HOARE LEA LIGHTING

RAIL CENTRAL

APPENDIX 21.1a – Baseline Survey - J15a

APPENDIX 21.1a-DOC-1602403-20180301-Rail Central-DDM-IIP 001-P1

March 2018

Contents

Section A

0.0 Introduction

Purpose of Report

The purpose of this report is to demonstrate the obtrusive light condition to survey locations in and surrounding the upgrading works to Junction 15a on the M1 to provide an understanding of the current artificial lighting condition and the pre development Environmental Zone classification.

1.0 Study Area

Extent of Study Area

Existing Lighting Measurement Locations

- Sample locations are recorded within and adjacent to Junction 15a to provide an overview of the existing lighting conditions in order to ascertain the current Environmental Zone classifications.

Figure 1.1: Extent of Study Area (external lighting within close proximity)

1.0 Study Area

Extent of Study Area

Baseline Survey Locations

The following locations are recorded in terms of relevant obtrusive light conditions to provide a baseline understanding of the current experience to the surrounding Junction 15a, with respect to Ecology constraints.

Ecology and Waterbodies

- **C9 to C33 – Grand Union Canal (Northampton Arm)**

Figure 1.2: Extent of Study Area and Identification of Ecological and Waterbody Constraints

1.0 Study Area

Extent of Study Area

Baseline Survey Locations

The following locations are recorded in terms of relevant obtrusive light conditions to provide a baseline understanding of the current experience to the surrounding Junction 15a, with respect to Heritage constraints.

Heritage - Grand Union Canal (Northampton Arm)

- **H5 – Lock 13 and Drawbridge, Grade 2**
- **H6 – Lock 12, Grade 2**
- **H7 – Lock 11, Grade 2**
- **H8 – Lock 10, Grade 2**
- **H9 – Lock 9, Grade 2**
- **H10 – Lock 8, Grade 2**
- **H11 – Lock 7, Grade 2**

Figure 1.4: Extent of Study Area and Identification of Heritage Constraints

2.0 The Survey

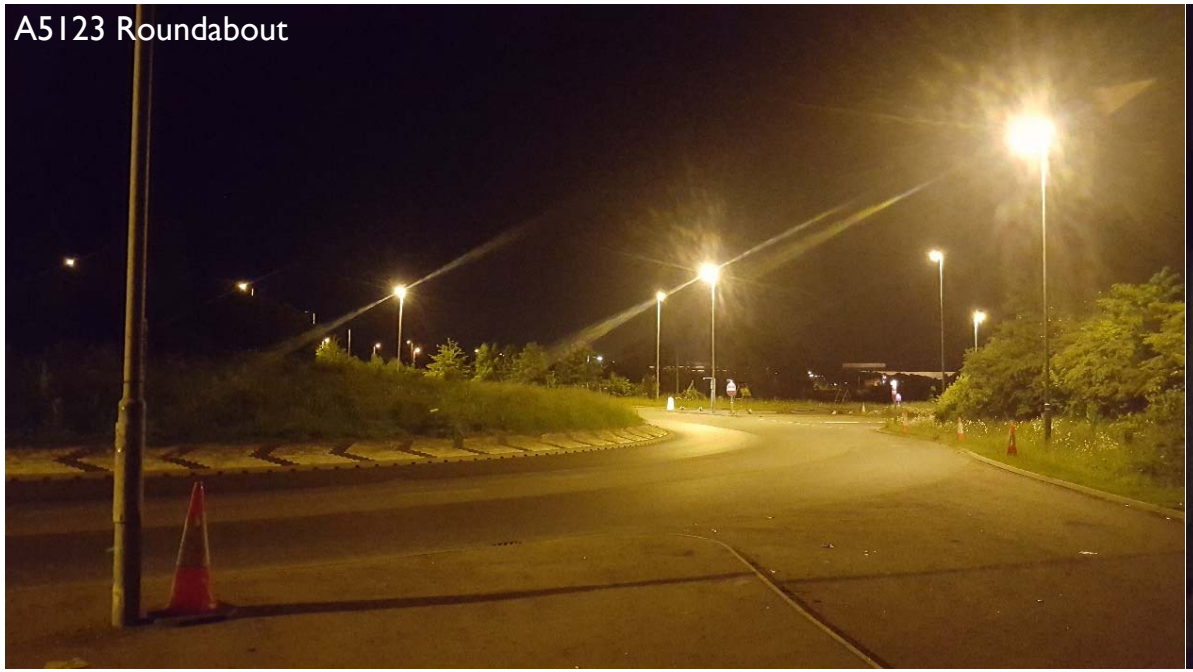
Introduction

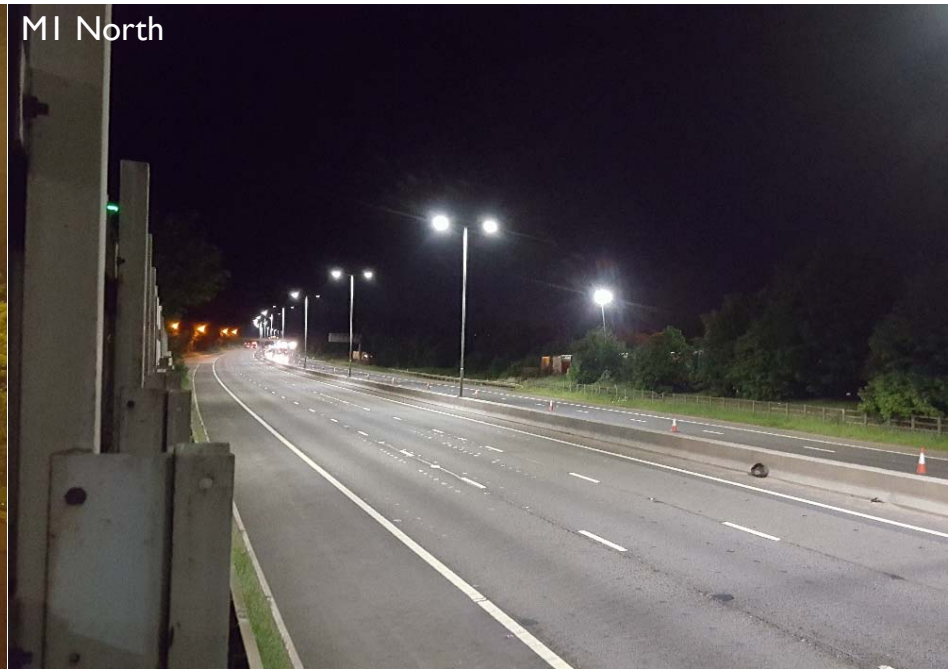
Survey

- The survey was undertaken between approximately 11.00pm and 03.00am, on Thursday 26th and Friday 27th May 2017.
- The weather was fairly humid and the sky clear during the night hours.
- The Moon was present in the sky, however was partially obscured by cloud when lighting measurements were taken.
- Unscreened Moonlight Condition measured as peak - 0.01 Lux (Horizontal) and 0.02 Lux (Vertical).

Technical

- Light Readings (illuminance levels in Lux) were taken using a hand held Konica Minolta T-10A illuminance meter.
- All horizontal lux readings were taken on the ground, all vertical lux readings were taken at arms length from a standing position; approximately 1.5m above ground.
- Photographs were taken using a Canon EOS 600D DSLR camera. Exposure times are variable.





2.0 The Survey

Existing Lighting

Existing Lighting within close proximity to Junction 15a

Existing Lighting A – Heronsford Road

Roadway is currently artificially lit with approximately 6m column mounted discharge lanterns to achieve an average light level of 5 Lux.

Average light levels equivalent to a S3 classification (BS 5489-1:2013)

Environmental Zone Setting

E2: Low District Brightness

2.0 The Survey

Existing Lighting

Existing Lighting B – A5123

Roadway is currently artificially lit with approximately 10/12m column mounted discharge lanterns

Although unsafe to access it is professionally judged that the lighting levels are representative of an:

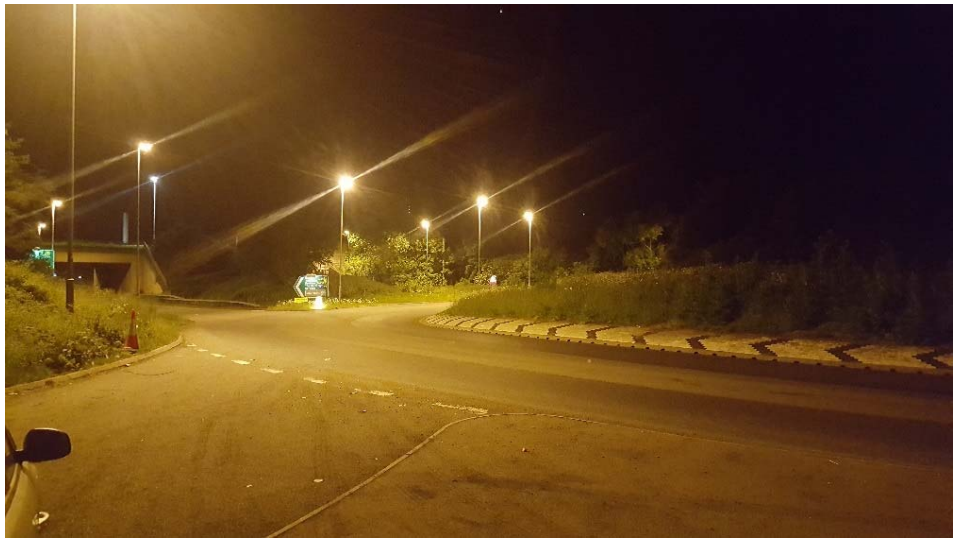
Average light levels judged as being equivalent to a M4 classification (BS 5489-1:2013):

0.75 cd m^2, U0 – 0.4, Ul – 0.6

Existing Lighting within close proximity to Junction 15a

2.0 The Survey

Existing Lighting



Existing Lighting within close proximity to Junction 15a

Existing Lighting C – Roundabout on A5123

Roadway is currently artificially lit with approximately 10/12m column mounted discharge lanterns

Although unsafe to access it is professionally judged that the lighting levels are representative of an:

Average light levels judged as being equivalent to a CE3 lighting class (BS 5489-1:2013):

15 Lux, Uo – 0.4

2.0 The Survey

Existing Lighting

Existing Lighting D – A43

Roadway is currently artificially lit with approximately 10/12m column mounted discharge lanterns

Although unsafe to access it is professionally judged that the lighting levels are representative of an:

Average light levels judged as being equivalent to a M5 classification (BS 5489-1:2013):

0.5 cd m^2, U0 – 0.35, Ul – 0.4

Existing Lighting within close proximity to Junction 15a

2.0 The Survey

Existing Lighting

Existing Lighting within close proximity to Junction 15a

Existing Lighting E – Roundabout on A43

Roadway is currently artificially lit with approximately 10/12m column mounted discharge lanterns

Although unsafe to access it is professionally judged that the lighting levels are representative of an:

Average light levels judged as being equivalent to a CE4 lighting class (BS 5489-1:2013):

10 Lux, Uo – 0.4

2.0 The Survey

Existing Lighting

Existing Lighting F – Swan Valley Way (roundabout)

Roadway is currently artificially lit with approximately 10/12m column mounted discharge lanterns

Horizontal Lux – 12 lux

Average light levels judged as being equivalent to a CE4 lighting class (BS 5489-1:2013)

Existing Lighting within close proximity to Junction 15a

2.0 The Survey

Existing Lighting

Existing Lighting G – Pets At Home - Carpark

Carpark is currently artificially lit with approximately 8/10m column mounted discharge lanterns and floodlights to achieve an average light level of 7 Lux.

Existing Lighting within close proximity to Junction 15a

2.0 The Survey

Existing Lighting

Existing Lighting within close proximity to Junction 15a

Existing Lighting H – M1 Junction 15A slip road – intersection

Roadway is currently artificially lit with approximately 10/12m column mounted discharge lanterns.

Although unsafe to access it is professionally judged that the lighting levels are representative of an:

Average light levels judged as being equivalent to a M4 classification (BS 5489-1:2013):

0.75 cd m^2, U0 – 0.4, Ul – 0.6

2.0 The Survey

Existing Lighting

Existing Lighting 1 – M1 Junction 15A Services (NORTH)

Parking and service areas are currently artificially lit with approximately 8/10m column mounted discharge lanterns to achieve an average light level of 17 Lux.

Existing Lighting within close proximity to Junction 15a

2.0 The Survey

Existing Lighting

Existing Lighting within close proximity to Junction 15a

Existing Lighting J – M1 North

Roadway is currently artificially lit with approximately 12m column mounted discharge lanterns

Although unsafe to access it is professionally judged that the lighting levels are representative of an:

Average light levels judged as being equivalent to a M2 classification (BS 5489-1:2013):

1.5 cd m^2, U0 – 0.4, Ul – 0.7

2.0 The Survey

Existing Lighting

Existing Lighting K – M1 Junction 15A Services (SOUTH)

Parking and service areas are currently artificially lit with approximately 8/10m column mounted discharge lanterns to achieve an average light level of 8 Lux.

Existing Lighting within close proximity to Junction 15a

2.0 The Survey

Existing Lighting

Existing Lighting within close proximity to Junction 15a

Existing Lighting L – M1 South

Roadway is currently artificially lit with approximately 12m column mounted discharge lanterns

Although unsafe to access it is professionally judged that the lighting levels are representative of an:

Average light levels judged as being equivalent to a M2 classification (BS 5489-1:2013):

1.5 cd m^2, U0 – 0.4, Ul – 0.7

2.0 The Survey

Existing Lighting

Existing Lighting within close proximity to Junction 15a

Existing Lighting M – A43

Roadway is currently artificially lit with approximately 10/12m column mounted discharge lanterns

Although unsafe to access it is professionally judged that the lighting levels are representative of an:

Average light levels judged as being equivalent to a M5 classification (BS 5489-1:2013):

0.5 cd m^2, U0 – 0.35, Ul – 0.4

2.0 The Survey

Existing Lighting

Existing Lighting N – A43

Although unsafe to access it is professionally judged that the lighting levels are representative of an:

Average light levels judged as being equivalent to a M3 classification (BS 5489-1:2013):

1.0 cd m^2, U0 – 0.4, Ul – 0.6

Existing Lighting within close proximity to Junction 15a

2.0 The Survey

Existing Lighting

Existing Lighting within close proximity to Junction 15a

Existing Lighting O – A43 Roundabout

Roadway is currently artificially lit with approximately 10/12m column mounted discharge lanterns

Although unsafe to access it is professionally judged that the lighting levels are representative of an:

Average light levels judged as being equivalent to a CE3 lighting class (BS 5489-1:2013):

15 Lux, Uo – 0.4

2.0 The Survey

Existing Lighting

Existing Lighting P – A34

Roadway is currently artificially lit with approximately 10/12m column mounted discharge lanterns

Although unsafe to access it is professionally judged that the lighting levels are representative of an:

Average light levels judged as being equivalent to a M4 classification (BS 5489-1:2013):

0.75 cd m^2, U0 – 0.4, Ul – 0.6

Existing Lighting within close proximity to Junction 15a

2.0 The Survey

Survey Locations

Grand Union Canal / Northampton Arm (tow path) - Ecology Constraints

Constraints:

Potential commuting and foraging location for Bats

External Lighting Condition:

Village or relatively dark outer suburban

Current Obtrusive Light Condition:

Natural screening provided by existing tree lines and hedgerows.

The notable increase above natural moonlight conditions occurs at survey points C11 and C12 where light spill from the northern A43 bridge increases light conditions to the canal and towpath to 5.98 Lux.

A minor increase is also notable at survey point C16 where light spill from the M1 and southern A43 bridge and roundabout increases light conditions to the canal and towpath to 0.56 Lux.

A minor increase is also notable at survey points C19 and C20 where light spill from the southern A43 bridge and roundabout increases light conditions to the canal and towpath to 0.45 Lux.

Ecological and Waterbody Constraints

2.0 The Survey

Survey Locations

Grand Union Canal / Northampton Arm (tow path) - Ecology Constraints

Survey Location	Peak Illuminance Measurement (Lux) Vertical @ 1.5m + AFL	Peak Illuminance Measurement (Lux) Horizontal @ Ground level
C9	0.10	0.02
C10	0.17	0.06
C11	2.63	3.14
C12	4.85	5.98
C13	0.19	0.03
C14	0.09	0.02
C15	0.03	0.03
C16	0.56	0.29
C17	0.03	0.02
C18	0.12	0.07
C19	0.45	0.02
C20	0.25	0.08
C21	0.03	0.01
C22	0.03	0
C23	0.03	0.01
C24	0.04	0.02
C25	0.04	0.02
C26	0.04	0.02
C27	0.02	0.01
C28	0.02	0.02
C29	0.02	0.01
C30	0.02	0.01
C31	0.02	0.01
C32	0.02	0.01

Ecological and Waterbody Constraints

2.0 The Survey

Survey Locations

H5 – H11

Constraints:

Heritage

External Lighting Condition:

Village or relatively dark outer suburban

Current Obtrusive Light Condition:

Natural screening provided by existing tree lines and hedgerows.

A minor increase is also notable at survey points H7 where light spill from the A43 roundabout increases light conditions to the canal and towpath to 0.25 Lux.

Survey Location	Peak Illuminance Measurement (Lux) Vertical @ 1.5m + AFL
H5 = C9	0.10
H6 = C15	0.03
H7 = C20	0.25
H8 = C25	0.04
H9 = C29	0.02
H10= C31	0.02
H11= C33	0.02

Heritage Constraints

3.0 Sky Glow – Site and Wider Area

Figure 3.1 adjacent, CPRE – Night Blight within the East Midlands gives a broad brush indication of the upwards light (sky glow) experienced for the year 2000 for the PDA location and further afield locations.

Satellite measurements range from 0 (being a dark sky) to 255 (being a saturated bright sky at night – city centre).

Taken on a local scale existing saturated sky glow is notable from major urban development of Northampton and associated conurbation.

CPRE – Night Blight Data	
0 to 1.70 – Very Dark Equivalent to Dark Sky Reserve / E0 Zone	Areas substantially remote to Development
1.71 to 50 – Dark / Brighter Equivalent to Dark Sky / Rural / E1 Zone	Areas remote to Development
50.01 to 150 – Brighter Equivalent to Rural / E1 and E2 Zones	Areas within close proximity to Development
150.1 to 240 – Brighter / Saturated Equivalent to Suburban / E3 Zone	Pockets of Development equivalent to Suburban, e.g. Collingtree, Roade, and Towcester, etc.
240.01 to 255 – Saturated Equivalent to City / E4 Zone	Major Development equivalent to City Centre, e.g. Northampton.

Table 3.1 – Night Blight data comparing to Site classifications

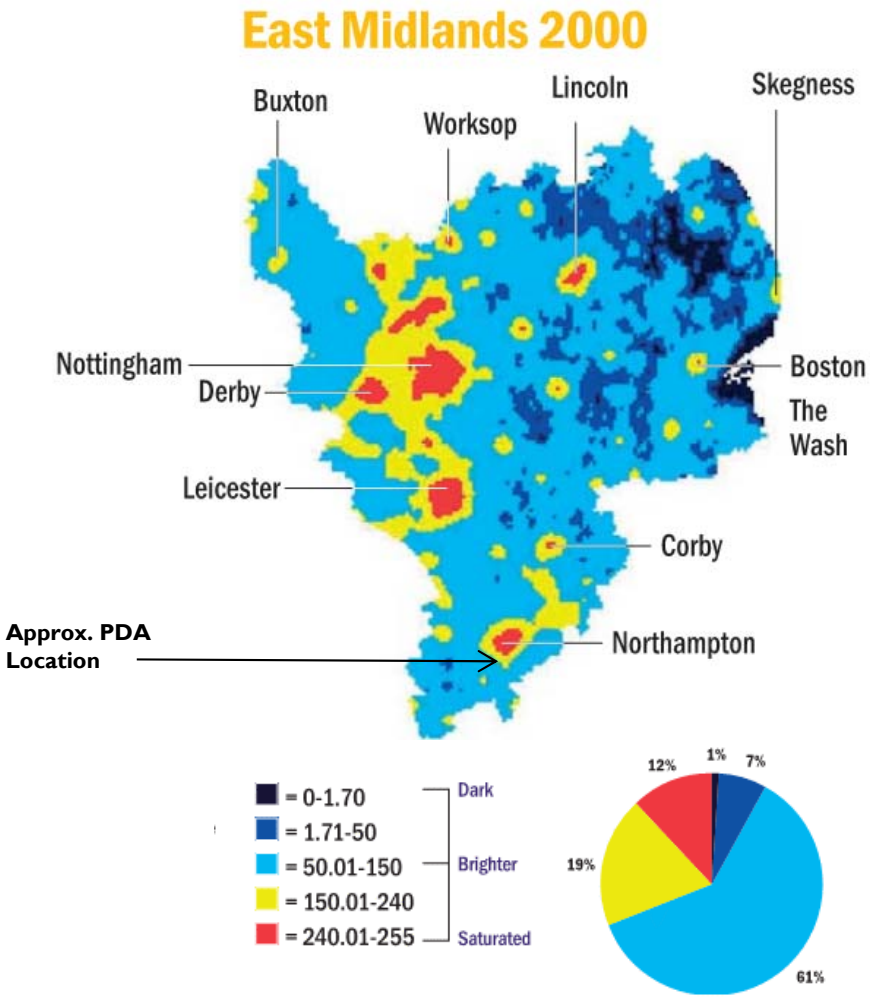


Figure 3.1: Night Sky Brightness (Sky Glow) within The East Midlands (2000)

4.0 The Survey – Environmental Zone Classification

The Site and Environmental Zone Classification

Assessment of the designation, use, habitat and external lighting condition dictates the classification of Environmental Zones across the PDA and surrounding areas. The Environmental Zones relate to limiting guidance published by the Institute of Lighting Professionals ILP for obtrusive light (residential and highway) - ILP Guidance Notes for the Reduction of Obtrusive Light (2011).

The current highway and motorway services are judged to be lit to the equivalent of an E3 / E4 Zone classification (Medium to High district brightness)

However, this is localised to artificially lit areas associated with the artificially lit motorway / services / retail zones and the with presence of natural treelines obtrusive light spill is limited towards the canal and towpath, which become representative of an E2: Low district brightness area.

This is considered this to be a fair representation of the existing Environmental Zone classifications and should the proposed lighting developments proceed within these parameters the overall obtrusive light impact is regarded to be no greater than what is currently experienced.

Obtrusive Light Limitations for Exterior Lighting Installations – General Observers

Environmental Zone	Sky Glow ULR [Max %][1]	Light Intrusion (into Windows) E_v [lux] [2]		Luminaire Intensity I [candelas] [3]		Building Luminance Pre-curfew [4]
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Average, L [cd/m^2]
E0	0	0	0	0	0	0
E1	0	2	0 (1*)	2,500	0	0
E2	2.5	5	1	7,500	500	5
E3	5.0	10	2	10,000	1,000	10
E4	15	25	5	25,000	2,500	25

Canal and Tow Path - E2 Zone classification.

Motorway / Services / Retail – E3 / E4 Zone classification.

1

Audit Sheet

Rev.	Description	Prepared and checked by	Reviewed by	Date by
P1	Draft Issue	LG	DDM	21.07.2017
P2	Final Issue	DDM	DDM	01.03.2018

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