

External Lighting Strategy Report

Fives Court, Mere

2563-B20-XX-XX-RP-E-0001



BOX TWENTY

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1. Executive Summary

This report has been prepared by Box Twenty Consulting Engineers Ltd to set out the proposed external lighting strategy for the proposed residential development on Fives Court in Mere, Warminster, BA12 6DH.

The information provided within this report is to be viewed as a lighting design strategy, rather than a detailed design solution.

The project involves the partial demolition, extension and refurbishment of a former care home to Affordable Housing independent living apartments for older people with communal day care facilities. The development will comprise 20no independent living apartments, within a two-story building with centrally located communal facilities, landscape gardens and onsite parking.

The report identifies the design criteria (comprising codes, standards, and best practice) which are associated with the proposed external lighting design strategy and minimising light spread in the expected location for the bat boxes.

This report also identifies and reviews project-specific planning conditions and other Local Authority documents that may influence the external lighting design.

The lighting shall be controlled via a combination of Photocell, Astronomical programmable timeclock and manual override control.

The proposed development can be provided with an appropriate external lighting solution utilising column-mounted luminaires, bollard luminaires and wall-mounted luminaires. The solution generally provides illuminance and uniformity that meet the proposed targets identified.

The building will operate the following evacuation strategy:

- Stay Put for individual Flats.
- Simultaneous Evacuation for communal areas, including the atrium, lounge corridors and quite rooms.

In the event of a full building evacuation, the designated Fire Assembly Point (Place of Safety) is located adjacent to the front gate, directly beside the space allocated for the minibus / ambulance parking.

External emergency lighting and signage will be provided allowing individuals to evacuate the building to reach the fire assembly point.

The external emergency lighting provision is proposed to be via self-contained individual emergency luminaires, integral conversion versions of the general lighting luminaires, or by using the general lighting luminaires supplied from a central uninterruptable power supply unit.

2. Introduction

Box Twenty Consulting Engineers have been appointed to produce a proposed external lighting strategy for the development at Fives Court in Mere, Warminster, BA12 6DH.

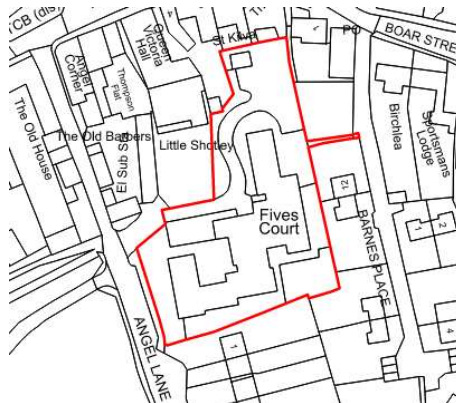


Figure 1: Development & Project Site Plan.

The report identifies the legal framework, design criteria (comprising of standards, codes, and best practice) and local planning requirements that are associated with the proposed external lighting design strategy.

This report will have accompanying diagrams identifying a proposed lighting solution for the site that complies with the BREEAM Planning Statement, namely to:

- Minimise nighttime light pollution.
- Provide sufficient light in the most effective way possible.
- Lighting to be controlled to operate only during hours of darkness.

The Ecological Impact Assessment report for the project provides guidance for the provision of external lighting where habitats for bats may be present. The Ecological Impact Assessment report provided by Ethos Environmental Planning, dated October 2024, has been considered for the proposed strategy for external lighting.

3. Design Criteria Reference Documents

The lighting design criteria for the proposed development shall be in line with the appropriate British Standards and guidance published by the Institution of Lighting Professionals (ILP) and the Society of Light and Lighting (SLL). In addition, Local Authority planning guidance and strategies shall be reviewed for any specific requirements or limitations, as well as any project-specific restrictions that may apply from the planning permission. The following summarises the documents reviewed and the relevant criteria applicable to this project.

CIBSE Lighting Guide LG06: The outdoor environment

This document provides comprehensive guidance on the design and application of lighting in outdoor environments. It addresses various aspects of the design of exterior lighting and refers to the standards and guidance listed below.

CIBSE Lighting Guide LG09: The outdoor environment

This document provides guidance on the design and application of lighting in communal residential buildings. It addresses various aspects of the design of exterior lighting and refers to the standards and guidance listed below.

BS8300-2: Design of Accessible and Inclusive Built Environments

This document provides guidance on the design and application of lighting for buildings. It provides guidance on the applicable standards addresses various aspects of the design of exterior lighting.

BS5489-1: Lighting of Roads and Public Amenity Areas and BS EN 12464-2: Lighting of Outdoor Workplaces

The design lux levels indicated later in this report for external areas have generally been selected in accordance with the above standards and guidance documents.

The Institution of Lighting Professionals, GN01/21, Guidance Note for the Reduction of Obtrusive Light

This guidance note sets out design parameters for minimising light pollution and recommends suitable and appropriate lighting and luminaire solutions that minimise upward light and glare for neighbouring properties.

The guidance recommends that the Local Planning Authority specify the environmental zones for exterior lighting control. In the absence of this, the table below shows the definitions of the environmental zones.

Zone	Surroundings	Lighting environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well-inhabited rural and urban settlements, smalltown centres or suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity

Table 1: Environmental Zones (ILP Guidance Note 01/21)

At this stage of the design process, we have not been advised of the environmental zones for exterior lighting control, so we propose an assumption that will need comment from the Local Planning Authority. Based on the location of the project within the Wiltshire, we suggest the project should be considered as being in Zone E2, Rural.

With a proposed Environmental Zone E2 selected for this project, guidance note GN01 proposes limitations which the external lighting installation should achieve. These requirements are shown in the table below:

Zone	Max. vertical illuminance on properties, Pre-curfew	Max. vertical illuminance on properties, Post-curfew	Max. luminous intensity of luminaires, Pre-curfew	Max. luminous intensity of luminaires, Post-curfew	Max. Upward Light Ratio (ULR) of luminaires	Max. Upward Flux Ratio (UFR) of installation
E2	5 lx	1 lx	Varies (max 7,500 cd)	Varies (max 500 cd)	2.5 %	6 % *see below

Table 2: Summary of Obtrusive Light Limitations (ILP Guidance Note 01/21)

* Current guidance from the ILP is that the Upward Flux Ratio is only required to be calculated for sites in proximity to observatories, for sites in zone E0, or for sites in zone E1 which abut an E0 zone. In addition, it is highly dependent upon the reflectance of ground surfaces, which can vary considerably outdoors and cannot be easily calculated. Therefore, the Upward Flux Ratio has not been calculated for this project.

Note that the limit on luminaire luminous intensity depends on the size of the luminaire and the distance to the observer, but the value stated is the upper limit.

GN01 also includes limits for the impact of the lighting installation on road users. As the road lighting class and design of the highways bordering the site are currently unknown, the effect of the new lighting installation on road users cannot be accurately assessed but the limits of luminous intensity in the table above can be applied. This will require a further assessment at a later stage when further information is available.

The Institution of Lighting Professionals, GN08/23, Bats and Artificial Lighting at Night

This document provides guidance on how to reduce the impact of artificial lighting on bat populations. It sets out a mitigation hierarchy and methods to mitigate the impact of lighting on bats, including guidance on demonstrating this through the production of 'Day 1' light spill calculations.

The effect of internal luminaires visible through windows is not included in this report. Internal luminaires should be recessed (as opposed to using a pendant fitting) where installed in proximity to windows to reduce glare and light spill. See Figure below indicating recommended internal lighting mitigation options, extracted from GN08:

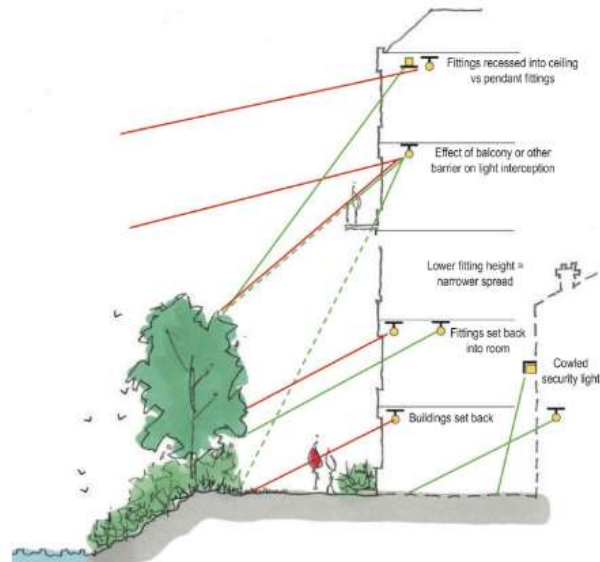


Figure 2: Internal lighting mitigation options

Ecology Report

The Ecological Impact Assessment report provided by Ethos Environmental Planning, dated October 2024, includes the following statements:

“The habitats on site are isolated and not well-connected to suitable habitat for bats within the wider area. There are gardens to the north, south and east of the site, and a road adjacent to the western boundary of the site. There are areas of trees, hedgerows and grassland to the south west of the site however, these areas have poor connectivity to the site itself. Overall, the site is assessed to hold low suitability for commuting and foraging bats and would not be suitable for light-sensitive species of bat due to existing lighting levels.”and,The plans will require new bat roosting features to be provided within the new roof. A lighting plan will be required to ensure the new roost features are not near security lights, or other lighting features and there are movement corridors for bats to these features.

Final detailed design lighting plans will be provided to the architect and ecologist to enable the location of bat roosting features within the roof space and movement corridors to be determined.

Requirements and Constraints from the Wiltshire Council Core Strategy and Local Plan

No specific lighting criteria has been identified within the council core strategy document or local plan for the Mere area, with the exception of:

“Lighting does not exceed the height of the development and is designed to minimise light pollution.”

4. Project Specific Design Criteria

The design criteria for this project have been based on requirements and recommendations set out in CIBSE Lighting Guide LG06, LG09 and the other referenced Standards. The design lux levels below are based on the guidance in these documents where appropriate.

Area	Minimum Maintained Illuminance (Em lux)	Uniformity (Uo)	Working Plane
External Main Entrance	50	0.25	Ground
Primary Pathways	20	0.25	Ground
Secondary Pathways	10	0.25	Ground
External Stairways	30	0.50	Stair Treads
Vehicle Access Routes	10	0.40	Ground
Car Parking	10	0.25	Ground
Cycle Parking	5	0.25	Ground
Disabled Parking & Minibus/Ambulance Bays	20	0.40	Ground
Courtyards, Patios & Balconies	Feature Lighting Only	-	Ground

Table 3: Project design criteria

These levels are also in line with the minimum illuminance and uniformity requirements of BS5489-1: Lighting of Roads and Public Amenity Areas and BS EN 12464:2 – Lighting of Outdoor Workplaces.

Limitations on light spill are as set out in the ILP guidance note for the reduction of obtrusive light.

The ecological constraints and mitigation strategy for the lighting will be in accordance with the lighting criteria detailed in the project's Ecological Impact Assessment report.

The feature lighting for the Patios and Balconies to be directed downwards to avoid spill onto bat habitat boxes at the roof level and they are not part of the intrusive light assessment.as they controlled by the flat's occupiers for short time

The proposed external lighting shall feature a combination of low-level bollards, wall-mounted luminaires, 5m columns and recessed soffit ceiling.

N.	The proposed luminaires are shown in the Area served	Image	Description	Upward Light Output Ratio	Proposed Mounting Height from Finish Floor Level
1	Pedestrian pathway		DW Windsor, Kirium 200 Bollard-Asymmetric Narrow. International Dark Sky Approved. Galvanised steel (body), Die-cast aluminium (head), Polyester powder coat. Light Colour Temperature RA = 3000 K. Luminaire Colour = Black RAL 9005. With integral PIR.	0%	1.0m
2	Disabled Parking		DW Windsor, Kirium Bollard,200-8LED-Asymmetric Medium International Dark Sky Approved. Galvanised steel (body), Die-cast aluminium (head), Polyester powder coat. Light Colour Temperature RA = 3000 K. Luminaire Colour = Black RAL 9005. With integral PIR.	0%	1.0m
3	Parking & Vehicle Road		DW Windsor, Kirium Pro S Mini with shield C1. International Dark Sky Approved Upper: die-cast aluminium Lower: die-cast aluminium / UV-stabilised polycarbonate, Smooth polyester powder coat, 5-meter column. Light Colour Temperature RA = 2700K. Luminaire Colour = Black RAL 9005. With integral PIR.	0%	5.0m
4	Parking & Vehicle Road		DW Windsor, Kirium Pro S Mini with shield B1. International Dark Sky Approved Upper: die-cast aluminium Lower: die-cast aluminium / UV-stabilised polycarbonate, Smooth polyester powder coat, 5-meter column. Light Colour Temperature RA = 2700K. Luminaire Colour = Black RAL 9005. With integral PIR.	0%	5.0m

5	Wall Lighting		DW Windsor Kirium Bulkhead-8LED-Narrow International Dark Sky Approved. Surface wall-mounted IP 66, IK 10 LED luminaire, die-cast aluminium powder-coated body with polycarbonate glazing. Light Colour Temperature RA = 3000 K. Luminaire Colour = Black RAL 9005. With integral PIR.	0%	2.0m
6	Soffit Lighting		Whitecroft, Mirage 3 IP65: Mirage 3 C165 IP65 Recessed down light luminaire, Narrow 11mm width bezel and shallow depth body, Colour Temperature RA = 3000 K Luminaire Colour = Graphite	-	Ceiling
7	Balconies, Patios		Aurora, Coastal Down Wall Light (WL8/CS) IP65 Rated IK06 Impact Rating Colour Temperature RA = 3000 K Luminaire Colour = Black	0%	2.0m

Table 4: Proposed Luminaire

The lighting in the communal area should be controlled via a combination of a Photocell, an Astronomical programmable time clock, and a manual override switch (used for testing purposes). For the Balconies and Patios, Control should be achieved via a Presence detector with photocell sensors. This will prevent the lighting from being operational when there is adequate daylight, and the lighting could be programmed to be off for a set period if required.

5. Results

The design has been produced using the latest version of Dialux Evo at the time issue of this report.

Please see the summary of the results in the table below, based on a maintenance factor of 0.8 to represent the installation after a period of use.

Surface calculations are shown in Appendix B.

Calculation area	Average Lux output	Uniformity	Working Plane
Vehicle Access Route	13.6	0.42	Ground
Parking Area	10.4	0.46	Ground
Cycle Parking	17.7	0.36	Ground
Disable parking & Minibus / Ambulance Bay	25.8	0.40	Ground
Disable parking	22.7	0.49	Ground

External Main Entrance	64.3	0.70	Ground
Primary Pedestrian Pathway 1	39.3	0.31	Ground
Primary Pedestrian Pathway 2	46.0	0.35	Ground
Primary Pedestrian Pathway 3	31.9	0.33	Ground
Primary Pedestrian Pathway 4	35.3	0.54	Ground
Primary Pedestrian Pathway 5	31.9	0.53	Floor
External Stairways Point 1	41.2	-	Stair Treads
External Stairways Point 2	48.2	-	Stair Treads
External Stairways Point 3	40.3	-	Stair Treads
External Stairways Point 4	43.1	-	Stair Treads
External Stairways Point 5	45.2	-	Stair Treads
External Stairways Point 6	39.6	-	Stair Treads
Secondary Pedestrian Pathway 1	41.3	0.39	Ground
Secondary Pedestrian Pathway 2	52.6	0.26	Ground
Secondary Pedestrian Pathway 3	33.9	0.30	Ground
Secondary Pedestrian Pathway 4	42.3	0.32	Ground
Patio 1	22.5	0.12	Floor
Patio 2	24.0	0.16	Floor
Patio 3	37.2	0.12	Floor
Patio 4	30.1	0.23	Floor
Patio 5	35.3	0.17	Floor
Patio 6	38.1	0.12	Floor
Patio 7	8.37	0.043	Floor
Patio 8	44.0	0.024	Floor
Patio 9	22.7	0.018	Floor
Balcony 1	27.9	0.041	Floor
Balcony 2	26.2	0.025	Floor
Balcony 3	27.7	0.029	Floor
Balcony 4	29.2	0.025	Floor
Balcony 5	24.3	0.046	Floor

Balcony 6	19.1	0.033	Floor
Balcony 7	43.9	0.028	Floor
Balcony 8	32.0	0.015	Floor
Balcony 9	28.5	0.74	Floor
Balcony 10	25.3	0.66	Floor
Courtyard	24.2	0.12	Floor

Table 5: Results from Dialux evo

Vertical Surface calculation areas are shown in Appendix C. The calculations for obtrusive light have been calculated with the Maintenance Factor at 1 to represent the initial installation when the output is its maximum, i.e. worst case.

Calculation area	Max Output Lux	Working Plan
Vertical Calculation surface 1	0.140	Vertical
Vertical Calculation surface 2	0.120	Vertical
Vertical Calculation surface 3	0.280	Vertical
Vertical Calculation surface 4	0.240	Vertical
Vertical Calculation surface 5	0.037	Vertical
Vertical Calculation surface 6	0.290	Vertical
Vertical Calculation surface 7	0.730	Vertical
Vertical Calculation surface 8	0.580	Vertical
Vertical Calculation surface 9	0.700	Vertical
Vertical Calculation surface 10	0.410	Vertical
Vertical Calculation surface 11	0.320	Vertical
Vertical Calculation surface 12	0.450	Vertical
Vertical Calculation surface 13	0.290	Vertical
Vertical Calculation surface 14	0.310	Vertical
Vertical Calculation surface 15	0.510	Vertical
Vertical Calculation surface 16	0.490	Vertical
Vertical Calculation surface 17	0.210	Vertical
Vertical Calculation surface 18	0.130	Vertical
Vertical Calculation surface 19	0.800	Vertical
Vertical Calculation surface 20	0.057	Vertical

Table 6: Results from Dialux evo

Zone	Max. vertical illuminance on properties, Pre-curfew	Max. vertical illuminance on properties, Post-curfew	Max. luminous intensity of luminaires, Pre-curfew	Max. luminous intensity of luminaires, Post-curfew	Max. Upward Light Ratio (ULR) of luminaires	Max. Upward Flux Ratio (UFR) of installation
E2	0.73	0.73	N/A	N/A	AS shown in Table 4, all luminaires are complied	N/A

Table 7: Results for the Light Parameters of the Zone

6. Conclusion

The proposed development can be provided with an appropriate lighting solution, utilising low-level bollards, wall-mounted luminaires and lighting columns.

The overall solution is able to meet the limits for Sky Glow. The development is located within a Rural area and is surrounded by residential buildings so further consideration of adjoining properties will need to be undertaken as the master plan's detailed design is developed.

The lighting in the communal area should be controlled via a combination of a Photocell, an Astronomical programmable time clock, and a manual override switch (used for testing purposes) and the lighting could be programmed to be off for a set period if required. For the Balconies and Patios, Control should be achieved via a Presence detector with photocell sensors. This will prevent the lighting from being operational when there is adequate daylight.

Appendix A

Concept External Lighting Design

2594-B20-XX-XX-RP-E-0001



BOX TWENTY



Legend	
	Outside Main Entrances
	Primary Pathways
	Secondary Pathways
	External Stairways
	Vehicle Access Routes
	Car Parking
	Cycle Parking
	Disable Parking & Minibus / Ambulance Bays
	Courtyards, Patios & Balconies



Legend

Red	Outside Main Entrances
Yellow	Primary Pathways
Blue	Secondary Pathways
Pink	External Stairways
Green	Vehicle Access Routes
Dark Green	Car Parking
Light Blue	Cycle Parking
Orange	Disable Parking & Minibus / Ambulance Bays
Light Blue	Courtyards, Patios & Balconies

First Floor

Appendix B

Luminaire Locations and Calculation Surface Results, MF 0.8

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BOX TWENTY

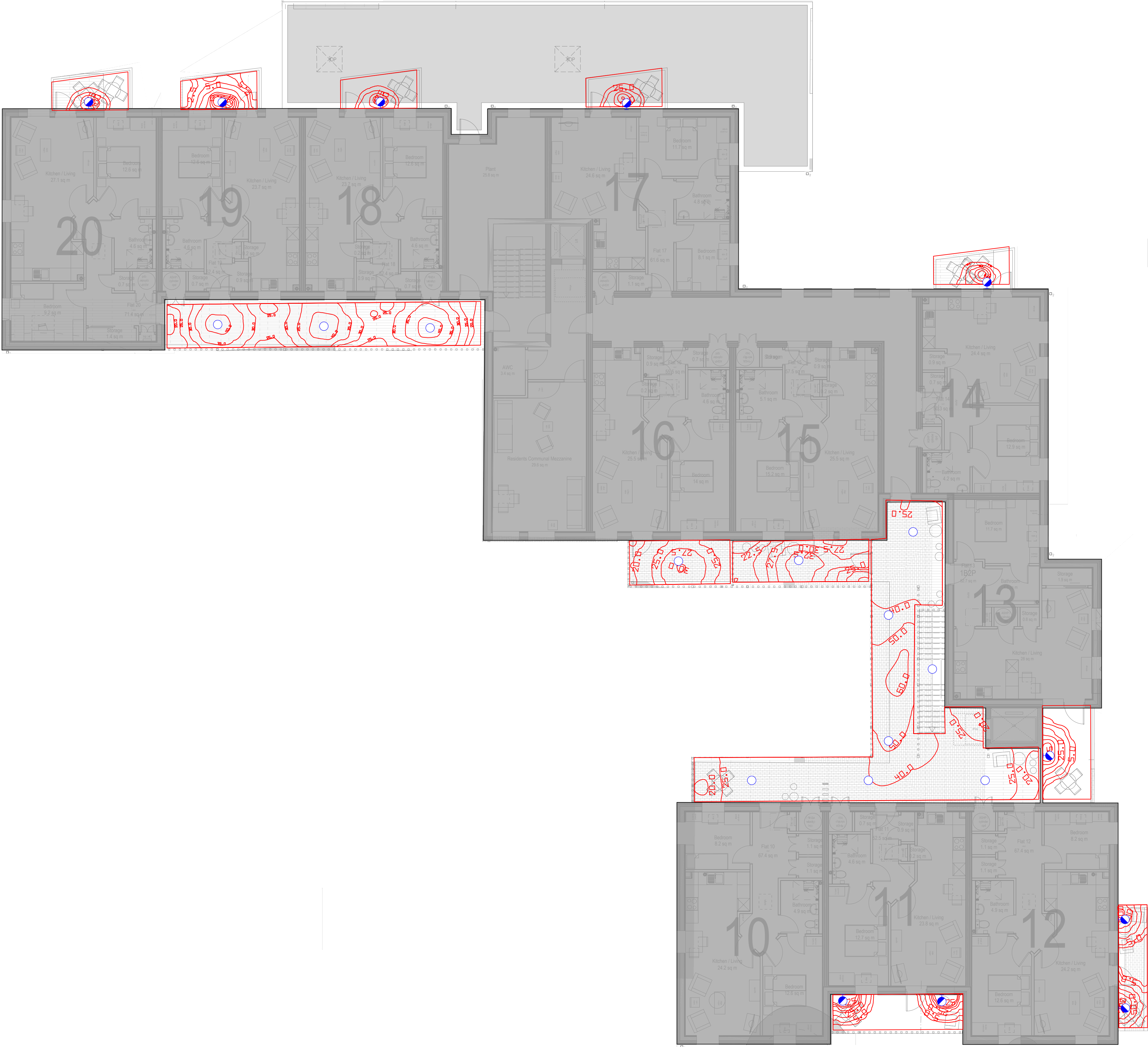
N.	Symbol	Image	Manufacturer Range	Proposed Mounting Height from FFL
1			DW Windsor Kirium 200 Bollard-Asymetric Narrow	1.0m
2			DW Windsor Kirium 200-Asymetric Medium	1.0m
3			DW Windsor Kirium Pro S Mini-C1	5.0m
4			DW Windsor Kirium Pro S Mini-B1	5.0m
5			DW Windsor Kirium Wall	2.0m
6			Whitecroft, Mirage 3 IP65	Ceiling
7			Aurora, Coastal Down Wall Light	2.0m

Indicative locations of gates to neighbouring properties, if required



Ground floor & Landscape

N.	Symbol	Image	Manufacturer Range	Proposed Mounting Height from FFL
1			DW Windsor Kirium 200 Bollard-Asymetric Narrow	1.0m
2			DW Windsor Kirium Bollard,200-Asymetric Medium	1.0m
3			DW Windsor Kirium Pro S Mini-C1	5.0m
4			DW Windsor Kirium Pro S Mini-B1	5.0m
5			DW Windsor Kirium Wall	2.0m
6			Whitecroft, Mirage 3 IP65	Ceiling
7			Aurora, Coastal Down Wall Light	2.0m



First Floor

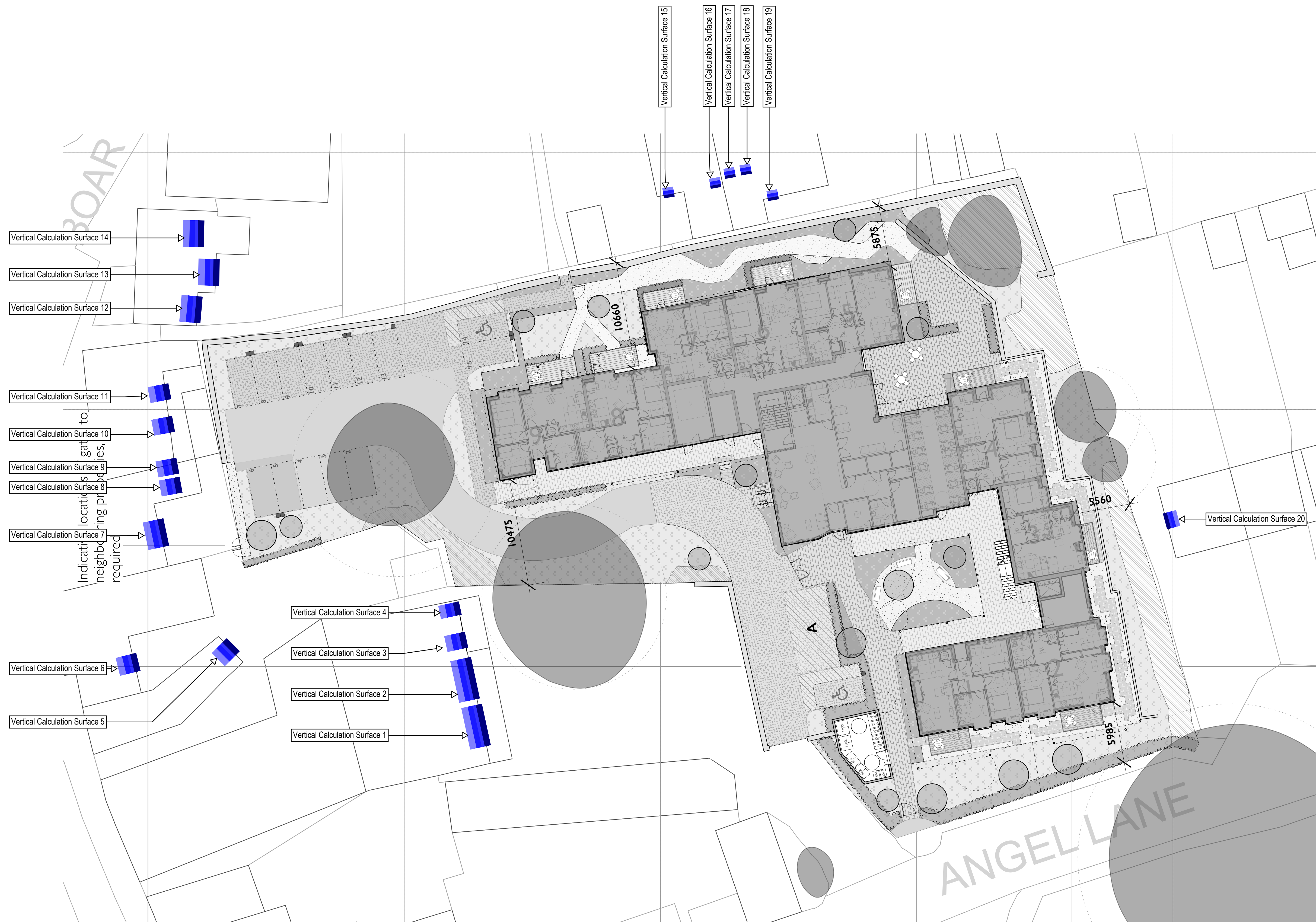
Appendix C

Light Spill Results at Day 1

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BOX TWENTY



Ground floor & Landscape

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