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5th July 2021

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DOCUMENT CONTROL

Document:	Light Monitoring Verification
Project:	Aberavon
Client:	Permission Homes West Wales
Job Number:	A116745
File Origin:	O:\Acoustics Air Quality and Noise\Active Projects

Revision:	-	Status:	First Issue
Date:	5 th July 2021		
Prepared by: Viral Patel Senior Environmental Consultant		Checked by Matthew Smith Principal Environmental Consultant	Approved By: Nigel Mann Director
Description of revision: -			

EXECUTIVE SUMMARY

Tetra Tech were commissioned by Permission Homes West Wales to undertake a Light Monitoring Assessment in support of a residential development at Aberavon, immediately to the south of the floodlit football pitches as part of the Afan Lido Football Club.

This light monitoring assessment was undertaken following a series of lighting assessments, the most recent dated 10th June 2021 (inclusive of the potential lighting from the re-instigation of the neighboring 'astro-turf' pitch) undertaken by Tetra Tech. This assessment concluded that previous floodlighting at the football pitch would result in an exceedance of 10lux (ILP pre-curfew criteria for E3 zone) at the proposed residential dwellings south of Afan Lido Football Club. This was determined through monitoring at the site in both February and September 2020.

The September and February 2020 surveys showed that the installation of baffle plates to the adjacent Afon Lido Football Clubs lighting would not significantly reduce lighting levels at the proposed residential development and would also exacerbate the problems posed by the floodlighting to try to achieve the required illuminance on the pitch. As such it was considered the most suitable option to be the installation of replacement floodlighting.

An updated floodlighting design produced by *Floodlighting and Electrical Services* for Afan Lido Football Club, based on 250 lux averages for the football pitch were modelled. It was determined that the newly installed LED floodlighting was expected to have lighting levels within the ILP pre-curfew criteria of 10 lux at all proposed receptors.

The new LED based lighting was installed in May/Jun 2021.

Tetra Tech visited the site on the 21st June 2021 to undertake a verification light survey of both the football pitch, to ensure compliance with the FA requirements of 250lx, and the proposed residential development site to the south to measure light levels and determine if the proposed residential development site was below 10lux.

Following the survey, it was identified that the majority of the proposed residential development would be below 10 lux. The areas identified to be over 10lux on the north eastern corner of the site exceeded due to existing footway security lighting at outside of Afan Lido Football Club, that is understood to be removed when the development site comes forward. Additionally, these areas were only where gardens are proposed and not the facades of the properties themselves.

As such it is considered following the re-installation of floodlighting at Afan Lido Football Club that the proposed residential development south of the football pitches will be below ILP pre-curfew criteria of 10lux for all residential dwellings.

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ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
CIBSE	Chartered Institute of Building Services Engineers
CIE	Commission on Illumination
ILP	Institution of Lighting Professionals
LDF	Local Development Framework
LP	Local Plan
CS	Core Strategy
DPD	Adopted Development Plan Documents
SPD	Adopted Supplementary Planning Documents
SG	Endorsed Supplementary Guidance Documents
NGR	National Grid Reference
PPS	Planning Policy Statement
NPPF	National Planning Policy Framework
Lx	Lux
ULR	Upward Lighting Ratio

1.0 INTRODUCTION

Tetra Tech were commissioned by Permission Homes West Wales to undertake a Light Monitoring Assessment in support of a residential development at Aberavon, immediately to the south of the floodlit football pitches as part of the Afan Lido Football Club.

This light monitoring assessment was undertaken following a series of lighting assessments, the most recent dated 10th June 2021 (inclusive of the potential lighting from the re-instigation of the neighboring 'astro-turf' pitch) undertaken by Tetra Tech. This assessment concluded that previous floodlighting at the football pitch would result in an exceedance of 10lux (ILP pre-curfew criteria for E3 zone) at the proposed residential dwellings south of Afan Lido Football Club. This was determined through monitoring at the site in both February and September 2020.

The September and February 2020 surveys showed that the installation of baffle plates to the adjacent Afon Lido Football Clubs lighting would not significantly reduce lighting levels at the proposed residential development and would also exacerbate the problems posed by the floodlighting to try to achieve the required illuminance on the pitch. As such it was considered the most suitable option to be the installation of replacement floodlighting.

An updated floodlighting design produced by *Floodlighting and Electrical Services* for Afan Lido Football Club, based on 250 lux averages for the football pitch were modelled. It was determined that the newly installed LED floodlighting was expected to have lighting levels within the ILP pre-curfew criteria of 10 lux at all proposed receptors.

The new LED based lighting was installed in May/Jun 2021.

Tetra Tech visited the site on the 21st June 2021 to undertake a verification light survey of both the football pitch, to ensure compliance with the FA requirements of 250lx, and the proposed residential development site to the south to measure light levels and determine if the proposed residential development site was below 10lux.

1.1 SITE LOCATION AND CONTEXT

The development site is situated on a derelict former lido site, the approximate national grid reference is 274662: 189553. The site is on the seafront of Port Talbot. The site is directly bounded by:

- Afan Lido Football Club with a floodlit sports pitches directly to the north of the site, with residential buildings beyond;
- Residential buildings to the east of the site on Channel View and Victoria Road, with Tywyn Primary School off Channel View;
- Residential buildings to the south of the site, with Port Talbot Beach, Hollywood Park, and the Sunken Garden also situated south;
- Port Talbot Beach and a mix of residential buildings and service-providing buildings (e.g. Burger King) to the west, with Swansea Bay beyond.

Reference should be made to **Figure 1-1** – Site Boundary

for a visual representation of the site and surrounding area.

1.2 LIGHTING DESIGN AND ASSESSMENT - OVERVIEW

The site is located within the vicinity of existing light sources. A significant light source is that of the adjacent floodlit sports pitches at the Afan Lido Football Club north of the proposed development site.

Alternative light sources include streetlights and residential properties on the roads around the site, such as The Princess Margaret Way, Channel View, and Victoria Road. These light sources, particularly the floodlights of the adjacent sports pitches, have the potential to cause light intrusion onto the site.

The following stages have therefore been undertaken to assess potential impacts:

- Post Floodlight installation survey on football pitch.
- Post Floodlight installation survey on proposed residential development site.

The results of the assessment are detailed in the following section of this report.

Figure 1-1 – Site Boundary



2.0 POLICY, LEGISLATION AND RELEVANT AGENCIES

2.1 DOCUMENTS CONSULTED

The following documents were consulted during the undertaking of this assessment:

- Guidance Notes for the Reduction of Obtrusive Light, The Institution of Lighting Professionals, 2020;
- National Planning Policy Framework, Ministry of Housing, Communities & Local Government, February 2019;
- Planning Practice Guidance on Light Pollution, Ministry of Housing, Communities & Local Government, 1st November 2019;
- Environmental Protection Act, 1990;
- Statutory Nuisance from Insects and Artificial Light, Guidance on Sections 101 to 103 of the Clean Neighborhoods and Environment Act 2005, DEFRA 2006;
- Artificial Lighting and Wildlife Interim Guidance: Recommendations to Help Minimise the Impact of Artificial Lighting, Bat Conservation Trust, 2014;
- BS EN 12464-2: Lighting of Work Places - Outdoor Work Places, British Standards Institute, 2007;
- BS EN 13201-4: Road Lighting – Methods of Measuring Lighting Performance, 2003;
- BS 5489-1: Code of Practice for the Design of Outdoor Lighting - Lighting of Roads and Public Amenity Areas, British Standards Institute, 2013;
- PLG 04- Guidance on Undertaking Environmental Lighting Impact Assessments, ILP, 2013; and,
- Neath Port Talbot County Borough Council Local Development Plan (2011-2026) Adopted January 2016.
- The FA Guide to Floodlighting
- UEFA Stadium Lighting Guide, 2016

2.2 LEGISLATIVE FRAMEWORK

Light pollution was introduced within the Clean Neighbourhoods and Environment Act (2005) as a form of statutory nuisance under the Environmental Protection Act (1990), which was amended to include the following definition:

“(fb) artificial light emitted from premises so as to be prejudicial to health or nuisance;”

Although light was described as a statutory nuisance, no prescriptive limits or rules have been set for assessment. Guidance within the National Planning Policy Guidance with regards to Light pollution has been referred to while

producing this assessment as well as documents produced by the International Commission on Illumination (CIE), Institution of Lighting Professionals (ILP) and the Chartered Institute of Building Services Engineers (CIBSE).

2.3 PLANNING POLICY AND GUIDANCE

2.3.1 National policy

The National Planning Policy Framework (NPPF), February 2019 principally brings together and summarises the suite of Planning Policy Statements (PPS) and Planning Policy Guidance (PPG) which previously guided planning policymaking. The NPPF broadly retains the principles of PPS 23: Planning and Pollution Control and with regard to light pollution, paragraph 180 states that;

“180 Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

c. limits the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.”

The National Planning Practice Guidance web-based resource was launched by the Department for Communities and Local Government (DCLG) on 6 March 2014 and updated for lighting on the 1st November 2019 to support the National Planning Policy Framework and make it more accessible. It states that “for maximum benefit, the best use of artificial light is about getting the right light, in the right place and providing light at the right time”. In light of this guidance, the assessment has considered the following implications of the proposed lighting design:

- *Does an existing lighting installation make the proposed location for a development unsuitable? For example, this might be because:*
 - the artificial light has a significant effect on the locality;
 - users of the proposed development (e.g. a hospital) may be particularly sensitive to light intrusion from the existing light source.
- *Will a new development, or a proposed change to an existing site, be likely to materially alter light levels in the environment around the site and/or have the potential to adversely affect the use or enjoyment of nearby buildings or open spaces?*
- *Will the impact of new lighting conflict with the needs of specialist facilities requiring low levels of surrounding light (such as observatories, airports and general aviation facilities)? Impacts on other activities that rely on low levels of light such as astronomy may also be a consideration but will need to be considered in terms of both their severity and alongside the wider benefits of the development.*
- *Is the development in or near a protected area of dark sky or an intrinsically dark landscape where new*

lighting would be conspicuously out of keeping with local nocturnal light levels, making it desirable to minimise or avoid new lighting?

- *Would new lighting have any safety impacts, for example in creating a hazard for road users?*
- *Is a proposal likely to have a significant impact on a protected site or species? This could be a particular concern where forms of artificial light with a potentially high impact on wildlife and ecosystems (e.g. white or ultraviolet light) are being proposed close to protected sites, sensitive wildlife receptors or areas, including where the light is likely to shine on water where bats feed.*
- *Does the proposed development include smooth, reflective building materials, including large horizontal expanses of glass, particularly near water bodies? (As it may change natural light, creating polarised light pollution that can affect wildlife behaviour.)*

If the answer to any of the above questions is 'yes', consideration should be made for:

- *Where the light shines;*
- *When the light shines;*
- *How much light shines; and*
- *Possible ecological impact.*

2.3.2 Local policy

The Neath Port Talbot County Borough Council Local Development Plan (2011-2026) Adopted January 2016 includes the following policy in relation to development and lighting:

“Policy EN 8

Pollution and Land Stability

Proposals which would be likely to have an unacceptable adverse effect on health, biodiversity, and/or local amenity or would expose people to unacceptable risk due to the following will not be permitted:

- *Air pollution;*
- *Noise pollution*
- *Light pollution*
- *Contamination*
- *Land instability*
- *Water (including groundwater) pollution.*

Proposals which would create new problems or exacerbate existing problems detailed above will not be

acceptable unless mitigation measures are included to reduce the risk of harm to public health, biodiversity, and/or local amenity to an acceptable level.”

This report seeks to demonstrate that the lighting used will be compliant with this local policy

3.0 LIGHT MONITORING SURVEY

This section provides a review of the lighting levels at the site both prior to the installation of new LED floodlights at Afan Lido Football Club as well as post installation. The floodlights at Afan Lido Football Club were switched on during the survey.

This monitoring report should be read in conjunction with the Lighting Assessment dated 10th June 2021. This report presents both the initial monitoring results of the 10th June 2021 lighting assessment, which includes light surveys undertaken in both February 2020 and September 2020 prior to the newly installed LED floodlights. As well as monitoring results post LED floodlighting installation in June 2021.

3.1 SURVEY CONDITIONS

A baseline lighting survey was undertaken on 21st June 2021. Due to the time of year, the survey was undertaken after 23:00.

The survey was conducted using a Digital Lux Meter which meets CIE photopic spectral response, with a maximum resolution of 0.01 lux. The survey was undertaken with a meter resolution of 0.01 lux.

Measurements were undertaken on the football pitch to determine if the pitch had been adequately illuminated to the 250lux average it was designed too.

Measurements were then also taken at the proposed residential development to determine if the newly installed LED floodlights would reduce light spillage to below 10 lux.

Previously baseline surveys of the site were undertaken on the 21st February 2020 and 1st September 2020. Both these surveys were undertaken prior to the LED Floodlight installation on the 21st June 2021.

3.2 EXISTING LIGHT SOURCES

Existing light sources surrounding the site include the floodlights on the adjacent floodlit football pitches, as well as street lighting and residential lighting from the surrounding streets such as The Princess Margaret Way, Channel View, and Victoria Road. There are two pitches north of the proposed development. Each pitch has eight floodlights; four equally spaced on each touchline. However, it is important to note that the adjacent NPTCBC pitch to the north of the Afon Lido Football Club is (as of August 2020) no longer operational. There are also leisure facilities west of the proposed development in the form of Aberavon Leisure and Fitness Centre and the Reel Cinema.

3.3 SURVEY LOCATIONS

Light monitoring was undertaken at a number of survey locations to determine variations in light levels within and around the site. Where possible, monitoring at the boundary of the receptor locations was undertaken to provide the best possible representation of existing light obtrusion. This was undertaken as a vertical measurement towards the site at 1.5m height in general accordance with the recommended monitoring method in the statutory guidance issued by the ILP. Where this was not possible, monitoring was undertaken at the most appropriate representative location. Reference should be made to **Figure 3-1** and **Figure 3-2** for an illustrative site map of the monitoring locations on and around the site. **Figure 3-1** represents monitoring locations on Afan Lido Football Clubs football pitch. **Figure 3-2** represents monitoring locations in the form of a grid transect for the residential development southwest of the Afan Lido Football Club.

To measure lighting on the football pitch at Afan Lido Football Club, monitoring methodology was undertaken in accordance with the *UEFA Stadium Lighting Guide, 2016*. This included creating a grid of the pitch to understand illuminance across the pitch as shown in **Figure 3-1**. Both horizontal and vertical illuminance at 4 angles (0°, 90°, 180° and 270°) was undertaken at each location. The measurements were taken at 1m height.

The purpose of the survey is to:

- Determine if the newly installed LED floodlighting provides sufficient illuminance on the pitch to the FA required 250lux
- Provide an indication as to whether the LED floodlighting will reduce lux levels at the proposed residential development to below 10lux
- identify any other light sources in the area that have the potential to contribute to existing lighting on the proposed development site.

The survey, therefore, provides a robust understanding of the artificial lighting illuminance levels currently experienced around the site. The locations of all the light monitoring locations relative to **Figure 3-2** are summarized **Figure 3-3** in and the results from this survey are contained in **Table 3-1**.

Figure 3-1 – On Pitch Monitoring Locations

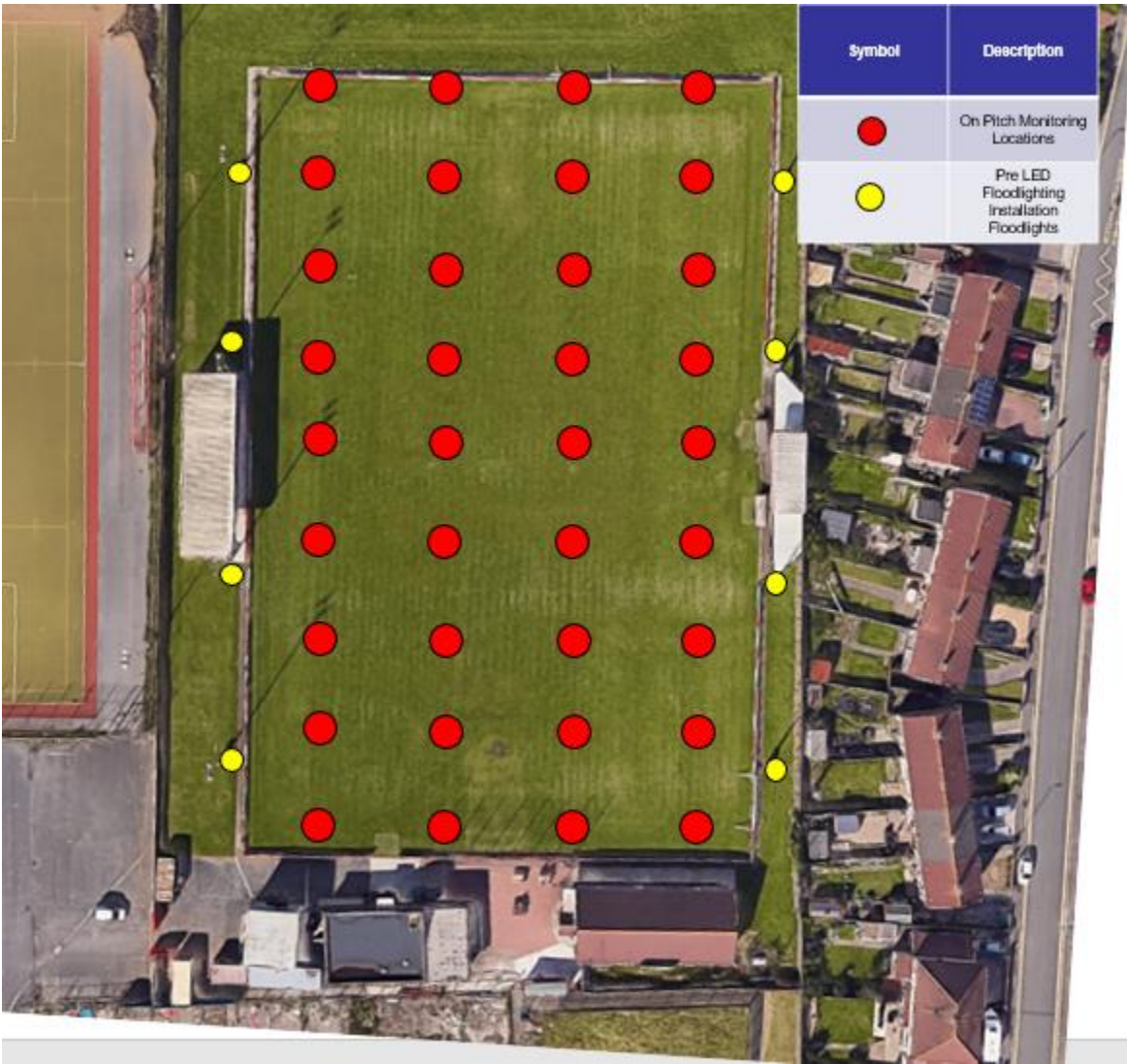


Figure 3-2 – Proposed Residential Development Site Light Monitoring Transect



3.4 SEPTEMBER 2020 SURVEY (PRE-LED FLOODLIGHTING)

The September 2020 survey included lighting measurements on the pitch and gathering information regarding the operation of the football club site. The survey was undertaken before 23:00 to establish the existing post curfew lighting conditions and was conducted using a Digital Lux Meter which meets CIE photopic spectral response, with a maximum resolution of 0.01 lux.

3.4.1 Survey Observations

Following discussions with the club, they have confirmed that the operational hours of the sports lighting never exceed 23:00 hours with most matches finishing at 22:00 at the latest. The club confirmed there have also been no complaints received from surrounding residents in regard to lighting on the pitch.

During the survey each of the floodlight locations contained 2 lamps, except one floodlight which had 1 lamp, there is normally a capacity for 4 lamps at each location. Also, the floodlights at the football pitch were subject to

wear and tear (exacerbated by the elevated saline corrosion) with some not being able to function and some were not orientated towards the pitch correctly.

Full details of the previous lighting levels of the pitch can be seen in the Lighting Assessment dated 10th June 2021. However, the levels of the sports pitch prior to the LED floodlighting installation are as below;

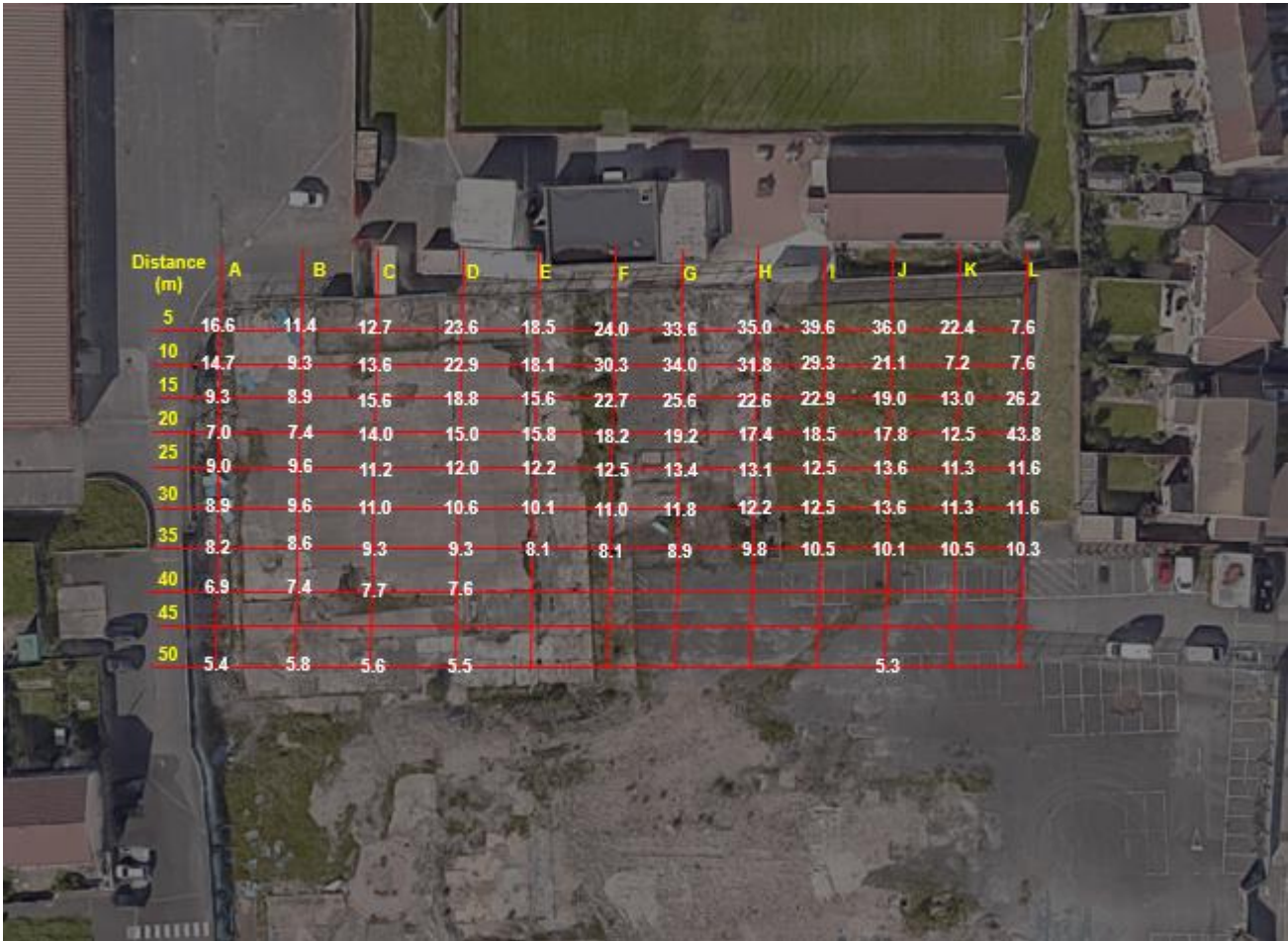
- Average - 136
- Min - 45
- Max - 205
- Uniformity - 0.33

The recommended criteria for a football pitch of this size and use is an average of 250 lux as recommended by FA Wales. It is expected that if all 4 lamps on each column were fully working, the 250 lux criteria would be met across the majority of the pitch, but that there would be some areas that would not quite achieve this.

3.4.2 Proposed Site Monitoring (February and September 2020)

From the initial February survey, a contour plot was produced based on the baseline data collected in a grid format – see **Figure 3-4**. The results of this survey are shown in **Table 3-1** and the results for the September Survey are shown in **Table 3-2**

Figure 3-3 – Pre-LED Floodlighting Lux Levels on Proposed Residential Light Monitoring Transect



The results show that the lux levels from the February survey are brighter, this can be attributed to several factors including the adjacent sports pitch lights no longer being operational and during the February survey more Afon Lido Football club lamps being operational, however even with fewer lights being operational lighting levels at 15m from the site boundary are still above the 10 lux ILP pre-Curfew criteria

Table 3-1 – Light Monitoring Results (lux) February 2020 Survey

	A	B	C	D	E	F	G	H	I	J	K	L
5	16.60	10.40	12.70	23.60	18.50	24.00	33.60	35.00	39.60	36.00	22.40	7.60
10	14.50	9.32	13.60	22.00	18.70	30.20	34.07	34.30	29.90	21.10	7.23	7.61
15	9.34	8.92	15.60	18.80	15.60	22.70	25.80	22.60	22.90	19.80	13.00	26.20
20	6.96	7.44	14.00	15.90	15.80	18.72	19.20	17.40	18.50	17.80	12.50	43.80
25	9.01	9.58	11.20	12.00	12.60	12.50	13.70	13.70	15.80	15.32	14.00	18.10
30	8.91	9.60	11.00	10.60	10.10	11.00	11.80	12.20	12.50	13.16	11.30	11.61
35	8.19	8.57	9.39	9.34	8.03	8.05	8.92	9.80	10.50	10.11	10.50	10.30
40	6.89	7.44	7.67	7.59					7.00	1.00	5.00	3.00
50	5.39	5.78	5.64	5.51								

Table 3-2 – Light Monitoring Results (lux) September 2020 Survey

	A	B	C	D	E	F	G	H	I	J	K	L
5		7.00	6.00	15.00	7.70	9.00	33.00	38.80	39.90	26.30	10.20	8.80
10	12.00	6.00	5.00	15.00	14.00	11.00	27.00	22.00	27.20	25.50	17.60	7.50
15	6.00	6.00	5.40	12.50	15.50	15.70	21.00	23.20	20.00	21.50	15.00	4.50
20	5.00		5.00		7.00		17.00		20.00			
25												
30	5.00		6.00		8.00		8.00		9.00			
35												
40	3.00		3.00		5.00		5.00		3.00			
50												
60			3.00		1.00		1.00		1.00			
70												

Figures **Figure 3-4** and **Figure 3-5** below illustrate the areas of the proposed residential development site that exceed the ILP 10lux criteria. The previous floodlighting at Afan Lido Football club resulted in the northern most residential dwellings likely to exceed 10lux, with some residential dwellings at 20lux.

Figure 3-4 – Pre-LED Floodlighting Contour Lux Lines on Proposed Residential Development Transect



Figure 3-5 – Pre-LED Contour Lux Plot on Proposed Residential Development



3.5 JUNE 2021 SURVEY (POST-LED FLOODLIGHTING)

As stated within the Lighting Assessment dated 10th June 2021, the installation of new LED Floodlighting would improve illuminance of the football pitch to the FA requirements of 250lux and reduce the light spillage from the football pitch on the proposed residential development south of Adan Lido Football Club to below 10lux. Following the LED Floodlighting installation at Afan Lido Football Club on 21st June 2021, Tetra Tech undertook a light monitoring survey in accordance with the methodology used previously indicated in Section 3.3.

Figure 3-6 below illustrates the on-pitch lighting monitoring locations for measuring the illuminance of the football pitch at Afan Lido Football Club pre and post LED floodlighting. The figure also illustrates the location, direction and specific LED floodlighting luminaires used at the football pitch.

Figure 3-6 – On Pitch Monitoring Location and LED Floodlight Locations

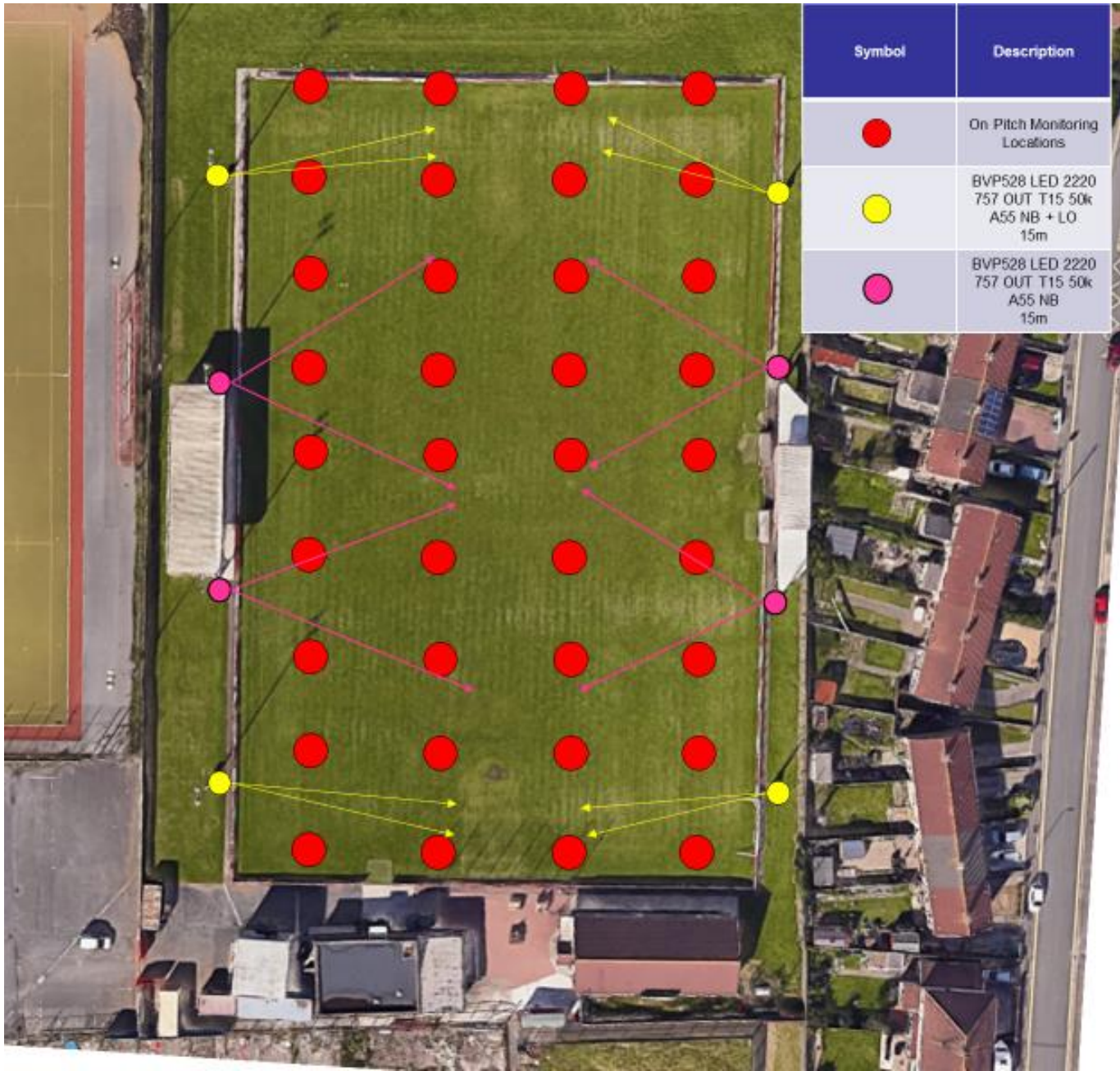


Figure 3-7 – Post-LED Floodlighting On Pitch Horizontal and Vertical Illuminance (lx)



Figure 3-7 above indicates the vertical and horizontal illuminance lux levels on the football pitch following the installation of LED floodlighting. The central figures indicate the horizontal illuminance and the figures surrounding are the vertical illuminance values facing 0°, 90°, 180° and 270°. The average horizontal illuminance values are shown below.

Horizontal Illuminance

- Average - 220
- Min - 99
- Max - 320
- Uniformity - 0.30

The FA requirements for Grade A football pitches is an average of 250lux with a minimum of 100 lux and a uniformity of 0.25, as stated within *The FA Guide to Floodlighting*. As shown above the minimum illuminance and uniformity of the pitch are appropriate, however the average of the pitch is still slightly below the FA requirements of 250 lux. However, after the onsite visit, it was confirmed that minor adjustments were still needed to be made on the floodlights which would improve the overall illuminance of the pitch to FA requirements. It is also understood that these minor adjustments would not change the findings of the assessment on the proposed residential development south of Afan Lido Football Club.

Following the installation of the LED floodlights at Afan Lido Football Club, monitoring on the proposed residential development site, south of the football pitch, was undertaken in accordance with the methodology in Section 3.3. **Figure 3-8** below illustrates the transect lux levels across the proposed development site with **Figure 3-9** and **Figure 3-10** indicating the contour lux levels on the site and its relation to where proposed residential developments are to be located.

Figure 3-8 - Post-LED Floodlighting Lux Levels on Proposed Residential Light Monitoring Transect

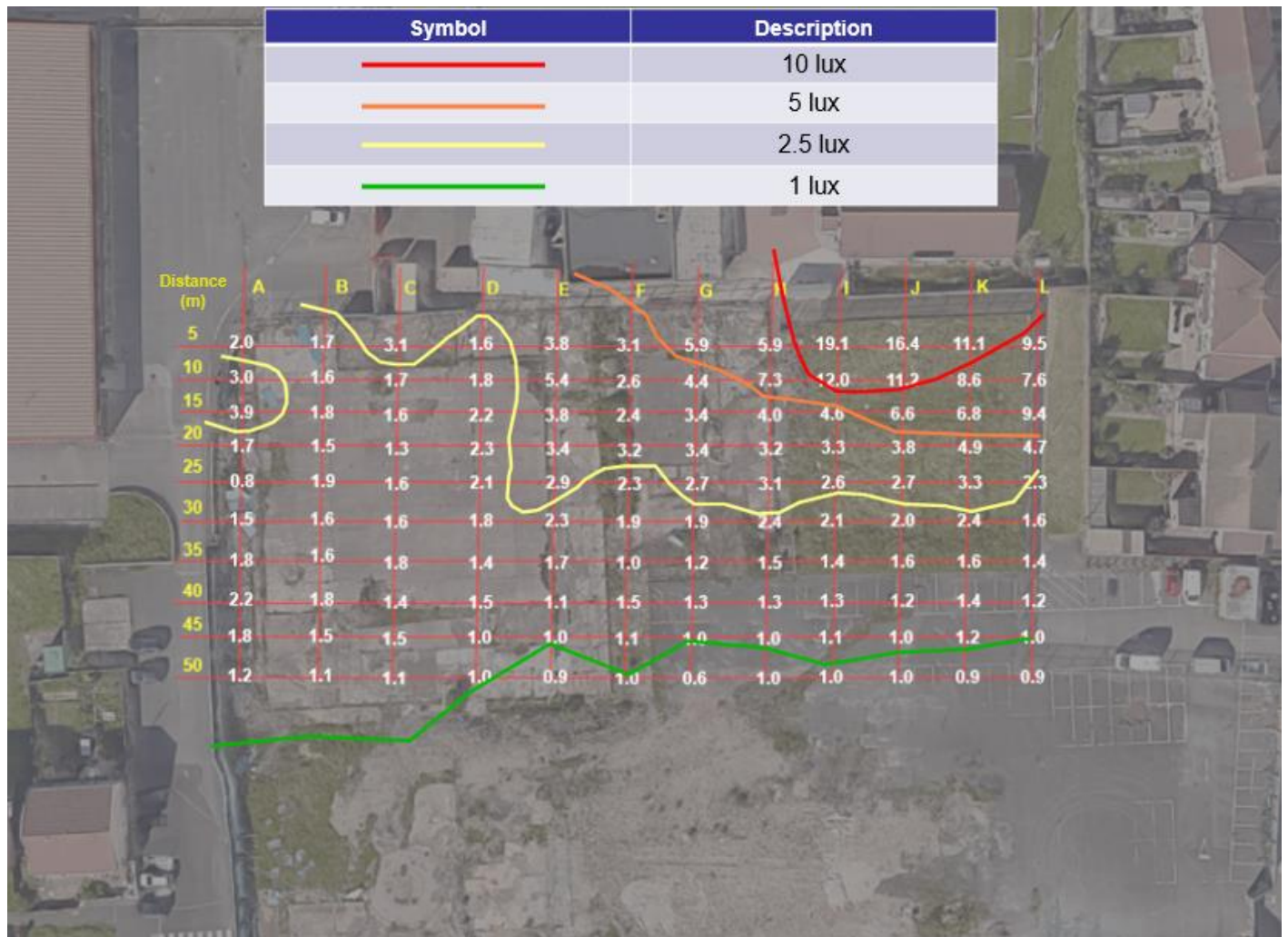
Figure 3-9 – Post-LED Floodlighting Contour Lux Lines on Proposed Residential Development Transect

Figure 3-10 – Post-LED Contour Lux Plot on Proposed Residential Development



Figure 3-9 and Figure 3-10 illustrate that no residential development is expected to exceed the ILP pre-curfew criteria of 10lux following the installation of the LED floodlighting at Afan Lido Football Club. It should be noted that the north east corner of the proposed residential development site that exceeds 10 lux, this area is only where gardens will be located, however it should also be noted that this exceedance of 10lux is not a result of the LED floodlighting from Afan Lido Football Club but the security street lighting.

Figure 3-11 and Figure 3-12 below illustrate the contour lux plots on the proposed residential development site post and pre LED floodlighting. The comparison of both indicates that the 10lux exceedances post LED floodlighting is a result of the security street lighting and not the LED floodlighting. Figure 3-13 shows an image of the security street lighting at the proposed residential development site with all floodlighting on and off.

Figure 3-11 - Pre-LED Floodlighting Contour Lux Lines on Proposed Residential Development Transect with Security and Street Lighting Location

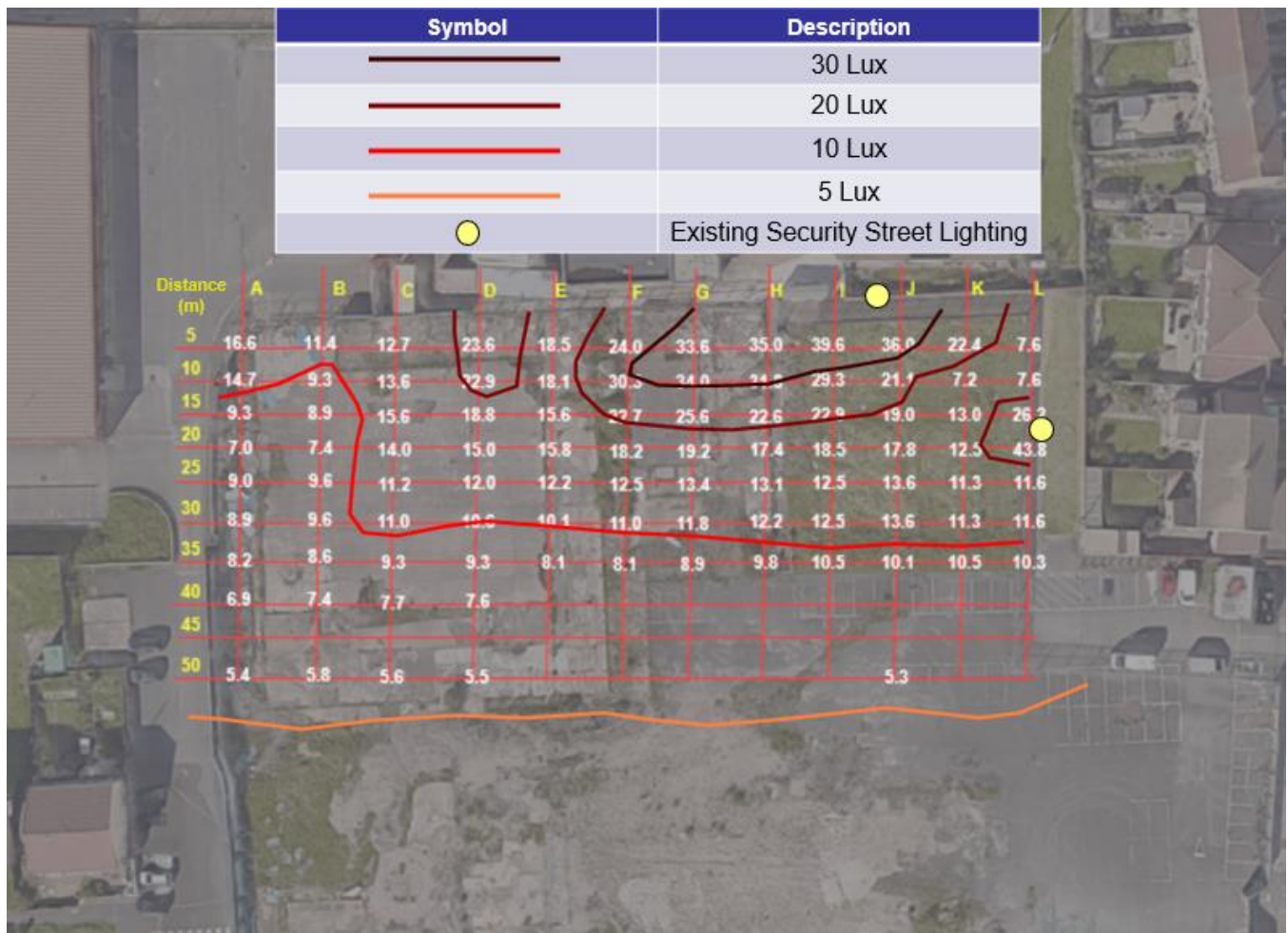


Figure 3-12 – Post-LED Floodlighting Contour Lux Lines on Proposed Residential Development Transect with Security and Street Lighting Location

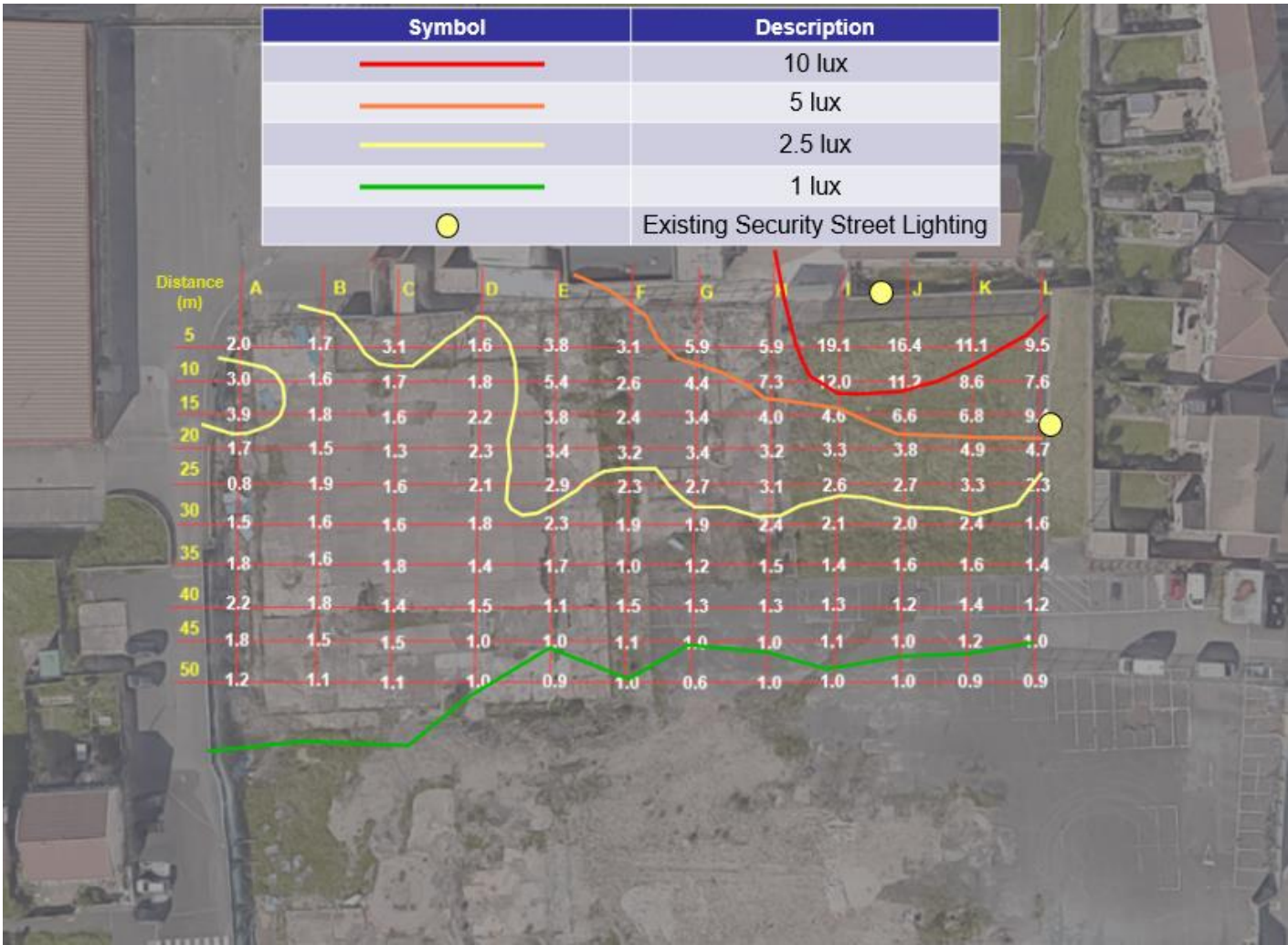


Figure 3-13 – Security Street Lighting at Proposed Residential Development Site with LED Floodlighting On and Off



4.0 CONCLUSIONS

Tetra Tech were commissioned by Permission Homes West Wales to undertake a Light Monitoring Assessment in support of a residential development at Aberavon, immediately to the south of the floodlit football pitches as part of the Afan Lido Football Club.

Tetra Tech visited the site on the 21st June 2021 to undertake a verification light survey of both the football pitch, to ensure compliance with the FA requirements of 250lx, and the proposed residential development site to the south to measure light levels and determine if the proposed residential development site was below 10lux.

Following the survey, it was identified that the majority of the proposed residential development would be below 10 lux. The areas identified to be over 10lux on the north eastern corner of the site exceeded due to existing footway security lighting at outside of Afan Lido Football Club, that is understood to be removed when the development site comes forward. Additionally, these areas were only where gardens are proposed and not the facades of the properties themselves.

As such it is considered following the re-installation of floodlighting at Afan Lido Football Club that the proposed residential development south of the football pitches will be below ILP pre-curfew criteria of 10lux for all residential dwellings.

APPENDIX A – IMAGES OF JUNE 2021 SURVEY**Figure A1 – Afan Lido Football Club****Figure A2 – South Eastern Side of Football Pitch**

Figure A3 – Western Side of Football Pitch**Figure A4 – North Eastern Side of Football Pitch**

Figure A5 – 20m Back on Eastern Side of Proposed Residential Development Site



Figure A6 – 40m Back on Eastern Side of Proposed Residential Development Site



APPENDIX B – REPORT CONDITIONS

Report Conditions

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