



MUSINA STATE WAREHOUSE FACILITY

ELECTRICAL INFRASTRUCTURE UPGRADE

SCOPE OF WORKS

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1. INTRODUCTION

The purpose of this document is to define the scope of works for the electrical works. This scope shall be in line with the position of the existing installations in terms of available supply and additional supply lighting for vehicle parking area. This scope is to deal with bulk supply issues for the warehouse, street lighting and vehicle parking area.

The Musina Military Base that is located at the South Western side of Musina CBD at grid reference of S 22°36'85".68 and E 30° 01'24".95.

2. ELECTRICAL INFRASTRUCTURE

2.1 Electrical Power Distribution Network

2.1.1 MV Reticulation Network

The installation of Medium Voltage (MV) reticulation networks consists of the following:

2.1.1.1. Incoming Main Power Supply

This refers to the incoming electrical power from the supply authority. Public Works will provide a bulk in-feed supply point at existing 11kV overhead MV line at the designated position within the Musina Military Based development (refer to attached layout drawing). The estimated total power to the warehouse facility is 350kVA.

2.1.1.2. Miniature Substation

One miniature substation rated at 500kVA will be installed at boundary fence of SARS customs yard near the generator room as part of the distribution network. This MV switchgear gear must be outdoor switchgear and must be surface mounted. A type 'B' mini substation will be installed complete with concrete plinth, to be installed with maximum demand metering, main LV moulded case circuit breaker (MCCB) and LV feeder circuit breakers. A maximum of two low voltage feeders will be on the mini substation, with an additional street lighting circuit being fed via the control circuit.

2.1.1.3. MV Cabling

The cable shall be 11kV PILC insulated, type B cable to SABS 1339, table 19, with a voltage rating of 6.35/11kV, 185mm² x 3 core, armoured, individually screened with copper conductors. The cable must be connected to the main overhead 11KV powerline using sectionalising link switches.

2.2. LV Reticulation Network

The installation of Low Voltage (LV) reticulation networks consists of the following:

2.2.1. Low Voltage Distribution Boards

The low voltage supply from the miniature substation (from LV compartment side) will be distributed to the main DB Boards and kiosks panels inside the warehouse and vehicle parking area. The surface mounted and floor standing distribution boards complete with new switchgears must be provided with normal and emergency power supply to the existing and new proposed facility. All Distribution boards must be properly labelled whereby the legend cards and danger warning signs will be installed on all distribution boards to comply with SANS 10142 and 10400 Code of Practice for Wiring of Premises and OHSACT of 1993 as amended.

2.2.2. Low Voltage Cabling

The end user voltage must be 400/230V that is supplied by the miniature substations, via 400V underground cables and relevant MCCB's as well as MCB's components.

The low voltage network must be fed from the circuit breakers in the miniature substations through 600/1000V, 400mm² 4 core armoured cable PVC/PVC/SWA/PVC. The cable sleeves must be installed for road crossings and any other required position where the sleeves would be considered appropriate 110mm inside diameter PVC or NEX tube sleeves must be used, buried at a depth of 1.5m where roads are to be serviced and repaired at a later stage.

2.3. External Lighting System

The installation refers to the street lights and general area lighting (post top fittings) and security flood lighting as well as its associated power supply and control system.

2.3.1 Street Lights Fittings

There are existing street lighting which consists of galvanised street light poles and 250W HPS light fittings. It is required under this contract that all the street poles should be serviced and repaired accordingly as well as the replacement of existing street light fittings with 115W LED fittings. The street lighting luminaire must be in compliance with SANS 60598-2-3, SANS 1277.

2.3.2. General Area Lighting (Post Top Fittings)

This item comprise of the post top fittings to cater for walk ways and also the parking area of the vehicles. The new post top lighting consist of 4.5m mounted high galvanised steel pole with 37W LED fittings. The top post lighting luminaire should be in compliance with SANS 60598-2-3, SANS 1277.

2.3.3. Security Lighting (Flood Lights - Two X 20 Metres High Mast Flood Lights)

The technical solution requires the installation of two twenty metre high mast flood lights each equipped with eight [8] 461 watt LED flood lights fed separately by a 10 sqm four core PVC SWA cable from a three phase supply to a junction box below the lighting mast equipped with a 10 amp triple pole MCB. From the junction box the flood lights will be fed from a 4 sqm cable with a maximum of three 461 watt LED floodlights per phase .The lighting simulation studies supporting the technical solution and attached to this report and comply to SANS 212 ISO 1461. The only cost which could vary would be the Geotechnical costs and foundation nominated after the soil test. The technical solution offers superior luminous efficiencies with minimum maintenance challenges and is not easy to temper with or vandalise. **The appointed contractor must appoint a Geotechnical company to perform tests on the soil where the masts will be erected.**

2.4. Building Services Infrastructure (Guard House)

The building power reticulation must cover the following items; power socket outlets, AC isolator's points to the air-conditioning system and CCTV as well as the access control point, data and telephone wiring as well as the internal lighting inside all the building facility. Furthermore, the inclusion of earthing and lightning protection methodology. The lightning protection design should be in accordance to SANS 10400.

2.4.1 Power Socket Outlets

Existing power outlets are to be connected to the distribution board. All the wiring for socket outlets shall be by means of galvanized conduits or to cover, 3 compartment aluminium power skirting. The 2.5mm² PVC insulated copper conductors and 1.5mm² PVC earth insulated copper conductors 600/1000V grade protected by 20A SP MCB's for general areas. The socket outlets shall be provided on new 3-compartment 2-cover power skirting which will house both electrical and ICT infrastructure.

2.4.2. Interior Lighting System

To supply and install lighting that is suitable for the environment being served. The light fittings must include lamps, wiring, connections and earthing. The following energy efficient light fittings are required:

- Fluorescent LED tubes 2 X 22W T5. The lights to be installed will consist mainly of both two tubes 22W, 1200mm and 86mm x 90mm both recessed and surface mounted T5 type energy efficient fluorescent light fittings. This shall be installed in the offices, ablutions and eating areas.

The design lux levels for each room will be in accordance with the SANS-10142, OHSACT provisions. New light switches will be provided in certain areas where occupancy sensors are not installed.

The 1.5mm² PVC earth insulated copper conductors drawn into conduit or installed in wiring channels must be used to feed the proposed LED light fittings. It's noted, all wiring for lights will be done by means of galvanized steel conduits and 1.5mm² The PVC insulated conductors 600/1 000V grade must be protected by 10A SP MCB's.

2.4.3. Earthing and Lightning System

The successful contractor will make provision for the installation of levels of earthing and lightning protection system as per latest SANS 0313 (1999) and SANS 10142, earthing code of practice and standard specifications to protect essential electronic equipment against possible lightning surges.

In addition, due to large quantity of electronic equipment to be used on site, the level of earthing and lightning protection system must be supplied and installed by a competent earthing and lightning protection specialist, who must test and issue the appropriate earthing certificate after completion.

The contractor must employ best practice segregation of section of earthing system. Allow for bonding of all exposed conductive parts of the electrical installation and all such extraneous conductive parts associated with the structure as necessary.

3. CONCLUSION AND RECOMMENDATION

The scope of work must be read together with the Bill of Quantities.

APPENDIX A

INFRASTRUCTURE PHOTOS

ELECTRICAL



Figure 01

Existing Vandalised 50kVA Transformer and Proposed Tap Off Supply Point



Figure 02
Existing Vandalised Streetlight Pole



Figure 03
Vandalised Control Circuit of Streetlight



Figure 04
Existing Street-lighting Fitting



Figure 05
Skew Existing Streetlight Pole



Figure 06
Vehicle Parking Area