RAF Croughton SATCOM

External Lighting Assessment Report

March 2016

Defence Infrastructure Organisation
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# Issue and revision record

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1 Introduction

1.1 Summary

An overview of the proposed works is given in Section 1.2 with the location of the site in Section 1.3.

Section 2 of this report discusses the common causes and adverse impacts of light pollution.

A summary of the proposed external lighting solution and visual impact minimisation strategy are described in Section 3 with the visual impact of the lighting proposal discussed in Section 3.3.

Section 4 provides a conclusion to the report, outlining the results of the lighting assessment.

1.2 Project Description

The project is required to provide a new purpose-built consolidated Satellite Communications (SATCOM) PL 1 facility and administrative facility that meets current and future operational requirements at RAF Croughton.

The scope of works can be surmised as follows:
- New SATCOM Facility (referred to as PL1 Building herein) within fenced compound;
- New administrative facility (referred to as Admin Building herein);
- Infrastructure only for six satellite terminals (four of which will be housed in geodetic domes);
- Entry Control Facility for PL1 Building;
- Access roads, temporary car park and pavements;
- Provision of associated services (power, water, gas, communications).
1.3 Project Location

Figure 1.1: RAF Croughton Site Location

RAF Croughton is located in the South Northamptonshire District of the County of Northamptonshire, close to the border with Oxfordshire.

The site is bound to the north by the B4031, to the east by the A43 and by agricultural land to the south and west. The village of Croughton is around 1km to the west of the main entrance to the Base (located on the B4031).
The new facilities are to be located to the south of the Base complex, next to the existing Building 180, which is the current SATCOM facility. This site is located on mostly undeveloped land used as part of the high frequency antenna field. It is sparsely occupied with a number of existing structures, and within some areas there are sheep grazing the land.

### 1.4 External Lighting Sensitive Receptors

Near to the proposed site the following sensitive receptors have been identified:

- Pimlico Farm (grid reference SP553315)
- Lilybird Cottage (SP568320)
- Astwick Farm and Cottages (SP564332)
- Residences at Juniper Hill (SP578324)
- Heath Farm and Aspen Court (SP571319)
- A43 Users
The potential impacts that the lighting described in Section 3.1 has on the surrounding environment are as described in the paragraphs that follow.

2.1 Visual impact during hours of daylight

This is the visual intrusion the lighting installation makes in relation to the surroundings when the lighting is not in operation.

2.2 Visual impact during evening and night-time operation

A lighting installation can have a significant effect on the appearance of a site during the hours of darkness. A poorly designed lighting scheme can result in:

- Sky glow - The brightening of the night sky above urban areas
- Glare - Uncomfortable brightness contrast occurring when viewed against a dark sky
- Light Trespass - Light-spill extending over the boundary of the property

The main causes for obtrusive light are over-lighting of areas, inappropriate choice of luminaires and improper optical control of distribution, or excessive tilt of fittings resulting in direct upward light into the sky.
3 External Lighting Proposals

External lighting is required on the proposed development for the following facilities:
- PL1 building
- Admin building
- Entry control facility
- Secure fenceline
- Satellite terminals
- Temporary car park
- Pathways

In order to minimise over-lighting of the proposed facilities, Mott MacDonald has undertaken extensive liaison with the End Users to fully understand the external lighting requirements. Lighting has been proposed to efficiently meet the Lux levels required for operations at RAF Croughton.

3.1 External Lighting Proposals

Area lighting around the satellite terminals will use floodlights mounted on 8m columns; and the area between the security fences will be illuminated by road lanterns mounted on 8m columns erected within the inner fence line and facing outwards. Both will use LED or alternative light sources to provide an average maintained illuminance at ground level of at least 10.8 Lux (1 foot-candle), required for CCTV surveillance.

Car parking lighting shall use floodlights incorporating LED lamps mounted on a maximum of 4 No. 8m high columns to give an average illumination of 10.8 lux.

Bollards with LED lamps will be provided to illuminate the pedestrian routes between the car park and the two buildings.

3.2 Visual Impact Minimisation

In order to demonstrate that the external lighting layout has been proposed in consideration of reducing the impact of lighting on to the environment and neighbouring properties, an external lighting assessment has been undertaken using Relux lighting planning software, see Appendix A. This illustrates the general lighting levels, the extent of the overspill lighting which is expected to occur in each area and the immediate impact on the sensitive receptors.

Sensitive receptors to external lighting have been identified in Section 1.4; consideration has been given to the areas and features of the landscape as described in earlier sections.

Where practicable, the following additional visual impact minimisation solutions have been incorporated from Northamptonshire County Council guidance:
- Beam angles of lights shall not exceed 70° from the vertical.
- Light shields shall be fitted to avoid both upward glare and the direct illumination of areas beyond a distance of 10 metres.
- Lamps shall be limited to 1kw with internal louvres fitted and asymmetric beams utilised that permit the front glazing of the unit to be kept at or near parallel to the surface being lit.
3.2.1 Scope of Assessment

In order to undertake the Relux external lighting assessment shown in Appendix A, the proposed new build facilities outlined in Section 3 were modelled. However the existing Building 180 and associated satellite antennas, located adjacent to the proposed site, has not been included in the model.

The End User operations are currently undertaken in Building 180. It should be noted that upon completion of the proposed new build facilities, operations will relocate to the new facilities. The transfer of operations is expected to be undertaken in approximately 24 months, during which there is a possibility that both the existing Building 180 and new build facilities will be lit simultaneously (for a short duration).

3.3 Expected Lighting Impact on Sensitive Receptors

The closest sensitive receptor, Lilybird Cottage, is over 350m from the proposed site. From the external lighting assessment undertaken it is apparent that the visual impact of the proposed lighting solution, described in Section 3.1, on the sensitive receptors will be negligible.
4 Conclusion

With respect to the identified the sensitive receptors, the desk top assessments on the site and the external lighting indicate that overall light pollution levels are not majorly influenced by the proposed lighting solution.

The Relux external lighting assessment in Appendix A shows that the worst case scenario impact that the lighting has on the surrounding area and residential properties is minimal, and that the proposed lighting scheme is suitable for the intended use.

In summary it is the considered opinion that the external lighting to the site has a minimal impact on the immediate environment with respect to lighting pollution.
Appendix A. Relux External Lighting Assessment Report

Refer to Appendix A folder