Eskom	USER REQUIREMENTS SPECIFICATION	Steam Generator Replacement Project

Title: **USER REQUIREMENTS SPECIFICATION FOR COMPLETION OF THE REMAINDER OF SGR FACILITIES**

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Compiled by	Functional Responsibility	Authorized by
Y Peyi	**M Bassie**	pp **J Gumede**
Project Manager	**SGR Facilities Programme**	**Senior Manager (SGR Project)**
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Content

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1. Introduction

Koeberg Nuclear Power Station (KNPS) will be replacing the Unit 1 and Unit 2 Steam Generators (SGs). The Steam Generator Replacement (SGR) Project is the largest project to be undertaken since initial power plant construction. For ease of management of this mega-project, the project itself is divided into three Lots. Lot 2 pertains to the SG installation, and in order to support the SG installation, a number of facilities and infrastructure need to be developed and constructed.

This user requirement specification defines the SGR infrastructure remainder of scope.

2. Supporting Clauses

2.1 Scope

This User Requirements Specification (URS) is limited to the requirement for the SGR infrastructure remainder of scope. **Attachment 1** shows the layout of this scope.

2.1.1 Purpose

This URS aims to clarify the Eskom technical requirements for the various areas, to enable ease of operations during the SGR installation, as well as the completion of certain works which need to be completed to support the SGR installation project. The strategy for this work is to place a contract with a *Contractor* to procure, construct/install, test and commission these various scope activities in time for their use.

2.1.2 Applicability

This document shall apply to the NPM SGR project, the commercial process and eventually in the inclusion of the contract.

2.1.3 Effective date

This document will be effective as of the date of approval.

2.2 References

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs. These documents are available from Eskom Technical Documentation and Records Management Department (TD&RM) or on request from the Project Manager for this project.

2.2.1 Normative

[1] ESK AM AAA 1: Corporate Identity Manual

[2] ISO 9001 Quality Management Systems.

[3] Act 85 of 1993 Occupational Health and Safety Act (OHS Act).

[4] KSA-097 Fire Prevention Standard for Stores and Storage Practise.

[5] SANS 10160: Basis of structural design and actions for buildings and industrial structures

[6] 331-170: Requirements for Protective Coating for Use At KNPS

[7] SANS 1186-1: Symbolic safety signs Part 1: Standard signs and general requirements.

[8] SANS 1186-5: Symbolic safety signs Part 5: Photoluminescent signs.

[9] ISO 16069:2004(en): Graphical symbols — Safety signs — Safety way guidance systems (SWGS)

2.2.2 **Informative**

[10] MANDIR 009: Personal Protective Equipment Code for the Koeberg Operating Unit.

[11] KAA 502: Project Management Process for New Facilities and Changes to Existing Facilities at Koeberg Nuclear Power Station

[12] SANS 10142-1: The Wiring of Premises – Low Voltage

2.3 Definitions

2.3.1 **Controlled disclosure** - Controlled disclosure to external parties (either enforced by law, or discretionary).

2.3.2 **Confidential** - The classification given to information that may be used by malicious/opposing/hostile elements to harm the objectives and functions of Eskom Holdings Limited.

2.3.3 **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.

2.3.4 **Designer** - Professionally registered personnel in terms of the Engineering Professions Act no.46 of 2000 appointed by the *Contractor* to perform the design activities required by this URS.

2.3.5 **Employer**: Eskom Holdings SOC Ltd

2.3.6 **Hard Standing** – A hard, well drained, level and prepared stable surface for cylinder storage such as concrete, interlocking blocks, bricks or a steel plate, excluding combustible material.

2.3.7 **Installer** - The *Contractor* appointed to perform the procurement, manufacturing, installation, commissioning, dismantling and removal of the activities as stipulated in this document, but also in the design compiled by the Designer.

2.3.8 **Quality Assurance** - The process of evaluating overall project performance on a regular basis to provide confidence that the project will satisfy the relevant quality standards.

2.3.9 **Specification** - The document/s forming part of the contract in which the methods of executing the various items of work to be done is described, as well as the nature and quality of the materials to be supplied and it includes technical schedules and drawings attached thereto as well as all samples and patterns.

2.4 Abbreviations

Abbreviation	Description
DCRF	Document Control Review Facility
DDR	Document/Drawing change Request
DDT	DDR and Document Tracking System
KNPS	Koeberg Nuclear Power Station

Abbreviation	Description
KOU	Koeberg Operating Unit
PPE	Personal Protection Equipment
RO	Reverse Osmosis
RSGSF	Replacement Steam Generator Storage Facility
SANS	South African National Accreditation System
SGR	Steam Generator Replacement
SI	International System of Units
TD&RM	Technical Documentation and Records Management
URS	User Requirement Specification

2.5 Roles and Responsibilities

Not applicable.

2.6 Process for Monitoring

Not applicable.

2.7 Related/Supporting Documents

Not applicable.

3. REQUIREMENTS FOR THE COMPLETION OF THE REMAINDER OF SGR INFRASTRUCTURE

3.1 RSGSF Completion Requirements

3.1.1 The *Contractor* shall install pedestrian walkway along the eastern boundary (behind the newly constructed edging) connecting the eKhaya building and the existing walkway located on the south-eastern corner of existing storm-water pond, refer to drawing **SC105 rev Z**. The *Contractor* shall use existing paver brick and allow for any additional pavers required to complete the works.

3.1.2 The total area of approximately 610m^2 in front of the RSGSF and Tools Storage building (between the Eastern wall and the road) shall be paved by the *Contractor*, using 80mm natural grey 40 MPa concrete interlocking pavers in herringbone Pattern to allow for the RSG's and equipment to enter the building, these areas are denoted as 1 and 2 respectively. The entrance into the building in front of the large doors has already constructed. Refer to **drawing SC105 rev Z**, for the paving detail.

3.1.4 *Contractor* shall conduct landscaping around the completed works to accommodate storm-water surface run-off and conduct rehabilitation as per drawing **SC105 rev Z.**

3.2 DECON Completion Requirements

3.2.1 The *Contractor* shall construct 2m x 1.2m x 0.2m (thick) concrete (class 20/19) landing with reinforcement mesh (ref 617) in front of the fire escape door at the Decontamination workshop. Refer to **attachment 2.**

3.2.2 The *Contractor* shall supply and install 4m long x 1m high mentis handrail (to be painted as per eskom cooperate colours). Refer to **attachment 2**.

3.2.3 The *Contractor* shall supply and install flashing 4m x 300mm x 0.8mm. The flashing shall be cut and bent to close openings on the Decontamination workshop.

3.3 RO building Refurbishment Requirements

3.3.1 The *Contractor* shall remove all the existing asbestos roof sheeting and side cladding (Approximately 850m^2 of roof and side cladding will need to be removed).

3.3.2 Remove the 2 structural steel columns indicated as C1&C2 [152×152×23 H]. Refer to **figure 1**: Plan View of the RO building. An additional internal column (one in number) is also to be removed from the building, this column is not indicated on the drawings but it does exist onsite.

3.3.3 Approximately 3 front girts closing the front part of the building will need to be cut out to make way for the roller shutter door frame. The cutting out shall terminate at the area where the roller shutter door frame is to be installed

3.3.4 The *Contractor* shall install the structural steel frame to support the automated galvanized roller door (3m x 2.5m). The frame structure supporting the roller door shall be constructed of same size columns as the existing inner columns (152×152×23 H section) and overhead 150×50×20mm×2.5mm CFLC channel section. The Frame structure shall be doweled to the existing concrete slab.

3.3.5 Install front girts to either side of the roller door frame in order to support side cladding. The side girts shall be of similar size and spacing as the existing side girts.

3.3.6 The *Contractor* shall clad the entire RO Building by 2 hour rated double cladding by making use of Zinc Aluminum IBR 686 Sheeting specification.

3.3.7 The *Contractor* shall install an automated galvanized roller door (3m x 2.5m).

3.3.8 The *Contractor* shall clean and close out existing floor trenches and openings inside the building with concrete (class 35/19). The estimated quantities are $12m^3$ of concrete.

3.3.9 The *Contractor* shall level the $6m^3$ concrete slab inside the building by cutting out protruding concrete surface areas (plinths), concrete finishing shall be same as existing.

3.3.10 The *Contractor* shall construct a paving ramp to the building in accordance with detail provided on **figure 2**: SGR Access Ramp layers works with estimated quantities.

3.3.11 The *Contractor* must be accredited to work with asbestos.

3.4 CAR PARK Completion Requirements

3.4.1 The *Contractor* shall supply 4 Fibres cable, MM-50/125-OM2 6 elements 1LT(PBT) 2.2mm, GRP, DRY WB, PE, SWA, PE, (steel wire armoured) black and access joint box to repair an installed broken cable. The cable length is approximately 50meters.

4. QUALITY REQUIREMENTS

4.1 Classification

The services shall be in accordance with the following classification 0001/96Q rev0. The required services in this URS are classified as a quality level Q3.

All designs and design alterations shall be signed off by a Professional ECSA registered engineer.

4.2 Specification Process Control

4.2.1 All material shall conform in respect to quality, manufacturing, testing, and performance with the requirements of SANS.

4.2.2 Materials manufactured in South Africa shall as far as possible be used, and where applicable shall bear the SANS mark. Imported materials shall comply with the requirements of the appropriate B.S. or I.E.C. specification and all relevant standards as listed in the specification.

4.3 QA Programme

4.3.1 The Employer or his appointed quality assurance representative reserves the right of access to *contractor*'s records for the purpose of inspections or audits. The contact details of the quality assurance representative are obtainable from the Project Manager.

4.3.2 Q3 requirements are as follows and shall include as applicable:

i. Examination and Inspection Control.
ii. Final Testing (Verification of Conformance to Requirements).
iii. Documentation.
iv. Final Inspection and Test Reports/Results.
v. Certificate of Conformance (C.O.C).
vi. Material Certificates, Shelf Life and Cure Dates.
vii. Meetings between the *contractor* and the client (KNPS) regarding the progress of the works will be held once a week.

4.3.3 Supporting documentation shall be supplied, before installation that demonstrates the *contractor* and sub-contractors competence, including experience, in the manufacture and installation of the equipment covered in this specification.

4.3.4 The systems and components of this specification shall be certified (e.g. Certificates of Conformance), and performance requirements met and documented, prior to handover.

5. GENERAL REQUIREMENTS

5.1 Safety, Health and Environmental Requirements

5.1.1 The *Contractor* shall at all times adhere to the site safety requirements and all national legislation including the OHSAct.

5.1.2 Eskom's lifesaving rules shall be incorporated into the construction of the works. The Eskom lifesaving rules are available from the Employer.

5.1.3 The *Contractor* shall conduct safety risk assessment for all the proposed activities on site and document all mitigation measures that will be implemented.

5.1.4 The facilities shall have photoluminescent exit and safety signage in accordance with SANS 1186 Part 1 [14] and Part 5 [15].

5.1.5 Emergency exit routes and demarcations shall be in accordance with SANS 10400-T: the application of the National Building Regulations Part T: Fire Protection. Demarcation of exit routes shall be by means of floor markings using durable photoluminescent paint.

5.1.6 All constructed facilities shall have Fire protection provided in accordance with SANS 10400-T: the application of the National Building Regulations Part T: Fire Protection.

5.1.7 The *Contractor* is to appoint all relevant safety personnel as required in the Construction Regulations.

5.1.8 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.

5.1.9 All personnel working on site are expected to have the correct Personnel Protective equipment (PPE).

5.1.10 All rubble produced on site shall be disposed of following completion of the works.

5.1.11 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 as required.

5.1.12 All chemicals used on site shall be accompanied with the necessary Material Safety Data Sheets.

5.1.13 All scaffolding on site shall be erected in accordance to KSM31 procedure and shall be the responsibility of the *Contractor*. Only scaffolding erected and inspected by qualified (competent) personnel to be used on site.

5.2 Risk Management Requirements

5.2.1 As part of risk management the *Contractor* is welcome to visit site to verify all information supplied in documents prior to tender.

5.2.2 The *Contractor* is expected to utilise experienced personnel in executing the scope. 5.2.3.

5.3 Statutory/Legal Requirements

5.3.1 All personnel on site shall be subjected to police clearance which might take time to be approved. It is expected that the *Contractor* ensure that personnel used for the works have the necessary police clearance to fast track this process.

5.3.2 All personnel shall be subjected to a site access training (or fitness for duty training) followed by a written exam in English. The *Contractor* is advised to use appropriately trained personnel taking account of these requirements.

5.4 Site and Logistics Requirements

5.4.1 The KNPS is a nuclear site and as such has certain specific access requirements. The *Contractor* is expected to familiarise himself with the necessary.

5.4.2 All vehicles accessing site will be subjected to security inspection which take some time to complete. The *Contractor* needs to factor this in their work schedule.

5.4.3 All vehicles entering the KNPS site shall have all the necessary safety features (e.g. safety belts, etc.).

5.5 Documentation Requirements

5.5.1 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. These requirements also apply to manufacturing drawings the Employer elects to review during the fabrication process. The drawings, data and technical documents shall be submitted in accordance with requirements stated in this specification.

5.5.2 All detailed design drawings, assembly- drawings and as-built drawings shall be supplied in accordance with 331-86.

5.5.3 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 copy of reproducible quality suitable for microfilming.

5.5.4 Electronic media shall be in a format fully compatible with the following software (latest version in use by Employer at the time of delivery):

Processing:	Microsoft Word
Database:	Microsoft Access
Spreadsheets:	Microsoft Excel
3D drawings:	Electronic files compatible with Microstation
Digital photographs:	JPEG format

5.5.5 Electronic copies of documents for review and approval shall be provided in searchable pdf format on a compact laser disc (CD) apart from and in addition to the hard copies.

5.5.6 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.

6. ACCEPTANCE

This document has been seen and accepted by:

7. REVISIONS

Date	Rev.	Compiler	Remarks
June 2021	0	Y Peyi	Original Issue

8. DEVELOPMENT TEAM

The following people were involved in the development of this document:

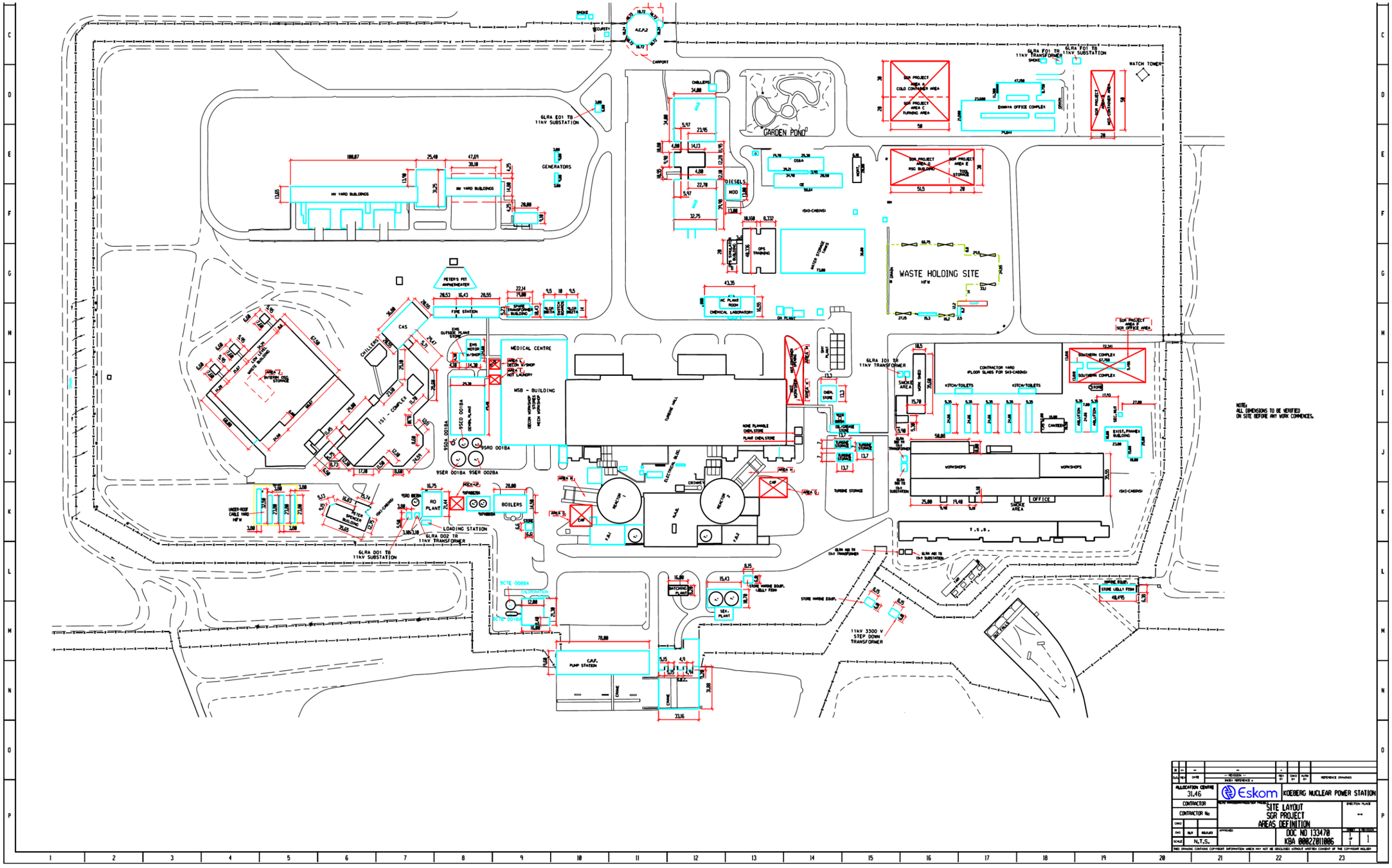
- Mawethu Pemba
- Xolile Ludidi

- Khuselo Dudeni

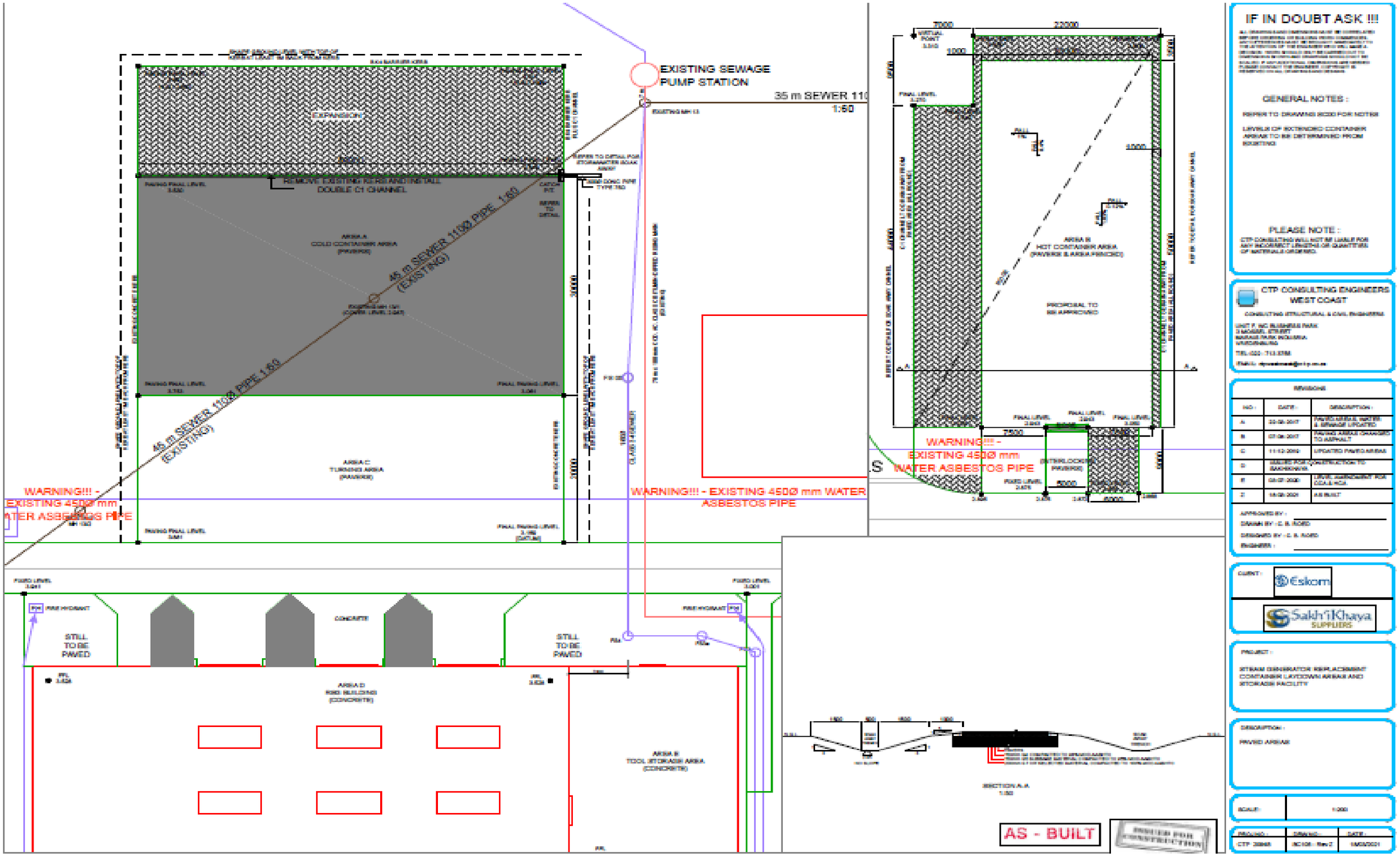
9. ACKNOWLEDGEMENTS

Not applicable

ATTACHMENT 1: KOEBERG SITE LAYOUT



DRAWING: SC105 rev Z



ATTACHMENT 2

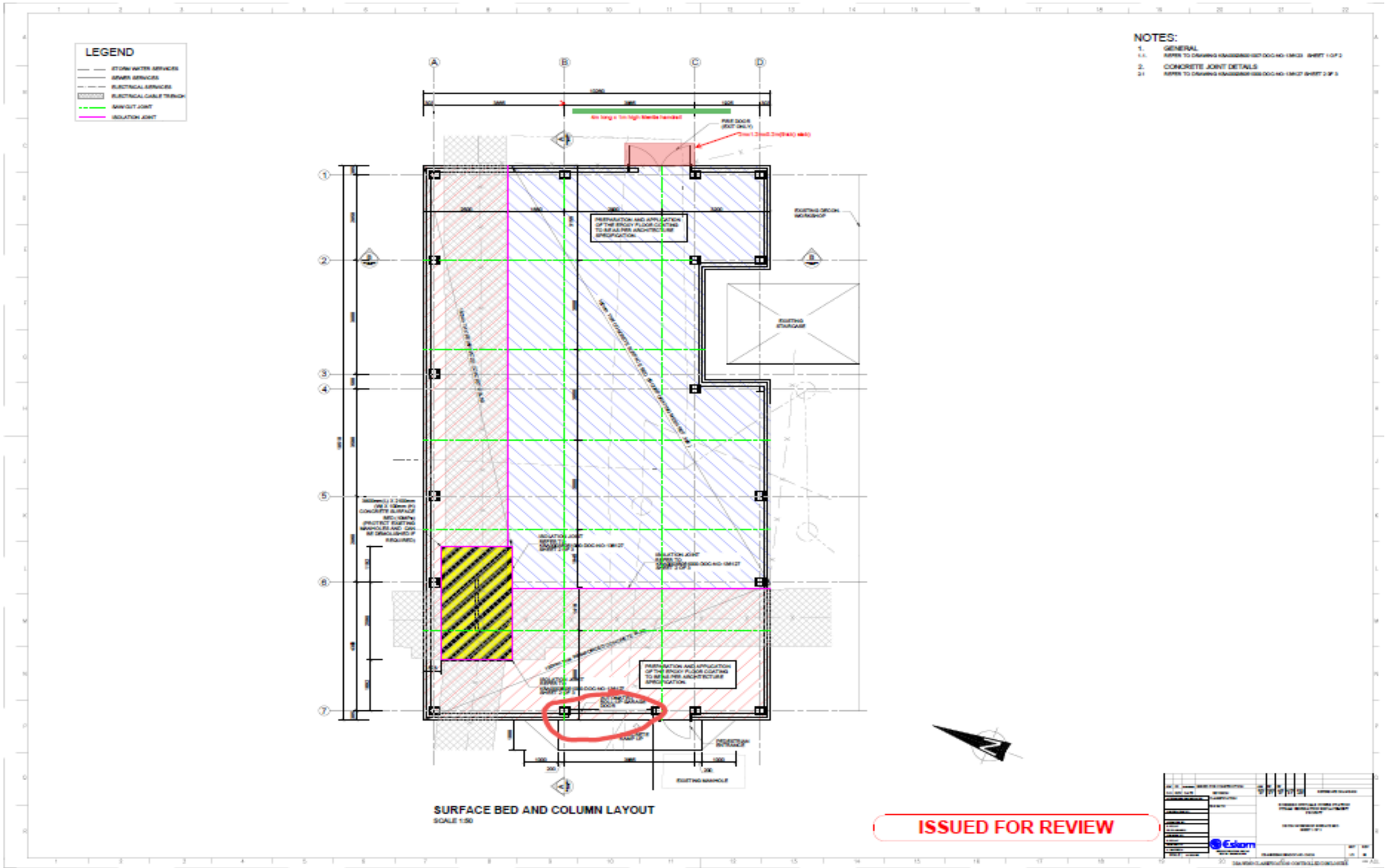


Figure 1: Plan View of the RO Plant

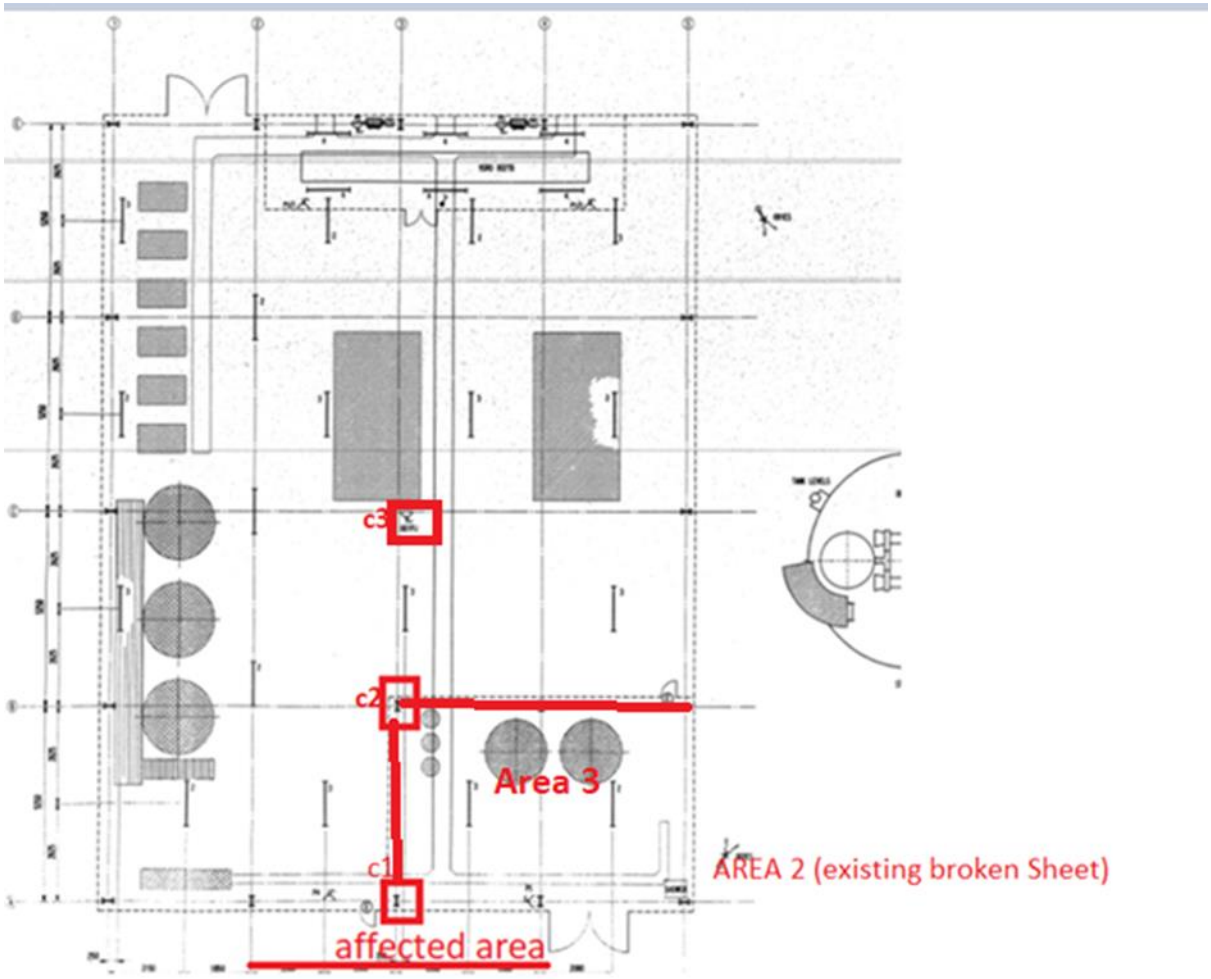
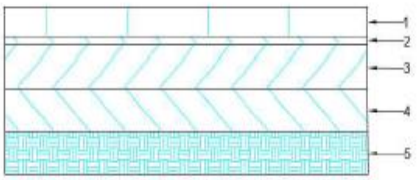


Figure 2: SGR Access Ramp layers works



PAVING BLOCKS LAYERWORKS
SCALE 1:10

PAVING RAMP LAYERWORKS		
LAYER NUMBER	LAYER THICKNESS(mm)	MATERIAL AND COMPACTION REQUIREMENT
1	80	80mm TYPE 1-A CONCRETE PAVING BLOCKS, CLASS 35
2	20mm	BEDDING SAND
3	150mm	C4 CEMENT STABILISED SUBBASE COMPACTED TO 97% MOD AASHTO
4	150mm	G5 GRANULAR MATERIAL COMPACTED TO 97% MOD AASHTO
5	150mm	INSITU MATERIAL COMPACTED TO 90% MOD AASHTO

Estimated ramp quantities

RO Plant ramp		
80mm paving block	64	m^2
Bedding sand	5.12	m^3
C4 cement stabilized subbase compacted to 97% MOD AASHTO	9.6	m^3
G5 Granular material compacted to 97% MOD AASHTO	9.6	m^3
Rip and recompact INSITU material to 90 % c MOD AASHTO	9.6	m^3
Total excavation	27.1	m^3