



Addendum to Planning Application: Lighting Design Strategy for Additional New Lodges at Bike Park Wales

Prepared by Paul Hindle, Director, Lumenata

Table of Contents

1. Executive Summary	3
2. Introduction	4
2.1 Project Description.....	4
2.2 Site Location and Context	4
2.3 Purpose of the Lighting Strategy	4
2.4 Relevant Planning Policies and Legislation	5
3. Baseline Assessment	9
4. Identification of Sensitive Receptors	10
5. Proposed Lighting Design	11
5.1 Lighting Objectives	11
5.2 Luminaire Schedule.....	12
5.3 Mounting Heights	14
5.4 Control Strategy and Operating Hours	14
6. Impact Assessment and Modelling.....	16
6.1 Assessment Methodology	16
8. Conclusions.....	19
Appendices	20
Appendix A: Luminaire Suppliers and Datasheets	20
Appendix B – Site Lighting Layout	26

1. Executive Summary

Addendum to Planning Application: Lighting Design Strategy for Five New Lodges at Bike Park Wales

This addendum presents a revised lighting design strategy for the proposed development of five new lodges at Bike Park Wales, intended to enhance site safety, accessibility, and aesthetic appeal while minimising environmental impact. The strategy builds upon the approved lighting elements from the original planning application, ensuring consistency with the site's overall design ethos and compliance with relevant standards for light pollution control and energy efficiency.

In this updated design, two primary types of lighting fixtures have been incorporated to illuminate pathways, entrances, and key external areas around the lodges. Firstly, the strategy utilises the same bollard lights that were previously approved as part of the original planning application. These bollards, known for their robust construction and low-level illumination, will be strategically placed along access routes to provide subtle, ground-directed lighting that maintains the natural ambiance of the site without causing glare or excessive sky glow.

Secondly, to complement the bollards and address the specific needs of the lodge exteriors, a new wall-mounted light product has been introduced. This fixture is designed for mounting on the outer walls of the lodges, offering focused, downward-directed illumination for doorways, verandas, and immediate surroundings. Selected for its modern, minimalist profile and high-efficiency LED technology, this wall light ensures optimal visibility for guests while integrating seamlessly with the architectural style of the lodges. Full specifications are provided in the technical appendices to demonstrate adherence to best practices in dark sky preservation and sustainability.

Internal lighting within the five new lodges comprises shielded decorative and functional fixtures, including the specified Lindby Tirzana 4-bulb pendant for dining areas and Tattoo 6201 3-light rondel pendant for lounges, both featuring opaque metal shades that direct 100 % of light downward with no horizontal or upward emission. All lamps will be dimmable warm-white LEDs with a correlated colour temperature (CCT) of 2700 K or lower, minimizing blue-light content and ecological disruption.

This lighting approach not only aligns with the original application's approvals but also supports the site's operational requirements as a premier mountain biking destination, promoting safe navigation during low-light conditions without compromising the rural character of the area.

Critical note: The ecological, obtrusive-light, and planning-compliance performance of the entire scheme is wholly dependent on the exact luminaire types, optics, mounting details, shielding, and control settings specified in this document. Any substitution of alternative fittings will invalidate the compliance statements and is very likely to breach planning conditions and/or protected-species legislation. It is therefore essential that the luminaires, controls, and installation details set out in this strategy are adopted without modification at construction stage.

2. Introduction

2.1 Project Description

Bike Park Wales, located in the scenic uplands of Merthyr Tydfil, South Wales, is the UK's leading uplift-assisted mountain bike facility, attracting over 140,000 visitors annually since opening in 2013. Set within Gethin Woodland on land managed by Natural Resources Wales, the park offers an extensive network of graded downhill and cross-country trails, a visitor centre, café, bike shop and upland skills area. To meet growing demand for multi-day visits and to support the local tourism economy, the approved development includes the phased introduction of on-site overnight accommodation. This comprises a mixture of high-quality glamping pods and larger timber-clad lodges, carefully sited to integrate with the existing woodland setting. The accommodation enables riders to extend their stay, reduces pressure on local off-site lodging, and reinforces Bike Park Wales' position as a premier year-round mountain biking destination. This planning addendum specifically addresses the lighting strategy for the five new lodges.

2.2 Site Location and Context

Bike Park Wales is situated within Gethin Woodland, approximately 2 km north-west of Merthyr Tydfil town centre and immediately south of the A470 trunk road. The application site lies on gently sloping, previously disturbed ground within a commercial conifer plantation managed by Natural Resources Wales.

The surrounding area is predominantly upland forestry, interspersed with existing Bike Park Wales infrastructure (uplift track, trails, visitor centre and car parks). To the north and east the site is well screened by dense blocks of mature conifers; to the south and west the land falls away towards open moorland forming part of the Brecon Beacons National Park, located approximately 2.5 km distant at the closest point.

2.3 Purpose of the Lighting Strategy

The purpose of this lighting strategy is to provide a comprehensive and cohesive lighting solution that incorporates the new lodges within the established lighting framework already approved for Bike Park Wales. Rather than introducing an entirely separate or standalone scheme, this strategy has been carefully developed to seamlessly integrate the new accommodation into the existing approved site-wide lighting design.

Wherever practicable, the proposal re-uses the exact bollard luminaires that were assessed and approved under the original planning permission. These proven fittings are employed for all pathway and general circulation lighting around the new lodges, ensuring visual continuity, maintaining the previously accepted low-level character of illumination, and avoiding any need for re-assessment of their performance or environmental impact.

Only where additional building-mounted illumination is required – specifically to safely light entrance doors, verandas and immediate external areas of the lodges themselves – has a new wall-mounted luminaire been introduced. This complementary fitting has been selected to match the colour temperature, output and full cut-off shielding characteristics of the approved bollards, thereby preserving the overall design intent and performance standards of the consented scheme.

This approach minimises change, guarantees consistency with the original approval, and ensures that the new lodges are fully and safely integrated into the existing lit environment without introducing new or unanticipated effects on amenity, ecology or the wider upland landscape.

2.4 Relevant Planning Policies and Legislation

2.4.1 ILP Guidance Note 08/23 – Bats and Artificial Lighting at Night

The Institute of Lighting Professionals, in association with The Bat Conservation Trust has produced a guide for designing lighting schemes that are less harmful to bats. The key points of this report are summarised below:

- All luminaires should lack UV elements
- A warm white spectrum (<2700K) should be adopted to reduce blue light
- Luminaires should feature peak wavelengths higher than 550nm
- Internal luminaires should be recessed in proximity to windows to reduce glare
- The use of low level luminaires such as bollards should be considered where possible
- Column heights should be carefully considered
- Only luminaires with an upward light ratio of 0% and good optical control should be used
- Luminaires should always be mounted on the horizontal plane with no upward light
- A lighting buffer zone should be used where needed
- Screening should be used where needed

All of the above factors have been taken into consideration when designing the lighting for the proposed development as is explained in this report.

2.4.2 ILP Guidance Note 01/21 – The Reduction of Obtrusive Light

The Institute of Lighting Professionals has also issued a guidance note on ‘The Reduction of Obtrusive Light’. In this report, the ILP defines Sky Glow as the brightening of the sky at night, something that we aim to avoid to protect dark skies. The report also states that the primary approach to limit sky glow is to use luminaires with an upward light ratio of 0%, as shown in the extract from the report below:

The Reduction of Obtrusive Light

Limitation of skyglow

Table 6 (CIE 150 table 5): Maximum values of upward light ratio (ULR) of luminaires

Light technical parameter	Environmental zones				
	E0	E1	E2	E3	E4
Upward light ratio (ULR) / %	0	0	2.5	5	15

Note 1 This is the primary approach to limit skyglow and is suitable to compare different single luminaires and mitigate the contribution of each luminaire within an installation.

Therefore, all exterior luminaires used in this lighting design have an upward light ratio of 0%, to protect the dark skies in the area of the site.

2.4.3 Guidance Notes local to the site

Given the site's location, several national and local guidance documents are particularly pertinent to the proposed lighting strategy. These emphasise minimising light pollution, protecting dark sky qualities, and ensuring ecological and amenity benefits in rural, elevated settings. Key summaries are outlined below, focusing on aspects directly applicable to low-level, shielded lighting for pathways and lodge exteriors.

Welsh Government: Good Practice Guidance – Planning for the Conservation and Enhancement of Dark Skies (2025)

This pioneering national guidance, launched in February 2025 and developed in partnership with NRW, local authorities, and designated landscapes (including Brecon Beacons), provides best practices for integrating lighting into planning decisions while preserving Wales's dark skies—over 68% of which fall into the darkest categories. Relevant to this upland site:

- **Lighting Design Principles:** Prioritise fully shielded, downward-directed fixtures (e.g., bollards and wall lights) to eliminate upward light spill, glare, and sky glow. Warm colour temperatures (below 3000K) and low lumen outputs are recommended for rural areas to maintain natural night-time cycles.
- **Integration with Approvals:** Encourages reusing approved fittings (as proposed here) to ensure consistency and avoid re-evaluating environmental impacts. Energy-efficient LEDs with timers or motion sensors are advocated to reduce carbon footprints and operational costs.
- **Outcomes:** Aligns with well-being goals under the Well-being of Future Generations Act, benefiting wildlife (e.g., bats in Gethin Woodland) and the site's role as a year-round destination.

The full document is available via GOV.WALES and is commended by DarkSky International for its role in positioning Wales as a leader in dark sky protection.

Merthyr Tydfil County Borough Council: Light Nuisances and Light Pollution Guidance (Updated 2022)

Under the Merthyr Tydfil Replacement Local Development Plan (LDP) 2016–2031, this environmental health guidance addresses statutory nuisances from artificial light under Section 102 of the Clean Neighbourhoods and Environmental Protection Act 2005. Tailored to the county's mix of urban and rural zones, it is highly relevant given the site's proximity to scattered dwellings (over 1 km away) and its status as an outdoor sports facility:

- **Nuisance Prevention:** Lighting must not prejudice health or amenity (e.g., no intrusion into nearby properties). A "best practicable means" defence applies to recreational sites like Bike Park Wales but requires evidence of minimised spill—achieved here through shielded bollards and wall lights.
- **Exemptions and Controls:** Street or pathway lighting is exempt if not from premises, but lodge-mounted lights must avoid sky glow. The guidance stresses PIR sensors and timers to limit operation to necessary periods, aligning with the site's low-light navigation needs.

- **Planning Integration:** Supplementary Planning Guidance (SPG) under the LDP reinforces pollution controls in sensitive landscapes, supporting the strategy's reuse of approved bollards to maintain visual continuity.

Available on the Merthyr Tydfil CBC website, this ensures compliance with local enforcement priorities.

Welsh Government: Planning Permission and Building Regulations for Lighting (Ongoing)

These technical notes provide baseline controls for external installations, applicable across Wales and reinforced in the LDP:

- **Planning Controls:** Minor domestic fittings are permitted, but security or functional lighting (e.g., for lodges) must avoid neighbour disturbance. Direct beams at ground level, use PIR/timers to prevent unnecessary activation, and consult on listed or sensitive sites—though not applicable here, the rural context demands similar caution near the National Park.
- **Energy Efficiency (Building Regs Part L):** External lights must use lamps $\leq 150\text{W}$ with auto-off in daylight/unneeded hours, or fittings compatible with >40 lumens per circuit-watt efficacy. The proposed LED bollards and wall lights meet this, promoting sustainability in NRW-managed woodlands.

These are accessible via GOV.WALES and the Planning Portal, ensuring the design supports broader net-zero goals.

Natural Resources Wales: Dark Skies and Light Pollution Map and Associated Advice (2023–Ongoing)

NRW's interactive map, based on 1:30am satellite data, classifies Gethin Woodland as a low-pollution upland area. Key points for this site:

- **Pollution Mitigation:** Upgrade to shielded, downward-pointing lights to counteract sky glow from adjacent uplifts or trails. Dimming, part-night operation, or full shut-off where safe is encouraged, directly supporting the strategy's integration with existing approved schemes.
- **Woodland Management Link:** Under the Gethin Forest Resource Plan (approved 2016), recreation (including Bike Park trails) must balance with environmental protection. Lighting should enhance tourism without fragmenting habitats, using the map as evidence for no impact on adjacent ancient woodlands or moorland.
- **Broader Benefits:** Promotes dark sky-friendly designs in planning applications to protect biodiversity and enable green recovery post-development.

The map and guidance are hosted on NRW's site, providing a robust evidence base for the addendum.

These notes collectively affirm the strategy's approach, ensuring the new lodges enhance safety and accessibility while upholding the site's dark rural character. Full compliance is demonstrated through photometric data and site-specific modeling in the technical appendices.

2.4.4 ILP Environmental Zones

The Institution of Lighting Professionals (ILP) Guidance Notes for the Reduction of Obtrusive Light (GN01:2021) define environmental zones to categorise areas based on their ambient brightness and sensitivity to light pollution, guiding appropriate lighting designs to minimize sky glow, glare, and ecological impacts. These zones range from E0 (darkest, most protected) to E4 (brightest, urban), with recommended limits on upward light ratio (ULR), illuminance, and luminous intensity. The zones help ensure lighting is proportionate to the surroundings, preserving dark skies in sensitive areas while providing necessary safety in others.

Zone Surrounding Lighting Environment			Examples
E0	Protected	Astronomical observable dark skies	UNESCO Starlight Reserves, IDA Dark Sky Places
E1	Natural	Intrinsically dark landscapes	National Parks, Areas of Outstanding Natural Beauty (AONB)
E2	Rural	Low district brightness	Villages, relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Small town centres, suburban residential areas
E4	Urban	High district brightness	Town/city centres with high night-time activity

For the Bike Park Wales site in Gethin Woodland, the appropriate ILP environmental zone is E2 (Rural). This classification is based on the site's location in a low-pollution upland area, its rural character within commercial forestry, and the absence of nearby urban development or high night-time activity. While proximate to the Brecon Beacons National Park (2.5 km away, which would typically be E1), the site itself falls outside formally protected boundaries and features existing low-level infrastructure like trails and car parks, justifying E2 to balance safety needs with light pollution controls.

Minimum Average Lux Levels for Footpaths

The Institution of Lighting Professionals (ILP) provides guidance on exterior lighting through documents like GN01:2021 for obtrusive light reduction and by endorsing British Standards such as BS 5489-1:2020 (Code of Practice for the Design of Road Lighting) and BS EN 13201-2:2015, which define performance requirements for pedestrian areas including footpaths. In an E2 rural environmental zone, characterized by low district brightness and minimal ambient light (e.g., villages or outer suburban areas), the recommended minimum average horizontal illuminance for footpaths is 5 lux, corresponding to lighting class P4. This level is selected based on factors such as low pedestrian traffic volume, reduced crime risk, and the need to prioritize dark sky preservation, ensuring safe navigation while limiting over-illumination; it includes a minimum point illuminance of 1 lux for uniformity, with adjustments possible via risk assessment to potentially lower to P5 (3 lux) or P6 (2 lux) in very quiet rural settings, or higher if specific hazards warrant it.

3. Baseline Assessment

No pre-development baseline night-time lighting survey or sky-quality measurement has been carried out as part of this Lighting Strategy.

4. Identification of Sensitive Receptors

Summary of the Preliminary Ecological Appraisal (PEA) Report

This PEA is highly relevant to the lighting strategy for the five new lodges, as it underscores the site's ecological sensitivity—particularly for light-averse nocturnal species like bats (confirmed foraging/commuting corridor with six species, including vulnerable brown long-eared, *Myotis*, and lesser horseshoe), hazel dormice (likely present in connected woodland), otters (potential commuters), and amphibians/reptiles (on-site presence). The report explicitly flags artificial lighting as a key risk, potentially causing significant impacts on foraging/ roosting behaviours, habitat fragmentation, and disturbance in this currently daytime-only site transitioning to overnight use.

It directly references and endorses the sensitive lighting strategy from the 2025 EclA (Appendix VII), emphasizing dark corridors, minimised spill, and bat-friendly designs—aligning seamlessly with the proposed strategy's use of the previously approved bollards (no PIR for continuity) and new 1.8 m wall lights (2700K LEDs, >550 nm peaks, zero UV, horizontal mounting for zero glare, 0% ULOR). These features ensure compliance with recommendations for shielded, warm-tone, low-output fixtures to preserve woodland connectivity, reduce sky glow, and support dark sky qualities near SINCs and the Brecon Beacons fringe. By integrating PIR controls only on verandas (private areas), the strategy avoids patchy activation that could disrupt site-wide uniformity while mitigating broader ecological risks. This PEA validates the approach as a low-impact extension of the approved scheme, contributing evidence for planning addendums and Net Biodiversity Gain. If implemented, it would prevent the "new artificial lighting" impacts noted, enhancing safety without ecological harm.

5. Proposed Lighting Design

5.1 Lighting Objectives

The primary objectives of this lighting strategy are as follows:

1. **Consistency with the Approved Scheme** To provide safe and effective illumination for the pathways, access routes, entrance areas and immediate external spaces of the new lodges using, wherever possible, the exact same bollard luminaires that were previously assessed, approved and successfully implemented under the original planning permission. This ensures visual and technical continuity across the entire Bike Park Wales site and avoids any requirement to re-evaluate fittings that have already been accepted by the local planning authority.
2. **Safe and Functional Lighting** To deliver appropriate levels of illumination to satisfy health and safety requirements for guests, staff and emergency access, particularly during hours of darkness. This includes clear definition of pathways, steps, ramps and entrance doors to minimise trip hazards and enable confident navigation in a rural, sloping woodland environment.
3. **Full Compliance with Regulatory and Best-Practice Standards** To ensure the lighting installation fully complies with all relevant legislation, planning policy and guidance, including (but not limited to):
 - Health and safety obligations under the Health and Safety at Work etc. Act 1974 and the Management of Health and Safety at Work Regulations 1999;
 - Building Regulations Part L (energy efficiency) and Part B (fire safety – emergency escape lighting routes);
 - Statutory nuisance controls under the Environmental Protection Act 1990;
 - Ecological protection requirements, particularly with regard to bats and other light-sensitive species present in Gethin Woodland (as informed by the site's EclA and NRW guidance);
 - National and local dark-sky policy, including the Welsh Government's Good Practice Guidance on Planning for the Conservation and Enhancement of Dark Skies (2025), NRW Dark Skies advice, and Merthyr Tydfil CBC light pollution guidance.

By reusing the approved bollard range for all ground-level and pathway lighting, and by carefully selecting a new, fully shielded, warm-tone wall light that matches the performance characteristics of the existing fittings, the strategy achieves these objectives with the minimum possible deviation from the consented scheme while fully satisfying current health, safety, ecological and dark-sky requirements.

5.2 Luminaire Schedule

The lighting strategy for the five new lodges employs only two luminaire types, selected to ensure continuity with the consented scheme and full compliance with current dark-sky, ecological and regulatory requirements:

1. Approved Pathway Bollards (re-used from the original planning permission)

Model: Collingwood Lighting Model - BL03FIS27 – 2700K LED Bollard – Timber Finish

These are the identical bollards that were submitted, assessed and approved under the original planning application for Bike Park Wales. No change is proposed to their specification, location principles or performance. Their continued use for all pathways around the new lodges guarantees complete consistency with the established and accepted site-wide lighting character.

2. New Lodge Wall-Mounted Exterior Luminaire

Model: Illorion Ltd 16576587M15 – 2700K Wall Light – Corten Finish

This compact, purpose-designed exterior wall light has been introduced solely where building-mounted illumination is required. It has been rigorously selected to match or exceed the environmental performance of the approved bollards and fully complies with the latest bat-friendly and dark-sky standards. Key technical characteristics include:

- Colour temperature: 2700 K (warm white)
- No UV Light emitted
- Peak Wavelengths above 550nm
- LEDs mounted in horizontal plane
- LEDs mounted inside the luminaire body to virtually eliminate glare
- Upward light ratio of 0%

3. Decorative Dining Pendant Light

Model: Lights.co.uk Lindby Tirzana pendant light – 4 bulb - black

The dining table lighting within the new lodges utilises the Lindby Tirzana 4-bulb pendant light, selected for its design that ensures responsible and dark-sky-friendly illumination. Featuring opaque black iron metal shades (with a gold-tinted interior for cozy reflections), the fixture directs 100 % of emitted light downward onto the table or surface below, with no upward, sideways, or horizontal projection; the shades fully obscure the light sources from horizontal viewing angles, eliminating direct glare and preventing visibility of the bulbs from outside or within the lodge at eye level.

These pendants will be equipped with dimmable 2700 K LED lamps (E27 base, low-wattage for energy efficiency), mounted at a maximum height of 2 m above floor level to further contain light output close to the intended surface and minimize any potential for spill through windows.

This configuration aligns with best-practice dark-sky principles (e.g., Welsh Government 2025 Guidance, Bat Conservation Trust/ILP GN08/23, and DarkSky International

recommendations for lodging), using warm-spectrum LEDs to reduce blue-light content that could disrupt nocturnal species or contribute to external spill, sky glow, or ecological disturbance. Key technical features of this light include:

- No UV Light emitted
- Peak Wavelengths above 550nm
- LEDs mounted in horizontal plane
- LEDs mounted inside the luminaire body to virtually eliminate glare
- Upward light ratio of 0%

4. Decorative Lounge Pendant Light

Model: Lights.co.uk Hanging light Tattoo 6201 3-light rondel black/gold

The lounge lighting within the new lodges includes the Tattoo 6201 3-light rondel hanging light (black/gold) as the specified decorative lounge pendant fixture, chosen for its design that promotes responsible, contained illumination in line with dark-sky and ecological sensitivities.

The fixture features three individual lampshades (Ø 18 cm, height 17 cm) that direct light downward onto the lounge area below, creating a warm, inviting ambiance while eliminating sideways or upward spill. The opaque shades effectively shield the light sources from horizontal and side viewing angles, preventing direct visibility of the bulbs and reducing glare or external light escape.

These pendants will be equipped with dimmable 2700 K LED lamps (E27 base, low-wattage for energy efficiency), suspended at a maximum height of 2 m above floor level to keep light output focused close to the intended surface and further limit potential spill through windows.

This setup adheres to best-practice dark-sky principles (e.g., Welsh Government 2025 Guidance, Bat Conservation Trust/ILP GN08/23, and DarkSky International recommendations for rural lodging), utilising warm-spectrum LEDs to curtail blue-light disruption to nocturnal species and also ensuring no contribution to external spill, sky glow, or ecological disturbance in the surrounding Woodland. Key technical features of this light include:

- No UV Light emitted
- Peak Wavelengths above 550nm
- LEDs mounted in horizontal plane
- LEDs mounted inside the luminaire body to virtually eliminate glare
- Upward light ratio of 0%

5. Bathroom Recessed Downlights

Model: Illorion Limited - Part No – FRDL-L-MW-R

Recessed low glare IP65 rated LED downlights are used in the bathrooms of the lodges. These lights are selected as

- Colour temperature is 2700K warm-white, well below the 3000K threshold routinely required by local authorities and ecologists for bat-sensitive rural sites.
- The LED sources have a spectral power distribution with peak wavelengths > 500 nm and contain no measurable output in the ultraviolet (< 400 nm) or blue-rich (< 470 nm) bands that are known to be most disruptive to nocturnal insects and bats.
- All light emission is directed downward with the LED light sources mounted in the horizontal plane with zero tilt.
- The optical design and full cut-off shielding deliver an Upward Light Ratio (ULR) of 0 %, eliminating all direct sky glow.

These characteristics ensure that the downlights present negligible risk to the protected bat species and other nocturnal wildlife on and immediately adjacent to the site, while still providing the necessary illumination for safe access, security, and wayfinding.

6. General Recessed Downlights

Model: Illorion Limited - Part No – FRDL-A-MW-R

Recessed tiltable LED downlights are used in the other area of the lodges, eg corridors, kitchen, dining room and lounge. These lights do not need to be low glare as they are installed in the ceilings above the glazing levels so are shielded by the solid walls above this shielding. The ability to tilt the light sources works well with the vaulted ceilings. These lights are selected as:

- Colour temperature is 2700K warm-white, well below the 3000K threshold routinely required by local authorities and ecologists for bat-sensitive rural sites.
- The LED sources have a spectral power distribution with peak wavelengths > 500 nm and contain no measurable output in the ultraviolet (< 400 nm) or blue-rich (< 470 nm) bands that are known to be most disruptive to nocturnal insects and bats.
- All light emission is directed downward with the LED light sources mounted in the horizontal plane with zero tilt.

These characteristics ensure that the downlights present negligible risk to the protected bat species and other nocturnal wildlife on and immediately adjacent to the site, while still providing the necessary illumination for safe access, security, and wayfinding.

5.3 Mounting Heights

Wall lights are mounted at 1.8m above finished floor level. Bollards are 1m high.

5.4 Control Strategy and Operating Hours

To maintain full consistency with the exterior lighting scheme approved under the original planning permission, the control strategy for the exterior lighting mirrors the established approach already in place across the wider Bike Park Wales site:

Pathway and general circulation lighting. All pathway illumination around the new lodges is provided exclusively by the re-used approved bollards. These bollards, as implemented

throughout the original consented scheme, operate without presence detection and are controlled solely by a site-wide astronomical time clock with dusk-to-dawn operation. For complete visual and operational continuity, no presence detectors or PIR sensors have been incorporated into any bollards serving pathways in the new lodge area.

Wall-mounted lights serving pathways and entrance areas The new wall lights that primarily illuminate shared pathways, steps, or entrance routes immediately adjacent to the lodges are wired and controlled in exactly the same manner as the approved bollards (i.e., dusk-to-dawn via the central astronomical time clock, no presence detection). This ensures a uniform lit appearance and avoids any sudden or patchy activation that would differ from the established character of the site.

Veranda and private external seating areas The only exception to the above is a limited number of the same wall-mounted luminaires positioned specifically to serve the private verandas of individual lodges. These fittings are separately circuited and controlled by a discreet PIR occupancy sensor mounted on the veranda ceiling. Activation is therefore on-demand only, limited to the immediate private area of each lodge, and timed to switch off automatically after 5 minutes of no detected movement. This arrangement provides convenience and security for guests using their private outdoor space late at night without affecting the consistent low-level pathway lighting or introducing additional light spill into the wider woodland environment.

Lodge Interior Lighting will be controlled as required by the user/guest.

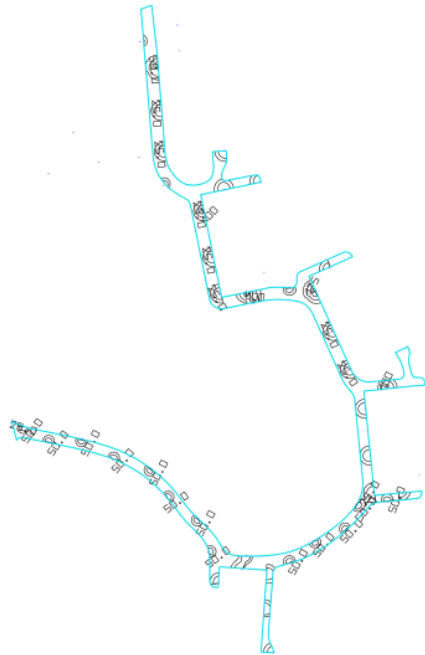
This layered control approach preserves the calm, uniform and low-impact lighting character already accepted by the local planning authority, while offering practical guest-focused functionality exactly where it is needed on the verandas.

6. Impact Assessment and Modelling

6.1 Assessment Methodology

The entire lighting scheme has been modelled using Dialux Light Modelling Software, incorporating the exact IES photometric files supplied by the manufacturers of the specified wall lights and LED bollards.

6.1.1 Illumination of Footpaths



Properties	$\bar{E}$	E_{min}	E_{max}	$U_o (g_1)$	g_2	Index
PATHWAYS Perpendicular illuminance (adaptive) Height: 0.150 m	21.7 lx	0.028 lx	184 lx	0.001	0.000	RS2

The image above illustrates the calculated illumination levels across the pathways in the extended lodge area at Bike Park Wales, when exterior lighting only is illuminated. The average lux values are greater than the recommended minimum of 5 lux for a P4 class footpath in an E2 rural zone. This elevated average is primarily due to the supplementary light contribution from the wall-mounted luminaires on the lodge exteriors, which overlap with the pathway areas and naturally increase the overall illuminance in those zones.

Additionally, the bollards produce localised peaks of 50 lux or more directly beneath each fixture, further boosting the pathway average, though the photometric distribution of these bollards results in darker spots between them where light levels drop to maintain energy efficiency and minimise over-illumination.

In practice, the paths remain well-lit for safe navigation without being overlit in the inter-lodge areas, ensuring the scheme fully complies with BS 5489-1:2020 standards, ILP guidance, and ecological considerations for dark sky preservation.

The only means to reduce the average lux level of the pathway would be to install the lights further apart, but that would produce dangerously large dark patches on the path that must be avoided.

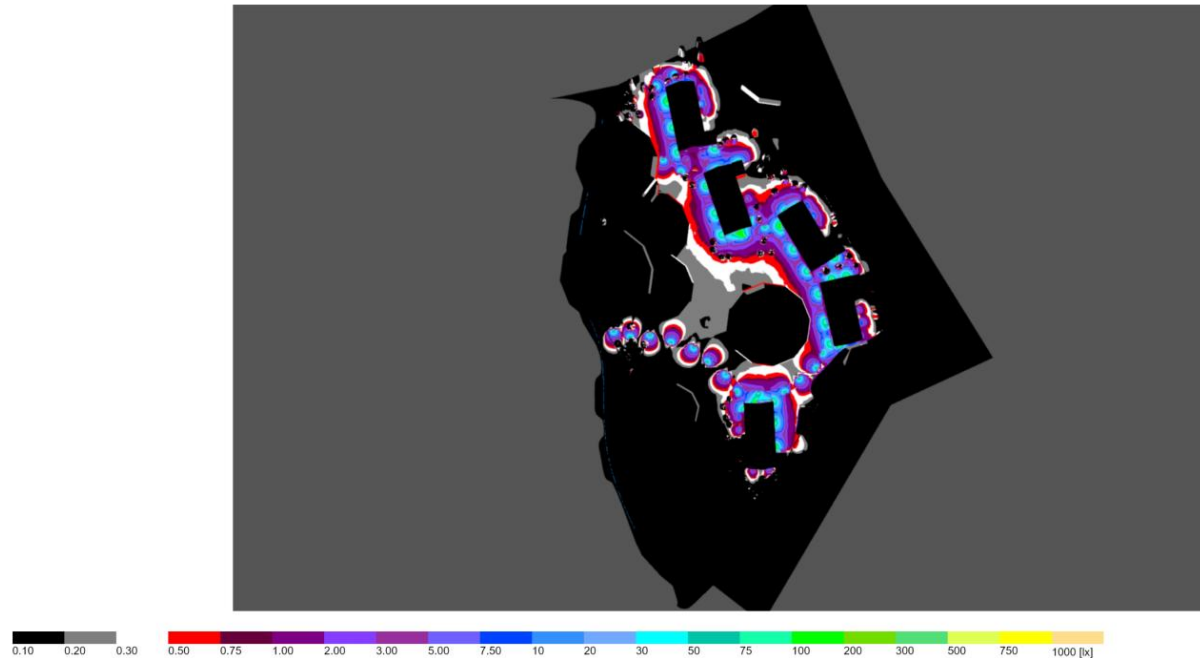
6.1.2 Lodges- Exterior Lighting

The entrances and verandas of the five new lodges are adequately and safely illuminated by the specified wall-mounted luminaires (2700 K, peak wavelengths >550 nm, zero UV emission, LEDs mounted horizontally within a fully shielded body achieving 0 % upward light output ratio). These fittings, installed at 1.8 m height, provide focused downward illumination only onto the immediate doorways, steps and private decked areas, delivering comfortable light levels for guest arrival, departure and evening use without glare or unnecessary brightness. Due to the full cut-off optics and precise beam control, no measurable light spill occurs beyond the lodge footprints or onto the surrounding woodland, pathways outside the immediate entrance zones, or the site boundary. This ensures complete compliance with the site's sensitive lighting strategy (EcIA Appendix VII), preserves established dark corridors for bats and other nocturnal species, and prevents any adverse ecological impact on the light-sensitive habitats and species confirmed present.



6.1.3 Site Wide Light Spill from Lighting

The model below reflects an absolute worst case scenario when all the interior and exterior lights are illuminated. The colours represent the predicted lux levels at ground level.



As can be seen all illumination is kept well away from the bat flight path that is at the left hand side of the image above.

Light spill to the boundary of the site is kept below 0.5 lux by careful positioning of the exterior wall lights and the use of screening in the form of planting where needed (please see landscaping plans for further information).

The above image is provide as a separate high resolution file for more detailed analysis.

8. Conclusions

This lighting strategy for the five new lodges at Bike Park Wales fully complies with all relevant legislation, planning policy, and best-practice guidance, including the Welsh Government's Good Practice Guidance on Planning for the Conservation and Enhancement of Dark Skies (2025), ILP Guidance Note 01:2021, BS 5489-1:2020, the Bat Conservation Trust/ILP Guidance Note 8 (2023), and the sensitive lighting recommendations contained within the site's Ecological Impact Assessment (WWE22067 EclA Rev D). By re-using the exact bollard luminaires approved under the original planning permission and introducing only one highly specified, fully shielded wall light with bat- and dark-sky-friendly characteristics (2700 K, peak wavelengths >550 nm, zero UV, 0 % ULOR), the scheme ensures safe navigation for guests while minimising light spill, glare, and ecological impact in this sensitive upland woodland setting. The strategy also considers interior lighting and its control through fully shielded decorative and functional fixtures (such as the Lindby Tirzana 4-bulb dining pendant and Tattoo 6201 3-light lounge rondel pendant), both equipped with dimmable 2700 K LED lamps and opaque metal shades that direct light 100 % downward with no horizontal or upward emission, mounted at a maximum of 2 m above floor level and supported by blackout blinds or low-transmittance glazing on windows and glazed doors. This integrated approach containing interior light prevents contribution to external spill, sky glow, or disruption, providing a scheme with minimal impact to the sensitive bat corridors and dark corridors adjacent to the site.

Although photometric modelling indicates that average illuminance on some pathway sections exceeds the 5 lux minimum recommended for P4-class footpaths in an E2 rural zone, this modest increase is attributable solely to beneficial spillage from the wall lights mounted on the lodges themselves, which supplement the bollard lighting in the immediate vicinity of entrances and verandas. The bollards alone deliver localised peaks of ≥ 50 lux directly beneath each fitting, with lower levels between them, resulting in a balanced and appropriately dim overall environment that remains well below levels that would constitute over-lighting or cause material harm.

As a result of dense planting/screening, there is no light spill greater than 0.5 lux beyond the site boundary and onto the adjacent open field to the south/south-east.

Critical Implementation Requirement The ecological, obtrusive-light, and regulatory compliance of the entire scheme is wholly dependent upon the exact luminaire types, optics, mounting details, shielding arrangements, and control settings specified in this document. Any substitution of alternative fittings or modifications during construction will invalidate the compliance statements presented herein and is very likely to breach planning conditions and/or protected-species legislation. It is therefore essential that the luminaires, controls, and installation details set out in this approved strategy are adopted without alteration at construction stage.

Appendices

Appendix A: Luminaire Suppliers and Datasheets

The of the luminaires used in this report are details below with data sheets provided on the following pages.

Drawing Ref	Part Code	Quantity	Supplier	Supplier Tel	Supplier Email
WL01	16576587M15	31	Illorion Ltd	01772 319 185	info@illorion.co.uk
B	BL03FIS27	23	Collingwood	01604 495151	sales@collingwoodgroup.com
DL03	TBC	5	Lights.co.uk	N/A	N/A
DL04	TBC	5	Lights.co.uk	N/A	N/A
DL02	FRDL-L-MW-R	20	Illorion Ltd	01772 319 185	info@illorion.co.uk
DL01	FRDL-A-MR-R	90	Illorion Ltd	01772 319 185	info@illorion.co.uk



BL03

Straight to mains Irako wood

FEATURES

IP rating	IP65
IK rating	Other
CSP Switchable	Single CCT
Sensor Option	No
Dimmable Option	No
LED Lifetime	L70 70,000h
Colour Rendering Index	CRI>95
Colour Consistency	SDCM3
Emergency Option	No

INSTALLATION INFORMATION

Input	200-240V AC
Maximum Ambient Temperature	35°C
Weight	5000g
Inrush Current	45A 0.037ms
Construction Material	Irako wood
UK Bathroom Zone	N/A
SELV	Yes
Electric Class (I, II, III)	I
Earth Leakage	GI
Suitable for coastal areas	Yes (with appropriate treatment)
UK Building Regulations	N/A

PHOTOMETRICS @ 25°C

Product code	Finish	Type	W	Colour	Beam	lm	lm/W	Lx @ 1m	Energy
BL03F527	Natural	Triple LED Chamfered	5W	2700K	30°	154	31	78	

Energy rating is a reflection of the LED light source

WIRING INFORMATION

Cable / Flying Lead	NEW 13mm SV 3 Core PVC Sheel Braid Cable 2M Length
Type of Wiring Required	Parallel

LED DRIVER

Driver	Input	SELV	Dimming	Bathroom Zone
N/A (Integrated SELV driver)	200-240V	Yes	N/A	N/A

ACCESSORIES

80L LED BRACKET	Stainless steel bracket for 80L LED range	Sold Separately
JBS	Gel filled junction box	Sold Separately

COLLINGWOOD
LIGHTING

LIGHTING INNOVATION

5W 5W at 350mA or 700mA

Coastal Protected

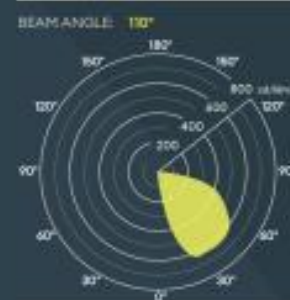
IP65 IP65 ideal for outdoor areas

WARRANTY

Warranty 7 years

FEATURES & BENEFITS

Choice of wood finishes Irako, Sapelo or Oak
Painted, Chamfered or Osmel top
Choice of low-voltage or straight-to-mains
Side-entry cable or base-entry cable options
Three colour temperature options: 2700K,
3000K or 4000K
7 year warranty





Datasheet

16576587M15



Features

- Low Glare Wall Light
- Warm White LEDs
- Corten Finish

Application

- Low glare exterior wall light with 0% upward light ratio to help protect dark skies

Specifications

General

- Size 89mm high x 89mm wide x 88mm high
- Colour Corten (dark brown)

Electrical

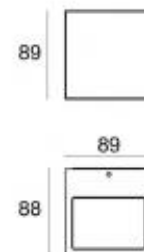
- Voltage 200-240v
- Wattage 8.7w
- Driver Built in Driver

Optical

- Lumen 849 lm
- CCT 2700K
- CRI 80+,
- Beam Angle 15 degrees

Durability

- 5 year warranty
- IP65



Illorion Limited

Tel: 01772 319 185 Web: www.illorion.co.uk Email: info@illorion.co.uk

50 days free returns

★★★★★ Rated 'Excellent' on Trustpilot

✓ The UK's largest selection of brands

25 YEARS

lights.co.uk

You can search our shop here

Rated Excellent

★★★★★ Trustpilot

Service

Sign in

Basket

Indoor Lighting

Rooms

Outdoor Lighting

Light Bulbs

Brands

SALE %

Trade

Outlet

More

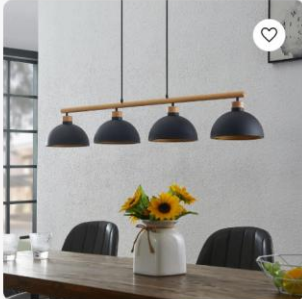
Only 01D 03H 44M 14S

Get up to an extra 15% OFF almost everything

Code: FLASH Copy

FLASH SALE | Up to 70% OFF

Lights & Lighting / Indoor Lighting / Pendant Lighting / Lindby Tirzana pendant light, 4-bulb, black, metal, wood

Lindby Tirzana pendant light, 4-bulb, black, metal, wood

★★★★☆ 4 | 4 Reviews

£148.90

RRP ~~£185.00~~

incl. VAT

SAVE £37.00

1

Add to basket

50 days free returns

Rated "Excellent" on Trustpilot

25 YEARS

lights.co.uk

You can search our shop here

Rated Excellent

★★★★★ Trustpilot

Service

Sign in

Basket

Indoor Lighting

Rooms

Outdoor Lighting

Light Bulbs

Brands

SALE %

Trade

Outlet

More

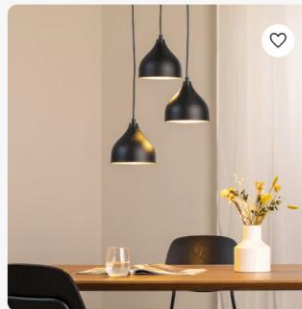
Only 01D 03H 42M 32S

Get up to an extra 15% OFF almost everything

Code: FLASH Copy

FLASH SALE | Up to 70% OFF

Lights & Lighting / Indoor Lighting / Pendant Lighting / Hanging light Tattoo 6201 3-light rondel black/gold

Hanging light Tattoo 6201 3-light rondel black/gold

£88.90

RRP ~~£129.00~~

incl. VAT

SAVE £41.00

1

Add to basket

50 days free returns

Rated "Excellent" on Trustpilot

Datasheet



FRDL-L-MW-R



Features

- Low Glare Recessed LED Downlight
- Low Glare
- IP65 Rated

Application

- Low glare recessed LED downlight with warm white LEDs and IP65 rating for use outdoors and in other wet areas such as bathrooms.

Specifications

General

- Size 83mm diameter x 75mm deep
- Colour Black baffle with choice of bezels (white shown)

Optical

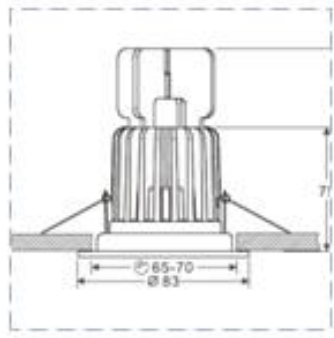
- Lumen 810 lm
- CCT 2700K
- CRI 80+
- Beam Angle 36 degrees

Electrical

- Voltage 200-240v
- Wattage 10w
- Driver Supplied with remote driver

Durability

- 5 year warranty
- IP65



ILLORION Limited

Tel: 01772 319 185 Web: www.illorion.co.uk Email: info@illorion.co.uk

Datasheet

FRDL-A-MW-R



Features

- Adjustable LED Downlight
- Fire rated
- Dim to Warm LED Technology

Application

- Adjustable LED downlight with warm white LEDs that get warmer as they dim to mimic classic tungsten light sources.

Specifications

General

- Size 90mm diameter x 60mm deep
- Colour Choice of bezels
(white shown)

Electrical

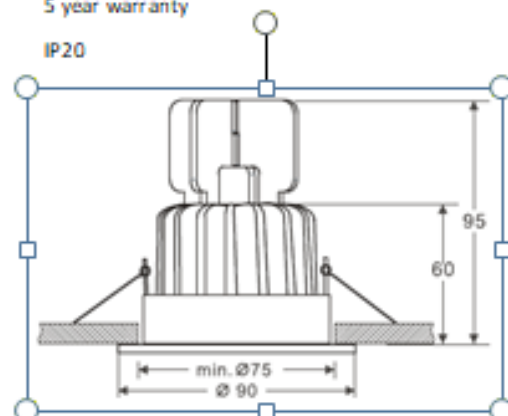
- Voltage 200-240v
- Wattage 10w
- Driver Supplied with remote driver

Optical

- Lumen 810 lm
- CCT 2700K
- CRI 80+,
- Beam Angle 36 degrees

Durability

- 5 year warranty
- IP20



 Limited

Tel: 01772 319 185 Web: www.illorion.co.uk Email: info@illorion.co.uk

