ASSET DESIGN

1.1. GENERAL SPECIFICATIONS AND WORKS INFORMATION

Project Description:	**UMKOMAAS 88/22/11-kV SUBSTATION UPGRADE**			
Project No.'s:	**ID**	**148367973B-00001**	**WBS**	**C.DE04169**
Document Identifier:	**PW**	**ER00779-00-P01#1.1-00**	**Rev**	**0**
Operating Unit	**Kwa-Zulu Natal Operating Unit**			
Section:	**Asset Creation – Network Engineering and Design**			
Department:	**Asset Design (Substations)**			
Project Category:	**Strengthening**			
PLCM Phase:	**Detail Design**			

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FOREWARD

This document is the General Specification and Works Information for the Umkomaas **88/22/11-kV Substation Upgrade** and covers both Civil and Electrical requirements. It also covers the Quality Control and Quality Assurance requirements of the project. It contains information on the scope of works and staging of the project for ease of construction. This document is to be read in conjunction with the Detailed Specification for the Civil and Electrical works.

TEMPLATE REVISION HISTORY

REV	Date	Template Compiled by	Comment
0	July 2014	J. K. Raghubir (Pr. Eng)	Previous Detailed specification split into General, Electrical and Civil Sections. Document re-worded. New ISO template used.
1	Sept 2014	J. K. Raghubir (Pr. Eng)	Only one Senior Design Engineer authorisation signature required.

DOCUMENT REVISION HISTORY

REV	Date	Compiler	Comment
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1. EXECUTIVE SUMMARY

(Section C3.1 of the NEC3 Engineering and Construction Short Contract)

1.1. Background to the Project

Umgeni water requires an increase in NMD of approximately 7MVA to in order to supply several new water related facilities in the Umkomaas area. Network Planning have done studies and determined that the best solution to meet this demand is to Upgrade Umkomaas Substation from a 22/11kV substation to a 88/22/11kV Substation and establish a new 22kV Feeder from the substation to accommodate the load from the various customer points of supply.

1.2. Interface with associated projects

The following projects are associated with the works as described:

a) 148367973B-00003 132kV Turn in Lines to Umkomaas 132/22kV Substation
b) 148367973B-00001 132/22kV Umkomaas Substation Establishment
c) 148367973B-00002 Umkomaas NB228 Line Establishment

1.3. Objectives of the works

The purpose of the works is to upgrade the existing Umkomaas substation, situated in the PMB Zone of KZN Operating Unit, from 22/11kV to 88/22/11kV. The purpose of the substation is to provide electricity to new customers in the area and deload existing networks.

2. SITE INFORMATION

(Section C4.1 of the NEC3 Engineering and Construction Short Contract)

2.1. Description of the Site and Access

Existing substation. Located in a suitable position relative to customer base. Substation established on relatively ground. Terrace is existing. Approximately 45 x 45 m. Not visible from nearby district road. Existing access road to the substation is in good condition. Does not meet turning circle requirements.
$30^0$11'41.5" $30^0$45'11.6"

2.2. Existing infrastructure (buildings, structures, plant & machinery) on the site

Existing 88kV and 132kV Lines adjacent to the substation. An underpass structure will have to be established under the 88kV line which will tee in to the substation. Existing terrace will have to be extended to accommodate the new 88/22kV transformer bay. Existing MV cable/s in substation yard will have to be located and possibly moved prior to construction. Existing 22/11kV transformer bay to be left as is. Existing switch/control room on site. Trench modifications need to be done for the new Fixed Pattern switchgear and cable entries.

2.3. Subsoil information

See Geotech report in Civil section of package

3. DESCRIPTION OF THE WORKS

(Section C4.1 of the NEC3 Engineering and Construction Short Contract)

3.1. Introduction

This project shall be carried out in full accordance with this detailed scope of work, all other technical specifications referred to and the relevant drawings provided by Eskom (refer attachments). This project shall conform in all instances to the Occupational, Health and Safety Act and Regulations, No. 85 of 1993, and any amendments thereto, including the Safety Specification referred to in Regulation 4 of these statutory requirements. The contractor shall provide a Health and Safety Plan in compliance with the Occupational, Health and Safety Act and Regulations, No. 85 of 1993, based upon but not limited to the Health & Safety Specification included in this package.

3.2. Scope of Work

The following is the scope of work proposed under this project:

3.2.1. Primary Plant: Civil Scope of work

a) Re-establish existing terrace.

b) Extend terrace.

c) Excavations and backfilling for new earth mat.

d) Establish access road.

e) Establish surface drainage.

f) Demolish and remove existing foundations from site and backfill.

g) Establish new foundations.

h) Remove and replace existing bund wall as per Standard for passive fire protection in Dx substation yards.

i) Establish new bund walls for new transformer and NECRT as per Standard for passive fire protection in Dx substation yards.

j) Remove existing mesh fence and replace with steel palisade fencing.

k) Installation of substation kerbing.

l) Modifications and repair within the building.

m) Rehabilitation of the substation site as per the Environmental Management Plan.

3.2.2. Primary Plant: Electrical Scope of work

a) PPM is to determine the MV cable routes within the main substation yard. Design engineer is to be advised of this and the cable/s need to be rerouted if necessary.

b) Erect 88kV busbar

c) String conductor and install insulators and clamps for 88kV busbar

d) Install 88/22kV transformer bay

e) Install conductors and clamps for 88/22kV transformer bay

f) Cable from cable end support to NECRT

g) Cable from cable end support to 22kV fixed pattern switchgear

h) Install earthmat and bond to fence and steelwork as per relevant drawings

i) Label all new equipment

j) Install new Fixed Pattern switchgear

k) Cable from Fixed Pattern switchgear to 22/11kV transformer

l) Labelling of all equipment

m) Install DC lighting

n) Install lighting/lightning mast and lighting

o) Add yardstone to substation terrace

3.3. Works Information: List of Drawings

3.3.1. Standard Drawings

Refer to addendum 2.4 of the project package for the Civil Standard Drawings and Index and addendum 3.5 for the standard electrical power plant equipment drawings and index.

3.3.2. Project Specific Drawings

Refer to addendum 1.3, 2.5 and 3.6 of the project package for the Project Specific Drawings Cover sheet. Project specific drawings will further reference standard and detail drawings. Some drawings may contain both Works Information and Site Information.

3.4. Works Information: Standards and Specifications

Refer to addendum 2.6 for the Civil Standards and Specifications Index and addendum 3.7 for the electrical Standards and Specifications Index. All Eskom Standards and Specifications are typically revised every 5 years and available on request.

3.5. Construction Program and Constraints (Constructability)

The staging of the works shall be as follows:

3.5.1. Stage 1: Civil Work

a) Earthworks and drainage associated with the substation yard

b) Excavation for Installation of the main substation Earth Mat

c) Construction of the structural layer works and drainage of the access road

d) Modifications and repair of existing building.

e) Demolish and remove existing foundations from site and backfill.

f) Establishment of all equipment foundations

g) Establish oil bund walls

h) Establish surface drains complete with dissipaters.

i) Installation of substation kerbing.

j) Rehabilitating of the site in accordance with the Environmental Management Plan.

3.5.2. Stage 2: Electrical Work

a) Installation of 88kV busbar and 88/22kV transformer bay
b) Installation and commissioning of all control equipment (protection, metering, DC and telecoms) in the control building and substation yard (ops lighting, auxiliary supply boxes, etc.).
c) All conductors and cabling associated with the above equipment
d) Installation of the Fixed Pattern switchgear
e) Cable from the cable-end support to the NECRT
f) Cable from the cable-end support to the 22kV fixed pattern transformer incomer
g) The installation of the yard earth mat and the bonding of all equipment earth tails to the earth mat
h) The stoning and fencing of the yard
i) The testing and commissioning of all installed equipment

3.5.3. Stage 3: Under Outages

The trench extension will have to be done under outages.
The 22kV and 11kV feeders should be backfed as much as possible (As per latest substation contingency report) and the remaining load needs to be shed for a number of 8-12 Hour periods (approximate and to be determined with the aid of Field Sevices/Plant) so that the trench can be safely extended to accommodate the installation of the Fixed Pattern switchgear.

Any work required to be done by the switchgear manufacturer or by the commissioning team while the existing switchgear is live, will have to comply with the relevant Eskom safety requirements. The switchboard manufacturer is to propose additional safety measures whilst construction is being carried out in the existing switchroom.

3.5.4. Stage 4: Energisation of the substation

Once all work is complete and the new 22kV fixed pattern switchgear is installed and commissioned, the old 22kV switchgear can be removed from the room and the substation can be energized.