of lighting for rural areas (Ref 12.9). This guidance is used to inform designers of the necessity to minimise light spill from developments, and provides guidance on good practice in use; and
- The Health and Safety at Work Act 1974 (Ref 12.10). This indicates the need to provide lighting for the safe transit and operations around the site.

Guidance for lighting effects on bats

12.10 Bats are protected by the Wildlife and Countryside Act (1981) (Ref 12.11) and the Conservation of Habitats and Species Regulations 2010 (Ref. 12.12). This makes it illegal to kill, injure, capture or disturb bats, obstruct access to bat roosts or damage/destroy bat roosts. Lighting in the vicinity of a bat roost causing disturbance could constitute an offence. There is no legislation relating directly to lighting effects on bats; however, there is a guidance document produced by the Bat Conservation Trust (Ref 12.13). The Bat Conservation Trust Guidance states that no bat roost (including access points) should be directly illuminated. If it is considered necessary to illuminate an area known to be used by roosting bats, the lights should be positioned to avoid the sensitive areas. It also states that the height of lighting should be as low as possible. The times during which the lighting is on should be limited to provide some dark periods. Roads or trackways in areas important for foraging bats should contain stretches left unlit to avoid isolation of bat colonies. These unlit stretches should be 10 metres in length either side of commuting route.

12.11 Lighting is not specifically mentioned in planning policies and therefore they do not have a specific implication for the Proposed Development. However regional and local planning documents do have specific policies relating to the protection of the landscape and the environment and the Proposed Development should comply with the planning

policy or provide suitable mitigation for any potential effects of the proposed lighting. Any potential effects on bats are discussed in the Ecology Chapter (**Chapter 7A**).

Assessment Methodology

General Approach

12.12 A site visit was conducted on 28th February 2013 to ascertain the context of the study area by day and night. This included noting existing sources of illumination. An assessment of relative heights between the ~~Assessment~~ **Application** Site and the local landscape including any existing adjacent properties or structures was made whilst on site.

12.13 The site survey was conducted by assessing the strategic views from the ~~Assessment~~ **Application** Site to the adjacent areas along with any relative views towards the Assessment **Application** Site from adjacent roadways and properties. The photographs utilised are relative to these views selected. They are not 'stitched' panoramic scenes and are not to the same scale. They are used to give context to the lighting assessments.

12.14 Relative heights for photographs include the 1.7m 'eye level' height and have been indicated to the nearest metre. They are not intended as absolutes, but are designed to provide some context relevant to the day and night views illustrated. Distances are similarly quoted to a point roughly central to the ~~Assessment~~ **Application** Site. These are provided using Google Earth for general context and are not intended as absolutes.

12.15 Night-time photographs cannot be compared between different Receptors, owing to differing ambient lighting conditions, exposure times and light sensitivity settings, as well as differing weather and atmospheric conditions.

12.16 General camera settings were left as normal, with auto white balance. No post-processing of photographs has been carried out, other than:

- Amending orientation if needed;
- Cropping to letterbox format; and
- Reduction of JPEG sizes for printing purposes within the Word document.

12.17 Following the site visit, an assessment was made of the effects that the Proposed Development lighting may have on the local landscape, including any potential alterations to longer distance views in adjacent to the ~~Assessment~~ **Application** Site. The survey/assessment was made of potential areas/views that may be affected by the proposed lighting.

Significance criteria

12.18 The significance criteria used are those outlined in the methodology chapter (Chapter 2). The significance level attributed to each impact has been assessed based on the magnitude of change due to the Proposed Development, and the sensitivity of the affected receptor/receiving environment to change. The criteria used to determine the "significance" of any change in baseline lighting levels have been defined qualitatively using professional judgement and best practice guidance. The lighting assessment has been based on "Lighting in the Countryside: Towards Good Practice" (Ref 12.8).

Summary of Terms

12.19 A summary of the terms used in the following sections is provided in Table 12.1.

Table 12.1: Summary of terms

Term	Definition
Atmospheric Conditions (for Aura / Sky Glow)	The amount of particle pollution and presence of moisture and other gases in the atmosphere. Light is scattered by the particles and that coming back to an observer below causes the veiling effect of Sky Glow.
Aura	Localised halo of light above a lit area, caused by direct upward light or reflections from the ground and other surfaces. More obvious where light units are grouped

	relatively close together and / or of high power.
Sky Glow	Wide area of night sky scattering direct and indirect upward light back to an observer. Depends on atmospheric conditions and the amount of upward light. Very typical above urban areas.
Environmental Zone E1 – E4	A classification method developed by the ILE to match appropriate lighting controls to the local environment e.g. an E1 Zone is an ANOB and an E4 Zone a City Centre area

Baseline Conditions

Landscape by Day

12.20 The location of the ~~Assessment~~ **Application** Site is described in Chapter 3. The ~~Assessment~~ **Application** Site lies in an area of rural landscape surrounded by woodland and agricultural land accessible from the Kirdford Road. Wisborough itself is situated approximately 1.5km to the west of the ~~Assessment~~ **Application** Site. The site lies approximately 14.25km west of Horsham Town with the nearest City being Chichester, situated approximately 28km south west of the site.

12.21 The ~~Assessment~~ **Application** Site is 1.63ha. The ~~Assessment~~ **Application** Site is located north of the South Downs National Park and is not within an Internationally designated site (Special Protection Area, Special Area of Conservation or Ramsar) or a nationally designated site (Sites of Scientific Special Interest and National Nature Reserve). The field in which the proposed site is situated is surrounded by woodland, some of which is designated as ancient woodland, which is likely to have significant ecological value. To the east of the site there is a pond, along with a watercourse in close proximity, located to the east of the ~~Assessment~~ Application Site at Boxal Bridge.

12.22 Directly to the east of the ~~Assessment~~ **Application** Site is the dense area of woodland of Dunhurst Cope, however the southern and eastern boundaries remain open the area of agricultural land adjacent to the ~~Assessment~~ **Application** Site.

12.23 There are a number of residential, agricultural properties/businesses properties within the locality of the ~~Assessment~~ **Application** Site, however other than the large barn located directly adjacent to the site, these are generally not visible from the site itself owing to the tree cover around the perimeter of the site.

12.24 The survey was undertaken in the winter and despite the loss of leaves from the deciduous trees and hedgerows, there was significant tree cover. It should therefore be taken into consideration that during the spring and summer months increased cover shall be provided affording to the fact that the trees/hedgerows will be in full bloom with increased foliage. The increased cover shall further restrict views onto and from the ~~Assessment~~ **Application** Site, over and above that shown in the photographs contained within this Chapter.

Landscape by Night

12.25 The rural nature of the immediate vicinity is confirmed by night. The ~~Assessment~~ **Application** Site itself and the surrounding woodland/farmland are in total darkness.

12.26 The local network of "B" roads and country lanes has no street/road lighting. There are localised areas of lighting affording to private developments and residential properties within Wisborough Green and its surrounding agricultural and business properties.

12.27 Due to the fact that the site is fully enclosed by trees/woodland the longer distance views looking out from the ~~Assessment~~ **Application** Site are largely restricted. As such there are no visible lighting units within the vicinity of the site.

Visual Assessment during the day

12.28 The lighting visual assessment has been undertaken separately to the Landscape and Visual Assessment presented in Chapter 8**A**, as this assessment is streamlined to ensure it remains relevant to making an assessment of the likely effect of lighting. Discussions were undertaken with the Landscape architect prior to the assessment to identify the

most sensitive receptors and viewpoints and to ensure that the approach taken to the lighting assessment was aligned to that used for landscape and visual impact assessment.

12.29 Viewpoints have generally been selected in accordance with the landscape assessment and the viewpoints detailed on Figures 5 and 6 in Chapter 8**A**. However views have been rationalised and lighting has been assessed from those views from which the site itself or parts of the exploration rig are visible, or those areas which are highlighted as sensitive receptors.

12.30 Where possible viewpoints have been selected to give representative views from representative views from the North, South, East and West towards the ~~Assessment~~ **Application** Site.

12.31 A summary of each viewpoint and its geographical location relative to the ~~Assessment~~ **Application** Site is given below in accordance with those viewpoints illustrated In the Landscape and Visual Impact Assessment in Chapter 8**A** (Figures 5 and 6);

- Viewpoint 1 - Views from the proposed entrance to the ~~Assessment~~ **Application** Site from Kirdford Road.
- Viewpoint 4 - Views from the east along Kirdford Road Looking West towards the ~~Assessment~~ **Application** Site entrance.
- Viewpoint 5 - Views from the east along Kirdford Road Looking West towards the ~~Assessment~~ **Application** Site entrance.
- Viewpoint 8 – Views from the west along Kirdford Road looking east towards the ~~Assessment~~ **Application** Site
- Viewpoint 17 – Views from the south-west of the ~~Assessment~~ **Application** Site, along the A272 adjacent to Bulchins Copse
- Viewpoint 25 – Views from the west of the ~~Assessment~~ **Application** Site, along Kirdford Road opposite the entrance to Whiffletree Farm/Normandie Stud.
- Viewpoint 32 – Views from the north of the ~~Assessment~~ **Application** Site along the PRoW at Walthurst Farm.

- Viewpoint 38 – Views from the north-east of the ~~Assessment~~ **Application** Site from the edge of Bittles Wood along Durbans Road
- Viewpoint 45 – Views from the south of the ~~Assessment~~ **Application** Site along the A272 Petworth Road
- Viewpoint 48 – Views from the east of the ~~Assessment~~ **Application** Site along the Kirdford Road

Viewpoint 1 – Views from the proposed entrance to the ~~Assessment~~ **Application** Site from Kirdford Road.

Relative Height: + 4m

Distance: 0m from site entrance

Plate 12.1

12.32 **Plate 12.1** shows an open view across agricultural land, onto the proposed ~~Assessment~~ **Application** Site access road along Kirdford Road. The ~~Assessment~~ **Application** Site itself is located out of view beyond the barn and row of trees to the left of the image.

Viewpoint 4 - Views from the east along Kirdford Road looking west towards the ~~Assessment~~ **Application** Site entrance.

Relative Height: - 2m

Distance: 100m from site Entrance

Plate 12.2

12.33 **Plate 12.2** shows a view looking towards the ~~Assessment~~ **Application** Site entrance along Kirdford Road. The ~~Assessment~~ **Application** Site entrance lies within a slightly elevated position, partially screened by the trees as indicated on the image above. There are no direct views of the ~~Assessment~~ **Application** Site itself from this location as it lies to the east of this view and is screened by dense woodland of Dunhurst/Northop Copse.

Viewpoint 5 - Views from the east along Kirdford Road looking west towards the ~~Assessment~~ **Application** Site entrance.

Relative Height:	- 2m
Distance:	140m from site

Plate 12.3

12.34 **Plate 12.3** shows a view looking towards the ~~Assessment~~ **Application** Site Entrance along Kirdford Road. The ~~Assessment~~ **Application** Site entrance lies within a slightly elevated position, partially screened by the trees as indicated on the image above. There are no direct views of the ~~Assessment~~ **Application** Site itself from this location as it lies to the east of this view and is screened by dense woodland of Dunhurst/Northop Copse.

Viewpoint 8 – Views from the west along Kirdford Road looking east towards the ~~Assessment~~ **Application** Site.

Relative Height: + 2m

Distance: 500m from site

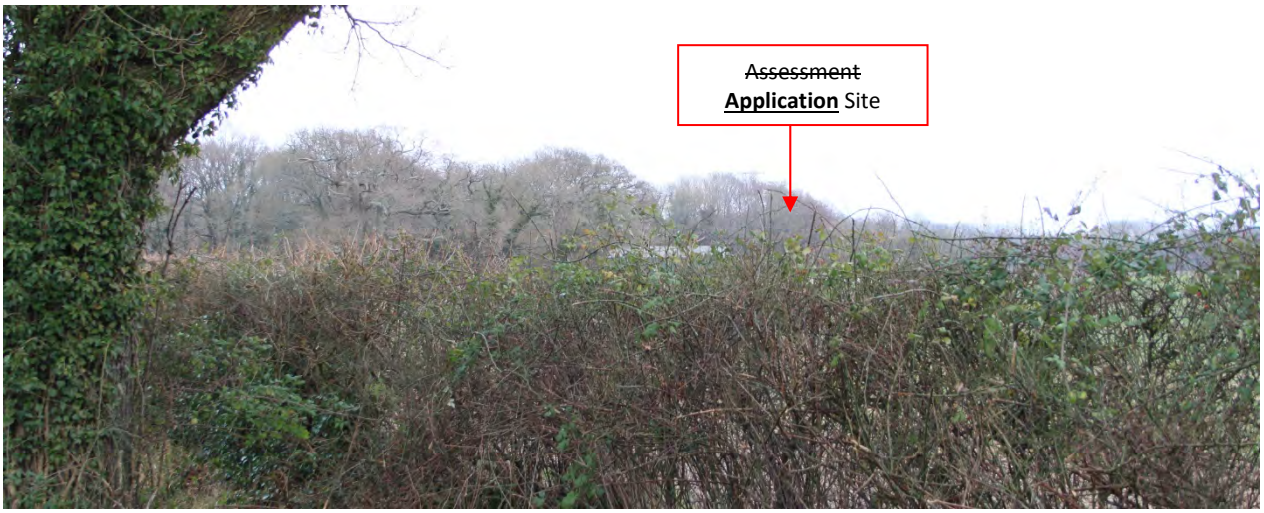


Plate 12.4

12.35 **Plate 12.4** shows a view looking towards the ~~Assessment~~ **Application** Site from the east along Kirdford Road. The ~~Assessment~~ **Application** Site is partially visible from this location although it is largely screened by the hedgerows which line Kirdford Road as indicated on the image above.

Viewpoint 17 – Views from the south west of the ~~Assessment~~ **Application** Site along the A272 adjacent to Bulchins Copse

Relative Height: +17m

Distance: 2.2km from site

Plate 12.5

12.36 **Plate 12.5** shows an obstructed view from the A272 to the south west of the Site. As can be seen in the image, any views of the ~~Assessment~~ **Application** Site are restricted by the residential property, trees and hedgerows within the immediate view. There are no direct views of the ~~Assessment~~ **Application** Site from this location due to its relative distance from the site along with the restrictions identified.

Viewpoint 25 – Views from the west of the ~~Assessment~~ **Application** Site along Kirdford Road opposite the entrance to Whiffletree Farm/Normandie Stud.

Relative Height: + 6m

Distance: 1.7km from site

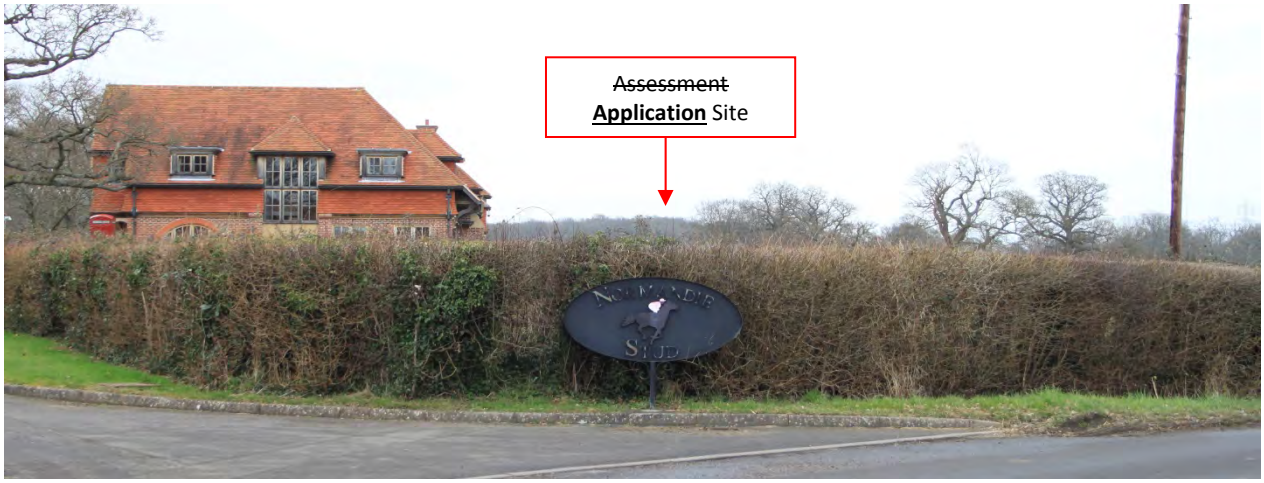


Plate 12.6

12.37 **Plate 12.6** illustrates the views from Kirdford Road, south of Kirdford itself, located to the west of the ~~Assessment~~ **Application** Site. There are no direct views of the ~~Assessment~~ **Application** Site from this location due to its relative distance from the site and the presence of hedgerows/trees within the immediate and middle distance views between the viewpoint and the site itself.

Viewpoint 32 – Views from the north of the ~~Assessment~~ **Application** Site along the PRoW at Walthurst Farm.

Relative Height: -+ 20m

Distance: 2.4km from site

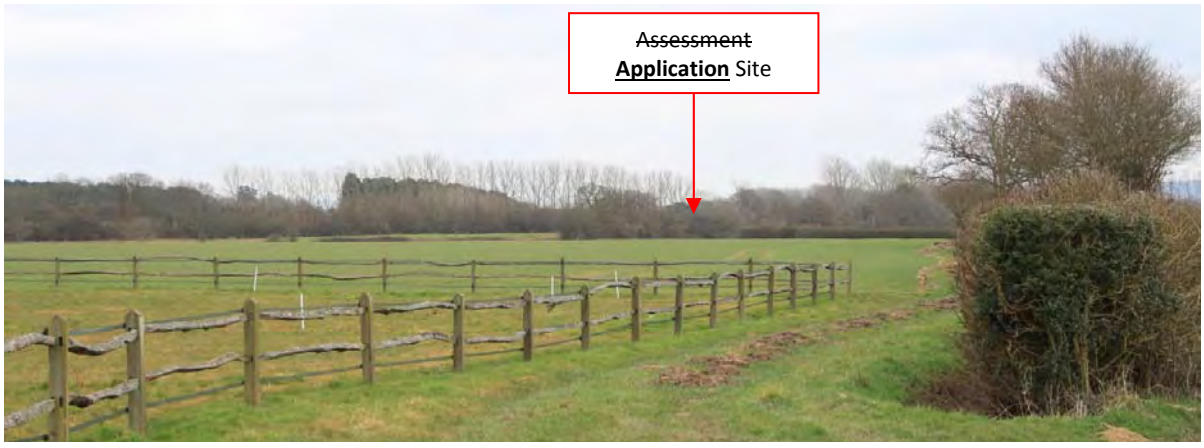


Plate 12.7

12.38 **Plate 12.7** shows the representative views towards the ~~Assessment~~ **Application** Site from the PRoW located north of the Site at Walthurst Farm. From this location there are open views across the agricultural land within the immediate view. However, there are no direct views of the ~~Assessment~~ **Application** Site from this location due to its relative distance from the site along with the dense area of woodland of Dunhurst Copse between the viewpoint and the ~~Assessment~~ **Application** Site.

Viewpoint 38 – Views from the north-east of the ~~Assessment~~ **Application** Site from the edge of Bittles Wood along Durbans Road

Relative Height: + 15m

Distance: 1.8km from site

Plate 12.8

12.39 **Plate 12.8** represents the views towards the ~~Assessment~~ **Application** Site from the north-east of the Site from the edge of Bittles Wood along Durbans Road. From this location there are open views across the agricultural land within the immediate view. However, there are no direct views of the ~~Assessment~~ **Application** Site from this location due to its relative distance from the site along with the dense area of woodland of Dunhurst Copse between the viewpoint and the ~~Assessment~~ **Application** Site.

Viewpoint 45 – Views from the south of the ~~Assessment~~ **Application** Site along the A272 Petworth Road

Relative Height: - 5m

Distance: 1.2km from site

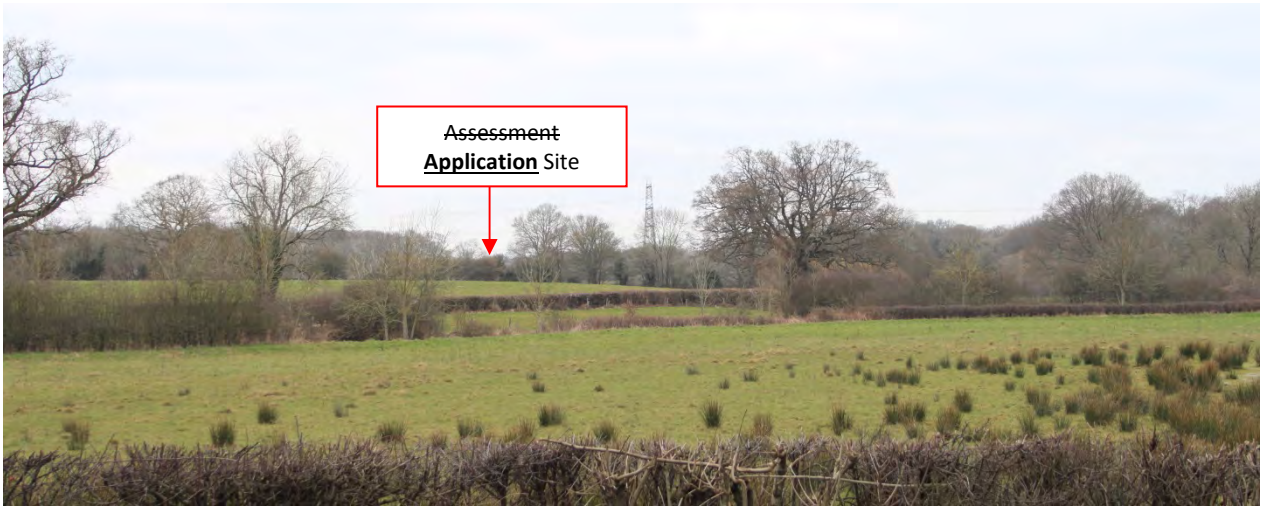


Plate 12.9

12.40 **Plate 12.9** represents the views across open agricultural land towards the ~~Assessment~~ **Application** Site from the A272 Petworth Road located south of the ~~Assessment~~ **Application** Site. There are no direct views of the ~~Assessment~~ **Application** Site from this location due to its relative distance from the site along with the various trees and hedgerows between the viewpoint and the ~~Assessment~~ **Application** Site.

Viewpoint 48 – Views from the east of the ~~Assessment~~ **Application** Site along the Kirdford Road

Relative Height: + 6m

Distance: 500m from site

Plate 12.10

Plate 12.10 shows views from the east of the ~~Assessment~~ **Application** Site along Kirdford. There are no direct views onto the site from this location due to the outbuilding/stable shown in the immediate view along with the significant tree cover beyond which is attributable to Northop Copse and Dunhurst Copse.

Visual Assessment during the night

View 1 – Views from the proposed entrance to the ~~Assessment~~ **Application** Site from Kirdford Road.

Relative Height: + 4m

Distance: 0m from site entrance

Conditions: Fair, some cloud cover. Moon and stars partially visible

IMAGE NOT AVAILABLE
(TOO DARK TO VIEW)

Plate 12.11

12.41 It is not possible to capture a night-time image of this view as the area and associated views are in total darkness. There are no visible light sources within this view. Sky glow is also minimal which emphasises the dark nature of this view. The agricultural land which forms the immediate foreground is very dark and difficult to distinguish against the trees and hedgerows and the night sky.

Viewpoint 4 - Views from the east along Kirdford Road looking west towards the ~~Assessment~~ **Application** Site entrance.

Relative Height:	- 2m
Distance:	100m from site Entrance
Conditions:	Fair, some cloud cover. Moon and stars partially visible

IMAGE NOT AVAILABLE
(TOO DARK TO VIEW)

Plate 12.12

12.42 It is not possible to capture a night-time image of this view as the area and associated views are in total darkness. There are no visible light sources within this view. Kirdford Road which forms the immediate foreground is very dark and difficult to distinguish against the trees and hedgerows which line either side of the road looking up towards the site entrance. It is not possible to view the site or the proposed entrance from this location. Lighting attributable to the vehicles passing along Kirdford Road are visible from this location, however they are momentary and relatively infrequent.

Viewpoint 5 - Views from the east along Kirdford Road Looking West towards the ~~Assessment~~ **Application** Site entrance.

Relative Height:	- 2m
Distance:	140m from site
Conditions:	Fair, some cloud cover. Moon and stars partially visible

IMAGE NOT AVAILABLE
(TOO DARK TO VIEW)

Plate 12.13

12.43 It is not possible to capture a night-time image of this view as the area and associated views are in total darkness. There are no visible light sources within this view. Kirdford Road which forms the immediate foreground is very dark and difficult to distinguish against the trees and hedgerows which line either side of the road looking up towards the site entrance. It is not possible to view the site or the proposed entrance from this location. Lighting attributable the vehicles passing along Kirdford Road are visible from this location, however they are momentary and relatively infrequent.

Viewpoint 8 – Views from the west along Kirdford Road looking east towards the ~~Assessment~~ **Application** Site.

Relative Height:	+ 2m
Distance:	500m from site
Conditions:	Fair, some cloud cover. Moon and stars partially visible

Plate 12.14

12.44 **Plate 12.14** shows a view looking towards the ~~Assessment~~ **Application** Site from the east along Kirdford Road. The ~~Assessment~~ **Application** Site is partially visible from this location although it is largely screened by the hedgerows which line Kirdford Road as indicated on the image above. Sky glow is also minimal which emphasises the dark nature of this view.

Viewpoint 17 – Views from the south-west of the ~~Assessment~~ **Application** Site along the A272 adjacent to Bulchins Copse

Relative Height: +17m

Distance: 2.2km from site

Conditions: Fair, some cloud cover. Moon and stars partially visible

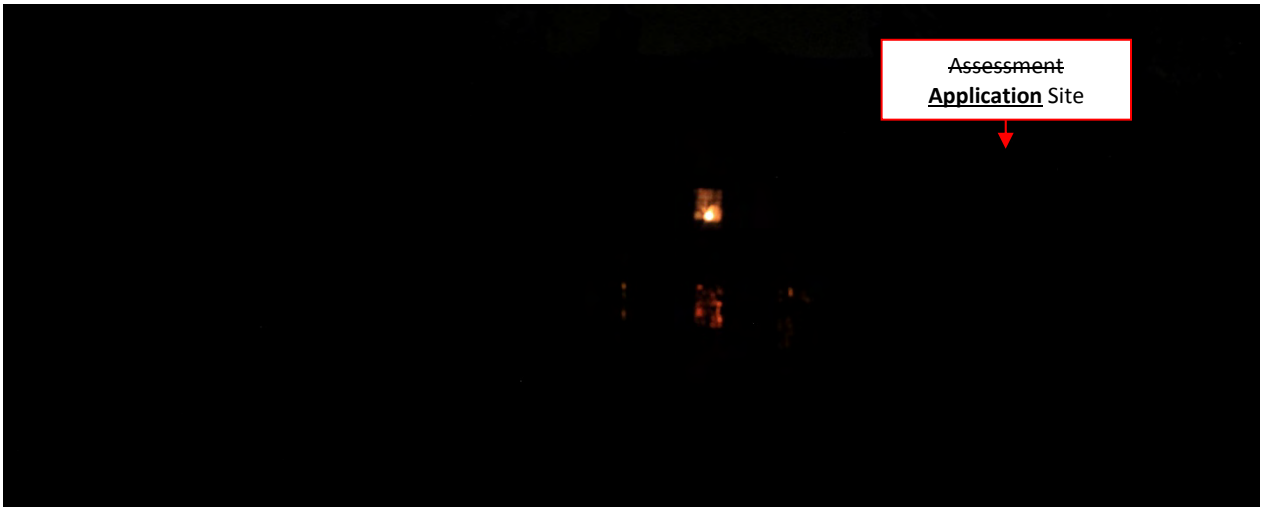


Plate 12.15

12.45 **Plate 12.15** shows the night time view from the A272 to the south-west of the Site. The view from this site is intrinsically dark at night, with only lighting from the adjacent residential property visible as illustrated in the photograph. Sky glow is also minimal which emphasises the dark nature of this view. Lighting attributable to the vehicles passing along the A272 is visible from this location and whilst they are momentary they are fairly frequent.

Viewpoint 25 – Views from the west of the ~~Assessment~~ **Application** Site, along Kirdford Road opposite the entrance to Whiffletree Farm/Normandie Stud.

Relative Height: + 6m

Distance: 1.7km from site

Conditions: Fair, some cloud cover. Moon and stars partially visible

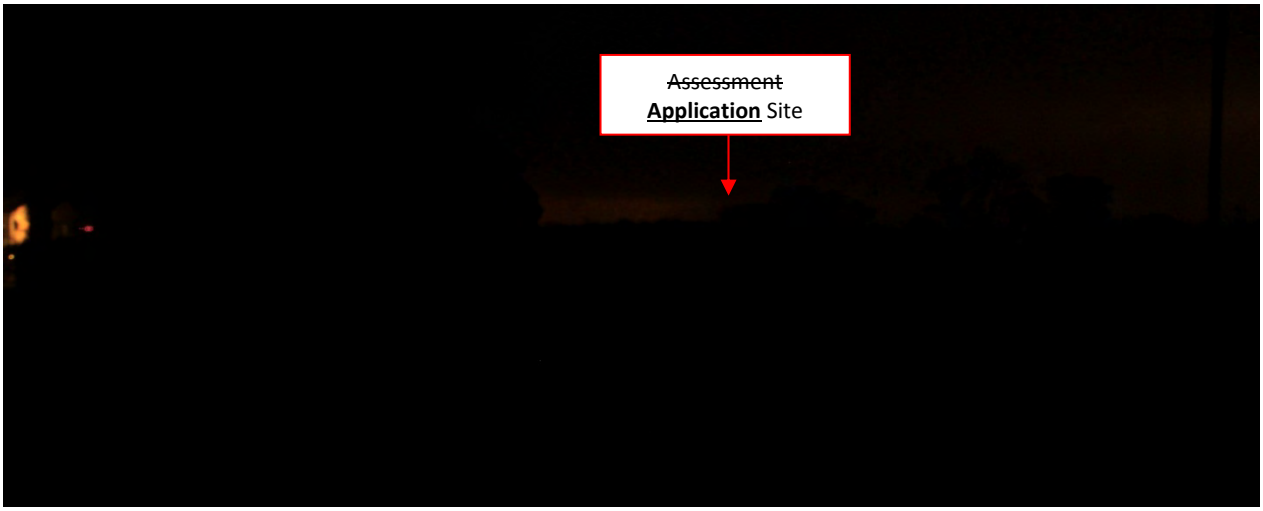


Plate 12.16

12.46 **Plate 12.16** illustrates the night time views from Kirdford Road, south of Kirdford itself, located to the west of the ~~Assessment~~ **Application** Site. Plate 12.18 demonstrates the intrinsically dark view from this location over the agricultural land towards the site. The light source to the left of the image is attributable to external floodlighting located at Whiffletree Farm/Normandie Stud. Sky glow within this view is minimal. Other light sources visible from this viewpoint are those of vehicles passing along Kirdford Road, although these are momentary and they are fairly infrequent.

Viewpoint 32 – Views from the north of the ~~Assessment~~ **Application** Site along the PRoW at Walthurst Farm.

Relative Height: -+ 20m

Distance: 2.4km from site

Conditions: Fair, some cloud cover. Moon and stars partially visible

IMAGE NOT AVAILABLE
(TOO DARK TO VIEW)

Plate 12.17

12.47 It was not possible to assess the views from this viewpoint at night. However our assessment would be that the views from here would be intrinsically dark across the agricultural land within the immediate views. There would be no light sources from here and similar to the other views sky glow/aura would be minimal due to the fact that there is very little artificial light within the surrounding district

Viewpoint 38 – Views from the north east of the ~~Assessment~~ **Application** Site from the edge of Bittles Wood along Durbans Road

Relative Height: + 15m

Distance: 1.8km from site

Conditions: Fair, some cloud cover. Moon and stars partially visible

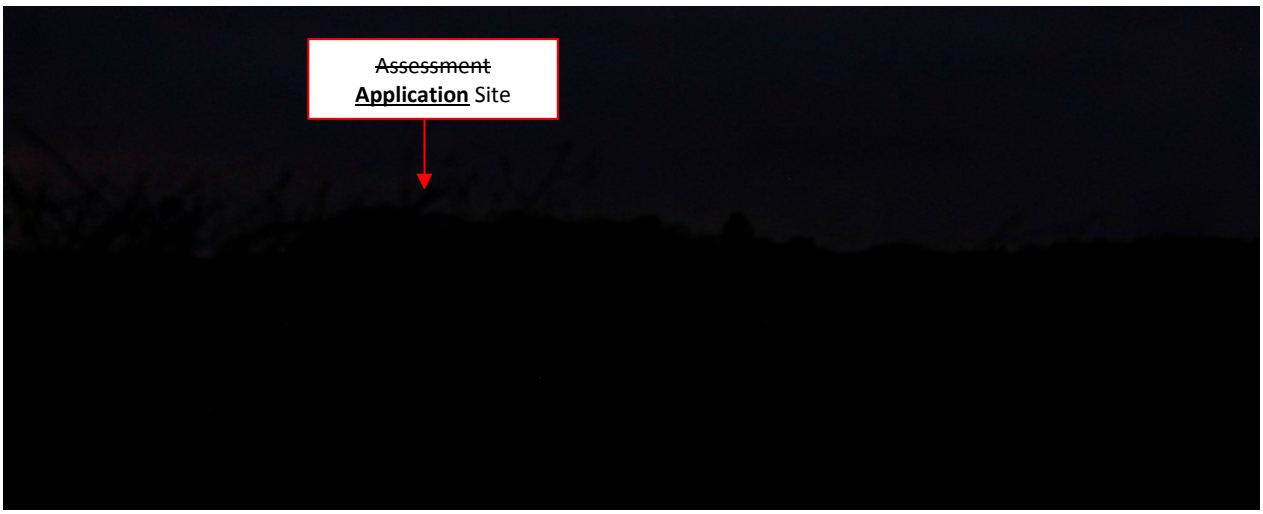


Plate 12.18

12.48 **Plate 12.18** represents the night time views towards the ~~Assessment~~ **Application** Site from the north-east of the site from the edge of Bittles Wood along Durbans Road. As illustrated within the image the view from here is extremely dark across the agricultural foreground. There are no artificial light sources within this view. Sky glow is minimal with the hedgerow along Durbans Road in the immediate view and the tree line of Dunhurst Copse showing as a faint silhouette against the dark sky.

Viewpoint 45 – Views from the south of the ~~Assessment~~ **Application** Site along the A272 Petworth Road

Relative Height: - 5m

Distance: 1.2km from site

Conditions: Fair, some cloud cover. Moon and stars partially visible

Plate 12.19

12.49 **Plate 12.19** represents the night time views across open agricultural land towards the ~~Assessment~~ **Application** Site from the A272 Petworth Road located south of the ~~Assessment~~ **Application** Site. As illustrated within the image the view from here is extremely dark across the agricultural foreground. There are no artificial light sources within this view. Sky glow is minimal with the tree line and hedgerows between the viewpoint and the ~~Assessment~~ **Application** Site showing as a faint silhouette against the dark sky.

Viewpoint 48 – Views from the east of the ~~Assessment~~ **Application** Site along the Kirdford Road

Relative Height: + 6m

Distance: 500m from site

Conditions: Fair, some cloud cover. Moon and stars partially visible

IMAGE NOT AVAILABLE
(TOO DARK TO VIEW)

Plate 12.20

12.50 It is not possible to capture a night time image of this view as the area and associated views are in total darkness. There are no visible light sources within this view. The immediate foreground is very dark and difficult to distinguish against the trees and hedgerows located between the viewpoint and the site. Also sky glow is minimal which adds to the dark nature of this view.

12.51 Lighting attributable the vehicles passing along Kirdford Road are visible from this location ate noticeable; however they are momentary and relatively infrequent.

Bat Activity

12.52 Refer to Chapter 7**A** (Ecology) for a full assessment of the effects of lighting on bats.

12.52a It has been noted that the woodland to the North of the Application Site is home to rare species of bat with bat activity observed within this area. As such this part of the Application Site has been assessed on an individual basis to ensure that there are no

detrimental effects to the woodland (or Bat species) as a result of artificial lighting installed from within the Application Site boundary.

12.52b When assessing the effects on Bats the guidelines published by The Conservation Trusts regarding Bats and lighting (as discussed above) shall be observed at all times. Although this document largely relates to street lighting applications, it remains a useful source of reference for the interaction between bats and artificial lighting.

12.52c It is understood that this is a particularly sensitive area and as such a lighting model has been produced to demonstrate the light spill from the artificial lighting to the surrounding areas. This enables a visual representation and allows us to quantify the amount of light spill upon which suitable conclusions may be drawn.

Proposed ~~Assessment~~ Application Site Lighting

Performance Objectives

12.53 The primary aims of the lighting design are summarised as follows:

- To deliver an efficient lighting design applicable to the exploration processes carried out on site;
- Provide safe and clear routes during the night time for site operatives;
- To create an environment where users feel safe and secure; and
- Be considerate to the sensitive areas of the site with regard to the ecological constraints and attempt to preserve the landscapes and minimise the environmental impact of the lighting installation.

Lighting Obtrusion

12.54 The ILE assessment method for lighting obtrusion is based on classifying landscapes into four Environmental Zones, E1 – E4. The current recommendations are set out in the **Table 12.2**.

Table 12.2 Obtrusive light limitations

Obtrusive Light Limitations – ILE UK Recommendations						
Environmental Zone	**Sky Glow ULR (Max) %**	**Light Trespass (into windows) Ev Lux**		**Source Intensity Kcd**		**Building Luminance L (cd/m2)**
		Pre-curfew	**Post-curfew**	**Pre-curfew**	**Post-curfew**	**Pre-curfew**
E1 Intrinsically dark landscapes National Parks, AONBs etc	0	2	1*	2.5	0	0
E2 Low distinct brightness Rural, small village, relatively dark urban location	2.5	5	1	7.5	0.5	5
E3 Medium distinct brightness Small town centres or urban location	5	10	2	10	1.0	10
E4 High distinct brightness areas Town / city centres with high night-time activity levels	15	25	5	25	2.5	25

ULR – Upward Light Ration of Installation (maximum permitted % of luminaire flux for total installation going directly skywards.
Ev – Vertical Luminance in Lux (Lumens per square metre) – measured on glazing at centre of window.
I – Light source intensity in Kilocandelas (Kcd)
L – Luminance in Candelas per square metre (cd/m2)**Institution of Lighting Engineers "Guidance Notes for the Reduction of Obtrusive Light" –**

12.55 This assessment is based upon the classification of the project falling within environmental zone E2.

Proposed Development Lighting

12.56 Throughout the **construction,** mobilisation, drilling ~~and~~ testing and **restoration** modes (Phases 1, 2**,** ~~and~~ 3 **and 4a** of the Proposed Development lighting is to be provided as detailed **within Table 4.1 of Chapter 4A.** ~~on the Proposed Site – Lighting layout (Drawing no. 3582 P 09) produced by R Elliott Associates Ltd~~.

12.57 The proposed lighting comprises the **luminaires and mitigation techniques shown on Figure 12.1, 12.2 and 12.3.**

12.57a In addition to the artificial lighting, there is a potential light source from the well testing flare. However, as set out in Chapter 4A Project Description, an enclosed flare is proposed and no flame would be visible. Should any hydrocarbons be found that need to be flared, it would be carried out during daylight hours, where possible. Flaring during darkness would only be carried out in an emergency situation.

12.57b Further physical mitigation of any night time flaring is provided within a pit by earth bunding of 1m in height, the 3m boundary bunds and the 4m high security fencing. As such, no element of the flare is able to be seen and this is considered to be negligible in terms of its effect.

- ~~Six freestanding 3 metre high fluorescent lights facing inwards towards the site and pointing downwards;~~
- ~~Five tungsten filament bulkhead lights located on site cabins;~~
- ~~Two horizontal strip lights at cabin level adjacent to the rig; and~~
- ~~Inward facing lighting within the derrick of the drilling rig.~~

Likely Significant Effects

Quantification of effects

12.58 This section sets out to provide an informed assessment of the effects that the lighting installations described above will have on the ~~Assessment~~ **Application** Site itself and the surrounding areas, as well as any alteration to any long distance views where applicable.

12.59 In order to provide a clear and concise assessment, the effect of the lighting will be considered in accordance with the Proposed Development phases as follows:

- Phase 1 Construction
- Phase 2 Mobilisation and drilling
- Phase 3~~a~~ Testing ~~(gas)~~
- ~~Phase 3b Testing (oil)~~
- Phase 4a Restoration
- Phase 4b Retention

12.60 A detailed project description is provided in Chapter 4**A** - Project Description. The Proposed Development comprises of the drilling of a vertical exploration well with a lateral exploration well being drilled as a contingent to the successful completion of Phase 2 or 3 of the initial vertical well. ~~Drilling of the contingent lateral exploration well will involve additional mobilisation and drilling (Phase 2), and testing (Phase 3) if hydrocarbons are found.~~ The lighting for the contingent lateral exploration well will not differ from that proposed for the other phases and therefore will not result in additional effects. Therefore it is not assessed separately in this chapter.

12.61 The identification of significant effects covers all effects but does not include mitigation measures, which have been considered as a separate entity.

Phase 1 - Construction

12.62 The site establishment works will normally be limited to daylight hours, and artificial lighting will be required only for short periods if establishment works extend into hours of darkness. **Figure 12.3 shows the lighting environment for this phase of works. Lighting will only be switched on in the hours of darkness where poor natural light occurs and when required only.**

12.63 Should any lighting be required for Phase 1 during the hours of darkness, it will be largely screened from view by the well-established hedgerows, trees and dense woodland surrounding the site **albeit at the relatively low lighting levels shown on Figure 12.3.** Views of any lighting will be ~~largely~~ restricted by the **4m high fence**, unless any of the lighting shall protrude above the canopy on the trees.

12.64 Sky glow arising from any direct lighting sources would be negligible providing lanterns and lamp sources are installed and angled so that they face downwards and inwards **(all lighting where installed to open areas i.e. not within the derrick structure shall be angled at 20 degrees below the horizontal plane to limit any sky glow in line with advice provided by the South Downs National Park Authority)** giving due consideration to obtrusive or nuisance light. Any aura created by the construction lighting is unlikely to be identifiable beyond the dense screening of ~~woodland~~ **boundary fence**, some minor effects of localised aura may be present.

12.65 The effects of any lighting will be short term, given that the construction period will be a maximum of 10 weeks. **Different lighting is required for the construction of the well pad and works involved with the conductor setting rig (see Table 4.1 of Chapter 4A). Figures 12.1 and 12.2 illustrate the lighting for this phase.**

12.66 The effects of any lighting used during Phase 1 would be minor. Effects at a local level and on longer distance views and the surrounding landscape are considered to be negligible.

Phase 2 - Mobilisation and drilling

12.67 Further to the completion of the Phase 1 works. The site lighting is expected to be as discussed herein and as detailed on the Proposed Site – **Lighting Layout (Figure 12.3).** The Phase 2 drilling works will be a 24 hour operation and will therefore require the proposed site lighting to be operational throughout this period of up to 1~~0~~**5** weeks for the vertical exploration well and up to 1~~2~~**3** weeks for the lateral exploration well.

12.68 Owing to the contouring landscape surrounded by well established hedgerows, trees and dense woodland the majority of the lighting will be screened from direct view from any sensitive receptors. Due to the positioning of the lighting towards the centre of the ~~Assessment~~ **Application** Site, light spill from the ~~Assessment~~ **Application** Site to the surrounding agricultural land and woodland will be ~~minimal~~ **negligible**.

12.69 It is not anticipated that any sky glow or aura resulting from the low level site lighting will be visible within the locality of the site, as it will be largely screened by the **boundary fence and** tree coverage, its effect is therefore considered to be negligible. Inward lighting within the derrick on the drilling rig will minimise any spillage but may be partially visible from the viewpoints identified within this report, should it protrude above the height of the woodland. However this will be a small element of localised lighting to illuminate the rig only. The effect of the rig lighting on the surrounding district is considered to be low magnitude on medium sensitive receptors. Given the short term period over which any effect will occur, the overall effect is considered to be minor adverse.

12.70 Direct views of lighting in the derrick and in particular any aviation warning lighting may be visible from the viewpoints assessed, although the effects of these would be minimal.

12.71 Direct views of some of the low level lighting may be visible through gaps in the hedgerow and woodland screening the site from the local properties, for example Whiffletree Farm (subject to final positioning of lighting equipment on site).

12.71a Lighting models (Figures 12.1, 12.2 and 12.3) have been prepared in accordance with the parameters set out in Chapter 4A and in order to assess if lighting would be likely to affect the adjacent woodland and bat population as described in the baseline conditions section above. Typical lighting levels surrounding the site range from 1 lux to 0.1lux at the immediate site boundary as indicated on Figures 12.1, 12.2 and 12.3. These figures are presented on a worst case basis, and in accordance with the lighting advice provided by South Downs National Park Authority. The only mitigation applied within the calculation is the 4m high perimeter fence as this is opaque in its nature and will not transmit light, hence the reasons for including in the calculation. Given that the woodland is located between 30-40m away from the Application Site with earth bunds in between, it is our assessment that the woodland itself will remain unaffected by the proposed lighting installations.

12.71b It is also unlikely that the low level lighting will be visible from the woodland edge, due to the 3 metre bunds provided and the additional 4 metre high security fence with opaque covering between the Application Site and the woodland. Also with the lighting units positioned both inward facing and pointing downwards, the amount of back spill will be minimal. As such the light emitted from the units would not be significant enough to spill from the site to the woodland itself.

12.71c Where tungsten halogen lamps are to be utilised, these luminaires shall be equipped with glass covers to afford greater UV filtration characteristics to detract insects and in turn foraging bats.

12.71d The lighting within the derrick is unlikely to be visible from the woodland, however this is intended to illuminate downwards and upwards only for short periods of time for essential maintenance. Although there will be an element of spill light through the lattice structure, this will be negligible due to the type of tungsten luminaires utilised. This lighting has been included within the lighting model and as such forms part of the overall site lighting assessment. The calculation software is unable to accurately model the derrick structure. Given that the lattice structure would obstruct some of the light, it would provide additional minor screening to mitigate any light spill.

12.71e Due to the sympathetic way in which lighting is applied to the Application Site, it is considered that any sky glow or aura resulting from the artificial lighting installations would be negligible. The highest mounted light fitting would be mounted above the *"dog house"* at approximately 6m above finished floor level. As described previously this in the general lighting conditions will be angled downwards.

12.71f It is considered that due to the relative distance from the site lighting to the boundary of the woods along with the sympathetic way in which the site is illuminated, that the resultant effects upon the woodland would be negligible.

12.72 The direct lighting sources will not be visible from any other locations other than those discussed above. It is unlikely therefore that this lighting will have any adverse effects on the district scale views and the surrounding landscape. The effect of the proposed lighting at a district scale is considered to be negligible.

Phase 3~~a:~~ Testing ~~(gas)~~

12.73 If gas is encountered during Phase 2, the Proposed Development will move to Phase 3~~a~~.

12.74 Phase 3~~a~~ will use the same lighting set up provided for the Phase 2 works ~~for a period of up to 2 weeks for both the lateral or vertical exploration well.~~ **as described within Table 4.1 of Chapter 4A.**The effects will therefore remain the same as those described for the Phase 2 works.

~~*Phase 3b: Testing (oil)*~~

~~12.75 If oil is encountered during Phase 2, the Proposed Development will move to Phase 3b.~~

~~12.76 Phase 3b will use the same lighting set up provided for the Phase 2 works for a period of up to 2~~6~~8 weeks depending on the success of the exploration. The effects will be further reduced compared with Phase 2 because the drilling rig will not be on site continuously throughout the phase.~~

Phase 4a - Restoration

12.77 Should Phases 2 or 3 in either the vertical or lateral exploration well be unsuccessful, then Phase 4a of the Proposed Development will commence. This will involve the restoration of the site back to its original state which is anticipated to take ~~6~~ 1~~0~~**02** weeks. As previously identified this would require an element of temporary construction lighting as discussed in relation to Phase 1 and will result in the same effects.

Phase 4b – Retention

12.78 Should Phase 3 be successful, Phase 4b of the Proposed Development will commence, which will involve works to retain the well pending further planning consent. It is unlikely that any ~~construction~~ lighting would be required here as the works will only involve decommissioning of the drilling rig and site accommodation.

12.79 All ground works will remain in place pending further planning consent; hence no ~~construction~~ lighting will be required throughout this Phase and there will be no effect on any receptors.

Mitigation Measures

12.80 The following mitigation measures will be applicable throughout the whole of the Proposed Development (Phases 1 to 4) and will be implemented through an Environmental Management Plan to be issued to the contractor.

- Lighting on the rig will be inward and downward pointing **and cowled in normal operation**;
- The target lighting levels for the site to be set according to the relevant standards, Health and Safety and security requirements, but should be kept to a minimum to limit the effects of reflected upward light creating an aura above the site;

- If areas of the site are not used operationally throughout the night, the opportunity to dim fittings or switch some off should be taken, again subject to safety and security needs. Motion sensor lighting to be applied to the tungsten filament lighting to further mitigate the effects of the compound lighting.
- Lighting should be angled away, and where possible positioned away, from the woodland edges; and
- The power of the lights should be the minimum necessary for purpose.

Residual Effects

12.81 The residual effects which are likely to be unavoidable are the visibility of any lighting used during Phase 1 (construction), and lighting of the rig (derrick) due to its elevated position above the tree canopy surrounding the site. Therefore a minor adverse effect remains within the local areas surrounding of the ~~Assessment~~ **Application** Site.

Cumulative Effects

12.82 There are not considered to be any projects in the area that need to be assessed cumulatively with this development.

Summary

12.83 At present the ~~Assessment~~ **Application** Site is an intrinsically dark site. It is therefore inevitable that there will be an element of alteration to the ambient lighting conditions within the site boundary and the immediate adjacent areas throughout the various phases of the works. However these effects will largely remain localised to the functional lighting provided for the site during all four Phases of the Proposed Development **and are shielded by the boundary fence**.

12.84 Alterations to the landscape and the effects of the site lighting within the longer distance views will be negligible. It is unlikely that any lighting other than those located within the derrick will be visible, and even the effects of this will be negligible.

12.85 **Table 12.3** contains a summary of the likely significant effects of the Proposed Development

Table 12.3: Table of Significance – Lighting

Potential Effect	**Nature of Effect** (Permanent/Temporary)	**Significance** (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)	**Mitigation / Enhancement Measures**	**Geographical Importance***							**Residual Effects** (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)
				I	UK	E	R	C	D	L	
Phase 1: Construction of access road and well site											
Effect of construction lighting on local landscape	Temporary	Negligible	Construction will take place mostly during daylight hours.							L	Negligible
Effect on longer distance views and the landscape	Temporary	Negligible	No specific mitigation required						D		Negligible
Effect on local properties adjacent to site	Temporary	Minor Adverse	Construction will take place during daylight hours except in emergencies.							L	Minor adverse
Effect on Wisborough Green and its associated properties	Temporary	Minor Adverse	Construction will take place during daylight hours except in emergencies.							L	Minor adverse
Effect on Kirdford and its associated properties	Temporary	Minor Adverse	Construction will take place during daylight hours except in emergencies.							L	Minor adverse
Phase 2: Mobilisation and drilling											
Effect on residents of Wisborough Green and Kirdford, of proposed low level lighting.	Temporary	Negligible	If areas of the site are not used operationally throughout the night, the opportunity to dim fittings or switch some off should be taken. Install motion sensor lighting to the tungsten filament lighting.							L	Negligible

Effect on residents of Wisborough Green and Kirdford of rig lighting	Temporary	Minor Adverse	All lighting equipment on the site to have luminaires with optics **and cowl/shields where suitable** to eliminate any direct upward light and maximise control of spill light. The target lighting levels for the site will be set according to the relevant standards, H&S and security requirements, but will be kept to a minimum to limit the effects of reflected upward light creating an aura above the site.							L	Minor adverse
Effect of rig lighting on passing motorists	Temporary	Negligible	No specific mitigation							L	Negligible
Effect of rig lighting on the surrounding adjacent area	Temporary	Negligible	No specific mitigation							L	Negligible
Effect of rig lighting on the district level views	Temporary	Negligible	No specific mitigation						D		Negligible
Effect on longer distance views and the landscape of proposed rig lighting	Temporary	Negligible	No specific mitigation required						D		Negligible
Phase 3~~a:~~ Testing ~~(gas)~~											

As outlined in Phase 2 -											
~~Phase 3b: Testing (oil)~~											
~~As outlined in Phase 2~~											
Phase 4a: Restoration											
As outlined in Phase 1											
Phase 4b: Retention											
No effects identified											
Cumulative											
No cumulative effects											

*** Geographical Level of Importance**

I = International; UK = United Kingdom; E = England; R = Regional; C = County; D = District; L = Local

References

12.1 Department for Communities and Local Government (2012) National Planning Policy Framework.

12.2 Clean Neighbourhoods and Environment Act (2005).

12.3 Chichester District Local Plan (1999)

12.4 West Sussex County Council (2003) West Sussex Minerals Local Plan.

12.5 West Sussex Minerals and Waste Core Strategy Development Plan (2007).

12.6 BS EN 12464-2:2007 Lighting of work places. Outdoor work places.

12.7 Chartered Institute of Building Services Engineers (CIBSE) Lighting Guide 6:1992 – Outdoor Environment.

12.8 Defra (2001) Lighting in the Countryside: Towards Good Practice.

12.9 Institution of Lighting Professionals (ILP formerly ILE) Guidance Notes for the reduction of Light Pollution.

12.10 The Health and Safety at Work Act 1974.

12.11 Wildlife and Countryside Act (1981).

12.12 The Conservation of Habitats and Species Regulations (2010).

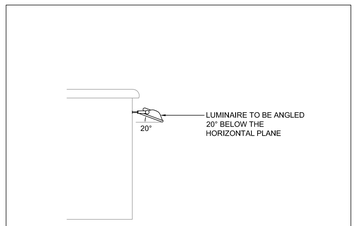
12.13 Bat Conservation Trust (Version 3, May 2009) ILE Bats and Lighting in the UK.

FIGURE 12.1

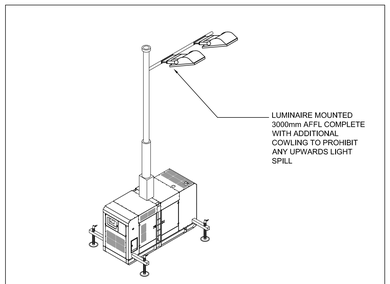
PROPOSED EXTERNAL ISOLINE CONTOURS FOR ARTIFICIAL LIGHTING (PHASE 2, 3 AND 4 OF PROCESS)

DRG No. 9Y0893 / 002

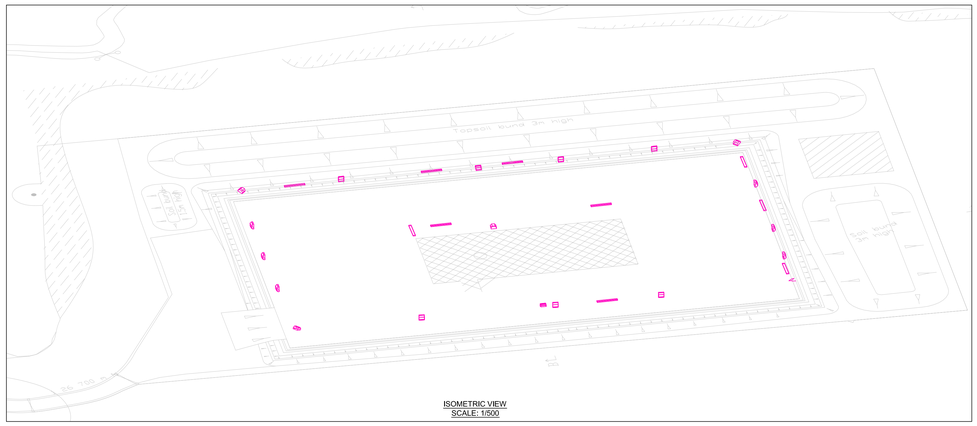
DO NOT SCALE



DETAIL A - EXAMPLE OF CABIN MOUNTED FLOODLIGHT
(SCALE: 1/50)



DETAIL B - EXAMPLE OF FREE STANDING LIGHTING
(SCALE: 1/50)



ISOMETRIC VIEW
SCALE: 1/500

LUMINAIRE SCHEDULE

Symbol	Label	Qty	Catalog Number	Description	Lamp	Lumens	LLF	Watts
	B	19	96002201 (STD - Standard)	PRT 3 500W QT-DE/R7s/NL BLK	500W TUNGSTEN HALOGEN	9500	1.00	500
	A	10	96200467 (STD - Standard)	PETRELUX ExEn 2x36w T26 HF	T26 36W	3350	1.00	71

NOTES

1. THE PURPOSE OF THIS DRAWING IS TO SHOW ILLUMINANCE CONTOURS FROM THE FIXED LIGHTING. THE LIGHTING UNITS SELECTED ARE BASED UPON INDUSTRY STANDARD LUMINAIRES AND MAY NOT BE THE EXACT UNITS PROPOSED.
2. THE CONTROL PHILOSOPHY IS FOR LIGHTING TO BE ON DURING HOURS OF DARKNESS. PHOTO-ELECTRIC CELLS TO BE PROVIDED AS NECESSARY.
3. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE RELEVANT SECTIONS OF THE ENVIRONMENTAL STATEMENT. THE ENVIRONMENTAL STATEMENT INCLUDES RELEVANT INFORMATION ON OPERATIONAL HOURS.
4. FOR THE PURPOSES OF THE CALCULATION, NO DERRICK STRUCTURE SHIELDING HAS BEEN MODELLED (INCLUDING THE STRUCTURE OF THE DERRICK). THIS SHOWS WORST CASE LIGHTING SPILL LEVELS OF THE DEVELOPMENT WHEN COMPARED AGAINST MOON LIGHT.
5. IT IS IMPOSSIBLE TO ACCURATELY MODEL THE DERRICK STRUCTURE. AS SUCH, THE CALCULATION ILLUMINANCE LEVELS ARE SHOWN IN FREE AIR. THE DERRICK STRUCTURE WILL PROVIDE FURTHER LIGHT SHIELDING TO THE ENVIRONMENT.
6. LLF - LAMP LUMINANCE FACTOR TAKEN AS 100% OR 1 TO INDICATE WORST POSSIBLE OUTPUT.

MITIGATION TECHNIQUES EMPLOYED WITHIN DESIGN

- ALL LUMINAIRES WITH THE EXCEPTION OF THE DERRICK STRUCTURE LIGHTING, WILL BE ANGLED AT 20° BELOW THE HORIZONTAL PLANE. REFER TO DETAIL A.
- TYPE A LUMINAIRES MOUNTED UPON FREE STANDING STRUCTURES SHALL BE COMPLETE WITH ADDITIONAL 'COWLING'. REFER TO DETAIL B.
- HORIZONTALLY MOUNTED FLUORESCENT LIGHTING SHALL BE ANGLED AT 45° SO AS TO EMIT LIGHT TOWARDS THE GROUND.
- COWLING TO BE PROVIDED TO LIGHTING MOUNTED TO THE CABINS SO AS TO PROHIBIT UPWARD LIGHT.
- WITHIN CALCULATION, EARTH BUNDING HAS BEEN MODELLED TO INDICATE THAT THESE PHYSICAL TECHNIQUES WILL LIMIT THE LIGHT SPILL FROM THE SITE.
- THE EFFECTS OF BATS HAS BEEN CONSIDERED AND THE FOLLOWING LAMP SOURCES ARE USED:
  - FLUORESCENT - WHICH EMITS LOW LEVELS OF U.V.
  - TUNGSTEN HALOGEN - EMITS LOW LEVELS OF U.V. AND IS CONTAINED WITH A GLASS REFLECTOR

LEGEND

0.1 — 0.1lux (LESS THAN MOON LIGHT)
0.25 — 0.25lux (EQUIVALENT TO MOON LIGHT ON A CLEAR DAY)
0.5 — 0.5lux
1 — 1lux (EQUIVALENT TO THE UPPER MEASUREMENTS OF MOON LIGHT)

REV	DATE	DESCRIPTION	BY	CHK	APP
B	14.04.14	LIGHTING LAYOUT AMENDED.	JH	JH	MSL
A	12.12.13	REVISED ISSUE FOLLOWING CONSULTATION RESPONSE	JH	JH	MSL

REVISIONS

CLIENT

CELTIQUE ENERGIE PETROLEUM

PROJECT

WISBOROUGH GREEN SITE

TITLE

PROPOSED EXTERNAL ISOLINE CONTOURS FOR ARTIFICIAL LIGHTING (PHASE 2, 3 AND 4 OF PROCESS)

Royal HaskoningDHV
Enhancing Society Together
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DRAWN	CHECKED	APPROVED
JH	JH	MSL
DATE	SCALE AT A0	REF.
22.11.13	1:500	9Y0893-002

DRAWING No. 9Y0893 / 12.1

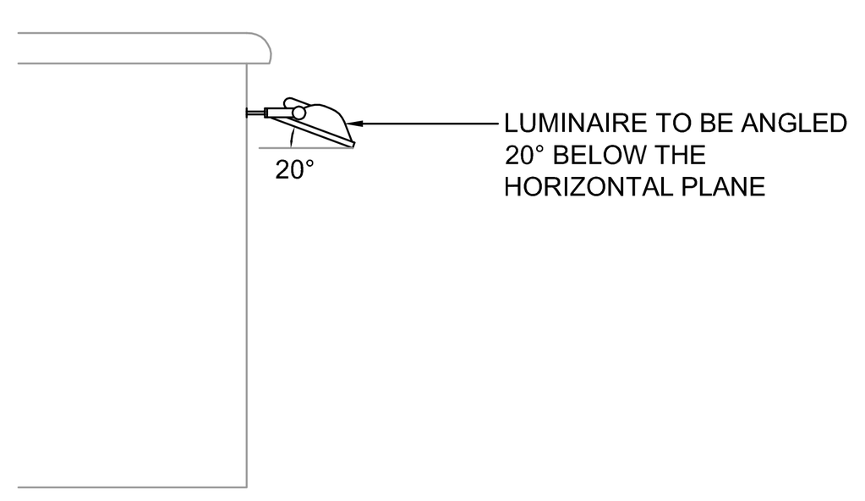
REVISION B

FIGURE 12.2

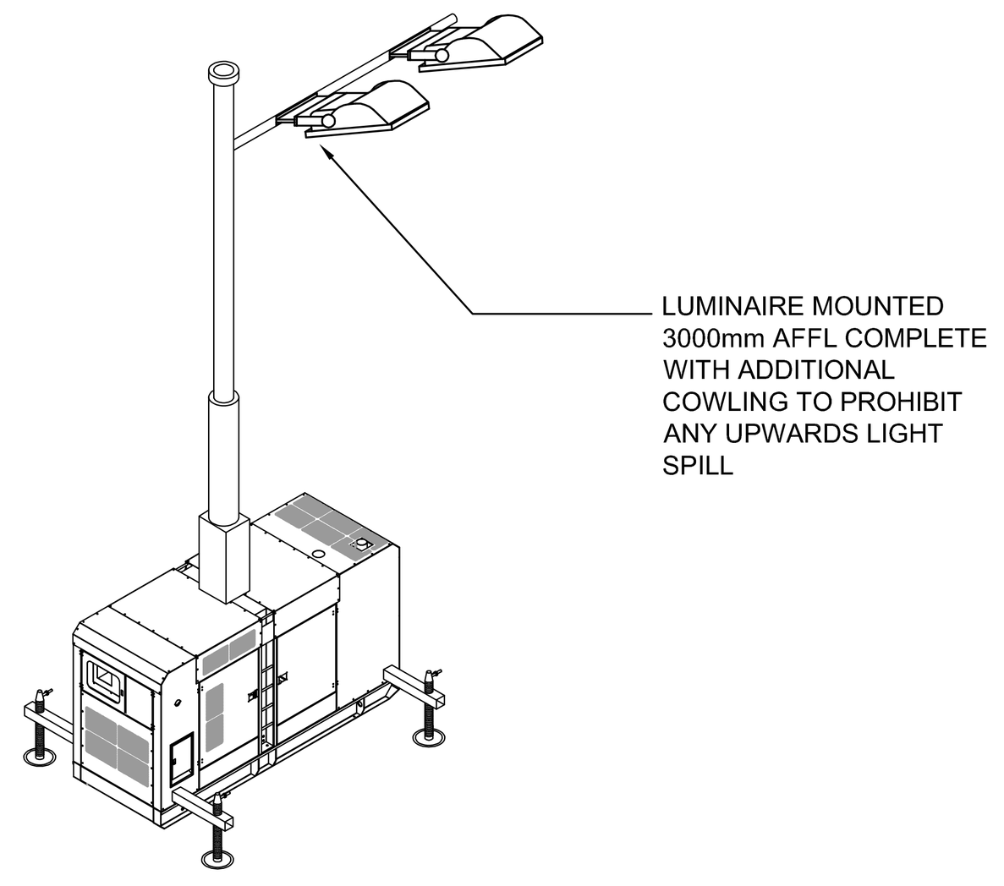
PROPOSED EXTERNAL ISOLINE CONTOURS FOR ARTIFICIAL LIGHTING (PHASE 1 – MOBILISE CONDUCTOR SETTING RIG, DRILL & SET CONDUCTOR PIPE, DEMOBILISE CONDUCTOR SETTING RIG)

DRG No. 9Y0893 / 12.2

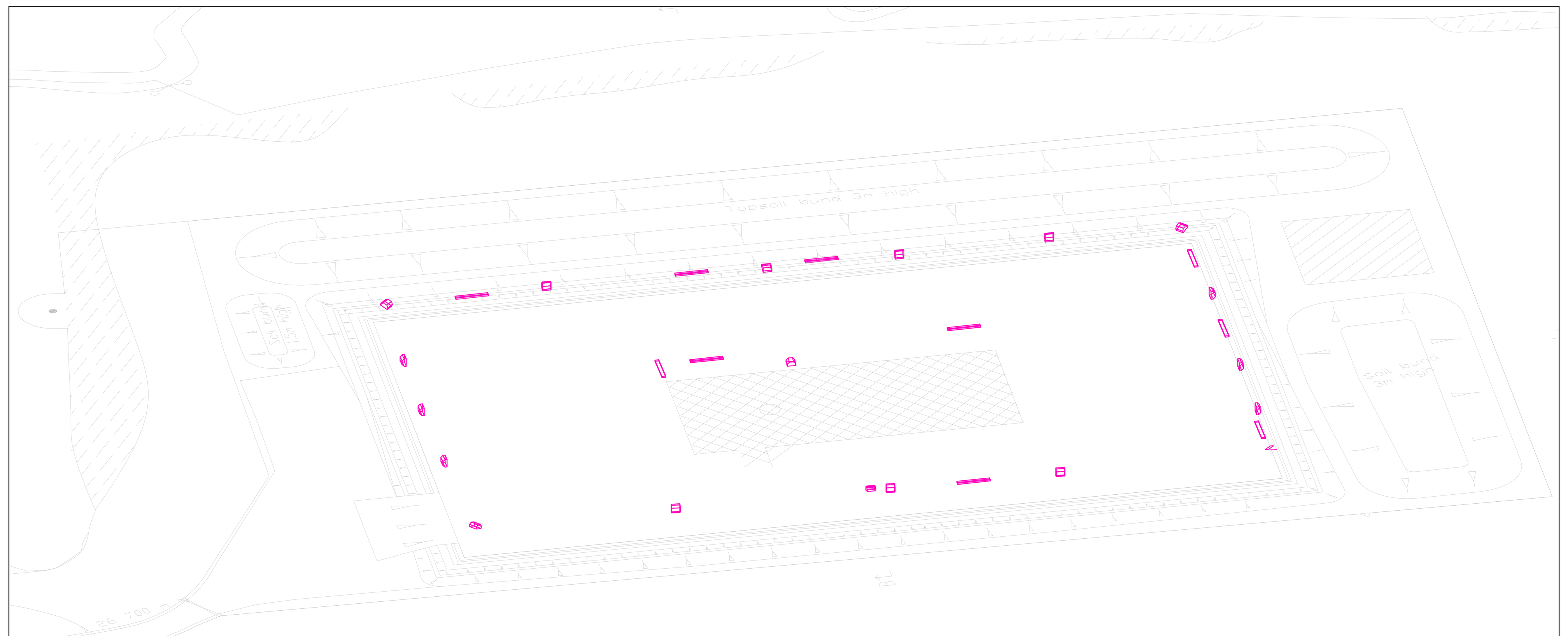
DO NOT SCALE



DETAIL A - EXAMPLE OF CABIN MOUNTED FLOODLIGHT
(SCALE: 1/50)



DETAIL B - EXAMPLE OF FREE STANDING LIGHTING
(SCALE: 1/50)



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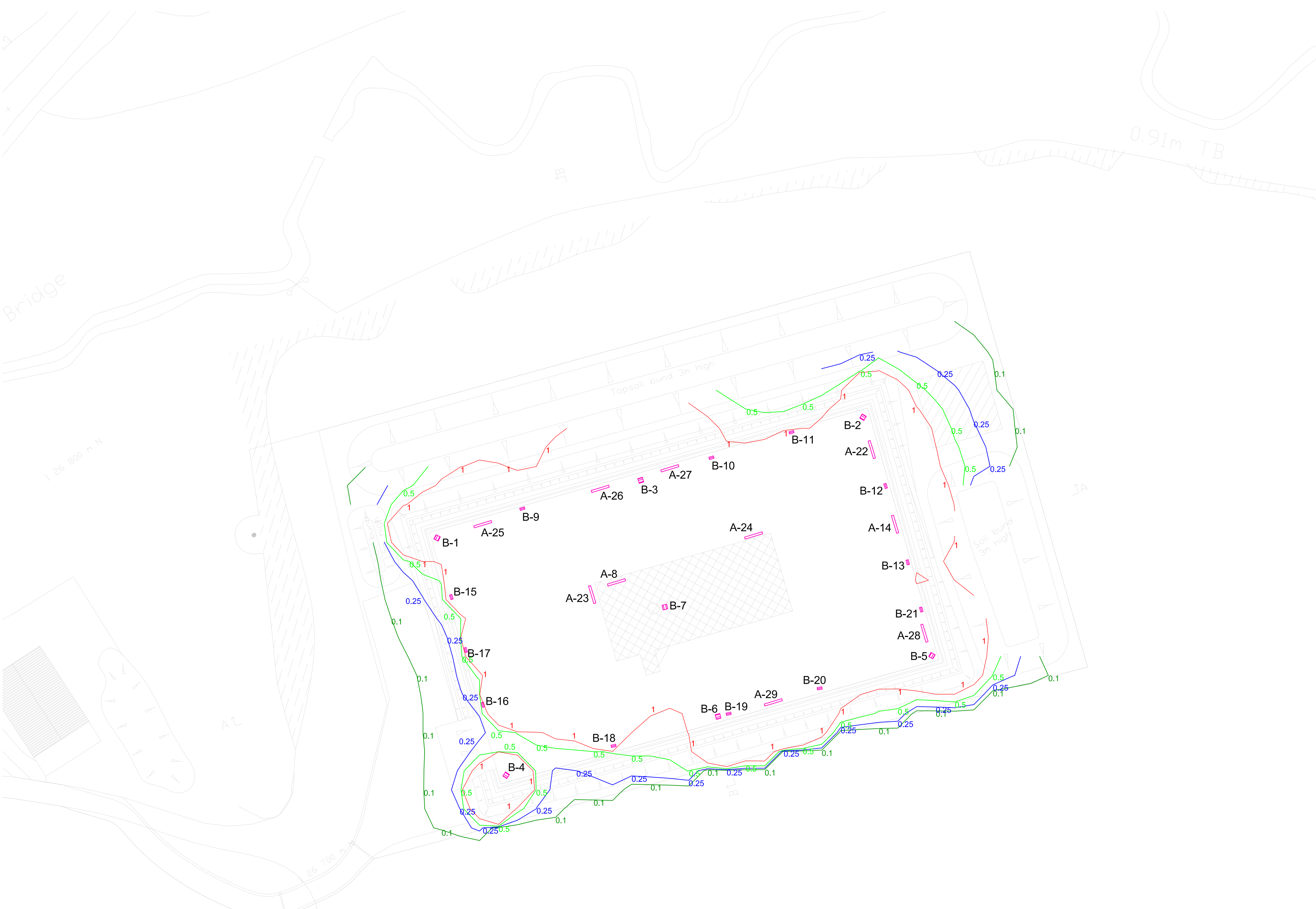

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5. IT IS IMPOSSIBLE TO ACCURATELY MODEL THE DERRICK STRUCTURE. AS SUCH, THE CALCULATION ILLUMINANCE LEVELS ARE SHOWN IN FREE AIR. THE DERRICK STRUCTURE WILL PROVIDE FURTHER LIGHT SHIELDING TO THE ENVIRONMENT.
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- HORIZONTALLY MOUNTED FLUORESCENT LIGHTING SHALL BE ANGLED AT 45° SO AS TO EMIT LIGHT TOWARDS THE GROUND.
- COWLING TO BE PROVIDED TO LIGHTING MOUNTED TO THE CABINS SO AS TO PROHIBIT UPWARD LIGHT.
- WITHIN CALCULATION, EARTH BUNDING HAS BEEN MODELLED TO INDICATE THAT THESE PHYSICAL TECHNIQUES WILL LIMIT THE LIGHT SPILL FROM THE SITE.
- THE EFFECTS OF BATS HAS BEEN CONSIDERED AND THE FOLLOWING LAMP SOURCES ARE USED:
  - FLUORESCENT - WHICH EMITS LOW LEVELS OF U.V.
  - TUNGSTEN HALOGEN - EMITS LOW LEVELS OF U.V. AND IS CONTAINED WITH A GLASS REFLECTOR

LEGEND

0.1 — 0.1lux (LESS THAN MOON LIGHT)
0.25 — 0.25lux (EQUIVALENT TO MOON LIGHT ON A CLEAR DAY)
0.5 — 0.5lux
1 — 1lux (EQUIVALENT TO THE UPPER MEASUREMENTS OF MOON LIGHT)

REV	DATE	DESCRIPTION	BY	CHK	APP
B	14.04.14	LIGHTING LAYOUT AMENDED.	JH	JH	MSL
A	12.12.13	REVISED ISSUE FOLLOWING CONSULTATION RESPONSE	JH	JH	MSL

REVISIONS

CLIENT
CELTIQUE ENERGIE PETROLEUM

PROJECT
WISBOROUGH GREEN SITE

TITLE
PROPOSED EXTERNAL ISOLINE CONTOURS FOR ARTIFICIAL LIGHTING
(PHASE 1 - MOBILISE CONDUCTOR SETTING RIG, DRILL & SET CONDUCTOR PIPE, DEMOBILISE CONDUCTOR SETTING RIG)

5th Floor, Radcliffe House, Blenheim Court, Solihull, B91 2AA
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Royal HaskoningDHV
Enhancing Society Together

DRAWN	CHECKED	APPROVED
JH	JH	MSL
DATE 22.11.13	SCALE AT A0 1:500	REF. 9Y0893-002

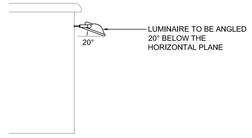
DRAWING No. 9Y0893 / 12.2 — REVISION B

FIGURE 12.3

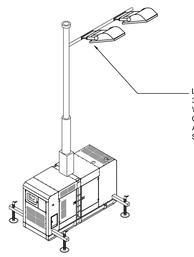
PROPOSED EXTERNAL ISOLINE CONTOURS FOR ARTIFICIAL LIGHTING (PHASE 2, 3 AND 4A)

DRG No. 9Y0893 / 12.3

DO NOT SCALE



DETAIL A - EXAMPLE OF CABIN MOUNTED FLOODLIGHT
(SCALE: 1/50)

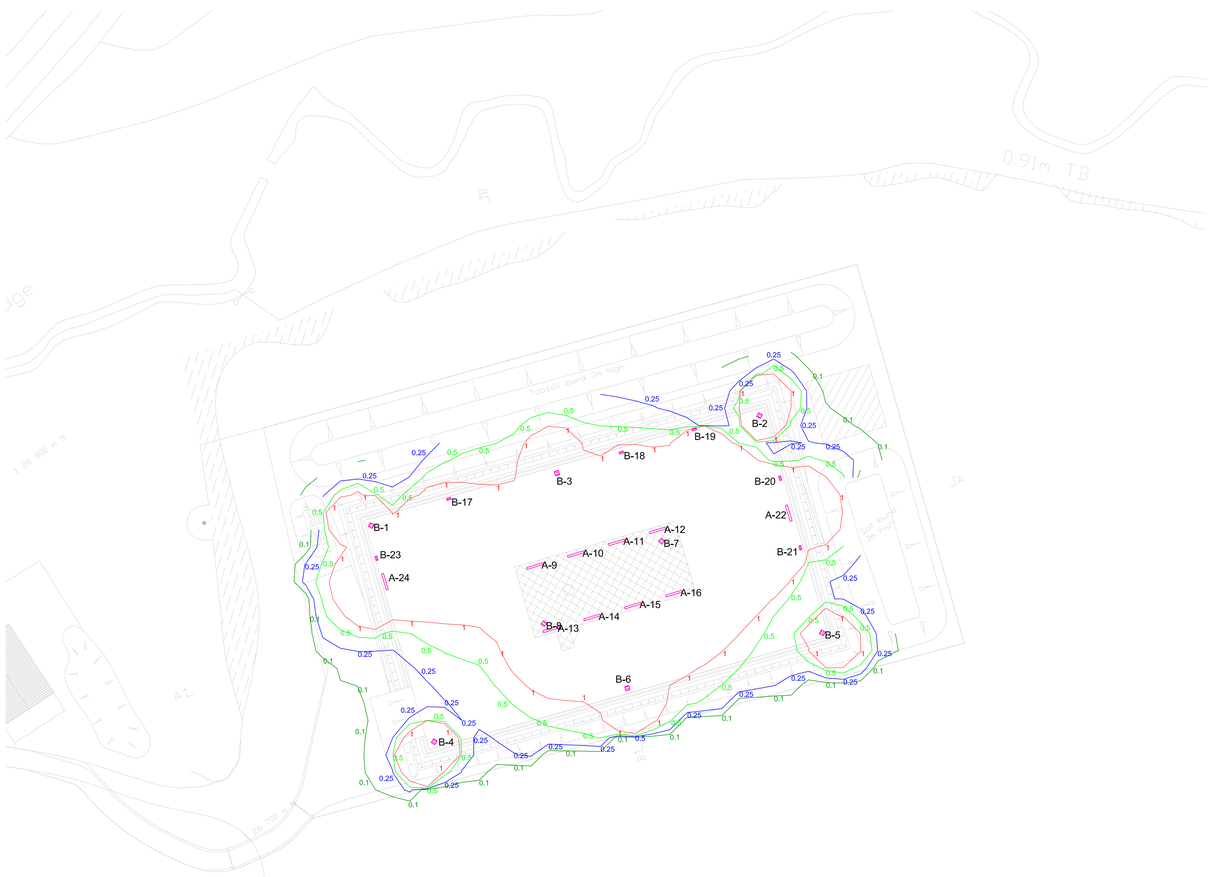


DETAIL B - EXAMPLE OF FREE STANDING LIGHTING
(SCALE: 1/50)

ISOMETRIC VIEW
SCALE: 1/500

LUMINAIRE SCHEDULE

Symbol	Label	Qty	Catalog Number	Description	Lamp	Lumens	LLF	Watts
	B	14	96002201 (STD - Standard)	PRT 3 500W QT-DE/R7s/NL BLK	500W TUNGSTEN HALOGEN	9500	1.00	500
	A	10	96200467 (STD - Standard)	PETRELUX ExEn 2x36w T26 HF	T26 36W	3350	1.00	71



NOTES

1. THE PURPOSE OF THIS DRAWING IS TO SHOW ILLUMINANCE CONTOURS FROM THE FIXED LIGHTING. THE LIGHTING UNITS SELECTED ARE BASED UPON INDUSTRY STANDARD LUMINAIRES AND MAY NOT BE THE EXACT UNITS PROPOSED.
2. THE CONTROL PHILOSOPHY IS FOR LIGHTING TO BE ON DURING HOURS OF DARKNESS. PHOTO-ELECTRIC CELLS TO BE PROVIDED AS NECESSARY.
3. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE RELEVANT SECTIONS OF THE ENVIRONMENTAL STATEMENT. THE ENVIRONMENTAL STATEMENT INCLUDES RELEVANT INFORMATION ON OPERATIONAL HOURS.
4. FOR THE PURPOSES OF THE CALCULATION, NO SHEILDING HAS BEEN MODELLED (INCLUDING THE STRUCTURE OF THE DERRICK). THIS SHOWS WORST CASE LIGHTING SPILL LEVELS OF THE DEVELOPMENT WHEN COMPARED AGAINST MOON LIGHT.
5. IT IS IMPOSSIBLE TO ACCURATELY MODEL THE DERRICK STRUCTURE. AS SUCH, THE CALCULATION ILLUMINANCE LEVELS ARE SHOWN IN FREE AIR. THE DERRICK STRUCTURE WILL PROVIDE FURTHER LIGHT SHIELDING TO THE ENVIRONMENT.
6. LLF - LAMP LUMINANCE FACTOR TAKEN AS 100% OR 1 TO INDICATE WORST POSSIBLE OUTPUT.
7. 2no FLOODLIGHTS SHOWN TO BE ACCURATELY MODELLED SHOWING THE LIGHT SPILL WITH THE RIG FOOTPRINT. UNDER NORMAL CIRCUMSTANCES THESE WILL BE ANGLED DOWNWARDS. IN MAINTENANCE PERIODS THESE WILL BE ANGLED IN THE DIRECTION OF THE RIG STRUCTURE TO FACILITATE A SAFE WORKING ENVIRONMENT.

MITIGATION TECHNIQUES EMPLOYED WITHIN DESIGN

- ALL LUMINAIRES WITH THE EXCEPTION OF THE DERRICK STRUCTURE LIGHTING, WILL BE ANGLED AT 20° BELOW THE HORIZONTAL PLANE. REFER TO DETAIL A.
- TYPE A LUMINAIRES MOUNTED UPON FREE STANDING STRUCTURES SHALL BE COMPLETE WITH ADDITIONAL 'COWLING'. REFER TO DETAIL B.
- HORIZONTALLY MOUNTED FLUORESCENT LIGHTING SHALL BE ANGLED AT 45° SO AS TO EMIT LIGHT TOWARDS THE GROUND.
- COWLING TO BE PROVIDED TO LIGHTING MOUNTED TO THE CABINS SO AS TO PROHIBIT UPWARD LIGHT.
- WITHIN CALCULATION, EARTH BUNDING HAS BEEN MODELLED TO INDICATE THAT THESE PHYSICAL TECHNIQUES WILL LIMIT THE LIGHT SPILL FROM THE SITE.
- THE EFFECTS OF BATS HAS BEEN CONSIDERED AND THE FOLLOWING LAMP SOURCES ARE USED:
  - FLUORESCENT - WHICH EMITS LOW LEVELS OF U.V.
  - TUNGSTEN HALOGEN - EMITS LOW LEVELS OF U.V. AND IS CONTAINED WITH A GLASS REFLECTOR
- 4m HIGH FENCE EMITTING NO LIGHT SHALL BE POSITIONED AROUND THE BOUNDARY PROTECTING THE ENVIRONMENT FROM LIGHT SPILL.
- NO LUMINAIRES SHALL BE POSITIONED ABOVE 6m ABOVE GROUND LEVEL LIMITING LIGHT SPILL.

LEGEND

- 0.1 — 0.1lux (LESS THAN MOON LIGHT)
- 0.25 — 0.25lux (EQUIVALENT TO MOON LIGHT ON A CLEAR DAY)
- 0.5 — 0.5lux
- 1 — 1lux (EQUIVALENT TO THE UPPER MEASUREMENTS OF MOON LIGHT)

REV	DATE	DESCRIPTION	BY	CHK	APP
A	14.04.14	FIRST ISSUE.	JH	JH	MSL

REVISIONS

CLIENT

CELTIQUE ENERGIE PETROLEUM

PROJECT

WISBOROUGH GREEN SITE

TITLE

PROPOSED EXTERNAL ISOLINE CONTOURS FOR ARTIFICIAL LIGHTING (PHASE 2, 3 and 4a)

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DRAWN	CHECKED	APPROVED
JH	JH	MSL
DATE	SCALE AT A0	REF.
22.11.13	1:500	9Y0893-002

DRAWING No. 9Y0893 / 12.3

REVISION A