External Lighting Impact Assessment

Downlands Retail Park, Lyons Way, Worthing

Prepared for Worthing Retail Ltd
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Author	Signature
David Bowman EngTech MIET MIHEEM FCMI	[redacted]
Checked & Authorised	**Signature**
Mark Kirbyshire BEng (Hons) CEng MCIBSE MinstR LCC	[redacted]

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Milton Keynes Office 01908 062819

enquiries@mepconcepts.co.uk

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1 EXECUTIVE SUMMARY

1.1 This report contain information regarding the refurbishment of the existing retail units 2 and 3 at Downlands Retail Park to incorporate a new Lidl food store with service yard to the rear and car parking to the front of the store. The area of car parking directly in front of the Lidl food store will also be modified and upgraded to Lidl's latest specification.

1.2 A planning application is being submitted to refurbish an existing units 2 and 3 to form a new Lidl store and this external lighting impact assessment forms part of this planning application.

1.3 The external lighting impact assessment described in this report has been based on the requirements of several standards and guides available to the lighting industry all of which recommend minimum light levels in addition to specific Lidl requirements. The relevant standards and guides that this report follows are:

- BS EN12464-2 'Light and lighting. Lighting of workplaces. Outdoor workplaces. 2014.
- CIBSE Society of Light and Lighting (SLL) 'Code for Lighting' 2012. *NB: still in publication but under review by SLL.*
- CIBSE Society of Lighting and Lighting (SLL) 'Lighting Handbook' 2108.
- Lidl Building and External Works Specification.

1.4 This assessment considers the effects of the existing external lighting on or about the new site for the Lidl store. The effects of the existing lighting has no resulting impact on the Lidl store and vice versa. The public highways (roads and footpath) has been considered as part this assessment and the introduction of new external lighting in the car park to the service yard has no resulting impact on the public highways.

1.5 The results calculated have been compiled by using the Signify Philips Lighting computer program. This is Signify Philips Lighting standard lighting software programme. The resulting LUX levels have been compared against the requirements of the aforementioned lighting standards and guides including Lidl Building and External Works specification.

1.6 The results of the assessment have considered several factors including the following:

- Building construction, in particular the elevational treatments.
- The environment and surroundings.

2 INTRODUCTION

2.1 This report is prepared by MEP Concepts Ltd following the commission to undertake an external lighting impact assessment of the proposed changes to the new Lidl car park and service yard to show that it does not impact on adjacent and occupied land including public highways.

2.2 Downlands Retail Park has currently B&Q, Curry's PC World stores and is undergoing redevelopment with new Lidl store to occupy existing Units 2 and 3 (formally Halfords and Benson for Beds). In addition planning permission is granted for a new Costa Drive Thru store south of the existing car park which has no impact on this proposal for Lidl.

2.3 Downlands Retail Park is located on the corner of Lyons Way and Sompting By-pass (A27). See figure 2.3 for site location generated by Google Maps.



Image 2.3 – Site Location Plan

2.4 There are further retail units including Sainsburys on the opposite side of Lyons Way. There are existing trees and hedges that run to the south and east side of Downlands Retail Park. There is also public footpath that runs along Lyons Way and extends onto Sompting By-pass.

2.5 There is vehicular access to Downlands Retail Park off the roundabout on Lyons Way. Pedestrian access is also off Lyons Way.

2.6 The location of the site has meant whilst specific attention needs to be made to the positioning of new fixtures including lighting columns and bollards, this will not affect the environment and surrounding areas. As far as we are aware there is no environmental impact where increased light levels in the area of the new Lidl store could harm biodiversity such as bats and other night flying birds e.g. Owls.

2.7 The external lighting proposals to the Lidl store are described further in the next sections.

3 TECHNICAL REQUIREMENTS

3.1 There are several design criteria to which any proposals for the site lighting must comply, these are as follows:

- BS EN12464-2 'Light and lighting. Lighting of workplaces. Outdoor workplaces. 2014.
- CIBSE Society of Light and Lighting (SLL) 'Code for Lighting' 2012. *NB: still in publication but under review by SLL.*
- CIBSE Society of Lighting and Lighting (SLL) 'Lighting Handbook' 2108.
- Lidl Building and External Works Specification.

3.2 BS EN12464-2 and SLL lighting guides publish the lighting requirements for outdoor work places according to application and for the purpose of this report we are using BS EN12464-2 which matches CIBSE (SLL) guidance. Refer to table below:

Table 5.1 — General requirements for areas and for cleaning at outdoor work places

Ref. no.	Type of area, task or activity	$\bar{E}_m$ lx	U_o –	R_{GL} –	R_a –	Specific requirements
5.1.1	Walkways exclusively for pedestrians	5	0,25	50	20	
5.1.2	Traffic areas for slowly moving vehicles (max. 10 km/h), e.g. bicycles, trucks and excavators	10	0,40	50	20	
5.1.3	Regular vehicle traffic (max. 40 km/h)	20	0,40	45	20	At shipyards and in docks, R_{GL} may be 50
5.1.4	Pedestrian passages, vehicle turning, loading and unloading points	50	0,40	50	20	
5.1.5	Cleaning and servicing	50	0,25	50	20	All relevant surfaces

Table 3.2 General lighting requirements for outdoor work spaces – courtesy of BS EN 12464-2

3.3 Lidl require specific light levels as outlined in their Building and External Works Specification. Where not indicated, then the values in BS EN12464-2 are applied. The table below indicates the light levels to be achieved:

Type of area, task or activity	Em (LUX level)	Uniformity (Uo)	Glare (RGL)	Colour rendering (Ra)
Roadways, patios and car parking *(as per Lidl Spec)*	15	0.25	50	20
Service Yard *(as per BS EN12464-2)*	50	0.4	50	20

Table 3.3 Required Lighting Requirements and Values

3.4 For the external lighting applications, we have only calculated the light levels for the Lidl store. Whilst some contribution of light from existing columns in the adjoining car park will contribute to the front of the Lidl car park, this has been excluded for the purpose of the calculation.

3.5 The colour rendition index relates to the accuracy of the colours perceived, relative to daylight. This will vary depending upon the types of lamp selected for the relative luminaire. The table below, produced from the SLL Code for Lighting indicates the colour rendering groups applicable for each conceived scenario, it is suggested that the lamps from group 4 will be required.

Colour rendering groups	CIE general colour rendering index (R_a)	Typical application
1A	Ra ≥ 90	Wherever accurate colour matching is required
1B	90 > Ra ≥ 80	Wherever good colour rendering is required
2	80 > Ra ≥ 60	Wherever moderate colour rendering is required
3	60 > Ra ≥ 40	Wherever colour rendering is of little significance.
4	40 > Ra ≥ 20	Wherever colour rendering is of no importance.

Table 3.5 – Colour Rendering Index – Courtesy of CIBSE SLL Code for Lighting

3.6 In this calculation we have considered the requirements for the avoidance of light pollution and with compliance with the dark sky requirements, direct upward light and split light should be eliminated. These are illustrated below in the diagram produced from the Institute of Lighting Professionals.

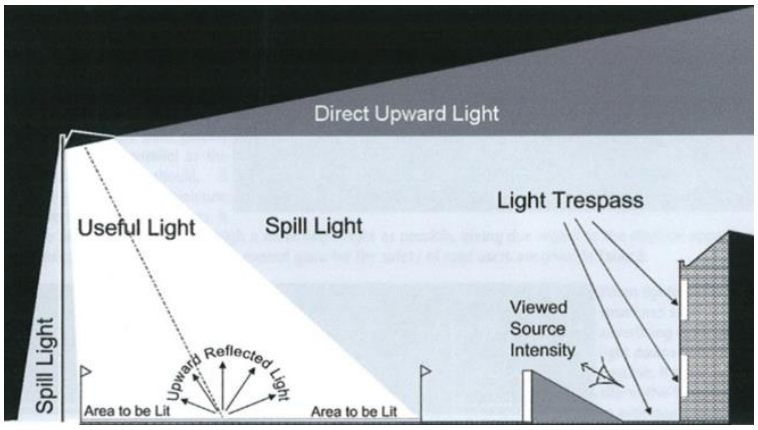


Figure 3.6 Light Pollution Diagram (Courtesy of ILP)

3.7 For the purposes of avoiding light pollution to the surrounding areas adjacent to the site, it is suggested that any luminaires providing illumination are mounted to direct the light away from the site boundary in the first instance and where not possible provided with suitable photometric control to alleviate spill light around the perimeter achieved by fitting shields to the front, sides and rear using products supplied by the manufacturer.

3.8 The external lighting design will comply with Obstructive light and Sky Glow requirements as set out within the ILP guidance notes. Based on the environmental zones, as set out below, MEP Concepts have assumed it will be Environmental Zone E3. For environmental zone E3 the obtrusive light limitations are summarised in the table below:

Environmental Zone	Sky Glow ULR *(%)*	Curfew periods	Illuminance on vertical plane *(Lux)*	Luminaire Source intensity *(I in cd)*	Building Luminance Pre-curfew *(cd/m2)*
E3 (Medium District Brightness)	5	Pre curfew	10	10,000	10
		Post curfew	2	1,000	

Table 3.8 – the *above information is courtesy of ILP Guidance Note 1 'GN01' for the reduction of obtrusive light 2021*

3.9 All the external lighting will be controlled via a photocell and a central time clock, there will also be a manual override key switch to allow auto off / on control function. The photocell will prevent any operation where there is adequate daylight, and the timeclock will ensure that the lighting will only come on at certain parts of the day.

3.10 Curfew periods will be applied when lighting will be switched off – post curfew periods will occur anytime between the hours of 23.00 and 07.00. Lighting in the car park and service yard will be switched off during curfew periods.

4 LIGHTING PROPOSALS

Existing Lighting

4.1 The existing lighting to the retail park consists of twin floodlights on 8m columns located in the car park. There is also public highway lighting and there is an existing 5/6m column located on the footpath south and west along Lyons Way and Sompting By-pass. Below are images showing the existing car park lighting and public footpath lighting.



Image 4.1 Existing Car Park Lighting – Image Courtesy of Melford Capital

New Lighting

4.2 New lighting to the Lidl car park and service yard shall consist of existing 8m high columns with new lanterns to match Lidl specification. Building mounted lighting shall be provided to the rear service yard. The car park shall achieve 15Lux and the service yard 50Lux. Luminaires have been selected from Signify Philips Lighting range which is Lidl's preferred manufacturer/supplier. The selected luminaires with images, location and descriptions are shown in the table below:

Image	Location	Model/Description
	Car park	Philips Lumi Street Gen 2 Mini – Street Optic – Asymmetrical Distribution – 6m Column – 45.5W (142lm/W)– 7500 lumen – CCT 4000k – Grey finish
	Service yard	Philips Lumi Street Gen 2 Medium – Street Optic – Asymmetrical Distribution – 6m Column and/or wall mount – 80W – 15000 lumen – CCT 4000k – Grey finish
	Car park	Image of existing floodlight – is an unknown manufacturer – for calculation purposes a Philips Clear Flood with 8000lm package

Table 4.2 – Luminaire Types and Descriptions

4.3 The below table (4.3) outlines the calculated Lux levels from the proposed design. The layout of the lighting is in accordance with the design teams' aspirations and meets with the requirements of Lidl with the right levels of illumination to guide customer's through the area. The calculated light level (LUX) exceeds the minimum requirement of Lidl.

Area	Lidl/BS EN12464-2 Design Guide – LUX Level	Calculated LUX Level - Average
Car park	15	17.8
Service Yard	50	50.4

Table 4.3 – Calculated LUX Levels

4.4 The calculations also provide the minimum and maximum LUX levels in addition to uniformity. The following values are noted:

Car park

- Average (Avg) LUX level – 17.8
- Minimum (Min) LUX level – 4.5
- Maximum (Max) LUX level – 49.3
- Uniformity (Uo) Min/Avg – 0.253

Service yard

- Average (Avg) LUX level – 50.4
- Minimum (Min) LUX level – 22.0
- Maximum (Max) LUX level – 76.9
- Uniformity (Uo) Min/Avg – 0.436

NOTE: A contribution to the LUX levels from existing floodlighting on site is considered. The drawing contained in Appendix 1 makes reference to this. The existing floodlight is an unknown manufacturer. For calculation purposes we used the Philips Clear Flood with 8000lm package to closely match the existing floodlights to check for compliance.

5 LIGHTING IMPACT

5.1 This external lighting assessment has been undertaken based on the lighting already outlined in this report, and relate to the main calculated areas which are:

- The calculated upward light ratio (ULR).
- The light source intensity, i.e. - candelas (cd) emitted from the light source.
- The calculated illuminance within the calculation areas within the site, Lux level plot to ensure the accessible areas are receiving the correct amount of illumination.

5.2 The above points have been compared against the recommended light limitations which are detailed within the Institution of Lighting Professionals guidance notes, relative to the environmental zone – E3. The lighting plots have also been compared against the recommended levels which are given in BS EN 12464-2 and CIBSE (SLL) Lighting Code and Handbook.

5.3 The table below provides a comparison or the recommended lighting limits given in the ILE and the BS EN 1246-2 and CIBSE (SLL) Lighting Code and Handbook, against the calculated levels for the proposed scheme during pre-curfew periods. It should be noted the external lighting will not be illuminated throughout the night as it will be controlled via a time clock with photocell override. There will be a manual override switch for maintenance purposes.

Assumed Environmental Zone E3	Sky Glow ULR (%)	Luminaire Source Intensity Pre-curfew (Candela (cd))
ILP Limitations	5	10,000
Lidl Service Yard	0	8,205
Lidl Car park	0	4,200

Table 5.3 – Recommended ULR and Source Intensity Candela Levels

5.4 The value for the service yard figure above shows worst case scenarios due to there not being any trees blocking the view, or foliage blocking any of the light sources. Any light spill from the existing lighting in the car park and from that on the public footpath has not been included either.

5.5 The LUX Level calculation plots have been calculated using a calculation plane of 0m due to the light needing to be visible on the road and paths.

5.6 The results from the calculations show that the LUX levels to the car park and service yard will be acceptable when compared to the Lidl Design guidelines in addition to BS EN 12464-2 and CIBSE (SLL) lighting guides.

5.7 The level of source intensity is a requirement within the ILP and as the proposed site will be an Environmental Zone E3, there can't be any light sources with an output higher than 10,000cd (pre-curfew). The fittings proposed all have lower levels then this, with the highest being the Lumi Street Gen 2 in the service yard with an output of 8,205cd (pre-curfew). All other luminaires proposed within the site are below the 10,000cd limit.

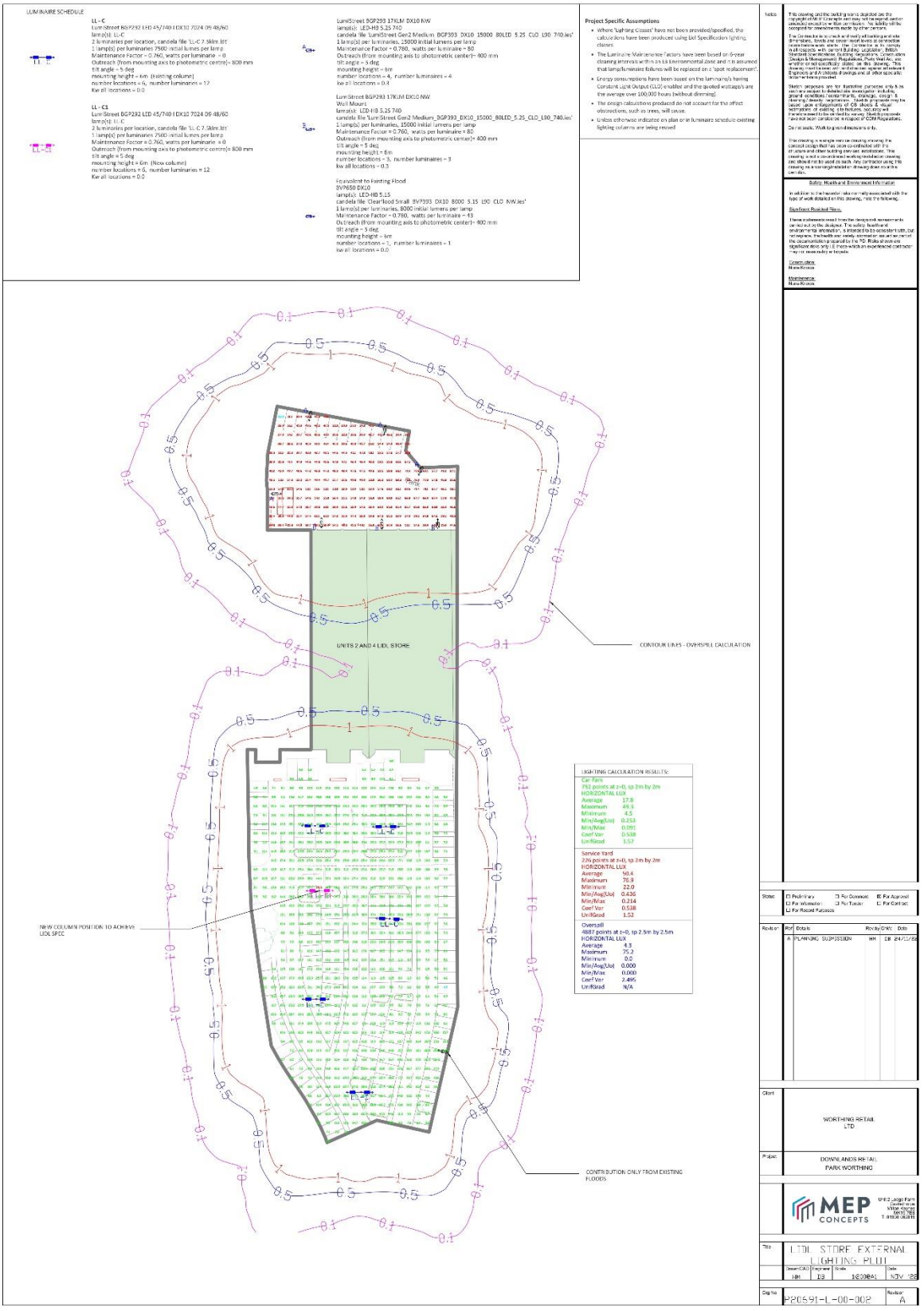
5.8 The calculated ULR impact from the completed installation of the proposed luminaires is 0%. This passes the ILP limitation of 5% for E3 zones.

5.9 To conclude, the impact from the proposed external lighting design will meet the current recommendations in relation to URL, Light Intensity, and LUX Levels. The proposed design will not impact on the surrounding areas by adding any additional nuisance light.

5.10 The drawings attached within the Appendices below give an outline of the proposed layout and what the calculations were based upon.

APPENDIX 1 – CALCULATED RESULTS

MEP Concepts drawing ref P20691-L-00-002 Rev A on Page 16. Full size copy issued with report.


LUMINAIRE SCHEDULE
LL - C
LL - C1
Project Specific Assumptions
UNITS 2 AND 4 LIDL STORE
CONTOUR LINES - OVERSPILL CALCULATION
NEW COLUMN POSITION TO ACHIEVE LIDL SPEC
CONTRIBUTION ONLY FROM EXISTING FLOODS
LIGHTING CALCULATION RESULTS:
Car Park
Service Yard
Overspill
WORTHING RETAIL LTD
DOWNLANDS RETAIL PARK WORTHING
MEP CONCEPTS
LIDL STORE EXTERNAL LIGHTING PLOT
P20691-L-00-002