

	Report	Technology
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Conditional Assessment**

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D00221-2**

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CONTENTS

	Page
1. INTRODUCTION	3
1.1 LOCALITY	3
2. SUPPORTING CLAUSES.....	3
2.1 SCOPE	3
2.1.1 Purpose	3
2.1.2 Applicability.....	4
2.2 NORMATIVE/INFORMATIVE REFERENCES.....	4
2.2.1 Normative	4
2.2.2 Informative.....	4
2.3 DEFINITIONS.....	4
2.3.1 Disclosure Classification	5
2.4 ABBREVIATIONS.....	5
2.5 ROLES AND RESPONSIBILITIES.....	5
2.6 PROCESS FOR MONITORING.....	6
2.7 RELATED/SUPPORTING DOCUMENTS.....	6
3. CONDITIONAL ANALYSIS	7
3.1 CIVIL/STRUCTURAL AND BUILDING CONDITIONAL ASSESSMENT	7
4. COMPLIANCE REVIEW	17
4.1 ROOFING REQUIREMENTS.....	17
5. CONCLUSIONS AND RECOMMENDATIONS.....	18
5.1 CIVIL/STRUCTURAL AND BUILDING WORKS.....	18
5.1.1 Block E:	18
5.1.2 Block C East.....	18
5.1.3 Block B	19
5.1.4 Doors	19
5.1.5 Existing Skylights – Block E.....	19
6. AUTHORISATION.....	20
7. REVISIONS	20
8. DEVELOPMENT TEAM	20
9. ACKNOWLEDGEMENTS	20

TABLES

Table 1: Applicable Eskom Standards.....	6
Table 2: Building Works.....	7
Table 3: Roof Materials Compliance	17

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1. INTRODUCTION

This document describes the findings and recommendations which relates to the investigation of the ERIC (Eskom Research and Innovation Centre) roof structures.

Eskom who is represented by Eskom Real Estate (ERE) has conducted the site infrastructure conditional assessment specifically for the ERIC roof structures.

Eskom Real Estate has identified and prioritised various facilities and its site infrastructure that need to be refurbished and maintained in order to ensure that they comply with the original intended design and latest statutory requirements. The ERIC facility is one of the facilities that have been identified and prioritised.

An inspection of the site infrastructure was undertaken by Eskom Real Estate team on 1 September 2021

1.1 LOCALITY

The campus comprises warehouse zones and multiple blocks with interlinking walkways. The blocks have flat concrete slab accessible roofs with water proofing. The ERIC Facility is located in Rosherville, Johannesburg South, as detailed by the figure below.



2. SUPPORTING CLAUSES

2.1 SCOPE

The project scope of work focuses on the repair/replacement of the existing roofing materials and water proofing activities required. Eskom Research and Innovation Centre Facility roof project is limited to following site infrastructure:

- a) Civil/Structural
- b) Maintenance
- c) Drainage and waterproofing

2.1.1 Purpose

The main purpose of this report is to provide a summary of site inspections carried out to determine the general conditions of the existing site infrastructure with specific focus on the roofing and drainage. The report will provide input in establishing the extent of the work that will be required to get the site

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infrastructure to conform to Eskom requirements and the latest industry standards including statutory requirements in general.

2.1.2 Applicability

This document shall apply to the Eskom Research and Innovation Centre.

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] URS: ERIC Roof Water Proofing
- [2] 240-53113685: Design Review Procedure

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

2.2.2 Informative

- [3] ISO 9001 Quality Management Systems.

2.3 DEFINITIONS

Definition	Description
Acceptance	The Client accepts the conditional assessment report or design but does not take responsibility from the appointed Consultant/Contractor.
Architect Engineer	Architect Engineer - When Eskom acts as the Architect Engineer on a project/package/plant/system/asset, the reviewer(s) shall review the design documentation issued by the Design Authority to ensure that: the design satisfies the stakeholder requirements (i.e. validation of design deliverables against stakeholder requirements); the design is integrated by identifying all interfaces with other packages/plant systems/assets and ensuring that these interfaces are catered for; foreseen technical risks are identified and addressed/challenged with the Design Authority; general technical oversight is provided over the design.
Approval	Written agreement or authorization by Employer. All requests for approval must be submitted in writing and any proposed deviation from specified requirements must be fully justified and agreed by Employer.
Client	The end user will be Eskom who will be represented by Eskom Real Estate (ERE) throughout the duration of the Project.
Contractor	Refers to the corporation appointed to perform engineering, plant and material selection, shop/construction drawings, procurement, and construction works.
Consultant	Refers to the corporation appointed to perform the site investigation/conditional assessment, concept and detail design, develop technical specification, tender documentation and provide construction supervision during execution phase of the project; to enable Eskom to source the services of a Contractor that is to execute the construction of project.
Design Authority	Design Authority - When Eskom acts as the Design Authority on a project/package/plant/system/asset, the reviewer(s) shall review the design documentation to ensure that: the design satisfies the design requirements; all relevant COE design standards, procedures and guidelines have been adhered to; the design is suitable and correct (calculations, philosophy,

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Definition	Description
	functionality, etc.); best COE practices were applied; the design is integrated by identifying all interfaces with other packages/plant systems/assets and ensuring that these interfaces are catered for.
Employer	Refers to Eskom Holdings State Owned Company
Owners Engineer	Owners Engineer - When Eskom acts as the Owners Engineer on a project/package/plant/system/asset, the reviewer(s) shall review the design documentation issued by the Design Authority to ensure that; the design satisfies the stakeholder requirements (i.e. validation of design deliverables against stakeholder requirements). General technical oversight is provided over the design.
Plant Equipment	An item performing a particular purpose as part of a system (Site Infrastructure).
Site Infrastructure	Refers to Civil/Structural and Building Works, Heating Ventilation and Air Conditioning (HVAC), Wet Services, Diesel Storage and its Distribution, Lifts and Escalators, Fire Protection and Detection System, Building Management System (BMS), and Electrical System required to support Eskom Real Estate Facilities.

2.3.1 Disclosure Classification

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

2.4 ABBREVIATIONS

Abbreviation	Description
ERE	Eskom Real Estate
ERIC	Eskom Research and Innovation Centre

2.5 ROLES AND RESPONSIBILITIES

Role	Responsibility
Compiler	The document compiler is responsible for ensuring that this document is up-to-date and that this document is not a duplication of an existing documentation, regarding the document's objectives and content
Functional Responsibility	The Functional Responsible Person shall determine if the document is fit for purpose, before the document is submitted for authorisation
Authoriser	The document authoriser is a duly delegated person with the responsibility to review the document for alignment to business strategy, policy, objectives and requirements. He/she shall authorise the release and application of the document
Lead Discipline Engineers and Stakeholders	Provide input and reviews to the document and associated engineering activities
Configuration Management Lead	Is accountable for ensuring that the engineering documentation, engineering systems and databases are correctly configured. As part of this role, the Configuration Practitioner is responsible for the development of the configuration management plan; configuration and management of the PBS and the management of plant item Tags.

ERE Asset Management will act as the Architect/Owners Engineer throughout the life cycle of this project. The Eskom Engineering team consists of Civil and Configuration Management:

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- a) Configuration Management: Responsible for engineering processes and configuration management.
- b) Civil Engineering: Responsible for Civil & structural requirements/designs.

The Consultant/Contractor will act as Design Authority throughout the life cycle of this project and is accountable for the design (where required) and construction supervision of the project.

ERE Engineering is accountable for the content in this visual inspection report, It must be noted that visual inspections will not substitute for detailed Structural analyses.

2.6 PROCESS FOR MONITORING

The primary process for monitoring will be governed by the Design Review Procedure (240-53113685), this entails assuring that the design achieves the requirements set out in this document. Any changes to this document will be performed as per Project Engineering Change Management Procedure (240-53114026).

Records will be stored on Hyper-wave and share-point will be used for collaboration throughout the project execution.

2.7 RELATED/SUPPORTING DOCUMENTS

The visual assessment was carried out through a walk-about by a team of competent professional/candidate Engineers and Technologist to establish the condition of the site infrastructure in accordance with the following standards, however not limited to:

Table 1: Applicable Eskom Standards

Number	Title
240-56364545	Structural Design and Engineering Standard
240-85549846	Standard for Design of Drainage and Sewerage Infrastructure
240-53114186	Document and Record Management Procedure
240-99527377	Inspection Manual For Civil Works at Eskom's Power Stations

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3. CONDITIONAL ANALYSIS

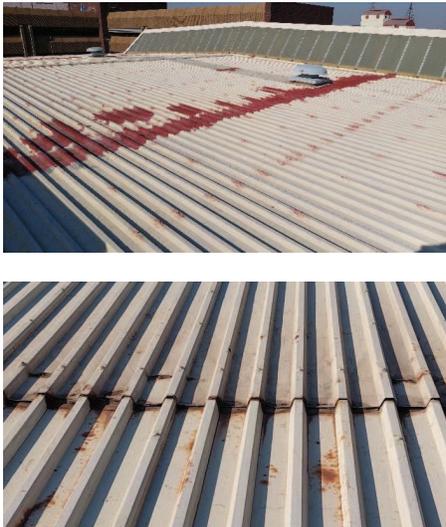
The site was surveyed, and an engineering evaluation was formulated in accordance with the applicable standards, codes and statutory requirements of the respective systems. The following ratings were assigned against each area to indicate whether the system is suitable for continued use or not, based on the current condition of the specific system:

- a) **Acceptable:** Suitable for continued use and there are no risks involved.
- b) **Partial suitable for continued use:** Can be refurbished and suitable for continued use, but there are risks involved.
- c) **Unsatisfactory:** Not suitable for continued use as the risks can no longer be tolerated.

3.1 CIVIL/STRUCTURAL AND BUILDING CONDITIONAL ASSESSMENT

The roofs of Blocks B, C, D and E were inspected including Links G, H, J, K.

Table 2: Building Works

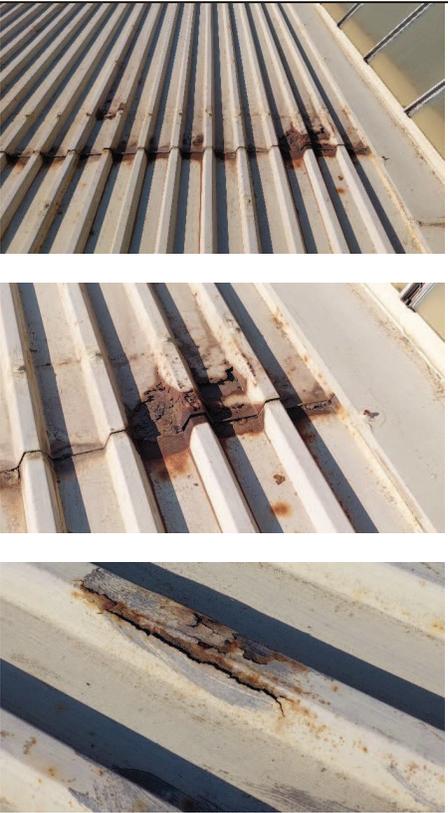
Location Reference	Picture	Comment
Block E – IBR Roof		<p>Classification: Unsatisfactory</p> <ul style="list-style-type: none"> • Previous repairs have been done to the IBR sheeting roof. • These repairs are at certain spots and are effective for a short period. • Points along the red marked areas are where leaks are present. • IBR sheeting has deteriorated and corroded in many areas. • The full IBR sheeting needs replacement • The East side of Block E roof has recently replaced IBR sheeting which is white in colour. This does not need replacement.

ERIC Roofs Conditional Assessment Report

Unique Identifier: **363-ERE-AABZ4-D00221-2**

Revision: **1**

Page: **8 of 20**

Location Reference	Picture	Comment
		

ERIC Roofs Conditional Assessment Report

Unique Identifier: **363-ERE-AABZ4-D00221-2**

Revision: **1**

Page: **9 of 20**

Location Reference	Picture	Comment
		

Location Reference	Picture	Comment
		
<p>Block E Skylights</p>		<p>Classification: Acceptable (this clarification is based on what could be seen from below the roof, further inspection recommended from above)</p> <ul style="list-style-type: none"> • From the various visual inspections conducted for the skylights it was found that the skylights are still in relatively good condition. • The skylight seals are to be redone as these will end up being removed during the roof refurbishment. • As part of the roof refurbishment, it is recommended that the skylights be cleaned and inspected thoroughly as a detailed inspection could not be done due to safety issues around accessibility.

Location Reference	Picture	Comment
		
<p>Block D – Flat accessible slab with waterproofing</p>		<p>Classification: Acceptable</p> <ul style="list-style-type: none"> Block D waterproofing is in good condition. While there are patches and pooling present, there have been no reports of leaks.
<p>Block C East – Flat accessible slab with waterproofing</p>		<p>Classification: Unsatisfactory</p> <ul style="list-style-type: none"> Leaks are present due to deterioration. Patches have been done but there are still leaks especially toward the sides. Replacement of water proofing for Block C East roof is recommended.

ERIC Roofs Conditional Assessment Report

Unique Identifier: 363-ERE-AABZ4-D00221-2

Revision: 1

Page: 12 of 20

Location Reference	Picture	Comment
		
Block C West – Flat accessible slab with waterproofing	No Issues	Classification: Acceptable <ul style="list-style-type: none">Block C - West waterproofing is in good condition.

ERIC Roofs Conditional Assessment Report

Unique Identifier: **363-ERE-AABZ4-D00221-2**

Revision: **1**

Page: **13 of 20**

Location Reference	Picture	Comment
<p>Block B – Flat accessible slab with waterproofing</p>		<p>Classification: Acceptable</p> <ul style="list-style-type: none"> • Block B waterproofing is in good condition. • The West end of Block B has experienced a leak previously in heavy rainfall. It is suspected that this is at a point where some of the plant in that location is mounted. • Instead of a full waterproofing replacement, it is recommended that the West end be flooded and tested to identify the root cause of the leak and then repair that portion only. <hr/> <ul style="list-style-type: none"> • Damage to the access door on this block is noted. It is recommended that all the access doors be checked and repaired/replaced where required.

ERIC Roofs Conditional Assessment Report

Unique Identifier: **363-ERE-AABZ4-D00221-2**
Revision: **1**
Page: **14 of 20**

Location Reference	Picture	Comment
		

ERIC Roofs Conditional Assessment Report

Unique Identifier: 363-ERE-AABZ4-D00221-2

Revision: 1

Page: 15 of 20

Location Reference	Picture	Comment
		
Links G, H, J and K		<p>Classification: Acceptable</p> <ul style="list-style-type: none">• All links have waterproofing that is in good condition.• Previously water would collect on the links due to the drainage downpipe points getting clogged with leaves and debris, but this issue has since been resolved as trees have been cut to lower heights than the links

Location Reference	Picture	Comment
		

Location Reference	Picture	Comment
		

4. COMPLIANCE REVIEW

4.1 ROOFING REQUIREMENTS

Table 3: Roof Materials Compliance

Compliance Reference	Picture	Comment	Proposed Solution
<p>240-56364545 - Structural Design and Engineering Standard</p> <p>7.1.4.7.2 Roof and wall sheets</p>		<p>If the supply of roof and wall sheets is included in the order for the steel structure, the type required shall be stated. Only galvanized steel sheets or pre-coated sheeting shall be used. Coating shall provide maximum protection against the local climate and other environmental factors. The colour of coating shall be selected in consultation with the End User.</p> <p>All hot dip galvanizing of coated carbon steel sheets shall be in accordance with the specifications as set out in SANS 3575 [55] and SANS 4998 [56].</p>	<p>Replacement of all affected IBR sheeting identified at Block E in line to the specifications of the standard.</p>

5. CONCLUSIONS AND RECOMMENDATIONS

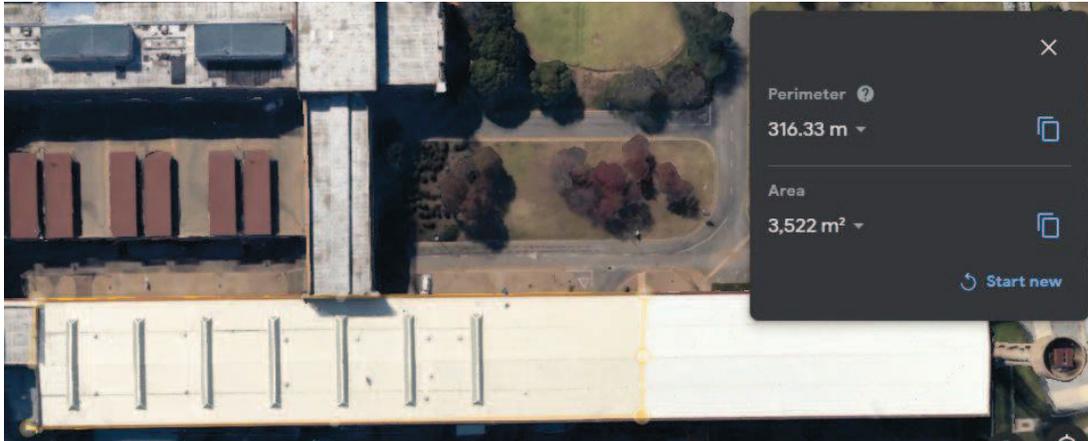
The following conclusions and recommendations are made based on what was surveyed and an engineering evaluation which is formulated in accordance with the applicable standards, codes and statutory requirements of the respective systems.

It is important to note that the recommendations provided in the report are speculative only as is based on conditional visual inspections, but adequate in developing scope of works for the initiation of projects.

5.1 CIVIL/STRUCTURAL AND BUILDING WORKS

5.1.1 Block E:

The full IBR sheeting needs replacement across the warehouse area except for the East side of Block E roof which was recently replaced with IBR sheeting that is white in colour. Approximate perimeter is 317m and the area is **3522 m²** for sheeting.

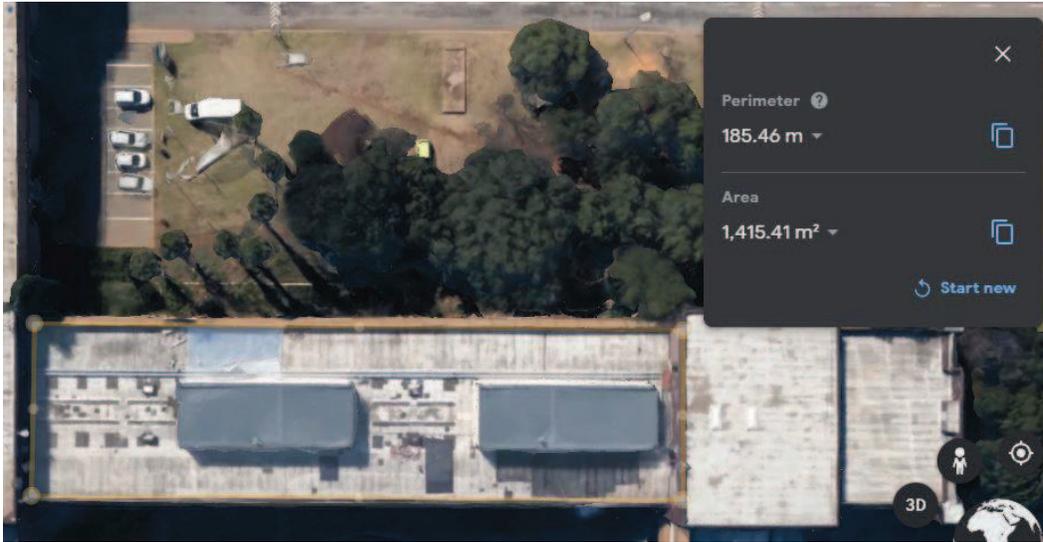


5.1.2 Block C East

Leaks are present due to deterioration. Patches have been done but there are still leaks especially toward the sides. Replacement of water proofing for Block C East roof is recommended. The total area is **1140 m²** of floor waterproofing excluding the two plant rooms below.

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5.1.3 Block B

Block B waterproofing is in good condition. The West end of Block B has experienced a leak previously in heavy rainfall. It is suspected that this is at a point where some of the plant in that location is mounted. Instead of a full waterproofing replacement, it is recommended that the West end be flooded and tested to identify the root cause of the leak and then repair that portion only.

5.1.4 Doors

All access doors are to be inspected for repair or replacement where required.

5.1.5 Existing Skylights – Block E

Additional inspections were conducted for the skylights due to the age of them and if there was a need to replace them.

Based on the numerous visual inspections conducted, it was observed that the skylights are in good working condition, however, a detailed inspection could not be conducted due to safety concerns regarding accessibility.

It is recommended that the successful Contractor, perform a detailed inspection of all the skylights as well as a structural integrity assessment for the roof support structure at Block E. The outcome of that assessment will justify/motivate for the replacement of the skylights.

With the roof sheeting replacement project soon to be underway it is recommended that the skylight seals be redone as this will get damaged during the sheeting replacement. As part of the roof refurbishment it is recommended that the skylights be cleaned.

The safe accessibility to the roof of Block E must also be addressed in the project scope for execution of future maintenance and cleaning of the skylights.

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