Eskom	Specification	Technology

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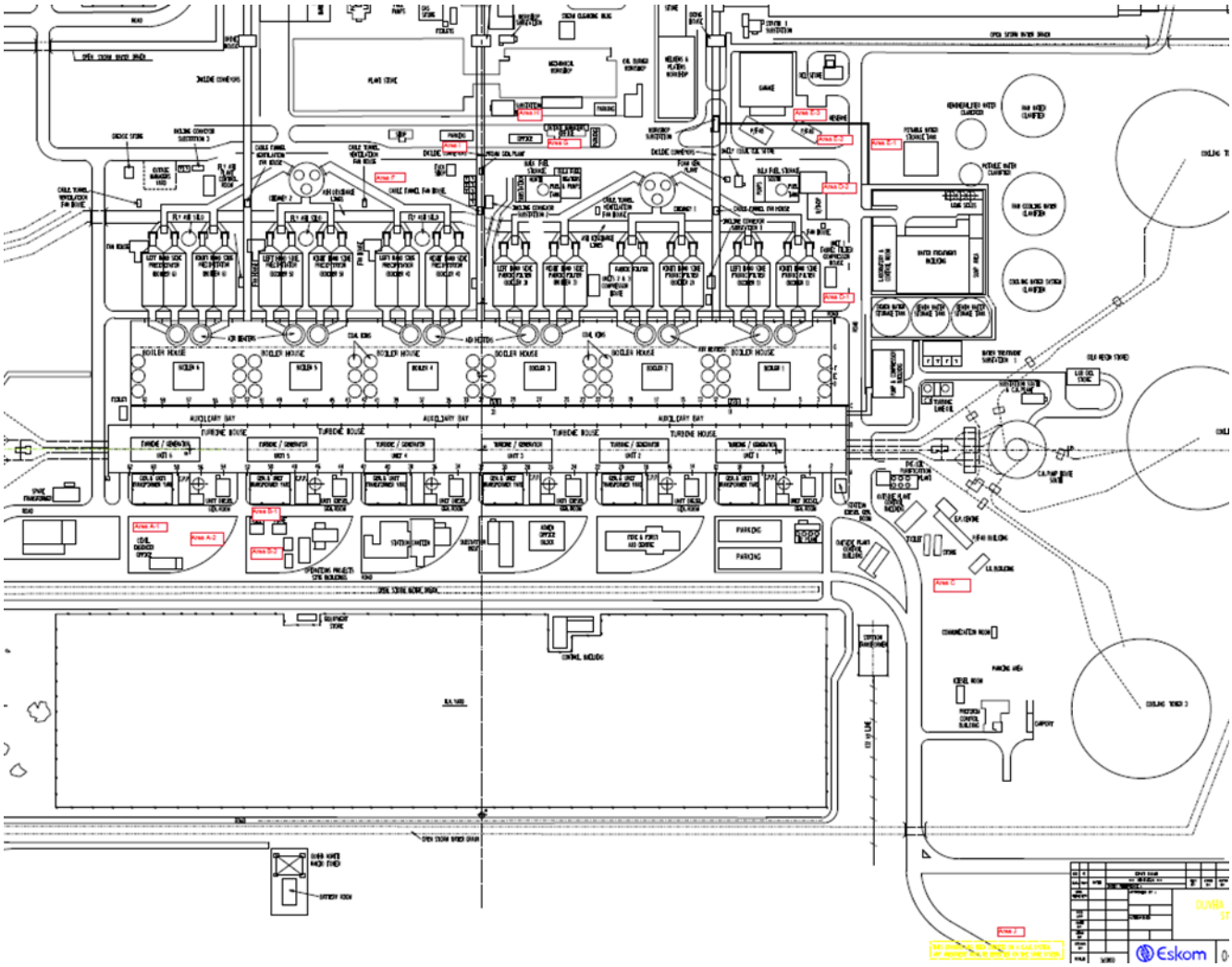
1. INTRODUCTION

This document provides technical specifications for the design and construction of Duvha parking shelters project. The purpose of the project is to provide shade and protection of vehicles against unfavourable weather conditions.

The parking covers request was raised in the business unit (BU) forum by the members after a need was identified that there are paved parking areas in the station that is used by Eskom Employees, Contractors and visitors during working hours which are currently not covered with structures to provide shade and protect vehicles from direct sunlight and storm/rain. The paved areas are within Duvha Power Station premises in various areas including Operating Support, Auxiliary Engineering, Procurement /Stores as well as across Water treatment Plant.

It is recommended that we erect parking cover structures to provide shade and protect vehicles from varying weather conditions. The parking covers proposed to be erected shall be similar to the existing type of parking covers in the station for standardisation. The current parking cover structures are made mainly steel material of hollowed circular poles columns and beams and bracings with shade netting. The concrete foundations for footings are used to support the structures from the ground. The parking covers are required to be placed in different plant areas at Duvha as shown in the station layout below in red blocks.



The identified areas requiring parking shelters labelled in the drawing above to accommodate a total number of 228 vehicles are as follows.

- Area A1&2 - located next to Auxiliary Engineering office to accommodate a total number of 32 vehicles.
- Area B1&2 - located next to OPS Support office to accommodate a total number of 34 vehicles.
- Area C – located next to Safety and IR offices to accommodate a total number of 12 vehicles.
- Area D1&2 - located next to WTP building to accommodate a total number of 18 vehicles.
- Area E1, 2&3 - located next to Transport and EMD offices to accommodate a total number of 28 vehicles.
- Area F - located next to Maintenance Training offices to accommodate a total number of 6 vehicles.
- Area G1&2 - located next to Smokestack 2 (North) to accommodate a total number of 13 vehicles.
- Area H - located next to Outage offices to accommodate a total number of 6 vehicles.
- Area I - located next to HMD office to accommodate a total number of 4 vehicles.
- Area J - located next to ERI TGS offices to accommodate a total number of 15 vehicles.

Additional areas

- Admin Building, Engineering parking, visitors parking and Mogolo building with parking bays to accommodate a total of 50 vehicles.

2. SUPPORTING CLAUSES

2.1 SCOPE

This document covers the technical specification for the works mentioned above. The scope covers design and construction of shade net parking covers in Duvha Power Station. The scope of work will be delivered by an appointed Contractor is defined in this document.

2.1.1 Purpose

The purpose of this document is to describe in detail the scope of work, which includes design, fabricate, supply and installation of shade net parking covers in Duvha Power Station

2.1.2 Applicability

This document applies to Duvha Power Station only.

2.2 NORMATIVE/INFORMATIVE REFERENCES

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

[1] ISO 9001 Quality Management Systems.

[2] ENVP0005 - Duvha Power Station Waste Management procedure

[3] 240-107981296, Constructability Assessment Guideline

[4] 240-53114186, Project/ Plant Specific Technical Document and Records Management Procedure

[5] 240-86973501, Engineering Drawing Standard

[6] National Environmental Management Act, 1998 (Act 107 of 1998)

[7] National Environmental Management Waste Act, 2008 (Act 59 of 2008)

[8] SANS 2001, Construction Works (All applicable parts)

[9] 32-727 - Eskom Safety, Health, Environment and Quality (SHEQ) Policy

[10] Occupational Health and Safety Act No. 85 of 1993, Asbestos regulations.

These documents are indispensable for the application of this document, i.e. documents to be used together with this document.

2.2.2 Informative

[11] 474-58 (Rev1): Document and Records Management

[12] SANS 10400 – The application of the National Building Regulations

[13] SANS 10162 – 1: The Structural Use of Steel Part 1: Limit State Design of Hot-rolled Steelwork

[14] SANS 10162 – 2: The Structural Use of Steel Part 2: Cold Formed Steel Structures

[15] SANS 10160 – Part 1: Basis of Structural Design

[16] SANS 10160 – Part 2: Self-weight and Imposed Loads

[17] SANS 10100 - The structural use of concrete

[18] SANS 14713 - Protection against corrosion of iron and steel in structures

[19] 240-56364535 - Architectural Design and Green Building Compliance Manual

[20] 240-56364545 - Structural design and Engineering standard

[21] 240-53113685 - Design Review Procedure

[22] 240-76992014 - Project/Plant Specific Technical Documents and Records Management Work Instruction

[23] 240-106365693 - Standard for the External Corrosion Protection of Plant, Equipment and Associated Piping with Coatings

[24] 240-83539994 - Standard for Non-Destructive Testing (NDT) on Eskom Plant

[25] 240-106628253 - Standard for Welding Requirements on Eskom Plant

2.3 DEFINITIONS

2.3.1 Disclosure Classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 ABBREVIATIONS

Abbreviation	Description
BU	Business Unit
CoC	Certificate of Compliance
EMD	Electrical Maintenance Department
ERI	Eskom Rotek Industries
IR	Industrial Relations
ISO	International Organisation of Standards

Abbreviation	Description
ITP	Inspection and Test Plan
NDE	Non-Destructive Examination
NDT	Non-Destructive Testing
OPS	Operation Support
SANS	South African National Standards
SHEQ	Safety, Health, Environmental & Quality
SE	System Engineer
PM	Project Manager
PPE	Personal Protective Equipment
PQR	Procedure Qualification Record
PSR	Plant Safety Regulations
QA	Quality Assurance
QC	Quality Control
QCP	Quality Control Plan
TDS	Technical Data Sheet
TGS	Turbo-Generation Services
WPS	Welding Procedure Specifications
WTP	Water Treatment Plant

2.5 ROLES AND RESPONSIBILITIES

Project manager/ Maintenance Supervisor

To ensure that the Contractor execute all the work specified in the scope of work on the set timelines and ensure that:

- All workers have appropriate PPE
- All workers are familiar with the risk assessment, safety precautions and hazards
- The work is carried out by appropriately by competent person(s)
- Ensure that all documents are accurately completed and signed before returning the documents like service instruction and information documentation to Work Management Department for capturing and filing.

System Engineer (SE)

- As custodian of the Maintenance Basis, they must ensure all actions required in terms of the reliability base and any other reliability matters are implemented on their systems
- The SE will review all works, which is being executed, and ensure that quality assurance is adhered to.
- Must inspect the system after the contractor has completed the tasks, following the approved quality control plan.

Appointed Contractor

- All contractors shall work within the parameter of the job description and scope of work. To keep all instructions/ procedures on hand and supply Eskom power station with reference to be included in this document and supply record and history requirements.
- Contractors must also ensure that the work is performed to the highest standard and safety standards and regulations.
- The Contractor is responsible for executing the works as detailed in this document. The Contractor takes all necessary precautions that may be required to safeguard existing infrastructure and services including protection of all surface works. These additional works are formally documented in method statements for the Employer's review and acceptance.
- The Contractor takes note that review and acceptance of any document/ drawing/ design calculations by the Project Manager in no way relieves the Contractor of his liability for the works. The Contractor remains liable for all works conducted as per this document.
- The Contractor is liable and fully accountable for the works and the constructability thereof.
- The Contractor interacts with others through the Project Manager, to ensure seamless integration of the various works.
- Execute the scope of work as per the employer's specification.
- Must ensure quality assurance is done as per QM 58 and adhered to SHEQ Policy.

2.6 REQUIRED CRITERIA FOR CONSULTANT

Not Applicable

2.7 RELATED/SUPPORTING DOCUMENTS

Not Applicable

3. SCOPE OF WORKS

3.1 DESCRIPTION OF THE *WORKS*

The Contractor is responsible for executing the design and construction of the required shade net parking covers as detailed in this document. The Contractor takes all necessary precautions that may be required to safeguard existing infrastructure and services including protection of all surface works. These additional works are formally documented in method statements for the Employer's review and acceptance.

The Contractor takes note that review and acceptance of any document/ drawing/ design calculations by the Project Manager in no way relieves the Contractor of his liability for the works. The Contractor remains liable for all works conducted as per this document.

The Contractor is liable and fully accountable for the works and the constructability thereof.

The Contractor interacts with others through the Project Manager, to ensure seamless integration of the various works.

Only trained personnel are allowed to perform works of all infrastructure.

Records of training are maintained by the Contractor's Quality Control Department

3.2 EMPLOYER'S DESIGN REQUIREMENTS

The appointed contractor is responsible to conduct and submit the design for the shade net parking covers.

The contractor to cover the following requirement for the Design unless stated otherwise by the client:

- Consolidated detailed design report signed by a Professional Civil Engineer which includes:
  - Survey drawings, design criteria/parameters, specifications and standards that were used, loadings, assumptions, calculations and results including detailed design calculations, design models, sources of information and any record of other information associated with the completed works. All calculation files and analysis/design models are also submitted in native electronic format together with the design report
  - The Contractor submits all design reports prior to fabrication for acceptance by the Project Manager. The Contractor does not commence with fabrication of the components covered in the design report without the acceptance of the Project Manager. The Contractor submits the design reports timeously to allow for the review period by the Project Manager and to subsequently allow for comments from the review to be addressed without resulting in delays in delivering the works. Acceptance of design reports by Employer does not transfer liability from the Contractor to the Employer with regard to accountability for the correctness, completeness, compliance to codes and accuracy of the design. The Contractor remains fully liable for the design
  - Design criteria statement and general information:
    - Design philosophy, including a narrative that explains the design approach,
    - List of applicable codes and literature that was used in the design,
    - List of assumptions made with regard to the design (verified and unverified),
    - Mitigations for unverified assumptions are included,
  - The following checks must be in the design report:
    - Stability and soil verifications,
    - Soil bearing capacity,
    - Overturning safety,
    - Check against swaying and provide bracing if applicable
  - Shade netting specification shall be in line with Eskom identity colours to match existing shade net in the Station.
- Detailed drawings for construction. Drawings are also submitted in CAD formats (.dwg/.dgn). All submitted drawings to be signed by a Professional Civil Engineer with ECSA registration number stated on drawing.
- Bill of Quantities for the *works*

3.2.1 Professional Engineering Certification

The *Consultant's* professional structural engineer who is registered with the Engineering Council of South Africa provides design certification in accordance with SANS 10400-A, declaring the design "fit for purpose" in terms of the relevant design codes and the OHS Act.

The *Consultant* is appointed for both design and construction monitoring, the *Consultant* is required to provide a 2-part certification:

- The first certificate is issued after the completion of the design (as above),

- The second certificate is issued upon completion of the construction in accordance with SANS 10400-A, declaring that the construction was carried out in accordance with the approved design and the OHS Act.

The Contractor is mandated in terms of Construction Regulations 2014: Duties of Designer, 6(1) a - j and 6(2) a – d, to fulfil the duties described therein for the detailed and temporary works designs done by the Contractor. The Contractor is responsible for construction monitoring at the level required to certify that the works have been constructed in accordance with the Contractor's design

4. CONSTRUCTION

The *Contractor* is responsible for the construction of the *works*, including all temporary works if applicable and design thereof, and all associated services in accordance with the technical specifications.

The *Contractor* disposes of all waste at a licenced waste disposal site to be accepted by the *Project Manager*. The waste disposal site is selected to suit the classification of the materials to be disposed of. Certificates of disposal are required to be submitted to the *Employer*.

The contractor shall construct the parking shelters in accordance with the approved and accepted design as well as construction drawings.

4.1 EXCAVATION

Excavations are performed such that it imposes a minimum restriction on access to Site for Others. Excavation permits are only issued if the area has been scanned by the Contractor, to ensure that there are no underground services in the area to be excavated. Refer to 32-727, Eskom Safety, Health, Environment and Quality (SHEQ) Policy.

Existing paving blocks shall be removed and rehabilitated are foundations for supporting columns have be constructed.

4.2 CONCRETE WORKS

- Materials
  - Cementitious binders are common cements that comply with SANS 50197-1
  - Water complies with the requirements of SANS 51008
  - The coarse aggregate has a nominal size of 19mm.
  - The nominal maximum size of coarse aggregate does not exceed one-quarter of the minimum thickness of the concrete cross section.
- The grade of concrete is as follows:
  - The minimum concrete grade for structural concrete is 35/19MPa.
  - The minimum grade of blinding is 15/19MPa.
  - The minimum grade of mass concrete is 15/19MPa.
- Concrete may not be placed before the *Supervisor* has given permission in writing. A minimum written notice period of 24 hours prior to pouring is required for each part of the structure.
- If ready mixed is used the *Contractor* receives from the ready-mixed concrete Supplier, a certificate with the following information:

- The nature and source of each constituent material.
- The proposed quantity of each constituent material per m3 of supply compacted concrete.

4.3 STRUCTURAL STEEL WORK

All steel materials supplied and erection of the steelwork complies with the requirements of the latest issue of SANS 2001 – CS1.

The *Contractor* complies with the requirements in the Standard for the External Corrosion Protection of Plant, Equipment and Associated Piping with Coatings (240-106365693) for the corrosion protection of the structural steel frame of the carports.

4.3.1 Welding requirements

All welding activities are in accordance with the OHS Act, and 240-106628253 “Standard for Welding Requirements on Eskom Plant”. Where requirements of a referenced code or standard differ from the Eskom Welding Requirements, the more stringent or restrictive requirements are applied.

Any request for deviation from specified requirements are submitted in writing and include the proposed deviation, rationale for the deviation, any technical data supporting the deviation, and historical experience supporting the deviation.

Combining or mixing of different codes is not permitted.

Welding procedures are prepared and qualified in accordance with the referenced code. Unless otherwise specified, the *Contractor* is responsible for conducting the tests required by the referenced code to qualify the Welding Procedure Qualification Record (PQR).

Welding Procedure Specifications (WPS) and supporting PQRs are submitted for review and acceptance by the *Project Manager* prior to start of fabrication.

Welders and welding operators are qualified in accordance with the referenced code. The welder and welding operator qualification records are available at the shop facility or on Site and are made available for review when requested.

The *Contractor* is responsible for the qualification of welders or welding operators. Welder or welding operator performance qualification testing is performed under the full supervision and control of the *Contractor*.

All companies performing welding related activities on Eskom plant have accreditation to ISO 3834 as follows:

Table 1: ISO 3834 accreditation

Equipment Group	Minimum Quality Level	Type
Eskom Level 1 Plant	IS0 3834 Part 2	Comprehensive
Eskom Level 2 Plant	IS0 3834 Part 3	Standard
Eskom Level 3 Plant	IS0 3834 Part 4	Elementary

NDE on welds are performed according to the requirements of the relevant design and construction codes, applicable (additional) engineering or product specifications and the Eskom “Standard for Non-Destructive Testing on Eskom Plant” (240-83539994).

All NDE is performed in accordance with the methods specified in the referenced code and any supplemental NDE specified within the other Welding Technical Supplemental Specification sections.

NDE is performed in accordance with written procedures that are prepared in accordance with the referenced code and as specified herein. NDE procedures are submitted for acceptance by the *Project Manager* prior to their use.

100 percent of all welds receive a visual examination. Visual weld examination acceptance criteria and other NDE acceptance criteria are in accordance with applicable referenced codes and design documents. The *Contractor* records these examinations.

The NDE results are provided in a NDE Report that is evaluated, interpreted, and approved by a Level II or Level III NDE personnel.

5. SAFETY REQUIREMENTS

- Contractor Safety File must be pre-approved by Duvha Safety Department.
- Contractor employees must complete Duvha Safety Induction Course, before any work can be executed.
- Risk assessment and Pre-job brief shall be conducted by Contractor Supervisor with all his employees. Copies shall be handed over to the client.
- No work shall be performed without a Permit to Work.
- No work shall be performed without pre-arrangement with the project manager.
- All other spares, materials and safety equipment needed to do the work, shall be supplied by the Contractor.
- All required Personal protective equipment (PPE) must be worn all the time.
- All Eskom's and other safety rules must be adhered to all the time.

6. QUALITY REQUIREMENTS

No work shall commence before the approval of the QCP. The *Contractor* is expected to compile the QCP document and submit it to the *Employer* for review and approval. The *Contractor* is also expected to thoroughly go through the standard: 240-105658000 Supplier Quality Management Specification. Find the standard attached. The following shall be submitted to the Project Manager before work commence;

- Method statements and specifications adhered to;
- Material Certificates;
- Calibration Certificates;
- Calculations for any temporary works that may be required for the safe execution of the works;
- Steel grade certificates;

6.1 HANDOVER

Apart from any statutory data packages required, the Contractor also compiles a data package of the relevant drawings, test certificates etc. to the Project Manager for acceptance. These include, but are not limited to:

- Document List;
- Instruction for Work/ Purchase Order;
- Approved and signed off ITP's, QCP's;
- Certificate of Compliance
- Notifications;
- Modifications;
- Concessions;

- Technical Queries, Engineering Responses and communications with Project Manager/ Employer
- Non-conformance reports;
- As-built data and marked up drawings of the completed *works* upon handover.
- Concrete 7 day and 28 day cube test results;
- Slump test results;
- Concrete mix designs including all required test results e.g. aggregate test results;
- Pre-concrete and post concrete surveys
- Weld Map;
- Weld Matrix Sheet;
- Weld Sequence;
- Welding Consumables Certificates;
- NDT Reports/ Results;

7. AUTHORISATION

This document has been seen and accepted by:

Name & Surname	Designation
Nelly Hlophe	Auxiliary Engineering Manager

8. REVISIONS

Date	Rev.	Compiler	Remarks
January 2022	0	Chirwa V	Draft Document
March 2023	0.1	Chirwa V	Revised for additional areas in the scope of work
March 2023	1	Chirwa V	Final document for Authorisation