

ANNEXURE A: ELECTRICAL ENGINEERING WORKS & DESIGN SPECIFICATION

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ELECTRICAL ENGINEERING WORKS

1.1 Scope of Work

The scope to be carried out by the *Contractor* shall include but not be limited to the following:

- i. The supply, delivery, storage, installation, and commissioning of all associated works for the replacement and installation of new lighting.
- ii. The design, supply, installation and testing of lightning protection and earthing of masts, kiosks, and distribution boards.
- iii. The supply, delivery, installation and testing of cabling, terminations and labelling for all associated lighting infrastructure.
- iv. Design, supply and installation of highmast kiosk
- v. The transportation of all removed electrical infrastructure to the Transnet National Ports Authority electrical depot or to a safe disposal site as directed.
- vi. The supply, delivery, installation, and commissioning of an energy management system for all high mast lighting.
- vii. Perform commissioning, testing, verification of the installation, and hand over to the Employer.

1.2 General

- i. An authorised representative from Transnet National Ports Authority shall perform all required switching and control work permits.
- ii. The Contractor shall submit a notification to the project manager at least 2 weeks prior to any required switching. It shall be noted that operational requirements shall always take precedent.
- iii. The contractor shall request access to high mast distribution boards, electrical kiosks, miniature substations, and substations at least two weeks in advance. Notification for access shall be submitted formally to the project manager.

1.3 Standard of work, plant and materials

- i. The electrical installation shall conform to the requirements of the latest edition and amendments of SANS 10142-1 Code of Practice for the Wiring of Premises and any additional requirements thereto, described in this specification.
- ii. The electrical installation shall conform to the requirements of the latest edition and amendments of SANS 10142-1 Code of Practice for the Wiring of Premises and any additional requirements thereto, described in this specification.
- iii. All Plant and Material used shall be of minimum SANS approved all the work shall be carried by qualified and experienced electrician and qualified staff under proper supervision by experienced and competent officers.
- iv. All Plant and Material shall comply with the relevant National or International standard specification.

1.4 Transnet National Ports Authority Specifications

All *Design's* undertaken, *Plant's* and *Materials* supplied by the *Contractor* in agreement with the *Employer*, with the intention to execute the works detailed in this document, shall comply in general with all associated Transnet National Ports Authority Specifications listed below. It is understood that Transnet Specification requirements are more stringent than the SANS standard requirements, the *Contractor* is required to fully comply with the Transnet Specifications. In the case where SANS standard is stringent than Transnet Standard, the *Contractor* shall comply with SANS Standard. The contractor shall also verify all site details given in the employers' drawings.

Table 2-1: Transnet National Ports Authority Specifications

TPD-002-DBSPEC	Technical specification for low voltage distribution boards
TPD-003-CABLESPEC	Technical specification for medium and low voltage cables
TPD-004-EARTHINGSPEC	Technical specification for earthing and the protection of buildings and structures against lightning
TDPLED FLOODLIGHT LUMINAIRE SPEC	Specification For the Supply of Luminaires for Lighting of Yards And high mast Lighting
TPD-010A-HIGHMASTSPEC-A rev00	Specification for the design, supply, and installation of high mast lighting.
TPD-010B-HIGHMASTSPEC-B rev00	Specification for the maintenance and upgrade of high mast lighting structures
EEAM-Q-008	Specification For Corrosion Protection

1.5 Service Conditions

All plant and materials offered shall be designed and rated for continuous operation under the following conditions.

1.5.1 Ambient/Environmental Conditions:

- Altitude: 0 to 1800m Above Sea Level
- Ambient temperature: -5°C to +40°C (daily average +35°C)
- Relative humidity: As high as 96%
- Lightning conditions: Severe, with a maximum lightning ground flash density of 0.3 flashes per km² per annum.

- Pollution Level: Pollution degree 3 of SANS 61439-1.

1.5.2 Lightning Conditions

All lightning protection Plant and Material offered shall be rated to withstand the following conditions:

- Current: The peak lightning current and its rate of rise of rise Shall be regarded as severe when $IMAX = 200kA$.
- Voltage: The highest cloud potential shall be assumed to be More than 100MV, where; $Q = CV$, where Q is Assumed at 100C and C to be 10-7.

1.6 Normative References

The following publications and specifications (latest edition) shall apply where applicable.

Table 2-2: Normative References

OHS Act	Occupational Health and Safety Act Of 1993
SABS 1180	Electrical Distribution Boards
000SABS 763	Hot Dip Zinc (Galvanised) Coatings
SANS 950	Non-metallic Conduit fitting for use in electrical installation.
SABS IEC 309	Plugs, Socket Outlets and Couplers for Industrial Purposes
SABS IEC 439	Low Voltage Switchgear
SABS IEC 742	Isolating Transformers and Safety Isolating Transformers
SANS 172	Low Voltage Fuses
SANS 10064	Code Of Practice for The Preparation of Steel Surfaces for Coating.
SANS 1012	Electric Light Dimmers
SANS 10199	The Design and Installation of Earth Electrodes
SANS 10225	Design and construction of lighting masts
SANS 10225	Glass reinforced polyester Poles
SANS 10313	Protection against Lightning – Physical damage to structures and life hazard
SANS 10389-1	Exterior Lighting Part 1: Artificial Lighting of Exterior Areas for Work and Safety
SANS 1065-1	Metal Conduits and Fittings for Electrical Wiring

SANS 1091	National Colour Standards for Paints.
SANS 121	Hot Dip Galvanized coating on fabricated iron and steel articles specifications and test methods
SANS 1279	Floodlight Luminaires
SANS 1507	Electric Cables with Extruded Solid Dielectric Installation for Fixed Installations
SANS 767-1	Earth Leakage Protection Units.
SANS 890-1	Ballasts For Fluorescent Lamps:
SANS10142-1	Code Of Practice for The Wiring of Premises
SANS152	Low Voltage Air Breaker Switches, Connectors, Switch Disconnectors, Fuse Combination Units.

2 HIGH MAST LIGHTING

2.1 A-Berth Lighting

- i. The contractor shall uninstall all existing luminaires from the six existing high masts in the area. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The contractor shall test all existing high mast cables in the presence of the employer's engineer, all results shall be formally documented and shall form part of the data packs. Should any cable not meet the required standard then the contractor shall be responsible for removal of the existing cable and the installation of a new cable as specified by the employer's engineer.
- iii. The contractor shall decommission all existing external high mast distribution boards and safely transport it to the TNPA electrical maintenance depot.
- iv. The contractor shall appoint an OEM to design, supply and install 30m highmast poles in accordance with electrical specification.
- v. The *Contractor* shall supply, deliver, offload, and install equal or similar approved to Beka Omniblast MAXI -1-E-455W, 10kV surge protection device, including photocell with 5188 optics on existing high masts at A-Berth as indicated on drawing XCTE0025-E-LA-0001-0A. The contractors shall ensure that all luminaires are positioned as detailed in the drawing.
- vi. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- vii. The contractor shall supply, deliver, offload, and install eight new external distribution boards as per specification for all high masts. This works shall include all necessary modifications to the existing cabling.
- viii. The contractor shall supply, deliver, offload, install and terminate 145m x 16mm² 4 core, PVC, ECC, SWA copper cable for the power supply to the new high mast (HM6), to be supplied from the A-Berth Spur Kiosk, as shown in drawing number XCTE0025-E-LA-0001-0A and the

associated civil engineers drawing. The contractor shall ensure that all required switchgear in correctly installed and labelled.

- ix. The contractor shall supply, deliver, offload, install and terminate 163m x 16mm² 4 core, PVC, ECC, SWA copper cable for the power supply to the new high mast (HM7), to be supplied from the A-Berth substation, as shown in drawing number XCTE0025-E-LA-0001-0A. The contractor shall ensure that all required switchgear in correctly installed and labelled.
- x. The *Contractor* shall design, supply, and install an earthing and lightning protection system in the new high mast. The *Contractor* shall also design, supply and install hot-dip Galvanized finials and bonding of the high mast to ground in all existing high masts. Test results shall be submitted to the Employer 's Engineer.
- xi. The Contractor is required to test the installation in the presence of the Employer's Engineers and issue electrical "Certificate of Compliance" (CoC) for all work done to the satisfaction of the Employer's Engineers. The Contractor shall also issue a "RMD 9 certificate" this certificate shall be issued for all high masts that have been installed or refurbished.
- xii. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.

2.2 K and L Berth

- i. The contractor shall uninstall all existing luminaires from the six existing high masts in the area. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The contractor shall test all existing high mast cables in the presence of the employer's engineer, all results shall be formally documented and shall form part of the data packs. Should any cable not meet the required standard then the contractor shall be responsible for removal of the existing cable and the installation of a new cable as specified by the employer's engineer.
- iii. The *Contractor* shall supply, deliver, offload, and install equal or similar approved to Beka Omniblast MAXI -1-E-455W, 10kV surge protection device, including photocell with 5188 optics on existing high masts at K and L berth as indicated on drawing XCTE0025-E-LA-0002-0A. The contractors shall ensure that all luminaires are positioned as detailed in the drawing.
- iv. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- v. The contractor shall supply, deliver, offload, and install seven new external distribution boards as per specification for all high masts also refer to single line diagram shown on drawing XCTE0025-E-LA-0002-0A. This works shall include all necessary modifications to the existing cabling.
- vi. The contractor shall appoint an OEM to design, supply and install 30m highmast poles in accordance with electrical specification.
- vii. The *Contractor* shall design, supply, and install an earthing and lightning protection system in the new high mast. The *Contractor* shall also design, supply and install hot-dip Galvanized finials and bonding of the high mast to ground in all existing high masts. Test results shall be submitted to the Employer 's Engineer.

- viii. Prior to modification on the highmast the contractor shall appoint a specialist to test the highmast pole and issue a certification to ensure the highmast comply with the highest standard of safety and reliability.
- ix. The Contractor is required to test the installation in the presence of the Employer's Engineers and issue electrical "Certificate of Compliance" (CoC) for all work done to the satisfaction of the Employer's Engineers. The Contractor shall also issue a "RMD 9 certificate" this certificate shall be issued for all high masts that have been installed or refurbished.
- x. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.

2.3 Rail Marshalling Yard

- i. The contractor shall uninstall all existing luminaires from the twelve (12) existing high masts in the area. (Refer to XCTE0025-E-LA-0009-0A and XCTE0025-E-LA-0010-0A). The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The contractor shall test all existing high mast cables in the presence of the employer's engineer, all results shall be formally documented and shall form part of the data packs. Should any cable not meet the required standard then the contractor shall be responsible for removal of the existing cable and the installation of a new cable as specified by the employer's engineer.
- iii. The contractor shall decommission all existing external high mast distribution boards, inclusive of all switchgear, and safely transport it to the TNPA electrical maintenance depot.
- iv. The contractor shall supply, deliver, offload, and install a new distribution kiosk as indicated in drawing XCTE0025-E-LA-0009-0A. And shall also make an allowance for data collection in preparation for manufacturing /replacement.
- v. The *Contractor* shall supply, deliver, offload, and install equal or similar approved to Beka Omniblast MAXI -1-E-455W, 10kV surge protection device, including photocell with 5188 optics on existing high masts at the rail marshalling yard as indicated on the following drawings:
 - a. XCTE0025-E-LA-0009-0A (Sheet 1)
 - b. XCTE0025-E-LA-0010-0A (Sheet 1)
 - c. The contractor shall ensure that all luminaires are positioned as detailed in the drawings.
- vi. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- vii. The contractor shall supply, deliver, offload, and install fourteen new external distribution boards as per specification for all high masts as well as on the drawing. This works shall include all necessary modifications to the existing cabling.
- viii. The contractor shall appoint an OEM to design, supply and install 4*30m highmast poles in accordance with electrical specification and as shown on the drawings as indicated above.
- ix. The *Contractor* shall design, supply, and install an earthing and lightning protection system in the new high mast. The *Contractor* shall also design, supply and install hot-dip Galvanized finials and bonding of the high mast to ground in all existing high masts. Test results shall be submitted to the Employer 's Engineer.

- x. Prior to modification on the highmast the contractor shall appoint a specialist to test the highmast pole and issue a certification to ensure the highmast comply with the highest standard of safety and reliability.
- xi. The Contractor is required to test the installation in the presence of the Employer's Engineers and issue electrical "Certificate of Compliance" (CoC) for all work done to the satisfaction of the Employer's Engineers. The Contractor shall also issue a "RMD 9 certificate" this certificate shall be issued for all high masts that have been newly installed or refurbished.
- xii. The Contractor shall undertake a lighting survey at night to measure and record the lighting lux level in the area where work was undertaken, this shall be done in the presence of the Employer's Engineers. The Contractor shall notify the Employer's Engineer, seven days prior to the lighting survey.

2.4 Tanker Basin and Eastern Mole

- i. The contractor shall uninstall all existing luminaires from the eight existing high masts in the area. (Refer to XCTE0025-E-LA-0013-01 Eastern Mole and XCTE0025-E-LA-0012-01). The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The contractor shall test all existing high mast cables in the presence of the employer's engineer, all results shall be formally documented and shall form part of the data packs. Should any cable not meet the required standard then the contractor shall be responsible for removal of the existing cable and the installation of a new cable as specified by the employer's engineer.
- iii. The Contractor shall supply, deliver, offload, and install equal or similar approved to Beka Omniblast MAXI -1-E-455W, 10kV surge protection device, including photocell with 5188 optics on existing high masts at Tanker Basin and Eastern Mole as indicated on the following drawings:
 - a. XCTE0025-E-LA-0012-0A (Sheet 1)
 - b. XCTE0025-E-LA-0012-0A (Sheet 2)
 - c. XCTE0025-E-LA-0013-0A (Sheet 1)
 - d. XCTE0025-E-LA-0013-0A (Sheet 2)
 - e. The contractors shall ensure that all luminaires are positioned as detailed in the drawing.
- iv. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- v. The contractor shall supply, deliver, offload, and install seven new external distribution boards as per specification for all high masts. This works shall include all necessary modifications to the existing cabling.
- vi. The Contractor shall design, supply, and install an earthing and lightning protection system in the new high mast. The Contractor shall also design, supply and install hot-dip Galvanized finials and bonding of the high mast to ground in all existing high masts. Test results shall be submitted to the Employer's Engineer.
- vii. Prior to modification on the highmast the contractor shall appoint a specialist to test the highmast pole and issue a certification to ensure the highmast comply with the highest standard of safety and reliability.
- viii. The Contractor is required to test the installation in the presence of the Employer's Engineers and issue electrical "Certificate of Compliance" (CoC) for all work done to the satisfaction of

the Employer's Engineers. The Contractor shall also issue a "RMD 9 certificate" shall be issued for all high masts that have been installed or refurbished.

- ix. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. 23The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.

2.5 Duncan Road High Masts

- i. The contractor shall uninstall all existing luminaires from the seventeen (20) existing high masts in the area. Refer to XCTE0025-E-LA-0003-0A, XCTE0025-E-LA-0004-0A, XCTE0025-E-LA-0006-0A, XCTE0025-E-LA-0007-0A. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The contractor shall test all existing high mast cables in the presence of the employer's engineer, all results shall be formally documented and shall form part of the data packs. Should any cable not meet the required standard then the contractor shall be responsible for removal of the existing cable and the installation of a new cable as specified by the employer's engineer.
- iii. The Contractor shall supply, deliver, offload, and install equal or similar approved to Beka Omniblast MAXI -1-E-455W, 10kV surge protection device, including photocell with 5188 optics on existing high masts along Duncan Road as indicated on the following drawings.
 - a. XCTE0025-E-LA-0003-0A
 - b. XCTE0025-E-LA-0004-0A
 - c. XCTE0025-E-LA-0006-0A
 - d. XCTE0025-E-LA-0007-0A
 - e. The contractors shall ensure that all luminaires are positioned as detailed in the drawing as mentioned above.
- iv. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- v. The contractor shall supply, deliver, offload, and install seven new external distribution boards as per specification for all high masts. This works shall include all necessary modifications to the existing cabling.
- vi. The Contractor shall design, supply, and install an earthing and lightning protection system in the new high mast. The Contractor shall also design, supply and install hot-dip Galvanized finials and bonding of the high mast to ground in all existing high masts. Test results shall be submitted to the Employer 's Engineer.
- vii. Prior to modification on the highmast the contractor shall appoint a specialist to test the highmast pole and issue a certification to ensure the highmast comply with the highest standard of safety and reliability.
- viii. The Contractor is required to test the installation in the presence of the Employer 's Engineers and issue electrical "Certificate of Compliance" (CoC) for all work done to the satisfaction of the Employer's Engineers. The Contractor shall also issue a "RMD 9 certificate" shall be issued for all high masts that have been installed or refurbished.
- ix. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.

2.6 Rail Marshalling Yard Access Road

- i. The contractor shall uninstall all existing luminaires from the five existing high masts in the area. Refer to XCTE0025-E-LA-0015-0A. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The contractor shall test all existing high mast cables in the presence of the employer's engineer, all results shall be formally documented and shall form part of the data packs. Should any cable not meet the required standard then the contractor shall be responsible for removal of the existing cable and the installation of a new cable as specified by the employer's engineer.
- iii. The *Contractor* shall supply, deliver, offload, and install equal or similar approved to Beka Omniblast MAXI -1-E-455W, 10kV surge protection device, including photocell with 5188 optics on existing high masts along the rail marshalling yard access road as indicated on the following drawing:
 - a. XCTE0025-E-LA-0015-0A
 - b. The contractors shall ensure that all luminaires are positioned as detailed in the drawing.
- iv. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- v. The contractor shall supply, deliver, offload, and install seven new external distribution boards as per specification for all high masts. This works shall include all necessary modifications to the existing cabling.
- vi. The *Contractor* shall design, supply, and install an earthing and lightning protection system in the new high mast. The *Contractor* shall also design, supply and install hot-dip Galvanized finials and bonding of the high mast to ground in all existing high masts. Test results shall be submitted to the Employer 's Engineer.
- vii. Prior to modification on the highmast the contractor shall appoint a specialist to test the highmast pole and issue a certification to ensure the highmast comply with the highest standard of safety and reliability.
- viii. The Contractor is required to test the installation in the presence of the Employer's Engineers and issue electrical "Certificate of Compliance" (CoC) for all work done to the satisfaction of the Employer's Engineers. The Contractor shall also issue a "RMD 9 certificate" shall be issued for all high masts that have been installed or refurbished.
- ix. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.

3 STREET LIGHTING

3.1 Duncan Road

- i. The contractor shall uninstall all existing luminaires from the existing street lighting along Duncan Road. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The Contractor shall supply deliver offload, install and paint 54 x 12m galvanized steel streetlight poles. The poles shall be installed complete with protection switchgear inside the pole, fittings to mount the luminaires and spigots as indicated in the following drawings:

- a. XCTE0025-E-LA-0004-0A
 - b. XCTE0025-E-LA-0005-0A
 - c. XCTE0025-E-LA-0006-0A
 - d. XCTE0025-E-LA-0007-0A
 - e. The poles, spigots and other steel accessories shall be prepared and painted as detailed by the structural engineer.
- iii. The contractor shall reroute the existing street lighting supply cable to supply all new street lighting positions. All cables shall first be tested in the presence of the employer's engineer. All results shall be formally documented and shall form part of the data packs. Should any cable not meet the required standard then the contractor shall be responsible for removal of the existing cable and the installation of a new cable as specified by the employer's engineer.
- iv. The contractor shall supply deliver, offload, and install luminaires equal or similar approved to Beka LEDLUME Maxi 135W, 5248 optics, with integrated photocell and a NEMA 7-pin socket. These luminaires shall be installed on the new poles as detailed in the following drawings:
- a. XCTE0025-E-LA-0003-0A
 - b. XCTE0025-E-LA-0004-0A
 - c. XCTE0025-E-LA-0005-0A
 - d. XCTE0025-E-LA-0006-0A
 - e. XCTE0025-E-LA-0007-0A
 - f. The contractor shall ensure that all luminaires are orientated as detailed in the drawings.
- v. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- vi. The *Contractor* shall design, supply, and install new earthing and lightning protection for the new installation. The *Contractor* shall also design, supply and install hot-dip Galvanized finials and bonding of the street poles to ground in all the street poles. Test results shall be submitted to the Employer 's Engineer.
- vii. Prior to modification on the highmast the contractor shall appoint a specialist to test the highmast pole and issue a certification to ensure the highmast comply with the highest standard of safety and reliability.
- viii. The Contractor is required to test the installation in the presence of the Employer 's Engineers and issue electrical "Certificate of Compliance" (CoC) for all work done to the satisfaction of the Employer's Engineers.
- ix. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.

3.2 M-Berth Access

- i. The contractor shall uninstall all existing luminaires from the existing 8 light poles, as indicated on drawing XCTE0025-E-LA-0005-0A, along M-Berth access road. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The Contractor shall supply deliver offload, install and paint 6 x 12m galvanized steel streetlight poles. The poles shall be installed complete with protection switchgear inside the pole, fittings to mount the luminaires and spigots as indicated in the following drawings.

- a. XCTE0025-E-LA-0005-0A
- b. The poles, spigots and other steel accessories shall be prepared and painted as detailed by the structural engineer.
- iii. The contractor shall reroute the existing street lighting supply cable to supply all new street lighting positions. All cables shall first be tested in the presence of the employer's engineer. All results shall be formally documented and shall form part of the data packs. Should any cable not meet the required standard then the contractor shall be responsible for removal of the existing cable and the installation of a new cable as specified by the employer's engineer.
- iv. The contractor shall supply deliver, offload, and install luminaires equal or similar approved to Beka LEDLUME Maxi 135W, 5248 optic, with integrated photocell and a NEMA 7-pin socket. These luminaires shall be installed on the new poles as detailed in the following drawings.
 - a. XCTE0025-E-LA-0005-0A
 - b. The contractor shall ensure that all luminaires are orientated as detailed in the drawings.
- v. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- vi. The *Contractor* shall design, supply, and install new earthing and lightning protection for the new installation. The *Contractor* shall also design, supply and install hot-dip Galvanized finials and bonding of the street poles to ground in all the street poles. Test results shall be submitted to the Employer 's Engineer.
- vii. The poles that are not new and modifications are required to the luminaires, then prior to modification the contractor shall appoint a specialist to test the highmast pole and issue a certification to ensure the highmast comply with the highest standard of safety and reliability.
- viii. The Contractor is required to test the installation in the presence of the Employer 's Engineers and issue electrical "Certificate of Compliance" (CoC) for all work done to the satisfaction of the Employer's Engineers.
- ix. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.

3.3 Tanker Basin

- i. The contractor shall uninstall all existing luminaires from the existing 46 light poles, as indicated on drawing XCTE0025-E-LA-0012-0A (sheet 2), along the quay road at Tanker Basin. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The Contractor shall supply deliver offload, install 8 x 6m fibre glass poles that are to be mounted on hinged bases. The poles shall be positioned so that when lowered the luminaire is safely accessible. The poles shall be installed complete with protection switchgear inside the pole, and fittings to mount the luminaires and spigots as indicated in the following drawings.
 - a. XCTE0025-E-LA-00012-0A (sheet 2)
- iii. The contractor shall reuse the existing lighting supply cables to supply all new luminaires. All cables shall first be tested in the presence of the employer's engineer. All results shall be formally documented and shall form part of the data packs. Should any cable not meet the required standard then the contractor shall be responsible for removal of the existing cable and the installation of a new cable as specified by the employer's engineer.

- iv. The contractor shall supply deliver, offload, and install luminaires equal or similar approved to Beka LEDLUME Midi 104W, 5248 optics, with integrated photocell and a NEMA 7-pin socket. These luminaires shall be installed on the existing poles and the 8 new poles as detailed in the following drawings.
 - a. XCTE0025-E-LA-00012-0A (sheet 2)
 - b. The contractor shall ensure that all luminaires are orientated as detailed in the drawings.
- v. The Contractor shall supply deliver offload, install, and paint 8 x 12m galvanized steel streetlight poles. The poles shall be installed complete with protection switchgear inside the pole, and fittings to mount the luminaires and spigots as indicated in the following drawings.
 - a. XCTE0025-E-LA-00012-0A (sheet 2)
 - b. The poles, spigots and other steel accessories shall be prepared and painted as detailed by the structural engineer.
- vi. The contractor shall supply deliver, offload and install luminaires equal or similar approved to Beka LEDLUME Maxi 135W, 5248 optic, with integrated photocell and a NEMA 7-pin socket. These luminaires shall be installed on the new poles as detailed in the following drawings.
 - a. XCTE0025-E-LA-00012-0A (sheet 2)
 - b. The contractor shall supply, deliver, offload, and install 280m of 10mm² 4 core ECC SWA cable to supply the new street light poles. This shall include all required connections, terminations, accessories, and cable ladders as necessary.
- vii. The Contractor shall supply deliver offload, install and paint 1 x 15m galvanized steel mast. The mast shall be installed complete with protection switchgear inside the pole, fittings to mount the luminaires and spigots as indicated in the following drawings.
 - a. XCTE0025-E-LA-00012-0A (sheet 2)
 - b. The poles, spigots and other steel accessories shall be prepared and painted as detailed by the structural engineer.
- viii. The contractor shall supply deliver, offload, and install luminaires equal or similar approved to Beka LEDFLOOD midi 122W, 5121 optics, with integrated photocell and a NEMA 7-pin socket. These luminaires shall be installed on the new mast as detailed in the following drawings.
 - a. XCTE0025-E-LA-00012-0A (sheet 2)
- ix. The contractor shall supply, deliver, offload, and install 4m of 10mm² 4 core ECC SWA cable to supply the new 15m mast. This shall include all required connections, terminations, switchgear, and accessories as necessary.
- x. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- xi. The Contractor shall design, supply, and install new earthing and lightning protection for the new installation. The Contractor shall also design, supply and install hot-dip Galvanized finials and bonding of the street poles to ground in all the street poles. Test results shall be submitted to the Employer's Engineer.
- xii. Prior to modification on the highmast the contractor shall appoint a specialist to test the highmast pole and issue a certification to ensure the highmast comply with the highest standard of safety and reliability.
- xiii. The Contractor is required to test the installation in the presence of the Employer's Engineers and issue electrical "Certificate of Compliance" (CoC) for all work done to the satisfaction of the Employer's Engineers.

- xiv. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.

3.4 Eastern Mole

- i. The contractor shall uninstall all existing luminaires from the existing 31 light poles, as indicated on drawing XCTE0025-E-LA-0013-0A (sheet 2), along the quay road at Eastern Mole. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The contractor shall reuse the existing lighting supply cables to supply all new luminaires. All cables shall first be tested in the presence of the employer's engineer. All results shall be formally documented and shall form part of the data packs. Should any cable not meet the required standard then the contractor shall be responsible for removal of the existing cable and the installation of a new cable as specified by the employer's engineer.
- iii. The Contractor shall supply deliver offload, install and paint 5 x 6m galvanized steel streetlight poles. The poles shall be installed complete with protection switchgear inside the pole, fittings to mount the luminaires and spigots as indicated in the following drawings.
 - a. XCTE0025-E-LA-00013-0A (sheet 2)
 - b. The poles, spigots and other steel accessories shall be prepared and painted as detailed by the structural engineer.
- iv. The contractor shall supply, deliver, offload, and install 220m of 16mm² 4 core ECC SWA cable to supply the new street light poles. This shall include all required connections, terminations, switchgear, and accessories as necessary.
- v. The contractor shall supply deliver, offload and install luminaires equal or similar approved to Beka LEDLUME Midi 104W, 5248 optic, with integrated photocell and a NEMA 7-pin socket. These luminaires shall be installed on the existing poles and the 5 new poles as detailed in the following drawings.
 - a. XCTE0025-E-LA-00013-0A (sheet 2)
 - b. The contractor shall ensure that all luminaires are orientated as detailed in the drawings.
- vi. The Contractor shall supply deliver offload, install and paint 1 x 15m galvanized steel mast. The mast shall be installed complete with protection switchgear inside the pole, fittings to mount the luminaires and spigots as indicated in the following drawings.
 - a. XCTE0025-E-LA-00013-0A (sheet 2)
 - b. The poles, spigots and other steel accessories shall be prepared and painted as detailed by the structural engineer.
- vii. The contractor shall supply deliver, offload, and install luminaires equal or similar approved to Beka LEDFLOOD midi 122W, 5121 optic, with integrated photocell and a NEMA 7-pin socket. These luminaires shall be installed on the new mast as detailed in the following drawings.
 - a. XCTE0025-E-LA-00013-0A (sheet 2)
- viii. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- ix. The Contractor shall design, supply, and install new earthing and lightning protection for the new installation. The Contractor shall also design, supply and install hot-dip Galvanized finials

and bonding of the street poles to ground in all the street poles. Test results shall be submitted to the Employer 's Engineer.

- x. Prior to modification on the highmast the contractor shall appoint a specialist to test the highmast pole and issue a certification to ensure the highmast comply with the highest standard of safety and reliability.
- xi. The Contractor is required to test the installation in the presence of the Employer 's Engineers and issue electrical "Certificate of Compliance" (CoC) for all work done to the satisfaction of the Employer's Engineers.
- xii. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.

3.5 Rondenrijs Road

- i. The contractor shall uninstall all existing luminaires from the existing 7 light poles, as indicated on drawing XCTE0025-E-LA-0008-0A, along Rodenrijs road. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The contractor shall reuse the existing lighting supply cables to supply all new luminaires. All cables shall first be tested in the presence of the employer's engineer. All results shall be formally documented and shall form part of the data packs. Should any cable not meet the required standard then the contractor shall be responsible for removal of the existing cable and the installation of a new cable as specified by the employer's engineer.
- iii. The contractor shall replace the arm on street light pole P3 is indicated in drawing XCTE0025-E-LA-0008-0A with an equal arm as currently installed in the area.
- iv. The contractor shall supply deliver, offload, and install luminaires equal or similar approved to Beka LEDLUME Midi 104W, 5248 optic, with integrated photocell and a NEMA 7-pin socket. These luminaires shall be installed on the existing poles.
 - a. XCTE0025-E-LA-00013-0A (Sheet 2)
 - b. The contractor shall ensure that all luminaires are orientated as detailed in the drawings.
- v. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- vi. The Contractor shall design, supply, and install new earthing and lightning protection for the new installation. The Contractor shall also design, supply and install hot-dip Galvanized finials and bonding of the street poles to ground in all the street poles. Test results shall be submitted to the Employer 's Engineer.
- vii. Prior to modification on the highmast the contractor shall appoint a specialist to test the highmast pole and issue a certification to ensure the highmast comply with the highest standard of safety and reliability.
- viii. The Contractor is required to test the installation in the presence of the Employer 's Engineers and issue electrical "Certificate of Compliance" (CoC) for all work done to the satisfaction of the Employer's Engineers.
- ix. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.

3.6 Berrio, Ocean and Titan Road

- i. The contractor shall uninstall all existing luminaires from the existing 17 light poles, as indicated on drawing XCTE0025-E-LA-0011-1, along Berrio, Ocean, Titan, and Monument Road. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The contractor shall reuse the existing lighting supply cables to supply all new luminaires. All cables shall first be tested in the presence of the employer's engineer. All results shall be formally documented and shall form part of the data packs. Should any cable not meet the required standard then the contractor shall be responsible for removal of the existing cable and the installation of a new cable as specified by the employer's engineer.
- iii. The contractor shall supply deliver, offload, and install luminaires equal or similar approved to Beka LEDLUME Midi 104W, 5248 optic, with integrated photocell and a NEMA 7-pin socket. These luminaires shall be installed on the existing poles.
 - a. XCTE0025-E-LA-0011-01
 - b. The contractor shall ensure that all luminaires are orientated as detailed in the drawings.
- i. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- ii. The *Contractor* shall design, supply, and install new earthing and lightning protection for the new installation. The *Contractor* shall also design, supply and install hot-dip Galvanized finials and bonding of the street poles to ground in all the street poles. Test results shall be submitted to the Employer 's Engineer.
- iii. The Contractor is required to test the installation in the presence of the Employer 's Engineers and issue electrical "Certificate of Compliance" (CoC) for all work done to the satisfaction of the Employer's Engineers.
- iv. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.
- v. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- vi. The *Contractor* shall design, supply, and install new earthing and lightning protection for the new installation. The *Contractor* shall also design, supply and install hot-dip Galvanized finials and bonding of the street poles to ground in all the street poles. Test results shall be submitted to the Employer 's Engineer.
- vii. Prior to modification on the highmast the contractor shall appoint a specialist to test the highmast pole and issue a certification to ensure the highmast comply with the highest standard of safety and reliability.
- viii. The Contractor is required to test the installation in the presence of the Employer 's Engineers and issue electrical "Certificate of Compliance" (CoC) for all work done to the satisfaction of the Employer's Engineers.
- ix. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.

4 BERTH LIGHTING

4.1 Quay 700's

- i. The contractor shall uninstall all existing luminaires from the existing 26 light poles, as indicated on drawing XCTE0025-E-LA-0014-0A, located at Quay 700. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The contractor shall uninstall all existing cabling supplying Quay 704 and 705 lighting. The contractor shall ensure that the cabling is safely transported to the TNPA electrical maintenance depot.
- iii. The contractor shall supply, deliver, offload, and install 170m of 10mm² 4 core ECC SWA cable to supply Quay 704 and 705 masts. This shall include all required connections, terminations, switchgear, and accessories as necessary.
- iv. The contractor shall reinstate the 2 missing fibre glass poles at Quay 704 including mounting plates as specified by the structural engineer.
- v. The contractor shall supply deliver, offload, and install luminaires equal or similar approved to Beka LEDLUME Midi 104W, 5248 optic, with integrated photocell and a NEMA 7-pin socket. These luminaires shall be installed on the existing poles and the reinstated poles.
 - a. XCTE0025-E-LA-0014-0A
 - b. The contractor shall ensure that all luminaires are orientated as detailed in the drawings.
- vi. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- vii. The *Contractor* shall design, supply, and install new earthing and lightning protection for the new installation. The *Contractor* shall also design, supply and install hot-dip Galvanized finials and bonding of the street poles to ground in all the street poles. Test results shall be submitted to the Employer 's Engineer.
- viii. Prior to modification on the highmast the contractor shall appoint a specialist to test the highmast pole and issue a certification to ensure the highmast comply with the highest standard of safety and reliability.
- ix. The Contractor is required to test the installation in the presence of the Employer 's Engineers and issue electrical "Certificate of Compliance" (COC) for all work done to the satisfaction of the Employer's Engineers.
- x. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.

4.2 Tanker Basin 1 and 2 Berth

- i. The contractor shall uninstall all existing luminaires from the existing 23 light poles, as indicated on drawing XCTE0025-E-LA-0012-0A, located at the berths at Tanker Basin 1 and 2. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The contractor shall reuse the existing lighting supply cables to supply all new luminaires. All cables shall first be tested in the presence of the employer's engineer. All results shall be formally documented and shall form part of the data packs. Should any cable not meet the

required standard then the contractor shall be responsible for removal of the existing cable and the installation of a new cable as specified by the employer's engineer.

- iii. The contractor shall supply deliver, offload, and install luminaires equal or similar approved to Nordland HA1 LED Ex-Proof pendant light, 40W. These luminaires shall be installed on the existing poles as indicated on drawing XCTE0025-E-LA-0012-0A. All associated conduits, cabling, junction boxes, and glands shall be suitably rated for zone 1 operation.
- iv. It shall be noted that no work shall be permitted on the berth while a "red line" vessel is berthed. The contractor shall ensure that works on the berth are correctly scheduled.
- v. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- vi. The *Contractor* shall design, supply, and install new earthing and lightning protection for the new installation. The *Contractor* shall also design, supply and install hot-dip Galvanized finials and bonding of the street poles to ground in all the street poles. Test results shall be submitted to the Employer 's Engineer.
- vii. Prior to modification on the highmast the contractor shall appoint a specialist to test the highmast pole and issue a certification to ensure the highmast comply with the highest standard of safety and reliability.
- viii. The Contractor is required to test the installation in the presence of the Employer 's Engineers and issue electrical "Certificate of Compliance" (COC) for all work done to the satisfaction of the Employer's Engineers.
- ix. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.

4.3 Eastern Mole 1 and 2 Berth

- i. The contractor shall uninstall all existing luminaires from the existing 25 light poles, as indicated on drawing XCTE0025-E-LA-0013-0A, located at the berths at Eastern Mole 1 and 2. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The contractor shall reuse the existing lighting supply cables to supply all new luminaires. All cables shall first be tested in the presence of the employer's engineer. All results shall be formally documented and shall form part of the data packs. Should any cable not meet the required standard then the contractor shall be responsible for removal of the existing cable and the installation of a new cable as specified by the employer's engineer.
- iii. The contractor shall reinstate all missing poles in the berths as indicated in drawing XCTE0025-E-LA-0013-0A. These poles shall be of fibre glass type and securely fixed to the berth as per structural engineer's detail.
- iv. The contractor shall supply deliver, offload, and install luminaires equal or similar approved to Nordland HA1 LED Ex-Proof pendant light, 40W. These luminaires shall be installed on the existing poles as indicated on drawing XCTE0025-E-LA-0013-0A. All associated conduits, cabling, junction boxes, and glands shall be suitably rated for zone 1 operation.
- v. It shall be noted that no work shall be permitted on the berth while a "red line" vessel is berthed. The contractor shall ensure that works on the berth are correctly scheduled.
- vi. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.

- vii. The *Contractor* shall design, supply, and install new earthing and lightning protection for the new installation. The *Contractor* shall also design, supply and install hot-dip Galvanized finials and bonding of the street poles to ground in all the street poles. Test results shall be submitted to the Employer 's Engineer.
- viii. The Contractor is required to test the installation in the presence of the Employer 's Engineers and issue electrical "Certificate of Compliance" (COC) for all work done to the satisfaction of the Employer's Engineers.
- ix. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.
- x. Landing Quay
- xi. The contractor shall uninstall all existing luminaires from the existing 2 light poles. located at the berths at Landing Quay. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- xii. The supply cable to pole P2 shall be removed and replaced with a new 10mm² 2 core, ECC cable. The cable shall be installed in the existing cable way.
- xiii. The contractor shall supply deliver, offload, and install luminaires equal or similar approved to Beka LEDLUME Midi 104W, 5248 optics, with integrated photocell and a NEMA 7-pin socket. These luminaires shall be installed on the existing poles and the reinstated poles.
- xiv. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- xv. The *Contractor* shall design, supply, and install new earthing and lightning protection for the new installation. The *Contractor* shall also design, supply and install hot-dip Galvanized finials and bonding of the street poles to ground in all the street poles. Test results shall be submitted to the Employer 's Engineer.
- xvi. Prior to modification on the highmast the contractor shall appoint a specialist to test the highmast pole and issue a certification to ensure the highmast comply with the highest standard of safety and reliability.
- xvii. The Contractor is required to test the installation in the presence of the Employer 's Engineers and issue electrical "Certificate of Compliance" (COC) for all work done to the satisfaction of the Employer's Engineers.
- xviii. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.

4.4 Jetty 1

- i. The contractor shall uninstall all existing luminaires from the existing 7 light poles. located at the berths at Jetty 1. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The contractor shall reuse the existing lighting supply cables to supply all new luminaires. All cables shall first be tested in the presence of the employer's engineer. All results shall be formally documented and shall form part of the data packs. Should any cable not meet the required standard then the contractor shall be responsible for removal of the existing cable and the installation of a new cable as specified by the employer's engineer.

- iii. The contractor shall supply deliver, offload, and install luminaires equal or similar approved to Beka LEDLUME Midi 104W, 5248 optics, with integrated photocell and a NEMA 7-pin socket. These luminaires shall be installed on the existing poles.
- iv. Should the contractor suggest a different luminaire, they are to undertake simulations and submit to the employer's engineer for acceptance.
- v. The *Contractor* shall design, supply, and install new earthing and lightning protection for the new installation. The *Contractor* shall also design, supply and install hot-dip Galvanized finials and bonding of the street poles to ground in all the street poles. Test results shall be submitted to the Employer 's Engineer.
- vi. Prior to modification on the highmast/pole the contractor shall appoint a specialist to test the highmast pole and issue a certification to ensure the highmast comply with the highest standard of safety and reliability.
- vii. The Contractor is required to test the installation in the presence of the Employer 's Engineers and issue electrical "Certificate of Compliance" (COC) for all work done to the satisfaction of the Employer's Engineers.
- viii. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.

5 PERIMETER LIGHTING

- i. The contractor shall uninstall all existing luminaires from the existing 206 light poles. located along the port perimeter. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The contractor shall reuse the existing lighting supply cables to supply all new luminaires. All cables shall first be tested in the presence of the employer's engineer. All results shall be formally documented and shall form part of the data packs. Should any cable not meet the required standard then the contractor shall be responsible for removal of the existing cable and the installation of a new cable as specified by the employer's engineer.
- iii. The contractor shall supply deliver, offload, and install luminaires equal or similar approved to Beka LEDLUME Midi 104W, 5248 optics, with integrated photocell and a NEMA 7-pin socket. These luminaires shall be installed on the existing poles. The contractor shall ensure that a suitable spigot is installed.
- iv. The contractor shall remove, refurbish, and reinstate all rusted pole access plates.
- v. Should the contractor suggest a different luminaire, they are to undertake simulations and submit them to the employer's engineer for acceptance.
- vi. The *Contractor* shall design, supply, and install new earthing and lightning protection for the new installation. The *Contractor* shall also design, supply, and install hot-dip Galvanized finials and bonding of the street poles to the ground in all the street poles. Test results shall be submitted to the Employer 's Engineer.
- vii. Prior to modification on the highmast the contractor shall appoint a specialist to test the highmast pole and issue a certification to ensure the highmast complies with the highest standard of safety and reliability.
- viii. The Contractor is required to test the installation in the presence of the Employer 's Engineers and issue an electrical "Certificate of Compliance" (COC) for all work done to the satisfaction of the Employer's Engineers.
- ix. The Contractor shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the Employer 's Engineers. The Contractor shall notify the Employer 's Engineer, seven days prior to the lighting survey.

6 ENTRANCE FACILITIES

6.1 South Arm Entrance Facility

- i. The contractor shall uninstall all existing luminaires from the South Arm Entrance Facility. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The contractor shall supply deliver, offload, and install 10 luminaires equal or similar approved to Beka LEDFLOOD Midi 104W, 5248 optics, with a NEMA 7-pin socket. These luminaires shall be mounted to the existing canopy in the same positions as the existing lights. The contractor shall ensure that all mounting and accessories are accounted for.
- iii. The contractor shall reuse the existing cabling for all connections.

6.2 Christiaan Barnard Entrance Facility

- i. The contractor shall uninstall all existing luminaires from the Christiaan Barnard Entrance and the Exit facility. The contractor shall ensure that the luminaires are safely transported to the TNPA electrical maintenance depot.
- ii. The contractor shall supply deliver, offload, and install 8 luminaires equal or similar approved to Beka LEDFLOOD Midi 104W, 5248 optics, with a NEMA 7-pin socket. These luminaires shall be mounted to the existing canopy in the same positions as the existing lights. The contractor shall ensure that all mounting and accessories are accounted for.
- iii. The contractor shall reuse the existing cabling for all connections.

7 TESTING AND COMMISSIONING OF THE ENTIRE INSTALLATION

- i. The *Contractor* shall conduct a Factory Acceptance Test (FAT) for all distribution boards and electrical kiosks to be installed as part of the Works to be executed in this Contract prior to delivery to the site. The FAT shall be conducted in the presence of the Employer's Engineers. The legal transfer of ownership from the supplier to the *Contractor* shall be held by the *Contractor* until the distribution boards and electrical kiosks are fully installed, tested commissioned on the Employer's designated site.
- ii. The *Contractor* shall test the entire installation, including but not limited to the LV installation and the lighting installation as per SANS 10142-1, and hand over all relevant test certificates to the Employers Project Manager for acceptance.

8 EARTHING AND LIGHTNING PROTECTION

- i. The *Contractor* shall design, supply, and install earthing and lightning protection to all street light poles and high masts in accordance with specification No. TPD: 004-EARTHINGSPEC; "Transnet National Ports Authority Specification for lightning protection and earthing". This component of work shall be undertaken by a specialist earthing and lightning protection *Contractor*.
- ii. The high mast shall be provided with an M12 earth bolt welded to the mast with stainless steel nuts. The incoming electrical supply earth conductor and all other electrical equipment shall be connected to the earth bolt.

- iii. The earth electrodes and couplers used on all street light poles and high masts shall be manufactured from stainless steel and in accordance with SABS 1063.
- iv. The earth electrode resistance shall not exceed the requirements of SANS 10142-1 and SANS 10313.
- v. The *Contractor* shall submit all the proposed designs to the employer's engineer for acceptance.

9 COMPLIANCE CERTIFICATE

- i. The *Contractor* is required to test the installation in the presence of the *Employer's* Engineers and issue compliance certificates for lightning protection and earthing systems (SANS 10313) for all work done to the satisfaction of the *Employer's* Engineers.
- ii. The *Contractor* is required to test the installation in the presence of the *Employer's* Engineers and issue compliance certificates for Low Voltage Installations (SANS 10142-1) for all work done to the satisfaction of the *Employer's* Engineers
- iii. The *Contractor* is required to test the installation in the presence of the *Employer's* Engineers and issue compliance certificates for all newly installed high masts and refurbished (RMD 9 Certificates) for all work done to the satisfaction of the *Employer's* Engineers
- iv. The *Contractor* shall submit a full set of completed and valid compliance certificates to the *Employer*.

10 LIST OF DRAWINGS

This is the list of drawings issued by the *Employer* at or before the Contract Date and which apply to this contract.

Note: Some drawings may contain both Works Information and Site Information.

Drawing number	Revision	Title
XCTE0025-E-LA-0001	0A	A-Berth
XCTE0025-E-LA-0002	0A	K and L Berth
XCTE0025-E-LA-0003	0A	Duncan Road 1
XCTE0025-E-LA-0004	0A	Duncan Road 2
XCTE0025-E-LA-0005	0A	Duncan Road 3 and M-Berth
XCTE0025-E-LA-0006	0A	Duncan Road 4
XCTE0025-E-LA-0007	0A	Duncan Road 5
XCTE0025-E-LA-0008	0A	Marine Drive and Interior Roads
XCTE0025-E-LA-0009	0A	Rail Marshalling Yard 1 (Sheet 1)

XCTE0025-E-LA-0009	0A	Rail Marshalling Yard 1 (Sheet 2)
XCTE0025-E-LA-0010	0A	Rail Marshalling Yard 2 (Sheet 1)
XCTE0025-E-LA-0010	0A	Rail Marshalling Yard 2(Sheet 2)
XCTE0025-E-LA-0011	0A	Berrio, Ocean and Vanguard Roads
XCTE0025-E-LA-0012	0A	Tanker Basin (Sheet 1)
XCTE0025-E-LA-0012	0A	Tanker Basin (Sheet 2)
XCTE0025-E-LA-0013	0A	Eastern Mole (Sheet 1)
XCTE0025-E-LA-0013	0A	Eastern Mole (Sheet 2)
XCTE0025-E-LA-0014	0A	Quay 700's
XCTE0025-E-LA-0015	0A	Rail Marshalling Yard Access Road
XCTE0025-E-LA-0016	0A	Willies Wharf