



TETRA TECH

Hangar 4

External Lighting Strategy

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1 INTRODUCTION

Threadneedle Curtis Ltd have commissioned Tetra to prepare an external lighting strategy for a proposed logistics development on the site of the existing Hangar 4 in the global logistics area at Manchester Airport.

An outline masterplan for the site has been prepared by RPS and is provided below. The site will comprise a 92,000 square foot logistics unit comprising warehouse and office space. The site is located within the western maintenance area of Manchester Airport in an area that is designated as 'controlled landside'.

External to the building, there is proposed yard area wrapping around the east, west and to the south of the building. A car park is provided to the North. Multiple accesses are provided to the site from the existing airport owned road network surrounding the perimeter.

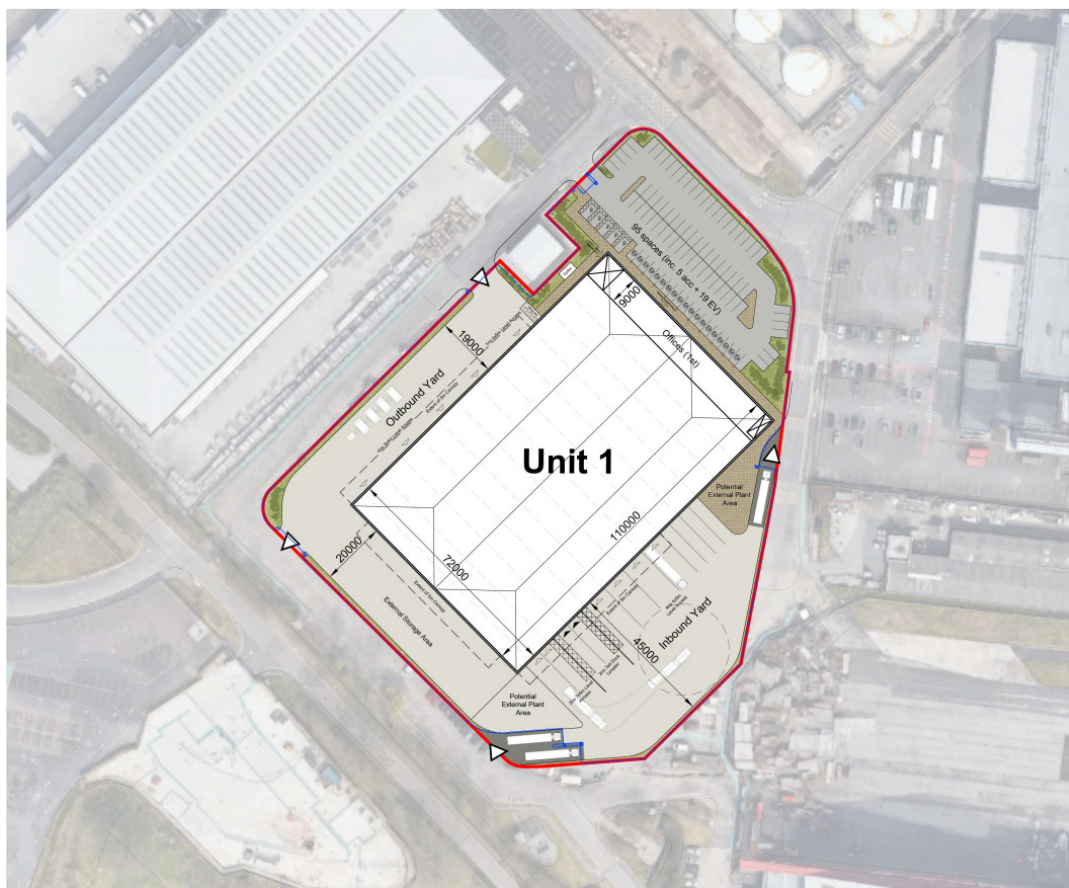


Figure 1 – Proposed Masterplan

2. EXISTING SITE LIGHTING

The site currently contains a former World War 2 Hangar known as Hangar 4 which is scheduled for demolition. A car park comprises the northern area of the site. Existing airport i-sub-station is located on the western boundary of the site which will be maintained in the proposed masterplan.

The site is bounded by Wilmslow Old Road to the South, Fairey's apron to the East, the DNATA logistics facility to the west and airport fuel farm to the north. Existing airport owned private roads run around the perimeter of the site. The existing site layout is demonstrated by Figure 2 below:



Figure 2 – Existing Site

Existing observed lighting is summarised as follows:

Perimeter road to West:

The road runs along the eastern boundary of the site between existing Hangar 4 and the DNATA warehouse. The road runs from Pinfold Lane to the North and Airport I Sub-station is located on the eastern edge of the carriageway.

Limited lighting provision is currently in place for this section of the road. Nominal building lighting on Hangar 4 provides light shed to the road. Low level lighting is provided to the western edge of the carriageway attached to an Armco barrier forming the edge of a designated safe walking route.

Limited light shed is provided from the adjacent DNATA site. Towards Pinfold Lane the recently constructed section of road has provision for lighting with sleeves and ducting observed however no columns or luminaires are installed.

Perimeter road to South:

The road runs to the south of the proposed development parallel to Wilmslow Old Road. Street lighting is provided in the southern verge adjacent to the road and some limited wall mounted luminaires are present on Hangar 4.

Eastern Yard (Front of Hangar 4):

Yard lighting to this area is provided by wall mounted luminaires on Hangar 4. Light shed from Fairey's apron occurs provided by wall mounted luminaires on the Jet 2 Hangar.

Perimeter road to East:

The road runs from Pinfold Lane to the north and currently serves the Hangar 4-yard area and access gate to Fairey's apron. Lighting Columns are provided to the eastern edge of the carriageway adjacent to the Thomas Cook Hangar. A lighting column is present adjacent to the Fairey's apron access gate.

Pinfold Lane (North of site):

The road runs east to west between the site and the Fuel Farm to the North. Provision for street lighting is observed in the form of sleeves and ducting however no columns nor luminaires are present. Minimal light shed is provided by Hangar 5 car park.

Hangar 5 Car Park:

The car park in the northern section of the site is known as Hangar 5. Lighting columns are observed in this area providing light shed to the parking areas.

3. CONSTRAINTS AND SENSITIVE RECEPTORS

The proposed development site is located within the logistics area of Manchester Airport and as such many of the surrounding facilities are of a similar nature to the proposed development, and the proposed external lighting will have minimal impact. To site is surrounded by logistics facilities and Aircraft Hangars with Wilmslow Old Road to the south the only undeveloped façade.

The logistics centre is a 24hr operational area with a great deal of vehicular movement throughout the day and night. When developing the new lighting strategy, the following items have been considered due to the impact that any new lighting scheme may have upon them. Refer also to section 4 for the proposed lighting strategy and mitigation measures to be introduced.

The following receptors have been considered in the strategy:

DNATA

The whole western façade of the site faces the DNATA building. The DNATA office building is cited in the northwestern corner of their building with no office windows facing the development site. The DNATA façade facing the development is operational yard area and warehouse with dock doors present into the warehouse. DNATA are a 24-hour operational warehouse and therefore the proposed development is considered to have negligible impact.

Jet 2

The Jet 2 Hangar is located to the Southeast of the site. Offices are cited on the western façade of the main Hangar building facing the proposed Hangar 4 site.

The proposed development is not dissimilar to the existing environment in which the Hangar is currently situated, and as such the users of the building are familiar with the lit environment. The new development may introduce some areas of higher lighting levels as the loading bay areas will be closer to the office building. Therefore, the external lighting will need to be designed to minimize light trespass into the office demise, and not make the existing condition worse than currently experienced. Sources of glare will need to be minimized by careful positioning and aiming of the proposed luminaires, so as not to cause nuisance to the office users.

Swissport Maintenance Shed

A small single Storey maintenance shed is located to the east of the site. The facility is purely a maintenance facility and does not contain any office space. It is therefore deemed that this is not a sensitive receptor, and the scheme will have minimal impact. The current occupation of the site and use as Motor Transport is no less onerous to this shed the proposed scheme and therefore, they are familiar with the working environment.

Former Thomas Cook Hangar

The Thomas Cook Hangar is located to the east of the site. Offices are cited on the western façade of the main Hangar building facing the proposed Hangar 4 site.

The proposed development is not dissimilar to the existing environment in which the Hangar is currently situated, and as such the users of the building are familiar with the lit environment. The new development may introduce some areas of higher lighting levels as the loading bay areas will be closer to the office building. Therefore, the external lighting will need to be designed to minimize light trespass into the office demise, and not make the existing condition worse than currently experienced. Sources of glare will need to be minimized by careful positioning and aiming of the proposed luminaires, so as not to cause nuisance to the office users.

Fuel Farm

The airports fuel farm is located to the North. Fuel Farm is not considered an occupied site and no office or regularly occupied spaces are present. Staff working in the fuel farm are maintenance based only. This is therefore deemed to not be a sensitive receptor. The adjacent DNATA development provides a similar impact to the Fuel Farm.

Cotterill Clough

An area of woodland containing a watercourse is present to the south of the site. The area is defined as a site of biological interest (SBI) due to fauna present in the woodland and watercourse corridor. It is known that the woodland provides a habitat for bats.

The bat protection zone is separated from the site by Wilmslow Old Road and the Waste Management Site. The airports waste management site sits immediately adjacent to the woodland and provides a more onerous light impact on Cotterill Clough than the proposed development.

A tree buffer is present adjacent to Wilmslow Old Road which will be maintained. It is concluded that Cotterill Clough will not be impacted by the development.

Airfield

The proposed development site is located adjacent to the live airport environment, but sufficiently far away as to not be impacted by Obstacle Limitation Surfaces and Radar installations.

The Unit will detailed has been developed to ensure no upward light and / or high glare sources that may have an impact on the approaching / departing aircraft are proposed.

4. PROPOSED LIGHTING SOLUTION

The proposed external lighting strategy shall be to provide artificial lighting to the building perimeter, loading dock areas, hard standing areas and roads, to allow safe vehicle and pedestrian movement around the site, as well as providing a level of security. Careful consideration shall be given to reducing obtrusive light during the night and the visual impact of the lighting scheme during the day, whilst maintaining an adequate level of illuminance for its application on the site.

Particular attention shall be paid to minimising any glare or sky glow produced by the scheme or intrusion onto nearby developments & wildlife habitats. Building mounted lighting shall be provided in the form of floodlights. Floodlights shall be chosen to have good light control and cut off angles to reduce light spillage and zero horizontal cut off to eliminate any upward light.

Where necessary to achieve the lighting levels stated in section 4.2, additional column mounted luminaires may be installed. These will generally be of a height to ensure clearance of the proposed vehicle types, but not excessive so as to cause light spill outside of the site boundary. However, to achieve the lighting levels required on the new Argosy drive and adjacent loading bays, the use of High Mast Lighting may be considered. This has the potential to have a wider impact on the surrounding areas and will be designed to minimise light spill outside of the developed area.

4.1 Standards & Legislation

Environmental Protection Act:

The Environmental Protection Act 1990 (Section 102 of the Clean Neighborhoods and Environment Act (CENA): 2005, gives local authorities the power to consider obtrusive artificial light as a Statutory Nuisance. The Act makes 'exterior light emitted from premises so as to be prejudicial to health or a nuisance' a criminal offence.

ILP Guidance Notes for the Reduction Obtrusive Light Guidance Note 1 2021:

The ILP (Institution of Lighting Professionals) has proposed lighting guidance and criteria for lighting impact assessments with a recommendation that they are incorporated at the local plan level. The guidance defines various forms of light pollution and describes a series of environmental zones (Table 1) against which limits for obtrusive light are defined. These guidance notes therefore provide suitable criteria against which the effects of artificial lighting have been assessed in this chapter.

Construction Industry Research and Information Association:

Good practice guidance documents prepared by the Construction Industry Research and Information Association (CIRIA) note that lighting on construction sites is typically required for onsite security and health and safety requirements during the night-time period and is temporary and short-term in nature.

CIE 150: Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations:

This guide sets out guidelines for assessing the environmental impacts of outdoor lighting and gives recommended limits for relevant lighting parameters to contain the obtrusive effects of outdoor lighting within tolerable levels.

CIE 126: Guidelines for Minimising Sky Glow:

The report gives general guidance for lighting designers and also policy makers about the ways the interference by sky glow of astronomical observations can be reduced or even avoided. The report gives guidance for the design of lighting installations and lighting equipment.

CIE 136: Guide to the Lighting of Urban Areas:

The purpose of this publication is to supplement the recommendations for the lighting of public thoroughfares within urban areas. This guide includes the justification for the lighting of these public thoroughfares and methods of lighting specific areas such as cycle tracks, pedestrian areas and malls, residential and other non-arterial routes, alleys and lanes.

BS EN 12464 Part 2: Lighting of Workplaces, Outdoor Workplaces:

This British Standard focuses on the recommendations for outdoor workplaces that are used at night and advice on limiting the effects of light intrusion within the environment.

BS EN 13201 Road Lighting Part 2: Performance Requirements 2015:

This standard defines lighting classes for road lighting according to photometric requirements and aiming at the visual needs of road users.

BS 5489 Part 1 2020 Code of practice for the design of road lighting:

Provides recommendations on the general principles, aesthetic and technical aspects of road lighting and advises on statutory provisions, operation, and maintenance of lighting. The standard provides recommendations for the design of lighting for all types of highways and public thoroughfares, including those specifically for pedestrians and cyclists, and for pedestrian subways and bridges. It also provides recommendations for the design of lighting in urban centres and public amenity areas.

CIBSE Lighting Guide LG6: Exterior Environment:

Looks to reflect changes in the area of exterior lighting which have occurred since 1992 and to supply a firm foundation useful when approaching exterior lighting design. Society of Light and Lighting: Code for Lighting Definitive reference source for lighting design in the UK.

4.2 Illumination Levels

Achieve the average-maintained illuminance values for the external areas, as specified below:

- | | | |
|-----------------------|--------|-----------------------|
| • Outdoor Car parks | 20 lux | uniformity ratio 0.25 |
| • Roadways | 20 lux | uniformity ratio 0.25 |
| • Loading Bays | 50 lux | uniformity ratio 0.4 |
| • Perimeter Footpaths | 5 lux | uniformity ratio 0.2 |

4.3 Light Pollution

Wherever possible luminaires are to be orientated towards the site, away from the land outside the site to make them less intrusive. Luminaires shall be chosen that have good light control and cut off angles to reduce light spillage. All the luminaires shall be angled to minimise glare.

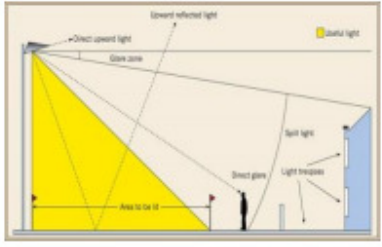
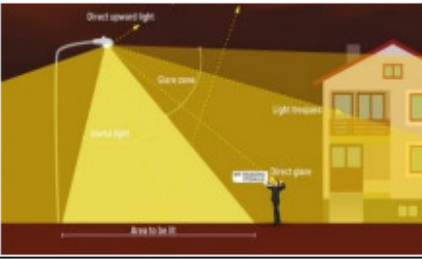
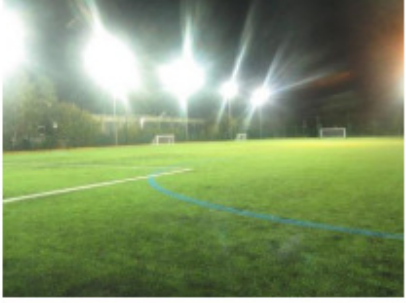
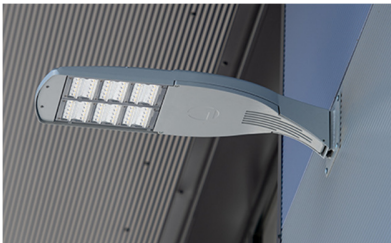
Description	Example of Good Practice	Example of Non-compliance
Luminaires with no upward light spill (i.e. horizontal flat glass lens, compact light for better light control).		
Luminaires correctly specified and installed to efficiently place the light on the task area and not beyond.		
Area lighting with horizontally mounted asymmetric luminaires.		

Table 1-Luminaire Mounting Examples

4.4 Luminaires

The proposed luminaires are as follows:

Description	Luminaire Images	Usage Location
- LED Light - Column mounted at 6m. - Forward Throw light distribution - IP65 - Controlled via a time-switches, photo-cells and contactors system with an override switch provided adjacent distribution board		Car parks & Yard Areas
- LED Light - Column mounted at 6m. - Long and Narrow light distribution - IP65 - Controlled via a time-switches and photocells		Site access junctions
- LED Light - Wall mounted at 6m. - Forward Throw light distribution - IP65 - Controlled via a time-switches, photo-cells and contactors system with an override switch provided adjacent distribution board		Loading Bays & Yard Areas
- LED Light - Wall mounted at 4m. - Long and Narrow light distribution - IP65 - Controlled via a time-switches, photo-cells, PIR sensor and contactors system with an override switch provided adjacent distribution board		Perimeter Footpaths

4.5 Further Mitigation Measures

Additional measures to be taken to minimise light obtrusion from any lighting installed:

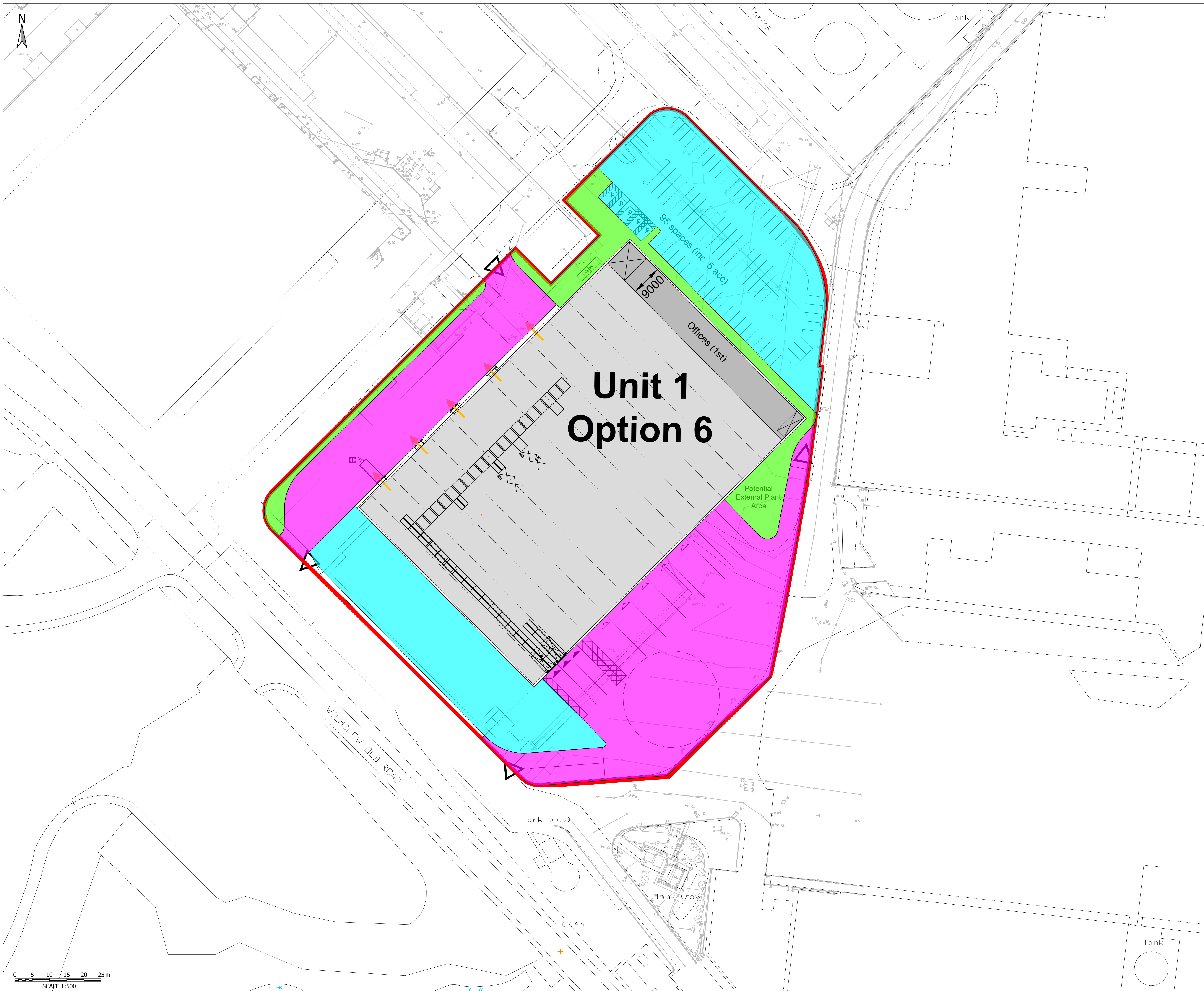
- Use of physical barriers e.g., buildings to obscure the view of lighting from sensitive receptors.
- Use modern technologies with constant output control gear. Light output will reduce with time and age and traditionally the scene is over-lit when new to ensure the lighting level is still acceptable after a period of time. Modern lighting control technologies enable the lighting to be maintained at the optimum output level throughout the life of the installation.
- Luminaires correctly specified to efficiently place the light on the task area and not beyond. Light source not visible from beyond the Proposed Development site;
- All external lighting to have horizontally mounted asymmetric luminaires with 0 degree horizontal cut-off optics i.e. no direct upward light;
- Impose a curfew; extinguish all non-essential lighting after 22.30 where possible.
- Install lighting baffles to luminaires closest to the site boundary, to significantly reduce the light intrusion from the back of the luminaire into areas beyond the site boundary

5. CONSTRUCTION PHASE LIGHTING

It is anticipated that the key potential sources of lighting during the construction phase will include the following:

- Floodlight and security lighting associated with temporary car parking areas for workers, the secure compound and any perimeter fencing/hoarding.
- Security and health and safety lighting associated with working areas, (e.g. where equipment is stored and safety hazards may be present).
- The potential for light trespass and glare from internal lighting associated with site offices and welfare facilities.
- Lighting required for operational purposes associated with construction when working during the late afternoon in the winter period (including light from headlamps of vehicles). It is anticipated that the construction phase working hours will be from 07:00hrs to 19:00hrs Monday to Saturday with only minimal working on Sunday or bank holidays. However certain operations are seasonal and weather dependent and these circumstances it may be necessary to extend working hours to take advantage of daylight hours, subject to prior agreement. Consequently, it is likely that sources of light will be predominate in winter months when working hours fall within hours of darkness. However, it is assumed that some of level of security lighting (associated with compound and perimeter fencing/hoarding) will be required during periods of darkness. As such, temporary lighting associated with the construction phase will need to be designed and installed generally in accordance with the lighting strategy described above for the operational lighting. In addition:
 - Procedures will be implemented to ensure effective liaison with the neighboring properties, adjacent residents and local community through newsletters, letter drops (when construction activities are likely to affect local residents) and information boards.
 - The sites will be registered to the Considerate Constructors Scheme to ensure the construction process is audited and monitored with the aim of maintaining the highest possible standards: and specifically in relation to temporary lighting, lighting will be kept to the minimum required for the activity (meeting health and safety requirements) and lighting will be located and directed away from the sensitive receptors where possible

APPENDIX A LIGHTING STRATEGY

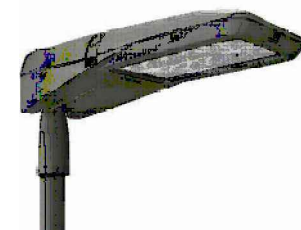


NOTES - GENERAL

1. THIS DRAWING TO READ IN CONJUNCTION WITH ALL RELEVANT CIVILS, STRUCTURAL AND ARCHITECTURAL DRAWINGS.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SPECIFICATION.
3. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED. LEVELS ARE IN METRES A.O.D.
4. ALL DIMENSIONS ARE TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF WORK.

KEY

- | | |
|---|--|
|  | 50 LUX AVE - 0.4 UNIFORMITY
VEHICLE TURNING & LOADING AREAS
100 LUX AVE UNDER LOADING CANOPIES |
|  | 20 LUX AVE - 0.25 UNIFORMITY
VEHICLE PARKING AREAS & ROADWAYS |
|  | 5 LUX AVE - 0.25 UNIFORMITY
PEDESTRIAN ONLY ROUTE |



TYPICAL COLUMN MOUNTED LUMINARIES



TYPICAL BUILDING MOUNTED LUMINARIES



TYPICAL HIGH MAST LUMINARIES

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MANCHESTER AIRPORT GROUP



CHANGER 4

INDICATIVE PROPOSED SITE LIGHTING LEVELS

TE Project Number	Drawn By	Date	Checked By	Date	Approved By	Date	Scale @ A1	Suitability
B041631	DO	MAR '23	JF	MAR '23	Neil M	MAR '23	1:500	S2
Client Project Number	Originator	Volume/System	Level/Location	Type/Code	Role	Number	Revision	
B041631	- TTE	- 00	- XX	- DR	- C	- 400001	P01	
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