Eskom	URS	Nuclear Project Management

Title:	**Civil Services to develop and construct facilities for the RPVCH replacement project**	Document Identifier:	**NPM21/008**
		Alternative Reference Number:	**N/A**
		Area of Applicability:	**U**
		Documentation Type:	**TS**
		Revision:	**0**
		Total Pages:	**25**
		Next Review Date:	**N/A**
		Disclosure Classification:	**CONTROLLED DISCLOSURE**

Compiled by	Functional Responsibility	Authorised by
.....	.....	.....
X. Motlhale	**D. Stuurman**	**J. Kotze**
Project Manager	**Project Manager**	**Programme Manager**
Date: 2021-06-11	Date: 2021-06-11	Date: 2021-06-14

ADDITIONAL CLASSIFICATION INFORMATION

Business Level:	**3**
Working Document:	**1**
Importance Classification:	**N/A**
NNR Approval:	**No**
Safety Committee Approval:	**No**
ALARA Review:	**No**
Functional Control Area:	**Reactor Pressure Vessel Closure Head, Nuclear Project Management**

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

CONTENTS

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

TABLES

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

1. INTRODUCTION

Koeberg Nuclear Power Station (KNPS) will be replacing the Unit 2 Reactor Pressure Vessel Closure Head (RPVCH) with Control Rod Drive Mechanisms (CRDMs) and In-core Instrumentation System (RIC) connection cables in outage 225. The RPVCH with CRDMs and RIC connection cables project itself is divided into 6 work packages. Work package 6 pertains to the RPVCH installation and commissioning, and in order to support the RPVCH replacement project, a number of facilities and infrastructure need to be developed and constructed.

The Low Level Waste (LLW) Storage complex (HQB) at Koeberg Nuclear Power Station (KNPS) is used for the interim storage of low and intermediate level waste drums, prior to shipment and ultimate disposal at Vaalputs. The LLW building entrance for the RPVCH haulage is not high enough for the component and the selected self-propelled modular transporter (SPMT) to enter. Alteration to the entrance of the HQB is thus required. Additionally, the HQB complex has an area dedicated for the storage of Unit 1 old RPVH. However, the modification to the existing pre-cast concrete shield panels to have a coverage of up 5.5 meters in height is required. This is due to possible radiation exposure to personnel in the LLW building owing to the fact that the Unit 2 RPVCH with its CRDMs is taller than the existing shielding panels.

The project team intends to temporarily store the RPVCH at the Low Level Waste complex (HQB) before it can be shipped off to Vaalputs for final disposal. Two possible storage locations exists in this complex, namely, the LLW building and Bulk dry chemical storage facility. The project team will make a final decision in due time on the final storage location and communicate this to the *Contractor* during contract scope clarification meeting. As such the *Contractor* is required to note and price for work activities required at both the proposed storage locations. The scope of this contract is therefore divided into option 1 and option 2. Option 1 of the scope of work is the storage at the low level waste building. Option 2 of the scope is the storage at Bulk Dry Chemical Storage Facility. For option 1, the *works* are divided into four work packages as follows:

- Work package 01: Modification of LLW building (and or Dry Bulk Chemical Storage Facility)
- Work package 02: Modification of the existing shielding walls
- Work package 03: Rigging of the unit 1 RPVCH into position to allow sufficient space for unit 2 RPVCH with CRDMs in the designated storage area
- Work package 04: Geotechnical services / studies (If required)

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

- Work package 05: Seismic modelling and analysis of the LLW building complex

1.1 PROJECT PURPOSE

The project purpose is to specify all civil activities required for the RPVCH Project

1.2 SCOPE

The scope of this document shall cover the following civil activities:

- The permanent enlargement of the LLW main equipment entrance opening.
- Removal of the old door and Installation of a new door at the main entrance into the LLW building.
- Removal of the door supported by a rail anchored on the overhead reinforced concrete beam.
- Removal of the overhead reinforced concrete beam inside the LLW building.
- Installation of a removable structural steel beam in the place of the removed overhead reinforced concrete beam.
- Reinstatement of the door to the overhead structural steel beam.
- Modify existing panels to have coverage of up to a height of 5.5 meters.
- Construction of 8 x Reinforced Concrete Plinths at ACP-1 car parking for the storage of the new RPVCH.
- Land and underground survey of the ACP-1 car parking where concrete plinths will be installed.
- Construction of the temporally structure to house the new RPVCH with CRDMs.

1.3 Applicability

This document is applicable to all civil works for the RPVCH with CRDMs and RIC connection cables project at the Koeberg Operating Unit (KOU) and should only be used in that context.

1.4 Effective date

This URS shall be effective from date of authorisation.

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

2. REFERENCES

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

2.1 Normative

[1] 14/12/16/3/3/2/947/AM1: Environmental Authorisation in Terms of the National Environmental Management Act, 1998: GN R. 982/983/984/985: Construction of a Used Fuel Transient Interim Storage Facility at Koeberg Nuclear Power Station, Western Cape

[2] 32-418 Rev. 4 Working at Heights Standard

[3] 32-520 Rev. 3 Occupational Health and Safety Risk Assessment Procedure

[4] Construction Regulations – 2014

[5] Construction Regulations Act 18 of 2003 To be removed- Non existent

[6] ISO 9001 Quality Management Systems – Requirements

[7] KAA-578 Rev 6 Control of Welding, Grinding, Cutting And Hot Work Operations

[8] KAA-611 Rev. 9 Emergency Mustering, Accountability and Evacuation

[9] KGA-067 Rev. 7 SHE Risk Assessment Guide

[10] KGA-073 Rev. 6 SHE Specification Guideline

[11] KAA-866 Rev. 0 The Management of Incidents, Occupational Injuries and Diseases at Koeberg Nuclear Power Station

[12] National Building Regulation and Building Standards Act, Act No 103 of 1977

[13] 331-86: Design Changes to Plant, Plant Structures or Operating Parameters.

[14] Guide for Classification of Plant Components, Structures and Parts

[15] KAA-501: Project Management Process for the Koeberg Nuclear Power Station Modifications 331-134: Screening and Safety Evaluation Guide

[16] KAA-502: project management process for new building and civil projects and changes to existing building and civil projects at Koeberg nuclear power station

2.2 Informative

[17] SANS 1200 (SABS 1200) Series Standardized specification for civil engineering construction: Concrete (structural)

[18] SANS 10400: The application of the National building Regulations – All Parts

[19] OHS Act: Occupational Health and Safety Act No. 85 of 1993 and not as OHSA No 85/93

[20] SANS 10100: All Parts – The structural use of concrete

[21] SANS 2001 – Construction works (All Relevant Parts)

[22] KBA00A1C01001: Koeberg Site Data

[23] 0.46/4576 – Low Level Waste Building Elevation on Walls

[24] 4600062954E/C 01063 – VHR-INST - 4600062954 – Early Warning concerning the dimensions of the Low Level Waste Building door

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

[25] KBA 06 03 Y60 1000 – HQB (Low Level Waste) General Layout

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

3. DEFINITIONS AND ABBREVIATIONS

3.1 Definitions

Term	Description
Contractor	A person, company, or firm (or his sub-supplier or sub-Contractor) who holds a contract for carrying out the works and/or the supply of goods or services in connection with the project.
Employer	A legal entity that controls and directs a servant or worker under an express or implied contract of employment and pays (or is obligated to pay) him or her salary or wages in compensation
Engineer	The person, company, department or group which will conduct the quality control (QC) of the works.
Project Team	The RPVH project team, whom form the Employer and ultimate modification of the LLW Building, construction of the concrete slab/plinths and modification of LLW shielding wall

3.2 Abbreviations

Abbreviation	Description
ACP	Access Control Point
CRDMs	Control Rod Drive Mechanisms
CoC	Certificate of Conformance
FFD	Fitness For Duty
HQB	Storage complex
KNPS	Koeberg Nuclear Power Station
LLW	Low Level Waste
MSDS	Material Safety Data Sheets
OHS	Occupational Health and Safety
PPE	Personnel Protective Equipment
PQP	Project Quality Plan
QMS	Quality Management System
RPVH	Reactor Pressure Vessel Head
RPVCH	Reactor Pressure Vessel Closure Head
RP	Radiation Protection
SANS	South African National Standard
SHE	Safety Health and Environment
URS	User Requirement Specification
WP	Work Package

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

4. SPECIFIC REQUIREMENTS

4.1 Licensing Requirements

There are no licensing requirements associated with this scope of work.

The project management requirements specified in KAA-502: Project management process for new building and civil projects and changes to existing building and civil projects at Koeberg nuclear power station [16] are applicable for this project.

4.2 Environmental Impact

- No harmful material will be used in the material specified for the installation.
- No harmful material will be used during installation.
- Standard construction waste will be generated during the installation. Waste generated shall be managed in accordance with Radiation Protection requirements.

5. Environmental Conditions

5.1 Normal Environment:

Temperature : Ambient Conditions
Pressure : Ambient Conditions
Humidity : Ambient Conditions
Radiation : Ambient Conditions around the LLW building
Corrosion : Marine environment, aggressive corrosion

5.2 Accident Environment

Temperature : Ambient Conditions
Pressure : Ambient Conditions
Humidity : Ambient Conditions
Radiation : >10 000 µSv/h (basis is that this is the lower limit of a red zone)

5.3 Nuclear Safety

- The works required on the LLW building are classified as minor works and as such is expected that the structural integrity of the building will not be negatively affected which in turn may result in radioactive releases to the external environment.
- A visual assessment was performed as well as a study of the structural drawings to ensure that no structural members are negatively affected by the implementation of these works.

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

5.4 Conventional Safety

Normal Construction Regulations shall govern the construction works during implementation of this project to ensure Occupational Health and Safety (OHS) standards are adhered to.

5.5 Impact on Original Design Bases

The main equipment entrance door shall be enlarged to meet the dimensional requirements of the RPVCH replacement project. In addition, the overhead beam adjacent to this entrance shall be removed to make way for the haulage of the RPVCH. However, the structural integrity of the building will not be negatively impacted by these changes.

5.6 Risk Assessment

A risk assessment is to be completed by the appointed Safety Health and Environment (SHE) agent prior to the commencement of construction. However, the following risks on the project should be noted:

- Construction methodology, inspection and test plans as well as general safety plans are to be approved prior to any construction work commencing
- The contractor to remain responsible for all temporary works, bracing of structural steel, etc. It is also required for the erection of the structural steel works and any operations required for the construction.

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

6. DESCRIPTION OF THE WORKS (Work Package 1 - 5)

6.1 WORK PACKAGE 01: Modification of the LLW Building (and or Bulk Dry Chemical Storage Facility at the LLW Complex)

6.2 Option 1: Storage of RPVCH at the Low Level Waste Building

In order to store the RPVCH in this area the following work activities are required to be executed by the *Contractor*:

(Refer to Appendix A & B below for graphical representation**):**

6.2.1 Removal of the existing door at gridline DI (Roller shutter door).

6.2.2 Permanent increment of the height of the door opening at gridline DI from 5m to 6m

6.2.3 Permanent removal of the overhead reinforced concrete beam (500mm x 5000mm) at gridline EI and replacing with a removable structural steel beam (PFC 300×100).

6.2.4 Removal of existing door at gridline EI (Metal Sliding door).

6.2.5 Coating of the newly repaired concrete area by hydrophobic coating or equivalent (coating must be on applied on both sides of the wall and extend 1 m beyond the repaired area).

6.2.6 Coating of the structural steel beam and associated anchorage.

6.2.7 Installation of a new door at gridline DI.

6.2.8 Reinstatement of the door at gridline EI.

6.3 Option 2: Storage at Bulk Dry Chemical Storage Facility

In order to store the RPVCH in this area the following work activities are required to be executed by the Contractor: The Contractor should note that the scope and the drawings described and or referenced in this section are based on concept drawings and a detail design as well as drawings" issued for construction" are still to be supplied by the Employer in due time. The Contractor:

6.3.1 Removes the fibre (to be confirmed by the Employer if it is Asbestos) roof sheeting and associated fixtures from the building.

6.3.2 Raises of the existing reinforced concrete wall from 5140mm to 6640mm (a total height increase of 1500mm) in accordance with concept drawing (Bulk dry chemical storage) in appendix C.

6.3.3 Constructs and installs 43 precast concrete corbels in accordance with concept drawing (Bulk dry chemical storage) in appendix C. The corbels shall be 600mm deep x 600 mm wide x 600 mm long. The corbels shall be used to support the precast concrete roof panels.

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

6.3.4 Constructs and installs 40 precast concrete roof panels in accordance with concept drawing (Bulk dry chemical storage) in appendix C The panels shall be 1500mm wide and 6000 mm long and 500 mm thick. The concrete panels shall be furnished with an additional 150 mm concrete screed.

6.3.5 After curing of the concrete screed the roof shall be furnished, by the Contractor, with a UV resistant waterproofing.

6.3.6 In addition to the roof precast panels, the Contractor shall construct 4 x 1500 mm wide x 4770 mm high precast concrete shield panels that will serve as shielding partitions to the balance of the structure. Refer to concept drawing for Shielding Barriers in Appendix D for layout details and specifications.

6.3.7 All the concrete works shall have 35 MPa strength.

6.4 WORK PACKAGE 02: Modification of the existing Pre - Cast Concrete Shield Panels

6.4.1 The Contractor is required to modify the existing shield panels such that their current height is increased to a minimum of 5.5m and maximum of 6m.

6.4.2 The upright shield panels shall have the following dimensions: 500mm (Width) ×5100mm (Height) ×300mm (Thickness). The Contractor shall evaluate if the proposed works is achievable and may suggest alternative methods to achieve the same objective.

6.4.3 The Contractor shall perform onsite measurements of the existing shield panels to confirm current dimensions.

6.4.4 The design work shall be done under the supervision of a competent person recognised by the Engineering Council of South Africa.

6.4.5 All the drawings emanating from the design shall be signed by a professional person recognised by the Engineering Council of South Africa.

6.4.6 A minimum specified concrete strength of 30MPa is required.

6.4.7 The Contractor shall submit his design to the client for review and acceptance. An allowance of two weeks shall be made for the client review process.

6.4.8 The construction of the shield panels shall be done in accordance with the drawings specification and all other SANS 2001 construction standards.

6.4.9 The Contractor shall submit method statements, quality control plans and risk assessment for all construction activities involved in his works.

6.5 WORK PACKAGE 03: Rigging of the unit 1 RPVCH into position to allow sufficient space for unit 2 RPVCH in the designated storage area in LLW building

The Contractor shall provide a rigging supervision as well as rigging plan as per KSA-132 that will be accepted by the Employer. The Contractor shall perform the following activities for the relocation of the Unit 1 RPVCH inside the bund wall in the LLW building:

6.5.1 setup a 500 ton Hydraulic Gantry system

6.5.2 perform installation of Hydraulic Gantry system before load test

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

6.5.3 perform Load test

6.5.4 remove the RPVCH Shielding walls

6.5.5 remove Seismic constraints

6.5.6 lay the gantry rails

6.5.7 perform lifting of RPVCH

6.5.8 to relocate the RPVCH inside the shielding walls

6.5.9 to perform demobilization

6.5.10 Remove gantry rails

6.5.11 Reinstate Seismic constraints

6.5.12 Reinstate shielding walls

Note: Employer's rigging team shall perform an oversight of all rigging activities. The Contractor notifies the Employer's Representative two days before rigging will be performed.

6.6 WORK PACKAGE 04: Geotechnical services / studies

6.6.1 The Contractor shall perform survey on the area close to the dry chemical stores so to see if the crane will be able to stand when it lowers the unit 2 RPVCH into the Dry chemical stores.

6.7 WORK PACKAGE 05: Seismic modelling and analysis of LLW building complex

6.7.1 The Contractor is required to perform a structural modelling of the LLW building complex in order to qualify it into a seismic class building.

6.7.2 The Contractor is to collect input information, build a model, analyse and produce results to the client.

6.7.3 Furthermore, the Contractor shall recommend suitable strengthening solutions for members that are overstressed when exposed to the seismic action.

6.7.4 The building is to be subjected to an earthquake with a magnitude of 0.5 g.

6.7.5 A finite element modelling shall be built to assess the global and local structural behaviour of the entire building complex as well as individual structural elements.

6.7.6 The modelling shall also take into account the proposed changes on the LLW building of permanently increasing the height main entrance door and replacement of the overhead concrete beam with removable steel beam.

6.7.7 A full analysis report containing all input data, assumptions, load cases, modelling philosophy, codes and standards, verification and validation, analysis, results and recommendations shall be submitted to the Employer following a 501 modification process.

6.7.8 The modelling file shall also be submitted to the Employer for future use.

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

Note: The Contractor should note that a similar structural model was developed for the Cask Storage Project (CSB). However, the contract has since lapsed and the scope of the modelling did not take into account the proposed changes on the LLW building.

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

7. CONSTRUCTION

7.1 Quality Requirements

7.1.1 The works shall be performed in accordance with the Contractor's Quality Management System (QMS), which is to be reviewed and approved by the Employer before the commencement of the works.

7.1.2 The Contractor shall provide the Employer with a Project Quality Plan (PQP) which is to be reviewed and approved by the Employer before commencement of the works.

7.2 Classification Summary of the Construction Works

The proposed classification of the structure and the ancillaries are:

Specification required: YES (Construction Drawings will be provided)

Quality Level: Q1

RD-0034 Safety Level: L3

Note: All designs and design alterations shall be signed off by an ECSA registered Professional Engineer.

7.3 Interfaces with Existing Plant

No interfaces. However, the Contractors modifications is not allowed to affect the existing infrastructure.

7.4 Environmental Considerations during construction

The expected waste during construction and the management of the waste is summarized in table 1 below:

Table 1: Waste Management during Construction

Waste Type	Measure to reduce the amount of waste	Type of Storage	Responsible Party
Imported fill (if required)	The quantities of the material shall be carefully calculated to minimise waste	Left over material shall be returned to the supplier	Contractor
Concrete	The quantities of the material shall be carefully calculated to minimise waste	None. Ready mix concrete shall be used.	Contractor
Reinforcement Steel	The quantities of the material shall be carefully calculated to minimise waste	Recycling of all waste shall be pursued	Contractor
Other materials	The quantities of the material shall be carefully calculated to minimise waste	Reuse of all left over material	Contractor

CONTROLLED DISCLOSURE
When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.
No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

8. QUALITY ASSURANCE

In all cases, the applicable SANS standards shall be adhered to. Where any discrepancies exist between the design or works information and relevant SANS standards is noted, the SANS standard shall govern. The Contractor shall inform the Project Team immediately when discrepancies are observed.

8.1 Quality Control Requirements

8.1.1 The Contractor shall develop a (Quality Control Plan) QCP for all activities to be performed on-site.

8.1.2 The QCP shall reference all applicable quality management documentation that the Contractor might have, and relevant codes and standards where test activities are performed.

8.1.3 All material on site shall have a certificate of conformance (CoC) from the supplier.

8.1.4 The Employer shall review, add intervention points and accept the QCP prior to any activities being performed on-site.

8.1.5 Intervention points shall include but shall not be limited to Hold Points, Witness Points and Review Points. Different terminology may be used by the Contractor in accordance with his QMS.

8.1.6 The Contractor shall allow the Employer to perform quality oversight as per the accepted QCP's.

8.1.7 The Contractor shall provide the Employer with a detailed program with weekly updates of progress reports.

9. INSTALLATION

The installation of this works shall strictly be done in accordance with applicable specifications such as design drawings and associated notes, project specifications and all other relevant SANS standards. When further uncertainties exist, the Contractor shall inform the Employer timeously, i.e. during the planning phase, to avoid any delays and compensation events.

9.1 Civil and Structural requirements:

Modification, performed by the *Contractor*, of the LLW building main Equipment entrance door shall meet the following requirements:

9.1.1 The building entrance shall be enlarged to have a minimum opening of 6000mm in height and a width of 5000mm (same as existing).

9.1.2 The overhead reinforced concrete beam parallel to the main entrance shall be removed and replaced with a removable structural steel beam (PFC 300×100) in order to assist with future removals of the RPVH.

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

9.1.3 The *Contractor* shall perform rebar scanning of the areas where the steel beam will be anchored to the existing concrete columns. Chemical anchors or equivalent shall be used for anchorage.

9.1.4 Where the anchorage into the columns is identified to interfere with the existing column rebar's via rebar scanning, ***Employer's*** Engineer shall be notified immediately for remedial actions. The *Contractor* is also afforded an opportunity to present an alternative solution.

9.1.5 The overhead crane shall not operate during the period where the overhead reinforced beam is removed. The operations of the overhead crane shall resume after installation of the removable structural steel beam

9.1.6 Corrosion resistant repair mortar shall be used reinstate the concrete cover in affected areas. The minimum required cube strength of the repair mortar shall be 35MPa.

9.1.7 During implementation of the *works*, the *Contractor* shall ensure that no damage is inflicted on the areas surrounding the affected areas.

9.1.8 After curing of the repair mortar a hydrophobic coating or equivalent (coating must be on shall be applied on both sides of the wall and extend 1m beyond the repaired area).

9.1.9 The *Contractor* to submit detailed method statements, quality control plans and risk assessments for all the work activities to the client prior to implementation of the *works* for review and acceptance.

9.1.10 All *works* including temporary *works* shall be the responsibility of the *Contractor*.

9.1.11 The *Contractor* is to verify all the dimensional requirements stated in this section during site walk downs and contract clarification meetings prior to commencement of any *works*.

9.2 Concrete Works

9.2.1 **Works required on Gridline** DI

The works required on Gridline DI, i.e. the main entrance/ opening in the structure are described below, and will be performed by the Contractor and inspected by Employer's Agent accordingly. The Contractor:

- Marks out the affected area that requires breaking out of the concrete as indicated in figure 1 below. The area to be broken out is approximately 1m (Height) ×5 m (Width) ×0.5 m (Thickness) reinforced concrete.
- Removes the existing roller door and break out the concrete.

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

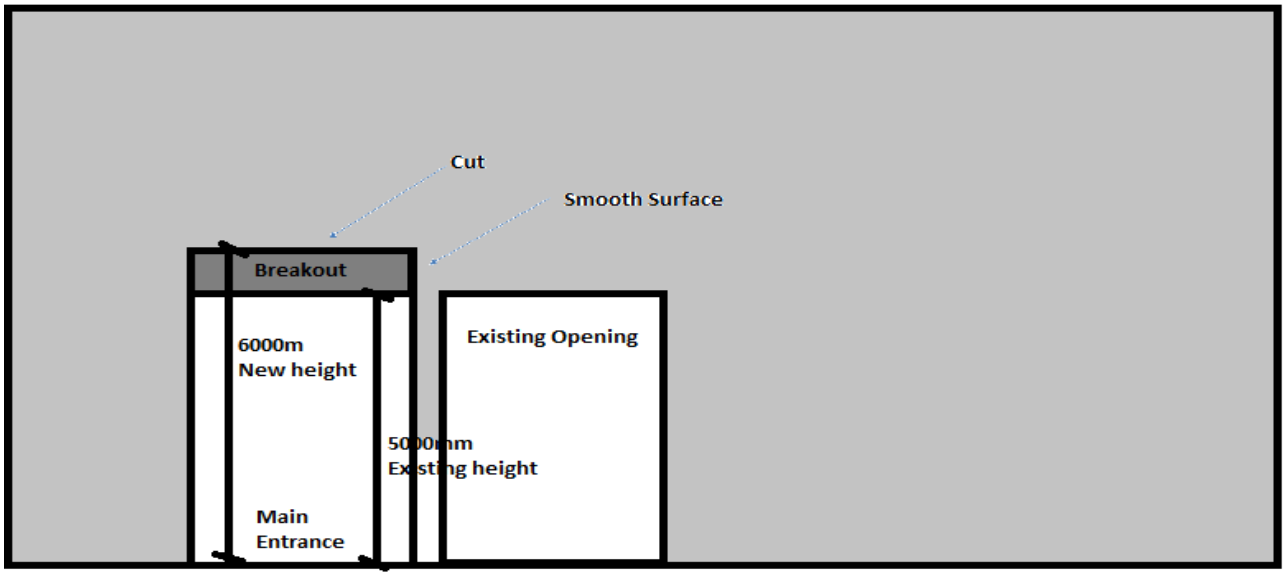


Figure 1: Marking out of the LLW Building Outer Wall (Gridline DI)

- Takes caution and ensure that no damage is inflicted on the immediate surrounding areas during execution of the works.
- The anticipated concrete strength of the affected area is 35 MPa which may have since increased over the years after commissioning of the building.
- After breaking out of concrete and cutting of insitu rebar in the affected area, the area is prepared, by the Contractor, for reinstatement of the concrete cover using an approved repair mortar. The concrete cover to be used is 50 mm.
- Provides the finishing similar as existing.
- After curing of the repair mortar the newly repaired area coats the area with corrosion resistant coating on the both the internal and external surface of the affected area.
- Executes concrete works in accordance with relevant SANS 2100 standards and manufacturers specifications.
- Submits all proposed products, to be used in the works, to the Employer's Agent for review and acceptance before commencement of any works can take place.
- Submit detailed method statements, Quality Control Plans and Risk Assessments for all the work activities to the Employer's Agent prior to implementation of the works for review and acceptance.
- All installation works shall be the responsibility of the Contractor.

9.2.2 Works required on Gridline EI

The Contractor:

- Removes door rail and associates anchored on overhead beam in gridline EI.

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

- Breaks/Cuts out the overhead reinforced concrete beam on gridline EI as indicated in figure 2 above.
- Cuts through the entire section of the beam and remove the entire beam safely.
- The Contractor shall take caution and ensure that no damage is inflicted on the immediate surrounding areas during execution of the works.
- Marks out and prepare the area where the new overhead removable steel beam is to be installed in accordance with requirements in drawing KBA 0003Y001000 Doc No: 136463– Overhead Beam (Low Level Waste Building) seen in Appendix 4.1.
- Sets out the coordinates and levels of bolts before installation.
- Installs removable overhead steel beam in accordance with drawing specification KBA0003Y001000 Doc No: 136463-Overhead beam (Low Level Waste Building) seen in Appendix 4.1.
- All structural steel, provided by the Contractor, shall be Grade S 355 JR.
- All steel works, performed by the Contractor, shall be coated in accordance with 331-170: Requirements for protective coatings for use at Koeberg Power Station.
- All the steel works to be done in accordance with SANS 2001-CS1 Structural Steelwork.
- Submits detailed method statements, quality control plans and risk assessments for all the work activities to the client prior to implementation of the works, to the Employer's Agent, for review and acceptance.
- All installation works shall be the responsibility of the Contractor.
- The Contractor is allowed to present an alternative solution to the proposed works for consideration and approval by the Employer.

10. VERIFICATION AND TESTS

The following verifications and test are to be performed by the *Contractor*: Verification and tests applies to both the options stated above.

- The *Contractor* shall measure the clear distance between the supports before and after removal of the beam and confirm opening of 5 m is still achieved.
- The *Contractor* shall inspect the affected areas prior to commencement of the *works* for cracks and notify the *Employer*. The *Contractor* shall ensure that the affected areas and surrounding are free of cracks after completion of the *works*.

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

- Installations shall be inspected and tested in accordance with the project specifications, reference documentation, detailed drawings and the manufacturer's specifications, instructions and recommendations.
- Verify concrete placing and test records including:
    - slump tests verification against concrete mix designs
    - concrete cube tests records to verify compressive strength of hardened concrete
- Verify that the curing of concrete (in accordance with approved curing method statement), is done immediately after the concrete is placed.
- Verify that all concrete defects are repaired subsequent to the removal of formwork.
- The Site supervisory authority is to provide an occupation certificate after all *works*, verifications and testing has been completed and approved.

11. GENERAL REQUIREMENTS

11.1 Safety, Health and Environmental Requirements

- The Contractor shall at all times adhere to the site safety requirements and all national legislation including the OHS Act [19].
- The Contractor shall conduct safety risk assessment for all the proposed activities on site and document all mitigation measures that will be implemented.
- The Contractor is to appoint all relevant safety personnel as required by the Construction Regulations.
- The information above shall be in a form of a safety file which shall be submitted to the Employer for acceptance prior to commencement of work.
- All personnel working on site are expected to have the correct Personnel Protective Equipment (PPE). Suitable protective equipment shall be worn at all times to prevent the spread of Covid-19. The Contractor is responsible to supply all his staff with the required safety equipment prior to the start of the works.
- The Contractor shall ensure provision is made for the collection of waste generated from the site by use of a skip that shall be monitored and emptied in an approved waste dump.
- The contractor shall be responsible for maintaining a clean and tidy construction site, ensuring that the site is kept clean on a daily basis.
- Proper construction sign boards shall be displayed at the site at all times.
- The site shall be barricaded at all times.

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

- As there will be drilling and cutting operations at the site a hot work permit shall be required. This permit will be provided by the Employer and the Contractor must request this 24 hours before any work requiring a hot work permit may commence. Also note, a hot work permit is only valid for three days.
- All chemicals used on site shall be CRACK approved and accompanied with the necessary Material Safety Data Sheets (MSDS).

11.2 Risk Management Requirements

- As part of risk management, the Contractor is expected to visit site to verify all information supplied in documents prior to tender.
- The Contractor must familiarise himself with the Employer processes especially the KAA-502 process.

11.3 Statutory/Legal Requirements

- All personnel on site shall be subjected to police clearance which might take time to be approved. It is expected that the Contractor shall manage this process ensure that personnel used for the works have the necessary police clearance and prevent avoidable delays.
- All personnel shall be subjected to a site access training (or fitness for duty (FFD) training) followed by a written exam in English. The Contractor is advised to use appropriately skilled personnel taking account of these requirements.

11.4 Site and Logistics Requirements

- The KNPS is a nuclear site and as such has certain specific access requirements. The Contractor is expected to familiarise himself with the necessary restrictions.
- The Client's representative will accompany the Contractor on the initial site visit and on successful placement of the contract. The Client's representative will arrange access. After completion of the generic training as stipulated, the Contractor will be issued with a personal Identification Access Card. All the relevant information to complete the security access application form must be submitted timeously for approval.
- All vehicles accessing site will be subjected to security inspection which takes some time to complete. The Contractor needs to factor this in their work schedule.
- All vehicles entering the KNPS site shall have all the necessary safety features (e.g. safety belts, proper registration/be registered to be on the road etc.). No personnel may be transported in the back of heavy or light duty industrial vehicles.

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

11.5 Documentation Requirements

The Contractor shall provide the following documentation:

- Marked-up drawings which can be captured as 'As-Built Drawings'
- The Contractor shall use the 'Issued for construction' pack drawings and mark-up the As-Built conditions.
- The mark-up shall be conducted on a copy of the original document in a neat and legible manner with colour indicating; Red – Add Detail, Blue – Remove Detail and Green – Representing Comments.
- All drawings shall be provided to the Employer in Native (.dxf or .dwg format) and pdf form.
- The Contractor shall update all existing Employer drawings and generate the required drawings as appropriate.
- Technical (design review comments) shall be captured using the DCRF format.
- All drawings, data and technical documents supplied to the Employer by the Contractor or any supplier shall be in the English language with SI System of measurements. The drawings, data and technical documents shall be submitted in accordance with requirements stated in this specification.
- All detailed design drawings, assembly- drawings and as-built drawings shall be supplied in accordance with 331-86 [13].
- Hard copies of documents submitted for review and approval shall be in the form of sets of clear, legible, full-size paper copies of reproducible quality. Hard copies of final submittal of Contractor's documentation shall be in the form of a clear, legible, full-size paper (A0) copy of reproducible quality suitable for microfilming.
- Electronic media shall be in a format fully compatible with the following software (latest version in use by the Employer at the time of delivery):

Processing:	Microsoft Word
Database:	Microsoft Access
Spreadsheets:	Microsoft Excel
Photogrammetry 3D drawings:	Electronic files compatible with Microstation
Digital photographs:	JPEG format
Drawings:	DWG/DXF/DGN format

- Electronic copies of documents for review and approval shall be provided in searchable pdf format on a USB-drive apart from and in addition to the hard copies.

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

- All drawings including graphs and figures larger than A4 submitted for Employer's review and approval shall be in the form of hard copies and electronic media (Adobe Acrobat format, PDF) Final hard copies of drawings shall be submitted.
- All drawings to be created using CAD software such as Bentley Micro Station (preferred CAD software).

12. Employer Scope of Supply

Employer shall supply the following in support of the work scope:

- Security access permits where required.
- Fitness for duty (FFD) training
- Supply point for potable water connection on site
- Supply point for Electricity on site.
- Provide a connection point for the installation/ connection of construction site ablution facilities.
- Provide to the Contractor all completed and partially completed designs for this scope of works.

13. Shift Regime

Normal working hours:

Monday to Thursday: 07h35am until 16h35pm

Friday : 07h35am until 13:30pm

Non-working times:

10h00 – 10h15 am; 12h15 – 12h50pm excluding Fridays.

Note: All other hours are subject to Employers approval.

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

14. Project Team Concurrence

This document has been seen and accepted by:

Name	Designation
Tshetlwane Moila	Civil Engineer
Xoliswa Motlhale	Project Manager
Letitia Geldenhuys	Design Engineering
Ngoako Mashao	Radiation Protection
Namhla Mphupu	Facilities Manager
Claire Nel	OH&S
Cullen Moleejane	Transport

15. Revisions

Date	Rev.	Compiler	Remarks
June 2021	0	NPM	First Compilation

16. Development Team

N/A

17. Appendix

Appendix A: Plan View of the LLW complex (Gridline EI and DI)

Appendix B: Elevation view of the LLW building and affected areas

Appendix C: Bulk dry chemical storage

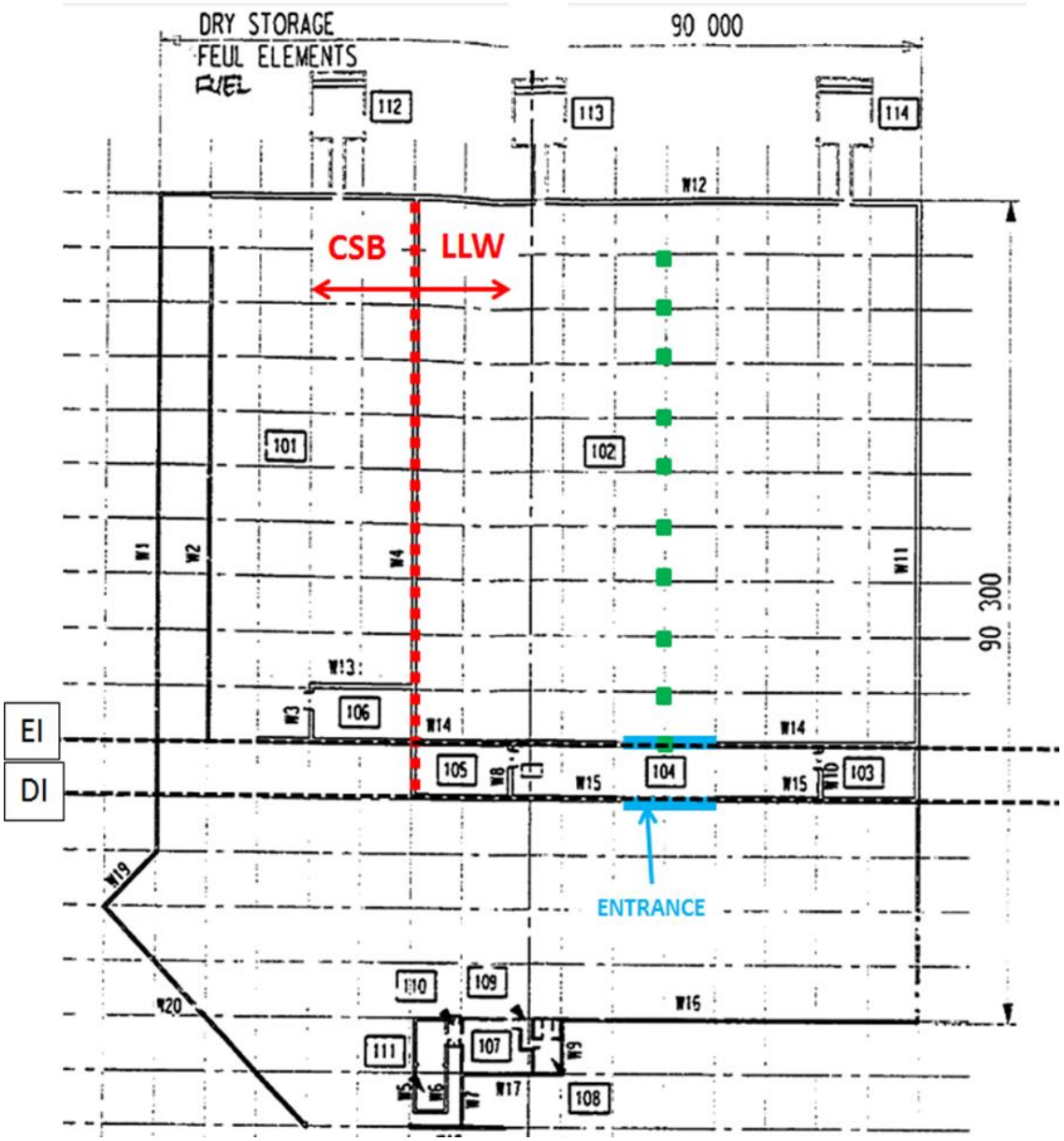
Appendix D: Shielding Barriers

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

APPENDIX A: Plan View of the LLW complex (Gridline EI and DI)

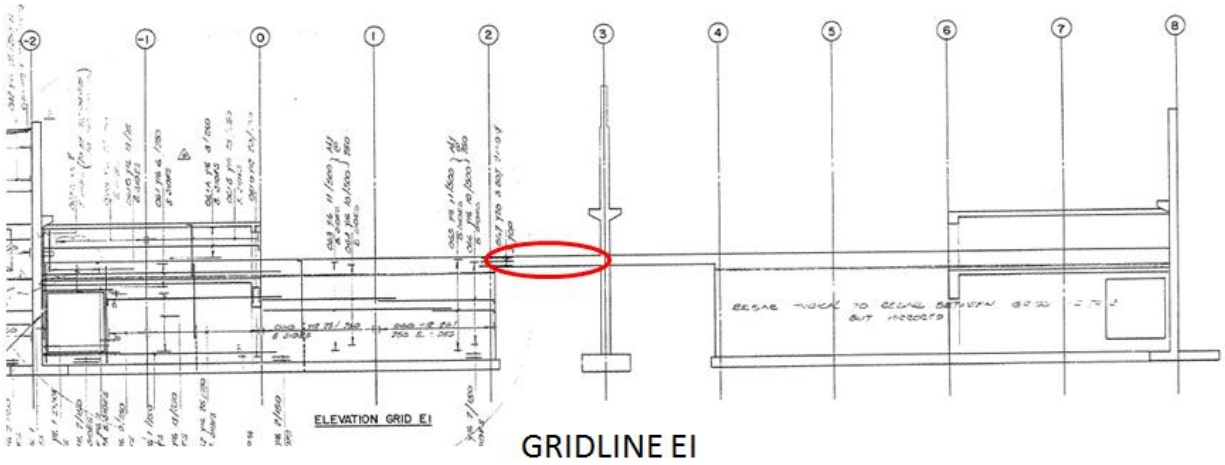


CONTROLLED DISCLOSURE

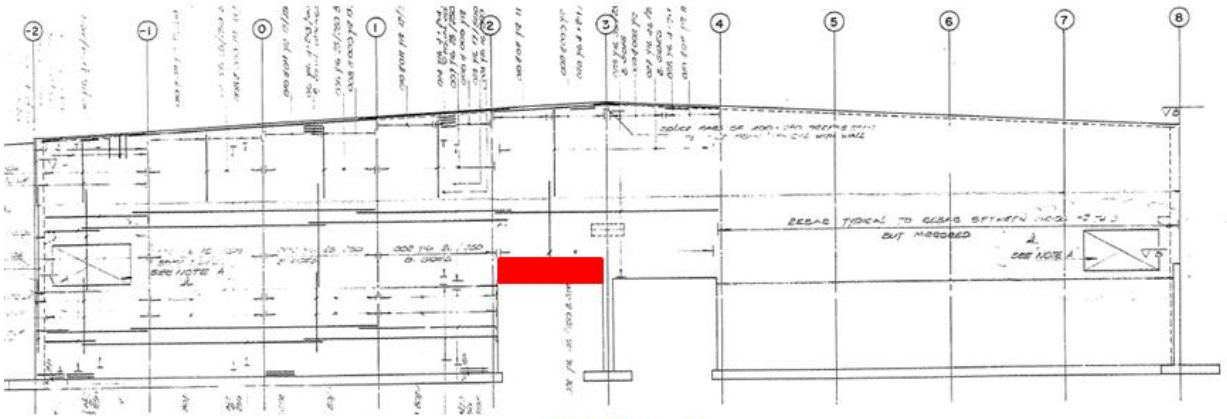
When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

APPENDIX B: Elevation view of the LLW building and affected areas



GRIDLINE EI



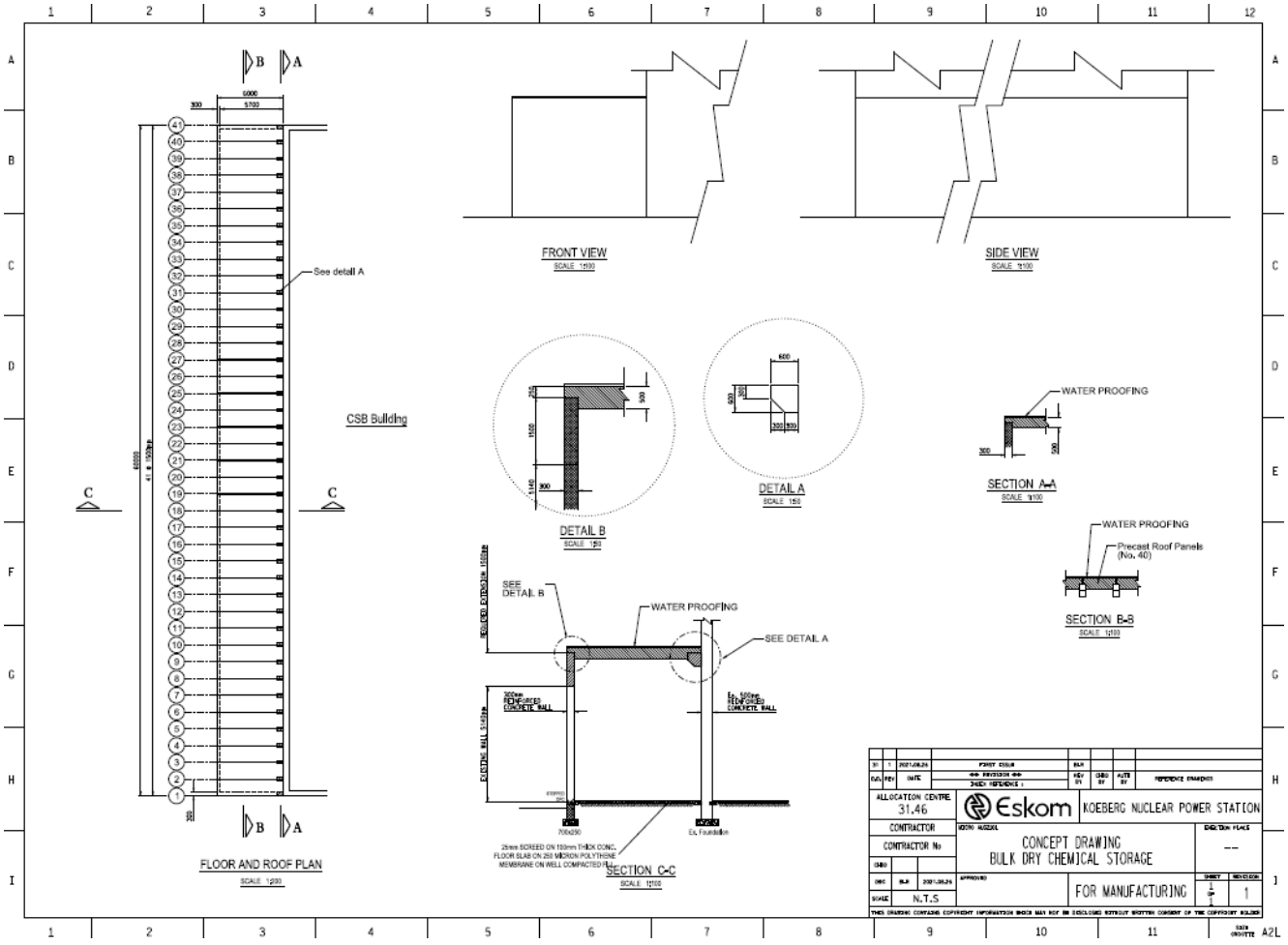
GRIDLINE DI

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

APPENDIX C: Bulk dry chemical storage

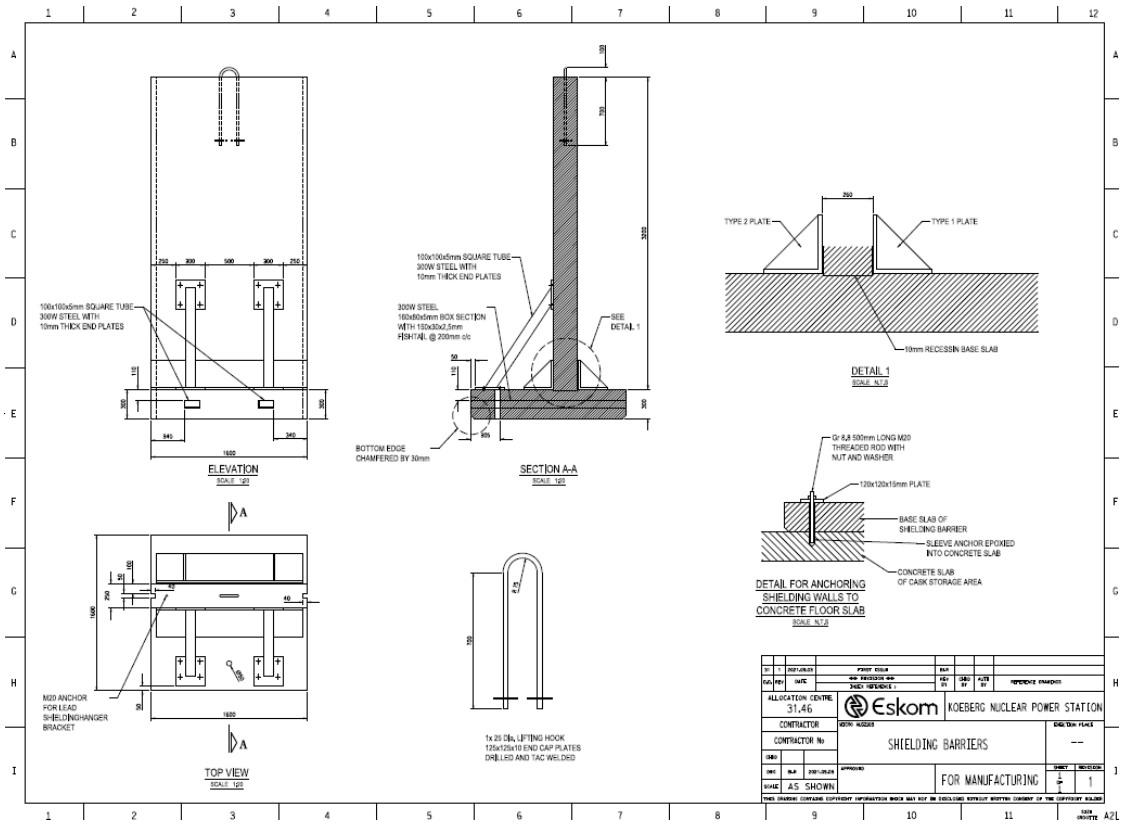


CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30

APPENDIX D: Shielding Barriers



CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Ltd, Reg. No 2002/015527/30