

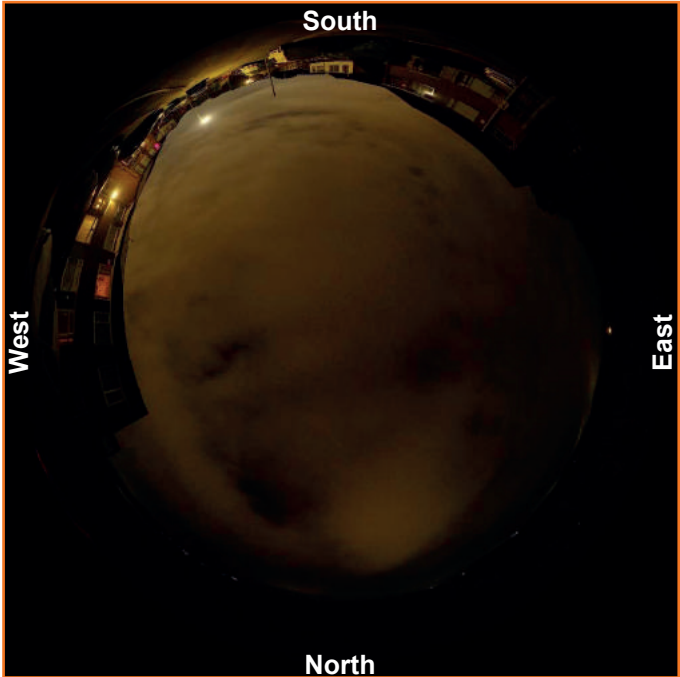
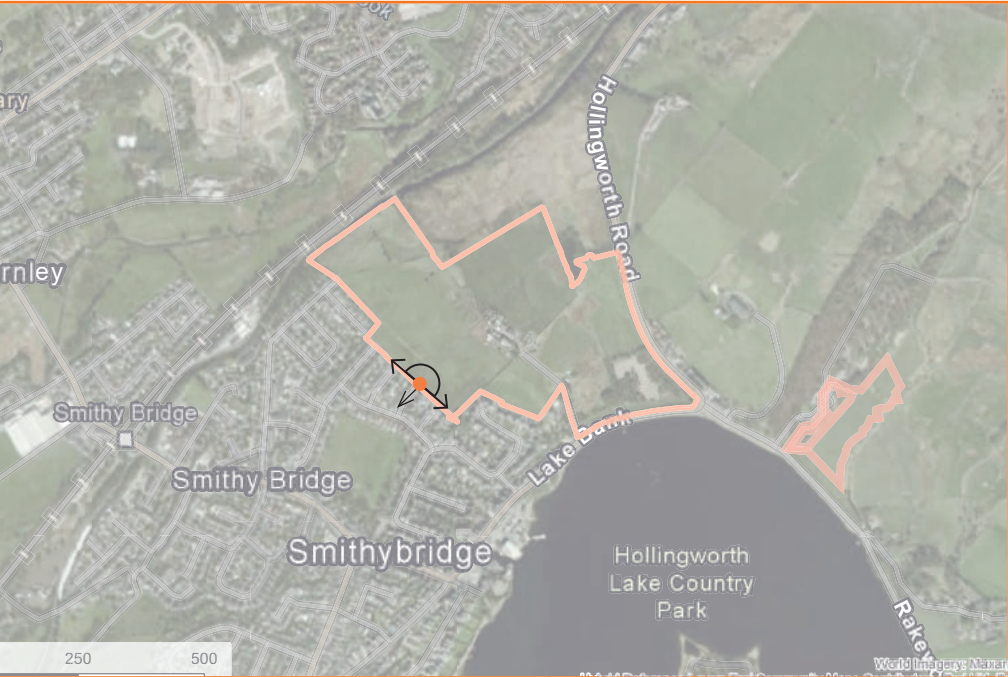
Proposed Development at Hollingworth Road and Rakewood Road, Littleborough
Lighting Assessment



View along Brown Lodge Drive
Extract from Theta Z1
Automatic HDR Settings
View composed and exported from Theta desktop application



View along Brown Lodge Drive
Taken from field gate, within Site
Nikon DX5300
f/2, 2sec, ISO200
Vertical Illuminance 0.27lux



Notes:

All directional annotations are approximate

Streetlighting from roads perpendicular to the Site can be seen illuminating into the Site.

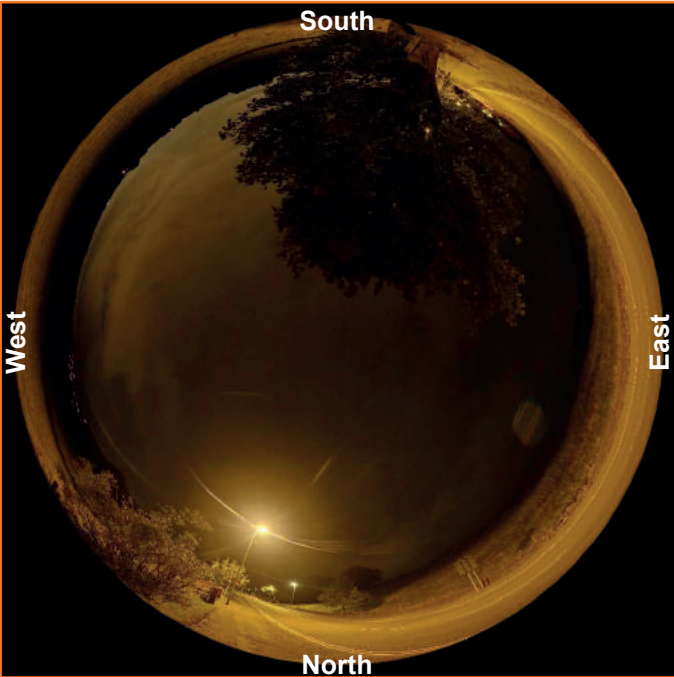
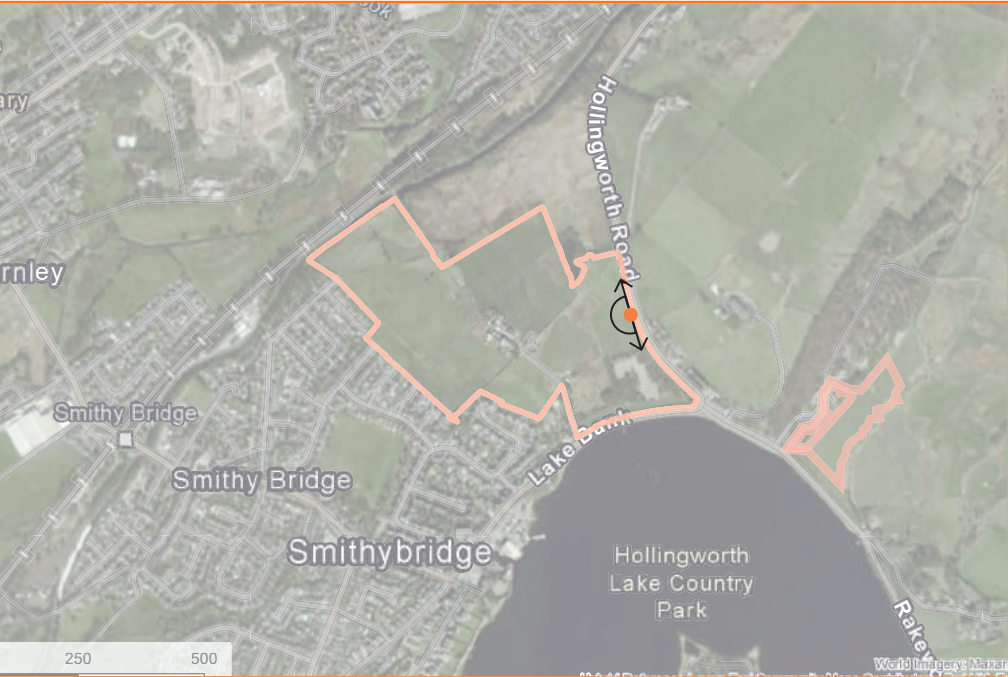
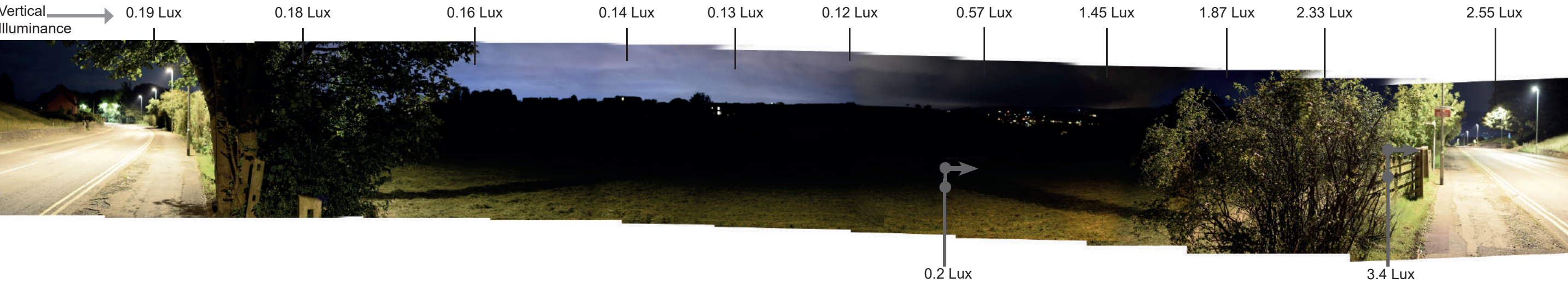
Residence immediately adjacent to site on north side of road has presence triggered floodlight on facade which illuminates into the street, site and influences surrounding properties.

Survey Location	
E	
Boundary of Site and Higher Bank Road, PRoW	
Camera & Lens	
Nikon DX5300 / AF-S Nikkor 35mm 1:1.4G	
Day Image	
YYYY/MM/DD & Time	Camera Settings
2023/08/22, 10:35	Auto
Photo Editing	
Photoshop automerger, Cylindrical projection	
Night Image	
YYYY/MM/DD & Time	Camera Settings
2023/08/23, 00:20	f/2, 10sec, ISO200
Photo Editing	
Overlaid & aligned with daytime image, manually blended panorama, no geometric distortion.	



South

West



Notes:

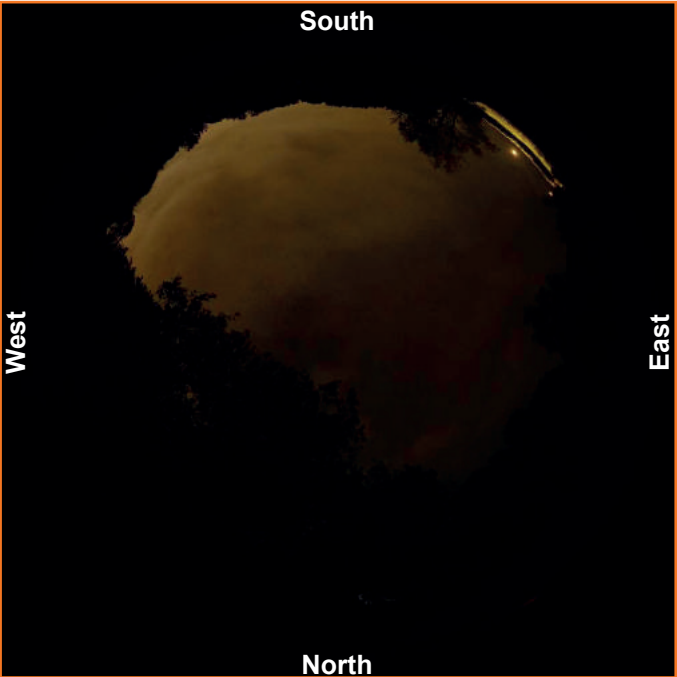
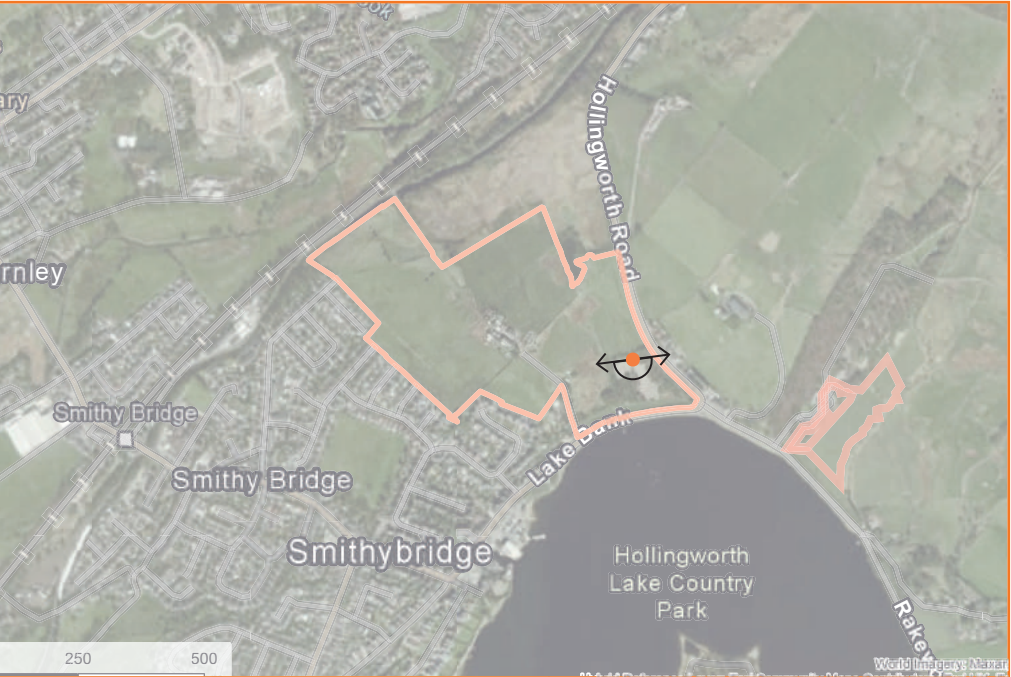
All directional annotations are approximate

Streetlighting from Hollingworth Road can be seen spilling into the site.

Survey Location	
F	
Hollingworth Road	
Camera & Lens	
Nikon DX5300 / AF-S Nikkor 35mm 1:1.4G	
Day Image	
YYYY/MM/DD & Time	Camera Settings
2023/08/22, 11:05	Auto
Photo Editing	
Photoshop automerge, Cylindrical projection	
Night Image	
YYYY/MM/DD & Time	Camera Settings
2023/08/23, 00:45	f/3.2, 6sec, ISO200
Photo Editing	
Overlaid & aligned with daytime image, manually blended panorama, no geometric distortion.	



South



Vertical Illuminance

Notes:

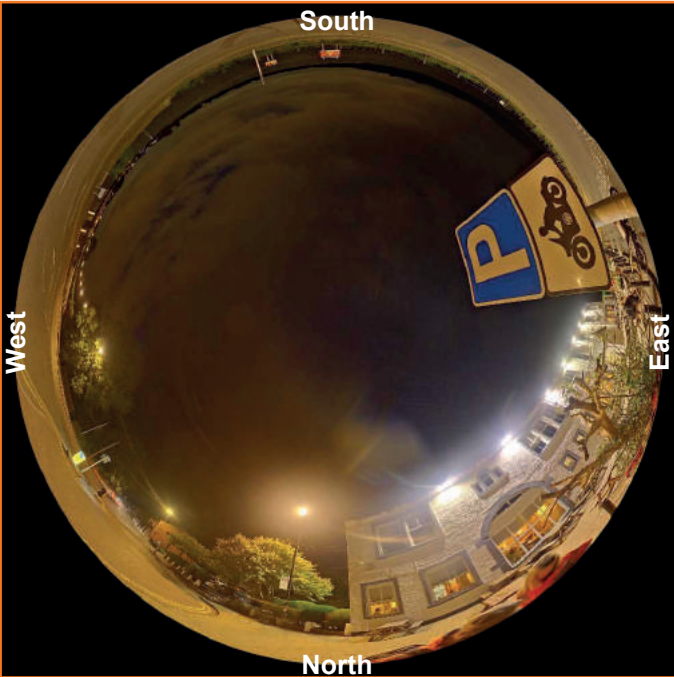
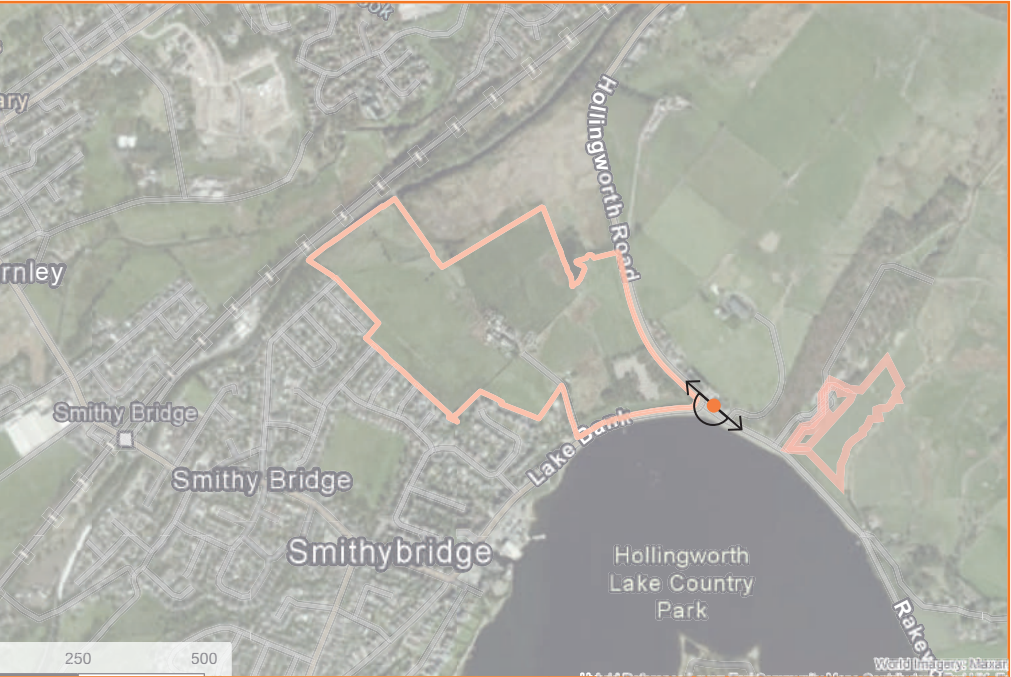
All directional annotations are approximate

Survey Location	
G	
Hollingworth Lake carpark	
Camera & Lens	
Nikon DX5300 / AF-S Nikkor 35mm 1:1.4G	
Day Image	
YYYY/MM/DD & Time	Camera Settings
2023/08/22, 11:20	Auto
Photo Editing	
Photoshop automerger, Cylindrical projection	
Night Image	
YYYY/MM/DD & Time	Camera Settings
2023/08/23, 01:00	f/2.2, 10sec, ISO200
Photo Editing	
Overlaid & aligned with daytime image, manually blended panorama, no geometric distortion.	

Proposed Development at Hollingworth Road and Rakewood Road, Littleborough
Lighting Assessment



View of public house façade and patio
Extract from Theta Z1
Automatic HDR Settings
View composed and exported from Theta desktop application



Vertical Illuminance taken during nautical twilight, some daylight is therefore expected as a contributing factor.

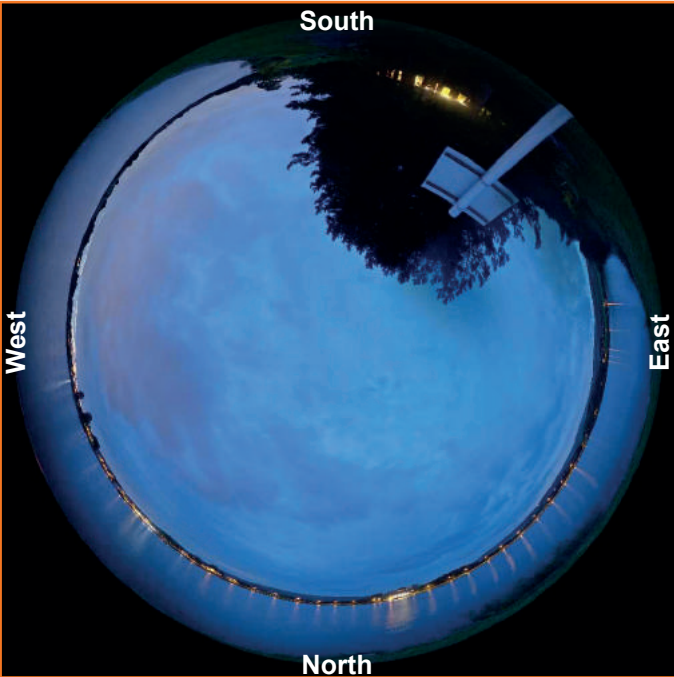
Notes:

All directional annotations are approximate

Survey Location	
H	
Camera & Lens	
Nikon DX5300 / AF-S Nikkor 35mm 1:1.4G	
Day Image	
YYYY/MM/DD & Time	Camera Settings
2023/08/22, 11:30	Auto
Photo Editing	
Photoshop automerge, Cylindrical projection	
Night Image	
YYYY/MM/DD & Time	Camera Settings
2023/08/22, 21:30	f/2.2, 1/2sec, ISO200
Photo Editing	
Overlaid & aligned with daytime image, manually blended panorama, no geometric distortion.	



View of Pavillion Cafe
Extract from Theta Z1
Automatic HDR Settings
View composed and exported from Theta desktop application



Vertical illuminance 0.7 Lux (west) - 0.4 Lux (east).
Images and illuminance taken at Civil twilight, daylight contributions are therefore present.

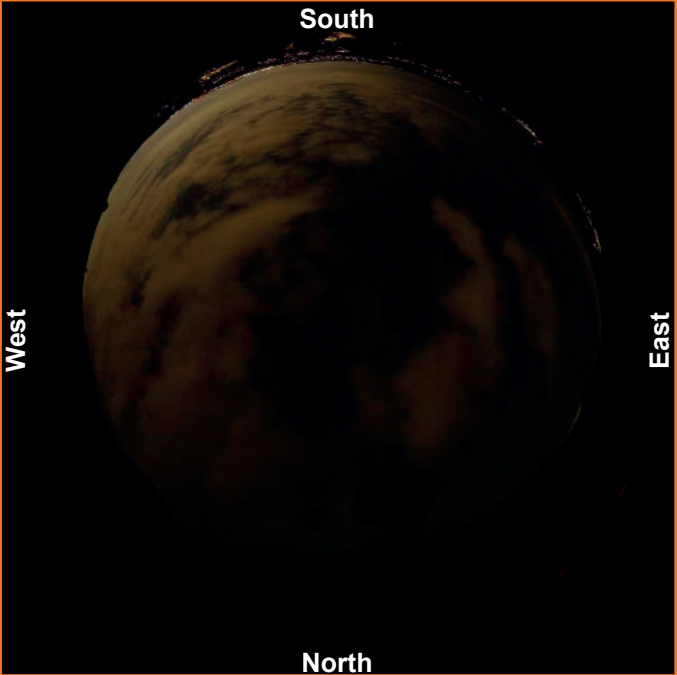
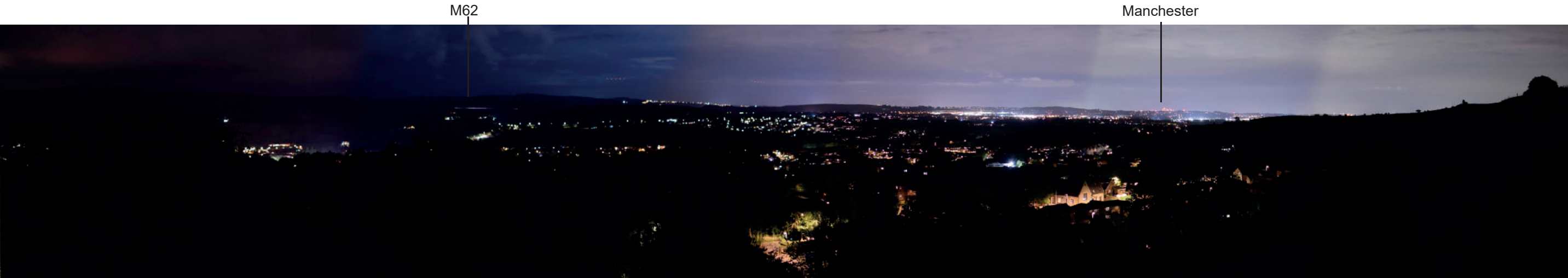
Notes:

All directional annotations are approximate

Lighting within Pavillion Cafe to south, whilst luminaires are under canopy the linear forms with dropped diffuser emit a high quantity of sideways and some upward light, as well as being visually prominent.

Pavillion cafe was closed and lighting was switched off shortly after 21:00 during survey.

Survey Location	
View from south of Hollingworth Lake, nr. Pavillion Cafe.	
Camera & Lens	
Nikon DX5300 / AF-S Nikkor 35mm 1:1.4G	
Day Image	
YYYY/MM/DD & Time	Camera Settings
2023/08/22, 12:30	Auto
Photo Editing	
Photoshop automerger, Cylindrical projection	
Night Image	
YYYY/MM/DD & Time	Camera Settings
2023/08/22, 21:00	f/2.8, 1/2sec, ISO200
Photo Editing	
Overlaid & aligned with daytime image, manually blended panorama, no geometric distortion.	



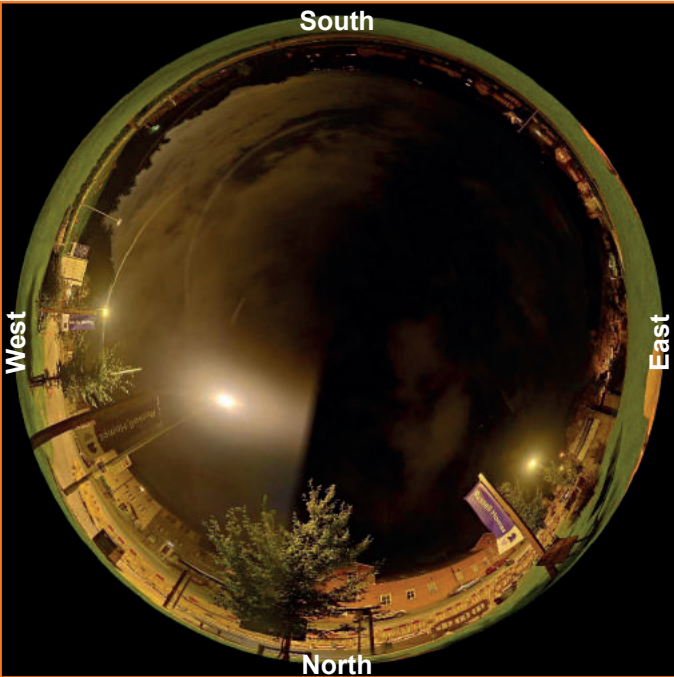
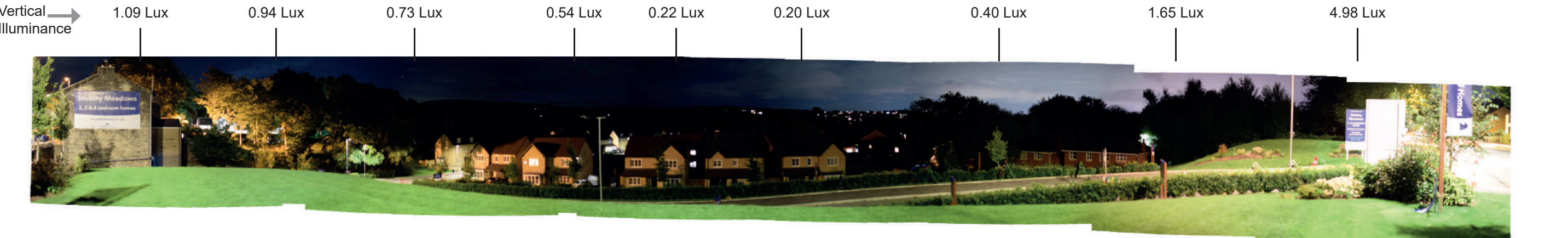
Vertical illuminance 0.06 - 0.08 Lux
Horizontal illuminance 0.18 Lux

Notes:

All directional annotations are approximate

Aeroplane on approach to Manchester airport captured across multiple images

Survey Location	
J	
Camera & Lens	
Nikon DX5300 / AF-S Nikkor 35mm 1:1.4G	
Day Image	
YYYY/MM/DD & Time	Camera Settings
2023/08/22, 13:50	Auto
Photo Editing	
Photoshop automerger, Cylindrical projection	
Night Image	
YYYY/MM/DD & Time	Camera Settings
2023/08/22, 22:05	f/2.5, 5sec, ISO200
Photo Editing	
Overlaid & aligned with daytime image, manually blended panorama, no geometric distortion.	



Notes:

Recently completed estate in the foreground may not have been adopted at time of survey and as such illuminance levels may not have been fully set through CMS system.

All directional annotations are approximate

Survey Location	
K	
Entrance of Dearnley Avenue. Typical of view from north.	
Camera & Lens	
Nikon DX5300 / AF-S Nikkor 35mm 1:1.4G	
Day Image	
YYYY/MM/DD & Time	Camera Settings
2023/08/22, 14:20	Auto
Photo Editing	
Photoshop automerge, Cylindrical projection	
Night Image	
YYYY/MM/DD & Time	Camera Settings
2023/08/22, 22:30	f/2, 5sec, ISO200
Photo Editing	
Photoshop automerge, Cylindrical projection	

Appendix B - Illuminance Meter, Certificate of Calibration



CERTIFICATE OF CALIBRATION



ISO 9001:2015
REGISTERED

Glanford Electronics Ltd.

Glanford House,
Exmoor Avenue
Skippingdale Business Park,
Scunthorpe
North Lincolnshire
DN15 8NJ
Telephone: (01724) 289600
Email: info@glanfordelectronics.com www.glanfordelectronics.com

CALIBRATION: 100128

Issued to: Stanec UK Ltd
3rd Floor, 10 Queen Square, Bristol, BS1 4NT

Instrument Certified: Extech Easy View 30 Light Meter

Serial No: 171106304

Date in: 06-Jan-23

Cal Date: 10-Jan-23

Date Due: 10-Jan-24

All measurements are traceable to UK National Standards / a UKAS Calibrated Test Instrument

Observations/Corrections (GEL249) Konica Minolta T10A Illuminance Meter S/N:20014565
No Adjustment

Calibrated at 22 °C 37 %RH

Certified that, unless otherwise stated, the equipment conforms in all respects to manufacturers published specifications at the points measured
Calibrations performed in accordance with our registration to BS EN ISO9001:2015
and the general requirements of BS EN ISO 17025:2017

certifying engineer



S. Lawrence
J. Taylor
B. Thorne
KW. Chung
G. Cowling

FORM 12

CERTIFICATE OF CALIBRATION



ISO 9001:2015
REGISTERED

Job No 100128

Page 2

Of 2

Extech Easyview 30 Light Meter

S/N: 171106304

Input	Low Limit	Measured	High Limit	Pass/Fail
0.1 Lux	-0.10	0.09	0.30	Pass
5.06 Lux	4.71	5.00	5.41	Pass
20.7 Lux	19.88	20.80	21.52	Pass
100 Lux	95.0	99.6	105.0	Pass
506 Lux	471	505	541	Pass

Manufacturer Specification +/- 3% rdg + 0.5% FS

Light

in the points



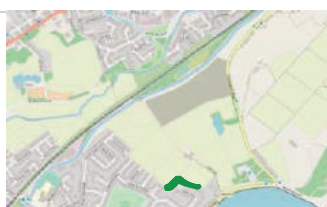
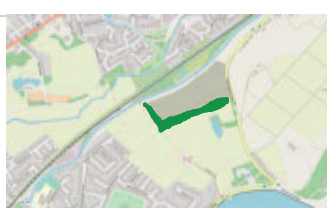
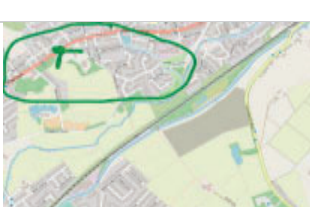
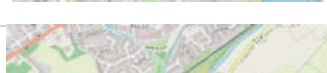
S. Lawrence
J. Taylor
B. Thorne
KW. Chung

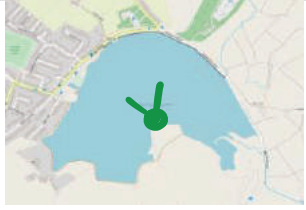
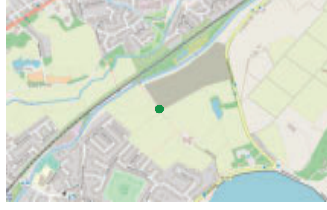
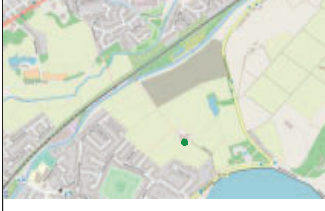
FORM 12A

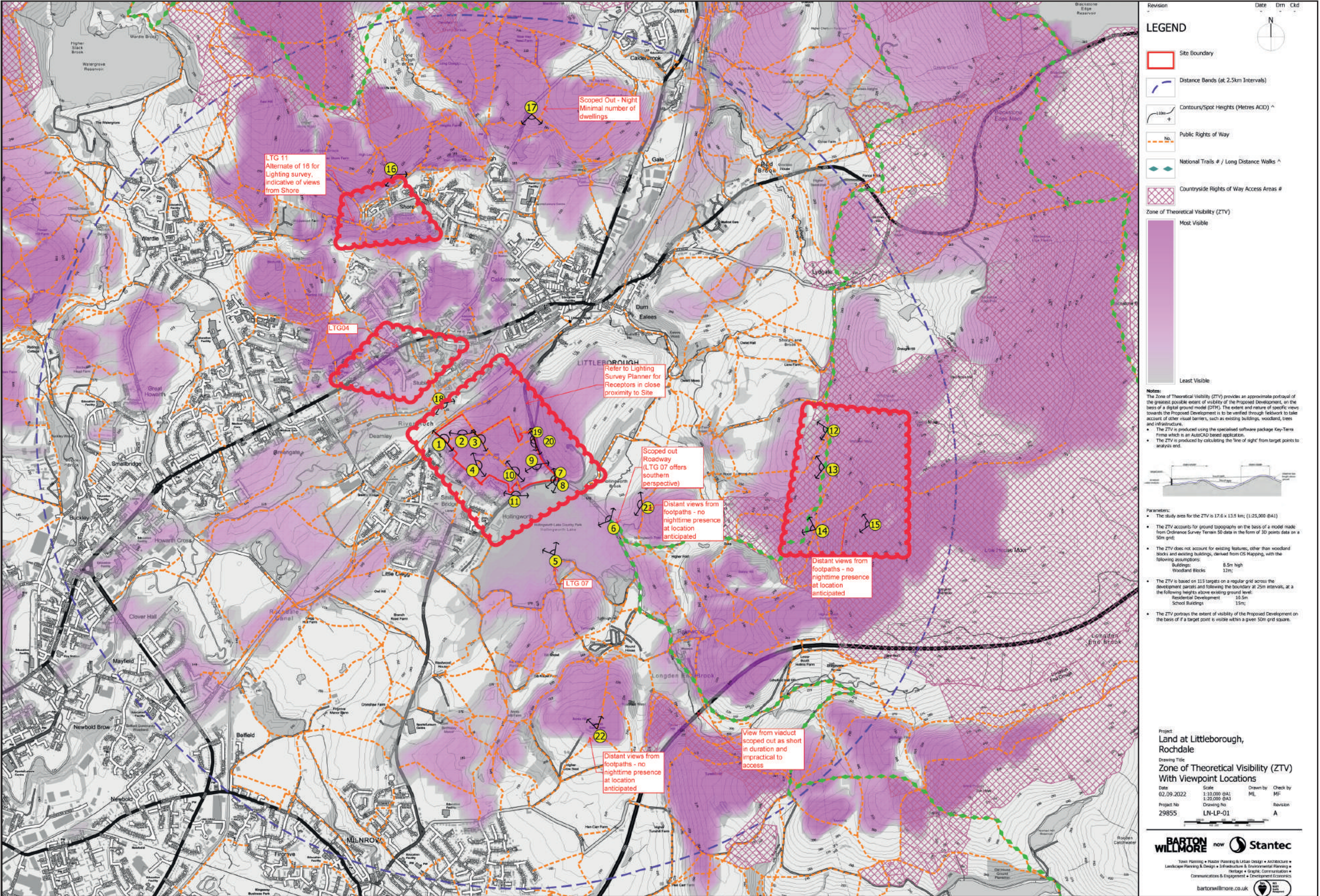
43

Appendix C - Receptor Scoping

The following documents were submitted within the ES Scoping (as Appendix B) report and formed part of evidencing the decision making process for inclusion and exclusion of receptors and survey locations.

Lighting Assessment - Receptor & Survey Planner															
Project:		LAND AT HOLLINGWORTH ROAD, LITTLEBOROUGH				Revision	P05	Date							
Project Location:		LITTLEBOROUGH, GREATER MANCHESTER				Prepared By		GD							
Project #:		332010570													
Planned Survey Date:		22nd August													
Receptor / Survey Point Ref	Description	Receptor Source	Scope In	Map View	Visual	Health & Wellbeing	Ecology	Scope In/Out Notes	Survey notes	Parking Location	Access Method	On or Near Highway / Transport	Working at height	Near water	Ru
LTG 01	Rochdale Canal	Stantec LTG / Tyler Grange	Scoped In		1	1	2	Ecology The Rochdale canal is a Site of Special Scientific Interest (SSSI), the site falling within the risk zone. Visual, Health and Wellbeing The canal towpath forms part of National Cycle Network route 66 and is valued leisure asset for walking, cycling and boating.	Spot Horizontal and Vertical illuminance readings along north bank (towpath) of canal. Vertical illuminance at 1.5m AGL and at ground level on towpath. No readings on or in the water will be taken. Whilst Access to the south bank appears possible, survey will use towpath as established waterside surface and to avoid the steep banks of south side. Non-Verified Reference Photography	Parking based from Brown Lodge Drive / Higher Bank road or simialr - Residential Street	On foot as part of main site and surround walkover	No	No	Yes - Working from towpath only	No
LTG 02 (Overlap with LVIA 01)	Residential Properties backing on to Site from Licoln Drive & Brown Lodge Drive	Stantec LTG	Scoped In		1	2		Included to assess residential amenity and potential for light intrusion to exceed guidance levels. Note: Forms part of general south west boundary receptor, may be merged into single receptor at future stages.	Horizontal (Ground Level) and Vertical illuminance readings (1.5m AGL) readings at boundary of site and last property on each side of the roads. Vertical illuminance to be taken facing Site and perpendicular to house front (facing existing street) Spot vertical illuminance (1.5m AGL) readings from within Site boudary as it backs to properties on Lincon Drive (Midway long and at souther corner) Non-Verified Reference Photography from end of Brown Lodge Drive	Parking based from Brown Lodge Drive / Higher Bank road or simialr - Residential Street	On foot as part of main site and surround walkover	No	No	No	No
LTG 02 (Overlap with LVIA 04)	Resiential properties adjacent to Site on Bridge Bank Road, Highlands, Higher Bank Road, Bank Close	Stantec LTG	Scoped In		1	2		Included to assess residential amenity and potential for light intrusion to exceed guidance levels. Note: Forms part of general south west boundary receptor, may be merged into single receptor at future stages.	Horizontal (Ground Level) and Vertical illuminance readings (1.5m AGL) at boundary of site and last property on each side of the roads. Vertical illuminance to be taken facing Site and perpendicular to house front (facing existing street) Non-Verified Reference Photography from end of Higher Bank Road	Parking based from Brown Lodge Drive / Higher Bank road or simialr - Residential Street	On foot as part of main site and surround walkover	No	No	No	No
LTG 02	Residential Properties backing on to Site from Higher Cleggswood Ave	Stantec LTG	Scoped In		1	2		Included to assess residential amenity and potential for light intrusion to exceed guidance levels. Note: Forms part of general south west boundary receptor, may be merged into single receptor at future stages.	Spot Vertical illminance readings (1.5m AGL) from within Site at boundary to houses. Note: Forms part of general south west boundary receptor, may be merged into single receptor at future stages.	Parking based from Brown Lodge Drive / Higher Bank road or simialr - Residential Street	On foot as part of main site and surround walkover	No	No	No	No
LTG 03	Future Residential properties on Vistry Site	Stantec LTG	Scoped In			2		Included to assess residential amenity and potential for light intrusion to exceed guidance levels.	Spot Vertical illminance readings (1.5m AGL) from within Site at boundary to Vistry site LVIA 02 LVIA 03 overlook location	Parking based from Brown Lodge Drive / Higher Bank road or simialr - Residential Street	On foot as part of main site and surround walkover	No	No	No	No
	Highest Accessible Location within site	Stantec LTG	Not a Receptor / Reference Only					Not a Receptor - Reference Survey point Included to determine reverse viewpoints and where possible record boundary conditions	Non-Verified Reference Photography (360 Panorama) if applicable.	Parking based from Brown Lodge Drive / Higher Bank road or simialr - Residential Street	On foot as part of main site and surround walkover	No	No	No	No
LTG 04	General Residential properties North of the site, Dearnlev and Littleborough. Junction of Featherstall Road and Dearnley Ave proposed for indicative view.	Stantec LTG	Scoped In		1	2		Included to allow for general commentary on visual change	Non-Verified Reference Photography. View from entrance to Stubley Gardens Horizontal (Ground Level) and Vertical illuminance readings (1.5m AGL) readings as applicable	On Street - James William Street - residential road	By foot on pavements	Yes - working from footpath only	No	No	No
LTG 05	Residential Properties at south end of B6225 and junction with Rakewood Road and Lake Bank	Stantec LTG	Scoped In		1	2		Included to assess residential amenity and potential for light intrusion to exceed guidance levels.	Horizontal (Ground Level) and Vertical illuminance readings (1.5m AGL) readings at boundary of properties and pavement.	pay and display car park - or Pub carpark					

Receptor / Survey Point Ref	Description	Receptor Source	Scope In	Map View	Visual	Health & Wellbeing	Ecology	Scope In/Out Notes	Survey notes	Parking Location	Access Method	On or Near Highway / Transport	Working at height	Near water	Ru
LTG 06 Overlaps with LVIA 07, 08, 11	Lake Bank - adjacent to Site	Stantec LTG	Scoped In		1	1		Considers amenity and setting of the lake. Proposed combined into general receptor with Rakewood Road	Non-Verified Reference Photography.	Hollingworth road pay and display car park - or Pub carpark					
LTG 07 Overlaps with LVIA 05	Southern Viewpoint / Pavillion Hollingworth Lake	Stantec LTG / Barton Willmore LVIA	Scoped In		2	1		Considers amenity and setting of the lake	Non-Verified Reference Photography, panorama. Vertical and horizontal illumance readings	Possible access via tracks in raalm otherwise	otherwise 20 min walk from carpark for LTG06				
LTG 08	Badger Set	Tyler Grange	Scoped In				2	Noted by ecologist	Horizontal illuminance on footpath edge at nearest point to set. No photography	Parking based from Brown Lodge Drive / Higher Bank road or simialr - Residential Street	On foot as part of main site and surround walkover	No	No	No	No
LTG 09	Bat Roost	Tyler Grange	Scoped In				2	Noted by ecologist	Review location from field boundary of properties - No access to properties planned. Illuminance readings as appropraite at nearest boundary of property to roost. No Photography	Parking based from Brown Lodge Drive / Higher Bank road or simialr - Residential Street	On foot as part of main site and surround walkover	No	No	No	No
LTG 10	Woodland Habitat / Perimeter	Tyler Grange	Scoped In				2	Noted by ecologist	Spot illuminance readings (vertically @ 1.5m AGL perpendicular to line of vegetation) along outer north & west perimeter.	pay and display car park - or Pub carpark					
LTG 11 Overlap with LVIA 16	Views from Shore, North of Site		Scoped In		1	1			Non-Verified Reference Photography. Horizontal (Ground Level) and Vertical illuminance readings (1.5m AGL) readings as applicable	On track	Car	Yes - quiet lane	no	no	no
									Refer to Annotated Map of ZTV and LVIA proposed viewpoints for scoping relative to LVIA proposals						
Map Thumbnails - © OpenStreetMap contributors https://www.openstreetmap.org/copyright															



Appendix D - ROLAN Manifesto

The ROLAN manifesto represents provides 10 key points which work towards responsible lighting at night. The manifesto has been acknowledged by national and international lighting organisations (including the ILP and SLL with the UK) and research institutions. Whilst by no means definitive and comprehensive the manifesto provides an overview and framework into which many of the topics regarding light pollution, obtrusive light and responsible, sustainable lighting design can be developed.

ROLAN Manifesto for lighting professionals

The Responsible Outdoor Lighting At Night (ROLAN) Manifesto sets out ten core principles for external illumination and a plan of action to implement positive change in the lighting community to lead to a more sustainable, healthier, and safer future for all.

1. Everyone should have the right to access darkness and quality lighting, and light needs to be used and distributed fairly without discrimination.
2. Start your design with darkness and only add light if it supports nocturnal placemaking and protects a view of the stars.
3. In all projects, strive to maximise the benefits of outdoor light at night by creating legible, safe spaces and journeys, simultaneously limiting each project's environmental and financial costs.
4. Apply the Five Principles of Responsible Outdoor Lighting in all lighting projects:
 - All light should have a clear purpose.
 - Light should be directed only to where it's needed.
 - Light should be no brighter than necessary.
 - Light should be dimmed down or turned off when not required.
 - Use warmer colour lights where possible.
5. Collaborate with researchers from different disciplines and specialties, such as astronomers, ecologists, biologists, lawyers, etc., so they can provide expertise on unfamiliar topics.
6. Educate your clients about the importance of ROLAN.
7. Ensure the community you work with is an active stakeholder and participant in all lighting projects. Enquire about their needs and wishes at night, and provide them with access to information to make informed decisions.
8. Embrace technology by asking for support from the lighting industry to ensure that night-time biodiversity is sustained, and energy consumption is reduced. Engage with the lighting design industry to deliver an appropriate lighting solution.
9. A circular economy should be integrated into the brief, design, specification, and manufacturing process of your project, as well as its installation.
10. After project completion, visit the site at night with community stakeholders, to verify that your lighting design was fully implemented and meets ROLAN principles.



Because the UN Sustainable Development Goals (above) do not explicitly refer to external illumination and its multiple impacts, the Founding Partners of the ROLAN movement, are keen to address this in support of the SDG Goals. By following the principles outlined in the ROLAN manifesto, governments, businesses, and individuals support the implementation of the following SDG.

The principal authors of the ROLAN Manifesto are Dr Karolina M. Zielinska-Dabkowska - the ILLUME research group/the Gdansk University of Technology; and Ruskin Hartley - the International Dark-Sky Association, with contributions and support from further Founding Partners: the Society of Light and Lighting (SLL), the International Association of Lighting Designers (IALD), the Illuminating Engineering Society (IES), the Institution of Lighting Professionals (ILP) and the Lighting Industry Association (LIA).

If your organisation would like to support ROLAN movement, please contact: k.zielinska-dabkowska@pg.edu.pl