

IMMINGHAM EASTERN RO-RO TERMINAL



Lighting Plan

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APFP Regulations 2009 – Regulation 5(2)(o)

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Project Sugar

Concept Lighting Design Stage Summary Report

P01

18th November 2022

Associated British Ports



Project Sugar

Project No: B2429400
Document Title: Concept Lighting Design Stage Summary Report
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Appendix A Concept Lighting Layout

1. Introduction

1.1 Background

Jacobs have been commissioned to undertake a concept design study to look at the potential provision of a new roll on, roll off (ro-ro) berth at the Port of Immingham that includes landside terminal area for a combination of container units, HGV and trailer units.

The layout requires water, drainage and electrical services as well as fueling provision. There is also a requirement for terminal building facilities and associated parking and marshalling areas for accompanied freight and passenger vehicles.

The concept stage design aims to provide sufficient information in terms of concept design, programme and costings to allow ABP to prepare a business case for the proposed facility. This report provides details of the concept level design undertaken and the assumptions made in undertaking the design.

1.2 Scope

Review of existing external lighting strategy and prepare a new lighting concept design and to limit any light pollution onto neighbouring properties such as rail lines operated by Network Rail. Information review: undertake review of information available through Jacobs records, ABP records and other publicly available information sources and identify gaps in the information.

2. Concept Design

2.1 Electrical Services

2.1.1 Design Parameters

The existing installation at Immingham consists of the following:

- Supply Voltage: 230 V & 400 V
- Phase: SP&N; 3 Wire & TP&N; 4 Wire + CPC • Supply Frequency (f): 50 Hz
- Ambient Temp: -5° C to 35° C
- Humidity: Normal • Presence of Water: High with high saline levels
- Impact: Moderate • Ventilation: Natural
- Fire Risk: Normal

Prior to works commencing on site, confirmation will be required of the above by direct measurement at the incoming supply point and for inclusion of these values in the design documents as part of the project. It is anticipated that this would be carried out as part of the investigations at detailed design stage.

It is assumed that if any existing columns or electrical distribution switchgear are in poor condition they will be replaced and redundant cabling and associated markings on distribution boards will be removed from site as required.

It is expected and will be specified that the work shall be carried out by an approved NICEIC and / or ECA Electrical Contractor.

The concept project design will include technical references consulted in preparation of this document to include, but not limited to:

- The Building Regulations, 1972
- Energy Conservation Act, 1981
- CIBSE Publications
- BS 7671 IET Wiring Regulations
- CE Directive on Machinery 89/392 EEG-98/37
- Low Voltage Directive EEG-72/23 EEG-93/68
- EEG and EMC Directive 89/336 – 93/68 EEG
- The CIBSE Lighting Guide: 'The Outdoor Environment'
- The Docks Regulations and Guidance 1988: 'Regulation 6 – Lighting'
- HSG38 – HSE – Lighting at work

All components and systems within the scope of this Section of the works must comply with all statutory acts of Parliament and any relevant British or European standards.

Materials, components and systems not manufactured in the UK or Europe shall be of a standard which ensures its compliance with all relevant British and European standards. Any such material, component or system which is utilized shall be affixed with the CE or new UKCA mark to indicate that certain European Directives or UK requirements, relevant to that product have been complied with.

2.1.2 Concept Design

All distribution boards and panels will be SP&N/TP&N and any surface mounted or underground / buried cable will be Cu/XLPE/SWA/LSF type multi core cables with a minimum cross-sectional area of 16 mm². Cabling supplying lighting circuits will be single phase and consideration shall be given to colour coding for ease of identification.

All additional duct work that is required will be installed at the appropriate depth, unless there is already sufficient spare ducting capacity. Note that all control cables must be run in a separate duct from power cables.

The following ducting will be used:

- 150 mm diameter for all LV electrical service and lighting cables;

Cable duct buried under carriageways finished concrete will consist of ducts having a minimum cover of 750 mm and will be protected by concrete surround or similar as directed and agreed with the Client's Engineer. The ducts will typically be twin walled high-density polypropylene with smooth bore of 150 mm in internal diameter to BS EN 50086-2-4, marked accordingly and terminate in an underground draw-in chamber.

When buried in land /soft soil service ducts will typically be twin walled high-density polypropylene with smooth bore of 100 mm in internal diameter to BS EN 50086-2-4. A minimum cover of 450 mm will be provided.

Consideration should be given to a new dedicated electrical distribution board fed from the existing primary distribution supply. Allowance must be made for co-ordination with the current provider to establish the supply arrangement and capacity details before work commences. Distribution will typically comprise a 400V distribution panel complete with moulded case circuit breakers to feed any / all sub distribution boards as required by the prospective demand.

Service voltage will be 400/230 Volt at 50 Hz and all equipment housings and enclosures will be constructed from materials that are resistant to the effects of weather (outdoor marine applications).

Generally, the concept will include but not be limited to:

- Replacement of external luminaires and existing columns.
- Identification and removal of redundant equipment and cabling.
- Supply and installation of all electrical cabling associated with the new lighting scheme.
- Supply and installation of the new equipment associated with the lighting control system.
- Inspection, testing and commissioning of the complete installation.
- The complete electrical installation will include all cables, glands, fixings, terminations, numbers, supports, tray work, bracketry, cable installation, labelling, junction boxes, local isolators and all equipment necessary to complete the installation in accordance with the specification.

2.1.2.1 Lighting

The initial concept design proposal is that a high mast system of lighting will be utilized to provide ambient and working illumination, recognizing any environmental impact to wildlife and minimizing energy consumption by use of a dimming regime to further reduce lighting levels at pre-determined times. All lighting will be LED type and use a light source that emits zero UV light and reduced blue white output, rather than other commonly used light sources, to further mitigate disruption to local wildlife.

The lighting scheme will be operated by photocells that turn the lighting on at dusk and switches them off again at dawn. There will also be a requirement for a lighting control system to switch the lighting between general and operation mode. It is recommended that luminaires with reduced energy consumption characteristics will be supplied.

Site lighting will use light types and methods to provide adequate colour rendition without degrading security protection visibility or creating safety concerns for the drivers. The light source will have a warm white appearance of approximately 4000 K, but further dialogue is required to consider the colour temperature of any existing lighting distribution.

The illumination levels for the new site lighting system will comply with the requirements of a lorry park in accordance to the HSG38 _ HSE Lighting at work documentation. All luminaires will operate at 230V AC and have an ingress protection rating not less than IP65 and luminaires will use electronic control equipment.

Activity	Typical locations/ types of work	Average illuminance (lux) 1x	Minimum measured illuminance (lux) 1x
Movement of people, machines and vehicles ^(a)	Lorry park, corridors, circulation routes	20	5
Movement of people, machines and vehicles in hazardous areas; rough work not requiring any perception of detail	Construction site clearance, excavation and soil work, loading bays, bottling and canning plant	50	20
Work requiring limited perception of detail ^(b)	Kitchens, factories assembling large components, potteries	100	50
Work requiring perception of detail ^(c)	Offices, sheet metal work, bookbinding	200	100
Work requiring perception of fine detail ^(d)	Drawing offices, factories assembling electronic components, textile production	500	200

All lighting columns will adopt a loop in / loop out termination method comprising a Tofco type cut-out that will be suitable to terminate SWA 3 core cable (up to 25 mm²). The cut-outs will also be suitable for use with BS88 type fuses. A maintenance, refurbishment and replacement regime of systems and components will be provided to meet the required design life.

The present lighting scheme mode of operation and control will be investigated to consider parallel mode of operation.

Because of the nature of the site discussion is required to review the need for a lighting scheme that is capable of variable lighting levels, which would be determined by footfall and traffic patterns, plus any environmental constraints that are present during dark hours.

2.1.2.2 Protective Earthing and Protective Equipotential Bonding

The installation will form an equipotential zone in the site to provide fault protection, by bonding all extraneous and exposed conductive parts to the main earth terminal in accordance with BS 7430, BS 7671. Where appropriate it will be linked to the existing network to ensure the earth potential is common across the full installation.

All high masts will come complete with lightning protection rod and top of mast.

2.1.3 Testing & Commissioning

Testing and commissioning of the electrical installation work will be in accordance with the relevant British Standards and on completion of the installation, commissioning of all items of plant and equipment will be carried out to demonstrate the complete installation is operating correctly and in accordance with any

project Specification or site standards. As a minimum testing will be carried as per the relevant applicable British standards and specifications in accordance with BS7671.

2.1.4 Assumptions and Exclusions

With regards to electrical installations near water there is a specific guidance in BS7671 and further review of this with regards the proposed site will be required.

Discussion will be required with regard to site standards relating to preferred power distribution equipment or lighting manufacturers to minimize the need for additional training or spares.

If it is determined by onsite investigations that the lighting on public roads is insufficient and requires upgrade, then that has been excluded from the concept design. This concept design has not taken into consideration of external lighting influences from neighboring properties.

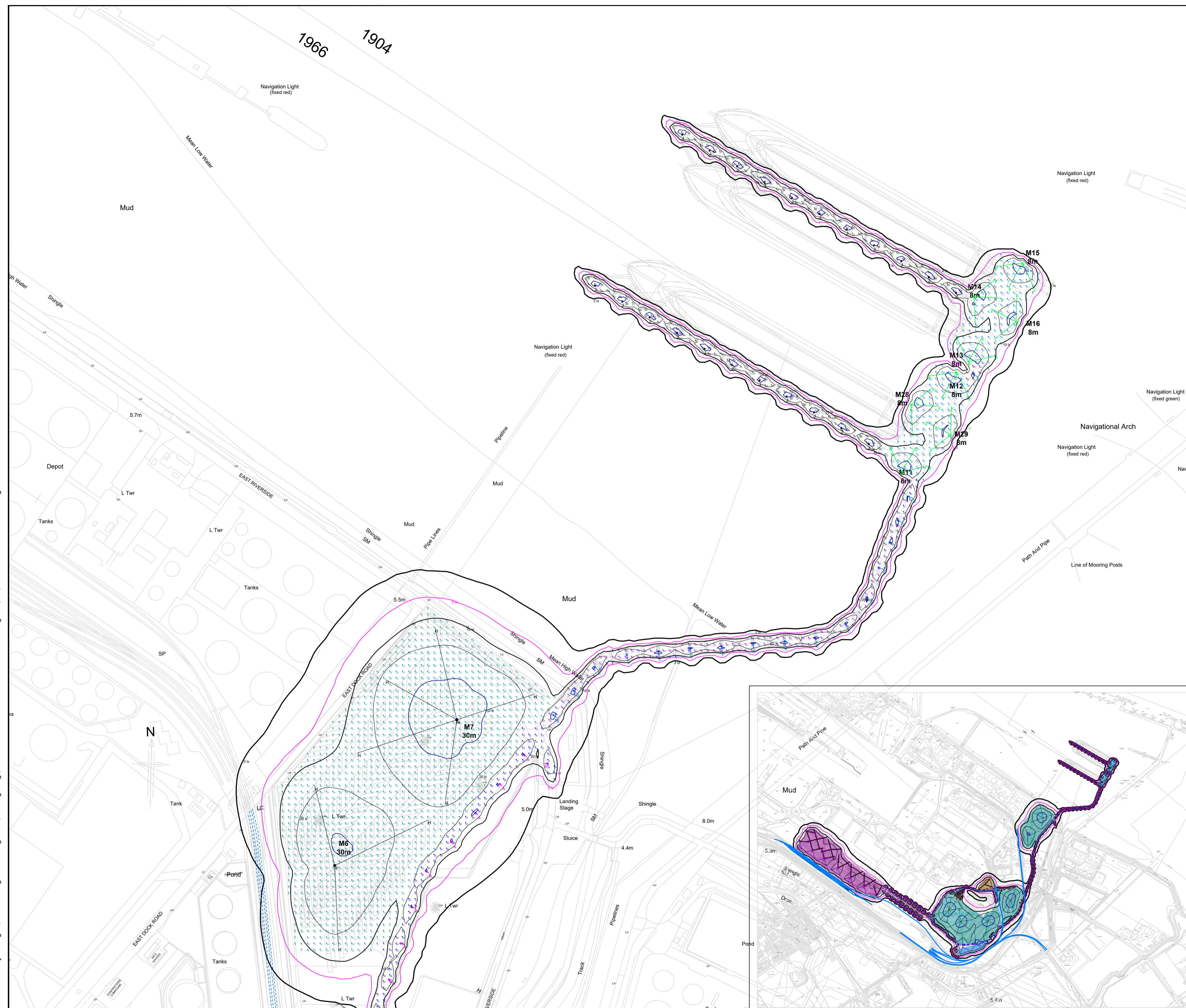
Drury's Area – The area is no longer part of the terminal and the existing workshops and laydown areas will be retained for maintenance activities, therefore the existing exterior lighting would also be retained. If areas of reduced levels of lighting are created because of the position of existing buildings, external lighting, or the proposed bridge embankment, then additional lighting can be investigated at the design stage.

Origin Entrance – The existing lighting will be retained, the proposed link road (between Robinson Road to Gresley Way) for the terminal entrance, and the new Shed 26 exit includes provision of street lighting.

East Dock Road / Robinson Road Junction – The work here is the realignment of the junction to improve accessibility for vehicles turning in and out of the junction. The existing roads and junction are already covered by existing street lighting located on the adjacent road edges close to the improvements, the intention is to maintain the existing street lighting (LP's indicated on OS plans) as we are not aware of any current lighting issues at the junction. Our assumption for concept is that additional lighting is not necessary in this area. The design / assessment of junction lighting should be included in the subsequent design stage and can be defined once the final road alignment is confirmed.

East Gate – There are existing LP's which cover both entrance and exit lanes, there is also exterior lighting on the existing gate house. We assume the current arrangements are adequate for purpose. The proposed works are; an additional entrance lane and new gatehouse / booth for incoming cars, vans the repositioning of the current gatehouse (new construction) to allow for the additional in lane, and the realignment of the exit lane to the north to accommodate the proposed works. The existing LP's will potentially require repositioning to suit the new gate arrangement, and possible an additional LP's to cover the in lane. Any changes at East Gate should be the subsequent design stage.

Appendix A Concept Lighting Layout



HORIZONTAL ILLUMINANCE LEVELS - SPECIFIED

Average Horizontal Illuminance (E_{av}) 20 Lux
Minimum Horizontal Illuminance (E_{min}) 5 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.25

HORIZONTAL ILLUMINANCE LEVELS - CALCULATED

Approach Bridge
Average Horizontal Illuminance (E_{av}) 23 Lux
Minimum Horizontal Illuminance (E_{min}) 6 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.26

Bridge
Average Horizontal Illuminance (E_{av}) 21 Lux
Minimum Horizontal Illuminance (E_{min}) 7 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.33

Central Trailer Park
Average Horizontal Illuminance (E_{av}) 26 Lux
Minimum Horizontal Illuminance (E_{min}) 7 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.26

Central Trailer Park Staff Parking
Average Horizontal Illuminance (E_{av}) 19 Lux
Minimum Horizontal Illuminance (E_{min}) 5 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.26

Linkspan 1
Average Horizontal Illuminance (E_{av}) 26 Lux
Minimum Horizontal Illuminance (E_{min}) 8 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.30

Linkspan 2
Average Horizontal Illuminance (E_{av}) 32 Lux
Minimum Horizontal Illuminance (E_{min}) 11 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.34

Marshall Yard - Entrance
Average Horizontal Illuminance (E_{av}) 19 Lux
Minimum Horizontal Illuminance (E_{min}) 7 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.39

Marshall Yard - Main Area
Average Horizontal Illuminance (E_{av}) 22 Lux
Minimum Horizontal Illuminance (E_{min}) 6 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.27

North Trailer Park
Average Horizontal Illuminance (E_{av}) 24 Lux
Minimum Horizontal Illuminance (E_{min}) 5 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.25

North Trailer Park Road 2
Average Horizontal Illuminance (E_{av}) 23 Lux
Minimum Horizontal Illuminance (E_{min}) 7 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.30

Pontoon 1
Average Horizontal Illuminance (E_{av}) 20 Lux
Minimum Horizontal Illuminance (E_{min}) 5 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.25

Pontoon 2
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South Trailer Park Road 2
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Minimum Horizontal Illuminance (E_{min}) 7 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.25

South Trailer Park Staff Parking
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Uniformity Ratio (E_{av} / E_{min}) 0.27

Finger Pier_1
Average Horizontal Illuminance (E_{av}) 28 Lux
Minimum Horizontal Illuminance (E_{min}) 8 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.28

Finger Pier_2
Average Horizontal Illuminance (E_{av}) 30 Lux
Minimum Horizontal Illuminance (E_{min}) 9 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.30

Western Trailer Park Area
Average Horizontal Illuminance (E_{av}) 20 Lux
Minimum Horizontal Illuminance (E_{min}) 5 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.25

Robinson Road
Average Horizontal Illuminance (E_{av}) 20 Lux
Minimum Horizontal Illuminance (E_{min}) 5 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.25

NOTES:
Maintenance Factor: 0.9
Based Upon:
- Luminaires depreciation due to dirt
- Medium Pollution

Horizontal Calculation Grid Intervals: 5m @ 0M AFL
Vertical T1 Calculation Grid Intervals: 3m @ 5M AFL
Grid values in Lux
Contours values: 50, 20, 10, 5, 2 Lux

Horizontal contours, Threshold Increment and ULR calculated and shown at initial lighting levels.

Bridge calculation shown with M4 switched off.

Upward Light Ratio (ULR)
Maximum Allowable Value: 5.0 %
Calculated ULR: 0.6 %
Test Results: **PASS**

This scheme has been developed based upon a completely flat and open area, where shadowing from building, plants and equipment have not been taken into consideration.

OBTRUSIVE LIGHT - COMPLIANCE REPORT

CIE 150:2017, E3-Medium District Brightness, Pre-Curfew
Filename: LS4057593_4_ABP_Humber_Project_Sugar
28/10/2022 08:40:55

Threshold Increment (TI)
Maximum Allowable Value: 15 %

Calculations Tested (32):

Calculation Label	Adaptation Luminance	Test Results
Threshold Increment_East_Track 1	10	PASS
Threshold Increment_East_Track 2	10	PASS
Threshold Increment_East_Track 3	10	PASS
Threshold Increment_East_Track 4	10	PASS
Threshold Increment_East_Track 5	10	PASS
Threshold Increment_East_Track 6	10	PASS
Threshold Increment_East_Track 7	10	PASS
Threshold Increment_East_Track 8	10	PASS
Threshold Increment_East_Track 9	10	PASS
Threshold Increment_East_Track10	10	PASS
Threshold Increment_East_Track11	10	PASS
Threshold Increment_East_Track12	10	PASS
Threshold Increment_East_Track13	10	PASS
Threshold Increment_East_Track14	10	PASS
Threshold Increment_East_Track15	10	PASS
Threshold Increment_East_Track16	10	PASS
Threshold Increment_East_Track17	10	PASS
Threshold Increment_East_Track18	10	PASS
Threshold Increment_East_Track19	10	PASS
Threshold Increment_East_Track20	10	PASS
Threshold Increment_East_Track21	10	PASS
Threshold Increment_East_Track22	10	PASS
Threshold Increment_East_Track23	10	PASS
Threshold Increment_East_Track24	10	PASS
Threshold Increment_East_Track25	10	PASS
Threshold Increment_East_Track26	10	PASS
Threshold Increment_East_Track27	10	PASS
Threshold Increment_East_Track28	10	PASS
Threshold Increment_East_Track29	10	PASS
Threshold Increment_East_Track30	10	PASS

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SCALE 1 : 5000

Rev	Rev. Date	Purpose of revision	Orig	Check'd	Rev'd	Apprv'd
P02	February 2023	FOR COMMENT	BHW	RH	RH	CN

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Client: **ABP ASSOCIATED BRITISH PORTS**

Project: **ABP Humber Project Sugar**
Abacus dwg. ref: LS4057593_4

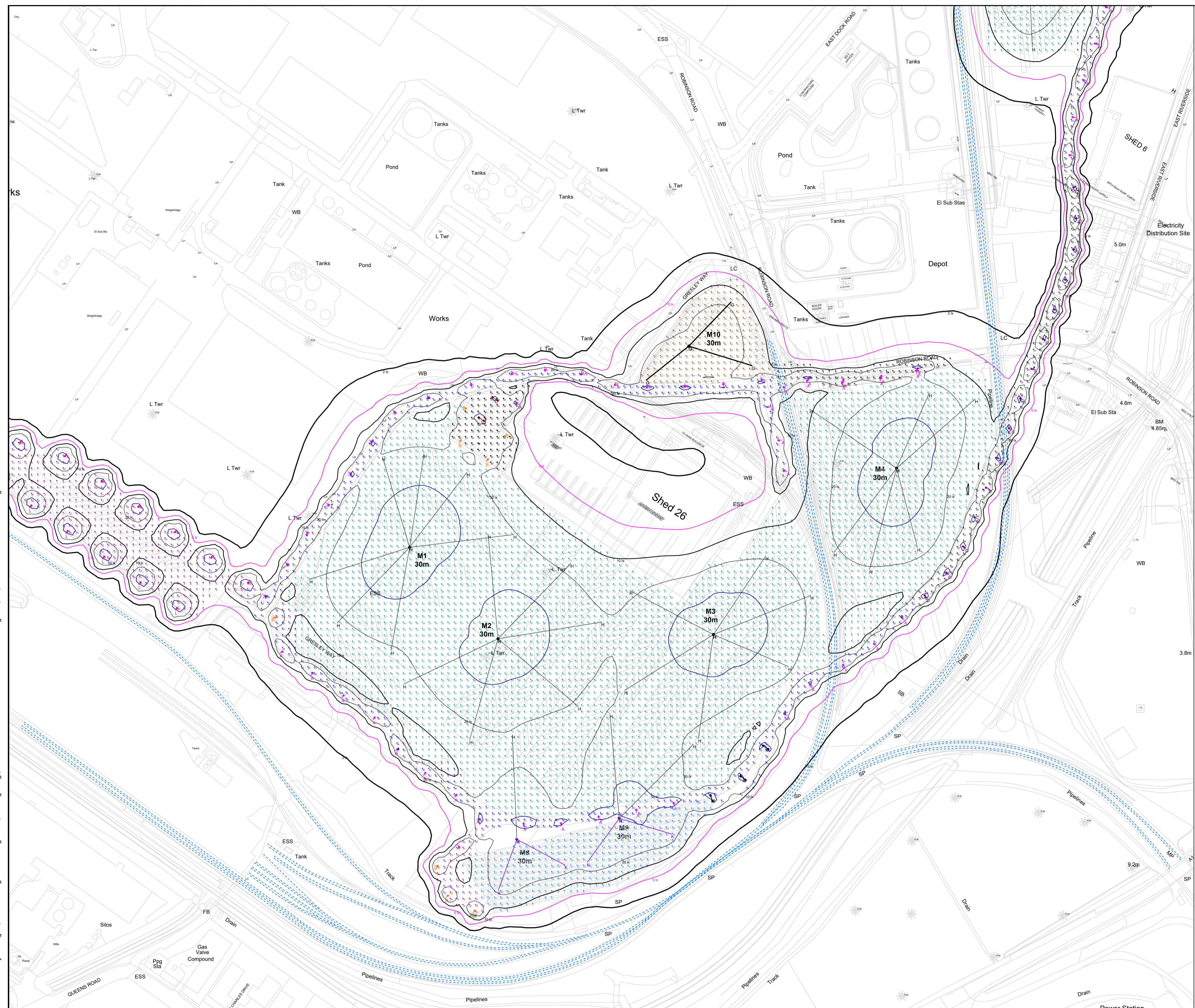
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Drawing status: **FOR COMMENT** Suitability: **S3**

Scale: 1:2500@A1
Jacobs No. B2429400 Rev
Client No. P02

Drawing number: **B2429400-JAC-00-ZZ-SK-ZZ-0150**

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Contours values: 50, 20, 10, 5, 2 Lux

Horizontal contours, Threshold Increment and ULR calculated and shown at initial lighting levels.

Bridge calculation shown with M4 switched off.

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FLOODLIGHTING EQUIPMENT:
5m masts each carrying the following Challenger 1
M1... 7 x AL6202_1075S1 GD
M2... 6 x AL6202_1075S1 GD
M3... 6 x AL6202_1075S1 GD
M4... 6 x AL6202_1075S1 GD
M5... 3 x AL6202_1075S1 GD
M7... 5 x AL6202_1075S1 GD
M8... 2 x AL6302_0575S1_F32 OK
M9... 2 x AL6202_1075S1 GD
M10... 2 x AL6302_0575S1_F32 OK
M11... 3 x AL6302_0575S1 GD
M12... 2 x AL6302_0575S1 GD
M13... 1 x AL6302_0575S1_F32 OK
M14... 2 x AL6302_0575S1 GD
M15... 2 x AL6302_0575S1 GD
M16... 2 x AL6302_0575S1 GD
M17... 2 x AL6302_0575S1 GD
M18... 2 x AL6302_0575S1 GD
M19 - M23... 2 x AL6302_0575S1 GD
M20... 2 x AL6302_0575S1 GD
M21... 1 x AL6302_0575S1 GD
M22... 2 x AL6302_0575S1 GD
M23... 4 x AL6302_0575S1 GD
M24... 1 x AL6302_0575S1 GD
M25... 2 x AL6302_0575S1 GD
M26, M27... 4 x AL6302_0575S1 GD

8 x 8m masts each carrying the following Vago
M1 - M10... 3 x AL6101_17_2_73W_4K (F)
M11 - M29... 3 x AL6101_17_2_73W_4K (F)

56 x 8m masts each carrying the following S-Lum
A... Single Bracket Projection 0.5M Bracket +0° / Spigot +0° / Lantern +0°
B... Single Bracket Projection 0.5M Bracket +0° / Spigot +0° / Lantern +0°
C... Tain Back to Back Bracket Projection 0.5M Bracket +0° / Spigot +0° / Lantern +0°
D... Single Bracket Projection 0.5M Bracket +0° / Spigot +0° / Lantern +0° Custom Mounted @ 1M AFL
E... Single Bracket Projection 1M Bracket +0° / Spigot +0° / Lantern +0° Custom Mounted @ 1M AFL
J... Single Post Top Mounted Lantern +0° Custom Mounted
L... Single Bracket Projection 0.5M Bracket +0° / Spigot +0° / Lantern +0°
M... Tain Back to Back Bracket Projection 0.5M Bracket +0° / Spigot +0° / Lantern +0°

OBTRUSIVE LIGHT COMPLIANCE REPORT
CIE 150:2017, E3-Medium District Brightness, Pre-Curfew
Filename: LS4057593_4_ABP_Humber_Project_Sugar
28/10/2022 08:40:55

Threshold Increment (TI)
Maximum Allowable Value: 15 %

Calculations Tested (32):

Calculation Label	Adaptation	Test Results
Threshold Increment_East_Track 1	10	PASS
Threshold Increment_East_Track 2	10	PASS
Threshold Increment_Vest_Track 2	10	PASS
Threshold Increment_Vest_Track 1	10	PASS
Threshold Increment_East_Track 3	10	PASS
Threshold Increment_Vest_Track 4	10	PASS
Threshold Increment_East_Track 5	10	PASS
Threshold Increment_Vest_Track 6	10	PASS
Threshold Increment_East_Track 7	10	PASS
Threshold Increment_Vest_Track 8	10	PASS
Threshold Increment_East_Track 9	10	PASS
Threshold Increment_Vest_Track 9	10	PASS
Threshold Increment_East_Track10	10	PASS
Threshold Increment_Vest_Track10	10	PASS
Threshold Increment_East_Track12	10	PASS
Threshold Increment_Vest_Track13	10	PASS
Threshold Increment_Vest_Track14	10	PASS
Threshold Increment_East_Track15	10	PASS
Threshold Increment_East_Track17	10	PASS
Threshold Increment_Vest_Track18	10	PASS
Threshold Increment_East_Track19	10	PASS
Threshold Increment_Vest_Track20	10	PASS
Threshold Increment_East_Track21	10	PASS
Threshold Increment_Vest_Track22	10	PASS
Threshold Increment_Vest_Track25	10	PASS
Threshold Increment_East_Track25	10	PASS
Threshold Increment_East_Track23	10	PASS
Threshold Increment_Vest_Track24	10	PASS
Threshold Increment_East_Track27	10	PASS
Threshold Increment_Vest_Track28	10	PASS
Threshold Increment_East_Track29	10	PASS
Threshold Increment_Vest_Track30	10	PASS

Upward Light Ratio (ULR)
Maximum Allowable Value: 5.0 %
Calculated ULR: 0.6 %
Test Results: PASS

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0 100 200 300 400 500 m
SCALE 1 : 5000

Rev	Rev. Date	Purpose of revision	Orig	Check'd	Rev'd	Apprv'd
P02	February 2023	FOR COMMENT				

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All luminance values are the result of computer calculations, based on precisely positioned luminaires in a fixed relationship to each other and the area under examination. In practice the values may vary due to tolerances on luminaire positioning, reflection properties and electrical supply.

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Client: **ABP ASSOCIATED BRITISH PORTS**

Project: **ABP Humber Project Sugar**
Abacus ref: LS4057593_4

Drawing title
**Lighting Project:
ABP Humber, Project Sugar
External Lighting
SHEET 2 OF 3**

Drawing status
FOR COMMENT

Suitability
S3

Scale
1:2500@A1

Client No.
B2429400

Client No.
P02

Drawing number
B2429400-JAC-00-ZZ-SK-ZZ-0151



HORIZONTAL ILLUMINANCE LEVELS - SPECIFIED

Average Horizontal Illuminance (E_{av}) 20 Lux
Minimum Horizontal Illuminance (E_{min}) 5 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.25

HORIZONTAL ILLUMINANCE LEVELS - CALCULATED

Approach Bridge
Average Horizontal Illuminance (E_{av}) 23 Lux
Minimum Horizontal Illuminance (E_{min}) 6 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.26

Bridge
Average Horizontal Illuminance (E_{av}) 21 Lux
Minimum Horizontal Illuminance (E_{min}) 7 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.33

Central Trailer Park
Average Horizontal Illuminance (E_{av}) 26 Lux
Minimum Horizontal Illuminance (E_{min}) 7 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.26

Central Trailer Park Staff Parking
Average Horizontal Illuminance (E_{av}) 19 Lux
Minimum Horizontal Illuminance (E_{min}) 5 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.26

Linkspan 1
Average Horizontal Illuminance (E_{av}) 26 Lux
Minimum Horizontal Illuminance (E_{min}) 8 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.30

Linkspan 2
Average Horizontal Illuminance (E_{av}) 32 Lux
Minimum Horizontal Illuminance (E_{min}) 11 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.34

Marshall Yard - Entrance
Average Horizontal Illuminance (E_{av}) 18 Lux
Minimum Horizontal Illuminance (E_{min}) 7 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.39

Marshall Yard - Main Area
Average Horizontal Illuminance (E_{av}) 22 Lux
Minimum Horizontal Illuminance (E_{min}) 6 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.27

North Trailer Park
Average Horizontal Illuminance (E_{av}) 24 Lux
Minimum Horizontal Illuminance (E_{min}) 6 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.25

North Trailer Park Road 2
Average Horizontal Illuminance (E_{av}) 23 Lux
Minimum Horizontal Illuminance (E_{min}) 7 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.30

Pontoon 1
Average Horizontal Illuminance (E_{av}) 20 Lux
Minimum Horizontal Illuminance (E_{min}) 5 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.25

Pontoon 2
Average Horizontal Illuminance (E_{av}) 20 Lux
Minimum Horizontal Illuminance (E_{min}) 5 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.25

South Trailer Park
Average Horizontal Illuminance (E_{av}) 27 Lux
Minimum Horizontal Illuminance (E_{min}) 7 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.25

South Trailer Park Road 1
Average Horizontal Illuminance (E_{av}) 27 Lux
Minimum Horizontal Illuminance (E_{min}) 7 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.26

South Trailer Park Road 2
Average Horizontal Illuminance (E_{av}) 28 Lux
Minimum Horizontal Illuminance (E_{min}) 7 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.25

South Trailer Park Staff Parking
Average Horizontal Illuminance (E_{av}) 26 Lux
Minimum Horizontal Illuminance (E_{min}) 7 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.27

Finger Pier 1
Average Horizontal Illuminance (E_{av}) 28 Lux
Minimum Horizontal Illuminance (E_{min}) 8 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.28

Finger Pier 2
Average Horizontal Illuminance (E_{av}) 30 Lux
Minimum Horizontal Illuminance (E_{min}) 9 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.30

Western Trailer Park Area
Average Horizontal Illuminance (E_{av}) 20 Lux
Minimum Horizontal Illuminance (E_{min}) 5 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.25

Robinson Road
Average Horizontal Illuminance (E_{av}) 20 Lux
Minimum Horizontal Illuminance (E_{min}) 5 Lux
Uniformity Ratio (E_{av} / E_{min}) 0.25

NOTES:
Maintenance Factor: 0.9
Based Upon:
- Luminaires depreciation due to dirt
- Medium Pollution

Horizontal Calculation Grid Intervals: 5m @ 0M AFL
Vertical TI Calculation Grid Intervals: 3m @ 15M AFL
Grid values in Lux
Contours values: 50, 20, 10, 5, 2 Lux

Horizontal contours, Threshold Increment and ULR calculated and shown as initial lighting levels.

Bridge calculation shown with M4 switched off.

This scheme has been developed based upon a completely flat and open area, where shadowing from buildings, plants and equipment have not been taken into consideration.

FLOODLIGHTING EQUIPMENT:
5m masts each carrying the following Challenger 1
M1... 7 x AL6202_1075S1 GD
M2... 6 x AL6202_1075S1 GD
M4... 6 x AL6202_1075S1 GD
M6... 3 x AL6202_1075S1 GD
M7... 5 x AL6202_1075S1 GD
M8... 1 x AL6202_1075S1 GD
2 x AL6302_0575S1_F32 00
M9... 2 x AL6202_1075S1 GD
2 x AL6302_0575S1_F32 00
M10... 3 x AL6302_0575S1 GD
M18... 2 x AL6302_0575S1 GD
1 x AL6302_0575S1_F32 00
M19 - M23... 2 x AL6302_0575S1 GD
2 x AL6302_0575S1_F32 00
M24... 1 x AL6302_0575S1 GD
1 x AL6302_0575S1_F32 00
M25... 2 x AL6302_0575S1 GD
M26, M27... 4 x AL6302_0575S1 GD

8 x 8m masts each carrying the following Vago
M1 - M10... 3 x AL6101_17_2_73W_4K(F)
M8 - M29... 3 x AL6101_17_2_73W_4K(F)

56 x 8m masts each carrying the following S-Lum
A... 1 x AL6100_35V_4K
Single
Bracket Projection 0.5M
Bracket +0° / Spigot +0° / Lantern +0°
B... 1 x AL6100_35V_4K
Single
Bracket Projection 0.5M
Bracket +0° / Spigot +0° / Lantern +0°

8 x 8m masts each carrying the following S-Lum
C... 1 x AL6100_35V_4K
Single
Bracket Projection 0.5M
Bracket +0° / Spigot +0° / Lantern +0°

2 x 8m masts each carrying the following S-Lum
D... 2 x AL6100_35V_4K
Twin
Back to Back
Bracket Projection 0.5M
Bracket +0° / Spigot +0° / Lantern +0°

15 x 6m masts each carrying the following S-Lum LED
E... 1 x AL6100_35V_4K
Single
Bracket Projection 0.5M
Bracket +0° / Spigot +0° / Lantern +0°
Custom Mounted

17 x 6m masts each carrying the following S-Lum
F... 1 x AL6100_35V_4K
Single
Bracket Projection 1M
Bracket +0° / Spigot +0° / Lantern +0°
Custom Mounted @ 1M AFL

22 x 6m masts each carrying the following S-Lum
G... 1 x AL6100_35V_4K
Single
Post Top Mounted
Lantern +0°
Custom Mounted

19 x 8m masts each carrying the following S-Lum
H... 1 x AL6100_135V_4K
Single
Bracket Projection 0.5M
Bracket +0° / Spigot +0° / Lantern +0°

3 x 8m masts each carrying the following S-Lum
I... 2 x AL6100_35V_4K
Twin
Back to Back
Bracket Projection 0.5M
Bracket +0° / Spigot +0° / Lantern +0°

OBTRUSIVE LIGHT - COMPLIANCE REPORT
CIE 150:2017, E3-Medium District Brightness, Pre-Curfew
Filename: LS4057593_4_ABP Number: Project Sugar
28/10/2022 08:40:55

Threshold Increment (TI)
Maximum Allowable Value: 15 %

Calculations Tested (32h)

Calculation Label	Adaptation Luminance	Test Results
Threshold Increment_East_Track 1	10	PASS
Threshold Increment_East_Track 2	10	PASS
Threshold Increment_East_Track 3	10	PASS
Threshold Increment_East_Track 4	10	PASS
Threshold Increment_East_Track 5	10	PASS
Threshold Increment_East_Track 6	10	PASS
Threshold Increment_East_Track 7	10	PASS
Threshold Increment_East_Track 8	10	PASS
Threshold Increment_East_Track 9	10	PASS
Threshold Increment_East_Track10	10	PASS
Threshold Increment_East_Track11	10	PASS
Threshold Increment_East_Track12	10	PASS
Threshold Increment_East_Track13	10	PASS
Threshold Increment_East_Track14	10	PASS
Threshold Increment_East_Track15	10	PASS
Threshold Increment_East_Track16	10	PASS
Threshold Increment_East_Track17	10	PASS
Threshold Increment_East_Track18	10	PASS
Threshold Increment_East_Track19	10	PASS
Threshold Increment_East_Track20	10	PASS
Threshold Increment_East_Track21	10	PASS
Threshold Increment_East_Track22	10	PASS
Threshold Increment_East_Track23	10	PASS
Threshold Increment_East_Track24	10	PASS
Threshold Increment_East_Track25	10	PASS
Threshold Increment_East_Track26	10	PASS
Threshold Increment_East_Track27	10	PASS
Threshold Increment_East_Track28	10	PASS
Threshold Increment_East_Track29	10	PASS
Threshold Increment_East_Track30	10	PASS

Upward Light Ratio (ULR)
Maximum Allowable Value: 5.0 %
Calculated ULR: 0.6 %
Test Results: PASS

\Users\p2\Maritime\PROJECTS\Ports\VT\AB2429400 ABP Project Sugar\900 Working & Incoming Docs\923 Lighting\B2429400-JAC-00-ZZ-SK-ZZ-0150-152.dwg - 09/02/2023 17:31:35 - 152 - Hodget
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0 100 200 300 400 500 m
SCALE 1 : 5000

Rev	Rev. Date	Purpose of revision	Orig	Check'd	Rev'd	Appr'd
P02	February 2023	FOR COMMENT	BHW	RH	RH	CN

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All luminance values are the result of computer calculations, based on precisely positioned luminaries in a fixed relationship to each other and the area under examination. In practice the values may vary due to tolerances on luminaire positioning, reflection properties and electrical supply.

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ABP ASSOCIATED BRITISH PORTS

Client
Project
ABP Humber Project Sugar
Abacus ref: LS4057593_4

Drawing title
Lighting Project:
ABP Humber, Project Sugar
External Lighting
SHEET 3 OF 3

Drawing status
FOR COMMENT

Suitability
S3

Scale
1:2500@A1

Jacobs No.
B2429400

Client No.
P02

Drawing number
B2429400-JAC-00-ZZ-SK-ZZ-0152